MAINE TURNPIKE AUTHORITY

CONTRACT DOCUMENTS

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE GARAGE
MILE MARKER 92.7

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SPECIFICATIONS

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

The Specifications are divided into two parts:
Part I, Supplemental Specifications and Part II, Special Provisions.

The Maine Turnpike Supplemental Specifications are additions and alterations to the 2014 Maine Department of Transportation Standard Specifications. See Subsection 100.1.

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MAINE TURNPIKE AUTHORITY

NOTICE TO CONTRACTORS

Sealed Proposals will be received by the Maine Turnpike Authority for:

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE FACILITY
MILE MARKER 92.7

at the office of the Maine Turnpike Authority, 2360 Congress Street, Portland, ME, until 1:00 p.m., prevailing time as determined by the Authority on November 14, 2019 at which time and place the Proposals will be publicly opened and read. Bids will be accepted from Contractors prequalified by the Maine Department of Transportation for Building Construction Projects. All other bids may be rejected.

Contractors not currently prequalified by MaineDOT for Building projects can seek prequalification for this project prior to the award by submitting the prequalification application included with this notice directly to the Authority at the above address. Contractors not currently prequalified by MaineDOT for Building Projects or Contractors not prequalified by the MTA for Building projects may not be awarded a contract for this project.

This Project includes a wage determination developed by the State of Maine Department of Labor.

The work consists of the following:

1. Construction of an approximate 10,400 square foot pre-engineered building consisting of a 4-bay equipment maintenance garage, 1 drive-thru wash bay, and a 1,975 SF mezzanine.
2. All site work, grading, drainage, paving, septic field, underground power, power utility services and site utilities.

The work includes all building structure, mechanical, electrical, and plumbing, as well as all site work, grading, pavement, lighting, utilities, and all other work incidental thereto in accordance with the Plans and Specifications.

Plans and Contract Documents may be examined by prospective Bidders weekdays between 8:00 a.m. and 4:30 p.m. at the office of the Maine Turnpike Authority, 2360 Congress St., Portland, ME 04102. The Plans and Contract Documents may be obtained on or after October 15, 2019 from the Authority upon payment of One Hundred Fifty ($150.00) Dollars for each set, which payment will not be returned. Checks shall be made payable to: Maine Turnpike Authority.

For general information regarding Bidding and Contracting procedures, contact Nathan Carll, Purchasing Manager, at (207) 482-8115. **For information regarding Schedule of Items, plan holders list and bid results, visit our website at** http://www.maineturnpike.com/project-and- planning/Construction-Contracts.aspx . For project specific information, fax all questions to contact Nathan Carll, Purchasing Manager, at (207) 482-8115. Responses will not be prepared for questions received by telephone. Bidders

shall not contact any other Authority staff or Consultants for clarification of Contract provisions, and the Authority will not be responsible for any interpretations so obtained.

All work shall be governed by the Specifications entitled "State of Maine, Department of Transportation, Standard Specifications, Revision of November 2014", "Standard Details, Revision of November 2014" and "Best Management Practices for Erosion and Sediment Control", latest issue. Copies and recent updates to these publications can be downloaded at: http://www.maine.gov/mdot/contractors/publications/

Proposals must be accompanied by an original bid bond, certified or cashier's check payable to the Maine Turnpike Authority in an amount not less than Five (5%) Percent of the Total Amount in the Proposal, but not less than $500.00. The Bidder to whom a Contract is awarded will be required to furnish a Surety Corporation Bond, satisfactory to the Authority, on the standard Contract Bond form of the Authority, for a sum not less than the Total Amount of the Proposal.

Proposals must be made upon the Proposal Forms furnished by the Authority separately with the Contract Documents, and must be enclosed in the sealed special addressed envelope provided therefore bearing the name and address of the Bidder, the name of the Contract, and the date and time of Proposal opening on the outside.

A pre-bid meeting will be held on October 22, 2019 at 10:00 a.m. at the office of the Maine Turnpike Authority, 2360 Congress St., Portland, ME. This pre-bid meeting is not required, but it is recommended.

The Authority reserves the unqualified right to reject any or all Proposals and to accept that Proposal which in its sole judgment will under all circumstances serves its best interest.

Very truly yours,

MAINE TURNPIKE AUTHORITY

_____

Nathan Carll
Purchasing Manager
Maine Turnpike Authority,
Portland, Maine

MAINE TURNPIKE AUTHORITY

PROPOSAL

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE FACILITY
MILE MARKER 92.7

TO MAINE TURNPIKE AUTHORITY:

The work consists of the following:

1. Construction of an approximate 10,400 square foot pre-engineered building consisting of a 4-bay equipment maintenance garage, 1 drive-thru wash bay, and a 1,975 SF mezzanine.

2. All site work, grading, drainage, septic field, underground power, power utility services and site utilities.

The work includes all building structure, mechanical, electrical, fire protection and plumbing, as well as all site work, grading, pavement, lighting, utilities, and all other work incidental thereto in accordance with the Plans and Specifications.

This Work will be done under a Contract known as Contract 2019.12 according to the Plans and Specifications which are on file in the office of the Maine Turnpike Authority, 2360 Congress Street, Portland, Maine.

On the acceptance of this Proposal for said Work, the undersigned will give the required bond with good security conditioned for the faithful performance of said Work, according to said Plans and Specifications, and the doing of all other work required by said Specifications for the consideration herein named and with the further condition that the Maine Turnpike Authority shall be saved harmless from any and all damages that might accrue to any person, persons or property by reason of the carrying out of said Work, or any part thereof, or by reason of negligence of the undersigned, or any person or persons under his employment and engaged in said Work.

