STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION

BEDFORD
X-A000(143), 13953

THIS PROJECT CONSISTS OF THE WIDENING AND RECONSTRUCTION OF NH 101 TO IMPROVE THE CONVEYANCE OF TRAFFIC AND ADDRESS SAFETY AND CAPACITY DEFICIENCIES OF THE CORRIDOR

NOTE: PLANS AND SPECIFICATIONS ON THIS PROJECT CANNOT BE TRANSFERRED TO ANY OTHER FIRM OR ORGANIZATION FOR THE PURPOSE OF SUBMITTING A BID AS A GENERAL CONTRACTOR WITHOUT THE KNOWLEDGE AND AUTHORITY OF THE DEPARTMENT.

NON-TRANSFERABLE:_____

Sample Proposal
NOT FOR BIDDING PURPOSES

GRAND TOTAL $_____

4/25/17

10/26/09

Supersedes 4/26/00; 12/23/02, 06/30/04

BEDFORD
13953

March 15, 2017

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STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

JOHN O. MORTON BUILDING
CONTRACT SECTION

7 HAZEN DRIVE
POST OFFICE BOX 483
CONCORD, NH 03302

INVITATION FOR BIDS

Proposals are to be submitted electronically via **https://icx.exevision.com/nhdot/icx/Index.aspx** by 2:00 o'clock PM, Eastern Time, on **THURSDAY, MAY 18, 2017** for the following project:

BEDFORD
X-A000(143), 13953
THIS PROJECT CONSISTS OF THE WIDENING AND RECONSTRUCTION OF NH 101 TO IMPROVE THE CONVEYANCE OF TRAFFIC AND ADDRESS SAFETY AND CAPACITY DEFICIENCIES OF THE CORRIDOR

CERTIFIED CHECK/BID BOND: 5% OF THE BID AMOUNT

A schedule of the minimum wages for all labor classifications as determined by the Secretary of Labor pursuant to Section 115 of the Federal Aid Highway Act of 1956 is included in the proposal. Unskilled labor may be hired from lists prepared by the NH Dept. of Employment Security designated in the proposal.

BIDDERS SHOULD ACT PROMPTLY AND SUBMIT ALL QUESTIONS PERTAINING TO THE PROJECT IN WRITING TO VICTORIA CHASE AT Victoria.Chase@dot.nh.gov AT LEAST FIVE (5) BUSINESS DAYS BEFORE THE HOUR AND DATE SET FOR THE BID OPENING. NO PHONE CALLS OR FAXES WILL BE ACCEPTED.

Plans and specifications **(NOT FOR BIDDING PURPOSES)** may be seen at the at the Office of Const. Industries of MA, 1500 Providence Hwy., Suite 14, Norwood, MA; Assoc. General Contractors of NH, 48 Grandview Rd, Bow, NH; Construction Summary of NH, Inc., 734 Chestnut St., Manchester, NH; Works in Progress, 20 Farrell Street, Suite 103, So. Burlington, VT; Minuteman Press, 95 Brewery Lane, Portsmouth, NH; Signature Press & Blueprinting, Inc., 880 Candia Road Unit 7, Manchester, NH; and Infinite Imaging. 933 Islington Street, Portsmouth NH.

In order to be authorized to bid, the Department's Request for Proposal (RFP) form must be submitted to the Contract Office of the Department of Transportation. Once the RFP from has been approved, the Contractor is authorized to bid. At this time the password card will be issued allowing the Contractor access to the on-line bidding documents, including the Plans and Specifications. In addition, hard-copy Plans and Specifications can be obtained at the Contract Office of the Department of Transportation for THIRTY-FIVE DOLLARS ($35.00) (NON-REFUNDABLE). An additional FIVE DOLLARS ($5.00) will be charged for shipping fees (NON-REFUNDABLE). Checks should be made payable to "Treasurer, State of New Hampshire". Send check with Project Name and No. to the Dept. of Transportation, c/o Finance & Contracts, P.O. Box 483 Hazen Drive, Concord, NH 03302.

Proposals must be **submitted electronically via** https://icx.exevision.com/nhdot/icx/Index.aspx and received by the Department of Transportation as specified above no later than the date and time mentioned above, at which time they will be publicly opened and the results immediately posted on the Department's website. A certified check or bid bond shall be submitted electronically at the time of bid in the amount listed above, payable to, "Treasurer, State of New Hampshire," as security for the execution of the contract.

All individuals, firms, partnerships or corporations intending to bid, must file a statement showing their qualifications with the Dept. of Transportation on forms prepared for that purpose at least ten (**10**) days prior to opening of bids. No authorization to bid will be granted to a prospective bidder **not** prequalified.

Any information submitted as part of the Invitation to Bids may be subject to public disclosure under RSA 91-A. In addition, in accordance with RSA 9-F:1, any contract entered into as a result of the bid letting will be made accessible to the public online via the website Transparent NH (http://nh.gov/transparentnh/).

If contract price is $35,000 or more, the successful bidder will be required to furnish electronically, at the time of bid submittal, a contract bond in the amount of One hundred (100) percent of their bid.

All bidders will be required to execute a sworn statement pursuant to Section 112(c) of Title 23 USC, certifying that he or she has not either directly or indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with such contract. Civil Rights Act of 1964,78 Stat. 252, USC 2005d to 2005d-4 and Title 49, Code of Federal Regulations, Dept. of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the Dept. of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color or national origin in consideration for an award.

The right is reserved to waive any informalities in or to reject any or all proposals.

April 25, 2017
F

Peter E.Stamnas, P.E.
Director of Project Development

New Hampshire DOT
Department of Transportation

Information Report

BEDFORD
13953
X-A000(143)

County:	HILLSBOROUGH
Date Bids Open:	5/18/2017
Scope of Work:	Widen NH 101 to 5 lanes from NH 114 to Wallace Road
Location:	NH 101
Completion Date:	9/27/2019
Proposal Guarantee:	5% of bid amount

Item Number	Item Description	Unit	Estimated Quantity
BEDFORD 13953			
Roadway			
201.1	CLEARING AND GRUBBING (F)	A	5.08
201.21	REMOVING SMALL TREES	EA	50.00
201.22	REMOVING LARGE TREES	EA	3.00
201.881	INVASIVE SPECIES CONTROL TYPE I	SY	1,300.00
201.882	INVASIVE SPECIES CONTROL TYPE II	SY	5,600.00
202.201	DEMOLISHING BUILDINGS	U	1.00
202.202	DEMOLISHING BUILDINGS	U	1.00
202.203	DEMOLISHING BUILDINGS	U	1.00
202.301	BUILDING ASBESTOS ABATEMENT	U	1.00
202.303	BUILDING ASBESTOS ABATEMENT	U	1.00
202.31	FILL ABANDONED PIPE	CY	100.00
202.32	FILL AND ABANDON STRUCTURE	CY	10.00
202.41	REMOVAL OF EXISTING PIPE 0-24" DIAMETER	LF	2,100.00
202.42	REMOVAL OF EXISTING PIPE OVER 24" DIAMETER	LF	100.00
202.5	REMOVAL OF CATCH BASINS, DROP INLETS, AND MANHOLES	EA	17.00

202.7	REMOVAL OF GUARDRAIL	LF	2,300.00
203.1	COMMON EXCAVATION	CY	83,000.00
203.2	ROCK EXCAVATION	CY	6,000.00
203.35	HANDLING EXCAVATED, CONTAMINATED SOILS (DEPARTMENT DISPOSAL)	CY	350.00
203.4	MUCK EXCAVATION	CY	13,000.00
203.53	LOW PERMEABILITY FILL (F)	CY	302.00
203.5525	PORTABLE CHANGEABLE MESSAGE SIGN PLATFORM	U	3.00
203.55261	INSTALLATION AND REMOVAL OF SWZ - PORTABLE QUEUE TRAILER PLATFORM	U	3.00
203.55262	INSTALLATION AND REMOVAL OF SWZ - PORTABLE CHANGEABLE MESSAGE SIGN PLATFORM	U	3.00
203.55264	INSTALLATION AND REMOVAL OF SWZ - MOBILE VIDEO TRAILER PLATFORM	U	1.00
203.55543	GUARDRAIL EAGRT OFFSET PLATFORM, TL 3	U	1.00
203.55555	GUARDRAIL EAGRT OFFSET PLATFORM, TL 2 - 25'	U	11.00
203.6	EMBANKMENT-IN-PLACE (F)	CY	68,000.00
203.661	GRAVEL BACKFILL FOR MUCK AND UNSUITABLE MATERIAL EXCAVATION	CY	7,500.00
203.662	ROCK AND GRAVEL BACKFILL FOR MUCK AND UNSUITABLE MATERIAL EXCAVATION	CY	12,100.00
203.7	REHANDLING SURCHARGE MATERIAL	CY	20,000.00
203.93	HYDROGEOLOGIST	U	1.00
203.941	BASELINE GROUNDWATER SAMPLING EVENT	EA	500.00
203.942	EXTENDED GROUNDWATER SAMPLING EVENT	EA	60.00
203.943	STANDARD ANALYSIS GROUNDWATER SAMPLING EVENT	EA	14.00
206.1	COMMON STRUCTURE EXCAVATION	CY	1,900.00
206.19	COMMON STRUCTURE EXCAVATION EXPLORATORY	CY	400.00
206.2	ROCK STRUCTURE EXCAVATION	CY	500.00
207.1	COMMON CHANNEL EXCAVATION	CY	250.00
209.1	GRANULAR BACKFILL	CY	350.00
209.61	LIGHTWEIGHT AGGREGATE BACKFILL	CY	150.00
210.1	SETTLEMENT PLATFORMS	EA	8.00

210.2	SETTLEMENT PLATFORM MONITORING	HR	48.00
211.11	VIBRATION MONITORING SERVICES	HR	100.00
214.	FINE GRADING	U	1.00
304.1	SAND (F)	CY	12,300.00
304.32	CRUSHED GRAVEL FOR SHOULDER LEVELING	TON	260.00
304.35	CRUSHED GRAVEL FOR DRIVES	CY	1,300.00
304.4	CRUSHED STONE (FINE GRADATION) (F)	CY	19,200.00
304.41	CRUSHED STONE (FINE GRADATION) FOR SHIM	CY	1,680.00
304.499	TEMPORARY CRUSHED STONE (FINE GRADATION)	CY	800.00
304.5	CRUSHED STONE (COARSE GRADATION) (F)	CY	15,200.00
403.11	HOT BITUMINOUS PAVEMENT, MACHINE METHOD	TON	2,500.00
403.11002	HOT BITUMINOUS PAVEMENT, MACHINE METHOD (QC/QA TIER 2)	TON	21,300.00
403.11902	HBP - MACHINE METHOD, HIGH STRENGTH (QC/QA TIER 2)	TON	7,400.00
403.12	HOT BITUMINOUS PAVEMENT, HAND METHOD	TON	1,870.00
403.4	MATERIAL TRANSFER VEHICLE (MTV)	TON	28,600.00
403.6	PAVEMENT JOINT ADHESIVE	LF	139,000.00
403.99	TEMPORARY BITUMINOUS PAVEMENT	TON	2,500.00
410.22	ASPHALT EMULSION FOR TACK COAT	GAL	7,200.00
411.1	HOT BITUMINOUS CONCRETE LEVELING COURSE	TON	800.00
417.	COLD PLANING BITUMINOUS SURFACES	SY	36,000.00
503.101	WATER DIVERSION STRUCTURE	U	1.00
503.102	WATER DIVERSION STRUCTURE	U	1.00
503.103	WATER DIVERSION STRUCTURE	U	1.00
503.201	COFFERDAMS	U	1.00
503.202	COFFERDAMS	U	1.00
506.4	STEEL SHEET PILING FOR ENVIRONMENTAL PROTECTION	SY	2,700.00
520.1	CONCRETE CLASS A	CY	60.00

544.1	REINFORCING STEEL (ROADWAY)	LB	430.00
570.4	MORTAR RUBBLE MASONRY (F)	CY	2.82
570.401	MORTAR RUBBLE MASONRY	CY	16.00
572.1	RECONSTRUCTING STONE WALL ONE STONE WIDE	LF	450.00
572.2	RECONSTRUCTING STONE WALL MULTIPLE STONES WIDE	LF	20.00
585.2	STONE FILL, CLASS B	CY	200.00
585.3	STONE FILL, CLASS C	CY	2,200.00
585.3401	SIMULATED STREAMBED MATERIAL	CY	400.00
593.411	GEOTEXTILE; PERM CONTROL CL.1, NON-WOVEN	SY	400.00
593.421	GEOTEXTILE; PERM CONTROL CL.2, NON-WOVEN	SY	8,300.00
603.0001	VIDEO INSPECTION	LF	14,000.00
603.00215	15" R.C. PIPE, 2000D	LF	3,050.00
603.00218	18" R.C. PIPE, 2000D	LF	2,100.00
603.00224	24" R.C. PIPE, 2000D	LF	630.00
603.00230	30" R.C. PIPE, 2000D	LF	30.00
603.00260	60" R.C. PIPE, 2000D	LF	120.00
603.00315	15" R.C. PIPE, 3000D	LF	1,000.00
603.00318	18" R.C. PIPE, 3000D	LF	50.00
603.30115	15" R.C. END SECTIONS	EA	3.00
603.30118	18" R.C. END SECTIONS	EA	8.00
603.30124	24" R.C. END SECTIONS	EA	6.00
603.30130	30" R.C. END SECTIONS	EA	1.00
603.36115	15" ALUMINIZED STEEL END SECTION	EA	6.00
603.36118	18" ALUMINIZED STEEL END SECTION	EA	14.00
603.36124	24" ALUMINIZED STEEL END SECTION	EA	3.00
603.82212	12" PE PIPE (TYPE S)	LF	600.00
603.82215	15" PE PIPE (TYPE S)	LF	5,400.00

603.82218	18" PE PIPE (TYPE S)	LF	1,200.00
603.82224	24" PE PIPE (TYPE S)	LF	870.00
603.99060	60" TEMPORARY DRAINAGE PIPE	LF	40.00
604.0007	POLYETHYLENE LINER	EA	140.00
604.124	CATCH BASINS TYPE B, 4-FOOT DIAMETER	U	175.00
604.125	CATCH BASINS TYPE B, 5-FOOT DIAMETER	U	14.00
604.126	CATCH BASINS TYPE B, 6-FOOT DIAMETER	U	2.00
604.154	CATCH BASINS TYPE E, 4-FOOT DIAMETER	U	5.00
604.164	CATCH BASINS TYPE F, 4-FOOT DIAMETER	U	7.00
604.324	DRAINAGE MANHOLES, 4-FOOT DIAMETER	U	3.00
604.4	RECONSTRUCTING/ADJUSTING CATCH BASIN & DROP INLET	LF	50.00
604.51	RECONSTRUCTING/ADJUSTING SEWER MANHOLES	LF	15.00
604.52	RECONSTRUCTING/ADJUSTING DRAINAGE MANHOLES	LF	20.00
604.62	DRAINAGE MANHOLE COVERS AND FRAMES	EA	7.00
604.9101	OUTLET CONTROL STRUCTURE	U	1.00
604.9102	OUTLET CONTROL STRUCTURE	U	1.00
604.9103	OUTLET CONTROL STRUCTURE	U	1.00
604.9104	OUTLET CONTROL STRUCTURE	U	1.00
605.506	6" PERF. CORR. POLYETHYLENE PIPE UNDERDRAIN	LF	9,300.00
605.79	UNDERDRAIN FLUSHING BASINS	EA	15.00
606.12122	BEAM GUARDRAIL (LONG SPAN DOUBLE NESTED - 18.75') (STEEL POST)	U	2.00
606.1254	BEAM GUARDRAIL (TERMINAL UNIT TYPE EAGRT, TL 3) (STEEL POST)	U	1.00
606.12551	BEAM GUARDRAIL (TERMINAL UNIT TYPE EAGRT, TL 2 - 25') (STEEL POST)	U	11.00
606.18001	31" W-BEAM GUARDRAIL WITH 8" OFFSET BLOCK (STEEL POST)	LF	3,650.00
606.417	PORTABLE CONCRETE BARRIER FOR TRAFFIC CONTROL	LF	8,700.00
606.4174	PORTABLE CONCRETE BARRIER FOR TRAFFIC CONTROL - BRACED	LF	120.00
606.91	RESETTING OR SETTING GUARDRAIL	LF	230.00

606.9522	TEMP. IMPACT ATTENUATION DEVICE (NON-REDIRECTIVE) TEST LEVEL 2	U	22.00
607.140	WOVEN WIRE FENCE, 4'-0" HIGH	LF	3,650.00
607.4140	POST ASSEMBLIES FOR WOVEN WIRE FENCE, 4'-0" HIGH	EA	50.00
607.9918	BAR WAY, 18 FT.	U	5.00
608.12	2" BITUMINOUS SIDEWALK (F)	SY	7,000.00
608.24	4" CONCRETE SIDEWALK (F)	SY	350.00
608.26	6" CONCRETE SIDEWALK (F)	SY	2,050.00
608.54	DETECTABLE WARNING DEVICES, CAST IRON	SY	70.00
609.01	STRAIGHT GRANITE CURB	LF	3,400.00
609.02	CURVED GRANITE CURB	LF	190.00
609.216	STRAIGHT GRANITE SLOPE CURB 6" HIGH	LF	14,000.00
609.226	STRAIGHT GRANITE SLOPE CURB WITH RADIAL JOINTS, 6" HIGH	LF	510.00
609.23	CURVED GRANITE SLOPE CURB	LF	30.00
609.5	RESET GRANITE CURB	LF	4,842.00
609.811	BITUMINOUS CURB, TYPE B (4" REVEAL)	LF	1,200.00
611.811	ADJUSTING/RELOCATING HYDRANTS	EA	1.00
614.331	3" STEEL CONDUIT	LF	13.00
614.512	CONCRETE PULL BOX 18"	EA	46.00
614.523	MOLDED PULL BOX 17"X30"	EA	2.00
614.73114	3" PVC CONDUIT, SCHEDULE 40	LF	1,550.00
614.73118	3" PVC CONDUIT, SCHEDULE 80	LF	1,500.00
615.0101	TRAFFIC SIGN TYPE A	SF	370.00
615.013	REMOVING TRAFFIC SIGN TYPE A	U	3.00
615.0301	TRAFFIC SIGN TYPE C	SF	995.00
615.033	REMOVING TRAFFIC SIGN, TYPE C	U	72.00
615.034	RELOCATING TRAFFIC SIGN, TYPE C	U	25.00
615.053	REMOVING TRAFFIC SIGN TYPE BB	U	1.00

615.0601	TRAFFIC SIGN TYPE CC	SF	400.00
616.141	COMPUTER EQUIPMENT AND TRAFFIC SIGNAL SOFTWARE	U	1.00
616.161	TRAFFIC SIGNALS (TEMP.)	U	1.00
616.162	TRAFFIC SIGNALS (TEMP.)	U	1.00
616.163	TRAFFIC SIGNALS (TEMP.)	U	1.00
616.191	ALTERATIONS TO TRAFFIC SIGNALS	U	1.00
616.192	ALTERATIONS TO TRAFFIC SIGNALS	U	1.00
616.193	ALTERATIONS TO TRAFFIC SIGNALS	U	1.00
616.194	ALTERATIONS TO TRAFFIC SIGNALS	U	1.00
616.195	ALTERATIONS TO TRAFFIC SIGNALS	U	1.00
616.35	SPREAD SPECTRUM RADIO COMMUNICATIONS SYSTEM	U	5.00
616.70001	RETROREFLECTIVE TAPE FOR SIGNAL HEAD BACKPLATES	LF	410.00
618.61	UNIFORMED OFFICERS WITH VEHICLE	$	249,000.00
618.7	FLAGGERS	HR	6,400.00
619.1	MAINTENANCE OF TRAFFIC	U	1.00
619.25	PORTABLE CHANGEABLE MESSAGE SIGN	U	3.00
619.27	TRAILER-MOUNTED SPEED LIMIT SIGN	U	2.00
619.502	WORK ZONE ITS OPERATIONAL COSTS (WINTER)	MON	8.00
619.503	WORK ZONE ITS OPERATIONAL COSTS (SUMMER)	MON	20.00
619.51	PORTABLE QUEUE TRAILER / SENSOR (PQT)	MON	110.00
619.519	PORTABLE QUEUE TRAILER / SENSOR (PQT) (SALVAGE TO DEPARTMENT)	U	3.00
619.52	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)	MON	308.00
619.54	MOBILE VIDEO TRAILER WITH PAN TILT ZOOM (PTZ)	MON	56.00
619.91	RELOCATE WORK ZONE ITS DEVICE	U	10.00
621.2	RETROREFLECTIVE BEAM GUARDRAIL DELINEATOR	EA	40.00
621.31	SINGLE DELINEATOR WITH POST	EA	100.00
621.32	DOUBLE DELINEATOR WITH POST	EA	7.00

622.1	STEEL WITNESS MARKERS	EA	65.00
622.2	CONCRETE BOUNDS	EA	9.00
628.2	SAWED BITUMINOUS PAVEMENT	LF	36,000.00
632.0104	RETROREFLECTIVE PAINT PAVE. MARKING, 4" LINE	LF	200,000.00
632.0106	RETROREFLECTIVE PAINT PAVE. MARKING, 6" LINE	LF	2,450.00
632.0118	RETROREFLECTIVE PAINT PAVE. MARKING, 18" LINE	LF	450.00
632.02	RETROREFLECTIVE PAINT PAVEMENT MARKING, SYMBOL OR WORD	SF	1,250.00
632.3104	RETROREFLECT. THERMOPLAS. PAVE. MARKING, 4" LINE	LF	8,100.00
632.3106	RETROREFLECT. THERMOPLAS. PAVE. MARKING, 6" LINE	LF	3,000.00
632.3108	RETROREFLECT. THERMOPLAS. PAVE. MARKING, 8" LINE	LF	190.00
632.3112	RETROREFLECT. THERMOPLAS. PAVE. MARKING, 12" LINE	LF	40.00
632.3118	RETROREFLECT. THERMOPLAS. PAVE. MARKING, 18" LINE	LF	800.00
632.32	RETROREFLECT. THERMOPLAS. PAVEMENT MARKING, SYMBOL OR WORD	SF	2,500.00
641.	LOAM	CY	2,000.00
644.82	SALT-TOLERANT GRASS SEED, TYPE 82	LB	10.00
645.0001	TURBIDITY BARRIER	LF	500.00
645.113	HYDRAULIC MULCH	LB	6,000.00
645.119	MULCH WITH TACKIFIERS	A	3.00
645.3	EROSION STONE	TON	6,000.00
645.44	TEMPORARY SLOPE STABILIZATION TYPE D (WILDLIFE FRIENDLY)	SY	19,400.00
645.46	PERMANENT CHANNEL STABILIZATION TYPE B	SY	10,200.00
645.48	EROSION CONTROL MIX	CY	500.00
645.481	WOOD CHIPS FOR TEMPORARY EROSION CONTROL	CY	800.00
645.482	STUMP GRINDINGS FOR TEMPORARY EROSION CONTROL	CY	3,200.00
645.51	HAY BALES FOR TEMPORARY EROSION CONTROL	EA	500.00
645.512	COMPOST SOCK FOR PERIMETER BERM	LF	3,300.00
645.52	RYEGRASS FOR TEMPORARY EROSION CONTROL	LB	300.00

645.531	SILT FENCE	LF	10,000.00
645.611	BONDED FIBER MATRIX (BFM)	LB	21,500.00
645.612	FIBER REINFORCED MATRIX (FRM)	LB	7,300.00
645.613	STABILIZED MULCH MATRIX	LB	2,900.00
645.7	STORM WATER POLLUTION PREVENTION PLAN	U	1.00
645.71	MONITORING SWPPP AND EROSION AND SEDIMENT CONTROLS	HR	1,000.00
646.2	TURF ESTABLISHMENT WITHOUT MULCH	A	14.00
647.1	HUMUS	CY	4,700.00
647.22	HUMUS, INTERMIXED, 2" DEEP	CY	20.00
650.2	LANDSCAPING	U	1.00
659.401	LANDSCAPE ESTABLISHMENT CREW (4 MEN - 8 HR DAY)	DAY	30.00
662.281	DECOMMISSION DRILLED WELL	LF	500.00
670.02	SEDIMENT SUMP MEASURING BLOCK	EA	4.00
670.066	MAILBOX SUPPORT ASSEMBLIES	EA	11.00
670.0661	MULTIPLE MAILBOXES SUPPORT ASSEMBLIES	EA	1.00
670.104	TEMPORARY PORTABLE LIGHTING	U	20.00
670.822	GNSS CONSTRUCTION INSPECTION EQUIPMENT	U	1.00
670.95	TEMPORARY SAFETY FENCE	LF	1,000.00
677.1201	PERMANENT FIXED LOCATION DYNAMIC MESSAGE SIGN (DMS)	U	1.00
677.54201	POLE MOUNTED ITS EQUIPMENT CABINET	U	1.00
677.6301	METER AND DISCONNECT PEDESTAL	U	1.00
677.64	UNINTERRUPTABLE POWER SUPPLY (UPS)	EA	1.00
677.9310	3-CONDUCTOR #10 AWG CABLE	LF	210.00
692.	MOBILIZATION	U	1.00
693.	ON-THE-JOB TRAINING OF UNSKILLED WORKERS	$	600.00
697.11	INVASIVE SPECIES CONTROL AND MANAGEMENT PLAN	U	1.00
697.31	PROJECT OPERATIONS PLAN	U	1.00

697.41	CRITICAL PATH METHOD (CPM) ELECTRONIC SCHEDULE	U	1.00
698.12	FIELD OFFICE TYPE B	MON	27.00
698.2	PHYSICAL TESTING LABORATORY	MON	25.00
699.	MISCELLANEOUS TEMPORARY EROSION AND SEDIMENT CONTROL	$	50,000.00
1006.1	SPECIAL WORK FOR GEOTECHNICAL INSTRUMENTATION	$	5,000.00
1008.123	ALTERATIONS AND ADDITIONS AS NEEDED - ARCHEOLOGIC MONITORING	$	10,000.00
1008.6	ALTERATIONS AND ADDITIONS AS NEEDED - DRINKING WATER RESOURCE PROTECTION	$	75,000.00
1010.15	FUEL ADJUSTMENT	$	98,600.00
1010.2	ASPHALT CEMENT ADJUSTMENT	$	100,000.00
1010.3	QUALITY CONTROL QUALITY ASSURANCE (QC/QA) ASPHALT	$	101,000.00
MWW (Non-Par)			
611.05216	16" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	LF	425.00
611.70016	16" FITTING	EA	38.00
611.77	CHLORINE INJECTION TAP	EA	1.00
611.90001	ADJUSTING WATER GATES AND SHUTOFFS SET BY OTHERS	EA	2.00
1010.15	FUEL ADJUSTMENT	$	400.00
BPW (Non-Par)			
612.213	42" RCP CASING	LF	80.00
612.21332	42" RCP CASING WITH 8" PVC CARRIER PIPE	LF	175.00
612.3104	SEWER MANHOLE, 4-FOOT DIAMETER	VF	77.00
612.61508	8" PVC SEWER PIPE (SDR 35)	LF	561.00
612.61512	12" PVC SEWER PIPE (SDR 35)	LF	75.00
1010.15	FUEL ADJUSTMENT	$	1,000.00

NEW HAMPSHIRE DEPARTMENT OF EMPLOYMENT SECURITY
EMPLOYMENT OF NEW HIRES

The following is a list of the local State Employment Security Offices from which the Contractor may secure the unskilled labor for this project:

Department of Employment Security
151 Pleasant Street, PO Box 159
Berlin, NH 03570-2006
Telephone: (603) 752-5500

Department of Employment Security
10 West Street, PO Box 1140
Concord, NH 03302-1140
Telephone: (603) 228-4100

Department of Employment Security
109 Key Road
Keene, NH 03431-3926
Telephone: (603) 352-1904

Department of Employment Security
646 Union Street, Suite 100
Littleton, NH 03561-5314
Telephone: (603) 444-2971

Department of Employment Security
6 Townsend West
Nashua, NH 03063-1217
Telephone: (603) 882-5177

Department of Employment Security
29 South Broadway
Salem, NH 03079-3026
Telephone: (603) 893-9185

Department of Employment Security
404 Washington Street, PO Box 180
Claremont, NH 03743-0180
Telephone: (603) 543-3111

Department of Employment Security
518 White Mountain Hwy.
Conway, NH 03818-4205
Telephone: (603) 447-5924

Department of Employment Security
426 Union Avenue, Suite 3
Laconia, NH 03246-2894
Telephone: (603) 524-3960

Department of Employment Security
300 Hanover Street
Manchester, NH 03104-4957
Telephone: (603) 627-7841

Department of Employment Security
2000 Lafayette Road
Portsmouth, NH 03801-5605
Telephone: (603) 436-3702

Department of Employment Security
6 Marsh Brook Road
Somersworth, NH 03878
Telephone: (603) 742-3600

06/24/08

Supercedes: 9/11/06, 12/5/90

WAGE RATES

FEDERAL AID PROJECTS

This proposal contains minimum wage determinations as specified by the U.S. Secretary of Labor. Copies of the attached wage determination(s) shall be posted on the bulletin board at the work site and furnished to employees upon request. Furthermore, the wage determination(s) shall be incorporated into all subcontract agreements.

If the Contractor, any subcontractor or lower-tier contractor intend to employ a classification of labor not listed in the attached determination(s), it shall submit a Request for Additional Work Classification(s) to the New Hampshire Department of Transportation, Labor Compliance Office at (603) 271-2467. The Contractor is responsible for ensuring that a Request is submitted for any additional classification of work to be employed by itself, any subcontractor or lower-tier contractor 3-4 weeks before the classification is utilized.

This contract is subject to the Work Hours Act of 1962, P.L. 87-581 and implementing regulations.

General Decision Number: NH170032 01/06/2017 NH32

Superseded General Decision Number: NH20160032

State: New Hampshire

Construction Type: Highway

County: Hillsborough County in New Hampshire.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2017

* SUNH2011-028 08/15/2011

	Rates	Fringes
CARPENTER (Excluding Form Work)	$ 24.27	1.06
CARPENTER (Form Work Only)	$ 19.93	1.06
ELECTRICIAN	$ 23.22	2.78
INSTALLER: Guardrail	$ 20.50	6.30
IRONWORKER, REINFORCING	$ 20.18	0.00
IRONWORKER, STRUCTURAL	$ 34.45	17.20
LABORER: Blaster Rock	$ 29.50	11.21
LABORER: Common or General	$ 16.99	2.60
LABORER: Flagger	$ 11.79	1.37
LABORER: Highway/Parking Lot Striping	$ 17.95	0.00

LABORER: Landscape	$ 14.40	0.00
LABORER: Pipelayer	$ 17.63	2.72
OPERATOR: Auger	$ 26.07	0.00
OPERATOR: Backhoe	$ 27.05	7.95
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 19.25	0.00
OPERATOR: Bucket	$ 25.19	0.00
OPERATOR: Bulldozer	$ 25.39	5.09
OPERATOR: Crane	$ 23.37	2.21
OPERATOR: Drill Rig Caissons	$ 33.46	19.78
OPERATOR: Excavator	$ 24.98	6.56
OPERATOR: Grader/Blade	$ 25.75	6.00
OPERATOR: Loader	$ 25.40	7.51
OPERATOR: Mechanic	$ 25.12	3.44
OPERATOR: Oiler	$ 29.54	16.15
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 28.88	17.05
OPERATOR: Roller	$ 25.23	9.69
OPERATOR: Post Driver/Pounder	$ 23.16	6.32
TRUCK DRIVER, Includes all axles including Dump Trucks (Excludes Low Bed Trucks)	$ 17.42	3.37
TRUCK DRIVER: Low Bed Truck	$ 20.77	4.27

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other

health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion

date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

BEDFORD
13953

April 17, 2017

PROSECUTION OF WORK

DESCRIPTION OF WORK

This project is located on NH Route 101 (NH 101) in the Town of Bedford, and consists of the widening and reconstruction of NH 101, to improve the conveyance of traffic and address safety and capacity deficiencies of the corridor. Work begins on NH 101 approximately 900' west of the intersection with Wallace Road and continues easterly, approximately two miles, to 750' east of the intersection with NH Route 114, which includes a total of 1,650' of approach work. This project consists of step box widening the existing two lane road to provide two travel lanes in each direction and a raised center median island with left turn lane. Work also includes limited full box reconstruction in areas of muck excavation and surcharge application, minor side road improvements, upgraded drainage and stormwater treatment, building demolition, substantial utility relocation, as well as sidewalk construction and landscaping.

CONCURRENT WORK

The Department has previously advertised and will advertise construction projects that will take place in the vicinity and during the life of this contract. The Contractor shall cooperate and coordinate with all other concurrent contracts.

Project	Anticipated Beginning	Anticipated Completion	Description
Central Turnpike Drainage 29024	Summer 2016	Summer 2017	Inlet/Outlet Reconstruction and Slip lining at several locations
Bedford - Manchester 40731	Fall 2017	Fall 2019	Bridge Pres. efforts for the bridges carrying I-293 EB & WB over Merrimack R. (199/128 & 199/129)
Bedford - Merrimack 16100	Spring 2018	Winter 2019	Improvement to Bedford Mainline Toll Plaza to Institute Open Road Tolling
Bedford 41174	Spring 2019	Fall 2019	Tier 1 Resurfacing of NH Route 101, from I-293/NH Route 101 Interchange to NH Route 101/114 Intersection
Bedford 16156	Spring 2018	Fall 2018	Bowman Brook Culvert rehabilitation beneath Old Bedford Road/NH Route 114

Refer to 105.07 specifically regarding coordination with other contractors working concurrently. Do not duplicate construction signs. Cover, uncover, or remove permanent signs as necessary (subsidiary to Item 619.1) to provide proper signing through the area.

UTILITIES

The following information is provided as a supplement to and in accordance with 105.06 - Cooperation with Utilities. Relocation time frames are as provided and estimated by the individual utility companies. The overall utility relocation time frame is the cumulative total of the individual utilities and their individual activities, including their advance notification time with some concurrent work as stated hereafter.

There are utility installations in the area belonging to, but not necessarily limited to, the following:

Eversource Energy Contact: William Couture Title: Project Coordinator – Design Build Phone: 634-2041 E-mail: coutuwh@eversource.com	**FairPoint Communications** Contact: David Kestner Title: Network Engineer Phone: 433-2119 E-mail: David.Kestner@fairpoint.com
Comcast Contact: Barry Sullivan Title: Project Coordinator Phone: 889-6718 x63917 E-mail: barry_sullivan@cable.comcast.com	**FirstLight Fiber** Contact: Michael Wescott Title: Sr. Manager OSP Construction Phone: 518-694-8740 E-mail: mwescott@firstlight.net
Bedford Police Department Contact: Nate Gagne Title: IT Systems Manager Phone: 792-1358 E-mail: ngagne@bedfordnh.org	**Pennichuck Water Works** Contact: John Boisvert Title: Chief Engineer Phone: 913-2328 E-mail: john.boisvert@pennichuck.com
Manchester Water Works Contact: Michael Adams Title: Water Distribution Manager Phone: 624-6494 E-mail: MADAMS@manchesternh.gov	**Bedford Public Works Department** Contact: Jim Stanford Title: Public Works Director Phone: 472-3070 E-mail: jstanford@bedfordnh.org

Aerial:

Eversource Energy, FirstLight Fiber, Bedford Police Department, Comcast, and FairPoint Communications will relocate their aerial wires. The aerial facility relocation will be split in two phases, the first phase from the Wallace Road/NH 101 intersection to the Bell Hill Road/NH 101 intersection and the second phase from the Meetinghouse Hill Road/NH 101 intersection to the Constitution Drive/NH 101 intersection.

Aerial facility relocations on the first phase can begin after clearing between Station 120+00 Rt to Station 134+00 Rt and Station 137+00 Lt to Station 139+00 Lt and earthwork between Station 137+00 Lt to Station 139+00 Lt is completed by the NHDOT Bureau of Highway Maintenance District 5. FairPoint Communications is responsible for maintenance of utility poles and, with 4 weeks advance notice after the site is available, anticipates 3 weeks to set the new poles. With 4 weeks advance notice of FairPoint Communications completing their work, Eversource Energy anticipates 3 weeks to transfer their wires to the new poles. With 4 weeks advance notice of Eversource Energy completing their work, FirstLight Fiber anticipates 4

weeks to transfer their wires to the new poles. With 4 weeks advance notice of FirstLight Fiber completing their work, Comcast anticipates 4 weeks to transfer their and Bedford Police Departments' wires to the new poles. With 4 weeks advance notice of Comcast completing their work, FairPoint Communications anticipates 5 weeks to attach new wires and to perform splicing operations. FairPoint Communications anticipates 4 weeks to remove the old cables and poles.

Aerial facility relocations on the second phase can begin after clearing between Station 158+00 Rt to Station 162+50 Rt and Station 163+00 Lt to Station 189+00 Lt and earthwork between Station 158+00 Rt to Station 162+00 Rt and Station 163+00 Lt to Station 188+00 Lt is completed by the Contractor. FairPoint Communications is responsible for maintenance of utility poles and, with 4 weeks advance notice after the site is available, anticipates 3 weeks to set the new poles. With 4 weeks advance notice of FairPoint Communications completing their work, Eversource Energy anticipates 3 weeks to transfer their wires to the new poles. With 4 weeks advance notice of Eversource Energy completing their work, FirstLight Fiber anticipates 4 weeks to transfer their wires to the new poles. With 4 weeks advance notice of FirstLight Fiber completing their work, Comcast anticipates 4 weeks to transfer their and Bedford Police Departments' wires to the new poles. With 4 weeks advance notice of Comcast completing their work, FairPoint Communications anticipates 5 weeks to attach new wires and to perform splicing operations. FairPoint Communications anticipates 4 weeks to remove the old cables and poles.

Underground:

Underground facilities are located within the project area as shown on the plans. The Contractor is advised to use extreme caution while excavating in these areas and to utilize Item 206.19 - Common Structure Excavation Exploratory, as directed, to locate these facilities prior to excavating.

FairPoint Communications will relocate a section of their underground conduit system between Station 154+00 Lt and Station 164+00 Lt that is in conflict with the proposed work. With 4 weeks advance notice of site availability including removal of the existing southwest traffic signal arm, mast arm foundation and signal conduit, FairPoint Communications anticipates 4 weeks to relocate their facilities.

Coordinate earthwork at storm water treatment DB198, as necessary, to facilitate the relocation of the existing water line, as well as the aerial utility pole at Sta. 199+64 Lt. Temporary anchors for the aerial utility pole may be required during excavation activities, until the pole can be relocated.

The Contractor shall relocate a portion of Manchester Water Works' water line between Station 196+50 Lt to Station 200+00 Lt, which is in conflict with the proposed work under bid items in the Contract as shown on the plans. With 4 weeks advance notice, Manchester Water Works will have a representative on site to inspect the Contractor's work.

The Contractor shall replace a portion of Bedford Public Works Department's sewer line between Station 195+00 Lt. to Station 201+00 Lt, which is in conflict with the proposed work under bid items in the Contract as shown on the plans. The Contractor shall also install steel sleeves for future sewer facilities under bid items in the Contract as shown on the plans. With 4 weeks advance notice, Bedford Public Works Department will have a representative on site to inspect the Contractor's work.

Pennichuck Water Works shall abandon their existing water line between Station 137+00 Rt to 138+50 Rt and between Station 140+25 Lt to Station 141+00 Lt, which is in conflict with the proposed work. Pennichuck Water Works shall install a new water service at Station 40+15 to the Convenient MD building and plug and abandon various gate valves at the Nashua Road/Bell Hill Road/Route 101 intersection.

Permanent Lighting:

Eversource Energy will relocate the existing street lighting at the Nashua Road/NH 101 and Meetinghouse Hill Road/NH 101 intersections to the new traffic signal mast arms under a Utility Supplement Agreement with the State. The Contractor shall install conduit and pull boxes under bid items as shown on the plans to accommodate this work. Provide Eversource Energy 4 weeks advance notification for inspection of work. Allow 2 weeks for Eversource Energy to schedule and complete installation of wiring and luminaires.

Existing highway lighting on wood utility poles will be relocated by Eversource Energy during the relocation of their facilities.

Temporary Lighting:

Provide and maintain temporary lighting (Item 670.104) in conjunction with portable concrete barrier as shown on the Traffic Control Plans or as directed. If portable concrete barrier is installed, other than required on the plans, provide temporary lighting as directed (at the Contractor's expense).

EPA NPDES CONSTRUCTION GENERAL PERMIT REQUIREMENTS

This project will be subject to the US EPA's Construction General Permit (CGP) issued on February 16, 2012 (http://www3.epa.gov/region1/npdes/stormwater/index.html) requiring construction sites to implement a range of erosion and sediment controls and pollution prevention measures to control the discharge of pollutants from construction sites. Refer to the Special Attention concerning the Contractor's obligation relative to the National Pollutant Discharge Elimination System (NPDES) Storm Water Construction General Permit as administered by the Environmental Protection Agency (EPA). This project is subject to Notice of Intent, Notice of Termination and other project records to be completed by the Contractor as required in the CGP. NPDES General Guidelines, Notice of Intent and Notice of Termination are available on line in *Doing Business with the DOT* at www.nhdot.com or thru the NHDOT Contracts office.

The Contractor should also be aware that EPA is in the process of renewing the 2012 CGP and is scheduled to issue a new permit while this project is under construction. This will require the Contractor, as well as the Department, to terminate coverage under the 2012 and issue a new Notice of Intent for the new CGP. A draft copy of the 2017 CGP can be found at https://www.epa.gov/npdes/epas-draft-2017-construction-general-permit-cgp

The Contractor will be responsible to comply with all published EPA regulations. The CGP will require, but is not limited to, the following:

- Assemble a "Stormwater Team" who's principal responsibilities are to develop, oversee, implement and document compliance with the requirements of the CGP.

These responsibilities shall be clearly outlined in the SWPPP documents with 24 hour contact information for the Stormwater Team provided.

- The Contractor's Stormwater Team members primary responsibilities shall be the day-to-day erosion control related operations and must be afforded the resources (equipment and manpower) required to maintain compliance with the CGP as described in Section 2.1.1.4 of the CGP.
- Initiate stabilization immediately when earth-disturbing activities have temporarily ceased and will not resume for a period exceeding 14 calendar days.
- Manage discharges from dewatering activities, including discharges from dewatering of trenches and excavations
- Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge.
- Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater.

The Contractor shall submit four (4) sets of the SWPPP (Item 645.7), as described in the NHDOT Specifications Section 645.3.2 and Part 7 of the NPDES's most recent CGP for Stormwater Discharges from Construction Activities. The SWPPP must be approved by the Department and be implemented prior to any earth disturbing activities, and shall graphically depict all required erosion and sediment control and stormwater management elements necessary for compliance with these regulations. In addition, the SWPPP shall include calculations to verify that storm water detention basins (interim, ultimate, or temporary) used to manage stormwater runoff during construction will be able to retain the volume of stormwater runoff received from a 2 year, 24 hour storm event. Cofferdams, steel sheeting for environmental protection, water diversion structures, piping and pumping installations, and all discharge points necessary to control all stormwater runoff from the site, must be incorporated into the SWPPP and shall conform in all aspects to the Standard Specifications for Road and Bridge Construction, Sections 503 and 645, and Special Provisions for Section 506 and 645.

It is anticipated that the SWPPP will be necessary for each phase of construction to graphically show the proposed BMPs, appropriate existing structures and surrounding natural resources. All SWPPP plans shall be annotated upon the full sized Contract Plans and/or Erosion and Sediment Control Base Plans, as provided by the Department. The Department's review of the SWPPP will be in accordance with Section 105.02.

The SWPPP will likely need to be segmented or submitted in phases. The phased submission will expedite the preparation of the SWPPP and receipt of approvals needed to advance the proposed work. Amendments to the SWPPP must be submitted to the Department for approval as necessary to document proposed changes to the erosion and sediment control BMPs and/or changes to the Contractor's methods of operation and/or schedule.

The Contractor shall install, inspect, and maintain all appropriate stormwater management and erosion control Best Management Practices (BMPs) in accordance with the SWPPP and CGP until an area is stabilized, to ensure that the New Hampshire Water Quality Standards (Env-Wq 1703) are not violated. Excavation dewatering shall comply with all state and federal regulations. This work shall be paid under the appropriate item numbers.

Before beginning grubbing operations (or tree clearing if so ordered by the Contract Administrator) or earthwork, install BMPs along the toe of slopes in areas adjacent to wetlands or other areas as described in the DOT approved SWPPP. Maintain the SWPPP BMPs throughout construction until the area is stabilized. The Contractor shall be proactive to assure that the appropriate BMPs are in place throughout the duration of the project.

Construction activities for this project are controlled by many permits including but not limited to the NH DES Dredge and Fill permit, Alteration of Terrain Regulations and the NPDES Construction General permit. If there are conflicts among these various permits, the most stringent terms, conditions, procedures or regulations shall be followed.

EXCAVATION, DREDGING, OR FILLING STATE WATERS

Permit and Plans

The Department has secured the necessary permits to accomplish the work shown in the proposal. The US Army Corps of Engineering (ACOE) (NAE-2016-02210) permit has been issued for this project to cover impacts to wetlands. The approved permit including special conditions contained therein, is included elsewhere in the Proposal. The Department has also secured the necessary the NH Department of Environmental Services (NHDES) Wetlands Bureau Permit (2016-02893) approval to accomplish the work and a copy of the approval, including special conditions contained therein, is included elsewhere in the Proposal. The Wetlands Permit will be available at the time of award of Contract. The Department's permits are only for the work shown in the Proposal.

The Wetland Permit(s) and wetland record plans are available on-line on the *Invitation to Bid* webpage at nhdot.com, in the specific project's Proposal Package.

Work Outside Permitted Area

If the Contractor desires to perform additional work in the wetlands that is not shown on the plans, and which requires a wetlands permit, the Contractor shall submit a separate application and provide the necessary working plans to the NHDES Wetlands Bureau and/or US ACOE sufficiently in advance for their review and approval. The Contractor shall not commence with the additional work until the approved permit is in hand. In all cases, the Contractor shall adhere to the permit conditions. Prior to submission to the Wetlands Bureau, the Bureau of Construction and the Bureau of Environment must review any additional impacts.

Erosion Control Plans

The Stormwater Pollution Prevention Plan (SWPPP) shall demonstrate compliance with the NHDES Dredge and Fill Permit. When preparing the SWPPP particular attention shall be paid to the approved "Erosion Control plans", "Erosion Control Strategies", "Construction Sequence", and specific conditions in the NHDES Dredge and Fill Permit. The Contractor is directed to review and comply with Section 107.01 as it refers to spillage, and also with regards to erosion, pollution, and turbidity precautions. The Contractor shall be proactive to assure that the appropriate temporary erosion control measures are in place throughout the duration of the project. These documents outline the Department's commitments and strategies to minimize the impacts of construction on the environment.

Environmental Pre-Construction Meeting

With two weeks advance notice, and at least 48 hours prior to the start of construction, a pre-construction meeting shall be held with the NHDOT Bureau of Environment staff, NHDES, and the US Army Corps of Engineers to review the conditions of the wetlands permits, the NHDES Water Quality Certificate, and other environmental commitments.

ALTERATION OF TERRAIN

The Contractor is not required to submit an application for coverage under this permit. However, compliance with any, and all, relevant published NHDES Alteration of Terrain Env-Wq 1500 requirements concerning construction activities and structures not depicted in the proposal is required (http://des.nh.gov/organization/commissioner/legal/rules/index.htm). The New Hampshire Stormwater Manual Volume 3 Erosion and Sediment Controls During Construction will be the primary guidance document to be implemented during construction of the proposed project and until the time when the site is permanently stabilized.

The SWPPP shall demonstrate compliance with any, and all, published NHDES Alteration of Terrain (AOT) Env-Wq 1500 requirements. When preparing the SWPPP particular attention shall be paid to Env-Wq 1505 which set limits on exposed soil, stabilization, environmental monitoring, winter conditions and specific requirements for methods for erosion and sediment control.

Sequencing

The Contractor shall submit a construction sequence plan showing compliance relative to the maximum open area and/or winter construction plan as discussed below. The construction sequence plan shall also demonstrate compliance with water quality regulations, and erosion and sediment control and stormwater management requirements. This plan shall be subsidiary to and submitted as part of the project's SWPPP. The Contractor's SWPPP shall be prepared utilizing contributing drainage areas for the particular phase of work being proposed, similar to the conceptual Construction Stormwater Analysis sub-watershed area plans. This plan shall address each phase of construction activity including a proposed construction sequence for the project showing compliance with Env-Wq 1505.02 relative to maximum open area. Temporary and/or permanent sediment collection/treatment areas shall be constructed as soon as possible and the timing of their construction shall be detailed in the construction sequence plan. Allowable areas for temporary sediment collection and treatment have been depicted on the conceptual drainage sub-area plans for use in preparation of the SWPPP. If the Contractor's means and methods determine that these areas are to be utilized then the design and timing of their construction shall be detailed in the construction sequence plan.

Open Area

The area of unstabilized soil shall not exceed five (5) acres at any time. The Contractor may be permitted to exceed the maximum open area allowed, with the approval from the Department, provided that the SWPPP shows adequate provisions to control erosion and sediment, and provided the additional area of disturbance is necessary to meet the Contractor's Critical Path Method schedule (CPM) and the Contractor can demonstrate there are adequate resources available (equipment and manpower) to respond to multiple events simultaneously. Maximum open area shall include all phases of construction activity including clearing and

grubbing items. Cleared areas shall be considered as an open area contributing to the 5-acre limit. An area shall be considered "stabilized" when it is in a condition in which the soils on the site will not erode under the conditions of a 10-year/ 24-hr. design storm.

Monitoring and Reporting

Requirements as specified by Env-Wq 5015.02 are necessary in addition to the Construction General Permit (CGP) and as detailed in Item 645.71. In addition to the regular weekly inspections, the monitor shall inspect the site during any rain event in which 0.25 inches of precipitation or more has fallen or within 24 hour of such an event. Note that standard specification 645.3.2.3.1 supersedes AOT regulation. Reporting, in addition to what is required by the CGP, includes:

- A statement confirming that the requirements of the AOT regulation are being met
- If AOT requirements are not being met, corrective actions including deadlines will be included in the report
- Representative photographs of the project area
- Reports must be stamped (signed) by a CPESC* or a PE

(*A Certified Erosion, Sediment and Storm Water Inspector (CESSWI) under the direct supervision of CPESC may monitor and sign the inspection reports.)

Winter Work

For the construction period from November 30th through May 1st, the area of exposed, unstabilized soil shall be limited to one (1) acre and shall be protected against erosion. The allowable area of exposed soil may be increased if a winter construction plan, developed by the SWPPP plan preparer (subsidiary to Item 645.7 – Storm Water Pollution Prevention Plan), is reviewed and approved by the Department.

WATER QUALITY CERTIFICATION

The Contractor's attention is directed to the documents in the Water Quality Special Attention included in the Proposal. These documents outline the responsibilities and requirements in order to meet the provisions of the Water Quality Certification, issued by the New Hampshire Department of Environmental Services (NHDES), in fulfillment of Section 401 of the U.S. Clean Water Act, and the State of New Hampshire's Surface Water Quality Regulations (Env-Wq 1700).

The Contractor's attention is also directed to the NHDES "Guidance for SWPPP's, BMP Inspection and Maintenance, Turbidity and Sediment Monitoring for NHDOT Projects with 401 Water Quality Certification" (dated August 14, 2013) which outlines the responsibilities and requirements in order to meet the provisions of the Water Quality Certification.

Department Discretionary Monitoring and Reporting

If direct by the Engineer, the SWPPP shall be modified to demonstrate compliance with all provisions of the above mentioned Guidance document including; all aspects of the inspection, monitoring and reporting specified in this Guidance.

Pre-Storm Inspections

In addition to the regular and post storm inspection and reporting as specified in the CGP, the Contractor shall perform pre-storm inspections as specified on Section D of the Guidance document.

Monitoring and Reporting

The Contractors attention is directed to Section E of the guidance document, which specifies weather, surface water, mixing zone, surface water background, controlled construction discharge, plumes, precipitation event and sediment deposit monitoring. Reporting shall conform to Section F of the Guidance document.

Surface Water Monitoring

The Department has identified surface water quality monitoring locations and construction stormwater discharge, and surface water monitoring within mixing zones for this project. These locations are detailed in the Department's memorandum regarding Water Quality Certification Condition E9, submitted to the DES Watershed Management Bureau on March 14, 2017. The complete monitoring and mixing zone package (with associated photos/maps) is available on-line on the *Invitation to Bid* webpage at nhdot.com, in the specific project's Proposal Package.

Communication with the Department

The Contractor shall conduct weekly meetings during the construction period to discuss proposed construction sequence relative to erosion and sediment control issues with the stormwater team as specified in Section C of the Guidance document. Attendees shall include the Contractor's site superintendent, the NHDOT Contract Administrator, the SWPPP plan preparer, Contractor's stormwater team leader and/or other state, federal or local agencies.

Required Sediment Deposition Monitoring and Reporting

The Contractors attention is directed to Section E.8 of the guidance document, which specifies sediment deposit monitoring. The contract shall complete at a minimum three (3) rounds of monitoring; prior to construction, within 24 hours of at least one storm event predicted to result in 0.75 inches or more of precipitation (rain), and after construction. Reporting shall conform to Section F.3 of the Guidance document.

BEST MANAGEMENT PRACTICES

Refer to the WATER QUALITY CERTIFICATION Special Attention included in the proposal.

ENVIRONMENTAL COMMITMENTS

Refer to the *Summary of Environmental Issues* document found elsewhere in the proposal.

INVASIVE PLANTS

Under the statutory authority of *RSA 430:55* (NH Department of Agriculture) and RSA 487:16-a (NH Department of Environmental Services), the spread of invasive plants listed in Agr 3800 and Env-Wq 1300 is prohibited. The project contains areas of the following prohibited invasive Type I plants: Autumn Olive, Oriental Bittersweet, Multiflora Rose, and Honeysuckle; and Type II plants: Japanese Knotweed, Purple Loosestrife, and Phragmites.

To prevent the spread of these plants both within and outside the project area, appropriate containment measures and disposal methods must be in place. Prior to clearing and grubbing operations occurring in areas identified on the General Plans as containing invasive plant species, the Contractor shall mitigate these areas as specified in the Special Provision for Item 201.88X – Invasive Species Control Type X. All work must comply with the NHDOT manual *Best Management Practices for Roadside Invasive Plants* and supporting fact sheet documents, available in the Department's Records Section or online at www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/invasivespecies.htm.

An Invasive Species Control and Management Plan, which details the specific method(s) of controlling the spread of the identified invasive plants and their proper disposal, must be submitted to the Department for review and approval prior to construction (paid for under Item 697.11 – Invasive Species Control and Management Plan).

Periodically review established slopes within the project limits (subsidiary to Item 697.11) for the presence of new populations of invasive plants that have been spread directly by construction activities. Upon approval of follow-up control measures, manage the new populations, which can include, but are not limited to, by pulling and bagging plants or by the application of herbicide. Follow-up control measures will be paid under Item 201.88X, as approved.

Contact the Project's Environmental Manager (Marc Laurin, 603-271-3226) at the Department's Bureau of Environment for questions about invasive plant identification and control methods.

NORTHERN LONG-EARED BAT PROTECTION

The U.S. Fish and Wildlife Service has listed the Northern Long-Eared Bat (NLEB) as threatened under the Endangered Species Act (ESA) and the following requirements exist to protect the bat and its habitat. This project has been reviewed in accordance with the provisions of the "Federal Highway Administration and Federal Railroad Administration: Range-Wide Biological Assessment for Transportation Projects for Indiana Bat and Northern Long-Eared Bat". A presence/absence survey was conducted with a determination of negative presence for the Northern Long-eared Bat, as such the project has been determined to Not Likely Adversely Affect the species.

The Contractor shall ensure all personnel working on the project site are made aware of the potential presence and protected status of the Northern Long-Eared Bat. The Northern Long-eared bat flyer, located elsewhere in this Proposal, shall be made available to all personnel and posted on project bulletin boards. Though unlikely to be present within the project limits, the Contractor will promptly notify the Engineer and the Project's Environmental Manager (Marc Laurin, 603-271-3226) upon finding a dead, injured, or sick NLEB.

NH ENDANGERED SPECIES

The Contractor is advised that State Endangered species, the Blanding's Turtle and Eastern Hognose Snake, and a specie of Special Concern, the Wood Turtle, have been identified as occurring within the Town of Bedford in the vicinity of the project by the NH Fish and Game Department (NHFGD). The Contractor is directed to be on the lookout for the possible presence of these species during construction of the project. Wildlife friendly matting (coco/straw matting), rather than netted erosion control fabrics, shall be used to avoid impacts to the species noted. The Contractor is to be aware and exercise caution during the turtle nesting season between late May and early June. Nesting turtles are to be reported to the NHFGD.

The Contractor is advised to make available to all personnel the flyer provided elsewhere identifying the Hognose Snake. Encounters with the snake are to be reported to the NHFGD as detailed in the flyer. For additional information regarding the endangered species listed here, contact the Department's Bureau of Environment, (Marc Laurin, 603-271-3226).

CULTURAL RESOURCES

The Contractor is made aware of the presence of the following historic resource located within the project limits: the Frederick W. & Thyra French House (2 Liberty Hill Road, Parcel 43) and the Bedford Village Historic District, located along the north side of NH 101 from Bell Hill Road to Olde Bedford Way, which are eligible for listing on the National Register of Historic Places. The Bedford Town Hall (10 Meetinghouse Road, Parcel 29) is listed on the National Register of Historic Places. Vibration monitoring shall be performed at the French House (2 Liberty Hill Road) under Item 211.11 – Vibration Monitoring. The Department has selected an alternative that minimizes impacts through design by reducing right-of-way takings. No additional impacts to these historical properties, beyond those shown on the construction plans, will be allowed.

The Contractor shall provide a 36 CRF 61 – Qualified Archaeologist under Item 1008.123 - Alterations and Additions as Needed – Archeologic Monitoring. See the *Summary of Environmental Issues* located elsewhere in this Proposal for additional information. The Archaeologist shall be on site to monitor all excavation, as well as any other soil disturbing activities, including but not necessarily limited to, all utility work, fill removal, and tree cutting at the locations noted below.

- Culvert removal along NH Route 101 at Sta. 169+20.
- Stone culvert removal along abandoned woods road at Sta. 192+00, Rt 140'.

The Archaeologist must be listed on the NH Division of Historical Resources Archaeological Consultants List.

Although not anticipated, if human burials should be found, halt all excavation in the area immediately, protect the burial(s) with a tarp, and immediately contact the following three parties: the Department's Cultural Resources Manager (Jillian Edelmann, 603-271-7968); the State Archaeologist (603-271-3483, 603-271-6433, or 603-271-2813); and the County Medical Examiner.

STONEWALLS

The Contractor is made aware of the following areas of stonewall reconstruction within the project:

- NH Route 101 – Sta. 196+65 – 197+14, Lt
- Meeting House Road – Sta. 20+03 – 23+46, Lt
- Meeting House Road – Sta. 23+67 – 24+03, Lt
- Liberty Hill Road – Sta. 51+30 – 51+44, Rt

These walls shall be reset and replaced in-kind, as noted on the Construction General Plans, and in accordance with Item 572.1 – Reconstructing Stone Wall One Stone Wide and/or Item 572.2 – Reconstructing Stone Wall Multiple Stones Wide. No further impacts are allowed.

RIGHT-OF-WAY AND PROTECTION OF PROPERTY

Protect all mailboxes and maintain them in accessible locations. Upon completion of the project, mailboxes shall be set at permanent locations as ordered and mounted on new posts and assemblies. All work related to mailbox maintenance and relocation shall be subsidiary to Item 619.1 - Maintenance of Traffic. New mailbox supports ordered will be paid under Item 670.066 - Mailbox Post Assemblies.

Right-of-Way agreements have been made with the following property owners:

PARCEL	NAME	ADDRESS/ CONTACT	PHONE	NEGOTIATIONS
53	Luke, Liane A. & the Thomas Luke Supplemental Needs Trust	20 Rowes Wharf, No Th-12, Boston MA	(857) 210-3797	No direct impacts
Parcel 53 – Contact the property owner (Liane Luke) one week in advance of any construction activities (including blasting) nearby or adjacent to their property (Sta. 182+30 – 184+50 LT) to provide an anticipated construction schedule with dates and times.				

BUILDING DEMOLITION

The following information is provided to give a general concept of the site characteristics and should not be used as a substitute for the Contractor's site visit. The buildings are described as follows:

Item No.	Parcel Number and Address	Former Property Owner	Description & Characteristics
202.201 202.301	Parcel 10 175 NH Route 101 Bedford, NH	R.E.L. Revocable Trust	2,156 ft² two level wood-framed raised ranch erected c. 1960 on a full concrete foundation. On site well and septic.
202.202	Parcel 12 169 NH Route 101 Bedford, NH	Nodraer Realty Trust	12,088 ft² wood-framed commercial structure erected c. 1970 on a concrete slab On site well and septic.

202.203 202.303	Parcel 36 111 NH Route 101 Bedford, NH	Robert Starace Homes, LLC	6,815 ft² wood-framed colonial style residential structure with an accessory apartment and office, erected c. 1979 with concrete cast-in-place walls, upon a concrete slab-on-grade basement floor, and a detached wood-framed shed. On site well and septic.

Bidders are advised to inspect the site on their own accord and to determine all conditions and requirements of the work per section 102.05 of the Standard Specification **Lisa Weir of the Bureau of Right-of-Way (603-271-7128) has scheduled a viewing for the three buildings on Wednesday, May 3rd 2017 from 10:00 am. until 2:00 pm.**

Prior to any demolition work, the Contractor shall review with the Contract Administrator, that the correct structures to be demolished have been identified and shall review the limits of any easements and right of way lines.

The locus plans for the above referenced projects are included elsewhere in the proposal.

ASBESTOS ABATEMENT

The Department has inspected the buildings for asbestos and any asbestos removal will be paid under Items 202.30X. Asbestos abatement operations may take place prior to submission and approval of the SWPPP.

The Contractor's attention is directed to the Special Attention for Asbestos, and the Special Provision for Items 202.30X - Building Asbestos Abatement, Parts I and II, found elsewhere in the Proposal. The Contractor shall schedule the asbestos removal operations in accordance with notification requirements outlined in the above-mentioned Special Provision. The Contractor shall notify The Department's Asbestos Inspector (ATC Group Services LLC - Christine Owens, 603-969-4122), ten (10) days prior to initiation of any asbestos abatement work. Upon receipt of a certificate of compliance from the Department's Asbestos Inspector, the Abatement Contractor shall notify the Demolition Contractor, in writing, within seven (7) days, that the building may then be demolished.

VIBRATION MONITORING

Structures that may be affected by the vibration source shall be monitored for vibrations and settlement, payable under Item 211.11 – Vibration Monitoring Services (not part of the requirement for vibration monitoring required for rock removal operations covered under section 203 of the Specifications). Monitoring performed under Item 211.11 and Section 203, shall be performed by the same individual(s). The following parcels, as a minimum, shall be included in the vibration monitoring plan:

PARCEL	OWNER NAME	LOCATION
43	Lins, Manessa R	2 Liberty Hill Road

CONTAMINATED SOILS & GROUNDWATER

NHDES Listed Sites:

A review of available NHDES files indicates that potentially-contaminated soil and/or groundwater may be present within Project Limits at and/or downgradient of the NHDES sites listed in the Soil and Groundwater Management Plan (SGMP) included with the Special Attention – Supporting Information for POP Development (SA – POP). Soil and groundwater quality reports associated with these sites are available on NHDES OneStop (www2.des.state.nh.us/DESOnestop/BasicSearch.aspx).

In addition, there are other properties/parcels within the Project Area that may have contaminated soil and/or groundwater due to site development, use, and/or practices (current and/or historic), but have not yet been identified. Therefore, it is possible that contaminated soil and/or groundwater may also be present at and in proximity to these sites or at other, as of yet unidentified, properties within the Project Limits.

To assist the Contractor in preparing a bid, a summary of the data gathered during the Department's file review is available for during the bidding period. This information may be examined at the office of the Bureau of Environment, 7 Hazen Drive, Concord, New Hampshire, by contacting the Contamination Program Manager (603-271-3226) on weekdays between the hours of 8:00 AM and 4:00 PM, PRIOR TO THE BID OPENING, or at other times by appointment with 72 hours advance notice.

Known Areas of Contaminated Soils and Groundwater:

Based on a detailed review of the information available, it is known that petroleum-contaminated soil and groundwater exists between Sta. 145+70 Lt and Sta. 150+10 Lt in the area of 137 NH 101 (Mobil 10977, NHDES Site No. 199201019). Due to the presence of contaminated soil and groundwater, the Contractor shall:

- Prepare a Project Operations Plan (POP) (Item 697.31);
- Refer to Special Attention – Supporting Information for POP Development (SA – POP)(See additional information below); and
- *Contact the Bureau of Environment (603-271-3226) at least two weeks prior to beginning excavation in this area to arrange for the Department's Environmental Consultant to be on-site.*

The Contractor shall prepare and submit a proposed Project Operations Plan (POP – Item 697.31) to the Bureau of Environment through the Engineer at least 15 business days prior to any excavation of soil. The Contractor shall refer to the SA – POP and the SGMP to develop the POP for this Project. The SA – POP and SGMP (without appendices) can be found elsewhere in the Proposal (the entire SGMP is available on-line on the Invitation to Bid webpage at nhdot.com in the specific project's Proposal Package). The Bureau of Environment, in concurrence with Department's Environmental Consultant, will review the proposed POP for conformance with the SGMP and Project requirements, and provide comments to the Engineer. The comments on the proposed POP must be addressed by the Contractor in a revised POP (subsidiary). When all comments have been addressed, the Bureau of Environment's Environmental Coordinator will approve the POP. No excavation of contaminated soil or dewatering activities in contaminated areas may take place until the POP has been approved by the Department.

As indicated in the SA – POP, the SGMP for this Project provides additional information regarding the known contaminated soils and groundwater and shall be used in preparation of the proposed POP.

Potential Areas of Contaminated Soils and Groundwater:

Although it is not anticipated, soil and groundwater contaminated with petroleum and/or hazardous materials may also be present outside of the areas between Sta. 145+70 Lt and Sta. 150+10 Lt. If the Contractor encounters potentially contaminated soil and/or groundwater, *the Contractor shall STOP WORK immediately and contact the Bureau of Environment (603-271-3226) to arrange for the Department's Environmental Consultant to be on-site.*

As indicated in the SA – POP, the SGMP for this Project provides additional information regarding the potential areas of contaminated soils and groundwater and shall be used in preparation of the proposed POP.

All costs incurred due to handling, on-site stockpiling, and on-site transporting of potentially contaminated soils encountered in the Project area will be paid for under Item 203.35 – Handling of Excavated, Contaminated Soils (Department Disposal), unless otherwise provided. The disposal or treatment of anticipated contaminated soil and groundwater will be managed by the Department's Environmental Contractor. Any frac tanks needed for storage of groundwater in areas of known contamination will be supplied by the Department's Environmental Contactor. The Contractor shall schedule work in contaminated areas such that sufficient time is allotted for investigating, testing, documenting, and removing any contaminated materials.

Monitoring Wells:

Monitoring wells that are likely to be impacted by construction must be properly decommissioned by a licensed well driller in accordance with NHDES requirements. Based on the likelihood that they will be impacted by construction, the Department will coordinate with the property owner's Environmental Consultant to complete required well decommissioning for certain existing wells (i.e., GES-1, GES-2, GES-4, GT-3R, MW-800, and MW-806) in advance of construction in the areas where these wells are located. To allow for continued sampling of the monitoring wells until the start of construction, NHDES has requested that the wells remain in place as long as possible. In order to allow adequate time to schedule decommissioning of these wells, the Contractor must notify the Bureau of Environment (603-271-3226) at least three weeks prior to any construction between Sta. 146+00 and Sta. 150+00.

Additional monitoring wells not listed above exist within or adjacent to the Project Limits, but are not anticipated to be encountered during the construction activities. If additional wells are encountered within the Project Limits that will be impacted by the construction activities, the Contractor shall avoid and maintain the wells and contact the Bureau of Environment (603-271-3226) immediately to arrange for proper decommissioning of the wells.

Additional Information and Requirements:

The Contractor shall provide the Department with accurate records relative to work associated with contamination issues. Additional discussion is provided in the SGMP.

All personnel involved with work associated with contamination issues shall have O.S.H.A. certification in accordance with 29 CFR 1926.65. If the Contractor elects to subcontract any or all work to be performed under 29 CFR 1926.65, determine in which areas, or for which tasks, the subcontractor is required. The Department's Environmental Consultant will not be responsible for meeting any of the Contractor's Health and Safety obligations under 29 CFR 1926.65.

GEOTECHNICAL INFORMATION

To assist the Contractor in preparing a bid, the GEOTECHNICAL REPORT is available for review during the bidding period. These reports are available on-line on the *Invitation to Bid* webpage at nhdot.com in the specific project's Proposal Package.

ROCK REMOVAL

Special requirements have been included in this contract to monitor and evaluate groundwater, and to require the use of best management practices for blasting operations to minimize the potential for adverse impacts to water quality as a result of blasting.

The Contractor shall submit a detailed blasting plan to the Engineer for review and approval as specified under the Standard Specification, Section 203 – Excavation and Embankment, specifically, Section 203.3.2.2. In addition, the Contractor's attention is directed to the Best Management Procedures (BMP's) provided in Section 203.3.2.11, to include preparing, reviewing and following an approved blasting plan; proper drilling, explosive handling and loading procedures; observing the entire blasting procedures; evaluating blasting performance; and handling and storage of blasted rock. The BMP's are required to minimize the effects of nitrates and other contaminants in groundwater and surface water systems related to blasting. The Best Management Procedures shall be followed for all rock blasting operations.

Drinking Water Monitoring

The Contractor shall be required to retain the services of a hydrogeology/hydrology consultant (Hydrogeologist) to monitor, record, analyze and report groundwater conditions prior to, during, and after construction (see Special Provision for Item 203.93 – Hydrogeologist).

Existing drinking water wells shall be sampled for laboratory analysis by the Hydrogeologist. Drinking water well locations which require data collection and analysis are included in the Special Provision, and paid for as Item 203.941 – Baseline Groundwater Sampling Event, Item 203.942 – Extended Groundwater Sampling Event or Item 203.943 – Standard Analysis Groundwater Sampling Event. Contact the Bureau of Materials and Research (Krystle Pelham, 603-271-1657) to confirm the locations of the existing water wells. Detailed requirements for well testing frequency and parameters are also included in the special provision.

Surcharge Areas

Existing embankment fill and a compressible muck deposit beneath the proposed embankment from Sta. 161+00 – 170+00 Rt will be excavated in the wet, and immediately replaced with suitable backfill, paid for as Item 203.661 – Gravel Backfill for Muck and Unsuitable Material Excavation or Item 203.662 – Rock and Gravel Backfill for Muck and Unsuitable Material Excavation, placed to depths as specified in the Plans. Backfilling will be

performed in such a manner as to displace any remaining muck in advance of the excavation without entrapment. Utilize Item 506.4 – Steel Sheet Piling for Environmental Protection along this area to prevent excavation spoils and turbid water from entering the adjacent wetland during these activities. The water level inside the excavation area shall be maintained to prevent destabilization. If signs of instability are observed during embankment construction or surcharge placement, discontinue these activities and notify the Engineer immediately.

Compressible muck deposits beneath proposed embankments from Sta. 164+00 to 174+00 Lt and Sta. 161+00 to 170+00 Rt will be treated, in part, by placing a surcharge on top of the proposed embankments, paid for as Item 203.6 – Embankment-in-Place, after they have been constructed to the roadway pavement structure subgrade. Install Item 210.1 – Settlement Platforms, and perform Settlement Monitoring (Item 210.2) as surcharges are placed and during the surcharge waiting period. The minimum waiting period is 90 days; however, this duration may be extended by the Engineer, if necessary. The beginning of the waiting period will begin when the surcharge materials has been placed over the entire segment. Utilize Item 203.7 – Rehandling Surcharge Material, to excavate the surcharge material to the subgrade of the roadway pavement structure. Agencies with utilities in these areas shall be notified prior to beginning the work. If signs of instability are observed during embankment construction or surcharge placement, discontinue these activities and notify the Engineer immediately. Contact the NHDOT Bureau of Materials & Research Geotechnical Section (603-271-3151) for assistance, as needed.

SMART WORK ZONE (SWZ) SYSTEM

The project includes an enhanced SWZ system to assist in alleviating additional congestion associated with construction activities by collecting and communicating real time traffic information to a broad interconnected network of Portable Changeable Message Signs (PCMS). Refer to SWZ Key Plan for the proposed and existing SWZ device locations. This plan summarizes the device type, locations, and naming convention for each of the devices by inventory number, route, direction of travel, and mile marker.

CONSTRUCTION REQUIREMENTS

General

1. Night work shall be performed without additional compensation for work, materials, personnel, equipment, or procedures required to accomplish the work.
2. Do not impact the existing wood fence along the frontage of the Bedford Village Inn, at approximately Sta. 191+00 – 195+00 Lt. Any impacts to the wooden fencing shall be repaired or replaced at the Contractors expense.
3. The Bedford Village Commons, located along NH 101 from Sta. 125+00 – 133+50 Rt, is to remain open during construction. Maintain access at all times.
4. Remove the existing traffic signal and existing underground signal conduit at the intersection of NH 101 and Meetinghouse Road, paid for under Item 616.193 – Alterations to Traffic Signals (S-037-02), prior to the coordination for relocation of the underground telephone conduit, to avoid conflicts between the existing southwest signal mast arm and conduit, and the proposed underground telephone conduit location.

5. Remove topsoil for its total depth within the limits of the slope lines. Unless otherwise directed, stockpile topsoil in accordance with Section 203 and use it on this project as needed under Section 641 - Loam and/or Section 647 - Humus.

Guardrail/Barrier

1. Maintain proper drainage under existing guardrail sections by removing and properly disposing of winter sand buildup and other debris that accumulates beneath the guardrail. This effort shall be subsidiary to the Work.
2. **Item 606.417 - Portable Concrete Barrier for Traffic Control shall conform to the current NHDOT Standard Plan GR-23.** See also the *Notice to Contractors* regarding portable concrete barrier and linking pin connection located elsewhere in the Proposal.
3. The quantity of Item 606.417 – Portable Concrete Barrier for Traffic Control included in this contract will be the maximum amount paid for this project. Should a greater quantity be required due to Contractor's means and methods, the exceeding quantity shall be at the Contractor's expense.
4. The Contractor is advised of the Special Provision provided for Item 606.1X5X – Beam Guardrail (Terminal Unit Type EAGRT, TL X) (Steel Post).

Pavement Work

1. Pavement joint adhesive (Item 403.6), shall be applied to all exposed longitudinal joints, including curbing, for all pavement courses prior to placement of each pavement course pass.
2. Use a Material Transfer Vehicle (MTV) (Item 403.4) for placement of the asphalt wearing course (Item 403.11902) within the project limits, or as directed.
3. The Contractor's attention is directed to the addition of Item 410.22 - Asphalt Emulsion for Tack Coat. This work, which was subsidiary on prior Contracts, will be paid for by the gallon at the application rate stated in the Section 410.3.
4. If the wearing course cannot be completed prior to winter shutdown, the binder lift shall be a "Winter" binder, subsidiary to Item 403.11002 – Hot Bituminous Pavement, Machine Method, (QC/QA Tier 2). The winter binder mix contains a slightly higher AC content coupled with a finer gradation to provide a tighter surface that is more amenable to winter plowing and deicing. See Supplemental Specification for Section 401 regarding "winter" binder.

Delineation

1. Quantities of Item 621.31 – Single Delineator with Post and Item 621.32 – Double Delineator with Post have been included to replace the existing delineators. Install these as shown on the Standard Sheets DL-1 and DL-2.
2. Mechanically connect delineators to the top of the portable concrete barrier for traffic control, subsidiary to Item 606.417.

Drainage

1. Provide water diversion during the installation of the headwall at Sta. 123+57 (DN 67) using Item 503.101 – Water Diversion Structure. Item 503.102 – Water Diversion Structure has also been included for operations associated with the muck excavation operation from Sta. 161+00 – 170+00.

2. Maintain the existing 60" rcp/cmp at Sta. 169+17 (DN R50) until the proposed 60" RCP at Sta. 169+00 (DN 193) is installed. Item 503.103 – Water Diversion Structure has been included at this location to support the pipe installation and removal operations.

3. Construct the proposed 60" RCP at Sta. 169+00 (DN 193) in sections associated with the surcharge operation, installing the left side upon completion of the surcharge on the left, and the right upon completion of the surcharge on the right. Utilize Item 503.201 and 503.202 – Cofferdams during installation operations. Exploration logs should be referenced for more detailed descriptions of the conditions at this location. Subsurface conditions are known only at the exploration locations and could vary at other locations at the site. Groundwater levels noted on the exploration logs represent the conditions at the times of measurement and could change in response to several factors including precipitation and terrain alteration.

4. Protect the existing underground telephone conduit, which runs along the west side of NH 101, during removal of the existing 60" cmp/rcp (DN 193) and installation of the proposed 60" RCP at Sta. 169+00. Temporary support and protection of the underground telephone conduit shall inspected by the owner of the conduit system, and is subsidiary to the respective drainage item.

5. Construct the channel (DN 248/249/250/257), which runs along the toe of the proposed slope between Colonial Drive and BMP 192 (Sta. 186+37 to 192+45Rt) from the road side of the channel, to minimize impacts to the adjacent wetland area.

6. Utilize Item 645.0001 – Turbidity Barrier during construction of the headwall at the existing triple 18" RCP's at Sta. 116+32 Lt (DN 28), to minimize impacts to the adjacent natural resources.

Pavement Marking and Signing

1. All permanent signs within the project limits are to be replaced under this project. The Contractor shall maintain all existing signing during the life of the contract. If the Contractor damages signs during construction, the Contractor shall be responsible to replace them, at the Contractor's expense, according to Department standards (available upon request).

2. Contact the NHDOT Bureau of Traffic (Julie Mathews, 603-271-8011) at least two (2) weeks in advance of final pavement marking operations in order to review the Contractor's layout.

3. Pavement markings shall extend beyond project paving limits as directed to overlap existing markings disturbed by construction.

4. The Contractor is responsible for any damage to public or private vehicles and property due to striping and must be reported to the Contract Administrator as soon as possible.

Permanent Dynamic Message Sign (DMS)

1. The Contractor is alerted that a mandatory ITS Pre-Construction meeting is required for this project. Coordinate with the Transportation Systems Management and Operations (TSMO) Transportation Management Center (TMC) ITS Project Manager (Charles Blackman, 603-271-0016).
2. All cellular communication equipment shall be subsidiary to the 677 Intelligent Transportation System (ITS) items.

SWZ CONSTRUCTION REQUIREMENTS

1. The Contract Administrator will coordinate with the Transportation Management Center (TMC) (603-271-6862) if any of the SWZ devices within the project limits and the surrounding area are needed for Incident Management.
2. The Contract Administrator will perform a periodic evaluation of the effectiveness of the SMZ. If certain SWZ devices are considered unnecessary or ineffective, the Contract Administrator will review the results of the evaluation with the TMC and the Town of Bedford, and may eliminate such devices upon concurrence.
3. Refer to the individual device plan sheets for additional information regarding device type, device locations, and if a platform is needed. Locations shown on the plans are approximately and may be adjusted to fit field conditions, upon approval of the Contract Administrator.
4. The approved field locations of the equipment must meet the clear zone requirements established in the AASHTO Roadside Design Guide (latest edition) unless specified or approved in the project proposal or by the Contract Administrator.
5. SWZ items are being utilized along NH 101, within and outside of the project area, as well as on nearby regional routes, to assist in mitigating construction activity effects on traffic flow. The Contractor shall coordinate with concurrent project contractors and the Contract Administrator with regard to issues relating to these components, including placement and construction related relocations.
6. The SWZ System shall provide device outage alerts via email to the TMC for outages greater than 30 minutes. These will be used to generate a monthly summary spreadsheet displaying outages to the Bureau of Construction and the Bureau of Transportation Systems, Management and Operations (TSMO). These outages shall be used to determine pay reduction as per the pro-rated schedule outlined in the Section 619 – Smart Work Zone Special Provision, under 619.5.10.
7. The SWZ System off-corridor PCMSs are intended to provide real-time travel time estimates for motorists intending to travel along NH 101, eastbound and westbound, through the project work zone. The travel time estimates are derived from the on-corridor Portable Queue Trailers (PQTs).
8. All SWZ equipment shall be compatible and fully integrated with the ASTI Transportation System backend software. See the 619 Special Provisions for additional details related to the SWZ system.
9. All Contractor-furnished SWZ equipment shall be in place and operational before the start of Traffic Control Plan Phase 1A.

10. Upon substantial completion of this project, three (3) PQTs shall be salvaged to the NHDOT, Bureau of TSMO. The Contractor shall conduct manufacturer-recommended preventative maintenance to the units and deliver them to the NHDOT District Five office.

EXCAVATIONS

If slopes steeper than 4:1 adjacent to the traveled way or shoulders open to traffic are not protected by existing or new guardrail through non-work hours, protect traffic from these areas using traffic control barrier and temporary lighting if required, as approved by the Engineer at the Contractor's expense.

ELECTRONIC SCHEDULING

The Contractor shall submit an electronic Critical Path Method Schedule (CPM) (Item 697.41) for documentation in accordance with 105.02. Refer to the Special Provision for Item 697.41 and Section 108.03.A – Progress Schedule for detailed information.

The Contractor is advised that, as part of the project schedule documentation, an early initial Progress Schedule must be submitted within 2 weeks of Governor and Council (G&C) contract approval (subsidiary to Item 697.41). This early schedule shall be in accordance with Section 108.03.A – Progress Schedule.

SALVAGE OF MATERIALS

If the Department judges the following materials suitable for re-use, salvage, stockpile, and load them onto the indicated recipients vehicles as required under 104.04. Care shall be taken during the removal operations so as not to damage any salvaged materials. Material damaged during removal due to the Contractor's negligence shall be replaced at the Contractor's expense. Removal of all materials will be paid for under specific Items of the contract or subsidiary as shown on the Plans or as stated in the Proposal or the Standard Specifications.

Highway Maintenance, District 5

Contact: District 5 Maintenance Engineer Rich Radwanski (603-666-3336)

- W-beam rail and end units. Contact one week in advance to schedule for pickup by District forces.

Bureau of Traffic

Contact: Traffic Operations Engineer Peter Crouch (603-419-0254)

- Traffic signal components.

In addition, upon substantial completion of the project, three (3) PQTs shall be salvaged and delivered to the District 5 office. Perform manufacturer-recommended preventative maintenance to the units prior to delivery to the District office. Contact the District 5 Maintenance Engineer to coordinate delivery.

Materials deemed not salvageable, including guardrail posts, shall become the property of the Contractor who is responsible for proper disposal.

WORK HOURS

Do not perform any work involving high noise machinery such as jackhammers or excavating equipment, including starting and warming up the equipment, prior to 6:30 a.m. or after 7:00 p.m., unless otherwise permitted in the contract or approved by the Engineer.

In addition to the Limitation of Work requirements described in 108.04, do not perform any work during special events scheduled by the Town of Bedford unless otherwise approved. Contact the Bedford Town Manager (Rick Sawyer, 603-472-5242) for special events.

WINTER MAINTENANCE PERIOD

Implement the following measures as a minimum prior to the winter suspension of work:

- Maintain traffic on new full width pavement with appropriate pavement markings for the winter.
- Pave all drives that have had pavement removed during construction.
- Stabilize and/or vegetate all disturbed slopes.
- Remove temporary traffic control barrier that hinders winter maintenance.
- Prior to winter maintenance season (beginning November 1), arrange a review of this project with the Bureau of Traffic (Julie Mathews, 603-271-8011), the Highway Maintenance District 5 Engineer (Rich Radwanski, 603-666-3336), and the Bedford Public Works Director (Jim Stanford, 603-472-4572) to ensure the roadway is acceptable for winter maintenance.

CONSTRUCTION OPEN HOUSE

As part of Public Outreach, the Contractor will attend a construction "open house", once the contract has been approved by G&C, and prior to beginning work. The open house will focus on providing the community with a preliminary seasonal schedule of work, and offer insight into the anticipate construction sequence. The Contractor shall present their early initial Progress Schedule, as discussed elsewhere in this Proposal, and shall be available to answer questions during the length of the open house.

INTERMEDIATE COMPLETION DATE

Demolish the existing buildings on Parcels 10, 12, and 36 by Friday, September 15, 2017 to allow for construction of the BMPs.

No allowance will be given for unfavorable weather or ground conditions (see Special Provision to 108.07) or for delays in materials (see 108.07.B.3).

FINAL COMPLETION DATE

The Completion Date is Friday, September 27, 2019.

No allowance will be given for unfavorable weather or ground conditions (see Special Provision to 108.07) or for delays in materials (see 108.07.B.3).

BEDFORD
13953

April 17, 2017

TRAFFIC CONTROL PLAN

The following are considered to be part of the Traffic Control Plan:

1. Sections 618 and 619 of the Standard Specifications
2. Work Zone Traffic Control Standard Plans*
3. *Manual on Uniform Traffic Control Devices* (MUTCD), *2009 Edition*
4. *Flagger and Uniformed Officer Use in Work Zones Policy* and *Guidelines**

* Available on line under *Doing Business with DOT>Contractors* at www.nhdot.com or through the NHDOT Contracts Office (603-271-3732).

The above referenced specifications, guidelines, and provisions herein provide minimum requirements and/or guidelines; the Contractor may be directed to expand upon the Traffic Control Plan if conditions warrant.

All Uniformed Officers working on any NHDOT funded project, including municipally managed projects, shall have successfully completed a NHDOT approved course on *The Safe and Effective Use of Law Enforcement Personnel in Work Zones*. The officer shall supply proof of successful course completion upon request.

NOTIFICATION REQUIREMENTS FOR CHANGES IN TRAFFIC CONTROL

Per FHWA rule 1201 the TMC shall be notified within 10 minutes of installing the first advanced warning sign for a lane closure or lane blocking event. The TMC shall also be notified within 10 minutes of removal of the last advanced warning sign. This is a requirement for every lane closure planned or unplanned. The Engineer may approve any refinements to the traffic control plan as appropriate. An additional notification with specific information on the pending change shall be provided to the Engineer at least 48 hours in advance of the proposed traffic control change. This work shall be subsidiary to Item 619.1-Maintenance of Traffic. No changes in traffic control will be allowed without completing all advanced notification requirements. The Contract Administrator will communicate all lane altering events to:

TMC Operations Supervisor
Bureau of Transportation Systems Management and Operations (TSMO)
State of New Hampshire-Department of Transportation
PO Box 483
Concord, NH 03302-0483
Tel. (603-271-6TMC)
N56TSMOMail@dot.nh.gov

In addition, the Contractor shall notify and provide information regarding traffic control operations to the area emergency services noted below (subsidiary to Item 619.1 – Maintenance of Traffic). Particularly this includes instances such as slip ramp closure, resetting of granite curb on the slip ramp, and other operations that may block traffic flow temporarily through the work zone:

Emergency Service Contacts:

I. Scott Wiggin, Town of Bedford, Fire Chief, (603-472-3219),
II. John Bryfonski, Town of Bedford, Police Chief, (603-472-5113),
III. Daniel Goonan, City of Manchester, Fire Chief, (603-669-2256), and
IV. Lt. Jeffrey Ladieu, Dept. of Safety, State Police Headquarters, (603-223-3856).

ADDITIONAL TRAFFIC CONTROL NOTIFICATION

For any traffic control that reduces total contiguous available pavement width to 15' or less, complete and fax a Lane Restriction Form two weeks in advance to the NHDOT Permit Office (603-271-5990). The form may be found elsewhere in the proposal. The Engineer may require the Contractor to sign for alternate routing of wide loads (subsidiary to Item 619.1).

MAINTENANCE OF TRAFFIC

1. The Contractor shall notify the Town of Bedford Police Chief (John Bryfonski, 603-472-5113), at least 72 hours in advance of any side road full closure or implementation of any traffic control that reduces travel to one lane.

2. Perform all side road work during the Town of Bedford school district summer suspension (vacation).

3. Simultaneous work will not be allowed on the following side roads: Wallace Road (east) and Nashua Road, Wallace Road (west) and Meetinghouse Road (west), Meetinghouse Road (west) and Meetinghouse Road (east), Pinecrest Drive West and Pinecrest Drive East, Meetinghouse Road (east) and Liberty Hill Road, Shaw Drive and Colonial Drive, Olde Bedford Way and Old Bedford Road. Work on these roads shall be done individually or in concurrence with other side roads that do not interfere with connecting travel patterns as approved by the Engineer.

4. Maintain one lane of traffic in each direction along NH 101 at all times, unless otherwise approved by the Engineer.

5. The Contractor is advised that work may be limited during the weeks of NASCAR activities at NH Motor Speedway (NHMS) in July and September.

6. Secure approval prior to any implementation of temporary lane closures. Short term one-lane, alternating two-way traffic will be allowed with approval. Maintain two-lane two-way traffic during peak volumes and non-work hours.

7. Temporary lane closures and/or traffic shutdowns, as approved by the Contract Administrator to accommodate blasting operations, will only be permitted Monday through Friday between the hours of 10:00 am and 2:00 pm.

8. The Contractor shall conduct blasting operations to prevent fly-rock onto adjacent properties outside the right-of way and onto the traveled way along NH 101. Following the blast, move immediately to clear any blasted rock from the traveled way and shoulders to enable traffic to resume. Make all equipment needed for cleanup of blasted rock readily available prior to each blast.

9. Maintain traffic on pavement having a minimum width of 11' travel lanes and 2' shoulders. Short (daily) duration lane shifts on unpaved (crushed gravel or reclaimed base material) surfaces shall be subject to the approval of the Engineer.

10. Use Item 619.25 - Portable Changeable Message Signs (PCMS) to advise motorists in advance of shoulder or lane closures associated with construction activities. Set the PCMSs up in advisory mode, one week prior to beginning the work. Notify District 5 Maintenance Engineer (Rich Radwanski, 603-666-3336), 1 week in advance of the closure. Provide any other required signs compliant with MUTCD requirements, subsidiary to Item 619.1. *The intent is to reserve the use of these signs for meaningful messages that will help motorists get through the work zone safely and not simply repeat information found on other Construction Signs.*

11. Maintain the operation of existing pedestrian signals at all times.

12. NH Route 101, east of the NH 101/114 intersection (400 series alignment) only:

    a) Place item 632.0106 - Retroreflective Paint Pavement Marking, 6" line (centerlines and lanelines) on all intermediate binder and temporary pavement courses in accordance with 619.3.3.1.1 prior to opening to traffic. This paint application will not have to be removed. If paint cannot be applied immediately due to unforeseen reasons, then Preformed Retroreflective Tape, Type I (Removable) 4" Line conforming to the requirements of Item 632.1104 shall be used until such time as the paint can be applied (4' lengths and 36' gaps). The use of temporary removable tape on the intermediate and/or temporary pavement courses, and its removal, shall be subsidiary to Item 619.1 in accordance with specification 619.5.2.1.

    b) Paint for the single solid line delineating the outside of the exterior lanes shall be applied to the binder and wearing courses as soon as possible or as directed by the Engineer. No offsetting of this line will be allowed.

    c) Temporary flexible raised pavement markers will only be permitted to be used on main line in case of an emergency (not in lieu of paint or tape). The Contractor will NOT be allowed to continue paving until the RPM's are removed from the main line and the necessary pavement striping placed. The RPM's shall only be used to delineate gore areas and shall be removed just prior to the application of Item 632.3112 - Retroreflective Thermoplastic Pave. Marking 12" Line.

13. If operational signs are approved for use in place of permanent construction signs, place the bottom of the signs a minimum 3' above the road grade. To improve operational sign visibility, use the same sign stands for operational signs in multi-lane areas and when signs are placed behind guardrail.

14. No lane or slip ramp closures will be allowed on Sundays, Holidays, or the day preceding a Holiday.
15. The use of the median crossovers on NH 101 will not be allowed for any purpose.
16. The Contractor shall supply new permanent construction signs at the beginning of the project.
17. Maintain permanent signing at all times.
18. The Contractor shall remove and relocate all existing regulatory/warning signs that are still relevant for each construction phase, as needed. This work is subsidiary to the Work.
19. Workers' private vehicles shall not be parked within the Right-of-Way or Controlled/Limited Access Right-of-Way, unless otherwise approved by the Engineer.
20. Work operations shall be discontinued whenever the Engineer determines traffic backups may contribute to either unsafe conditions or result in excessive delays for the traveling public.
21. Maintain access to businesses and residences at all times. Eliminate "lips" created with cold planing operations at the Contractor's expense. In the event that work must be completed at side roads/drives that preclude full access, the Contractor shall coordinate with the abutters to arrange the work to be done at a time that minimizes inconvenience to the property owners/tenants.

MAINTENANCE OF PEDESTRIAN AND BICYCLE TRAFFIC

The project includes both existing and proposed sidewalks. The Contractor shall provide continued access through the project area for pedestrians and bicyclists at all times once a route is established. The Contractor shall perform sidewalk work on one side of the road at a time and a delineated 5' (minimum) area shall be maintained on the opposite side through the construction zone at all times. The Contractor is to provide ADA compliant temporary routes and connections (i.e. crosswalks or ramps) from the existing sidewalk through the temporary route until the new sidewalks are constructed and operational. The temporary facilities shall be detectable and shall include accessibility features consistent with the features present on the existing pedestrian facility. The Contractor shall install signs such as "SIDEWALK CLOSED-CROSS HERE" during these closures. Signs shall be placed far enough in advance of the closure to warn pedestrians prior to entering the work zone, see the MUTCD Typical Applications 28 and 29 for reference. This work will be subsidiary to Item 619.1 – Maintenance of Traffic.

SPEED REDUCTION

No speed reduction will be allowed on this project for normal construction activities.

NIGHTTIME CLOSURE CONSIDERATIONS

It is anticipated that traffic restrictions will occur during the hours of darkness. When that occurs:

1. Dim flashing arrow boards by 50% at night for lane closures.

2. Be aware of and adhere to Section 619.3.2.7 concerning Loading and Unloading Equipment and written instructions to all drivers.
3. Do not allow workers or construction vehicles to enter into, or impede the flow of traffic in an open lane. Do not allow construction vehicles to slow down or stop in any travel lane unless such lane has previously been made safe with appropriate signs and channelizing installed devices as required.

PROHIBITION OF UNNECESSARY TRAFFIC OBSTRUCTION

The clear zone measured from the edge of the traveled way open to traffic shall be as follows:

- 16 feet in areas of posted speed limits 40 mph or less,
- 20 feet in areas of posted speed limits from 45 to 55 mph, and

Work must be performed in such a way that does not adversely affect traffic from both sides of the roadway at any location at the same time.

VARIATION FROM THE TRAFFIC CONTROL PLAN

If the Contractor feels improvements can be made to the Traffic Control Plan for this project, the Contractor shall submit a written proposal to the Department with any necessary plans for consideration and approval.

OVERSIZE/OVERWEIGHT
LANE RESTRICTION FORM

SUBMIT TO OVERSIZE/OVERWEIGHT PERMIT OFFICE

FAX: 603-271-5990

Date Submitted: _____

Project Name: _____ **Project #:** _____

Town: _____ **Bridge #:** _____

Roadway: _____ **Crossing:** _____
(NB, SB, EB, WB) (NB, SB, EB, WB)

Available Travel Width: _____ **Time of Day from:** _____ **to:** _____

Date Starting: _____ **Type of Work:** _____

Date Ending: _____ **Contact Name:** _____

Duration: _____ **Phone #:** _____

One Lane Traffic: ☐ Yes ☐ No **Cell Phone #:** _____

Detour: ☐ Yes ☐ No

Description: _____

_____

Notes:

1. The following are NETC routes: Route 2 from Route 3 to NH/ME stateline, Route 3 from Route 302 to Route 2, Route 9 from NH/VT stateline to I-89, Route 16 from Portsmouth to Route 302, I-89, I-93, Route 101 from Route 3 to Hampton, Route 125, Route 202 from Route 16 to NH/ME stateline and Route 302 from I-93 to NH/ME stateline. Maintain at least one lane with adequate width and geometry to allow loads up to 14 feet wide and 100 feet long from 1/2 hour before sunrise to 1/2 hour after sunset on non-holiday weekdays.

2. Maintain adequate width and geometry for loads up to 10 feet 6 inches wide, 13 feet 6 inches height, and 75 feet long or provide adequate detour route.

3. Submit lane restriction form a minimum of 10 working days prior to: 1) start of lane restriction, 2) change of lane restriction conditions, and 3) change of lane restriction ending date.

OVERSIZE/OVERWEIGHT PERMIT OFFICE USE ONLY

Notifications: **Date Received:** _____

Maine _____
Massachusetts _____
Vermont _____
Rhode Island _____
TMC _____
Districts _____
Other: _____

Lane Restriction Form 071411.xls

BEDFORD
13953
April 4, 2017

Summary of Environmental Issues

The following is provided to assist in identifying the environmentally sensitive aspects of this project. This notification is neither intended to be all-inclusive nor to replace the need to thoroughly read and abide by all contract documents including but not limited to all applicable state specifications and permits. (See the Prosecution of Work (POW) located elsewhere in the proposal for additional information.)

Actions To Be Completed Prior to Earth Disturbing Activities (including clearing)

- **Storm Water Pollution Prevention Plan (SWPPP):** A Storm Water Pollution Prevention Plan (SWPPP) shall be submitted to the Department for approval at least 15 working days prior to the expected start date.

- **Notice of Intent (NOI):** This project is eligible for coverage under the Environmental Protection Agency's (EPA), National Pollutant Discharge Elimination Systems (NPDES) Construction General Permit (CGP). A Notice of Intent (NOI) shall be filed with the EPA.

- **Water Quality Certificate:** A 401 Water Quality Certificate has been issued by the Department of Environmental Services (DES) for this project. A water quality sampling and analysis plan shall be included as part of the project SWPPP.

- **Erosion Control Strategies:** The Contractor is directed to review and incorporate all applicable provisions outlined by the Department in the Wetland Plans "Erosion Control Strategies and Stabilization Matrix" sheet. This sheet outlines the Department's commitments and strategies to minimize the impacts of construction to the environment. The Erosion Control Strategies and Stabilization Matrix" sheet is available on-line on the Invitation to Bid webpage at nhdot.com in the specific project's Proposal Package.

- **Project Bulletin Board:** Environmental documents shall be posted on the project's Bulletin Board. Documents shall include, but are not limited to, signed copies of permits issued by regulatory agencies, NOI tracking numbers, contact information and location of project SWPPP.

- **Invasive Species Control and Management Plan:** An Invasive Species Control and Management Plan shall be submitted to the Department for approval at least 15 working days prior to the expected start date.

- **Endangered/Threatened Species:** The U.S. Fish and Wildlife Service (USFWS) has listed the Northern Long-eared bat (NLEB) as threatened under the Endangered Species Act (ESA) to protect the bat and its habitat. A presence/absence survey was conducted with a determination of negative presence for the Northern Long-eared Bat within the project limits.

The Northern Long-Eared Bat Flyer, included elsewhere in the contract, shall be shared with all operators, employees, and contractors working on the project and operators, employees, and contractors shall be made aware of all applicable environmental commitments.

The Eastern Hognose Snake, and Blanding's Turtle, NH State Endangered reptiles; and Wood Turtle, a NH Special Concern reptile, have been identified as occurring within the Town of Bedford by the NH Fish and Game Department (NHFGD). The Contractor is directed to be on the lookout for the possible presence of these species during construction of the project. If encountered, the Eastern Hognose Snake shall not be harassed or harmed. Encounters with the snake are to be reported to the NHFGD as detailed in the flyer included elsewhere in the contract. Nesting turtles are to be reported to the NHFGD.

- **Contaminated Materials Management:** Areas of contamination are located within the project limits. The Contractor shall prepare a Projects Operation Plan (POP). A Soils Management Report prepared by the Department is available for use in preparation of the POP.

  An Environmental pre-construction meeting shall be held separate of the projects pre-construction meeting to discuss the POP and shall be attended by the Contractor, the NHDOT and NHDOT's environmental consultant.

- **NHDES/Army Corps of Engineers Wetland Impact Permits/Mitigation:** The Department has received the necessary wetland impact permits from the NHDES and USACOE for work as shown on the plans. The Department of Transportation shall make a one-time payment in the amount of $954,706.95 to the DES Aquatic Resource Mitigation (ARM) Fund once the project has been approved by G&C and construction funds are available.

Actions to be Completed During Construction

- **Endangered/Threatened Species:** All sightings of dead or sick bats shall be immediately reported to the NHDOT Bureau of Environment.

- **Cultural Resources:** The following historic resources are located within the project limits: the Bedford Village Historic District (west side of NH 101 from Bell Hill Road to Ode Bedford Way), the Frederick & Thyra French House at 2 Liberty Hill Road (Parcel 43), and the Bedford Town Hall at 10 Meeting House Rd. (Parcel 29). The Department has designed this project to minimize impacts and/or avoids these resources. No further impacts to these historic properties are allowed.

  Monitoring of vibration impacts shall be established during construction that will include a direct communication protocol with the home owner of the Individually Eligible French House at 2 Liberty Hill Road (Parcel 43).

- **Contaminated Materials Management:** If previously unidentified contaminated soils are encountered during construction, the NHDOT Bureau of Environment shall be informed and work shall be halted until a representative of the NHDOT Bureau of Environment inspects the site.

  If contaminated groundwater is encountered during construction and dewatering of the area is necessary, the contractor shall be required to obtain a groundwater discharge permit from the Department of Environmental Services.

s:\environment\projects\bedford\13953\summary of environmental issues1.docx

DEPARTMENT OF THE ARMY PERMIT

Permittee New Hampshire Department of Transportation

Permit No. NAE-2016-02210

Issuing Office New England District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

Fill approximately 216,944 sq. ft. of Waters of the United States which includes 56,110 sq. ft. of temporary impacts and 160,834 sq. ft. of permanent impacts in Bedford, New Hampshire, associated with the widening and improvement of New Hampshire (NH) RT 101 located between Wallace Road and NH Route 114/Boynton Street.

This work is shown on the attached plans entitled, USGS Map, Pinardville, WETLAND SUMMARY TABLE and NHDOT WETLAND PLANS, TOWN OF BEDFORD, RT 101, NH PROJECT NO. 13953, on a total of 17 sheets, and dated "October, 2015 and January 27, 2017".

Project Location:

New Hampshire (NH) RT 101 located between Wallace Road and NH Route 114/Boynton Street, in Bedford, NH

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on March 24, 2027 **. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.**

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. The permittee shall ensure that a copy of this permit is at the work site (and the project office) authorized by this permit whenever work is being performed, and that all personnel with operational control of the site ensure that all appropriate personnel performing work are fully aware of its terms and conditions. The entire permit shall be made a part of any and all contracts and sub-contracts for work that affects areas of Corps jurisdiction at the site of the work authorized by this permit. This shall be achieved by including the entire permit in the specifications for work. The term "entire permit" means this permit (including its drawings, plans, appendices and other attachments) and also includes permit modifications.

(Special conditions continued on Page 4)

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

(PERMITTEE) *(DATE)*

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

3-24-2017

(DATE)

Frank J. DelGiudice
Chief, Permits & Enforcement Branch
Regulatory Division
For District Engineer

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) *(DATE)*

★U.S. GOVERNMENT PRINTING OFFICE: 1986 — 717-425

(Special conditions continued from Page 2)

If the permit is issued after the construction specifications, but before receipt of bids or quotes, the entire permit shall be included as an addendum to the specifications. If the permit is issued after receipt of bids or quotes, the entire permit shall be included in the contract or sub-contract. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions contained within the entire permit, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps jurisdiction.

2. The permittee shall complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

3. Construct in accordance with the attached plans

All construction shall be completed in accordance with the limits of construction and construction sequences detailed on the attached plan drawings, entitled "USGS Map, Pinardville, WETLAND SUMMARY TABLE and NHDOT WETLAND PLANS, TOWN OF BEDFORD, RT 101, NH PROJECT NO. 13953, on a total of 17 sheets, and dated "October, 2015 and January 27, 2017". If you change the plans or construction methods for work within or adjacent to the wetlands and/or waterways, please contact us immediately to discuss modification of this authorization. The Corps must approve any changes before you undertake them.

4. Submittals and Notification

Except where stated otherwise, reports, drawings, correspondence and any other submittals required by this permit shall be marked with the words "Permit No. NAE-2016-02210" and shall be submitted via: a) MAIL: PATS Branch - Regulatory Division, Corps of Engineers, New England District, 696 Virginia Road, Concord, MA 01742-2751, or b) FAX: (978) 318-8303. Documents which are not marked and addressed in this manner may not reach their intended destination and do not comply with the requirements of this permit. Requirements for immediate notification to the Corps shall be done by telephone to (978) 318-8338.

5. Pre-Construction Meetings:

Prior to the commencement of work authorized by this permit, the New Hampshire DOT shall schedule and hold a pre-construction meeting with the Corps of Engineers and the contractor in order to discuss the terms and conditions of this authorization.

6. Invasive Species

a. Prior to being onsite, the contractor shall thoroughly inspect and remove seeds, plant material, soil, mud, insects, and other invertebrates on all equipment, including construction mats, to be used on the project site to prohibit introduction of invasive organisms. At a minimum, the following shall be inspected and cleaned on terrestrial vehicles where applicable:

Rubber Tired Vehicles - Crevices in upper surface and panels, tires, rims, and fender wells, spare tire mounting area, bumpers, front and rear quarter panels, around and behind grills, bottom of radiator vent openings, brake mechanisms, transmission, stabilizer bar, shock absorbers, front and rear axles, beds, suspension units, exhaust systems, light casings, and mirrors.

Tracked Land Vehicles - Crevices in upper surface and panels, top of axles and tensioners, support rollers, between rubber or gridded areas, beneath fenders, hatches, under casings, and grills.
Interiors of All Vehicles - Beneath seats, beneath floor mats, upholstery, beneath foot pedals, inside folds of gear shift cover.

b. When equipment has been previously used in an area known or suspected to contain live zebra or quagga mussels at any life stage, the contractor shall thoroughly clean all equipment that was in contact with the body of water before bringing it. Whenever practical, the least infested (or least likely to be infested) sites should be visited first to reduce the risk of accidentally infecting a new area during field work.

7. Temporary Fill
Temporary fill that is authorized herein shall adhere to the following:
a. All temporary fill shall be stabilized to prevent its eroding into portions of waters of the U.S., including wetlands, where it is not authorized.
b. Unconfined temporary fill authorized for discharge into waters of the U.S., including wetlands, shall consist of material that minimizes impacts to water quality (e.g. sandbags, clean gravel, stone, aggregate, etc.).
c. Temporary fill authorized for discharge into wetlands should be placed on geotextile fabric or other material (e.g., straw) laid on the pre-construction wetland grade where practicable to minimize impacts.
d. Temporary fill shall be removed as soon as it is no longer needed, disposed of at an upland site, and suitably contained to prevent subsequent erosion into waters of the U.S, including wetlands. Temporary fill placed during the:
i. Growing season must be removed before the beginning of the next growing season.
ii. Non-growing season may remain throughout the following growing season, but must be removed before the beginning of the next growing season.
e. Waters of the U.S., including wetlands, where temporary fill was discharged shall be restored.
f. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must be placed in a manner that will not be eroded by expected high flows.
g. Construction mats and corduroy roads are considered as temporary fill when they are removed immediately upon work completion. The area must be restored.
h. When temporary fill is authorized and placed in wetlands or waters to support excavation equipment which will perform trenching operations, protective geotextile fabric shall first be placed in two parallel strips, separated by the location and width of the future trench. The excavation equipment shall operate atop these parallel strips. This does not apply to mats.

8. Mitigation

a. In-Lieu Fee

Mitigation shall be provided in the form of an "in-lieu-fee" (ILF) payment of $954,706.95 into the NHDES Aquatic Resource Mitigation (ARM) Fund as mitigation for this project, in accordance with the terms of Condition No. 23 of the above-referenced NHDES Approval Notice, dated March 17, 2017. Work shall not begin until this payment is made.

The State of New Hampshire
Department of Environmental Services

Clark B. Freise, Assistant Commissioner

March 17, 2017

NH DEPT OF TRANSPORTATION
ATTN: MARC LAURIN
PO BOX 483
CONCORD NH 03302-0483

RE: NH Dept Of Transportation - File # 2016-02893 - Bedford

Dear Mr. Laurin:

The New Hampshire Department of Environmental Services (NHDES) Wetlands Bureau has concluded its review of file 2016-02893. NHDES issues this approval notice for the application to: Widen Route 101 approximately 2 miles from Wallace Rd. to Route 114/Boynton St. constructing turn lanes, medians and sidewalks impacting 236,848 sq. ft. (56,110 sq. ft. temporary) of palustrine and riverine wetlands. Compensatory mitigation includes a one-time payment of $954,706.95 to the Aquatic Resource Mitigation Fund. NHDOT project 13953.

The decision to approve this application was based on the following conditions being met:

1. All work shall be in accordance with:
   a. Plans by NHDOT Bureau of Highway Design dated 11/14/15 (REVISED Jan. 27, 2017) as received by the Department on Feb. 7, 2017 and
   b. Simulated Streambed Material shall be in accordance with Special Provision sheet / chart dated Feb. 1, 2017 (Bedford 13953).
2. At least 48 hours prior to the start of construction, a pre-construction meeting shall be held with NHDES Land Resources Management Program staff at the project site, at the NHDES Office in Concord, N.H. or NHDOT Office in Concord, N.H. to review the conditions of this wetlands permit.
3. It shall be the responsibility of the permittee to schedule and coordinate the pre-construction meeting providing at least 5-day notice to the NHDES Wetlands Bureau and / or other Land Resources Management Program staff, and the meeting shall be attended by the permittee, the contract administrator(s), wetlands scientist(s), erosion control monitor, and the contractor(s) responsible for performing the work.
4. Any dredged material shall be placed out of the DES Wetlands Bureau jurisdiction.
5. Appropriate siltation/erosion/turbidity controls shall be in place prior to construction, shall be maintained during construction, and shall remain until the area is stabilized.
6. Construction equipment shall not be located within surface waters.
7. Discharge from dewatering of work areas shall be to sediment basins that are: a) located in uplands; b) lined with hay bales or other acceptable sediment trapping liners; and c) set back as far as possible from wetlands and surface waters, in all cases with a minimum of 20 feet of undisturbed vegetated buffer.
8. Within three days of the last activity in an area, all exposed soil areas, where construction activities are complete, shall be stabilized by seeding and mulching during the growing season, or if not within the growing season, by mulching with tack on slopes steeper than 3:1 or netting /matting and pinning on slopes steeper than 2:1.
9. Where construction activities have been temporarily suspended within the growing season, all exposed soil areas shall be stabilized within 14 days by seeding and mulching or if temporarily suspended outside the growing season, all

exposed areas shall be stabilized within 14 days by mulching, mulching with tack on slopes steeper than 3:1 and stabilized by matting and pinning on slopes steeper than 2:1.
10. The contractor responsible for completion of the work shall utilize techniques described in the New Hampshire Stormwater Manual, Volume 3, Erosion and Sediment Controls During Construction (December 2008).
11. Extreme precautions to be taken within riparian areas to limit unnecessary removal of vegetation during road construction and areas cleared of vegetation to be revegetated as quickly as possible.
12. There shall be no further alteration to wetlands or surface waters without amendment of this permit.
13. Proper headwalls shall be constructed within seven days of culvert installation.
14. Work shall be done during low flow.
15. Should invasive species be encountered during construction, the contractor will follow the appropriate procedures outlined in NHDOT's Best Management Practices for Roadside Invasive Plants, dated 2008 to ensure proper handling and disposal.
16. All construction personnel shall be informed to exercise caution and be aware during turtle nesting season between late May and early July. Nesting turtles are to be reported to NH Fish and Game Dept. which is to be added to the project construction list.
17. Coco/straw matting shall be used instead of netted erosion control fabric to avoid impacts to the species noted.
18. Mitigation Project Monitoring plan to be submitted prior to construction in accordance with Env-Wt 803.04 including the information required per Env-Wt 803.03 and Env-Wt 803.01.
19. Plantings shall be monitored for 5 growing seasons
20. The mitigation areas shall have at least 75% successful establishment of wetlands vegetation after two (2) growing seasons, or shall be replanted and re-established until a functional wetland buffer is replicated in a manner satisfactory to the DES Wetlands Bureau.
21. Contractor is to consider using vegetative blocks that are transplanted from wetland impact areas into the wetland/ stream bank re-establishment areas to reduce the opportunity of inserting invasive species and decrease mortality rate by using native species
22. A post-construction report documenting the status of the completed project with photographs shall be submitted to the Wetlands Bureau within 60 days of the completion of construction.
23. This approval is not valid until DES receives a one-time payment of $954,706.95 to the DES Aquatic Resource Mitigation (ARM) Fund. The applicant shall remit payment to DES. If DES does not receive payment within 120 days of the date of this approval letter, DES will deny the application.

The decision to approve this application was based on the following findings:

1. This is a major impact project per Administrative Rule Env-Wt 303.02(c) and (i) alteration of more than 20,000 sq. ft. of non-tidal wetlands and more that 200 linear feet of impacts to streams and banks.
2. The need for the proposed impacts has been demonstrated by the applicant per Env-Wt 302.01.
3. The applicant has provided evidence which demonstrates that this proposal is the alternative with the least adverse impact to areas and environments under the department's jurisdiction per Env-Wt 302.03.
4. The applicant has demonstrated by plan and example that each factor listed in Env-Wt 302.04(a) Requirements for Application Evaluation, has been considered in the design of the project.
5. The project was presented and coordinated during six different Natural Resource Agency meetings held between Sept. 18, 2013 and Oct. 19, 2016.
6. No comments have been submitted to the file since the application was received.
7. No impacts to species noted by the NH Fish and Game Dept. (NHFG) is expected as the project design includes sloped curbing in median islands, the use of coco/ straw matting and the training of construction personnel to recognize the species along with notification to NHFG if encountered as detailed in the March 27, 2014 email included with the application.
8. On Oct. 4, 2016 an application was received by the NH Dept. of Environmental Services (DES) to widen Route 101

approximately 2 miles from Wallace Rd to Route 114/Boynton St. constructing turn lanes, medians and sidewalks impacting 235,054 sq. ft. (56,389 sq. ft. temporary) of palustrine and riverine wetlands. The mitigation proposed was a payment to the DES Aquatic Resource Mitigation fund of 1,203,746.00.

9. As a result of the discussion during the Oct. 19, 2016 Natural Resource Agency meeting the applicant submitted an amended proposal to DES on Nov. 8, 2016 to include areas intended to be self-mitigating. The DES description of those proposed impacts are:

Widen Route 101 approximately 2 miles from Wallace Rd to Route 114/Boynton St. constructing turn lanes, medians and sidewalks impacting 235,551 sq. ft. (56,416 sq. ft. temporary) of palustrine and riverine wetlands.

10. On Dec. 6, 2016 the DES met with the applicant and discussed concerns that the application did not contain enough stream data to determine if the stone channel design could be self-mitigating and that a more natural stream channel design be considered.

11. Inspection by NHDES on January 20, 2017 found:

a. An additional stream channel of approximately 100 ft. that was not previously identified;

b. There were numerous locations of impacts which were determined to be repair or replacement and therefore did not require mitigation;

c. There were areas of stream and bank impacts which could be relocated in a manner, using similar materials, so that they could be considered as self- mitigating; and

d. The road widening will improve safety as the minimum width shoulders at many locations make the safe turning of vehicles difficult.

12. On Feb. 7, 2017 the DES received modified plans with channel details, cross sections and specifications for stream bed materials to mimic a naturalized stream channel design.

13. In accordance with RSA 482-A:8, DES finds that the requirements for a public hearing do not apply as the permitted project is not of substantial public interest, and will not have a significant impact on or adversely affect the values of the riverine resource, as identified under RSA 482-A:1.

14. The DES has determined the applicant has met the purpose of the current stream rules relative to not causing damage upstream or downstream and not impeding aquatic organisms.

15. The total permanent impacts of 180,738 sq. ft. includes 3,235 linear feet of stream channel and banks.

16. The applicant has reviewed on-site options for mitigation and the department has determined that a portion of this project that is not being mitigated is acceptable for payment to the Aquatic Resource Mitigation (ARM) Fund to compensate for the wetland areas not previously impacted by the existing roadway.

17. The payment calculated for the proposed wetland loss equals $954,706.95.

18. The Department decision is issued in letter form and upon receipt of the ARM fund payment, the Department shall issue a posting permit in accordance with Env-Wt 803.08(f).

Any person aggrieved by this decision may appeal to the New Hampshire Wetlands Council (the Council) by filing an appeal that meets the requirements specified in RSA 482-A:10, RSA 21-O:14, and the rules adopted by the Council, Env-WtC 100-200. The appeal must be filed directly with the Council within 30 days of the date of this decision and must set forth fully every ground upon which it is claimed that the decision complained of is unlawful or unreasonable. Only those grounds set forth in the notice of appeal can be considered by the Council.

Information about the Council, including a link to the Council's rules, is available at <http:/nhec.nh.gov/> (or more directly at <http://nhec.nh.gov/wetlands/index.htm> Copies of the rules also are available from the NHDES Public Information Center at (603) 271-2975.

This permit is contingent on receipt of a one-time payment of $954,706.95 dollars to the NHDES Aquatic Resource Mitigation (ARM) Fund. The payment should be received after the 30-day reconsideration period or after April 16, 2017. If the payment is not received by NHDES by July 15, 2017 or 120 days from the approval decision, NHDES will deny the application. Please include a copy of this letter with the payment. If you have any questions please contact me at (603) 271-4059 or via e-mail, lori.sommer@des.nh.gov.

Sincerely,

Lori Sommer
Wetland Mitigation Coordinator
NHDES Wetlands Bureau

cc: Bedford Conservation Commission
Bedford Board of Selectmen
Bedford Municipal Clerk

08/05/13

SSD: 10/1/92, 11/29/93, 9/11/97; 04/30/98, 07/08/05, 09/21/07, 02/09/09, 03/30/10

SPECIAL ATTENTION

WATER QUALITY CERTIFICATION

Contractors are advised that the New Hampshire Department of Environmental Services (NHDES) has issued a Water Quality Certificate as required under Section 401 of the United States Clean Water Act (33 U.S.C. 1341) for this project. This certificate requires that any discharges of storm water associated with construction activities, to water bodies of the United States does not violate surface water quality standards, or cause additional degradation in surface waters not presently meeting water quality standards.

Contractors are directed to address the conditions of the Water Quality Certification in the project's Storm Water Pollution Prevention Plan (SWPPP), as stated is Section 645 of the Standard Specifications.

Also, in accordance with the conditions of the Water Quality Certificate, the Contractor is required to prepare and submit, for approval, an erosion control inspection and maintenance plan and a turbidity sampling and analysis plan (to be included in the project SWPPP) to NHDES at least 15 days prior to the beginning of construction.

Included in the contract is a plan sheet showing discharge points to be sampled during turbidity monitoring. Also included is a NHDES memo dated August 5, 2013 (Guidance for SWPPPs, BMP Maintenance, Turbidity and Sediment Monitoring for NHDOT Projects with 401 Water Quality Certification), to be used as guidance for preparing the erosion control inspection/maintenance plan, and the turbidity sampling/analysis plan.

All submittals required to meet the Water Quality Certificate conditions shall be in accordance with Section 105.02 of the Standard Specifications.

Turbidity limitations shall be as stated in Section 107.01 of the Standard Specifications.

Preparation of the inspection/maintenance and turbidity sampling/analysis plan shall be subsidiary to Item 645.7. Inspections and turbidity sampling shall be included for payment in accordance with Item 645.71.

New Hampshire Department of Transportation
Victoria Chase
Project Manager
7 Hazen Drive
Concord, NH 03301

WATER QUALITY CERTIFICATION

In Fulfillment of

Section 401 of the United States Clean Water Act (33 U.S.C 1341) and NH RSA 485-A:12, III and NH RSA 485-A:12, IV

WQC # 2016-404I-002

Activity Name	Widening and Reconstruction of New Hampshire Route 101 [Bedford X-A000(143),13953]
Activity Location	Bedford, New Hampshire
Affected Surface waters	Riddle Brook NHRIV700060905-18 Unnamed Brooks to Patten Brook NHRIV700060803-11 Bowman Brook NHRIV700060803-03 Unnamed wetlands
Owner/Applicant	New Hampshire Department of Transportation 7 Hazen Drive Concord, NH 03301
Applicable Federal permit(s):	U.S. Army Corps of Engineers Individual 404 Permit (NAE-2016-02210) (PENDING) New Hampshire Department of Environmental Services Wetlands Permit [File No. 2016-02893 (PENDING)]
DATE OF APPROVAL (subject to Conditions below)	February 28, 2017

A. INTRODUCTION

The New Hampshire Department of Transportation (Applicant) is proposing to widen and reconstruct NH Route 101 in the Town of Bedford from its intersection with Wallace Road easterly approximately 2 miles to its intersection with NH Route 114/ Boynton Street (Activity). A more complete description of the Activity is provided in Finding D-1 of this Certification.

This 401 Water Quality Certification (WQC or Certification) documents laws,

regulations, determinations and conditions related to the Activity for the attainment and maintenance of New Hampshire (NH) surface water quality standards, including the provisions of NH RSA 485-A:8 and NH Code of Administrative Rules Env-Wq 1700, for the support of designated uses identified in the standards.

B. 401 CERTIFICATION APPROVAL

Based on the facts, findings and conditions noted below, the New Hampshire Department of Environmental Services (NHDES or DES) has determined that there is reasonable assurance that construction and operation of the Activity will not violate surface water quality standards. NHDES hereby issues this Certification, subject to the conditions in Section E of this Certification, in accordance with Section 401 of the United States Clean Water Act (33 U.S.C. 1341) and RSA 485-A:12,III.

C. STATEMENT OF FACTS AND LAW

C-1. Section 401 of the United States Clean Water Act (33 U.S.C. 1341) states, in part: "Any applicant for a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate...that any such discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of this title.....No license or permit shall be granted until the certification required by this section has been obtained or has been waived...No license or permit shall be granted if certification has been denied by the State..."

C-2. §401(d) of the CWA provides that: "Any certification provided under this section [401] shall set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a Federal license or permit will comply with [enumerated provisions of the CWA]...and with any other appropriate requirement of State law set forth in such certification, and shall become a condition on any Federal license or permit subject to the provisions of this section."

According to EPA 401 Guidance[1], "Under § 401(d) the water quality concerns to consider and the range of potential conditions available to address those concerns, extend to any provision of state or tribal law relating to the aquatic resource. Considerations can be quite broad so long as they relate to water quality. The U.S. Supreme Court has stated that, once the threshold of a discharge is reached (necessary for § 401 certification to be applicable), the conditions and limitations in the certification may address the permitted activity as a whole."[2]

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[1] *Clean Water Action Section 401 Water Quality Certification: A Water Quality Protection Tool for States and Tribes*. U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds. 2010.

[2] *PUD No. 1 of Jefferson County v. Washington Department of Ecology*, 511 U.S. 700, 712 (1994).

C-3. NH RSA 485-A:12, III, states: "No activity, including construction and operation of facilities, that requires certification under section 401 of the Clean Water Act and that may result in a discharge, as that term is applied under section 401 of the Clean Water Act, to surface waters of the state may commence unless the department certifies that any such discharge complies with the state surface water quality standards applicable to the classification for the receiving surface water body. The department shall provide its response to a request for certification to the federal agency or authority responsible for issuing the license, permit, or registration that requires the certification under section 401 of the Clean Water Act. Certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide assurance that the proposed discharge complies with applicable surface water quality standards. The department may enforce compliance with any such conditions, modifications, or monitoring requirements as provided in RSA 485-A:22."

C-4. NH RSA 485-A: IV states: "No activity that involves surface water withdrawal or diversion of surface water that requires registration under RSA 488:3, that does not otherwise require the certification required under paragraph III, and which was not in active operation as of the effective date of this paragraph, may commence unless the department certifies that the surface water withdrawal or diversion of surface water complies with state surface water quality standards applicable to the classification for the surface water body. The certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide reasonable assurance that the proposed activity complies with applicable surface water quality standards."

C-5. NH RSA 485-A:8 and Env-Wq 1700 (Surface Water Quality Standards), together fulfill the requirements of Section 303 of the Clean Water Act that the State of New Hampshire adopt water quality standards consistent with the provisions of the Act.

C-6. Env-Wq 1701.02, entitled "Applicability", states that these rules shall apply to:

" (a) All surface waters; and
(b) Any person who:
(1) Causes any point or nonpoint source discharge of any pollutant to surface waters;
(2) Undertakes hydrologic modifications, such as dam construction or water withdrawals; or
(3) Undertakes any other activity that affects the beneficial uses or the water quality of surface waters."

C-7. Env-Wq 1703.01 entitled "Water Use Classifications; Designated Uses", states the following:

"(a) All surface waters shall be classified as provided in RSA 485-A:8, based on the standards established therein for class A and class B waters. Each classification shall identify the most sensitive use it is intended to protect.

(b) All surface waters shall be restored to meet the water quality criteria for their designated classification including existing and designated uses, and to maintain the chemical, physical, and biological integrity of surface waters.

(c) All surface waters shall provide, wherever attainable, for the protection and propagation of fish, shellfish and wildlife, and for recreation in and on the surface waters.

(d) Unless high or low flows are caused by naturally-occurring conditions, surface water quantity shall be maintained at levels that protect existing uses and designated uses."

C-8. Env-Wq 1702.44 defines surface waters as "surface waters of the state" as defined in NH RSA 485-A:2, XIV and waters of the United States as defined in 40 CFR 122.2.

NH RSA 485-A:2, XIV defines "surface waters of the state" as "perennial and seasonal streams, lakes, ponds and tidal waters within the jurisdiction of the state, including all streams, lakes, or ponds bordering on the state, marshes, water courses and other bodies of water, natural or artificial."

40 CFR 122.2 defines "waters of the United States".

C-9. NH RSA 482-A:2, X. defines "Wetlands" as "[a]n area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

C-10. Env-Wq 1702.07 states that ""Best management practices" means those practices that are determined, after problem assessment and examination of all alternative practices and technological, economic and institutional considerations, to be the most effective practicable means of preventing or reducing the amount of pollution generated by point or nonpoint sources to a level compatible with water quality goals."

C-11. Env-Wq 1702.05 states that ""Benthic community" mean the community of plants and animals that live on, over, or in the substrate of the surface water."

C-12. Env-Wq 1702.06 states that ""Benthic deposit" means any sludge, sediment, or other organic or inorganic accumulations on the bottom of the surface water."

C-13. Env-Wq 1702.08 states that ""Biological integrity" means the ability of an aquatic ecosystem to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region."

C-14. Env-Wq 1702.26 states that ""Mixing zone" means a defined area or volume of the surface water surrounding or adjacent to a wastewater discharge where the

surface water, as a result of the discharge, might not meet all applicable water quality standards."

C-15. Env-Wq 1702.15 states that ""Cultural eutrophication" means the human-induced addition of wastes that contain nutrients to surface waters, resulting in excessive plant growth or a decrease in dissolved oxygen, or both."

C-16. Env-Wq 1702.17 states that ""Designated uses" means those uses specified in water quality standards for each water body or segment whether or not such uses are presently occurring. The term includes the following:

(a) Swimming and other recreation in and on the water, meaning the surface water is suitable for swimming, wading, boating of all types, fishing, surfing, and similar activities;

(b) Fish consumption, meaning the surface water can support a population of fish free from toxicants and pathogens that could pose a human health risk to consumers;

(c) Shellfish consumption, meaning the tidal surface water can support a population of shellfish free from toxicants and pathogens that could pose a human health risk to consumers;

(d) Aquatic life integrity, meaning the surface water can support aquatic life, including a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of the region;

(e) Wildlife, meaning the surface water can provide habitat capable of supporting any life stage or activity of undomesticated fauna on a regular or periodic basis; and

(f) Potential drinking water supply, meaning the surface water could be suitable for human intake and meet state and federal drinking water requirements after adequate treatment."

C-17. Env-Wq 1702.18 states that ""Discharge" means

(a) The addition, introduction, leaking, spilling, or emitting of a pollutant to surface waters, either directly or indirectly through the groundwater, whether done intentionally, unintentionally, negligently or otherwise; or

(b) The placing of a pollutant in a location where the pollutant is likely to enter surface waters."

C-18. Env-Wq 1702.22 states that ""Existing uses" means those uses, other than assimilation waste transport, that actually occurred in the waterbody on or after November 28, 1975, whether or not they are included in the water quality standards."

C-19. Env-Wq 1702.33 states that ""Nuisance species" means any species of flora or fauna living in or near the water whose noxious characteristics or presence in sufficient number or mass prevent or interfere with a designated use of those surface waters."

C-20. Env-Wq 1702.38 states that ""Pollutant" means "pollutant" as defined in 40 CFR 122.2." According to 40 CFR 122.2, "pollutant" means "dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water."

C-21. The term "discharge", as applied under section 401 of the Clean Water Act means the potential for a discharge. It does not need to be a certainty, only that it may occur should the federal license or permit be granted. Further, the discharge does not need to involve the addition of pollutants (such as water released from the tailrace of a dam). As the U.S. Supreme Court has stated "[w]hen it applies to water, 'discharge' commonly means a 'flowing or issuing out'" and an addition of a pollutant is not "fundamental to any discharge" [3].

C-22. Env-Wq 1703.03 entitled "General Water Quality" includes the following:

(c)(1) "All surface waters shall be free from substances in kind or quantity that:
a. Settle to form harmful benthic deposits;
b. Float as foam, debris, scum or other visible substances;
c. Produce odor, color, taste or turbidity that is not naturally occurring and would render the surface water unsuitable for its designated uses;
d. Result in the dominance of nuisance species; or
e. Interfere with recreational activities."

C-23. Env-Wq 1703.06 includes water quality criteria for bacteria.

C-24. Env-Wq 1703.07 entitled "Dissolved Oxygen" states the following:

"(a) Class A waters shall have a dissolved oxygen content of at least 75% saturation, based on a daily average, and an instantaneous minimum of at least 6 mg/l at any place or time except as naturally occurs.

(b) Except as naturally occurs, and subject to (c) and (e) below, class B waters shall have a dissolved oxygen content of:
(1) At least 75% of saturation, as specified in RSA 485-A:8,II, based on a daily average; and
(2) An instantaneous minimum dissolved oxygen concentration of at least 5 mg/L.

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[3] Information in this paragraph is from page 4 of the following guidance document: *Clean Water Action Section 401 Water Quality Certification: A Water Quality Protection Tool for States and Tribes*. U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds. 2010. The Supreme Court case that is referred to is *S.D. Warren Co. v. Maine Board of Environmental Protection et al*, 547 U.S. 370, 126 S. Ct. 1853 (2006).

(c) In areas identified by the New Hampshire fish and game department (NHF&G) as cold water fish spawning areas of species whose early life stages are buried in the gravel on the bed of the surface water, the 7 day mean dissolved oxygen concentration shall be at least 9.5 mg/l and the instantaneous minimum dissolved oxygen concentration shall be at least 8 mg/l for the period from October 1 of one year to May 14 of the next year, provided that the time period shall be extended to June 30 for a specific discharge to a specific waterbody if modeling done in consultation with the NHF&G determines the extended period is necessary to protect spring spawners or late hatches of fall spawners, or both.

(d) Unless naturally occurring or subject to (a), above, surface waters within the top 25 percent of depth of thermally unstratified lakes, ponds, impoundments and reservoirs or within the epilimnion shall contain a dissolved oxygen content of at least 75 percent saturation, based on a daily average and an instantaneous minimum dissolved oxygen content of at least 5 mg/l. Unless naturally occurring, the dissolved oxygen content below those depths shall be consistent with that necessary to maintain and protect existing and designated uses."

(e) As specified in RSA 485-A:8, III, waters in a temporary partial use area established under RSA 485- A:8, II as a surface water that is receiving a combined sewer overflow discharge shall contain not less than 5 parts per million of dissolved oxygen for the duration of the discharge and up to 3 days following cessation of the discharge.

C-25. Env-Wq 1703.08 entitled "Benthic Deposits" states the following:
"(a) Class A waters shall contain no benthic deposits, unless naturally occurring.
(b) Class B waters shall contain no benthic deposits that have a detrimental impact on the benthic community, unless naturally occurring."

C-26. Env-Wq, 1703.09, 1703.10 and 1703.12 include water quality criteria for oil and grease, color and slicks, odors, and surface floating solids respectively.

C-27. Env-Wq 1703.11 entitled "Turbidity" states the following:

"(a) Class A waters shall contain no turbidity, unless naturally occurring.

(b) Class B waters shall not exceed naturally occurring conditions by more than 10 NTUs.

(c) Turbidity in waters identified in RSA 485-A:8, III shall comply with the applicable long-term combined sewer overflow plan prepared in accordance with Env-Wq 1703.05(c).

(d) For purposes of state enforcement actions, if a discharge causes or contributes to an increase in turbidity of 10 NTUs or more above the turbidity of the receiving water upstream of the discharge or otherwise outside of the visible discharge, a violation of the turbidity standard shall be deemed to have occurred."

C-28. Env-Wq 1703.13 entitled "Temperature", states the following:

"(a) There shall be no change in temperature in class A waters, unless naturally occurring.
(b) Temperature in class B waters shall be in accordance with RSA 485-A:8, II, and VIII."

NH RSA-A:8,II states the following for Class B waters "[A]ny stream temperature increase associated with the discharge of treated sewage, waste or cooling water, water diversions, or releases shall not be such as to appreciably interfere with the uses assigned to this class."

NH RSA-A:8,VIII states the following: "In prescribing minimum treatment provisions for thermal wastes discharged to interstate waters, the department shall adhere to the water quality requirements and recommendations of the New Hampshire fish and game department, the New England Interstate Water Pollution Control Commission, or the United States Environmental Protection Agency, whichever requirements and recommendations provide the most effective level of thermal pollution control."

C-29. Env-Wq 1703.14, entitled "Nutrients", states the following:

"(a) Class A waters shall contain no phosphorous or nitrogen unless naturally occurring.
(b) Class B waters shall contain no phosphorous or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring.
(c) Existing discharges containing either phosphorous or nitrogen which encourage cultural eutrophication shall be treated to remove phosphorus or nitrogen to ensure attainment and maintenance of water quality standards.
(d) There shall be no new or increased discharge of phosphorous into lakes or ponds.
(e) There shall be no new or increased discharge(s) containing phosphorous or nitrogen to tributaries of lakes or ponds that would contribute to cultural eutrophication or growth of weeds or algae in such lakes and ponds."

C-30. Env-Wq 1703.18, entitled "pH", states the following:

"(a) The pH of Class A waters shall be as naturally occurs.
(b) As specified in RSA 485-A:8, II, the pH of Class B waters shall be 6.5 to 8.0, unless due to natural causes.
(c) As specified in RSA 485-A:8,III, the pH of waters in temporary partial use areas shall be 6.0 to 9.0 unless due to natural causes.

C-31. Env-Wq 1703.19, entitled "Biological and Aquatic Community Integrity", states the following:

"(a) All surface waters shall support and maintain a balanced, integrated and adaptive community of organisms having a species composition, diversity,

and functional organization comparable to that of similar natural habitats of a region.

(b) Differences from naturally-occurring conditions shall be limited to non-detrimental differences in community structure and function."

C-32. Env-Wq 1703.21 entitled "Water Quality Criteria for Toxic Substances" states the following:

"(a) Unless naturally occurring or allowed under part Env-Wq 1707, all surface waters shall be free from toxic substances or chemical constituents in concentrations or combinations that:

(1) Injure or are inimical to plants, animals, humans or aquatic life; or

(2) Persist in the environment or accumulate in aquatic organisms to levels that result in harmful concentrations in:

a. Edible portions of fish, shellfish, or other aquatic life; or

b. Wildlife that might consume aquatic life."

C-33. Env-Wq 1707.01 entitled "Designation of Mixing Zones" states the following:

"(a) Because RSA 485-A:8, I prohibits the discharge of any sewage or other wastes into class A waters, mixing zones shall be prohibited in such waters.

(b) For class B waters, the department shall designate a limited area or volume of the surface water as a mixing zone if the applicant provides sufficient scientifically valid documentation to allow the department to independently determine that all criteria in Env-Wq 1707.02 have been met."

C-34. Env-Wq 1707.02 entitled "Criteria for Approval of Mixing Zones" states that "the department shall not approve a mixing zone unless the proposed mixing zone:

(a) Meets the criteria in Env-Wq 1703.03(c)(1);

(b) Does not interfere with biological communities or populations of indigenous species;

(c) Does not result in the accumulation of pollutants in the sediments or biota;

(d) Allows a zone of passage for swimming and drifting organisms;

(e) Does not interfere with existing and designated uses of the surface water;

(f) Does not impinge upon spawning grounds or nursery areas, or both, of any indigenous aquatic species;

(g) Does not result in the mortality of any plants, animals, humans, or aquatic life within the mixing zone;

(h) Does not exceed the chronic toxicity value of 1.0 TUc at the mixing zone boundary; and

(i) Does not result in an overlap with another mixing zone."

C-35. Env-Wq 1707.03 entitled "Conditions for Mixing Zones" states that "if the department approves a mixing zone, the department shall include such conditions as are needed to ensure that the criteria on which the approval is based are met."

C-36. Env-Wq 1707.04 entitled "Technical Standards" states that mixing zones " shall be established in accordance with "Technical Support Document for Water Quality-based Toxics Control", EPA/505/2-90-001, dated March 1991, available as noted in Appendix B."

C-37. Antidegradation provisions are included in Env-Wq 1702 and Env-Wq 1708.

a. Env-Wq 1702.03 states that ""Antidegradation" means a provision of the water quality standards that maintains and protects existing water quality and uses.
b. Env-Wq 1708.02 states that "Antidegradation shall apply to: (a) Any proposed new or increased activity, including point source and nonpoint source discharges of pollutants, that would lower water quality or adversely affect the existing or designated uses;(b) Any proposed increase in loadings to a waterbody when the proposal is associated with existing activities; (c) Any increase in flow alteration over an existing alteration; and (d) Any hydrologic modifications, such as dam construction and water withdrawals."
c. Antidegradation applies to all parameters as evidenced by Env-Wq 1708.08 (a) (Assessing Waterbodies) which states " The applicant shall characterize the existing water quality and determine if there is remaining assimilative capacity for each parameter in question."
d. According to Env-Wq 1708.03 (b), "A proposed discharge or activity shall not eliminate any existing uses or the water quality needed to maintain and protect those uses".
e. Env-Wq 1702.04 states that "Assimilative capacity" means the amount of a pollutant or combination of pollutants that can safely be released to a waterbody without causing violations of applicable water quality criteria or negatively impacting uses."
f. Env-Wq 1708.08 describes the process for assessing waterbodies to determine if there is remaining assimilative capacity for each parameter in question.
g. Env-Wq 1708.09 entitled "Significant or Insignificant Determination" states the following: (a) Any discharge or activity that is projected to use 20% or more of the remaining assimilative capacity for a water quality parameter, in terms of either concentration or mass of pollutants, or volume or flow rate for water quantity, shall be considered a significant lowering of water quality. (b) The department shall not approve a discharge or activity that will cause a

significant lowering of water quality unless the applicant demonstrates, in accordance with Env-Wq 1708.10, that the proposed lowering of water quality is necessary to achieve important economic or social development in the area where the waterbody is located.

h. Env-Wq 1708.01(b)(1), in general, states that: For significant changes in water quality, where the quality of the surface waters exceeds levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water, that quality shall be maintained and protected unless the department finds, after full satisfaction of the intergovernmental coordination and public participation provisions and the analysis required by Env-Wq 1708.10, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the surface waters are located. In allowing such degradation or lower water quality, the department shall assure water quality adequate to fully protect existing uses. Further, the department shall assure that the highest statutory and regulatory requirements shall be achieved for all new and existing point sources and that all cost effective and reasonable best management practices for nonpoint source control shall be implemented.

i. Env-Wq 1708.01(b)(2), in general, states that: The department shall not approve any proposed discharge or activity that might cause degradation or lower water quality, without such conditions as are necessary to ensure that: a) Water quality will be adequate to protect existing uses; b) The highest statutory and regulatory requirements will be achieved for all new and existing point sources; and c) All cost effective and reasonable best management practices for nonpoint source control will be implemented.

C-38. Env-Wq 1708.04 entitled "Protection of Water Quality in ORW" states that the following:

"(a) Surface waters of national forests and surface waters designated as natural under NH RSA 483:7-a, I, shall be considered outstanding resource waters (ORW).

(b) Subject to (c), below, water quality shall be maintained and protected in surface waters that constitute ORW.

(c) The department shall allow a limited point or nonpoint source discharge to an ORW only if:

(1) The discharge will result in no more than temporary and short-term changes in water quality, wherein "temporary and short term" means that degradation is limited to the shortest possible time;

(2) The discharge will not permanently degrade water quality or result at any time in water quality lower than that necessary to protect the existing and designated uses in the ORW; and

(3) All practical means of minimizing water quality degradation are implemented."

C-39. Env-Wq 1708.06 entitled "Protection of Water Quality in High Quality Waters" states the following:

"(a) Subject to (b) through (d) below, high quality waters shall be maintained and protected.

(b) The department shall evaluate and authorize insignificant changes in water quality as specified in Env-Wq 1708.09.

(c) The department shall allow degradation of significant increments of water quality, as determined in accordance with Env-Wq 1708.09, in high quality waters only if the applicant can demonstrate to the department, in accordance with Env-Wq 1708.10, that allowing the water quality degradation is necessary to accommodate important economic or social development in the area in which the receiving water is located.

(d) If the waterbody is Class A Water, the requirements of Env-Wq 1708.05 shall also apply."

C-40. Env-Wq 1708.12 states the "" transfer" means the intentional conveyance of water from one surface water to another surface water for the purpose of increasing volume of water available for withdrawal from the receiving surface water. The term does not include the transfer of stormwater, for the purpose of managing stormwater during construction, between basins created or otherwise lawfully used for stormwater detention or treatment, or both, and does not include the discharge of stormwater from a detention or treatment basin to a surface water."

C-41. RSA 483 regarding Designated Rivers, states the following:

RSA 483:4, XVIII. "River corridor" means the river and the land area located within a distance of 1,320 feet of the normal high water mark or to the landward extent of the 100 year floodplain as designated by the Federal Emergency Management Agency, whichever distance is larger.

RSA 483:8-a, III. The duties of such committees shall be:
(a) To advise the commissioner, the advisory committee, the municipalities through which the designated river or segment flows, and municipalities within tributary drainage areas on matters pertaining to the management of the river or segment and tributary drainage areas. Municipal officials, boards, and agencies shall inform such committees of actions which they are considering in managing and regulating activities within designated river corridors.
(b) To consider and comment on any federal, state, or local governmental plans to approve, license, fund or construct facilities that would alter the resource values and characteristics for which the river or segment is designated.

RSA 483:10-b. Withholding of Section 401 Certification. – The general court finds that the development of any dam or channel alteration activities within a natural river or segment or the development of any new dam within a rural or community river or segment, except as provided in RSA 483:9-a, II and RSA

483:9-b, II, will alter the physical and chemical characteristics of that river and will constitute violation of the water quality standards established under RSA 485-A:8. The commissioner shall deny certification of any federally licensed or permitted activity on such designated rivers or segments under section 401 of the Federal Water Pollution Control Act, P.L. 92-500, as amended.

RSA 483:12-a State Action; Notification of Rivers Coordinator; Petition for Review

I. Any state agency considering any action affecting any river or segment designated under this chapter shall notify the rivers coordinator prior to taking any such action. Such agency shall forward to the rivers coordinator for review and comment copies of all notices of public hearings, or, where a public hearing is not required, a copy of the application for issuance of a permit, certificate, or license within the designated river or corridor under RSA 485-C, RSA 485-A, RSA 483-B, RSA 12-E, RSA 270:12, RSA 482, RSA 482-A, RSA 149-M, RSA 430, or RSA 147-A. If an agency is notified by the rivers coordinator that a proposed activity would violate a protection measure under RSA 483:9, 483:9-a, 483:9-aa, or 483:9-b, such agency shall deny the application.

C-42. NH RSA 488:3 regarding registration of withdrawals and discharges states the following:

I. No person shall withdraw or discharge a cumulative amount of more than 20,000 gallons of water per day, averaged over any 7-day period, or more than 600,000 gallons of water over any 30-day period, at a single real property or place of business without registering the withdrawal or discharge with the department. Transfers of such volume of water shall also be registered. Registration shall be in addition to any required permits.
II. No registration shall be transferred to another person without written notification to the commissioner.

C-43. NH RSA 485:61 regarding Rules for Water Conservation, states the following:

"I. The department shall adopt rules, pursuant to RSA 541-A, for water conservation practices for water users. These rules shall strike a reasonable balance between environmental, energy, and economic impacts and be consistent with current industry standards and practices for different types of water users.
II. The water conservation rules in paragraph I of this section shall apply to all new permit applicants and applications for water withdrawals subject to the provisions of RSA 485:3, RSA 485:48, RSA 485-C:21 and section 401 of the Clean Water Act.
III. Water conservation rules shall be consistent with applicable state or federal rules and regulations. Water Conservation Rules were adopted May 14, 2005 codified as Env-Wq 2101."

C-44. Env-Wq 2101.24 entitled "Water Conservation Plan Required", states that

"(a) The applicants for approval of a source that would be a conservation source shall submit a water conservation plan that demonstrates compliance with the applicable provisions of Env-Wq 2101.05 through Env-Wq 2101.22 in accordance with the following:"

"(5) For a new withdrawal from a surface water associated with a project requiring a 401 Water Quality Certification, the water conservation plan shall be submitted prior to or in conjunction with the application for a 401 Water Quality Certification pursuant to Section 401 of the federal Clean Water Act;
(6) For a new withdrawal from a surface water that requires water quality certification pursuant to RSA 485-A:12, IV, the water conservation plan shall be submitted prior to or in conjunction with the certification request".

Env-Wq 2101.23, entitled Waivers, allows DES to grant waivers of certain provisions in Env-Wq 2101 provided the person requesting the waiver submits a written request to DES that includes the information specified in Env-Wq 2101.23(d).

C-45. NH RSA 483:4 defines "interbasin transfer" and "river drainage basin" as follows:

XII. "Interbasin transfer" means any transfer of water for use from one river drainage basin to another.

XIX. "River drainage basin" means the Androscoggin, Coastal, Connecticut, Merrimack, Piscataqua, and Saco river basins as delineated on a map compiled by the department.

C-46. NH RSA 483:9 Natural Rivers Protection (at 9-a, 9-aa, and 9-b) states that no interbasin transfers from designated rural, rural-community, or community rivers or their segments shall be permitted.

C-47. In 2010, DES published guidance (hereinafter called the 2010 instream flow guidance or 2010 ISF guidance) for estimating instream flow requirements for the protection of aquatic life for situations. The guidance is available at: http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-3.pdf.

C-48. Section 303(d) of the Clean Water Act (33 U.S.C. 1313(d)) and the regulations promulgated thereunder (40 C.F.R. 130.0 – 40 C.F.R. 130.11) require states to identify and list surface waters that are violating state water quality standards (i.e., Section 303(d) List) that do not have an approved TMDL. For these water quality-impaired waters, states must establish Total Maximum Daily Loads (TMDLs) for the pollutants causing the impairments and submit the list of impaired surface waters and TMDLs to EPA for approval. TMDLs include source identification, determination of the allowable load and pollutant reductions (by source) necessary to meet the allowable load. Once a TMDL is conducted, the pollutant/surface water is transferred to the list of impaired waters with approved TMDLs (known as Category 4A waters). The Section 303(d) List is,

therefore, a subset of all impaired waters. The most recent Section 303(d) list of impaired waters is the 2014 Section 303(d) List. A list of all impaired waters is available at http://www2.des.state.nh.us/WaterShed_SWQA/WaterShed_SWQA.aspx

C-49. On December 20, 2007, EPA approved the Northeast Regional Mercury TMDL[4] which addressed mercury impairments in all New Hampshire fresh surface waters.

C-50. On September 21, 2010, EPA approved the Statewide Bacteria TMDL for 394 surface waters listed as impaired on the 2008 303(d) List of impaired waters[5].

C-51. When a surface water does not meet water quality standards (i.e., when it is impaired), the addition of pollutants causing or contributing to impairment is prohibited in accordance with the following:

> Env-Wq 1703.03 (a) states that "The presence of pollutants in the surface waters shall not justify further introduction of pollutants from point or nonpoint sources, alone or in any combination".
>
> NH RSA 485-A:12 (I) (Enforcement of Classification) states that "After adoption of a given classification for a stream, lake, pond, tidal water, or section of such water, the department shall enforce such classification by appropriate action in the courts of the state, and it shall be unlawful for any person or persons to dispose of any sewage, industrial, or other wastes, either alone or in conjunction with any other person or persons, in such a manner as will lower the quality of the waters of the stream, lake, pond, tidal water, or section of such water below the minimum requirements of the adopted classification".

C-52. NHDES Alteration of Terrain regulations (Env-Wq 1500), effective January 1, 2009) include design criteria for stormwater best management practices (BMPs) as well as criteria for minimizing the hydrologic impacts of stormwater runoff both during and after construction. Further, BMP design details as well as guidance for preparing pollutant loading analyses using the "Simple Method" are provided in *The New Hampshire Stormwater Manual* (http://des.nh.gov/organization/divisions/water/stormwater/manual.htm).

C-53. On October 4, 2016, the Applicant submitted an application for a NHDES Wetlands Permit which was assigned the file number 2016-02893.

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[4] Northeast Regional Mercury Total Maximum Daily Load. Connecticut Department of Environmental Protection, Maine Department of Environmental Protection, Massachusetts Department of Environmental Protection, New Hampshire Department of Environmental Services, New York Stated Department of Environmental Conservation, Rhode Island Department of Environmental Management, Vermont Department of Environmental Conservation, New England Interstate Water Pollution Control Commission. October 24, 2007.

[5] Final Report, New Hampshire Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters. Prepared by FB Environmental Associates, Inc. for the New Hampshire Department of Environmental Services. September, 2010.

C-54. In April, 2015 the New Hampshire Department of Transportation completed an "Environmental Study/Final Section 4(f) Evaluation" for the proposed Activity.

C-55. On August 19, 2016 the DES received an application for Section 401 Water Quality Certification for the Activity dated June 23, 2016.

C-56. On November 1, 2016 the U.S. Army Corps of Engineers issued the draft individual section 404 permit (NAE-2016-02210) for public comment. The public comment period ended on December 1, 2016.

C-57. DES issued a draft section 401 Water Quality Certification for public comment from January 18, 2017 to February 21, 2017. No comments were received.

D. FINDINGS

D-1. *Activity Description:* The proposed Activity is described in the text and plans provided in the application for Section 401 Water Quality Certification filed by the Applicant (see C-55). In general the Activity includes: 1) the widening (i.e., an additional travel lane in each direction) and reconstruction of New Hampshire (NH) Route 101 in the Town of Bedford from its intersection with Wallace Road easterly approximately 2 miles to the intersection with NH Route 114/Boynton Street; 2) construction of turn lanes, medians, and sidewalks, stormwater runoff treatment facilities and other associated infrastructure; and 3) operation of the proposed improvements. The Activity will increase the travel lane-miles from approximately 4.8 lane-miles to 8.0 lane-miles and increase the impervious area within the project area by approximately 33%. The Activity will impact a total of approximately 5.4 acres of wetlands of which approximately 4.1 acres will be permanent impacts. Construction is anticipated to begin in June, 2017 and be completed in November, 2019.

D-2. The Applicant is responsible for the Activity.

D-3. Surface waters are navigable waters for the purposes of certification under Section 401 of the Clean Water Act. Surface waters are jurisdictional wetlands for the purposes of wetlands permitting under RSA 482-A.

D-4. The named and unnamed streams and wetlands affected by the Activity, are surface waters under Env-Wq 1702.44 (see C-8) and are therefore subject to New Hampshire Surface Water Quality Standards (Env-Wq 1700 – see C-5). NHDES has assigned Assessment Unit (AU) identification numbers to many, but not all surface waters. Surface waters that do not have an AU number are still considered surface waters of the State in accordance with Env-Wq 1702.44 (see C-8). Surface waters that could be potentially affected by the Activity and their associated AU numbers (where available) include, but are not limited to the following:

Assessment Unit ID	Description
NHRIV700060905-18	Riddle Brook
NHRIV700060803-11	Unnamed Brooks to Patten Brook
NHRIV700060803-03	Bowman Brook

D-5. The potentially affected surface waters are Class B waterbodies; therefore Class B New Hampshire surface water quality standards apply to the Activity. Class B waterways are considered suitable for aquatic life, primary and secondary contact recreation, fish consumption, wildlife, and, after adequate treatment, as a water supply (see C-16).

D-6. Stormwater runoff during construction and/or operation of the Activity, including snowmelt runoff, and groundwater flow from within the area affected by the Activity, are discharges as defined in Env-Wq 1702.18 (see C-17). They are also discharges as applied under Section 401 of the Clean Water Act (see C-21). If not properly controlled, such discharges may cause the permanent alteration of, or temporary impacts to surface water quality, quantity, or both.

D-7. The Activity requires an individual section 404 permit from the U.S. Army Corps of Engineers (see C-56). It is expected that the USACOE will issue a permit following issuance of the 401 Certification.

D-8. Because the Activity may result in a discharge (see D-6) to navigable surface waters (see D-3) and requires a federal permit (see D-7), a section 401 Water Quality Certification is required in accordance with section 401 of the Clean Water Act (see C-1) and RSA 485-A:12, III (see C-3). NHDES has received an application from the Applicant for 401 Water Quality Certification (see C-55).

D-9. The Activity includes dredge and fill of jurisdictional wetlands in New Hampshire and therefore requires a NHDES Wetlands Permit (or permits) under NH RSA 482-A. This 401 Certification decision relies, in part, on an approved permit (or permits) from the NHDES Wetlands Bureau for the potential impacts to jurisdictional wetlands. Through its processing and issuance, NHDES wetlands permits issued for the Activity will address the dredge and fill impacts to jurisdictional wetlands. The Applicant submitted an application for a NHDES Wetlands Permit (see C-53). A NHDES Wetlands Permit is expected to be issued in the 2017.

D-10. The Activity is not within the jurisdiction of the Designated Rivers Program created under RSA 483 (see C-41).

D-11. The surface waters in the vicinity of the Activity are not Outstanding Resource Waters (see C-38).

D-12. The Activity does not involve an interbasin transfer as defined in RSA 483:4 (see C-45)

D-13. The Activity does not involve a "transfer" of water as defined in Env-Wq 1708.12 (a) (see C-40).

D-14. On December 30, 2016, staff from the NHDES Water Conservation Program confirmed that the Activity, as described in the 401 WQC application, does not require Water Use Registration (see C-42) or submittal of a Water Conservation Plan (see C-43 and C-44).

D-15. If not properly controlled, the disturbance of earth during construction may temporarily increase turbidity levels in surface waters adjacent to and downstream from the area affected by the Activity, particularly during wet weather events, and may contribute to long-term sediment retention in and/or transport through the surface water adjacent to and downstream from the Activity site. According to the Applicant, appropriate erosion and sediment control measures will be employed during construction with details provided in the SWPPP (see D-16). The SWPPP will be prepared by the contractor and approved by the Applicant prior to construction. To ensure that erosion and sediment control measures are properly functioning the SWPPP will also include procedures for inspection and maintenance of the control measures. If necessary, NHDES can also require turbidity monitoring and sedimentation inspections to confirm that turbidity water quality criteria are met (see C-27) and that benthic sediment deposits (see C-11, C-12, C-22, and C-25) are in compliance with State surface water quality standards.

D-16. The Applicant must comply with conditions in the federal National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP)[6]. CGPs are typically reissued by the U.S. Environmental Protection Agency (EPA) every 5 years. The most recent CGP was issued in 2017 and became effective on February 16, 2017. Activities must comply with the CGP if they "[d]isturb 1 or more acres of land, or will disturb less than 1 acre of land but is part of a common plan of development or sale that will ultimately disturb 1 or more acres of land". The CGP covers construction related stormwater discharges (including stormwater runoff, snowmelt runoff and surface runoff and drainage) as well other discharges, including but not limited to, construction dewatering that has been treated by an appropriate control. The CGP requires development of a Stormwater Pollution Prevention Plan (SWPPP) that describes how the Activity will meet the requirements of the CGP. This includes identification of the stormwater team, a description of the nature of construction activities, emergency-related projects, identification of other site operators, the sequence and estimated dates of construction activities, a site map, identification of construction site pollutants and non-stormwater discharges, buffer documentation, a description of stormwater control measures, pollution prevention procedures, procedures for inspection, maintenance and corrective action, staff training, documentation of compliance with other federal requirements, SWPPP Certification and Post-Authorization Additions to the SWPPP. According to the CGP the SWPPP must be made available to NHDES upon request.

With regards to inspection of construction BMPs, the Applicant has advised that the Contractor and Contract Administer will be on-site every day and that the Contractor's Environmental Consultant and the Applicant's Environmental Coordinator will be on site to complete the weekly and storm inspections.

D-17. According to the 2014 305(b)/303(d) lists of impaired waters (see C-48), the following surface waters in the vicinity of the proposed Activity are listed as

[6]The 2017 Construction General Permit is available at https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents.

the allowable load and reductions (by source) necessary to meet the allowable load. For waters with an approved TMDL, pollutant reductions per the TMDL are required. For pollutants causing an impairment without a TMDL, loadings of the pollutant causing impairment must be held such that there are no increased loadings until such time as a TMDL is prepared.

For all other pollutants (i.e., those not known to be causing impairment) which are likely to be discharged from the Activity, Applicants can either hold existing loadings (i.e., no degradation), or request to degrade the water in accordance with the antidegradation provisions of Env-Wq 1700. To demonstrate no additional loading for pollutants which can be removed by structural BMPs, NHDES allows Applicant's to submit loading analyses in accordance with guidance included in the NHDES Stormwater Manual (see section C-52 of this Certification). The guidance allows use of the "Simple Method" for calculating loads before and after construction. At this time, DES uses total suspended solids (TSS), total nitrogen (TN) and total phosphorus (TP) as surrogates for all other parameters. That is, if the loadings for TSS, TN and TP are held to pre-construction levels, it is assumed that loadings of all other parameters which can be removed by structural BMPs, are held as well. The pollutant loading guidance also assumes that all permanent stormwater practices (i.e., best management practices or BMPs) referenced in the loading analysis are designed and maintained in accordance with current Alteration of Terrain regulations (Env-Wq 1500). The 401 WQC application submitted by the Applicant included a pollutant loading analysis. The analysis concluded that the Activity, which includes four proposed permanent stormwater BMPs (two wet extended detention ponds and two micropool extended detention basins) to treat the stormwater, is expected to result in an overall reduction in pollutant loading to each of the three brooks as compared to existing conditions. On January 5, 2017, the Applicant confirmed that the four proposed permanent stormwater BMPs have been designed in accordance with Env-Wq 1500 and guidelines provided in the NHDES Stormwater Manual (see section C-52 of this Certification).

Chlorides cannot be treated by structural BMPs because they are conservative and relatively untreatable substances that persist in the environment. De-icing chemicals containing chloride (i.e., road salt) are typically the primary source of chlorides in fresh surface waters. Because they cannot be treated by structural BMPs, chlorides cannot be addressed by typical loading analyses. In the 401 WQC application, it is stated that NHDOT "has and will continue to implement operational BMPs to reduce the amount of salt needed to maintain an acceptable level of service during the winter months." Submittal and implementation of a road salt minimization plan to reduce chloride to the maximum extent practicable can be required to address concerns associated with chloride.

D-19. To help ensure that permanent stormwater best management practices (BMPs) will always function as intended, development and implementation of a permanent stormwater BMP inspection and maintenance plan can be required.

D-20. Section C-37h and C-37i of this Certification includes excerpts from Env-Wq 1708.01 regarding antidegradation which state that "the department shall

impaired. All impairments, with the exception of those highlighted in bold (which have approved TMDLs), are on the Section 303(d) List:

Assessment Unit (AU)	Waterbody Name	Cause of Impairment (Designated Use Impaired)
NHRIV700060905-18	Riddle Brook	**Mercury (FC)** pH (AL) **E.coli (PCR)**
NHRIV700060803-11	Unnamed Brooks to Patten Brook	**Mercury (FC)**
NHRIV700060803-03	Bowman Brook	**Mercury (FC)**
Notes: AL = Aquatic Life, PCR = Primary Recreation, SCR = Secondary Recreation, FC = Fish Consumption, SFC = Shellfish Consumption Impairments highlighted in bold have approved TMDLs. All other impairments are on the Section 303(d) List. All fresh surface waters are impaired mercury due to elevated levels of mercury in fish tissue which has resulted in statewide fish consumption advisory.		

As stated in C-51 of this Certification, when a surface water does not meet water quality standards (i.e., when it is impaired), the addition of pollutants causing or contributing to impairment is prohibited. As noted above, all fresh surface water in New Hampshire are impaired for mercury due to concentrations found in fish tissue which have resulted in a statewide fish consumption advisory. On December 20, 2007, EPA approved the Northeast Regional Mercury TMDL which addressed mercury impairments in all New Hampshire fresh surface waters (see C-49). The primary source of mercury is atmospheric deposition from in-state and out-of-state emissions. The proposed Activity is not expected to have a significant impact on mercury levels in fish tissue. On September 21, 2010, EPA approved the Statewide Bacteria TMDL for 394 surface waters listed as impaired on the 2008 303(d) List of impaired waters (see C-50), which included the Riddle Brook assessment unit in the vicinity of the proposed Activity (NHRIV700060905-18). The proposed Activity is not expected to have a significant impact on bacteria levels in Riddle Brook.

D-18. The Activity includes the addition of approximately 2.5 acres of impervious area due to roadway widening. If not properly controlled, the increase in impervious area can cause violations of the antidegradation provisions of the surface water quality standards (see C-37) due to hydrologic alterations (i.e., increased flow) and/or increased deposition and eventual transport to surface waters of pollutants such as chlorides (from road salt), total suspended solids, various metals (i.e., lead, zinc, etc.), and petroleum aromatic hydrocarbons (PAHs). With regards to hydrologic alterations, the 401 WQC application provided by the Applicant includes a hydrologic analysis which concluded that the impact of the proposed Activity "...will have a negligible impact on the watersheds and tributaries identified throughout the corridor."

With regards to pollutants, as stated in C-51 of this Certification, when a surface water does not meet water quality standards (i.e., when it is impaired), the addition of pollutants causing or contributing to impairment is prohibited. That is, existing loadings must be held. Further, as stated in C-48 of this Certification, TMDLs must be conducted for any surface water listed on the Section 303(d) List. The TMDL includes source identification, determination of

assure that the highest statutory and regulatory requirements shall be achieved for all new and existing point sources and that all cost effective and reasonable best management practices for nonpoint source control shall be implemented". In addition to being cost effective and reasonable, best management practices must be selected to ensure attainment of water quality standards in receiving waters as evidenced by the following:

a. As stated in section C-10 of this Certification, "Best Management Practices" (BMPs) are defined in Env-Wq 1702.06 as "those practices which are determined, after problem assessment and examination of all alternative practices and technological, economic and institutional considerations, to be the most effective practicable means of preventing or reducing the amount of pollution generated by point or nonpoint sources to a level *compatible with water quality goals"* (italics added).
b. Env-Wq 1708 (b)(1) and (b)(2) (see section C-37h and C-37i of this Certification) which states "In allowing such degradation or lower water quality, the department shall assure water quality adequate to fully protect existing uses".

NHDES has determined that, if properly constructed and maintained, the temporary and permanent BMPs proposed for this Activity satisfy the above regulations.

E. WATER QUALITY CERTIFICATION CONDITIONS

Unless otherwise authorized by NHDES, the following conditions shall apply:

E-1. **Compliance with Certification Conditions:** The Applicant shall construct and operate the Activity to comply with this Certification.

E-2. **Compliance with Water Quality Standards:** The Activity shall not cause or contribute to a violation of New Hampshire surface water quality standards.

E-3. **Modification of Certification:** The conditions of this Certification may be amended and additional terms and conditions added as necessary to ensure compliance with New Hampshire surface water quality standards, when authorized by law, and after notice and opportunity for hearing.

E-4. **Proposed Modifications to the Activity:** The Applicant shall consult with and receive prior written approval from NHDES regarding any proposed modifications to the Activity that could have a significant or material effect on the conditions of this Certification including any changes to project operation or approved plans required by this Certification. If necessary, NHDES may modify the Certification in accordance with condition E-3 of this Certification.

E-5. **Compliance Inspections:** In accordance with applicable laws, the Applicant shall allow NHDES to inspect the Activity and affected surface waters to monitor compliance with the conditions of this Certification.

E-6. **Transfer of Certification:** Should this Certification be transferred to a new owner, contact information for the new owner (including name, address, phone number and email) shall be provided to NHDES within 30 days of the transfer.

E-7. **Compliance with Other Permits**: The Applicant shall comply with all applicable permits associated with the Activity, and any amendments or reissuances including but not limited to the following:

- NHDES Wetlands Permit,
- U.S. Army Corps of Engineers Section 404 Permit,
- NPDES Construction General Permit (CGP).

The conditions of these permits shall become conditions of this Certification upon issuance of this Certification. Should there be any discrepancies between permit requirements, the more stringent requirement as it relates to compliance with New Hampshire surface water quality standards shall apply.

E-8. **Stormwater Pollution Prevention Plan (SWPPP) and BMP Inspection Reports:** The Applicant shall provide a copy of the SWPPP and/or BMP construction BMP inspection reports required by the NPDES Construction General Permit (CGP) within 14 days of receiving a written request from NHDES.

E-9. **Mixing Zone/ Turbidity Monitoring and Reporting Plan**: Prior to construction, the Applicant shall submit to NHDES for approval, a mixing zone/turbidity monitoring and reporting plan. The Applicant shall then implement the approved plan. Turbidity monitoring shall be implemented if deemed necessary and when directed in writing by NHDES because it is suspected that construction activities could violate state surface water quality criteria such as turbidity and/or benthic deposits (see D-15). Mixing zones shall comply with Env-Wq 1707 (see C-33 through C-36) The plan shall show the extent of proposed mixing zones with supporting calculations as well as the location of proposed turbidity monitoring stations. The plan shall also include turbidity meter specifications (including accuracy), quality assurance/quality control provisions and sampling protocols. Turbidity Monitoring Reports shall be submitted to NHDES via email within 48 hours of completion of the event and shall include all water quality sampling results compiled in a table or spreadsheet. The reports shall also include a narrative description or summary which includes the dates of monitoring; names of persons who conducted the monitoring and prepared the report; predicted and actual precipitation amounts; start and end times of sampling; summary of sampling results including duplicates and blanks; time when meter was calibrated and calibration results; summary of any exceedances of the turbidity compliance criteria and thresholds and a summary of corrective actions, if needed. NHDES shall be notified via email of any non-compliances within 24 hours.

E-10. **Sediment Deposition Monitoring and Reporting:** Prior to construction, the Applicant shall submit a sediment deposition monitoring and reporting plan to NHDES for approval. The Applicant shall then implement the approved plan. The purpose of the plan is to determine if sediment deposition associated with construction of the Activity has or is likely to cause detrimental impacts to the

benthic communities. The plan shall include visual observations (and documentation) and photos of the channel/substrate of the affected surface waters downstream of the area of disturbance prior to construction, after construction and within 24 hours of at least one storm event predicted to result in 0.75 inches or more of precipitation in 24 hours. NHDES may require monitoring after more storm events if violations are suspected. Sediment Deposition Monitoring Reports shall be submitted via email within 30 days of when sediment monitoring is conducted and shall include a descriptive narrative and summary; dates of monitoring; names of persons who conducted the monitoring and prepared the report; any turbidity water quality samples pertinent to the report; a compiled table or spreadsheet of field measurements; photos with appropriate labels and a plan showing the location of where the photos were taken; and the field data form for recording benthic deposit observations.

E-11. **Road Salt Minimization Plan:** Within 90 days of the date of approval of this Certification, the Applicant shall prepare and submit a Road Salt Minimization Plan to NHDES for approval to minimize, to the maximum extent practicable, discharges of de-icing chemicals containing chloride (road salt) within the project corridor. As a minimum, the Road Salt Minimization Plan shall include the following:

1) A description of current NHDOT de-icing application practices and rates in the project corridor;

2) an evaluation of alternative measures and technologies including use of brine for pre-wetting salt and for anti-icing, and pervious pavement;

3) a schedule for implementation of salt reduction measures; and

4) a method for tracking and reporting progress in reducing salt usage that includes, but is not limited to, a log to document road salt use and application rates and documentation showing the relationship between salt usage and the winter severity index.

The Applicant shall than implement the approved plan.

E-12. **Permanent Stormwater BMP I & M Plan**: To ensure the long-term effectiveness of approved permanent stormwater best management practices (BMPs), the Applicant shall prepare a Permanent Stormwater BMP Inspection and Maintenance (I & M) plan. The plan shall include:

1) The names of the responsible party or parties who will implement the required reporting, inspection and maintenance activities;

2) the frequency of inspections;

3) an inspection checklist to be used during each inspection;

4) an I & M log to document each I & M activity;

5) a plan showing the locations of stormwater practices; and

6) actions to be taken if any invasive species begin to grow in the permanent stormwater BMPs.

The Applicant shall obtain NHDES approval of the I & M plan prior to operation of permanent stormwater practices. The Applicant shall then implement the approved plan. All record keeping required by the approved plan shall be maintained by the Applicant and made available to NHDES within 14 days of receiving a request from NHDES.

F. APPEAL

Any person aggrieved by this decision may appeal to the N.H. Water Council ("Council") by filing an appeal that meets the requirements specified in RSA 21-O:14 and the rules adopted by the Council, Env-WC 100-200. The appeal must be filed directly with the Council within 30 days of the date of this decision and must set forth fully every ground upon which it is claimed that the decision complained of is unlawful or unreasonable. Only those grounds set forth in the notice of appeal can be considered by the Council.

Information about the Council, including a link to the Council's rules, is available at http://nhec.nh.gov/ (or more directly at http://nhec.nh.gov/water/index.htm). Copies of the rules also are available from the NHDES Public Information Center at (603) 271-2975.

If you have questions regarding this Certification, please contact Gregg Comstock at (603) 271-2983 or Gregg.Comstock@des.nh.gov.

Eugene J. Forbes, P.E.
Director, NHDES Water Division

cc via email:
Michael Hicks, USACOE
Bedford Town Council
Rick Sawyer, Bedford Town Manager
Carol Henderson, NHFGD

STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE March 14, 2017

FROM: Mark Hemmerlein
Water Quality Program Manager

AT (OFFICE) Department of Transportation

Bureau of Environment

SUBJECT Water Quality Certification Condition E9
NH Route 101 Widening
Bedford 13953

TO Gregg Comstock
Watershed Management Bureau
29 Hazen Drive
Concord, NH 03302

Please find attached plans depicting the proposed turbidity monitoring sample location layout for this project, which will re-construct NH Route 101 between Wallace Road and NH Route 114. Sampling for this contract will occur in the Riddle Brook and Bowman Brook watersheds along with an unnamed brook. See Watershed Maps. This document identifies the sampling locations as specified in Part III of the memo issued by the NHDES Watershed Bureau on August 14, 2013. Compliance with this memo will satisfy Condition E9 of the Water Quality Certificate issued on February 28, 2017. In order to fulfill this requirement, the Department of Transportation will have the contractor note the August 14, 2013 memo and include this memo in the Stormwater Pollution Prevention Plan (SWPPP). If it becomes necessary to activate the provisions of condition E9, the Department will have the contractor develop all necessary plans and tables necessary to monitor the water quality of the three above mentioned waterbodies and controlled discharges associated with the construction.

This request included designation of "Extended Mixing Zones" (EMZ) and Complete Mix Mixing Zones (CMZ) in class B waters. Extended Mixing Zones are proposed in areas where mixing, dilution and assimilation of treated stormwater (released at less than or equal to 50 NTUs) would be allowed to occur. Compliance (10 NTUs above background) for CMZs will be determined at a specified distance into the closest downstream wetland resource. See attached layout.

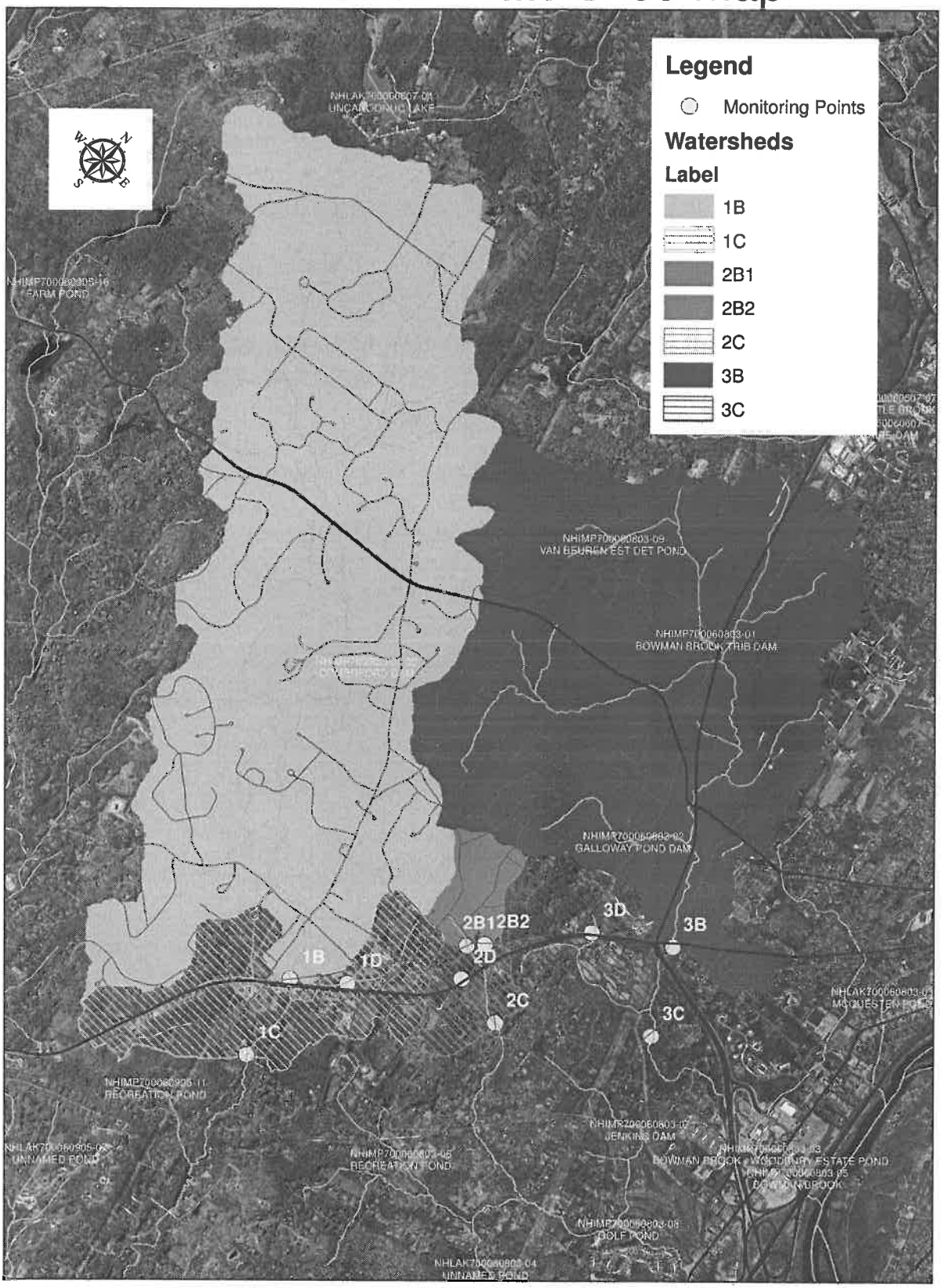
Please include any general conditions that apply to all mixing zones and specific requirements for individual mixing zones in your concurrence memo. Not included, but may be present within the project area are locations where construction stormwater can be captured in small setting ponds. Discharges from these areas will be restricted to 50 NTUs. In addition, there will be short duration activities that require monitoring which will be addressed through the weekly SWPPP meetings.

Should you have any further questions regarding this matter, please contact me at the Bureau of Environment at 271-3226.

c.c. Gregg Tedeschi, Contractor Administrator
Victoria Chase, Project Manager
Randy Talon, Environmental Coordinator
Marc Laurin, Environmental Manager

S:\Environment\PROJECTS\BEDFORD\13953\Water Quality\Turbidity Monitoring\2017-03-14 Memo.docx

Bedford 13593 - Watershed Map



0 0.5 1 2 3 4 Miles

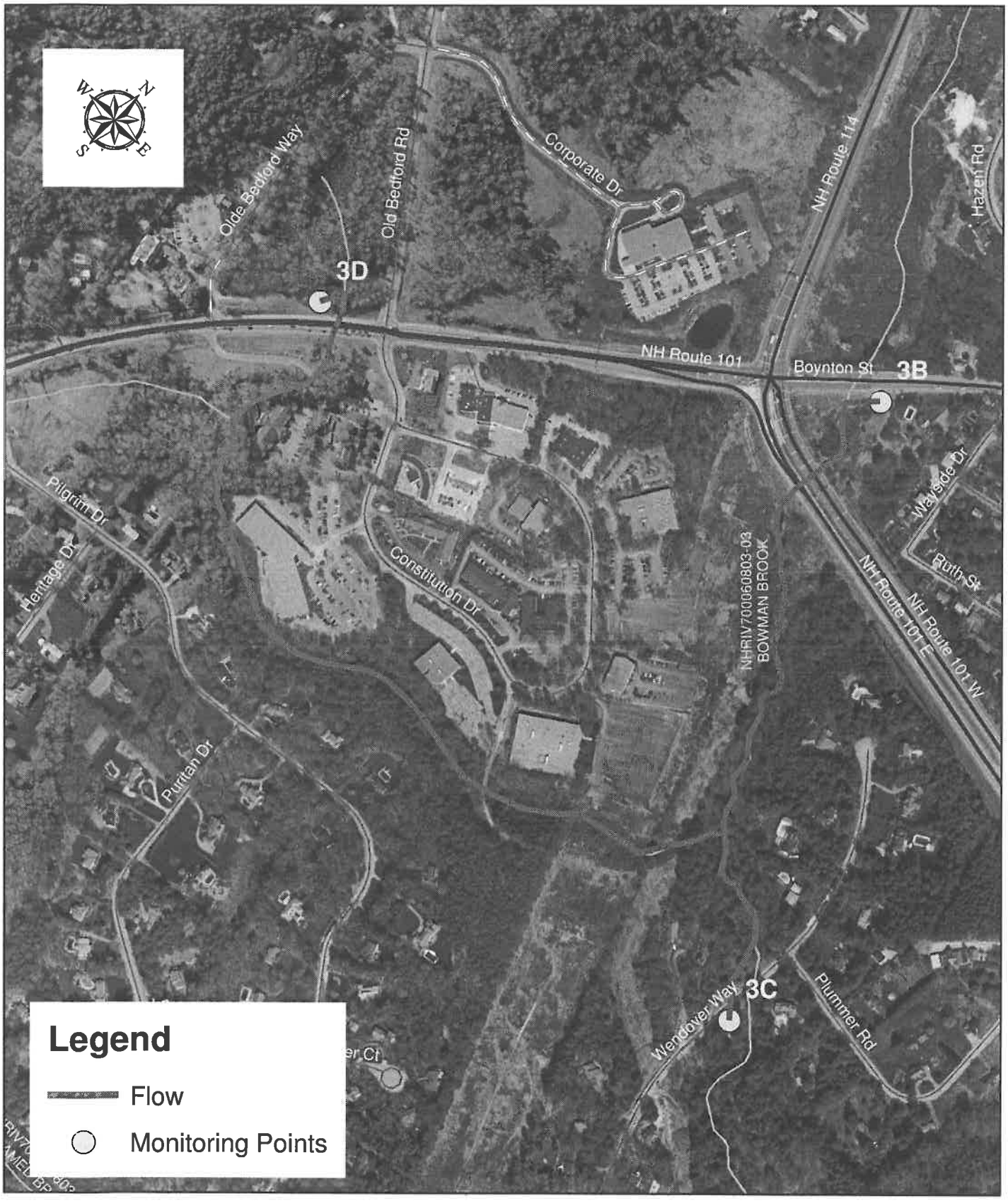
Bedford 13593 - Monitoring

0 0.075 0.15 0.3 0.45 0.6 Miles

Bedford 13593 - Monitoring

0 0.075 0.15 0.3 0.45 0.6 Miles

Bedford 13593 - Monitoring



0 0.075 0.15 0.3 0.45 0.6 Miles

STATE OF NEW HAMPSHIRE
Inter-Department Communication

DATE: 8/14/13

FROM: Gregg Comstock, P.E., and
Jocelyn Degler

AT (OFFICE): Water Division
Watershed Management Bureau

SUBJECT: Guidance for SWPPPs, BMP Inspection and Maintenance, Turbidity and Sediment Monitoring for NHDOT Projects with 401 Water Quality Certification

TO: Mark Hemmerlein, Water Quality Program Manager
Bureau of Environment
Department of Transportation

A. Introduction

This memorandum applies to New Hampshire Department of Transportation (DOT) projects that require an individual Clean Water Act section 401 Water Quality Certification (Certification) and provides guidance (Guidance) to DOT Contractors for the following:

- Developing and implementing Stormwater Pollution Prevention Plans (SWPPPs) and BMP inspection and maintenance plans;
- Monitoring for turbidity and sediment deposition and;
- Reporting of results.

These practices are required by the 401 Certification issued for this project to ensure compliance with New Hampshire Surface Water Quality Standards (SWQS). For the most part, the elements described in this Guidance are intended to complement the requirements of the National Pollution Discharge Elimination System (NPDES) Construction General Permit (CGP), as well as reinforce the need to comply with the provisions of the New Hampshire Code of Administrative Rules, part Env-Wq 1500. Where differences exist between these documents, the more stringent criteria shall apply.

B. Definitions

1. **Construction Discharge:** Construction discharges include, but are not limited to, stormwater runoff, snowmelt runoff, and groundwater (i.e., from dewatering) associated with construction activities. Construction discharges include controlled construction discharges (as defined in B.2) and uncontrolled construction discharges (such as overland flow on a side slope).

2. **Controlled Construction Discharges:** Controlled construction discharges are construction discharges where the rate of flow can be regulated such as from a construction settling basin or flocculation system.

3. **Mixing Zones:**

   a. **Complete Mixing Zone (CMZ):** A Complete Mixing Zone (CMZ) is the minimum DES approved distance or area in a Class B surface water that is needed to completely mix the construction discharge with the surface water. The CMZ begins at the point where the construction discharge enters the surface water and ends at a compliance station where the

discharge has completely mixed with the receiving water.

b. **Extended Mixing Zone (EMZ):** An Extended Mixing Zone (EMZ) is any DES approved mixing zone in a Class B surface water that exceeds the length of the CMZ. The EMZ begins at the point where the construction discharge enters the resource water and ends at a compliance station located at the end of the EMZ.

4. **Sampling Stations:**

   a. **Background:** Background stations (with the exception of historical background stations - see section E.4.c) are located upstream and beyond the influence of all construction discharges and are needed for determining compliance with turbidity water quality standards.

   b. **Compliance:** Compliance stations are located downstream of construction discharges and is where compliance with the turbidity standards in section E.9 must be met.

   c. **Discharge:** Discharge stations are located in controlled construction discharges just prior to mixing with a surface water (including wetlands) and is where the turbidity standards in section E.9.a. must be met.

   d. **Sentry:** Sentry stations are located between construction discharges and compliance stations and are typically used as an early warning system to determine if turbidity standards at compliance stations will be met.

5. **Workday:** A workday includes any time, day or night, that construction is active. Typical workdays are daylight hours, Monday through Friday, excluding holidays, but may be extended to include Saturdays, Sundays, and holidays if the contractor is anticipated to have crews on site for those days. If the typical workday is extended to include additional times, this shall be agreed to by all parties and documented in the weekly meeting minutes.

6. **Workweek:** A workweek consists of all scheduled workdays from Monday through Sunday.

C. Plan Requirements And Meetings

Preparation and maintenance of stormwater management plans and/or installation of temporary BMPs to control sediment and erosion during most Department of Transportation (DOT) construction projects are required by the following:

- The NPDES General Stormwater Permit for Discharges from Construction Activities (commonly known as the Construction General Permit or CGP) which requires development of Stormwater Pollution Prevention Plans (SWPPPs); and

- The Memorandum of Agreement (MOA) between the Department of Environmental Services (DES) and DOT which requires all construction projects contracted by, and under direct supervision of, the DOT to incorporate best management practices (BMPs) for erosion and sediment control and stormwater management, for each project that has the potential to significantly alter terrain.

1. **Stormwater Pollution Prevention Plan (SWPPP)**

   a. The SWPPP shall:

      i. Include a plan describing procedures to address and correct emergency construction related stormwater issues in an expeditious manner. The plan shall include the

responsibilities of key individuals, the availability of equipment, and the availability of erosion control and BMP supplies and require that all emergency erosion control and BMP supplies be kept on site.

ii. Prior to winter shutdown, require the construction site to be stabilized in accordance with Env-Wq 1505.03 and Env-Wq 1505.05.

iii. Require all construction settling basins (CSBs), alone or in combination, be sized to retain no less than the construction run-off volume of a 2-year 24-hour storm event on-site and managed to provide sufficient storage between precipitation events in order to prevent overflow, (i.e. uncontrolled releases) and violations of turbidity standards in surface waters. In addition, CSBs shall be managed to control no less than the 10-year, 24 hour storm event to prevent violations of turbidity water quality standards where control means other measures such as larger sized basins, use of pumps, active treatment or combinations thereof to control discharges and/or manage the volume of the 10-year 24-hour storm event

iv. Require all construction discharges to be treated to the maximum extent practicable with a goal of providing treatment for at least the 10 year storm that will meet turbidity water quality standards and removing particles larger than silt and clays [i.e., particles larger than the #270 sieve (0.053 mm)].

v. Include an Erosion Control Inspection and Maintenance Plan that satisfies the requirements of this Guidance and the CGP. The Inspection and Maintenance Plan is a required component of the SWPPP and shall be submitted to DES as specified in the 401 Certification, or at least 15 days prior to construction if requested by DES.

vi. Include a copy of this Guidance, a copy of the DES approved turbidity monitoring locations and mixing zones (if applicable) and any applicable conditions.

vii. Require that no earthmoving activities shall begin until the DOT has approved a SWPPP, meeting the requirements of the most recent CGP, the New Hampshire Code of Administrative Rules part Env-Wq 1505 and 1506, and the provisions of this Guidance.

b. In accordance with the CGP a current copy of the SWPPP shall be kept on site, or at an easily accessible location, and be made available to agencies and the public.

c. The DOT shall be responsible to ensure that the Contractor's SWPPP and appropriate BMP's are implemented.

2. Weekly Erosion Control Meetings and Minutes

a. The Contractor shall hold weekly erosion control meetings with the DOT and their erosion control consultant for the duration of the contract.

b. Minutes of the meeting shall be sent to DES within 3 calendar days of the meeting and to other interested parties upon request. The meeting minutes shall include the following:

i. Printed copies of each 24-hour precipitation forecast for the site for each day of the previous week, and a copy of the 5 day forecast on the day of weekly meeting.

ii. Any new or revised Mixing Zone requests, changes to active sampling locations and a list of all active sampling locations.

D. Inspection Requirements

The effectiveness of construction best management practices (BMPs) to reduce erosion and sedimentation can be evaluated through routine inspection and maintenance of the BMPs. The Erosion Control Inspection and Maintenance Plan (see section C.1.v) shall, at a minimum, meet or exceed (i.e., be more stringent than) the requirements stipulated in this section, Env-Wq 1506 and in Section 4.1 of the CGP..

1. **Daily**
   a. All erosion control measures shall be inspected and maintained daily by the prime contractor from the time construction commences and earth is disturbed until construction is complete.
   b. The erosion control consultant shall print the 24-hour precipitation forecast once daily (7-9 am) for the duration of the project. All precipitation forecasts shall be clearly marked with the date and time, kept on file, provided to the DOT Contract Administrator and be made available for other interested parties.
   c. The erosion control consultant shall print the 5-day forecast once daily (7-9 am) for the duration of the project. All forecasts shall be clearly marked with the date and time, kept on file, provided to the DOT Contract Administrator and be made available for other interested parties. In addition, the 5-day forecast on the day of the weekly meeting shall be attached to the weekly meeting minutes distributed by the erosion control consultant.
2. **Weekly**
   a. After construction has commenced and earth has been disturbed, the erosion control consultant shall conduct a weekly erosion control site inspection to verify all erosion control measures are maintained properly to protect surface waters (including wetlands).
   b. The consultant shall document and report its findings, including recommendations for maintenance of in-place BMPs or the addition of new control measures to the DOT Contract Administrator and other interested parties.
3. **Pre-Storm**
   a. Inspection shall occur within 24 hours prior to the start of any forecasted rain or rain-mix precipitation event of 0.5 inches or more in a 24-hour period that is predicted to occur during the workweek.
   b. If the predicted event occurs outside of the workweek, the pre-storm inspection shall occur on the workday just before any scheduled days off, such as holidays and weekends.
   c. Unless otherwise approved by DES, the Accuweather website (http://home.accuweather.com/index.asp?partner=accuweather) shall be used for the purpose of predicting future precipitation amounts and determining sunrise and sunset times. Future precipitation amounts on the Accuweather web site may be determined by typing in the location of the project (city, state and/or zip code), clicking on the link for Days 1-5 forecasts and then clicking on the day(s) of interest.
4. **Storm Events**
   a. Inspections for erosion and sediment control performance shall occur whenever plumes are visible, turbidity sampling indicates water quality standards are exceeded or significant sediment deposits are observed in the surface water that are caused, or partially caused by construction discharges.

b. Inspections and corrective action shall be implemented until turbidity water quality standards are met and/or the source of significant sediment deposits is abated.

5. Post Storm

a. Inspections shall occur within 24 hours of the occurrence of 0.25 inches of rain or rain mix event in accordance with the CGP. If the inspection falls on a non-workday, the inspection shall take place on the next workday.

b. Inspections shall occur within 24 hours of the occurrence of 1.0 inch of rain or rain mix event regardless of whether it falls on a workday or non-workday.

c. For a multi-day rain or rain-mix precipitation event, inspections shall occur during each day that follows a day where 0.25 inches or more of rain or rain-mix precipitation has fallen.

d. Precipitation amounts shall be based on precipitation recorded at the weather station described in section E.1.

6. Winter Shutdown

a. Inspections during winter shutdown shall occur as specified in Section 4.1.4.3. of the CGP.

E. Monitoring

Erosion controls, particularly those that are improperly installed and/or maintained, may fail during storm events, potentially causing sediment discharge to surface waters. The extent of sediment discharge as a result of erosion control failures must be quantified to determine compliance with NH surface water quality standards. The turbidity sampling, as described below, is typically necessary only for storms that exceed 0.5 inches in a 24-hour period and/or when a turbidity violation, plume or significant sediment deposit is evident in the surface water as a result of construction discharges (as defined in section 6) from the site. Additional turbidity sampling, however, may be necessary for sites experiencing chronic water quality standard violations due to erosion control problems.

1. Weather

a. Weather Station Specifications: The prime contractor shall be responsible for providing and maintaining a weather station with the following specifications if included in the proposal. The weather station must be capable of measuring precipitation to an accuracy of 0.01 inch, monitor temperature to accuracy of 1 degree Fahrenheit or Celsius, hourly data storage and download, and remote access capabilities to allow automated email notifications.

b. Weather Station Location: The Contractor may use a DES approved off-site weather station, provided that the weather station has the capabilities described in Weather Station Specifications and is reasonably close to the construction area. Weather stations with those capabilities may include the DOT Traffic Management Center's (TMC) Roadway Weather Information System (RWIS) weather stations

c. Automated email notification:

i. Start of rain or rain-mix precipitation event: Once 0.25 inches of rain or rain-mix precipitation has been measured an automated email notification will be sent to the DOT, DES and any other interested parties. The email shall note the intensity of the precipitation.

ii. Continuation of rain or rain-mix precipitation event: Once 0.5 inches of rain or rain-mix precipitation has been measured an automated email notification will be sent to

the DOT, DES and any other interested parties. The email shall note the intensity of the precipitation.

iii. Continuation of rain or rain-mix precipitation event: Once 1.0 inches of rain or rain-mix precipitation has been measured an automated email notification will be sent to the DOT, DES and any other interested parties. The email shall note the intensity of the precipitation.

iv. End of precipitation event: Once six hours without rain or rain-mix precipitation has passed an automated email notification will be sent to the DOT, DES and any other interested parties.

v. The Contractor shall be responsible for obtaining an accurate account of precipitation from the agreed upon weather station and provide that information to the DOT, DES and other interested parties. This information shall be provided in the turbidity monitoring reports (section F.2).

d. If the approved weather station is inoperable, the nearest National Weather Service station with a rain gauge can be used temporarily and a plan shall be developed and implemented to repair and resume use of the approved weather station within two weeks, or as soon as possible.

2. Surface Waters

a. Definitions of background, discharge, sentry and compliance stations are provided in section B.4.

b. Turbidity monitoring at background, discharge, sentry, and compliance stations are typically designated for the project during the design phase, approved by DES, and included in the DOT contract documents. The contractor must monitor these locations from the time construction activities upstream of the compliance station disturb the earth's surface (including clearing) and until the construction area is permanently stabilized in accordance with Env-Wq 1505.03.

c. The DOT, with DES approval, may amend the list of active sampling locations. Any revisions to sampling locations and a list of all active sampling locations shall be documented in the weekly meeting minutes distributed by the erosion control consultant.

d. Sampling conducted to determine compliance with surface water quality standards shall account for lag time, which is the time it takes for water from the construction discharge to reach the DES approved surface water compliance sampling station. The Contractor shall submit and receive DES approval of lag time sampling protocols prior to construction discharges to the extended mixing zone (see section E.3).

e. Turbidity compliance criteria for surface waters are provided in section E.9.b.

f. If compliance with turbidity standards can be demonstrated downstream of all construction discharges but upstream of a DES approved compliance station, the compliance station does not need to be monitored.

g. For Class A waters, compliance sampling stations shall be within the receiving water and no more than 75 feet downstream of the construction discharge.

h. Turbidity sampling of background, sentry and compliance stations shall be in accordance with Table 1 and i. through v. below.

Table 1 - Number of turbidity samples at each station relative to stream width,

Stream/River Width (feet)	Number of Samples from Left Bank[a]	Number of Samples Between Left and Right Bank[b]	Number of Samples from Right Bank[a]
≤ 20	--	1 (mid-channel)	--
20 – 60	1	--	1
60 – 150	1	1	1
>150	1	2	1

[a] collected within plume; if plume is not visible, collect within 10-15 feet of bank
[b] collected equally spaced between samples from left and right banks

i. Rinse sampling container three times with water from the waterbody.

ii. Submerge sampling container a minimum of an arm's length upstream and allow the container to fill.

iii. Do not collect any water immediately adjacent to legs or boots.

iv. Ensure that any introduced air bubbles are removed prior to analysis.

v. Immediately cap the sample container.

i. Quality Assurance/ Quality Control

i. A duplicate measurement shall be made immediately after every 10th sample. The field sheets shall clearly indicate the duplicate measurement. If the relative difference between the duplicate measurement and the original measurement exceeds 10%, then recalibrate the turbidity meter and re-measure turbidity. If the difference is continually greater than 10%, then provide notice on field documentation and consult DES after the sampling is complete.

ii. A blank measurement shall also be made after every 10th sample. For blank measurements simply fill a sample container with deionized water and measure immediately following the measurement of the 10th sample.

iii. Turbidity Meters shall be calibrated every day sampling is conducted and prior to collection of the first sample.

j. Field Analysis and Meter Specifications:

i. Measure turbidity in the field using turbidity meters. All measurements shall be made immediately following sample collection.

ii. Unless otherwise approved by DES, use turbidity meters with an accuracy of ± 2% for readings below 100 NTU and ± 3% for readings above 100 NTU, and resolution of ± 0.1 NTU.

iii. Measuring Turbidity in the Laboratory: If unforeseen complications preclude the use of a field turbidity meter, collect turbidity samples for analysis in a laboratory in accordance with protocols approved by DES.

3. Mixing Zones

a. Definitions of Complete Mixing Zones (CMZs) and Extended Mixing Zones (EMZs) are provided in section B.3.

b. Mixing zones are only allowed in Class B waters; they are not allowed in Class A waters.

c. The compliance station at the end of a CMZ shall be approved by DES and established as follows:

   i. Lotic waterbodies (i.e. flowing waters such as rivers and streams) shall be sampled at a distance downstream of the construction discharge that meets at least one of the following three criteria:

      (1) No more than 75 feet;

      (2) No more than 10 times the average bank full width of the receiving stream (as measured within 25 feet downstream of the discharge point); or

      (3) No more than a distance equal to ½ the average cross-sectional area of the stream (as measured within 25 feet downstream of the discharge point).

   ii. Lentic waterbodies (i.e., waters with little to no discernible flow such as lakes, ponds, marshes, etc.) shall be sampled within or at the edge of the mixing area that does not exceed 5% of the lentic water surface area or 200 feet from the discharge point, whichever is more limiting.

d. All mixing zones (with the exception of those set up to address violations discussed in section E.6) must be pre-approved by DES. The DOT, with DES approval, may add or subtract from the list of active sampling locations and/or establish new or revised mixing zones that were not specified in the contract documents.

e. Any new or revised Mixing Zone requests, changes to active sampling locations and a list of all active sampling locations shall be documented in the weekly meeting minutes distributed by the erosion control consultant.

f. All mixing zones shall comply with Env-Wq 1707.

g. The equations provided in Figure 1(see section G of this Guidance) shall be used to determine compliance with turbidity standards of construction discharges to multiple mixing zones (CMZs and EMZs) in surface waters. An example demonstrating how compliance would be calculated for three construction discharges in series is included in Figure 1.

4. Backgrounds

a. Background sampling stations not specified in contract documents shall be located within the receiving waterbody and at least 50 feet upstream of any construction discharge and outside the zone of influence of any discharge to a lentic (i.e., non-flowing) waterbody.

b. If it is not possible to collect an upstream background sample (such as for compliance stations in the upper headwaters of a drainage area) background shall be set at 0 NTUs.

c. Historical Background: A DES approved historical background based on pre-construction turbidity measurements may be used for situations such as when there is no upstream background sampling location or for determining compliance.

   i. Historical backgrounds must be approved in writing by DES.

   ii. The contractor may request a historical background level from DES through DOT. This request shall include:

      (1) Results of a minimum of 10 turbidity measurements taken during at least 5

different storm events at locations approved by DES and at a time when there is no influence of construction activities from the project on turbidity levels.

(2) Turbidity monitoring results shall include the information specified in section F.2.

(3) If the area has been disturbed or cleared, include the date of disturbance.

iii. DES will then determine the historical background based on the median or other appropriate statistic.

d. If a compliance station has multiple upstream background stations or the number of background stations is modified, a composite background turbidity for determining compliance shall be determined using one of the following two methods:

i. A 2 year -24 hour runoff volume weighted average turbidity value based on each background station that is derived using engineering software such as HydroCAD or an approved equal. Calculations for determining the average runoff volume weighted composite background turbidity values shall be provided with the storm reports. An example calculation is provided below in section D.4.d.iii.

ii. The composite background turbidity value shall be set equal to the lowest turbidity reading or be based on a flow weighted average of turbidity measurements at the background stations. Flow estimates (in cubic feet per second) may be approximate and based on simple estimates of velocity (i.e., time it takes a stick to travel a known distance in feet per second) multiplied by the wetted cross sectional area (visual estimate of the average depth (in feet) multiplied by a visual estimate of the average width (in feet) of the flowing water). Flow calculations and calculations for determining the flow weighted composite background turbidity values shall be submitted with the storm reports.

iii. An example of how the composite background turbidity shall be computed based on predicted 2 year -24 hour storm volume is provided below:

Background Station	2 year - 24 hour storm volume (ac-ft)	Fraction of total volume	Turbidity Reading (NTU)
08-B1	1.3	0.22	20
08-B2	2.7	0.45	5
08-B3	2.0	0.33	12
	6.0		

Composite background turbidity = (0.22 x 20) + (0.45 x 5) + (0.33 x 12) = 10.6 NTU

5. Controlled Construction Discharges

a. Definitions of construction discharges and controlled construction discharges are provided in section B.

b. Design requirements for controlled construction discharges and construction settling basins are provided in section C.1.a.

c. Turbidity compliance criteria for controlled construction discharges are provided in section E.9.a.

d. Discharge sampling shall occur within the controlled construction discharge just prior to mixing with a surface water (including wetlands).

e. The frequency of turbidity monitoring of controlled construction discharges and associated

surface waters when controlled construction discharges occur shall comply with the monitoring requirements in Env-Wq 1506.12(j)(3)e of the NH Alteration of Terrain regulations (Env-Wq 1500). Sampling may be limited to just daily sampling of construction discharges from construction settling basin (CSBs) when flocculants are not being used, there is no new flow entering the CSBs that could increase the turbidity in the CSB and turbidity in the construction discharges from the CSBs are no greater than

i. 10 NTU above background taken during the precipitation event for Class B surface waters,

ii. a DES Approved Historical Background level, or

iii. 0 NTU above background taken during the precipitation event for Class A surface waters, respectively.

f. Controlled construction discharges from CSBs to surface waters shall be conducted during or soon (i.e., within approximately 72 hours) after a precipitation event, if necessary, to provide adequate storage in preparation for a predicted precipitation event. Unless otherwise directed by DES, releases beyond the 72-hour window are allowed if additional detention time will reduce the amount of sediment discharged to the receiving water.

g. When controlled construction discharges commence, loadings from the discharges to surface waters shall be gradually and incrementally increased in steps followed by compliance monitoring to ensure that turbidity standards in the discharge and surface waters are met.

i. If standards are met, loadings from the construction discharges may be gradually increased to the next level, followed by compliance monitoring, and so on.

ii. If compliance cannot be met, the turbidity loading from the construction discharges shall be immediately and substantially reduced by either reducing the turbidity in the discharges (i.e., via further treatment) and/or reducing the construction discharge flow rates so that turbidity standards are once again attained as soon as possible.

h. Once monitoring from a controlled construction discharge as described in E.5.g.ii above indicates a return to compliance with turbidity standards, and if the system is deemed capable of meeting turbidity standards, flow from the construction discharge to surface waters may be gradually increased in small increments, followed by compliance monitoring (starting at hour one) to confirm that turbidity standards are met.

i. If the controlled construction discharge exceeds the criteria in section E.9 or the compliance point exceeds water quality standards, sampling shall be conducted in the surface water to document the duration and extent of any water quality violation at a frequency of at least one sample round every hour until turbidity standards are met. The monitor shall also sample the extent of the violation by sampling downstream every 100 feet until the resource meets water quality standards.

j. Should violations continue for longer than 3 hours, flow from the pertinent construction discharges to the surface water shall immediately cease and the treatment system shall be assessed to determine if it is capable of discharging without resulting in a turbidity standards violation. Turbidity sampling shall continue until the water quality standards have been met at the compliance point or until sunset. If sampling is suspended due to darkness the violation is assumed to continue and sampling shall resume within one hour of sunrise on the following day.

6. Plumes, Violations of Turbidity Standards or Evidence of Sediment Deposits

a. Hourly turbidity sampling of individual locations is required whenever plumes are visible due

to construction discharges from the site, when sampling results indicate that a violation of the turbidity standards is occurring or when significant sediment deposits are observed in the surface water that are due or partially due to construction discharges. Turbidity monitoring shall commence within 2 hours of the discovery of a violation.

b. Whenever a turbidity plume is observed, or surface water quality sampling indicates that there is a violation of the turbidity standard at the compliance point, the following actions shall be taken by the monitor:

   i. Immediately contact the Contractor and the NHDOT Contract Administrator to take remedial action, as needed.

   ii. The Contractor shall take appropriate corrective actions until the condition causing the violation has been identified and corrected.

   iii. Set up a Complete Mix Mixing Zone (CMZ) around the suspected discharge (Plume) with its corresponding background, and compliance stations (see E.3.c.).

   iv. Begin sampling the background, discharge, and compliance. If the turbidity standard cannot be met at the compliance station, continue sampling downstream (for lotic - flowing waters), or away (for lentic - non-flowing waters) from the compliance point, at approximately 100 foot intervals, until turbidity standards have been met to document the extent of the water quality violation.

   v. Continue hourly sampling as needed to document both the extent and duration of the violation. If sampling must be suspended due to darkness, sampling shall continue within one hour of sunrise the next day, and continue until compliance is obtained.

   vi. Include all sampling data with a chronology of actions taken to correct the situation in the turbidity monitoring report, as specified in section F.2.

c. Unless otherwise required by DES, sampling shall occur during daylight hours only. If the event extends past sunset the violation is assumed to continue and sampling shall recommence within 1 hour of sunrise of the following day.

7. Precipitation Events

a. Definitions of workday and workweek are in section B.

b. For storms forecasted to be less than 0.5 inches, and when the actual rain or rain mix accumulation is less than 0.5 inches, no turbidity sampling is required.

c. Workday Sampling: For storms forecasted to be greater than 0.5 inches in 24 hours that begin during a workday:

   i. Begin sampling within 2 hrs after at least 0.25 inch of rain or rain mix has fallen and every hour thereafter that stormwater discharges from the site occur, up to four hours or sunset, whichever comes sooner.

   ii. Sampling shall occur during daylight hours unless controlled construction discharges are occurring or unless otherwise directed by DES through DOT.

   iii. If the 0.25 inch rain notification is received between sunset and sunrise of two workdays, sampling shall start within one hour of sunrise and continue every hour thereafter that stormwater discharges from the site occur, up to four hours or until sunset. If an end rainfall notification is received before sunrise sample each sample site once commencing within an hour of sunrise and include result with the post-rainfall inspection report.

iv. If the 0.25 inch rain notification is received during a workday followed by another workday and it is less than four hours to sunset:

(1) The monitor shall attempt to complete as many rounds of sampling prior to sunset. Sampling shall be suspended at sunset but shall resume within one hour of sunrise and continue every hour thereafter that construction stormwater discharges from the site occur, up to four hours.

(2) If it is less than 2 hours to sunset at the time of the notification sampling may begin within an hour of sunrise on the following workday.

(3) If an end rainfall notification is received before sunrise sample each sample site once commencing within an hour of sunrise and include results with the post-rainfall inspection report.

v. If the storm starts and the 0.25 inch rain notification is received within 2 hours of sunset on a workday, followed by a non-workday no sampling is required if less than 1.0 inch of rain or rain-mix accumulates.

d. Workday Sampling: For storms forecasted to be less than 0.50 inches in 24 hours but which exceed 0.50 inches in 24 hours:

i. Begin sampling within 2 hours after 0.50 inches of rain or rain-mix has fallen and every hour thereafter during the workday that stormwater discharges from the site occur, up to four hours.

ii. Sampling shall occur during daylight hours unless controlled construction discharges are occurring or unless otherwise directed by DES through DOT.

iii. If the 0.5 inch rain notification is received between sunset and sunrise of two workdays, sampling shall start within one hour of sunrise and continue every hour thereafter that stormwater discharges from the site occur, up to four hours or until sunset. If an end rainfall notification is received before sunrise sample each sample site once commencing within an hour of sunrise and include result with the post-rainfall inspection report.

iv. If the 0.5 inch rain notification is received during a workday followed by another workday and it is less than four hours to sunset:

(1) The monitor shall attempt to complete as many rounds of sampling prior to sunset. Sampling shall be suspended at sunset but shall resume within one hour of sunrise and continue every hour thereafter that stormwater discharges from the site occur, up to four hours.

(2) If it is less than 2 hours to sunset at the time of the notification sampling may begin within an hour of sunrise on the following workday.

(3) If an end rainfall notification is received before sunrise sample each sample site once commencing within an hour of sunrise and include results with the post-rainfall inspection report.

v. If the 0.5 inch rain notification is received within 2 hours of sunset of a workday followed by a non-workday no sampling will be required if less than 1.0 inch of rain or rain-mix accumulates. If greater than 1.0 inch of rain falls sampling shall start within 1 hour of sunrise on the following day and continue every hour thereafter that stormwater discharges from the site occur, up to four hours. If an end rainfall notification is received before sunrise sample each sample site once and include

result with the post-rainfall inspection report.

e. Non-Workday Sampling: For storms forecasted to be less than 1.0 inches, and when the actual rain or rain mix is less than 1.0 inch no turbidity sampling required on a non-workday.

f. Non-Workday Sampling: For forecasted storms greater than 1.0 inch in 24 hours:

   i. Begin sampling within 2 hours after 0.50 inches of rain or rain mix has fallen and every hour thereafter during the non-workday that stormwater discharges from the site occur, up to four hours.

   ii. Sampling shall occur during daylight hours unless controlled construction discharges are occurring or unless otherwise directed by DES through DOT.

   iii. If the 0.5 inch notification is received between sunset and sunrise sampling shall start within 1 hour of sunrise the following day and continue every hour thereafter that stormwater discharges from the site occur, up to four hours. If an end rainfall notification is received before the next day sample each sample site once and include result with the post-rainfall inspection report.

g. Non-Workday Sampling: For storms not forecasted to be greater than 1.0 inch in 24 hours but which exceed 1.0 inches in 24 hours:

   i. Begin sampling within 2 hours after 1.0 inches of rain or rain mix has fallen and every hour thereafter during the non-workday that stormwater discharges from the site occur, up to four hours.

   ii. Sampling shall occur during daylight hours unless controlled construction discharges are occurring or unless otherwise directed by DES through DOT.

   iii. If the 1.0 inch notification is received between sunset and sunrise sampling shall start at sunrise the next day and continue every hour thereafter that stormwater discharges from the site occur, up to four hours. If an end rainfall notification is received before sunrise sample each sample site once and include result with the post-rainfall inspection report

h. Fast Moving Isolated Storms: For storms not forecasted to be greater than 1.0 inch in 24 hours but which exceed 0.25 inches and the storm in question was a fast moving isolated storm (such as a summer thunder storm), the monitor shall mobilize within 2 hours and conduct a single round of sampling. If it is determined that there is no discharge leaving the site and the weather and radar indicate no further rain or rain mix, no further sampling is required. However, if an additional 0.25 inches of precipitation is recorded the monitor must return to the site and complete the unfinished rounds.

i. Sampling requirements for events that are all snow or during Winter Shutdown are provided in section E.10.b and E.10.c respectively.

8. Sediment Deposition Inspections

a. Inspection Prior to Construction:

   i. Prior to commencement of construction activities, the contractor shall set up locations every 50 to 100 feet along the Extended Mixing Zone that will function as the standard observation points for benthic observation.

   ii. Pictures shall be taken of all standard observation points and visual observation of all accessible portions of mixing zones shall occur to document sediment conditions prior to commencement of construction activities in the upstream watershed.

b. Inspection During Construction:

i. All accessible portions of Mixing Zones that receive controlled construction discharges at turbidity levels greater than 30 NTUs, shall be visually inspected and photographs taken along standard observation points within 7 days of when such controlled construction discharges occur to determine if construction related discharges have resulted in significant sediment deposits that would have detrimental impact on the benthic communities.

9. Turbidity Compliance Criteria and Thresholds

a. In Controlled Construction Discharges:

i. Controlled Construction Discharges to Class A waters shall not exceed 0 NTUs above background taken during the precipitation event or 0 NTUs above a DES approved historical background.

ii. Controlled Construction Discharges to Class B waters shall not exceed 50 NTUs.

b. In Surface Waters at Compliance Locations:

i. Surface waters within Class A watersheds shall not exceed 0 NTUs above background taken during the precipitation event or 0 NTUs above a DES approved historical background.

ii. Surface waters within Class B watershed shall not exceed 10 NTUs above background taken during a precipitation event or 10 NTUs above a DES approved historical background.

10. Relief of Monitoring Requirements

a. If sampling results for at least 5 consecutive events indicate that turbidity standards are being met, and the area in question has been stabilized in accordance with Env-Wq 1505.03, a request can be made to DES through DOT to suspend or reduce the turbidity monitoring requirements.

b. Turbidity sampling for events that are only snow shall not be required. If the event is a mixed precipitation event it shall be at the discretion of DES if sampling is necessary after consultation with the DOT field staff.

c. Turbidity sampling during winter shutdown shall not be required, provided the site is stabilized in accordance with Env-Wq 1505.03 and Env-Wq 1505.05 and unless there is evidence of in-stream turbidity violations during this time (i.e., visual plumes or turbidity measurements conducted according to DES accepted protocol). If turbidity violations are found to exist, monitoring and reporting shall commence within 24 hours of discovery of the violation, and shall be conducted in accordance with the requirements of this Guidance. If the site is not stabilized prior to winter shutdown in accordance with Env-Wq 1505.03 and Env-Wq 1505.05, DES may require additional turbidity monitoring to confirm there are no turbidity violations during winter shutdown.

F. <u>Reporting</u>

1. BMP Inspection and Maintenance Reports

a. Written inspection and maintenance reports shall be conducted as prescribed in Section 4.1.7 of the CGP and Env-Wq 1505.02 and made available to DES, the DOT Contract Administrator and other interested parties, upon request.

b. Minimum Required information:

   i. Predicted 24-hour precipitation for pre-storm inspection reports and measured precipitation amounts for post-inspection reports;

   ii. Total project area, including but not limited to cleared area, active construction area, temporally stabilized area and permanently stabilized area;

   iii. A determination if erosion control measures during dry weather inspections are properly installed;

   iv. Determinations if erosion control measures during wet weather inspections are properly installed and functioning adequately to protect surface water quality;

   v. A summary describing all corrective actions taken to resolve any deficient erosion control measures and the time it took to resolve them; and

   vi. Pictures of the general condition of the site and deficient BMPs.

2. Turbidity Monitoring Reports

a. Turbidity monitoring reports shall contain all water quality sampling results, as required by this Guidance, compiled into a table or spreadsheet, along with a descriptive narrative or summary that includes the following:

   i. Date(s) of sampling;

   ii. Names of samplers and report preparer;

   iii. Sunrise and sunset times;

   iv. Predicted and actual precipitation amounts;

   v. Time and amount of precipitation notification;

   vi. Start and end times of sampling;

   vii. Summary of sampling results including duplicates and blanks;

   viii. Time when meter calibration was conducted and calibration results:

   ix. Summary of any exceedances of the turbidity compliance criteria and thresholds and a summary of corrective actions, if needed; and

b. DOT and DES shall be notified of all non-compliance events immediately.

c. DOT and DES shall receive a full report within 24 hours of discovery of a non-compliance event.

d. DOT and DES shall receive all turbidity-monitoring reports within two days of completion of the event.

e. All reporting shall be transmitted to DES and DOT via electronic mail.

3. Sediment Deposit Monitoring Reports

a. Sediment Deposit monitoring reports shall contain information to allow DES to determine if an event had detrimental impacts on the benthic communities. Reports shall include the following:

   i. Descriptive narrative and summary;

   ii. Date(s) of monitoring;

iii. Names of the persons who conducted the monitoring and prepared the report;

iv. All water quality sampling results pertinent to the event;

v. A compiled table or spreadsheet of field measurements;

vi. Pictures with appropriate labels and a plan showing the location of where the pictures were taken;

vii. The field data form for recording benthic deposit observations; and

viii. Duration, estimated volume and estimated rates of controlled construction discharges, unless waived by DES.

b. DOT and DES shall be notified of all non-compliance events on the same day that they were discovered.

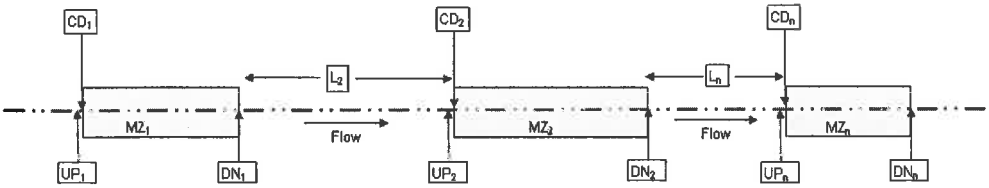
c. DOT and DES shall receive a full report within 24 hours of discovery of a non-compliance event.

d. DOT and DES shall receive the pre-construction sediment monitoring report (section E.8.a) within one month of when it was conducted.

e. DOT and DES shall receive all other sediment monitoring reports within a week of completion of the event. This requirement may be relaxed to monthly upon approval by DOT and DES.

f. All reporting shall be transmitted to DES and DOT via electronic mail.

G. Figure 1



Turbidity Compliance Equations: **The maximum allowable turbidity in NTUs at the downstream boundary of the mixing zone for CDn shall be equal to the greater of** $10 + UP_n - [RF_n \times (DN_{n-1} - UP_{n-1})]$ or $10 + DN_{n-1}$

where:

CD_n = The Construction Discharge (CD) of interest

UP_n = the measured turbidity concentration upstream of the CD of interest (NTU)

DN_n = the measured turbidity concentration at the downstream boundary of the mixing zone for the CD of interest (NTU)

MZ_n = the length of the Mixing Zone (MZ) of interest (ft)

L_n = the distance from the end of the mixing zone for the upstream CD to the CD of interest (ft)

RF_n = Reduction Factor for the CD of interest which is a function of Ln as shown in the table below:

L_n (ft)	RFn
≤ 500	1
> 500 ≤ 1000	0.75
>1000 ≤ 1500	0.5
>1500 ≤ 2000	0.25
>2000	0

Example: **Calculation of maximum allowable turbidity for 3 construction discharges in series (CD_1, CD_2 and CD_3 - see diagram above)**

CD_n	L_n (ft)	UP_n (NTU)	DN_n (NTU)	RF_n	$10 + UP_n - [RF_n \times (DN_{n-1} - UP_{n-1})]$	$10 + DN_{n-1}$	Max Allowable Turbidity at DN_n (NTU)	Comments
CD_1		21	30		10+ 21 = 31	10 + 0 = 10	31	In compliance since measured DN of 30 is < 31 NTU
CD_2	1200	32	42	0.5	10 + 32 - [0.5 x (30-21)] = 37.5	10 + 30 = 40	40	Violation since measured DN of 42 is > 40 NTU
CD_3	1700	50	55	0.25	10 + 50 - [0.25 x (42-32)] = 57.5	10 + 42 = 52	57.5	In compliance since measured DN of 55 is < 57.5 NTU

2/16/2017

SPECIAL ATTENTION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT REQUIREMENTS

Contractors are advised that 40 CFR Part 122 applies to this project. This provision prohibits point source discharges of storm water associated with construction activity to water bodies of the United States without a National Pollutant Discharge Elimination System (NPDES) storm water construction general permit.

This project is eligible for coverage under the reissued NPDES Storm Water Construction General Permit for Storm Water Discharge from construction sites, which was published on January 11, 2017. Contractors apply for coverage under this permit through the Environmental Protection Agency (EPA), Notice of Intent (NOI) website (http://cdx.epa.gov/epa_home.asp) at least 14 days prior to commencement of construction on any site which will result in the disturbance of the land and after your Storm Water Pollution Prevention Plan has been prepared.

Other provisions of the General Permit requires a Storm Water Pollution Prevention Plan to be prepared, implemented, kept current, and maintained on the project site along with inspection reports; and when the project site has been finally stabilized and storm water discharges from construction activities have been eliminated, a Notice of Termination (NOT) must be submitted.

NPDES General Guidelines, including an outline for Construction (Storm Water) Pollution Prevention Plan, Notice of Intent and Notice of Termination are available on the internet at EPA's Stormwater site (https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting).

An "active status" of the all submitted NOI's is required prior to commencing any work on the project.

On both the Notice of Intent (NOI) and the Notice of Termination (NOT) forms the information relative to the Facility Operator Information shall be that of the prime Contractor.

See the attached information for required information for filing for coverage under this permit.

PROJECT: Bedford
STATE NO.: 13953

The following statements have been provided for the Contractor, and the consultant service group they choose, to assist in preparation of the Stormwater Pollution Prevention Plan (SWPPP). These statements provided are intended to meet the requirements of the designated sections outlined below for the Construction General Permit (CGP).

Section 9.1.2.1.

This project may qualify for coverage under the Alteration of Terrain (AoT) Permit issued by Department of Environmental Services (DES) pursuant to RSA 485-A: 17 and Env-Ws 1500. If so, this requirement is satisfied through a Memorandum of Agreement (MOA) between the NH Department of Transportation and the Department of Environmental Services. All requirements of Env-Ws 1500 are in force even though no permit was issued.

Section 9.1.2.2.

The Department of Transportation has reviewed the project area to determine if there are known contaminates that could be discharged to surface waters. The determination was made either by a review of the NHDES OneStop Geographic Information System, or through investigation and consultation with the NHDES Waste Division. If there are, contaminates present on the site, other waste disposal dewatering options have been arranged and are included in the proposal. Necessary permits to discharge to surface waters have been obtained.

Section 9.1.2.4.

Opportunities to include Post-Construction groundwater recharge using infiltration best management practices (BMPs) were evaluated in accordance the Memorandum of Agreement (MOA) between the NH Department of Transportation and the Department of Environmental Services regarding compliance with Env-Wq 1500 Alteration of Terrain. The Department of Transportation has obtained coverage under its own NPDES General Permit for discharges from its Municipal Separate Storm Sewer System and therefore not subject to others. If feasible as described in our MOA and NPDES permit, appropriate on-site Infiltration BMPs were included in the design of the project.

The following information is provided to help in the Contractor's preparation of the Environmental Protection Agency NPDES Permit NOI Form for the Construction General Permit (CGP). It is expressly understood and agreed that the information has been obtained with reasonable care and recorded in good faith, but the Department assumes no responsibility whatsoever with respect to the sufficiency or accuracy of the information.

I. Approval to Use Paper NOI Form

It is the contractor's responsibility to follow the rules and regulations under the current CGP regarding methods for filing their NOI. The filing method chosen is solely the responsibility of the contractor.

II. Permit Number

The permit coverage for stormwater discharges from construction activities with ground disturbance over one (1) acre occurring in the State of New Hampshire is the Construction General Permit (CGP). The state specific CGP permit number is provided; the EPA is the permitting authority in NH: **NHR100000**

III. Operator Information

The contractor awarded the contract shall fill out all operator information in this section for their eNOI using their company's information and IRS Employer Identification Number (EIN).

The point of contact listed in this section should be the named responsible party within the construction company for this project.

IV. Project/Site Information

Project Site Name: Bedford
Site Address/Location: The widening and reconstruction of approximately 2 miles of NH Route 101 from Wallace Road intersection to the NH Route 114/Boynton Road intersection in Bedford, NH.
Town: Bedford
Zip Code: 03110
County: Hillsborough

Latitude: 42° 56′ 15″ to 42° 57′ 35″ N Longitude: 71° 31′ 34" to 71° 30′ 06″ W
From ☐ USGS Topo (Scale); ☐ GPS or ☒ Other GRANIT View II v0
Reference Datum ☐ NAD 27, ☒ NAD 83 or WGS 84, ☐ Unknown

Estimated Project Start Date: July 31, 2017
Estimated Project End Date: September 27, 2017
Estimated Area to be disturbed: 34 acres

Is this project an emergency[1] related project? ☐YES ☒ NO

Type of Construction Site (check all that apply): ☐ Single-Family Residential ☐ Multi-Family Residential ☐ Commercial ☐ Industrial ☐ Institutional ☒ Highway or Road ☐ Utility ☐ Other _____

Will there be demolition of any structure built or renovated before January 1, 1980? ☒YES ☐ NO; If yes, do any of the structures being demolished have at least 10,000 square feet of floor space? ☒YES ☐ NO

Was the pre-development land use used for agriculture (see Appendix A for definition of "agricultural land")? ☐YES ☒ NO

V. Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? ☒YES ☐NO

Are there any *surface waters*[2] *within* 50-Feet of earth disturbance on this project? ☒YES ☐NO

Name(s) of the first surface water that received stormwater directly from the project site:
NHRIV700060803-03, BOWMAN BROOK
NHRIV700060803-11, UNNAMED BROOK
NHRIV700060905-18, RIDDLE BROOK

Name(s) of any impaired waters to which you discharge and the pollutant(s) for which they are impaired:
NHRIV700060905-18, RIDDLE BROOK - PH/acidity/caustic conditions

Name(s) of any waters to which you discharge for which there is an EPA approved or established TMDL, the name of the TDML and the pollutant(s) for which there is a TMDL:
Northeast Regional Mercury TMDL
NEW HAMPSHIRE STATEWIDE BACTERIA

Name(s) of surface waters to which this project discharges designated by the state under its anti-degradation policy as Tier 2 (or Tier 2.5) water[3] or as a Tier 3[4] water:
N/A

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[1] Emergency related project is defined as a project initiated in response to a public emergency (e.g. natural disaster, disruption in essential public services), for which the related work requires immediate authorization to avoid imminent endangerment to human heath or the environment, or to reestablish essential public services.
[2] Surface waters are defined as a "water of the United States" as defined in 40 CFR 122.2. Wetlands are also defined here.

Describe the methods you used to complete the above tables: NHDES Data

VI. Chemical Treatment Information

The contractor shall provide any necessary chemical Treatment Information[5] to the NH DOT through the Stormwater Pollution Prevention Plan (SWPPP) prior to the Department filing their eNOI.

VII. Stormwater Pollution Prevention Plan (SWPPP) Information

All sites eligible for coverage under this permit are required to prepare a SWPPP in advance of filing the NOI in accordance with Part 7 of the CGP.

The contractor shall provide the name and contact information for the person who developed the SWPPP on the contractor's behalf for this project. The contractor shall provide this information to the NH DOT through the Stormwater Pollution Prevention Plan (SWPPP) prior to the Department filing their eNOI.

VIII. Endangered Species Protection

Federally Endangered/Threatened Species located within the project area: Northern Long-eared Bat

The contractor is eligible to file for coverage under **criteria B** using the Tracking number provided below by NH DOT

NOI Tracking Number: **bd22bc7d-14b0-4f18-8b39-afaaef560469.**

The preparer shall include the attached Natural Heritage Bureau and/or US Fish and Wildlife correspondence in the SWPPP

IX. Historic Preservation

Is the Department requiring, or is the Contractor installing per their SWPPP, any stormwater controls that require subsurface earth disturbance? ☒**YES** ☐**NO**

IF YES... Continue on to the next question.

IF NO... All subsequent boxes in this section should be skipped

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[3] Tier 2 (or Tier 2.5) waters are waters where quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water as defined by EPA, NH DES also must define these for us. As of May 1, 2012 DES issued a clarification document indicating that there are currently no Tier 2 (or 2.5) waters in NH.

[4] Tier 3 waters are outstanding natural resource waters.

[5] Chemical names and information required by the CGP for polymers, flocculants, or other treatment chemicals, including cationic treatment chemicals if applicable. NH DES and the regional EPA office must approve use of such chemicals.

Have prior surveys or evaluations conducted on the site determined whether historic properties do not exist, or that prior disturbance has precluded the existence of historic properties? ☐**YES** ☒**NO**

IF YES… All subsequent boxes in this section should be skipped and **the SWPPP preparer shall include the attached Memo in the SWPPP.**

IF NO… Continue on to the next question.

Did State Historic Preservation Office (SHPO) respond to you within the 15 calendar days to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties? ☒**YES** ☐**NO**

Have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? ☐**YES** ☒**NO**

IF YES… ☐ SHPO provided written indication that no historic properties will be affected by the installation of stormwater controls on site. **The SWPPP preparer shall include the attached Cultural Resources No Historic Properties Affected Memo in the SWPPP.**

IF NO… ☒ SHPO provided written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by the agreed upon actions. **The SWPPP preparer shall include the attached Cultural Resources No Adverse Effect Memo or the Adverse Effect Memo and Memorandum of Agreement (MOA) between the Department and SHPO in the SWPPP.**

-OR-

IF NO & INVESTIGATIONS ARE PENDING OR ARE INCLUDED AS PART OF THE CONTRACT…
☐ Other: _____

X. Certification

A responsible corporate officer should certify this NOI. For more information on the purpose and definition of this responsible party, please see Appendix I (I.11 Signatory Requirements) in the CGP.

Memo

NH NATURAL HERITAGE BUREAU
NHB DATACHECK RESULTS LETTER

To: Marc Laurin, NH DOT
Hazen Drive
Concord, NH 03301

From: Amy Lamb, NH Natural Heritage Bureau
Date: 3/29/2017 (valid for one year from this date)
Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB17-0878 Town: Bedford Location: Bedford 13953 - NH 101 widening from Wallace Road east to NH 114/Boynton Street.

Description: Widening of approximately 2 miles of NH 101 from Wallace Road east to NH 114/Boynton Street intersection. Project will provide two travel lanes in each direction, center raised medians with openings for left turns at selected intersections and commercial driveways, shoulders acceptable for bicycle travel and sidewalks.

cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments: Please contact NH Fish & Game.

Vertebrate species	State[1]	Federal	Notes
Blanding's Turtle (*Emydoidea blandingii*)	E	--	Contact the NH Fish & Game Dept (see below).
Eastern Hognose Snake (*Heterodon platirhinos*)*	E	--	Contact the NH Fish & Game Dept (see below).
Wood Turtle (*Glyptemys insculpta*)	SC	--	Contact the NH Fish & Game Dept (see below).

[1]Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

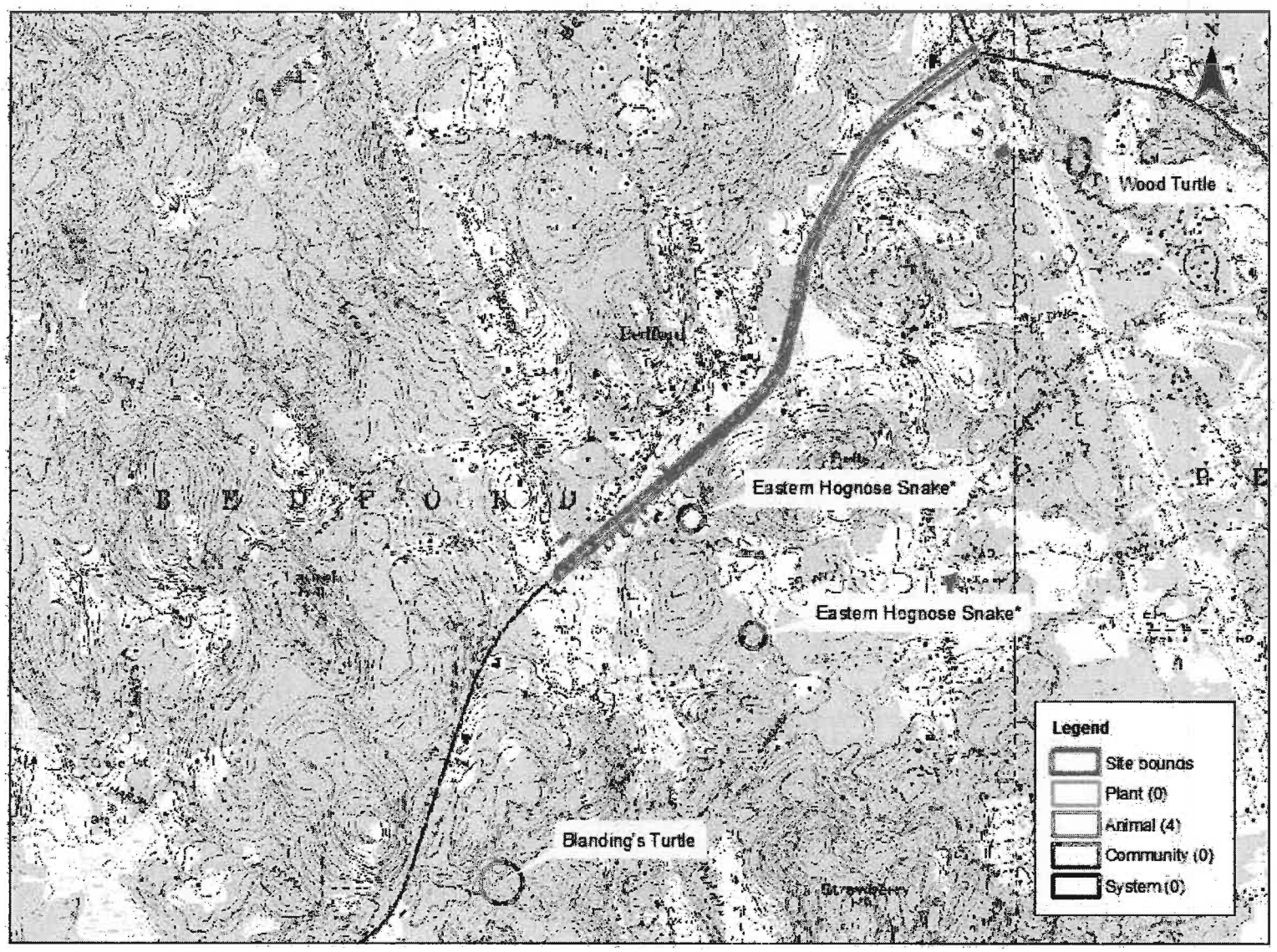
Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

Department of Resources and Economic Development
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DRED/NHB
172 Pembroke Rd.
Concord, NH 03301

NHB17-0878



0 0.1 0.2 0.3 0.4 0.5 Miles

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Apparently secure but with cause for concern
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2009: Area 12330: 1 observed, 6x8~ in size.
General Area: 2009: Area 12330: Roadside.
General Comments:
Management Comments:

Location

Survey Site Name: Riddle Brook
Managed By:

County:
Town(s):
Size: 7.7 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2009: Area 12330: 54 Brick Mill Road, Bedford.

Dates documented

First reported: 2009-05-09
Last reported: 2009-05-09

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Eastern Hognose Snake (*Heterodon platirhinos*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1983: 1 specimen found.
General Area: 1983: Near town pool and tennis courts.
General Comments:
Management Comments:

Location

Survey Site Name: Nashua Road
Managed By:

County:
Town(s):
Size: 2.8 acres
Elevation: 240 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Nashua Road, near town pool and tennis courts.

Dates documented

First reported: 1983
Last reported: 1983-08-18

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Eastern Hognose Snake (*Heterodon platirhinos*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1985: 1 individual, length of 28.6 inches.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Bells Hill, west of
Managed By:

County:
Town(s):
Size: 2.8 acres
Elevation: 250 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: At 25 Nashua Road. Crossing Normandeau Associates driveway.

Dates documented

First reported: 1985-05-23
Last reported: 1985-05-23

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Wood Turtle (*Glyptemys insculpta*)

Legal Status

Federal: Not listed
State: Special Concern

Conservation Status

Global: Apparently secure but with cause for concern
State: Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2011: Area 12895: 1 adult observed.2010: Area 12798: 1 adult observed.
General Area: 2011: Area 12895: Roadside adjacent to Bowman Brook.2010: Area 12798: Stream.
General Comments:
Management Comments:

Location

Survey Site Name: Bowman Brook
Managed By:

County:
Town(s):
Size: 3.5 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2011: Area 12895: Near 58 Wendover Way where Bowman Brook crosses under road.2010: Area 12798: Intersection of Wendover Way and Plummer Road, adjacent to Bowman Brook.

Dates documented

First reported: 2010-06-05
Last reported: 2011-05-11

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To:
Consultation Code: 05E1NE00-2016-SLI-0339
Event Code: 05E1NE00-2017-E-02271
Project Name: Bedford, 13953

March 30, 2017

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the

human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2016-SLI-0339

Event Code: 05E1NE00-2017-E-02271

Project Name: Bedford, 13953

Project Type: TRANSPORTATION

Project Description: The widening and reconstruction of NH Route 101 in the Town of Bedford beginning at the intersection of Wallace Road and continuing easterly approximately two miles to its intersection with NH Route 114/Boynton Street. The proposed roadway typical widens NH 101 to two 11 foot wide lanes in each direction with four-foot wide paved shoulders. The widening is proposed to be symmetrical about the existing highway centerline with an 8 to 20 foot wide raised median island and a five foot sidewalk.

Project Location:

Approximate location of the project can be viewed in Google Maps:
https://www.google.com/maps/place/42.94857090663345N71.51234417645783W

Counties: Hillsborough, NH

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Northern Long-eared Bat *(Myotis septentrionalis)* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

There are no critical habitats within your project area.

Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and Federal Transit Administration (FTA)

Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat

Project Submittal Form

Updated December 2016

If not using the Assisted Determination Key in the U.S. Fish and Wildlife Service (Service) Information for Planning and Conservation (IPaC) System, transportation agencies must provide this submittal form (or a comparable Service approved form) with provide project-level information for use of the range-wide programmatic consultation covering actions that may affect the Indiana bat and/or northern long-eared bat (NLEB). The completed form should be submitted to the appropriate Service Field Office prior to project commencement. For more information, see the Standard Operating Procedure for Site Specific Project(s) Submission in the User's Guide.

By submitting this form, the transportation agency ensures that the proposed project(s) adhere to the criteria and conditions of the range-wide programmatic consultation, as outlined in the biological assessment (BA) and biological opinion (BO). Upon submittal of this form, the appropriate Service Field Office may review the project-specific information provided and request additional information. For projects that may affect, but are not likely to adversely affect (NLAA) the Indiana bat and/or NLEB, if the applying transportation agency is **not** contacted by the Service with any questions or concerns within 14 calendar days of form submittal, it may proceed under the range-wide programmatic consultation and assume concurrence of the NLAA determination made by the Service in the BO. For projects that may affect, and are likely to adversely affect (LAA) the Indiana bat and/or the NLEB, the appropriate Service Field Office will respond (see recommended response letter template) within 30 calendar days of receiving a complete project-level submission, which includes, but may not be limited to this completed form.

Further instructions on completing the submittal form can be found by hovering your cursor over each text box.

---

1. Date: March 30, 2017

2. Lead agency: FHWA
   This refers to the Federal governmental lead action agency initiating consultation; select FHWA, FRA or FTA as appropriate.

3. Requesting agency: NH Department of Transportation
   This refers to the transportation agency completing the form (it may or may not be the same as the Lead Agency.

   Name: Marc G. Laurin

   Title: Senior Environmental Manager

Phone: (603) 271-4044

Email: marc.laurin@dot.nh.gov

4. Consultation code[1]: 05E1NE00-2016-SLI-0339

5. Project name(s): Bedford, 13953

6. Project description:
Please attach additional documentation or explanatory text if necessary

The widening and reconstruction of NH Route 101 in the Town of Bedford beginning at the intersection of Wallace Road and continuing easterly approximately two miles to its intersection with NH Route114/Boynton Street. The proposed roadway typical widens NH 101 to two 11 foot wide lanes in each direction with four-foot wide paved shoulders. The widening is proposed to be symmetrical about the existing highway centerline with an 8 to 20 foot wide raised median island and a five foot sidewalk.

7. Project location (county, state): Hillsborough, NH
If not delineated in IPaC, attach shape files

8. For species other than Indiana bat and NLEB (from IPaC official specieslist):

☐ No effect – project(s) are inside the range, but no suitable habitat (see additional information attached).

☐ May affect – see additional information provided for those species (see attached or forthcoming).

Please confirm and identify how the proposed project(s) adhere to the criteria of the BO by completing the following (see User Guide Section 2.0):

[1] Available through IPaC System Official Species List: https://ecos.fws.gov/ipac/

NO EFFECT

9. For Indiana bat/NLEB, if applicable, select your no effect determination:

☐ No effect – project(s) are outside the species' range. *submittal form complete*

☐ No effect – project(s) are inside the species range with no suitable summer habitat; project(s) must also be greater than 0.5 miles from any hibernaculum unless meeting exceptions listed below. *submittal form complete*

☐ No effect – project(s) do not involve any construction activities (e.g., bridge/ abandoned structure assessments, property inspections, planning and technical studies, property sales, property easements, and equipment purchases). *submittal form complete*

☐ No effect – project(s) are completely within existing road/rail surface and do not involve percussive or other activities that increase noise above existing traffic/ background levels (e.g., road line painting). *submittal form complete*

☐ No effect - project(s) are outside suitable summer bat habitat and limited to the maintenance of existing facilities (e.g., rest areas, stormwater detention basins) with no new ground disturbance.

☐ No effect – project(s) includes maintenance, alteration, or removal of bridge(s)/ structure(s) and indicate(s) no signs of bats from results of a bridge/abandoned structure assessment. *submittal form complete*
Otherwise, please continue below.

MAY AFFECT, NOT LIKELY TO ADVERSELY EFFECT – W/O AMMS

10. For Indiana bat/NLEB, if applicable, select your may affect, NLAA determination (without implementation of AMMs):

☑ NLAA – project(s) are inside the species range and within suitable bat habitat, but **negative** bat presence/absence (P/A) surveys; must also be greater than 0.5 miles from any hibernaculum. *submittal form complete*

☐ NLAA – project(s) are within 300 feet of the existing road/rail surface and in area that contain suitable habitat (but no documented habitat) that do not involve tree removal, but include percussives or other activities that increase noise above existing traffic/background levels (must also be greater than 0.5 miles of a hibernaculum). *submittal form complete*

☐ NLAA – project(s) are limited to slash pile burning (must also be greater than 0.5 miles from any hibernaculum). *submittal form complete*

☐ NLAA – project(s) are limited to wetland or stream protection activities associated

with compensatory wetland mitigation that do not clear suitable habitat (must also be greater than 0.5 miles from any hibernaculum). *submittal form complete*

☐ NLAA – project(s) *anywhere*, including within 0.5 mile of hibernacula, with suitable summer bat habitat present that are limited to the maintenance of existing facilities (e.g., rest areas, stormwater detention basins) with no new ground disturbance or tree removal/trimming. *submittal form complete*

Otherwise, please continue below.

MAY EFFECT, NOT LIKELY TO ADVERSELY AFFECT – WITH AMMs

11. For Indiana bat/NLEB, if applicable, document your may affect, NLAA determination by completing the following section (**with implementation of AMMs**; use #13 to document AMMs).

Affected Resource/Habitat Type:

a. Trees

☐ Verify that all tree removal occurs greater than 0.5 mile from any hibernaculum

☐ Verify that the project is within 100 feet of existing road/rail surfaces

☐ Verify that no documented Indiana bat and/or NLEB roosts and/or surrounding summer habitat within 0.25 mile of documented roosts will be impacted

Verify that all tree removal will occur outside the active season (i.e., will occur in winter)[2]:

Acres of trees proposed for removal:

b. Bridge/Structure Work Projects

Proposed work:

Timing of work:

Evidence of bat activity on/in bridge/structure? Yes: ○ No: ◉

☐ Verify that work will be conducted outside the active season, or if during the active season, verify that no roosting bats will be harmed or disturbed in any way

☐ Verify that work will not alter roosting potential in any way

[2] Coordinate with the local Service Field Office for appropriate dates

☐ Verify that all applicable lighting minimization measures will be implemented

MAY AFFECT, LIKELY TO ADVERSELY AFFECT

12. For Indiana bat/NLEB, if applicable, document your may affect, LAA determination by completing the following section (use #13 to document AMMs).

Affected Resource/Habitat Type:

a. Trees

☐ Verify that all tree removal occurs greater than 0.5 mile from any hibernaculum

Project Location:
☐ 0-100 feet from edge of existing road/rail surface
☐ 100-300 feet from edge of existing road/rail surface

☐ Verify that no documented Indiana bat roosts or surrounding summer habitat within 0.25 mile of documented roosts will be impacted between May 1 and July 31

☐ Verify that no documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted between June 1 and July 31

Timing of tree removal:

Acres of trees proposed for removal:

b. Bridge/Structure Work Projects

Proposed work:

Timing of work:

☐ Verify no signs of a colony

☐ Verify that work will not alter roosting potential in any way

13. For Indiana bat/NLEB, **if applicable to the action type**, the following AMMs will be implemented[3] unless P/A surveys and/or bridge/abandoned structure assessments[4] have occurred to document that the species are not likely to be present:

General AMM 1 (required for all projects):

[3] See AMMs Fact Sheet (Appendix C) for more information on AMMs
[4] Structure assessment for occupied buildings means a cursory inspection for bat use. For abandoned buildings a more 5 thorough evaluation is required (See User Guide Appendix D for bridge/abandoned structure assessment guidance).

- ☐ Tree Removal AMM 1
- ☐ Tree Removal AMM 2 (required for NLAA)
- ☐ Tree Removal AMM 3 (required for all projects)
- ☐ Tree Removal AMM 4 (required for NLAA)
- ☐ Tree Removal AMM 5 (required for LAA)
- ☐ Tree Removal AMM 6 (required for LAA)
- ☐ Tree Removal AMM 7 (required for LAA)

- ☐ Bridge AMM 1
- ☐ Bridge AMM 2 (required for all projects during active season)
- ☐ Bridge AMM 3 (required for NLAA during active season)
- ☐ Bridge AMM 4 (required for NLAA during active season)
- ☐ Bridge AMM 5 (required for all projects)

Structure AMMs are required for all Indiana bat projects, required for NLAA NLEB projects.

- ☐ Structure AMM 1
- ☐ Structure AMM 2
- ☐ Structure AMM 3
- ☐ Structure AMM 4

- ☐ Lighting AMM 1 (required for all projects during the active season)
- ☐ Lighting AMM 2 (required for all projects)

- ☐ Hibernacula AMM 1 (required for all projects)

14. For Indiana bat, if applicable, compensatory mitigation measures will also be required to offset adverse effects on the species (see Section 2.10 of the BA). Please verify the mechanism in which compensatory mitigation will be implemented and that sufficient information is provided to the Service.

Range-wide In-Lieu Fee Program, The Conservation Fund ☐

State, Regional, Recovery Unit-Specific In-Lieu Fee Program
Name:

Conservation Bank
Name:
Location:

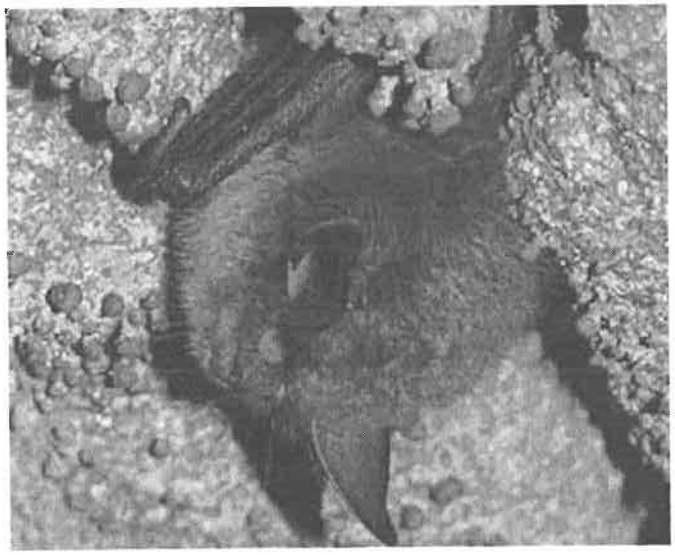
Local Conservation Site(s)
Name:
Location:
Description:

Northern Long-Eared Bat

(Myotis septentrionalis)

NLEB DESCRIPTION:

The Northern Long-Eared Bat (NLEB) is between 3" and 3.7" long with a wingspan of 9" to 10". NLEB are medium to dark brown on back and have tawny to pale brown undersides. NLEB have long ears. NLEB are nocturnal, they are active at night and sleep during the day.



Hibernating NLEB by Ann Froschauer USFWS

PROTECTION:

NLEB populations have been decimated by White-Nose Syndrome, a fungal disease that affects bats during hibernation. When a species experiences a significant population decline and is determined to be at risk, it may be listed under the Endangered Species Act (ESA). The NLEB was listed as threatened under the ESA on April 2, 2015. Threatened species are likely to become endangered in the foreseeable future and endangered species are in danger of becoming extinct. This listing provides special protections for NLEB, which are intended to help the population recover.

HABITAT:

NLEB habitat is found throughout New Hampshire. NLEB hibernate in caves and mines called hibernacula during winter. NLEB swarm in wooded areas surrounding hibernacula in fall. During late spring and summer NLEB roost and forage in upland forests. During the day NLEB roost under bark and in tree crevices of both live trees and snags (dead trees). NLEB sometimes also roost in caves and structures, like buildings and bridges.

NH DOT CONSERVATION MEASURES:

NH DOT incorporates conservation measures into projects to protect the NLEB. The specific conservation measures for each project are found in the Summary of Environmental Issues. Dead and sick bats of any species must immediately be reported to the Bureau of Environment, call 271-3226. Contact Rebecca Martin at the Bureau of Environment 271-3226 for explanation of NLEB conservation measures.