The undersigned hereby declares that he/she has carefully examined the Plans, Specifications and other Contract Documents, and that he/she will contract to carry out and complete the said Work as specified and delineated at the price per unit of measure for each scheduled item of Work stated in the Schedule of Prices as follows:

It is understood that the TOTAL AMOUNT stated by the undersigned in the following Schedule of Prices is based on approximate quantities and will be used solely for the comparison of bids, and that the quantities stated in the Schedule of Prices for the various items are estimates only and may be increased or decreased all as provided in the Specifications.

Item No	**Item Description**	**Units**	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
203.20	COMMON EXCAVATION	Cubic Yard	2,000				
203.24	COMMON BORROW	Cubic Yard	400				
203.25	GRANULAR BORROW	Cubic Yard	1,300				
304.10	AGGREGATE SUBBASE COURSE - GRAVEL	Cubic Yard	2,050				
304.105	STRUCTURAL FILL	Cubic Yard	400				
403.207	HOT MIX ASPHALT, 19 MM	Ton	375				
403.208	HOT MIX ASPHALT, 12.5 MM	Ton	300				
409.15	BITUMINOUS TACK COAT, APPLIED	Gallon	250				
419.05	SAWING BITUMINOUS PAVEMENT	Linear Foot	550				
603.04	6” PVC DRAIN SERVICE	Linear Foot	40				
603.05	6” PVC PIPE – ROOF DRAIN OUTLET	Linear Foot	40				
603.06	10 INCH CORRUGATED PLASTIC PIPE - OPT III	Linear Foot	10				
603.132	8” CULVERT PIPE OPT III – ROOF DRAIN OUTLET	Linear Foot	40				
604.154	72” MANHOLE	EACH	1				

Item No	Item Description	Units	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
			BROUGHT FORWARD:				
604.158	UTILITY VAULT (6,000 GALLON HOLDING TANK)	Each	1				
610.08	PLAIN RIPRAP	Cubic Yard	5				
613.319	EROSION CONTROL BLANKET	Square Yard	400				
615.07	LOAM	Cubic Yard	80				
618.14	SEEDING METHOD NUMBER 2	Unit	5				
619.1201	MULCH - PLAN QUANTITY	Unit	5				
633.03	PROPANE SERVICE TRENCH	Linear Foot	105				
655.102	500 KCMIL WIRE	Linear Foot	550				
655.104	#8 AWG WIRE	Linear Foot	900				
655.106	#6 AWG WIRE	Linear Foot	120				
655.11	#10 AWG WIRE	Linear Foot	200				
655.12	#12 AWG WIRE	Linear Foot	680				
655.16	FIBER OPTIC CABLE	Linear Feet	900				
655.2001	1 1/2" SCHEDULE 80 PVC CONDUIT	Linear Foot	120				

Item No	Item Description	Units	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
			BROUGHT FORWARD:				
655.2002	1" SCHEDULE 80 PVC CONDUIT	Linear Foot	400				
655.2003	2" SCHEDULE 80 PVC CONDUIT	Linear Foot	50				
655.201	3" SCHEDULE 80 PVC CONDUIT	Linear Foot	1000				
655.202	4" SCHEDULE 80 PVC CONDUIT	Linear Foot	500				
655.209	4” GALVANIZED RIGID METAL CONDUIT	Linear Foot	1				
655.2100	1 “ LIQUID TIGHT METALLIC FLEXIBLE CONDUIT	Linear Foot	30				
655.2101	1 1/2" LIQUID TIGHT METALLIC FLEXIBLE CONDUIT	Linear Foot	30				
655.2102	2" LIQUID TIGHT METALLIC FLEXIBLE CONDUIT	Linear Foot	30				
655.31	UNDERGROUND PULL BOX	Each	2				
655.40	12" X 12" X 6" NEMA 3R JUNCTION BOX	Each	20				
655.50	2” PVC CONDUIT CONDULETS	Each	5				
655.51	4” PVC CONDUIT CONDULETS	Each	12				

Item No	Item Description	Units	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
			BROUGHT FORWARD:				
655.52	1" PVC CONDUIT CONDULETS	Each	20				
655.53	1½" PVC CONDUIT CONDULETS	Each	50				
655.55	3" PVC CONDUIT CONDULETS	Each	90				
655.75	CONCRETE ENCASED CONDUIT	Cubic Yard	500				
656.632	30" TEMPORARY SILT FENCE	Linear Foot	700				
659.10	MOBILIZATION	Lump Sum	1				
800.01	LITCHFIELD MAINTENANCE GARAGE	Lump Sum	1				
800.090	CONCRETE GENERATOR PAD	Lump Sum	1				
800.091	CONCRETE WASTE OIL TANK PAD	Lump Sum	1				
801.132	2” FORCE MAIN	Linear Foot	25				
801.16	6” PVC SANITARY SEWER (SDR-35)	Linear Foot	30				
802.23	SEWAGE DISPOSAL SYSTEM	LUMP SUM	1				

Item No	**Item Description**	**Units**	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
				BROUGHT FORWARD:			
802.241	1000 GALLON SEPTIC TANK WITH LIFT STATION	Each	1				
822.3213	2” COPPER SERVICE	Linear Foot	850				
825.343	SPECIAL WATER SERVICE FACILITY (5000 GALLON WATER TANK)	Lump Sum	1				
832.41	TYPE A STEEL SITE BOLLARD	Each	4				
					TOTAL:		

Acknowledgment is hereby made of the following Addenda received since issuance of the Plans and Specifications:

_____

_____

_____

Accompanying this Proposal is an original bid bond, cashiers or certified check on_____

_____ Bank, for _____

, payable to the Maine Turnpike Authority. In case this Proposal shall be accepted by the Maine Turnpike Authority and the undersigned should fail to execute a Contract with, and furnish the security required by the Maine Turnpike Authority as set forth in the Specifications, within the time fixed therein, an amount of money equal to Five (5%) Percent of the Total Amount of the Proposal for the Contract awarded to the undersigned, but not less than $500.00, obtained out of the original bid bond, cashier’s or certified check, shall become the property of the Maine Turnpike Authority; otherwise the check will be returned to the undersigned.