MORE NLEB INFORMATION:

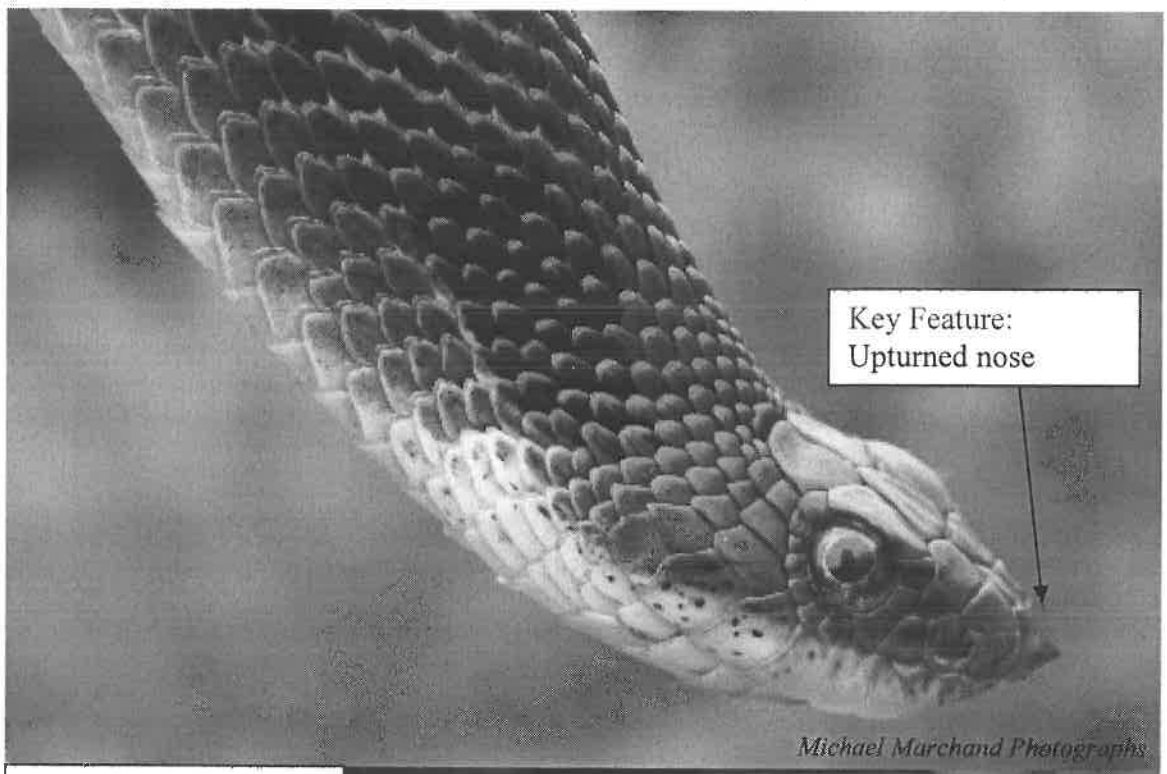
To learn more about the NLEB visit the USFWS website and search for the species by name.

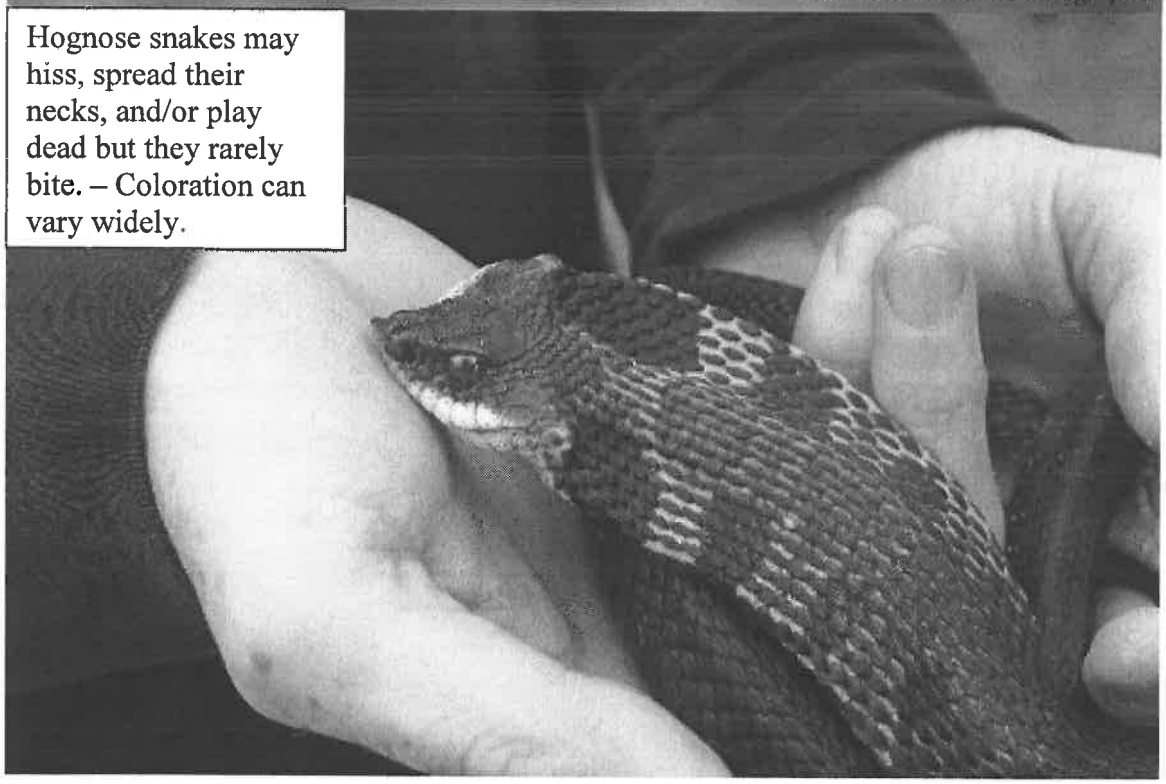
FHWA Programmatic Consultation Avoidance and Mitigation Measure 1: Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all environmental commitments, including all applicable AMMs.

Eastern Hognose Snake – NH State Endangered

Know your NH Snakes – This is a native harmless snake and should never be harassed or injured.

Penalties include fines up to $2,000 and a year in jail (RSA 212-A)





Report all sightings of this snake to NHFG at 603-271-2461 or RAARP@wildlife.nh.gov - Photographs encouraged

For more information on New Hampshire's 11 native snakes, see http://www.wildlife.state.nh.us/Wildlife/Nongame/snakes.htm

MEMORANDUM OF AGREEMENT
AMONG NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION,
FEDERAL HIGHWAY ADMINISTRATION,
and the
NEW HAMPSHIRE STATE HISTORIC PRESERVATION OFFICER

Regarding the BEDFORD, X-A000(143), 13953 project with plans to widen NH Route 101 between NH Route 114 and Wallace Road in Bedford, New Hampshire.

WHEREAS, the Federal Highway Administration (FHWA) plans to provide funds for the New Hampshire Department of Transportation (NHDOT) to widen NH Route 101 to allow for increased capacity between NH Route 114 and Wallace Road in the town of Bedford, New Hampshire; and

WHEREAS, the undertaking will improve the corridor by providing two lanes in each direction, 4-5 foot shoulders, sidewalks, and a raised median island. Right and left turn lanes and median breaks will be provided at intersections/driveways where traffic patterning has proven their necessity.

WHEREAS, FHWA has determined that the undertaking will have an adverse effect on the Frederick W. & Thrya French House (2 Liberty Hill Road), which is eligible for listing in the National Register of Historic Places, and has consulted with the NHDOT and the New Hampshire State Historic Preservation Officer (SHPO) pursuant to 36 C.F.R. part 800, of the regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f); and

WHEREAS, NHDOT has reached out to the Town and other interested groups via letters and at the Public Informational Meeting and the Public Hearing to seek Consulting Party status; one Consulting Party has been identified; and

WHEREAS, in accordance with 36 C.F.R. § 800.6(a)(1), FHWA has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination with specified documentation and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii).

NOW, THEREFORE, FHWA, NHDOT and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

FHWA/NHDOT shall ensure that the following measures are carried out:

1. Vibration monitoring will occur at the French House, located at 2 Liberty Hill Road. NHDOT will conduct the vibration monitoring as specified in Section 211 of the NHDOT Design Specifications (see attached). Under Section 211 a Vibration Monitoring Plan will be completed, comprehensively

addressing Section 3.2.2.d. SHPO will have an opportunity to review and comment on the plan, within the same allotted time NHDOT has to review and approve (10 working days). Additionally, prior to construction activity related to vibrations covered by Section 211, the NHDOT will provide the property owner with written instruction on appropriate contacts should they feel the vibratory impacts are affecting their property.

2. NHDOT will limit, to the extent practical, the amount of ledge at 2 Liberty Hill Road to be removed.

3. NHDOT will consult with the property owner at 2 Liberty Hill Road on appropriate plantings to be incorporated on the property at the site of impacts.

I. DURATION

This MOA will expire if its terms are not carried out within seven (7) years from the date of its execution. Prior to such time, FHWA may consult with the other signatories to reconsider the terms of the MOA and amend it in accordance with Stipulation IV below.

II. MONITORING AND REPORTING

Each year following the execution of this MOA until it expires, is terminated or stipulations completed, NHDOT shall provide all parties to this MOA a summary report detailing work undertaken pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in FHWA's efforts to carry out the terms of this MOA.

III. DISPUTE RESOLUTION

Should any signatory to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, FHWA shall consult with such party to resolve the objection. If the FHWA determines that such objection cannot be resolved, FHWA will:

A. Forward all documentation relevant to the dispute, including FHWA's proposed resolution, to the ACHP. The ACHP shall provide FHWA with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, FHWA shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. FHWA will then proceed according to its final decision.

B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, FHWA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, FHWA shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the ACHP with a copy of such written response.

C. FHWA's responsibility to carry out all other actions subject to the terms of this MOA that are

not the subject of the dispute remain unchanged.

IV. AMENDMENTS

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

V. TERMINATION

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation IV, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, FHWA must either (a) execute an MOA pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. FHWA shall notify the signatories as to the course of action it will pursue.

Execution of this MOA by FHWA, NHDOT and SHPO and implementation of its terms evidence that FHWA has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

FEDERAL HIGHWAY ADMINISTRATION

By: _____ Date: 04/07/2015
for Patrick A. Bauer
NH Division Administrator

NEW HAMPSHIRE DIVISION OF HISTORICAL RESOURCES

By: Richard A Boisvert, DS HPO Date: 4-7-2015
for Elizabeth H. Muzzey
State Historic Preservation Officer

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

By: _____ Date: 4/7/15
William J. Cass
Director of Project Development

SECTION 211 -- VIBRATION MONITORING

Description

1.1 This work shall consist of monitoring construction related vibrations and setting vibration limits to avoid damaging existing nearby structures, properties and utilities located on or near this project.

1.1.1 Sources of construction related vibrations which are covered by this specification include compaction equipment (sections 203, 209, 304, 508), cofferdam construction (section 503), sheet piling (section 506) and bearing piles (section 510) or other construction activities as identified. The provisions of section 203.3.2 shall still apply to vibrations caused by blasting operations.

1.2 The work under this specification includes providing the services of a qualified Vibration Consultant.

1.2.1 As part of this work, the Vibration Consultant shall submit vibration documentation as described in 211.3.7

Construction Requirements

3.1 Vibration Consultant Qualifications. The Vibration Consultant shall meet all the applicable qualification requirements of sections 203.3.2.5.2 and 203.3.5.3.

3.2 Vibration Monitoring Plan. Prior to initiating a particular activity which requires vibration monitoring, the Contractor shall submit a Vibration Monitoring Plan prepared by the Vibration Consultant. The plan shall be submitted a minimum of 10 working days prior to beginning the particular construction activity. The construction activity shall not begin until the plan has been approved, except as allowed under 3.2.1.

3.2.1 Prior to the production phase of the particular construction activity, the Contractor will be permitted to conduct a test program to establish the allowable vibration limits, subject to approval. The production phase shall not begin until the results of the test program have been approved.

3.2.2 The plan shall include the following:

a) The qualifications of the Vibration Consultant in accordance with 3.1

b) A description of the monitoring equipment in accordance with 3.3

c) Recommendations for vibration limits for the particular construction activity under consideration, or recommendations for a test program in accordance with 3.2.1, if the vibration limits cannot be predetermined. Justification shall be provided for all recommendations.

d) Recommendations for structures, utilities and all other facilities which in the judgment of the Vibration Consultant require a pre and post construction condition survey in accordance with 3.4. This recommendation shall pay particular attention to historic structures, structures in poor condition, structures supported by vibration sensitive materials which could cause settlement or loss of support, and structures which contain sensitive equipment or processes. The Monitoring Plan shall also include methods for measuring deformation or settlement of selected structures, if deemed necessary by the Vibration Consultant or Engineer.

e) Recommendations, if it is determined that the proposed construction activity could not be reasonably implemented without exceeding vibration limits that are necessary to protect adjacent facilities.

3.2.3 As part of the review of the Monitoring Plan, the Engineer may require modifications to the submittal to include, but not limited to, surveying and monitoring of additional structures, the number of monitoring sites and the distances for monitoring. There may be a need for simultaneous setups with multiple monitoring devices.

3.3 Vibration Monitoring Instrumentation. All vibration monitoring equipment shall meet the requirements of 203.3.2.5.6.

3.4 Pre and post construction condition surveys. Pre and post construction surveys shall be conducted on all structures as directed by the Engineer or as contained in the approved Vibration Monitoring Plan. The surveys shall not be initiated until approval of the vibration monitoring plan has been given. The requirements contained in 203.3.2.5.5 shall be followed in conducting the condition surveys.

3.5 Coordination Meeting. A coordination meeting arranged by the Contractor shall be held prior to initiating the particular construction activity and the associated vibration monitoring. The coordination meeting shall not take place until the Contractor has submitted and received approval of the Vibration Monitoring Plan. The purpose of the meeting shall be to review all aspects of the vibration monitoring and to facilitate coordination between all parties involved. Individuals attending the meeting shall include the Engineer, the Vibration Consultant, the Contractor, the Sub-Contractor involved with the particular construction activity, the Research Geologist from the Materials and Research Bureau and all other personnel deemed appropriate by the previously mentioned personnel. The Engineer and Research Geologist shall be notified at least 5 working days in advance of the meeting.

3.6 Schedule for Vibration Monitoring. The frequency and duration of vibration monitoring for a particular construction activity shall be as directed by the Engineer. The Contractor shall make all necessary arrangements for scheduling the Vibration Consultant, after direction to provide vibration monitoring has been given. The particular construction activity requiring monitoring shall not begin until the Vibration Consultant is on-site.

3.7 Vibration Monitoring Reports. At the end of each day of monitoring, the following information shall be recorded and submitted to the Engineer:

a) The name of the Contractor and/or Subcontractors responsible for the particular construction activity.

b) The name and signature of the approved Vibration Consultant.

c) The name of the operator of the vibration monitoring equipment.

d) A sketch indicating the location of the vibration monitors and the particular construction activity.

e) Complete details of the particular construction activity which is being monitored, including all related equipment, operating frequencies, piling depths and all other related information as requested by the Engineer.

f) Results of monitored vibrations and noise levels for the particular construction activity. The information should include the frequencies of the measured peak particle velocities.

g) Identification of any activity that caused the vibration limits to be exceeded and the time of day that the limits were exceeded.

h) A summary of any vibration related complaints received during the day.

3.7.1 The Vibration Consultant shall complete and submit the Contractor Vibration Report Form for each vibration producing activity each day. Submission of the daily reports at the conclusion of each vibration producing activity is acceptable. The required form can be found at www.nh.gov/dot/business/contractors.htm. Submit two (2) copies; one to the Engineer and one copy to:

New Hampshire Department of Transportation
Attention Research Geologist
5 Hazen Drive, PO Box 483
Concord, NH 03302-0483

3.8 Adjustments in construction procedures. All complaints about vibrations shall be reported immediately to the Engineer. If the monitoring data indicates that the ground vibration limits for any of the three mutually perpendicular components have been exceeded, the Contractor shall cease the particular construction activity and submit a written report giving corrective action. The construction activity shall not resume until the report has been reviewed and approved by the Engineer. If complaints occur when vibrations are below the specified limits, the Engineer may order the Contractor to modify the operations to reduce the vibrations further.

Method of Measurement

4.1 Vibration monitoring services including pre and post construction surveys will be measured by the hour for the accountable time on site to the nearest one-quarter hour. The hourly rate is all inclusive of the equipment and personnel necessary to perform the vibration monitoring service. The hourly rate is also all inclusive of equipment and personnel necessary to measure or monitor for potential deformation in structures.

4.1.1 Travel time and other time not spent at the construction site and time not authorized will not be measured.

Basis of Payment

5.1 The accepted quantity of vibration monitoring services will be paid for at the Contract unit price per hour, complete. A minimum of 4 hours will be paid for each day's service.

5.1.1 The Vibration Monitoring Plan will be subsidiary except that payment will be made for time on-site which is used in conducting a test program in accordance with 3.2.1.

5.1.2 Travel time and other time not spent at the construction site or off-site areas and support services (i.e., travel, mileage, clerical staff, miscellaneous expenses, overhead, etc.) will be subsidiary.

5.1.3 No payment will be made for time spent in preparing the reports for the condition surveys.

Pay Item and Unit:

211.11	Vibration Monitoring Services	Hours

Soil and Groundwater Management Plan

NH Route 101 Widening
Bedford, New Hampshire
NHDOT Project No. 13953

Stantec

Prepared for:
NHDOT
7 Hazen Drive
John O. Morton Building
PO Box 483
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Prepared by:
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5 Dartmouth Drive, Suite 101
Auburn, New Hampshire 03032

February 3, 2017

Sign-off Sheet

This document entitled Soil and Groundwater Management Plan was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of the New Hampshire Department of Transportation (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____
(signature)

Leigh-Anne Sapienza

Reviewed by _____
(signature)

David A. Allwine, P.G.

Stantec

Areas of Known Soil and/or Groundwater Contamination

Between STA 147+50 LT and RT and STA 150+10 LT and RT, it is anticipated that the Contractor will encounter the following:

- Petroleum-contaminated soil below approximately 2 feet below ground surface (ft-bgs) or approximately 272 ft-mean sea level (msl);

Between STA 145+70 LT and RT and STA 150+10 LT and RT, it is anticipated that the Contractor will encounter the following:

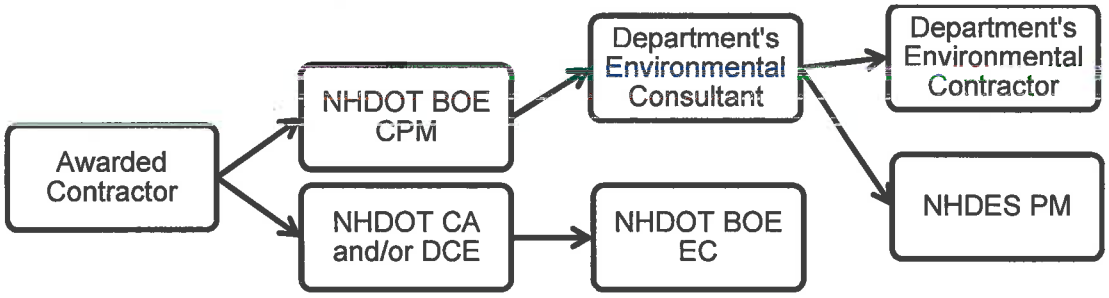
- Petroleum-contaminated groundwater below approximately 3 ft-bgs or approximately 271 ft-msl.

Notification Requirements

The Contractor must notify the Department's Bureau of Environment (BOE), as follows:

- At least two week's notification prior to the Contractor beginning excavation in the areas of known/suspected soil and groundwater contamination identified above; and
- Immediate notification if the Contractor encounters potentially-contaminated soil and/or groundwater within Project Limits, but outside of areas of known/suspected contamination identified in this document.

Notification Flow Chart



Contacts

Contacts (acronyms spelled out below)	**Name**	**Office**	**Cell**
NHDOT BOC DCE			
NHDOT BOE CPM			
NHDOT BOE EC			
Department's Environmental Consultant	Contacts will be determined after award. Please contact CPM for contact information.		
Department's Environmental Contractor			

Notes:

NHDOT New Hampshire Department of Transportation
BOC Bureau of Construction
CA Contract Administrator
DCE District Construction Engineer
BOE Bureau of Environment
CPM Contamination Program Manager
EC Environmental Coordinator
PM Project Manager

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1.0 INTRODUCTION

As requested by the Department (New Hampshire Department of Transportation [NHDOT]), Stantec Consulting Services Inc. (Stantec) prepared this Soil and Groundwater Management Plan (SGMP) to describe project-specific management procedures for contaminated soils and groundwater as required and/or requested by the New Hampshire Department of Environmental Services (NHDES). The Contractor should use this SGMP as a guide for preparation of their Project Operations Plan (POP, Special Provision 697.31) and as a reference for managing contaminated soil and groundwater encountered during construction activities.

Key items included in this document are:

- Existing state-listed sites of concern within Project Limits[1];
- Anticipated limits (vertical and horizontal extent) of known soil and groundwater contamination;
- Site-specific management procedures for contaminated soils and groundwater; and
- Contingency plans for management of potentially-contaminated soil and groundwater, if encountered.

As there is a suspect area of contaminated groundwater that may be encountered during construction of this Project, the Contractor shall prepare and submit a proposed POP to the Department's Bureau of Environment through the Department's Engineer at least 15 business days prior to excavation. The Contractor shall use a professional consulting firm or qualified in-house staff for preparation of the POP, which shall be stamped by a New Hampshire-licensed professional engineer (PE) or professional geologist (PG). The PE or PG shall prepare the proposed POP based on the information included in this SGMP and the POP Special Attention. The proposed POP must reference applicable rules and regulations, and describe the means and methods for management of contaminated soil and groundwater. The means and methods described shall include, but are not limited to:

- Handling and management of contaminated and potentially-contaminated soils, including identifying staging areas for stockpiling contaminated soil, as needed; and
- Handling and management of contaminated and potentially-contaminated dewatering liquids, including identifying staging areas for storage (e.g., fractionation [frac] tank) of known or potentially-contaminated groundwater.

The Department's Environmental Consultant will review the proposed POP for compliance with the requirements stipulated in this SGMP, and will provide comments to the Department's

[1] Project Limits are detailed in the Plans provided in the Bid Documents.

Engineer. The comments on the proposed POP must be addressed by the Contractor in a revised POP in order to receive approval of the POP from the Department. No excavation of contaminated soil or dewatering activities in contaminated areas may take place until the POP has been approved by the Department.

2.0 NHDES-LISTED SITES OF CONCERN

A review of available NHDES files indicates that potentially-contaminated soil and/or groundwater may be present at and/or downgradient of NHDES sites listed below. Soil and groundwater quality reports associated with these sites are available on the NHDES OneStop database. The OneStop data retrieval webpage can be accessed at the following link:

http://www2.des.state.nh.us/DESOnestop/BasicSearch.aspx

In addition, it is possible that contaminated soil and/or groundwater may also be present at, and in proximity to other, as of yet unidentified, properties within the Project Limits.

The following parcels are existing NHDES state-listed sites of concern within Project Limits:

Parcel No.	Name	Address	NHDES Site No.	Comment
002-1	101 Plaza	209 Route 101	199706027	Closed Hazardous Waste Project On-Premise Use Fuel Oil Facility (OPUF) Project
002	Shorty's Mexican Roadhouse	206 Route 101	200702035	Closed Spill Site
11	Bedford Village Shops	170-184 Route 101	200507044	Closed Leaking Underground Storage Tank (LUST) Facility
19	Bedford Village Common	15 Bell Hill Road	None	Known Groundwater Impact from Adjoining Mobil Site
22	Mobil Gasoline and Service Station10977*	137 Route 101	199201019	Active LUST Facility

Note: * indicates that the site is eligible for reimbursement through the New Hampshire Petroleum Reimbursement Fund.

3.0 EXTENT OF SOIL AND GROUNDWATER CONTAMINATION

Based on a detailed review of the information available, it is known that petroleum-contaminated soil and/or groundwater exists between STA 145+70 LT and RT and STA 150+10 LT and RT in the area of 137 Route 101 (Mobil 10977, NHDES Site No. 199201019) as described further below. **The Contractor shall contact the Department's Bureau of Environment (603-271-3226) at least two weeks prior to beginning excavation in these areas to arrange for the Department's Environmental Consultant to be on-site and to allow for coordination with the Department's Environmental Contractor, as necessary.**

Although not anticipated, it is possible that contaminated soil and/or groundwater may be encountered in other areas within the Project Limits. Additional discussion is provided below. **If the Contractor encounters potentially-contaminated soil and/or groundwater within Project Limits, but outside the areas previously identified as having petroleum-contaminated soil and/or groundwater, the Contractor shall STOP WORK and contact the Department's Bureau of Environment (603-271-3226) immediately to arrange for the Department's Environmental Consultant to be on-site.**

3.1 AREAS OF KNOWN SOIL CONTAMINATION

Between STA 147+50 LT and RT and STA 150+10 LT and RT

An area of known and potential soil contamination associated with the Mobil 10977 property (137 Route 101, NHDES Site No. 199201019) exists between STA 147+50 LT and RT and STA 150+10 LT and RT. It should be noted that this area is described conservatively to capture likely impacts. Therefore, while contamination is expected to be present within this area, it is not expected that the entire area is contaminated. In this area, impacts have been observed at and below approximately 2 ft-bgs (approximately 272 ft-msl). Based on the available data, the anticipated vertical depth of impacts may extend to 14 ft-bgs. Given the proposed work in this area, it is anticipated that the Contractor will encounter petroleum-impacted soil in those areas where excavation below 2 feet is required.

As stated above, the Contractor shall contact the Department's Bureau of Environment (603-271-3226) at least two weeks prior to beginning excavation in this area to arrange for the Department's Environmental Consultant to be on-site. The Department's Environmental Consultant will be on-site during the Contractor's excavation activities between these stations to determine which portions of the excavated soils, if any, will require special handling. If petroleum-contaminated soil requiring off-site disposal is encountered, the Department's Environmental Consultant will direct the Contractor to segregate the material as described in Section 4.1. The Department's Environmental Consultant will coordinate transport and off-site disposal activities with the Department's Environmental Contractor as discussed in Section 4.1.

Additional information regarding screening, segregation, and management of petroleum-contaminated soils in this area is presented in Section 4.1.

Monitoring points where contaminated soil has been observed are depicted on the annotated plans and cross-sections included in Appendices A and B, respectively. Historical soil analytical data is available through OneStop as described above.

3.2 AREAS OF KNOWN GROUNDWATER CONTAMINATION

Between STA 145+70 LT and RT and STA 150+10 LT and RT

An area of known petroleum-contaminated groundwater associated the Mobil 10977 property (137 Route 101, NHDES Site No. 199201019) exists between STA 145+70 LT and RT and STA 150+10 LT and RT. It is anticipated that groundwater exists below approximately 3 ft-bgs (approximately 271 ft-msl). It should be noted that this area is described conservatively to include a buffer zone around the known area of petroleum-contaminated groundwater. Although not all groundwater within this zone may be contaminated, it must all be handled as contaminated as described in Section 5 below.

Based on a review of anticipated construction depths and groundwater elevations calculated for the Mobil 10977 property, it is anticipated that groundwater requiring dewatering will be encountered during excavation between STA 145+70 LT and RT and STA 150+10 LT and RT. If groundwater requiring dewatering is encountered, the Contractor must containerize the water in frac tanks to be provided by the Department's Environmental Contractor. The Department's Environmental Consultant will coordinate groundwater storage and disposal activities with the Department's Environmental Contractor as discussed in Section 5.1.

Monitoring points where contaminated groundwater has been observed are depicted on the annotated plans and cross-sections included in Appendices A and B, respectively. Historical groundwater analytical data is available through OneStop as described above.

3.3 AREAS OF POTENTIAL SOIL AND GROUNDWATER CONTAMINATION

Although it is not anticipated, contaminated soil and/or groundwater may be present in proximity to the NHDES-listed sites identified in Section 2.0, or at other, as of yet unidentified, properties within the Project Limits. As stated above, if the Contractor encounters potentially-contaminated (petroleum or other) soil and/or groundwater within the Project Limits, based on visual and/or olfactory evidence of impacts, the Contractor shall STOP WORK and contact the Department's Bureau of Environment (603-271-3226) immediately to arrange for the Department's Environmental Consultant to be on-site.

In addition to investigation at Parcel 22, the Department's Environmental Consultant performed a limited subsurface investigation to identify if contaminated soil and/or groundwater were likely to be encountered during construction in the vicinity of the following parcels:

- Parcel 36 (111 Route 101);
- Parcel 19 (15 Bell Hill Road);
- Parcel 11 (170 to 184 Route 101, NHDES Site No. 200507044);
- Parcel 2-1 (209 Route 101, NHDES Site No. 199706027); and
- Parcel 2 (206 Route 101, NHDES Site No. 200702035).

As shown on the data tables included in Appendices C and D, the constituents of concern detected during the investigation were below applicable standards, with the following exceptions:

- Arsenic was detected in all three soil samples collected from Parcel 36. The detected concentration of 13 milligrams per kilogram (mg/kg) at a depth of 5 to 7 feet below grade at soil boring B1/TMW1 exceeded arsenic's NHDES S-1 Soil Remediation Standard (SRS) of 11 mg/Kg. However, this arsenic detection was attributed to natural background conditions and is, therefore, not representative of contamination.
- Total lead was detected in all three groundwater samples collected from Parcel 36. The detected concentration of 0.015 mg/L at temporary monitoring well B3/TMW2 exceeded the Water Quality Criteria for Toxic Substances (WQCTS). Since dissolved lead was not detected in a groundwater sample obtained from the well, the elevated total lead concentration (i.e., exceeding the WQCTS) was attributed to lead sorbed to suspended solids. Therefore, it was recommended that best management practices including discharging groundwater through a filter bag to remove sediment be followed.

A copy of the full report is available from the Contamination Program Manager.

Based on the available data, construction observation by the Department's Environmental Consultant will not be required except as noted in Section 3.1 above and in the attached plans. Unless observations indicate otherwise, excavated soil and/or dewatering liquids from outside of the areas described above will not require handling as impacted materials. Groundwater outside of the areas described above can be discharged to the ground surface or surface water, if necessary, with appropriate permits and approvals.

4.0 MANAGEMENT OF CONTAMINATED SOILS

As stated above, available information has indicated the likely presence of contaminated soils within or adjacent to the Project Limits in the areas listed in Section 3.1. The Department's Environmental Consultant must be on-site during excavation activities in these areas. **The Contractor shall contact the Department's Bureau of Environment (603-271-3226) at least two weeks prior to beginning excavation in these areas to arrange for the Department's Environmental Consultant to be on-site.**

Although not anticipated, it is possible that contaminated soil requiring screening, segregation and management may be encountered in other areas within the Project Limits. Additional information regarding this contingency is provided below.

4.1 AREAS OF KNOWN SOIL CONTAMINATION

Due to the areas of petroleum-contaminated soil that exist between STA 147+50 LT and RT and STA 150+10 LT and RT, the Department's Environmental Consultant must be on-site during the Contractor's excavation activities in these areas to screen and assist with segregation of petroleum-contaminated soil. The Department's Environmental Consultant will be responsible for documenting daily photoionization detector (PID) calibration, ambient air volatile organic compound (VOC) readings, headspace VOC readings with respect to stationing and depth, general notes about soil conditions and excavation observations, and collecting soil samples for laboratory analysis, as necessary for waste disposal. Additional information is provided in this section.

4.1.1 Screening of Excavated Soil

Within the areas of petroleum-contaminated soil referenced above, the Department's Environmental Consultant will be on-site to screen the soils and assist the Contractor with segregation of petroleum-impacted soil. During excavation activities in these areas, the Contractor shall allow the Department's Environmental Consultant to collect soil samples from the excavator bucket. The Department's Environmental Consultant will determine if the soil has visual or olfactory indications of petroleum-contamination and screen the soil samples for the presence of VOCs using a properly calibrated PID.

4.1.2 Segregation Criteria

The Department's Environmental Consultant will assist the Contractor in segregating the contaminated soils, based on the visual and/or olfactory evidence of impacts and PID screening results. Based on discussions with NHDES and because there is limited opportunity for re-use of soil within the area of known petroleum impacts, all soil observed to be impacted above background will be segregated and stockpiled for off-site disposal. The Department's Environmental Consultant will categorize soils with obvious petroleum staining, odor, sheen, and/or PID headspace readings in excess of background (anticipated to be 0 parts per million by volume (ppmv)) as contaminated and will direct the soil to be stockpiled in a designated stockpile area to be identified by the Contractor.

Excavated soils that do not exhibit obvious petroleum staining, odor, sheen, and/or elevated PID headspace readings will be reused as backfill by the Contractor.

4.1.3 Management of Segregated Soil

As stated above, petroleum-contaminated soil with visual evidence of staining, odor, sheen and/or PID readings above background will be segregated. The Contractor will secure the contaminated, stockpiled soil in such a manner as to prevent the soil from coming into contact with the ground, precipitation, and/or stormwater runoff. Specifically, the Contractor will stockpile the soil on, and cover the stockpiles entirely with, 6-mil polyethylene sheeting and will label the area of origin (station coordinates) and date of its excavation. The Contractor will store the segregated soils on-site for a period up to, but not exceeding, four (4) months prior to disposal. Stockpiled soil shall only be uncovered when additional soil is being added or removed from the stockpile. The storage areas shall be constructed to address erosion control, and public access shall be restricted utilizing caution flagging, fencing, or similar measures.

Following receipt of waste characterization data and disposal facility approvals (see Section 4.1.4), the Contractor will load the impacted soil into trucks provided the Department's Environmental Contractor. The Department's Environmental Contractor will transport the petroleum-contaminated soil to a licensed off-site facility for disposal.

4.1.4 Sampling of Segregated Stockpiled Soil

The Department's Environmental Consultant will be responsible for sampling and analysis of stockpiled soils. Typical acceptance criteria require one composite soil sample per 200 cubic yards of soil. In accordance with NHDES Env-Or-611.04(a), the Department's Environmental Consultant will collect each sample from the stockpiled soils by compositing at least eight (8) discrete samples from newly exposed soil a minimum of 12 inches deep within the stockpile. Sub-samples collected for analysis of volatiles will be collected individually and composited by the analytical laboratory. The Department's Environmental Consultant will submit the waste characterization samples for analysis of waste characterization parameters consistent with the

requirements of the receiving facility selected for disposal of the anticipated waste stream. These analyses may include some or all the following parameters: VOCs, total petroleum hydrocarbons (TPH) gasoline range organics (GRO) and/or diesel range organics (DRO), total RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), semi-volatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), ignitability/flashpoint, corrosivity/pH, reactive sulfide, and reactive cyanide.

In accordance with NHDES Env-Or 611.04 (c), if the impacted soil is designated as non-hazardous oil contaminated soil and the quantity of contaminated soil stockpiled is less than 50 tons (about 34 cubic yards), sampling and analysis may not be required except as required by the receiving facility.

Once sampled, approximately two weeks will be required for analysis of the soil (stockpile) samples and receipt of laboratory results. The Department's Environmental Consultant will provide the analytical results to the Department's Environmental Contractor for use in securing disposal facility approvals.

4.2 CONTINGENCY PLAN FOR POTENTIALLY CONTAMINATED SOILS

The Department's Environmental Consultant will NOT be on-site during the Contractor's excavation activities outside of the areas described above and depicted on the attached plans, unless the Contractor encounters potentially-contaminated soil in this area. As stated in Section 3.3, if the Contractor encounters potentially-contaminated soil (petroleum or otherwise), as evidenced by staining or odors within the Project Limits, the Contractor shall STOP WORK and contact the Department's Bureau of Environment (603-271-3226) immediately to arrange for the Department's Environmental Consultant to be on-site. A plan for addressing unanticipated contaminated soil will be developed, if needed, based on site conditions.

4.3 REUSE OPTIONS

As noted above, all segregated petroleum impacted soil associated with releases from the Mobil 10977 site (including soil that may be impacted below Soil Remediation Standards) will be transported off-site for disposal. Regardless of waste characterization sampling results, on-site reuse of the soil is not anticipated.

To extent that unanticipated contaminated soil is identified in other areas, a plan for addressing the soil, including sampling and reuse options, will be developed at that time.

5.0 MANAGEMENT OF CONTAMINATED GROUNDWATER

As stated above, available information has indicated the likely presence of contaminated soils within or adjacent to the Project Limits in the areas listed in Section 3.2. **The Contractor shall prepare and submit a proposed Project Operations Plan at least 15 business days prior to any excavation of soil. No work shall be scheduled (or performed) in known contaminated areas until the POP has been approved. Additionally, the Contractor contact the Department's Bureau of Environment (603-271-3226) at least two weeks prior to beginning excavation in these areas to arrange for the Department's Environmental Contractor to provide frac tanks for groundwater storage.**

In order to aid in estimating the volume of groundwater requiring handling as part of the evaluation of potential disposal options, slug testing was completed for monitoring well GES-4. Test results are provided in Appendix E. Soil boring logs for environmental investigation conducted on behalf of the Department are provided in Appendix F. Additional boring logs for previously investigated properties are available through NHDES OneStop as described above.

5.1 AREA OF KNOWN GROUNDWATER CONTAMINATION

Due to the presence of known contaminated groundwater at and in proximity to the Mobil 10977 property (137 Route 101, NHDES Site No. 199201019), groundwater pumped from between STA 145+70 LT and RT and STA 150+10 LT and RT as depicted on the plans included in Appendix A must be handled as contaminated. Based on a review of anticipated construction depths and the observed depth to groundwater, it is anticipated that groundwater requiring dewatering will be encountered during excavation in these areas. The Contractor will dewater as necessary to complete the proposed work and store dewatering liquids in frac tanks to be provided by the Department's Environmental Contractor. To the extent feasible, the Contractor should attempt to implement practices that will minimize dewatering required in these areas.

The Department's Environmental Consultant will be responsible for sampling and analysis of containerized water. Following receipt of waste characterization data and disposal facility approvals, the Department's Environmental Contractor will pump the dewatering liquid into a vacuum truck and will transport the dewatering liquids off-site to licensed facility for disposal.

5.2 CONTINGENCY PLAN FOR POTENTIALLY CONTAMINATED GROUNDWATER

The Department's Environmental Consultant will NOT be on-site during the Contractor's excavation activities outside STA 147+50 LT and RT and STA 150+10 LT and RT, unless the Contractor encounters potentially-contaminated soil and/or groundwater in this area. As stated

in Section 3.3, if the Contractor encounters potentially-contaminated (petroleum or other) soil and/or groundwater within Project Limits, the Contractor shall STOP WORK and contact the Department's Bureau of Environment (603-271-3226) immediately to arrange for the Department's Environmental Consultant to be on-site. A plan for addressing unanticipated contaminated groundwater will be developed, if needed, based on site conditions.

6.0 DOCUMENTATION

Documentation of handling, management, sampling and analysis, transportation and off-site disposal performed by the Contractor shall be provided by the Contractor to the Department's Engineer as described below. This documentation does not include sampling and analysis, transportation and off-site disposal performed by the Department's Environmental Consultant and Environmental Contractor.

6.1 CONTAMINATED SOIL HANDLING AND STORAGE

The Contractor will maintain records of contaminated soil that is segregated and stockpiled. The records should include the area of origin (station coordinates), the date of excavation, the approximate volume, and the date that it is loaded into trucks provided the Department's Environmental Contactor for off-site disposal.

6.2 CONTAMINATED SOIL TRANSPORTATION AND DISPOSAL

While off-site transport and disposal of contaminated soil is not anticipated to be provided by the Contractor on this Project, if it should occur, any documentation related to these efforts will need to be maintained and provided to the Department. More specifically, documentation related to off-site transport and disposal of contaminated soil, including but not limited to, bills-of-lading/manifests, weight tickets, analytical reports, and waste profiles, shall be provided by the Contractor to the Department's Engineer within five (5) business days of receipt.

6.3 CONTAMINATED GROUNDWATER TREATMENT AND DISCHARGE OR DISPOSAL

While dewatering, on-site treatment of dewatering liquids, and discharge and/or off-site disposal of contaminated groundwater are not anticipated to be provided by the Contractor on this Project. If it should occur, any documentation related to these efforts will need to be maintained and provided to the Department. More specifically, documentation related to on-site treatment system sampling and discharge, or transportation and off-site disposal of contaminated groundwater including, but not limited to, permits, bills-of-lading/manifests,

confirmatory sampling analytical reports, discharge rates, and waste profiles, shall be provided by the Contractor to the Department's Engineer within five (5) business days of receipt.

SPECIAL ATTENTION

SUPPORTING INFORMATION FOR PROJECT OPERATIONS PLAN (POP) DEVELOPMENT

As described in Item 697.31, Contractors are advised that a Project Operations Plan (POP) is required for the project due to the known presence and/or potential presence of:

Media	Known to be Present	Potentially Present	Not Anticipated
Contaminated Soil	☒	☐	☐
Contaminated Groundwater	☒	☐	☐

The POP shall specify the Contractor's means and methods for handling and management of the contaminated materials referenced above. The Contractor shall review available data included and referenced in these contract documents to determine their means and methods.

The Contractor shall prepare and submit a proposed POP to the Bureau of Environment through the Engineer at least 15 business days prior to excavation of any soil. **No work shall be scheduled (or performed) in known contaminated areas until the Bureau of Environment has indicated that the plan conforms to the requirements of the Project.** The Department's Environmental Consultant will review the proposed POP for compliance with the Soil and Groundwater Management Plan (SGMP) and Project requirements, and provide comments to the Engineer. The comments on the proposed POP must be addressed by the Contractor in a revised POP in order to receive approval of the POP from the Department. No excavation of contaminated soil or dewatering activities in contaminated areas may take place until the POP has been approved by the Department.

The Contractor shall direct questions relating to any of the information herein to the Bureau of Environment(603-271-3226).

Major Considerations for POP Preparation

The following identifies major considerations for the POP preparation based on review of available information for the Project Area by the Department and the Department's Environmental Consultant:

Item	Yes	No	Unknown
Listed Sites within Project Limits	☒	☐	☐
Listed Sites within 1,000 feet of Project Limits	☒	☐	☐
Known Contaminated Soil requiring Special Management	☒	☐	☐
Potentially-Contaminated Soil – Contingency Plan	☒	☐	☐
Dewatering of Known Contaminated Groundwater	☒	☐	☐
Potentially-Contaminated Groundwater – Contingency Plan	☒	☐	☐

Additional information is available for review as follows:

- SGMP (see attached) prepared by the Department's Environmental Consultant;
- NHDES's electronic files for the state-listed sites through NHDES's OneStop website (`www2.des.state.nh.us/DESOnestop/BasicSearch.aspx`); and
- Department's available information: Contact the Bureau of Environment's Contamination Program (603-271-3226) for review.

Contaminated Soil

As it relates to contaminated soil, the SGMP includes:

- ☒ Narrative description of contaminated soil
- ☒ Cross-sections annotated with vertical extent of contamination
- ☒ Plan sheets annotated with horizontal extent of contamination
- ☒ Stockpile management requirements
- ☐ Designated locations for staging contaminated soils
- ☒ Contingency plan for potentially contaminated soil
- ☐ Reuse criteria
- ☒ Segregation criteria
- ☒ Soil boring logs / subsurface data
- ☒ Tabular summary of available soil analytical data
- ☒ Decontamination requirements

The Department's Environmental Consultant will be present during excavation between the stations listed in the SGMP and Prosecution of Work to observe the Contractor's activities related to management of contaminated soil. The Department's Environmental Consultant will be present to screen the excavated soils and aid the Contractor with segregation of material using visual/olfactory/headspace measurements using a photoionization detector (PID).

The Department's Environmental Consultant may collect samples of segregated materials for waste disposal characterization analysis. If collected, the results of the analyses will generally be available within 7 calendar days following sample collection.

If the Contractor proposes alternate management methods, then the Contractor shall provide a detailed description of the proposed approach in the POP. The alternate method must be approved by the Bureau of Environment's Environmental Coordinator, in concurrence with Department's Environmental Consultant, prior to excavation activities in the area of known contamination.

Contaminated Groundwater

As it relates to contaminated groundwater, the Soil and Groundwater Management Plan includes:

- ☒ Narrative description of contaminated groundwater
- ☒ Cross-sections annotated with anticipated groundwater elevations
- ☒ Plan sheets annotated with horizontal extent of contaminated groundwater
- ☒ Hydrogeologic / slug test data
- ☐ Groundwater elevation data
- ☒ Soil boring and monitoring well logs
- ☒ Tabular summary of analytical data
- ☐ Designated staging location for treatment system(s)
- ☐ Discharge options

As noted in the SGMP, the Department's Environmental Contractor will be responsible for supplying frac tanks for storage of groundwater pumped in areas of contaminated groundwater. Furthermore, it is anticipated that the Department's Environmental Contractor will be responsible for managing the treatment and/or disposal of the groundwater. The Contractor's POP shall describe the means and methods of managing contaminated groundwater including an approach to coordinate with the Department's Environmental Contractor for dewatering as specified within the SGMP. The approach must be approved by the Bureau of Environment's Environmental Coordinator, in concurrence with Department's Environmental Consultant, prior to excavation activities.

09/08/15
SSD: 09/05/02, 02/13/13

SPECIAL ATTENTION

ASBESTOS

The item for the removal of asbestos is included in this contract. The following is provided to inform the Contractor of the concerns regarding this material.

Asbestos is the common name for a group of minerals that may appear as masses of compact or relatively long, silky fibers. Asbestos is resistant to heat.

Asbestos fibers are carried into the body as airborne particles. These fibers can become embedded in the tissues of the lung and digestive system. Once the fibers become trapped in the lung's air sacs, they are removed slowly. Years of exposure to asbestos can cause a number of disabling and fatal diseases. Diseases associated with Asbestos exposure include Asbestosis (a fibrotic scarring of the lung), lung cancer, and Mesothelioma (a type of cancer that spreads rapidly and is always fatal).

Forms of Asbestos

Asbestos comes in two (2) forms, friable and non-friable:

Friable asbestos is a material that can be crumbled, pulverized, or when dry, reduced to powder by hand pressure. Examples of friable asbestos materials include sprayed-on fireproofing, ceiling treatments, and pipe insulation.

Non-friable asbestos is a material that cannot be crumbled, pulverized, or when dry, reduced to powder by hand pressure. Examples of non-friable asbestos materials include floor tile, mastic, transite cement sheeting, asphalt curbing and bridge decking.

The forms that asbestos products take determine the potential airborne exposure risk. Friable asbestos materials can present a higher exposure risk than non-friable materials. Non-friable materials can become friable due to weathering, disturbance, and many other factors.

There are over 3600 commercial products that contain asbestos. Asbestos has many different applications but is used most frequently in building products, insulating materials, friction materials, and textiles. Asbestos materials may be sprayed on structural beams as fireproofing. Asbestos materials may also be found in boiler and pipe insulation, stage curtains, and ceiling treatments on plaster or sheetrock. Manufactured asbestos products have included floor and ceiling tiles, brake and clutch linings, paints and sealants, patching and taping compounds, and transite cement panels.

SSD: 04/09/08, 3/11/11, 04/25/11

SPECIAL ATTENTION

INVASIVE SPECIES

The statutory authority of NH Department of Agriculture *RSA 430:55* and NH Department of Environmental Services RSA 487:16-a prohibits the spread of invasive plants listed on the NH Prohibited Species list. Construction activities should avoid impacting areas containing invasive plant species in order to avoid spreading these plants to new sites. If invasive plants cannot be avoided, then the following suggested best management practices (BMPs) should be incorporated into all projects. These BMPs have been summarized from the NHDOT manual "*Best Management Practices for Roadside Invasive Plants*."

Earthwork:

- Minimize soil disturbance whenever possible outside the limits of excavation.
- Stabilize disturbed soils by seeding and/or using mulch, hay, rip-rap, or gravel that is free of invasive plant material.
- Materials such as fill, loam, mulch, hay, rip-rap, and gravel should not be brought into project areas from sites where invasive plants are known to occur.

Movement of equipment:

- Equipment movement should be from areas not infested by invasive plants to areas infested by invasive plants whenever possible.
- Staging areas should be free of invasive plants to avoid spreading seeds and other viable plant parts.

Removing vegetation:

- In areas where invasive plants will be impacted by construction activities, vegetation should be cut or removed prior to seed maturation (approximately August 1st).
- These invasive plants have the ability to sprout from stem and root fragments: purple loosestrife, phragmites, and Japanese knotweed. Mowing these plants should be avoided. When these plants are cut by other means, all plant material must be destroyed and extra care should be taken to avoid spreading plant fragments.
- Equipment used to cut or remove invasive plants should be cleaned at least daily, as well as prior to transport.

The NHDOT manual "Best *Management Practices for Roadside Invasive Plants*" and supporting fact sheet documents are available on line at www.nh.gov/dot/org/projectdevelopment/environment/documents.htm or through the NHDOT Records Section (603-271- 1601).

Items will be included in the contract under Sections 201 or 697 for projects that will require these control methods.

SPECIAL ATTENTION

CHAPTER Env-A 1000 PREVENTION, ABATEMENT, AND CONTROL OF OPEN SOURCE AIR POLLUTION

Statutory Authority: RSA 125-C:4

PART Env-A 1001 OPEN BURNING

Env-A 1001.01 Purpose. The purpose of this part is to regulate emissions of particulate matter and toxic air pollutants from the burning of materials in the open where the products of combustion are discharged directly into the atmosphere rather than through a stack, chimney, or flue, in order to achieve and maintain attainment of the ambient air quality standards in accordance with sections 109 and 110 of the Clean Air Act, and to protect the public health and welfare pursuant to RSA 125-C:1.

Env-A 1001.02 Scope. This part shall apply to any natural person, firm, corporation, association, municipality or state agency that conducts open burning within the state.

Env-A 1001.03 Permissible Burning.

(a) Open burning in any part of the state shall be done only when the following conditions are satisfied:

(1) When not prohibited by any local ordinance;

(2) When not prohibited by an official having jurisdiction over open burning;

(3) When no nuisance is created; and

(4) When all materials that are burned are in conformance with this part.

(b) Throughout the state, only the following types of burning shall be permissible without authorization from the division:

(1) Burning of untreated wood, campfire wood, brush or charcoal in a campfire, outdoor grill or outdoor fireplace for recreational purposes or for the preparation of food;

(2) On-premises burning for the purpose of frost prevention, or agricultural, forestry, or wildlife habitat improvement;

(3) Burning of solid fuel, liquid fuel, a motor vehicle, or a structure that has been certified to be free of asbestos in accordance with Env-C 400, provided that the following conditions shall be met:

a. The burning shall be conducted to provide bona fide instruction and training of firefighters in methods of fighting fires;

b. The burning shall be conducted under the direct control and supervision of qualified instructors; and

c. Written permission shall have been obtained in advance from the New Hampshire department of resources and economic

development, division of forests and lands, bureau of forest protection; or

(4) Burning of untreated wood, campfire wood or brush in bonfires in conjunction with holiday or festive celebrations.

(c) In an area which has been classified as "attainment" of the ambient air quality standards for particulates pursuant to Env-A 300, the following types of burning shall be permissible without authorization from the division:

(1) Burning of combustible domestic rubbish from a residence where the following conditions exist:

a. There is no public removal service;

b. The burning shall occur on-premises in a waste burner having a capacity of 7 cubic feet or less; and

c. The waste is generated from a residential building containing 4 or less dwelling units;

(2) Periodic on-site burning by the landowner of brush and leaves which originate on-site;

(3) Commercial burning of brush, provided that no other disposal method, such as chipping, can be utilized; or

(4) Burning of untreated wood from the construction or demolition of a building, provided that such burning shall be done in an area which shall be specified and approved by officials having jurisdiction over open burning.

Env-A 1001.04 Division Authorization for Certain Open Burning.

(a) In addition to any other required state or local permits or authorizations, written authorization shall be obtained from the division prior to conducting any of the following types of open burning:

(1) Burning of materials as described in Env-A 1001.03(c), above, in an area of the state that has been classified as "non-attainment" of the ambient air quality standards for particulates pursuant to Env-A 300;

(2) Burning by any city or town of brush or untreated wood from the construction or demolition of a building, provided the material originates within the state; or

(3) Open burning of explosive or dangerous material for which there is no other feasible method of safe disposal.

(b) The open burning in this section shall only be done in an area which is approved by the division and all officials having jurisdiction over open burning.

(c) The written authorization from the division shall include the date, time, and place where the open burning shall be permissible and any conditions and requirements which are necessary to ensure the safeness of the

burning and to properly regulate the emissions.

Env-A 1001.05 Absolute Prohibition Against Burning Tires and Tubes.

(a) No tires, tubes or any portion thereof shall be burned in the ambient air at any place in the state for any reason.

(b) Tires, tubes or any portion thereof which are received at any dump shall be separated from the waste and disposed of by a feasible means other than open burning.

Env-A 1001.06 Absolute Prohibition Against Burning in the Ambient Air at Salvaging or Reclaiming Operations.

(a) A suitable incinerator or other means of compliance approved by the division pursuant to Env-A 1201 shall be employed for all thermal salvaging or reclaiming.

(b) No salvaging or reclaiming operation shall burn anything on-site in the ambient air.

PART Env-A 1002 FUGITIVE DUST

Env-A 1002.01 Purpose. The purpose of this part is to regulate the direct emissions of particulate matter to the atmosphere from activities that involve mining, transportation, storage, use, and removal of mineral material or soil.

Env-A 1002.02 Scope.

(a) This part shall apply to any natural person, firm, corporation, association, municipality or state agency that emits fugitive dust within the state, including those engaged in any of the following:

(1) Commercial mining activities, including the construction, maintenance or operation of a commercial mining or strip mining facility or part thereof;

(2) Construction activities, including building, paving, sweeping, trenching, excavating, filling, or other activity associated with the building of streets, roads, highways, parking lots, shopping centers, housing developments, or other centers of business or residential development;

(3) Maintenance activities, including sweeping, vacuuming, or other activity involved with the upkeep of streets, roads, highways, parking lots, shopping centers, housing developments, or other centers of business or residential development, buildings, bridges, utilities, sewerlines, waterlines, or similar entities;

(4) Demolition activities, including the tearing down of buildings, bridges or other structures; and

(5) Bulk hauling activities, including the transportation and transfer of material over public roads.

(b) This part shall not apply to the following:

(1) Application of traction enhancement materials, including sand, and de-icing chemicals such as road salt, that have been applied to roads for public safety;

(2) Normal usage of gravel or dirt roads;

(3) Resurfacing activities of existing highways where the removal of surplus sand is not necessary; and

(4) Agricultural industry activities or operations.

Env-A 1002.03 Precautions to Prevent, Abate, and Control Fugitive Dust. Precautions shall be taken and continued throughout the duration of the activity in order to prevent, abate, and control the emission of fugitive dust. Such precautions shall include wetting, covering, shielding, or vacuuming.

SSD: 1/19/95, 4/6/99, 2/14/03 & 7/14/08

SPECIAL ATTENTION

HISTORIC AND ARCHAEOLOGICAL RESOURCES

In order to avoid impacts to archaeological resources, the Contractor shall obtain and submit to the Engineer a written certification from either: 1) the State Archaeologist, or 2) a qualified archaeologist as defined below prior to any offsite excavation or other work at any disposal site, haul road, storage area, staging area, or other areas located outside the right-of-way limits of the project. Such certification shall be made on one of the attached forms. One is intended for site clearance by the state archaeologist and the other for investigation by a qualified archaeologist. Any work in such areas may only commence after receipt of this certification and upon written authorization to proceed by the Engineer.

This Special Attention does not apply to natural materials obtained from pre-existing (i.e., owned and operated by the Contractor prior to bidding on the subject contract) and/or commercially available sources. Commercially available sources is meant to include licensed or permitted sources where anyone could purchase natural materials.

If the State Archaeologist determines that further field investigation is necessary the Contractor must decide whether to pursue alternative locations or to have the site(s) in question evaluated. If the latter is decided, it will be necessary for the Contractor and the Engineer to meet with the NHDOT Bureau of Environment, the Division of Historic Resources and the Federal Highway Administration to determine the appropriate course of action. Note that the latter parties meet twice a month on the first and second Thursdays of each month.

Professional Qualifications for Principal Investigators in Archaeological Investigations

All archaeologists contracting with NHDOT as principal investigators will be qualified for such work, as determined by NHDHR. **See list of qualified archaeological firms at www.nh.gov/nhdhr/consultants_archaeology.html.** According to NHDHR guidelines, principal investigators must meet the minimum standards presented in 36 CFR 61.

These regulations require a graduate degree in archaeology, anthropology, or related field; at least one year full-time professional experience or an equivalent period of training in archaeological research, administration, or management; at least four months of supervised field and analytical experience in general North American archaeology; and demonstrated capability to complete archaeological research through all its phases. These standards distinguish between the prehistorian and historical archaeologist. Each must have a specialization in his/her respective areas and at least one year of full-time professional experience at the supervisory level in the study of the Native American cultural traditions or the historic period.

NHDHR also requires the following additional qualifications. All prehistorians will have at least one year of supervisory experience in the region encompassing the glaciated Northeast. Historical archaeologist will have a least one year of supervisory experience in New England, New Jersey, New York, or Pennsylvania. Historical archaeologists specializing in submerged nautical resources will possess at least one year's experience in the study of such resources along the Atlantic seaboard. NHDOT requires that the principal investigator has successfully completed one or more projects in New Hampshire in a timely manner. Principal investigators will be knowledgeable about the federal and state cultural resources management laws and regulations including those relating to the treatment of human remains in marked and unmarked graves. As soon as research or initial investigations indicate the likely presence of Native American or historic deposits, a principal investigator with training and experience in that area shall supervise the work.

The principal investigator is responsible for each aspect of the project. The principal investigator will maintain sufficient presence in repositories, the field, and laboratory to set up the study, ensure appropriate collection and accurate documentation of data, direct needed modifications as investigations proceed, field-check accuracy of field data, establish and direct analysis, and oversee documentation and preparation of recommendations at its close. In phases II and III as the intensity of excavation increases, it is anticipated that this presence will proportionately rise. All research, field investigations, analysis, and report preparation will be completed within the schedule set in the authorization of work unless notification is given and adequate justification is provided to NHDOT.

Depending on the nature of the site, the prehistoric or historic archaeologist may require additional qualifications or additional personnel qualified in other fields that may not be specified under 36CFR61. For example, projects for NHDOT encounter situations in which personnel with expertise and/or demonstrated experience in geomorphology, botany, faunal analysis, forensic anthropology, and industrial and urban archaeology are needed. These individuals will possess graduate training in their field, two years of professional experience in the area of expertise for which they are being consulted, and the demonstrated ability to complete a research project with a report of findings. Principal investigators may also need to add architectural historians, historians, historical landscape architects, etc. to their team whose professional qualifications will follow those provided in 36 CFR 61.

CERTIFICATION BY NHDHR

For the purpose of compliance with the Special Attention, Historic and Archeological Resources, dated February 14, 2003, relative to Federal-Aid Highway Project No. _____, NHDOT Project No. _____, I certify the following:

1. That I have reviewed the maps, plats, photographs or other identifying geographical information supplied to me by the Contractor.

2. That the areas located on these maps, etc. are to be utilized by the Contractor _____ _____ for the following purposes:

   a. Excavation area _____.
   b. Waste material area _____.
   c. Storage or staging area _____.
   d. Haul road _____.
   e. Other (describe) _____
   _____
   _____.

3. That I have reviewed the NHDHR site files relative to these locations and proposed uses.

4. On the basis of the above information, I have concluded that:

   a. The location(s) have been previously reviewed, no resources have been identified, and there is no need for further archaeological evaluation _____.
   b. The location(s) are such that no further archaeological evaluation is necessary _____.
   c. The location(s) are such that further field investigation is necessary _____.

_____ _____
NHDHR Review and Compliance Coordinator Date

Received:

_____ _____
NHDOT Contract Administrator Date

cc: FHWA
NH Division of Historical Resources
NHDOT, Bureau of Environment

CERTIFICATION BY ARCHAEOLOGICAL CONTRACTOR

For the purpose of compliance with the Special Attention, Historic and Archeological Resources, dated February 14, 2003, relative to Federal-Aid Highway Project No. _____, NHDOT Project No. _____, I certify the following:

1. That I have examined the areas identified on the attached plans, maps, or property plats.

2. That these areas are to be utilized by the Contractor _____ for the following purposes:
   a. Excavation area _____.
   b. Waste material area _____.
   c. Storage or staging area _____.
   d. Haul road _____.
   e. Other (describe) _____
   _____
   _____.

3. That I have used the following techniques in my examination:

   a. Literature search _____
   b. Walkover (describe methodology) _____
   _____
   c. Subsurface testing (if appropriate) _____
   _____

4. That in my professional opinion, there is minimal or no likelihood that there are cultural resources (either historic or pre-historic) present or that any such resources present have integrity, and that there is no need for any other evaluative measures prior to the use of the areas described above for the purposes noted.

_____ _____
Archaeological Contractor Date

Review by: _____ _____
NHDHR Review and Compliance Coordinator Date

Received:

_____ _____
NHDOT Contract Administrator Date

cc: FHWA
NH Division of Historical Resources
NHDOT, Bureau of Environment

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April 25, 2017

SPECIAL ATTENTION

REVISION TO PLANS

Bidders are hereby advised:

1) Amend, on sheet 20 in the Plans, on the *Summary of Quantities* sheet, in the *Guardrail* summary, the following item quantity:

Item Number	Description	Quantity	
		From	**To**
606.12122	Beam Guardrail (Long Span Double Nested – 18.75') (Steel Post)	187.5 LF	**2 Units**

2) Revise, on sheet 20 in the Plans, on the *Summary of Quantities* sheet, in the *Guardrail* summary, the item quantity for Item 606.4174 – Portable Concrete Barrier for Traffic Control – Braced, for both Phase 2 and Phase 3, to 120 LF, for a total of 120 LF.

These item changes have already been reflected in the Information Report and the Bid Schedule.

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April 17, 2017

SPECIAL ATTENTION

FUEL ADJUSTMENT

(a) The shortage of all products in relation to the national and worldwide energy situation has made future costs of fuel unpredictable. For this reason, a price adjustment clause is being inserted in this contract to provide for either additional compensation to the Contractor or payment to the State, depending upon an increase or decrease in the price of fuel.

(b) The fuel usage factors, which will be applied to the several items of the Contract shall be those set forth in Table 1.

(c) Price adjustment will be based upon the quantity of fuel incorporated in the work as determined by the factors in Table 1.

- When the monthly sales price determined per paragraph (f) is more than 110% of the fixed base price set forth in paragraph (e), a contract adjustment will be made under Item 1010.15 based on: [monthly sales price less 110% of the fixed base price] multiplied by [item quantity eligible for payment during month] multiplied by [fuel factor].

- When the monthly sales price determined per paragraph (f) is less than 90% of the fixed base price set forth in paragraph (e), a contract adjustment will be made under Item 1010.15 based on: [monthly sales price less 90% of the fixed base price] multiplied by [item quantity eligible for payment during month] multiplied by [fuel factor].

(d) The Contractor warrants that its bid prices for this Contract include no allowances for any contingency to cover increased costs for which adjustment is provided herein.

(e) The fixed base price of fuel will be $ 2.1825 per gallon.

- This price is used solely to compute price adjustments. The fuel price will be the lower bulk retail price of **ultra low sulfur diesel fuel** for Boston as published by OPIS (Oil Price Information Service) in the Oil Price Daily, formerly known as the Journal of Commerce, and will include current Federal and State taxes.

(f) The monthly sales price of fuel will be determined by the Department on the 15th calendar day of each month. When the 15th calendar day falls on a Saturday or Sunday, the price from the previous Friday will be utilized. Monthly sales prices will be set in the same manner as indicated in paragraph (e).

(g) The price adjustment, when such adjustment is called for as provided in paragraph (c), will be made subsequent to the month in which the work was accomplished.

(h) No price adjustment will be allowed beyond the Project completion date unless there is a Department-approved extension of time. Price adjustments will be made on quantities adjusted as a result of the final audit.

(i) The Department will not be responsible for computing or otherwise indicating price adjustments except to the prime contractor, which must make its own arrangements with its subcontractors.

(j) When no item for Fuel Adjustment is included in the Contract no adjustments will be made.

Pay item and unit:

1010.15	Fuel Adjustment [1]	$

[1] Not a bid item.

Table 1 - FUEL FACTORS

Item of Work	Item No.	Units	Fuel
Excavation:			
Earth	203.1_,.4_ 203.50_,.51_,.52_ 203.6_,.7_ 206.1_ 207.1_ 504.1_	gal/c.y.	0.26
Rock	203.2_ 206.2_ 207.2_ 504.2_	gal/c.y.	0.34
Other	203.3_ 206.3_ 207.3_ 583._ 585._ 586._ 587._	gal/c.y.	0.31
Bases:			
Unprocessed	209._ 304.1_,.2_	gal/c.y.	0.46
Processed [4]	304.3_ 304.4_,.5_,.6_ 508._	gal/c.y.	0.82
Bituminous Concrete			
Pavement [2]	403._ 411._	gal/ton	1.90
All Other Items:		gal/$1,000 of work	13.0

Excluded Items: [3]

210._	510.61_	550.2_	565.2_	624._
211._	510.65_	560._	565.7_	645.7_
306.31_	521.2_	561._	568._	692._
306.32_	528._	563.1_	592._	697._
410._	544._	563.2_	603.0001	698._
510.31_	548._	563.3_	618._	8_ _._
510.41_	550.1_	563.7_	619._	10_ _._

[2] Item 403.4 & 403.6 shall be calculated using the "All Other Items" category rate.
[3] Also excluded are all supplementary agreements, extra work and per specification items.
[4] Item 304.32 shall be calculated using the "All Other Items" category rate.

April 15, 2017

SPECIAL ATTENTION

ASPHALT CEMENT ADJUSTMENT AND ASPHALT CEMENT ADJUSTMENT FOR EMULSION

Bid items involving asphalt concrete mixtures containing asphalt cement may be subject to a price adjustment. Only the asphalt portion of asphalt-rubber cement will be eligible for price adjustment. The adjustment will take effect when the monthly price for asphalt cement as furnished by the Bureau of Materials and Research differs from the base price contained in the proposal. Affected Sections and formulas are detailed below.

The base price* of asphalt cement for this Contract is $ _415.00_ per ton.

* Source: The base price is developed from data published in the *Asphalt Weekly Monitor*, a publication from Poten and Partners, Inc. (Applies to contracts advertised after January 1, 2012.)

The **monthly price** of asphalt cement will be furnished by the Bureau of Materials and Research on the first business day following the 14th calendar day of each month.

The contract prices of bituminous materials will be paid under the respective items in the contract. The price adjustment, as provided herein, upwards or downwards, will be made at the end of each month in which the work was accomplished as follows:

Item 403.__ - Pavement (except items 403.4 & 403.6_) and Item 411.__ - Hot Bituminous Concrete Leveling Course and Plant Mix Surface Treatment

The price adjustment will be based on the percent of virgin asphalt cement stated in the Approved Mix Design containing the maximum percentage of reclaimed asphalt pavement. In the event of breakdown or unforeseen circumstances other than weather, an Approved Virgin Mix Design may be used. The price adjustment will then be based on the total percent of virgin asphalt cement in that approved design.

A contract adjustment will be made under Item 1010.2 based on; [monthly price minus the base price] X [Approved Mix Design percent of virgin asphalt cement] X [tons of pavement used].

Item 410.72 - Chip Seal Surface Treatment Rubber Polymerized

A contract adjustment will be made under Item 1010.2 based on; [monthly price minus the base price] X [asphalt factor] X [tons of AC used] where:

Assumptions:

- Asphalt factor equals 82%
- Tons of AC used equals the total number of gallons sprayed divided by 235

Item 419.1__ - Bonded Wearing Course

A contract adjustment will be made under Item 1010.2 based on; [monthly price minus the base price] X [Total AC in the BWC process percent] X [tons of BWC paved] where:

Assumptions:

- Total AC in the BWC process equals 6% (includes the emulsion tack coat)
- Tons of BWC equals 0.0425 times the number of SYs paved (85 lbs/SY)

Item 419.2__ – AR Bonded Wearing Course

A contract adjustment will be made under Item 1010.2 based on; [monthly price minus the base price] X [Total AC in the AR BWC process percent] X [asphalt factor] X [tons of BWC paved] where:

Assumptions:

- Total AC in the BWC process equals 6% (includes the emulsion tack coat)
- Asphalt factor equals 82%
- Tons of BWC equals 0.0425 times the number of SYs paved (85 lbs/SY)

Emulsified Asphalt Cement [Including Items 405.__, 410.__ (excluding 410.22, 410.72 & 410.75_), 418.11__ and 418.32]

A contract adjustment will be made under Item 1010.21 based on; [monthly price minus the base price] X [percent of residual asphalt cement] X [Tons of Emulsion used].

Assumptions:

- Quantities are assumed to be measured at 60° F
- Volume reduction between typical delivery temperature (+/- 140° F) and 60° F is 2%
- Adjustment payment assumes 62% Residual Asphalt for all grades
- 239 Gallons/Ton is the unit conversion at 60° F

Item 1010.2	Asphalt Cement Adjustment[1]	Dollar
Item 1010.21	Asphalt Cement Adjustment for Emulsion[1]	Dollar

When no item for Asphalt Cement Adjustment and/or Asphalt Cement Adjustment for Emulsion is included in the contract no adjustments will be made.

[1] Not a bid item

03/22/12

SSD: 6/7/94, 8/14/97, 3/17/98, 10/31/08, 07/06/10

SPECIAL ATTENTION

Four weeks prior to the start of casting of any precast and/or prestressed items specified below, the Contractor shall notify the Bureau of Materials and Research, Concrete Unit Supervisor (603-271-3151), of intent to start casting and advise them of the name and location of the manufacturer. This will allow the Department time to make arrangements for inspection. Items not documented as being inspected will not be accepted.

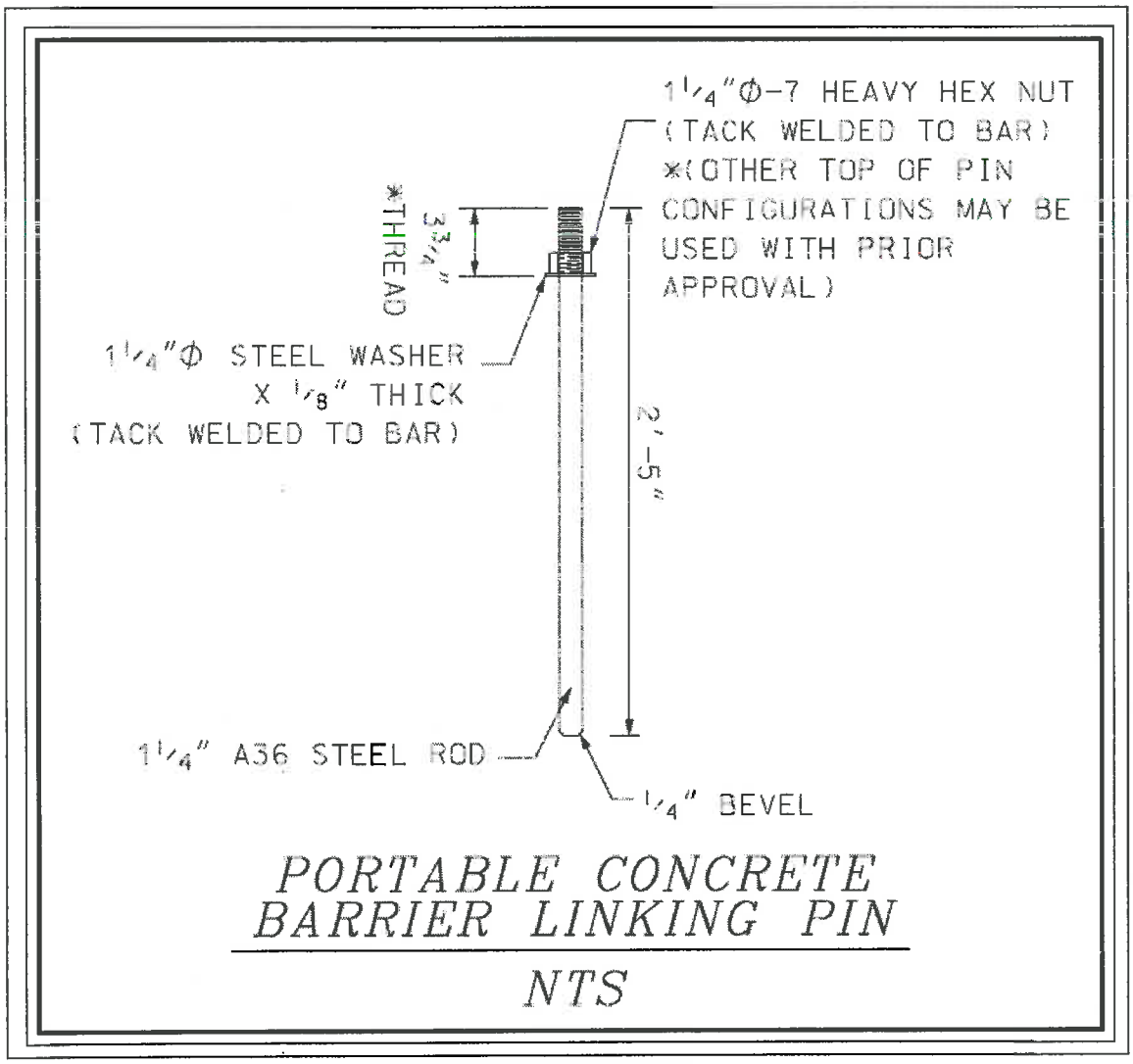
The following precast and/or prestressed items will have continuous inspection during casting: all bridge components; box culverts; permanent concrete barrier; special catch basins, drop inlets and manholes over six feet in diameter; concrete pipes greater than 72 inches in diameter; mechanically stabilized earth retaining walls, and precast concrete headwalls.

NOTICE TO CONTRACTORS

Portable Concrete Barrier (PCB)

All contracts **advertised after January 1, 2017** on the NHS or with a posted speed of 45 MPH or greater, which includes, but is not limited to, Item 606.417 - Portable Concrete Barrier (For Traffic Control), are not permitted to use PCB with 2-loop connections. Only PCB's that conform to the testing and evaluation criteria of the National Cooperative Highway Research Program (NCHRP) Report 350 or the Manual for Assessing Safety Hardware (MASH) shall be utilized.

All contracts advertised after May 20, 2016 are required to **only** use smooth 1.25" (A-36 steel) pin connections (see example below for an acceptable *Portable Concrete Barrier Linking Pin* detail). This Notice supersedes the PCB standard detail requirements. This requirement applies, but is not limited, to Item 606.417 - Portable Concrete Barrier (For Traffic Control) and Item 606.41731 - Portable Concrete Barrier for Traffic Control with Drainage Slots.



SPECIAL ATTENTION

ROADSIDE SAFETY HARDWARE WORTHINESS COMPLIANCE WITH NCHRP REPORT 350 AND MASH

The American Association of State Highway and Transportation Officials (AASHTO) has published the Manual for Assessing Safety Hardware (MASH). The main objective of MASH is to present uniform guidelines for the crash testing of both permanent and temporary highway safety hardware and evaluation criteria to assess test results. The need for updated crash criteria was based primarily on the changes to the vehicle fleet since the publication of National Cooperative Highway Research Program (NCHRP) Report 350. Highway safety hardware includes, but is not limited to, longitudinal barriers, crash cushions, attenuators, end terminals, breakaway supports, and work zone hardware/devices.

IMPORTANT: Any hardware that was designed, tested and accepted prior to January 1, 2011 under the NCHRP Report 350 criteria may continue to be used without retesting to MASH criteria. As of January 1, 2011, all new or revised highway safety hardware must be tested or retested and accepted using MASH criteria. If highway safety hardware that has been accepted by FHWA using criteria contained in NCHRP Report 350 fails testing using MASH criteria, AASHTO and FHWA will jointly review the test results and determine a course of action.

Hardware tested under MASH should be considered for use but there is no requirement to use or replace hardware that was accepted prior to January 1, 2011 under NCHRP Report 350. However, all highway safety hardware shall meet the appropriate NCHRP 350 or MASH requirements for the indicated test levels or be exempted by the FHWA from meeting this requirement. However, the Department may, in certain circumstances, require compliance to higher criteria if deemed appropriate.

WORK ZONE TRAFFIC CONTROL DEVICES:

The following is a summary of work zone traffic control devices categories, and their crash testing acceptance requirements, titled "Recommended Procedures for the Safety Performance Evaluation of Highway Features," testing and evaluation criteria as implemented by the AASHTO-FHWA Agreement (350 Agreement) dated July 1, 1998. These categories and associated requirements also apply to newly designed or revised devices that would now fall under MASH testing criteria.

Category I: Small, lightweight devices that are known to be crash-worthy from crash testing or years of demonstrable safe operational performance. These include plastic or rubber cones, tubular markers, flexible delineators, and plastic drums with no lights, batteries, signs, etc. added. For devices to be included in this category there must be virtually no potential that they will penetrate windshields, cause tire damage, or have a significant effect on the control or trajectory of an impacting vehicle. These devices will be allowed based upon developers self-certification.

Category II: Devices that are not expected to produce significant vehicular velocity change, but may be otherwise hazardous. All or parts of the devices may be substantial enough to penetrate a windshield or injure a worker or they may cause instability when driven over or become lodged under a vehicle. The total mass of a Category II device must be less than 45 kg. Examples of this category are barricades, portable sign supports, intrusion detectors and alarms and drums, vertical panels, or cones with lights.

Category III: Devices expected to cause significant velocity change or other potentially harmful reactions in impacting vehicles and Category II devices with a mass greater than 45 kg. Examples of this category are Truck-mounted attenuators (TMA), portable crash cushions and Portable concrete barrier (requires appropriate sized pin and loop or better connection).

Category IV: Crashworthy installations of Category IV devices are encouraged, though not mandated. Examples of this category are portable, usually trailer mounted devices such as area light supports, flashing arrow panels/arrows displays, temporary traffic signals and changeable message signs. However, these types of devices combined with TMA are considered Category III devices.

All category I, II, and III project work zone traffic control devices in use, except portable concrete barrier that transfers tension and moment from segment to segment, shall conform to the testing and evaluation criteria as outlined above. Devices not conforming to the criteria shall be replaced with conforming devices at no expense to the Department.

06/18/13

SSD: 09/01/05, 04/07/09, 11/30/10

SPECIAL ATTENTION

SECTION 606 – GUARDRAIL

W-BEAM RAIL

There may be situations where standard beam guardrail, set at 30 inches high (or 31 inches high as required by the mid-splice guardrail system), will need to be connected to beam guardrail terminals that have only been crash tested at 27 inches high or bridge approach units that are designed at 27 inches high. This may reflect an existing or new installation. Similarly, new standard beam guardrail may be connected to existing beam guardrail that is not at the 30 inch height (or 31 inch height as stated above). In those circumstances transition the height over 50 feet of the standard rail that is connected to the terminal or bridge approach unit (transition shall be subsidiary to 606 Items).

Set the EAGRT heights according to the manufacturer's recommendation, as accepted under the NCHRP 350 or Manual for Accepting Safety Hardware (MASH) - 2009 criteria. All other terminals, including but not limited to, ELT, MELT, and the CRT, shall be set at the crash acceptance height of 27-inch unless otherwise accepted under crash test acceptance for a higher height.

Rev. 6/2/10
Supersedes Spec. Attn. dated 3/9/90, 12/5/90, 4/4/92, 2/22/93, 4/24/95 & 6/5/98

ALL FA PROJECTS (STEEL & IRON PRODUCTS)

SPECIAL ATTENTION

BUY AMERICA

In accordance with the **BUY AMERICA** requirements of the Federal regulations, all manufacturing processes for steel and iron materials furnished for permanent incorporation into the work on this project shall occur in the United States. The only exception to this requirement is the production of pig iron and the processing, pelletizing and reduction of iron ore, which may occur in another country. Other than these exceptions, all melting, rolling, extruding, machining, bending, grinding, drilling, coating, etc. must occur in the United States.

Products of steel include, but are not limited to, such products as structural steel, piles, reinforcing steel, structural plate, steel culverts, guardrail and steel supports for signs, signals and luminaires. Products of iron include, but are not limited to, such products as cast iron frames and grates. Coatings include, but are not limited to, the applications of epoxy, galvanizing and paint. The coating material is not subject to this clause, only the application process.

A Certificate of Compliance, conforming to the requirements of Section 106.04, shall be furnished for steel and iron materials. Records to be maintained by the contractor for this certification shall include a signed mill test report and a signed certification by each supplier, distributor, fabricator, and manufacturer that has handled the steel or iron product affirming that every process, including the application of a coating, performed on the steel or iron product has been carried out in the United States of America, except as allowed by this Special Attention. The lack of these certifications will be justification for rejection of the steel or iron product.

The requirements of said law and regulations do not prevent a minimal use of foreign steel and iron materials if the cost of such materials used does not exceed one-tenth of one percent (0.1%) of the total contract price or $2,500.00, whichever is greater.

Upon completion of the project, the Contractor shall certify in writing as to compliance with this Special Attention and also provide the total project delivered cost of all foreign steel and/or iron permanently incorporated into the project. The form for this certification is entitled "Buy America Certificate of Compliance" and can be found at www.NHDOT.com.

SPECIAL ATTENTION

SHIPPING

In accordance with the **Title 46 - Shipping** requirements of the Federal regulations (46 CFR 381.7), contractors must comply with the Cargo Preference Act (CPA) requirements and implementation regulations for all Federal-aid projects awarded after February 15, 2016. **Title 46 - Shipping** reads as follows:

Title 46 - Shipping
Volume: 8
Date: 2014-10-01
Original Date: 2014-10-01
Title: Section 381. 7 - Federal Grant, Guaranty, Loan and Advance of Funds Agreements.
Context Title 46 - Shipping. CHAPTER II - MARITIME ADMINISTRATION, DEPARTMENT OF TRANSPORTATION. SUBCHAPTER J - MISCELLANEOUS. PART 381 - CARGO PREFERENCE-U.S.FLAG VESSELS.

§ 381.7 Federal Grant, Guaranty, Loan and Advance of Funds Agreements.
In order to insure a fair and reasonable participation by privately owned United States-flag commercial vessels in transporting cargoes which are subject to the Cargo Preference Act of 1954 and which are generated by U.S. Government Grant, Guaranty, Loan and/or Advance of Funds Programs, the head of each affected department or agency shall require appropriate clauses to be inserted in those Grant. Guaranty, Loan and/or Advance of Funds Agreements and all third party contracts executed between the borrower/grantee and other parties, where the possibility exists for ocean transportation of items procured, contracted for or otherwise obtained by or on behalf of the grantee, borrower, or any of their contractors or subcontractors. The clauses required by this part shall provide that at least 50 percent of the freight revenue and tonnage of cargo generated by the U.S. Government Grant, Guaranty, Loan or Advance of Funds be transported on privately owned United States-flag commercial vessels. These clauses shall also require that all parties provide to the Maritime Administration the necessary shipment information as set forth in § 381 .3. A copy of the appropriate clauses required by this part shall be submitted by each affected agency or department to the Secretary, Maritime Administration, for approval no later than 30 days after the effective date of this part. The following are suggested acceptable clauses with respect to the use of United States-flag vessels to be incorporated in the Grant, Guaranty, Loan and/or Advance of Funds Agreements as well as contracts and subcontracts resulting therefrom:

(a) *Agreement Clauses.* Use of United States-flag vessels:
(1) Pursuant to Pub. L. 664 (43 U.S.C. 1241(b)) at least 50 percent of any equipment, materials or commodities procured, contracted for or otherwise obtained with funds granted, guaranteed, loaned, or advanced by the U.S. Government under this agreement, and which may be transported by ocean vessel shall be transported on privately owned United States-flag commercial vessels, if available.

(2) Within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (a)(1) of this section shall be furnished to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(b) *Contractor and Subcontractor Clauses.* Use of United States-flag vessels: The contractor agrees

(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills--0f-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.

SPECIAL ATTENTION

CONVICT PRODUCED MATERIAL

In accordance with the requirements of the Federal regulations (23 U.S.C. 114(b)(2), 23 CFR 635.417), essentially all convict produced material is prohibited from Federal–aid highway construction projects. More specifically, materials produced after July 1, 1991, by convict labor, may only be incorporated in a Federal-aid construction projects if: 1) such materials have been produced by convicts who are on parole, supervised release, or probation from a prison; or 2) such material has been produced in a qualified prison facility, e.g., prison industry, with the amount produced during any 12-month period, for use in Federal-aid projects, not exceeding the amount produced, for such use, during the 12-month period ending July 1, 1987*.

* Because the Department, Federal Highway Administration, nor New Hampshire Correctional Industries can produce documents to meet condition 2 above, this condition cannot be met for New Hampshire convict produced material.

1/2001
Supersedes 3/90
ALL FA PROJECTS

SPECIAL ATTENTION

LOBBYING

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SUBJECT: LIMITATION ON USE OF GRANT OR CONTRACT FUNDS FOR LOBBYING

The lobbying restrictions were established by Section 319 of Public Law 101-121 (Department of the Interior and Related Agencies Appropriations Act for Fiscal Year 1990).

The law prohibits Federal funds from being expended by the recipient or any lower tier subrecipients of a Federal contract, grant, loan, or cooperative agreement to pay any person for influencing or attempting to influence a Federal agency or Congress in connection with the awarding of any Federal contract, the making of any Federal grant or loan, or the entering into of any cooperative agreement. The extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement is also covered.

Federal-aid contractors, and consultants, as well as lower tier subcontractors and subconsultants are also subject to the lobbying prohibition. To assure compliance, a certification provision is included in all Federal-aid construction solicitations and contracts, and consultant agreements exceeding $100,000 in Federal funds.

The Contractor shall be aware that by signing and submitting this proposal, he or she is attesting to the requirements of the certification provisions.

During the period of performance of a grant or contract, recipients and subrecipients must file disclosure form (Standard Form LLL) at the end of each calendar year quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any previously filed disclosure form.

Lower tier certifications should be maintained by the next tier above (i.e., prime contractors will keep the subcontractors' certification on file, etc.). Copies of Standard Form LLL will be included in the subcontract package for distribution to successful bidders.

December 24, 1998
Supersedes Spec. Attn. dated 3/29/88 & 12/5/90

FHWA Projects

SPECIAL ATTENTION

CONTRACT AFFIDAVIT - CERTIFICATION REGARDING DEBARMENT SUSPENSION

The separate form entitled, CONTRACT AFFIDAVIT (As Required by Section 112(c) of Title 23 USC) has been deleted from this proposal.

Bidders are advised that the last page of the bidding proposal has been revised to include the same reference, **IN BOLD PRINT**, relative to the non-collusion statement included on the discontinued form.

XXXXXXXXXXXXXX

The Contractor is advised that 49 CFR 29.510, Appendix A, requires that the Contractor, including all principals, certify that they are not currently under debarment or suspension or have not been under debarment or suspension within the past three years. (For certification instructions see next page).

The certification has been added, **IN BOLD PRINT,** onto the next to the last page of the bidding proposal.

The Contractor is further advised that Appendix B of 49 CFR 29.510 regarding certification of lower tier transactions has been added to Form FHWA-1273.

Appendix A - Certification regarding Debarment, Suspension, and other Responsibility Matters - Primary Covered Transactions.

Instruction for Certification

1. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.

3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

4. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of these regulations.

6. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

7. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification" Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

10. Except for transactions authorized under paragraph 6 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

SPECIAL ATTENTION

SUMMARY OF REQUIREMENTS FOR FEDERAL-AID PROJECTS

1. **Subletting on Federal-aid Contracts.**

   a. On Federal-Aid projects, the following documents are required to be incorporated in and made a part of every subcontract agreement (including lower-tier subcontract agreements):

      - NHDOT Policy on Subcontracting
      - Required Contract Provisions (FHWA-1273)
      - Disadvantaged Business Enterprise (DBE) Program Requirements (Standard Spec 103.06)
      - *41 CFR 60-4 Affirmative Action Requirements
      - **U.S. Department of Labor (USDOL) wage rates entitled "GENERAL WAGE DECISION" (as contained in the contract)

      *Applicable only to contracts or subcontracts in excess of $10,000
      **Does not apply to companies performing non-Davis Bacon type work (testing, monitoring, and inspection services).

   b. Subcontractor Approvals for Companies Who Perform Testing, Monitoring, Inspection Services

      1) Companies and/or independent contractors performing testing, monitoring, or inspection, such as ground penetrating radar, erosion control monitoring, video inspection, SWPPP, environmental testing/monitoring or vibration monitoring, for example, require subcontractor approval (NHDOT must verify Workers Compensation (WC) Insurance coverage).

      2) The following subcontractor approval documentation is required:
         - OFC Form 15 (15a for a State managed project and 15b for Local Public Agency (LPA) projects), Transmittal
         - OFC Form 26, Work Certificate
         - Proof of Workers Compensation Insurance coverage (if not already on file)

   c. Contractors will not be approved/authorized to work until the Department's Annual Assurances requirements have been fulfilled.

   d. RSA 228:4-b shall apply to any work done by an individual contractor on any state transportation project.

   e. Prime Contractors shall submit consent to sublet packages to the NHDOT at least 5 working days prior to said subcontractor (or lower-tier subcontractor) performing work on site. On LPA projects, the Prime Contractor shall also provide a courtesy copy to the town or the town's consultant, if applicable.

   f. LPA Projects Only: NHDOT Office of Federal Compliance (OFC) is the sole approval authority for all LPA construction projects. Consents to sublet shall be submitted directly to the OFC.

2. **FHWA Form 1273, Required Contract Provisions**.

   a. The Prime Contractor shall insert in each subcontract all the stipulations contained in the Required Contract Provisions. Primes shall further require their inclusion in any lower-tier subcontract or purchase order that may in-turn be made. The Required Contract Provisions shall not be incorporated by reference in any case.

   b. In accordance with Section I, Paragraph 1, the Prime Contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. This shall include any unpaid wages found to be owed that is not paid by a subcontractor or lower-tier subcontractor.

   c. In accordance with Section I, Paragraph 3, "A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contact, suspension/debarment or any other action determined to be appropriate by the contracting agency and FHWA."

3. **Submission of Payrolls**: Payrolls, as required by FHWA Form 1273, shall be submitted electronically (email) as a pdf document to the NHDOT Contract Administrator, consistently named in the following format: Contractor's name (abbreviated is acceptable) followed by the "week ending" date (yyyy/mm/dd). The Contractor's and each Sub-contractor's payroll shall be submitted as separate, individual files. Example: Plow Brothers Inc 2014-12-06

4. **Sign-In Sheets.** Use of daily sign-in sheets is **mandatory** on all LPA projects. Every worker must sign in, on a daily basis, prior to performing work on site. The OFC Form 20 shall be used for this purpose. The Prime Contractor is responsible to ensure sign-in sheet requirements are met and are turned in to the Contract Administrator on a daily basis. Contract Administrators shall review and initial sign-in sheets daily cross matching what employees have indicated for their work classification and what employers are indicating on certified payroll reports, and verifying employers of workers signing in have been approved to work by the NHDOT. Sign-in sheets shall be co-located with certified payrolls and filed in a 3-ring binder, newest sign-in sheets on top. Sign-in sheets are an inspection item. Note: Use of sign-in sheets may also be directed by the OFC on State managed projects for any contractor who does not accurately report all workers performing work on site on their payrolls.

5. **Requesting Work Classifications, Classifying Workers, and/or Payment of Wages**.

   a. The Prime Contractor is required to submit an additional request to the NHDOT for any classification of labor/equipment that they or their subcontractors shall be utilizing under the contract that is not contained in the proposal's Federal General Decision.

   b. Unless otherwise instructed by the OFC, a SF 1444 shall be used for this purpose.

   c. Requests must be submitted to the NHDOT prior to any work being performed in the classification(s).

   d. Contractors who do not receive a USDOL conformance decision from the OFC within 45 days of submission should follow-up with the OFC.

e. Once a decision is received from the USDOL, the OFC will, in-turn, notify the Prime Contractor. In cases when the USDOL stipulates a higher rate of pay than the one proposed by a contractor, and the Contractor elects not to submit an appeal, restitution, if due, shall be paid to employees within 10 calendar days of being notified by the OFC. Restitution requirements of the NHDOT shall apply.

f. Appeals shall be filed with the USDOL within 30 calendar days and a courtesy copy forwarded to the OFC at the same time. Restitution, if applicable, does not need to be paid during the time the appeal is under review by the USDOL.

g. Contractors shall immediately inform the OFC whenever appeal decisions (including reconsideration requests) are received from the USDOL.

h. In those cases when a contractor indicates to the OFC he/she plans to appeal the USDOL decision but fails to provide the OFC proof of submission within 30 calendar days, the contractor shall comply with the original USDOL decision. The OFC will subsequently notify the Contractor that proof of an appeal was not received within 30 days and restitution, if applicable, must be paid to workers within 10 calendar days. Contractors who fail to provide restitution will be deemed "in non-compliance."

i. Time Sheets: Every contractor shall create and maintain time sheets for every worker performing work on the project. This includes salaried employees who perform work in a classification, either intermittingly or full time. Time sheets shall record all work performed during the work week, both Federal and non-Federal, shop time, travel time considered work time, including any time considered "hours worked" as described under the Fair Labor Standards Act, Part 785. When requested, Contractors shall provide copies of time sheets to the OFC in support of certified payroll report information being provided. Time sheets, payroll records, and other basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of work.

j. OFC payment release authorization letters (Ok to Pay letters) cannot be accomplished until all wage conformances have been deemed closed (USDOL responses have been received and there are no pending contractor wage appeals).

k. Job Classifications Descriptions (Laboring Category): While most of skilled and unskilled crafts appearing in Wage Determinations are self-explanatory, the below classifications (not all inclusive) have been described by the NHDOT and are consistent with USDOL requirements. Workers performing in these classes, according to the description, will be classified by contractors accordingly:

1) Asbestos Abatement: All work associated with asbestos abatement shall be classified as "Laborer," unless said work involves piping that will be reinsulated. In these cases, "Asbestos Abatement Worker" shall be used.

2) Blaster: Supervises and assists in locating, loading, and firing blast holes with explosives to break up hard materials. This work includes any of the following duties on-site: determining the spacing and depth of drilled holes; determining the amount of explosives, timing and placement of detonators; handling blasting materials in the work area; loading holes with detonators, primers and explosives; tamping and stemming holes; directing the placement of blasting mats or other flyrock controls; and detonating the charges.

3) Brick Mason (also called Brick Layers): Builds and repairs walls, floors, paths/sidewalks, partitions, fireplaces, chimneys, and other structures with brick, pavers, precast masonry panels, concrete block, and other masonry materials, with or without mortar.

4) Drill Operator: Unless a hand held tool, which can then be classified and performed as a Common/General Laborer, all drill work shall be performed in the "Drill Operator" classification. Conformances, if needed, shall be consistent with this requirement.

5) Guardrail Installer: Except for the "pounder," each person performing guardrail installation work shall be classified as "Guardrail Installer."

6) Ironworker (Reinforcing): Positions and secures steel bars to placement of reinforced concrete; determines number, size, shape and location of reinforcing rods from plans, specifications, sketches and/or oral instructions; places and ties reinforcing steel using wire and pliers, sets rods in place, spaces and secures reinforcing rods. May bend steel rods with hand tools or operate a rod-bending machine; may reinforce concrete with wire mesh; may perform other related duties.

7) Ironworker (Structural): Performs any combination of the following duties to set beams, hang diaphragms, install bolts, torque bolts, test bolts, raise, place and unite girders, columns and other structural steel members to form completed structures or structure frameworks, working as a member of a crew; sets up hoisting equipment for raising and placing structural steel members; fastens steel members to cable of hoist using chain, cable or rope; signals worker operating hoisting equipment to lift and place steel members. Guides member using guy line (rope) or rides on member to guide it into position. Reads plans; rigs, assembles and erects structural members requiring riveting or welding. May perform other related duties.

8) Lead Abatement Worker: All work associated with lead abatement shall be classified as "Lead Abatement Worker."

9) Stone Mason: Builds stone walls, as well as set stone exteriors and floors, lays/sets all cut stone, marble, slate, or stone, with or without mortar. They work with natural cut stone, such as marble, granite, limestone and artificial stone made of concrete, marble chips, or other masonry materials.

10) Sweeper/Broom Operators: Whenever Sweeper or Broom does not appear in the Wage Determination, contractors may use the Truck Driver classification for this service if the equipment used is of the over the road type (only). However, anytime the contract has an established classification/rate for "Sweeper or "Broom," this classification must be used and the minimum rate, as it appears in the contract, shall apply.

11) Traffic Coordinator: Performs sign placement and maintenance, including proper set up and relocation of construction sign packages and message boards; designs lane closures in accordance with local, state, and Federal requirements. Please do not confuse this classification with Flagger.

6. **Mandatory Training**. Prime Contractors who fail to obtain an annual average (based on the calendar year) of at least 50% "Satisfactory" ratings on all OFC Compliance Field Audit Reports will be required to attend a mandatory 4-hour Contractor Compliance Training Class each spring (as scheduled by the OFC). A principal owner (or executive officer of the company) and his/her payroll accountant shall attend. Note: Compliance ratings on all projects will be averaged whenever a Prime Contractor has multiple projects.

7. **Temporary Suspensions**.
   a. Any Contractor, Subcontractor, or Lower-tier Subcontractor found to be in violation of FHWA Form 1273, Required Contract Provisions, made part of its contract, or has failed to comply with OFC Field Audit requirements, will be required to take corrective action before participating in future projects funded by the Department. Corrective action will include, but not limited to, the submission of certified payrolls or other records and reports necessary to verify compliance with the Provisions.
   b. Any Contractor, Subcontractor or Lower-tier Subcontractor found to have repeatedly violated the FHWA Form 1273, Required Contract Provisions, may be required to complete 4-hours of Federal Contract Compliance Training conducted by the NHDOT Office of Federal Compliance. When mandated, a principal owner and/or company executive and his/her payroll accountant shall attend. Federal Contract Compliance Training must be completed before participation on future projects is authorized. This requirement does not relieve the Contractor of its obligations under the prime contract, nor does it prevent the Department from seeking other remedies or enforcement action, as provided by the governing Rules, Laws, and Federal Regulations.
   c. Companies will be notified of suspensions in writing. Actions the company must take to have participation privileges restored will be clearly indicated. Companies will also be advised that if a satisfactory response is not received within 30 days of receipt of the suspension notice, the company will be considered "non-responsive." In cases where companies are non-responsive, and unpaid wages on the part of the subcontractor or lower-tier subcontractor are involved, the matter will then be deferred to the Prime Contractor for payment of wages as provided in Form FHWA 1273, Required Contract Provisions, Section I, Paragraph 3.

8. **Right To Withhold Payments**. The Department may withhold payments claimed by the Contractor on account of:
   a. Failure of the Contractor to make payments to Subcontractors for materials or labor.
   b. Regulatory non-compliance or enforcement.
   c. Failure to comply with NHDOT Office of Federal Compliance Field Audit Report requirements.
   d. Failure to comply with monthly reporting requirements, as applicable.
   e. For projects with an OJT requirement, failure to submit OJT 1, On-The-Job Training Acknowledgement and Statement of Intent within 30 days of the project start date.
   f. Failure to submit closeout documentation.
   g. All other causes that the Department reasonably determines negatively affect the State's interest.

9. **Final Payment Release**. Once final project records are transferred to the NHDOT Office of Federal Compliance, a final review shall be performed to determine compliance with the Federal provisions. Release of any final payment shall not be made to the Contractor until the Office of Federal Compliance issues a payment release letter (ok to pay) certifying:

   a. All required payrolls, labor, and EEO documentation have been received and deemed complete and correct.

   b. DBE requirements stipulated in the Contract and/or the Required Contract Provisions have been fulfilled.

10. **Deposits and Escrows**. Every attempt is made to complete compliance actions and resolve any disputes before the project is completed and final payments are made. Sometimes, however, corrective actions or disputes continue after completion and provisions must be made to ensure that funds are available to pay any wage restitution that is ultimately found due. In these cases, the project can proceed to final closing provided the Prime Contractor, from payments already provided him/her, provides written evidence a deposit of an amount equal to the potential liability for wage restitution and liquidated damages, if applicable, has been deposited in an *escrow account*. When a final decision is rendered, the Prime Contractor makes disbursements from the account in accordance with the decision. Deposit/escrow accounts are established for one or more of the following reasons:

    a. Where the parties have agreed to amounts of wage restitution that are due but the employer has not yet furnished evidence that all the underpaid workers have received their back wages. The deposit is equal to the amount of restitution due to workers lacking payment evidence. As proper documentation is received, an amount corresponding to the documentation is returned to the depositor. Amounts for any workers who cannot be located are held in the escrow account for three (3) years. Amounts remaining in the account not disbursed by the end of this three-year period shall be returned to the Prime Contractor.

    b. Where underpayments are suspected or alleged and an investigation has not yet been completed. The deposit is equal to the amount of wage restitution and liquidated damages, if applicable, that is estimated to be due. If the final determination of wages due is less than the amount estimated and placed in the escrow account, the escrow will be reduced to the final amount and the difference will be returned to the depositor. If the parties agree to the investigative findings, the amounts due to workers will be disbursed from the escrow account in accordance with the schedule of wages due. Amounts for unfound workers will be retained for a period of three (3) years and subsequently disbursed to the depositor as described above in Paragraph 7a.

    c. Where the parties are waiting for the outcome of an administrative hearing that has been or will be filed contesting a final determination of wages due. The deposit shall be equal to the amount of wage restitution and liquidated dates, if applicable, that have been determined to be due. Once the final decision is rendered, disbursements from the escrow account are made in accordance with the decision.

Direct questions relating to any of the information above to the NHDOT Office of Federal Compliance (603-271-6752).

SPECIAL ATTENTION

Disadvantaged Business Enterprise (DBE)

Disadvantaged Business Enterprise (DBE) Policy. It shall be the policy of the New Hampshire Department of Transportation (NHDOT) to ensure nondiscriminatory opportunity for Disadvantaged Business Enterprises (DBE's) to participate in the performance of all contracts and subcontracts financed with Federal funds as specified by the regulations of the United States Department of Transportation (USDOT), Federal Highway Administration and as set forth below.

1. **Policy**. It is the policy of the United States Department of Transportation to ensure nondiscriminatory opportunity for disadvantaged business enterprises, as defined in 49 Code of Federal Regulation (CFR) Part 26, to participate in the performance of contracts and subcontracts financed in whole or in part with Federal funds. Consequently, the DBE requirements of 49 CFR Part 26 applies to this contract.

2. **Disadvantaged Business Enterprise (DBE) Obligation.** The State and its Contractor agree to ensure nondiscriminatory opportunity for disadvantaged business enterprises, as defined in 49 CFR Part 26, to participate in the performance of contracts and subcontracts financed in whole or in part with Federal funds. **Prime Contractors and subcontractors who further sublet must include this assurance in every subcontract:** *The Contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT-assisted contracts. Failure by any contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this Contract or such other remedy, as the NHDOT deems appropriate.*

3. **Sanctions of Non-Compliance**. The Contractor is hereby advised that failure of the Contractor, or any Subcontractor performing work under this Contract, to carry out the requirements set forth in paragraphs 1 and 2 above shall constitute a breach of contract and, after notification of the United States Department of Transportation, may result in termination of this Contract or such remedy as the State deems appropriate.

Overall Statewide DBE Goals. The NHDOT currently employs a race/gender neutral DBE policy to attain its overall statewide DBE goals. This means that unless otherwise stated in the Contract, the NHDOT relies on the voluntary cooperation of all contractors to utilize DBE's on every project, sufficient to meet or exceed the current statewide DBE goal. Although the majority of statewide DBE goals are currently voluntary, failure of the NHDOT to meet or exceed the overall statewide DBE goal as required by the Federal Highway Administration (FHWA), could necessitate placement of mandatory DBE participation requirements on all future statewide projects.

Disadvantaged Business Enterprise (DBE) Program Goals. The New Hampshire Department of Transportation is required to set an overall DBE goal for participation in all transportation related Federal-aid projects. The goal is determined following guidelines set forth in 49 CFR 26.45, and based on the availability of ready, willing and able DBE's who submitted bids for transportation related projects, compared as a percentage of all available contractors who submitted bids for transportation related projects during the same time period. The DBE goal may be adjusted to take into account other factors impacting DBE utilization, in an effort to narrowly tailor the overall DBE goal. The detailed goal setting methodology and current overall DBE goal may be viewed on the NHDOT website at www.nh.gov/dot.

Disadvantaged Business Enterprise (DBE) Definition. A DBE is defined as a business that is owned and controlled by one or more socially and economically disadvantaged person(s). For the purpose of this definition:

A. "Socially and economically disadvantaged person" means an individual who is a citizen or lawful permanent resident of the United States and who is a Woman, Black, Hispanic, Portuguese, Native American, Asian American, or a member of another group, or an individual found to be disadvantaged by an individual determination of social disadvantage as described in 49 CFR 26 appendix E, determinations of social and economic disadvantage.

B. "Owned and controlled" means a business which is:
   (1) A sole proprietorship legitimately owned and controlled by an individual who is a disadvantaged person.
   (2) A partnership, joint venture or limited liability Company in which at least 51% of the beneficial ownership interests is legitimately held by a disadvantaged person(s).
   (3) A corporation or other entity in which at least 51% of the voting interest and 51% of the beneficial ownership interests are legitimately held by a disadvantaged person(s).

The disadvantaged group owner(s) or stockholder(s) must possess control over management, interest in capital, and interest in earnings commensurate with the percentage of ownership. Disadvantaged participation in a joint venture must also be based on the sharing of real economic interest and must include proportionate control over management, capital, and earnings, as above. If the disadvantaged group ownership interests are real, substantial and continuing and not created solely to meet the requirements of this program, a firm is considered a bona fide DBE.

Certified DBE Directory. The current New Hampshire Unified Disadvantaged Business Enterprise (DBE) Directory is available online at www.nh.gov/dot. This directory contains all currently certified DBE's available for work in New Hampshire, and is updated monthly. Only firm's listed in this directory are eligible for DBE credit on NH Federal-aid projects. If you have questions about DBE certification, or do not have access to the Internet, please call the DBE Coordinator at (603) 271-6612 for assistance.

Counting DBE Participation For Project Goals. In order for payments made to DBE contractors to be counted toward DBE goals, the DBE contractors must perform a commercially useful function (CUF). The DBE must be responsible for execution of the work of the contract and must carry out its responsibilities by actually performing, managing, and supervising the work involved, consistent with standard industry practices. This means that:

A. The DBE must also be responsible for ordering its own materials and supplies, determining quantity and quality, negotiating price, installing (where applicable) and paying for the material itself;
B. The DBE must perform work commensurate with the amount of its contract;
C. The DBE's contribution cannot be that of an extra participant or a conduit through which funds are passed in order to obtain the appearance of DBE participation;
D. The DBE must exercise responsibility for at least fifty percent of the total cost of its contract with its own work force;
E. None of the DBE's work can be subcontracted back to the Prime Contractor, nor can the DBE employ the prime's, or other subcontractor's supervisors currently working on the project;

F. The DBE's labor force must be separate and apart form that of the Prime Contractor or other subcontractors on the project. Transferring crews between primes, subcontractors, and DBE contractors is not acceptable;
G. The DBE owner must hold a Public Works license and any other professional or craft licenses required for the type of work he/she performs on the project;
H. The DBE may rent or lease, at competitive rates, equipment needed on the project from customary leasing sources or from other subcontractors on the project.

Allowable credit for payments made to DBEs for work performed. A contractor may take credit for payments made to a certified DBE that satisfies (CUF) requirements at the following rate.

A. A DBE Prime Contractor; count 100% of the value of work performed by own forces, equipment and materials count towards DBE goals.
B. An approved DBE subcontractor; count 100% of the value of work performed by the DBE's own forces, equipment and materials, excluding the following:
   - The cost of materials/supplies purchased from a non-DBE Prime Contractor.
   - The value of work provided by non-DBE lower tier subcontractors, including non-DBE trucking to deliver asphalt to a DBE contractor.
C. A DBE owner-operator of construction equipment; count 100% of expenditures committed.
D. A DBE manufacturer; count 100% of expenditures committed. The manufacturer must be a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Prime Contractor.
E. A regular DBE dealer/supplier; count 60% of expenditures committed.
   A regular dealer/supplier is defined as a firm that owns, operates, or maintains a store, warehouse or other establishment, in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. A person may be a dealer in such bulk items as petroleum products, steel, cement, gravel, stone or asphalt without owning, operating or maintaining a place of business, if the person both owns and operates distribution equipment for the products, by the means of a long term agreement, and not by a contract by contract basis.
F. A DBE Broker; count for DBE credit only the fees or commissions charged for assistance in the procurement, and, fees and transportation charges for the delivery of materials or supplies required at the job site, but not the cost of materials procured. A broker is defined as any person(s) or firm who arranges or expedites transactions for materials or supplies, and does not take physical possession of the materials or supplies at their place of business for resale.
G. A DBE renter of construction equipment to a contractor; count 20% of expenditures committed, with or without operator.
H. A bona fide DBE service provider; count 100% of reasonable fees or commissions.
   Eligible services include professional, technical, consultant, or managerial, services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for the performance of the contract. Eligible services also include agencies providing bonding and insurance specifically required for the performance of the contract.
I. A trucking, hauling or delivery operation, count 100% of payments when trucks are owned, operated, licensed and insured by the DBE and used on the contract and, if applicable, includes the cost of the materials and supplies. 100% of payments when the DBE leases trucks from another DBE firm including an owner-operator. 100% of reasonable fees, or commissions, the DBE receives as a result of a lease arrangement for trucks from a non-DBE, including an owner-operator.
J. Any combination of the above.

Reporting Requirements for Payments Made To DBE's: On all Federal-aid projects, the Prime Contractor is required to report payments made to DBE's during the life of the contract, on a quarterly basis, for the periods covering January 1st–March 31st, April 1st-June 30th, July 1st-September 30th and October 1st-December 31st, The NHDOT will provide the Prime Contractor with a quarterly DBE payments report, detailing all DBE's subcontracted by the Prime Contractor, per project. The Prime Contractor shall report any payments made to DBE's during the requested reporting period. This documentation shall be submitted to the Office of Federal Compliance within the time period stated on the NHDOT quarterly request. Failure of the Prime Contractor to submit this information may result in the Department withholding progress payments.

Removal of Approved DBE From Transportation Related Project: Contractors may not terminate for convenience, any approved DBE subcontractor and perform the work with their own forces, without prior written consent from the NHDOT.

MUNICIPAL PROJECTS ONLY: Timely submission of invoices to Municipalities: Prime Contractors must submit all invoices received for satisfactorily completed work, from any subcontractor/lower-tier subcontractor/material supplier, to Municipalities for payment within 30 days of receipt.

02/09/17
SSD: 1/7/00, 3/22/00, 6/14/00, 2/8/01, 4/2/01, 1/25/02, 4/1/02, 04/15/03, 04/20/04, 05/06/05, 05/19/06, 09/17/07, 06/12/08, 03/04/09, 08/26/09, 06/28/10, 06/10/11, 04/12/12, 04/18/13, 01/02/14, 10/22/14, 01/16/15, 01/15/16, 09/12/16

SPECIAL ATTENTION

QUALIFIED PRODUCTS LIST

The Qualified Products List is available online at www.nhdot.com on the *Doing Business with DOT>Contractors* webpage. A link to the Qualified Product List is shown under the *Products and Materials* heading in the *Engineering/Technical Information* section of this webpage. The QPL is now considered a live document and periodic updates will occur.

Products added to a future version of the QPL can be used under this contract upon issuance of the updated QPL. The Contractor shall not use the anticipated addition of a product to the QPL as a basis for use of a product. A product removed from a future updated QPL can be still used under this contract unless specifically directed by the Department that the removed product shall not be used.

SPECIAL ATTENTION

STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, STANDARD PLANS FOR ROAD CONSTRUCTION & BRIDGE DETAIL SHEETS

This project will be constructed under the requirements of the 2016 Standard Specifications for Road and Bridge Construction, which has been adopted and will be utilized for projects advertising after March 1, 2016, and the 2010 Standard Plans for Road Construction, including revised Standard Plans.

For Bridge Standard Plans, Bridge Design will include the appropriate standard plans, now referred to as Detail Sheets, in the plan set that pertain to the specific project, as necessary.

The Standard Specifications for Road and Bridge Construction and the Standard Plans for Road Construction manuals are available for purchase from NHDOT Records Section (603-271-3514) or can be viewed on the NHDOT website: http://www.nh.gov/dot/business/contractors.htm. The Specification Book and the Standard Plans are located under the *Standards and Specifications* heading while the Bridge Detail Sheets are located under the *Plans and Details* heading.

SPECIAL ATTENTION

THIS PROJECT IS TO BE BID AND CONSTRUCTED UNDER THE 2010 STANDARD PLANS FOR ROAD CONSTRUCTION

NOTICE OF STANDARD PLANS

The following table is a list of all of the Standard Plans that have been adopted as additions or revisions to the *Standard Plans for Road Construction*, June 2010 Edition as of the date of this Proposal. The Bidder is responsible to examine each standard to determine its effect, if any, upon the Contract.

Note: All Standard Plans are available on-line:
www.nh.gov/dot/org/projectdevelopment/highwaydesign/standardplans/index.htm.

Note: See also Standard Plans for Road Construction List of Revisions on-line:
www.nh.gov/dot/org/projectdevelopment/highwaydesign/standardplans/documents/errata_2010_standards.pdf.

2010 Highway Standard Plans

Standard Plan	Description	Previous Revision Date	Current Revision Date
CR-1	Granite Curb Details		06/16/10
CR-2	Curb Details		06/16/10
DL-1	Roadside Delineation	06/16/10	**03/05/15**
DL-2	Interchange Delineation	06/16/10	**03/05/15**
DL-3	Milled Rumble Strips (Shoulders)	04/03/14	**1/25/16**
DL-4	Milled Rumble Strips (Shoulders)	04/03/14	**1/25/16**
DL-5	Milled Rumble Strips (Shoulders)	04/03/14	**1/25/16**
DL-6	Milled Rumble Strips (Centerline)	06/16/10	**1/25/16**
DL-7	Milled Rumble Strips (Centerline)	06/16/10	**1/25/16**
DL-8	Milled Rumble Strips (Centerline)	06/16/10	**1/25/16**
DP-1	Drainage Pipe Details		06/16/10
DR-1	Grate and Frame Details	06/16/10	**8/14/15**
DR-2	Grate and Frame, M.H.Cover and Pavement Depression Details	11/5/10	**8/14/15**
DR-3	Precast Concrete Median Barrier Drainage Details		06/16/10

DR-4	DI-DB, Underdrain Flushing Basin and Polyethylene Liner Details	06/16/10	**8/14/15**
DR-5	Precast Reinforced Concrete C.B., D.I. and M.H.		06/16/10
ES-1	End Sections for Corrugated Steel and Reinforced Concrete Pipes		06/16/10
EW-1	Earthwork - Muck Excavation		06/16/10
FN-1	Woven Wire Fence		06/16/10
FN-2	Chain Link Fence		06/16/10
GR-1	31" Mid-Splice Beam Guardrail Standard Section - Steel Posts and Hardware Details	06/16/10	**8/19/15**
GR-2	Beam Guardrail Standard Section - Steel Posts and Hardware Details	05/03/11	**8/19/15**
GR-2A	Beam Guardrail Standard Section - Wood Posts and Hardware Details	06/16/10	**8/19/15**
GR-3	Preferred Platform for Energy Absorbing Guardrail Terminal (EAGRT)		Superseded (08/19/15) - See Detail Sheets
GR-4	Alternative Platform for Energy Absorbing Guardrail Terminal (EAGRT)		Superseded (08/19/15) - See Detail Sheets
GR-5	Beam Guardrail Terminal Section Type E-2		06/16/10
GR-6	Beam Guardrail - Terminal Section Type E-2 Hardware Details		06/16/10
GR-7	Beam Guardrail - Terminal Section Type E-2 Modified 30		06/16/10
GR-8	Beam Guardrail - Terminal Section Type E-2 Modified 40		06/16/10
GR-9	Beam Guardrail - Terminal Section Type E-2 Modified 45		06/16/10
GR-10	Beam Guardrail - Terminal Unit Type G-2		06/16/10
GR-11	Beam Guardrail - Thrie Beam Double Faced (Wood Posts)	06/16/10	**11/05/10**
GR-12	Beam Guardrail - Thrie Beam Double Faced (Steel Posts)	11/05/10	**05/03/11**
GR-13	Beam Guardrail - Thrie Beam Single Faced (Wood Posts)	06/16/10	**11/05/10**
GR-14	Beam Guardrail - Thrie Beam Single Faced (Steel Posts)	11/5/10	**05/03/11**
GR-15	Precast Concrete Barrier 42" F-Shape (Double-Faced)	06/16/10	**11/05/10**
GR-16	Transition F-Shape Barrier	06/16/10	**11/05/10**
GR-17	Transition F-Shape Barrier and Guardrail (Wood Posts)	11/05/10	**10/30/12**
GR-18	Transition F-Shape Barrier and Guardrail (Steel Posts)	11/05/10	**10/30/12**
GR-19	Single Slope Barrier	11/05/10	**04/03/14**
GR-20	Transition Single Slope Concrete Barrier, Precast	10/30/12	**04/03/14**
GR-21	Transition Single Slope Concrete Barrier and Guardrail (Wood Posts)	11/05/10	**10/30/12**

GR-22	Transition Single Slope Concrete Barrier and Guardrail (Steel Posts)	11/05/10	**10/30/12**
GR-23	Portable Concrete Barrier 10 foot	06/16/10	**10/03/13**
HR-1	Handrail Details		06/16/10
HR-2	Concrete Bound and Steps		06/16/10
HW-1	Headwall Details		06/16/10
HW-2	Headwall Details (45° Wings)		06/16/10
HW-3	Headwall Details (2 Pipes 45° Wings)		06/16/10
MB-1	Mailbox Details	06/16/10	**02/25/16**
PL-1	Planting Details		06/16/10
PL-2	Planting Details		06/16/10
SL-1	Pull Boxes and Conduit Trench Detail		06/16/10
SL-2	Concrete Foundations and Light Pole Base, Type B		06/16/10

2010 Traffic Standard Plans

Standard No.	Description	Previous Revision Date	Current Revision Date
PM-1	Layout Details		02/26/10
PM-2	Tolerances for Pavement Marking Lines		02/26/10
PM-3	Divided Roadway Multiple Lanes with Entrance and Exit Ramps Striping Layout	02/26/10	11/05/10
PM-4	Divided Roadway Multiple Lanes with Entrance and Exit Ramps Striping Layout	02/26/10	11/05/10
PM-5	Divided Roadway Multiple Lanes with Entrance and Exit Ramps Striping Layout		02/26/10
PM-6	Painted Island Details		02/26/10
PM-7	Intersection Details	02/26/10	11/05/10
PM-8	Word and Symbol Lane Layout		02/26/10
PM-9	Pavement Marking at Minor Intersections		02/26/10
PM-10	Turning Lane Extension Details		02/26/10
PM-11	Accessible Parking Details		02/26/10
PM-12	Words and Symbols		02/26/10
PM-13	Words and Symbols		02/26/10
PM-14	Speed Zone Pavement Markings (Divided Highway)		02/26/10
PS-1	Aluminum Plank Details		02/26/10
PS-2	Aluminum Plank Details		02/26/10
PS-3	Aluminum Sheet Details		02/26/10

PS-4	Tubular/ U-Channel Post Detail		02/26/10
PS-5	Steel Beam Details (Non-Breakaway)		02/26/10
PS-6	Steel Beam Details (Non-Breakaway)		02/26/10
PS-7	Steel Beam Details (Breakaway)		02/26/10
PS-8	Steel Beam Details (Breakaway)		02/26/10
PS-9	Breakaway Mounts		02/26/10
PS-10	Breakaway Mounts		02/26/10
SG-1	Route Marker Details		02/26/10
SG-2	Regulatory Signs		02/26/10
SG-3	Regulatory Signs		02/26/10
SG-4	Regulatory Signs		02/26/10
SG-5	Regulatory Signs		02/26/10
SG-6	Regulatory Signs		02/26/10
SG-7	Warning Signs		02/26/10
SG-8	Warning Signs		02/26/10
SG-9	Warning Signs		02/26/10
SG-10	Warning Signs		02/26/10
SG-11	Warning Signs		02/26/10
SG-12	Miscellaneous Signs		02/26/10
SG-13	Informational Signs		02/26/10
SG-14	Informational Signs		02/26/10
TS-1	Traffic Signal Mast Arm Foundation - Type 1A	02/26/10	Superseded (03/30/16) See Detail Sheets
TS-2	Traffic Signal Mast Arm Foundation - Type 1B and 1C	02/26/10	Superseded (03/30/16) See Detail Sheets
TS-3	Traffic Signal Mast Arm Foundation - Type 2	02/26/10	Superseded (03/30/16) See Detail Sheets
TS-4	Quadrupole Loop Detector 2-4-2 Turns		02/26/10
TS-5	Rectangular Loop Detector 3 Turns		02/26/10

Work Zone Traffic Control Standard Plans (Metric and not part of the 2010 Edition)			
Standard No.	**Description**	**Previous Revision Date**	**Current Revision Date**
TC-1	Text Amendment Note Sheet	08/03/04	03/16/17
TC-2	Permanent Construction Signing	08/03/04	03/16/17
TC-3	Two-Way Traffic Lane Shift	08/03/04	03/16/17
TC-4	Bridge Rehabilitation: Stop/Yield Control	08/03/04	03/16/17
TC-5	Single Lane Shift (Divided Highway)	08/03/04	See Detail Sheets
TC-6	Lane Closure with Lane Shift for Speed Reduction (Divided Highway)	08/03/04	03/16/17
TC-7	Multi-Lane Closure (Divided Highway)	08/03/04	03/16/17
TC-8	Construction Signing for Cold-Planed Surfaces	08/03/04	03/16/17

SPECIAL ATTENTION

ERRATA SHEET

The following table is a list of corrections to the 2016 *Standard Specifications for Road and Bridge Construction*, as of the date of this Proposal.

Section	Description	Correction	Date
DIVISION 100			
DIVISION 200			
DIVISION 300			
DIVISION 400			
DIVISION 500			
520	Classes of Concrete	Insert the following footnotes under Table 520-1A: [1] See 3.1.6 TESTING [2] For mixes containing fly-ash, silica fume, slag, or any other pozzolanic or cementitious material, the water/cement ratio of the concrete mix shall be based on the water cementitious (cement + pozzolanic or cementitious material) ratio of the mix. This water to cementitious ratio shall not exceed those listed in Table 1A. The maximum water/cement ratios listed for Concrete Class B and T are for design purposes only. [3] Deck Overlays. [4] <u>Maximum</u> 84 day Compressive Strength for Flowable Fill, Excavatable shall not exceed 200 psi. [5] These are recommended values that may be used as a starting point for a mix design that has shown ability to meet the requirements. The amount of cement shall be adjusted and fly-ash or ground granulated blast furnace slag shall be used provided the mix design meets the minimum and does not exceed the maximum compressive strength in accordance with 2.11.1. [6] Target values shown are for mix design approval only and are not intended for use as quality control or quality assurance requirements.	06/11/16

Section	Description	Correction	Date
520	Classes of Concrete – Performance Requirements (QC/QA)	Amend the title of *Table 420-1B - Class of Concrete – Performance Requirements (QC/QA)* to *Table 520-1B - Class of Concrete – Performance Requirements (QC/QA)*	11/28/16
528	Shear Key Grout for Butted Beams	Amend 528.2.9.1 to read: *Grout for shear keys shall be an approved grout as listed in Section 528A of the Qualified Products List.* Amend 528.2.9.2 to read: *For testing, 3 neat 2" cubes shall be molded and cured in accordance with AASHTO T 106 (ASTM C 109). The average compressive strength of the 3 cubes at 7 days shall be a minimum of 6000 psi.*	06/10/16
528	Installation of Deck Panels	Replace last sentence of 528.3.22.6.4 to read: *If leveling screws are used, they shall be completely removed and the holes filled with grout listed in Section 528A of the Qualified Products List prior to placement of deck concrete.*	06/10/16
550	PTFE Surfaces for Bearings	Amend the first sentence of 550.2.10 to read: *PTFE for use in expansion bearing assemblies shall be 100 percent virgin (unfilled)* ***polytetrafluoroethylene*** *polymer...*	08/03/16
550	Anchor Rods	Amend 550.3.15.4.1 to read: *Anchor rods shall be set in one of the following materials:* *(a) Non-shrinking, non-ferrous, cement-base grout listed in Section 550A of the Qualified Products List. This grout shall be used only when both the temperature of the masonry and the ambient temperature are kept at 40 °F or above until the grout has cured.* *(b) Sulfur.* Amend the first sentence of 550.3.15.4.2 to read: *Non-shrinking, non-ferrous, cement base grout shall be a product as included in Section 550A of the Qualified Products List.*	06/10/16
563	Bridge Rail	Amend 4.1 to read: *Bridge rail, of the type specified, will be measured by the linear foot to the nearest tenth of a foot.*	06/27/16
DIVISION 600			
606	Handrail	Amend 606.2.8.2 to read: *Grout for anchoring the pipe posts shall be High Strength, Impact Resistant, Non-shrink Grout as included in Section 528A of the Qualified Products List.*	06/10/16

Section	Description	Correction	Date
606	Temporary Impact Attenuators	Amend in 606.2.10.2 the reference to *2.12.4* to *2.**10**.4*.	11/28/16
609	Curbing	Amend the 2nd sentence of 609.2.5 to read: *The non-shrink, non-metallic grout shall be a product as included in Section 550A of the Qualified Products List..*	06/10/16
609	Curb anchors	Amend 609.3.1.5.1 to read: *Curb anchors shall be set and grouted using non-shrink, non-metallic grout as shown on the plans.*	06/10/16
621	Delineators	Add the following to the end of 621.3.1.3: *Grout shall be as listed in Section 550A of the Qualified Products List or as directed by the Engineer.*	06/10/16
DIVISION 700			
707	Cement Mortar	Amend 2.3 to read: *Testing for impurities shall comply with AASHTO T 21. Results that are darker than the standard shall be cause for rejection, except as provided in 2.3.1.* Amend 2.3.1 to read: *Sand for mortar not conforming to 2.3 shall be tested in accordance with AASHTO T 71 and shall meet the requirements of 5.2.3 of AASHTO M 45.*	10/31/16

SPECIAL ATTENTION

THIS PROJECT IS TO BE BID AND CONSTRUCTED UNDER THE 2016 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION

NOTICE OF SUPPLEMENTAL SPECIFICATIONS

The following table is a list of all of the Supplemental Specifications that have been adopted as additions or revisions to the *Standard Specifications for Road and Bridge Construction*, **March 2016** Edition as of the date of this Proposal. The Bidder is responsible to examine each item to determine its effect, if any, upon the Contract.

Note: Due to the limited scope of some projects, not all Supplemental Specifications will be included in all Proposals. All Supplemental Specifications are available on-line: www.nh.gov/dot/org/projectdevelopment/highwaydesign/specifications/.

Section	Description	Revision	Previous Revision Date	Current Revision Date
DIVISION 100				
109.04	Differing Site Conditions, Changes and Extra Work	Regional Adjustment Factor	09/01/10	01/06/12
DIVISION 200				
211.3.4	Vibration Monitoring	Adds reference to pre- and post-construction survey requirements		04/05/17
DIVISION 300				
DIVISION 400				
401.2.5	Winter Binder	Adds winter binder to the design control points		04/05/17
410	Bituminous Surface Treatment	2.1- Adopts new AASHTO Specifications for Emulsions (04/13/16) 3.4.1.1 – Revises pavement conditions, application rate for tack (01/04/17)	04/13/16	01/04/17
DIVISION 500				
538	Barrier Membrane	3.3.5 – Updates the laydown temperature range.		09/15/16
563	Bridge Fence	2.8 – Allows aluminum ties for attaching bridge fence		09/15/16

DIVISION 600				
603	Plastic Pipe	2.3, 2.6 & 2.7 – Updated to include Polypropylene Pipe as well as associated UV Requirements 2.13 – Adds Contractor's Option	04/13/16	06/02/16
605	Plastic Pipe	2.1 & 2.2 – Updated to include Polypropylene Pipe		04/13/16
645	Matting	1.1 – Matting Section Revised Pay Items Revised	01/04/17	02/01/17
DIVISION 700				
702	Bituminous Materials	Amends Table 702-1 & 702-2	04/13/16	05/11/16

10/31/16
SSD: 05/13/97, 12/09/98

BEDFORD
13953

April 17, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 105 -- CONTROL OF WORK

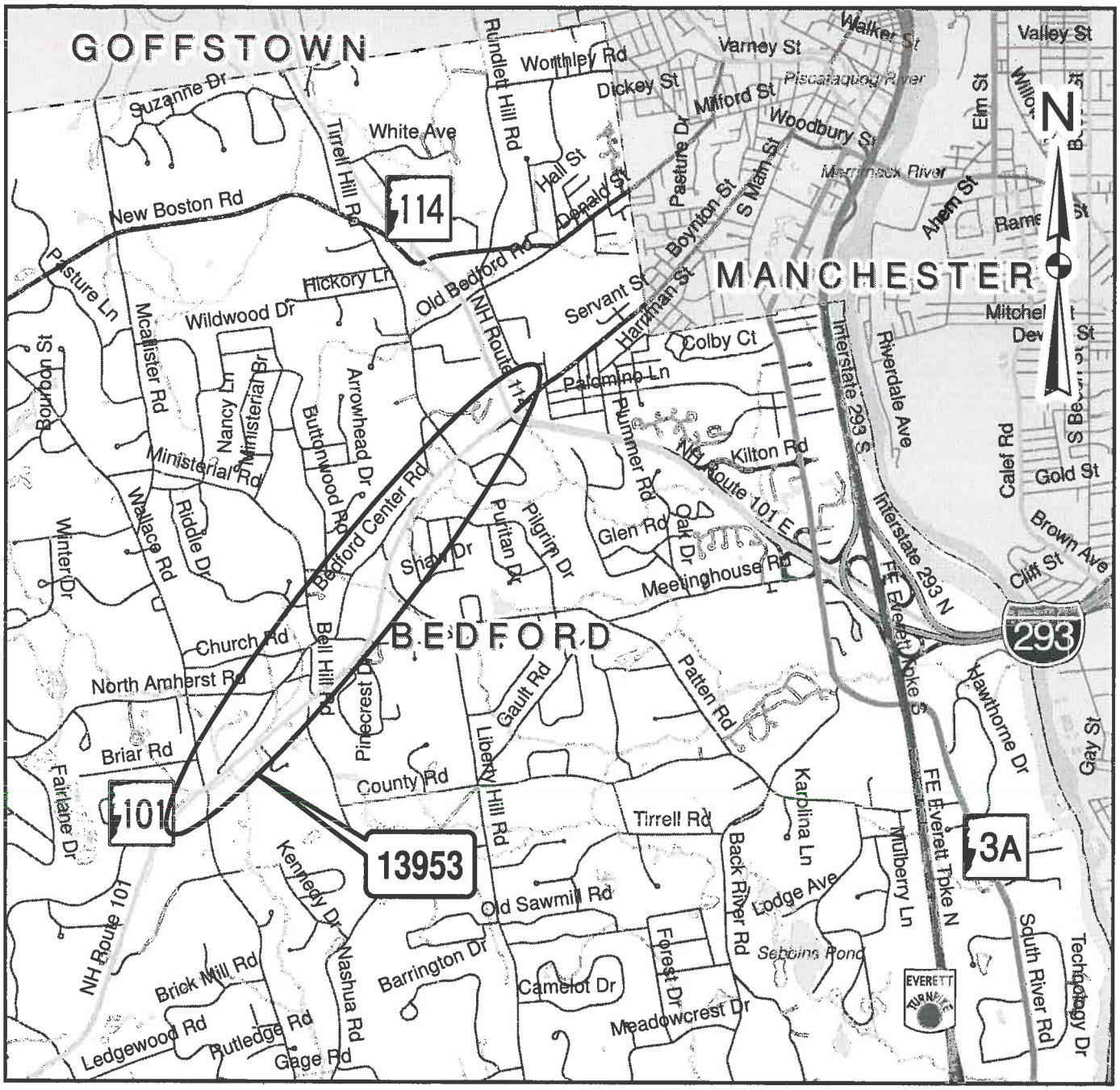
AMENDMENT TO SECTION 105.12 - CONSTRUCTION ZONE(S)

In accordance with Section 105.12 of the Standard Specifications, the construction work zone(s) designated for this contract shall extend 500 ft beyond the work limits as described below and/or as shown on the project layout map on the reverse of this page:

DESCRIPTION OF WORK LIMITS

This project begins on NH Route 101 approximately 900' west of the intersection with Wallace Road, extending easterly approximately 2 miles to 750' east of the intersection with NH Route 114, and includes a total of 1,650' of approach work. Work also extends north on Wallace Road approximately 625', north on Meetinghouse Road approximately 420' and south on Meetinghouse Road approximately 700'.

BEDFORD - NH ROUTE 101



Miles

1 ½ 0 1 2

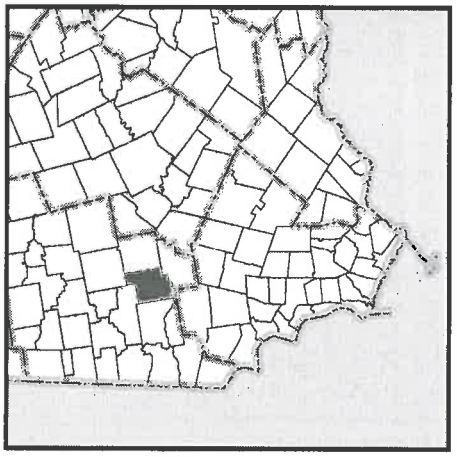
LEGEND

- Streams
- Water Bodies
- US Routes
- State Routes
- Interstates
- Local Roads
- Town Boundary

New Hampshire DOT
Department of Transportation

State #: 13953
Federal #: X-A000 (143)

LOCATION MAP



03/01/16

BEDFORD
13953

March 16, 2017

SPECIAL PROVISION

SECTION 107 -- LEGAL RELATIONS AND RESPONSIBILITIES TO PUBLIC

SUBSECTION 107.01 – LAWS TO BE OBSERVED

The intent of this Special Provision is to clarify Bulletin Board requirements.

Add to 107.01's third paragraph titled *Bulletin Board Requirements* the following:

New Hampshire Department of Transportation Bulletin Board Diagram
(Revision 1-15-16)

NHDOT PROJECT: (NAME) (NUMBER)

Federal Posters

1 Equal Employment Opportunity (EEO) is The Law (OFCCP-1420) Rev. 11/09

2 "EEO is the Law" Poster Supplement 9/15

3 NOTICE Federal-Aid Project (FHWA-1022) Rev. 11/11

4 Employee Rights Under the Davis Bacon Act (WH-1321) [substitute for FHWA-1495] Rev. 4/09

5 Employee Rights and Responsibilities Under the Family & Medical Leave Act (WH-1420) Rev. 2/13

6 Employee Polygraph Protection Act (WH-1462) Rev. 1/12

7 Your Rights Under Uniformed Services Employment & Reemployment Rights Act (USERRA) Rev. 10/08

8 Job Safety & Health It's the Law (OSHA-3165) Minimum Size: 8 1/2 X 14 Rev. 12/06

State Posters

9 Protective Legislation Law (Pay Day Notice) Rev. 4/14

10 The Whistleblowers' Protection Act (RSA 275-E Requirement) Rev. 4/14

11 The Workers' Right to Know (Toxic Substances) Rev. 4/14

12 Unemployment Notice (NH Employment Security Office) Rev. 1/12

13 Workers' Compensation (from Insurance Provider)

14 Criteria to Establish an Employee or Independent Contractor Rev. 4/14

15 Equal Pay RSA 275:37 Rev. 12/14

Other Required Postings

16 24-Hour Emergency Contact Information

17 Contractor's EEO Officer Appointment Letter (must have all contact information)

18 Contractor's EEO & Harassment Policy Statement

19 NHDOT Federal Compliance Officer Contact Information (OFC Poster 1)

20 Davis-Bacon Wage Rates

21 Additionally Approved Wage Rates

06/20/11
Supersedes Spec. Prov. dated 10/11/83, 1/11/91, 11/20/97 & 09/01/10

BEDFORD
13953

March 16, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 108 -- PROSECUTION AND PROGRESS

AMENDING SUBSECTION 108.07 - DETERMINATION CONTRACT TIME EXTENSION FOR EXCUSABLE, NONEXCUSABLE, NONCOMPENSABLE AND COMPENSABLE DELAYS

**** See Prosecution of Work for applicable completion date(s). ****

Amend the fourth paragraph to read:

The Contractor's plea that insufficient time was specified is not a valid reason for an extension of time. When the contract sets forth a calendar completion date, due consideration will have been given to the Saturdays, Sundays, legal holidays, and the period between December 1 and April 1 inclusive in the anticipated period of construction. **No extension of the contract completion date will be allowed due to such days.** When the contract stipulates a completion date that falls on a Saturday, Sunday, or legal holiday, or when the time as extended by the Engineer falls on a date that is a Saturday, Sunday, or legal holiday, the contract time will be extended to the next working day. **No consideration will be given for unfavorable weather or ground conditions.**

Delete 108.07.B.2.

SUPPLEMENTAL SPECIFICATION

AMENDMENT TO SECTION 109 -- MEASUREMENT AND PAYMENT

AMENDMENT TO SUBSECTION 109.04 - DIFFERING SITE CONDITIONS, CHANGES AND EXTRA WORK.

Add the following after the first sentence of 109.04.4.4(d):

The average regional adjustment factor is **0.95**.

SPECIAL PROVISION

AMENDMENT TO SECTION 201 -- CLEARING AND GRUBBING

Item 201.881 – Invasive Species Control Type I
Item 201.882 – Invasive Species Control Type II

Add to Description:

1.5 Invasive species control shall consist of furnishing all labor (including, but not limited to, handling, cutting, stockpiling and spraying), materials, services, equipment and supplies required for removal and proper disposal of the vegetation listed in the Prosecution of Work. The intent of this item is to compensate the Contractor for all additional costs incurred due to the handling of invasive species during construction excavations. This item will be paid in addition to the appropriate pay items for the class excavation and/or embankment work being performed. Work shall be done in accordance with the *NHDOT's Best Management Practices for Roadside Invasive Plants* handbook and the specific Invasive Species Control and Management Plan developed for this project. This work shall be coordinated with the NHDOT Bureau of Environment.

1.5.1 Invasive species control type shall be as specified in the item description. The plant species of concern within the project limits will be specified in the Prosecution of Work.

Add: Materials section:

2.1 Backfill to replace contaminated soil that is excavated shall conform to the material requirements of the appropriate section of the Standard Specifications for the material to be placed at that location.

Add to Construction Requirements:

3.4 Invasive Species Control

3.4.1 Type I / Type II

3.4.1.1 Invasive species control for Types I and II shall consist of:

- Cleaning equipment upon leaving the area of the infestation.

3.4.2 Type I

3.4.2.1 Invasive species control Type I methods shall consist of:

- July 1st through February 1st, when mature fruit are most likely present, chip plants and dispose of in a manner that precludes the spreading of mature seeds and/or fruit. Outside of this time period, usual clearing and grubbing methods shall be used.

3.4.3 Type II

3.4.3.1 Invasive species control Type II methods shall consist of one or more of the following treatment measures:

- Bagging cut plant material for later disposal.
- Removing cut plant material from the site to bury, burn, or stockpile on an impervious surface.
- Removing excavated material from an infested site to bury, or stockpile on an impervious surface.
- Appling herbicides to invasive plants.

3.4.3.2 Herbicides shall be registered with and approved for use by the New Hampshire Department of Agriculture, Division of Pesticide Control and applied by a licensed applicator.

3.4.3.2.1 If herbicide use is proposed, the Contractor, or his licensed herbicide applicator, shall submit a site-specific plan and application to the NH Department of Agriculture, Division of Pesticide Control (contact the Division at 603-271-3550 for information on their permitting process). Issuance of an herbicide application permit(s) may take up to three months for approval.

3.4.3.3 Burning invasive species shall be done in accordance with State and local regulations and Env A-1000 - Prevention, Abatement, and Control of Open Source Air Pollution issued by the New Hampshire Air Resources Division of Environmental Services, a copy of which is included in this Proposal.

3.4.3.3 Excavation, when required, shall be in accordance with the appropriate sections of the Standard Specifications.

3.4.3.4 Backfill in all excavated areas shall be placed and compacted in accordance with the plans and the appropriate sections of the Standard Specifications.

3.4.3.5 When required, disposal of invasive species materials and their contaminated soils by burying shall be in accordance with the appropriate sections of the Standard Specifications for Embankment-in-Place.

3.4.3.6 Monitor the project site for re-growth of invasive species in treated areas. If re-growth occurs secondary treatment shall be preformed. The Engineer may also order areas to receive secondary treatment.

Add to Method of Measurement:

4.6 Invasive species control of the type specified will be measured by the square yard (square meter) to nearest square yard (square meter) from measurements taken on the ground surface covered.

Add to Basis of Payment:

5.7 The accepted quantities of invasive species control of the type specified will be paid for at the contract unit price per square yard (square meter) complete in place.

5.8 Invasive Species Control and Management Plan, including monitoring invasive species re-growth, will be paid under Item 697.11.

5.9 Excavation of invasive species material will be paid under the appropriate contract items for the class of excavation being performed.

5.10 Materials required to replace material for excavated areas will be paid for as Item 203.6 – Embankment-In-Place or other appropriate items in the contract.

5.11 Disposal of invasive species material and their associated soils by burying within the road section will be paid under Item 203.6 – Embankment-In-Place.

5.12 Disposal of invasive species material outside of the road section but with in the job limits, when allowed, will be paid as Item 203.1 – Common Excavation or Item 203.6 – Embankment-In-Place. Disposal of any surplus material from this excavation will be subsidiary to the work.

5.12.1 If disposal off-site is approved disposal fees will be paid as provided for in 104.02 and 109.04.

5.13 If standard clearing and grubbing methods are used per 3.4.2.1, no additional payment will be made under Item 201.88X.

Add to Pay Items and Units:

201.881	Invasive Species Control Type I	Square Yard (Square Meter)
201.882	Invasive Species Control Type II	Square Yard (Square Meter)

SPECIAL PROVISION

AMENDMENT TO SECTION 202 -- REMOVAL OF STRUCTURES AND OBSTRUCTIONS

This amendment requires the extermination of rodents in connection with demolishing buildings.

Add to 3.2:

3.2.10 Prior to, and during, the operations of demolishing buildings or other such installations or appurtenances, rodents (rats) therein shall be exterminated in accordance with the recommended practice of the U.S.D.A. Wildlife Service.

3.2.10.1 The rodenticide applicator shall be licensed in accordance with NH.

3.2.10.2 Extermination shall consist of two phases:

(a) Blitz. This phase shall start immediately after execution of the contract, and where, and as directed. All foods edible by rodents shall be removed from the buildings and surroundings, and then a toxic material consisting of 1 percent zinc phosphide with an emetic added, together with a suitable, attractive, moist bait shall be used. The treated bait shall be placed in all structures to be demolished in accordance with the best practice so as to attract the greatest possible number of rodents. All uneaten baits and dead rats shall be collected and destroyed after 2 days.

(b) Maintenance. Three days (more or less, as directed) after the blitz, the Contractor shall start a program of maintenance within the limits of this contract to rid the structures and adjacent areas of any remaining rodents or their carcasses and to prevent rodent migration to other adjacent areas. The toxic material shall consist of anticoagulants with a suitable cereal for treatment of structures, and in torpedo form for the treatment of any adjacent areas within the limits of this contract as ordered.

3.2.11 All visible carcasses of rodents shall be removed and disposed of satisfactorily.

3.2.12 The toxic bait shall be renewed semi-monthly, if so directed, throughout the maintenance period until the structures have been demolished and the cellar holes have been filled to the extent required.

3.2.13 Extermination operations shall be in accordance with any applicable rules and regulations of the municipality and State Department of Agriculture.

3.2.14 No extra payment will be made for this extermination work.

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
58 TEMPLE PLACE
BOSTON 11, MASSACHUSETTS

USE OF ZINC PHOSPHIDE AS A RAT POISON

GENERAL INFORMATION

Zinc phosphide is a highly efficient poison for rats and all kinds of mice. It is highly toxic to all forms of animal life, and great care must be exercised in its use. This material should be used only in cases where children, irresponsible persons, pets and livestock are protected. However, its strong pungent odor makes it, to some extent, unattractive to some animals. In actual practice, few animals have been poisoned accidentally.

It is a dark gray powder, insoluble in water and has the characteristic phosphorus odor. Zinc phosphide deteriorates rather rapidly, hence treated baits are relatively non-toxic after being exposed several days to the open air. As fats and oils increase the absorption of phosphorus in the body, baits composed of these materials give the best results.

Tartar Emetic (Antimony-Potassium Tartrate) added, reduces or nullifies the primary toxic action of Zinc Phosphide in dogs and cats.

ZINC PHOSPHIDE RAT POISON

Zinc phosphide, plus the Tartar Emetic, known as Zinc Phosphide Rat Poison, is distributed in one-ounce and one-pound cans by the Rodent Control Fund, University of Massachusetts, Amherst, Massachusetts. This material can be used in preparing rat and house mouse baits.

Pure Zinc phosphide is not generally stocked by druggists, but any druggist may obtain this poison through his wholesaler or jobber. It is packed from ¼ lb. sizes up. The Hooker Electro-Chemical Company is the only manufacturer in the United States. There are several firms who package the poison in small quantities.

PRELIMINARY

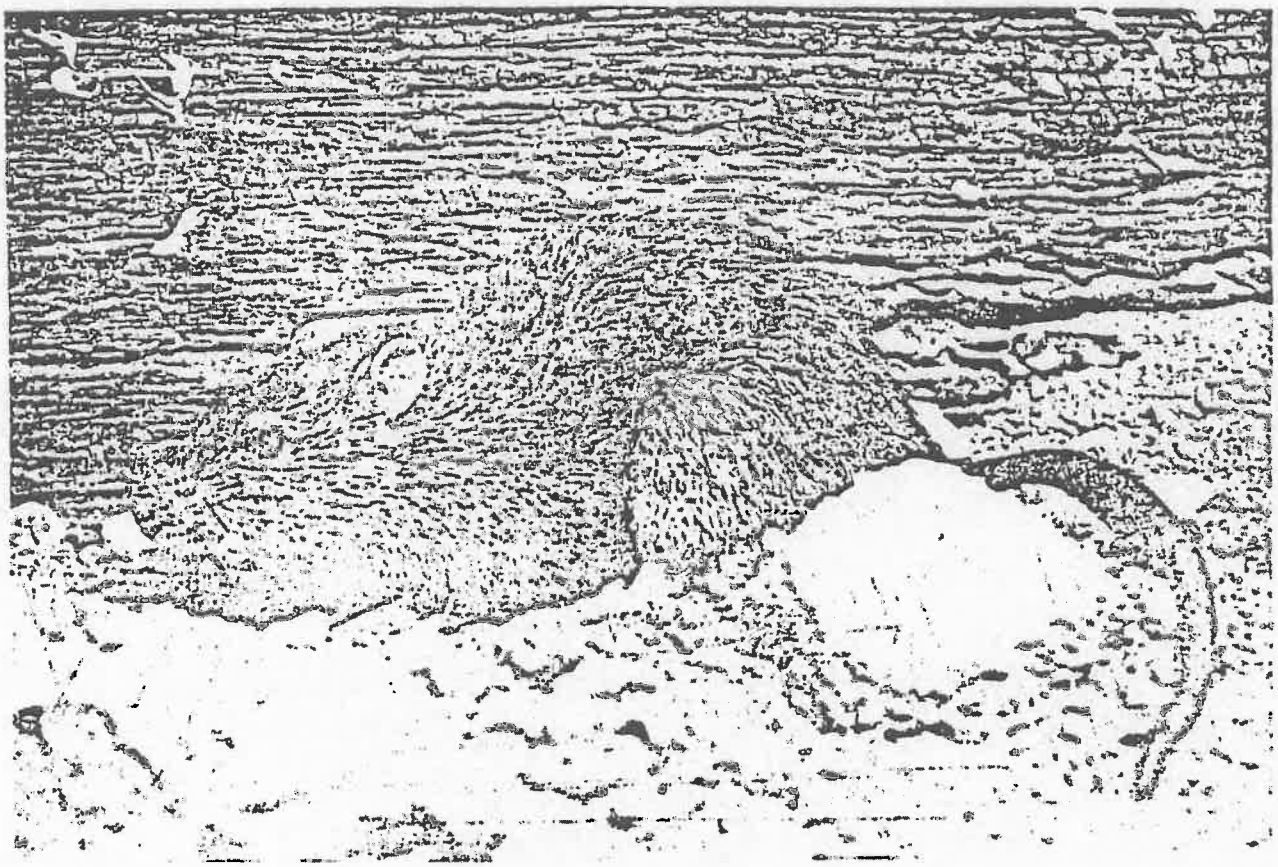
As far as possible, remove all sources of food for rats before exposing baits. Cover grain bins, empty self-feeders, protect garbage, etc. Do not disturb the environment any more than necessary, as this tends to make the rats suspicious.

TYPES OF BAIT

There is no one "best" rat bait. Some suggested foods are as follows:—

Meats: Fresh ground beef, ground bacon, canned dog food, dried dog food.

Fish: Fresh ground fish, canned fish or cat food.



- Grains: Chicken mash, rolled oats, corn meal, wheat germ.

Miscellaneous: Ground cake or doughnuts, bread crumbs, peanut butter.

MIXING THE POISON AND FOOD

Using Zinc Phosphide Rat Poison

A one-ounce can will make 4 pounds, and a one-pound can will make 64 pounds, of poisoned bait. While stirring, gradually sprinkle the poison upon the bait such as canned dog or cat food, and corn meal. The bait must be stirred thoroughly to obtain a uniform mixture.

If a dry bait is used, such as chicken mash, corn meal or bread crumbs, add a small amount of corn oil or melted kitchen grease before adding the poison so that the poison will stick better to the bait. Avoid making the bait mushy or lumpy.

Using Pure Zinc Phosphide

Zinc phosphide is used at 1% by weight in food. For a one-pound lot, use ¾ teaspoonful of zinc phosphide. For six pounds, use one ounce of zinc phosphide.

Since the ratio of poison to food is very small, the addition of a diluent will give a more uniform distribution of the poison.

Other Notes

To keep baits from freezing, add about 25% glycerine by weight or volume to protect wet foods to about 20°F.

To preserve wet baits during hot weather, add 1/10 of 1% of sodium sulphite.

DISTRIBUTION OF BAIT

Place baits in tablespoon quantities where rats are known to feed. Place baits under cover along walls, in corners, under floors, or behind boards, boxes, etc. leaned against the wall to make a runway. Baits should be placed every few feet along runways but, in some cases, it may be necessary to concentrate them around known active burrows or runs.

When using fresh or moist baits, mix and distribute them late in the day but place before dusk.

Bait entire premises at one time.

FOLLOW-UP

Collect and destroy all uneaten baits and dead rats after two days. If a repeat baiting is necessary, use an anticoagulant cereal-type bait in bait stations, or use other poisons such as Antu or Red Squill mixed with a different bait. Do not repeat with Zinc Phosphide Rat Poison in less than one month intervals.

CAUTION

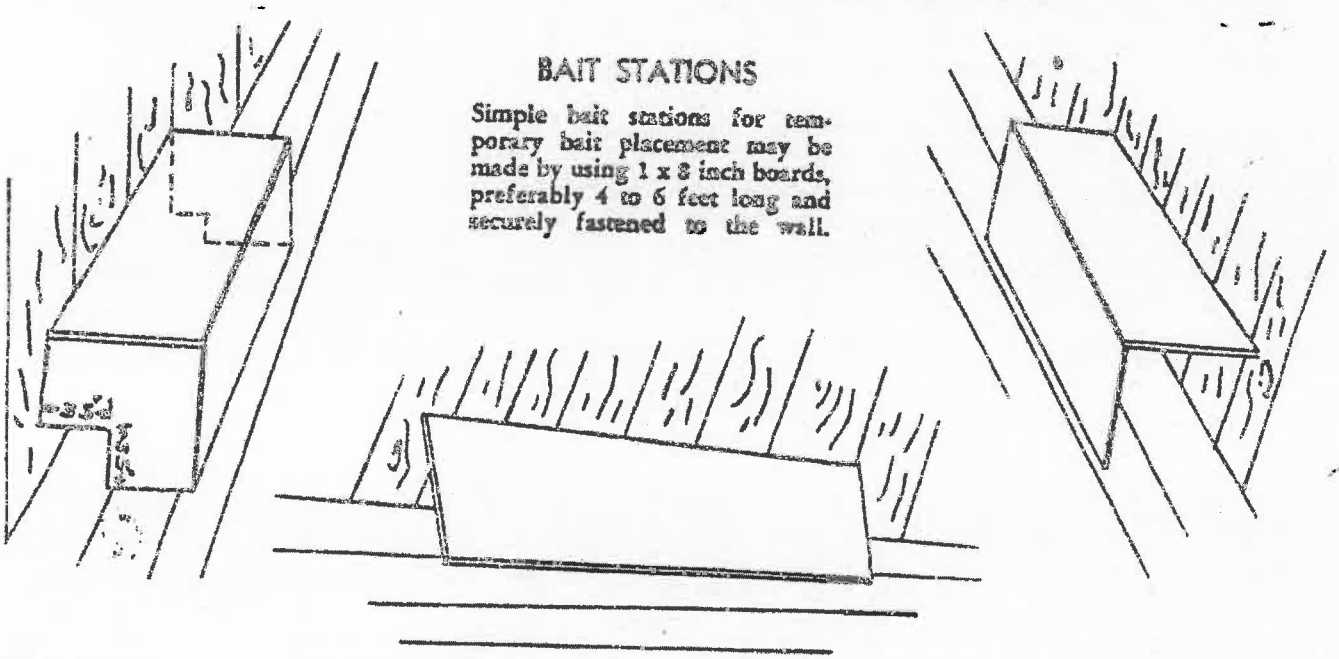
After mixing, wash hands and utensils. Store poison in a safe place.

ANTIDOTE

Call a physician at once. While waiting, cause vomiting. Give ½ teaspoonful copper sulphate (bluestone) in ½ pint of water. If vomiting does not occur in 10 minutes, repeat. After 1 hour, give 2 teaspoonfuls of Epsom Salts in glass of warm water. Do NOT give any milk, lard, or other oil.

BAIT STATIONS

Simple bait stations for temporary bait placement may be made by using 1 x 8 inch boards, preferably 4 to 6 feet long and securely fastened to the wall.



UNITED STATES
DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife
Washington 25, D. C.

Wildlife Leaflet 402
April 1959

ANTICOAGULANT RODENTICIDES FOR CONTROL OF RATS AND MICE

Anticoagulants are chemicals that reduce or prevent the clotting of blood. Used as a poison an anticoagulant causes death by internal bleeding. Anticoagulants currently registered for the control of rats and mice include diphacin, fumarin, pival, PMP, and warfarin.

These materials are the poisonous ingredients in many rodenticide baits sold under various brand names. They are also sold as concentrates for mixing home-made baits, or as powders which can be dissolved in water. They are effective for the control of house mice and domestic rats found in the United States.

Anticoagulants seldom kill by a single dose, but must be fed upon several times over a period of days. Feeding does not have to be on consecutive days, but should occur within a 10-day interval with no longer than 48 hours between feedings. It is important that plenty of bait be available at all times. Rodents may not eat the bait when it is first offered, so it may take from 5 to 14 days to get rid of them by this method; for house mice it often takes longer. In most instances less bait is eaten, and less damage done by the rats or mice, after about the third day of treatment.

Anticoagulants will kill most animals if they eat enough, over a long enough period of time. Hogs are especially susceptible to anticoagulants. However, the amount of anticoagulant contained in bait mixtures is so small that with reasonable precautions there is little danger to domestic animals. Mixing the anticoagulant with grain or cereal-type bait serves to protect most pets as they do not usually care for such foods. Another safeguard is to place the bait in "bait stations" where rats and mice can get to it but larger animals cannot.

Anticoagulant preparations should not be left where children or irresponsible persons can get to them. If accidentally swallowed, induce vomiting at once and call a physician.

Dry Baits

Ready-To-Use-Baits. There are many satisfactory commercial baits on the market containing anticoagulants. These ready-made baits are more convenient, but not necessarily better than home-made baits.

Home-made Baits. The most economical dry bait is a home-made bait, mixed with an anticoagulant concentrate according to the manufacturer's instructions (generally 1 part of 0.5% anticoagulant concentrate is mixed with 19 parts of food ingredients). Thorough mixing is required.

The following mixture (by weight) makes a satisfactory bait:

12 parts	ground whole yellow corn
5 parts	rolled oats
1 part	granulated sugar
1 part	vegetable oil
1 part	anticoagulant concentrate (or as recommended by the manufacturer)

For control of house mice, it may be advisable to double the amount of anticoagulant.

It is of prime importance that only fresh bait be used. Bait stations should be cleaned frequently and all old or contaminated bait discarded. Perishable foods such as ground meat or fish can be used, substituting them for the cereals, sugar and oil, but they must be replaced daily or every other day; and their use increases the hazards to pets.

If insects are a problem in packaged or stored cereal baits, it may be advisable to add 0.01% technical malathion (95% malathion - 5% corn oil). This is a specialty item only available from S. R. Penick and Company, 50 Church Street, New York 8, New York, and Prentiss Drug and Chemical Company, 101 West 31st Street, New York 1, New York. No other form of malathion or other insecticides should be used.

Water Baits

Where rodents are especially troublesome, water-soluble anticoagulant concentrates are a useful supplement to dry baits, when put out at the same locations. Water bait is more effective during the summer months or in locations where other water is not

readily available. Ordinary pint-sized chick founts or commercial dispensers may be used in bait boxes or stations. Liquid containers should be cleaned and replenished frequently. Many liquid concentrates contain sugar which improves acceptance. If it is not included in the concentrate, 1 or 2 tablespoons can be added to each quart of water.

Instructions for Placing Bait Stations. Baits should be exposed in shallow open trays or water founts in areas frequented by the rodents. Protected feeding stations or bait boxes are recommended for locations where there may be a hazard to humans and domestic animals (see accompanying illustrations). They are particularly helpful as permanent installations in poultry houses, granaries, and other locations subject to frequent reinfestation. Rats may often be prevented from entering warehouses and other buildings by the establishment of permanent-type bait stations in suitable locations around the perimeter of the buildings.

From 4 ounces to 1 pound of bait is recommended for each rat bait placement. Baits should be inspected daily and replenished as necessary. Similar bait placements can be used for mice, but they should be smaller, there should be more of them, and (since house mice do not travel very far from their nests) they should be closer together. Tablespoonful quantities are generally adequate for each mouse bait spot. It is important to remember that anticoagulants will not kill unless the rodents have plenty of bait available during the 5 to 14-day feeding period. Replace baits as often as necessary to keep them fresh. Frequent replacements will be necessary in warm humid climates.

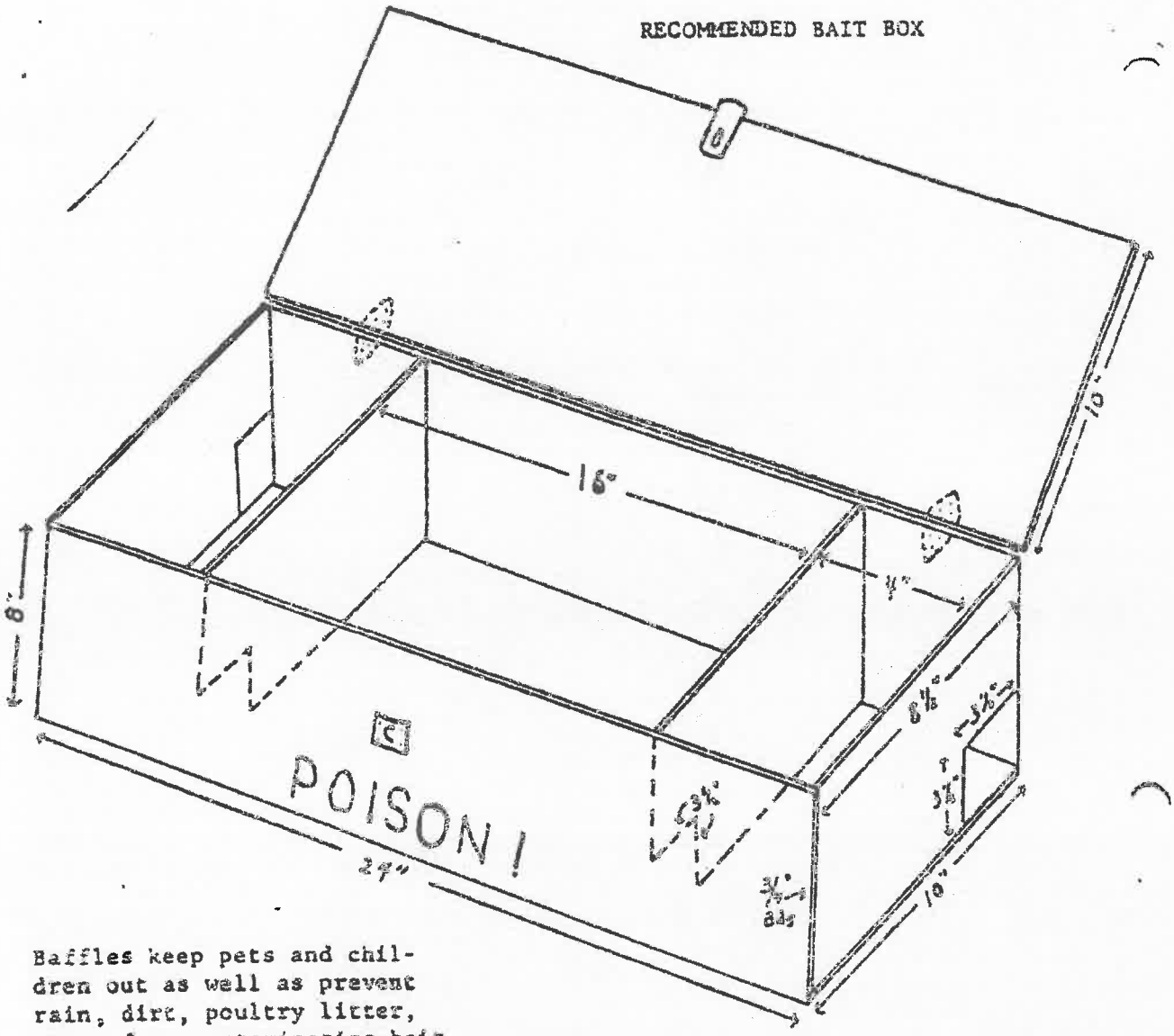
Miscellaneous

In locations heavily infested with rats, other poisons may be used to obtain a quick kill, followed up with anticoagulant-poisoned baits to eliminate wary, bait-shy individuals.

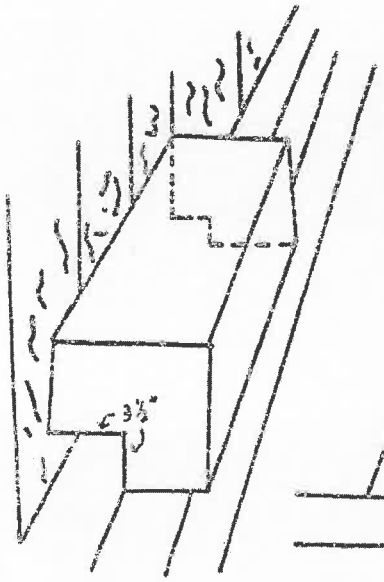
Unpleasant odors from dead rats may follow the use of anticoagulants, as with other poison. Poisons do not prevent rat carcasses from decaying. Placing baits in the basement (or not higher than the first floor) will help keep odors where they are not so objectionable. Commercial preparations, neutroleum alpha or isobornyl acetate, will help to minimize odor.

In cases of heavy or difficult infestations of rats or house mice, specialized methods are often necessary; in such cases the services of a pest control operator or exterminator may be required.

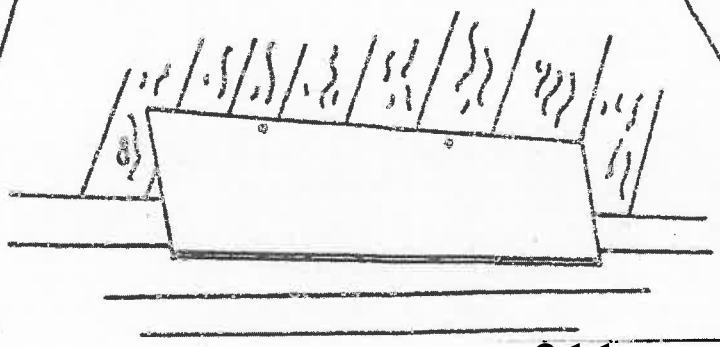
RECOMMENDED BAIT BOX

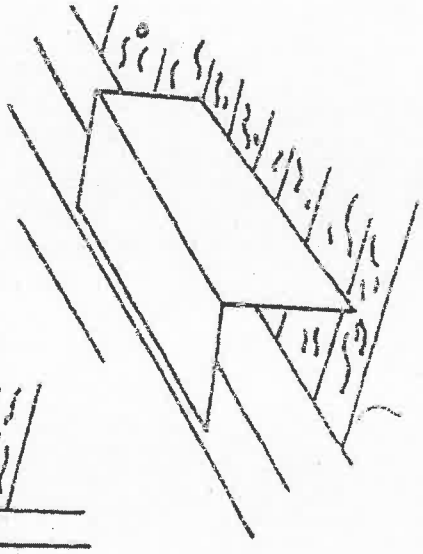


Baffles keep pets and children out as well as prevent rain, dirt, poultry litter, etc., from contaminating bait.



Simple bait stations for temporary bait placement may be made by using 1 x 8 inch boards, preferably 4 to 6 feet long and securely fastened to the wall.





INT.-DUP., D.C.-

February 28, 2017

AMENDMENT TO SECTION 202 -- REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Item 202.201 – Demolishing Buildings (Parcel 10)

INFORMATIONAL DATA - BUILDING INTERIOR SURVEY

Parcel # 10, is the former REL Revocable Trust property located at 111 NH Route 101 in Bedford, New Hampshire. The 2,156 ft², 2-story wood-framed raised ranch style structure erected c. 1960, has been inventoried for regulated and/or hazardous waste. Following is a list of known environmental hazards on the site. Removal and proper disposal of these items are subsidiary to Item 202.20X – Demolish Building. The Contractor shall contact the Department's asbestos inspector, ATC Group Services LLC (Christine Owens (603) 969-4122) prior to removing the listed items to coordinate and document the removal.

If regulated and/or hazardous waste of a different type than outlined below is discovered during the work, it shall be provided for in 107.17. No additional compensation will be made for quantities exceeding the estimates below.

Item/ Material	Location	Estimated Quantity
Exterior of Building		
High Intensity Lights	Exterior of House	5
Wood Debris Pile	Exterior of House	300 ft²
Pad Mounted AC Unit	Exterior of House	1
Interior of Building		
Smoke Detector	Room 3	3
Rechargeable Batteries (exit signs)	Hall 1, Rooms 4, 6, Entrance	4
High Intensity Lights	Room 6	2
Fluorescent Lights	Rooms 1, 2, 3, 4 ,5, 6, 7, 8, Hall 1, 2, Oil Tank Room	50
Fluorescent Light Ballasts	Rooms 1, 2, 3, 4 ,5, 6, Hall 1, 2, Oil Tank Room	25
Potential Mercury switch/Thermostat	Rooms 3,5,7	3
Vent/Fan	Rooms 1, 2, 3, 5, 6, 7, 8 Hall 1, Bath 1	15
Above Ground Storage Tank	Oil Tank Room	1-275 Gallon
AC Unit	Basement	1
Furnace	Basement	1
Hot Water Heater	Basement	1
Water Filter Cylinder	Water Filter Room	2
Water Tank	Basement	1
Well Pump	Basement	1

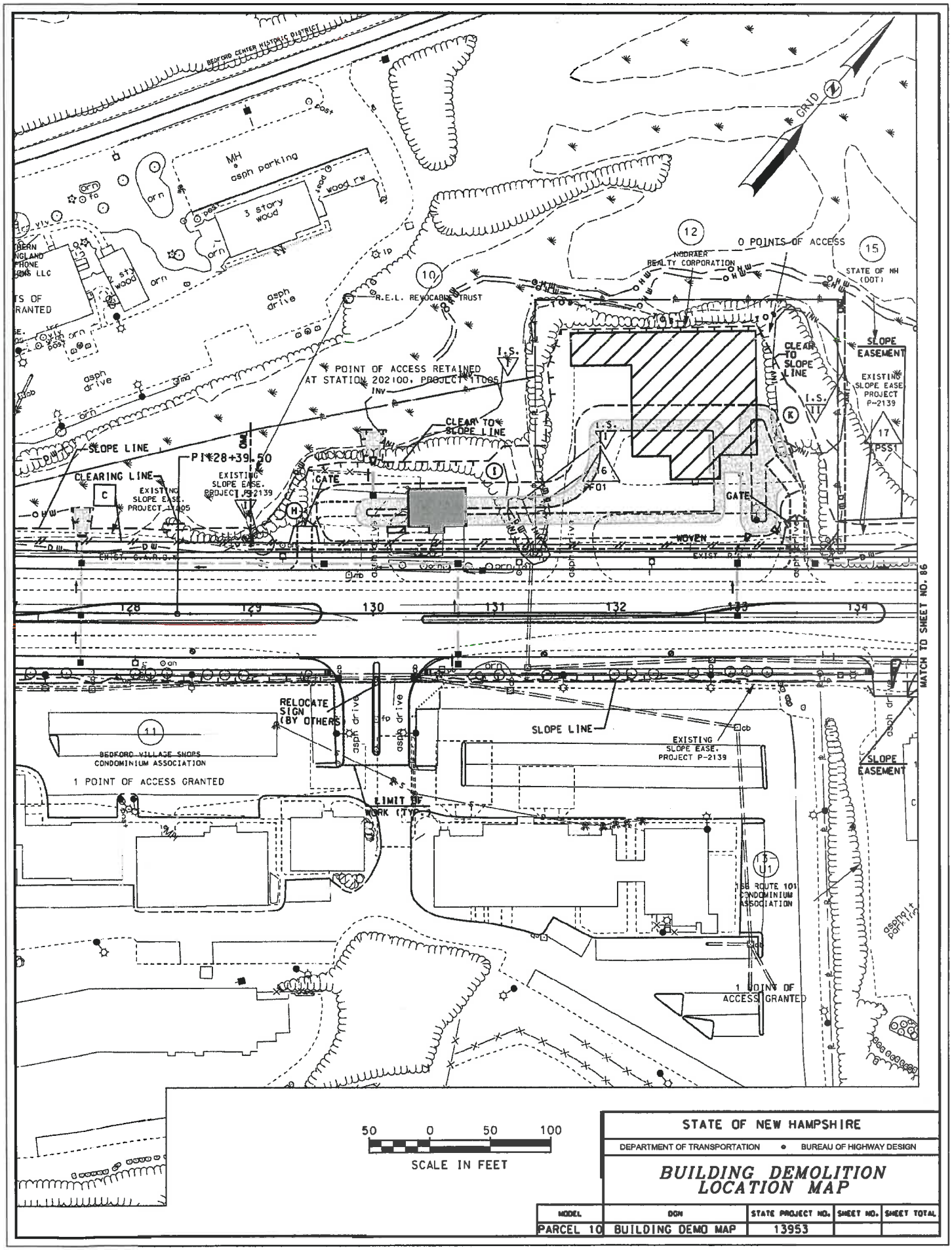
ft² = Square feet

Toxicity Characteristic Leaching Procedure (TCLP) testing was performed on the Property with the results listed below. **No further action is required.**

Toxicity Characteristic Leaching Procedure (TCLP) testing

TCLP Sample Description	**Below 5.0 mg/L for lead and classified as non-hazardous Yes or No**	**Further Action Required Yes or No**
Mixture of painted and unpainted Building Materials	Yes	No

Parcel 10
175 Route 101
Formerly R.E.L. Revocable Trust
202.201

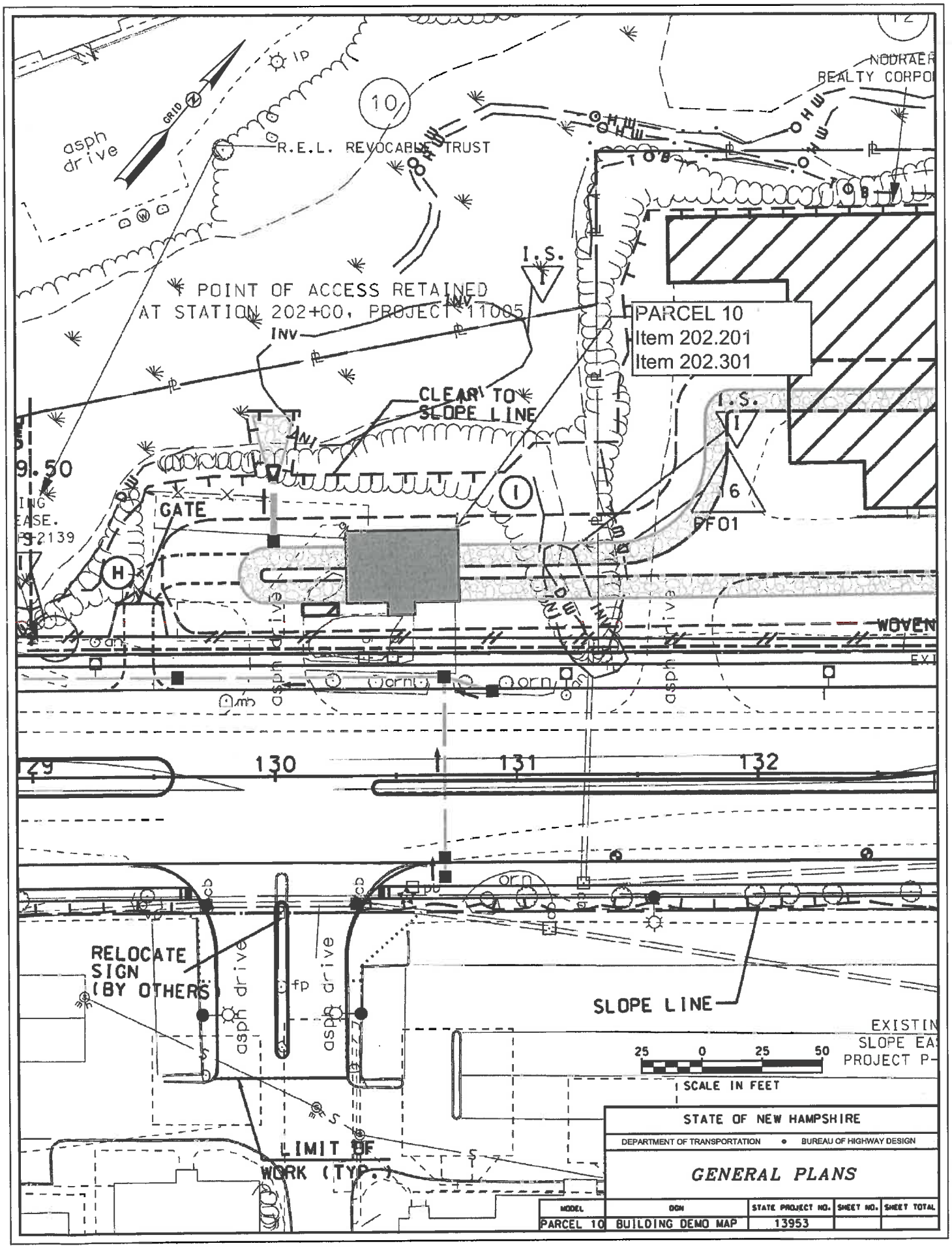


STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

BUILDING DEMOLITION LOCATION MAP

MODEL	DGN	STATE PROJECT NO.	SHEET NO.	SHEET TOTAL
PARCEL 10	BUILDING DEMO MAP	13953		


PARCEL 10
Item 202.201
Item 202.301
R.E.L. REVOCABLE TRUST
NODRAER REALTY CORPO
POINT OF ACCESS RETAINED AT STATION 202+00, PROJECT 11005
CLEAR TO SLOPE LINE
GATE
PF01
WOVEN
130
131
132
RELOCATE SIGN (BY OTHERS)
SLOPE LINE
LIMIT OF WORK (TYP.)
asph drive
SCALE IN FEET
STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN
GENERAL PLANS
MODEL
DGN
STATE PROJECT NO.
SHEET NO.
SHEET TOTAL
PARCEL 10
BUILDING DEMO MAP
13953

BEDFORD
13953

February 28, 2017

AMENDMENT TO SECTION 202 -- REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Item 202.202 – Demolishing Buildings (Parcel 12)

INFORMATIONAL DATA - BUILDING INTERIOR SURVEY

Parcel # 12, is the former Nodraer Trust property located at 169 NH Route 101 in Bedford, New Hampshire. The 12,088 ft² wood-framed commercial structure erected c. 1970 on a concrete slab has been inventoried for regulated and/or hazardous waste. Following is a list of known environmental hazards on the site. Removal and proper disposal of these items are subsidiary to Item 202.20X – Demolish Building.

If regulated and/or hazardous waste of a different type than outlined below is discovered during the work, it shall be provided for in 107.17. No additional compensation will be made for quantities exceeding the estimates below.

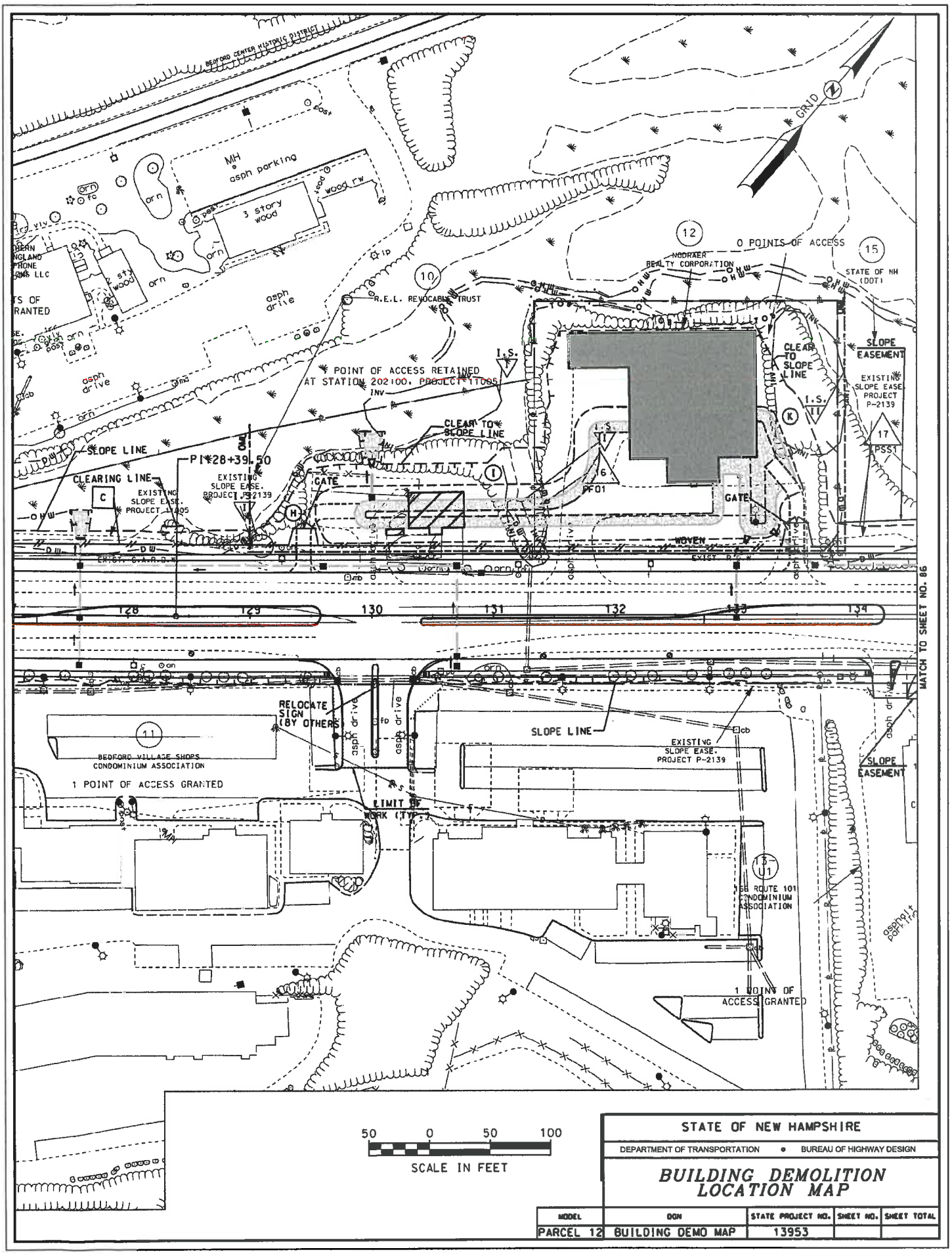
Item/ Material	Location	Estimated Quantity
Exterior of Building		
High Intensity Lights	Exterior of Building	5
Wood Debris Pile	Exterior of Building	100 ft²
Roof-Mounted Vent Fan	Roof	1
Interior of Building		
Smoke Detector	Office, Showroom, Warehouse 1	4
Rechargeable Batteries (exit signs)	Showroom, Warehouse 1, & 2	4
High Intensity Lights	Showroom, Warehouse 1, & 2, Loading Dock	12
Fluorescent Lights	Office, Showroom, Warehouse 1, & 2, Loading Dock	156
Fluorescent Light Ballasts	Office, Showroom, Warehouse 1, & 2, Loading Dock	100
Garage Door Opener	Warehouse 1, Loading Dock	3
Potential Mercury Switch/Thermostat	Office, Showroom, Warehouse 1	6
Vent/Fan	Office, Showroom	7
Above-Ground Storage Tank	Warehouse 1	2-275 Gallon
AC Unit	Showroom	1
Furnace	Warehouse 1	2
Hot Water Heater	Warehouse 1	1
Water Filter Cylinder	Warehouse 1	4
Water Tank	Warehouse 1	1
Well Pump	Warehouse 1	1

Toxicity Characteristic Leaching Procedure (TCLP) testing was performed on the Property with the results listed below. **No further action is required.**

Toxicity Characteristic Leaching Procedure (TCLP) testing

TCLP Sample Description	**Below 5.0 mg/L for lead and classified as non-hazardous Yes or No**	**Further Action Required Yes or No**
Mixture of painted and unpainted Building Materials	Yes	No

Parcel 12
169 Route 101
Formerly Nodraer Realty Trust Property
202.202

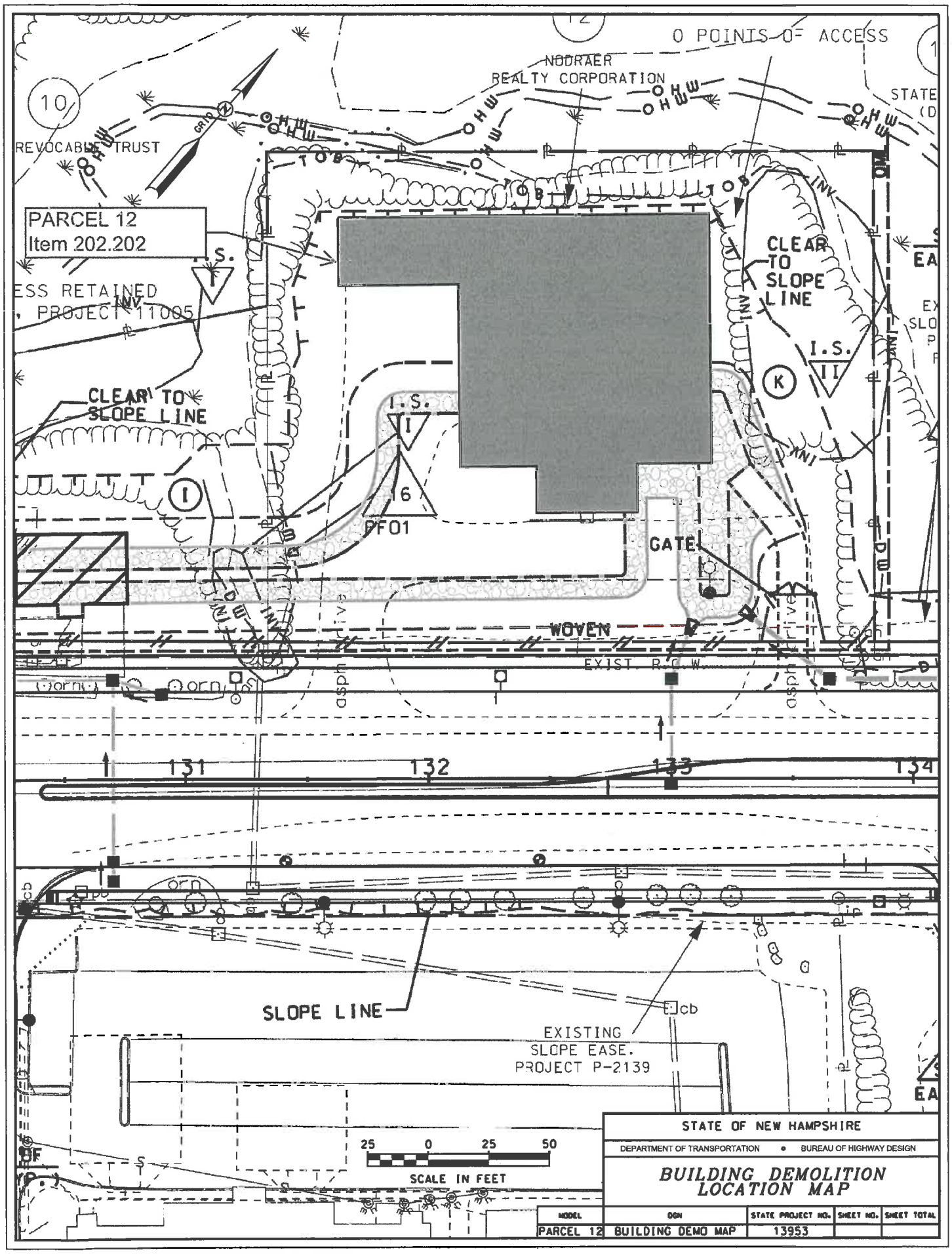


STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

BUILDING DEMOLITION LOCATION MAP

MODEL	DGN	STATE PROJECT NO.	SHEET NO.	SHEET TOTAL
PARCEL 12	BUILDING DEMO MAP	13953		


0 POINTS OF ACCESS
NODRAER
REALTY CORPORATION
REVOCABLE TRUST
PARCEL 12
Item 202.202
ESS RETAINED
PROJECT 11005
CLEAR TO SLOPE LINE
CLEAR TO SLOPE LINE
I.S.
I
I.S.
II
16
PF01
GATE
WOVEN
EXIST. R.O.W.
131
132
133
134
SLOPE LINE
EXISTING
SLOPE EASE.
PROJECT P-2139
25 0 25 50
SCALE IN FEET
STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN
BUILDING DEMOLITION
LOCATION MAP
MODEL
DGN
STATE PROJECT NO.
SHEET NO.
SHEET TOTAL
PARCEL 12
BUILDING DEMO MAP
13953

BEDFORD
13953

February 28, 2017

AMENDMENT TO SECTION 202 -- REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Item 202.203 – Demolishing Buildings (Parcel 36)

INFORMATIONAL DATA - BUILDING INTERIOR SURVEY

Parcel # 36, is the former Robert Starace Homes, LLC property located at 111 NH Route 101 in Bedford, New Hampshire. The 6,815 ft² wood-framed colonial style residential structure with an accessory apartment and office constructed with concrete cast-in-place walls, upon a concrete slab-on-grade basement floor, and a detached wood-framed shed, has been inventoried for regulated and/or hazardous waste. Following is a list of known environmental hazards on the site. Removal and proper disposal of these items are subsidiary to Item 202.20X – Demolish Building. The Contractor shall contact the Department's asbestos inspector, ATC Group Services LLC (Christine Owens (603) 969-4122) prior to removing the listed items to coordinate and document the removal.

If regulated and/or hazardous waste of a different type than outlined below is discovered during the work, it shall be provided for in 107.17. No additional compensation will be made for quantities exceeding the estimates below.

Item/ Material	Location	Estimated Quantity
Exterior of House		
High Intensity Lights	Exterior of House	6
*Propane UST	Exterior of House, Rear	1
Septic Pump	Exterior of House	1
Roof-Top Vents	Roof of House	3
Pad-Mounted AC Units	Exterior of House	3
Interior of House		
Smoke Detector	Halls 1,2,4,5, Rooms 5, 14, 15, 18, 19, Kitchens 1, 2, Basement 1	11
Dishwasher	Kitchen	1
Rechargeable Batteries (exit signs)	Hall	1
High Intensity Lights	Entry	2
Fluorescent Lights	Halls 2, 3, Kitchen 2, Rooms 10, 11, 12, 13, 17, 18	80
Fluorescent Light Ballasts	Halls 2, 3, Kitchen 2, Rooms 10, 11, 12, 13, 17, 18	40
Potential Mercury Switch/Thermostat	Hall 1, Rooms 3, 5, 6, 10, 14, 16, 18, 21, Foyer, Bath 6	11
Vent/Fan	Hall 1, Bath 2, 3, 4, 6, 7, Rooms 14, 15, 16, 17, 18, 19, 21, Laundry	20

Above-Ground Storage Tank	Basement 1	1-275 Gallon
Sump and Associated Pump	Basements 1, 2	3
Furnace	Bath 7, Basements 1, 2	3
Hot Water heater	Basements 1, 2	2
Water Filter Cylinder	Basement 2	8
Well Pump	Basement 2	1

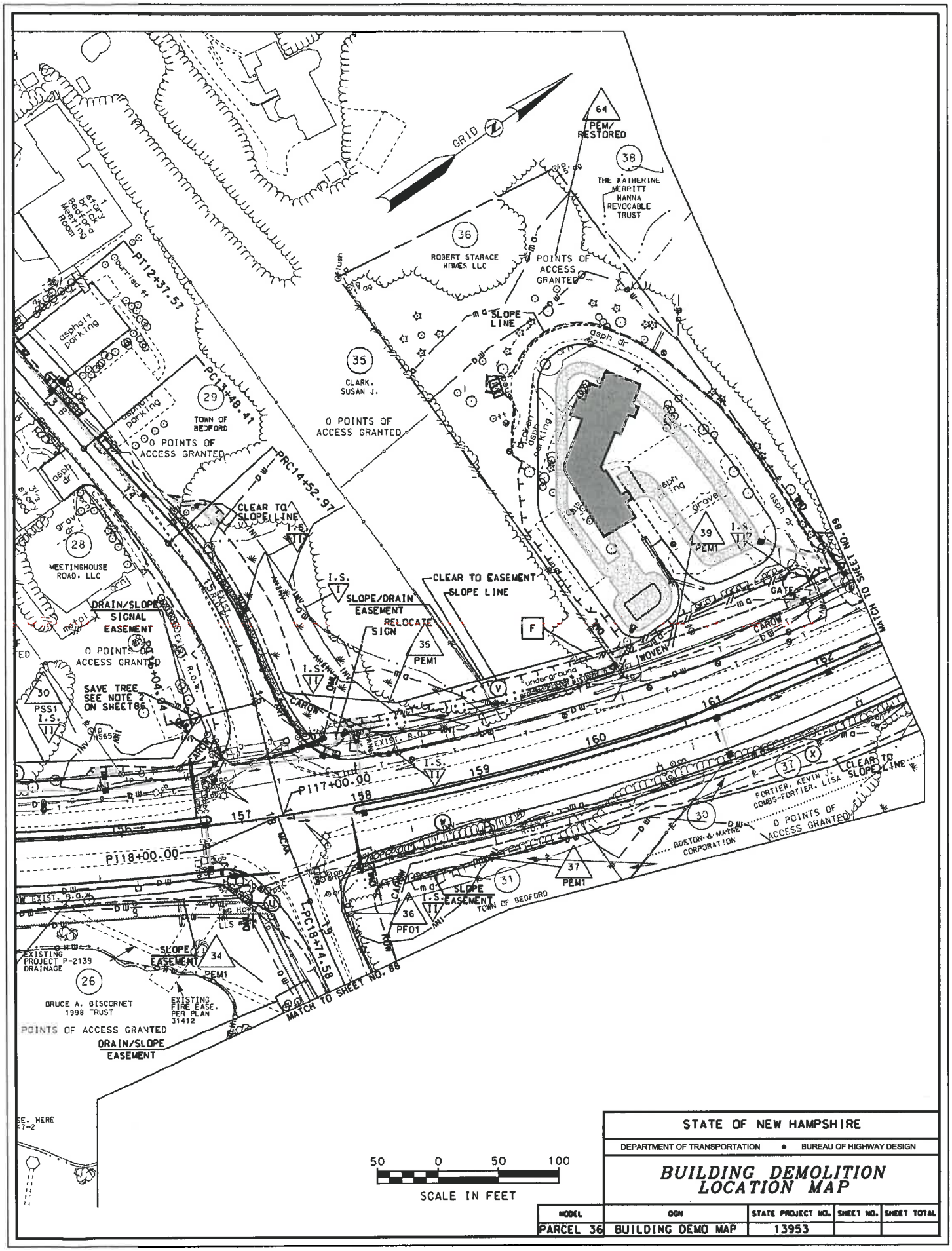
*Contact Tom Clark, Eastern Propane for propane tank removal ((603) 883-6400 x-5004)

Toxicity Characteristic Leaching Procedure (TCLP) testing was performed on the Property with the results listed below. **No further action is required.**

Toxicity Characteristic Leaching Procedure (TCLP) testing

TCLP Sample Description	**Below 5.0 mg/L for lead and classified as non-hazardous Yes or No**	**Further Action Required Yes or No**
Mixture of painted and unpainted Building Materials	Yes	No

Parcel 36
111 Route 101
Formerly Robert Starace Homes LLC
202.203

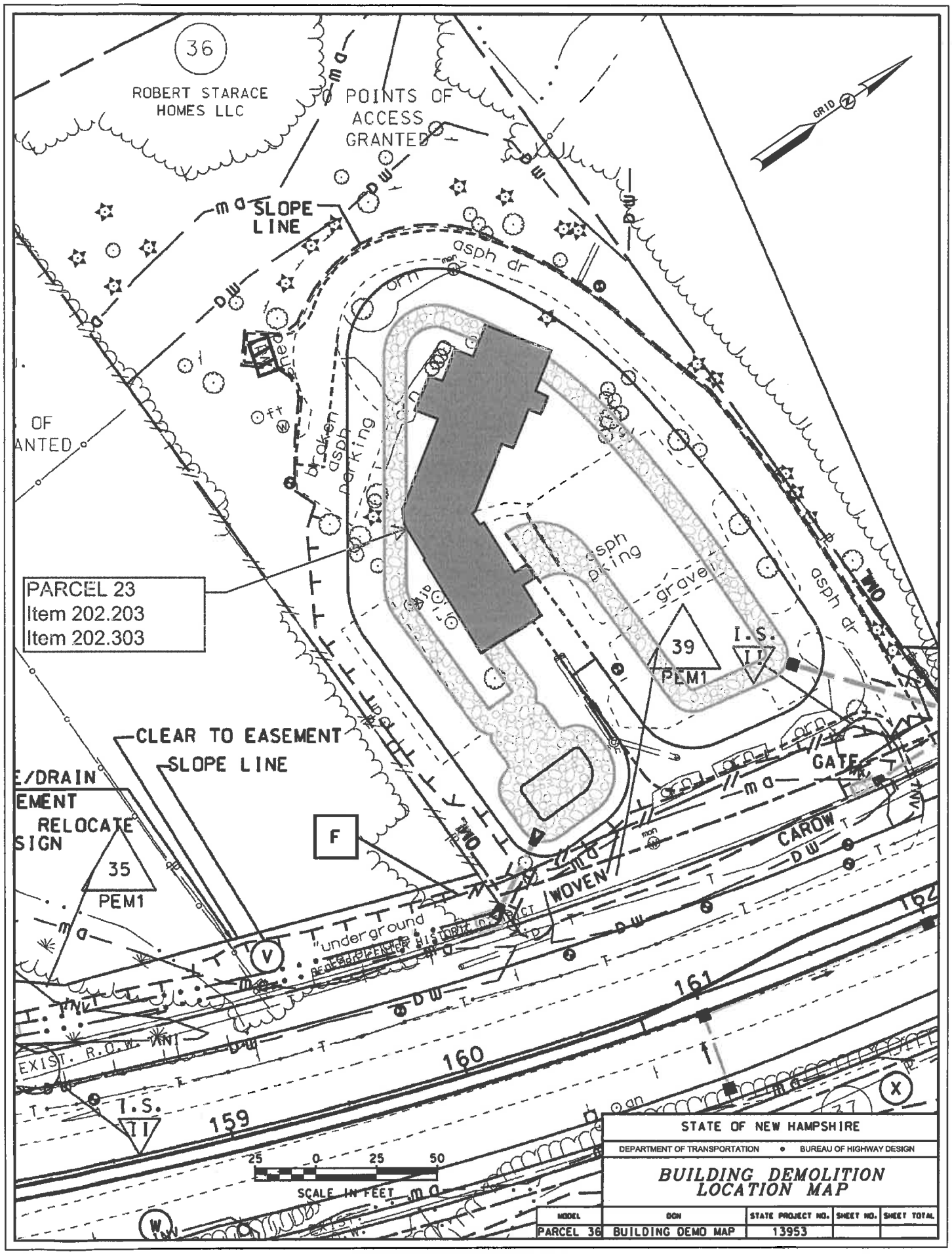


STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

BUILDING DEMOLITION LOCATION MAP

MODEL	DGN	STATE PROJECT NO.	SHEET NO.	SHEET TOTAL
PARCEL 36	BUILDING DEMO MAP	13953		


36
ROBERT STARACE HOMES LLC
POINTS OF ACCESS GRANTED
SLOPE LINE
asph dr
broken asph parking
asph pking
gravel
39
PEM1
I.S. II
PARCEL 23
Item 202.203
Item 202.303
CLEAR TO EASEMENT
SLOPE LINE
E/DRAIN
EMENT
RELOCATE
SIGN
35
PEM1
F
GATE
CAROW
WOVEN
underground
EXIST. R.O.W.
I.S. II
159
160
161
162
25 0 25 50
SCALE IN FEET
STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN
BUILDING DEMOLITION LOCATION MAP
MODEL
DGN
STATE PROJECT NO.
SHEET NO.
SHEET TOTAL
PARCEL 36
BUILDING DEMO MAP
13953

BEDFORD
13953

April 22, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 202 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS

PART I

Item 202.30X – Building Asbestos Abatement

Add to Description:

1.5 The work shall consist of furnishing all labor, materials, services, equipment and supplies required for removal and proper disposal of asbestos identified by the Department's Asbestos Inspector. An Asbestos Inspector has been contracted by the Bureau of Right-of-Way as the representative for Department to manage and oversee the asbestos abatement phases of this project.

1.5.1 Each site in which asbestos abatement is to occur, will have a separate Asbestos Identification Survey (Part II of this Provision) detailing analytical results of all samples collected, methodology utilized, and the survey findings. The Asbestos Identification Survey is available for review and may be examined in the Bureau of Right-of-Way – Property Management (603-271-3222) with 72 hours' notice.

1.5.2 A summary of the material that tested positive as asbestos containing material (ACM) for each site is included as part of this Special Provision.

Add to Construction Requirements:

3.8 Building Asbestos Abatement

3.8.1 The Contractor shall be required to be a licensed Asbestos Abatement Entity per State of New Hampshire Code of Administrative Rules Chapter Env–A 1800 Asbestos Management and Control for the removal and disposal of asbestos.

3.8.2 The Contractor shall comply with the following Federal, State, and local standards, regulations, and codes pertaining to abatement, storage, transportation, and disposal of ACM's. Whenever regulations are in conflict, the more stringent will prevail.

a. U.S. Department of Labor (DOL), Occupational Safety and Health Act of 1970. (Particular attention is drawn to the Asbestos Regulations: CFR Title 29, Part 1910, Sec 1910.1001 and Part 1926, Sec 1926.1101, and the Respirator Regulations; CFR 29, Part 1910, Sec 1910.134 and Hazard Communication, CFR Title 29, Part 1910.1200).

b. U.S. Environmental Protection Agency (EPA), CFR, Title 40, Part 61, Subparts A and M, National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Revision; Final Rule, Dated Tuesday, November 20, 1990.

c. U.S. Department of Transportation (DOT) regulations, 49 CFR Parts 172 and 173.

d. All State of New Hampshire laws, regulations and standards, including the Department of Environmental Services (DES), Chapter Env-A 1800 Asbestos Management and Control, and;; Chapter Env-Sw 900 Management of Certain Wastes. Contact NH DES Air Resource Division Asbestos Management Section:

NH DES Air Resource Division - Asbestos Management Section (603-271-1373)

All regulations by these and other governing agencies in their most current version are applicable. It is the Contractor's responsibility to know, understand, and abide by all such regulations and common practices.

3.8.2.1 The Contractor shall determine whether any additional and/or more stringent protective measures are required by any legal requirements or prudent conservative work practices, and implementing such measures if deemed necessary.

3.8.3 Pre-Construction Meeting

3.8.3.1 The Abatement Contractor shall meet with the Engineer, Demolition Contractor and the Asbestos Inspector, at the project site, a minimum of ten (10) working days prior to beginning abatement work. The Abatement Contractor shall be represented by an authorized representative and the field supervisor who shall supervise the project on a daily basis. The Contractor shall present evidence that all requirements for initiation of the work have been met. The minimum agenda for the meeting shall be:

1. Review of Pre-Job Submittals.
2. Channels of communication.
3. Construction schedule, including sequence of critical work.
4. Designation of responsible personnel.
5. Procedures for safety, security, quality control, housekeeping, and related matter.
6. Use of premises, facilities, and utilities.

3.8.3.2 The Contractor is required to provide one copy of the following at the pre-construction meeting:

1. Abatement Contractors Entity License, State, Local Notifications, and SSCWP as required.
2. A list of employees to be used on the project. Copy of licenses, training certificates and fit-tests of all workers and supervisors who will work on the project.
3. Documentation of medical records as required by OSHA or a notarized statement by examining medical doctor that such examinations took place and when, for each employee to be used on the project (preferred).
4. Copy of State or local license for waste hauler and waste disposal site.
5. Documentation that the Utilities have been shut off.

3.8.4 Regulatory Submittals. The Contractor shall be responsible for securing all necessary permits for Asbestos-related work, including removal, hauling, fire, and materials usage, and any other permits required to perform the work.

3.8.4.1 The Contractor, as applicable, shall notify the following agencies in the appropriate manner of the work:

1. Appropriate notification to NH DES, Air Resources Division (NH DES-ARD), at least 10 working days prior to the beginning work.
2. Local Emergency authorities including, but not limited to, fire, police, and medical services, of the site location(s), schedules of work and hazards anticipated. Per NH Asbestos Management and Control, Chapter Env-A 1800.

3.8.5 The Contractor is required to submit Waste Shipment Records to the Department's Asbestos Inspector, within thirty (30) days after completion of the project.

3.8.6 If ACM of a different type outlined in the site specific Asbestos Identification Survey is discovered during the work, it shall be provided for in 107.17.

Add to Method of Measurement:

4.1.1 Building Asbestos Abatement for each site will be measured as a unit. When more than one unit is specified in the contract, separate item numbers will appear for each separate and complete unit.

4.1.1.1 Asbestos Containing Material abated that is not identified in the Asbestos Identification Survey per 3.7.6, will be paid as extra work.

Add to Basis of Payment:

5.1.3 The accepted quantity of Building Asbestos Abatement will be paid for at the contract price per unit.

5.1.4 If an Asbestos Identification Survey is not available prior to award of the contract abatement will be paid as provided for in 109.04.

Add to pay items and units:

202.30X	Building Asbestos Abatement	Unit
Thru		
202.3XX	Building Asbestos Abatement	Unit

1

Bedford
13953

February 28, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 202 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS

PART II

Item 202.301 – Building Asbestos Abatement

Add to Description:

1.5.2.1 Site Description. Parcel # 10, is the former REL Revocable Trust property located at 111 NH Route 101 in Bedford, New Hampshire. The property consists of a 2,156 ft², 2-story wood-framed raised ranch style structure erected c. 1960. The foundation consists of a full lower level.

1.5.2.2

Asbestos Containing Material (ACM)

Parcel 10, 175 NH Route 101

Material	Location	Asbestos Type and Percent %	Approximate Quantity
Tan Joint Compound and non ACM Contaminated Sheetrock (Original layer)	Basement	Chrysotile 2%	1,950 ft²
Textured Application on Sheetrock Walls and Ceiling (Original layer)	Basement	Chrysotile 2%	1,950 ft²
9x9 Tan Floor Tile (Under carpet and plywood)	Basement	Chrysotile 2%	500 ft²
Black Mastic associated with 9x9 Tan Floor Tile	Basement	Chrysotile 10%	500 ft²
Multi-Color Sheet Flooring (under 9x9 tan floor tile)	Basement	Chrysotile 40%	500 ft²
Residual Brown Mastic on Hardwood Floor	First Floor	Chrysotile 3%	450 ft²
Textured Paint on Sheetrock Ceiling	First Floor and Basement	Chrysotile 2%	1,800 ft²
Chimney/Vent Flashing	Roof	Chrysotile 10%	5 ft²

ft² = Square Feet

1

Bedford
13953

February 28, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 202 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS

PART II

Item 202.303 – Building Asbestos Abatement

Add to Description:

1.5.2.1 Site Description. Parcel # 36, is the former Robert Starace Homes, LLC property located at 111 NH Route 101 in Bedford, New Hampshire. The property consists of a 6,815 ft² wood-framed colonial style residential structure with an accessory apartment and office constructed on concrete cast-in-place walls, upon a concrete slab-on-grade basement floor, and a detached wood-framed shed. On-site septic and well.

Asbestos Containing Material (ACM)

Parcel 36 111 NH Route 101, Bedford

Material	Location	Asbestos Type and Percent	Approximate Quantity
Black Tar underneath Rubber Roof, along house	Roof, back Entrance	Chrysotile 5%	125 ft²
Built-up Roof, Bottom Layer	Roof, back Entrance	Chrysotile 5%	125 ft²

ft² = Square Feet

Supersedes 2/21/97 3/16/01, & 02/12/03, 06/28/07, 07/23/08, 10/28/08, 12/11/08, 04/09/09, 06/20/11, 05/03/12

BEDFORD
13953

December 14, 2016

SPECIAL PROVISION

AMENDMENT TO SECTION 203 -- EXCAVATION AND EMBANKMENT

Item 203.35 - Handling Excavated, Contaminated Soils (Department Disposal)

Add to Description:

1.2 This work consists of the on-site handling, transporting, and stockpiling potentially contaminated soils resulting from spills/releases of petroleum product(s) and/or the presence of other contaminants including the decontamination of equipment. This work also includes loading contaminated soils onto trucks for disposal. The intent of this item is to compensate the Contractor for all additional costs incurred due to the handling of excavated contaminated soil during roadway, bridge, drainage, structure, and utility excavations. This item will be paid in addition to the appropriate pay items for the class of excavation being performed.

1.2.1 This work may also consist of re-incorporation of uncontaminated and treated soils into the project. Based on testing of the soil, soil determined to be acceptable shall be re-incorporated in the project limits.

Add to Materials:

2.6 Backfill to replace potentially contaminated soil that is excavated and stockpiled for testing shall conform to the material requirements of the appropriate section of the Standard Specifications for the material to be placed at that location.

2.7 Liners for temporary coverage and storage, above and beneath contaminated soils, shall be leak-proof and impervious to rain or petroleum products and shall consist of polyethylene sheeting a minimum of 6 mils thick or other material approved by the Engineer.

Add to Construction Requirements:

3.13 Contaminated Soil.

3.13.1 The Contractor shall perform all work related to the contaminated soil in accordance with, but not necessarily limited to, the following:

- New Hampshire Code of Administrative Rules Env-Or 600 – Contaminated Site Management;
- New Hampshire Code of Administrative Rules Env-Hw 100-1000 (formerly Env-Wm 100-1000) - Hazardous Waste Rules;
- RSA 146-A, RSA 146-C, and RSA 146-D;
- RSA 147-A, and RSA 147-B, (Administered by the Waste Management Division);
- RSA 125-C, (Administered by the Air Resources Division);
- Statutory Authority: RSA 149-M:7 and RSA 147-A:3; and
- OSHA Regulations Standard 29 Code of Federal Regulations (CFR) 1926.65, Hazardous Waste Operations and Emergency Response.

3.13.2 The Contractor shall prepare and submit a proposed Project Operations Plan (POP) to the Bureau of Environment through the Engineer at least 15 business days prior to any excavation of soil. **No work shall be scheduled (or performed) in known contaminated areas until POP has been approved by the Bureau of Environment's Environmental Coordinator.** The POP shall be prepared in accordance with the Special Provision for Item 697.31 and the information provided in the Special Attention – Supporting Information for Project Operations Plan (POP) Development, and describe the Contractor's plan to manage contaminated soil.

3.13.2.1 Excavation, handling, on-site transportation, and on-site stockpiling of excavated materials shall be performed in accordance with the submitted POP and as directed by the Department or the Department's Environmental Consultant.

3.13.2.2 Health and safety precautions shall conform to the Contractor's Health and Safety Plan as required by law (29 CFR 1926.65).

3.13.3 The limits of contaminated soil requiring segregation and management will be established in the field based on observations and field screening performed by the Department's Environmental Consultant, and the results of analytical testing of soil samples collected by the Department's Environmental Consultant.

3.13.4 The Contractor shall handle, transport and stockpile the identified contaminated soils on site. After testing by the Department's Environmental Consultant, acceptable soil may be incorporated into the project.

3.13.4.1 Care shall be taken by the Contractor that existing drilled wells adjacent to the site shall remain uncontaminated and intact subsequent to the earth and groundwater disturbance due to construction.

3.13.4.2 Existing groundwater monitoring well(s) scheduled to be retained, and new monitoring wells placed by others, as well as recovery system(s) placed by others, shall be replaced in kind, if disturbed or destroyed during construction. All costs shall be borne by the Contractor.

3.13.4.3 Temporary storage of contaminated soil(s) and/or equipment prior to transporting and stockpiling or loading shall be on a surface that will be impermeable, such as a liner (double liner of min. 6 mil poly sheeting), sealed asphalt, or concrete, and shall be approved by the Engineer. This soil shall be transported to a stockpile site and/or loaded as soon as possible and no material shall be left at the temporary site overnight.

3.13.4.5 All contaminated materials shall be appropriately secured and covered with liners during stockpiling. The liners shall be secured to prevent damage to the liners and minimize emissions and the leaching effect of rain or other adverse weather.

3.13.4.6 Processing or storage areas, when required, shall be fenced to eliminate unauthorized entry. The temporary fence shall be a 6-foot (1.8 meter) high chain link fence conforming to 607 and include a gated entrance. The fence shall have at least one "NO TRESPASSING" sign per side, and be mounted approximately 4 feet (1.2 meters) from the bottom of the fence. The signs shall be kept clearly visible at all times.

3.13.5 Backfill in all excavated areas shall be placed and compacted in accordance with the plans and the appropriate sections of the Standard Specifications.

Add to Method of Measurement:

4.10 Handling excavated, contaminated soil will be measured by the cubic yard (cubic meter).

Add to Basis of Payment:

5.12 The accepted quantity of handling excavated, contaminated soil will be paid for at the contract unit price per cubic yard (cubic meter) of material handled, removed, transported, stockpiled, and loaded onto trucks and/or containers for disposal. This work also includes decontamination equipment.

5.12.1 Liners, covers, fencing when required, and other materials for the storage site will be subsidiary.

5.12.2 Soil and water testing for contamination will be provided by the Department.

5.12.3 Materials required, or ordered, for embankment and backfill to replace material not returned to the project will be paid for under the appropriate items of the contract.

5.12.4 The handling of contaminated soil excavated as subsidiary to the drainage items will be included under this item.

5.12.5 Dewatering will be subsidiary to the pertinent item(s).

5.12.6 No extra payment will be made for re-incorporating soil into project under 3.13.4.

5.12.7 The Project Operations Plan will be paid under Item 697.31.

Add to Pay items and units:

203.35	Handling Excavated, Contaminated Soils (Department Disposal)	Cubic Yard (Cubic Meter)

SPECIAL PROVISION

AMENDMENT TO SECTION 203 -- EXCAVATION AND EMBANKMENT

Item 203.53 – Low Permeability Fill (F)

Add to Description:

1.3 This work shall consist of furnishing and placing a low permeability fill in conformity with the lines, grades, and dimensions shown on the plans or as ordered. The intent is to place a layer of low permeable soil that reduces the rate of surface water infiltration into the ground.

Add to Materials:

2.10 Low permeability fill shall be natural, inorganic soil that is free from foreign matter such as construction debris, trash, wood, roots, leaves, and other organic matter.

2.10.1 An example of soil that may be considered acceptable for low permeability fill is a well graded, granular soil with high silt content. Low permeability fill shall be as follows when tested in accordance with AASHTO T 27:

Sieve Size		Percentage by Weight Passing
3 in	(75 mm)	100
No. 4	(4.75 mm)	80 - 100
No. 40	(0.425 mm)	60 – 90
No. 100	(0.150 mm)	40 – 60
No. 200	(0.075 mm) in total	25 – 45

2.10.2 For a preliminary determination of compliance with the specification for grading and for determination of the maximum dry density, the Contractor shall submit to the Engineer samples of materials to be used for low permeability fill prior to its placement. Samples may be taken from the pit or from stockpiles. Sampling and testing shall conform to AASHTO T 27, R 13, and T 99. Materials not meeting these specifications shall not be placed.

Add to Construction Requirements:

3.13 Low permeability fill shall be placed in 6 in maximum lifts and shall be compacted to at least 95 percent of the maximum dry density. During compaction, the moisture content of the

low permeability fill shall be between 1 percent below and 3 percent above the optimum moisture content. The maximum dry density and the optimum moisture content shall be as determined by AASHTO T 99 (Standard Proctor Test).

Add to Method of Measurement:

4.12 Low permeability fill will not be measured, but shall be the cubic yard final pay quantity in accordance with 109.11 for compacted material required within the lines shown on the Plans.

Add to Basis of Payment:

5.14 Low permeability fill is a final pay item quantity and will be paid for at the Contract unit price per cubic yard, in accordance with 109.11.

Add to Pay items and units:

203.53	Low Permeability Fill (F)	Cubic Yard

SPECIAL PROVISION

AMENDMENT TO SECTION 203 -- EXCAVATION AND EMBANKMENT

Item 203.55261 – Installation and Removal of SWZ – Portable Queue Trailer Platform
Item 203.55262 – Installation and Removal of SWZ – Portable Changeable Message Sign Platform
Item 203.55264 – Installation and Removal of SWZ – Mobile Video Trailer Platform

This special provision provides for the installation and removal of platforms for Smart Work Zone (SMZ) devices. All requirements as set forth in the Standard Specifications are applicable except as modified or changed herein for these items only.

Add to Description:

2.14 This work shall consist of the installation and removal of platforms for Smart Work Zone (SWZ) devices as shown on the plans or as ordered.

Add to Materials:

2.9 Gravel and crushed gravel for shoulder leveling for SWZ device platforms shall conform to 304.2.4 and 304.2.6 respectively.

Add to Construction Materials:

5.14 SWZ Device Platforms. SWZ device platforms shall be installed as shown on the plans with the top layer of the platform constructed with 6" of crushed gravel for shoulder leveling.

5.14.1 Crushed gravel for shoulder leveling and gravel, if required, shall be placed in accordance with 304.3.

5.14.2 Removal of the SWZ device platforms shall be removed when the platform if no longer needed or as directed by the Engineer. The disturbed area shall be graded to its existing condition and acceptable to the Engineer. Disposal of surplus material removed shall become the responsibility of the contractor as set forth in 203.3.9.

Add to Method of Measurement:

4.12 Installation and removal of SWZ device platforms will be measured as a unit. The unit shall include excavation, embankment, gravel (if required), crushed gravel for shoulder leveling, removal of material placed, disposal of surplus material and grading of disturbed area.

Add to Basis of Payment:

5.14 The accepted quantity of installation and removal of SWZ device platforms will be paid for at the Item Bid Price per unit.

5.14.1 No separate payment will be made for removal or disposal of surplus material from removed SWZ device platforms, or final grading of the disturbed area.

Add to pay items and units:

203.55261	Installation and Removal of SWZ – Portable Queue Trailer Platform	Unit
203.55262	Installation and Removal of SWZ – Portable Changeable Message Sign Platform	Unit
203.55264	Installation and Removal of SWZ – Mobile Video Trailer Platform	Unit

06/06/16
SSD: 06/15/11, 12/09/14, 05/14/15

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April 22, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 203 -- EXCAVATION AND EMBANKMENT

Item 203.55554 – Guardrail EAGRT Offset Platform Alternate, TL 2 - 25'
Item 203.55555 – Guardrail EAGRT Offset Platform, TL 2 - 25'

This special provision provides for pay items for specific installation of TL 2-25' offset platforms for EAGRT guardrail terminals. **The EAGRT platforms designated "TL 2 – 25'" shall only be used if specifically called for in the contract (bid item).** All requirements as set forth in the Standard Specifications are applicable except as modified or changed herein for these items only.

Add to 1.2:

1.2.1 This work shall consist of the installation of TL2-25 offset platforms for EAGRT terminals as shown on the plans or as ordered.

Add to 3.13.3:

3.13.3.1 TL 2-25 EAGRT Platforms. Offset platforms for TL 2-25' shall be installed as shown on the plans.

Add to pay items and units:

203.55554	Guardrail EAGRT Offset Platform Alternate, TL 2 -25'	Unit
203.55555	Guardrail EAGRT Offset Platform, TL 2 – 25'	Unit

March 16, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 203 – EXCAVATION AND EMBANKMENT

Item 203.661 – Gravel Backfill for Muck and Unsuitable Material Excavation
Item 203.662 – Rock and Gravel Backfill for Muck and Unsuitable Material Excavation

Add to Description:

1.3 Backfill material for excavated muck and unsuitable material locations shall consist of gravel or a rock and gravel mixture, as indicated in the plans or as directed. Gravel backfill is generally applicable for backfill of dry excavations and wet excavations that extend less than 5 feet below the prevailing water level. Rock and gravel backfill is generally applicable for wet excavations that extend greater than 5 feet below the prevailing water level. Material availability will also be considered by the Engineer when determining backfill material requirements.

Add to Classification of Materials:

2.9 Backfill material for muck and unsuitable material excavations shall conform to the following.

2.9.1 Gravel Backfill for Muck and Unsuitable Material Excavation shall conform to the gradation requirement of Item 304.2 in Section 304, Table 1. The gravel shall not be required to meet the wear requirement in 304.2.1.1.

2.9.2 Rock and Gravel Backfill for Muck and Unsuitable Material Excavation shall have 30 percent to 70 percent rock by volume with the remainder volume being gravel. The rock portion shall meet the stone size requirements in 585.2.1.2. The gravel portion shall meet the required gradation defined in 2.9.1.

Replace 3.5.1:

3.5.1 Muck removal and replacement. The excavation of muck shall be handled in a manner that prevents the entrapment of muck within the backfill. Backfilling of the excavated area shall follow immediately behind the excavation of the muck. The backfill shall be placed in a manner that pushes any remaining soft material within the excavation ahead of the advancing backfill. Materials used for muck backfill shall be as indicated on the plans or as directed, and shall include Items 203.6, 203.661, 203.662, or other specified items. When used, voids in the final surface of Rock and Gravel Backfill shall be thoroughly filled to prevent downward migration of embankment materials into any voids within the Rock and Gravel Backfill. Where groundwater is present, the backfill material shall be placed in one continuous lift to a maximum

elevation of 4 feet (1.2 m) above the water level, unless otherwise directed. During muck removal, the Contractor shall allow the Engineer adequate opportunity to take all the necessary elevations and measurements for determining the volume removed.

Replace 3.6.1:

3.6.1 Removal and replacement of unsuitable material for subgrade and slopes.

3.6.1.1 Subgrade unsuitable material removal and replacement. Where unsuitable material as defined in 2.7 is encountered at the design subgrade in cut sections, the Engineer will direct the limits of unsuitable material excavation. Materials used for backfilling the unsuitable material excavation at subgrade shall be as directed, and shall include Items 203.6, 203.661, 203.662, or other specified items. The replacement materials shall be compacted to the design subgrade, unless otherwise ordered. Backfilling to replace unsuitable material where groundwater is present shall follow the same procedure described in 3.5.1 so that any unsuitable material is pushed ahead of the backfill. When directed for use, a geotextile meeting the requirements of Section 593 for separation shall be placed between the final surface of the backfill material and the overlying embankment or base course materials.

3.6.1.2 Slope unsuitable material removal and replacement. Where unsuitable material, including unstable material caused by groundwater seepage is encountered within cut slopes, the Engineer will direct the limits of the unsuitable excavation. Materials used for backfilling the unsuitable excavation within slopes shall be as indicated on the plans or as directed, and include Items 203.661, 203.662, Items 585.1 through 585.4, or other specified items. When directed for use, a geotextile meeting the requirements of Section 593 for permanent erosion control shall be placed below the slope backfill materials.

Replace 3.7.4:

3.7.4 Unsuitable material removal and replacement below embankments. Where unsuitable material, including unstable material caused by groundwater conditions is encountered at the embankment bearing elevation within fill areas, the Engineer will direct the limits of unsuitable excavation. Removal and replacement of unsuitable materials shall follow the requirements of 3.6.1.1.

Add to 4.1:

4.1.4 Gravel Backfill for Muck and Unsuitable Material Excavation, and Rock and Gravel Backfill for Muck and Unsuitable Material Excavation will be measured by the cubic yard.

Replace 5.1.3:

5.1.3 Excavation of unsuitable material in roadway cut slopes as described in 3.6.1.2 will be paid as provided in 5.1.8. Backfill of the unsuitable material excavation in slopes shall be as described in 3.6.1.2 with payment made under the item that is directed and approved for use as backfill.

Replace 5.1.9:

5.1.9 Backfill of unsuitable material excavations at subgrade and below embankments shall be as described in 3.6.1.1 and 3.7.4 with payment made under the item that is directed and approved for use as backfill. When Item 203.6 is used, an adjustment in the embankment-in-place final pay quantity will be made as provided in 203.4.2.1.

Add to Basis of Payment:

5.14 When directed for use, geotextile will be paid for under the applicable Section 593 item or as provided in 109.04 if no bid item is in the contract.

Add to Pay items and units:

203.661	Gravel Backfill for Muck and Unsuitable Material Excavation	Cubic Yard (Cubic Meter)
203.662	Rock and Gravel Backfill for Muck and Unsuitable Material Excavation	Cubic Yard (Cubic Meter)

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SPECIAL PROVISION

AMENDMENT TO SECTION 203 -- EXCAVATION AND EMBANKMENT

Item 203.93 - Hydrogeologist
Item 203.941 – Baseline Groundwater Sampling Event
Item 203.942 – Extended Groundwater Sampling Event
Item 203.943 – Standard Analysis Groundwater Sampling Event

Add to Description:

1.3 Hydrogeologist. The Contractor shall retain the services of a hydrogeology/hydrology/environmental consultant (Hydrogeologist) to monitor, record, analyze and report groundwater conditions prior to, during and after construction. This special provision is applicable to all rock excavation items under this and other sections. The Contractor shall cooperate with and share groundwater testing information with other Contractors performing concurrent work for the Department.

Add to Construction Requirements

3.14 Hydrogeologist

3.14.1 Hydrogeologist Submittal. The name and resumé with respective qualifications of the Hydrogeologist shall be submitted to the Engineer for approval no later than the preconstruction conference. The Hydrogeologist shall not be an employee of the Contractor, subcontractor(s), explosives manufacturer, or explosives distributor or have been previously employed in such a capacity for at least 6 months prior to the contract award date.

3.14.2 Hydrogeologist Qualifications. The Hydrogeologist shall be experienced in the subject of environmental effects of blasting and shall be capable of thoroughly analyzing the potential environmental effects from blasting activities and associated construction related activities. The Hydrogeologist shall be qualified to thoroughly analyze potential groundwater and surface water flow pathways that may carry contaminants off site generated by blasting activities. The Hydrogeologist shall also be qualified in constructing and maintaining groundwater flow and solute transport simulation models, hydrogeologic modeling on groundwater resource assessments, conducting aquifer characterization, risk assessments, remediation planning and permitting, analyzing and interpreting hydrogeological and hydrogeochemical data, design and supervision of field tests, and analysis of test data. The necessary documentation and analysis shall be performed by a Professional Geologist or

Professional Engineer licensed in the State of New Hampshire. Proof of licensure, experience, and qualifications shall be provided with the submittal. The individual employees of the Hydrogeologist and their assignments under Items 203.93 shall be identified in the submittal. Qualifications of individuals shall be submitted for review if additional personnel are assigned to this project or if responsibilities change.

3.14.3 Hydrogeologist Duties. The Hydrogeologist shall monitor the quality of the groundwater by collecting, analyzing, interpreting, and reporting on groundwater data from samples collected from drinking water wells and tested per 3.14.3.2, 3.14.3.3, and 3.14.3.4. Groundwater samples shall be collected prior to the commencement of blasting and/or construction activities, once a month throughout the blasting activities and while blasted rock is stockpiled and/or crushed, and once upon completion of the construction project. The Hydrogeologist shall obtain written acceptance by the property owner identified in 3.14.3.1 and 3.14.3.1.1 to access and coordinate sampling events of their drinking water wells. All designated drinking water wells shall be sampled on the same day, and this will be known as a sampling event. Groundwater samples from parcels in 3.14.3.1 shall be collected prior to blasting activities and/or construction activities and upon completion of construction and shall be analyzed for the parameters in the Extended Analysis List in 3.14.3.3. Groundwater samples collected from parcels listed in 3.14.3.1.1 shall be collected prior to construction activities and upon completion of construction and be analyzed for the parameters in the Standard Analysis detailed in 3.14.3.4. Groundwater samples collected from parcels listed in 3.14.3.1 shall be collected throughout blasting activities and while rock is stockpiled and/or crushed shall be analyzed for the Baseline Analysis List outlined in 3.14.3.2. The Hydrogeologist shall employ the services of a laboratory accredited through the New Hampshire Environmental Laboratory Accredidation Program to analyze the samples. The Hydrogeologist shall analyze the groundwater test results and conditions after each sampling event. If groundwater quality impacts are identified, the Hydrogeologist shall investigate any and all potential sources of contamination and evaluate potential receptors. The Hydrogeologist shall provide the Engineer with recommendations of any additional private drinking water wells to sample and any other actions to take to address identified contamination. A report shall be provided to the Contractor and Engineer after each sampling event, and the report shall contain a summary of findings and provide recommendations to adjust excavation activities if it is found that groundwater is being affected. Laboratory results shall be provided to the respective property owner and include appropriate NHDES fact sheets and contact information for a representative from the Hydrogeology consultant. The contractor shall notify the property owner immediately if an exceedance of a drinking water standard is detected in any of the drinking water wells sampled. An immediate verbal notification is required in the event of a drinking water standard exceedance and shall be followed up with the letter as stated above.

The Engineer shall be copied on all correspondences and notifications to property owners. The contractor shall also provide bottled water to property owners if an exceedance of drinking water standards is identified to be a result of blasting.

3.14.3.1 Drinking Water Wells. The following drinking water wells shall be included in groundwater sampling events. If access is not granted by the property owner for any of the wells listed then a substitute well can be proposed for use by the Hydrogeolgist subject to approval by the Department.

Map-Block-Lot	Street	Owner
13-13-24	11 Shaw Dr.	Prud'homme, Roland G. Trustee
13-13-28	14 Shaw Dr.	Milonas, Christopher S.
13-13-29	20 Shaw Dr.	Chen, Michael G. & Melinda H.
13-19-000	23 Colonial Dr.	Dagher, Charbel & Samia
13-20-000	15 Colonial Dr.	Fish, Joseph Raymond Trustee
13-21-000	10 Shaw Dr.	Lodico, Robert A Trustee
13-47-000	27 Bedford Center Rd	Moore, Susan Tufts and Richard
13-49-000	14 Bedford Center Rd	Luke, Liane G & William Trustees
13-50-000	20 Bedford Center Rd	Connors, Steven & Lori
13-51-000	24 Bedford Center Rd	Jenkins, Kenneth E & Amelia E.
13-22-000	4 Shaw Dr.	Heng, Vichira & Sophy
13-57-000	30 Bedford Center Rd	Pease, Paula R. Trustee
13-11-000	2 Liberty Hill Rd	Lins, Manessa R.
13-11-1	4 Liberty Hill Rd	Fairfield, Thomas
13-12-000	5 Shaw Dr.	Rubin, Jonathan & Kelley
13-23-000	9 Colonial Dr.	Chandonnet, Keith T. & Susan
13-24-000	Colonial Dr.	Chandonnet, Keith T. & Susan
13-13-22	19 Shaw Dr.	Girard, Jami Stedfast
13-13-23	15 Shaw Dr.	Murai, Sarah E. & Marc

3.14.3.1.1

Parcel	Owner
25	TTI Realty Trust
35	Clark, Susan J.
37	Fortier, Kevin J., Combs-Fortier, Lisa
38	The Katherine Merritt Hanna Revocable Trust
48	Rubin, Jonathan & Kelley

3.14.3.2 Baseline Analysis List. Samples collected during construction shall be analyzed for the following parameters:

a) nitrate (See Note 2)
b) nitrite (See Note 2)

c) ammonia

Note 2 - Regulated contaminant

3.14.3.3 Extended Analysis List. Samples collected prior to blasting activities and after the construction shall include the following parameters:

a) pH
b) total alkalinity
c) iron (total and dissolved)
d) manganese (total and dissolved) (See Note 2)
e) arsenic (total and dissolved) (See Note 2)
f) hardness (total)
g) total dissolved solids (TDS)
h) nitrate (See Note 2)
i) nitrite (See Note 2)
j) ammonia
k) turbidity
l) polyaromatic hydrocarbons (PAH) via method 8270
m) total petroleum hydrocarbons (TPH) diesel range organics (DRO) via method 8015B
n) methyl tertiary butyl ether (MtBE) (See Note 2)
o) perchlorate
p) radon

Note 2 -Regulated contaminant

3.14.3.4 Standard Analysis List. Samples collected from parcels listed in 3.14.3.1.1 prior to construction and upon completion shall be analyzed for the following parameters:

a) Total Coliform Bacteria
b) Chloride
c) Iron
d) Lead (both stagnant and flushed)
e) *E. coli* Bacteria
f) pH
g) Manganese
h) Copper (both stagnant and flushed)
i) Nitrate
j) Hardness
k) Sodium
l) Uranium
m) Nitrite

n) Fluoride
o) Arsenic

3.14.5 Periodic Reporting of Monitoring Results. The Hydrogeologist shall provide a verbal periodic report within 24 hours of reciept of laboratory results, providing a summary table of sample analytical results for each sampling event to the Engineer. A written periodic report presenting all analytical results and evaluations shall be provided to the Engineer within one week of reciept of laboratory results for each sampling event. A sampling event is the completion of the sampling of all of the drinking water wells in the intervals specified under 3.14.3. One electronic copy of the periodic reports shall be submitted to the Engineer. The periodic reports shall include the following items:

a) A discussion of the hydrogeologic and hydrologic conditions (including water quality) across the project and indicate anywhere variations of water quality occur.

b) A summarized tabulation of test results from the current and prior analysis. Drinking water quality results shall be compared to the United States Environmental Protection Agency (USEPA, 2003) maximum contaminant levels (MCLs) and secondary maximum contaminant levels (SMCLs), and NHDES ambient groundwater quality standards (AGQS, NHDES, 2008)

c) Evaluation of any hydrologic/hydrogeologic impacts to the regional groundwater system relative to the drilling and blasting.

d) Recommendations to address any impacts identified.

e) A site plan depicting sample locations delineation of areas determined to be impacted (indicating severity). This map shall be based on and include information on local topography, subsurface conditions, nearby surface water, and any other major geologic features in close proximity to the drilling and blasting that the Hydrogeologist deems significant.

f) Appendices including laboratory reports for the water quality sampling from the current analysis, including all field collection data associated with the collection of samples in a tabular format.

g) The Periodic Monitoring Reports shall be certified and stamped by a Professional Geologist or Professional Engineer licensed by the State of New Hampshire.

3.14.5.1 Any regulated contaminant detected above current ambient groundwater quality standards (AGQS) shall be reported to the New Hampshire Department of Environmental

Services in accordance with PART Env-Or 600 NOTIFICATION of the Contaminated Site Management rules.

3.14.6 Final Report of Monitoring Results. The Hydrogeologist shall provide a final report presenting all technical data and evaluations upon completion of all sampling events at the end of the construction project to the Engineer. One electronic copy of the final report shall be submitted to the Engineer. The final report shall include the following items:

a) A discussion of the water quality across the project and anywhere variations of water quality occur.

b) A summarized tabulation of test results from all analysis. Drinking water quality results shall be compared to the United States Environmental Protection Agency (USEPA, 2003) maximum contaminant levels (MCLs) and secondary maximum contaminant levels (SMCLs), and NHDES ambient groundwater quality standards (AGQS, NHDES, 2008)

c) Evaluation of any hydrologic/hydrogeologic impacts to the regional groundwater system relative to the drilling and blasting.

d) A site plan depicting sample locations, and delineation of areas determined to be impacted (indicating severity). This map shall be based on and include information on local topography, subsurface conditions, nearby surface water, and any other major geologic features in close proximity to the drilling and blasting that the Hydrogeologist deems significant.

e) Appendices including all results of the water quality sampling including all field collection data associated with the collection of samples in a tabular format.

f) The Final Monitoring Reports shall be certified and stamped by a Professional Geologist licensed by the State of New Hampshire.

Add to Method Of Measurement:

4.12 Hydrogeologist will be measured as a unit and will include all work necessary to prepare and provide and the final report on 19 private water supply wells.

4.13 Groundwater sampling for the baseline, extended, and standard analysis will be measured by each complete sample tested and reported on periodially. This work includes all labor and materials to collect the sample, submit the sample for laboratory analysis, the laboratory cost for analysis, and reporting the reults to the Department and property owner.

Add to Basis Of Payment:

5.14 Hydrogeologist item will be paid as follows:

5.14.1.1 When the Hydrogeologist Submittal described in 3.14.1 is approved, 50 percent of the item will be paid.

5.14.1.2 When the Final Report described in 3.14.6 is submitted, the remaining 50 percent of the item will be paid.

5.14.1.3 If less than 27 individual wells are sampled the unit price will be reduced by 0.02 units for each well that is not included in the monitoring.

5.14.2 Water sample collection and testing for the Baseline Reporting under 3.14.3.2 will be paid for each sample collected, analyzed, and reported on.

5.14.3 Water sample collection and testing for the Extended Reporting under 3.14.3.3 will be paid for each sample collected, analyzed, and reported on.

5.14.4 Water sample collection and testing for the Standard Analysis Reporting under 3.14.3.4 will be paid for each sample collected, analyzed, and reported on.

5.14.4 Additional water samples ordered for baseline, extended, or standard testing will be paid for as extra work according to 109.04.2 and will be paid for under Item 1008.6.

5.14.5 The cost of providing bottled water by the contractor will be paid for as extra work according to 109.04 and will be paid for under Item 1008.6.

5.14.6 Additional Hydrogeologist work ordered and not otherwise provided for in other pay items will be paid for as extra work according to 109.04 under Item 1008.6.

Pay items and units:

203.93	Hydrogeologist	Unit
203.941	Baseline Groundwater Sampling Event	Each
203.942	Extended Groundwater Sampling Event	Each
203.943	Standard Analysis Groundwater Sampling Event	Each

SPECIAL PROVISION

AMENDMENT TO SECTION 209 – GRANULAR BACKFILL

Item 209.61 – Lightweight Aggregate Backfill

Add to Description:

1.2 Lightweight Aggregate (LWA) Backfill shall meet the material and construction requirements contained herein and shall be used as indicated in the plans, or as directed.

1.2.1 The LWA is required as backfill behind the headwall extension at Sta. 116+32, left. The LWA is required to limit the lateral earth pressure on the existing and extended headwall.

Add to Materials:

2.3 LWA shall be Expanded Shale, Clay or Slate (ESCS) produced by the rotary kiln process that meets the requirements of ASTM C330 and the following requirements. The material shall not contain any by-product slags, cinders or by-products from coal combustion.

2.3.1 Gradation. Gradation sampling and testing methods for the LWA shall conform to Section 304.3.5. The LWA shall conform to the following gradation:

Sieve Size	Percentage by Weight Passing
1 inch	100
3/4 inch	90-100
3/8 inch	10-50
No. 4	0-15

2.3.2 Soundness Loss. The maximum soundness loss shall be 10 percent, when tested with 5 cycles of Magnesium Sulfate in accordance with ASTM C-88.

2.3.3 Chloride Content. The maximum chloride content shall be 100 ppm, when tested in accordance with ASTM D4327 and AASHTO T 291.

2.3.4 Sulfate Content. The maximum sulfate content shall be 200 ppm, when tested in accordance with ASTM D4327 and AASHTO T 290.

2.3.5 pH. The acceptable pH range shall be 5 to 10, when tested in accordance with AASHTO T 289.

2.3.6 Resistivity. The minimum resistivity shall be 3000 ohm-cm at 100 percent saturation, when tested in accordance with AASHTO T 288. The resistivity test shall be conducted at 100 percent saturation, not in a supersaturated slurry state beyond 100 percent saturation.

2.3.7 Shear Strength. The minimum shear strength (phi angle) shall be 36 degrees for materials in a loose state, and 40 degrees for materials compacted to a relative density of 65 percent. The materials shall be saturated and tested in accordance with ASTM D 3080 using direct shear test methods. The test samples shall be representative of the required gradation, with particles greater than 3/4 inches removed from the sample. The direct shear box shall have a minimum of width of 12 inches in all directions.

2.3.8 Density. The dry loose bulk density shall be less than 50 pounds per cubic foot, when tested in accordance with ASTM C 29. The maximum in situ compacted density (moist, surface dry) shall be less than 65 pounds per cubic foot at a minimum relative density of 65 percent. The compacted density shall be determined in accordance with AASHTO T-99/ASTM D698 using the one point method on a representative sample with a moisture content that is typical of the expected field moisture content; a 0.5 cubic foot bucket shall be used for the density test in place of the Standard Proctor mold. The relative density shall be determined in accordance with ASTM D 4253 and 4354.

2.3.9 The Contractor shall furnish to the Engineer a certificate of compliance certifying the LWA material complies with this section of the specifications. A copy of all test results performed by the Contractor, which are necessary to assure compliance with the specifications, shall also be furnished to the Engineer. Material not conforming to this specification shall not be used without the written consent of the Engineer.

Add to Construction Requirement:

3.2 Submittals. At least four weeks prior to constructing the LWA, the Contractor shall submit an installation plan in accordance with 105.02 to the Engineer for review and approval. The installation plan shall include the information described in 2.3.9, and a description of the methods and equipment that will be used to place, compact and test the LWA in the field. The installation plan shall be reviewed and approved in writing by an authorized technical representative of the LWA supplier, prior to the submittal.

3.3 LWA Supplier's Technical Representative. The Contractor shall make the necessary arrangements with the LWA supplier to have a Technical Representative available on-site at any time during the LWA construction, as requested by the Engineer. When a Technical Representative has been requested by the Engineer, no LWA construction shall be allowed until the Technical Representative has arrived at the project site.

3.4 LWA Placement and Compaction. The LWA shall be placed with a maximum loose lift thickness that does not exceed 8 inches. The Contractor shall decrease this lift thickness, if necessary to obtain the specified density. Each lift shall be compacted using vibratory compaction equipment weighing no more than 12 tons static weight, or less, if a lower weight compactor is required by the LWA supplier. Equipment used to place and compact the LWA

shall have rubber tires. Steel tracked placement and compaction equipment shall not be used. Construction equipment other than for placement and compaction shall not operate on the exposed lightweight fill.

3.5 LWA In-Place Density and Testing Requirements. The frequency of sampling and testing of the Item 209.61 material that is necessary to assure gradation and compaction control throughout construction shall be as directed by the Engineer. The acceptance criteria for the control of compaction and in-place density shall be either, a minimum 65 percent relative density as determined by ASTM D 4253 and D4254, or a method specification based on a test compaction section that defines the type of equipment, lift thickness, number of passes of the specified equipment, and placement moisture content. The methods used for the in-place density determination shall be in accordance with 304.3.7.

Add to Method of Measurement:

4.5 Lightweight Aggregate Backfill will be measured by the cubic yard in accordance with 109.01.

4.5.1 Lightweight Aggregate Backfill sampling, testing and Technical Representative site visits shall be subsidiary to Item 209.61.

Add to Basis of Payment:

5.4 The accepted quantity of Lightweight Aggregate Backfill will be paid for at the Contract unit price, complete in place.

Add to Pay items and unit

209.61	Lightweight Aggregate Backfill	Cubic Yard

SPECIAL PROVISION

SECTION 210 – GEOTECHNICAL INSTRUMENTATION

Item 210.1 Settlement Platform Installation
Item 210.2 Settlement Platform Monitoring

Description

1.1 This work shall consist of furnishing, installing, surveying, maintaining, and protecting settlement platforms at the following locations or as ordered:

Roadway	Station (ft)	Designation	Base Plate Level
NH Route 101 Westbound	166+00 LT 35	SP1	Cleared embankment subgrade
	168+00 LT 35	SP2	
	170+00 LT 35	SP3	
	172+00 LT 40	SP4	
NH Route 101 Eastbound	164+00 RT 50	SP5	Top of muck backfill
	166+00 RT 50	SP6	
	168+00 RT 50	SP7	
	170+00 RT 50	SP8	

1.2 Surveying will be required for settlement platform installation.

1.3 Surveying will be required to monitor the settlement platforms during construction as directed by the Engineer.

Materials

2.1 Settlement platforms shall be constructed as shown on Figure 1.

2.1.1 Riser pipe shall be black steel, schedule 40, male threaded and coupled and have a nominal inner diameter of 2 inches.

2.1.2 Couplings and flanges shall be of similar quality to and compatible with the riser pipes.

2.1.3 Fasteners shall be black steel and have a minimum nominal diameter of 1/2 inch.

2.1.4 Plywood shall be of exterior grade and have a minimum nominal thickness of 1 inch.

2.2 Protective railings shall be constructed as shown on Figure 2.

2.2.1 Lumber for the protective railings shall be of sound quality and have minimum nominal dimensions of 2 inches by 4 inches.

Construction Requirements

3.1 Survey personnel for this work shall have previous surveying experience and shall be subject to the Engineer's approval. Survey equipment shall be accurate to within 0.01 feet. Survey work shall reference a benchmark located outside the influence of construction work as approved by the Engineer.

3.1.1 Settlement monitoring shall be performed at a frequency established by the Engineer. The Contractor shall report the results of each survey to the Engineer by the end of the work day on which the readings were taken.

3.2 The settlement platform shall be installed on a level surface. The riser pipe shall be within 2 degrees of vertical for the entire length of the instrument.

3.3 The settlement platform shall be installed to the Engineer's satisfaction before the Contractor is permitted to place any fill above the specified level of the platform.

3.4 The first section of riser pipe shall be 5 feet long and wrench-tightened to the flange. An initial elevation of the base plate shall be taken by the Contractor and provided to the Engineer. A minimum 2.5 foot thick layer of sand (Item 304.1) shall be placed on top of the platform to stabilize the pipe. After stabilizing sand placement, the elevation of the top of the pipe shall be surveyed.

3.5 Subsequent sections of wrench-tightened riser pipe shall not extend less than 2 feet or more than 7 feet above the surface during embankment fill placement. Reference points shall be file-cut into the outsides of the pipes at regular intervals during embankment fill placement to maintain a continuous, manual record of the length of pipe above the settlement platform. The top of the pipe shall not extend more than 4 feet above the surface at the top of embankment fill placement when completed. After embankment fill placement, the elevation of the top of the pipe shall be surveyed.

3.6 Compaction of all materials within 2 feet of the riser pipe shall be performed using manually propelled compaction equipment. Sufficient care shall be exercised in placing and compacting the embankment materials adjacent to the platforms to maintain the riser pipes in a vertical position.

3.7 Failure to maintain riser pipe alignment to within 2 degrees of vertical at the top of embankment fill placement shall result in removal and reinstallation of the entire settlement platform at the Contractor's expense.

3.8 Protective railings shall be placed around the riser pipe at the end of fill placement and maintained in-place at all times by the Contractor.

3.9 Construction related disturbances and damages to the settlement platforms and protective railings shall be reported to the Engineer immediately and corrected by the Contractor within two working days at the Contractor's expense.

Method of Measurement

4.1 Settlement platforms will be measured by the unit, complete in-place, including installation surveying and protective railings.

4.2 Settlement platform monitoring performed after installation will be measured by the hour for the accountable time on site to the nearest one-quarter hour. The hourly rate is all inclusive of the equipment and personnel necessary to perform the work. Travel time and other time not spent at the site, and measurements not authorized by the Engineer, will not be measured.

Basis of Payment

5.1 The accepted quantities of settlement platforms will be paid for at the contract unit price, complete in-place.

5.2 Sand and sand placement, protective railings, railing maintenance, and surveying for settlement platform installation are subsidiary.

5.3 The accepted quantity of settlement platform monitoring services will be paid for at the contract unit price per hour, complete. Travel time and other time spent at the site or off-site areas and support services (i.e. travel, mileage, clerical staff, miscellaneous expenses, overhead, etc.) are subsidiary. No payment will be made for time spent reporting settlement monitoring results.

Pay item and units:

210.1	Settlement Platform Installation	Each
210.2	Settlement Platform Monitoring	Hour

Figure 1 – Settlement Platform

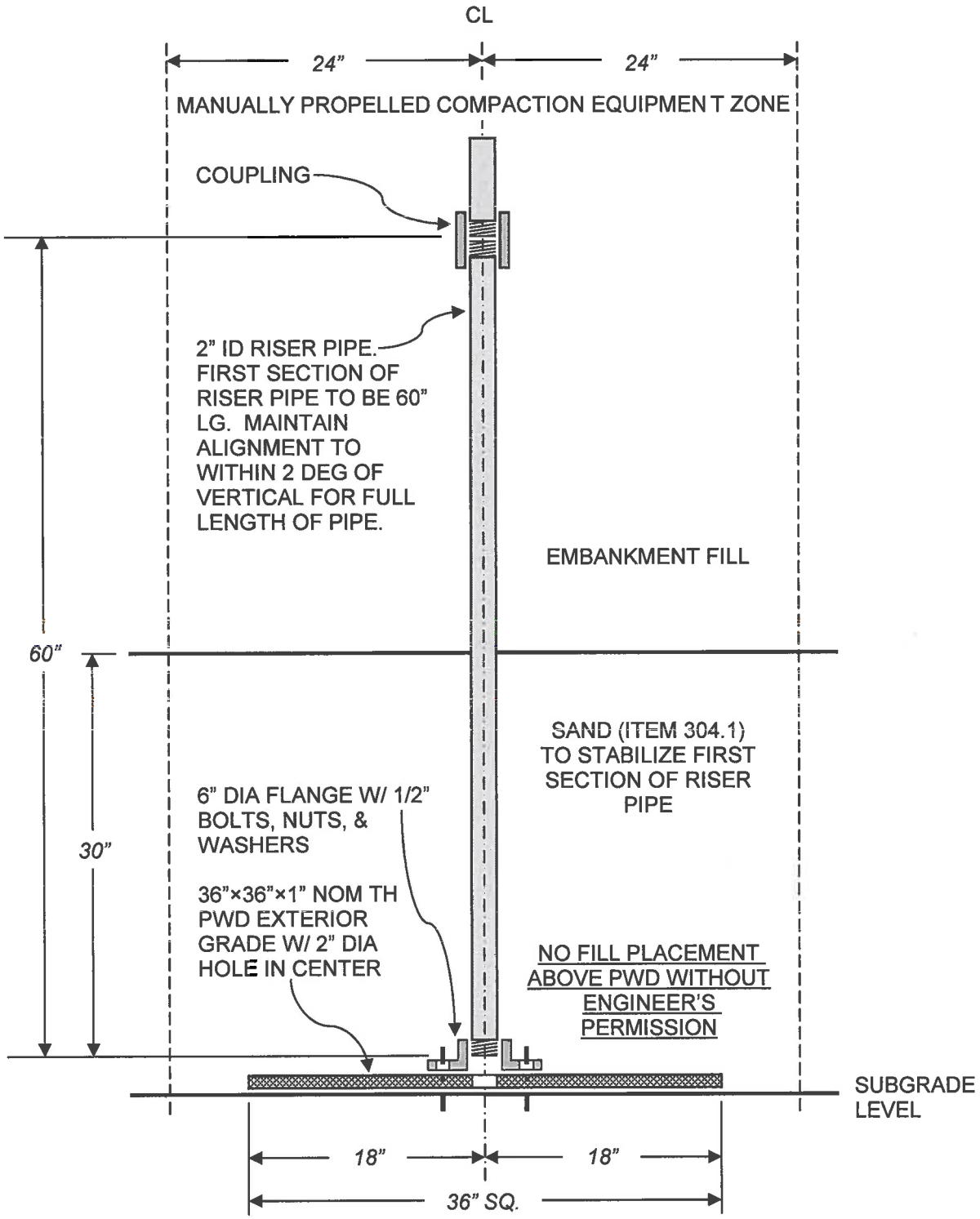
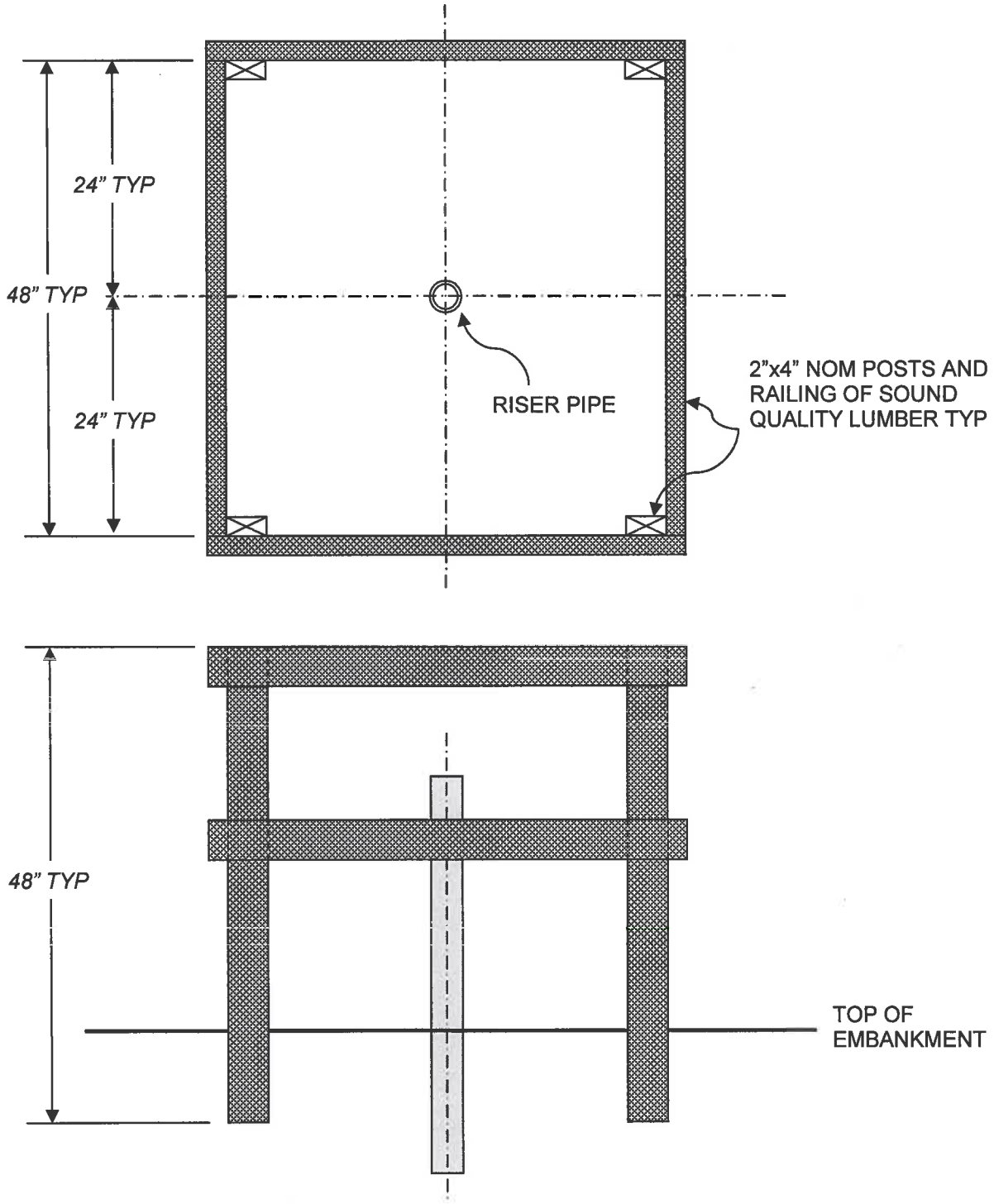


Figure 2 – Protective Railing



SUPPLEMENTAL SPECIFICATION

AMENDMENT TO SECTION 211 – VIBRATION MONITORING

The purpose of this Supplemental Specification is to add the reference to the requirements for pre-construction and post-construction surveys.