The performance of said Work under this Contract will be completed during the time specified in Subsection 107.1.

It is agreed that time is of the essence of this Contract and that I (we) will, in the event of my (our) failure to complete the Work within the time limit named above, pay to Maine Turnpike Authority liquidated

damages in the amount or amounts stated in the Specifications.

The undersigned is an Individual/Partnership/Corporation under the laws of the State of _____, having principal office at _____, thereunto duly authorized.

_____ (SEAL)

_____ (SEAL)

_____ (SEAL)

Affix Corporate Seal or Power of Attorney
Where Applicable

By: _____

Its:_____

Information below to be typed or printed where applicable:

INDIVIDUAL:

_____ _____
(Name) (Address)

PARTNERSHIP - Name and Address of General Partners:

_____ _____
(Name) (Address)

_____ _____
(Name) (Address)

_____ _____
(Name) (Address)

_____ _____
(Name) (Address)

INCORPORATED COMPANY:

_____	_____
(President)	(Address)
_____	_____
(Vice-President)	(Address)
_____	_____
(Secretary)	(Address)
_____	_____
(Treasurer)	(Address)

MAINE TURNPIKE AUTHORITY

CONTRACT AGREEMENT

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE FACILITY
MILE MARKER 92.7

This Agreement made and entered into between the Maine Turnpike Authority, and sometimes termed the "Authority", and_____

_____

_____

herein termed the "Contractor":

WITNESSETH: That the Authority and the Contractor, in consideration of the premises and of the mutual covenants, considerations and agreements herein contained, agree as follows:

FIRST: The parties hereto mutually agree that the documents attached hereto and herein incorporated and made a part hereof collectively evidencing and constituting the entire Contract to the same extent as if herein written in full, are the Notice to Contractors, the Accepted Proposal, the Specifications, the Plans, this Agreement, the Contract Bond and all Addenda to the Contract Documents duly issued and herewith enumerated:

_____

_____

SECOND: The Contractor for and in consideration of certain payments to be made as hereafter specified, hereby covenants and agrees to perform and execute all of the provisions of this Contract and of all documents and parts attached hereto and made a part thereof, and at his own cost and expense to furnish and perform everything necessary and required to construct and complete, ready for its intended purpose, in accordance with the Contract and such instructions as the Engineer may give, acceptable to the Authority, in the times provided, all of the Work covered and included under Contract No. _____covering _____as herein described.

THIRD: In consideration of the performance by the Contractor of his covenants and agreements as herein set forth, the Authority hereby covenants and agrees to pay the Contractor according to the Schedule of Prices set forth in the Proposal with additions and deductions as elsewhere herein provided in the times and in the manner stated in the Specifications. This Agreement shall insure to the benefit of, and shall be binding upon the parties hereto, and upon their respective successors and assigns; but neither party hereto shall assign or transfer his interest herein in whole or in part without the consent of the other, except as herein provided.

IN WITNESS WHEREOF the parties to this Agreement have executed the same in quintuplicate.

AUTHORITY -

MAINE TURNPIKE AUTHORITY

By: _____

Title: CHAIRMAN

Date of Signature: _____

ATTEST:

_____
Secretary

CONTRACTOR -

_____
CONTRACTOR

By: _____

Title: _____

Date of Signature: _____

WITNESS:

_____

MAINE TURNPIKE AUTHORITY

CONTRACT BOND

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE FACILITY
MILE MARKER 92.7

KNOW ALL MEN BY THESE PRESENTS that _____

of _____ in the County of _____ and State of _____

_____

as Principal, and _____ a Corporation duly organized under the laws of the State of _____ and having a usual place of business in _____

_____

As Surety, are held and firmly bound unto the Maine Turnpike Authority in the sum of _____

_____ Dollars ($_____.__), to be paid to said Maine Turnpike Authority, or its successors, for which payment, well and truly to be made, we bind ourselves, our heirs, executors, successors and assigns jointly and severally by these presents.

The condition of this obligation is such that the Principal, designated as Contractor in the foregoing Contract No. _____ shall faithfully perform the Contract on his part and satisfy all claims and demands incurred for the same and shall pay all bills for labor, material, equipment and all other items contracted for, or used by him, in connection with the Work contemplated by said Contract, and shall fully reimburse the Obligee for all outlay and expense which the Obligee may incur in making good any default of said Principal, then this Obligation shall be null and void; otherwise it shall remain in full force and effect.

Signed and sealed this _____ day of _____, A.D., 201____

Witnesses: CONTRACTOR

_____ _____ *(SEAL)*

_____ _____ *(SEAL)*

_____ _____ *(SEAL)*

SURETY

_____ _____
(SEAL)

_____ _____
(SEAL)

_____ _____
(SEAL)

(Surety must attach copy of Power of Attorney showing authority of Office or Agent to execute bonds)

MAINE TURNPIKE AUTHORITY

FINAL LIEN AND CLAIM WAIVER AND AFFIDAVIT

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE FACILITY
MILE MARKER 92.7

Upon receipt of the sum of_____, which sum represents the total amount paid, including the current payment for work done and materials supplied for Project No. _____, in_____, Maine, under the undersigned's Contract with the Maine Turnpike Authority.

The undersigned, on oath, states that the Final Payment of_____ is the final payment for all work, labor, materials, services and miscellaneous (all of which are hereinafter referred to as "Work Items") supplied to the said Project through_____ and that no additional sum is claimed by the undersigned respecting said Project.

The undersigned, on oath, states that all persons and firms who supplied Work Items to the undersigned in connection with said Project have been fully paid by the undersigned for such Work Items or that such payment will be fully effected immediately upon receipt of this payment.

In consideration of the payment herewith made, the undersigned does fully and finally release and hold harmless the Maine Turnpike Authority, and its Surety, if any, from any and all claims, liens or right to claim or lien, arising out of this Project under any applicable bond, law or statute.