Replace 3.4 to read:

3.4 Pre-construction and post-construction condition surveys. The Contractor shall conduct a pre-construction condition survey on all structures, including swimming pools and mobile homes, within 150 feet of the anticipated sources of construction related vibrations. A pre-construction survey shall also be conducted on structures that may be affected by construction related vibrations beyond the 150 foot distance as directed by the Engineer or as contained in the approved Vibration Monitoring Plan. The pre-construction surveys shall not be initiated until the Vibration Monitoring Plan has been approved. Upon completion of all construction operations that are a source of construction related vibrations, the Contractor shall conduct a post-construction condition survey of all structures for which a complaint of damage has been received or a damage claim has been filed. Notification of the post-construction survey shall be given to all interested parties, so they may be present during the survey. A copy of all pre-construction condition surveys shall be provided to the Engineer prior to the start of work. A copy of all post-construction condition surveys conducted shall be provided to the Engineer upon completion of the survey. Perform the surveys in accordance with of 203.3.3.3.2 and 203.3.3.3.3.

04/13/12
SSD: 5/23/00, 04/20/11

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March 16, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 304 -- AGGREGATE BASE COURSE

Item 304.41 – Crushed Stone (Fine Gradation) for Shim
Item 304.43 – Crushed Stone (Fine Gradation) for Shoulder Leveling
Item 304.45 – Crushed Stone (Fine Gradation) for Drives

Add to Materials:

2.12 Crushed stone (fine gradation) for shim, shoulder leveling, or drives. The material shall meet the gradation requirements of crushed stone (fine) as shown in Table 1.

Add to 3.4:

3.4.11 Crushed stone (fine gradation) for shim, shoulder leveling, or drives shall be placed where as shown on the plans and as determined by the Engineer.

Amend 4.4 to read:

4.4 Gravel, crushed gravel, and crushed stone (fine gradation) for the type specified will be measured by the cubic yard (cubic meter) of compacted material placed within the lines shown on the plans or as directed by the Engineer.

Amend 5.3 to read:

5.3 The accepted quantities gravel, crushed gravel, and crushed stone (fine gradation) for type specified will be paid for at the contract unit price per yard cubic (cubic meter) complete in place.

Add to Pay items and units:

304.41	Crushed Stone (Fine Gradation) for Shim	Cubic Yard (Cubic Meter)
304.43	Crushed Stone (Fine Gradation) for Shoulder Leveling	Cubic Yard (Cubic Meter)
304.45	Crushed Stone (Fine Gradation) for Drives	Cubic Yard (Cubic Meter)

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March 16, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 304 -- AGGREGATE BASE COURSE

Item 304.299 - Temporary Gravel
Item 304.399 - Temporary Crushed Gravel
Item 304.499 - Temporary Crushed Stone, Fine Gradation
Item 304.599 - Temporary Crushed Stone, Coarse Gradation

Add to 1.1:

1.1.1 This work shall consist of furnishing, placing and removing temporary gravel, temporary crushed gravel, or temporary crushed stone, either fine or coarse gradations, on the detour, or temporary widening of the roadway to maintain traffic as shown on the plans or as ordered.

Add to Materials:

2.11 Temporary gravel and temporary crushed gravel shall meet the requirements of 2.2 and 2.4 or 2.5 as appropriate.

2.12 Temporary crushed stone shall meet the requirements of 2.2 and 2.9 or 2.10 as appropriate.

Add to Construction Requirements:

3.10 Temporary gravel, temporary crushed gravel or crushed stone, either fine or coarse gradation, shall be furnished and placed in accordance with applicable provisions of the Construction Requirements on the detour or widened areas as required to maintain traffic. This material may be reused in subsequent phases providing that the material does not become contaminated during use and continues to meet the requirements of 2.2 and 2.4, 2.5, 2.9 or 2.10 as appropriate. Temporary gravel, temporary crushed gravel or crushed stone, either fine and coarse gradation, shall be removed at the completion of the project or when no longer necessary.

Add to 4.1:

4.1.1 Temporary gravel, temporary crushed gravel or temporary crushed stone, of the types specified, will be measured as provided in 4.1.

Add to Basis of Payment:

5.3 The accepted quantity of temporary gravel, temporary crushed gravel or temporary crushed stone, of the types specified, will be paid for as provided in 5.1.

5.3.1 Removal of temporary gravel, temporary crushed gravel or temporary crushed stone, of the types specified, will not be paid for under other items of the contract but will be subsidiary.

Add to pay items and units:

304.299	Temporary Gravel	Cubic Yard (Cubic Meter)
304.399	Temporary Crushed Gravel	Cubic Yard (Cubic Meter)
304.499	Temporary Crushed Stone, Fine Gradation	Cubic Yard (Cubic Meter)
304.599	Temporary Crushed Stone, Coarse Gradation	Cubic Yard (Cubic Meter)

4/23/09

SSD: 10/21/97, 2/9/98; Reviewed 6/10

BEDFORD
13953

April 11, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 401 -- PLANT MIX PAVEMENTS - GENERAL

Amend the second sentence of 2.2 to read:

On this project the grade of bituminous material to be used shall be PG 64 -28. The grade of bituminous material for Item 403.11902 shall be PG 76-28.

04/09/09

SSD: 1/11/1999

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13953

April 11, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 401 -- PLANT MIX PAVEMENTS - GENERAL

Items 403.XX - Hot Bituminous Pavement, XXXXX (Superpave)

Add to 2.5.1:

2.5.1.1 The Volumetric Mix Design for this project shall utilize a 75 gyration N design mix.

SUPPLEMENTAL SPECIFICATION

AMENDMENT TO SECTION 401 – PLANT MIX PAVEMENTS - GENERAL

The purpose of this Supplemental Specification is to add "winter binder" to the design control points.

Amend the Minimum Binder Content table under Section 2.5.1 as follows:

Minimum Binder Content

50 Gyration		75 Gyration
	3/8"	6.0%
5.8%	1/2"	5.5%
5.5%	Winter Binder 3/4"	5.2%
4.9%	3/4"	4.6%
4.6%	1"	4.3%

Amend Table 401-1 – Design Control Points under Section 2.5.1 as follows:

Table 401-1 –Design Control Points*

Standard	Nominal Maximum Aggregate Size											
Sieves	1"		3/4"		3/4" Winter Binder		1/2"		3/8"		No. 4	
	Max.	Min.	Max.	Min.	Max.	Min.	Max	Min.	Max.	Min.	Max.	Min.
Inch	Percentage by Weight Passing Criteria (Control Points)											
2												
1-1/2		100.0										
1	100.0	90.0		100.0		100.0						
3/4	90.0		100.0	90.0	100.0	90.0		100.0				
1/2			90.0		90.0		100.0	90.0		100.0		
3/8							90.0		100.0	90.0	100.0	99.0
No. 4									90.0		97.0	90.0
No. 8	45.0	19.0	42.0	32.0	48.0	38.0	52.0	42.0	56.0	46.0	75.0	65.0
No. 16											55.0	45.0
No. 30											36.0	26.0
No. 50											30.0	20.0
No. 100											13.0	8.0
No. 200	7.0	1.0	8.0	2.0	8.0	2.0	10.0	2.0	10.0	2.0	8.0	4.0

SUPPLEMENTAL SPECIFICATION

AMENDMENT TO SECTION 400 -- PAVEMENTS

AMENDMENT TO SECTION 410– BITUMINOUS SURFACE TREATMENT

The purpose of this Supplemental Specification is to

- *adopt new AASHTO specifications for emulsions (2.1 – 04/13/16)*
- *revise the pavement conditions and application rates for tack (3.4.1.1 – 01/04/17)*

Amend 2.1 to read:

2.1 Bituminous material shall be the type and grade specified or ordered and shall conform to the requirements of AASHTO M 140 or M 208, except as amended in Section 702.

Amend 3.4.1.1 to read:

3.4.1.1 A tack coat shall be applied immediately prior to placement of pavement. The rate of application of emulsified asphalt shall be between 0.02 and 0.06 gal/yd^2, based on the application table below. The Engineer may further modify the rate depending on the relative absorbance and texture of the pavement surface.

Existing Pavement Condition	Application Rate in Gal/yd^2
Smooth HMA	0.02 – 0.04
Milled HMA	0.04 – 0.06

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March 16, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 506 – SHEET PILING

Item 506.4 - Steel Sheet Piling for Environmental Protection

Add to Description:

1.2 This work shall consist of furnishing and placing temporary steel sheet piling to create barrier walls for environmental protection and to maintain water quality standards. It is anticipated that in some areas the Storm Water Pollution Prevention Plan (SWPPP) will require steel sheet piling walls in order to prevent turbid water from entering environmentally sensitive areas. Steel sheet piling walls will be used in conjunction with various construction operations (muck excavation, BMP construction, drainage installations/extensions, embankment-in-place, etc.) located near existing watercourses and wetlands.

Add to Materials:

2.2 Steel sheet piling for environmental protection shall have a minimum length of fifteen (15) feet and shall possess sufficient cross section strength to survive installation in the ground. The sheet piling shall be free of holes or other defects that would allow undesired movement of water through the sheet pile wall.

Delete 3.1.2

Add to Construction Requirements:

3.3 The Contactor shall submit working drawings for approval per 105.02. The working drawings shall be included as a supplement to the SWPPP. The plan shall include the proposed method of installation and removal, construction sequencing, the plan location of the sheet piling wall, sheet piling size, embedment, bracing required for stability, and the anticipated duration that the sheet piling wall will be left in place.

3.4 If site conditions provide sufficient room, the sheet piling shall be located such that there is no excavation adjacent to them. In situations where excavation adjacent to sheet piling cannot be avoided the sheet piling shall be designed with sufficient bracing to be self-supporting.

3.5 Sheeting shall be installed with three (3) feet extending above existing ground elevation or adjacent surface water elevation unless otherwise directed.

3.6 Sheeting shall be left in place until the work area is considered stable and can meet the requirements contained in the environmental permits.

Replace 4.1 with:

4.1 Steel sheeting used for environmental protection will be measured by the square yard as determined according to 4.1.1 and 4.1.2

4.1.1 Where excavation adjacent to the sheet piling wall is not required, the horizontal length of the sheet piling wall will be measured by a straight-line dimension on the approved plan to the nearest foot. The vertical height will not be measured. It will be fifteen (15) feet for the purposes of calculating the pay quantity.

4.1.2 Where excavation is performed near the sheet piling wall, necessitating deeper embedment of the sheet piling for stability and therefore longer sheet piling and/or bracing, the vertical height measured will include the total vertical height of the sheeting installed as required for stability according to the approved plan. Any bracing installed will not be measured and will be subsidiary to the item.

Delete 4.2.

Replace 5.1 with:

5.1 The accepted quantity for steel sheeting will paid for at the contract unit price per square yard.

Add to Pay items and units:

506.4	Steel Sheet Piling for Environmental Protection	Square Yard

08/18/03

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13953

March 17, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 570 -- STONE MASONRY

Item 570.301 – Dry Squared Stone Masonry
Item 570.401 – Mortar Rubble Masonry

Amend 4.1 to read:

4.1 Mortar rubble masonry and dry squared stone masonry shall be measured by the cubic yard (cubic meter), to the nearest 0.1 of a cubic yard (cubic meter). The dimensions as shown on the plans or as ordered will be used in computing the quantity for payment.

Amend 5.1 to read:

5.1 The accepted quantity of mortar rubble masonry and dry squared stone masonry will be paid for at the contract unit price per cubic yard (cubic meter) complete in place.

Add to pay items and units:

570.301	Dry Squared Stone Masonry	Cubic Yard (Cubic Meter)
570.401	Mortar Rubble Masonry	Cubic Yard (Cubic Meter)

Bedford
13953

February 1, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 585 – STONE FILL

Item 585.3401 – Simulated Streambed Material

Add to Description:

1.2 This work shall consist of furnishing and placing Simulated Streambed Material at the following location on this project:

1. DN #250 – Sta. 188+25, RT 80.1' to Sta. 186+37, RT 75.3'
2. DN #249 – Sta. 191+01, RT 87.0' to Sta. 188+25' RT 80.1'
3. DN #248 – Sta. 192+00, RT 139.0' to Sta. 191+01, RT 87.0'
4. DN # 257 – Sta. 192+45, RT 169.3' to Sta. 192+00, RT 139.0'

1.2.1 The Simulated Streambed Material shall be placed in locations as shown on the contract plans. The intent is to protect and replicate the natural streambed environments of the reference reach listed above. The percentage of specific stream bed material was determined in the field utilizing the Wolman Pebble Count methodology. The gradation of substrate particle sizes are based on the Wentworth scale as referenced in the Guidelines for Naturalized River Channel Design and Bank Stabilization.

Add to Materials:

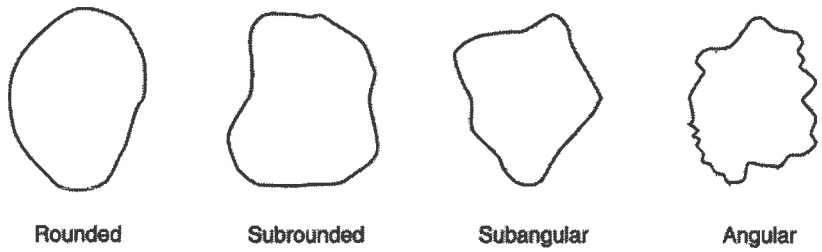
4.1.6 Simulated Streambed Material shall consist the following gradation:

	% by Weight				
	DN# 250	DN# 249	DN# 248	DN# 257	Sieve Sizes (in)
Item 585	0.3401	0.3401	0.3401	0.3401	
Muck	15%	15%	15%	15%	See item 647.29 – Wetland Humus specifications
Sand	15%	15%	15%	15%	0.003 to 0.08 (smaller than head of a match)
Gravel	30%	30%	30%	30%	0.08 to 2.5 (between head of match and tennis ball)
Cobble	40%	40%	40%	40%	2.5 to 10.00 (between tennis ball and volleyball)
Boulder	0%	0%	0%	0%	10.0 to > (Larger than volleyball)
Depth	1.5'	1.5'	1.0'	1.0'	
Shape	Sub-A	Sub-A	Sub-A	Sub-A	

2.1.6.1 Streambed Material depth is as shown in the table except as noted in the contract plans.

2.1.6.2 Particle shape shall general conformity to:

R = Rounded, Sub-R = Subrounded, Sub-A = Subangular, A = Angular



Add to 3.1:

3.1.3 In accordance with the *Guidelines for Naturalized River Channel Design and Bank Stabilization*, specifically 2.2.1.2 Semi-Natural Form Design, the Streambed Material shall be placed directly on the existing channel floor as shown in the contract plans. In cases where scour protection or streambed anchorage material is required the scour/anchorage material shall be placed first, then the Streambed Material shall be worked into the top 1'-0" filling voids, followed by the depth of Streambed Material specified.

Method of Measurement

Add to Method of Measurement:

4.2 Simulated Streambed Material will be measured by the cubic yard.

Basis of Payment

Add to Basis of Payment:

5.1.1 The accepted quantity of Simulated Streambed Material will be paid for at the Contract unit price per cubic yard complete in place.

Add to Pay Items and Units:

585.3401	Simulated Streambed Material	Cubic Yard

09/18/14
SSD: 11/26/03

BEDFORD
13953

March 17, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 603 -- CULVERTS AND STORM DRAINS

Item 603.990_ _ - _ _ in. (mm)Temporary Drainage Pipe
Item 603.389_ _ - Temporary End Section for _ _ in. (mm) Pipe

Add to Materials:

2.8.4 Temporary end sections shall meet the requirements of 2.8 except used end sections may be allowed.

2.8.4.1 The thickness of the metal or class of concrete end section shall match the pipe furnished that the end section is connected to.

Add to Materials:

2.13 Temporary drainage pipe shall meet the requirements of 2.1, 2.2 or 2.3 except used pipe approved by the Engineer may be allowed.

2.13.1 The Contractor shall determine the D-load or thickness of steel or aluminum needed.

Add to Construction Requirements:

3.11 Temporary pipe and/or temporary end sections shall be removed from the project and remain property of the Contractor upon completion of the project, or when no longer needed.

Add to 5.1:

5.1.4 Removal of temporary pipe and/or temporary end sections shall be subsidiary.

Add to pay items and unit:

603.990_ _	_ _ _ in. Temporary Drainage Pipe	Linear Foot
603.389_ _	Temporary End Section for _ _ in. Pipe	Each

SUPPLEMENTAL SPECIFICATION

AMENDMENT TO SECTION 603 -- CULVERTS AND STORM DRAINS

The purpose of this Supplemental Specification is to allow polypropylene pipe, clarify UV light requirements as well as Contractor's Option requirements.

Amend 2.3 to read:

2.3 Plastic Pipe.

2.3.1 Manufacturers of Polyvinyl Chloride (PVC) pipe, Polyethylene (PE) pipe and Polypropylene (PP) pipe must participate in and maintain compliance with the AASHTO National Transportation Product Evaluation Program (NTPEP) that audits producers of plastic pipe.

2.3.2 Polyvinyl chloride profile wall pipe shall conform to the requirements of AASHTO M 304. PVC pipe and associated fittings shall not be used in applications where it will be exposed to long term ultraviolet light .

2.3.3 Polyethylene pipe shall conform to the requirements of AASHTO M 252 or M 294, Type C, Type S, or Type D as specified on the plans. PE pipe and associated fittings shall be protected from ultraviolet light degradation by the inclusion of carbon black as specified in AASHTO M 294.

2.3.4 Polypropylene pipe shall conform to the requirements of AASHTO M 330, Type C, Type S, or Type D as specified on the plans. PP pipe and associated fittings shall be protected from ultraviolet light degradation by the inclusion of carbon black or ultraviolet light stabilizers as specified in AASHTO M 330.

2.3.5 Only soil tight pipefittings supplied or recommended by the manufacturer shall be used, unless otherwise specified.

2.3.6 When watertight joints are specified, watertight pipefittings supplied or recommended by the manufacturer shall be used and shall conform to ASTM D3212.

2.3.7 When the item description includes plastic pipe or plastic pipe material with the plastic material type not specified, either polyvinyl chloride, polyethylene, or polypropylene pipe shall be furnished meeting the requirements of 2.3.

Amend 2.6 to read:

2.6 Pipe for Slope Drainage.

2.6.1 Pipe for slope drain shall conform to the requirements of 2.3 and shall be limited to Type C.

2.6.2 The pipe coupler for plastic pipe shall consist of a plastic coupler and a minimum of 2 stainless steel or 3 plastic bands installed on the exterior corrugations. Slope pipe coupling bands shall engage a minimum of two full corrugations of each pipe section being joined, and shall be reinforced to meet the criteria for the "Downdrain Joint" category of Section 26 of the AASHTO LRFD Bridge Construction Specifications.

Amend 2.7 to read:

2.7 Pipe for Drives and Minor Approaches.

2.7.1 It shall be the Contractor's option to furnish reinforced concrete pipe or corrugated aluminized steel type 2 pipe, unless otherwise specified, for pipe for drives and minor approaches. Reinforced concrete pipe shall meet the requirements of 2.1. Corrugated aluminized steel pipe shall meet the requirements of 2.2. The strength or thickness shall meet the requirements of Table 3. Where cover is 2' or greater, and where load requirements can be met, polyethylene or polypropylene pipe, meeting the requirements of 2.3, may be used.

Add 2.13:

2.13 Contractor's Option. When the pipe material is not specified in the item description, pipe conforming to either 2.1 or 2.3 shall be supplied. Once selected, pipe of similar type shall be used for the entire pipe run.

Amend Table 3 to read:

Table 3 - Required Strength of Culvert Pipes

Material	Diameter	Strength Concrete	Thickness, in. "Specified" Steel	Pipe Stiffness Plastic
Reinforced Concrete	All	2000 D		
Corrugated Metal	12"-18"		0.064	
	24"-30"		0.079	
	36"		0.109	
Plastic				Reference
(Polyethylene)	All			AASHTO M294
(Polypropylene)	All			AASHTO M 330

Amend .4 under Pay Items to read:

.4 Pipe for Slope Drainage (Plastic only) Linear Foot

B Material
0 Unspecified
1 Blank
2 Blank
3 Blank
4 Plastic

C Type
0 Blank
1 Blank
2 Polyethylene (Type C)
3 Polypropylene (Type C)

Amend .8 under Pay Items to read:

.8 Plastic Pipe — Linear Foot

B Materials
0 Unspecified
1 PVC
2 Polyethylene
3 Polypropylene

C Type
1 Corrugated Interior (Type C)
2 Smooth Interior, Double Wall (Type S)
3 Smooth Interior, Triple Wall (Type D)
4 Blank
5 Corrugated Interior (Type C) (Watertight)
6 Smooth Interior, Double Wall (Type S) (Watertight)
7 Smooth Interior, Triple Wall (Type D) (Watertight)

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13953

March 17, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 604 – CATCH BASINS, DROP INLETS, AND MANHOLES

Item 604.910x – Outlet Control Structure

This Special Provision provides for the detention basin Outlet Control Structures. Neither amends nor modifies the provision of this section except as noted below.

Description

1.1 This work shall consist of furnishing and constructing Precast Concrete Outlet Control Structures to be installed in detention basins (BMP); as shown on the plans or as ordered. Each Outlet Structure is custom constructed to meet the design needs of the BMP. Common structure excavation to the depth specified in section 206.4.1, bedding if required, and backfill shall be included in this work.

Method of Measurement

4.1 The outlet structure shall be measured as a unit, inclusive of all accessories and appurtenances.

Basis of Payment

5.1 Outlet Control Structures will be paid in the same manner as structures will be paid in the same manner as 'special' structures as stated 604.5, including frame and cover.

Add to pay items and units:

604.910X – Outlet Control Structure	Unit

SUPPLEMENTAL SPECIFICATION

AMENDMENT TO SECTION 605 -- UNDERDRAINS

The purpose of this Supplemental Specification is to remove steel pipe and to allow polypropylene pipe for underdrain.

Amend the Material section to read:

Materials

2.1 Plastic Pipe.

2.1.1 Manufacturers of plastic pipe must participate in and maintain compliance with, the AASHTO "National Transportation Product Evaluation Program" (NTPEP) that audits producers of plastic pipe.

2.1.2 Polyvinyl Chloride (PVC) Smooth-wall perforated and un-perforated polyvinyl chloride pipe, bends and cleanouts shall conform to AASHTO M 278. Perforated polyvinyl chloride profile wall pipe shall conform to AASHTO M 304.

2.1.3 Polyethylene (PE). Polyethylene drainage tubing 6" in diameter shall conform to AASHTO M 252, Type SP, with either Class 1 or Class 2 perforations. Perforated corrugated polyethylene pipe of nominal sizes 12 to 36" diameter shall conform to AASHTO M 294, with Class 1 perforations. Lengths for all sizes shall not exceed 20 ft.

2.1.4 Polypropylene (PP). Polypropylene corrugated perforated pipe shall conform to AASHTO M 330 for 12" or greater diameter pipe, or ASTM F2376 for 6" pipe. All sizes shall be Type SP.

2.2 Pipe Underdrain, Materials Per Contractor's Option.

2.2.1 When the item reads 6" pipe underdrain (Contractor's option), it shall be the Contractor's option as to whether perforated polyvinyl chloride pipe or perforated corrugated polyethylene drainage tubing or polypropylene pipe is furnished.

2.3 Sand cushion shall be so graded that 90 to 100 percent by weight will pass a 1/2" sieve, and not more than 12 percent will pass a No. 200 sieve.

2.4 Underdrain backfill shall meet the requirements of 209.2.1.

2.5 Molded pull boxes for underdrain flushing basins shall comform to 614.2.6.

2.6 Aggregate for aggregate underdrain shall conform to Table 703-1, Standard Size #4.

2.7 Support membrane shall be non-woven geotextile and conform to Item 593.131 – Geotextile, Subsurface Drainage, Class 3, Non-woven.

Amend Pay items and units to read:

Pay items and units:

605.4_	_in Perforated Polyvinyl Chloride Pipe Underdrain	Linear Foot
605.5_	_in Perforated Corrugated Polyethylene Pipe	Linear Foot
605.6	_in Perforated Corrugated Polypropylene Pipe	Linear Foot
605.79	Underdrain Flushing Basins	Each
605.81A	_in Aggregate Underdrain Type 1	Linear Foot
605.82ABC	_in Aggregate Underdrain Type 2, With__Pipe	Linear Foot
605.84015	1-1/2" PVC Plastic Horizontal Drains	Linear Foot
605.906	6" Pipe Underdrain (Contractor's Option)	Linear Foot

Notes:

A = Width of Underdrain

1 = 18" 2 = 24" 3 = 30" 4 = 36" 5 = 48" 6 = 16"

B = Type of Material

1 = Blank
2 = Blank
3 = Blank
4 = Perforated Polyvinyl Chloride
5 = Perforated Corrugated Polyethylene
6 = Perforated Corrugated Polypropylene

C = Diameter of Pipe

1 = 6" 2 = 12" 3 = 18" 4 = 24" 5 = 4" 8 =8"

Examples:

605.82311	30" Aggregate Underdrain Type 2, with Perforated Corrugated Polyethylene 6" Pipe	Linear Foot
605.906	6" Pipe Underdrain (Contractor's Option)	Linear Foot

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March 17, 2017

.SPECIAL PROVISION

AMENDMENT TO SECTION 606 -- GUARDRAIL

Item 606.12121 – Beam Guardrail (Long Span Double Nested - 12.5') (Steel Post)
Item 606.12122 – Beam Guardrail (Long Span Double Nested - 18.75') (Steel Post)
Item 606.12123 – Beam Guardrail (Long Span Double Nested - 25') (Steel Post)

This special provision provides for the installation of conventional guardrail with a long span. All requirements as set forth in the Standard Specifications are applicable except as modified or changed herein for these items only.

Add to Description:

1.2 The Contractor shall furnish and install Beam Guardrail Long Span, for the length shown, at the locations shown on the plans, details or ordered.

Add to Materials:

2.14 Beam Guardrail Long Span, Double Nested. Materials/components required for installation shall be as shown in the plans or as ordered.

Add to Construction Requirements:

3.9 Beam Guardrail Long Span, Double Nested. Construction requirements shall be as shown in the plans or as ordered.

Add to pay items and units:

606.12121	Beam Guardrail (Long Span Double Nested - 12.5') (Steel Post)	Unit
606.12122	Beam Guardrail (Long Span Double Nested - 18.75') (Steel Post)	Unit
606.12123	Beam Guardrail (Long Span Double Nested - 12.5') (Steel Post)	Unit

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March 17, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 606 -- GUARDRAIL

Item 606.1254 - Beam Guardrail (Terminal Unit Type EAGRT, TL 3) (Steel Post)
Item 606.1255 - Beam Guardrail (Terminal Unit Type EAGRT, TL 2) (Steel Post)
Item 606.12551 - Beam Guardrail (Terminal Unit Type EAGRT, TL 2 – 25') (Steel Post)
Item 606.1454 - Beam Guardrail (Terminal Unit Type EAGRT, TL 3)
Item 606.1455 - Beam Guardrail (Terminal Unit Type EAGRT, TL 2)

Amend 2.12.1 as follows:

2.12.1 Terminal unit EAGRT shall be an energy absorbing tangent type end unit selected from one of the following (Test Level 3 shall be a fixed-head or through-anchored-head energy absorbing tangent type end unit, no substitutions allowed):

Terminal Name	Manufacturer and/or US Distributor	Test Level
Trend®350 Tangent	Trinity Highway Products, LLC	TL2 / TL3
X-LITE®	Lindsay Corporation/Barrier Systems, Inc.	TL 3
Softstop®	Trinity Highway Products, LLC	TL 2 / TL 3
X-Tension™	Lindsay Corporation/Barrier Systems, Inc.	TL 3
SKT-SP	Road Systems, Inc.	TL 2 Only

2.12.1.1 The EAGRT shall be FHWA eligible and meet the NCHRP 350 test level required, at a minimum. MASH certification of a terminal for the same or greater test level meets the NCHRP 350 requirement.

2.12.1.2 The EAGRT designated "TL 2 – 25'" shall be a FHWA eligible, minimum NCHRP 350, Test Level 2 EAGRT unit 25' in length or less.

Add to 3.3 the following:

3.3.3 The first 12.5' of the EAGRT unit is assumed gating and the length of need begins at the 3rd post. In addition, the Test Level 3 EAGRT is assumed to require a 50 foot length and the Test Level 2 EAGRT is assumed require a 37.5 foot length. If a terminal of a length other than indicated is selected, or the gating length is other than indicated, then extend or shorten the rail run to maintain the coverage of length-of-need redirective rail. Refer to the FHWA website (http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/listing.cfm?code=cushions) for the Letters of Acceptance (Eligibility) indicating the beginning of length-of-need for the terminals.

3.3.4 The EAGRT terminal unit designated "TL 2 – 25'" shall only be installed in specific situations as shown on the plans or as ordered by the Engineer.

Add to 4.1:

4.1.4.1 Any additional standard rail required to maintain the coverage of the length-of-need (Section 3.3.3) for an EAGRT will not be measured.

Add to 5.1:

5.1.1.1 Any additional standard rail required to maintain the coverage of the length-of-need (Section 3.3.3) will be subsidiary to the EAGRT unit.

Revise item numbers to read:

606.1254	Beam Guardrail (Terminal Unit Type EAGRT, TL3) (Steel Post)	Unit
606.1255	Beam Guardrail (Terminal Unit Type EAGRT, TL2) (Steel Post)	Unit
606.12551	Beam Guardrail (Terminal Unit Type EAGRT, TL2 – 25') (Steel Post)	Unit
606.1454	Beam Guardrail (Terminal Unit Type EAGRT, TL3)	Unit
606.1455	Beam Guardrail (Terminal Unit Type EAGRT, TL2)	Unit

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March 17, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 606 -- GUARDRAIL

Item 606.18001 – 31" W-Beam Guardrail with 8" Offset Block (Steel Post)
Item 606.18011 – 31" W-Beam Guardrail with 8" Offset Block (8' Steel Post)
Item 606.18021 – 31" W-Beam Guardrail with 8" Offset Block (9' Steel Post)
Item 606.18041 – 31" W-Beam Guardrail with 8" Offset Block (11' Steel Post)
Item 606.18_ - 31" W-Beam Guardrail Long Span (_'-_")
Item 606.184 – 31" W-Beam Guardrail (Reduced Post Spacing)
Item 606.28001– 31" Double Faced W-Beam Guardrail with 8" Offset Block (Steel Post)

This special provision provides for mid-way splice guardrail. All requirements as set forth in the Standard Specifications are applicable except as modified or changed herein for these items only.

Add to Materials:

2.14 31" W-Beam Guardrail. Materials/components required for installation shall be as shown in the plans or as ordered.

2.14.1 Long Span. Refer to detail for offset block sizing.

Add to Construction Requirements:

3.9 31" W-Beam Guardrail. Construction requirements shall be as shown in the plans or as ordered.

Add to pay items and units:

606.18001	31" W-Beam Guardrail with 8" Offset Block (Steel Post)	Linear Foot
606.18011	31" W-Beam Guardrail with 8" Offset Block (8' Steel Post)	Linear Foot
606.18021	31" W-Beam Guardrail with 8" Offset Block (9' Steel Post)	Linear Foot
606.18041	31" W-Beam Guardrail with 8" Offset Block (11' Steel Post)	Linear Foot
606.181	31" W-Beam Guardrail Long Span (12'-6")	Unit
606.182	31" W-Beam Guardrail Long Span (18'-9")	Unit
606.183	31" W-Beam Guardrail Long Span (25')	Unit
606.184	31" W-Beam Guardrail (Reduced Post Spacing)	Linear Foot
606.28001	31" Double Faced W-Beam Guardrail with 8" Offset Block (Steel Post)	Linear Foot

01/10/16
SSD: 8/13/2012

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13953

April 22, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 606 -- GUARDRAIL

Item 606.4174 - Portable Concrete Barrier for Traffic Control – Braced

Add to 3.7:

3.7.5 Portable concrete barrier for traffic control - braced. The portable concrete barrier shall consist of 20 foot (6.0 meter) long sections and shall be braced and pinned as detailed on the contract plans or as otherwise approved.

Add to 4.4:

4.4.5 Portable concrete barrier for traffic control - braced will be measured by the linear foot (linear meter) for barrier ordered and delivered to the project. Relocating portable concrete barriers on the project will not be measured.

Amend 5.3 to read:

5.3 The accepted quantity of permanent concrete barrier of the type specified, portable concrete barrier for traffic control and portable concrete barrier for traffic control – braced will be paid for at the contract unit price per linear foot (linear meter).

Add to 5.3

5.3.6 No separate payment will be made for the required bracing and pinning of the portable concrete barrier. All structural steel, steel rods and hardware will be subsidiary.

Add to Pay items and units:

606.4174	Portable Concrete Barrier for Traffic Control - Braced	Linear Foot (Linear Meter)

SPECIAL PROVISION

AMENDMENT TO SECTION 607 -- FENCES

Item 607.99__ - Bar Way (XX ft (XX m))

Add to Materials:

2.7 Steel pipe for steel gates shall conform to ASTM F 1083 Grade 1 or Grade 2, Schedule 40 in accordance with ASTM A 53 unless otherwise noted, of the size and diameter shown on the plans.

2.7.1 Gates shall be galvanized. Steel materials shall be hot-dip galvanized in conformance with AASHTO M 111 (ASTM A 123) utilizing the dry kettle process in a bath of molten zinc. Treat welds and areas of damaged galvanizing in accordance with ASTM A 780 after fabrication. Hardware shall be hot-dip galvanized in conformance with AASHTO M 232 (ASTM A 153) or mechanically galvanized in conformance with AASHTO M 298 (ASTM B 695) Class 50.

2.7.2 Retroreflective tape shall be white and shall conform to AASHTO M 268 (ASTM D 4956) Type I or Type IV sheeting, with a Class I adhesive backing. Visual inspections to assure that the tape meets the specified requirements may be made by the Engineer at any time prior to Acceptance.

2.8 Object markers shall conform to 615, OM-3L and OM-3R details and as described on the details.

2.9 Padlock shall be Master Pro Series 6125, Schlage PL 2000 or equal.

Amend 3.5 to read:

3.5 Entry gates shall be firmly and securely erected as shown on the plans and in accordance with the recommendations of the manufacturer unless otherwise directed by the Engineer.

3.5.1 Gates shall be constructed to maintain the clearances specified on the details.

3.5.2.1.1 Blast cleaning shall be performed prior to the formation of "white rust" on the galvanized surface. If any "white rust" is detected by visual means, the galvanizing shall be stripped off and the steel re-galvanized in conformance with these specifications. "White rust"

shall be as defined in the Inspection of Products Hot Dip Galvanized After Fabrication, Table IV, by the American Galvanizers Association.

3.5.3 Install an additional post to lock the gate in a full open position. The gate shall swing open in a direction away from the public roadway.

3.5.4 Provide an enclosure around the locking device to protect the padlock from weather and vandalism.

3.5.5 Install the padlock into the locking device and provide six keys to the Engineer.

3.5.6 Install another additional post to establish a pedestrian/bicycle access adjacent to the gate.

3.5.7 Install retroreflective tape on all posts and gates as shown on the Plans or as directed. The retroreflective tape shall be installed on both approach sides.

Add to 4.3:

4.3.1 A unit will include a gate, two support posts, hardware, two auxiliary posts, object markers, retroreflective tape, one padlock and six keys.

Add to Pay items and units:

607.99__	Bar Way (XX ft. (XX m))	Unit

SPECIAL PROVISION

SECTION 611 -- WATER MAIN INSTALLATION

Description

1.1 General Description of Work. The purpose of this work is to reroute an existing 16-inch ductile iron water main around proposed drainage impoundment in Route 101 in Bedford, N.H. by installing new 16-inch ductile iron water main in a new alignment and abandoning, removing and disposing portions of the existing water main. The CONTRACTOR shall furnish all materials, labor, tools and equipment, and perform all operations and incidentals necessary for a complete operating water main installation, as outlined herein and on the plans.

The Manchester Water Works (MWW) or its Designated Agent, hereinafter called OWNER with the ENGINEER, will inspect, accept and/or reject work related to the water main herein specified. The OWNER is also responsible for operating any valves or hydrants.

The CONTRACTOR shall furnish all materials, labor, tools and equipment, and perform all operations and incidentals necessary for a complete operating water main installation, as outlined herein and on the plans, and to maintain water service at all times, except for authorized shutdowns approved by the MWW.

1.2 Sequence/Maintenance of Service. The CONTRACTOR is responsible for maintaining continuous water service to affected customers except when construction requires an interruption of water service. A service interruption may last for a maximum of six hours. The CONTRACTOR must obtain written approval from the MWW prior to interruption of water service to affected water users. The MWW requires that a written notice be sent to all water customers 48 hours in advance of the scheduled shutdown. The OWNER will provide written notification, but it is the CONTRACTOR's responsibility to establish and address needs and coordinate with the ENGINEER and the OWNER.

1.3 Reference Drawings and Information. Neither the NHDOT nor the Manchester Water Works guarantees the accuracy or completeness of existing conditions shown on the NHDOT project construction plans for this water main work. Sufficient investigations shall be made by the CONTRACTOR so that the CONTRACTOR is knowledgeable of existing conditions prior to tendering a bid.

Materials

2.1 The CONTRACTOR shall provide the following material for the installation of the water mains, services, and appurtenances.

2.1.1 Common Fill shall be granular material, consisting of hard, sand and gravel with not more than 15 percent of the material passing the No. 4 sieve passing the No. 200 sieve, free of organic matter, trash, roots or other deleterious material. Common fill material shall contain no stone measuring greater in any dimension than two-thirds of the loose lift thickness or 8 inches, whichever is smaller. Common fill material shall be capable of forming a firm, stable base when spread and compacted in accordance with this specification. In addition, the common fill shall be non-plastic (plasticity index zero, defined as liquid limit minus plastic limit). Common fill materials may be obtained from either on-site excavations or off-site sources. Any materials excavated from the site not conforming to this specification shall be disposed of as specified and replaced with approved material, as required, at no additional cost to the OWNER and NHDOT.

2.1.2 Sand bedding and blanket material required for installation of the water mains, services, and appurtenances. The sand must meet the following gradation requirements, 100% passing the 1/2" sieve and no more than 12% passing the #200 sieve.

2.1.3 Gravel fill shall consist of hard, durable gravel free from trash, organic matter, clay, surface coatings, and other deleterious materials. Gravel fill shall have a maximum stone size of two-thirds of the loose lift thickness or 6 inches, whichever is smaller. That portion passing the 4-inch sieve shall meet the following gradation requirements, as determined by ASTM C136 and ASTM C117:

U.S. Sieve Size	Percent Passing
6 inch	100
No. 4	25-70
No. 200 *	0-12

* Based on fraction passing the No. 4 sieve.

When approved by the OWNER, gravel fill used for pipe bedding shall have a maximum stone size of 1-1/2 inches.

2.1.4 Crushed Gravel shall consist of hard durable sand and gravel, free from trash, organic matter, clay, surface coatings, and other deleterious materials. Crushed gravel material shall meet the following gradation requirements, as determined by ASTM C136 and ASTM C117:

U.S. Sieve Size	Percent Passing
3 inch	100
2 inch	95-100
1 inch	55-85
No. 4	27-52
No. 200*	0-12

* Based on fraction passing the No. 4 sieve.

2.2 Water Mains and Appurtenances: All products and materials shall conform to the latest appropriate section of American Water Work Association (AWWA) and American National Standards Institute (ANSI) Standards and as otherwise specified hereinafter.

2.2.1 Ductile Iron Water Main Pipe:

2.2.1.1 Class 52 push-on type ductile iron water pipe with "Field Lok" gaskets - Water pipe shall be ductile iron complying with ANSI A21.51 and AWWA C151, Class 52. Pipe shall be double cement-lined (1/8" thick) and seal coated inside and out in accordance with ANSI A21.4 and AWWA-C104. Joints shall be rubber gasket, push-on restrained joint type Field Lok gaskets or approved equal in accordance with ANSI A21.11 and AWWA C111. Use only lubricant that is specified by the pipe manufacturer.

2.2.1.2 Ductile Iron Fittings shall be mechanical joint type with a 350 psi pressure rating in accordance with AWWA C153. Fittings shall be double cement-lined (1/8" thick) and seal coated inside and out in accordance with AWWA-C104. Fitting shall be U.S. Pipe or approved equal. See paragraph 2.3 for thrust restraint.

2.2.1.3 Mechanical Joint Restraining Devices shall be used with all mechanical joints. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80. The ring shall be grade 65-45-12 ductile iron in accordance with ASTM A536-80. M.J. restraining devices shall be EBBAA Iron Sales,"Megalug", or approved equal.

2.2.1.4 Couplings shall be mechanical joint ductile iron solid sleeve type, meeting the requirements stated above for ductile iron fittings.

2.2.1.5 Polyethylene Wrap for Ductile Iron Pipe shall be 8 mil, lineal low density minimum, flat tube virgin polyethylene film. Polyethylene film shall be installed to prevent contact between the pipe and surrounding soil. The film shall be marked showing trademark, year of manufacture, type of resin, specification conformance, applicable size and a corrosion protection warning. The polyethylene wrap shall meet or exceed the AWWA C105-10, ANSI A21.5-10, ASTM D4976 and NT 4112-10.

2.2.1.6 Corporation Stops shall be ball valve type with a PTFE coated brass ball, CC (AWWA tapered) threads, double O-ring seal, blow-out proof stem design, and compression-type outlet connection with a grip joint. Corporation stops shall be Ford or approved equal.

2.2.1.7 Service Saddles shall be required for corporation stops greater than 1" diameter. Service saddles shall be double strap type with 360° contact on the main. The body shall be constructed of nylon-coated ductile iron and the straps shall be stainless steel. Service saddles shall be Ford or approved equal.

2.2.1.8 Service Pipe for house services and chlorine injection points shall be Type "K" copper tubing conforming to ASTM B88. The name of trademark of the manufacturer and type shall be stamped at intervals along the pipe.

2.2.1.9 Curb Stops shall be ball valve type with a PTFE coated brass ball, CC (AWWA tapered) threads, double O-ring seal, blow-out proof stem design, and compression-type outlet connection with a grip joint. Curb stops shall be Ford or approved equal. No draining port.

2.2.1.10 Curb Boxes shall be adjustable in lengths consistent with pipe depths. Curb boxes shall be ERIE style with a 1/2"x24" stainless steel rod and plug type cover.

2.2.1.11 Service Pipe Couplings shall be made of brass. Both ends of the coupling shall be compression type with a grip joint. Couplings shall be Ford or approved equal.

2.3 Concrete for thrust restraint shall be Class B in accordance with Section 520.

2.4 Trench insulation shall be rigid polystyrene 8 feet long, 2 feet wide, and 2 inches thick, as manufactured by Dow Chemical or approved equal.

Construction Requirements

3.1 General. The CONTRACTOR shall furnish all water main pipe, fittings, services and related material and appurtenances, labor, tools and equipment, granular material, and concrete; and perform all operations and incidentals necessary for complete excavation, installation, and backfill, as outlined herein and on the plans; and maintain service at all times.

3.1.1 The CONTRACTOR shall be responsible for the layout of the work. NHDOT will provide control points as described in Section 105.08. The temporary and permanent water mains, service connections and appurtenances shall be built at the locations indicated on the plan to facilitate reconstructing other facilities within this area of the project.

3.1.2 Consequential damages resulting from the CONTRACTOR not locating the facilities as shown on the plan are the responsibility of the CONTRACTOR.

3.1.3 The CONTRACTOR, at the completion of each part of the work, shall furnish the as-built locations of the water main and appurtenances referenced to NHDOT'S Construction Base Line and Bench Marks. The as-built locations shall be to an accuracy of plus or minus 0.10 feet in plan and elevation.

3.1.4 Any deviations from the locations shown on the plans require the OWNER's and the ENGINEER's approval. Any discrepancies with locations shown on the plans will be brought to the ENGINEER's attention and subsequently resolved between the OWNER, the ENGINEER and the CONTRACTOR.

3.2 Trench Excavation.

3.2.1 General - Excavation, dewatering, sheeting, and bracing shall be carried out in such a manner as to eliminate any possibility of undermining or disturbing the foundations of any existing structure, utilities or any work previously completed under this contract.

3.2.2 On paved surfaces that will not be resurfaced under this contract, the CONTRACTOR shall not use or operate tractors, bulldozers, or other power-operated equipment with treads or wheels which are so shaped as to cut or otherwise damage such surfaces during excavation or other phases of the work.

3.2.3 All lawns, paved surfaces, roadways, and structures which have been damaged or disturbed by the CONTRACTOR's operations outside of the project work areas shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of operations or as specified on the drawings.

3.2.4 The CONTRACTOR shall provide trench shoring and dewatering, if necessary, to provide a stable and dry trench at all times. The pipe trench must be dewatered to 18 inches below the invert of the new water main pipe. Trench width shall be 2 feet plus the diameter of the pipe. Cover on water pipe shall be a minimum of 5 feet 6 inches. Trench depth shall extend to 12 inches below the invert of the main.

3.2.5 As the excavation approaches pipes, conduits, or other underground structures, digging by conventional trenching machine methods shall be discontinued. Only manual methods of excavating shall be employed around buried utilities.

3.2.6 Prior to doing any work outside the right-of-way line on private property for connection of water services, the CONTRACTOR shall advise the property owner of the work and/or disturbance of the person's property that will be done, and the restoration thereof.

3.2.7 The CONTRACTOR shall maintain utilities, utility services and sewers encountered in the excavation, and repair or replace them to their owner's satisfaction and be responsible for consequential damages thereof.

3.2.8 The CONTRACTOR shall not be compensated for any additional work involved if a utility line, sewer or underground structure is in the trench line above or below the water main, except for common structure excavation if required.

3.2.9 Excavations shall be kept dry until the pipes and appurtenances to be built therein have been completed to such extent that they will not be damaged.

3.2.9.1 Provide, operate and maintain any dewatering system required to lower and control groundwater levels and groundwater hydrostatic pressure during the construction of the Work as required by this Section and the Contract Documents. The CONTRACTOR shall assume full responsibility and expense for the adequacy of the dewatering system with no additional time for performance.

3.2.9.2 The dewatering system shall be capable of developing an excavated subgrade relieved of any hydrostatic pressure that could cause a decrease in the stability of the excavated subgrade and which will provide the necessary groundwater control for the proper performance required for completion of the Work.

3.2.9.3 Dispose of subsurface water collected in a manner which conforms to all applicable local and state ordinances, statutes and laws.

3.2.9.4 Maintain continual and complete effectiveness of the dewatering system operation to provide a firm, stable, excavated subgrade at all times as required for proper performance of the Work.

3.2.9.5 Provide dewatering necessary to maintain the groundwater table 18" below the base of the proposed structure and/or pipe at all times.

3.2.9.6 Erosion Control: Provide adequate protection from erosion from any of the dewatering operations utilized during the course of the construction. Any damage, disruption or interference to newly constructed work or existing properties, buildings, structures, utilities and/or other work resulting directly or indirectly from dewatering operations conducted under this Contract shall be remedied by the CONTRACTOR, at no cost to the OWNER and NHDOT.

3.2.9.7 Treatment of Dewatering Operations Discharges: Provide such additional treatment devices as may be required to meet the provisions of the Contract. This may include the construction of sumps and/or settling basins, stone rip-rap, silt fences or other requirements. The treatment devices shall be later removed and/or filled in with acceptable backfill material, and restored to original conditions once they are no longer needed, at no additional cost to the OWNER and NHDOT.

3.2.10 Over-Excavation - If, in the opinion of the ENGINEER together with the OWNER, the material at or below the depth of the trench is unsuitable for foundation, it shall be removed to such depths as directed by the OWNER and ENGINEER and shall be replaced with Granular Backfill (sand), conforming to 209.2.1.1 and placed as provided in 209.3.

3.2.11 If the bottom of the excavation is deeper than the depth shown on the drawings, by error of the CONTRACTOR, the condition shall be corrected by refilling to the proper grade with compacted Granular Backfill (sand), conforming to 209.2.1.1. All costs shall be borne by the CONTRACTOR.

3.2.12 Rock and Boulder Excavation - Rock and boulder excavation shall be in accordance with "Section 206, Structure Excavation for Pipes and Other Minor Structures."

3.2.13 Excess and Unsuitable Excavation - Excess excavation that will not be used for backfill and unsuitable excavation shall be removed from the site and disposed of by the CONTRACTOR in accordance with local, state or federal regulations.

3.3 Trench Backfill.

3.3.1 General - After the pipe has been placed and has been inspected by the OWNER together with the ENGINEER, backfilling shall be performed without delay.

3.3.2 Bedding - Bedding shall be sand and shall extend the full width of the trench from 12 inches below the pipe, to the springline of the pipe. Compact the bedding material to 95% modified proctor (in accordance with ASTM D157 and ASTM D2922) prior to the placement of the blanket material.

3.3.3 Blanket - From the springline of the pipe to a minimum of 12 inches above the pipe crown, the trench shall be backfilled by placing and compacting the sand in lifts of 6 inches or less. The filling shall be carried up evenly on both sides of the pipe, so as not to disturb the pipe. Compact the blanket material to 95% modified proctor (in accordance with ASTM D157 and ASTM D2922) with approved hand-operated devices.

3.3.4 Backfill - Backfill material from 12 inches above the pipe to the underside of the pavement select material profile, or to the underside of loam and grassed areas, shall be backfilled with common fill materials described herein and as approved by the ENGINEER.

3.3.5 Backfill shall be placed and compacted in layers of 6 inches or less. Compact the backfill material to 95% modified proctor (in accordance with ASTM D157 and ASTM D2922). Compaction shall be by hand-operated compactors or other approved method.

3.3.6 Jetting and bucket compaction are not acceptable means of compaction.

3.3.7 Trench areas improperly backfilled or having excessive settlement, as determined by the ENGINEER, shall be reopened to the required grade backfilled using proper techniques and repaved as necessary. The CONTRACTOR shall receive no additional compensation for repair of trenches constructed under this Contract.

3.3.8 Temporary Trench Pavement Patch - All pavement patching of water main-related trenches shall be in accordance with Section 401.3. The water main trench pavement edges shall be wheel cut prior to patching.

3.4 Pipe Installation.

3.4.1 There shall be no physical connection between a public or private potable water supply system and a sewer, or sewer appurtenance which would permit the passage of any sewage or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer manhole. Locate the new water main with a 10-foot horizontal separation between it and the existing or proposed sewer main.

3.4.2 A deviation from the separation requirements of 3.5.1 above shall be allowed where necessary to avoid conflict with subsurface structures, utility chambers and building foundations, provided that the sewer is constructed as follows:

3.4.2.1 Sewer pipe shall be Class 52 ductile iron.

3.4.2.2 Joints shall be pressure tested with zero leakage at 25 pounds per square inch for gravity sewers, and at 1-1/2 times working pressure for force mains.

3.4.3 Whenever sewers must cross water mains, the sewer shall be constructed as follows:

3.4.3.1 Sewer pipe joints shall be located at least nine feet horizontally from the water main.

3.4.3.2 Sewer pipe joints shall be pressure tested with zero leakage at 25 pounds per square inch for gravity sewers, and at 1-1/2 working pressure for force mains.

3.4.3.3 Vertical separation of the sewer and water main shall be not less than 18 inches.

3.4.4 Piping in place shall be subject to inspection and approval of the ENGINEER together with the OWNER.

3.4.5 Pipe and accessories shall be kept in a sound, undamaged condition. They shall, at all times, be handled with care and shall not be dropped, dumped or bumped against any other object. Damaged material shall be replaced at no cost to NHDOT or OWNER, at any time during the construction that the damage is identified or occurs.

3.4.6 Pipe shall be stored off the ground.

3.4.7 Buried Pipe Installation - Installation of all buried piping shall be in accordance with AWWA Standard for installation of ductile iron water mains and their appurtenances, AWWA C600.

3.4.8 Pipe and fittings shall be thoroughly cleaned before they are placed. All lumps, blisters, and excess coal tar coating shall be removed from the spigot and from the interior of the bell, and these surfaces shall be wire-brushed, wiped clean and dry, and be free from oil and grease before the pipe is laid.

3.4.9 The interior of pipe, fittings and valves shall be kept clean and free of foreign material or soils at all times during storage and installation, or the material may be rejected by the OWNER and ENGINEER.

3.4.10 All pipes and appurtenances laid in open trench excavation shall be bedded and uniformly supported over their full-length on bedding of the types specified herein and shown on the drawings. All work shall be performed in a dry trench.

3.4.11 At all times when pipe laying is not actually in progress, the open ends of pipe in the trench shall be closed by temporary water-tight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

3.4.12 Pipe and fittings shall be laid accurately to the line and grades. Care shall be taken to provide a firm bearing for the pipe along its entire length. Pipes shall not be laid in water, nor shall water be allowed to flow through them.

3.4.13 Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, the amount of deflection allowed shall not exceed that required for making a satisfactory joint and shall be subject to the approval of the OWNER and ENGINEER.

3.4.14 For mechanical joints, the spigot shall be centrally located in the bell, and adequate anchorage shall be provided at abrupt changes in direction and at dead-ends. All surfaces in contact with the rubber gaskets shall be brushed thoroughly with a wire brush immediately prior to assembly. The clean surfaces shall then be brushed with manufacturer's recommended lubricant prior to slipping the gasket over the spigot and into the bell. Lubricant shall also be brushed over the gasket prior to installation for the purpose of removing loose dirt and lubricating the gasket, as it is forced into its retaining space. The CONTRACTOR shall use wrenches as recommended by the manufacturer. When tightening bolts, it is essential that the gland be drawn toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket.

3.4.15 For push-on joints, all foreign matter in the gasket seat in the socket shall be removed and the gasket wiped clean and flexed before placing in its seat. A thin film of lubricant shall be applied to the inside surface of the gasket. The plain end of the next pipe, after wiping clean, shall be aligned and carefully entered into the socket until it just makes contact with the gasket. Joint assembly shall be completed by forcing the end of the pipe past the gasket until it makes contact with the bottom of the socket. Final joint assembly of pipe 8 inches and smaller shall be accomplished by pushing against the face of bell of the entering pipe with a crow-bar or other tool. For larger pipe, the assembly shall be made with a jack and suitable slings.

3.4.16 When pipe is cut in the field, the cut end shall be tapered back approximately 1/8 of an inch at an angle of 30 degrees with the centerline of the pipe with a coarse file or grinder to remove any rough edges which might injure the gasket.

3.4.17 The CONTRACTOR shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner at the lines and grades indicated on the drawings or as directed by the OWNER and ENGINEER.

3.4.18 Bends, tees, and other fittings in pipe lines buried in the ground shall be backed up with thrust restraint Class B concrete (1/2 cubic yard minimum) against undisturbed earth (bearing area as shown on the drawings). If the soil does not provide firm support, then bridle rods, clamps, etc. shall be provided to brace the fittings properly. All accessories shall be seal-coated thoroughly and heavily with an approved material per AWWA C104 after assembly and shall be subsidiary to the ductile iron fitting unit price.

3.5 Service Installation. Install corporation stops on the new water main. The tapping machine shall be rigidly fastened to the pipe halfway between the horizontal and vertical position. The length of travel of the tap should be established so that when the stop is inserted and tightened with a 14-inch wrench, not more than one to three threads shall be exposed on the outside. When a wet tapping machine is used, the corporation stop shall be inserted with the machine while it is in place. Stops shall be tightened only sufficiently to give water-tightness, and care must be constantly exercised not to overtighten them.

3.5.1 Service saddles shall be required as indicated by the following chart:

Pipe Size	Saddle Requirements for Class 52 D.I. Pipe
6-inch	Taps > 1 inch
8-inch	Taps > 1 inch
12-inch	Taps > 1 inch
16-inch	Taps > 1 inch

3.5.2 Install copper tubing, from the corporation stop to the curb stop, in a trench with a depth of at least 6 feet. Care shall be exercised in the placing and laying of copper tubing to be sure that the pipe does not have kinks. Place at least 6 inches of sand adjacent to and below the tubing and 12 inches above the tubing.

3.5.3 Install curb stops and curb boxes at approximately 5 feet from property line, or as indicated on the drawings, and connect with new copper tubing coming from the new main. Place concrete block or flat stone beneath curb stop. Install curb box vertically centered over the operating key, with the elevation of the top adjusted to conform to the finished grade. Prior to backfilling, the CONTRACTOR shall ensure that corporation stops are in the open position and curb stops are fully shut. Adequately support the box during backfilling to maintain vertical alignment. Care must be taken to ensure that the curb box does not rest on the curb stop.

3.5.4 Make connections of new copper services to existing services as directed by the ENGINEER. Connection shall be made, using suitable couplings.

3.6 Inspection. Each section of installed water main will be visually inspected by the OWNER and ENGINEER. The pipe shall be true to both line and grade, shall contain no broken pipe, shall show no leaks, and shall contain no debris or other deposits of which shall in any way reduce the full cross-sectional area of the pipe.

3.6.1 Any section of water pipe which does not comply with these inspection criteria, as determined by the OWNER and ENGINEER, shall be promptly corrected, replaced or repaired by the CONTRACTOR at no cost to the OWNER and NHDOT. Such methods as are employed for the correction shall be approved by the OWNER.

3.7 Pressure and Leakage Testing. The CONTRACTOR shall furnish all necessary equipment and labor for, and perform pressure testing and leakage tests on the pipeline in accordance with AWWA C600 Specifications.

3.7.1 The CONTRACTOR shall make any taps and furnish all necessary caps, plugs, etc., as required in conjunction with testing, and also furnish a test pump, gauges, and any other equipment required in conjunction with carrying out the hydrostatic tests. The CONTRACTOR shall at all times protect the new water mains and the existing water mains against the entrance of polluting material.

3.7.2 Testing Requirements:

1. Test duration: Two (2) hours, minimum.
2. Test pressure: One hundred and fifty percent (150%) of maximum operating pressure as determined by the OWNER, or one hundred (100) psi whichever is higher.
3. Allowable pressure loss: Pressure shall not vary more than 5 psi for the duration of the pressure test.
4. Allowable leakage: Allowable leakage shall be determined by the following formula:

$$L = \frac{SD\,(P)^{0.5}}{133200}$$

   Where:
   L = allowable leakage, in gallons per hour.
   S = length of pipe tested, in feet.
   D = nominal pipe diameter, in inches.
   P = average test pressure, in PSI (gauge).
5. Acceptance of installation shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than that specified, the CONTRACTOR shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance.
6. All visible leaks are to be repaired regardless of the amount of leakage.
7. The leakage test shall be conducted concurrently with the pressure test.

3.8 Disinfection. Before being placed in service, and prior to performing any service taps, all new and temporary water pipelines shall be chlorinated in accordance with the requirements of AWWA C651. The procedure shall be discussed with the OWNER and ENGINEER prior to proceeding with the work.

3.8.1 The location of the chlorination and sampling points will be determined by the OWNER and ENGINEER in the field. Taps for chlorination and sampling shall be uncovered and backfilled by the CONTRACTOR, as required. The general procedure for chlorination shall be first to flush all dirty or discolored water from the lines, and then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line. The chlorine solution shall remain in the pipeline for a minimum of 24 hours.

3.8.2 Following the chlorination period, all treated water shall be flushed from the lines at their extremities, and replaced with water from the distribution system. Bacteriological sampling and analysis of the replacement water shall then be made after the replacement water has occupied the chlorinated pipeline for a minimum of 24 hours. Bacteriological analysis shall be completed by a state-certified laboratory in full accordance with AWWA C651. The CONTRACTOR will be required to rechlorinate at no cost to the OWNER if the test fails to achieve satisfactory results. The line shall not be placed in service until the requirements of the NHDES, Water Supply Engineering Bureau are met.

3.8.3 Special disinfection procedures, such as soaking or swabbing approved by the ENGINEER, shall be used in connections to existing mains and where the method outlined above is not practical.

Method of Measurement

4.1 Water main pipe with restrained joints of the kind, type and size specified will be measured by the linear foot to the nearest 0.1 of a foot of furnished and installed and operational water main. **Polyethylene Wrap, chlorine injection taps and copper tubing required for testing, and rigid insulation are considered subsidiary to the water main pipe.** Measurements will be taken along the centerline of the pipe, end to end, with no deductions for any valves and fittings.

4.2 Valves, fittings, chlorine injection taps, corporation stops, and curb stops will be measured by the each for the number of units furnished and installed.

4.4.1 Tapping sleeves and valves with box, including thrust block and appurtenances, will be measured by the each for the number of units furnished and installed.

4.4.2 Adjusting water gates and shutoffs set by others will be measured by the number of units adjusted.

4.3 The ENGINEER must be involved in and approve of the measurement of any pay item.

Basis of Payment

5.1 The accepted quantity of restrained joint ductile iron pipe with polyethylene wrap will be paid for at the contract unit price per linear foot of the kind, type, and size specified complete in place, with the following stipulations:

5.1.1 Common structure excavation required for the removal of unsuitable material below the typical trench section shall be paid for as provided in 206.

5.1.2 All rock structure excavation, any common structure excavation exploratory and any common structure excavation below the depth specified in 206.4.1.1 shall be paid as provided in 206.

5.1.3 Granular backfill (sand), to replace material excavated under 5.1.1 only, shall be paid as provided in 209.

5.2 The accepted quantity of valves, fittings, chlorine injection taps, corporation stops, and curb stops will be paid for at the contract unit price of each of the kind, type, and size specified complete in place.

5.2.1 Tapping sleeves and valves with box, including thrust block and appurtenances, will be paid for at the contract unit price for each complete in place.

5.2.2 The accepted quantities of adjusting water gates and shutoffs set by others will be paid for at the contract unit price per each complete in place.

5.3 Excavation, bedding, sheeting and shoring, dewatering, insulation of water main, concrete thrust blocks, thrust restraining systems, MJ glands, pressure testing, disinfection, flushing, maintaining water service, abandonment of existing water pipe, couplings, connections to existing water mains, backfill, temporary trench pavement repair, restoration of property, utilities, loam and seed, as-built drawings, and any other work necessary or required for a complete operational water main relocation shall be subsidiary to the pipe, and fittings.

Pay Items and Units

611.05216	16" Cement Lined Restrained joint, D.I. Water Pipe, Cl. 52	LF
611.70016	16" Fittings	EA
611.77	Chlorine Injection Tap	EA
611.90001	Adjusting Water Gates and Shutoffs Set by Others	EA

SPECIAL PROVISION

SECTION 611 -- WATER PIPES

Item 611.811 - Adjusting/Relocating Hydrants

Description

1.1 This work shall consist of adjusting or relocating hydrants in accordance with the agency requirements. Additional connector pipe, extensions, and fittings may be required.

Materials

2.1 Pipe, fittings, and extensions for hydrant relocations shall be similar to existing materials and compatible for proper coupling.

2.2 Concrete for thrust block shall conform to 520, Class B.

Construction Requirements

3.1 Hydrants shall be adjusted or relocated in accordance with appropriate Agency requirements.

3.1.1 Thrust blocks shall be appropriate for the pipe size as detailed in the plans or as ordered.

3.1.2 All hydrants shall stand plumb and shall have their nozzles parallel with the pumper nozzle facing the edge of pavement, except that hydrants having two hose nozzles 90 degrees apart shall be set with each nozzle facing the edge of pavement at an angle of 45 degrees. Hydrants shall be set to the established grade, with nozzles at least 12 in. (300 mm) above the ground, as shown or as directed.

3.1.3 Wherever a hydrant is set in soil that is pervious, a drainage pit 2 ft. (600 mm) in diameter and 1 ft. (300 mm) deep shall be excavated below each hydrant and filled with coarse gravel or crushed stone mixed with coarse sand, under and around the elbow of the hydrant and to a level of 6 in. (150 mm) above the waste opening. Compaction shall be in accordance with 304.3.7.

3.1.4 Wherever a hydrant is set in clay or other impervious soil, a drainage pit 2 ft. (600 mm) in diameter and 3 ft. (900 mm) deep shall be excavated below each hydrant and filled with coarse gravel or crushed stone mixed with coarse sand, under and around the elbow of the hydrant and to a level of 6 in. (150 mm) above the waste opening. Drainage pits shall not be connected to a sewer. Compaction shall be in accordance with 304.3.7.

3.1.5 Hydrants shall be set on a concrete base or other materials approved by the Engineer and shall be well braced and anchored by depositing concrete behind the hydrants on undisturbed earth at the end of the trench, or by wedging granite block in place of concrete.

3.1.6 Height adjustments for hydrants shall be made with appropriate extensions as approved by the Agency.

3.2 When hydrants are to be removed the existing isolation valve shall be removed and hydrant piping shall be cut and capped a maximum of 12 in. (300 mm) from the water main tee with a 1/3 cy (0.25 m^3) concrete thrust block poured against the cap.

3.3 The water main may be shut off for a maximum of 4 hours beginning after 9:00 a.m. for the removal of hydrants or installation of the tap or tee. Coordinate the shut off with the utility.

Method of Measurement

4.1 Adjusting/relocating hydrants will be measured as units. A unit shall include adjusting or relocating hydrants, adjusting or relocating pipe and fittings, installing new pipe and fittings, extensions, bedding, stone, backfill and taps to the water main, if required.

Basis of Payment

5.1 The accepted quantity of adjusting/relocating hydrants will be paid for at the contract unit price per each complete in place.

5.1.1 Any bedding, stone, backfill, piping, fittings, extensions, and taps, if required, for adjusting/relocating hydrants will be subsidiary.

5.1.2 Concrete work ordered for required thrust blocks will be subsidiary.

Pay items and units:

611.811	Adjusting/Relocating Hydrants	Each

SPECIAL PROVISION

SECTION 612 -- SANITARY SEWER INSTALLATION

Description

1.1 General Description of Work. This work shall consist of furnishing and installing approximately 175 feet of 42-inch diameter reinforced concrete pipe sewer sleeve with 8" PVC carrier pipe, approximately 80 feet of 42-inch diameter reinforced concrete pipe sewer sleeve, approximately 561 feet of 8-inch PVC gravity sanitary sewer main, approximately 75 feet of 12-inch diameter PVC gravity sanitary sewer and approximately 77 feet of 4-foot sewer manholes for current and future use. This work includes excavation, bedding, backfill, bulk heading and sealing the ends of the sleeves and all appurtenant and incidental work as shown on the plans and as specified herein. The CONTRACTOR shall be responsible for supplying and installing the new sewer main piping and appurtenances in accordance with the sewer plans and specifications or as ordered by the Engineer.

1.1.1 The Town of Bedford or its Designated Representative, hereinafter called OWNER, together with the ENGINEER, will inspect, accept, and/or reject work related to the sanitary sewer installation herein specified.

1.1.2 The CONTRACTOR shall furnish all materials, labor, tools, and equipment and perform all operations, testing, and incidentals necessary for a complete sewer installation as shown on the plans and specified herein.

1.2 Sequence/Maintenance of Service. The CONTRACTOR shall provide a bypass pumping system as necessary to maintain continuous sewer service. The CONTRACTOR shall be responsible for providing whatever is necessary to allow for continuation of sewage flow from residences upstream of, and adjacent to, the construction of the replacement sewer. The flow shall be maintained in whatever manner the CONTRACTOR chooses; however, the method chosen must provide for round-the-clock fail-safe sewer service which shall not result in any spills. Should pumps be employed by the CONTRACTOR to maintain flow, the pumps shall be electrically driven and powered by electrical drops from power companies during non-working hours. The CONTRACTOR shall submit the proposed plan to maintain sewage flow to the OWNER for review and approval a minimum of 10 days prior to start-up of the bypass system.

1.3 Reference Drawings and Information. The plans indicate, in general, the alignment and finished grade elevation and underground utility and piping invert grades. The ENGINEER may make such adjustments in grade and alignment, as are necessary, in order to avoid interference and to adapt the piping to other special conditions encountered. All locations of

existing pipes, utilities, etc., shall be verified by the CONTRACTOR with the proper authority. Neither the NHDOT nor the OWNER guarantees the accuracy or completeness of the existing conditions shown on the construction plans. Cover over pipes shall conform to requirements of the New Hampshire Department of Environmental Services (NHDES).

1.3.1 Sufficient investigations shall be made by the CONTRACTOR so that the CONTRACTOR is knowledgeable about existing conditions prior to tendering a bid.

1.4 Submittals

1.4.1 Shop Drawings are required for each and every element of the sewer facilities installation work. Four (4) copies of shop and working drawings for sewer facilities shall be submitted to the Town of Bedford, New Hampshire Sewer Division or its Designated Representative, together with the ENGINEER for approval in accordance with 105.02. Each shop drawing shall be assigned a sequential number for purposes of easy identification, and shall retain its assigned number, with appropriate subscript, on required resubmissions.

1.4.2 Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the CONTRACTOR, his subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.

1.4.3 Shop Drawings shall be submitted as a complete package by Special Provision section, unless otherwise reviewed and approved by the ENGINEER. It is the intent that all information, materials and samples associated with each specification section be included as a single submittal for the ENGINEER's review. Any deviation from this requirement, such as submitting miscellaneous metals grouped by structure, shall be requested in writing prior to any associated submittal.

1.4.4 The CONTRACTOR shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.

1.4.5 No material or equipment shall be purchased or fabricated specifically for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.

Materials

2.1 Earthwork Materials

2.1.1 Common Backfill. Common backfill shall be granular material consisting of hard sand and gravel so graded that, of the material passing the No. 4 (4.75 mm) sieve, not more than 35% shall pass the No. 200 (0.075 mm) sieve. Common backfill shall be free of organic matter, trash, roots or other deleterious material and shall contain no stone measuring greater in any dimension than two-thirds of the loose lift thickness, or 8 inches (200 mm), whichever is smaller. Common backfill material shall be capable of forming a firm, stable base when spread and compacted in accordance with this specification. In addition, common backfill shall be non-plastic (plasticity index zero, defined as liquid limit minus plastic limit). Common backfill materials may be obtained from either on-site excavations or from off-site sources. Any materials excavated from the trench and not conforming to this specification shall be properly disposed of as specified and replaced with approved material, as required, at no additional cost to the OWNER or DEPARTMENT.

2.1.2 Sand Blanket Material. Sand blanket material required for installation of the sewer mains, services, and appurtenances shall meet the following gradation requirements, 100% passing the ½ inch (12.5 mm) sieve and, of the material passing the #4 (4.75) sieve, no more than 12% passing the #200 (0.075 mm sieve).

2.1.3 Gravel Fill. Gravel fill shall consist of hard, durable gravel free from trash, organic matter, clay, surface coatings, and other deleterious materials. Gravel fill shall have a maximum stone size of two-thirds of the loose lift thickness, or 6 inches (150 mm), whichever is smaller. That portion passing the 4 inch (100 mm) sieve shall meet the following gradation requirements, as determined by ASTM C 136 and ASTM C 117:

Sieve Size	Percent Passing
6 inch (150 mm)	100
No. 4 (4.75 mm)	25-70
No. 200 (0.075 mm) *	0-12

* Based on fraction passing the No. 4 (4.75 mm) sieve.

2.1.4 Crushed Gravel. Crushed gravel shall consist of hard durable sand and gravel, free from trash, organic matter, clay, surface coatings, and other deleterious materials. Crushed gravel material shall meet the following gradation requirements, as determined by ASTM C 136 and ASTM C 117:

Sieve Size	Percent Passing
3 inch (75 mm)	100
2 inch (50 mm)	95-100
1 inch (25 mm)	55-85
No. 4 (4.75 mm)	27-52
No. 200 (0.075 mm)*	0-12

* Based on fraction passing the No. 4 (0.075 mm) sieve.

2.1.5 Bedding. Bedding shall be crushed stone conforming to ASTM C 33 stone size No. 67 gradation requirements.

2.2 Sanitary Sewer. All products and materials shall conform to the latest ASTM, ANSI or other appropriate standards and as otherwise specified herein.

2.2.1 Gravity Polyvinyl Chloride Pipe shall be SDR-35, push-on joint conforming with ASTM D 3034. Fittings shall comply with ASTM D 3034. Joints shall comply with ASTM D 3212.

2.2.1.1 Each length of pipe shall have an integral bell and shall be supplied in 12.5 foot (3.81 m) lengths.

2.2.1.2 Joint shall be push-on type using elastomeric gasket designed to prevent slipping during jointing. The gaskets shall be factory installed and secured in place prior to delivery to the job site.

2.2.1.3 Wye branch connections shall be supplied for service connections.

2.2.1.4 All pipe, fittings, gasket material, and lubricant shall be supplied by the same manufacturer. Petroleum base lubricants shall not be used.

2.2.1.5 Physical and chemical properties of pipe couplings shall be equal to those properties of the pipe.

2.2.2 Mechanical Joint (MJ) Ductile Iron Pipe for use on bridge crossings shall conform to ANSI A21.51/AWWA C151 Class 52. MJ fittings for bridge crossings shall be ductile iron conforming to ANSI A21.10/AWWA C110. Other pipe installations and mechanical fitting joints shall meet ANSI A21.11/AWWA C111 standards and shall include plain rubber gaskets. Pipe and fittings shall be double cement lined and seal coated inside and outside in accordance with ANSI A21.4/AWWA C104. All pipe and fittings shall be furnished with ductile iron retainer glands.

2.2.3 Push-On Type Ductile Iron Pipe shall be ductile iron complying with ANSI A21.51 and AWWA C151, Class 52. Pipe shall be double cement-lined $^1/_8$ inch (3 mm) thick and seal coated inside and out in accordance with ANSI A21.4 and AWWA C104. Joints shall be rubber gasket, push-on type in accordance with ANSI A21.11 and AWWA C111. Use only lubricant that is specified by the pipe manufacturer.

2.2.4 Flexible Couplings and Transition Couplings for non-pressure sewer pipe shall be resilient elastomeric plastic with recessed stainless steel bands at each end for fastening.

2.2.5 Couplings used to join plain ends of PVC pipes shall be PVC double bell couplings, which shall conform to ASTM D 3034 for materials and ASTM D 3212 for joints.

2.2.6 Identification. Each pipe length and fitting shall be clearly marked with:

2.2.6.1 Manufacturer's name and trademark.

2.2.6.2 Nominal pipe size with sidewall dimension ratio.

2.2.6.3 Material designation.

2.3 Precast Concrete Manholes

2.3.1 Materials

2.3.1.1 Cement shall conform to ASTM C 150, Portland Type II.

2.3.1.2 Fine and coarse aggregates shall conform to ASTM C 33.

2.3.1.3 Water shall be fresh, clean and potable.

2.3.1.4 Reinforcing steel shall conform to ASTM A 615, Grade 60.

2.3.1.5 Welded wire fabric shall conform to ASTM A 185.

2.3.2 Precast Manhole Sections

2.3.2.1 Precast manhole structures shall be capable of supporting H-20 loads.

2.3.2.2 Cone sections shall be eccentric.

2.3.2.3 In lieu of a cone section, when manhole depth is less than 6 feet (1.8 m), a reinforced concrete slab cover shall be used; having an eccentric entrance opening.

2.3.2.4 The base section shall be monolithic to a point at least 6 inches (150 mm) above the openings cast to receive the sewer lines. For drop manholes, any opening shall be a minimum of 6 inches (150 mm) away from any joint.

2.3.3 Manhole Joints and Pipe Seals

2.3.3.1 Horizontal joints between precast manhole sections shall be tongue and groove as shown on the Drawings and shall have a mastic-like sealant such as Ram-Nek, Kent Seal No. 2 or a butyl rubber joint gasket (O-ring) conforming to ASTM C 443. All horizontal joints shall be watertight in accordance with the testing requirements of this Section.

2.3.3.2 Pipe to manhole joints shall be an embedded flexible rubber boot or as shown on the plans. Non-shrinking mortar or grout is not acceptable. Pipe to manhole connections and joints shall be watertight in accordance with the testing requirements of this Section.

2.3.4 Waterproofing

2.3.4.1 All manholes shall be waterproofed, at the factory, with two seal coats applied to the exterior of the manhole in accordance with the seal coating manufacturer's recommendations. Waterproofing shall be masonry seal MSP-1 waterproofing material as made by the Masonry Seal Corporation, 7500 West Ridge Road, Elyria, Ohio, or Foundation Coating 47-461 as made by TNEMEC, 6800 Corporate Drive, Kansas City, Missouri, or approved equal.

2.3.4.2 Exterior of all joints shall be filled with hydraulic cement and then coated with waterproofing after setting.

2.3.5 Brick Masonry for inverts and grade adjustment shall conform to ASTM C 32, Grade SS.

2.3.6 Mortar

2.3.6.1 Masonry Cement shall conform to ASTM C 150 (Type II).

2.3.6.2 Aggregate for Masonry Mortar shall conform to ASTM C 144.

2.3.6.3 Hydrated Lime for Masonry purposes shall conform to ASTM C 207.

2.3.6.4 Mortar for Unit Masonry shall conform to ASTM C 270, Type S.

2.3.6.5 Premixed Materials shall conform to ASTM C 387.

2.4 Sewer Manhole Frames and Covers

2.4.1 General

2.4.1.1 Castings shall be at least Class 30 conforming to ASTM A 48.

2.4.1.2 The castings shall be of good quality, strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of every nature which would render them unfit for the service for which they are intended.

2.4.1.3 Contact surfaces of covers and frame seats shall be machined at the foundry, before shipment to prevent rocking of covers in any orientation.

2.4.1.4 All castings shall be thoroughly cleaned and subject to a careful hammer inspection.

2.4.2 Manhole frames and covers shall provide a 30 inch (750 mm) diameter clear opening. The cover shall have the word "SEWER" in 3 inch (75 mm) letters cast into a diamond design top surface.

2.5 Casing pipe for highway crossing shall be steel and shall be in accordance with AP1 STD.5L, Grade B, X-42, ASTM A 139.

2.5.1 Casing Pipe:

Description	8" (200 mm) Carrier Pipe
Nominal Casing Size	42 in (1067 mm)
Outside Diameter	42.62 in (1082 mm)
Wall Thickness (min)	0.668 in (16.57 mm)
Weight (Mass) per Foot (Meter) (min)	303.84 #/ft (452.2 kg/m)
Yield Strength (min)	35,000 psi (241 MPa)
Type of Joint	Butt Welded
Type of Coating	None

2.5.2 Tolerance. Out-of-round tolerance shall not exceed 0.50 inch (12.5 mm).

2.5.3 Pipe Spacers shall be a two-piece 14-gauge T-304 stainless steel assembly with stainless steel bolts. Assembly shall be the restrained positioning type. The runners shall be a ultra-high molecular weight polymer with a maximum coefficient of friction of 0.12. The assembly shell liner shall be 0.090 inch (2.3 mm) ribbed PVC with 85-90 durometer. Spacer assembly shall be as manufactured by Cascade Waterworks MFG. Co. or approved equal.

2.5.4 Carrier Pipe shall be mechanical joint ductile iron per section 2.2.2.

2.5.5 Bulkhead Materials shall be one of the following (see plan for type):

2.5.5.1 Brick and Mortar. Brick for bulkheads shall be sound, uniformly burned and shall comply with ASTM C 32, Grade SA. Mortar shall consist of one part cement, one-quarter part lime, and two parts sand. Sand shall comply with ASTM C 144; lime shall comply with ASTM C 207, Type S; cement shall comply with ASTM C 150, Type II.

2.5.5.2 Rubber Seal. Rubber shall have one adhesive side for initial attachment to the pipe. Bonding agent shall be as recommended by the seal manufacturer. Three-quarter-inch stainless steel bands shall be used to secure the rubber seal to the casing and carrier pipes. Rubber seal shall be Model CCES as manufactured by Cascade Waterworks MFG or approved equal.

Construction Requirements

3.1 General. The CONTRACTOR shall furnish all sanitary sewer pipe, fittings, services and related material and appurtenances, labor, tools and equipment, granular material, and concrete; and perform all operations and incidentals necessary for complete excavation, installation, backfill and testing, as outlined herein and on the plans; and maintaining service at all times.

3.1.1 The CONTRACTOR shall be responsible for the layout of the work. The DEPARTMENT will provide control points as described in Section 105.08. The sanitary sewer and appurtenances shall be built at the locations indicated on the plan to facilitate reconstruction of other facilities within this area of the project.

3.1.2 The CONTRACTOR shall be responsible to field locate all existing sewer service laterals for the purpose of connecting them to the proposed sewer. This may involve exploratory test pits of which payment will be made under Item 206.19 – Common Structure Excavation Exploratory.

3.1.3 Consequential damages resulting from the CONTRACTOR not locating the facilities as shown on the plan are the responsibility of the CONTRACTOR.

3.1.4 Location of new sewer services for all lots throughout the project area as part of the new sewer line shall be as determined by the OWNER and ENGINEER.

3.1.5 The CONTRACTOR, at the completion of each part of the work, shall furnish the as-built locations of the sewer main, and appurtenances referenced to the DEPARTMENT's Construction Base Line and Benchmarks. The as-built locations shall be to an accuracy of plus or minus 0.10 feet (0.03 m) in plan and elevation.

3.1.6 Any deviations from the locations shown on the plans require the OWNER's and ENGINEER's approval. Any discrepancies with locations shown on the plans shall be brought to the ENGINEER's attention and subsequently resolved between the OWNER, the ENGINEER and the CONTRACTOR.

3.2 Trench Excavation

3.2.1 General - Excavation, dewatering, sheeting, and bracing shall be carried out in such a manner as to eliminate any possibility of undermining or disturbing the foundations of any existing structure, utilities or any work previously completed under this contract.

3.2.2 On paved surfaces that will not be resurfaced under this contract, the CONTRACTOR shall not use or operate tractors, bulldozers, or other power-operated equipment with treads or wheels which are so shaped as to allow cutting or damage of such surfaces during excavation or other phases of the work.

3.2.3 All lawns, paved surfaces, roadways, and structures which have been damaged or disturbed by the CONTRACTOR's operations outside of the project work areas shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of operations or as specified on the plans.

3.2.4 The CONTRACTOR shall provide trench shoring and dewatering, if necessary, to provide a stable and dry trench at all times. The pipe trench must be dewatered to 1 foot 6 inches (0.5 m) below the invert of the new sewer pipe. Trench width shall be 2 feet (0.6 m) plus the diameter of the pipe or a minimum of 3 feet (1 m), whichever is greater. Cover on the gravity

sewer pipe shall be a minimum of 6 feet (1.8 m) or as shown on the contract drawings. Trench depth shall extend to 6 inches (150 mm) below the invert of the pipe.

3.2.5 As the excavation approaches pipes, conduits, or other underground structures, digging by conventional trenching machine methods shall be discontinued. Only manual methods of excavating shall be employed around buried utilities.

3.2.6 Prior to doing any work outside the right-of-way line on private property or disturbing private property, the CONTRACTOR shall advise the property owner of the work and/or disturbance of the person's property that shall be performed, and the restoration thereof.

3.2.7 The CONTRACTOR shall maintain utilities, utility services and water pipe encountered in the excavation, and repair or replace them to their owner's satisfaction and be responsible for consequential damages thereof.

3.2.8 The CONTRACTOR shall not be compensated for any additional work required in working in close proximity to a utility line, water or underground structure in the trench line above or below the sewer pipe, except for common structure excavation (if required).

3.2.9 Excavations shall be kept dry until the pipes and appurtenances to be built therein have been completed to such extent that they shall not be damaged.

3.2.9.1 Provide, operate and maintain any dewatering system required to lower and control groundwater levels and groundwater hydrostatic pressure during the construction of the Work as required by this Section and the Contract Documents. The CONTRACTOR shall assume full responsibility and expense for the adequacy of the dewatering system with no additional time for performance.

3.2.9.2 The dewatering system shall be capable of developing an excavated subgrade relieved of any hydrostatic pressure that could cause a decrease in the stability of the excavated subgrade and which shall provide the necessary groundwater control for the proper performance required for completion of the Work.

3.2.9.3 Properly dispose of subsurface water collected in a manner which conforms to all applicable local and state ordinances, statutes and laws. Obtain all permits required for operation of the dewatering system.

3.2.9.4 Maintain continual and complete effectiveness of the dewatering system operation to provide a firm, stable, excavated subgrade at all times as required for proper performance of the Work.

3.2.9.5 Provide dewatering necessary to maintain the groundwater table 18 inches (450 mm) below the base of the proposed structure and/or pipe at all times.

3.2.9.6 **Erosion Control.** Provide adequate protection from erosion from any of the dewatering operations utilized during the course of the construction. Any damage, disruption or

interference to newly constructed work or existing properties, buildings, structures, utilities and/or other work resulting directly or indirectly from dewatering operations conducted under this Contract shall be remedied by the CONTRACTOR, at no cost to the OWNER or DEPARTMENT.

3.2.9.7 Treatment of Dewatering Operations Discharges. Provide such additional treatment devices as may be required to meet the provisions of the Contract. This may include the construction of sumps and/or settling basins, stone rip-rap, silt fences or other requirements. The treatment devices shall be later removed and/or filled in with acceptable backfill material, and restored to original conditions once they are no longer needed, at no additional cost to the OWNER or DEPARTMENT.

3.2.10 Over-Excavation. If, in the opinion of the ENGINEER together with the OWNER, the material at or below the depth of the trench is unsuitable for foundation, it shall be removed to such depths as directed by the OWNER and ENGINEER and shall be replaced with Granular Backfill (Sand), conforming to 209.2.1.1, and placed as provided in Section 209.3.

3.2.10.1 If the bottom of the excavation is deeper than the depth shown on the plans, by error of the CONTRACTOR, the condition shall be corrected by refilling to the proper grade with compacted Granular Backfill (Sand), conforming to 209.2.1.1. All costs shall be borne by the CONTRACTOR.

3.2.11 Rock and Boulder Excavation. Rock and boulder excavation shall be in accordance with Section 206.

3.2.12 Excess and Unsuitable Excavation. Excavation not used for backfill, and unsuitable excavation shall be removed from the site and disposed of by the CONTRACTOR in accordance with local, State or Federal regulations.

3.3 Trench Backfill

3.3.1 General. After the pipe has been placed and has been inspected by the OWNER together with the ENGINEER, backfilling shall be performed without delay.

3.3.2 Bedding shall extend the full width of the trench from 6 inches (150 mm) below the pipe invert, to the springline (horizontal centerline) of the pipe. Compact the bedding material to 95% Modified Proctor in accordance with ASTM D 157 and ASTM D 2922 prior to placement of the pipe and blanket material.

3.3.3 Blanket Material shall be placed from the springline of the pipe to a minimum of 12 inches (300 mm) above the pipe crown. The trench shall be backfilled by placing and compacting the blanket material in lifts of 6 inches (150 mm) or less to 95% Modified Proctor in accordance with ASTM D 157 and ASTM D 2922. The filling shall be carried up evenly on both sides of the pipe with care being taken not to raise or otherwise disturb the pipe. Backfill to this depth shall be thoroughly compacted with approved hand-operated devices.

3.3.4 Backfill shall be placed from 12 inches (300 mm) above the pipe crown to the underside of the pavement select material profile, or to the underside of gravel and loam areas, with common backfill described herein and as approved by the ENGINEER.

3.3.4.1 Backfill shall be placed and compacted in layers of 6 inches (150 mm) or less. Compact the backfill material to 95% Modified Proctor in accordance with ASTM D 157 and ASTM D 2922. Compaction shall be by hand-operated compactors or other approved method.

3.3.4.2 Jetting and bucket compaction are not acceptable means of compaction.

3.3.4.3 Trench areas improperly backfilled or having excessive settlement, as determined by the ENGINEER, shall be reopened to the required grade, backfilled using proper techniques, and repaved as necessary. The CONTRACTOR shall receive no additional compensation for repair of trenches constructed under this Contract.

3.3.5 Trench Pavement Patch. All pavement patching of sewer pipe-related trenches shall be in accordance with Section 401.3. The sewer main trench pavement limits shall be saw cut prior to patching.

3.4 Pipe Installation

3.4.1 General

3.4.1.1 Pipe and fittings shall be handled with care to ensure that the pipe and fittings are in sound, undamaged condition. Particular care shall be taken to prevent damage to pipe coating and lining (if any).

3.4.1.2 The CONTRACTOR shall furnish slings, straps and/or other approved devices to support the pipe when it is lifted. Pipe and fittings shall not be dropped from trucks onto the ground or into the trench. Transporting pipe and fittings from storage areas shall be restricted to operations which shall not cause damage to the pipe or lining (if any).

3.4.1.3 All pipe and fittings shall be examined before laying, and no pipe or fittings shall be installed which are found to be defective. Damaged pipe coatings and/or lining (if any) shall be repaired as approved or directed by the ENGINEER at no additional cost to the OWNER or NHDOT.

3.4.1.4 Any pipe showing a distinct crack with no evidence of incipient fracture beyond the limits of the visible crack, if approved, may have the cracked portion cut off by, and at the expense of, the CONTRACTOR before the pipe is laid so that the pipe used is sound. The cut shall be made in the sound portion of the barrel at least 12 inches (300 mm) from the visible limit of the crack.

3.4.1.5 If any defective pipe is discovered after it has been laid, the CONTRACTOR shall remove the defective pipe and replace it with sound pipe at no additional cost to the OWNER or DEPARTMENT.

3.4.1.6 In general, gravity pipe laying shall proceed upgrade with spigot ends pointing in the direction of the flow.

3.4.1.7 Flow from existing service connections and main lines shall be maintained at all times by pumping or other methods approved by the ENGINEER. Under no circumstances will the dumping of raw sewage on private property, in municipal streets or into waterways, be allowed.

3.4.2 Control of Alignment and Grade

3.4.2.1 Easement and property and other control lines necessary for locating the Work, as well as elevations and benchmarks used in the design of the Work, are shown on the Plans. The CONTRACTOR shall use this information to set line and use a level or transit to set grade.

3.4.2.2 The CONTRACTOR shall use laser equipment to assist in setting the pipe and casing and must demonstrate satisfactory skill in its use.

3.4.2.3 The use of string levels, hand levels, carpenter's levels or other similar devices for transferring grade or setting pipe will not be permitted.

3.4.2.4 During construction provide the OWNER, upon request, all reasonable and necessary materials, opportunities, and assistance for setting stakes and making measurements, including the furnishing of one or two rodmen as needed at intermittent times.

3.4.2.5 The CONTRACTOR shall not proceed until he has made timely request of the ENGINEER for, and has received, such controls and instructions as may be necessary as Work progresses. The Work shall be done in strict conformance with such controls and instructions.

3.4.2.6 The CONTRACTOR shall carefully preserve benchmarks, reference points and stakes, and in case of willful, careless, or accidental destruction by his own workers, he shall be responsible for the resulting expense to re-establish such destroyed control data and shall be responsible for any mistakes or delay that may be caused by the loss or disturbance of such control data.

3.4.2.7 Maintain good alignment while laying pipe. The deflection at joints shall not exceed the manufacturer's recommended limit. Provide fittings, if required, in addition to those shown on the Drawings when pipe crosses utilities encountered when excavating the trench. Use solid sleeves only where shown on the plans unless otherwise approved by ENGINEER.

3.4.3 Installing Pipe and Fittings

3.4.3.1 The CONTRACTOR shall have on the job site with each pipe laying crew, all the proper tools to handle and cut the pipe.

3.4.3.2 All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until installed.

3.4.3.3 Pipe shall be laid in the dry trench conditions. At no time shall water in the trench be permitted to flow into the pipe. At any time that work is not in progress, or the trench is unattended, the end of the pipe in the trench shall be suitably closed to prevent the entry of animals, earth, water, etc. using watertight expandable plugs.

3.4.3.4 Lay PVC pipe and fittings in accordance with the requirements of AWWA C900, except as provided herein. PVC pipe shall not be installed when temperatures are below 32 ° F (0 ° C) unless approved by the ENGINEER.

3.4.3.5 Lay ductile iron pipe and fittings in accordance with the requirements of AWWA C600, except as provided herein.

3.4.3.6 Excavation shall conform to the Trenching Section shown on the plans.

3.4.3.7 As soon as excavation has been completed to the proper depth place and compact bedding materials, as specified in the Trenching Section, to the elevation necessary to bring the pipe to grade. The compacted material shall be shaped so that the bottom quadrant of the pipe rests firmly on the bedding for the entire length of pipe barrels. Suitable holes shall be dug for bells or couplings to provide ample space for jointing pipe.

3.4.3.8 Each pipe section shall be placed into position on the pipe bed in such a manner and by such means required to avoid injury to all persons, property and pipe involved.

3.4.3.9 Permanent blocking under the pipe is not permitted, except where a concrete cradle is required, in which case precast concrete blocks shall be used.

3.4.3.10 Jointing shall conform to the manufacturer's instructions and appropriate ASTM Standards.

3.4.3.11 Any debris, tools, etc. shall be removed from the pipe.

3.4.3.12 After placing the pipe on the bedding, the bedding material shall be placed and compacted to the springline of the pipe.

3.4.3.13 Following placement of the bedding material, the blanket material shall be placed and compacted from the springline to 12 inches (300 mm) above the crown of the pipe.

3.4.3.14 After placement of the blanket material the pipe shall be checked for alignment and grade. If the pipe has been properly installed, the CONTRACTOR may refill or backfill the remainder of the trench in conformance with the Trenching Section, and details shown on the plans.

3.4.3.15 At the end of each day's work, or more frequently, the ENGINEER will view the pipe installation with the CONTRACTOR. Unsatisfactory work shall be dug up and reinstalled

to meet the requirements of the Contract Documents with no additional time allowed for completion of the Work and at no additional cost to the OWNER or DEPARTMENT.

3.4.3.16 When cutting of pipe is required, the cutting shall be done by machine (power cutter) without damage to the pipe or cement lining (if any). Cut ends shall be smooth and at right angles to the long axis of the pipe. Pipe ends to be used with a rubber gasket joint shall be beveled and filed or ground smoothly to conform to a manufactured spigot.

3.4.4 Protection of Water Supplies

3.4.4.1 There shall be no physical connection between a public or private potable water supply system and a sewer, or sewer appurtenance, which would permit the passage of any sewage or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer manhole.

3.4.4.2 Sewers shall be located outside a 400 foot (125 m) radius centered at a municipal well; a 200 foot (60 m) radius centered at a small public well; and a 75 foot (25 m) radius centered at a private well.

3.4.4.3 Sewers shall be located during design with at least 10 feet (3 m) of horizontal separation distance from any existing or proposed water main; except in cases to avoid subsurface structures, including telecommunication chambers, interference of building foundations shall be allowed, provided that the sewer is constructed as follows:

3.4.4.3.1 Sewer pipe shall be class 52 ductile iron for a minimum distance of 75 feet (25 m) each side of the obstruction.

3.4.4.3.2 Joints shall be mechanical type water pressure rated with zero leakage when tested at 25 psi (172 kPa) for gravity sewers and 1-1/2 times working pressure for force mains.

3.4.4.4 Whenever sewers must cross water mains, the sewer shall be constructed as follows:

3.4.4.4.1 Vertical separation of the sewer and water main shall not be less than 18 inches (450 mm).

3.4.4.4.2 Sewer pipe shall be class 52 ductile iron for a minimum distance of 9 feet (2.75 m) each side of the crossing.

3.4.4.4.3 Joints shall be mechanical type water pressure rated with zero leakage when tested at 25 psi (172 kPa) for gravity sewers and 1-1/2 times working pressure for force mains and joints shall not be located within 9 feet (2.75 m) of the crossing.

3.4.5 Service Connections

3.4.5.1 House service lines shall be laid from the wye connection on the main line sewer to the property line, as directed by the ENGINEER.

3.4.5.2 All new service connections shall be 6 inch (150 mm) PVC.

3.4.5.3 New services shall terminate as shown on the plans, be capped with a watertight cap, and the end shall be marked with a ferrous metal rod or pipe terminating at finish grade.

3.4.6 Testing

3.4.6.1 General

3.4.6.1.1 Leakage tests under the direction of the ENGINEER shall be conducted on all pipes installed under this section of the Work. Deflection tests shall be conducted on PVC pipe as ordered by the ENGINEER. The ENGINEER will witness all tests. The CONTRACTOR shall supply all plugs, pumps, weirs, gauges, water, water trucks, mandrels, etc., necessary to conduct the tests. Should the Work fail the leakage or deflection tests, corrective action shall be taken by the CONTRACTOR in a manner approved by the ENGINEER and, if directed by the ENGINEER, the CONTRACTOR shall dig up and relay the failed section with no additional time allowed for completion of the Work and at no additional cost to the OWNER or DEPARTMENT.

3.4.6.1.2 The use of sealants, applied from the inside of the pipe, is not acceptable.

3.4.6.1.3 Flush all piping systems with water prior to testing.

3.4.6.1.4 Testing forms which indicate all testing information and results shall be submitted to the ENGINEER.

3.4.6.2 Gravity Sanitary Sewer Pipe Testing

3.4.6.2.1 Air Test: Leakage testing shall be by means of low-pressure air in accordance with the procedures described in UNI-B-6 with all service connections capped. The maximum allowable pressure drop from the test pressure shall be 1.0 psig during the minimum holding time.

Test pressure psi (kPa) shall be calculated using the following equation:

(ENGLISH)
$P = 3.5 + (H/2.31)$
P = Test pressure (max. = 9 psi) H = Height (ft) of groundwater above invert.

Minimum holding time required for a 1.0 psig maximum pressure drop shall be calculated using the following chart:

Pipe Dia. (in.)	Min. Time (min: sec)	Length For Min. Time (ft)	Time For Longer Length (sec)	Time (min:sec) for Length (L) Shown					
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43
36	34:00	66	30.768 L	51.17	76.55	102.34	128.12	153.50	179.29

3.4.6.3 Deflection Test for Flexible Pipe: Optional devices for testing include calibrated television, photography, properly sized "GO-NO-GO" mandrel, sewer ball or deflectometer. Maximum allowable pipe deflection shall be five percent (5%). The deflection test shall be performed no sooner than thirty (30) days after installation.

3.4.6.4 **Force Mains** shall be tested for pressure and leakage in accordance with AWWA C600, except as amended or added below:

3.4.6.4.1 Water shall be furnished by CONTRACTOR.

3.4.6.4.2 Test Duration shall be two (2) hours.

3.4.6.4.3 Test Pressure shall be one hundred and fifty percent (150%) of maximum operating pressure, or 100 psi (690 kPa), or the greater of the two, as determined by the ENGINEER.

3.4.6.4.4 **Allowable Pressure Loss.** Pressure shall not vary more than ± 5 psi (34 kPa) for the duration of the pressure test.

3.4.6.4.5 **Allowable Leakage.** Allowable leakage shall be determined by the following formula:

ENGLISH
$L = \frac{SD(P)^{0.5}}{133200}$
L = allowable leakage, in gallons per hour. S = length of pipe tested, in feet. D = nominal pipe diameter, in inches. P = average test pressure, in psi (gauge).

Allowable leakage, in gallons (liters) per hour, per 1,000 feet of pipe line can be determined from the following chart (see next page).

Avg. Test Pressure psi	Nominal Pipe Diameter-in. 3	4	6	8	10	12	14	16	18	20	24
450	0.48	0.64	0.95	1.27	1.59	1.91	2.23	2.55	2.87	3.18	3.82
400	0.45	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	3.60
350	0.42	0.56	0.84	1.12	1.40	1.69	1.97	2.25	2.53	2.81	3.37
300	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60	3.12
275	0.37	0.50	0.75	1.00	1.24	1.49	1.74	1.99	2.24	2.49	2.99
250	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37	2.85
225	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25	2.70
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12	2.55
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98	2.38
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68	2.01
100	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.80

3.4.7 Casing Installation

3.4.7.1 Casing pipe shall be installed by open cut, with bedding and cover material as shown on the plans.

3.4.7.2 Casing pipe ends shall be beveled with a single V-groove for field welding. Pipe joints shall be butt welded and shall be a full penetration on the outside circumference of the pipe. The single V-groove butt weld shall conform to the latest AWS Welding Code. All joints of the casing pipe shall be butt welded by a welder certified by the State of New Hampshire for the specific application.

3.4.8 Carrier Pipe Installation - After casing pipe has been installed and cleaned of dirt and debris, pipe spacers shall be attached to carrier pipe as shown on the plans. As carrier pipe is jointed, it shall be pushed into position inside the casing pipe. After the carrier pipe has been tested for leakage, bulkheads shall be constructed at each end of the casing pipe.

3.4.8.1 On brick bulkheads, a "one brick" opening shall be left in the bulkhead at the top of the casing pipe at each end and covered with polyethylene to prevent entry of backfilling materials. The portion of the carrier pipe passing through the brick bulkhead shall be wrapped with three layers of fifteen pound asphalt-impregnated felt before the bulkhead is constructed.

3.4.8.2 On rubber sealed bulkheads, apply bonding agent to seal the two ends of the rubber seal. Three-quarter inch stainless steel bands shall secure the rubber seal to the casing and carrier pipes.

3.5 Manhole Installation

3.5.1 Installation of Manhole Bases and Sections

3.5.1.1 Precast bases shall be placed on a 1 foot (0.3 meter) layer of compacted bedding material. The excavation shall be properly dewatered to allow placing of bedding material and setting the manhole base on completely drained subgrade.

3.5.1.2 Inlet and outlet stubs shall be connected and sealed in accordance with the manufacturer's recommended procedure, and as shown on the Drawings.

3.5.1.3 Barrel sections and cones of the appropriate combination of heights shall then be placed, using manufacturer's recommended procedure for sealing the horizontal joints.

3.5.1.4 A leakage test shall then be made as described below in this section.

3.5.1.5 Upon successful completion of the leakage test all joints shall be pointed.

3.5.1.6 The exterior waterproofing coat shall be touched up after installation and shall be applied to the exterior of all joints in accordance with manufacturer's recommendations.

3.5.1.7 The inverts and the shelf shall be constructed of brick.

3.5.1.8 The frame and cover shall be placed on the top of the manhole or some other approved means shall be provided to prevent accidental entry by unauthorized persons, children, animals, etc., until the CONTRACTOR is ready to make final adjustment to grade.

3.5.2 Mixing Mortar shall be mixed in accordance with ASTM C 270 or the recommendations of the manufacturer.

3.5.3 Brick Masonry

3.5.3.1 Only clean bricks shall be used in brickwork for grade adjustment and manhole inverts. The bricks shall be moistened by suitable means, until they are in a surface dry, saturated condition.

3.5.3.2 Each brick shall be laid in full bed and joint of mortar without requiring subsequent grouting, flushing, or filling; and shall be thoroughly bonded.

3.5.3.3 Brick masonry shall be protected from drying too rapidly. Use an approved cover and protect from the weather and frost.

3.5.3.4 All masonry joints which are exposed to view shall be examined to locate cracks, pointed up and filled with mortar. Where necessary, in the opinion of the ENGINEER, the joints shall be cut out and repointed with mortar.

3.5.3.5 All brick masonry inverts shall allow unimpeded flow. Steps or puddles will be basis for rejection.

3.5.4 Setting Frames and Covers

3.5.4.1 Frames shall be set with the tops conforming accurately to the grade of the pavement or finished ground surface or as indicated on the Drawings. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed all around and on the top of the bottom flange. The mortar shall be smoothly finished and have a slight slope to shed water away from the frame.

3.5.4.2 Manhole covers shall be left in place in the frames on completion of other work at the manholes.

3.5.5 Leakage Tests for Sewer Manholes

3.5.5.1 Leakage tests shall be made and observed by the ENGINEER on each manhole. The test shall be a vacuum test made as described below.

3.5.5.2 Vacuum test

3.5.5.2.1 The vacuum test may be performed on manholes, completely constructed, with inlet and outlet pipes in place. Test shall be conducted before any backfilling begins. Any material around the base section shall be removed to expose the entire side of the manhole. Plug pinholes and horizontal seams with a non-shrinking mortar.

3.5.5.2.2 Brace the inlet and outlet pipes/plugs to prevent movement during the test. Use air inflated plugs in good condition.

3.5.5.2.3 The vacuum test shall be performed using equipment approved by the ENGINEER. The equipment shall be in good operating condition. No gauges are to have any broken glass or other visible abnormalities. The test shall be performed by trained personnel familiar with the equipment and the test.

3.5.5.2.4 The test shall have a minimum duration of two minutes. The vacuum shall be pumped down to 10 inches (250 mm) of mercury on an approved gauge, and held. At the time the removal of air is stopped, the test time shall begin.

3.5.5.2.5 Any manhole that has a vacuum drop to nine inches (225 mm) of mercury or less, within the following time intervals, shall have failed the test.

0 – 10 ft. (3.0 m) deep: less than 2 minutes.
10 ft. (3.0 m) – 15 ft. (4.5 m) deep: less than 2-1/2 minutes.
15 ft. (4.5 m) – 20 ft. (6.0 m) deep: less than 3 minutes.
over 20 ft. (6.0 m) deep: less than T.

T Calculations for manholes deeper than 20 feet.

T = 0.085 DK/Q

T = Time of pressure drop in seconds
K =0.000419 DL; but not less than 1.0
Q = 0.0015 $ft^3/min/ft^2$ of area
D = Nominal manhole diameter in .
L = Depth of manhole in feet .

Method of Measurement

4.1 Sanitary gravity sewer and sewer service pipe of the kind, type and size specified will be measured by the linear foot (linear meter) to the nearest 0.1 foot (meter) for the furnished, installed and operational sewer pipe to the inside face of manholes.

4.2 Sanitary sewer force main and sewer service pipe of the kind, type and size specified will be measured by the linear foot (linear meter) to the nearest 0.1 foot (meter) for the furnished, installed and operational sewer pipe from the pump or structure connection to the inside face of manholes or sanitary gravity sewer main.

4.3 Encased pipe including encasement of the kind, type and size specified will be measured by the linear foot (linear meter) to the nearest 0.1 foot (meter).

4.4 Sewer service wyes will be measured as each wye furnished and installed.

4.5 Sewer manholes will be measured by the vertical foot (meter) to the nearest 0.1 foot (meter) from invert to bottom of frame and cover.

4.6 No separate measurement will be made for any removal of existing sewer manholes or sewer pipe or bypass system or plugging of abandoned sewers.

4.7 Insulation will be measured by the square yard (square meter) to the nearest .01 of a square yard (square meter) of area covered. When more than one 2 inch (50 mm) layer is specified, each layer will be measured.

4.8 Temporary sewer system will be measured by the unit of furnished, installed, operational, and removed temporary pipe.

4.9 The ENGINEER must be involved in and approve the measurement of any pay item.

Basis of Payment

5.1 The accepted quantity of sanitary sewer pipe of the kind and type specified (including temporary pipe and service pipe) will be paid for at the contract price per linear foot (linear meter) complete in place as shown on the plans and specified herein with the following stipulations:

5.1.1 Common structure excavation required for the removal of unsuitable material below the typical trench section will be paid for as provided in Section 206.

5.1.2 Rock structure excavation and common structure excavation exploratory will be paid for as provided in Section 206.

5.1.3 Granular backfill (sand) to replace material excavated under 5.1.1 will be paid for as provided in Section 209.

5.2 The accepted quantity of encased pipe, including encasement, will be paid at the contract price complete in place as shown on the plan and specified herein, and shall include furnishing and installing carrier pipe, assembly of carrier pipe, excavation, bedding, blanket, backfill, furnishing and installing carrier pipe, pipe spacers, bulkheads and appurtenances, furnishing and installing grout and all other work required for, or incidental to, the completion of this item, except as noted below.

5.3 The accepted quantity of sewer service wyes will be paid at the contract unit price and shall include furnishing and installing the wyes and all other work required or incidental to the completion of this item.

5.4 The accepted quantity of sewer manholes will be paid for at the contract unit price per vertical foot (meter) and shall include furnishing and installing manhole base, riser and cone sections, frames and covers, installing inside drop connections where required, furnishing and installing pipe stubs and couplings for "cut-in" manholes where required, brick channel and table, all brick work to adjust frames, testing, and all other work required or incidental to the completion of this item.

5.5 Bituminous pavement incorporated into the final pavement structure, or remaining over a winter maintenance season, will be paid for under Item 403.12 – Hot Bituminous Pavement, Hand Method.

5.6 Any work not specifically having a pay item and necessary for a complete and operational sanitary sewer, as herein specified and called for on the plans, shall be considered incidental and subsidiary to the pay item work specified herein. The work considered as subsidiary and not separately paid for shall include but not be limited to the following:

5.6.1 Pipe material handling and storage on site.

5.6.2 Excavation, bedding, blanket and backfill.

5.6.3 Sheeting, shoring, and dewatering of trenches (if applicable).

5.6.4 Maintaining existing sewer service.

5.6.5 Removal and decommissioning of temporary sewer system.

5.6.6 Restoration of property including loam and seed, utilities, and water lines (if applicable).

5.6.7 Pressure testing and lamping.

5.6.8 Restoration of and connections to existing sewers including couplings.

5.6.9 Plugging abandoned sewers and removal and disposal of existing manholes.

5.6.10 Temporary bituminous pavement for the temporary trench patch.

5.6.11 Saw cutting of existing pavement.

5.6.12 Record plans.

Pay items and units (ENGLISH):

612.213	42" RCP CASING	LF
612.21332	42" RCP CASING WITH 8" PVC CARRIER PIPE	LF
612.3104	SEWER MANHOLE, 4 FOOT DIAMETER	VF
612.61508	8" PVC SEWER PIPE (SDR 35)	LF
612.61512	12" PVC SEWER PIPE (SDR 35)	LF

SPECIAL PROVISION

AMENDMENT TO SECTION 615 – TRAFFIC SIGNS

This special provision, in addition to other issues, removes demountable copy, updates reference documents, updates the concrete class for bases and removes the final pay designation for signs. For further information with respect to overhead sign structures, see the additional special provision to Section 615.

Amend 1.2.1 to read:

1.2.1 Traffic Signs Type A and Type AA shall be extruded aluminum plank traffic signs with retroreflective sheeting background and retroreflectorized copy. Type A shall include W-beam mounts and hardware as shown on the plans.

Amend 2.5.1.1 to read:

2.5.1.1 Blank.

Add 2.5.3.1 to read:

2.5.3.1 U-channel breakaway systems may be used. See Section 2.8.1.

Amend 2.8.1 (including the addition of 2.8.1.1) to read:

2.8.1 All sign supports and breakaway support systems shall conform to the AASHTO "Standard Specifications for Structural Supports for Highway Traffic Signs, Luminaires and Traffic Signals" and shall conform to the testing and evaluation criteria of NCHRP Report 350. Devices not conforming to the criteria shall be replaced with conforming devices at no expense to the Department.

2.8.1.1 The Contractor shall provide a Certificate of Compliance for each sign support and breakaway support system being supplied, stating it meets the testing and evaluation criteria of NCHRP Report 350 and has been approved by FHWA for use in weak and strong soils. A copy of the FHWA Eligibility Letter for breakaway sign supports shall be submitted with the sign shop drawings.

Amend 2.8.2 to read:

2.8.2 Concrete for bases shall be Class A and shall conform to Section 520. Reinforcing steel shall conform to Section 544.

Amend 2.9.1.1, 2.9.1.2, and 2.9.1.3 to read:

2.9.1.1 The design, arrangement, color, and spacing of copy shall be in accordance with, the NHDOT Standard Plans for Road Construction, or the MUTCD and the FHWA "Standard Highway Signs".

2.9.1.2 All sign sheeting and copy materials shall be fabricated from components of compatible systems warrantied by the same manufacturer in accordance with the NHDOT Qualified Products List Product Qualification Criteria/Acceptance Criteria.

2.9.1.3 Blank.

Amend 2.9.2.1 and 2.9.2.2 to read:

2.9.2.1 The letters, numerals, symbols, shields, and borders shall be retroreflective sheeting conforming to 718 Retroreflective Sheeting. Interstate route shields (red, white, and blue) and Turnpike shields shall not be silk screened.

2.9.2.2 Blank.

Amend 2.9.3.1 to read:

2.9.3.1 The letters, numerals, symbols, shields, and borders shall be retroreflective sheeting conforming to 718 Retroreflective Sheeting. Interstate route shields (red, white, and blue) and Turnpike shields shall not be silk screened.

Amend 2.9.4.1 to read:

2.9.4.1 The letters, numerals, symbols, shields, and borders of retroreflective or nonreflective sheeting shall be shall be cut-out, overlay film or silk screened retroreflective or nonreflective sheeting conforming to 718 Retroreflective Sheeting. Interstate route shields (red, white, and blue) and Turnpike shields shall not be silk screened.

Amend 2.10.1.1 to read:

2.10.1.1 All background sheeting shall be retroreflective sheeting conforming to 718 Retroreflective Sheeting. Overlay film shall be from the NHDOT Qualified Products List.

Amend 3.2.4 to read:

3.2.4 The Contractor shall submit shop drawings for all signs for approval showing arrangements, spacing, arrow sizes, radii, border widths, indent spacing and colors of copy, and manufacturer and types of retroreflective sheeting, overlay or nonreflective materials for the background and letters, numerals, symbols, shields, and borders in accordance with 105.02.

Amend 3.2.5 to read:

3.2.5 Application of Retroreflective Sheeting to Aluminum Plank. The sheeting shall be applied to the face of the extruded aluminum planks by a squeeze roller applicator in accordance with the recommendations of the sheeting manufacturer. The face of the planks shall be completely covered by the retroreflective sheeting. All signs shall contain the date of manufacture and size, located in the lower left corner of the front face of the sign (e.g., 3-15 10'x15'). Letters and numbers shall be 2 in. white adhesive pressure copy.

Amend 3.2.6 to read:

3.2.6 Application of Retroreflective Sheeting to Aluminum Sheets. The sheets shall conform to the provisions of 3.2.5 except that the sheeting shall be applied to the aluminum either by the heat vacuum applicator method or by mechanical roller application in accordance with the recommendations of the sheeting manufacturer. All Type B and C aluminum sheet signs larger than 48" x 48" shall contain the date of manufacture and size, located in the lower left corner of the front face of the sign (e.g., 3-90 4'x6'). Letters and numbers shall be 1 in. white adhesive pressure copy. All aluminum sheet signs 48" x 48" and smaller shall contain a legible size and date of manufacture, located in the lower right corner on the back of the sign, applied with permanent marker or paint (e.g., 9-14, 3'x3').

Delete entire 3.2.7 section.

Add 3.2.7 to read:

3.2.7 Application of Sign Copy. Sign copy shall be applied in accordance with manufacturer's recommendations.

Delete entire 3.4 section. (See additional Special Provision for Section 615, if necessary.)

Add 3.5.9 to read:

3.5.9 Overhead mounted signs shall be attached to the overhead structure with all new mounting hardware unless otherwise noted on the plans.

Amend 4.2 and 4.3 to read:

4.2 Traffic sign Type A, B, C will be measured by the square foot (square meter) for traffic, including all necessary posts, footings, bases, and mounting hardware.

4.3 Traffic sign Type AA, BB or CC will be measured by the square foot (square meter), including all necessary mounting hardware.

Amend 4.5 to read:

4.5 Removing traffic signs Type B or C shall be measured by the unit. Removing traffic signs Type BB or CC shall be subsidiary unless otherwise noted. Removal will include all footings (to a minimum of one foot below finished grade, posts, mounting hardware and all signs on each post.

Amend 5.2 and 5.2.1 to read:

5.2 Traffic signs type A, B, C, AA, BB or CC will be paid for at the Contract unit price per square foot (square meter) complete in place.

5.2.1 The accepted quantities of removing traffic sign Type A, AA, B or C or relocating traffic sign Type A, B, C, AA, BB or CC will be paid for at the Contract unit price per each unit.

Delete all final pay items from the Pay Item and Units section.

Add to Pay Items and Units:

615.0101	Traffic Signs Type A	Square Feet (Square Meter)
615.01201	Traffic Signs Type A, Breakaway Mounts	Square Feet (Square Meter)
615.0201	Traffic Signs Type B	Square Feet (Square Meter)
615.02201	Traffic Signs Type B, Breakaway Mounts	Square Feet (Square Meter)
615.0301	Traffic Signs Type C	Square Feet (Square Meter)
615.03201	Traffic Signs Type C, Breakaway Mounts	Square Feet (Square Meter)
615.0401	Traffic Signs Type AA	Square Feet (Square Meter)
615.0501	Traffic Signs Type BB	Square Feet (Square Meter)
615.0601	Traffic Signs Type CC	Square Feet (Square Meter)

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

Item 616.141 – Computer Equipment and Software

Add to Description:

1.4 This work shall consist of modifying and programming existing computer equipment and software to operate two (2) closed loop traffic signal systems, necessary to provide the system as called for in the plans, specifications, or as ordered, and all work necessary to make the installation complete, at the following locations:

Traffic Signal System 1

- NH Route 101 / Wallace Road Intersection (S-037-07) – Master Location
- NH Route 101 / Nashua Road Intersection (S-037-11)
- NH Route 101 / Meetinghouse Road Intersection (S-037-02)

Traffic Signal System 2

- NH Route 101 / Old Bedford Road & Constitution Drive (S-037-06)
- NH Route 101 / NH Route 114 & Boynton Street (S-037-03) – Master Location

Each Traffic Signal System shall be coordinated, with the system master to be installed at NH Route 101 / Wallace Road and NH Route 101 / NH Route 114 & Boynton Street intersections.

1.4.1 The master location traffic signal remote monitoring equipment, and software, shall be cloud-based, or through an ISP broadband connection at the NHDOT - Bureau of Traffic, NH Route 106, Concord, NH.

Add to Materials

2.10

The existing computer system (located at the Bureau of Traffic, 18 Smokey Bear Blvd, Concord, NH) shall be modified to include all software, cabling, connectors, cards and other ancillary equipment required for interconnection of the processors and peripheral equipment to perform the functions as required by these specifications, resulting in a fully operational closed loop traffic signal system.

Add to Construction Requirements:

3.17 - Signal Timing/System Programming

3.17.1 The Contractor shall install all isolated controller data including timing parameters into the existing and new controllers. System coordination data as shown on the plans will be installed by the Contractor.

3.17.2 The Contractor shall produce cloud based or ISP broadband connection computer software for the purpose of monitoring traffic signal cabinet(s) equipment remotely. Any software required for this purpose (connect ability) shall be licensed for an eight windows based devices owned by the NHDOT – Bureau of Traffic. The software shall also be capable of monitoring the status of the master controller(s) and conflict monitor(s). The software shall be capable altering user changeable settings in said equipment. There shall be a graphic representation of all intersections and a system map for the purpose of monitoring the system(s) status.

At a minimum, the maps shall contain the following information:

Intersection Maps:

- Graphical representation of the intersection (scaled maps are not required)
- Municipality (NHDOT/Town of *Town/City name*)
- Street Names
- System Name
- North Arrow
- Lane Configuration
- Real Time Signal Display Status; Vehicle and Pedestrian
- Detector Call Status
- System Parameters Status (Cycle, Split, Offset, Force-offs, etc…)
- Intersection Operational Status (Flash, Coordinated, Free, On-line, Preemption)
- Time/Date.

System Map:

- Graphical representation of the system showing all intersections within the Subsystem (scaled maps are not required)
- Municipality (NHDOT/Town of *Town/City name*)
- Street Names
- Subsystem Number
- North Arrow
- Coordinated Phase Green at Each Location
- System Parameters Status (Cycle, Split, Offset, Force-offs, etc…)
- System Detector Status
- Intersection Operational Status (Flash, Coordinated, Free, On-line, Preemption).

3.17.3 The following section describes the system report requirements along with their uploading assignments. Legend as follows:

(F) Failure Report uploaded to the remote computer station immediately.
(N) Non-failure Report uploaded daily at midnight to remote computer station.
(O) Operator initiated reports. These reports can be accessed at any time from the remote computer station.

The on-street master shall be programmed to report the following:

a. System/free operation (N)
b. Master power on/off (F)
c. System detector failure (F)
d. Communication failure, master to local (N)
e. Coordination failures (F)
f. Master keyboard access (F)
g. System detector logging (volume, occupancy) (N)
h. System speed logging (O)
i. Local controller failure (F)
j. System coordination parameter changes (N).
k. Door Opened (F).

The local controllers shall be programmed to report the following:

a. Local detector failure (F)
b. Local controller keyboard access (F)
c. Pre-empt operation (N)
d. Local detector logging (volume, occupancy (N)
e. Intersection flash (F)
f. Local control cabinet accessed (F)

g. Door Opened (F).

3.17.4 Annual reoccurring pricing i.e. software licensing shall be included for the first 5 (five) years. The five year period starts at the date the project is completed and accepted by the Department.

Amend the first sentence of 4.1 to read:

4.1 Computer equipment and software will be measured as a unit.

Amend 5.1 to read:

5.1 The accepted quantity of modifications to the existing computer equipment and software will be paid for at the Contract lump sum price complete in place.

Add to Pay Items and Units

616.141	Computer Equipment and Software	Unit

BEDFORD
13953

April 6, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

Item 616.161 – Traffic Signals (Temporary)

This special provision provides for the construction of temporary traffic signals at the intersection of NH Route 101 and Nashua Road in the Town of Bedford, NH:

GENERAL:

All provisions of Section 616, except as modified or changed below, shall apply.

1. The Contractor shall be responsible for signal operation and maintenance during the contract. The Contractor shall furnish the Engineer and the Transportation Systems Management and Operations (TSMO) (tel. 603-271-6862) with names and phone numbers of persons to be contacted in case of a malfunction. The Contact person must be available 24 hours a day, seven days a week. The Contractor shall also keep a signal log in the cabinet to track all maintenance work completed on the signal system. This log shall be placed within a plastic cover and shall at least include the description of the trouble call, corrective action taken, date, time, and personnel who completed the work.

2. The Contractor shall furnish and install a NEMA three-phase traffic signal controller/conflict monitor with detector amplifiers and three (3) microwave or video vehicle detection system in a pole-mounted cabinet. The cabinet and controller shall remain the property of the Contractor at the completion of the temporary signal phases.

3. The Contractor shall furnish and install wooden poles, back-guys, screw type anchors, span wire, signal heads and necessary hardware to complete the signal installation.

4. Minimum clearance to the bottom of overhead signal housing shall be 16 feet/maximum 19 feet.

5. The Contractor shall upon completion of the project remove the signal installation and salvage all material back to the Contractor.

6. The Contractor shall make arrangements with the local utility company to supply electrical power for the traffic signal and beacons and shall be responsible for all of the utility company's electrical costs including installation and monthly charges.

7. The Contractor shall adjust the signal system as required due to the construction phasing. All adjustments shall be subsidiary to Item 616.

Add to 2.1

2.1.3 List of Major Materials:

1– Three – phase NEMA menu driven traffic signal controller/conflict monitor with detector amplifiers and three (3) microwave or video vehicle detection system capable of time-based coordination in a pole-mounted cabinet.