It is understood that this Affidavit is submitted to assure the Owner and others that all liens and claims relating to the Work Items furnished by the undersigned are paid.

_____
(Contractor)

By: _____

Title: _____

State of MAINE

County of _____

I,_____, hereby certify on behalf of _____
(Company Officer) *(Company Name)*

its_____, being first duly sworn and stated that the foregoing representations are
(Title)

---

are true and correct upon his own knowledge and that the foregoing is his free act and deed in said capacity and the free act and deed of the above-named _____
. *(Company Name)*

The above-named,_____, personally appeared before me this____day of _____ and swears that this is his free act and deed.

(SEAL)

_____

Notary Public

My Commission Expires: _____

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART I – SUPPLEMENTAL SPECIFICATIONS

(Rev. November 10, 2016)

CONTRACT 2019.12

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE FACILITY
MILE MARKER 92.7

The Supplemental Specifications are not included in these contract documents but are available at MaineTurnpike.com for download.

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART II – SPECIAL PROVISIONS

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE FACILITY
MILE MARKER 92.7

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART II - SPECIAL PROVISIONS

All work shall be governed by the Maine Department of Transportation Standard Specifications, Revision of November 2014, except for that work which applies to sections of the Maine Department of Transportation Standard Specifications which are amended by the Maine Turnpike Supplemental Specifications and the following modifications, additions and deletions.

General Description of Work

The work consists of replacing the constructing a 10,400 square foot maintenance building with 4-maintenance bays and 1 drive thru wash bay. Within this space is a 1,975 square foot mezzanine space over occupied lower level space. The mezzanine will be used to store parts and mechanical equipment. Area beneath the mezzanine will be offices, restrooms, locker spaces, parts and bulk fluid storage spaces.

All associated site utilities, septic and wells systems, overhead power service, earthwork and pavement are a part of this contract.

Plans

The drawings included in these Contract Documents, and referred to as the Plans, show the general character of the work to be done under this Contract. They bear the general title "Maine Turnpike – Contract 2019.12 – New Mechanics Garage, Litchfield Maintenance Garage, Litchfield Maintenance Yard at Mile Marker 92.7". The right is reserved by the Resident to make such minor corrections or alterations in the Plans as he deems necessary without change in the unit prices on the Schedule of Prices of the Proposal.

101.2 Definition

Holidays

The following is added after Memorial Day in the Supplemental Specifications:

Christmas Day 2019	12:01 p.m. (Noon) preceding Friday to 6:00 a.m. the following Thursday.
New Year's Day 2020	12:01 p.m. (Noon) preceding Friday to 6:00 a.m. the following Thursday.
Independence Day 2020 (Fourth of July)	12:01 p.m.(Noon) preceding Thursday to 6:00 a.m. the following Monday.
Christmas Day 2020	12:01 p.m. (Noon) preceding Wednesday to 6:00 a.m. the following Monday.
New Year's Day 2021	12:01 p.m. (Noon) preceding Wednesday to 6:00 a.m. the following Monday.

Independence Day 2021 (Fourth of July)	12:01 p.m.(Noon) preceding Friday to 6:00 a.m. the following Monday.

103.4 Notice of Award

The following sentence is added:

The Maine Turnpike Authority Board is scheduled to consider the Contract Award on November 21, 2019.

104.3.8 Wage Rates and Labor Laws

Section 104.3.8 Wage Rates and Labor Laws has been amended as follows:

The fair minimum hourly rates determined by the State of Maine Department of Labor for this Contract are as follows:

THIS DOCUMENT MUST BE CLEARLY POSTED AT THE PERTAINING STATE FUNDED PREVAILING WAGE CONSTRUCTION SITE

State of Maine Department
of Labor Bureau of Labor
Standards
Augusta, Maine 04333-0045
Telephone (207) 623-7906

Wage Determination - In accordance with 26 MRS §1301 et. seq., this is a determination by the Bureau of Labor Standards, of the fair minimum wage rate to be paid laborers and workers employed on the below title project.

Title of Project -------- MTA 2019.12-Litchfield Maintenance Garage & Yard-MM 92.7
Location of Project – Litchfield, Kennebec County

2019 Fair Minimum Wage Rates
Building 2 Kennebec County
(other than 1 or 2 family homes)

Occupation Title	Minimum Wage	Minimum Benefit	Total	Occupation Title	Minimum Wage	Minimum Benefit	Total
Asbestos/Lead Removal Worker	$13.25	$0.82	$14.07	Ironworker - Structural	$22.50	$3.00	$25.50
Backhoe Loader Operator	$22.00	$5.08	$27.08	Laborers (Helpers & Tenders)	$16.00	$1.04	$17.04
Boilermaker	$24.00	$9.00	$33.00	Laborer - Skilled	$18.05	$2.79	$20.84
Bricklayer	$24.25	$2.04	$26.29	Loader Operator - Front-End	$19.00	$3.00	$22.00
Bulldozer Operator	$20.00	$3.71	$23.71	Mechanic- Maintenance	$25.00	$3.94	$28.94
Carpenter	$21.50	$3.79	$25.29	Mechanic- Refrigeration	$26.00	$5.16	$31.16
Carpenter - Acoustical	$19.50	$2.03	$21.53	Millwright	$29.47	$10.77	$40.24
Carpenter - Rough	$20.00	$1.03	$21.03	Oil/Fuel Burner Serv& Installer	$23.00	$3.51	$26.51
Cement Mason/Finisher	$19.50	$2.11	$21.61	Painter	$16.50	$0.00	$16.50
Communication Equip Installer	$22.20	$3.67	$25.87	Pipe/Steam/Sprinkler Fitter	$25.25	$5.95	$31.20
Concrete Mixing Plant Operator	$22.11	$4.92	$27.03	Plumber (Licensed)	$25.00	$4.04	$29.04
Crane Operator =>15 Tons)	$28.00	$8.45	$36.45	Plumber Helper/Trainee	$21.00	$3.37	$24.37
Dry-Wall Applicator	$22.00	$0.00	$22.00	Propane/Natural gas serv/inst	$26.00	$4.03	$30.03
Dry-Wall Taper & Finisher	$22.91	$1.08	$23.99	Pump Installer	$16.13	$3.14	$19.27
Electrician - Licensed	$27.00	$4.53	$31.53	Rigger	$22.25	$6.60	$28.85
Electrician Helper/Cable Puller	$17.00	$1.24	$18.24	Roofer	$15.00	$2.79	$17.79
Excavator Operator	$20.50	$2.91	$23.41	Sheet Metal Worker	$19.52	$3.12	$22.64
Fence Setter	$15.00	$2.00	$17.00	Sider	$16.75	$1.38	$18.13
Flagger	$13.00	$0.00	$13.00	Stone Mason	$21.00	$0.95	$21.95
Floor Layer	$20.00	$3.06	$23.06	Truck Driver - Light	$17.00	$1.17	$18.17
Glazier	$17.25	$0.89	$18.14	Truck Driver - Medium	$19.00	$3.37	$22.37
HVAC	$24.88	$2.71	$27.59	Truck Driver - Heavy	$17.00	$1.09	$18.09
Insulation Installer	$20.25	$2.88	$23.13	Truck Driver - Tractor Trailer	$17.15	$1.08	$18.23
Ironworker - Reinforcing	$16.00	$2.79	$18.79	Truck Driver - Mixer (Cement)	$17.88	$3.15	$21.03

The Laborer classifications include a wide range of work duties. Therefore, if any specific occupation to be employed on this project is not listed in this determination, call the Bureau of Labor Standards at the above number for further clarification.
Welders are classified in the trade to which the welding is incidental.

Apprentices - The minimum wage rate for registered apprentices are those set forth in the standards and policies of the Maine State Apprenticeship and Training Council for approved apprenticeship programs.

Posting of Schedule - Posting of this schedule is required in accordance with 26 MRS §1301 et. seq., by any contractor holding a State contract for construction valued at $50,000 or more and any subcontractors to such a contractor.

Appeal - Any person affected by the determination of these rates may appeal to the Commissioner of Labor by filing a written notice with the Commissioner stating the specific grounds of the objection within ten (10) days from the filing of these rates with the Secretary of State.

Determination No: **B2-080-2019**

A true copy

Filing Date: **July 2, 2019**

Attest: Scott R. Cotnoir

Scott R. Cotnoir
Wage & Hour Director
Bureau of Labor
Standards

BLS 424BU (R2019) (Building 2 Kennebec)

104.4.6 Utility Coordination

This Subsection is amended by the addition of the following:

These Special Provisions outline the arrangements which have been established by the Authority for coordination of the work to be accomplished by the utilities. The scope and schedule of utility relocation work is noted herein. The Contractor shall plan and conduct his work accordingly.

General

Utility working days are Monday through Friday, conditions permitting. Times are estimated on the basis of a single crew for each utility. Any times and dates mentioned are estimates only and are dependent upon favorable weather, working conditions, and freedom from emergencies. The Contractor shall have no claim against the Authority if they are exceeded.

The Contractor shall plan and conduct his operations in accordance with the following utility schedule. The Contractor must comply with all OSHA regulations pertaining to work adjacent to utility wires. The Contractor shall plan and conduct his work accordingly.

The following utilities are located within the Project limits. The Contractor shall ascertain the location of the existing utilities and any other necessary information by direct inquiry at the office of the following utility owners:

AERIAL AND UNDERGROUND UTILITIES

ELECTRIC:
Central Maine Power Company
83 Edison Drive
Augusta, ME 04336
(207) 626-9443
ATTN: Tim Robbins

WATER: N/A

CENTRAL MAINE POWER (CMP)

CMP will be setting new pole, service and transformer for the proposed Maintenance Facility Building. The contractor shall be responsible for the conduit and junction boxes from the new pole to the new mechanics garage.

The contractor shall notify CMP ten (10) working days prior to the utility coordination meeting. The coordination effort is to relay contractor's construction schedule, determine possible covering of aerial conductors and schedule of the new service.

104.4.6.1 Temporary Utilities

The Contractor will be required to maintain all services and utilities to the existing facility throughout construction. Existing services and utilities include, but are not necessarily limited to, power, telephone, water, sewer, propane, heat and site/roadway lighting. The Contractor shall be responsible for all temporary connections, service runs, relocation, disconnections, reconnections, etc. required to maintain these services

due to phasing of construction and constraints of the site and work area. This includes any needed temporary services for the New Maintenance Garage. Temporary power can be provided on wooden poles located outside the clear zone or protected. The contractor shall coordinate with the Resident and MTA on a temporary service.

Prior to start of construction, the Contractor shall submit a plan and schedule for maintaining existing services and utilities. The plan shall identify all proposed temporary connections, service runs, relocations, disconnections, reconnections, etc. and shall reflect construction phasing and the Contractor's proposed sequence of work. Maintaining existing services and utilities and all temporary utility work, including proposed temporary connections, service runs, relocations, disconnections, reconnections, etc. shall be incidental to Contract 2019.12.

107.1 Contract Time and Contract Completion Date

All work for Contract 2019.12 shall be completed within 300 days of starting the work or by the following dates, whichever comes first:

- Substantial Completion: May 7, 2021
- Final Completion: May 28, 2021

MTA will entertain a start date for this work that fits within the contractor's schedule beginning after a successful MTA approval on November 21, 2019 and completed on or before the above completion dates. Liquidated damages will occur for each day after 300 days from start date or following the above completion dates.