7 – One-way, three section, 12 inch span wire mounted signal head.

2 - Class IV, 50' wood poles with back guy and screw type anchors.

1 – Class IV, 35' wood service pole with back guy and screw type anchors.

140 - 3/8" Diameter, messenger cable, tether cable.

175 - Aerial signal cable.

3 – Microwave or video vehicle detection system and all necessary hardware for a complete operational installation or other alternative detection method approved by the Engineer.

1 – Three (3) 1-Way temporary emergency preemption including 1 confirmation strobe light, preemption receivers for each leg of the intersection and emergency preempter selectors.

2 – Hand held emergency transmitters (If required by Bedford Fire Department)

1 - R10-11a(M), 24 inch by 30 inch, "No Turn On Red Arrow".

BEDFORD
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April 6, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

Item 616.162 – Traffic Signals (Temporary)

This special provision provides for the construction of temporary traffic signals at the intersection of NH Route 101 and Meetinghouse Road in the Town of Bedford, NH:

GENERAL:

All provisions of Section 616, except as modified or changed below, shall apply.

1. The Contractor shall be responsible for signal operation and maintenance during the contract. The Contractor shall furnish the Engineer and the Transportation Systems Management and Operations (TSMO) (tel. 603-271-6862) with names and phone numbers of persons to be contacted in case of a malfunction. The Contact person must be available 24 hours a day, seven days a week. The Contractor shall also keep a signal log in the cabinet to track all maintenance work completed on the signal system. This log shall be placed within a plastic cover and shall at least include the description of the trouble call, corrective action taken, date, time, and personnel who completed the work.

2. The Contractor shall furnish and install a NEMA four or eight-phase traffic signal controller/conflict monitor with detector amplifiers and four (4) microwave or video vehicle detection system in a pole-mounted cabinet. The cabinet and controller shall remain the property of the Contractor at the completion of the temporary signal phases.

3. The Contractor shall furnish and install wooden poles, back-guys, screw type anchors, span wire, signal heads and necessary hardware to complete the signal installation.

4. Minimum clearance to the bottom of overhead signal housing shall be 16 feet/maximum 19 feet.

5. The Contractor shall upon completion of the project remove the signal installation and salvage all material back to the Contractor.

6. The Contractor shall make arrangements with the local utility company to supply electrical power for the traffic signal and beacons and shall be responsible for all of the utility company's electrical costs including installation and monthly charges.

7. The Contractor shall adjust the signal system as required due to the construction phasing. All adjustments shall be subsidiary to Item 616.

Add to 2.1

2.1.3 List of Major Materials:

1 – 4 or 8 – phase NEMA menu driven traffic signal controller/conflict monitor with detector amplifiers and four (4) microwave or video vehicle detection system capable of time-based coordination in a pole-mounted cabinet.

8 – One-way, three section, 12 inch span wire mounted signal head.

5 - Class IV, 50' wood poles with back guy and screw type anchors.

1 – Class IV, 35' wood service pole with back guy and screw type anchors.

445 - 3/8" Diameter, messenger cable for span, with tether cable.

470 - Aerial signal cable.

4 – Microwave or video vehicle detection system and all necessary hardware for a complete operational installation or other alternative detection method approved by the Engineer.

1 – Four (4) 1-Way temporary emergency preemption including 1 confirmation strobe lights, preemption receivers for each leg of the intersection and emergency preempter selectors.

2 – Hand held emergency transmitters (If required by Bedford Fire Department)

Signs:

4 - R10-12, 24 inch by 30 inch, "Left Turn Yield on Green" (Green Ball).

BEDFORD
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April 6, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

Item 616.163 – Traffic Signals (Temporary)

This special provision provides for the construction of temporary traffic signals at the intersection of NH Route 101 and Constitution Drive/Old Bedford Road in the Town of Bedford, NH:

GENERAL:

All provisions of Section 616, except as modified or changed below, shall apply.

1. The Contractor shall be responsible for signal operation and maintenance during the contract. The Contractor shall furnish the Engineer and the Transportation Systems Management and Operations (TSMO) (tel. 603-271-6862) with names and phone numbers of persons to be contacted in case of a malfunction. The Contact person must be available 24 hours a day, seven days a week. The Contractor shall also keep a signal log in the cabinet to track all maintenance work completed on the signal system. This log shall be placed within a plastic cover and shall at least include the description of the trouble call, corrective action taken, date, time, and personnel who completed the work.

2. The Contractor shall furnish and install a NEMA four or eight-phase traffic signal controller/conflict monitor with detector amplifiers and four (4) microwave or video vehicle detection system in a pole-mounted cabinet. The cabinet and controller shall remain the property of the Contractor at the completion of the temporary signal phases.

3. The Contractor shall furnish and install wooden poles, back-guys, screw type anchors, span wire, signal heads and necessary hardware to complete the signal installation.

4. Minimum clearance to the bottom of overhead signal housing shall be 16 feet/maximum 19 feet.

5. The Contractor shall upon completion of the project remove the signal installation and salvage all material back to the Contractor.

6. The Contractor shall make arrangements with the local utility company to supply electrical power for the traffic signal and beacons and shall be responsible for all of the utility company's electrical costs including installation and monthly charges.

7. The Contractor shall adjust the signal system as required due to the construction phasing. All adjustments shall be subsidiary to Item 616.

Add to 2.1

2.1.3 List of Major Materials:

1 – 4 or 8 – phase NEMA menu driven traffic signal controller/conflict monitor with detector amplifiers and four (4) microwave or video vehicle detection system capable of time-based coordination in a pole-mounted cabinet.

11 – One-way, three section, 12 inch span wire mounted signal head.

2 - Class IV, 50' wood poles with back guy and screw type anchors.

1 – Class IV, 35' wood service pole with back guy and screw type anchors.

138 - 3/8" Diameter, messenger cable for span, with tether cable.

180 - Aerial signal cable.

4 – Microwave or video vehicle detection system and all necessary hardware for a complete operational installation or other alternative detection method approved by the Engineer.

1 – Four (4) 1-Way temporary emergency preemption including 1 confirmation strobe lights, preemption receivers for each leg of the intersection and emergency preempter selectors.

2 – Hand held emergency transmitters (If required by Bedford Fire Department)

Signs:

2 - R10-11a(M), 24 inch by 30 inch, "No Turn On Red Arrow".

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

Item 616.191 – Alterations To Traffic Signals (S-037-07)
(Master Location)

This special provision provides for the reconstruction of the existing traffic signal system at the intersection of *NH ROUTE 101* with *WALLACE ROAD* in the town of *BEDFORD*. The system is coordinated with the following intersections:

- Nashua Rd Intersection (S-037-11)
- Meetinghouse Rd Intersection (S-037-02)

GENERAL:

All provisions of Section 616, except as modified or changed below, shall apply.

1. The Contractor shall be responsible for signal operation and maintenance once alterations to the existing signals, excavation or other work within 75 feet or 400 feet (if advanced detection is in place) of the stop bar at any leg of the intersection has begun. At this point in time the Contractor shall notify the Bureau of Traffic and furnish the Engineer and the Transportation Systems Management and Operations (TSMO) (tel. 603-271-6862) with names and phone numbers of persons to be contacted in case of a malfunction. The Contact person must be available 24 hours a day, seven days a week. The Contractor shall also keep a signal log in the cabinet to track all maintenance work they complete on the signal system. This log shall be placed within a plastic cover and shall at least include the description of the trouble call, corrective action taken, date, time, and personnel who completed the work.

2. The traffic signal must be inspected and approved by the Bureau of Traffic prior to placing in flash operation. The Contractor shall contact Peter Crouch at the Bureau of Traffic at (603) 271-2291 one week prior to turning the signals on flash. If the Contractor does not speak directly with Peter Crouch they must leave a detailed message with the Administrative Assistant and expect a call back. Leaving a message does not constitute an approval.

3. The Contractor shall be responsible for the dismantling and removing of the existing signal heads, mast arms and poles, foundations, existing electrical service, and controller cabinet. All surplus equipment shall be salvaged and delivered to the Department of Transportation, Bureau of Traffic in Concord, within normal business hours.

4. The Contractor shall install a generator – anchoring system to the new traffic controller cabinet's concrete foundation (See NHDOT Standard Plans for Road Construction – SL-2). The location of the anchoring system will be on the side of the cabinet that houses the controller's power supply. The anchoring system shall be a 1/2" x 13 tpi galvanized wrought eyebolt with a thread length of 1 5/8". The eyebolt shall be installed in a 5/8" diameter drilled hole into the concrete foundation. The eyebolt shall be bonded into the concrete foundation by an epoxy compound [Component "A" (105 resin) and Component "B" (205 hardener)], with the epoxy compound filling the drilled hole and covering the threads of the eyebolt. The epoxy compound shall be a product as included on the NHDOT's Qualified Product List (See Attachment "A" – Detail Plan).

5. Provide additional sweep for ISP Broadband Conduit in the controller cabinet foundation.

6. The initial power hook-up shall be paid for by the Contractor during the construction contract. The monthly billing will continue to be paid for by the Department:

   NHDOT – Bureau of Traffic, Signal 037-07, PO Box 483, Concord, NH 03302-0483

7. The initial ISP Broadband Cable hook-up shall be paid for by the Contractor during the construction contract. The monthly billing for the ISP Broadband Cable service shall be paid for by the Department:

   NHDOT – Bureau of Traffic, Signal 037-07, PO Box 483, Concord, NH 03302-0483

6. All interconnect cable shall be labeled and terminated on a terminal panel protected with EDCO PCD642-008D surge suppressers. Coordination shall be achieved via a spread spectrum radio system (ITEM 616.35).

7. All system detectors shall be terminated on a separate panel from the main detector panel.

Add to 2.1:

2.1.3 List of Major Materials:

1 - ATC & NEMA specification compliant master signal controller. Input and output connections shall be TS2 Type 2 configuration. Econolite Corp., Model ASC/3, PEEK Traffic Inc., Model ATC-1000, Naztec ATC or approved equal. The controller shall utilize a removable memory card capable of storing user input data, and shall include two. Equipment to be housed in a P Type cabinet (with a 15-inch extension base) assembled by the equipment manufacture which will include telemetry harness and panel. The exterior of the Controller Cabinet shall be natural aluminum finish; the interior shall be painted white. The interior of the cabinet shall be illuminated by an LED light strip mounted to the ceiling of the cabinet between 12 and 18 inches long and will be controlled by a door switch. The cabinet shall be equipped with a pull out keyboard tray (shall be free moving without obstruction from controller cable connections).

1 - GPS Technology Equipment, Model TR-3/TR-4 GPS Assembly (501661F), mounted inside the controller cabinet. Model TR-3/TR-4 GPS Receiver (501532), mounted on top of the controller cabinet. GPS Receiver Simulator Software (501638TR). PC Cable for Simulator Software (504567). RTC Manufacturing, Inc. or approved equal.

1 - Closed loop system master to facilitate direct software communications via the ISP cable broadband connection from system master to NHDOT in Concord NH. Contractor shall submit a test plan for approval to configure central control software testing (as part of Item 616.141 – Computer Equipment and Software).

1 – 5.8 GHz point-to-point radio/antenna capable of broadband capacity with ability to transmit video images (EnCom Energy series, or compatible equivalent).

1 - 30 Amp 125 V semi-flush Traffic Signal Generator Transfer switch and anchoring system with confirmation pilot light to indicate restored power mounted to the controller cabinet. Parallax Power Supply Model ATS-301, GenTran Corp or approved equal. The lock will utilize a different key than used to open the cabinet door.

6 - One-way, three-section, 12-inch aluminum signal heads with LED modules type (Duralight Corp., G.E. Lighting (Gecore) or Dialight/Trastar), mounted on mast arms with Pelco Astro-Bracs, with 5-inch louvered backplate. The outside perimeter of the backplate shall be lined with a fluorescent-yellow 2-inch strip of Type IX or XI retroreflective sheeting to highlight the three-section signal head.

8 - Install fluorescent-yellow retroreflective tape on existing signal head backplates, as per Item 616.70001 – Retroreflective Tape for Signal Head Backplates. This work shall be paid under Item 616.70001.

1 - Meter pedestal with 30 amps disconnect switch, Alloy Castings Co., Inc. model ACTB-20-695 or approved equal.

2 - Galvanized steel mast arm poles, the signal arm shall be *40* ft. Mast arm poles shall be manufactured by Valmont Industries, Inc., or Union Metal Corp., or approved equal.

4 - 8 ft signal pole, Alloy Castings Co., Inc. model ACTB-20-695 or approved equal.

1 - Bracket mounted 16-inch x 18-inch, LED pedestrian signal heads with solid hand symbol and solid walking man symbol with countdown timer display.

7 - Pedestal mounted 16-inch x 18-inch, LED pedestrian signal heads with solid hand symbol and solid walking symbol with countdown timer display.

8 - Accessible pedestrian systems Campbell Company Advisory Guide Accessible Pedestrian Station (AGPS), Polara Navigator Accessible Pedestrian Signals, or approved equal. System shall also include attaching R10-3e sign.

1 - Optical Fire Preempter Phase Selector, GTT Opticom Model 754, with a Model 760 Card Rack, Tomar 2140 OSP with 1881 Card Cage, or approved equal.

4 - Optical Fire Preempter receivers GTT Opticom Model 71, Tomar 2090SD, or approved equal (with associated wiring back to the Controller Cabinet).

1 – Electric service complete.

2 – Remove existing R10-11a(M) signs, 24 inch by 30 inch, "No Turn On Red Arrow".

2 - Designated as sign "D3-1A, 66-inch by 16-inch (NH Route 101) Type BB aluminum sign mast arm mounted. The center of the street sign shall be mounted on the mast arm one half the sign width distance plus two (2) feet from the signal pole. Refer to the Project's Sign Text Layout Sheet for design of this mast arm mounted street name sign.

2 - Designated as sign "D3-1B, 60-inch by 16-inch (Wallace Rd) Type BB aluminum sign mast arm mounted. The center of the street sign shall be mounted on the mast arm one half the sign width distance plus two (2) feet from the signal pole. Refer to the Project's Sign Text Layout Sheet for design of this mast arm mounted street name sign.

1 - GridSmart 360 Video Detection Camera, with traffic count performance module mounted a minimum 35 foot mounting height. Contractor shall submit a test plan for approval for all signal component communications configure central control testing (as part of Item 616.141 – Computer Equipment and Software).

1 – Shelf Mounted Video Detection Processor, phase selector and cable and any other equipment for a complete working detection system.

1 - Advanced Vehicle Detection – shall integrate with the GridSmart Video Detection System. The Advanced Detection System shall include support equipment, mounting hardware, wiring and software. This Advanced Detection System shall have the ability to function in all types of weather and be able to handle temperature extremes from -40°F to 130°F. This Advanced Detection System must meet NEMA 250 Standards, be able to detect vehicles a minimum of 300 ft from the stop bar and the ability to detect multiple vehicles at the same time. The Advanced Detection System's hardware and software used to setup, configure and communicate must be compatible with the GridSmart Video Detection operating system. The Advanced Detection System must have a minimum 2-year replacement warranty. The Contractor shall install these units on the proposed signal mast arms and provide four (4) hours of training to NHDOT – Bureau of Traffic personnel.

575 - Linear feet of 14 Conductor intersection signal cable. Cable shall be a home run from the signal cabinet to the existing mast arms. This quantity also includes new signal wire within the signal mast arm.

500 - Linear feet of ¼ inch 3 strand polypropylene yellow rope shall be installed within the new and existing conduit for future use. Adequate length of slack shall be left in each pull box such that it can be tied to the conduit should future hand hole work be required.

Add to 3.5:

3.5.2 Video Detectors

3.5.2.1 The Contractor shall provide GridSmart 360 Video Detection System to detect vehicles. The system shall also provide full motion video output showing zones highlighted during detection for fine-tuning. All hardware and software within the traffic signal cabinet shall be NEMA TS-2 compliant.

3.5.2.2 The Contractor shall supply and install the Video Detection System. It shall be Ethernet based and IP addressable. The major components of the Video Detection System are further described as follows:

3.5.2.2.1 Prior to installation of the Video Detection System a detailed site survey shall be conducted by a factory trained and certified representative. The site survey shall ensure that the design of the camera, camera location, camera optics, and video/data interconnect is appropriate for the application.

3.5.2.2.2 The supplier of the Video Detection System shall supervise the installation and testing of the Video Detection System and computer software. A factory certified representative from the supplier shall be on site during installation.

3.5.2.2.3 The Video Detection System shall include a configuring device and/or a Windows based computer software that provides for configuring the Video Detection System, viewing real time video, and updating the memory of the Video Detection System with updated application software.

3.5.2.2.4 The Video Detection System shall provide count & presence detection performance with at least 96% accuracy under normal (day and night) conditions.

3.5.2.2.5 The Video Detection System shall be comprised of a Video Detection System Camera, Video Detection System Cable, and Video Detection System Hardware (Complete and Working System).

3.5.2.2.10 Video Detection System Cameras

3.5.2.2.10.1 The Video Detection System Camera shall contain an automatic gain control (AGC) to provide a satisfactory image over the full range of light levels.

3.5.2.2.11 Video Detection System Cable

3.5.2.2.11.1 The Video Detection System Cable shall meet the design requirements of the Video Detection System Camera manufacturer, and shall be designed and manufactured specifically for the Video Detection System Camera supplied.

3.5.2.2.11.2 The Video Detection System Cable shall be capable of withstanding the rigors of outdoor environments, including all combinations of precipitation, heat and cold from -34 to 74 degrees Celsius, and direct exposure to sunlight without exhibiting any signs of deterioration over time.

3.5.2.2.12 Video Detection System Hardware

3.5.2.2.12.1 The Video Detection System Hardware shall operate without degradation over a temperature range of -34 to 74 degrees Celsius at a relative humidity of 10% to 90% condensing.

3.5.2.2.12.2 The Video Detection System Hardware shall include interface device(s) which shall be installed in the traffic control cabinet.

3.5.2.2.12.3 The interface device(s) shall be used to terminate the traffic controller cabinet end of the Video Detection System Cable.

3.5.2.2.12.3.1 The interface device(s) shall contain transient suppression devices for all signals transported on the Video Detection System Cable, including but not limited to video, data, and power.

3.5.2.2.12.3.1.1 The surge protector shall be electrically connected to the cabinet ground rod.

3.5.2.2.12.3.1.2 Surge protectors should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The protector complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

3.5.2.2.12.3.1.3 Units should be pre-approved or unconditionally warranted for at least 3 years from factory purchase and certified to comply with the product's published specifications by an independent laboratory.

3.5.2.2.12.3.2 The interface device(s) shall contain a switch or shut-off mechanism that shall allow the user to turn off AC service to all components of the Video Detection System.

3.5.2.2.12.3.3 The interface device(s) shall contain a connector for interfacing to an included configuring device and/or a Windows based computer in the field for the purpose of configuring the Video Detection System, viewing real time video, and for updating the memory of the Video Detection System with updated application software.

3.5.2.2.12.4 The Video Detection System Hardware shall include all necessary cables for interconnection to the traffic signal controller, AC power service, a modem for transport of video to the traffic operations center, and a configuring device and/or a Windows based computer in the field. Two (2) hours of training shall be provided at an NHDOT facility for training on camera operation and maintenance.

3.5.3 Surge Suppression

3.5.3.1 Wherever expensive electronic equipment is located (cabinets, cameras, etc.), each input & output should be surge protected except traffic signal outputs. Signal outputs from load switches do not need surge suppression since the load switches act as surge suppressors.

3.5.3.2 The surge protector must be electrically connected to the nearest grounded metal structure or nearest ground rod.

3.5.3.3 Surge protection for power service shall conform to the current NEMA TS-2 standard except surge capacity shall be 80 kA. The product complies when a lab report from an independent test laboratory stating the product passes the current NEMA TS-2(5.4.2.4) specification (with the additional surge capacity of 80 kA) is submitted with the shop drawings.

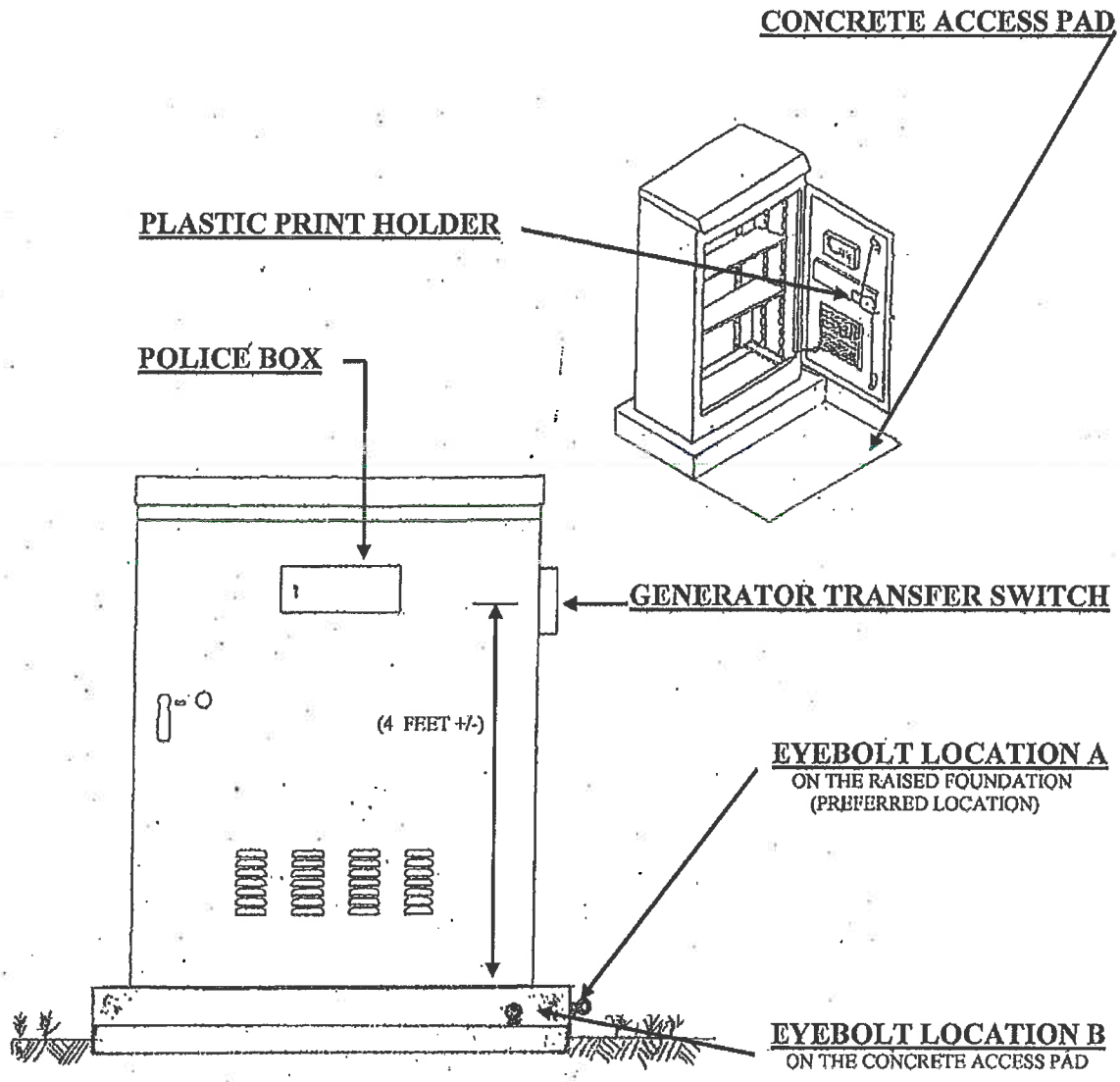
3.5.3.4 Surge protection for all video, pedestrian button, and pre-emption connections should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The product complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

3.5.3.5 Units should be unconditionally warranteed for at least 3 years.

Add to 5.1

5.1.1 All work for failures due to pre-existing conditions will be negotiated and paid for as extra work as provided in 109.04. The labor and equipment necessary to complete this application will be subsidiary.

ATTACHMENT "A"



TRAFFIC CONTROLLER CABINET

N.T.S.

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

Item 616.192 – Alterations To Traffic Signals (S-037-11)

This special provision provides for the reconstruction of the existing traffic signal system at the intersection of *NH ROUTE 101* with *NASHUA ROAD* in the town of *BEDFORD*. The system is coordinated with the following intersections:

- Wallace Road Intersection (S-037-07) (Master Location)
- Meetinghouse Road Intersection (S-037-02)

GENERAL:

All provisions of Section 616, except as modified or changed below, shall apply.

1. The Contractor shall be responsible for signal operation and maintenance once alterations to the existing signals, excavation or other work within 75 feet or 400 feet (if advanced detection is in place) of the stop bar at any leg of the intersection has begun. At this point in time the Contractor shall notify the Bureau of Traffic and furnish the Engineer and the Transportation Systems Management and Operations (TSMO) (tel. 603-271-6862) with names and phone numbers of persons to be contacted in case of a malfunction. The Contact person must be available 24 hours a day, seven days a week. The Contractor shall also keep a signal log in the cabinet to track all maintenance work they complete on the signal system. This log shall be placed within a plastic cover and shall at least include the description of the trouble call, corrective action taken, date, time, and personnel who completed the work.

2. The traffic signal must be inspected and approved by the Bureau of Traffic prior to placing in flash operation. The Contractor shall contact Peter Crouch at the Bureau of Traffic at (603) 271-2291 one week prior to turning the signals on flash. If the Contractor does not speak directly with Peter Crouch they must leave a detailed message with the Administrative Assistant and expect a call back. Leaving a message does not constitute an approval.

3. The Contractor shall be responsible for the dismantling and removing of the existing signal heads, mast arms and poles, foundations, existing electrical service, and controller cabinet. All surplus equipment shall be salvaged and delivered to the Department of Transportation, Bureau of Traffic in Concord, within normal business hours.

4. The Contractor shall install a generator – anchoring system to the new traffic controller cabinet's concrete foundation (See NHDOT Standard Plans for Road Construction – SL-2). The location of the anchoring system will be on the side of the cabinet that houses the controller's power supply. The anchoring system shall be a 1/2" x 13 tpi galvanized wrought eyebolt with a thread length of 1 5/8". The eyebolt shall be installed in a 5/8" diameter drilled hole into the concrete foundation. The eyebolt shall be bonded into the concrete foundation by an epoxy compound [Component "A" (105 resin) and Component "B" (205 hardener)], with the epoxy compound filling the drilled hole and covering the threads of the eyebolt. The epoxy compound shall be a product as included on the NHDOT's Qualified Product List (See Attachment "A" – Detail Plan).

5. The initial power hook-up shall be paid for by the Contractor during the construction contract. The monthly billing will continue to be paid for by the Department:

   NHDOT – Bureau of Traffic, Signal 037-11, PO Box 483, Concord, NH 03302-0483

6. All interconnect cable shall be labeled and terminated on a terminal panel protected with EDCO PCD642-008D surge suppressers. Coordination shall be achieved via a spread spectrum radio system (ITEM 616.35).

7. All system detectors shall be terminated on a separate panel from the main detector panel.

Add to 2.1:

2.1.3 List of Major Materials:

1 - ATC & NEMA specification compliant signal controller. Input and output connections shall be TS2 Type 2 configuration. Econolite Corp., Model ASC/3, PEEK Traffic Inc., Model ATC-1000, Naztec ATC or approved equal. The controller shall utilize a removable memory card capable of storing user input data, and shall include two. Equipment to be housed in a P Type cabinet (with a 15-inch extension base) assembled by the equipment manufacture which will include telemetry harness and panel. The exterior of the Controller Cabinet shall be natural aluminum finish; the interior shall be painted white. The interior of the cabinet shall be illuminated by an LED light strip mounted to the ceiling of the cabinet between 12 and 18 inches long and will be controlled by a door switch. The cabinet shall be equipped with a pull out keyboard tray (shall be free moving without obstruction from controller cable connections).

1 – 5.8 GHz point-to-point radio/antenna capable of broadband capacity with ability to transmit video images (EnCom Energy series, or compatible equivalent).

1 - 30 Amp 125 V semi-flush Traffic Signal Generator Transfer switch and anchoring system with confirmation pilot light to indicate restored power mounted to the controller cabinet. Parallax Power Supply Model ATS-301, GenTran Corp or approved equal. The lock will utilize a different key than used to open the cabinet door.

8 - One-way, three-section, 12-inch aluminum signal heads with LED modules type (Duralight Corp., G.E. Lighting (Gecore) or Dialight/Trastar), mounted on mast arms with Pelco Astro-Bracs, with 5-inch louvered backplate. The outside perimeter of the backplate shall be lined with a fluorescent-yellow 2-inch strip of Type IX or XI retroreflective sheeting to highlight the three-section signal head.

1 - One-way, three-section, 12-inch bracket mounted aluminum signal heads with LED modules type (Duralight Corp., G.E. Lighting (Gecore) or Dialight/Trastar), with 5-inch louvered backplate, the outside perimeter of the backplate shall be lined with a fluorescent-yellow 2-inch strip of Type IX or XI retroreflective sheeting to highlight the four-section signal head.

1 - Meter pedestal with 30 amps disconnect switch, Alloy Castings Co., Inc. model ACTB-20-695 or approved equal.

1 - Galvanized steel mast arm poles, the signal arm shall be *25* ft. Mast arm poles shall be manufactured by Valmont Industries, Inc., or Union Metal Corp., or approved equal.

1 - Galvanized steel mast arm poles with street light luminaries arm at a 40 ft mounting height. The signal arms shall be *40* ft. Mast arm poles shall be manufactured by Valmont Industries, Inc., or Union Metal Corp., or approved equal.

1 - Galvanized steel mast arm poles with street light luminaries arm at a 40 ft mounting height. The signal arms shall be *50* ft. Mast arm poles shall be manufactured by Valmont Industries, Inc., or Union Metal Corp., or approved equal.

3 - 8 ft signal pole, Alloy Castings Co., Inc. model ACTB-20-695 or approved equal.

4 - Pedestal mounted 16-inch x 18-inch, LED pedestrian signal heads with solid hand symbol and solid walking symbol with countdown timer display.

4 - Accessible pedestrian systems Campbell Company Advisory Guide Accessible Pedestrian Station (AGPS), Polara Navigator Accessible Pedestrian Signals, or approved equal. System shall also include attaching R10-3e sign.

1 - Optical Fire Preempter Phase Selector, GTT Opticom Model 754, with a Model 760 Card Rack, Tomar 2140 OSP with 1881 Card Cage, or approved equal.

3 - Optical Fire Preempter receivers GTT Opticom Model 71, Tomar 2090SD, or approved equal (with associated wiring back to the controller cabinet).

2 - Confirmation strobe light, 120 VAC, with red Lexan optic lens. Whelan Model, IAC 12 RP, Tomar 804-110 MAXI or approved equal.

1 – Electric service complete.

1 - Designated as sign "D3-1A, 66-inch by 16-inch (NH Route 101) Type BB aluminum sign mast arm mounted. The center of the street sign shall be mounted on the mast arm one half the sign width distance plus two (2) feet from the signal pole. Refer to the Project's Sign Text Layout Sheet for design of this mast arm mounted street name sign.

2 - Designated as sign "D3-1C, 60-inch by 16-inch (Nashua Rd) Type BB aluminum sign mast arm mounted. The center of the street sign shall be mounted on the mast arm one half the sign width distance plus two (2) feet from the signal pole. Refer to the Project's Sign Text Layout Sheet for design of this mast arm mounted street name sign.

1 - GridSmart 360 Video Detection Camera, with traffic count module mounted a minimum 35 foot mounting height. Camera system software shall be installed and viewed on NHDOT servers. Contractor shall submit a test plan for approval to configure central control testing for camera software.

1 - Shelf Mounted Video Detection Processor, phase selector and cable and any other equipment for a complete working detection system.

360 - Linear feet of ¼ inch 3 strand polypropylene yellow rope shall be installed within the new conduit for future use. Adequate length of slack shall be left in each pull box such that it can be tied to the conduit should future hand hole work be required.

Add to 3.5:

3.5.2 Video Detectors

3.5.2.1 The Contractor shall provide GridSmart 360 Video Detection System to detect vehicles. The system shall also provide full motion video output showing zones highlighted during detection for fine-tuning. All hardware and software within the traffic signal cabinet shall be NEMA TS-2 compliant.

3.5.2.2 The Contractor shall supply and install the Video Detection System. It shall be Ethernet based and IP addressable. The major components of the Video Detection System are further described as follows:

3.5.2.2.1 Prior to installation of the Video Detection System a detailed site survey shall be conducted by a factory trained and certified representative. The site survey shall ensure that the design of the camera, camera location, camera optics, and video/data interconnect is appropriate for the application.

3.5.2.2.2 The supplier of the Video Detection System shall supervise the installation and testing of the Video Detection System and computer software. A factory certified representative from the supplier shall be on site during installation.

3.5.2.2.3 The Video Detection System shall include a configuring device and/or a Windows based computer software that provides for configuring the Video Detection System, viewing real time video, and updating the memory of the Video Detection System with updated application software.

3.5.2.2.4 The Video Detection System shall provide count & presence detection performance with at least 96% accuracy under normal (day and night) conditions.

3.5.2.2.5 The Video Detection System shall be comprised of a Video Detection System Camera, Video Detection System Cable, and Video Detection System Hardware (Complete and Working System).

3.5.2.2.10 Video Detection System Cameras

3.5.2.2.10.1 The Video Detection System Camera shall contain an automatic gain control (AGC) to provide a satisfactory image over the full range of light levels.

3.5.2.2.11 Video Detection System Cable

3.5.2.2.11.1 The Video Detection System Cable shall meet the design requirements of the Video Detection System Camera manufacturer, and shall be designed and manufactured specifically for the Video Detection System Camera supplied.

3.5.2.2.11.2 The Video Detection System Cable shall be capable of withstanding the rigors of outdoor environments, including all combinations of precipitation, heat and cold from -34 to 74 degrees Celsius, and direct exposure to sunlight without exhibiting any signs of deterioration over time.

3.5.2.2.12 Video Detection System Hardware

3.5.2.2.12.1 The Video Detection System Hardware shall operate without degradation over a temperature range of -34 to 74 degrees Celsius at a relative humidity of 10% to 90% condensing.

3.5.2.2.12.2 The Video Detection System Hardware shall include interface device(s) which shall be installed in the traffic control cabinet.

3.5.2.2.12.3 The interface device(s) shall be used to terminate the traffic controller cabinet end of the Video Detection System Cable.

3.5.2.2.12.3.1 The interface device(s) shall contain transient suppression devices for all signals transported on the Video Detection System Cable, including but not limited to video, data, and power.

3.5.2.2.12.3.1.1 The surge protector shall be electrically connected to the cabinet ground rod.

3.5.2.2.12.3.1.2 Surge protectors should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The protector complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

3.5.2.2.12.3.1.3 Units should be pre-approved or unconditionally warranted for at least 3 years from factory purchase and certified to comply with the product's published specifications by an independent laboratory.

3.5.2.2.12.3.2 The interface device(s) shall contain a switch or shut-off mechanism that shall allow the user to turn off AC service to all components of the Video Detection System.

3.5.2.2.12.3.3 The interface device(s) shall contain a connector for interfacing to an included configuring device and/or a Windows based computer in the field for the purpose of configuring the Video Detection System, viewing real time video, and for updating the memory of the Video Detection System with updated application software.

3.5.2.2.12.4 The Video Detection System Hardware shall include all necessary cables for interconnection to the traffic signal controller, AC power service, a modem for transport of video to the traffic operations center, and a configuring device and/or a Windows based computer in the field. Two() hours of training shall be provided at an NHDOT facility for training on camera operation and maintenance.

3.5.3 Surge Suppression

3.5.3.1 Wherever expensive electronic equipment is located (cabinets, cameras, etc.), each input & output should be surge protected except traffic signal outputs. Signal outputs from load switches do not need surge suppression since the load switches act as surge suppressors.

3.5.3.2 The surge protector must be electrically connected to the nearest grounded metal structure or nearest ground rod.

3.5.3.3 Surge protection for power service shall conform to the current NEMA TS-2 standard except surge capacity shall be 80 kA. The product complies when a lab report from an independent test laboratory stating the product passes the current NEMA TS-2(5.4.2.4) specification (with the additional surge capacity of 80 kA) is submitted with the shop drawings.

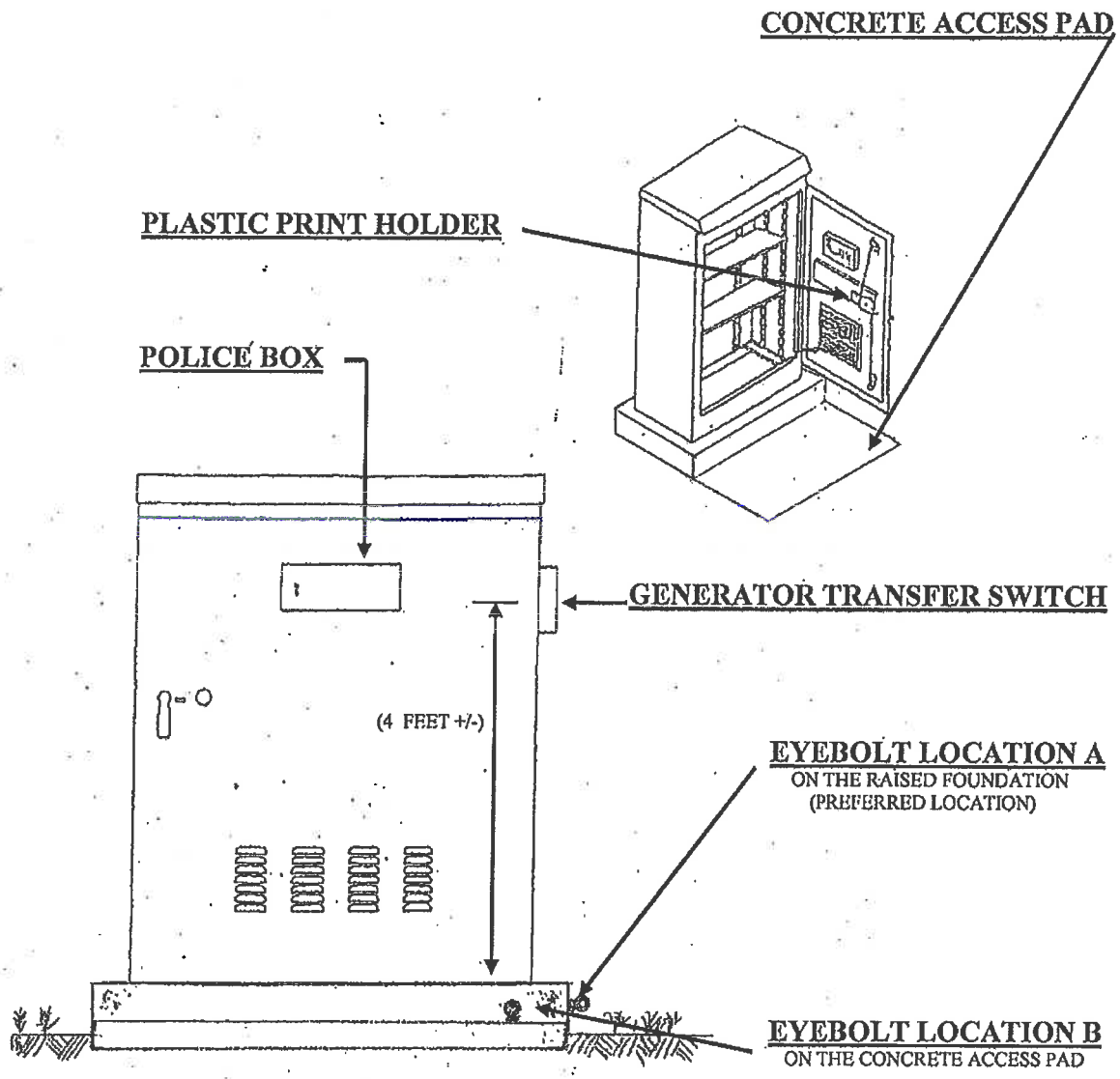
3.5.3.4 Surge protection for all video, pedestrian button, and pre-emption connections should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The product complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

3.5.3.5 Units should be unconditionally warranteed for at least 3 years.

Add to 5.1

5.1.1 All work for failures due to pre-existing conditions will be negotiated and paid for as extra work as provided in 109.04. The labor and equipment necessary to complete this application will be subsidiary.

ATTACHMENT "A"



TRAFFIC CONTROLLER CABINET

N.T.S.

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

Item 616.193 – Alterations To Traffic Signals (S-037-02)

This special provision provides for the reconstruction of the existing traffic signal system at the intersection of *NH ROUTE 101* with *MEETINGHOUSE ROAD* in the town of *BEDFORD*. The system is coordinated with the following intersections:

- Wallace Road Intersection (S-037-07) (Master Location)
- Nashua Road Intersection (S-037-11)

GENERAL:

All provisions of Section 616, except as modified or changed below, shall apply.

1. The Contractor shall be responsible for signal operation and maintenance once alterations to the existing signals, excavation or other work within 75 feet or 400 feet (if advanced detection is in place) of the stop bar at any leg of the intersection has begun. At this point in time the Contractor shall notify the Bureau of Traffic and furnish the Engineer and the Transportation Systems Management and Operations (TSMO) (tel. 603-271-6862) with names and phone numbers of persons to be contacted in case of a malfunction. The Contact person must be available 24 hours a day, seven days a week. The Contractor shall also keep a signal log in the cabinet to track all maintenance work they complete on the signal system. This log shall be placed within a plastic cover and shall at least include the description of the trouble call, corrective action taken, date, time, and personnel who completed the work.

2. The traffic signal must be inspected and approved by the Bureau of Traffic prior to placing in flash operation. The Contractor shall contact Peter Crouch at the Bureau of Traffic at (603) 271-2291 one week prior to turning the signals on flash. If the Contractor does not speak directly with Peter Crouch they must leave a detailed message with the Administrative Assistant and expect a call back. Leaving a message does not constitute an approval.

3. The Contractor shall be responsible for the dismantling and removing of the existing signal heads, mast arms and poles, foundations, existing electrical service, and controller cabinet. All surplus equipment shall be salvaged and delivered to the Department of Transportation, Bureau of Traffic in Concord, within normal business hours.

4. The Contractor shall install a generator – anchoring system to the new traffic controller cabinet's concrete foundation (See NHDOT Standard Plans for Road Construction – SL-2). The location of the anchoring system will be on the side of the cabinet that houses the controller's power supply. The anchoring system shall be a 1/2" x 13 tpi galvanized wrought eyebolt with a thread length of 1 5/8". The eyebolt shall be installed in a 5/8" diameter drilled hole into the concrete foundation. The eyebolt shall be bonded into the concrete foundation by an epoxy compound [Component "A" (105 resin) and Component "B" (205 hardener)], with the epoxy compound filling the drilled hole and covering the threads of the eyebolt. The epoxy compound shall be a product as included on the NHDOT's Qualified Product List (See Attachment "A" – Detail Plan).

5. The initial power hook-up will be paid for by the Contractor during the construction contract. The monthly billing will continue to be paid for by the Department:

   NHDOT – Bureau of Traffic, Signal 037-02, PO Box 483, Concord, NH 03302-0483

6. All interconnect cable shall be labeled and terminated on a terminal panel protected with EDCO PCD642-008D surge suppressers. Coordination shall be achieved via a spread spectrum radio system (ITEM 616.35).

7. All system detectors shall be terminated on a separate panel from the main detector panel.

Add to 2.1:

2.1.3 List of Major Materials:

1 - ATC & NEMA specification compliant signal controller. Input and output connections shall be TS2 Type 2 configuration. Econolite Corp., Model ASC/3, PEEK Traffic Inc., Model ATC-1000, Naztec ATC or approved equal. The controller shall utilize a removable memory card capable of storing user input data, and shall include two. Equipment to be housed in a P Type cabinet (with a 15-inch extension base) assembled by the equipment manufacture which will include telemetry harness and panel. The exterior of the Controller Cabinet shall be natural aluminum finish; the interior shall be painted white. The interior of the cabinet shall be illuminated by an LED light strip mounted to the ceiling of the cabinet between 12 and 18 inches long and will be controlled by a door switch. The cabinet shall be equipped with a pull out keyboard tray (shall be free moving without obstruction from controller cable connections).

1 – 5.8 GHz point-to-point radio/antenna capable of broadband capacity with ability to transmit video images (EnCom Energy series, or compatible equivalent).

1 - 30 Amp 125 V semi-flush Traffic Signal Generator Transfer switch and anchoring system with confirmation pilot light to indicate restored power mounted to the controller cabinet. Parallax Power Supply Model ATS-301, GenTran Corp or approved equal. The lock will utilize a different key than used to open the cabinet door.

12 - One-way, three-section, 12-inch aluminum signal heads with LED modules type (Duralight Corp., G.E. Lighting (Gecore) or Dialight/Trastar), mounted on mast arms with Pelco Astro-Bracs, with 5-inch louvered backplate. The outside perimeter of the backplate shall be lined with a fluorescent-yellow 2-inch strip of Type IX or XI retroreflective sheeting to highlight the three-section signal head.

2 - One-way, three-section, 12-inch bracket mounted aluminum signal heads with LED modules type (Duralight Corp., G.E. Lighting (Gecore) or Dialight/Trastar), with 5-inch louvered backplate, the outside perimeter of the backplate shall be lined with a fluorescent-yellow 2-inch strip of Type IX or XI retroreflective sheeting to highlight the four-section signal head.

1 - Meter pedestal with 30 amps disconnect switch, Alloy Castings Co., Inc. model ACTB-20-695 or approved equal.

1 - Galvanized steel mast arm poles, the signal arm shall be *40* ft. Mast arm poles shall be manufactured by Valmont Industries, Inc., or Union Metal Corp., or approved equal.

1 - Galvanized steel mast arm poles, the signal arm shall be *50* ft. Mast arm poles shall be manufactured by Valmont Industries, Inc., or Union Metal Corp., or approved equal.

2 - Galvanized steel mast arm poles with street light luminaries arm at a 40 ft mounting height. The signal arms shall be *45* ft. Mast arm poles shall be manufactured by Valmont Industries, Inc., or Union Metal Corp., or approved equal.

4 - Bracket mounted 16-inch x 18-inch, LED pedestrian signal heads with solid hand symbol and solid walking man symbol with countdown timer display.

4 - Accessible pedestrian systems Campbell Company Advisory Guide Accessible Pedestrian Station (AGPS), Polara Navigator Accessible Pedestrian Signals, or approved equal. System shall also include attaching R10-3e sign.

1 - Optical Fire Preempter Phase Selector, GTT Opticom Model 754, with a Model 760 Card Rack, Tomar 2140 OSP with 1881 Card Cage, or approved equal.

4 - Optical Fire Preempter receivers GTT Opticom Model 71, Tomar 2090SD, or approved equal (with associated wiring back to the controller cabinet).

2 - Confirmation strobe light, 120 VAC, with red Lexan optic lens. Whelan Model, IAC 12 RP, Tomar 804-110 MAXI or approved equal.

1 – Electric service complete.

2 - Designated as sign "D3-1A, 66-inch by 16-inch (NH Route 101) Type BB aluminum sign mast arm mounted. The center of the street sign shall be mounted on the mast arm one

half the sign width distance plus two (2) feet from the signal pole. Refer to the Project's Sign Text Layout Sheet for design of this mast arm mounted street name sign.

2 - Designated as sign "D3-1D, 78-inch by 16-inch (Meetinghouse Rd) Type BB aluminum sign mast arm mounted. The center of the street sign shall be mounted on the mast arm one half the sign width distance plus two (2) feet from the signal pole. Refer to the Project's Sign Text Layout Sheet for design of this mast arm mounted street name sign.

1 - GridSmart 360 Video Detection Camera, with traffic count module mounted a minimum 35 foot mounting height. Camera system software shall be installed and viewed on NHDOT servers. Contractor shall submit a test plan for approval to configure central control testing for camera software.

1 - Shelf Mounted Video Detection Processor, phase selector and cable and any other equipment for a complete working detection system.

1 - Advanced Vehicle Detection – shall integrate with the GridSmart Video Detection System. The Advanced Detection System shall include support equipment, mounting hardware, wiring and software. This Advanced Detection System shall have the ability to function in all types of weather and be able to handle temperature extremes from -40°F to 130°F. This Advanced Detection System must meet NEMA 250 Standards, be able to detect vehicles a minimum of 300 ft from the stop bar and the ability to detect multiple vehicles at the same time. The Advanced Detection System's hardware and software used to setup, configure and communicate must be compatible with the GridSmart Video Detection operating system. The Advanced Detection System must have a minimum 2-year replacement warranty. The Contractor shall install these units on the proposed signal mast arms and provide four (4) hours of training to NHDOT – Bureau of Traffic personnel.

370 - Linear feet of ¼ inch 3 strand polypropylene yellow rope shall be installed within the new conduit for future use. Adequate length of slack shall be left in each pull box such that it can be tied to the conduit should future hand hole work be required.

Add to 3.5:

3.5.2 Video Detectors

3.5.2.1 The Contractor shall provide GridSmart 360 Video Detection System to detect vehicles. The system shall also provide full motion video output showing zones highlighted during detection for fine-tuning. All hardware and software within the traffic signal cabinet shall be NEMA TS-2 compliant.

3.5.2.2 The Contractor shall supply and install the Video Detection System. It shall be Ethernet based and IP addressable. The major components of the Video Detection System are further described as follows:

3.5.2.2.1 Prior to installation of the Video Detection System a detailed site survey shall be conducted by a factory trained and certified representative. The site survey shall ensure that the design of the camera, camera location, camera optics, and video/data interconnect is appropriate for the application.

3.5.2.2.2 The supplier of the Video Detection System shall supervise the installation and testing of the Video Detection System and computer software. A factory certified representative from the supplier shall be on site during installation.

3.5.2.2.3 The Video Detection System shall include a configuring device and/or a Windows based computer software that provides for configuring the Video Detection System, viewing real time video, and updating the memory of the Video Detection System with updated application software.

3.5.2.2.4 The Video Detection System shall provide count & presence detection performance with at least 96% accuracy under normal (day and night) conditions.

3.5.2.2.5 The Video Detection System shall be comprised of a Video Detection System Camera, Video Detection System Cable, and Video Detection System Hardware (Complete and Working System).

3.5.2.2.10 Video Detection System Cameras

3.5.2.2.10.1 The Video Detection System Camera shall contain an automatic gain control (AGC) to provide a satisfactory image over the full range of light levels.

3.5.2.2.11 Video Detection System Cable

3.5.2.2.11.1 The Video Detection System Cable shall meet the design requirements of the Video Detection System Camera manufacturer, and shall be designed and manufactured specifically for the Video Detection System Camera supplied.

3.5.2.2.11.2 The Video Detection System Cable shall be capable of withstanding the rigors of outdoor environments, including all combinations of precipitation, heat and cold from -34 to 74 degrees Celsius, and direct exposure to sunlight without exhibiting any signs of deterioration over time.

3.5.2.2.12 Video Detection System Hardware

3.5.2.2.12.1 The Video Detection System Hardware shall operate without degradation over a temperature range of -34 to 74 degrees Celsius at a relative humidity of 10% to 90% condensing.

3.5.2.2.12.2 The Video Detection System Hardware shall include interface device(s) which shall be installed in the traffic control cabinet.

3.5.2.2.12.3 The interface device(s) shall be used to terminate the traffic controller cabinet end of the Video Detection System Cable.

3.5.2.2.12.3.1 The interface device(s) shall contain transient suppression devices for all signals transported on the Video Detection System Cable, including but not limited to video, data, and power.

3.5.2.2.12.3.1.1 The surge protector shall be electrically connected to the cabinet ground rod.

3.5.2.2.12.3.1.2 Surge protectors should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The protector complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

3.5.2.2.12.3.1.3 Units should be pre-approved or unconditionally warranted for at least 3 years from factory purchase and certified to comply with the product's published specifications by an independent laboratory.

3.5.2.2.12.3.2 The interface device(s) shall contain a switch or shut-off mechanism that shall allow the user to turn off AC service to all components of the Video Detection System.

3.5.2.2.12.3.3 The interface device(s) shall contain a connector for interfacing to an included configuring device and/or a Windows based computer in the field for the purpose of configuring the Video Detection System, viewing real time video, and for updating the memory of the Video Detection System with updated application software.

3.5.2.2.12.4 The Video Detection System Hardware shall include all necessary cables for interconnection to the traffic signal controller, AC power service, a modem for transport of video to the traffic operations center, and a configuring device and/or a Windows based computer in the field. Two (2) hours of training shall be provided at an NHDOT facility for training on camera operation and maintenance.

3.5.3 Surge Suppression

3.5.3.1 Wherever expensive electronic equipment is located (cabinets, cameras, etc.), each input & output should be surge protected except traffic signal outputs. Signal outputs from load switches do not need surge suppression since the load switches act as surge suppressors.

3.5.3.2 The surge protector must be electrically connected to the nearest grounded metal structure or nearest ground rod.

3.5.3.3 Surge protection for power service shall conform to the current NEMA TS-2 standard except surge capacity shall be 80 kA. The product complies when a lab report from an independent test laboratory stating the product passes the current NEMA TS-2(5.4.2.4) specification (with the additional surge capacity of 80 kA) is submitted with the shop drawings.

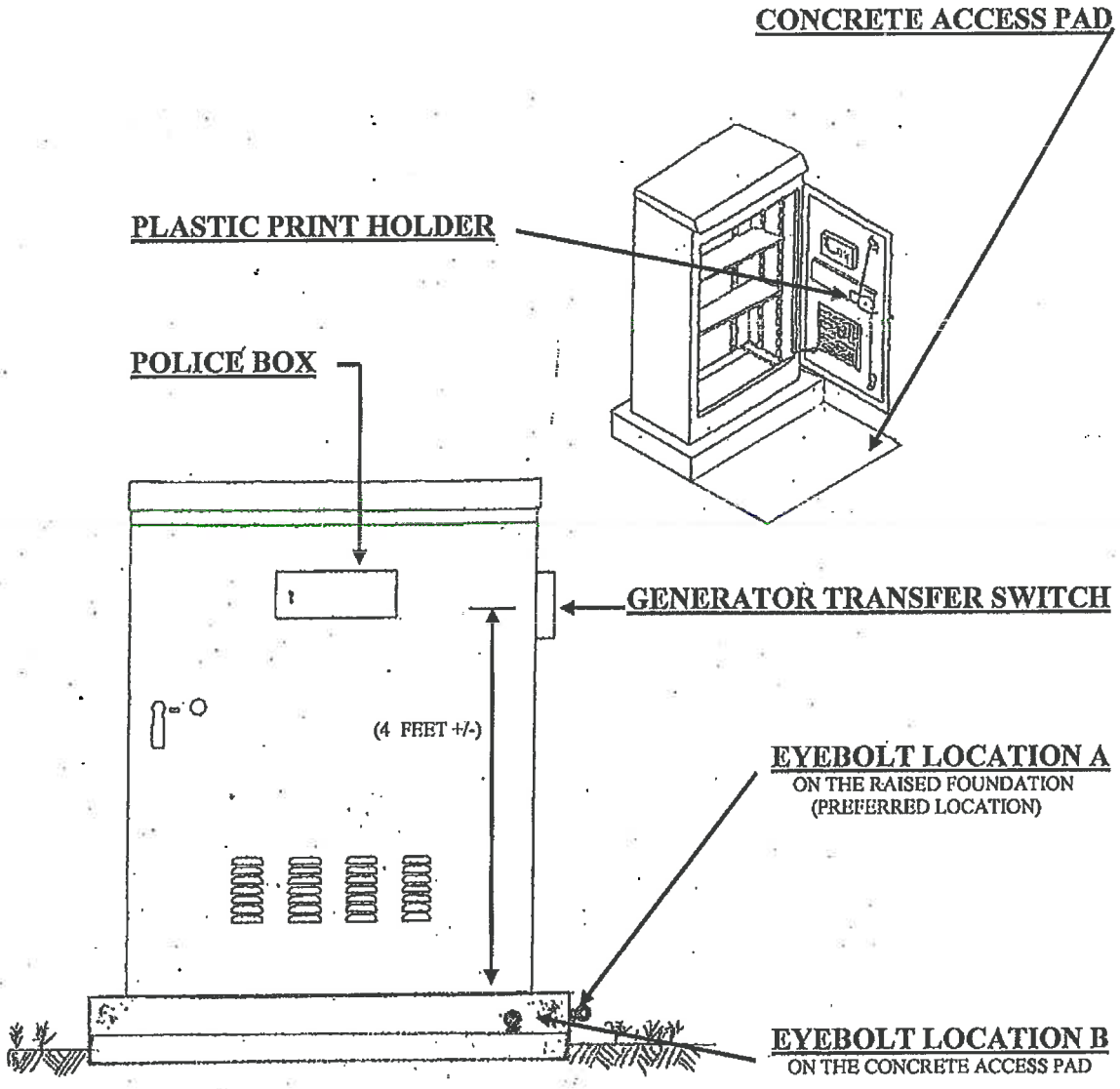
3.5.3.4 Surge protection for all video, pedestrian button, and pre-emption connections should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The product complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

3.5.3.5 Units should be unconditionally warranteed for at least 3 years.

Add to 5.1

5.1.1 All work for failures due to pre-existing conditions will be negotiated and paid for as extra work as provided in 109.04. The labor and equipment necessary to complete this application will be subsidiary.

ATTACHMENT "A"



TRAFFIC CONTROLLER CABINET

N.T.S.

BEDFORD
13953

March 29, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

Item 616.194 – Alterations To Traffic Signals (S-037-06)

This special provision provides for the reconstruction of the existing traffic signal system at the intersection of *NH ROUTE 101* with *OLD BEDFORD ROAD/CONSTITUTION DRIVE* in the town of *BEDFORD*. The system is coordinated with the following intersection:

- NH Route 114/Boynton Street (S-037-03) (Master Location)

GENERAL:

All provisions of Section 616, except as modified or changed below, shall apply.

1. The Contractor shall be responsible for signal operation and maintenance once alterations to the existing signals, excavation or other work within 75 feet or 400 feet (if advanced detection is in place) of the stop bar at any leg of the intersection has begun. At this point in time the Contractor shall notify the Bureau of Traffic and furnish the Engineer and the Transportation Systems Management and Operations (TSMO) (tel. 603-271-6862) with names and phone numbers of persons to be contacted in case of a malfunction. The Contact person must be available 24 hours a day, seven days a week. The Contractor shall also keep a signal log in the cabinet to track all maintenance work they complete on the signal system. This log shall be placed within a plastic cover and shall at least include the description of the trouble call, corrective action taken, date, time, and personnel who completed the work.

2. The traffic signal must be inspected and approved by the Bureau of Traffic prior to placing in flash operation. The Contractor shall contact Peter Crouch at the Bureau of Traffic at (603) 271-2291 one week prior to turning the signals on flash. If the Contractor does not speak directly with Peter Crouch they must leave a detailed message with the Administrative Assistant and expect a call back. Leaving a message does not constitute an approval.

3. The Contractor shall be responsible for the dismantling and removing of the existing signal heads, mast arms and poles, foundations, existing electrical service, and controller cabinet. All surplus equipment shall be salvaged and delivered to the Department of Transportation, Bureau of Traffic in Concord, within normal business hours.

4. The Contractor shall install a generator – anchoring system to the new traffic controller cabinet's concrete foundation (See NHDOT Standard Plans for Road Construction – SL-2). The location of the anchoring system will be on the side of the cabinet that houses the controller's power supply. The anchoring system shall be a 1/2" x 13 tpi galvanized wrought eyebolt with a thread length of 1 5/8". The eyebolt shall be installed in a 5/8" diameter drilled hole into the concrete foundation. The eyebolt shall be bonded into the concrete foundation by an epoxy compound [Component "A" (105 resin) and Component "B" (205 hardener)], with the epoxy compound filling the drilled hole and covering the threads of the eyebolt. The epoxy compound shall be a product as included on the NHDOT's Qualified Product List (See Attachment "A" – Detail Plan).

5. The initial power hook-up will be paid for by the Contractor during the construction contract. The monthly billing will continue to be paid for by the Department:

   NHDOT – Bureau of Traffic, Signal 037-06, PO Box 483, Concord, NH 03302-0483

6. All interconnect cable shall be labeled and terminated on a terminal panel protected with EDCO PCD642-008D surge suppressers. Coordination shall be achieved via a spread spectrum radio system (Item 616.35).

7. All system detectors shall be terminated on a separate panel from the main detector panel.

Add to 2.1:

2.1.3 List of Major Materials:

1 - ATC & NEMA specification compliant signal controller. Input and output connections shall be TS2 Type 2 configuration. Econolite Corp., Model ASC/3, PEEK Traffic Inc., Model ATC-1000, Naztec ATC or approved equal. The controller shall utilize a removable memory card capable of storing user input data, and shall include two. Equipment to be housed in a P Type cabinet (with a 15-inch extension base) assembled by the equipment manufacture which will include telemetry harness and panel. The exterior of the Controller Cabinet shall be natural aluminum finish; the interior shall be painted white. The interior of the cabinet shall be illuminated by an LED light strip mounted to the ceiling of the cabinet between 12 and 18 inches long and will be controlled by a door switch. The cabinet shall be equipped with a pull out keyboard tray (shall be free moving without obstruction from the controller cable connections).

1 – 5.8 GHz point-to-point radio/antenna capable of broadband capacity with ability to transmit video images (EnCom Energy series, or compatible equivalent).

1 - 30 Amp 125 V semi-flush Traffic Signal Generator Transfer switch and anchoring system with confirmation pilot light to indicate restored power mounted to the controller cabinet. Parallax Power Supply Model ATS-301, GenTran Corp or approved equal. The lock will utilize a different key than used to open the cabinet door.

4 - One-way, three-section, 12-inch aluminum signal heads with LED modules type (Duralight Corp., G.E. Lighting (Gecore) or Dialight/Trastar), mounted on mast arms with Pelco Astro-Bracs, with 5-inch louvered backplate. The outside perimeter of the backplate shall be lined with a fluorescent-yellow 2-inch strip of Type IX or XI retroreflective sheeting to highlight the three-section signal head.

8 - Install fluorescent-yellow retroreflective tape on existing signal head backplates, as per Item 616.70001 – Retroreflective Tape for Signal Head Backplates. This work shall be paid under Item 616.70001.

1 - Meter pedestal with 30 amps disconnect switch, Alloy Castings Co., Inc. model ACTB-20-695 or approved equal.

1 - Galvanized steel mast arm poles with street light luminaries arm at a 40 ft mounting height. The signal arms shall be *55* ft. Mast arm poles shall be manufactured by Valmont Industries, Inc., or Union Metal Corp., or approved equal.

1 - 8 ft signal pole, Alloy Castings Co., Inc. model ACTB-20-695 or approved equal.

6 - Bracket mounted 16-inch x 18-inch, LED pedestrian signal heads with solid hand symbol and solid walking man symbol with countdown timer display.

2 - Pedestal mounted 16-inch x 18-inch, LED pedestrian signal heads with solid hand symbol and solid walking symbol with countdown timer display.

8 - Accessible pedestrian systems Campbell Company Advisory Guide Accessible Pedestrian Station (AGPS), Polara Navigator Accessible Pedestrian Signals, or approved equal. System shall also include attaching R10-3e sign.

1 - Optical Fire Preempter Phase Selector, GTT Opticom Model 754, with a Model 760 Card Rack, Tomar 2140 OSP with 1881 Card Cage, or approved equal.

5 - Optical Fire Preempter receivers GTT Opticom Model 71, Tomar 2090SD, or approved equal (with associated wiring back to the Controller Cabinet).

1 - Electric service complete.

1 - Remove existing R10-11a(M) signs, 24 inch by 30 inch, "No Turn On Red Arrow".

1 - Designated as sign "D3-1E, 90-inch by 30-inch (Constitution Dr/Old Bedford Rd) Type BB aluminum sign mast arm mounted. The center of the street sign shall be mounted on the mast arm one half the sign width distance plus two (2) feet from the signal pole. Refer to the Project's Sign Text Layout Sheet for design of this mast arm mounted street name sign.

1 - GridSmart 360 Video Detection Camera, with traffic count module mounted a minimum 35 foot mounting height. Camera system software shall be installed and viewed on NHDOT servers. Contractor shall submit a test plan for approval to configure central control testing for camera software.

1 - Shelf Mounted Video Detection Processor, phase selector and cable and any other equipment for a complete working detection system.

1 - Advanced Vehicle Detection – shall integrate with the GridSmart Video Detection System. The Advanced Detection System shall include support equipment, mounting hardware, wiring and software. This Advanced Detection System shall have the ability to function in all types of weather and be able to handle temperature extremes from -40°F to 130°F. This Advanced Detection System must meet NEMA 250 Standards, be able to detect vehicles a minimum of 300 ft from the stop bar and the ability to detect multiple vehicles at the same time. The Advanced Detection System's hardware and software used to setup, configure and communicate must be compatible with the GridSmart Video Detection operating system. The Advanced Detection System must have a minimum 2-year replacement warranty. The Contractor shall install these units on the proposed signal mast arms and provide four (4) hours of training to NHDOT – Bureau of Traffic personnel.

850 - Linear feet of 14 Conductor intersection signal cable. Cable shall be a home run from the signal cabinet to the existing mast arms. This quantity also includes new signal wire within the signal mast arm.

400 - Linear feet of ¼ inch 3 strand polypropylene yellow rope shall be installed within the new and existing conduit for future use. Adequate length of slack shall be left in each pull box such that it can be tied to the conduit should future hand hole work be required. This quantity is based for only the major conduit runs that service the Signal Mast Arm Poles.

Add to 3.5:

3.5.2 Video Detectors

3.5.2.1 The Contractor shall provide GridSmart 360 Video Detection System to detect vehicles. The system shall also provide full motion video output showing zones highlighted during detection for fine-tuning. All hardware and software within the traffic signal cabinet shall be NEMA TS-2 compliant.

3.5.2.2 The Contractor shall supply and install the Video Detection System. It shall be Ethernet based and IP addressable. The major components of the Video Detection System are further described as follows:

3.5.2.2.1 Prior to installation of the Video Detection System a detailed site survey shall be conducted by a factory trained and certified representative. The site survey shall ensure that the design of the camera, camera location, camera optics, and video/data interconnect is appropriate for the application.

3.5.2.2.2 The supplier of the Video Detection System shall supervise the installation and testing of the Video Detection System and computer software. A factory certified representative from the supplier shall be on site during installation.

3.5.2.2.3 The Video Detection System shall include a configuring device and/or a Windows based computer software that provides for configuring the Video Detection System, viewing real time video, and updating the memory of the Video Detection System with updated application software.

3.5.2.2.4 The Video Detection System shall provide count & presence detection performance with at least 96% accuracy under normal (day and night) conditions.

3.5.2.2.5 The Video Detection System shall be comprised of a Video Detection System Camera, Video Detection System Cable, and Video Detection System Hardware (Complete and Working System).

3.5.2.2.10 Video Detection System Cameras

3.5.2.2.10.1 The Video Detection System Camera shall contain an automatic gain control (AGC) to provide a satisfactory image over the full range of light levels.

3.5.2.2.11 Video Detection System Cable

3.5.2.2.11.1 The Video Detection System Cable shall meet the design requirements of the Video Detection System Camera manufacturer, and shall be designed and manufactured specifically for the Video Detection System Camera supplied.

3.5.2.2.11.2 The Video Detection System Cable shall be capable of withstanding the rigors of outdoor environments, including all combinations of precipitation, heat and cold from -34 to 74 degrees Celsius, and direct exposure to sunlight without exhibiting any signs of deterioration over time.

3.5.2.2.12 Video Detection System Hardware

3.5.2.2.12.1 The Video Detection System Hardware shall operate without degradation over a temperature range of -34 to 74 degrees Celsius at a relative humidity of 10% to 90% condensing.

3.5.2.2.12.2 The Video Detection System Hardware shall include interface device(s) which shall be installed in the traffic control cabinet.

3.5.2.2.12.3 The interface device(s) shall be used to terminate the traffic controller cabinet end of the Video Detection System Cable.

3.5.2.2.12.3.1 The interface device(s) shall contain transient suppression devices for all signals transported on the Video Detection System Cable, including but not limited to video, data, and power.

3.5.2.2.12.3.1.1 The surge protector shall be electrically connected to the cabinet ground rod.

3.5.2.2.12.3.1.2 Surge protectors should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The protector complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

3.5.2.2.12.3.1.3 Units should be pre-approved or unconditionally warranted for at least 3 years from factory purchase and certified to comply with the product's published specifications by an independent laboratory.

3.5.2.2.12.3.2 The interface device(s) shall contain a switch or shut-off mechanism that shall allow the user to turn off AC service to all components of the Video Detection System.

3.5.2.2.12.3.3 The interface device(s) shall contain a connector for interfacing to an included configuring device and/or a Windows based computer in the field for the purpose of configuring the Video Detection System, viewing real time video, and for updating the memory of the Video Detection System with updated application software.

3.5.2.2.12.4 The Video Detection System Hardware shall include all necessary cables for interconnection to the traffic signal controller, AC power service, a modem for transport of video to the traffic operations center, and a configuring device and/or a Windows based computer in the field. Two (2) hours of training shall be provided at an NHDOT facility for training on camera operation and maintenance.

3.5.3 Surge Suppression

3.5.3.1 Wherever expensive electronic equipment is located (cabinets, cameras, etc.), each input & output should be surge protected except traffic signal outputs. Signal outputs from load switches do not need surge suppression since the load switches act as surge suppressors.

3.5.3.2 The surge protector must be electrically connected to the nearest grounded metal structure or nearest ground rod.

3.5.3.3 Surge protection for power service shall conform to the current NEMA TS-2 standard except surge capacity shall be 80 kA. The product complies when a lab report from an independent test laboratory stating the product passes the current NEMA TS-2(5.4.2.4) specification (with the additional surge capacity of 80 kA) is submitted with the shop drawings.

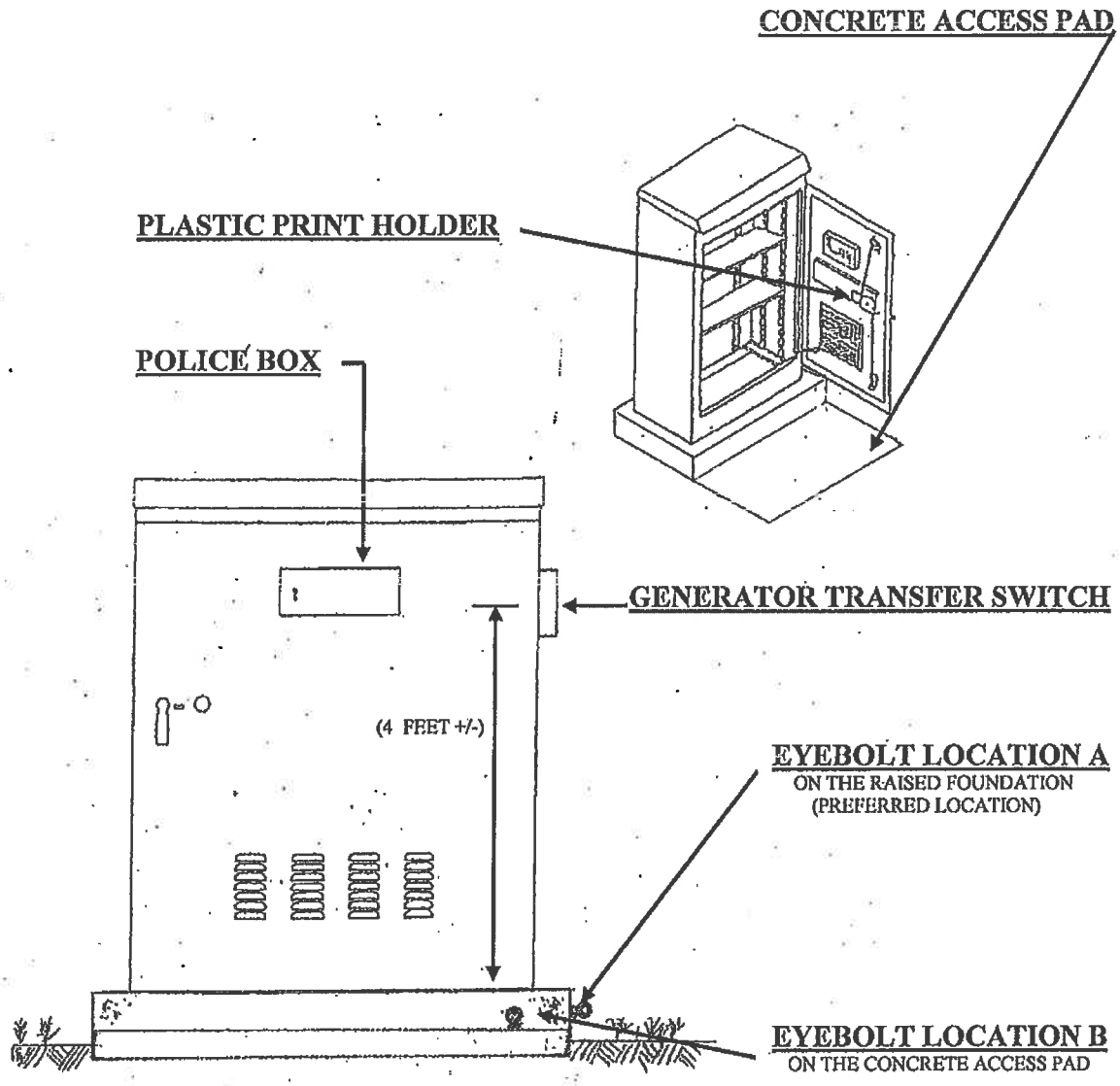
3.5.3.4 Surge protection for all video, pedestrian button, and pre-emption connections should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The product complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

3.5.3.5 Units should be unconditionally warranteed for at least 3 years.

Add to 5.1

5.1.1 All work for failures due to pre-existing conditions will be negotiated and paid for as extra work as provided in 109.04. The labor and equipment necessary to complete this application will be subsidiary.

ATTACHMENT "A"



TRAFFIC CONTROLLER CABINET

N.T.S.

March 29, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

Item 616.195 – Alterations To Traffic Signals (S-037-03)
(Master Location)

This special provision provides for the reconstruction of the existing traffic signal system at the intersection of *NH ROUTE 101* with *NH ROUTE 114/BOYNTON STREET* in the town of *BEDFORD*. The system is coordinated with the following intersections:

- Old Bedford Road/Constitution Drive Intersection (S-037-06)

GENERAL:

All provisions of Section 616, except as modified or changed below, shall apply.

1. The Contractor shall be responsible for signal operation and maintenance once alterations to the existing signals, excavation or other work within 75 feet or 400 feet (if advanced detection is in place) of the stop bar at any leg of the intersection has begun. At this point in time the Contractor shall notify the Bureau of Traffic and furnish the Engineer and the Transportation Systems Management and Operations (TSMO) (tel. 603-271-6862) with names and phone numbers of persons to be contacted in case of a malfunction. The Contact person must be available 24 hours a day, seven days a week. The Contractor shall also keep a signal log in the cabinet to track all maintenance work they complete on the signal system. This log shall be placed within a plastic cover and shall at least include the description of the trouble call, corrective action taken, date, time, and personnel who completed the work.

2. The traffic signal must be inspected and approved by the Bureau of Traffic prior to placing in flash operation. The Contractor shall contact Peter Crouch at the Bureau of Traffic at (603) 271-2291 one week prior to turning the signals on flash. If the Contractor does not speak directly with Peter Crouch they must leave a detailed message with the Administrative Assistant and expect a call back. Leaving a message does not constitute an approval.

3. The Contractor shall be responsible for the dismantling and removing of the existing signal heads, mast arms and poles, foundations, existing electrical service, and controller cabinet. All surplus equipment shall be salvaged and delivered to the Department of Transportation, Bureau of Traffic in Concord, within normal business hours.

4. The Contractor shall install a generator – anchoring system to the new traffic controller cabinet's concrete foundation (See NHDOT Standard Plans for Road Construction – SL-2). The location of the anchoring system will be on the side of the cabinet that houses the controller's power supply. The anchoring system shall be a 1/2" x 13 tpi galvanized wrought eyebolt with a thread length of 1 5/8". The eyebolt shall be installed in a 5/8" diameter drilled hole into the concrete foundation. The eyebolt shall be bonded into the concrete foundation by an epoxy compound [Component "A" (105 resin) and Component "B" (205 hardener)], with the epoxy compound filling the drilled hole and covering the threads of the eyebolt. The epoxy compound shall be a product as included on the NHDOT's Qualified Product List (See Attachment "A" – Detail Plan).

5. Provide additional sweep for ISP Broadband Conduit in the controller cabinet foundation.

6. The initial power hook-up shall be paid for by the Contractor during the construction contract. The monthly billing will continue to be paid for by the Department:

   NHDOT – Bureau of Traffic, Signal 037-07, PO Box 483, Concord, NH 03302-0483

7. The initial ISP Broadband Cable hook-up shall be paid for by the Contractor during the construction contract. The monthly billing for the ISP Broadband Cable service shall be paid for by the Department:

   NHDOT – Bureau of Traffic, Signal 037-07, PO Box 483, Concord, NH 03302-0483

6. All interconnect cable shall be labeled and terminated on a terminal panel protected with EDCO PCD642-008D surge suppressers. Coordination shall be achieved via a spread spectrum radio system (ITEM 616.35).

7. All system detectors shall be terminated on a separate panel from the main detector panel.

8. Due to the presents of high tension transmission lines in the area additional grounding may be necessary for the Controller Cabinet foundation and the Mast Arm Pole foundation which will house the video detection camera. The Contractor shall submit a grounding plan for approval.

Add to 2.1:

2.1.3 List of Major Materials:

1 - ATC & NEMA specification compliant master signal controller. Input and output connections shall be TS2 Type 2 configuration. Econolite Corp., Model ASC/3, PEEK Traffic Inc., Model ATC-1000, Naztec ATC or approved equal. The controller shall utilize a removable memory card capable of storing user input data, and shall include two. Equipment to be housed in a P Type cabinet (with a 15-inch extension base) assembled by the equipment manufacture which will include telemetry harness and panel. The exterior of the Controller Cabinet shall be natural aluminum finish; the interior shall be painted white. The interior of the cabinet shall be illuminated by an LED light strip

mounted to the ceiling of the cabinet between 12 and 18 inches long and will be controlled by a door switch. The cabinet shall be equipped with a pull out keyboard tray (shall be free moving without obstruction from controller cable connections).

1 - GPS Technology Equipment, Model TR-3/TR-4 GPS Assembly (501661F), mounted inside the controller cabinet. Model TR-3/TR-4 GPS Receiver (501532), mounted on top of the controller cabinet. GPS Receiver Simulator Software (501638TR). PC Cable for Simulator Software (504567). RTC Manufacturing, Inc. or approved equal.

1 - Closed loop system master to facilitate direct software communications via cable broadband connection from system master to NHDOT in Concord NH. Contractor shall submit a test plan for approval to configure central control software testing (as part of Item 616.141 – Computer Equipment and Software).

1 – 5.8 GHz point-to-point radio/antenna capable of broadband capacity with ability to transmit video images (EnCom Energy series, or compatible equivalent).

1 - 30 Amp 125 V semi-flush Traffic Signal Generator Transfer switch and anchoring system with confirmation pilot light to indicate restored power mounted to the controller cabinet. Parallax Power Supply Model ATS-301, GenTran Corp or approved equal. The lock will utilize a different key than used to open the cabinet door.

2 - One-way, three-section, 12-inch aluminum signal heads with LED modules type (Duralight Corp., G.E. Lighting (Gecore) or Dialight/Trastar), mounted on mast arms with Pelco Astro-Bracs, with 5-inch louvered backplate. The outside perimeter of the backplate shall be lined with a fluorescent-yellow 2-inch strip of Type IX or XI retroreflective sheeting to highlight the three-section signal head.

15 – Install fluorescent-yellow retroreflective tape on existing signal head backplates, as per Item 616.70001 – Retroreflective Tape for Signal Head Backplates. This work shall be paid under Item 616.70001.

1 - Meter pedestal with 30 amps disconnect switch, Alloy Castings Co., Inc. model ACTB-20-695 or approved equal.

1 - Galvanized steel mast arm poles, the signal arm shall be *45* ft. Mast arm poles shall be manufactured by Valmont Industries, Inc., or Union Metal Corp., or approved equal.

1 - Optical Fire Preempter Phase Selector, GTT Opticom Model 754, with a Model 760 Card Rack, Tomar 2140 OSP with 1881 Card Cage, or approved equal.

1 – Electric service complete.

1 - GridSmart 360 Video Detection Camera, with traffic count module mounted a minimum 35 foot mounting height. Camera system software shall be installed and viewed on NHDOT servers. Contractor shall submit a test plan for approval to configure central control testing for camera software.

1 - Self Mounted Video Detection Processor, phase selector and cable and any other equipment for a complete working detection system.

1220 - Linear feet of 14 Conductor intersection signal cable. Cable shall be a home run from the signal cabinet to the existing mast arms. This quantity also includes new signal wire within the signal mast arm.

920 - Linear feet of ¼ inch 3 strand polypropylene yellow rope shall be installed within the new and existing conduit for future use. Adequate length of slack shall be left in each pull box such that it can be tied to the conduit should future hand hole work be required. This quantity is based for only the major conduit runs that service the Signal Mast Arm Poles.

Add to 3.5:

3.5.2 Video Detectors

3.5.2.1 The Contractor shall provide GridSmart 360 Video Detection System to detect vehicles. The system shall also provide full motion video output showing zones highlighted during detection for fine-tuning. All hardware and software within the traffic signal cabinet shall be NEMA TS-2 compliant.

3.5.2.2 The Contractor shall supply and install the Video Detection System. It shall be Ethernet based and IP addressable. The major components of the Video Detection System are further described as follows:

3.5.2.2.1 Prior to installation of the Video Detection System a detailed site survey shall be conducted by a factory trained and certified representative. The site survey shall ensure that the design of the camera, camera location, camera optics, and video/data interconnect is appropriate for the application.

3.5.2.2.2 The supplier of the Video Detection System shall supervise the installation and testing of the Video Detection System and computer software. A factory certified representative from the supplier shall be on site during installation.

3.5.2.2.3 The Video Detection System shall include a configuring device and/or a Windows based computer software that provides for configuring the Video Detection System, viewing real time video, and updating the memory of the Video Detection System with updated application software.

3.5.2.2.4 The Video Detection System shall provide count & presence detection performance with at least 96% accuracy under normal (day and night) conditions.

3.5.2.2.5 The Video Detection System shall be comprised of a Video Detection System Camera, Video Detection System Cable, and Video Detection System Hardware (Complete and Working System).

3.5.2.2.10 Video Detection System Cameras

3.5.2.2.10.1 The Video Detection System Camera shall contain an automatic gain control (AGC) to provide a satisfactory image over the full range of light levels.

3.5.2.2.11 Video Detection System Cable

3.5.2.2.11.1 The Video Detection System Cable shall meet the design requirements of the Video Detection System Camera manufacturer, and shall be designed and manufactured specifically for the Video Detection System Camera supplied.

3.5.2.2.11.2 The Video Detection System Cable shall be capable of withstanding the rigors of outdoor environments, including all combinations of precipitation, heat and cold from -34 to 74 degrees Celsius, and direct exposure to sunlight without exhibiting any signs of deterioration over time.

3.5.2.2.12 Video Detection System Hardware

3.5.2.2.12.1 The Video Detection System Hardware shall operate without degradation over a temperature range of -34 to 74 degrees Celsius at a relative humidity of 10% to 90% condensing.

3.5.2.2.12.2 The Video Detection System Hardware shall include interface device(s) which shall be installed in the traffic control cabinet.

3.5.2.2.12.3 The interface device(s) shall be used to terminate the traffic controller cabinet end of the Video Detection System Cable.

3.5.2.2.12.3.1 The interface device(s) shall contain transient suppression devices for all signals transported on the Video Detection System Cable, including but not limited to video, data, and power.

3.5.2.2.12.3.1.1 The surge protector shall be electrically connected to the cabinet ground rod.

3.5.2.2.12.3.1.2 Surge protectors should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The protector complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

3.5.2.2.12.3.1.3 Units should be pre-approved or unconditionally warranted for at least 3 years from factory purchase and certified to comply with the product's published specifications by an independent laboratory.

3.5.2.2.12.3.2 The interface device(s) shall contain a switch or shut-off mechanism that shall allow the user to turn off AC service to all components of the Video Detection System.

3.5.2.2.12.3.3 The interface device(s) shall contain a connector for interfacing to an included configuring device and/or a Windows based computer in the field for the purpose of configuring the Video Detection System, viewing real time video, and for updating the memory of the Video Detection System with updated application software.

3.5.2.2.12.4 The Video Detection System Hardware shall include all necessary cables for interconnection to the traffic signal controller, AC power service, a modem for transport of video to the traffic operations center, and a configuring device and/or a Windows based computer in the field. Two (2) hours of training shall be provided at an NHDOT facility for training on camera operation and maintenance.

3.5.3 Surge Suppression

3.5.3.1 Wherever expensive electronic equipment is located (cabinets, cameras, etc.), each input & output should be surge protected except traffic signal outputs. Signal outputs from load switches do not need surge suppression since the load switches act as surge suppressors.

3.5.3.2 The surge protector must be electrically connected to the nearest grounded metal structure or nearest ground rod.

3.5.3.3 Surge protection for power service shall conform to the current NEMA TS-2 standard except surge capacity shall be 80 kA. The product complies when a lab report from an independent test laboratory stating the product passes the current NEMA TS-2(5.4.2.4) specification (with the additional surge capacity of 80 kA) is submitted with the shop drawings.

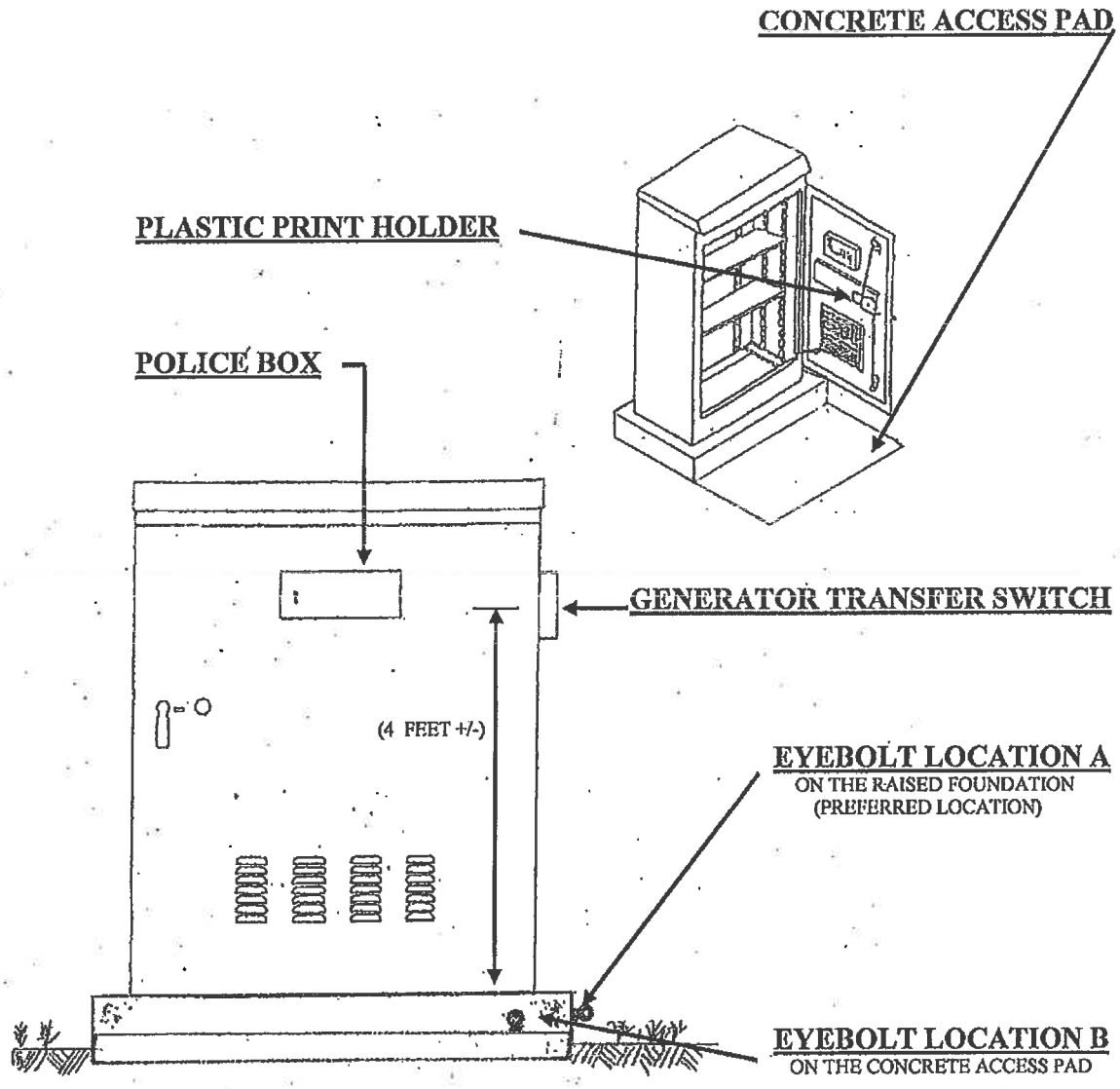
3.5.3.4 Surge protection for all video, pedestrian button, and pre-emption connections should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The product complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

3.5.3.5 Units should be unconditionally warranteed for at least 3 years.

Add to 5.1

5.1.1 All work for failures due to pre-existing conditions will be negotiated and paid for as extra work as provided in 109.04. The labor and equipment necessary to complete this application will be subsidiary.

ATTACHMENT "A"



TRAFFIC CONTROLLER CABINET

N.T.S.

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

Item 616.35 – Spread Spectrum Radio Communications System

Add to Description:

1.3 This work shall consist of the Contractor furnishing and installing two (2) separate fully operational spread spectrum radio communication networks for each closed loop traffic signal control system, as shown on the plans and in accordance with this Special Provision, or as ordered. For each system this includes, but is not limited to, performing a detailed path analysis and on-site survey; installing ENCOM Model 5200 or Microwave Data Systems (MDS) TransNET 900 radios; Diagnostics Adder; antennas; connector kits; antenna cable; and installing lightning protection. The Contractor shall provide four additional radio units (two for each system) to NHDOT for future use as spares. The radio performance shall be guaranteed in writing by the radio supplier for a period of 5 years and the radios shall be installed according to the radio supplier's recommendations.

System #1 and Locations

- Intersection of NH Route 101 / Wallace Road (Master Location)
- Intersection of NH Route 101 / Nashua Road
- Intersection of NH Route 101 / Meetinghouse Road

System #2 and Locations

- Intersection of NH Route 101 / Constitution Drive & Old Bedford Road
- Intersection of NH Route 101 / NH Route 114 & Boynton Street (Master Location)

These intersections shall be coordinated separately, with each system master to be installed at the NH Route 101 / NH 114 & Boynton Street and NH Route 101 / Wallace Road intersections.

1.3.1 The radio at each master location shall be direct software communication by cable broadband connection provided in Items 616.191 and 616.195, and shall relay the closed loop information from the local and master controllers through the cable broadband communications to the NHDOT as described in Item 616.141 – Computer Equipment and Software.

Add to Materials:

2.10 Spread Spectrum Radio Communications. The location and type of radio antenna; type of low loss feed line; type and use of bandpass filters, shall be as recommended by the radio supplier. The supplier's recommended equipment will be based on their on-site survey to provide a minimum Received Signal Strength Indication (RSSI) of –85 dBm or stronger as recommended by the supplier.

Add to Construction Requirements:

3.7.5 The Contractor shall perform an "On-the-Air" test once the systems are installed to confirm the signal strength. The Received Signal Strength Indication (RSSI) shall be at least –85 dBm or stronger as recommended in the on-site survey. The Contractor will adjust the installed system to meet this minimum RSSI. Prior to the final inspection, the Contractor shall have a preliminary review with NHDOT Bureau of Traffic representatives to review and verify this test.

Amend to read:

4.1 Spread spectrum radio communications network will be measured as a unit.

Amend 5.1 to read:

5.1 The accepted quantity of spread spectrum radio communications system will be paid for at the Contract lump sum price complete in place.

Add to Pay Items and Units

616.35	Spread Spectrum Radio Communications System	Unit

March 29, 2017

SPECIAL PROVISION

SECTION 616 – TRAFFIC SIGNALS

Item 616.70001 –Retroreflective Tape for Signal Head Backplates

Description

1.1 This work shall consist of furnishing and installing retroreflective tape onto existing traffic signal backplates including all necessary surface treatment and preparation.

Materials

2.1 Retroreflective Tape.

2.2.1 A 2 in. wide fluorescent yellow retroreflective strip shall be applied to the perimeter of the existing backplate aligned with the edge of the backplate. The sheeting shall be ASTM 4956 Type IX or Type XI fluorescent yellow applied in the orientation for the maximum angularity according to the manufacturer's recommendations.

2.2.2 The retroreflective tape shall be self-adhesive.

Construction Requirements

3.1 All traffic signal and electrical installations shall comply with local and utility codes, MUTCD, and the National Electric Code (NEC).

3.2 The Contractor shall provide a copy of the manufacturer's storage and application recommendations along with the manufacturer's certificate of compliance to the Engineer prior to the first application of the retroreflective tape.

3.3 Backplate shall be prepared by washing with detergent and water, wiping with a quick dry solvent like isopropyl alcohol and then immediately dried using a lint-free paper towel.

3.4 Backplate temperature shall be above 50°F and below 100°F at time of application.

3.5 Retroreflective tape shall be stored and applied according to the manufacturer's recommendations including surface preparation, cutting techniques, smoothing techniques and installation temperature.

3.5.1 The retroreflective tape shall be applied to the face of the backplate oriented towards on-coming traffic (i.e. the tape shall be applied to the backplate face oriented in the same direction as the signal head lenses).

3.5.2 The tape shall be applied with a roller using pressure sufficient to activate the adhesive.

3.5.3 Sheeting shall be placed no closer than ½ in. to any louver and no sheeting shall cover any louvered area.

3.5.4 The retroreflective tape shall be applied along the outside edge of the backplate, around the full perimeter of the backplate, with no gaps. At the corners, the tape shall be either mitered to provide angled corners or shall be perpendicular to the adjacent edge. Tape seams shall be butted together; tape shall not overlap.

3.5.5 The retroreflective tape shall have no creases, bubbles, tears or other imperfections when applied.

3.5.6 The retroreflective tape shall not be spliced along an edge. Every edge stripe shall be continuous from top to bottom and left to right.

3.6 Warranty. The Contractor shall provide a six month warranty for the tape installation in accordance with Section 616, part 3.16.

Method of Measurement

4.1 Retroreflective tape will be measured by the linear foot to the nearest 0.5 foot based on the established linear foot quantities for the type of backplate taped and approved.

Basis of Payment

5.1 The accepted quantity of Retroreflective Tape will be paid for at the Contract unit price per linear foot installed for the type of backplate. Payment shall be full compensation for surface preparation and furnishing and installing the new retroreflective tape. The price shall also include furnishing all labor, tools, hardware, materials, equipment, transportation, guaranties/warranties, and incidentals necessary to provide a complete installation.

5.1.1 A 3-section backplate shall be paid as a quantity of 13.0 linear feet per backplate approved.

5.1.2 A 4-section backplate shall be paid as a quantity of 15.5 linear feet per backplate approved.

5.1.3 A 5-section vertical (stacked) backplate shall be paid as a quantity of 17.5 linear feet per backplate approved.

5.1.4 A 5-section cluster (doghouse) backplate shall be paid as a quantity of 16.0 linear feet per backplate approved.

Pay items and units:

616.70001	Retroreflective Tape for Signal Head Backplates	Linear Foot

SPECIAL PROVISION

AMENDMENT TO SECTION 616 – TRAFFIC SIGNALS

This special provision amends Section 616 and addresses the design and installation criteria for the traffic signal structure and foundation.

Amend 1.1 to read:

1.1 This work shall consist of furnishing and installing traffic signals, pedestrian signals, or flashing beacons including poles, mast arms, foundations, excavation, backfill, and all necessary fittings, cables and components as ordered.

Amend 2.4 to read as follows:

2.4 Traffic Signal Poles, Mast Arms and Foundations.

2.4.1 General. Traffic signal structures and foundations shall be designed and installed in accordance with the current edition of the AASHTO "Standard Specifications for Structural Supports for Highway Traffic Signs, Luminaires and Traffic Signals" including all interims, except as modified per NHDOT design criteria stated herein:

2.4.1.1 Design Loads.

2.4.1.1.1 Wind Loads:

(a) The 3-second wind gust map in AASHTO Specifications shows the basic wind speed to be used in computing design wind pressure.

(b) Basic wind speed of 100 mph (161 km/hr) shall be used for the whole state of NH *except* in the Special Wind Region (i.e. regions along the NH-VT border and Franconia Notch) as shown in AASHTO Specifications, Fig. 3.8.3-5. The maximum-recorded wind speed in this area shall be used as the basic wind speed if it is greater than the NH basic wind speed of 100 mph (161 km/hr).

2.4.1.1.2 Design Life and Recurrence Interval (Table 3.8.3-2, AASHTO Specifications):

(a) 50 years for all traffic signal mast arms with/without luminaires (all heights)

2.4.1.1.3 Fatigue Design:

Fatigue design shall conform to AASHTO Specifications (Table 11.6-1) and the following categories:

(a) Cantilevered Fatigue Category II:

- All traffic signal supports (mast arms)

- Natural Wind Gust loading shall be included.
- Truck Induced Gust loading, Gallop loading and vortex shedding effects may be excluded.

2.4.1.2 Structure Requirements.

(a) The maximum mast arm span is 60 ft. (18 m). Any exception to this shall be approved by the Design Chief, Bureau of Bridge Design and the Bureau of Traffic.

(b) The standard layout plan TS-7 shows configurations of the traffic signal supports with combinations of signals, attachments and luminaire and the corresponding foundation that should be used with that configuration. The foundation configurations shall be based on current Department standard plans for either the Type 1 or Type 2 foundation (TS-1, TS-2, TS-3 and TS-4 Standard Plans) as directed and as modified by the Engineer. Any traffic signal structure with a different configuration or dimensions greater than what is shown on the standard layout plan TS-7 shall not be accepted, unless approved by the Design Chief, Bureau of Bridge Design and the Bureau of Traffic.

(c) The structures shall be steel, galvanized in accordance with NHDOT Specification 550 Section 2.9.

(d) The traffic signal structure Fabricator shall design the anchor rods' size, length and layout. A minimum of 6 anchor rods shall be provided.

(e) The connection of the structure to the foundation shall be a double-nut moment connection. Do not place grout between the top of foundation and the base plate.

(f) Anchor rods shall conform to the requirements of ASTM F1554 Grade 55 (minimum). Do not use ASTM A615 reinforcing steel. Galvanize the entire rod per ASTM A153. Each anchor rod shall be supplied with a minimum of two hex nuts (ASTM A563 or ASTM A194) and a minimum of two flat hardened washers (ASTM F436). Lock washers shall not be used.

(g) Ultrasonic testing (UT) - The anchor rods shall be ultrasonically tested (UT) prior to installation using straight-beam transducers to verify the absence of flaws. The Contractor shall provide written documentation and traceability of the anchor rods supplied to the site. The Department will reject if reflectors are found with an indication rating less than 15 decibels.

(h) 25 percent of the base plate-to-post weld shall be inspected by magnetic particle testing per AASHTO Specifications. This requirement shall be noted on the shop plans.

(i) The Contractor shall furnish the design calculations and complete shop drawings for the traffic signal structure and foundation (when required) for approval in accordance with Section 105.02.

(j) A stainless steel standard grade wire cloth (1/4" [6.4 mm] maximum opening with minimum wire diameter of AWG No. 16) shall be installed around the structure base plate and top of footing with a 2-inch [51 mm] lap. The screen is to prevent debris from collecting beneath the base plate, keep animals out, and protect the electrical wires.

(k) Mast arm spans greater than 50 ft. (15 m) shall have a mitigation device. The mitigation device shall consist of a horizontal sign blank 60"x16"x1/8" placed within 5 ft. (1.5 m) of the mast arm tip and provide at least 6-inches (150 mm) clear from the top of any signal assembly or sign panel.

2.4.1.3 Geometry.

(a) The top of the foundation should be placed 3-inches (75 mm) higher than adjacent highest finished grade.

(b) The bottom of the foundation shall be placed a minimum of 5'-0" (1.5 m) below the lowest finished grade for frost protection.

(c) Minimum clearance to the bottom of overhead signal housings shall be 16 ft. (4.9 m).

(d) The distance from the top of the concrete footing to the bottom of the signal mast arm structure base plate shall be the nut height plus 1-inch [25 mm] (preferred) or nut height plus the anchor rod diameter (maximum). (Note the nut height equals the rod diameter.)

(e) The foundation and structure shall be located without interference with utilities, drainage pipes or structures.

2.4.1.4 Concrete for a circular shaft foundation, Type 2, shall be Concrete Class A for cast in place or Concrete Class AAA for precast, conforming to Section 520. Concrete for foundation Type 1 shall be Concrete Class B, conforming to Section 520. Reinforcing steel shall conform to AASHTO M31/ 31M, Grade 60 (420), and Section 544, unless noted otherwise.

2.4.1.5 Wood poles shall be Class IV, with a fiber bending stress of 8,000 psi, to a length specified conforming to Rural Electrification Administration (REA) Specification DT-5C.

2.4.1.6 Messenger cable and guy cable shall be seven-strand wire with a breaking strength of 8,000 pounds, double galvanized in accordance with NHDOT Specification 550, Section 2.9.

Amend 3.14 Installation of signals and equipment to read as follows:

3.14 Installation of Signals, Equipment, Signal Structures and Foundations.

Add to 3.14 Installation of Signals, Equipment, Signal Structures and Foundations the following:

3.14.4 The applicable provisions of 550.3 apply to the signal structures and installation of signal structure connections made with high strength bolts (e.g. ASTM A325). The installation procedures for anchor rods are different than for high strength bolts and shall conform to the following:

1. AASHTO "Standard Specifications for Structural Supports for Highway Traffic Signs, Luminaires and Traffic Signals";
2. FHWA Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaires, and Traffic Signals (Publication No. FHWA NHI 05-036 March 2005). (See Sections 6.8 and 6.9)

3.14.5 See Appendix A of this special provision for anchor rod installation, and tensioning requirements.

Add to 4.1 the following:

4.1.1 Stainless steel wire mesh will not be measured.

4.1.2 Ultrasonic testing of anchor rods will not be measured.

Add to 5.1

5.1.1 All work for failures due to pre-existing conditions will be negotiated and paid for as extra work as provided in 109.04. The labor and equipment necessary to complete this application will be subsidiary.

Add to Basis of Payment the following:

5.4 The following shall be subsidiary to Item 616.1XX:

5.4.1. Stainless steel wire mesh will be subsidiary

5.4.2 Ultrasonic testing of anchor rods will be subsidiary.

5.4.3 Excavation for foundation will be subsidiary.

5.4.4 Concrete for foundation will be subsidiary.

5.4.5 Reinforcing steel for foundation will be subsidiary.

5.4.6 Backfill for foundation will be subsidiary.

5.4.7 Conduit to 3 ft. (1 m) will be subsidiary.

Appendix A- Procedure for Signal Mast Arm Anchor Rod Installation

Any alterations to the following procedures for the installation, tensioning, and inspection of anchor rods by the Contractor shall be submitted to the Department for approval.

Procedure for Installing Anchor Rods in the Foundation for Double-Nut Connections

The procedure for installing anchor rods in the signal mast arm foundation for double-nut connections is as follows:

1. Anchor rods shall be installed as a group in the concrete form and secured against relative movement and misalignment, such as with a template set composed of metal rings with nuts on both sides at two locations along the length of the anchor rods. One of the rings is usually above the top of the concrete and is reused as a template.
2. The template set (or other device) with anchor rods shall be secured in its correct position in the concrete form in accordance with the drawings. The exposed threads shall be taped with duct tape to prevent contamination by concrete.
3. The concrete shall be placed and cured.
4. If a top template is above the concrete surface, it may be removed 24 hours after placing the concrete.
5. The exposed part of the anchor rods shall be cleaned with a wire brush or equivalent and lubricated. Use an approved paraffin-based stick wax, as listed on the NHDOT Qualified Products List for Item 550 fasteners, applied to the threads and the nut face in contact with the washer.
6. At least 24 hours after placing the concrete, the anchor rods shall be inspected visually to verify that there is no visible damage to the threads and that their position, elevation, and projected length from the concrete are within the tolerances specified on the drawings. In the absence of required tolerances, the position, elevation, and projected length from the concrete shall be according to the AISC *Code of Standard Practice for Steel Buildings and Bridges.* The misalignment from vertical shall be no more than 1:40. It is good practice to use a steel or wood template with the required hole pattern to check the base of the post and the anchor rods.

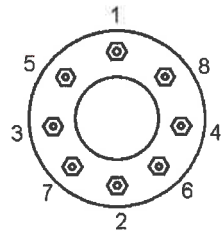
   To check the thread condition the nuts shall be turned onto the rods full length well past the elevation of the bottom of the leveling nut and backed off by one worker using an ordinary wrench without a cheater bar. The threads are considered damaged if more than minimal effort (i.e. an unusually large effort) is required to turn the nut.
7. Once the concrete has reached sufficient strength (7 days minimum), anchor rods are ready to be subjected to erection loads.

Procedure for tensioning Anchor Rods for Signal Mast Arm Foundation in Double-Nut Joint Moment Connections.

The procedure for tensioning anchor rods in double-nut joint moment connections in the installed concrete foundation is as follows:

1. The proper position of the anchor rods and the proper hole pattern on the post shall be verified (preferably with a template).
2. It shall be verified that the nuts can be turned onto the rods well past the elevation of the bottom of the leveling nut and backed off by one worker using an ordinary wrench without a cheater bar.

3. If the threads of anchor rods were lubricated more than 24 hours before placing the leveling nuts or have been wet since they were lubricated, the exposed threads of the anchor rod shall be relubricated. Leveling nuts shall be cleaned and the threads and bearing surfaces lubricated.
4. Leveling nuts shall be placed on the anchor rods and set level.
5. Leveling nut washers shall be placed on the anchor rods.
6. The template shall be placed on top of the leveling nuts to check the level of the nuts. Verify that the maximum clear distance between the bottom of the bottom leveling nut and the top of the concrete is not more than one anchor rod diameter. The preferred clear distance is one inch. Start by placing the leveling nuts one half inch clear distance above the concrete foundation. Bring all the nuts to the same level as the highest nut above the foundation. Do not exceed the maximum clear distance of one anchor rod diameter between the concrete foundation and the bottom of the leveling nuts. Remove the template once all the nuts are level.
7. The baseplate and structural element (e.g. post, end frame, or structure leg) shall be placed with a crane.
8. The post, end frame, or structure leg shall be plumbed or the base plate leveled, and the anchor rods tensioned. The following is the installation sequence for double-nut joints using the "turn-of-the-nut" method of tensioning.
9. Top nut washers shall be placed. (Note: Do not use lock washers when anchor rods are pretensioned for double-nut connections using the pretension procedures described herein.)
10. Lubrication of the fastener components is required for proper installation. Anchor rod threads, nut threads, and the bearing surface of top nuts shall be lubricated, and the top nuts placed and tightened to the snug-tight condition. See section FHWA Guideline Reference. (Note: A snug-tight condition is the tightness attained by the full effort of a person using a wrench with a handle length equal to 14 times the diameter of the bolt but not less than 18 inches. Apply the full effort as close to the free end of the wrench as possible. Pull firmly by leaning back and using the entire body weight on the end of the wrench until the nut stops rotating.)
11. Leveling (bottom) nuts shall be tightened to the snug-tight condition following a star pattern for two full tightening cycles. (Note: Use a minimum of two separate passes of tightening. Sequence the tightening in each pass so that the opposite side nut will be subsequently tightened (i.e. following a star pattern) until all the nuts in that pass have been snugged.)



12. At this point, the installation crew shall verify if beveled washers are necessary. Beveled washers may be necessary under the leveling or top nut if any face of the base plate has a slope greater than 1:20 and/or any nut could not be brought into firm contact with the base plate. If any beveled washer is required, the installation crew shall disassemble the joint as necessary, add the beveled washer(s) and retighten (in a star pattern) to the snug-tight condition for the top and leveling nuts.

13. Tensioning by "Turn-of-the-Nut": Before turning the top nuts further, the reference position of the top nut in the snug-tight condition shall be marked relative to the rod and base plate with a suitable marking using a permanent paint marker. Mark the rod, nut, and base plate with marks in a straight line when viewed from above. Top nuts shall be turned in increments following a star pattern for at least two full tightening cycles to attain the nut rotation specified in Table 1 if UNC threads are used. After pretensioning, the nut rotation shall be verified.

Table 1 - Nut Rotation for Turn-Of-Nut Pretensioning

Anchor Rod Diameter, in.	Nut Rotation from Snug-Tight Condition a, b, c	
	F1554 Grade 36	F1554 Grades 55 and 105 A615 and A706 Grade 60
1 1/2 or less	1/6 Turn (60°)	1/3 Turn (120°)
>1 1/2	1/12 Turn (30°)	1/6 Turn (60°)

a. Nut rotation is relative to the anchor rod. The tolerance is plus 20 degrees.
b. Applicable only to double-nut joints.
c. Beveled washer shall be used if:
   i) the nut is not in firm contact with the base plate; or
   ii) the outer face of the base plate is sloped more than 1:40.

14. The load may be released from the crane.
15. The Department may reject, and subsequently require replacement of, the entire base installation if the threads have stripped. All costs associated with replacing the base installation, if rejected, or performing other repairs shall be borne by the Contractor.
16. During maintenance activities the Department intends to verify that the top nuts are not loose. Under no circumstance shall any nut be tack welded to the washer or the base plate nor shall the leveling nut be tack welded as a method of preventing nut loosening.

FHWA Guideline Reference:

1. A very large torque may be required to properly tighten anchor rods greater than 1 inch in diameter. A "cheater bar" such as a pipe or extension handle as much as 10 feet long may be required for the torque wrench. For snugging the leveling nuts, an open-end wrench with a ten-foot long pipe or extension handle will typically suffice. Tightening the top nuts for anchor rods greater than 1 inch in diameter may require either of the following:

   - A hydraulic torque wrench, or
   - A box end "slug" or "knocker" wrench with a 10-ft, long pipe or extension handle.

   The box end wrench may be moved by impacts with a 16-pound sledgehammer or by the efforts of three or more workers. It is essential that the workers have good traction during this effort.

April 13, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 619 -- MAINTENANCE OF TRAFFIC

Item 619.502 - Work Zone ITS Operational Costs (Winter)
Item 619.503 - Work Zone ITS Operational Costs (Summer)
Item 619.51 – Portable Queue Trailer/Sensor (PQT)
Item 619.52 – Portable Changeable Message Sign (PCMS)
Item 619.54 – Mobile Video Trailer with Pan Tilt Zoom (PTZ)
Item 619.519 - Portable Queue Trailer/Sensor (PQT) (Salvage to Department)
Item 619.549 - Mobile Video Trailer with Pan Tilt Zoom (PTZ) (Salvage to Department)
619.91 - Relocate Work Zone ITS Device

The intent of a Work Zone Intelligent Transportation System (Work Zone ITS, or "Smart Work Zone") is to monitor the project's work zone traffic and disseminate real-time information to the traveling public through devices installed on the project. The Contractor is expected to coordinate this work with The New Hampshire Department of Transportation (NHDOT) Bureau of Transportation Systems Management and Operations (TSMO) and the Transportation Management Center (TMC). All provisions of Section 619, except as modified or changed below, shall apply.

Add to Description:

1.3 This work shall consist of furnishing, installing, relocating, operating and maintaining any devices called out per Contract plans that provide an automated, portable, real-time work zone information system (Work Zone Intelligent Transportation System).

1.4 Work Zone ITS operational costs shall consist of providing and maintaining all communications required by the Work Zone Intelligent Transportation System, such as FCC licensing, any third party licensing, cellular telephone, wireless data networks, satellite and Internet subscriptions, as well as providing and maintaining solar-power system support and battery charging, and maintenance as part of both winter and summer operation of Work Zone Intelligent Transportation Systems.

Add to Materials:

2.3 System Components

2.3.1 The Work Zone Intelligent Transportation System (ITS) may consist of any of the following devices as called out per Contract plans:

(a) Portable Queue Trailer/Sensors (PQT). Refer to 2.4.3 below.

(b) Portable Changeable Message Signs (PCMS). Refer to 2.4.4 below.

(c) Mobile Video Trailer with Pan Tilt Zoom (PTZ) cameras. Refer to 2.4.5 below.

(d) Communication equipment for all above components, including wireless data networks, base stations, cell phone data interfaces, Ethernet network interfaces and internet interfaces

2.3.2 Each PQT, PCMS, and PTZ camera shall be individually mounted on trailer units with solar power.

2.3.3 Each PQT, PCMS, and PTZ camera shall be equipped with digital modems or wireless data interfaces as required.

2.3.4 Each PQT, PCMS, and PTZ camera shall be linked back to the Work Zone ITS provider's central software server.

2.3.5 If no other computer is provided to the Department as part of this contract, the Contractor shall provide a laptop computer meeting requirements of Section 698 of the Contract Special Provisions for additional field office equipment. A laptop travel case, MS-Office Professional (latest version), and a wireless air-card for mobile internet access shall also be provided for use with the laptop.

2.3.6 The components of a Work Zone Intelligent Transportation System may vary. In all cases, as called out per Contract Documents, the varied number and type of components become part of a "Smart" Work Zone (SWZ) Intelligent Transportation System along with the operational and communication costs. All components of the SWZ system must be able to fully integrate with the ASTI Transportation Systems browser based webpage. The Vendor shall coordinate with ASTI Transportation to transfer this live data to integrate into ASTI's backend software.

2.4 Device Requirements and Configurations

2.4.1 All Work Zone ITS devices called out per Contract plans shall have the capability to collect and transfer real time data to the ASTI Transportation Systems hosted backend.

2.4.2 Work Zone ITS devices shall be capable of withstanding winter and inclement weather conditions, and provide adequate solar and battery power.

2.4.3 The Work Zone ITS PQT devices shall meet the following minimum requirements:

2.4.3.1 The Work Zone ITS traffic sensors shall be configured to acquire real-time speed, volume, occupancy and a minimum of 3 vehicle classifications data from up to eight lanes of traffic in multiple directions, e.g. northbound and southbound. Vehicle classifications are to be selected by the ITS Project Manager from the most recent FHWA Vehicle Classification chart.

2.4.3.2 Work Zone ITS traffic sensors shall be such that the accuracy is not degraded by inclement weather and visibility conditions including precipitation, fog, darkness, excessive dust, foliage, and/or road debris.

2.4.4 The Work Zone ITS PCMS devices shall meet the following minimum requirements:

2.4.4.1 The signs shall meet the requirements of Section 619.2.1 for portable changeable message signs.

2.4.4.2 The signs shall meet legibility and visibility requirements of the MUTCD for changeable message signs.

2.4.4.3 Solar panel array shall be sized to replace the power used in typical daily operation with less than four hours of sun.

2.4.4.4 Batteries shall consist of commercial off the shelf heavy-duty 225 amp hour deep cycle batteries. They shall be wired as proposed by the manufacturer. The batteries shall be capable of providing enough power for the sign to display a three-line message with 8 characters per line for 30 days without any charge from the solar panels or any other source. The supplier shall provide the battery calculations showing they can support this load. The signs shall be equipped with an on-board voltmeter.

2.4.4.5 The message sign shall provide for remote sign operation via central computer base station.

2.4.4.6 When the signs are displaying messages, they shall be considered a traffic control device. At all times when no message is displayed, they shall be considered equipment.

2.4.5 The Work Zone ITS PTZ camera devices shall be configured with the following minimum requirements:

2.4.5.1 The CCTV camera shall be Underwriter's Laboratory (UL) approved. UL certification shall be provided with the catalog cuts in the Technical Submittal.

2.4.5.2 The CCTV camera shall weigh no more than 10 pounds.

2.4.5.3 The CCTV camera shall be digital, IP addressable and Ethernet ready.

2.4.5.4 The CCTV interface shall be an RJ45 type connector for 10BASE-T/100BASE-TX, and shall include an IP66-rated RJ45 connector kit.

2.4.5.5 The CCTV camera shall be compatible with existing CCTV software at the NHDOT Transportation Management Center (TMC), including the Milestone Video Management System, Corporate Edition, latest version.

2.4.5.6 The CCTV shall have the following image setting functionalities: Wide dynamic range (WDR), manual shutter time, compression, color, brightness, sharpness, white balance, exposure control, exposure zones, backlight compensation, fine tuning of behavior at low light,

rotation, text and image overlay, 32 individual 3D privacy masks, image freeze on pan-tilt-zoom (PTZ), electronic image stabilization and automatic defog.

2.4.5.7 The CCTV shall provide a camera imaging system that automatically shifts from daytime mode to nighttime mode, and shifts from color mode to a black-and-white mode under very low light conditions, in order to render a more detailed video image.

2.4.5.8 The CCTV shall provide automatic and manual control of camera imaging characteristics (such as exposure and contrast).

2.4.5.9 The CCTV shall return operational status and report system faults to the NHDOT TMC.

2.4.5.10 The CCTV shall receive and process camera positioning and camera configuration commands received from the NHDOT TMC.

2.4.5.11 The CCTV shall have the capability to be viewed, controlled, and tested locally at the camera site utilizing a laptop computer with OEM software. This shall include the capability to locally retrieve operational status and fault data for the CCTV.

2.4.5.12 The CCTV camera dome shall be constructed of clear polycarbonate with a sun shield.

2.4.5.13 The lower exterior dome shall be made of seamless polycarbonate, optically clear with no distortion, optical discontinuities, or anomalies of any type in any portion of the dome up to 20-degrees above horizontal.

2.4.5.14 The CCTV camera dome drive system shall consist of an integral camera pan-tilt assembly with a variable high speed drive unit with continuous 360-degree rotation, CCD camera, optical and digital zoom, auto focusing, motorized zoom lens and integral camera control receiver.

2.4.5.15 The CCTV shall have user-defined "pre-sets" for position, zoom, exposure and focus, to be defined by the NHDOT TSMO Bureau.

2.4.5.16 The CCTV shall have a minimum Pan/Tilt/Zoom functionality of: 100 preset positions, 360° endless pan at a speed of 0.05 - 450°/s; Tilt - 220° at a speed of 0.05 - 450°/s.

2.4.5.17 NHDOT TMC control of CCTV pan, tilt, and zoom (PTZ) features shall have a latency of no greater than one (1) second.

2.4.5.18 The CCTV shall have an automatic variable pan-tilt speed adjustment operating as a function of degree of zoom.

2.4.5.19 The CCTV shall have a minimum 30x optical zoom and 12x digital zoom, total 360x zoom.

2.4.5.20 The CCTV shall have the following intelligent video analytics: video motion detection, auto-tracking.

2.4.5.21 The CCTV shall have alarm triggers from multiple sources including intelligent video, PTZ position.

2.4.5.22 The CCTV shall have a minimum 1/3-inch progressive scan CCD image sensor.

2.4.5.23 The CCTV shall have a minimum illumination of: Color: 0.2 lux at 30 IRE; B/W: 0.04 lux at 30 IRE.

2.4.5.24 The CCTV shall have minimum resolution range of: HDTV 320x180 up to 1280x720, 720p.

2.4.5.25 The CCTV shall provide H.264 (MPEG-4 Part 10/AVC) and Motion JPEG video compression formats.

2.4.5.26 The CCTV shall have a minimum frame rate of: H.264 25/30 frames per second (fps) (50/60 Hz) in all resolutions, M-JPEG: up to 25/30 fps (50/60 Hz) in all resolutions.

2.4.5.27 The CCTV shall be capable of multi-streaming in H.264 and Motion JPEG formats: Multiple individually configured streams in maximum resolution at 30/25 (60 / 50 Hz) fps. The frame rate and bandwidth shall be controllable.

2.4.5.28 The CCTV shall have the following security features: password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, digest authentication, user access log.

2.4.5.29 The CCTV shall support the following protocols: IPv4/v6, HTTP, HTTPSa, SSL/TLSa, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnPTM, SNMPv1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS, SSH, and NTCIP.

2.4.5.30 The CCTV shall conform to the ONVIF Profile S standard and have an open Application Programming Interface for software integration.

2.4.5.31 The CCTV shall be able to process alarm events of at least these types: File upload: FTP, HTTP, network share and email notification: email, HTTP and TCP; PTZ preset, guard tour, video recording to edge storage, auto-tracking, day/night mode, pre- and post-alarm video buffering.

2.4.5.32 The CCTV shall include transient voltage surge suppression (TVSS) to protect against transients and surges within 5 feet of the camera enclosure.

2.4.5.33 The CCTV shall be powered by an industrial grade Power Over Ethernet Injector (POEI).

2.4.5.33.1 The POEI shall provide operating power and Ethernet data to the CCTV. The POEI power consumption shall not exceed 60 watts.

2.4.5.33.2 The POEI shall include integral transient voltage surge suppression (TVSS) to protect against transients and surges on the incoming power and data (Ethernet) connections to the POEI, as well as to protect against transients and surges on the outgoing data (Ethernet) connection to the camera. The TVSS shall be a product approved by the CCTV manufacturer for use with the camera.

2.4.5.34 The CCTV shall be housed in an environmentally hardened aluminum enclosure suitable for continuous outdoor use and shall feature an internal temperature regulation system. The CCTV shall be IP66-, NEMA 4X- and IK09-rated and shall have an operating temperature range of -40 degrees F to +122 degrees F, minimum.

2.4.5.35 The CCTV shall be mechanically and functionally compatible with the camera pole mounted lowering device.

2.5 System Communications

2.5.1 The Contractor shall perform the required configuration of the communications system during system initialization.

2.5.2 The wireless communications systems used for this project must be reliable, dependable, and capable of functioning 24 hours per day, 365 days per year, regardless of weather, locations and cell phone usage. The Contractor shall be responsible for all communications costs, utilities, and satellite or cellular phone services needed to provide a dependable, functioning Work Zone Intelligent Transportation System.

2.6 Technical Submittals and Approvals

2.6.1 At least 15 working days prior to beginning installation, submit to the Engineer for review and approval evidence that the Work Zone ITS Contractor has successfully completed at least 5 "Work Zone ITS" projects similar in concept and scope to the proposed system. The Work Zone ITS Contractor shall provide contact information to both the prime contractor and the Department as references for the required project history. Include names, addresses and telephone numbers of the owner's representatives for verification.

2.6.2 The Contractor shall supply contact information for an on-call service technician, available 24 hours per day, 365 days per year, to provide technical support, relocate SWZ devices, provide routine maintenance, and make necessary repairs to ensure the SWZ system remains functional for the entire deployment.

2.6.3 The Contractor shall verify the actual device layout prior to installation of the Work Zone ITS devices. Any variation from the plans shall be submitted to the Engineer for approval 15 working days before installation.

2.6.3.1 The approved field locations of the equipment must meet the clear zone requirements for the Contract, and MUTCD guidance for changeable message sign locations.

2.6.4 The Contractor shall submit brochures and cut sheets of the Work Zone ITS devices, along with a plan that details the integration into the ASTI Transportation Systems backend software.

2.6.5 All technical submittal material will require review and written approval from the Engineer prior to deployment of the Work Zone Intelligent Transportation System.

Add to Construction Requirements:

3.4 It is anticipated that traffic conditions will deteriorate due to queuing caused by high traffic volumes, work zone vehicle interference, weather, grade changes, and other factors affecting level of service. The intention of the Work Zone ITS equipment is to monitor traffic due to these conditions.

3.5 The Contractor shall assume all responsibility for any damage to Work Zone ITS devices or equipment that may occur during the system's deployment.

3.6 Placement of devices shall meet Contract clear-zone requirements, and MUTCD guidelines.

3.7 Proposed sign messaging shall meet MUTCD guidelines.

3.8 Work Zone ITS Deployment

3.8.1 Work Zone ITS devices shall be installed on all approaches to the work zone, on designated sections of the project, and/or as called out in the Contract documents. Refer to the layout plan included elsewhere.

3.8.2 The system shall be fully maintained and operational during summer and winter months, as required by the Contract and at the discretion of the Engineer.

3.8.3 The Contractor shall install each component of the system in accordance with the manufacturer's recommendations in compliance with all industry standards and codes such that each device is fully operational and can be operated and controlled from the Department's TMC and from the field via laptop.

3.8.4 The Contractor shall work with the ITS Project Manager (603-271-6862) to validate that the Work Zone ITS devices are communicating and posting the correct default messages on the message boards, prior to turning the message signs to the viewing public.

3.8.5 The Contractor shall prepare the locations to receive the equipment in accordance with the equipment manufacturer's requirements.

3.8.6 Refer to item 203.5526X for installation and removal of SWZ device platforms.

3.9 Relocating Work Zone ITS Devices

3.9.1 Where Work Zone ITS devices are ordered to be relocated, the Contractor shall remove the mobile trailer from one location and reset the mobile trailer at another location as indicated in the contract documents or as directed by the Engineer. The relocation may be any PQT, PCMS, or PTZ unit.