107.1.1 Substantial Completion

This subsection is amended by the addition of the following:

Substantial completion is defined as having completed the following work:

1. Installation and commissioning of new water system, including all underground piping, tanks, manholes, pumps and controls, electrical work, treatment systems and connections to other buildings on the site;
2. Installation and commissioning of new septic system, including leach field, septic tank, pump, controls, electrical work and piping;
3. Installation and commissioning of new 6,000 gallon holding tank and high-level warning system;
4. Installation and commissioning of new building electrical and communication systems;
5. Substantially completed construction of the New Mechanics Building, including construction of all building foundation, framing and insulation, roofing, siding, doors, and commissioning of all building electrical, mechanical, heating, cooling, plumbing, and communication systems;
6. Completion of Interior finish carpentry and painting;
7. Base pavement and surface pavement has been placed to lines and grades shown on plans.

Supplemental Liquidated damages on a calendar day basis in accordance with Supplemental Specifications Subsection 107.8 shall be assessed for each calendar day that substantial completion is not achieved. The Contractor will be responsible for paying the per diem costs listed in the Supplemental Specifications Subsection 107.7.2 Schedule of Liquidated Damages for each day that substantial completion is not achieved by the specified date.

107.4.6 Limitations of Operations

Construction of the New Mechanics Garage shall not interfere with Highway and Equipment Maintenance operations at any time.

The Contractor shall submit his proposed staging and storage areas for approval by the Resident. All stored equipment must be located so as to not interfere with Highway and Equipment maintenance operations.

SPECIAL PROVISION

SECTION 203

EXCAVATION AND EMBANKMENT

203.01 Description

The following paragraph is added:

The work shall consist of cutting, removing and disposing of the existing bituminous concrete pavement within the limit or work shown on the Plans or as approved by the Owner.

The work shall also include the removal and disposal of any uncontrolled fills encountered during excavation activities.

203.04 General

The following sentence is added to the end of the third paragraph.

There are no approved waste storage areas or waste areas within the Project limits unless shown on the Plans. Unsuitable materials shall be disposed of off-site in accordance with Subsection 203.06.

All excavations shall be accomplished in accordance with the applicable OSHA Standards. The Resident reserves the right to request the Contractor to prepare an excavation plan. This plan shall include, but not necessarily be limited to, the limit and depth of excavation, side slope, shoring, trench box and utility support.

203.10 Embankment Construction - General

The thirteenth and fourteenth paragraphs are deleted and replaced with the following:

All portions of the embankment shall be compacted in accordance with the designated embankment compaction requirements specified for the Project.

The existing slopes should be benched as shown on the drawings prior to placing additional fill. Embankment fill should be placed in lifts which extend laterally beyond the limits of the design side slopes such that the specified degree of compaction is achieved within the limits of the completed embankment. The slopes should then be trimmed back to design dimensions.

203.16 Winter Construction of Embankments

The word “core” is deleted from the first and second sentences in the first paragraph.

203.18 Method of Measurement

The following paragraphs are added:

There will be no additional payment for the required excavation plan, and costs shall be incidental to the Excavation items. Removal of pavement shall incidental to Pay Item 203.20 Common Excavation.

Compaction of common borrow, granular borrow, and recycled asphalt pavement per the specifications shall be incidental to the respective Pay Items as shown in 203.19

Removal and disposal of any uncontrolled fills encountered during excavations shall be paid for at the Pay Item 203.20 Common Excavation.

The costs for additional fill related to the removal of uncontrolled or unsuitable material encountered below parking areas shall be paid at the unit price of Pay Item 203.24 Common Borrow.

The costs for additional fill related to the removal of uncontrolled or unsuitable material encountered below building areas shall be paid at the unit price of Pay Item 203.25 Granular Borrow.

SPECIAL PROVISION

SECTION 304

AGGREGATE BASE AND SUBBASE COURSES

The provisions of Section 304 of the Standard Specifications shall apply with the following additions and modifications:

304.02 General

Sources of Aggregate and preliminary test results shall be submitted ten working days prior to any placement of material on the job. Failure of these preliminary tests will be grounds for rejection of material from that source. Aggregates will be tested on the job and shall meet these specifications as the material is incorporated into the work.

304.07 Basis of Payment

The costs for laboratory testing and source documentation shall be incidental to providing Type “D” gravel. The costs for all failing tests shall be the responsibility of the contractor.

No additional payment will be made for the temporary placement of gravels during construction.

SPECIAL PROVISION

SECTION 403

HOT MIX ASPHALT PAVEMENT

Full Depth Pavement – Trench Patching

Course	HMA Grading	Item Number	Total Thickness	No. of Layers	Complimentary Notes
Wearing	**12.5mm**	**403.208**	**2.0”**	**1**	**C,I**
Base	**19.0mm**	**403.207**	**2.5”**	**1**	**C,I**

COMPLEMENTARY NOTES

A. The required PGAB for this mixture shall be **64E-28.**
B. RAP may not be used.
C. The Maine DOT will conduct the job mix verification. The aggregate qualities shall meet the design traffic level of 3 to <10 million ESALS for mix placed under this contract. Minimum and Maximum PGAB content limits from 401.21 shall not apply.
D. The MTA will conduct the job mix verification. The aggregate qualities shall meet the design traffic level of 10 to <30 million ESALS for mix placed under this contract. The design verification, Quality Control, and Acceptance tests for this mix will be performed at **75 gyrations**. (N design)
E. A material transfer vehicle (MTV) shall be used for the placement of Hot Mix Asphalt wearing surface on all roadways including acceleration and deceleration lanes and all ramps.
F. Joints shall be constructed as the “notched wedge” type in accordance with Subsection 401.17.
G. Joint density will be measured in accordance with Subsection 401.165.
H. PGAB shall conform to the provisions of 403.02 – Polymer Modified PGAB for HMA
I. The contractor shall furnish a quality control technician equipped with an approved densometer to ensure density requirements are met.
J. Hydrated Lime shall be incorporated into the mixture.
K. The antistrip additive Zycotherm manufactured by Zydex Industries shall be incorporated into the PGAB at a rate of 0.1%.

SPECIAL PROVISION

SECTION 409

BITUMINOUS TACK COAT

409.01 Description

This Subsection is deleted and replaced with the following:

This work consists of furnishing and applying one uniform application of RS-1 or RS-1h tack or an approved equal as indicated in this specification and as per manufacturers' recommendation. The application rate shall be 0.06 gal/yd^2

409.05 Equipment

Add "or as determined by the Resident", after the words "gal/yd^2]" in the fourth line of the second paragraph of this Subsection.

409.06 Preparation of Surface

The following paragraph is added:

All existing pavement and shoulder areas on which bituminous concrete mixtures are to be placed shall receive a tack coat. The surface area where the tack coat is to be applied shall be dry and cleaned of all dirt, sand, and loose material. Cleaning shall be accomplished by use of revolving brooms or mechanical sweepers. Undesirable material not removed by the above means shall be cleaned by hand sweeping or scraping, or a combination of both. Small areas otherwise inaccessible may be swept with hand brooms. The tack coat shall be applied only when the existing surface is dry.

409.08 Method of Measurement

The following paragraphs are added:

Measurement will be based on delivery slips made out in duplicate by the Contractor and signed by the Resident, or his representative, at the point of delivery. One of these slips shall be retained by the Resident and one by the Contractor. Delivery slips shall be furnished by the Contractor and shall provide space for identifying the vehicle and driver, for stating the volume of material carried, the source of the material, the date, and the Resident or his representative's signature.

Material included in the delivery slips and not used or rejected shall be deducted from the amount being measured for payment. Each day's delivery slips shall be reconciled by the Contractor and the Resident within 24-hours.

Cleaning of the surface area where tack coat is to be applied shall be incidental to Item 409.152, Bituminous Tack Coat - Applied.

SPECIAL PROVISION

SECTION 419

SAWING AND SEALING JOINTS IN BITUMINOUS PAVEMENT

(Sawing Bituminous Pavement)

419.01 Description

This work consists of sawing bituminous concrete pavement as shown on the Plans, as specified herein or as approved by the Resident.

419.02 General

The bituminous concrete pavement to be sawed shall be accurately marked before cutting. The marking shall be in accordance with the locations as shown on the Plans or as approved by the Resident. Cutting shall be with an approved power driven saw with an abrasive blade.

Unless otherwise noted or directed, the sawcut shall be vertical, a minimum of 3/8 inch wide, and extend to the depth as shown on the Plans.

Residue or debris from the sawing operation shall be removed immediately and legally disposed of by the Contractor.

419.03 Method of Measurement

Sawing Bituminous Pavement will be measured by the linear foot of pavement actually cut and accepted. No additional payment will be made for variations in the pavement thickness.

419.04 Basis of Payment

Sawing Bituminous Pavement will be paid for at the Contract unit price per linear foot which shall be full compensation for all materials, tools, equipment labor, and all incidentals necessary for the completion of the work to the satisfaction of the Resident. The disposal of sawcut residue shall be incidental to this item.

Payment will be made under:

Pay Item		Pay Unit
419.05	Sawing Bituminous Pavement	Linear Foot

SPECIAL PROVISION

SECTION 603

PIPE CULVERTS AND STORM DRAINS

(Corrugated Polyethylene Pipe)

(PVC Pipe)

603.01 Description

The following paragraphs are added:

This work shall also consist of furnishing and installing various sizes of corrugated HDPE pipe, including a dual wall adaptor fitting by Hancor or an approved equal as shown on the plans. No other pipe types within the Option III alternatives will be accepted.

603.02 Materials

All Corrugated High-Density Polyethylene (HDPE) pipe for storm water and drainage systems shall meet the requirements of Subsection 706.06.

603.11 Method of Measurement

The following paragraph is added:

For measurement purposes the end of the pipe in closed structures will be considered at the inside face of the wall of the structure, and in masonry headwalls it will be considered to be at least the face of the headwall.

603.12 Basis of Payment

Corrugated HDPE pipe will be paid for under the appropriately sized Culvert Pipe Option III pay items.

Payment for trench excavation to the established trench profile indicated on the plans, with the exception of structural rock excavation and pavement section removal, will be included in the cost of the applicable pay item. Pipe bedding materials, backfilling and backfilling materials shall also be included in the cost of the applicable pipe pay item.

The costs for PVC bends, retainer glands and thrust blocking shall be incidental to the appropriate pipe item.

Payment will be made under:

Pay Item		Pay Unit
603.06	10” Corrugated Plastic Pipe – OPT III	Linear Foot
603.132	8” Culvert Pipe OPT III – Roof Drain Outlet	Linear Foot

SPECIAL PROVISION

SECTION 604

MANHOLES, INLETS AND CATCH BASINS

604.01 Description

This work shall consist of the construction and placement of all structures and holding tanks.

604.02 Materials

Frame and Cover for Manhole and Holding tank shall be Neenah R-1156A or equivalent

See Division 22 for pumping and internal piping for the pump manhole.

High Water Alarm:

Provide float type non-mercury switches, encapsulated within a solid polyurethane float ball. Provide level sensors with individual float weights to detect high water level in the holding tank. Provide a mounting bracket near the access opening to allow adjustment of the control and alarm levels. Furnish each non-mercury float switch with cable lengths to suit the installation without splices (control panel is remotely mounted). A properly rated electrical cable with a screwed, sealing type, cord-grip shall connect the switches to the electrical junction box. Float switches to be installed with Primex float switch connection system or equivalent.