3.9.2 The Contractor shall notify the ITS Project Manager before any device relocations occur. The Contractor shall supply GPS coordinates of the relocated devices in order to fully update the Work Zone Intelligent Transportation System at the TMC.

3.9.3 The Contractor shall complete the Request to Relocate SWZ ITS Devices form found on NHDOT's website (http://www.nh.gov/dot/business/contractors.htm), and in Appendix A of this specification. The completed request shall be sent to the ITS Project Manager for review 15 working days prior to scheduling any proposed device relocations. Failure to notify the ITS Project Manager in a timely manner may result in the Work Zone Intelligent Transportation System being considered malfunctioning, and may be subject to a pro-rated monthly payment as specified in sections 3.11 and 5.10.

3.9.4 The Contractor shall be responsible for reconfiguring and reprogramming the PQT, PCMS, PTZ, and communication equipment, as needed, for each device relocation.

3.10 Support and Training

3.10.1 The Contractor shall ensure that a technician, who is skilled in the operation of all the Work Zone ITS equipment, is available 24 hours per day, 7 days per week to maintain the system components, move portable devices as necessary, and respond to emergency situations within 4 hours. Ensure that this technician is equipped with sufficient resources to make needed corrections of deficiencies within 8 hours of notification. Contact information for this technician shall be included in the technical submittal as stated in 2.5 above.

3.10.2 The Contractor shall provide training to NHDOT project staff on the use and operation of the physical field hardware of the Work Zone Intelligent Transportation System, ASTI integration and use for monitoring devices and researching collected data, as well as all user programmable features of the devices.

3.11 Performance

3.11.1 The System, as called out per Contract plans, shall perform with no major malfunctions throughout the entire contract, unless the Department requests the system to be removed before the contract completion date. The Department reserves the right to terminate items at any time if it determines the Work Zone Intelligent Transportation System is not performing in accordance with this specification.

3.11.2 Malfunctions include, but are not limited to:

3.11.2.1 Inability of the equipment to provide accurate real-time video and/or data feeds to the ASTI Transportation Systems hosted webpage/backend software.

3.11.2.2 Inability to display approved messages on PCMS devices.

3.11.2.3 Inability to communicate with the ASTI Transportation Systems hosted webpage and backend software.

3.11.2.4 Inability to withstand a construction roadside environment or normal weather conditions.

3.11.2.5 Displaying inaccurate or misleading information as a result of failing to notify the ITS Project Manager of device relocations.

3.11.3 The Contractor shall be required to make all necessary corrections to the components of the system within 24 hours of notification by the Department.

3.11.4 The Department reserves the right to remove the Work Zone ITS components at any time if it determines the System is not performing in accordance with this specification.

3.12 Salvaged Equipment. At the completion of the contract, the Contractor shall perform all manufacturer-recommended preventative maintenance to all portable equipment and trailers indicated to be salvaged to the Department, replacing any parts or components that have failed during the term of the contract.

Add to Method of Measurement:

4.4 The Work Zone ITS Operational Costs, both winter and summer, will be measured by the month.

4.4.1 Work Zone ITS Operational Costs (Summer) are valid for April 1 through November 30th.

4.4.2 Work Zone ITS Operational Costs (Winter) are valid for December 1 through March 31st.

4.5 Portable Queue Trailer/Sensors (PQT), Portable Changeable Message Signs (PCMS) and Mobile Video Trailer with Pan Tilt Zoom cameras (PTZ) will be measured on a per unit basis for each month that the piece of equipment is in use.

4.6 All monthly measurements (for both ITS devices and seasonal operational costs) shall begin from the date each unit or Work Zone System is fully operational and in use, as determined by the Engineer, to the date it is released back to the Contractor. The Engineer shall compute periods of less than one month at the rate of 1/30 of the unit price per month for each day of use.

4.7 Portable equipment and trailers salvaged to the Department will be measured by the unit for each trailer and equipment salvaged.

4.8 Relocate Work Zone ITS device will be measured by the unit. A relocated unit shall consist of equipment on one mobile trailer moved to a location at least 75 feet from the initial position, and reinstalled for use in the SWZ system. Relocations of less than 75 feet shall be subsidiary.

Add to Basis of Payment:

5.7 The accepted quantity for the Work Zone ITS Operational Costs will be paid for at the Contract unit price per month. Payment shall include maintenance of all devices, communication systems, power systems, and system integration, all in accordance with sections 3.11, 5.9 and 5.10.

5.8 The accepted quantity of Portable Queue Trailer/Sensor (PQT), Portable Changeable Message Sign (PCMS) and, Mobile Video Trailer with Pan Tilt Zoom (PTZ) will be paid for at the contract unit price per month complete in place, all in accordance with section 3.11, 5.9 and 5.10.

5.9 If an intermediate completion date is included in the Contract for Work Zone ITS installations, all of the required components of the Work Zone Intelligent Transportation System shall be fully operational before that date. If the system is not fully operational before the intermediate completion date, a pay reduction of 5% of the Contract unit price for all Work Zone ITS pay items shall occur, per day, until the system is installed and confirmed to be operational and communicating with the NHDOT TMC, as determined by the Engineer.

5.10 In accordance with 3.11, if the Contractor fails to make corrections to bring the Work Zone Intelligent Transportation System, or any malfunctioning components, back online within the 24-hour period, no payment shall be made from the time of initial notification until the system is brought back on-line. The pro-rated monthly payment, based on the number of days the system or device is malfunctioning, shall be as follows:

1 day = 5% pay reduction	6 days = 30% pay reduction
2 days = 7% pay reduction	7 days = 35% pay reduction
3 days = 10% pay reduction	8 days = 40% pay reduction
4 days = 20% pay reduction	9 days = 50% pay reduction
5 days = 25% pay reduction	10 days = 75% pay reduction

5.10.1 If the components of the Work Zone Intelligent Transportation System are down for more than 10 total days in a month, whether they are consecutive or cumulative, the Contractor shall forfeit payment for the entire month.

5.10.2 No payment shall be made for devices removed from the site in accordance with 3.11.3 and 3.11.4 beyond the date of notification by the Engineer.

5.11 Pro-rated monthly payments, as specified in 5.9 and 5.10, shall apply to Work Zone ITS Operational Cost items, Work Zone ITS device items, or both, at the determination of the Engineer.

5.12 The accepted quantity of portable equipment and trailers salvaged to the department will be paid for at the contract unit price for each unit installed and salvaged. Payment shall be full compensation for the furnishing, installing, final preventative maintenance, and delivery of the salvaged units to the Department. Payment will be made periodically based on the anticipated timeframe that the device shall be in use.

5.13 The accepted quantity of Relocate Work Zone ITS Device will be paid for at the contract unit price, for each unit relocated. Price shall include preparing the device and trailer for travel, relocating the device and trailer to the new location, setting up the unit in the new configuration, coordinating with the NHDOT TSMO Bureau and TMC, providing updated GPS coordinates, re-establishing communications and returning the original location back to pre-existing conditions. This item shall also include the removal of any device platforms that were previously established at the previous device location.

5.13.1 Removal of device platforms constructed by others but utilized by this contract shall be subsidiary.

Add to Pay items and units:

619.502	Work Zone ITS Operational Costs (Winter)	Month
619.503	Work Zone ITS Operational Costs (Summer)	Month
619.51	Portable Queue Trailer/Sensor (PQT)	Month
619.52	Portable Changeable Message Sign (PCMS)	Month
619.54	Mobile Video Trailer with Pan Tilt Zoom (PTZ)	Month
619.519	Portable Queue Trailer/Sensor (PQT) (Salvage to Department)	Unit
619.549	Mobile Video Trailer with Pan Tilt Zoom (PTZ) (Salvage to Department)	Unit
619.91	Relocate Work Zone ITS Device	Unit

Appendix A

Date of Last Revision: 01/25/2017

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION
BUREAU OF TRANSPORTATION SYSTEMS MANAGEMENT & OPERATIONS (TSMO)

REQUEST TO RELOCATE SMART WORK ZONE (SWZ) ITS DEVICES

Requested Information

Date Submitted:	**Completion Date Requested:**
Submitted By:	**Entity:**
Phone:	**Email:**

Project Information

☐ Modification to existing project		
Project Name:		
Federal #:	**State #:**	**Route(s):**
Project Description:		

ITS Device Information

Total Number of Devices to be Relocated:
Type(s) of Device(s) to be Relocated: ☐ Portable Changeable Message Sign (PCMS) ☐ Queue Sensor ☐ Camera ☐ Other, Explain:

Please fill out the following for each device to be relocated. Copy and paste additional tables as needed.

Device 1

	Current Device Name:		**New Device Name (if applicable):**	
	Type of Device:	☐ Portable Changeable Message Sign (PCMS) ☐ Queue Sensor ☐ Camera ☐ Other, Explain:		
	Current Device Location: Route: MM:		**New Device Location:** Route: MM:	
	Lat:	**Long:**	**Lat:**	**Long:**
IF PCMS	Does this board currently display travel times? ☐ Yes ☐ No			
	If Yes list all queue sensors and/or Inrix segments that will be associated with the board once it is moved:			
	Will any queue sensors be moved with the board? ☐ Yes ☐ No If Yes list all sensors that will be moved:			
	Will the default message currently displayed on the board be updated? ☐ Yes ☐ No			
	Current Default Message:		**New Default Message (if applicable):**	
	Phase 1	**Phase 2**	**Phase 1**	**Phase 2**
	(Line 1)	(Line 1)	(Line 1)	(Line 1)
	(Line 2)	(Line 2)	(Line 2)	(Line 2)
	(Line 3)	(Line 3)	(Line 3)	(Line 3)
	***Note Messaging Maximum: 2 Phases with 8 Characters Per Line**			

Device 2

	Current Device Name:		**New Device Name (if applicable):**	
	Type of Device:	☐ Portable Changeable Message Sign (PCMS) ☐ Queue Sensor ☐ Camera ☐ Other, Explain:		
	Current Device Location: Route: MM:		**New Device Location:** Route: MM:	
	Lat:	**Long:**	**Lat:**	**Long:**
IF PCMS	Does this board currently display travel times? ☐ Yes ☐ No			
	If Yes list all queue sensors and/or Inrix segments that will be associated with the board once it is moved:			
	Will any queue sensors be moved with the board? ☐ Yes ☐ No If Yes list all sensors that will be moved:			
	Will the default message currently displayed on the board be updated? ☐ Yes ☐ No			
	Current Default Message:		**New Default Message (if applicable):**	
	Phase 1	**Phase 2**	**Phase 1**	**Phase 2**
	(Line 1)	(Line 1)	(Line 1)	(Line 1)
	(Line 2)	(Line 2)	(Line 2)	(Line 2)
	(Line 3)	(Line 3)	(Line 3)	(Line 3)
	***Note Messaging Maximum: 2 Phases with 8 Characters Per Line**			

Device 3

	Current Device Name:		**New Device Name (if applicable):**	
	Type of Device:	☐ Portable Changeable Message Sign (PCMS) ☐ Queue Sensor ☐ Camera ☐ Other, Explain:		
	Current Device Location: Route: MM:		**New Device Location:** Route: MM:	
	Lat:	**Long:**	**Lat:**	**Long:**
IF PCMS	Does this board currently display travel times? ☐ Yes ☐ No			
	If Yes list all queue sensors and/or Inrix segments that will be associated with the board once it is moved:			
	Will any queue sensors be moved with the board? ☐ Yes ☐ No If Yes list all sensors that will be moved:			
	Will the default message currently displayed on the board be updated? ☐ Yes ☐ No			
	Current Default Message:		**New Default Message (if applicable):**	
	Phase 1	**Phase 2**	**Phase 1**	**Phase 2**
	(Line 1)	(Line 1)	(Line 1)	(Line 1)
	(Line 2)	(Line 2)	(Line 2)	(Line 2)
	(Line 3)	(Line 3)	(Line 3)	(Line 3)
	***Note Messaging Maximum: 2 Phases with 8 Characters Per Line**			

Email to: Charlie Blackman (Charles.Blackman@dot.nh.gov), **Dana Lacasse** (Dana.Lacasse@dot.nh.gov), **Desiree Carron** (Desiree.Carron@dot.nh.gov), and **CC: Contract Administrator**

**********For TSMO use only**********

Comments: _____

_____ ITS Project Manager

_____ Date

Project Name:
Project #:
Date:

Page 2 of 2

SPECIAL PROVISION

AMENDMENT TO SECTION 644 -- GRASS SEED

Item 644.82 - Salt-Tolerant Grass Seed Type 82

This special provision provides for a special seed mixture to be used on well-drained roadside areas that receive moderate to high salt runoff. These provisions apply to Salt-Tolerant Grass Seed Type 82 and neither amends nor modifies the provisions of this section except as noted.

Amend 1.1 to read:

1.1 This work shall consist of furnishing and sowing seed of the specified type at the locations shown on the plans or as ordered after preparation work and placement of humus (Item 647.22).

Add to 2.1.3:

2.1.3.1 Any seed type within the mixture that does not meet the minimum requirements for purity or germination shall be considered unacceptable and subject to rejection. Under no circumstances shall the mix be altered or modified in any way to compensate for unacceptable purity or germination.

Add to Materials:

2.5 Salt-Tolerant Grass Seed Type 82 shall be used on well drained roadside areas that receive moderate to high salt runoff as shown on plans or as ordered. This seed mixture shall conform to Table 5.

Table 5 - Salt Tolerant Grass Seed Type 82

ScientificName	Kind of Seed	Minimum Purity (%)	Minimum Germination (%)	Application Rate lbs/acre
Agrostis stolonifera	Creeping Bentgrass	95	85	20
Puccinellia distans	Alkali Grass	95	85	20
Festuca Arundinacea	Tall Fescue	95	85	30
Sorghastrum nutans	Indian Grass	95	85	30
Panicum virgatum	Switch Grass	95	85	15
			Total	115 lbs/acre

Add to 3.1:

3.1.5 The Contractor shall notify the Bureau of Highway Design, Roadside Development Engineer at least one week in advance prior to planting grass seed.

Amend 3.2.1 to read:

3.2.1 Seeding and initial fertilizing shall be done in the spring (April 1 through June 15) and Fall (August 15 through October 15) only or as permitted. No spring planting will be authorized after June 30. Seeding shall not be done during windy weather or where the ground is frozen, excessively wet, or otherwise untillable.

Amend 3.3 to read:

3.3 Application. Unless specifically ordered, seed shall be spread at the rates specified for the seed type specified.

Add to 3.3:

3.3.1 The Contractor shall adhere to the application rate and the seeding seasons as specified herein. The grass mixture shall not be mixed and used with other cool season seed such as Slope Seed Type 44.

Add to Basis of Payment:

5.6.1 Reseeding of the same area will be at the Contractor's expense and in the season specified in 3.2.1 of this special provision.

Add to pay items and units:

644.82	Salt-Tolerant Grass Seed Type 82	Pound

SPECIAL PROVISION
SECTION 645 -- EROSION CONTROL
Item 645.0001 - Turbidity Barrier

Add to Materials:

2.12 Turbidity Barrier

A. Siltation fence shall be made of 5 mil industrial polypropylene 71g/sy (85g/m^2). Coefficient of permeability shall be 0.009 cm/sec with a water flow rate of 18 gal/min/ft^2 (114 L/min/m). Opening size shall be a maximum of 20 (U.S. Standard Sieve) with a minimum retention efficiency of 75%. Fabric shall be stable against ultraviolet radiation. Fabric width shall be 36 in. (0.91m).

B. The turbidity barrier shall consist of a woven and calendared polypropylene geotextile fabric suspended from a floatation device and sealed against the bottom of the water body by ballast sewn into the bottom of the geotextile. All seams shall have a minimum of 2 rows of stitches (Federal Stitch Type 401, 2 thread stitch). Stitch count shall be between 2 and 3 stitches per centimeter. Seam strength shall develop at least 50 percent of Wide Width Tensile Strength of the geotextile when tested in accordance with ASTM D4884.

The geotextile fabric shall be woven and calendared polypropylene manufactured to form a stable network such that the filaments retain their relative positions. The specific gravity of the fabric shall be 0.95 or greater.

The geotextile fabric shall have the following properties based upon minimum average roll values:

Property	Test Method	Unit	Value
Percent Open Area	CWO-22125	Percent	4 to 6
Apparent Opening Size	ASTM D4751-87	U. S. Sieve	70-100
Permittivity	ASTM D4491-92	sec-1	0.25 to 0.30
Puncture	ASTM D4833-88	kgs.	greater than 60
Mullen Burst	ASTM D3786-87	kg/centimeter^2	greater than 32
Trapezoidal Tear	ASTM D4533-91	kgs.	greater than 43 x 25
Grab/Tensile	ASTM D4632-91	kgs.	greater than 159 x 113
Wide Width Tensile	ASTM D4595	kg/centimeter	greater than 38 (MD) x 24 (XD)
UV Resistance	ASTM D4355 (after 150 hours)	percent	greater than 90

The barrier shall be assembled according to manufacturers recommendations. High water and high wind conditions shall be considered in the determination of the necessary lengths and widths of the barrier. Connections between adjacent sections of floatation booms shall be designed to withstand all stresses and movements and shall be tightly sealed to prevent flow of turbid water through the barrier. All splices in the geotextile shall be sewn except at connections between adjacent segments of the barrier. Geotextile splices at connections must form a closure as tight as the sewn stitch specified. Open stitching or splicing through widely spaced grommets are not permitted.

C. "Booms", logs or other types or floats that may be used to suspend flexible fabric filter membrane enclosing areas of excavation, trenching, etc., along or out into the bodies of water shall be standard products normally used in this type of work and shall be approved by the Engineer prior to their use.

Add to Construction Requirements:

3.10 Turbidity Barrier. The Contractor is advised that stream flows and water levels of resource areas may vary substantially due to climatic and seasonal conditions and shall be responsible for controlling and handling ground and/or surface water regardless of the volume of water and regardless of whether this flow is due to flood waters from storms.

3.10.1 Erosion and Turbidity Control.

A. The Contractor shall take every precaution to minimize and control erosion and turbidity within the project area. These precautions shall be subject to approval by the Engineer and shall include, but not be limited to, the following:

1. The turbidity barrier shall be installed as noted in the Prosecution of Work or the Plans to contain suspended material disturbed by the construction activities. The turbidity barrier shall be anchored to prevent significant movement resulting from wind, water currents or construction activities. The bottom of the barrier shall be held tight against the bottom by the ballast chain, supplemented by sand bags or other weights where necessary. There shall be sufficient slack in the barrier and anchorage system to allow movement with shifts in water current or wind and changes in water depth without causing submergence of the flotation devices or lifting of the bottom of the barrier off the bottom of the water body. The barrier shall be so designed and installed to prevent movement of turbid water over, under or through the barrier during all conditions of weather, construction activities or other circumstances.

   The area contained by the turbidity barrier shall not be used as a sedimentation basin for site runoff.

   The Contractor shall inspect the turbidity barrier and adjacent water for signs of leakage at least once per day during period of construction activities and more frequently during periods of adverse weather. The Contractor shall perform any necessary repairs immediately. If water quality outside of the barrier exceeds the maximum allowable turbidity levels specified in 107.01, the Contractor shall cease all activities which may be contributing to the excessive turbidity and notify the Engineer. The Contractor shall perform the necessary repairs to the turbidity barrier or change operations to return the turbidity to within acceptable levels. The cost of all inspection/monitoring by the Contractor of the turbidity barrier shall be paid under Item 645.0001.

The turbidity barrier shall be kept in place until the turbidity is below the maximum allowable levels specified 107.01. The Contractor shall then remove all components of the barrier and dispose of them offsite.

2. If for any reason the turbidity barrier becomes damaged or drops below the water surface or is found to be lifting off the bottom, the Contractor shall immediately make all necessary repairs to insure proper turbidity control. If the Contractor fails to make immediate repairs, all work shall be stopped until repairs have been made and the Contractor shall assume all costs related to the work stoppage for nonconformance to these requirements.

Amend 4.5 to read:

4.5 The silt fence and turbidity barrier will be measured by the linear foot (linear meter) to the nearest 1 foot. Measurement will be along the top of the barrier for each continuous run in place.

Amend 5.5 to read:

5.5 The accepted quantity of silt fence and turbidity barrier will be paid for at the contract price per linear foot installed, complete in place. Relocating barriers on the project will not be measured. No payment will be made for overlaps or splices.

5.5.1 Removing sediment deposits will be paid for under Item 699.

5.5.2 Replacement of silt fence and turbidity barrier, as ordered and approved by the Engineer, will be paid for in accordance with 5.5.

Pay Items and Units:

645.0001	Turbidity Barrier	Linear Foot

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13953

March 17, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 645 – EROSION CONTROL

Item 645.113 -Hydraulic Mulch

This special provision provides for the use of hydraulic mulch as an erosion control measure to help assist in meeting the environmental commitments set forth in the contract documents and neither amends no modifies this section, except as specifically noted below. This item may be used separately as a soil stabilizer, or in conjunction with Item 646.2 - Turf Establishment without Mulch.

Description

1.1 The work shall consist of furnishing and installing Hydraulic mulch (HM) on areas shown on the plans or ordered.

Materials

2.1 Hydraulic mulch (HM) shall be composed of defibrated paper, wood, and / or natural fibers that may or may not contain tackifiers. Do not use materials composed of greater than 30 percent cellulose fiber. Use a HM that does not form a water-insensitive crust that can inhibit plant growth. Provide a HM that completely biodegrades within 2 years. Seed, lime, and fertilizer may be added to the HM mixture according to the current requirements of Sections 644, Grass Seed and Item 646 - Turf Establishment.

2.2 HM components shall be furnished pre-packaged by the manufacturer to assure material performance and compliance with the minimum requirements of Table 1 when applied at a rate of 3,500 pounds per acre. Under no circumstances will field mixing of additives or components be accepted.

Table 1: Minimum HM Requirements HM Property	Required Value
Moisture Content	12% ± 3% maximum
Organic Matter	90% minimum
Non-Cellulose Fiber by Weight	70% minimum
Cellulose Fiber by Weight	30% maximum
Water Holding Capacity (ASTM D7367)	750% minimum
Functional Longevity	Maximum of 3 months
Color	Colored to contrast application area, shall not stain concrete or painted surfaces.

2.3 The HM shall be listed on the most recent edition of the NHDOT Qualified Products List, Department of Environmental Services Interim Approved List, or must meet the physical and performance criteria outlined in this specification and be approved by the Department, prior to incorporating the product into to the Stormwater Pollution Prevention Plan or applying it on site.

Construction Requirements

3.1 Use HM with components pre-packaged by the manufacturer to assure material performance. Do not field mix materials, additives, or components. The HM shall be applied to previously prepared and approved surfaces.

3.2 NHDOT shall examine the prepared soil to ensure slope stability, that surface water flow from above slopes has been redirected away from the face of the slope, and that loam or humus has been spread in such a manner as to create a loose, friable seedbed, in areas where HM is to be combined with turf establishment.. The Contractor shall not install slope stabilization materials until any unsatisfactory conditions, have been corrected.

3.3 The Contractor shall only use personnel or subcontractors trained by the manufacturer. Mixing and application of materials must comply with the manufacture's specifications.

3.4 Apply HM to the soil surface from at least two opposing directions, in thin and successive layers, to achieve an even coverage of all exposed soil surfaces. Do not apply the HM within 24 hours of a predicted rain event, or under saturated soil conditions. Install HM materials at the general application rates of Table 2, unless otherwise directed by the Department.

Table 2: HM Installation Requirements Condition	**Max Continuous Slope Length (ft)**	**Temporary Cover by Mulch (no seed) Application Rate (lbs/acre)**	**Temporary Cover by Seeding Application Rate (lbs/acre)**	**Permanent Cover Applicatio n Rate (lbs/acre)**
5:1 Slope	30	Not Applicable	1,500	1,500
4:1 Slope	25	Not Applicable	1,500	2,000
3:1 Slope	20	Not Applicable	1,500	2,500
2:1 Slope	Not Applicable	Not Applicable	Not Applicable	Not Applicable

3.5 Inspection and Maintenance: Reapplication will be required if the HM treated soils are disturbed or turbidity or water quality shows the need for an additional application. Properly installed HM has an effective life of 6 months.

3.6 Upon request by the CA, a manufacturer's representative shall be on-site to oversee and approve the HM installation. If reapplication is required due to damage or inappropriate installation cost will not be reimbursed.

Method of Measurement

4.1 The quantity for the pay item Hydraulic Mulch (HM) shall be measured by the pound based upon the delivery slips and tags furnished to the Engineer, but not to exceed the rate specified or ordered.

Basis of Payment

5.1 Payment under this item will be made at the contract unit price per pound.

Pay items and units:

645.113	Hydraulic Mulch	Pound (Lb)

03/10/02

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13953

March 17, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 645 -- EROSION CONTROL

Item 645.119 – Mulch with Tackifiers

Amend 2.6 to read:

2.6 Mulch Tackifiers as shown on the Department's Qualified product list and that are environmentally non-toxic may be used.

Amend 3.1.2 to read:

3.1.2 Mulch Tackifiers are to be uses as a tie-down or adhesive for mulch, it shall be used at the rate specified by the manufacturer and applied uniformly over and through the mulch.

Add to Pay Items and Units:

645.119	Mulch with Tackifiers	Acre (Hectare)

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March 17, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 645 -- EROSION CONTROL

Item 645.481 - Wood Chips for Temporary Erosion Control

Item 645.482 - Stump Grindings for Temporary Erosion Control

This special provision provides for the use of wood chips and stump grindings as an erosion control measure to assist in meeting the environmental commitments set forth in the contract documents and neither amends nor modifies this section except as specifically noted below.

Amend to Description:

1.2 Temporary erosion control. This work shall consist of furnishing, stockpiling, installing, sowing, maintaining, and removing temporary erosion control and sediment control devices at locations shown on the plans, or where ordered. Erosion control device examples are: temporary seeding, silt fence, hay bales, temporary mulch, erosion stone, stump grindings, and wood chips.

Add to Materials:

2.11 Stump grindings shall be chipped by-products of tree and sapling removal operations. Stump grindings shall be composed of at least 80% fibrous woody root material (free of soil) from recently cut, live, disease-free, and non-invasive trees and saplings. A maximum of 20% of the material may be derived from the portions of trunks attached directly to the roots, located within one foot of original ground surface. Stump grindings shall be dense, fibrous, woody material graded from approximately 3/8 to 2 inches in width, with a maximum length not to exceed 12 inches.

2.12 Wood chips shall be chipped by-products of tree pruning and removal operations. Wood chips shall be composed of the stems, branches, leaves, bark, roots (free of soil), and other woody debris from recently cut, live and disease free trees and saplings. Wood chips may not include any inorganic materials, ground construction debris, reprocessed wood products, invasive species, or soil of any kind. Wood chips should be graded from approximately 3/8 to 2 inches in width, with a maximum length not to exceed 8 inches.

Add to Construction Requirements:

3.4.5 Stump grindings may be applied as mulch by evenly distributing across the soil surface at a rate of 2 to 4 inches in thickness; or, incorporated into erosion control berms.

3.4.6 Wood chips shall be evenly distributed across the soil surface at a rate of 2 to 4 inches in thickness. Wood chips shall only be applied as mulch and are not suitable material for the construction of berms, check dams, or other water diversion items. Wood chips shall not be placed as mulch in areas where a concentrated flow of water can occur.

Add to Method of Measurement:

4.8 Stump Grindings will be measured by the cubic yard.

4.9 Wood Chips will be measured by the cubic yard.

Add to Basis of Payment:

5.9 Stump Grindings for erosion control will be paid for at the contract unit price per cubic yard complete in place.

5.10 Wood Chips for erosion control will be paid for at the contract unit price per cubic yard complete in place.

Pay items and units:

645.481	Wood Chips for Temporary Erosion Control	Cubic Yard
645.482	Stump Grindings for Temporary Erosion Control	Cubic Yard

SPECIAL PROVISION

AMENDMENT TO SECTION 645 -- EROSION CONTROL

Item 645.512 - Compost Sock for Perimeter Berm

This special provision provides for compost sock for perimeter berm and neither amends nor modifies the provision of this section except as noted below. The intent of this item is to work in conjunction with or in-lieu of silt fence where entrenched silt fence its not feasible.

Description

1.1 The Contractor shall furnish and install degradable compost socks for perimeter berm at locations shown on the SWPPP plans or as ordered. Removal, if necessary, will be subsidiary to the item, and will be conducted as directed by the Engineer. The compost sock for perimeter berm shall be used as such and is not intended for areas which may receive concentrated flows such as channels or restricted outlets.

Materials

2.1 Compost Sock for Perimeter Berm. Sock must be:

- A mesh tube, oval to round in cross section, 12 inches in diameter. Sock must have a minimum durability of one year after installation.
- Composed of a knitted biodegradable or photodegradable material with 1/8 to 3/8 inch openings. Fabric must be clean; evenly woven; free of encrusted concrete or other contaminated materials; and free from cuts, tears, broken or missing yarns and thin, open, or weak places.

2.2 Compost Media.

- Compost may be derived from green material consisting of chipped, shredded, or ground vegetation; or clean recycled wood products.
- Compost must not be derived from mixed municipal solid waste and be reasonably free of visible contaminates. Compost must not contain paint, petroleum products, pesticides or any other chemical residues harmful to animal life or plant growth. Compost must not possess objectionable odors.

2.3 Chemical, Physical and Biological Parameters.

- Compost products specified for use in this application must meet the criteria specified in Table 1, below.
- Only compost products that meet all applicable state and federal regulations pertaining to its production and distribution may be used in this application. Approved compost products must meet related state and federal chemical contaminant (e.g., heavy metals, pesticides, etc.) and pathogen limits pertaining to the feedstocks (source materials) in which it is derived.

Table 1 – Compost Media Parameters

Parameters	Reported as (units of measure)	Characteristics
pH2	pH units	5.0 - 8.5
Soluble Salt Concentration2 (electrical conductivity)	dS/m (mmhos/cm)	Maximum 5
Moisture Content	%, wet weight basis	30 – 60
Organic Matter Content	%, dry weight basis	25 – 65
Particle Size	% passing a selected mesh size, dry weight basis	3" (75 mm), 100% passing 1" (25mm), 90% to 100% passing 3/4" (19mm), 70% to 100% passing 1/4" (6.4mm), 30% to 75% passing Maximum: particle size length of 6" (152mm) (no more than 60% passing 1/4" (6.4 mm) in high rainfall/flow rate situations)
Stability3 Carbon Dioxide Evolution Rate	mg CO2-C per g OM per day	< 8
Physical Contaminants (man-made inerts)	%, dry weight basis	< 1

Note: The composition of this media is similar to the vegetated filter berm media from AASHTO R 51. Very coarse (woody) composts that contain less than 30% of fine particles (1mm in size) shall be avoided, as optimum reductions in total suspended solids (TSS) is desired and berms may be seeded.

Construction Requirements

3.1 Site Preparation. To ensure optimum performance, cut down or remove heavy vegetation, and level uneven surfaces to ensure that the filter sock uniformly contacts the ground surface.

3.2 Installation.

- Prior to installation, clear the area of obstructions including rocks, clods, and debris greater than one inch
- Fill socks uniformly with compost to the desired length such that the logs do not deform. Secure ends.
- When more than one compost sock is required to achieve desired length, join socks longitudinally with a 1 foot 6 inch overlap.
- Compost sock may be installed using installation method Type 1, Type 2, or a combination:

- Installation method Type 1:
  - Place directly on the ground with good contact with the finish grade.
  - Secure with wood stakes every 4 feet along the length of the compost sock.
  - Secure the ends of the compost sock by placing a stake 6 inches from the end of the compost sock.
  - Drive the stakes into the soil so that the top of the stake is less then 2 inches above the top of the compost sock.

- Installation method Type 2:
  - Place directly on the ground with good contact with the finish grade.
  - Secure with rope and notched wood stakes.
  - Drive stakes into the soil until the notch is even with the top of the compost sock.
  - Lace the rope between stakes and over the compost sock. Knot the rope at each stake.
  - Tighten the compost sock to the surface of the slope by driving the stakes further into the soil.

- Install compost sock approximately parallel to the slope contour or as otherwise specified in the SWPPP or ordered by the Engineer.

3.3 Maintenance.

- Inspect compost socks regularly, and after each rainfall event, to ensure that they are intact and functioning correctly. Remove sediment that builds up behind the sock before it interferes with the functionality of the sock. Deposit the removed sediment within the project limits so that the sediment is not subject to erosion by wind or by water.
- Repair or replace split, torn, or unraveling socks. Replace broken or split stakes. Sagging or slumping compost socks must be repaired with additional stakes or replaced. Correct locations where rills and other evidence of concentrated runoff have occurred beneath the socks. Compost socks must be repaired or replaced within 24 hours of identifying the deficiency.
- Remove sock mesh tubes when directed by the Engineer. Cut mesh and empty sock contents in place and rake to distribute evenly.

Method of Measurement

4.1 Compost sock for perimeter berm will be paid for by the linear foot (linear meter) to the nearest 1 foot (one-half meter). Measurement will be along the top of each continuous run complete in place.

Basis of Payment

5.1 The accepted quantity of compost sock for perimeter berm will be paid for at the contract unit price per linear foot (linear meter) installed. No additional payment will be made for overlaps, splices or the anchoring of the system.

Pay items and units:

645.512	Compost Sock for Perimeter Berm	Linear Foot (Linear Meter)

SPECIAL PROVISION

AMENDMENT TO SECTION 645 – EROSION CONTROL

Item 645.611- Bonded Fiber Matrix (BFM)

This special provision provides for the use of a hydraulically applied Bonded Fiber Matrix as allowable mulch for erosion control and vegetation establishment, to assist in meeting the environmental commitments set forth in the contract documents. This item may be used separately as a soil stabilizer, or in conjunction with Item 646.2 - Turf Establishment without Mulch. This special provision neither amends nor modifies this section, except as specifically noted below.

Description

1.1 The work shall consist of furnishing and installing Bonded Fiber Matrix (BFM) on areas shown on the plans or ordered.

Materials

2.1 Bonded Fiber Matrix (BFM) shall be composed of: long strand, non-toxic, and thermally processed fibers, heated to an appropriate temperature for sterilization purposes; and, water insoluble cross-linked hydro-colloidal tackifiers, that upon drying become insoluble and non-dispersible. Materials composed of paper, cellulose fiber, or a mixture of paper, cellulose, and other materials shall not be used.

2.2 The BFM shall completely biodegrade overtime. Hydraulic Mulch (HM) or Stabilized Mulch Matrix (SMM) shall not be substituted where BFMs are required.

2.3 Seed, lime, and fertilizer if added to the BFM mixture shall be according to the current requirements of Item 646, Turf Establishment.

2.4 BFM shall meet the following requirements: does not dissolve or disperse upon re-wetting; has no germination or growth inhibiting factors and will not form a water-resistant crust.

2.5 BFM components shall be furnished pre-packaged by the manufacturer to assure material performance and compliance with the minimum physical requirements of Table 1 when applied at a rate of 3,500 pounds per acre. Field mixing of additives or components will not be allowed.

Table 1: Minimum BFM Performance and Physical Requirements

BFM Property		Required Value
Thermally Processed Fiber by Weight		80% ± 10%
Cross-linked Hydro-Colloidal Tackifiers		10% ± 2%
Moisture Content		10% ± 3%
Organic Matter		90% minimum
Color		Colored to contrast application area, shall not stain concrete or painted surfaces.
BFM Property	**Test Method**	**Required Value**
Physical		
Mass Per Unit Area	ASTM D6566*	10.0 oz/sy minimum
Thickness	ASTM D6525*	0.10 inch minimum
Ground Cover	ASTM D6567*	97% minimum
Water Holding Capacity	ASTM D7367	1000% minimum
Endurance		
Functional Longevity	Observed	Minimum of 6 months
Performance		
Cover Factor	SCDOT Approved Large Scale Testing	0.05 maximum
% Effectiveness	SCDOT Approved Large Scale Testing	95% minimum
Cure time	Observed	24 - 48 hours
Vegetation Establishment	ASTM D7322*	400% minimum

* ASTM test methods developed for Rolled Erosion Control Products (RECPs) that have been modified to accommodate Hydraulic Erosion Control Products (HECPs).

2.6 The BFM shall be listed on the most recent edition of the NHDOT Qualified Products List, Department of Environmental Services Interim Approved Products List, or must meet the physical and performance criteria outlined in this specification and be approved by the Department, prior to incorporating the product into to the Stormwater Pollution Prevention Plan or applying it on site.

Construction Requirements

3.1 The BFM shall be applied to previously prepared and approved surfaces.

3.2 NHDOT shall examine the prepared soil to ensure slope stability, that surface water flow from above slopes has been redirected away from the face of the slope, and that loam or humus has been spread in such a manner as to create a loose, friable seedbed, in areas where BFM is to be combined with turf establishment. The Contractor shall not install slope stabilization materials until any unsatisfactory conditions, have been corrected.

3.3 The Contractor shall only use personnel or subcontractors trained by the manufacturer. Mixing and application of materials must comply with the manufacture's specifications.

3.4 Apply BFM to the soil surface from at least two opposing directions, in thin and successive layers, to achieve an even coverage of all exposed soil surfaces. Do not apply the BFM within 24 hours of a predicted rain event, or under saturated soil conditions.

3.5 Install BFM materials at the general application rates of Table 2, unless otherwise directed by the Department.

Table 2: BFM Installation Requirements

Condition	Maximum Continuous Slope Length (ft)	Temporary Cover by Mulch (no seed) Application Rate (lbs/acre)	Temporary Cover by Seeding Application Rate (lbs/acre)	Permanent Cover Application Rate (lbs/acre)
4:1 Slope	70	2,500	1,500	2,500
3:1 Slope	60	3,000	1,800	3,000
2:1 Slope	50	3,500	2,000	3,500
1:1 Slope	35	4,000	2,500	Not Applicable

3.6 Inspection and Maintenance: Reapplication will be required if the BFM treated soils are disturbed or turbidity or water quality testing shows the need for an additional application within a required effective period of six (6) months.

3.7 Upon request by the CA, a manufacturer's representative shall be on-site to oversee and approve the BFM installation. If reapplication is required due to damage or inappropriate installation cost will not be reimbursed.

Method of Measurement

4.1 The quantity for the pay item Bonded Fiber Matrix (BFM) shall be measured by the pound based upon the delivery slips and tags furnished to the Engineer, but not to exceed the rate specified or ordered.

Basis of Payment

5.1 Payment under this item will be made at the contract unit price per pound.

5.1.1 Seed, lime and fertilizer, if ordered, will be paid under Item 646.2 – Turf Establishment without Mulch. If this item is not included in the contract, this work will be paid in accordance with 109.04.

Pay item and unit:

645.611 Bonded Fiber Matrix Pound (Lb)

SPECIAL PROVISION

AMENDMENT TO SECTION 645 – EROSION CONTROL

Item 645.612 - Fiber Reinforced Matrix (FRM)

This special provision provides for the use of a hydraulically applied Fiber Reinforced Matrix as an allowable mulch for erosion control and vegetation establishment, to assist in meeting the environmental commitments set forth in the contract documents. This item may be used separately as a soil stabilizer, or in conjunction with Item 646.2 - Turf Establishment without Mulch. This special provision neither amends nor modifies this section, except as specifically noted below.

Description

1.1 The work shall consist of furnishing and installing Fiber Reinforced Matrix (FRM) on areas shown on the plans or ordered.

Materials

2.1 Fiber Reinforced Matrix (FRM) shall be composed of: long strand, non-toxic and thermally processed fibers, heated to an appropriate temperature for sterilization purposes; crimped, interlocking natural or synthetic fibers; performance enhancing additives; and water insoluble cross-linked hydro-colloidal tackifiers and activators.

2.2 FRM shall not require a curing period and when applied forms an intimate bond with the soil surface to create a continuous, porous, absorbent, and erosion resistant matrix that allows rapid germination and accelerated plant growth. Hydraulic Mulch (HM), Stabilized Mulch Matrix (SMM), or Bonded Fiber Matrix (BFM) shall not be substituted where FRMs are required.

2.3 Seed, lime, and fertilizer if added to the FRM mixture shall be according to the current requirements of Item 646 - Turf Establishment.

2.4 Furnish FRM components pre-packaged by the manufacturer to assure material performance and compliance with the minimum physical requirements of Table 1 when applied at a rate of 3,500 pounds per acre. Under no circumstances will field mixing of additives or components be accepted.

Table 1: Minimum FRM Performance and Physical Requirements

FRM Property		Required Value
Thermally Processed Fiber by Weight		75% ± 10%
Crimped Interlocking Fibers		5% ± 2%
Cross-linked Hydro-Colloidal Tackifiers		5% ± 2%
Moisture Content		10% ± 3%
Organic Matter		90% minimum
Color		Colored to contrast application area, shall not stain concrete or painted surfaces.
FRM Property	**Test Method**	**Required Value**
Physical		
Mass Per Unit Area	ASTM D6566*	11.0 oz/yd² minimum
Thickness	ASTM D6525*	0.15 inch minimum
Ground Cover	ASTM D6567*	97% minimum
Water Holding Capacity	ASTM D7367	1400% minimum
Flexural Rigidity (wet)	ASTM D6575*	5 oz-yd maximum
Endurance		
Functional Longevity	Observed	Minimum of 12 months
Performance		
Cover Factor	NHDOT Approved Large Scale Testing	0.01 maximum
% Effectiveness	NHDOT Approved Large Scale Testing	99% minimum
Cure Time	Observed	98% effective after 2 hours
Vegetation Establishment	ASTM D7322*	500% minimum

* ASTM test methods developed for Rolled Erosion Control Products (RECPs) that have been modified to accommodate Hydraulic Erosion Control Products (HECPs).

2.5 The FRM shall be listed on the most recent edition of the NHDOT Qualified Products List, Department of Environmental Services Interim Approved Product List, or meet the physical and performance criteria outlined in this specification and be approved by the Department, prior to incorporating the product into to the Stormwater Pollution Prevention Plan or applying it on site

Construction Requirements

3.1 The FRM shall be applied to previously prepared and approved surfaces.

3.2 NHDOT shall examine the prepared soil to ensure slope stability, that surface water flow from above slopes has been redirected away from the face of the slope, and that loam or humus has been spread in such a manner as to create a loose, friable seedbed, in areas where HM is to be

combined with turf establishment. The Contractor shall not install slope stabilization materials until any unsatisfactory conditions, have been corrected.

3.3 The Contractor shall only use personnel or subcontractors trained by the manufacturer. Mixing and application of materials must comply with the manufacture's specifications.

3.4 Apply FRM to the soil surface from at least two opposing directions, in thin and successive layers, to achieve an even coverage of all exposed soil surfaces. FRM does not require a cure time and is effective immediately; therefore, FRM may be applied immediately before, during, or after a "typical" rainfall event. Avoid installing FRM during high intensity rainfall events. Install FRM materials at the general application rates of Table 2.

Table 2: FRM Installation Requirements

Condition	Maximum Continuous Slope Length (ft)	Temporary Cover by Mulch (no seed) Application Rate (lbs/acre)	Temporary Cover by Seeding Application Rate (lbs/acre)	Permanent Cover Application Rate (lbs/acre)
4:1 Slope	100	2,500	1,500	2,500
3:1 Slope	85	3,000	1,800	3,000
2:1 Slope	75	3,500	2,000	3,500
1:1 Slope	50	4,000	2,500	Not Applicable

3.5 Inspection and Maintenance: Reapplication will be required if the FRM treated soils are disturbed or turbidity or water quality shows the need for an additional application. If reapplication is required due to damage or inappropriate installation, cost will not be reimbursed.

3.6 Upon request by the CA, a manufacturer's representative shall be on-site to oversee and approve the FRM installation.

Method of Measurement

4.1 The quantity for the pay item Fiber Reinforced Matrix (FRM) shall be measured by the pound based upon the delivery slips and tags furnished to the Engineer, but not to exceed the rate specified or ordered.

Basis of Payment

5.1 Payment under this item will be made at the contract unit price per pound.

Pay items and units:

645.612	Fiber Reinforced Matrix	Pound (Lb)

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SPECIAL PROVISION

AMENDMENT TO SECTION 645 – EROSION CONTROL

Item 645.613 - Stabilized Mulch Matrix (SMM)

This special provision provides for the use of a hydraulically applied Stabilized Mulch Matrix as allowable mulch for erosion control and vegetation establishment, to assist in meeting the environmental commitments set forth in the contract documents. This item may be used separately as a soil stabilizer, or in conjunction with Item 646.2 - Turf Establishment without Mulch. This special provision neither amends nor modifies this section, except as specifically noted below.

Description

1.1 The work shall consist of furnishing and installing Stabilized Mulch Matrix (SMM) on areas shown on the plans or ordered.

Materials

2.1 Stabilized Mulch Matrix (SMM) shall be composed of: defibrated organic fibers with, at a minimum, one of the following additives: soil flocculants, cross-linked hydro-colloidal polymers, or cross-linked tackifiers that upon drying become insoluble and non-dispersible to prevent erosion on soil. Materials composed of paper, cellulose fiber, or a mixture of paper, cellulose, and other materials shall not be used.

2.2 Applied SMM shall not form a water-insensitive crust that can inhibit plant growth. Provide a SMM that completely photo-degrades or biodegrades. Do not use materials listed for use as a Hydraulic Mulch (HM).

2.3 Seed, lime, and fertilizer if added to the SMM mixture shall be according to the current requirements of Sections 644 (Seeding) and 646, (Turf Establishment).

2.4 Furnish SMM components pre-packaged by the manufacturer to assure material performance and compliance with the minimum requirements of Table 1 when applied at a rate of 3,500 pounds per acre. Under no circumstances will field mixing of additives or components be accepted.

Table 1: Minimum SMM Requirements

SMM Property	Required Value
Thermally Processed Fiber by Weight	80% ± 10%
Bonding Agent / Cross-linked Hydro-Colloidal Tackifiers by weight	5% ± 2%
Moisture Content by weight	12% ± 3%
Organic Matter	90% minimum
Color	Colored to contrast application area, shall not stain concrete or painted surfaces.

SMM Property	Test Method	Required Value
Physical		
Mass Per Unit Area	ASTM D6566*	9.0 oz/yd2 minimum
Thickness	ASTM D6525*	0.08 inch minimum
Ground Cover	ASTM D6567*	97% minimum
Water Holding Capacity	ASTM D7367	900% minimum
Endurance		
Functional Longevity	Observed	Minimum of 3 months
Performance		
Cover Factor	NHDOT Approved Large Scale Testing	0.05 maximum
% Effectiveness	NHDOT Approved Large Scale Testing	90% minimum
Cure time	Observed	24 - 48 hours
Vegetation Establishment	ASTM D7322*	300% minimum

* ASTM test methods developed for Rolled Erosion Control Products (RECPs) that have been modified to accommodate Hydraulic Erosion Control Products (HECPs).

2.5 The SMM shall be listed on the most recent edition of NHDOT Qualified Products List, Department of Environmental Services Interim Approved List, or must meet the physical and performance criteria outlined in this specification and be approved by the Department, prior to incorporating the product into to the Stormwater Pollution Prevention Plan or applying it on site.

Construction Requirements

3.1 The SMM shall be applied to previously prepared and approved surfaces.

3.2 NHDOT shall examine the prepared soil to ensure slope stability, that surface water flow from above slopes has been redirected away from the face of the slope, and that loam or humus has been spread in such a manner as to create a loose, friable seedbed, in areas where HM is to be combined with turf establishment. The Contractor shall not install slope stabilization materials until any unsatisfactory conditions, have been corrected.

3.3 The Contractor shall only use personnel or subcontractors trained by the manufacturer. Mixing and application of materials must comply with the manufactures specifications.

3.4 Apply SMM to the soil surface from at least two opposing directions, in thin and successive layers, to achieve an even coverage of all exposed soil surfaces. Do not apply the SMM within 24 hours of a predicted rain event, or under saturated soil conditions. Install SMM materials at the general application rates of Table 2, unless otherwise directed by the Department.

Table 2: SMM Installation Requirements

Condition	Max Continuous Slope Length (ft)	Temporary Cover by Mulch (no seed) Application Rate (lbs/acre)	Temporary Cover by Seeding Application Rate (lbs/acre)	Permanent Cover Application Rate (lbs/acre)
5:1 Slope	70	1,800	1,200	1,800
4:1 Slope	60	2,000	1,500	2,000
3:1 Slope	50	2,500	1,800	2,500
2:1 Slope	25	3,000	2,000	Not Applicable

3.5 Inspection and Maintenance: Reapplication will be required if the SMM treated soils are disturbed or turbidity or water quality shows the need for an additional application. If reapplication is required due to damage or inappropriate installation cost will not be reimbursed.

3.6 Upon request by the CA, a manufacturer's representative shall be on-site to oversee and approve the SMM installation.

Method of Measurement

4.1 The quantity for the pay item Stabilized Mulch Matrix (SMM) shall be measured by the pound based upon the delivery slips and tags furnished to the Engineer, but not to exceed the rate specified or ordered.

Basis of Payment

5.1 Payment under this item will be made at the contract unit price per pound.

Pay items and units:

645.613	Stabilized Mulch Matrix	Pound (Lb)

SUPPLEMENTAL SPECIFICATION

AMENDMENT TO SECTION 645 – EROSION CONTROL

The purpose of this Supplemental Specification is to update erosion control requirements.

Replace 1.1 with the following:

1.1 Erosion Control Products. This work shall consist of furnishing and placing hay mulch, bark mulch, "Rolled Erosion Control Products" (RECP), or other material to provide soil stabilization and/or erosion control on slopes or in channels at locations shown on the plans or where ordered.

1.1.1 Temporary Slope Matting Type A (Not Currently Used)

1.1.2 Temporary Slope Matting Type B (Wildlife Friendly) shall be a temporary, biodegradable RECP specified for protection of slopes of 3:1 or flatter. This material may also be specified for temporary protection of channels expected to experience flow-induced shear of 1.5 lbs/ft² or less. These products shall maintain their functional integrity for a minimum of 3 months and then biodegrade.

1.1.3 Temporary Slope Matting Type C (Not Currently Used)

1.1.4 Temporary Slope Matting Type D (Wildlife Friendly) shall be shall be a temporary, biodegradable RECP specified for protection of slopes of 2:1 or flatter. This material may also be specified for temporary protection of channels expected to experience flow-induced shear of 1.75 lbs/ft² or less. These products shall maintain their functional integrity for a minimum of 12 months and then biodegrade.

1.1.5 Permanent Channel Matting Type A shall be a permanent RECP specified for protection of channels or ditches that are expected to experience flow-induced shear of 2.5 lbs/ft² or less. These products are considered to be permanent and shall be non- degradable.

1.1.6 Permanent Channel Matting Type B (Not Currently Used)

1.1.7 Temporary Channel Matting Type A shall be a long term RECP specified for protection of channels or ditches that are expected to experience flow-induced shear of 2.0 lbs/ft² or less. These products are considered temporary and shall biodegrade between 24 and 36 months.

1.1.8 Temporary Channel Matting Type B (Wildlife Friendly) shall be an extended term RECP, specified for protection of channels or ditches that are expected to experience flow-induced shear of 2.0 lbs/ft² or less. These products are considered temporary and shall biodegrade between 12 and 36 months.

Amend the Pay Items to read:

Pay items and units:

645.111	Mulch	Square Yard
645.11	Mulch	Acre
645.12	Temporary Mulch	Acre
645.15___	Bark Mulch___ in. Deep	Square Yard
645.3	Erosion Stone	Ton
645.42	Temporary Slope Matting Type B (Wildlife Friendly)	Square Yard
645.44	Temporary Slope Matting Type D (Wildlife Friendly)	Square Yard
645.45	Permanent Channel Matting Type A	Square Yard
645.471	Temporary Channel Matting Type A	Square Yard
645.472	Temporary Channel Matting Type B (Wildlife Friendly)	Square Yard
645.48	Erosion Control Mix	Cubic Yard
645.51	Hay Bales for Temporary Erosion Control	Each
645.52	Ryegrass for Temporary Erosion Control	Pound
645.531	Silt Fence	Linear Foot
645.532	Silt Fence with Support Fence	Linear Foot
645.7	Storm Water Pollution Prevention Plan	Unit
645.71	Monitoring SWPPP and Erosion and Sediment Controls	Hour

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SPECIAL PROVISION

AMENDMENT TO SECTION 646 – TURF ESTABLISHMENT

Item 646.2_ – Turf Establishment without Mulch

This special provision provides for the use of the item Turf Establishment without Mulch. This new item will be used with other strategies such as Bonded Fiber Matrix (BFM), Hydraulic Mulch (HM), Stabilized Mulch Matrix (SMM), Fiber Reinforced Matrix (FRM), Temporary Slope Stabilization Type D, and Mulch with Tackifiers which are reimbursed under other items within the contract. This special provision neither amends nor modifies this section, except as specifically noted below.

Description

1.1 This work shall consist of preparing the soil and furnishing and applying seed of the type or types specified, fertilizer, tackifiers, and limestone, on all areas designated for turf establishment as shown on the plans or ordered.

Materials

2.1 Limestone shall conform to 642.2.

2.2 Fertilizer shall be that for initial fertilization and shall conform to 643.2

2.3 Seed shall conform to 644.2 using the type of mixture(s) ordered.

2.4 Tackifiers shall be as included on the Qualified Products List.

Construction Requirements

3.1 Construction requirements shall conform to 642.3, 643.3, 644.3, and 647.3.

Method of Measurement

4.1 Turf establishment of the type specified will be measured by the acre or square yard to the nearest 0.01 of an acre or nearest square yard from measurements taken on the ground surfaced covered.

Basis of Payment

5.1 The accepted quantities of turf establishment of the type specified will be paid for at the Contract unit price per acre or square yard complete in place.

Pay items and units:

646.2	Turf Establishment without Mulch	Acre
646.21	Turf Establishment without Mulch	Square Yard

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SPECIAL PROVISION

AMENDMENT TO SECTION 647 -- HUMUS

Item 647.22 - Humus, Intermixed, 2-Inches Deep
Item 647.23 - Humus, Intermixed, 3-Inches Deep
Item 647.250 - Humus, Intermixed, 50 mm Deep

This special provision provides for humus to be placed on areas where specified seed will be used, and intermixed with the existing soil. These provisions apply to Humus, Intermixed, and neither amends nor modifies the provisions of this section except as noted.

Add to 1.1:

1.1.1 This work shall consist of furnishing and placing humus at a depth specified for the item at the locations shown on the plans or as ordered and intermixing it with the existing soil.

Add to Construction Requirements:

3.2 Humus material shall be spread over the prepared areas designated at the depth specified for the item and intermixed with the existing soil to create a homogeneous growing medium. Intermixing to create a homogeneous growing medium can be done by dozer tracking, tilling, raking or any other method that effectively intermixes the applied humus and existing soil.

Amend 4.1:

4.1 Humus material will be measured by the cubic yard. Slope measurements will be taken of the lengths and widths of the material in place and the volume will be computed by using the nominal depth specified for the item.

Add to 5.1:

5.1.1 Intermixing of the existing soil and humus will be subsidiary to Item 647.250 or Item 647.22.

Add to pay item and unit:

647.22	Humus, Intermixed, 2-Inches Deep	Cubic Yard
647.23	Humus, Intermixed, 3-Inches Deep	Cubic Yard
647.250	Humus, Intermixed, 50 mm Deep	Cubic Meter

SPECIAL PROVISION

SECTION 659 -- LANDSCAPE ESTABLISHMENT

Item 659.401 - Landscape Establishment Crew (4 men - 8 hour day)

Description

1.1 This section is intended to provide and pay for unanticipated work and non-subsidiary work regarding plant establishment, maintenance, and all related landscaping work of trees and shrubs of this project. Establishment shall include but is not limited to, weed and grass control, pruning, stake and guy adjustments, rodent control, saucer repair and mulching, performed by one or more landscape establishment crews.

Materials

2.1 All other materials shall meet NHDOT Standard Specifications.

Construction Requirements

3.1 The Contractor shall be responsible for monitoring the project and coordinating all work with the Engineer in advance of such work.

3.2 Landscape Establishment Crew.

3.1.1 The Contractor may employ one or more crews on this project during the contract period. Each crew will be composed of a foreman and one or more laborers, as needed. At least one member of each crew must be knowledgeable in horticultural practices. In the event a crew, or crew member, is not productive or working in an expeditious manner to accomplish the work, the Engineer will submit written notification to the Contractor. Upon the second written notification concerning the same crew, or crew member, the Contractor shall replace said crew, or crew member, immediately with a competent replacement.

3.1.2 The Contractor shall employ all horticultural practices so as to insure proper landscape establishment.

3.3 Work performed under this item shall include, but not be limited to, weeding, pruning, saucer repair, mulching, or other work as may be ordered, to preserve the plantings in a healthy, vigorous condition. Monitoring and follow-up maintenance work, including reseeding as necessary shall be the Contractor's responsibility.

Method of Measurement

4.1 Landscape establishment crew will be measured by the day per crew for an eight-hour day to the nearest quarter day. Saucer reconstruction, weeding, pruning, rodenticide work, or other ordered work will not be separately measured.

Basis of Payment

5.1 The accepted quantity of landscape establishment crew will be paid for at the contract unit price per unit. The crew day (4 men - 8 hour day) shall include all labor, and equipment required to perform the following work. This work shall include, but not be limited to, weed and grass control, pruning, stake and guy adjustments, rodent control, saucer repair and mulching.

5.2 All payment will be contingent upon daily certification of work performed and materials used. This certification will be made on a form provided by the Department which must be prepared by the Contractor's foreman and submitted to the Engineer within 48 hours.

Pay Items and Units:

659.401	Landscape Establishment Crew (4 men - 8 hour day)	Day

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION
ROADSIDE DEVELOPMENT

CONTRACTOR'S DAILY REPORT FOR LANDSCAPE ESTABLISHMENT CREW WORK AND MISCELLANEOUS LANDSCAPE TREATMENT
(ITEMS 659.401 AND 1007)

Project:	**State No.**	**Date:**

659.401 – LANDSCAPE ESTABLISHMENT CREW (4 MEN – 8 HR DAY)

Crew I.D.	**Crew #1**	**Crew #2**	**Crew #3**
	Name	**Name**	**Name**
Foreman			
Laborer			
Laborer			
Laborer			
Start Time			
Stop Time			
Net Work Time (hr.)			
Time Conversion (to nearest 0.25 day)	**DAY**	**DAY**	**DAY**

General Description of work			

1007 – MISCELLANEOUS LANDSCAPE TREATMENT

Description of Work	**Plan Sheet #**	**Materials**	**Equipment**

11/99

I certify that the foregoing has been performed as stated above and in accordance with NHDOT contract specifications.

_____
Contractor

Distribution:
- ❑ Roadside Development
- ❑ Contractor Crew Supervisor/Foreman
- ❑ Contract Administrator

By:_____

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OFFICIAL USE (Item 1007)
Re: Extra Work Report #_____

SPECIAL PROVISION

SECTION 662 -- WELLS, PUMPS AND APPURTENANCES

Item 662.281 - Decommission Drilled Wells

Description

1.1 This work shall consist of sealing an existing drilled well where shown on the plans or as directed in accordance with applicable sections of the New Hampshire Water Well Board Code of Administrative Rules, Chapter We 100 - We 1000, mainly Part We 604 - Abandonment of Wells. Well decommissioning shall only be performed by a licensed New Hampshire water well contractor per Administrative Rule We 604.02(b).

1.2 If constructed after January 1, 1984, well installation information may be on file with the NH Department of Environmental Services (NHDES). Well information may be obtained by visiting either the NHDES One-Stop website (http://des.nh.gov/onestop/index.htm) or by contacting the NHDES Water Well Board by phone at 603-271-1974.

Materials

2.1 Sealing material for a non-contaminated well shall consist of neat Portland cement grout, Portland cement and bentonite grout, or bentonite clay pellets as described in Administrative Rule We 604.05(f). Sealing material for pressure grout shall consist of only Portland cement and bentonite grout proportioned per Table 604-1 in Administrative Rule We 604.05(c).

Construction Requirements

3.1 Prior to decommissioning, the well should be investigated to determine its condition, the details of construction and whether or not any obstructions exist that could interfere with the decommissioning process. The depth of the existing well shall be measured and recorded by the Contractor in the presence of the Engineer. Other information, such as the groundwater level and well casing diameter, shall be recorded by the contractor for inclusion in the Abandoned Well Report.

3.2 The Contractor shall remove the existing pump, waterline, well cover, and miscellaneous hardware from the well. The well casing shall be cut off a minimum of one foot below finished grade.

3.3 The drilled well shall be sealed using one of the grout materials listed in 2.1.

3.3.1 A drilled well identified as contaminated shall only be sealed by the pressure grout method, as described in Administrative Rule 604.05(c), using a tremie pipe from the bottom of the well to within one foot of ground level.

3.3.2 When bentonite chips are used for sealing the well, water shall be added in the filling process per the manufacturer's recommendation to assist in hydration of the clay.

3.4 The pump, waterline, cover, miscellaneous hardware, and any other material removed from the well shall become the property of the Contractor unless otherwise noted, and it shall be disposed of properly according to current State and Federal regulations.

3.5 Excavations or holes resulting from the well decommissioning shall be backfilled and compacted as directed. If removal is in a paved area, at least 8 inches of sand or gravel backfill shall be used covered by asphalt cold patch equal in thickness to the existing pavement. The resulting backfilled area or pavement patched location shall be level with the adjacent ground surface.

3.6 Per Administrative Rule We 602.02, an Abandoned Well Report shall be completed by the licensed water well contractor and submitted to the NHDES Water Well Board. The report can be found at: http://des.nh.gov/organization/divisions/water/dwgb/wwb/categories/forms.htm.

3.7 A copy of the completed Abandoned Well Report shall be provided to the Engineer for inclusion with the project records.

Method of Measurement

4.1 Decommission drilled well will be measured by the linear foot to the nearest 1.0 foot from the ground surface to the bottom of the well.

Basis of Payment

5.1 Decommission drilled well will be paid for at the contract unit price per linear foot complete in place.

5.1.1 Removing the pump, waterline, well cover, hardware, cutting the well casing, grout and backfill material used shall be subsidiary to the item.

Pay items and units:

662.281	Decommission Drilled Wells	Linear Foot

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SPECIAL PROVISION

SECTION 670 – MISCELLANEOUS

Item 670.02 – Sediment Sump Measuring Block

This Special Provision provides for the Sediment Sump Measuring Block.

Description

1.1 This work shall consist of constructing and installing the Sediment Sump Measuring Block as shown on the plans and details of the contract plans

Materials

2.1 Precast concrete structure to conform to AASHTO M 199 (AASHTO M 199M). The concrete shall be class AA, meeting the requirements of 520 except as noted herein.

2.2 Curing of precast concrete. Curing of precast measuring blocks shall meet the requirements of 604 2.3.1 and 604 2.3.2.1.

2.3 Ruler Measuring Device. Ruler measuring device shall be a cast or etched into the concrete surface on opposing sides of the measuring block. Numbers and markings shall be in standard US feet, legible from a distance of 40 feet and abrasion and fading resistant.

Method of Measurement

4.1 Sediment Sump Measuring Block shall be paid per each, assembled and installed complete in place.

Basis of Payment

5.1 Sediment Sump Measuring Block shall be paid for per each installed.

Pay items and units:

670.02	Sediment Sump Measuring Block	Each

SPECIAL PROVISION

SECTION 670 -- MISCELLANEOUS INCIDENTALS

Item 670.066 - Mailbox Support Assemblies
Item 670.0661 - Multiple Mailboxes Support Assemblies

Description

1.1 This work shall consist of installing relocated mailboxes or new mailboxes furnished by others on new mailbox support assemblies at locations shown on the plans or as ordered.

1.1.1 The Contractor shall contact the United States Post Office for any additional requirements regarding postal delivery.

Materials

2.1 Support posts shall break away if struck by a vehicle and shall meet the requirements of NCHRP Report 350 for Category II devices. Materials described in 2.1.1, 2.1.2 and 2.1.3 comply with these requirements. Any other support post materials will require a Certificate of Compliance with a Federal Highway Administration (FHWA) Letter of Acceptance stating that the support post material meets the testing and evaluation criteria of NCHRP Report 350.

2.1.1 Steel posts shall be black or galvanized, standard weight conforming to ASTM A 53 without hydrostatic testing or ASTM F 1083 minimum 1-1/2 in (38 mm) and maximum 2 in (50 mm) diameter.

2.1.2 Aluminum posts shall be aluminum alloy 6061-T6 or 6063-T6 conforming to ASTM B 429 minimum 1-1/2 in (38 mm) and maximum 2 in (50 mm) diameter.

2.1.3 Wood posts shall be 4 in x 4 in (100 mm x 100 mm) or 4 in (100 mm) diameter nominal conforming to 568.

2.1.4 Anti-twist devices for metal post shall be of the same material as the post and attached by the use of pipe or muffler type clamps. Other products designed for resisting torsion may be used upon approval.

2.1.5 A list of manufactures of acceptable support post assemblies that meet the requirements of NCHRP 350 can be found on the FHWA Safety Website on Roadside Hardware.

2.2 Mailboxes shall be of light sheet metal or plastic construction conforming to the requirements of the U. S. Postal Service. Newspaper delivery boxes shall be of light sheet metal or plastic construction of

minimum dimensions suitable for holding a newspaper. Mailboxes and newspaper delivery boxes shall be furnished by others.

2.3 Post to box attachment coupling and hardware shall be compatible with post and box and shall be of sufficient strength to prevent the box from separating from the post if a vehicle strikes the installation. The exact hardware dimensions and design may vary.

Construction Requirements

3.1 The Contractor shall satisfactorily protect all mailboxes and maintain them in accessible locations throughout the construction period.

3.2 Upon completion of the project, the mailboxes shall be set at permanent locations as shown on the plans or ordered on support assemblies conforming to 2.1 and 2.3. Mailboxes mounted on acceptable mailbox support assemblies shall be salvaged during construction and be reinstalled on the existing acceptable mailbox support assemblies.

3.3 The Contractor shall install the mailbox support assemblies and mailbox at locations and in accordance with Postal regulations.

3.3.1 Mailbox support assemblies shall be set plumb and at the proper offset distance and vertical clearance.

3.3.2 Details as shown in the Standard Plans shall serve as a guide in meeting minimum requirements.

Method of Measurement

4.1 Single or double mailbox support assemblies will be measured by the number of complete assemblies (post) installed.

4.2 Multiple mailboxes support assemblies will be measured as a single unit. This unit shall include all materials and labor required to install the support assembly and mailboxes specified on the plans.

Basis of Payment

5.1 Single or double mailbox support assemblies will be paid for at the contract unit price per each as specified, complete in place.

5.1.1 Mailboxes mounted on acceptable mailbox support assemblies salvaged during construction shall be reinstalled subsidiary to Item 619.1 - Maintenance of Traffic.

5.2 Multiple mailboxes support assemblies will be paid for at the contract lump sum price per each complete in place.

Pay item and units:

670.066	Mailbox Support Assemblies	Each
670.0661	Multiple Mailboxes Support Assemblies	Each

Supersedes 9/18/95; 10/02/97, 09/26/03, 10/01/09

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March 17, 2017

SPECIAL PROVISION

SECTION 670 -- MISCELLANEOUS INCIDENTALS

Item 670.10_ - Temporary Lighting
Item 670.10X - Temporary Portable Lighting

Description

1.1 Work shall consist of furnishing, installing, maintaining (including power) and removing temporary stationary lighting. This includes poles, bracket arms, luminaires, photo cells, and wiring as described herein, shown on the plans, described in the Prosecution of Work or as ordered.

1.1.1 This work shall include either, the installation of a temporary metered service in accordance with the local utility standards, or providing and maintaining a power source(s) adequate for the requirements and duration of the lighting.

1.2 Work shall consist of furnishing, maintaining, relocating and the removal of temporary portable lighting provided by portable light towers as described herein, shown on the plans, described in the Prosecution of Work or as ordered.

1.2.1 This work shall include providing and maintaining a power source(s) adequate for the requirements and duration of the lighting.

Materials

2.1 Temporary Lighting.

2.1.1 Fiberglass poles shall be direct burial with breakaway characteristics. The fiber-glass shall be constructed from ultraviolet resistant polyester resin and shall contain a minimum of 65% glass and 35% resin by weight. Poles shall be designed in accordance with the currant AASHTO "*Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*" for a 100 mph wind speed and include safety breakaway supports capable of providing the nominal light mounting height specified in 3.1.4. The pole shall be tapered and the surface shall be uniform for the entire length of the pole. Poles shall be provided with a removable aluminum top cap.

2.1.1.1 Pole shall be pigmented <u>silver</u> and be of uniform color throughout the entire body of the pole.

2.1.1.2 Pole shall contain a minimum 2½ in x 5 in hand hole with a non-metallic cover attached with tamper resistant hardware. The hand hole shall be located approximately 12-18 in above the ground line when installed and 90 degrees from the side intended for mounting of the arm.

2.1.1.3 Pole shall also contain a minimum 2 3/8 in diameter conductor entrance located approximately 18 in (300 mm) below grade after installation and 180 degrees from the side intended for mounting of the arm.

2.1.1.4 Pole shall be predrilled for bracket arm mounting.

2.1.1.5 A coating to provide additional ultraviolet and chemical resistance shall be applied at a minimum dry film thickness of 1½ mils. The surface shall meet the following requirements when tested for a minimum of 2500 hours of accelerated testing in accordance with ASTM 653 (UV-B Lamp 313 NM wave length 130° F, cycle lamp 4 hours on 4 hours off):

Fiber Exposure	None
Crazing	None
Checking	None
Chalking	None
Color	May dull slightly

2.1.1.6 Poles will be rejected if the pole contains any scratches, gouges or fraying deeper than one-half the wall thickness.

2.1.2 Wood poles shall be Class IV or higher capable of providing the nominal light mounting height specified in 3.1.4.

2.1.3 The bracket arm shall be aluminum one-piece seamless, round tapered tubes conforming to ASTM B 241 Alloy 6061 T6 or 6063 T6 with a 2 in national pipe size (NPS) slip-filter.

2.1.4 Luminaires shall operate one 250-watt high-pressure sodium (HPS) lamp from a nominal 120 volt 60 hertz power source. The luminaire shall contain a pre-wired integral ballast and optical assembly that shall provide a full cutoff Type III IES distribution.

2.1.4.1 The luminaire shall contain a photoelectric control for automatic dusk to dawn operation of luminaire.

2.1.5 Temporary metered service equipment and wiring shall be in compliance with the National Electrical Code, local codes and utility requirements.

2.2 Temporary Portable Lighting.

2.2.1 Temporary portable light towers shall have a minimum tower height of 30 feet.

2.2.2 Lighting shall operate a minimum of two 250-watt lamps. Light system shall contain a ballast and shall provide an NEMA-6 beam spread.

2.2.2.1 Lights shall be full cut-off.

2.2.3 Temporary portable lighting shall contain an independent power source.

Construction Requirements

3.1 Temporary Stationary Lighting.

3.1.1 Poles placed within the clear zone and not behind barrier shall meet breakaway requirements of the aforementioned AASHTO Standard.

3.1.1.1 Poles placed behind barrier shall be located beyond the limits of barrier deflection.

3.1.2 Poles shall be buried a minimum of 20 percent of the mounting height.

3.1.3 Fiberglass poles shall be handled in accordance with manufacture's recommendations.

3.1.4 Lights shall be installed at a 35 foot mounting height on an 8 ft, 12 ft or 16 ft bracket arm as specified.

3.1.4.1 Lights shall be aimed directly down, unless otherwise specified, so as not to produce excess glare for the traveling public and to minimize the projection of light upward.

3.1.5 Temporary metered service and wiring shall be installed in accordance with the National Electrical Code, local codes and utility requirements.

3.1.5.1 The Contractor shall obtain all necessary permits for the work and meet the requirements of all codes.

3.1.6 The power source will be determined by the appropriate electric utility listed in the Prosecution of Work, if available, and the Engineer in the field.

3.2 Temporary Portable Lighting.

3.2.1 Light towers shall be placed as shown on the plans at the angle point in the concrete barrier.

3.2.1.1 Lights shall be aimed directly down, unless otherwise specified, so as not to produce excess glare for the traveling public and to minimize the projection of light upward.

3.2.2 The Contractor shall insure that temporary portable lighting is installed as part of the temporary concrete barrier installation.

3.2.3 The Contractor shall insure that temporary portable lighting is operating during night hours and not operating during daylight hours.

3.2.4 Power source shall maintain light operations for a minimum of 14 continuous hours (dusk to dawn).

3.3 If temporary lighting is proposed at locations other than as shown on the plans, the Contractor shall submit plans for approval in accordance with 105.02 prior to the start of operations.

3.4 The Contractor shall insure that temporary lighting is installed prior to disturbing traffic flow.

3.5 Temporary lighting shall be removed at the completion of the project or when no longer required.

Method of Measurement

4.1 Temporary stationary lighting and temporary portable lighting will be measured as a unit. A unit will include all work, material, equipment, hardware, required power and appurtenances as necessary for each unit required to provide temporary lighting. Relocating temporary portable lighting will not be measured.

4.2 Temporary portable lighting (unit/week) will be measured as a unit week. A week shall consist of seven consecutive days beginning from when the item is first used on the project. The number of units required each week will be specified in the Traffic Control Plan or as approved.

Basis of Payment

5.1 The accepted quantity of stationary or portable temporary lighting will be paid for at the contract lump sum price complete.

5.2 The accepted quantity of temporary portable lighting (unit/week) will be paid for at the contract unit price complete. Payment will be made based on the use for each unit, whether used once or multiple times during the week.

5.3 All costs for obtaining permits for temporary lighting will be subsidiary.

5.4 Barrier provided solely for the purpose of protecting temporary lighting shall be subsidiary to Item 619.1 – Maintenance of Traffic.

5.5 Temporary lighting provided to illuminate portable concrete barrier installed other than required on the Plans, shall be at the Contractor's expense.

Pay item and unit:

670.10_	Temporary Lighting	Unit
670.104	Temporary Portable Lighting	Unit
670.105	Temporary Portable Lighting	Unit/Week

SPECIAL PROVISION

Section 670 – MISCELLANEOUS INCIDENTALS

Item 670.822 - GNSS Construction Inspection Equipment

Description

1.1 Work shall consist of furnishing, configuring, installing, maintaining, and removing Global Navigation Satellite System (GNSS) equipment as needed for use by the Engineer and their inspection staff, including building the required surface models and downloading them into the Contractor provided data collectors, and the training of the Engineer and their representatives on the use of the GPS provided.

Equipment

2.1 The GNSS Construction Inspection Equipment shall include all necessary components, communication devices, integrated antennae and receiver and cables, data collectors, operating manuals, attachments, and fastening hardware to meet the minimum requirements described below.

(a) GNSS equipment provided for a single Contract shall be the same model and manufacturer; and shall include, and be licensed to operate, the same version of GNSS planning/processing software (such as Carlson Survey, Trimble Business Center HCE, or similarly functioned software), and data collection software. This system to be utilized by the Contractor, Engineer, and their representatives for data collection shall be the same. All software provided (including firmware) shall be the most current available or in use by the Contractor. GNSS equipment shall be of the same age as those actively in use by the Contractor. To verify the age of the GNSS equipment, the Contractor shall provide a dated copy of the manufacturer's receipt(s) for the purchase, lease, or rental of the equipment.

(b) GNSS planning/processing software shall have the following minimum capabilities:

(1) Surfaces

- Build surfaces by triangulation or rectangular grids
- Earthwork volumes between triangulation or grid surfaces
- Create surfaces from collected data points
- Calculate 2D and 3D surface areas from existing and collected data points

(2) Centerlines

- Design or input alignments on screen or in dialog with graphics
- Create points at specified stations and offsets
- Reports stations and offsets for selected points along centerline

(3) Points

- User-defined import and export of point data
- Draw points with settings for symbols, layers and styles
- Calculate 2D and 3D lengths from existing and collected point data

(4) Survey

- Upload and download to data collectors
- Create cross section reports from field topo survey.

(c) GNSS equipment shall include both standard USB cable and Bluetooth wireless technology for data transfer between the GNSS equipment and the data collectors.

(d) GNSS equipment shall be equipped, at a minimum, to receive Global Positioning System (GPS) and GLONASS data.

(e) GNSS equipment shall be equipped to receive, and be capable of utilizing, Real Time Kinematics (RTK) correctional data (current version of RTCM format). This shall include all necessary communication devices, repeaters, and systems, data service plans, and communications to meet the minimum required accuracy and not exceed two (2) second latency at the rover. The Contractor shall ensure that the RTK data shall be available at all locations across the entire Contract site during all hours of construction and inspection operations.

(f) GNSS equipment shall include either an integrated or modular communication device capable of receiving RTK correctional data.

(g) GNSS Equipment shall be capable of collecting dual frequency GPS data.

(h) Minimum Required Kinematic Accuracy relative to primary project control (CORS):

(1) Horizontal: 10mm +1.0 ppm (0.033 ft +1.0 ppm)

(2) Vertical: 20mm + 1.0 ppm (0.065 ft + 1.0 ppm)

(i) Necessary hardware and software shall be included (including communication drivers) to connect the GNSS equipment to a Contractor-provided PC and communicate/exchange/process positional data with that Contractor PC. (Contractor-provided PC shall be the PC/Laptop provided under Item 698.__ - Field Office Type_, no additional PC/Laptops will be necessary.)

(j) GNSS equipment shall have an internal, or modular, rechargeable battery system capable of operating through all active working hours (may include interchangeable batteries), including the battery charger.

(k) GNSS equipment shall include a hard or soft shell carry cases, and all appropriate operation manuals.

(l) GNSS rover shall include one (1) fixed or collapsible height rover rod of two (2) meters (6.56 feet) in length, one attachable bipod which is compatible with the rover rod, and one Topo shoe.

(m) GNSS equipment set up to operate as a base stations shall include all necessary additional cables, hardware, fasteners, or accessories necessary to install it in a fixed semi–permanent location, will not be considered as a rover unit, and therefore will not require a rover, a bi- pod, or a Topo shoe.

(n) If a high accuracy machine control system is to be utilized for fine grading, a high accuracy measurement system shall be made available for Department use to check prepared fine graded surfaces. If the supplied GNSS unit is not capable of utilizing the high accuracy system, one that is shall be provided for the purposes of fine grade checking. This unit will not be considered an additional unit as it will only be made available for fine grading purposes. High accuracy systems may include, but are not limited to, Laser Tied GPS and Ultimate Total Station machine guidance.

Construction Requirements

3.1 The Department may have electronic data files available for the project. Any files available were originally created with the computer software applications MicroStation® (CADD software) and InRoads® (civil engineering software). The data files will be in the native formats and other software formats as described below. The Contractor will perform any and all necessary conversion of the files for the selected grade control equipment, including the creation of Digital Terrain Model(s) (DTM(s)) if necessary. The data provided by the Department will be, at a minimum, a finished grade model from "edge of pavement" to "edge of pavement". Additional files listed below may also be available.

(a) Terrain Models.

(1) Terrain models representing the existing ground and design surfaces in DGN format.

(2) Terrain models representing the existing ground and design surfaces in **DTM** or LandXML format (ASCII format).

(b) Alignment Data Files.

(1) Geometry files containing horizontal and vertical geometry in DGN format.

(2) Geometry files containing horizontal and vertical geometry in LandXML format.

(3) Alignment Geometry Report (ASCII Report format).

(c) Other Files.

(1) MicroStation® cross section design files (DGN format).

(2) MicroStation® ROW design file (DGN format).

(3) MicroStation® existing ground features (DGN format).

3.2 Particular care shall be taken to ensure that any and all files converted to other file formats maintain the same units of measure and coordinate system of the original data. This includes any necessary conversion from MicroStation® DGN to other drawing formats; as well as from InRoads® to

other engineering formats.

3.3 Any electronic project design data provided by the Department will not be deemed a part of the contract, and is supplied as a courtesy by the Department. The Contractor shall upon discovery of any ambiguity or error notify the Department before proceeding. The Contractor may convert any electronic data provided by the Department into a format required by the Contractor's system and equipment at the Contractor's expense. If not provided by the Department or changed from what was supplied, any Digital Terrain Model (DTM) to be used for construction shall be submitted to the Department as an OpenRoads® terrain model or LandXML format at least 14 days prior to the pre-construction meeting; any other format shall be preapproved by the Department prior to submittal. The submission shall at minimum include a finished grade model.

3.4 The Contractor assumes all risk of error if the information is used for any purposes for which the information was not intended.

3.5 Any assumptions the Contractor makes from this electronic information is at the Contractor's risk.

3.6 The Contractor shall choose which communication technique and devices will be used which will insure the consistent and reliable delivery of RTK correctional data from the network to the GNSS equipment. When geographic locations or lack of reliable communications network prohibits the use of a network directly, the Engineer may approve the use of a Survey Grade GNSS Inspection unit as a base station in place of the network. The Contractor shall semi-permanently mount the base station in a stable and secure location where it shall not be disturbed by construction activities nor be easily damaged by vandalism, and where it shall be capable of providing radio signal coverage over the entire Contract area. A GNSS unit installed as a base station for inspection operations shall only be moved with the approval of the Engineer. Additional base station setups as required by the Engineer for areas outside the Contractors work area may be requested and paid for in accordance with 109.04.

3.7 The Contractor shall build the required surface models and download them into the provided data collectors to facilitate construction inspection by the Engineer.

3.8 Provide the Engineer with a GNSS rover (with the same capabilities as equipment used by the Contractor) for use during the duration of the Contract. At the end of the Contract, the GNSS rover unit will be returned. Provide the Engineer 8 hours of formal training on the Contractor's GNSS machine control systems.

3.9 The GNSS equipment shall be maintained and remain in service until either:

(a) A maximum of one week after the Engineer requests its removal in writing, or
(b) The Department relinquishes the Engineer's Field Office.

3.10 The Contractor shall maintain all GNSS equipment and software in good working condition and shall provide replacement due to breakdown, damage, or theft within two (2) working days. The Contractor shall retain ownership of all supplied GNSS equipment at the end of the Contract.

3.11 Training requirements are as follows:

(a) For all Construction Grade GNSS equipment, the Engineer and/or duly

authorized representatives shall be provided with a minimum of two separate 8 hour minimum training sessions on the use and operation of the GNSS equipment and software during the first month of the Contract. One of the two classes shall occur within one week of delivery of GNSS equipment to the site. The second of the two classes shall occur at the request of the Engineer. If a Contract has multiple years of work, an additional 8 hour minimum training shall be provided at the request of the Engineer.

(b) All training shall be performed by a manufacturer–verified trainer who is approved by the Engineer. The training shall occur at the Engineer's Field Office or at a location agreed to by the Engineer.

Method of Measurement

4.1 GNSS Construction Inspection Equipment will be measured by the unit for complete and accepted work.

Basis of Payment

5.1 The accepted quantity of GNSS Construction Inspection Equipment will be paid for at the Contract unit price per unit. Payment will be full compensation for furnishing all equipment, support, and maintenance as specified and required in 2.2, and for furnishing all materials, labor, tools, materials, equipment, training, and incidentals necessary to complete the work.

5.2 Partial payments will be made as follows:

(a) When 5 percent of the original Contract amount is earned, the accumulated total to be paid will be 50 percent of the amount bid.

(b) When 25 percent of the original Contract amount is earned, the accumulated total to be paid will be 75 percent of the amount bid.

(c) When 50 percent of the original Contract amount is earned, the accumulated total to be paid will be 100 percent of the amount bid.

5.3 Upon written request by the Contractor made within 30 days of the Award of Contract, an amount equal to 25 percent of the amount bid for this item. Further partial payments will be made according to the schedule in 5.4.

Pay item and unit:

670.822	GNSS Construction Inspection Equipment	Unit

BEDFORD
13953

March 17, 2017

SPECIAL PROVISION

SECTION 670 -- MISCELLANEOUS INCIDENTALS

Item 670.95 - Temporary Safety Fence

Description

1.1 This work shall consist of furnishing, installing, maintaining and removing a safety fence at the areas shown on the plans or ordered.

Materials

2.1 Safety fence shall be of plastic-type, UV stabilized, construction orange in color 4-feet, (1.2 m) high and flexible to conform to ground conditions. The support members may be of steel or other approved material.

2.1.1 The minimum properties are as follows:

Minimum Ultimate Tensile Strength	200 lb/ft (28 kg/m) of width
Temperature Service Range	-40 to 200 °F (-40 to 93 °C)

Construction Requirements

3.1 The Contractor shall install the safety fence as soon as conditions allow to delineate certain areas and prevent possible intrusion into the area.

3.2 The fence shall be maintained during the contract construction period or until no longer needed. The fence shall then be removed and remain the property of the Contractor.

Method of Measurement

4.1 Temporary safety fence will be measured by the linear foot (linear meter) from end-to-end of each run of fence installed.

Basis of Payment

5.1 The accepted quantity of temporary safety fence will be paid for at the contract unit price per linear foot (linear meter).

5.1.1 The cost of maintaining and removing temporary safety fence will be subsidiary.

Pay items and units:

670.95	Temporary Safety Fence	Linear Foot (Linear Meter)

April 13, 2017

SPECIAL PROVISION

SECTION 677 – INTELLIGENT TRANSPORTATION SYSTEMS (ITS) EQUIPMENT

BASE SPECIFICATION

Description

1.1 ITS Devices: This work shall consist of furnishing, installing, relocating, wiring, licensing, testing and providing GPS as-built documentation for Dynamic Message Sign (DMS) Systems, Closed Circuit Television (CCTV) Systems, Road Weather Information Systems (RWIS), Variable Speed Limit Sign (VSLS) Systems, Motor Vehicle Detection Sensor (MVDS) Systems, Non-Invasive Pavement Sensor Systems, ITS Device Foundations and Supports, and all ancillary equipment necessary to provide a complete working system.

1.2 ITS Cabinet Equipment and Communications: This work shall consist of furnishing, installing, relocating, wiring and testing Radio Units (RU), associated Wireless Communication Equipment, ITS Equipment Cabinets, Fiber Optic Cables, Splices, Patch Panels and Distribution Enclosures, Ethernet Switches, Device Servers, Media Converters and all ancillary equipment necessary to provide a complete working system.

1.3 ITS Equipment Power: This work shall consist of furnishing, installing, wiring, and testing Meter and Disconnect Pedestal(s), Uninterruptible Power Supplies (UPS), Service Wires and all ancillary equipment necessary to provide a complete ITS power supply system.

Materials

2.1 General Standards Requirements. Materials provided for this contract shall comply with the following standards. If no revision date is specified, the most recent revision of the standard applies.

2.1.1 Structural Integrity – Device housings, structures, support poles and foundations shall be designed and constructed to comply with all applicable sections of the current AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals with all published addendums.

2.1.2 Material Certification – All materials and products shall be manufactured in the United States of America, and comply with applicable ASTM, AASHTO and the latest version of the NHDOT Standard Specifications for Road and Bridge Construction (NHDOT Standard Specifications) Sections 550 and/or 615. Mill test reports and Certificates of Compliance shall be supplied in compliance with the material specifications.

2.1.3 Fabricator Qualification – The Fabricator shall have ample experience and shall be qualified and certified in accordance with Section 550.3 of the NHDOT Standard Specifications. Proof of qualification will be required.

2.1.4 Steel Welding – All steel welding shall be in accordance with the 2015 AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, AWS D1.1 and Section 550.3 of the NHDOT Standard Specifications. All circumferential welded pole and arm splices shall be ultrasonically or radiographically inspected.

2.1.5 Electrical Components – All electrical installations, materials, and grounding shall meet all applicable local and public utility codes and requirements, as well as the National Electrical Code (NEC) and National Electrical Safety Code (NESC). Cabinets and enclosures shall meet the standards herein and the National Electrical Manufacturer's Association (NEMA) requirements.

2.2 Special provisions for specific ITS devices and required equipment will be included in the Contract as an amendment to this specification. Refer to the requirements of those specific ITS devices and required equipment special provisions, along with requirements of this special provision, to complete the Intelligent Transportation System installation.

2.3 Technical Submittal: The Contractor shall provide a complete technical submittal as outlined below, and shall not proceed with manufacture, fabrication or construction until the Engineer has approved the submittals in accordance with Section 105.02. See special provisions of individual ITS devices for additional Technical Submittal requirements.

2.3.1 The Contractor shall provide drawings, manufacturer's specifications, and applicable catalog cuts for all materials and components for this work, submitted in accordance with section 105.02.

2.3.2 The Technical Submittal shall list all proposed equipment to be provided and list project locations and ITS cabinet connection points where the equipment is to be installed and connect to the state's ITS network.

2.3.3 The Contractor shall provide cabinet diagrams for all equipment cabinets showing installed hardware and wiring connections.

2.3.4 The Contractor shall provide performance specifications for all devices proposed for use on the project.

2.3.5 The Contractor shall supply electric load calculations required for all power supply equipment to be installed.

2.3.6 All specification documentation shall be clearly marked to identify the exact proposed model and all options to be supplied.

2.3.7 The Department will give no guarantee as to the completeness of the plan details and the Contractor shall be required to furnish, install, and test any other equipment and materials required to provide a complete and operational ITS device system.

2.3.8 The submittal for device support poles shall include the following for approval in accordance with Section 105.02:

2.3.8.1 LRFD design calculations for support structures or poles, for the wind speeds defined in device special provisions provided as stated in section 2.2 above, signed and stamped by a Professional Engineer licensed in the State of New Hampshire.

2.3.8.2 Manufacturer's specifications and applicable catalog cuts for all materials and components.

2.3.8.3 Complete sets of shop drawings for the pole signed and stamped by a Professional Engineer licensed in the State of New Hampshire.

2.3.8.4 Elevations and dimensions.

2.3.8.5 If not provided with the Contract Documents, the Contractor shall submit elevation and plan views showing the device support locations, foundations, and the proposed slopes plotted on cross-sections showing no interference with utilities, drainage pipes or structures and showing cofferdams with sheeting left-in-place if needed for construction of the foundation.

2.3.8.6 Top of foundation reactions from the support pole design (LRFD), in conjunction with section 2.3.8.1 above, shall be submitted to the Department for verification and/or modification of the preliminary foundation design for final design, in accordance with the device special provisions prior to fabrication.

2.3.8.7 The submittal shall include the foundation system (i.e., drilled shaft or spread footing) that is selected for each pole location, if required.

2.3.8.8 When more than one Engineer is responsible for the design of separate components (i.e. pole, attachment information), the Contractor shall make one submittal containing all of the components unless otherwise allowed by the Department.

2.4 Flexible Liquid Tight Conduit

2.4.1 The flexible liquid tight conduit shall be white or light gray in color.

2.4.2 The flexible liquid tight conduit shall have a minimum operating temperature range of -4°F to 140°F.

2.4.3 The flexible liquid tight conduit shall at a minimum be IP-65 rated for watertight applications.

2.4.4 The flexible liquid tight conduit shall be UV resistant and have a flexible PVC outer shell and galvanized steel inner core.

2.4.5 Mounting hardware for flexible liquid tight conduit shall be stainless steel.

2.4.6 Flexible liquid tight conduit shall include bushings and gaskets where the conduit enters a pole mounted ITS equipment cabinet.

2.5 Cellular Communication Equipment

2.5.1 ITS devices shall be equipped with all the necessary ancillary equipment to communicate with both the manufacturer's computer software and NHDOT's Advanced Transportation Management System (ATMS).

2.5.2 Modems shall be compatible with all major local cellular communication carrier companies, and shall be capable of changing operator networks to any other major cellular communication carriers at the time of acceptance via SIM.

2.5.3 Cellular modems shall be rugged, suitable for outdoor use.

2.5.4 Modems shall be suitable for solar or battery powered installations, and capable of consuming less than 1 Watt while in idle mode, and less than 60 mW in standby mode. Modems shall enter idle and standby modes, and shall trigger active mode via periodic timers, low-voltage detection or I/O.

2.5.5 Modems shall be capable of operating in the temperature range of -40°F to +158°F. Storage temperature shall be between -40°F to +185°F. Modems shall be capable of operating at 90% relative humidity at 140°F.

2.5.6 The modem case shall be IP64 rated for ingress resistance, conform to MIL-STD-810G standards for shock, vibration, temperature and humidity, and certified in Class I Division 2 hazardous environments.

2.5.7 Modems shall be capable of surviving brownouts and spikes from -600 VDC to 200 VDC.

2.5.8 Modems shall be capable of 4G LTE communications, and shall support the frequency bands in table 1 below:

Table 1: Cellular Modem Supported Bands

Type	Bands
4G/LTE	1900(B2), AWS(B4), 850(B5), 700(B13), 700(B17), 1900(B25)
3G/HSPA/WCDMA	2100(B1), 1900(B2), AWS(B4), 850(B5), 900(B8)
2G/CDMA/EV-DO	2100(B1), 1900(B2), AWS(B4), 850(B5), 900(B8)
2G/EDGE/GSM/GPRS	Quad-band

2.5.9 Modems shall have the following industry approvals: FCC, IC, PTCRB.

2.5.10 Cellular modems shall be supplied with mounting brackets from the manufacturer.

2.5.11 Cellular Modem shall provide enough ports and outlets to connect ITS device and all antennas needed to provide communication to the NHDOT TMC. Modems shall include the following types of ports and connections:

2.5.11.1 10/100/1000 Ethernet ports (RJ45)

2.5.11.2 RS-232 Serial ports (DB-9)

2.5.11.3 USB 2.0 Micro-B

2.5.11.4 SMA antenna connector ports (primary, secondary/diversity antennas)

2.5.11.5 Support for active GPS antenna

2.5.12 Modems shall have a configurable, web-based device interface, able to display device status, power usage, device temperature, data usage, and event alerts. The modem shall be configurable with IP addresses and login credentials supplied by the Department.

2.5.13 Modems shall be capable of IPv6 addressing.

2.5.14 Modems shall support up to five (5) concurrent VPN tunnels for secure cellular communications.

2.5.15 Cellular modems shall support the following security features:

2.5.15.1 Remote Authentication (LDAP, RADIUS, TACACS+)

2.5.15.2 DMZ

2.5.15.3 Inbound and Outbound Port filtering

2.5.15.4 Inbound and Outbound Trusted IP

2.5.15.5 MAC Address Filtering

2.5.15.6 PCI Compatibility

2.5.16 Cellular antennas may be of directional or omnidirectional type, manufactured either with ruggedized construction or enclosed in a fiberglass or plastic radome to protect from weather.

2.5.17 Antennas shall be of the tri-band LTE type, capable of operation in the three primary North American LTE frequency bands.

2.5.18 Antennas shall be provided with mounting poles, brackets and hardware to make up full installation of the system.

2.5.19 Radio Frequency (RF) surge suppressors shall be of the in-line coaxial type, with a minimum frequency rating of 3 GHz.

2.5.20 Coaxial cable shall be of the low-loss type, rated for minimum loss at 3 GHz or higher.

2.5.21 Coaxial cable shall be of the RG-8/9913, LMR-400 type, or approved equal with 100% foil shield and no less than 88% copper braid.

Construction Requirements

3.1 All ITS systems and electrical installations shall comply with the requirements specified herein, local and utility codes, and the National Electrical Code (NEC).

3.1.1 Prior to electrical connection to public utility power, all meters and disconnect pedestals shall be inspected by the municipal electrical inspector or by the NHDOT Bureau of Public Works Electrical Inspector.

3.1.2 All electrical wiring and communication cables shall be of diameters and colors as required by the device manufacturers.

3.1.3 Wire connections shall be made without excessively long exposed conductors, or unraveled strands extending beyond connections, to prevent shock hazards.

3.2 A preconstruction meeting with the Contractor, equipment manufacturer, Engineer, and a TSMO Bureau representative shall be arranged not less than 7 days prior to the start of the ITS system installations.

3.3 Flexible Liquid Tight Conduit

3.3.1 Any conduit installed above grade for communications and electrical cabling shall be flexible liquid tight conduit meeting the requirements of these specifications.

3.3.2 Connections of above grade flexible liquid tight conduit to underground PVC conduit shall be made watertight.

3.3.3 Cabling shall be installed through housings and junction boxes in a manner that provides a watertight installation and prevents moisture damage to the device components.

3.3.4 Insulating materials shall be placed between conduit mounting hardware and any concrete mounting surface to prevent corrosion.

3.4 Cellular Communications

3.4.1 Unless a different communication system is specified, ITS devices shall communicate with the NHDOT network wirelessly via a cellular communication system.

3.4.2 Cellular modems, antennas and any mounting plates, poles, brackets and hardware shall be supplied and mounted by the Contractor. The ITS device shall be equipped with all the necessary ancillary equipment to communicate with both the manufacturer's computer software and NHDOT's ATMS.

3.4.3 For locations serviced by commercial AC power, the modem shall include an AC power adapter. Modems provided for solar powered sites shall include a DC power cord.

3.4.4 Cellular Modem shall be installed inside the equipment cabinet. Power shall be supplied through a dedicated power outlet.

3.4.5 Cellular modems shall be provided with data plans from the cellular service carrier suitable for unlimited use. The Department will assume control of the cellular data account at the completion of Final ITS System Acceptance as stated in section 3.8 below.

3.4.6 Two antennas shall be installed to provide diversity reception of wireless signal, and a Multiple-Input and Multiple-Output (MIMO) signal link.

3.4.7 The two cellular antennas shall be installed to provide the maximum signal performance possible at the device location. Antenna location shall be determined by best signal strength and physical mounting, but to avoid excessive cable lengths. Antenna mounting height shall be no less than 6-1/2 feet.

3.4.8 Antennas shall be mounted on the control cabinet, as close to the modem as possible to reduce signal loss through the coaxial cables.

3.4.9 Holes drilled into the control cabinet shall be drilled on the sides or underside of the cabinet to allow for mounting and cable entry. Holes shall not be drilled into the top of the control cabinet. Holes shall be sealed to prevent moisture damage to cabinet and equipment.

3.4.10 Coaxial cables shall be installed through the antenna mounts and equipment cabinets in a manner that provides a watertight installation, secures cables to prevent movement, and prevents moisture damage to the antenna and any other part of the ITS device systems.

3.4.11 Coaxial Cables shall be installed in the length and quantity required to connect all antennas used in the system, and furnished with appropriate connectors. Tools and hardware needed for connectorizing the cables for any connections shall be included in this work. Neither cable splices, nor RF connector adaptors will be allowed.

3.4.12 Two Radio Frequency (RF) surge suppressors (one for each antenna installed) shall be installed as recommended by the manufacturer to provide system protection from lighting strikes. Any mounting hardware required and all grounding and bonding of surge suppressors shall be included as part of the installation.

3.5 ITS Device Documentation Requirements

3.5.1 A minimum of 15 working days prior to configuration of the IP-addressable equipment, the Contractor shall formally request the assigned IP addresses from the Department.

3.5.2 The Contractor shall fill out a copy of the "IP Address Request Worksheet" found on the NHDOT website (http://www.nh.gov/dot/business/contractors.htm), and return it to the Engineer. Directions to fill out this worksheet are included in the download file.

3.5.3 All ITS Device documentation shall identify the specific manufacturer and model number as approved in the technical submittal, sections 2.3.1 and 2.3.2 above.

3.5.4 IP addresses and login credentials will be assigned for each device by the Department and returned to the Contractor.

3.5.5 The Contractor shall configure all devices with the correct IP addresses and login credentials assigned by the Department.

3.5.6 The Contractor shall properly label all ports and outlets within device interfaces with the correct component connected to the port or outlet.

3.6 ITS Device and System Testing.

3.6.1 In addition to the requirements of this specification, all installations of ITS devices and equipment, fiber optic cable, and wireless communication equipment will be subjected to rigorous testing before the work will be accepted by the Department. The Contractor is directed to review NHDOT's standard testing plans for ITS devices, located on NHDOT's website (http://www.nh.gov/dot/business/contractors.htm). Successful completion of device testing, as specified in the applicable standard test plans, shall be considered a requirement of the Contract. The Contractor shall provide all equipment, materials and labor required to perform each test, including laptop computers, internet connections, software, and Maintenance of Traffic.

3.6.1.1 If standard test plans are not available for a specific device or communication method, the Contractor shall propose ITS testing plans and procedures, and submit these plans to the Engineer for approval. Test Plans shall be developed to provide a mechanism that ensures that all contract requirements have been tested successfully and verified. The following separate test plans shall be submitted by the Contractor, when required:

(a) Fiber optic communications testing

(b) Wireless Communications Testing

(c) ITS device standalone testing for RWIS and Non-Invasive Pavement sensor sites

(d) Central control and nighttime testing for devices stated in section 3.6.1.1.c above

3.6.1.2 See special provisions of specific device or communication method, when standardized test plans are not available, for specific testing requirements.

3.6.2 The Contractor shall coordinate with the TSMO Bureau no less than seven (7) days prior to scheduling any equipment or systems testing.

3.6.3 The Department reserves the right to examine and test or retest any or all materials furnished by the Contractor for the project to determine if they meet the requirements specified within the Contract Documents.

3.6.4 If the Department decides that any material used in the construction of this project is defective or otherwise unsuitable, and the workmanship does not conform to the requirements of this contract, the Contractor shall replace such defective parts and material at no cost to the Department.

3.6.5 The Contractor shall conduct all tests in the presence of the Engineer and a representative of the TSMO Bureau. Testing shall be scheduled only on weekdays, subject to the approval of the Department.

3.6.6 Test results shall be packaged and submitted to NHDOT within one week of test completion. No test phase shall begin until all prior test phases have been completed, and test results have been approved by the NHDOT.

3.6.7 Contractor shall provide any vendor supplied or test specific software for testing, as needed.

3.6.8 Testing shall be performed after the field installation of all equipment is complete, but before connection with any communications system, network, or the NHDOT TMC in Concord. The test shall exercise all functional operations of the ITS device and equipment installed and demonstrate compliance with the functional requirements defined in the Contract Documents and all applicable standards. If an ITS device fails to pass testing, the Contractor shall correct the problem or replace the unit and retest it until satisfactory results are achieved. Testing shall utilize vendor supplied software for testing the ITS devices, UPS's, and Ethernet switches, and all ancillary equipment, as needed. Test results shall be packaged and submitted to NHDOT within one week of test completion.

3.7 Operational Acceptance Test Period.

3.7.1 A 30 day Operational Acceptance Test Period will be required for all ITS components installed. This test period shall commence upon successful completion of field tests, communication tests, and central control tests, and will last for 30 consecutive days. This test period will demonstrate that all the ITS devices, systems and components are properly installed, are free from problems, exhibit stable and reliable performance, communicate reliably with the NHDOT TMC and comply with the Contract Documents.

3.7.2 If necessary, the Contractor shall coordinate with the TSMO Bureau to schedule any exercises and have a representative at the device to provide on-site verification of device functionality.

3.7.3 In the event of a failure, the problem shall be reported to the Contractor. The failure shall be corrected and the test shall then be restarted for another 30 days.

3.8 Final ITS System Acceptance - Final ITS System Acceptance of installed devices shall be issued upon satisfactory completion of the Operational Acceptance Test and any required Training. The ITS devices will be inspected and issued Final ITS System Acceptance upon approval and verification by the Engineer and the TSMO Bureau representative that the project requirements have been met 100 percent. The contract Guarantee/Warranty period will commence after the Final ITS System Acceptance has been issued by the Department.

3.9 Training.

3.9.1 The Contractor shall provide a training program consisting of the furnishing of educational training in the installation, operation, and maintenance of the ITS equipment installed. Upon written request by the Contractor and at the sole discretion of the ITS Project Manager, this training requirement may be waived if similar ITS equipment has been installed and Department personnel have been trained within the previous six months.

3.9.2 The Contractor shall provide qualified instructors, approved in writing by the Engineer, and all training materials necessary for training Department and maintenance agency personnel in the operation and maintenance of the system components. Training shall consist of classroom lectures as well as hands-on demonstrations.

3.9.3 The Contractor shall develop and submit training course outlines and samples of all training aids and manuals. The training course outlines shall include a list and resumes of individuals who will conduct the training.

3.9.4 The Contractor shall develop and supply all necessary manuals, displays, class notes, visual aids, and other instructional materials as required for the training program. The Contractor shall supply an adequate number of manuals and class notes, individually bound in loose-leaf binders, to provide 1 copy for each session participant. An additional 3 copies shall be provided to the Engineer at the completion of the training program.

3.9.5 All training materials and instructors' resumes shall be submitted to the Engineer for approval at least 15 working days prior to the proposed start of the training sessions. Training schedule shall be coordinated with the Department, and shall be scheduled no later than 30 days after the first field unit is brought on-line.

3.9.6 Training will be conducted at a classroom facility supplied by the Contractor. This facility shall be within 15 miles of either the City of Concord or the NHDOT District Office, at the discretion of the Engineer. The Contractor may request use of NHDOT facilities subject to the approval of the Engineer.

3.9.7 The training session shall last no longer than 6 hours, and shall accommodate up to 20 people. As a minimum, the training session shall completely cover the following topics:

3.9.7.1 Operational Overview Element – The emphasis in this portion of the training program shall be placed on familiarizing those individuals not accustomed to the ITS equipment, devices, or technology furnished, installed or provided in this project with the abilities and functionality of the system.

3.9.7.2 Maintenance – The emphasis in this portion of the training shall be placed on the manufacturer's recommended maintenance procedures and preventative maintenance schedules.

3.9.7.3 Communications System – This element shall consist of training on the operation, maintenance and theory of the communication systems implemented in the project. The communications portion of this session shall include a discussion of the following components and elements:

(a) An overview of the communications system as a whole

(b) Fiber optic communications principles (if the project includes fiber optic equipment and hardware)

(c) Wireless communication principles (if the project includes wireless equipment and hardware)

(d) Communication interfaces – Ethernet Switches and Fiber Ethernet Switches

(e) Grounding/lightning protection

(f) All other unique aspects of the particular project

3.9.7.4 Equipment Operation – This element shall consist of training on the operation, calibration and proper use of all installed software, and hardware, such as dynamic sign elements, ITS device controllers, CCTV Camera lowering systems, sensor instrumentation, software systems and device interfaces, utility or solar power systems, UPS backup power supplies, generator hookups, network switches and patch panels, and any other component installed as part of the Intelligent Transportation System.

3.10 Documentation. Complete and accurate as-built global positioning system (GPS) coordinates for the entire system shall be clearly labeled with the project name, number, marked as ITS As-Builts and forwarded to the NHDOT TSMO – Attn: ITS Project Manager, 110 Smokey Bear Blvd. Concord, NH 03301 (603-271-6862).

3.10.1 The Contractor shall provide as-built GPS coordinates and information for the following elements:

(a) Each ITS device location

(b) Each ITS equipment cabinet location

(c) Each wireless communication equipment location

(d) Each ITS equipment power source and any disconnect locations

(e) Electrical power provider information and electric meter numbers

(f) All pull boxes associated with the ITS equipment power and communication system

(g) All electrical and communication conduit associated with the ITS equipment constructed under the project

(h) All electrical and communication conduit runs in 50 foot intervals and at any point of directional change

(i) All delineator locations installed along the conduit runs

3.10.2 The GPS coordinates shall be accurate to +/- 2 feet.

3.10.3 The Contractor shall provide a complete set of maintenance and user manuals along with all the wiring and assembly schematics/diagrams, along with any material safety data sheets (MSDS), prepared by the manufacturer, for any toxic substances (coatings, liquids, or other) used.

3.11 Guarantees and Warranties

3.11.1 Limits of Guaranteed Work. The Contractor shall unconditionally guarantee all system and subsystem modules including all cabinets, equipment, hardware, and software installed to be free of defects. The guarantee shall cover all materials, labor, equipment, transportation, maintenance of traffic, and incidentals required to facilitate responsive maintenance as necessary to repair and replace any defective modules, systems or subsystems of the completed ITS installation.

3.11.2 It shall be the Contractor's responsibility to secure all guarantees that are customarily issued by the equipment manufacturers for the specific equipment included in the Contract. The form in which such guarantees are delivered to the Contractor shall include the provision that they are subject to transfer to the Department, and shall be accompanied by proper validation of such fact. Transfer of guarantees shall coincide with the Guarantee Period specified below.

3.11.3 Guarantee Period. The length of guarantee will be 1 year from the date of Final ITS System Acceptance by the Engineer, as specified in section 3.8 above, for each site. Additionally, the Contractor shall guarantee availability of compatible replacement equipment (to the field replaceable unit level) for a ten-year time period from the same date.

3.11.4 Manufacturer's Warranties. The terms of any equipment warranties stipulated by the equipment manufacturers shall be provided with product data included in the Technical Submittal, specified in Section 2.3 above. The terms of any equipment manufacturer's warranties will not relieve the Contractor from any of the guarantee requirements of this contract.

3.11.5 Guarantee Work (Corrective Action). The Contractor shall be responsible for repairs during the Guarantee Period. Repair is defined as all activities that shall be performed for the system to remain in, or return to, operation as observed at the time of Final ITS System Acceptance. The work consists of the repair of defective devices that fail during the normal course of operation, and does not include repairs or replacements made necessary due to damage resulting from vandalism, traffic accidents, or acts of God. The Contractor shall provide on-site warranty service of the equipment within 24-hours of notification by NHDOT. If the Contractor is unable to affect a repair to the system within 7 days of notification, temporary equipment meeting all the original equipment specifications may be requested by the Department, and shall

be provided and installed at no cost to the Department. The Contractor shall then either fix or replace the broken device or equipment at their discretion.

3.11.6 A log of all guarantee work performed by the Contractor during the Guarantee Period shall be maintained by the Contractor. The log shall include, as a minimum, the following information:

(a) Date and time defect reported

(b) Entity reporting the defect

(c) Description of the reported defect

(d) Technician responding to reported defect

(e) Arrival time at the site of the technician

(f) Technician performing defect repair or replacement

(g) Description of observed defect

(h) Corrective actions taken

(i) Model and serial number of any module repaired or replaced

(j) Date and time defect rectified

3.11.7 The Contractor shall maintain records, which show the itemized material, equipment, and labor cost incurred to provide response maintenance during the guarantee period. These records shall be provided to the TSMO Bureau within 15 working days of the warranty work. These records will not be used as a Basis of Payment to the Contractor. The Contractor shall assure that these cost records are as complete and accurate as practicable. The Department may perform an audit to verify the accuracy of the cost records.

3.11.8 When a guarantee is available on repaired or replacement components, a written and signed guarantee shall accompany the manufacturer's billing invoice. The Engineer or inspecting agent will sign and retain the original and provide a copy to the maintaining agency and a copy to the manufacturer.

Method of Measurement

4.1 Fiber Optic Cable, Splices, ITS Device and System Components will be measured as specified in the respective special provisions for those items.

4.2 Flexible Liquid Tight Conduit will not be measured for payment but shall be subsidiary to the ITS device items.

4.3 Cellular communication equipment and antennas will not be measured for payment but shall be subsidiary to the ITS device items.

4.4 Guarantees/Warranties will not be measured, but shall be considered subsidiary to the devices and equipment installed.

4.5 Testing and integration of Fiber Optic Cable, ITS Device and/or System installations will not be measured, but shall be considered subsidiary to the Fiber Optic Cable, ITS Device or System being installed. No separate payment shall be made for the monitoring, testing, test equipment, and documentation of test results.

4.6 Training for Fiber Optic Cable, ITS Device and/or System installations will not be measured, but shall be considered subsidiary to the Fiber Optic Cable, ITS Device, or System being installed. No separate payment shall be made for the preparation of training documents, classroom lodging or presentation of training materials.

4.7 Record "As-built" documentation will not be measured, but shall be considered subsidiary to the devices and equipment installed.

Basis of Payment

5.1 Fiber Optic Cable, Splices, ITS Devices, supports structures, foundations and all system components and equipment will be paid for as specified in the respective special provisions for those items.

5.2 Partial payments for ITS device items will be made approximately as follows:

(a) Up to 50 percent of the contract unit price will be paid after receipt and installation of all equipment

(b) Remaining 50 percent of the payment will be made after the completion of Acceptance Testing and receipt of the as-built documentation and GPS coordinates in accordance with Section 3.10

5.3 Payment for all items will include all electric service inspections, all electric service charges, cellular communication equipment and cellular service charges, if required, until Final ITS System Acceptance.

5.4 Payment for all items will also include any licensing or integration fees required for adding equipment into the Department's ATMS software.

5.5 All conduit and pull boxes, except flexible liquid tight conduit, will be paid for under 614.

5.6 Ground wires will be subsidiary to the ITS device or equipment that is grounded.

BEDFORD
13953

April 13, 2017

SPECIAL PROVISION

SECTION 677 – INTELLIGENT TRANSPORTATION SYSTEMS (ITS) EQUIPMENT

Item 677.12__ – Permanent Fixed Location Dynamic Message Sign (DMS)

This special provision provides for installation of permanent, ground-mounted dynamic message signs (DMS), supports, foundations, and all equipment necessary to provide a working DMS system. All provisions of Section 677(Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification), except as modified or changed below, shall apply.

Add to Description (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

1.4 This work shall consist of furnishing, installing, wiring, connecting, configuring, testing, and providing GPS as-built documentation of a new permanent post-mounted dynamic message sign (DMS) structure system, including foundations, controller, hardware, software, integration, training, technical assistance and warranty.

Add to 2.1 General Standards Requirements (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

2.1.6 General DMS Requirements – The DMS board and controllers shall be designed in accordance with NEMA Standards Publication TS 4, Hardware Standards for Dynamic Message Signs (DMS), with NTCIP Requirements.

2.1.7 Aluminum Welding – The DMS housing shall be fabricated, welded, and inspected in accordance with current ANSI/AWS D1.2 Structural Welding Code Aluminum including Part E Workmanship Class I Structures and NHDOT Standard Specifications for Road and Bridge Construction (NHDOT Standard Specifications), Section 716.

2.1.8 Environmental Resistance – The DMS housing shall be designed to protect components from rain, ice, dust and corrosion in accordance with NEMA enclosure Type 3R standards, as described in NEMA Standards Publication 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

2.1.9 Product Electrical Safety – All DMS and associated equipment and enclosures shall be listed by the Underwriters Laboratories (UL®) and shall bear the UL mark. DMS shall be listed as conformant to UL 48 Standard for Electric Signs and UL 50 Enclosures for Electrical

Equipment. Control equipment and enclosures shall be listed as conformant to UL 1433 Standard for Control Centers for Changing Message Type Electric Signs.

2.1.10 Radio Frequency Emissions – All equipment shall be designed in accordance with Federal Communications Commission (FCC) Part 15, Subpart B as a "Class A" digital device.

2.1.11 Communication Protocols – The DMS controller hardware/firmware and DMS control software shall conform to the applicable National Transportation Communication for ITS Protocol (NTCIP) standards. Refer to the NTCIP section of this specification for detailed NTCIP requirements for this contract.

Add to 2.3 Technical Submittal (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

2.3.9 The Contractor shall provide documentation of the DMS Manufacturer's previous experience. Only experience with manufacturing of electronic LED sign products that meet these specifications will satisfy the requirements for Manufacturer's qualifications. Experience with other sign types will not be considered. Requirements of the DMS Manufacturer's previous experience are as follows:

2.3.9.1 The DMS Manufacturer shall have been in the business of manufacturing DMS used to manage vehicular roadway traffic for a minimum period of 5 years prior to the contract bid date.

2.3.9.2 The DMS Manufacturer shall have in operation, as of the contract bid date, a minimum of 10 different project specific LED DMS systems. Each of the 10 systems shall use the National Transportation Communications ITS Protocol (NTCIP 1203 v02) as their primary communication protocol.

2.3.10 The DMS Manufacturer shall provide a customer service department that is contactable via telephone, e-mail, and fax to provide technical support and help services 24 hours per day, 365 days per year for the applicable DMS systems. Contact information for the customer service department shall be provided in this technical submittal.

2.3.11 The DMS Manufacturer shall provide documentation indicating that the DMS product has been built and tested to the standards referenced in Section 2.1. Failure to conform to the testing requirements shall be grounds for rejection.

2.3.12 The Manufacturer shall provide results of third party testing, performed to demonstrate the DMS system (message board and controllers) meets the standards below. The report shall include a record of the test laboratory and the test lab's representative that witnessed the tests, including the signature of the lab's representative. Provide test reports for the following standards:

2.3.12.1 NEMA Standards Publication TS 4, Hardware Standards for Dynamic Message Signs (DMS), and a minimum NTCIP 1203 V03.

2.3.12.2 Underwriters Laboratories (UL), UL 48 Standard for Electric Signs, UL 50 Enclosures for Electrical Equipment, and UL 1433 Standard for Control Centers for Changing Message Type Electric Signs. The UL report number(s) for all DMS and control equipment manufactured by the DMS Manufacturer shall be submitted and the products shall bear the UL mark.

2.3.13 Submit third-party test results verifying management information base (MIB) object support for the device. Documentation shall show all required MIB and object groups are fully supported by the device and meet NHDOT NTCIP requirements as specified in 2.6 below.

2.3.14 The Contractor shall provide a compact disk that contains all management information base and an Interface Control Document that enables the Department's Advanced Transportation Management System (ATMS) software integrator to integrate the new DMS into the NHDOT ATMS.

2.3.15 The Contractor shall provide two (2) copies of the DMS control software on CD, as described in section 2.11.2 below, along with the controller operator's manual.

2.3.16 The Contractor shall indicate on the technical submittal that the DMS provided meets NTCIP 1203 Version 2, or latest supported specification, and that the signs to be delivered are equipped with the software and hardware required to meet all NTCIP Conformance Requirements below.

2.3.17 In addition to the documentation described above, the Contractor shall also provide NTCIP documentation as described in section 2.6.9 below. NTCIP documentation shall be included on the control software CD copies provided in section 2.13.15 above.

2.3.18 Documentation that proves the DMS manufacturer complies with these specifications shall be provided with the DMS manufacturer's Technical Submittal. A cross-matrix shall be provided that lists each specification point and indicates how the manufacturer meets that requirement.

2.3.19 Failure to provide complete and accurate submittal information may be cause for rejecting the proposed DMS system.

Add to Materials:

2.6 NTCIP Conformance Requirements.

2.6.1 This section describes the minimum specifications for the NTCIP communication capabilities of the DMS controller and DMS control software. All hardware, software, firmware, and services necessary to install and operate the DMS system shall fully comply with the NTCIP functional requirements specified herein.

2.6.2 These specifications reference standards and MIBS through their NTCIP designated names. Each NTCIP device covered by these project specifications shall implement the version of the standard that is specified in Table 2 below. Refer to the NTCIP library at www.ntcip.org for information on the current status of NTCIP.

Table 2: NTCIP Document References		
Document Number and Version	**Document Title**	**Document Status**
NTCIP 1101:1996 and Amendment 1	Simple Transportation Management Framework (STMF)	Approved Standard with Amendment
NTCIP 1102:2004 v01.15	Octet Encoding Rules (OER) Base Protocol	Recommended Standard
NTCIP 1103 v02.16	Transportation Management Protocols	Jointly Approved
NTCIP 1201 v02	Global Object (GO) Definitions	Jointly Approved with Amendment
NTCIP 1203 v02	Object Definitions for Dynamic Message Signs	Recommended Standard
NTCIP 2101:2001 v01.19	Point to Multi Point Protocol (PMPP) Using RS-232 Subnetwork Profile	Jointly Approved
NTCIP 2103 v02	Point-to-Point Protocol Over RS-232 Subnetwork Profile	Jointly Approved
NTCIP 2104v01.11	Ethernet Subnetwork Profile	Jointly Approved
NTCIP 2201 v01.15	Transportation Transport Profile	Jointly Approved
NTCIP 2202 v01.05	Internet (TCP/IP and UDP/IP) Transport Profile	Jointly Approved
NTCIP 2301 v02.18	Simple Transportation Management Framework (STMF) Application Profile	Recommended Standard

2.6.3 Each serial or modem port on each NTCIP device shall be configurable to support both NTCIP 2101:2001 v01.19 and NTCIP 2103 v02. Only one of these profiles shall be active at any given time. Serial ports shall support external dial-up modems.

2.6.4 Each Ethernet port on the NTCIP device shall comply with NTCIP 2104 v01.11

2.6.4.1 The NTCIP device may support additional Subnet Profiles at the manufacturer's option. At any one time, only one subnet profile shall be active on any single port of the NTCIP device. All response datagram packets shall use the same transport profile used in the request. The NTCIP device shall be configurable in a way that allows a field technician to activate the desired subnet profile and shall provide a visual indication of the current selected subnet profile.

2.6.5 Each Ethernet port on the NTCIP device shall comply with NTCIP 2202 v01.05

2.6.5.1 The NTCIP device(s) may support additional transport profiles at the manufacturer's option. Response datagrams shall use the same transport profile used in the request. Each NTCIP device shall support the receipt of datagrams conforming to any of the supported transport profiles at any time.

2.6.6 Each NTCIP device shall comply with NTCIP 2301 v02.18.

2.6.6.1 An NTCIP device may support additional application profiles at the manufacturer's option. Responses shall use the same application profile used by the request. Each NTCIP device shall support the receipt of application data packets at any time allowed by the subject standards.

2.6.7 Each NTCIP device shall support all mandatory objects of all mandatory conformance groups as defined in NTCIP 1201 v02 and NTCIP 1203 v02.

2.6.7.1 All mandatory and optional objects listed in these MIBS shall be supported. Table 3 outlines the specific groups within the MIBS that must be supported:

Table 3: Object Support MIBS
NTCIP 1201 V02
Time Management Group Time Based Event Schedule Group Report group PMPP Group Security Group Auxiliary Group
NTCIP 1203 V02
Sign Configuration and Capability Conformance Group Sign Configuration and Capability Conformance Group Font Definition Conformance Group VMS Configuration Conformance Group MULTI Configuration Conformance Group Message Table Conformance Group Sign Control Conformance Group

2.6.8 Each NTCIP device shall support the following message formatting MULTI tags as shown in Table 4. The manufacturer may choose to support additional standard or manufacturer-specific MULTI tags.

Table 4: Required Multi Tags	
Multi Tag	**Description**
f1	Field 1-time (12 hr)
f2	Field 1-time (24 hr)
f8	Field 8- day of month
f9	Field 9-month
f10	Field 10-2 digit year
f11	Field 11-4 digit year
fl (and /fl)	Flashing text on a line-by-line basis with flash rates controllable in 0.1-second increments.
Fo	Font
jl2	Justification- line-left
jl3	Justification- line-center
jl4	Justification- line- right
jp2	Justification- page- top
jp3	Justification- page- middle
jp4	Justification- page- bottom
mv	Moving text
nl	New line
np	New page up to 5 instances in a message (i.e. up to 6 pages/frame in a message counting first page)
pt	Page times controllable in 0.1-second increments

2.6.9 NTCIP documentation shall be provided on a CD-ROM and will contain ASCII versions of the following Management Information Base (MIB) files in Abstract Syntax Notation 1 (ASN.1) format:

2.6.9.1 The relevant version of each official standard MIB modules referenced by the device functionality.

2.6.9.2 If the device does not support the full range of any given object within a standard MIB Module, a manufacturer specific version of the official standard MIB Module with the supported range indicated in ASN.1 format in the SYNTAX and/or DESCRIPTION fields of the associated OBJECT TYPE macro. The filename of this file shall be identical to the standard MIB Module except that it will have the extension "man".

2.6.9.3 A MIB module in ASN.1 format containing any and all manufacturer specific objects supported by the device with accurate and meaningful DESCRIPTION fields and supported ranges indicated in the SYNTAX field of the OBJECT-TYPE macros.

2.6.9.4 A MIB containing any other objects supported by the device.

2.7 Post-Mounted Dynamic Message Sign.

2.7.1 The sign shall be full matrix LED, capable of displaying variable height text with varying fonts, and graphic messages.

2.7.2 The sign board shall be capable of displaying 3 rows of 18 inch tall characters, with 8 characters in each row.

2.7.3 The center-to-center pixel spacing shall be between 1.6-inches and 2.6-inches. The signs shall provide character spacing meeting MUTCD guidance, Section 2L.04.

2.7.4 There shall be 4 LEDs per pixel. The LEDs shall be amber and the background shall be black. The sign shall have a minimum viewing angle of 30-degrees.

2.7.5 The sign shall be capable of wireless and wired communications.

2.7.6 The sign shall be capable of running from solar DC and utility AC power.

2.7.7 The DMS shall be designed in accordance with NEMA Standards Publication TS 4, Hardware Standards for Dynamic Message Signs (DMS), with NTCIP Requirements as it applies to LED DMS and the NTCIP 1203 v02 standard, as specified in this document.

2.7.8 The post-mounted DMS shall weigh not more 1,000 lbs with all installed hardware and accessories.

2.7.9 The sign face shall be modular in design to allow for ease of replacement of faulty components. There shall be no fewer than 10 equal-sized modules per sign that are quickly replaceable in the field.

2.7.10 The DMS shall have front access for maintenance.

2.7.11 The DMS shall include a photocell for automated dimming between 10% and 100% of the full LED output based on ambient light conditions.

2.7.12 The DMS shall operate within the temperature range of -40°Fto +148°F, and within the humidity range of 10 to 95 percent relative humidity, non-condensing.

2.8 DMS Controller.

2.8.1 The DMS controller shall be capable of maintaining a minimum of 255 changeable messages, and a minimum of 100 permanent messages in a user-accessible library.

2.8.2 The DMS controller shall support changeable graphic pictograms and permanent graphic pictograms.

2.8.3 The DMS controller shall capable of supporting the following functions:

(a) Scheduling message displays

(b) Scrolling fonts

(c) Per character font sizing

(d) Per character and per line flashing text

(e) Graphics

(f) Support for automated messaging for motorist speed, travel time, live temperature, time and date, and live countdowns

2.9 DMS Post & Mounts

2.9.1 Support posts shall be ASTM A992 steel, galvanized in accordance with section 550.2.9.

2.9.2 DMS board mounting brackets shall be 6061-T6 aluminum Z-extrusions.

2.9.3 All mounting hardware and bolts shall be stainless steel.

2.10 Foundation

2.10.1 Concrete for foundations shall be Class B and shall conform to Section 520. Reinforcing steel shall conform to Section 544.

2.11 Communications & Control

2.11.1 The sign controller shall be capable of being controlled on site from a hand held terminal, a personal computer equipped with the sign software, and from a remote computer through a modem. The Contractor shall provide the hand held terminal to be used as an interface to the controller. The terminal must be environmentally sealed.

2.11.2 The signs shall be supplied with computer software that allows NHDOT personnel to remotely control the on-board computer from a personal computer equipped with the latest Windows released version. Control software shall be provided on CD and allow the NHDOT to install software on as many computers as NHDOT deems necessary to remotely control the DMS. The software will be password protected and allow administrator defined privileges for at least three levels of users.

2.11.3 The DMS controller shall contain a minimum of one 10/100Base-T Ethernet communication port. This port shall be available for use for communicating to and from the sign's central controller for the purpose of modifying sign messages, changing configuration settings, obtaining sign diagnostic information, and performing all sign management functions. The Ethernet port shall have a standard RJ45 connector, which conforms to EIA/TIA standard 568A or 568B. The sign shall have configurable IP address, subnet mask, and gateway addresses, and shall be capable of being assigned a fixed IP address or be assigned an address via DHCP.

2.11.4 The DMS shall be native Ethernet-ready for installation of a wireless modem or other Ethernet communications device.

Amend 3.7 (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification) as follows:

3.7 Operational Acceptance Test Period.

3.7.1 A 60 day Operational Acceptance Test Period will be required for all ITS components installed. This test period shall commence upon successful completion of field tests, communication tests, and central control tests, and will last for 60 consecutive days. This test period will demonstrate that all the ITS devices, systems and components are properly installed, are free from problems, exhibit stable and reliable performance, communicate reliably with NHDOT's TMC and comply with the Contract Documents.

3.7.2 If necessary, the Contractor shall coordinate with the TMC to schedule any exercises and have a representative at the device to provide on-site verification of device functionality.

3.7.3 In the event of a failure, the problem shall be reported to the Contractor. The failure shall be corrected and the test shall then be restarted for another 60 days.

Amend 3.11.3 (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification) as follows:

3.11.3 Guarantee Period. The length of guarantee will be 2 years from the date of Final ITS System Acceptance by the Engineer, as specified in section 3.8 above, for each site. Additionally, the Contractor shall guarantee availability of compatible replacement equipment (to the field replaceable unit level) for a ten year time period from the same date.

Add to Construction Requirements (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

3.13 DMS Construction.

3.13.1 The sign face shall be installed to optimize the sign display for oncoming traffic. The sign itself should be visible both day and night from a distance of up to 0.5 miles from the sign.

3.13.2 The sign message shall be legible from a minimum distance of 800 feet for daytime conditions and 600 feet for nighttime conditions, per the MUTCD.

3.13.3 All electrical components for the sign shall be placed in either the Control Cabinet or the Sign Board, and all enclosures shall be water tight and water proof.

3.13.4 The Contractor shall coordinate with local utilities for power access and schedule all required electrical inspections.

3.14 Foundations, Posts & Mounting.

3.14.1 The DMS shall be mounted to two wide-flange, steel beams set in concrete placed within a drilled shaft, in accordance with the project details.

3.14.2 The posts for DMS mounts shall be set in the foundation holes and securely held in place by a brace or template before the concrete for the base is placed. All posts shall be plumb and properly oriented with the roadway. Flanges supporting the DMS will lie in the same plane.

3.14.3 The forms and templates supporting the posts shall not be removed until the concrete has cured at least 24 hours. No sign shall be attached to the posts until the concrete has cured as provided in Section 520, Table 10 – Concrete Loading, for substructure concrete including footings.

3.14.4 After erection, all bare steel shall be thoroughly wire brushed or power-tool cleaned and covered with 2 coats of approved zinc-rich primer. The first coat shall be thoroughly dry before the second coat is applied.

3.14.5 When rock is encountered in erecting posts, the depth to be drilled into the rock shall be as stated on the details.

3.14.6 The DMS shall be mounted to the support posts using two Z bars attached along the top and bottom of the DMS panel. The back of the DMS shall be flush with the Z bars after mounting is complete.

3.14.7 The DMS shall be mounted horizontally on the posts by the Z bars. The Z bars shall be bolted to the steel beams on each side of the web. The back of the Z bars shall be flush with the posts after the mounting is completed.

3.15 Grounding, Bonding and Surge Suppression.

3.15.1 The Contractor shall furnish and install Transient Voltage Surge Suppression (TVSS) devices for all power and communications conductors. TVSS devices shall be installed for all conductors leaving the ITS equipment cabinet, DMS cabinet, and any solar power cabinets.

3.15.2 The Contractor shall supply and install a ground array system to be installed at the base of the DMS. The ground rod array system shall be connected to the DMS through an appropriate ground clamp. A #4 AWG copper wire shall be installed between the DMS posts and the ITS equipment cabinet, providing a common ground system for each terminus.

3.15.2.1 Additional ground rods shall be installed to meet the manufacturer's recommended resistance to ground, or a maximum of 25 ohms, whichever is less.

3.15.2.2 The Contractor shall provide and install a transient voltage surge suppressor between the AC power mains and all DMS equipment.

3.15.3 Anti-oxidation grease shall be used on all attachment points of the ground system where dissimilar metals intended for grounding and bonding come in contact with each other

3.16 Communications & Control.

3.16.1 NHDOT operators shall be able to monitor and remotely control the sign messages as if they were being controlled locally.

3.16.2 NHDOT operators shall be able to access a library of pre-programmed standard or customized messages and graphics. Text messages shall be easily created, labeled, stored, and programmed with Windows-based message sign software provided as part of this installation.

3.16.3 The management information base (MIBS) and an Interface Control Document provided in the Contractor's technical submittal specified in section 2.3.14 shall be used by the Department's Advanced Transportation Management System (ATMS) software integrator to integrate the new DMS into the NHDOT ATMS. Integrating the DMS into the NHDOT ATMS shall be the responsibility of the Contractor.

3.16.4 Communications on the Ethernet port shall be NTCIP-compatible using the NTCIP 2202 Internet transport profile, and the NTCIP 2104 Ethernet sub network profile. This shall permit the controller to be operated on any typical Ethernet network using the TCP/IP and UDP/IP protocols.

3.17 Spare Parts.

3.17.1 The Contractor shall provide the following spare parts when up to 4 DMS are installed:

(a) 3-each LED Modules

(b) 1-each spare controller

(c) 1-each spare handheld terminal unit

(d) 1-each of every other circuit board in the sign

(e) 1-each spare surge protector

3.17.2 If more than four (4) DMS are installed per this Contract, the Contractor shall supply another full set of spare parts as outlined in section 3.17.1 for the fifth sign installed, or for every two (2) additional signs installed thereafter.

Add to Method of Measurement (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

4.8 Post-mounted dynamic message signs will each be measured by the unit installed and integrated. Where more than one unit is specified in the contract, separate item numbers will appear for each unit.

4.8.1 Support posts and foundations will not be measured for payment but shall be subsidiary to the DMS item.

Add to Basis of Payment (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

5.7 The accepted quantity of DMS will be paid for at the contract lump sum price complete in place. Payment shall be full compensation for the preparation and submittal of the Technical Submittal, fabrication and installation of the DMS board and mounting system, mounting hardware, steel posts, foundation, controller, controller cabinet, spare parts, hand-held terminal, flexible conduit, grounding and bonding, connection to electrical and communication services, training, testing and providing as-built record documentation.

5.7.1 Partial payments for this item will be made approximately as follows:

(a) Up to 50 percent of the contract unit price will be paid after receipt and installation of all equipment

(b) Remaining 50 percent of the payment will be made after the completion of Acceptance Testing and receipt of the as-built GPS coordinates in accordance with 3.10

5.8 If more than one ground rod is required to achieve the required earth grounding resistance, all additional ground rod installation and ground wire connections will be subsidiary to the DMS.

5.9 Excavation and backfill for sign support foundations will be subsidiary.

5.10 All costs associated with 2.3 and device integration will be subsidiary.

5.11 ITS equipment cabinets shall be paid for under Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – ITS Cabinet Specification.

5.12 All conduit and pull boxes, except flexible liquid tight conduit, will be paid for under Section 614.

Pay Items and Units:

677.12__	Permanent Fixed Location Dynamic Message Sign (DMS)	Unit

April 13, 2017

SPECIAL PROVISION

SECTION 677 – INTELLIGENT TRANSPORTATION SYSTEMS (ITS) EQUIPMENT

ITS CABINET SPECIFICATION

This special provision provides for installation of ITS equipment cabinets, related network equipment, power supplies, power service, and all associated equipment necessary to provide a working ITS device site. All provisions of Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification, except as modified or changed below, shall apply.

Add to Description (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

1.4 ITS Cabinet Equipment and Communications. This work shall consist of furnishing, installing, wiring and testing, ITS Equipment Cabinets, Fiber Optic Patch Panels and Distribution Enclosures, Ethernet Switches and all ancillary equipment necessary to provide a complete working system as shown on the plans or as ordered.

1.5 ITS Equipment Power. This work shall consist of furnishing, installing, wiring, and testing Meter and Disconnect Pedestals, Uninterruptible Power Supplies (UPS), Service Wires and all ancillary equipment necessary to provide a complete power supply system as shown on the plans or as ordered.

Add to Materials (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

2.6 ITS Cabinets and Equipment.

2.6.1 Ground Mounted ITS Equipment Cabinet shall be 66"H x 24"W x 30"D. The cabinet shall have two locking doors located on opposite sides of the cabinet. All equipment housed in the cabinet shall be rack mountable.

2.6.2 The cabinet shall contain a full-height standard EIA 19-inch rack. The rack shall be secured within the cabinet by mounts at the top and bottom.

2.6.3 Concrete work pad for cabinets shall meet the requirements of Section 608 for Concrete Sidewalks.

2.6.4 Granular material under concrete work pad shall meet requirements of Section 209.

2.6.5 The cabinet shall protect all equipment against sustained winds of 90 miles per hour (MPH), with 120 MPH wind gusts, blowing sand and dust, roadside pollutants from vehicle exhausts, blowing rain and snow, and heavy ice accumulations.

2.6.6 The cabinet shall be weatherproof with the top of the enclosure crowned or slanted to prevent standing water. The field cabinet shall also provide protection against vandalism and theft of equipment. Each cabinet door shall be supplied and installed with Corbin 1548-1 locks for access by #2 keys.

2.6.7 The cabinet and doors shall be constructed from sheet aluminum, which has a minimum thickness of 0.125 inches. All welds shall be neatly formatted and free of cracks, blowholes and other irregularities.

2.6.8 The cabinet shall be supplied with a captive door restraint bar. The bar shall allow the door to be kept open at a minimum of two different angles, with one at 90° and the other in the fully open position. The door restraint bar shall be supplied and installed such that the door is held in place during a 40 MPH wind without the restraint bar being bent. The door restraint bar shall be provided to prevent door movement when open in windy conditions.

2.6.9 Door hinges shall be continuous and bolted to the cabinet and door utilizing steel carriage bolts and nylock nuts. The hinges shall be made of a minimum 0.083-inch thick aluminum and shall have a minimum 0.250-inch diameter stainless steel hinge pin. The hinge pin shall be capped at the top and bottom by a weld to prevent removal.

2.6.10 The top and bottom of the latching pushrods shall contain nylon rollers to promote secure door closure.

2.6.11 The door handle shall be stainless steel. The latching handle shall have provisions for padlocking in the closed position.

2.6.12 The cabinet shall contain a power panel, sized for the required current and the required number of circuit breakers. The panel shall also contain a single phase filtering surge protector, designed for use within traffic equipment cabinets, to absorb power line noise and switching transients. The cabinet shall also be supplied with electrical neutral and ground terminal busses.

2.6.13 A generator anchoring system provided at each cabinet shall consist of a ½-inch x 13 tpi galvanized wrought eyebolt with a thread length of 1 5/8 inches. Epoxy compound for anchoring the eyebolt to the ITS cabinet foundation shall be a product as included on the Department's Qualified Products List (QPL).

2.6.14 Generator transfer switch shall be an external manual 30-amp, 125-volt switch with a confirmation pilot light.

2.6.15 The cabinet shall be equipped with a slide out metal drawer mounted below the bottom shelf. It shall be constructed and installed such that it is capable of holding a 15-pound notebook computer.

2.6.16 The current rating of all duplex outlets shall be 15 amperes.

2.6.17 Thermostats for controlling electric cooling fans shall have the capability of being field adjusted from 50°F to 120°F.

2.6.18 The cabinet shall be supplied with a 120 VAC, 200 watt radiant heater. The radiant heater shall be a self-contained device designed to provide heat for an outdoor metal enclosure. The heater shall have an on/off switch, along with an adjustable thermostat with a minimum turn on range of 10°F to 60°F.

2.6.19 The air filters shall have an average rated efficiency of 30% and an arrestance of 90% when tested in accordance with ASHRAE 52.1-1992 Test Standard. The filter shall be listed and rated Class 2 by the Underwriters Laboratories. Filters shall have a metal structure; paper or paper-based filters shall be prohibited.

2.6.20 All intake and exhaust vents shall meet NEMA 3R requirements with and without powering the air venting arrangements.

2.7 Pole Mounted ITS Equipment Cabinet shall meet all requirements of the ground mounted ITS equipment cabinet, except as indicated below.

2.7.1 The pole mounted ITS equipment cabinet shall be 46"H x 24"W x 20"D. The cabinet shall have two locking doors.

2.8 ITS Cables.

2.8.1 All equipment shall be supplied with the Manufacturer's recommended cables.

2.8.2 All Ethernet cable shall be weatherproof Category 6.

2.8.2.1 Ethernet cable not installed within a cabinet, conduit, or other enclosed space shall be UV protected and weatherproof.

2.8.2.2 All free-hanging Ethernet cable shall be plenum type.

2.8.2.3 When required for rodent control or underground burial, Ethernet cable shall be armored, ruggedized, and/or gel filled.

2.9 Rack Mounted Fiber Optic Distribution Enclosure.

2.9.1 The Rack Mounted Fiber Optic Distribution Enclosure shall be a stand-alone unit manufactured for mounting in EIA 19-inch racks.

2.9.2 The Rack Mounted Fiber Optic Distribution Enclosure shall include and be capable of accommodating a minimum of 96 SC type connector sleeves, or as shown in the Plans, whichever is greater.

2.9.3 The Rack Mounted Fiber Optic Distribution Enclosure shall include and be capable of terminating up to 36 connectorized pigtails.

2.9.4 The Rack Mounted Fiber Optic Distribution Enclosure shall incorporate a hinged access door.

2.9.5 The Rack Mounted Fiber Optic Distribution Enclosure shall include a number of splice trays capable of holding a total minimum of 36 splices or as shown in the plans. Splice trays shall meet the following requirements:

2.9.5.1 Each splice tray shall be capable of holding 12 splices.

2.9.5.2 Each splice tray shall incorporate a system to retain and provide strain relief to the fiber optic buffer tubes and connector pigtails.

2.9.5.3 Each splice tray shall incorporate grooves where the fiber optic splices can be held in place.

2.9.5.4 Each splice tray shall incorporate a clear snap-on lid.

2.9.6 The Rack Mounted Fiber Optic Distribution Enclosure shall include a restraining system to hold the splice trays securely in place.

2.9.7 The Rack Mounted Fiber Optic Distribution Enclosure shall incorporate cable guides that maintain fiber strands and fiber buffer tubes bending radius greater than the minimum allowed by the fiber optic cable manufacturer.

2.9.8 The Rack Mounted Fiber Optic Distribution Enclosure shall include connectorized pigtails to connect the fiber optic cable to the Rack Mounted Fiber Optic Distribution Enclosure front panel. The connectorized pigtails shall meet the following requirements:

2.9.8.1 All fiber optic connectors shall be SC type with a physical contact 2.5 mm ceramic ferrule.

2.9.8.2 The connector mean insertion loss shall be 0.3 dB and maximum 0.5 dB.

2.9.8.3 The connector mean return loss shall be less than -59 dB and maximum of -55 dB.

2.9.8.4 All SC connectors shall have a durability rate of less than 0.2 dB change over 500 rematings.

2.9.8.5 Connectors shall meet ANSI/TIA EIA-604-3A requirements.

2.9.8.6 The fiber optic strand of the connectorized pigtail shall have matching optical properties as the fiber optic strand used on the fiber optic cable.

2.9.9 The Rack Mounted Fiber Optic Distribution Enclosure shall incorporate a restraining mechanism to hold the fiber optic cable central member and outside jacket.

2.10 Fiber Optic Patch Panel.

2.10.1 The Fiber Optic Patch Panel shall be supplied with the number of positions indicated in the Contract Documents.

2.10.2 The Fiber Optic Patch Panel shall meet all of the requirements of the Rack Mounted Fiber Optic Distribution Enclosure, except as follows:

2.10.2.1 The Fiber Optic Patch Panel shall be a stand-alone unit manufactured for use in outdoor field cabinets and mounted in EIA 19 inch racks, wall mounted, or shelf mounted, as required by the application.

2.10.2.2 The Fiber Optic Patch Panel shall be one rack unit in height for the 12-position and a maximum of two rack units in height for the 24-position.

2.10.2.3 The 12-Position Fiber Optic Patch Panel shall include and be capable of accommodating a minimum of 12 SC type connector sleeves. The 24-Position Fiber Optic Patch Panel shall include and be capable of accommodating a minimum of 24 SC type connector sleeves.

2.10.2.4 The Fiber Optic Patch Panel shall incorporate a hinged access door.

2.10.2.5 The 12-Position Fiber Optic Patch Panel shall include a splice tray capable of holding 12 splices. The 24-Position Fiber Optic Patch Panel shall include two splice trays, each capable of holding 12 splices.

2.10.2.6 The 12-Position Fiber Optic Patch Panel shall include 12 connectorized pigtails, and the 24-Position Fiber Optic Patch Panel shall include 24 connectorized pigtails.

2.11 Ethernet Switch may be 100 Mbps or 1 Gbps containing Ethernet ports of the quantity indicated in the Contract Documents, and shall meet the following requirements:

2.11.1 Ethernet Switch shall be a self-contained unit capable of 24-hour per day unattended operation, manufactured by Cisco, RuggedCom, Etherwan, or approved equal. Ethernet Switch shall be of rugged design and suitable for reliable operation. Ethernet Switch shall be configured for minimum maintenance and need for adjustment after initial setup.

2.11.2 Ethernet Switch shall allow for remote configuration and status using web based tools via the most current version of Internet Explorer.

2.11.3 Ethernet Switch shall allow for remote configuration and status using Command Line Interface (CLI) via a local console (RS-232).

2.11.4 Ethernet Switch shall support remote configuration and status over Ethernet using SSH port 22.

2.11.5 Ethernet Switch shall support HTTPS (hypertext transfer protocol secure) using port 443.

2.11.6 Ethernet Switch shall include LED indicators for each Ethernet port to provide port status. Indicators shall be for:

(a) Power

(b) Collisions (1 LED for 10Mb, or 100Mb)

(c) LK (steady on when twisted pair link is operational)

(d) RX (Activity, flashing when port is receiving data)

2.11.7 Ethernet Switch shall enforce partitioning enforced after 32 consecutive collisions.

2.11.8 Ethernet Switch shall enforce partitioning enforced after 32 consecutive collisions.

2.11.9 Ethernet Switch shall auto-reconnect after one packet of error free transmission.

2.11.10 Ethernet Switch shall be a managed Ethernet layer 2 device.

2.11.11 Ethernet Switch shall have a switching method of store and forward.

2.11.12 Ethernet Switch shall support the following protocols:

(a) RTP/I

(b) TCP/IP

(c) DNS

(d) DHCP

2.11.13 Ethernet Switch shall support the following network management protocols and be interoperable and compatible with the proposed communication system:

(a) SNMP V2c

(b) RMON for Ethernet agent

(c) Telnet/TFTP

(d) ICMP

2.11.14 Ethernet Switch interface shall include a Port Note Description field to identify connected devices.

2.11.15 Ethernet Switch shall be rack and shelf mountable.

2.11.16 Ethernet Switch shall be UL listed.

2.11.17 Ethernet Switch shall be field hardened and rated by its manufacturer in accordance with the operating temperature, storage temperature, and relative humidity requirements of the NEMA TS2 Standard. The design shall be inherently temperature compensated to prevent

abnormal operation. The circuit design shall include such compensation as is necessary to overcome effects due to temperature in the specified environmental range.

2.11.18 100 Mbps Ethernet Switch shall have dual speed 10/100 Mbps Ethernet ports with RJ45 connectors. The Contractor shall determine the number of ports required for the specific project installation and provide a switch with the required number of ports, plus a minimum of 4 spare Ethernet ports with RJ45 connectors, or a minimum of 12 total dual speed 10/100 Mbps Ethernet ports, whichever is greater.

2.11.19 The 10/100 Mbps Ethernet ports shall support the following network:

(a) IEEE.802.3 10 Base-T

(b) IEEE.802.3u 100 Base-T

(c) IEEE.802.1d Spanning Tree

(d) IEEE.802.1w Rapid Spanning Tree

(e) IEEE.802.1q VLAN

(f) IEEE.802.1p Class of service (CoS)

(g) Support for IGMP Multicast

2.11.20 In addition to the requirements described above, 1 Gbps Ethernet Switches shall also meet the following requirements:

2.11.20.1 1 Gbps Ethernet Switch shall have multi-speed 10/100/1000 Mbps Ethernet ports with RJ45 connectors. The Contractor shall determine the number of ports required for the specific project installation and provide a switch with the required number of ports, plus a minimum of 2 spare Ethernet ports with RJ45 connectors, and 2 spare Small Form Factor Pluggable (SFP) ports.

2.11.20.2 The 10/100/1000 Mbps Ethernet ports shall support the following network standards:

(a) IEEE.802.3 10 Base-T

(b) IEEE.802.3u 100 Base-T

(c) IEEE.802.3ab 1000 Base-T

(d) IEEE.802.1d Spanning Tree

(e) IEEE.802.1w Rapid Spanning Tree

(f) IEEE.802.1q VLAN

(g) IEEE.802.1p Class of service (CoS)

(h) Support for IGMP Multicast

2.12 Fiber Ethernet Switch. Fiber Ethernet switches may be either 100 Mbps or 1 Gbps as indicated in the contract documents. 100 Mbps Fiber Ethernet Switch shall meet all of the requirements of the 100 Mbps Ethernet switch described above, and shall also meet the following requirements:

2.12.1 Fiber Ethernet Switch shall be a self-contained unit capable of 24-hour per day unattended operation, manufactured by Cisco, RuggedCom, Etherwan, or approved equal. Fiber Ethernet Switch shall be of rugged design and suitable for reliable operation. Fiber Ethernet Switch shall be configured for minimum maintenance and need for adjustment after initial setup.

2.12.2 The 100 Mbps Fiber Ethernet Switch shall include a minimum of four spare single mode fiber optic patch cords. All spare patch cords shall be the length required to establish fiber connections to any device placed in the cabinet, or minimally three feet long, whichever is greater. The fiber patch cords shall be terminated on both ends with one type SC and one type LC single mode connector.

2.12.3 The 100 Mbps Fiber Ethernet Switch shall have two (2) or more single mode fiber optic ports. Each port shall have two (2) type SC connectors.

2.12.4 Single mode fiber optic ports shall meet the following requirements:

(a) Optical emitters shall be laser diode type

(b) Fiber optic ports shall have an operating wavelength of 1310 nm, single mode, and/or 1550 nm, single mode

(c) Fiber optic ports shall each have an optical power budget of 13dB, minimum

(d) Optical emitters shall have a transmit power of -15dBm, minimum

(e) Optical detectors shall have received sensitivity of -28dBm, worst case

(f) Fiber optic ports may be integrated into the fiber Ethernet switch, or may be of the SFP type

2.12.5 All single mode fiber optic ports of Ethernet switches supplied on the project shall be fully compatible with each other, as well as with existing Ethernet switches on adjacent projects with which they must connect and interoperate. This compatibility shall include, but not be limited to, such characteristics as optical operating wavelengths, transmit power, receive sensitivity, and operating protocols.

2.12.6 Fiber optic ports shall support the following network standards:

(a) IEEE.802.3u 100 Base-FX

(b) IEEE.802.1d Spanning Tree

(c) IEEE.802.1w Rapid Spanning Tree

(d) IEEE.802.1q VLAN

(e) IEEE.802.1p Class of service (CoS)

(f) Support for IGMP Multicast

2.12.7 The 1 Gbps Fiber Ethernet Switches shall meet all of the requirements of the 1 Gbps Ethernet switch described above, and shall also meet the following:

2.12.7.1 The 1 Gbps Fiber Ethernet Switches shall include at a minimum the following troubleshooting and management support methods:

(a) ICMP from device

(b) Viewing and clearing the ARP cache

(c) Viewing and clearing the SAT table

(d) Spanning tree monitoring and troubleshooting

2.12.7.2 The two single mode fiber optic ports shall meet the following requirements:

(a) Optical emitters shall be laser diode type

(b) Fiber optic ports shall have an operating wavelength of 1310 nm, single mode, and/or 1550 nm, single mode

(c) Fiber optic ports shall each have an optical power budget of 16dB, minimum

(d) Optical emitters shall have a transmit power of -12dBm, minimum

(e) Optical detectors shall have received sensitivity of -28dBm, worst case

(f) Fiber optic ports may be integrated into the fiber Ethernet switch, or may be of the SFP type

2.12.7.3 All single mode fiber optic ports of Ethernet switches supplied on the project shall be fully compatible with each other, as well as with existing Ethernet switches on adjacent projects with which they must connect and interoperate. This compatibility shall include, but not be limited to, such characteristics as optical operating wavelengths, transmit power, receive sensitivity, and operating protocols.

2.12.7.4 Fiber optic ports shall support the following network standards:

(a) IEEE.802.3u 100 Base-FX

(b) IEEE.802.3z 1000 Base-FX

(c) IEEE.802.1d Spanning Tree

(d) IEEE.802.1w Rapid Spanning Tree

(e) IEEE.802.1q VLAN

(f) IEEE.802.1p Class of service (CoS)

(g) Support for IGMP Multicast

2.13 Meter and Disconnect Pedestal

2.13.1 Meter and Disconnect Pedestals, also known as metered service pedestals, shall be UL listed "Suitable for Service Equipment" and shall be acceptable to the local utility companies for use as a service connection.

2.13.2 Meter Pedestals shall consist of a galvanized steel post containing a main circuit breaker for service disconnect, branch circuit breakers, and an integral meter socket.

2.13.3 Meter Pedestals shall contain a 100 amp main circuit breaker and two 50 amp branch circuit breakers, or as otherwise shown on the Plans.

2.13.4 Disconnect Pedestals shall consist of a galvanized steel post containing a single branch circuit breaker.

2.13.5 Disconnect Pedestals shall not be metered. If a meter socket is provided, the Disconnect Pedestal shall contain a meter bypass.

2.13.6 Disconnect Pedestals shall contain a single 40 amp circuit breaker, or as otherwise shown on the Plans.

2.13.7 The metered service installed shall provide power with a reserve capacity of 50 percent over the requirements of the connected ITS equipment cabinet(s) and all installed equipment, including the connected ITS loads.

2.13.8 The Contractor shall adhere to all applicable NEC, IEEE 1100-1992, UL 1459, and UL 1950 standards and practices.

2.14 Transformers. Transformers shall be 5.0 KVA Step-Up or Step-Down, and shall meet the following requirements:

2.14.1 Incoming Power.

2.14.1.1 The Step-Up Transformer shall receive incoming power at 120/240 Volts AC, single phase. The primary (input) side of the Step-Up Transformer shall be capable of accepting 120 Volts AC single phase power (two wire), 240 Volts AC single phase power (two wire), and 120/240 Volts AC single phase power (three wire).

2.14.1.2 The Step-Down Transformer shall receive incoming power at 240/480 Volts AC, single phase. The primary (input) side of the Step-Down Transformer shall be capable of accepting 240 Volts AC single phase power (two wire), 480 Volts AC single phase power (two wire), and 240/480 Volts AC single phase power (three wire).

2.14.2 Output Power

2.14.2.1 The Step-Up Transformer shall provide output power at 480 Volts AC, single phase. The secondary (output) side of the Step-Up Transformer shall be capable of providing 480

Volts AC single phase power (two wire), 240/480 Volts AC single phase power (three wire), and 240 Volts AC single phase power (two wire).

2.14.2.2 The Step-Down Transformer shall provide output power at 120/240 Volts AC, single phase. The secondary (output) side of the Step-Down Transformer shall be capable of providing 120 Volts AC single phase power (two wire), 120/240 Volts AC single phase power (three wire), and 240 Volts AC single phase power (two wire).

2.14.3 Unless specifically allowed by the transformer manufacturer, a step-up transformer shall not be a step-down transformer wired in reverse. Likewise, a step-down transformer shall not be a step-up transformer wired in reverse.

2.14.4 The Step-Up and Step-Down Transformers shall be rated by the manufacturer for supplying loads of 5.0 KVA, 60 Hz AC, when installed in an unprotected outdoor environment.

2.14.5 All equipment used on Step-Up and Step-Down Transformers shall be individually UL listed, CSA certified and suitable for outdoor use.

2.14.6 Step-Up and Step-Down Transformers shall be an enclosed dry type unit.

2.14.7 Step-Up and Step-Down Transformers shall include a means to disconnect the primary feed of the transformer from the utility power source.

2.14.8 Step-Up and Step-Down Transformers shall include a NEMA 3R enclosure sufficiently large enough to contain the transformer and disconnect means. The enclosure shall have the facilities for padlocking, and a padlock with two sets of keys shall be provided by the Contractor. The enclosure shall meet all requirements specified by the transformer manufacturer including, but not limited to, size and ventilation requirements.

2.15 Uninterruptible Power Supply (UPS) with Remote Power Manager.

2.15.1 The UPS shall include a remote power manager (RPM) unit that includes a minimum of eight 120 VAC outlets. Each of the 120 VAC outlets shall be individually controllable from the Transportation Management Center (TMC) via TCP/IP. In addition, the RPM shall include the ability to program time-of-day/day-of-week schedules whereby each of the 120 VAC outlets can be individually controlled by these schedules. The RPM shall include an RJ45 Ethernet port.

2.15.2 The UPS shall be sized to provide power to all 120 VAC loads described herein, plus 50% spare power capacity. The Contractor shall supply load calculations to the Engineer for approval prior to installation of the UPS.

2.15.3 The UPS batteries shall be sized to provide a hold-up time to all connected loads, plus the required spare capacity, of 15 minutes minimum, or as indicated in the Contract Documents, whichever is greater.

2.15.3.1 If the UPS provides power to a variable speed limit sign, either directly through the ITS equipment cabinet or indirectly through a downstream cabinet, the UPS shall provide a hold-up time of 4 hours minimum, or as indicated in the Contract Documents, whichever is greater.

2.15.4 The UPS batteries shall be of the sealed, maintenance free type.

2.15.5 During the transfer from utility power to UPS power, there shall be no transfer or switchover time, i.e., the maximum transfer or switchover time shall be zero seconds.

2.15.6 The UPS shall provide true sine wave power to all connected loads. The UPS output total harmonic distortion shall not exceed 2 percent.

2.15.7 Each cabinet-mounted UPS unit shall be SNMP compatible to allow being configured and integrated for remote monitoring via TCP/IP from the TMC. Any software required to monitor all UPSs shall be furnished, configured and integrated into the TMC monitoring system. The UPS monitoring software shall provide the following capabilities, as a minimum:

(a) Data logging

(b) Event logging

(c) Fault notification

(d) Unattended system shutdown

(e) Hibernation

(f) Manage all network UPS units

(g) Operating system shutdown

(h) Power event summary

(i) Run command file

2.15.8 The UPS shall have at least one RJ45 Ethernet connector and at least one EIA 232 connector for remote monitoring, as well as local connection to a laptop computer for configuration.

2.15.9 The UPS shall have status indicators that display, as a minimum:

(a) Power

(b) Remaining battery capacity, as a ratio of total battery capacity

(c) Load level, as a ratio of maximum UPS capacity

(d) Overload

(e) Battery failure

2.15.10 The UPS shall be field hardened and rated by its manufacturer in accordance with the operating temperature, storage temperature, and relative humidity requirements of the NEMA TS2 Standard. The design shall be inherently temperature compensated to prevent abnormal operation. The circuit design shall include such compensation as is necessary to overcome effects due to temperature in the specified environmental range.

2.15.11 The UPS shall have a manual power on/off switch.

2.15.12 The UPS shall have transient voltage surge protection that protects itself as well as connected loads against normal mode and common mode power line transients and surges. The UPS shall be capable of providing surge protection of 800 joules, minimum, and 6500 amperes, maximum. The UPS response time to transients and surges shall be no more than 5 nanoseconds.

2.15.13 The UPS shall provide output voltage regulation. The output voltage variation shall not exceed 5 percent.

2.15.14 The UPS shall include one Category 6 Ethernet patch cord, a minimum of three feet in length, and terminated on both ends with Type RJ45 connectors.

2.16 Transient Voltage Surge Suppression.

2.16.1 All ITS cabinets shall have a transient voltage surge suppressor (TVSS) sized for the incoming current and loads to be protected.

2.16.2 The TVSS shall be UL 1449 Compliant.

2.16.3 The TVSS shall be field hardened and rated by its manufacturer in accordance with the operating temperature, storage temperature, and relative humidity requirements of the NEMA TS2 Standard. The design shall be inherently temperature compensated to prevent abnormal operation. The circuit design shall include such compensation as is necessary to overcome effects due to temperature in the specified environmental range.

2.16.4 The TVSS shall have protected lines L, N, and G.

2.16.5 The TVSS shall operate with a maximum leakage current of less than 0.3 mA.

2.16.6 The TVSS shall satisfy a maximum attenuation of -55 dB@ 100 MHz, typical.

2.16.7 The TVSS shall satisfy a maximum surge current of 18 kAmp per mode, 8/20 impulse.

2.16.8 The TVSS shall provide lightning induced voltage surge protection.

2.16.9 The TVSS shall filter and absorb power line noise and switching transients.

2.16.10 The TVSS shall utilize three stages for power line voltage spike and Radio Frequency Interference (RFI) suppression.

2.17 Service Wires for Power.

2.17.1 Single conductor cable shall be copper, Type THWN as designated by the Underwriter's Laboratory (UL) Specifications. The single conductor cable shall have heat and moisture resistant insulation for a maximum operating temperature of 75 degrees C, in wet and dry conditions.

2.17.2 Bare stranded copper ground wire shall consist of 7 copper strands of soft-drawn bare copper wire, size #4 AWG or larger if required by the NEC, complying with ASTM B-3 and ASTM B-8. The ground wire shall be UL approved.

Add to Construction Requirements (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

3.12 ITS Cabinets and Equipment.

3.12.1 All equipment housed in the cabinet shall be rack mounted, unless otherwise noted.

3.12.2 Ground mounted cabinets shall be mounted and secured on concrete foundations as shown on the control cabinet details.

3.12.3 A 3'0" x 2'6" x 4" concrete work pad shall be installed in front of each cabinet door. The pad shall be placed on a minimum of 4-inches of compacted granular material, and the pad shall be set with at least 1 percent grade sloping away from the cabinet. Where the work pad is installed on a slope, the depth of the pad shall be increased such that there is at least two inches of the concrete pad below grade.

3.12.4 All conduits terminating in the cabinet shall be sealed with duct sealant. Use of tape to permanently seal conduits shall be prohibited.

3.12.4.1 Conduits less than 1 in. diameter shall be sealed with a silicone sealant

3.12.4.2 Conduits greater than 1 in. diameter shall be filled with steel wool in addition to being sealed with duct sealant.

3.12.5 Prior to placing the ITS cabinet on the concrete foundation, silicone sealant shall be applied to the area of contact. A two-inch gap shall be left without sealant on the front side of the cabinet.

3.12.6 Where indicated, spare sweeps shall be provided in the cabinet foundations for future use. If no spare sweeps are identified in the plans, the Contractor shall supply one 3-inch PVC conduit sweep as a spare.

3.12.7 All ground-mounted cabinets shall include grounding at described in section 3.20.

3.12.8 Ground mounted cabinets shall be installed with doors opening parallel to adjacent traffic.

3.12.9 All cabinet electrical wiring and communication cables shall be of diameters and colors as required by the device manufacturers.

3.12.9.1 Wire connections shall be made without excessively long exposed conductors, or unraveled strands extending beyond connections, to prevent shock hazards.

3.12.10 Each cabinet shall contain a power panel containing a primary circuit breaker, which will accept the incoming 120 VAC, single-phase power. This primary circuit breaker shall serve as the electrical disconnect for the cabinet and shall shut off all cabinet power when in the "off" position.

3.12.11 The primary circuit breaker shall be a single pole, 30-amp breaker. Two additional single pole, 20 amp circuit breakers shall be supplied, installed and be fed from the primary circuit breaker.

3.12.11.1 One of the 20 amp circuit breakers shall feed the four 15 amp, electrical outlets to be installed in the cabinet. The other 20 amp circuit breaker shall feed a power distribution buss, providing hard wired electrical feed for the lamps, the cabinet heater, the electric fan, and all other integrated electrical equipment.

3.12.12 The power panel shall also contain a single phase filtering surge protector, as described in sections 2.6.12 and 3.20.3.

3.12.13 The cabinet shall contain all necessary AC power equipment required for connections to utility power and generator power. This shall include: disconnect switches, circuit breakers, surge suppressors, power distribution equipment and other equipment required to fully power the cabinet and its equipment.

3.12.14 The cabinet shall include power inputs for connections to external power sources, including both the local utility company AC lines service, and from an external generator.

3.12.14.1 The cabinet shall include an external generator plug and transfer switch, with which a generator can be connected to the cabinet without opening the cabinet doors. The transfer switch shall toggle the cabinet between AC line service and generator supplied power.

3.12.14.2 Access to the external manual transfer switch shall be protected by a keyed lock. The generator transfer switch access key shall be different from the cabinet's main door keys.

3.12.15 The field cabinet shall be provided with a minimum of 4 utility duplex electric power outlets to support electrical equipment. The power outlets shall be installed with minimum 2 inch spacing between each other. The utility power outlets shall be installed within the field cabinet and not on the cabinet door.

3.12.16 The field cabinet shall contain a power switch mounted within the cabinet to control power to all duplex outlets.

3.12.17 The field cabinet shall include a thermostatically controlled electric cooling fan, capable of maintaining temperatures inside the cabinet to that recommended by the equipment Manufacturers for outside installations, or as specified in these Special Provisions.

3.12.18 Cabinet heaters shall have a hardwired connection to the cabinet's electrical power distribution buss. The heater shall be installed in the lower portion of the cabinet, mounted such that it is not blocking or touching installed equipment. It shall not be installed directly under a shelf. There shall be sufficient space around the unit to facilitate proper airflow and prevent damage or overheating of other installed equipment. The control knob for the heater thermostat shall be located such that it can easily be read and adjusted by field personnel.

3.12.19 All exposed, high voltage electrical terminals shall be insulated with non-conducting material such as rubber boots or silicon/rubber caulking.

3.12.20 The cabinet shall be electrically bonded to all of its associated metallic ITS Device support structure grounding systems, as described in section 3.20 or shown on the plans or directed by the Engineer.

3.12.21 All air venting arrangements shall contain air filters. All fans shall be located above the air filters at the top of the cabinet. All exhaust vents shall be furnished with a screen to prevent insects from entering the field cabinet.

3.12.22 The cabinet shall be supplied and installed with 2 internal lights located in the top of the cabinet inside each door. This light shall automatically turn on when the cabinet door is open and shut off when the door is closed. The lights shall be hardwire-connected to the cabinet's electrical power distribution buss.

3.12.23 The cabinet shall include a generator anchoring system and pad integrated with the cabinet's foundation. The location of the anchoring system shall be on the same side as the cabinet's power supply. The anchoring eyebolt shall be installed in a 5/8-inch diameter hole drilled into the concrete foundation or pad such that the eyebolt does not interfere with the cabinet's anchor bolt system or the opening of the cabinet doors. The eyebolt shall be bonded into the concrete by a two-component epoxy compound (resin and hardener). The epoxy compound shall fill the drilled hole and cover the threads of the eyebolt.

3.12.24 A solid ¼" diameter weatherproof padlock approved by the Engineer shall be installed with each cabinet. All padlocks supplied as part of this Contract shall be keyed alike.

3.12.25 Two sets of keys shall be supplied for the generator transfer switch access. Four sets of keys shall be supplied for each of the two cabinet locks, and the padlock.

3.12.26 In addition to meeting ground mounted cabinet requirements, pole mounted ITS cabinets shall meet the following:

3.12.26.1 The pole mounted ITS equipment cabinet shall be strapped to the pole using stainless steel bands. The cabinet shall be mounted with banding at a minimum of two locations (i.e. top and bottom). Banding shall be installed in a way that prevents movement of the cabinet.

3.12.26.2 Incoming power feeds and communications feeds shall enter the pole mounted ITS cabinet through separate external conduit risers and shall not enter through the mounting pole.

3.12.26.3 The opening of the doors shall not be impeded by the mounting location of the cabinet on the support pole, nor shall the support pole's equipment or hand holes be impeded by the installed cabinet when the doors are closed.

3.12.27 The Contractor shall furnish, in a watertight container, a control cabinet-wiring diagram. Three sets of identical wiring diagrams shall be furnished for each cabinet.

3.12.28 If tracer wire equipment connection points are installed inside ITS equipment cabinets, the tracer wire shall enter the cabinet through a conduit or conduit riser specifically installed for that purpose.

3.13 ITS Cables.

3.13.1 All equipment shall be installed using the Manufacturer's recommended cables.

3.13.2 The Contractor shall furnish, install, connectorize, and test all Category 6 (Cat. 6) cables, of the types required for the application, at locations shown in the plans or as required to construct a complete, functional system.

3.13.3 The Cat. 6 cables shall not exceed 325 feet in length unless the Contractor is granted written permission from the Engineer.

3.13.4 All cables shall be installed in a continuous run. Splicing will not be allowed.

3.14 Fiber Optic Distribution Enclosures shall be rack mounted, as shown on the Plans or as directed by the Engineer, and shall be securely fastened in place as recommended by the manufacturer.

3.14.1 The Contractor shall provide factory assembled fiber optic pigtails. Modified fiber optic patch cords will not be accepted.

3.15 Fiber Optic Patch Panels shall be rack mounted in the ITS Cabinet as required by the specific location. The patch panel shall be securely fastened in place as recommended by the manufacturer.

3.15.1 Connectorized fiber optic pigtails shall connect the fiber optic cable to the front panel of the Fiber Optic Patch Panel.

3.16 Ethernet and Fiber Ethernet Switches shall be installed by the Contractor in the ITS cabinets as shown on the Plans or as directed by the Engineer.

3.16.1 Ethernet and Fiber Ethernet Switches shall include all accessories required for a full and complete installation, including but not limited to connecting cables, power supplies, and mounting hardware.

3.16.2 Ethernet and Fiber Ethernet Switches shall be shelf mounted or rack mounted, as shown on the Plans or as directed by the Engineer.

3.16.3 The Contractor shall configure all ports as required with IP addresses provided by the Department. The Contractor shall label all ports in the switch management software.

3.16.4 Fiber optic ports shall remain covered at all times, unless connected to fiber optic cable.

3.16.5 Switches shall be provided with a minimum of twelve (12) Category 6 Ethernet patch cords, each a minimum of three feet in length and terminated on both ends with Type RJ45 connectors.

3.17 Meter and Disconnect Pedestal.

3.17.1 Where multiple electrical services are to be connected near the same location, separate meter pedestals for each service shall be furnished and installed unless otherwise directed by the Contract Documents or by the Engineer.

3.17.2 The Contractor shall arrange a meeting with the Engineer and the local utility company representatives to establish a schedule for utility connections before any control equipment or material is ordered.

3.17.3 The Contractor shall make the necessary arrangements with the utility companies to ensure utility service is available and connected at the time of equipment testing and power-up. Any utility energization, connection, or disconnection delays will not be a valid reason for a time extension. Difficulties in securing utility company services are to be reported to the Engineer at the earliest possible time.

3.18 Transformers.

3.18.1 The Step-Up and Step-Down transformer primary and secondary wiring shall be connected in strict accordance with the manufacturer's recommendations, depending on the mode of operation.

3.18.2 The Step-Up transformer shall not be a Step-Down transformer wired in reverse. Likewise, a Step-Down transformer shall not be a Step-Up transformer wired in reverse. If such operation is allowed by the transformer manufacturer, then the Contractor shall present a letter from the Manufacturer to the Engineer stating such, and also stating that the Manufacturer's warranty shall not be adversely affected by using this transformer in the reverse wiring configuration.

3.18.3 The Step-Up and Step-Down transformers shall be installed in accordance with the manufacturer's recommendations and consistent with the local utility company requirements. In the event the manufacturer's recommended mounting requirements exceed the mounting layouts described below, the Contractor shall install the transformers in accordance with the manufacturer's recommendations.

3.18.4 Ground mounted transformers shall be mounted to a 6-inch thick concrete pad meeting Section 608 for concrete sidewalks. Width and length of the pad shall be at least 3 inches greater than the transformer's dimensions. The concrete pad shall be installed on 6 inches of crushed gravel conforming to item 304.4.

3.18.5 Pole mounted transformers shall be mounted to metal struts (galvanized or stainless steel) spanning between two 6-inch x 6-inch wood posts embedded in the ground a minimum of four feet, or aluminum struts spanning between two 4-inch round aluminum poles on concrete foundations in accordance with NHDOT Standards PS-4 and PS-9.

3.19 Uninterruptible Power Supply (UPS) unit shall be housed in each ITS equipment cabinet, and shall supply power to all ITS equipment cabinet devices, except as otherwise indicated. The UPS shall be connected to a 120 VAC, non-GFCI, line power outlet.

3.19.1 The UPS shall supply power to all ITS equipment cabinet devices, except as otherwise indicated.

3.19.1.1 In the event that environmental control equipment, such as heaters and/or air conditioners, or spare 120 VAC auxiliary convenience outlets are installed in the ITS equipment cabinet, they shall not be connected to UPS power.

3.19.2 All equipment connected to the UPS shall be properly connected and insulated to prevent shock hazard.

3.19.3 The UPS control software shall be configured to display the correct battery backup amp-hour ratings.

3.19.4 The UPS shall include a remote power manager (RPM) unit.

3.19.4.1 The RJ45 Ethernet port on the RPM shall be connected to an RJ45 Ethernet port on the Ethernet Switch. Any and all software needed at the TMC to control the RPM shall be supplied, installed, and configured by the Contractor. Additional power strips shall be supplied and installed as needed to facilitate plugging devices into the RPM.

3.19.4.2 The Contractor shall label all ports of the RPM in the RPM control software.

3.20 Grounding, Bonding and Surge Suppression

3.20.1 Provide grounding and Transient Voltage Surge Suppression (TVSS) at all ITS cabinets and all metallic ITS device structural supports. The Contractor shall provide grounding connection between each TVSS device and the main grounding terminus in the cabinet. Each TVSS device shall have a dedicated grounding connection, directly with the grounding terminus. Daisy-chaining of grounding connection is not permitted.

3.20.2 The Contractor shall furnish and install TVSS devices for all power and communications conductors leaving the ITS equipment cabinets, including but not limited to utility service, and power and communications for all ITS devices that are external to the cabinet.

3.20.3 The power panel of all ITS cabinets shall contain a single phase filtering surge protector, connected to the load side of the primary circuit breaker. The electrical neutral buss, the ground buss, the cabinet shell, and the ground rod shall all be wired in conformance to the applicable electrical codes.

3.20.4 All grounding shall meet the requirements of the installed equipment manufacturers. In the event that the manufacturers' requirements are more stringent than those of the national, state, and local codes, then the manufacturers' grounding requirements shall apply.

3.20.5 Each ITS cabinet and each metallic ITS device support structure, including but not limited to camera poles, detector sensor poles, and dynamic message sign structures, shall include at least one ¾-inch by 10-foot ground rod made of solid copper or copper-clad steel rod. A #4 AWG copper ground wire shall be connected to the ground lug on the cabinet or support structure, and exothermically welded to the ground rod. Additional ground rods shall be furnished and installed to provide required grounding.

3.20.5.1 For grounding connections internal to the cabinet or support structure, a conduit shall be installed through the foundation specifically to provide the means to connect the ground wire to the ground rods. Ground wires shall not be mounted externally to any structure, and shall not be installed in conduit with any other power or communication wiring.

3.20.6 All ITS cabinets shall be electrically bonded to their associated ITS device support structure ground system using #4 AWG copper wires. The #4 AWG copper wires shall be installed between the support structures and the cabinet providing a common ground system for each terminus.

3.21 Service Wires for Power. The Contractor shall furnish, install and test the Service Wires for Power for proper operation at locations shown in the plans. All materials including splice connectors shall conform to the latest version of the National Electric Code published at the time of installation.

3.21.1 The Contractor shall be responsible for coordinating and scheduling any utility inspections required for connecting to utility power service.

Add to Method of Measurement (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

4.8 Ground Mounted ITS Equipment Cabinets and Pole Mounted ITS Equipment Cabinets will be measured for payment as a unit. When more than one unit is specified in the contract, separate item numbers for the type of cabinet specified will appear for each separate unit.

4.9 Category 6 cables will not be measured but shall be subsidiary to other contract items.

4.10 Rack Mounted Fiber Optic Distribution Enclosure will be measured for payment as a unit. When more than one unit is specified in the contract, separate item numbers will appear for each unit.

4.11 Fiber Optic Patch Panels of the size specified will be measured by the number of patch panels, installed, connected, tested and accepted.

4.12 Ethernet Switches of the speed and type specified will be measured by the number of switches installed, connected, tested and accepted.

4.13 Meter and Disconnect Pedestal will be measured for payment as a unit. When more than one unit is specified in the contract, separate item numbers will appear for each unit.

4.13.1 Disconnect Pedestals will be measured for payment as a unit under the Meter and Disconnect Pedestal unit item. The Contract Documents shall indicate where a Meter and Disconnect Pedestal does not require a meter.

4.14 Transformers will not be measured but shall be subsidiary to other contract items.

4.15 Uninterruptible Power Supply (UPS) with Remote Power Manager will be measured by the number of UPS devices installed, connected, tested and accepted.

4.16 Grounding, bonding and Transient Voltage Surge Suppression will not be measured, but shall be considered subsidiary to each ITS cabinet, ITS device or ITS device support structure, unless otherwise noted.

4.17 Service Wires for power of the sizes and quantities specified will be measured by the linear foot of the specified wire actually installed, tested, and accepted.

Add to Basis of Payment (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

5.7 The accepted quantity of ITS Equipment Cabinets of the type and at the location specified will be paid for at the contract unit price complete in place. Payment shall be full compensation for the cabinet, foundation and work pads, mounting hardware, generator transfer switch, grounding, TVSS, thermostats, fans, heater, power panel, electrical service connection, grounding, bonding, locks, installation and testing.

5.7.1 If more than one ground rod is required to achieve the required earth grounding, all additional ground rod installations and ground wire connections will be subsidiary to the ITS Equipment Cabinet.

5.7.2 When separate bid items for equipment contained in the equipment cabinets are not included in the project, these items shall be subsidiary to the ITS Equipment Cabinet.

5.8 Category 6 Ethernet cables, patch cables, and pigtails will be subsidiary to the ITS devices or equipment installed.

5.9 The accepted quantity of Rack Mounted Fiber Optic Distribution Enclosures will be paid for at the contract unit price complete in place. Payment shall be full compensation for the Rack Mounted Fiber Optic Distribution Enclosure, installation and testing.

5.10 The accepted quantity of Fiber Optic Patch Panels will be paid for at the contract unit price per each of the size specified, complete in place. Payment shall be full compensation for the Patch Panel, installation and testing.

5.11 The accepted quantity of Ethernet Switches will be paid for at the contract unit price per each at the speed and of the type specified, complete in place. Payment shall be full compensation for the Ethernet Switch, Ethernet cables, installation, configuration, and testing.

5.12 The accepted quantity of Meter and Disconnect Pedestals will be paid for at the contract unit price complete in place. Payment shall be full compensation for the meter, disconnect switch, support pedestal, foundation (as required), wiring, and testing. The price shall also include all coordination with the local utility company, connection fees, inspections and service costs through the Final ITS System Acceptance by the Department.

5.12.1 When separate bid items for meter and disconnect pedestals are not included in the project, these items shall be subsidiary to the ITS Equipment Cabinet.

5.13 Transformers, mounting structures, struts, brackets, hardware, anchor bolts, concrete, crushed gravel, hardware, tools, wiring and ancillary items needed for a complete transformer installation shall be considered ancillary and subsidiary to the associated ITS cabinet, unless otherwise noted.

5.14 The accepted quantity of Uninterruptible Power Supply (UPS) with Remote Power Manager will be paid for at the contract unit price per each installed. Payment shall be full compensation for the UPS, RPM, additional power strips as needed, Ethernet cables, installation, configuration, and testing.

5.15 Ground wires will be subsidiary to the ITS device or equipment that is grounded.

5.16 The accepted quantity of Service Wires for Power of the type and at the locations specified will be paid for at the contract unit price per linear foot complete in place, including furnishing, installing, coordinating with the utility companies, inspecting, connecting and testing the service wires.

5.16.1 Furnishing and installing connectors and all other passive components shall be subsidiary.

5.16.2 When separate bid items for power service connections and service wires are not included in the contract, these items shall be subsidiary to the ITS equipment being connected with the power service.

Pay Items & Units (Special Provision to Section 677 - Intelligent Transportation Systems (ITS) Equipment – Base Specification):

677.541__	Ground Mounted ITS Equipment Cabinet	Unit
677.542__	Pole Mounted ITS Equipment Cabinet	Unit
677.55__	Rack Mounted Fiber Optic Distribution Enclosure	Unit
677.561	Fiber Optic Patch Panel (12-Position)	Each

677.562	Fiber Optic Patch Panel (24-Position)	Each
677.5811	100 Mbps Ethernet Switch	Each
677.5812	1 Gbps Ethernet Switch	Each
677.5821	100 Mbps Fiber Ethernet Switch	Each
677.5822	1 Gbps Fiber Ethernet Switch	Each
677.63__	Meter and Disconnect Pedestal	Unit
677.64	Uninterruptible Power Supply (UPS)	Each
677.9AB	Service Wires	Linear Foot

A	Number of conductors:
1-9	1 to 9 conductors
0	10 or more conductors
B	Wire/Cable size:
14	14 AWG
12	12 AWG
10	10 AWG
04	4 AWG
02	2 AWG
01	0 AWG
00	00 AWG
30	000 AWG
40	0000 AWG

Examples:

677.9100	1-Conductor #00 AWG wire	Linear Foot
677.9304	3-Conductor #4 AWG cable	Linear Foot
677.9714	7-Conductor #14 AWG cable	Linear Foot

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13953

March 17, 2017

SPECIAL PROVISION

SECTION 697 -- PROJECT MANAGEMENT PLANS

Item 697.11 - Invasive Species Control and Management Plan

This section is intended to provide and pay for certain Plans associated with project construction.

Description

1.1 This work shall consist of providing an Invasive Species Control and Management Plan, which includes detailing the specific method(s) of controlling the spread of the identified invasive species, and the continued monitoring and management of invasive plant species found on the site for the duration of the contract.

Construction Requirements

3.1 Develop an Invasive Species Control and Management Plan detailing specific measures to control identified invasive plant species within the project area.

3.1.1 The Invasive Species Control and Management Plan shall include updating, modifying, and revising the Plan as appropriate and/or as directed by the Contract Administrator; monitoring existing invasive plant species for the duration of the project; and taking measures to not encourage the establishment of invasive plant species within the project limits.

3.1.2 The Invasive Species Control Plan shall also consist of but not be limited to the following:

- List of plants that were identified within project limits as shown on the plans.
- Appropriate Best Management Practices that will be utilized to prevent the spread of these plants during construction.
- A proposed schedule that describes the sequence of BMPs relative to construction activities.
- If Type II plants are to be excavated, the extent of excavation needs to be noted.
- A preliminary plan showing approximate locations of any proposed disposal area within the project limits, including areas where plants will be buried or stockpiled.
- If invasive plant material or soil that contains invasive plant material will be transported, the method of transport needs to be described.

- If invasive species are to be transported off-site, when allowed, the method of transport needs to be described as well as the terminus of plant material.
- A general overview should be given of how invasive plants will be managed throughout construction, including but not limited to:
    - monitoring of newly established slopes;
    - proposed methods of eradication of any plants that appear in new areas as a result of construction activities and re-growth;
    - general BMPs such as cleaning of equipment, location of staging areas, and importation of weed-free materials, see Invasive Species Special Attention.

3.2 Invasive Species Control and Management Plan shall be submitted for approval through the Contract Administrator to the Bureau of Environment and be compliant with NHDOT's "Best Management Practices for Roadside Invasive Plants" Manual available on-line at www.nh.gov.dot/bureau/environment/documents.htm and include the continued management of invasive plants during the duration of the project.

3.3 The Contractor shall perform the work necessary to control, remove and dispose of the invasive plant species found on the site as directed and in accordance with Special Provision, Amendment to Section 201 – Clearing and Grubbing, Item 201.881 – Invasive Species Control Type I and/or Item 201.882 – Invasive Species Control Type II.

Method of Measurement

4.1 Invasive Species Control and Management Plan will be measured as a unit.

Basis of Payment

5.1 Invasive Species Control and Management Plan will be paid for at the Contract unit price.

5.1.1 No separate payment will be made for verifying the location of Invasive Species, which shall be considered subsidiary.

Pay item and unit:

697.11	Invasive Species Control and Management Plan	Unit

December 14, 2016

SPECIAL PROVISION

SECTION 697 -- PROJECT MANAGEMENT PLAN

Item 697.31 - Project Operations Plan

Description

1.1 This work shall consist of developing a site-specific Project Operations Plan (POP) and furnishing equipment and supplies needed to implement the plan if, contaminated soil and/or groundwater, or any other contaminants or materials that may pose a risk to human health, are expected to be encountered on a project.

Construction Requirements

3.1 General. The Contractor shall prepare and submit a proposed POP to the Bureau of Environment through the Engineer at least 15 business days prior to any excavation of soil. **No work shall be scheduled (or performed) in known contaminated areas until the Bureau of Environment's Environmental Coordinator has approved the POP**. The Contractor shall use a professional consulting firm or qualified in-house staff for preparation of the POP, which shall be stamped by a New Hampshire-licensed professional engineer (PE) or professional geologist (PG). The PE or PG shall prepare the proposed POP based on the information included in the *Soil and Groundwater Management Plan* (SGMP) and the Special Attention for *Supporting Information for Project Operations Plan (POP) Development*. (SA-POP). The proposed POP must reference applicable rules and regulations, and describe the means and methods for management of contaminated soil and groundwater. The means and methods described shall include, but are not limited to:

- Handling and management of contaminated and potentially-contaminated soils, including identifying staging areas for stockpiling contaminated soil, as needed; and
- Handling and management of contaminated and potentially-contaminated dewatering liquids, including, as appropriate, identifying staging areas for storage (e.g., fractionation [frac] tank).

The Department's Environmental Consultant will review the proposed POP for conformance with the SGMP and Project requirements, and provide comments to the Engineer. The comments on the proposed POP must be addressed by the Contractor in a revised POP in order to receive approval of the POP from the Department. **No excavation of contaminated soil or dewatering activities in contaminated areas may take place until the POP has been approved by the Department.**

3.2 Contaminated Soil and/or Groundwater. The Contractor shall refer to the SA-POP and the SGMP to develop the POP for this Project. The POP shall identify:

- Proposed means to segregate clean soils from contaminated soil encountered during excavation;
- Proposed means to reduce the waste stream for excess soils that can be reused on site;
- The proposed locations within the Project Area for stockpiling suspected contaminated soils;
- The means to line and cap stockpiles to prevent leachate generation, contaminated runoff, and windblown impacts from stockpiles of contaminated soils and waste materials;
- Proposed mean to reduce the volume of dewatering in areas of contaminated groundwater;
- The means to secure the stockpile area to limit public access; and
- Steps to inspect and maintain stockpiles until materials are characterized and properly disposed and/or reused.

3.2.1 Department's Environmental Consultant shall be on site at all times during contaminated soil and/or groundwater handling to observe Contractor's work procedures for compliance with applicable regulations and the approved POP.

3.2.2 The POP shall also identify the Contractor's approach to dewater, if groundwater is encountered, in areas of identified contamination. The POP shall identify the temporary storage location for water pumped during various phases of the work.

3.2.3 BLANK.

3.2.4 Excavation, handling, on-site transportation, and on-site stockpiling of excavated materials shall be performed in accordance with the submitted POP as directed.

3.3 Other types of Contaminants/Materials. If other types of known contaminants/ materials are identified in the Prosecution of Work, SA-POP, and/or the SGMP, the POP shall also identify the proposed means and methods to abate/segregate/contain the "material" per industry standards.

3.4 Health and safety precautions shall conform to industry standards, including, but not limited to, Department of Labor and OSHA rules and regulations.

3.5 The Contractor shall maintain all furnished equipment and supplies in good working condition and shall provide replacements due to breakdown, damage, usage, or theft within two (2) working days of notice.

3.6 Upon completion of project all equipment and supplies shall remain the property of the Contractor.

3.7 Personnel training shall be in accordance with 29 CFR 1926.65(e) for all personnel conducting, supervising, or managing field work. Cost for training shall be the responsibility of the Contractor.

3.8 The Contractor shall provide a list of the Contractor's key Project personnel and their cell phone numbers in the POP, as well as to the Engineer and Bureau of Environment. This list shall include the contacts provided in the SGMP also.

3.9 Should the project have more than one known type of contaminant/material, the Contractor shall identify all means and methods for segregation/containment/treatment/disposal, as necessary, for all contaminants/materials in one plan for review and approval.

Method of Measurement

4.1 The POP will be measured as unit. A unit shall include any equipment/supplies that are a requirement of the prepared POP, unless specifically stated under other items.

4.1.1 No separate measurement will be made for replacement equipment/supplies required under 3.5, unless specifically stated under other items.

4.1.2 No separate measurement will be made for multiple "contaminants/materials" plans.

Basis of Payment

5.1 The POP will be paid for at the Item Bid Price per unit.

5.1.1 No separate payment will be made replacement equipment/supplies required under 3.5 unless specifically stated under other items.

5.1.2 Excavation, handling, on-site transportation, and on-site stockpiling of excavated materials will be paid under Item 203.35 – Handling Excavated, Contaminated Soils (Department Disposal).

Pay item and unit:

697.31	Project Operations Plan	Unit

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March 17, 2017

SPECIAL PROVISION

SECTION 697 -- PROJECT MANAGEMENT PLANS

Item 697.41 – Critical Path Method (CPM) Electronic Schedule

Description

1.1 This work shall consist of producing a CPM schedule and updates meeting all the requirements of 108.03.A Progress Schedules with the exception of 108.03.A.1.5, which shall be deleted.

Method of Measurement

4.1 This item will be measured as a unit based on a submission schedule as described in 108.03.A.1.4, not exceed one (1) unit, unless authorized by the Engineer.

Basis of Payment

5.1 Partial payments for this item will be made approximately as follows:

(a) When the Initial CPM Schedule as described in 108.03.A.2.2 is submitted and accepted, the initial payment will be 50% of the amount bid.

(b) The balance will be paid as a monthly prorated sum based upon the specified Contract duration.

(c) Failure to submit and updated schedule per 108.03.A.1.4 shall result in the forfeiture of that month's prorated sum as described in (b).

Pay item and unit:

697.41	Critical Path Method (CPM) Electronic Schedule	Unit

April 10, 2017

SPECIAL PROVISION

AMENDMENT TO SECTION 698 – FIELD FACILITIES

This Special Provision provides for additional field office equipment as specified in 698.2.2.3.

Add to 2.2.3 The Contractor shall also provide the following equipment for use by the Engineer (indicated by the initials below):

☒ Desktop Computer

Quantity: __2_ _

Processor:	Intel Core i7, Quad Core 3.4 GHz or better
Operating System:	Microsoft Windows 10
Memory:	16 GB RAM Minimum
Hard Disk Drive:	1TB Minimum
CD-ROM:	DVD +/- RW
Monitor:	24 inches or larger 1920 x 1080 resolution or better
Video:	Internal web camera 512 MB Video memory or higher
Audio:	16 Bit Audio with Speaker and Microphone
Communication:	Wireless (802.11a/b/g/n compliant) 10/100/1000 Ethernet
Expansion Ports:	Four USB 2.0/3.0
Internet Access:	Unlimited, cable modem service. DSL only acceptable if cable unavailable.

Software:

- Microsoft Office 2010, or newer, Professional Version
- Bluebeam Revu (current version), or other approved software, that allows user to create, markup, and edit project documents; collaborate work processes with contracting parties; and offers full integration with Microsoft Office Antivirus software w/updated subscription maintained

Other Equipment:

- Keyboard
- Optical mouse, wireless or with connecting cable
- Surge Protector: 15 Amps, six outlets with circuit breaker control and spike protection
- Ten (10) rewriteable DVD-RW disks with protective covers
- Two (2) flash drives, 64 GB minimum each
- Computer workstation unit: Approximately 6 feet long with 5 pedestal chair and static guard mats.

☒ Laptop Computer

Quantity: _1____

Processor:	Intel Core i7, Quad Core 3.4 GHz or better
Operating System:	Microsoft Windows 10
Memory:	12 GB RAM Minimum
Hard Disk Drive:	500 GB Minimum
CD-ROM:	DVD-RW/CD-RW
Display:	15.4" or larger, Matte/Non-reflective Finish 1920 x 1080 resolution or better
Video:	Internal web camera 512 MB Video memory or higher
Audio:	16 Bit Audio with Speaker and Microphone
Communication:	Wireless (802.11a/b/g/n compliant adapter)
Expansion Ports:	Two USB 2.0/3.0
Internet Access:	Mobile Hotspot - Coverage shall be adequate for the area required and shall be 4G compatible. Unlimited data usage and at least 128 kbps upload and 384 kbps download bandwidth.

Software:

- Microsoft Office 2010, or newer, Professional Version
- Bluebeam Revu (current version), or other approved software, that allows user to create, markup, and edit project documents; collaborate work processes with contracting parties; and offers full integration with Microsoft Office.
- Antivirus software w/updated subscription maintained

Other Equipment:

- Power cord and charger for car and office
- Carrying case
- Optical mouse, wireless
- External USB 2.0 (or 3.0) hard drive for data backup
- Ten (10) rewriteable DVD-RW disks with protective covers
- Two (2) flash drives, 64 GB minimum each

☒ Tablet Computer

Quantity: ___1__

Microsoft Surface Pro 4

Processor:	Intel® Core i7
Operating System:	Windows 10 Pro (latest version)
Memory:	16 GB RAM minimum
Hard drive:	512 GB minimum
Wireless:	Wi-Fi 802.11ac/802.11 a/b/g/n
Internet Access:	Cellular 4G Data Service or Mobile Hotspot, unlimited usage
Communication Ports:	1 – USB
Screen size:	12.3" minimum
Data:	Unlimited Data Plan

Software Applications:

- Microsoft Office 365 (current version)
- Bluebeam Revu (current version), or other approved software, that allows user to create, markup, and edit project documents; collaborate work processes with contracting parties; and offers full integration with Microsoft Office.

- Antivirus software w/updated subscription maintained.

Other Equipment:
- Port car or equivalent DC adapter
- Carrying case
- Bluetooth Keyboard
- Screen Protectors (minimum: 10)

☒ Monitor

Quantity*: ___1__

24" Minimum Diagonal View Area

**Note: The Desktop Computer specification requires that a monitor be provided with the desktop when selected. This quantity <u>is in addition to</u> the desktop computer monitor quantity.*

- Color Flat Panel
- Minimum 16:9 aspect ratio with a 1920x1080 pixel resolution
- 3ms response time or better
- Adequate graphics card that supports the monitor's resolution; interfaces properly with the field computers and laptops; and provides high definition video display.
- Compatible connecting cable(s)

☐ Color Printer/Scanner/ Copier

- Laser Jet or Ink Jet
- Network Capable
- Wireless
- Microsoft Windows compatible
- Resolution: 1200 vertical x 1200 horizontal dpi, minimum
- Capable of scan/copy/print 8 ½ x 14 color originals
- Computer disks with software drivers and utilities
- Tray Capacity: 100 sheets, minimum
- Replacement Toner Cartridge(s) as required, with 1 spare on hand at all times
- Speed: 10 sheets per minute, minimum
- Laser Jet or Ink Jet
- Network Capable
- Paper with the following minimum specifications:
  - 8 ½" x 11" sheets – 3 reams to be maintained
  - 8 ½" x 14" cut sheets – 2 reams to be maintained

☒ High Capacity Color Copier/Scanner/Printer

- Laser Jet
- Network Capable
- Wireless
- Microsoft Windows compatible
- Resolution: 600dpi color, 1200dpw b&w, minimum
- Capable of scan/copy/print 11 x 17 color originals
- Two dedicated printing trays: (1) 8½ x 11 and (1) 11 x 17
- Tray Capacity: 250 sheets, minimum
- Speed: 30 sheets per minute, minimum
- Duplex printing capable
- Computer disks with software drivers and utilities

- Replacement Toner Cartridge(s) as required, with 1 spare on hand at all times
- Paper with the following minimum specifications:
  - 8 ½" x 11" sheets – 3 reams to be maintained
  - 8 ½" x 14" cut sheets – 2 reams to be maintained
  - 11" x 17" cut sheets – 1 ream to be maintained

☒ Smart Phone

Quantity: ___2__

Smart Phone with the following minimum specifications:

- Memory: min. 64 MB
- RAM/256 MB (Accessible: 172 MB)
- Resolution/Screen: min. 240x320 pixels, touch screen LCD, portrait & landscape display
- Software: Microsoft® Office Word Mobile, Excel® Mobile, and PowerPoint® Mobile Adobe® Reader® LE PDF viewer, Internet Explorer Mobile, Windows Media Player, Bluetooth profile (or equivalent) enabled
- EV-DO, 1X RTT capable
- Internal flash card: min. 8 GB
- Unlimited data service
- Minimum service area shall be Maine, New Hampshire, Vermont, and Massachusetts with a minimum 90% coverage area. The service plan shall have a New Hampshire calling number and a minimum service plan of 1,000 minutes per month.
- Accessories: Wall charger, car charger, screen protector protective case, belt attachment capability, hands-free adapter and owner's manual

☐ Cellular Phone

Quantity: _____

Cellular hand set shall have a 1/3-watt nominal power output, shall have a protective case and belt attachment capability, DC adapter (cigarette lighter operation), battery charger, hands-free adapter, and owner's manual. The minimum service area shall be Maine, New Hampshire, Vermont, and Massachusetts with a minimum 90% coverage area. The service plan shall have a New Hampshire calling number and a minimum service plan of 1,000 minutes per month.

☒ Digital Camera

Quantity: ___1__

Digital camera with the following minimum specifications:

- Min. 16.0 Mega Pixels resolution
- Picture file storage media, compatible for uploading picture data to the computer unit and printer (min. 8 GB)
- Supports jpeg file format
- HD Video capability
- USB interface and cable
- 12-volt DC adapter and AC adapter power supply cables
- Rechargeable with backup set of batteries and charger
- Owner's manual
- Carrying case

☒ Video Camera Quantity: __1__	Video Camera with the following minimum specifications: • New (or used with a recently performed service check verified by an invoice) • 30 GB internal hard drive • 34x optical zoom • Low light capability • Image stabilization • USB interface and cable • Extra battery with charger • Owner's manual • Storage case
☐ 2-Drawer File Cabinet Quantity: _____	In addition to the File Cabinet quantity requirements of 698.2.2.2, provide a 2-drawer file cabinet with the following minimum specifications: Fire resistant, legal size; inside dimension approximately 10 x 15 x 26 in, each, with lock(s) and key(s). The file shall bear an Underwriters Laboratories "C" Label - 350°F (177° C) for one hour, inside surface.
☒ Internet Access	Unlimited-hours Broadband Internet Access Wireless router
☒ Telephone Service	Landline phone service with voicemail accessibility.
☒ Telephone Quantity: 1	A wired phone with an additional portable handset.
☐ 3 Hole Punch:	Adjustable, 2 to 3 metal hole punch able to punch through a minimum of 10 sheets of standard paper at once with 9/32" holes and chip tray.
☐ Surge Protector/ Battery Backup Quantity**: _____	15 Amps, 6 outlets with circuit breaker control and spike protection ***Note: The Desktop Computer specification requires that a surge protector be provided with the desktop when selected. **This quantity is in addition to the desktop computer surge protector quantity.*
☒ Strobe Light Quantity: ___1__	Magnetic mount, 20 watt, 12/24 Volt DC (Whelen model VP420M or equivalent) with Port car or equivalent DC adapter.
☐ Concrete Testing Equipment	In addition to the Concrete Testing Equipment required per section 520.3.1.3.1.2, provide a complete additional set of Concrete Testing Equipment meeting the requirements of Section 520.3.1.3.1.2

☐ Portable Turbidimeter

Quantity: ____

Portable Turbidimeter with the following minimum specifications:

- Turbidity Range: 0 to 1000 NTU
- Range: .01 to 1100 NTU
- Accuracy: ± 2% of reading or .01 NTU (0 to 500 NTU); ± 3% of reading
- Resolution: .01 NTU < 10 NTU; .1 NTU < 100 NTU; 1NTU < 1100 NTU
- Analytical Method: ISO 7027
- Rechargeable battery pack with charger
- Twelve (12) sampling vials
- Calibration kit
- Range: .01 to 1100 NTU

Amend 5.1.2 to read:

5.1.2 For each cell phone and/or Smartphone provided, the monthly service charge, including taxes, and any activation or deactivation fee for cellular phone or mobile telephone service, including toll calls up to 1000 minutes per month per each, shall be paid by the Contractor and shall be subsidiary. Any call time charges, used by State personnel, above the base 1000 minutes per month will be paid as extra work under Section 104.05.

SUPPLEMENTAL SPECIFICATION

AMENDMENT TO SECTION 702– BITUMINOUS MATERIALS

The purpose of this Supplemental Specification is to adopt new AASHTO specifications for emulsions.

Amend Section 702 to read:

Table 702-1 – Anionic Asphalt Emulsion

	Rapid-Setting						Medium Setting						
Grade	RS-1h		RS-1		RS-2		HFMS-2		MS-4		MS-5		
Tests on emulsified asphalt:	min	max	min	max	min	max	min	max	min	max	min	max	**Test Method**
Viscosity, Saybolt Furol at 25°C (77° F), s[a]	20	100	20	100					50	500	50	500	T59
Viscosity, Saybolt Furol at 50°C (122° F), s[a]					75	400	100 see (d)						
Storage stability test, 24 h, %[a,b]		1.0		1.0		1.0		1.0		1.0		1.0	
Demulsibility, 35 mL, 0.02 *N* $CaCl_2$, %[a]	60		60		60								
Coating ability and water resistance													
Coating, dry aggregate							good		75%		75%		
Coating, after spraying							fair		see (e) (f)		see (e) (f) (g)		
Coating, wet aggregate							fair						
Coating, after spraying							fair						
Sieve test, %[a,b]		0.10		0.10		0.10		0.10		0.10		0.10	
Distillation													
Oil distillate, %									2.0	7.0	0	3.0	
Residue, %[c]	55		55		65		65		65		65		
Tests on residue from distillation:													
Penetration, 25°C (77°F), 100 g, 5 s, 0.1 mm	40	90	90	150	90	150	90	250	200		150	250	T49
Ductility, 25°C (77°F), 5 cm/min, cm	40		40		40		40						T51
Ash content, %		1.0		1.0		1.0		1.0					T111
Float test, 60°C (140°F), s							1200		50		100		T50

Table 702-2 -- Cationic Asphalt Emulsion

Type	Rapid-Setting				
Grade	CRS-1h		CRS-1		
Tests on emulsified asphalt:	min	max	min	max	Test Method
Viscosity, Saybolt Furol at 50°C (122°F), s[a]	20	100	20	100	T59
Storage stability test, 24-h, %[a,b]		1		1	
Sodium dioctyl sulfosuccinate, %[a]	40		40		
Particle charge test	Positive		Positive		
Sieve test, %[a,b]		0.10		0.10	
Distillation:					
Oil Distillate by volume of emulsified asphalt, %		3		3	
Residue, %[c]	60		60		
Tests on residue from distillation:					
Penetration, 25°C (77°F), 100 g, 5 s, 0.1 mm	40	90	90	150	T49
Ductility, 25°C (77°F), 5 cm/min, cm	40		40		T51
Ash content, %		1		1	T111

Footnotes:

a. This test requirement and associated specification limits are waived for emulsified asphalt products following dilution

b. This test requirement on representative samples may be waived if successful application of the material has been achieved in the field.

c. For emulsions that are diluted, the percent residue requirements must be adjusted accordingly.

d. 50 + when material is used for sealing.

e. Wet Coating: Weigh 100 ± 0.5 g of aggregate, 20 to 30 mesh (0.85 to 0.60 mm) standard Ottawa sand, into a 600 mL glass beaker and add soft tap water, approximately twice the volume of that of sand. Weigh into the beaker containing the sand and water 8 ± 0.2 g of the emulsion at room temperature and mix for two minutes with a stiff spatula. Cover the mixture with approximately twice its own volume of tap water and pour the water off without further mixing. Repeat this process. After the second rinse, at least 75 percent of the sand shall remain coated.

f. Stripping: After evaluating the wet coating, place the mixture into a clear 600 mL glass beaker, cover the mixture with tap water, let stand for 1 to 16 hours, and examine. At least 75 percent of the sand shall remain coated.

g. The coating and stripping tests may be waived when MS-5 is used for sand sealing.

September 8, 2016

SPECIAL PROVISION

SECTION 1006 – SPECIAL WORK FOR GEOTECHNICAL INSTRUMENTATION

Item 1006.1 Special Work for Geotechnical Instrumentation

Description

1.1 This work shall consist of performing additional geotechnical instrumentation work, as ordered by the Engineer, beyond the scope of the geotechnical instrumentation items already provided for in the contract documents. Examples of work which may be ordered include installation of additional geotechnical instrumentation, repair or replacement of geotechnical instrumentation damaged through no fault of the Contractor, and preparation of geotechnical instrumentation for use beyond the contract period.

1.2 Installation of additional geotechnical instrumentation that may be ordered by the Engineer includes, but is not limited to, the following:

- Item 210.1 – Settlement Platform Installation
- Item 210.2 – Settlement Platform Monitoring
- Item 210.24 – Vibrating Wire Piezometer Installation
- Item 210.3 – Slope Inclinometer Installation
- Item 210.6 – Surface Monitoring Points
- Item 201.7 – Utility Monitoring Points
- Item 210.8 – Crack Gages

The Engineer shall provide special provisions for additional geotechnical instrumentation items to the Contractor, if necessary.

Materials

2.1 Materials required shall meet the requirements of the Materials section of the applicable items or as ordered by the Engineer.

Construction

3.1 The Contractor shall repair and make operable instruments which have become inoperable through no fault of the Contractor's operations as ordered by the Engineer.

Method of Measurement

4.1 Work performed under this section shall be measured in accordance with the provisions of 109.04.

Basis of Payment

5.1 Work performed under this section will be paid for in accordance with the provisions of 109.04. The dollar limit set in the proposal will not limit the Engineer in the value of work performed under this item.

5.1.1 Payment of the amount set in the proposal will not be on a lump sum basis, but will be for the actual dollars worth of work ordered by the Engineer.

5.1.2 Remobilization and repair work to damaged instrumentation made necessary due to the negligence or carelessness of the Contractor will not be paid for.

5.2 The price inserted in the proposal under this item is the allowance the Department has set up to pay for Special Work. This figure must not be altered by the Bidder in the proposal and must be included to obtain the grand total of the bid.

Pay item and unit:

1006.1	Special Work for Geotechnical Instrumentation	Dollar

BEDFORD
13953

October 13, 2016

SPECIAL PROVISION

SECTION 1008 -- ALTERATIONS AND ADDITIONS AS NEEDED

Item 1008.123 - Alterations and Additions as Needed - Archaeological Monitoring

This section is intended to provide and pay for certain measures, which may be required during construction. Engineering judgment indicates that a reasonable estimated dollar allowance is in order in setting up the contract.

Description

1.1 This work shall provide for archeological monitoring of alteration and earth disturbing activities associated with two identified historic stone culverts that are to be impacted during construction.

Construction Requirements

3.1 The Contractor shall have a 36 CRF 61-qualified Archeologist on-site to monitor all excavation as well as any other soil disturbing activities including, but not necessarily limited to, all utility work, excavation, fill removal, and tree cutting at the locations noted in the Plans, or as directed. The archaeologist will need to regulate the amount and speed of excavation at any given time to provide time needed to monitor, photo document, and compile measurements and drawings, as needed, pertaining to the construction of the culverts, including interior dimensions and assembly.

3.2 This work shall be completed according to the NHDHR Archaeological Standards and Guidelines dated May 2004.

3.3 This work shall be performed by qualified Principal Investigator in Archaeological Investigations as defined in the Special Attention Historic and Archaeological Resources.

3.4 The Archeologist must be listed on the NH Division of Historical Resources Archeology Consultants List.

Method of Measurement

4.1 Work authorized under this section will be measured as provided in 109.01.

Basis of Payment

5.1 Payment for work authorized under this section will be made on a dollar basis according to 109.04. The dollar limit set in the proposal will not limit the Engineer in the value of work directed to be performed under this item.

5.1.1 Payment of the amount set in the proposal will not be on a lump sum basis, but only the amount determined for the value of the work ordered will be paid.

5.2 The Bidder's attention is called to the price inserted in the proposal under this item, which price is the allowance the Department has set up to pay for special work. This figure must not be altered by the Bidder on the proposal, and must be included to obtain the grand total of the bid.

Pay items and units:

1008.123	Alterations and Additions as Needed – Archaeological Monitoring	Dollar

SPECIAL PROVISION

SECTION 1008 -- ALTERATIONS AND ADDITIONS AS NEEDED

Item 1008.6 - Alterations and Additions as Needed – Drinking Water Resource Protection

This section is intended to provide and pay for certain measures, which may be required during construction. Engineering judgment indicates that a reasonable estimated dollar allowance is in order in setting up the contract.

Description

1.1 This work shall consist of additional groundwater sampling and testing to identify if drinking water wells have been affected by blasting operations.

1.2 This work may also include providing drinking water through a water delivery service for parcel(s) listed in the Prosecution of Work if the individual drinking water well test results (affected by blasting operations) show levels of contaminates (listed in Special Provision to Item 203.9X) near or above the Ambient Groundwater Quality Standards (AGQS).

Materials

2.1 Materials and procedures required to conduct the groundwater sampling shall conform to the requirements in 203.3.14.3 (Special Provision Item 203.93 - Hydrogeologist).

2.2 Drinking water and delivery shall be from a reputable water delivery service.

Construction Requirements

3.1 This special provision is to perform all necessary work to adequately determine if drinking water supplies have been affected by blasting operations.

3.2 This special provision is to provide drinking water to parcels which have been affected by adverse drinking water well test results described in 1.1. The delivery of drinking water shall stay in effect until a long term plan is developed.

Method of Measurement

4.1 Any professional services required to evaluate water samples taken under this special provision will be paid for by extra work according to 109.04.

4.2 Groundwater samples collected and analyzed under this special provision will be measured according to 203.4.13 (Special Provision Items 203.94/203.941/203.942 – Water Sampling).

4.3 Drinking water, set-up, and delivery charges under this special provision will be paid for as extra work according to 109.04.

Basis of Payment

5.1 Payment for work authorized under this section will be made on a dollar basis according to 109.04. The dollar limit set in the proposal will not limit the Engineer in the value of work performed.

5.1.1 If impacts from blasting operations are identified during the additional water supply well testing the Contractor shall bear the cost of the additional sampling, testing and evaluation and no payment will be made under this special provision.

5.1.2 If impacts from blasting operations are not identified during additional water supply sampling the Department will reimburse the Contractor under this special provision.

5.2 The Bidder's attention is called to the dollar amount inserted in the proposal under these items, which dollar amount is the allowance the Department has set up for the special work. This figure must not be altered by the Bidder on the proposal, and must be included to obtain the grand total of the bid.

Pay item and unit:

1008.6	Alterations and Additions As Needed – Drinking Water Resource Protection	Dollar

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. General
II. Nondiscrimination
III. Nonsegregated Facilities
IV. Davis-Bacon and Related Act Provisions
V. Contract Work Hours and Safety Standards Act Provisions
VI. Subletting or Assigning the Contract
VII. Safety: Accident Prevention
VIII. False Statements Concerning Highway Projects
IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
X. Compliance with Governmentwide Suspension and Debarment Requirements
XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under

this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL)

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
(2) the prime contractor remains responsible for the quality of the work of the leased employees;
(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. **Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

1/9/2014

Appendix B to Subpart A of Part 230

TRAINING SPECIAL PROVISIONS

This Training Special Provision supersedes subparagraph 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities," and is in implementation of 23 U.S.C. 140(a).

As part of the Contractor's specific Equal Employment Opportunity Affirmative Action Program, training shall be provided as follows:

> The Contractor shall provide on-the-job training aimed at developing full journeymen in the type of trade or job classification involved.

The number of trainees to be trained under the special provision will be 1 (amount to be filled in by State highway department).

In the event that a contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this training special provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the contractor shall submit to the state highway agency for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g. by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of minority group or not.

No employee shall be employed as a trainee in any classification in which he has have successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The contractor should satisfy this requirement by including appropriate questions in the

employee application or by other suitable means. Regardless of the method used, the contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the State highway agency and the Federal Highway Administration. The State highway agency and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the engineer, reimbursement will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the contractor received additional training program funds from other sources, provided such other does not specifically prohibit the contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee will begin training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. It is not required that all trainees be on board for the entire length of the contract. A contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by

the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The contractor shall furnish the trainee a copy of the program he will follow in providing the training. The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION POLICY

Failure to complete the Training Special Provision requirement: When a contractor fails to complete this Training Special Provision requirement and fails to make and document good faith efforts to fulfill the requirements of this provision, the New Hampshire Department of Transportation Office of Federal Compliance (OFC) shall notify the Prequalification Committee in writing. The Pre-Qualification Committee will inform the contractor of the OFC notification and require the contractor to submit a Corrective Action Plan to the OFC. Failure to provide an acceptable Corrective Action Plan could lead to partial or full suspension consistent with the prequalification rules.

41 CFR 60-4 Affirmative Action Requirements
41 CFR 60-4.2 Solicitations

Notice of Requirement for Affirmative Action
To Ensure Equal Employment Opportunity
(Executive Order 11246)

The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

	Goals for minority participation for each trade	Goals for female participation in each trade
STANDARD METROPOLITAN STATISTICAL AREAS (SMSA)		
SALEM-PLAISTOW	**4.0**	**6.9**
MANCHESTER-NASHUA	**0.7**	**6.9**
NON-SMSA COUNTIES		
COOS, GRAFTON, SULLIVAN	**0.8**	**6.9**
BELKNAP, MERRIMACK, CARROLL, STRAFFORD	**3.6**	**6.9**
CHESHIRE	**5.9**	**6.9**
ROCKINGHAM	**4.0**	**6.9**
HILLSBOROUGH	**0.7**	**6.9**

These goals are applicable to all contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with Executive Order and the regulations in 41 CFR Part 60-4 shall be bases on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by specifications set forth in 41 CFR 60-4.3(a). and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

The Contractor shall provide written notification to the Director of the Office of Federal contract compliance programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation addressed as follows:

Director
Federal Contract Compliance Program
US Department of Labor
JFK Building, Room 1612-C
Boston, MA 02203

The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed as noted within in the Contract Special Provisions for Affirmative Action to ensure Equal Employment Opportunity.

Source 41 CFR 60-4.3 Equal Opportunity Clauses

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)

[1]. As used in these specifications:
a. ``Covered area" means the geographical area described in the solicitation from which this contract resulted;
b. ``Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
c. ``Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
d. ``Minority" includes:
(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

[2]. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

[3]. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

[4]. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7 a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

[5] Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

[6]. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

[7]. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have

affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

(b) The notice set forth in 41 CFR 60-4.2 and the specifications set forth in 41 CFR 60-4.3 replace the New Form for Federal Equal Employment Opportunity Bid Conditions for Federal and Federally Assisted Construction published at 41 FR 32482 and commonly known as the Model Federal EEO Bid Conditions, and the New Form shall not be used after the regulations in 41 CFR Part 60-4 become effective. [43 FR 49254, Oct. 20, 1978; 43 FR 51401, Nov. 3, 1978, as amended at 45 FR 65978, Oct. 3, 1980]

4/99

NOTICE TO ALL BIDDERS

In accordance with the Section "NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)", the New Hampshire Department of Transportation has the authority and responsibility to notify the Office of Federal Contract Compliance Program of the United States Department of Labor if they become aware of any possible violations of Executive Order 11246 and 41 Code of Federal Regulation Chapter 60.

The Office of Federal Contract Compliance Programs is the sole authority for determining compliance with Executive Order 11246 and 41 Code of Federal Regulation Chapter 60 and the Contractor should contact them regarding related compliance issues.

NOTICE TO ALL BIDDERS

To report bid rigging activities call:

1-800-424-9071

To the U.S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

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Rev: November, 2003

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

Sample Proposal
NOT FOR BIDDING PURPOSES

Proposal of _____
NAME

_____
ADDRESS

to furnish and deliver all materials and to perform all work in accordance with the Contract of the State of New Hampshire, Department of Transportation for roadway reconstruction on which proposals will be received until 2:00 o'clock P.M., Prevailing Time on the 18th day of May, 2017. Said project being situated as follows:

NH Route 101 in Bedford

N.H. Department of Transportation
John O. Morton Building
Room 130, Contract Section
P. O. Box 483
Concord, NH 03302-0483

Commissioner:

In accordance with the advertisement of the Department of Transportation inviting proposals for the project hereinbefore named and in conformity with the Plans and Specifications on file in the office of the Department of Transportation, I/WE hereby certify that I AM/WE ARE the only person, or persons, interested in this proposal as principals; that this proposal is made without collusion with any person, firm or corporation; that an examination has been made of the Plans, of the Standard Specifications, of the Standard Plans Book, of the Proposal, and applicable addendums, including but not restricted to the Special Attentions, Supplemental Specifications, and Special Provisions attached thereto, and also that an examination has been made of the site of the work; and I, or we, propose to furnish all necessary machinery, equipment, tools, labor and other means of construction, and to furnish all materials specified in the manner and at the time prescribed; and understand that the quantities of work as shown herein are approximate only and are subject to increase or decrease, and further understand that all quantities of work whether increased or decreased are to be performed at the following prices:

New Hampshire DOT
Department of Transportation

Bid Schedule

BEDFORD
13953
X-A000(143)

NOTE: This proposal shall be prepared by the bidder, with the unit prices specified in both words and figures, and the extensions made by the bidder. For complete information concerning these items, see plans, special provisions, supplemental specifications, and 2016 NHDOT Standard Specifications for Road and Bridge Construction.

Item#	Quantity	Description	Unit Price	Amount
201.1	5.08 A	CLEARING AND GRUBBING (F) At _____ Dollars Per A		
201.21	50.00 EA	REMOVING SMALL TREES At _____ Dollars Per EA		
201.22	3.00 EA	REMOVING LARGE TREES At _____ Dollars Per EA		
201.881	1,300.00 SY	INVASIVE SPECIES CONTROL TYPE I At _____ Dollars Per SY		
201.882	5,600.00 SY	INVASIVE SPECIES CONTROL TYPE II At _____ Dollars Per SY		
202.201	1.00 U	DEMOLISHING BUILDINGS At _____ Dollars Per U		
202.202	1.00 U	DEMOLISHING BUILDINGS At _____ Dollars Per U		
202.203	1.00 U	DEMOLISHING BUILDINGS At _____ Dollars Per U		
202.301	1.00 U	BUILDING ASBESTOS ABATEMENT At _____ Dollars Per U		
202.303	1.00 U	BUILDING ASBESTOS ABATEMENT At _____ Dollars Per U		

Item#	Quantity	Description	Unit Price	Amount
202.31	100.00 CY	FILL ABANDONED PIPE At _____ Dollars Per CY		
202.32	10.00 CY	FILL AND ABANDON STRUCTURE At _____ Dollars Per CY		
202.41	2,100.00 LF	REMOVAL OF EXISTING PIPE 0-24" DIAMETER At _____ Dollars Per LF		
202.42	100.00 LF	REMOVAL OF EXISTING PIPE OVER 24" DIAMETER At _____ Dollars Per LF		
202.5	17.00 EA	REMOVAL OF CATCH BASINS, DROP INLETS, AND MANHOLES At _____ Dollars Per EA		
202.7	2,300.00 LF	REMOVAL OF GUARDRAIL At _____ Dollars Per LF		
203.1	83,000.00 CY	COMMON EXCAVATION At _____ Dollars Per CY		
203.2	6,000.00 CY	ROCK EXCAVATION At _____ Dollars Per CY		
203.35	350.00 CY	HANDLING EXCAVATED, CONTAMINATED SOILS (DEPARTMENT DISPOSAL) At _____ Dollars Per CY		
203.4	13,000.00 CY	MUCK EXCAVATION At _____ Dollars Per CY		
203.53	302.00 CY	LOW PERMEABILITY FILL (F) At _____ Dollars Per CY		
203.5525	3.00 U	PORTABLE CHANGEABLE MESSAGE SIGN PLATFORM At _____ Dollars Per U		

Item#	Quantity	Description	Unit Price	Amount
203.55261	3.00 U	INSTALLATION AND REMOVAL OF SWZ - PORTABLE QUEUE TRAILER PLATFORM At _____ Dollars Per U		
203.55262	3.00 U	INSTALLATION AND REMOVAL OF SWZ - PORTABLE CHANGEABLE MESSAGE SIGN PLATFORM At _____ Dollars Per U		
203.55264	1.00 U	INSTALLATION AND REMOVAL OF SWZ - MOBILE VIDEO TRAILER PLATFORM At _____ Dollars Per U		
203.55543	1.00 U	GUARDRAIL EAGRT OFFSET PLATFORM, TL 3 At _____ Dollars Per U		
203.55555	11.00 U	GUARDRAIL EAGRT OFFSET PLATFORM, TL 2 - 25' At _____ Dollars Per U		
203.6	68,000.00 CY	EMBANKMENT-IN-PLACE (F) At _____ Dollars Per CY		
203.661	7,500.00 CY	GRAVEL BACKFILL FOR MUCK AND UNSUITABLE MATERIAL EXCAVATION At _____ Dollars Per CY		
203.662	12,100.00 CY	ROCK AND GRAVEL BACKFILL FOR MUCK AND UNSUITABLE MATERIAL EXCAVATION At _____ Dollars Per CY		
203.7	20,000.00 CY	REHANDLING SURCHARGE MATERIAL At _____ Dollars Per CY		
203.93	1.00 U	HYDROGEOLOGIST At _____ Dollars Per U		
203.941	500.00 EA	BASELINE GROUNDWATER SAMPLING EVENT At _____ Dollars Per EA		
203.942	60.00 EA	EXTENDED GROUNDWATER SAMPLING EVENT At _____ Dollars Per EA		

Item#	Quantity	Description	Unit Price	Amount
203.943	14.00 EA	STANDARD ANALYSIS GROUNDWATER SAMPLING EVENT At _____ Dollars Per EA		
206.1	1,900.00 CY	COMMON STRUCTURE EXCAVATION At _____ Dollars Per CY		
206.19	400.00 CY	COMMON STRUCTURE EXCAVATION EXPLORATORY At _____ Dollars Per CY		
206.2	500.00 CY	ROCK STRUCTURE EXCAVATION At _____ Dollars Per CY		
207.1	250.00 CY	COMMON CHANNEL EXCAVATION At _____ Dollars Per CY		
209.1	350.00 CY	GRANULAR BACKFILL At _____ Dollars Per CY		
209.61	150.00 CY	LIGHTWEIGHT AGGREGATE BACKFILL At _____ Dollars Per CY		
210.1	8.00 EA	SETTLEMENT PLATFORMS At _____ Dollars Per EA		
210.2	48.00 HR	SETTLEMENT PLATFORM MONITORING At _____ Dollars Per HR		
211.11	100.00 HR	VIBRATION MONITORING SERVICES At _____ Dollars Per HR		
214.	1.00 U	FINE GRADING At _____ Dollars Per U		
304.1	12,300.00 CY	SAND (F) At _____ Dollars Per CY		

Item#	Quantity	Description	Unit Price	Amount
304.32	260.00 TON	CRUSHED GRAVEL FOR SHOULDER LEVELING At _____ Dollars Per TON		
304.35	1,300.00 CY	CRUSHED GRAVEL FOR DRIVES At _____ Dollars Per CY		
304.4	19,200.00 CY	CRUSHED STONE (FINE GRADATION) (F) At _____ Dollars Per CY		
304.41	1,680.00 CY	CRUSHED STONE (FINE GRADATION) FOR SHIM At _____ Dollars Per CY		
304.499	800.00 CY	TEMPORARY CRUSHED STONE (FINE GRADATION) At _____ Dollars Per CY		
304.5	15,200.00 CY	CRUSHED STONE (COARSE GRADATION) (F) At _____ Dollars Per CY		
403.11	2,500.00 TON	HOT BITUMINOUS PAVEMENT, MACHINE METHOD At _____ Dollars Per TON		
403.11002	21,300.00 TON	HOT BITUMINOUS PAVEMENT, MACHINE METHOD (QC/QA TIER 2) At _____ Dollars Per TON		
403.11902	7,400.00 TON	HBP - MACHINE METHOD, HIGH STRENGTH (QC/QA TIER 2) At _____ Dollars Per TON		
403.12	1,870.00 TON	HOT BITUMINOUS PAVEMENT, HAND METHOD At _____ Dollars Per TON		
403.4	28,600.00 TON	MATERIAL TRANSFER VEHICLE (MTV) At _____ Dollars Per TON		
403.6	139,000.00 LF	PAVEMENT JOINT ADHESIVE At _____ Dollars Per LF		

Item#	Quantity	Description	Unit Price	Amount
403.99	2,500.00 TON	TEMPORARY BITUMINOUS PAVEMENT At _____ Dollars Per TON		
410.22	7,200.00 GAL	ASPHALT EMULSION FOR TACK COAT At _____ Dollars Per GAL		
411.1	800.00 TON	HOT BITUMINOUS CONCRETE LEVELING COURSE At _____ Dollars Per TON		
417.	36,000.00 SY	COLD PLANING BITUMINOUS SURFACES At _____ Dollars Per SY		
503.101	1.00 U	WATER DIVERSION STRUCTURE At _____ Dollars Per U		
503.102	1.00 U	WATER DIVERSION STRUCTURE At _____ Dollars Per U		
503.103	1.00 U	WATER DIVERSION STRUCTURE At _____ Dollars Per U		
503.201	1.00 U	COFFERDAMS At _____ Dollars Per U		
503.202	1.00 U	COFFERDAMS At _____ Dollars Per U		
506.4	2,700.00 SY	STEEL SHEET PILING FOR ENVIRONMENTAL PROTECTION At _____ Dollars Per SY		
520.1	60.00 CY	CONCRETE CLASS A At _____ Dollars Per CY		
544.1	430.00 LB	REINFORCING STEEL (ROADWAY) At _____ Dollars Per LB		

Item#	Quantity	Description	Unit Price	Amount
570.4	2.82 CY	MORTAR RUBBLE MASONRY (F) At _____ Dollars Per CY		
570.401	16.00 CY	MORTAR RUBBLE MASONRY At _____ Dollars Per CY		
572.1	450.00 LF	RECONSTRUCTING STONE WALL ONE STONE WIDE At _____ Dollars Per LF		
572.2	20.00 LF	RECONSTRUCTING STONE WALL MULTIPLE STONES WIDE At _____ Dollars Per LF		
585.2	200.00 CY	STONE FILL, CLASS B At _____ Dollars Per CY		
585.3	2,200.00 CY	STONE FILL, CLASS C At _____ Dollars Per CY		
585.3401	400.00 CY	SIMULATED STREAMBED MATERIAL At _____ Dollars Per CY		
593.411	400.00 SY	GEOTEXTILE; PERM CONTROL CL.1, NON-WOVEN At _____ Dollars Per SY		
593.421	8,300.00 SY	GEOTEXTILE; PERM CONTROL CL.2, NON-WOVEN At _____ Dollars Per SY		
603.0001	14,000.00 LF	VIDEO INSPECTION At _____ Dollars Per LF		
603.00215	3,050.00 LF	15" R.C. PIPE, 2000D At _____ Dollars Per LF		
603.00218	2,100.00 LF	18" R.C. PIPE, 2000D At _____ Dollars Per LF		

Item#	Quantity	Description	Unit Price	Amount
603.00224	630.00 LF	24" R.C. PIPE, 2000D At _____ Dollars Per LF		
603.00230	30.00 LF	30" R.C. PIPE, 2000D At _____ Dollars Per LF		
603.00260	120.00 LF	60" R.C. PIPE, 2000D At _____ Dollars Per LF		
603.00315	1,000.00 LF	15" R.C. PIPE, 3000D At _____ Dollars Per LF		
603.00318	50.00 LF	18" R.C. PIPE, 3000D At _____ Dollars Per LF		
603.30115	3.00 EA	15" R.C. END SECTIONS At _____ Dollars Per EA		
603.30118	8.00 EA	18" R.C. END SECTIONS At _____ Dollars Per EA		
603.30124	6.00 EA	24" R.C. END SECTIONS At _____ Dollars Per EA		
603.30130	1.00 EA	30" R.C. END SECTIONS At _____ Dollars Per EA		
603.36115	6.00 EA	15" ALUMINIZED STEEL END SECTION At _____ Dollars Per EA		
603.36118	14.00 EA	18" ALUMINIZED STEEL END SECTION At _____ Dollars Per EA		
603.36124	3.00 EA	24" ALUMINIZED STEEL END SECTION At _____ Dollars Per EA		

Item#	Quantity	Description	Unit Price	Amount
603.82212	600.00 LF	12" PE PIPE (TYPE S) At _____ Dollars Per LF		
603.82215	5,400.00 LF	15" PE PIPE (TYPE S) At _____ Dollars Per LF		
603.82218	1,200.00 LF	18" PE PIPE (TYPE S) At _____ Dollars Per LF		
603.82224	870.00 LF	24" PE PIPE (TYPE S) At _____ Dollars Per LF		
603.99060	40.00 LF	60" TEMPORARY DRAINAGE PIPE At _____ Dollars Per LF		
604.0007	140.00 EA	POLYETHYLENE LINER At _____ Dollars Per EA		
604.124	175.00 U	CATCH BASINS TYPE B, 4-FOOT DIAMETER At _____ Dollars Per U		
604.125	14.00 U	CATCH BASINS TYPE B, 5-FOOT DIAMETER At _____ Dollars Per U		
604.126	2.00 U	CATCH BASINS TYPE B, 6-FOOT DIAMETER At _____ Dollars Per U		
604.154	5.00 U	CATCH BASINS TYPE E, 4-FOOT DIAMETER At _____ Dollars Per U		
604.164	7.00 U	CATCH BASINS TYPE F, 4-FOOT DIAMETER At _____ Dollars Per U		
604.324	3.00 U	DRAINAGE MANHOLES, 4-FOOT DIAMETER At _____ Dollars Per U		

Item#	Quantity	Description	Unit Price	Amount
604.4	50.00 LF	RECONSTRUCTING/ADJUSTING CATCH BASIN & DROP INLET At _____ Dollars Per LF		
604.51	15.00 LF	RECONSTRUCTING/ADJUSTING SEWER MANHOLES At _____ Dollars Per LF		
604.52	20.00 LF	RECONSTRUCTING/ADJUSTING DRAINAGE MANHOLES At _____ Dollars Per LF		
604.62	7.00 EA	DRAINAGE MANHOLE COVERS AND FRAMES At _____ Dollars Per EA		
604.9101	1.00 U	OUTLET CONTROL STRUCTURE At _____ Dollars Per U		
604.9102	1.00 U	OUTLET CONTROL STRUCTURE At _____ Dollars Per U		
604.9103	1.00 U	OUTLET CONTROL STRUCTURE At _____ Dollars Per U		
604.9104	1.00 U	OUTLET CONTROL STRUCTURE At _____ Dollars Per U		
605.506	9,300.00 LF	6" PERF. CORR. POLYETHYLENE PIPE UNDERDRAIN At _____ Dollars Per LF		
605.79	15.00 EA	UNDERDRAIN FLUSHING BASINS At _____ Dollars Per EA		
606.12122	2.00 U	BEAM GUARDRAIL (LONG SPAN DOUBLE NESTED - 18.75') (STEEL POST) At _____ Dollars Per U		
606.1254	1.00 U	BEAM GUARDRAIL (TERMINAL UNIT TYPE EAGRT, TL 3) (STEEL POST) At _____ Dollars Per U		

Item#	Quantity	Description	Unit Price	Amount
606.12551	11.00 U	BEAM GUARDRAIL (TERMINAL UNIT TYPE EAGRT, TL 2 - 25') (STEEL POST) At _____ Dollars Per U		
606.18001	3,650.00 LF	31" W-BEAM GUARDRAIL WITH 8" OFFSET BLOCK (STEEL POST) At _____ Dollars Per LF		
606.417	8,700.00 LF	PORTABLE CONCRETE BARRIER FOR TRAFFIC CONTROL At _____ Dollars Per LF		
606.4174	120.00 LF	PORTABLE CONCRETE BARRIER FOR TRAFFIC CONTROL - BRACED At _____ Dollars Per LF		
606.91	230.00 LF	RESETTING OR SETTING GUARDRAIL At _____ Dollars Per LF		
606.9522	22.00 U	TEMP. IMPACT ATTENUATION DEVICE (NON-REDIRECTIVE) TEST LEVEL 2 At _____ Dollars Per U		
607.140	3,650.00 LF	WOVEN WIRE FENCE, 4'-0" HIGH At _____ Dollars Per LF		
607.4140	50.00 EA	POST ASSEMBLIES FOR WOVEN WIRE FENCE, 4'-0" HIGH At _____ Dollars Per EA		
607.9918	5.00 U	BAR WAY, 18 FT. At _____ Dollars Per U		
608.12	7,000.00 SY	2" BITUMINOUS SIDEWALK (F) At _____ Dollars Per SY		
608.24	350.00 SY	4" CONCRETE SIDEWALK (F) At _____ Dollars Per SY		
608.26	2,050.00 SY	6" CONCRETE SIDEWALK (F) At _____ Dollars Per SY		

Item#	Quantity	Description	Unit Price	Amount
608.54	70.00 SY	DETECTABLE WARNING DEVICES, CAST IRON At _____ Dollars Per SY		
609.01	3,400.00 LF	STRAIGHT GRANITE CURB At _____ Dollars Per LF		
609.02	190.00 LF	CURVED GRANITE CURB At _____ Dollars Per LF		
609.216	14,000.00 LF	STRAIGHT GRANITE SLOPE CURB 6" HIGH At _____ Dollars Per LF		
609.226	510.00 LF	STRAIGHT GRANITE SLOPE CURB WITH RADIAL JOINTS, 6" HIGH At _____ Dollars Per LF		
609.23	30.00 LF	CURVED GRANITE SLOPE CURB At _____ Dollars Per LF		
609.5	4,842.00 LF	RESET GRANITE CURB At _____ Dollars Per LF		
609.811	1,200.00 LF	BITUMINOUS CURB, TYPE B (4" REVEAL) At _____ Dollars Per LF		
611.05216	425.00 LF	16" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52 At _____ Dollars Per LF		
611.70016	38.00 EA	16" FITTING At _____ Dollars Per EA		
611.77	1.00 EA	CHLORINE INJECTION TAP At _____ Dollars Per EA		
611.811	1.00 EA	ADJUSTING/RELOCATING HYDRANTS At _____ Dollars Per EA		

Item#	Quantity	Description	Unit Price	Amount
611.90001	2.00 EA	ADJUSTING WATER GATES AND SHUTOFFS SET BY OTHERS At _____ Dollars Per EA		
612.213	80.00 LF	42" RCP CASING At _____ Dollars Per LF		
612.21332	175.00 LF	42" RCP CASING WITH 8" PVC CARRIER PIPE At _____ Dollars Per LF		
612.3104	77.00 VF	SEWER MANHOLE, 4-FOOT DIAMETER At _____ Dollars Per VF		
612.61508	561.00 LF	8" PVC SEWER PIPE (SDR 35) At _____ Dollars Per LF		
612.61512	75.00 LF	12" PVC SEWER PIPE (SDR 35) At _____ Dollars Per LF		
614.331	13.00 LF	3" STEEL CONDUIT At _____ Dollars Per LF		
614.512	46.00 EA	CONCRETE PULL BOX 18" At _____ Dollars Per EA		
614.523	2.00 EA	MOLDED PULL BOX 17"X30" At _____ Dollars Per EA		
614.73114	1,550.00 LF	3" PVC CONDUIT, SCHEDULE 40 At _____ Dollars Per LF		
614.73118	1,500.00 LF	3" PVC CONDUIT, SCHEDULE 80 At _____ Dollars Per LF		
615.0101	370.00 SF	TRAFFIC SIGN TYPE A At _____ Dollars Per SF		

Item#	Quantity	Description	Unit Price	Amount
615.013	3.00 U	REMOVING TRAFFIC SIGN TYPE A At _____ Dollars Per U		
615.0301	995.00 SF	TRAFFIC SIGN TYPE C At _____ Dollars Per SF		
615.033	72.00 U	REMOVING TRAFFIC SIGN, TYPE C At _____ Dollars Per U		
615.034	25.00 U	RELOCATING TRAFFIC SIGN, TYPE C At _____ Dollars Per U		
615.053	1.00 U	REMOVING TRAFFIC SIGN TYPE BB At _____ Dollars Per U		
615.0601	400.00 SF	TRAFFIC SIGN TYPE CC At _____ Dollars Per SF		
616.141	1.00 U	COMPUTER EQUIPMENT AND TRAFFIC SIGNAL SOFTWARE At _____ Dollars Per U		
616.161	1.00 U	TRAFFIC SIGNALS (TEMP.) At _____ Dollars Per U		
616.162	1.00 U	TRAFFIC SIGNALS (TEMP.) At _____ Dollars Per U		
616.163	1.00 U	TRAFFIC SIGNALS (TEMP.) At _____ Dollars Per U		
616.191	1.00 U	ALTERATIONS TO TRAFFIC SIGNALS At _____ Dollars Per U		
616.192	1.00 U	ALTERATIONS TO TRAFFIC SIGNALS At _____ Dollars Per U		

Item#	Quantity	Description	Unit Price	Amount
616.193	1.00 U	ALTERATIONS TO TRAFFIC SIGNALS At _____ Dollars Per U		
616.194	1.00 U	ALTERATIONS TO TRAFFIC SIGNALS At _____ Dollars Per U		
616.195	1.00 U	ALTERATIONS TO TRAFFIC SIGNALS At _____ Dollars Per U		
616.35	5.00 U	SPREAD SPECTRUM RADIO COMMUNICATIONS SYSTEM At _____ Dollars Per U		
616.70001	410.00 LF	RETROREFLECTIVE TAPE FOR SIGNAL HEAD BACKPLATES At _____ Dollars Per LF		
618.61	249,000.00 $	UNIFORMED OFFICERS WITH VEHICLE At One and 0/100 Dollars Per $	$1 00	$249,000 00
618.7	6,400.00 HR	FLAGGERS At _____ Dollars Per HR		
619.1	1.00 U	MAINTENANCE OF TRAFFIC At _____ Dollars Per U		
619.25	3.00 U	PORTABLE CHANGEABLE MESSAGE SIGN At _____ Dollars Per U		
619.27	2.00 U	TRAILER-MOUNTED SPEED LIMIT SIGN At _____ Dollars Per U		
619.502	8.00 MON	WORK ZONE ITS OPERATIONAL COSTS (WINTER) At _____ Dollars Per MON		
619.503	20.00 MON	WORK ZONE ITS OPERATIONAL COSTS (SUMMER) At _____ Dollars Per MON		

Item#	Quantity	Description	Unit Price	Amount
619.51	110.00 MON	PORTABLE QUEUE TRAILER / SENSOR (PQT) At _____ Dollars Per MON		
619.519	3.00 U	PORTABLE QUEUE TRAILER / SENSOR (PQT) (SALVAGE TO DEPARTMENT) At _____ Dollars Per U		
619.52	308.00 MON	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) At _____ Dollars Per MON		
619.54	56.00 MON	MOBILE VIDEO TRAILER WITH PAN TILT ZOOM (PTZ) At _____ Dollars Per MON		
619.91	10.00 U	RELOCATE WORK ZONE ITS DEVICE At _____ Dollars Per U		
621.2	40.00 EA	RETROREFLECTIVE BEAM GUARDRAIL DELINEATOR At _____ Dollars Per EA		
621.31	100.00 EA	SINGLE DELINEATOR WITH POST At _____ Dollars Per EA		
621.32	7.00 EA	DOUBLE DELINEATOR WITH POST At _____ Dollars Per EA		
622.1	65.00 EA	STEEL WITNESS MARKERS At _____ Dollars Per EA		
622.2	9.00 EA	CONCRETE BOUNDS At _____ Dollars Per EA		
628.2	36,000.00 LF	SAWED BITUMINOUS PAVEMENT At _____ Dollars Per LF		
632.0104	200,000.00 LF	RETROREFLECTIVE PAINT PAVE. MARKING, 4" LINE At _____ Dollars Per LF		

Item#	Quantity	Description	Unit Price	Amount
632.0106	2,450.00 LF	RETROREFLECTIVE PAINT PAVE. MARKING, 6" LINE At _____ Dollars Per LF		
632.0118	450.00 LF	RETROREFLECTIVE PAINT PAVE. MARKING, 18" LINE At _____ Dollars Per LF		
632.02	1,250.00 SF	RETROREFLECTIVE PAINT PAVEMENT MARKING, SYMBOL OR WORD At _____ Dollars Per SF		
632.3104	8,100.00 LF	RETROREFLECT. THERMOPLAS. PAVE. MARKING, 4" LINE At _____ Dollars Per LF		
632.3106	3,000.00 LF	RETROREFLECT. THERMOPLAS. PAVE. MARKING, 6" LINE At _____ Dollars Per LF		
632.3108	190.00 LF	RETROREFLECT. THERMOPLAS. PAVE. MARKING, 8" LINE At _____ Dollars Per LF		
632.3112	40.00 LF	RETROREFLECT. THERMOPLAS. PAVE. MARKING, 12" LINE At _____ Dollars Per LF		
632.3118	800.00 LF	RETROREFLECT. THERMOPLAS. PAVE. MARKING, 18" LINE At _____ Dollars Per LF		
632.32	2,500.00 SF	RETROREFLECT. THERMOPLAS. PAVEMENT MARKING, SYMBOL OR WORD At _____ Dollars Per SF		
641.	2,000.00 CY	LOAM At _____ Dollars Per CY		
644.82	10.00 LB	SALT-TOLERANT GRASS SEED, TYPE 82 At _____ Dollars Per LB		
645.0001	500.00 LF	TURBIDITY BARRIER At _____ Dollars Per LF		

Item#	Quantity	Description	Unit Price	Amount
645.113	6,000.00 LB	HYDRAULIC MULCH At _____ Dollars Per LB		
645.119	3.00 A	MULCH WITH TACKIFIERS At _____ Dollars Per A		
645.3	6,000.00 TON	EROSION STONE At _____ Dollars Per TON		
645.44	19,400.00 SY	TEMPORARY SLOPE STABILIZATION TYPE D (WILDLIFE FRIENDLY) At _____ Dollars Per SY		
645.46	10,200.00 SY	PERMANENT CHANNEL STABILIZATION TYPE B At _____ Dollars Per SY		
645.48	500.00 CY	EROSION CONTROL MIX At _____ Dollars Per CY		
645.481	800.00 CY	WOOD CHIPS FOR TEMPORARY EROSION CONTROL At _____ Dollars Per CY		
645.482	3,200.00 CY	STUMP GRINDINGS FOR TEMPORARY EROSION CONTROL At _____ Dollars Per CY		
645.51	500.00 EA	HAY BALES FOR TEMPORARY EROSION CONTROL At _____ Dollars Per EA		
645.512	3,300.00 LF	COMPOST SOCK FOR PERIMETER BERM At _____ Dollars Per LF		
645.52	300.00 LB	RYEGRASS FOR TEMPORARY EROSION CONTROL At _____ Dollars Per LB		
645.531	10,000.00 LF	SILT FENCE At _____ Dollars Per LF		

Item#	Quantity	Description	Unit Price	Amount
645.611	21,500.00 LB	BONDED FIBER MATRIX (BFM) At _____ Dollars Per LB		
645.612	7,300.00 LB	FIBER REINFORCED MATRIX (FRM) At _____ Dollars Per LB		
645.613	2,900.00 LB	STABILIZED MULCH MATRIX At _____ Dollars Per LB		
645.7	1.00 U	STORM WATER POLLUTION PREVENTION PLAN At _____ Dollars Per U		
645.71	1,000.00 HR	MONITORING SWPPP AND EROSION AND SEDIMENT CONTROLS At _____ Dollars Per HR		
646.2	14.00 A	TURF ESTABLISHMENT WITHOUT MULCH At _____ Dollars Per A		
647.1	4,700.00 CY	HUMUS At _____ Dollars Per CY		
647.22	20.00 CY	HUMUS, INTERMIXED, 2" DEEP At _____ Dollars Per CY		
650.2	1.00 U	LANDSCAPING At _____ Dollars Per U		
659.401	30.00 DAY	LANDSCAPE ESTABLISHMENT CREW (4 MEN - 8 HR DAY) At _____ Dollars Per DAY		
662.281	500.00 LF	DECOMMISSION DRILLED WELL At _____ Dollars Per LF		
670.02	4.00 EA	SEDIMENT SUMP MEASURING BLOCK At _____ Dollars Per EA		

Item#	Quantity	Description	Unit Price	Amount
670.066	11.00 EA	MAILBOX SUPPORT ASSEMBLIES At _____ Dollars Per EA		
670.0661	1.00 EA	MULTIPLE MAILBOXES SUPPORT ASSEMBLIES At _____ Dollars Per EA		
670.104	20.00 U	TEMPORARY PORTABLE LIGHTING At _____ Dollars Per U		
670.822	1.00 U	GNSS CONSTRUCTION INSPECTION EQUIPMENT At _____ Dollars Per U		
670.95	1,000.00 LF	TEMPORARY SAFETY FENCE At _____ Dollars Per LF		
677.1201	1.00 U	PERMANENT FIXED LOCATION DYNAMIC MESSAGE SIGN (DMS) At _____ Dollars Per U		
677.54201	1.00 U	POLE MOUNTED ITS EQUIPMENT CABINET At _____ Dollars Per U		
677.6301	1.00 U	METER AND DISCONNECT PEDESTAL At _____ Dollars Per U		
677.64	1.00 EA	UNINTERRUPTABLE POWER SUPPLY (UPS) At _____ Dollars Per EA		
677.9310	210.00 LF	3-CONDUCTOR #10 AWG CABLE At _____ Dollars Per LF		
692.	1.00 U	MOBILIZATION At _____ Dollars Per U		
693.	600.00 $	ON-THE-JOB TRAINING OF UNSKILLED WORKERS At One and 0/100 Dollars Per $	$1 00	$600 00

Item#	Quantity	Description	Unit Price	Amount
697.11	1.00 U	INVASIVE SPECIES CONTROL AND MANAGEMENT PLAN At _____ Dollars Per U		
697.31	1.00 U	PROJECT OPERATIONS PLAN At _____ Dollars Per U		
697.41	1.00 U	CRITICAL PATH METHOD (CPM) ELECTRONIC SCHEDULE At _____ Dollars Per U		
698.12	27.00 MON	FIELD OFFICE TYPE B At _____ Dollars Per MON		
698.2	25.00 MON	PHYSICAL TESTING LABORATORY At _____ Dollars Per MON		
699.	50,000.00 $	MISCELLANEOUS TEMPORARY EROSION AND SEDIMENT CONTROL At One and 0/100 Dollars Per $	$1 00	$50,000 00
1006.1	5,000.00 $	SPECIAL WORK FOR GEOTECHNICAL INSTRUMENTATION At One and 0/100 Dollars Per $	$1 00	$5,000 00
1008.123	10,000.00 $	ALTERATIONS AND ADDITIONS AS NEEDED - ARCHEOLOGIC MONITORING At One and 0/100 Dollars Per $	$1 00	$10,000 00
1008.6	75,000.00 $	ALTERATIONS AND ADDITIONS AS NEEDED - DRINKING WATER RESOURCE PROTECTION At One and 0/100 Dollars Per $	$1 00	$75,000 00
1010.15	100,000.00 $	FUEL ADJUSTMENT At One and 0/100 Dollars Per $	$1 00	$100,000 00
1010.2	100,000.00 $	ASPHALT CEMENT ADJUSTMENT At One and 0/100 Dollars Per $	$1 00	$100,000 00
1010.3	101,000.00 $	QUALITY CONTROL QUALITY ASSURANCE (QC/QA) ASPHALT At One and 0/100 Dollars Per $	$1 00	$101,000 00

Item#	Quantity	Description	Unit Price	Amount
			Grand Total:	

GRAND TOTAL MUST ALSO BE ENTERED ON THE COVER PAGE OF THE PROPOSAL

Sample Proposal
NOT FOR BIDDING PURPOSES

It is further proposed:

To execute the Contract and begin work within 10 days from the date specified in the "Notice to Proceed" and to prosecute said work so as to complete the Roadway Project and its appurtenances on or before September 27, 2019 .

To furnish a Contract Bond in the amount of 100 per cent of the Contract award, as security for the construction and completion of the Roadway Project and its appurtenances in accordance with the Plans, Specifications and Contract. The Contractor's attention is called to section 103.05 of the Standard Specifications which reads, in part, as follows: "Unless specifically waived in the Proposal, upon execution of the Contract, the successful Bidder shall furnish the Department a surety bond or bonds equal to the sum of the Contract amount. The form of the bonds(s) shall be acceptable to the Department and the bonding Company issuing the bond(s) shall be licensed to transact business in the State of New Hampshire, and ..."

To certify that the Bidder, in accordance with the requirements of 103.06 and 108.01, intends to sublet, assign, sell, transfer or otherwise dispose of one or more portions of the work and (1) has contacted the appropriate listed disadvantaged businesses and afforded such disadvantaged businesses equal consideration with non-disadvantaged business for all work the Bidder currently proposes to sublet, assign, sell, transfer or otherwise dispose of, (2) may contact additional appropriate disadvantage businesses and will afford such businesses equal consideration with non-disadvantaged businesses for all work the Bidder in the future proposes to sublet, assign, sell, transfer or otherwise dispose of, and (3) will complete enclosed "DISADVANTAGED BUSINESS ENTERPRISE COMMITMENT FORM" and Letters of Intent for each disadvantaged business. The name of the person in the Bidder's organization who has been designated as the liaison officer to administer the disadvantaged business enterprise program is:

_____

(To be completed by the Bidder)

To guarantee all of the work performed under this Contract to be done in accordance with the Specifications and in good and workmanlike manner, and to renew or repair any work which may be rejected, due to defective materials or workmanship, prior to final completion and acceptance of the project.

Enclosed herewith find certified check or bid bond in the amount of **5% OF THE BID TOTAL** made payable to the "Treasurer, State of New Hampshire," as a proposal guarantee which it is understood will be forfeited in the event the Contract is not executed, if awarded by the Department to the undersigned.

Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions.

(1). The prospective primary participant certifies to the best of its knowledge and belief, that it and all its principals: (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency; (b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statues or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property; (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1) (b) of this certification and (d) Have not within a three-year period proceeding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. (2). Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Contract Affidavit

I/We declare under penalty of perjury under the laws of the United States and the State of New Hampshire that, in accordance with the provisions of Title 23 USC, Section 112(c), have not either directly or indirectly entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this Proposal.

Dated: _____

(If a firm or individual)

Signature of Bidder _____

By _____

Address of Bidder _____

Names and addresses of members of the Firm:

_____

_____

_____

(If a Corporation)

Signature of Bidder _____

Title _____

By _____

Business Address _____

Incorporated under the laws of the State of _____

Names of Officers:

President _____
Name Address

Secretary _____
Name Address

Treasurer _____
Name Address

Note: See Subsection 102.07 for signature requirements.