604.06 Basis of Payment

The first paragraph shall be amended by adding the following:

The cost of furnishing and installing steps, installing reinforced steel concrete stubs and other appurtenances shall be considered as incidental to the structure and no separate payment will be made therefore. The cost of furnishing and installing the high water alarm system shall be incidental to the structure and no separate payment will be made therefore. The cost of furnishing and installing the sump pump discharge line and removable floor grate shall be incidental to the pump manhole.

Pay Item		Pay Unit
604.154	72” Manhole (Pump Manhole)	Lump Sum
604.158	Utility Vault (6000 Gallon Holding Tank)	Each

SPECIAL PROVISION

SECTION 613

EROSION CONTROL BLANKET

613.01 Description

This work shall also include seeding, mulching and watering the side slopes and non-impervious areas as shown on the plans or directed by the Owner.

613.02 Materials

The following sentences are added:

Seeding shall meet the requirements of Section 618, Seeding, Method Number 2. Mulch shall meet the requirements of Section 619.

The following Subsection is added: 613.041

Maintenance and Acceptance

See Section 618.10 for maintenance and acceptance of seeding.

613.042 Mulch

All mulch shall be placed after the area has been seeded and prior to the installation of the Erosion Control Blanket.

613.09 Basis of Payment

The following "and mulch" is added after the words "initial seeding" in the second sentence.

SPECIAL PROVISION

SECTION 615

LOAM

The Supplemental Specification shall replace Section 615, 618 and 619 of the Standard Specifications:

615.01 Description

This work shall consist of loaming, seeding and mulching areas as shown on the plans or as required. Include restoration of existing lawn and seeded areas disturbed by Work as well as new lawn and seeded areas indicated

615.02 Submittals

Loam/topsoil testing: Provide soils testing by an approved soil testing laboratory for any loam/topsoil to be used. Submit the following: pH, mechanical analysis, percentage of organic content, recommendations on type and quantity of additives to establish satisfactory pH level and supply of nutrients to bring topsoil to satisfactory level for planting.

Certification: Submit manufacturers or vendors certified analysis for soil amendments and fertilizer materials. Submit other data substantiating that materials comply with specified requirements.

Seed Mix: Submit certificate that seed mix meets the specified grass species, proportions and minimum percentages of purity, germination and maximum percentage of weed seed.

Seeding Schedule: Submit proposed schedule for seeding work. Once accepted, revise dates only after request in writing including documentation of reason for delays, and approval of the Department of Public Works.

615.04 Materials

Loam/topsoil: Conform to the requirements of Section 615. Loam shall have a finished depth of four (4) inches, unless noted otherwise on the plans and shall be screened and free of foreign materials greater than 1 inch in every dimension. Acidity range shall be between 5.0 and 7.0 and shall contain not less than 6% organic matter by weight as determined by loss on ignition of moisture-free samples dried at 65 degrees C.

Soil amendments:

1. Fertilizer: Provide a complete fertilizer and a standard product complying with the State and United States fertilizer laws. Deliver to site in original unopened containers which shall bear the manufacturer’s name and guaranteed statement of analysis. At least 40% by weight of the nitrogen content of fertilizer shall be derived from organic materials. Fertilizer shall contain not less than 10% nitrogen, 10% phosphorus, and 10% potash by weight of ingredients or as otherwise indicated by topsoil test results.
2. Superphosphate: Finely ground phosphate rock as commonly used for agricultural purposes, containing not less than 18 percent available phosphoric acid.
3. Ground limestone: Dolomitic limestone and contain not less than 85% of total carbonates and magnesium, ground to such fineness that 50% will pass a 100 mesh sieve and 90% will pass through a 20 mesh sieve. Coarser material will be accepted provided the specified rates of application are increased proportionately on the basis of quantities passing the 100 mesh sieve.
4. Humus: Reed peat, sedge peat or moss peat furnished air dried, finely shredded and suitable for horticultural use.

5. Compost: Commercially processed, well composted food waste, wood ash, leaf and yard waste, wood waste, shredded paper and other acceptable materials and containing no chemicals or ingredients harmful to plants. Compost processing temperatures should exceed 131 degrees to kill any weed seeds and disease organisms.

Seed mix: Provide fresh, clean, new-crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Provide seed mixture composed of grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified. Purchase seed only from a recognized distributor, and composed of the following varieties mixed in proportions indicated. Seed shall test to minimum percentages of purity and germination specified.

Grass Seed Mixture	Proportion by Weight	% Germination
KenBlue Kentucky Bluegrass	20%	80
Trifecta Perennial Ryegrass	30%	80
Creeping Red Fescue	40%	85
Chewings Fescue	10%	80

Mulch:

1. Mechanical method: Provide long fibered hay or straw mulch free from noxious weeds and other undesirable material. Use no material which is excessively wet, decayed or compacted as to inhibit even and uniform spreading. Use no chopped hay, grass clippings or other short fibered material unless approved by the Department of Works.

2. Hydraulic spray method: Provide cellulose fiber mulch consisting of natural wood, recycled paper or humus cellulose fiber containing no materials which will inhibit seed germination or plant growth. Add sufficient quantity of non-toxic water soluble green dye to provide a definite color contrast to ground surface to aid in uniform distribution

615.05 Execution

Preparation:

1. Planting soil (loam/topsoil) depths shall be not less than 4 inches unless otherwise noted. Loosen subgrade of lawn areas to a minimum depth of 4 inches.
2. Remove stones over 1 ½ inches in any dimensions and sticks, roots, rubbish and other extraneous matter.
3. Limit preparation to areas which will be planted promptly after preparation.
4. Place topsoil and add specified soil amendments and mix thoroughly into the loam.
5. Fine Grading: Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture. Roll, rake and drag lawn areas, remove ridges and fill depressions as required to meet finish grades. Remove all lumps, clots, stones, roots and other extraneous matter greater than 1 inch size. Roll to compact topsoil surface sufficient to support pedestrian traffic without leaving footprints greater than ½ inch deep.
6. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.
7. Restore lawn areas to specified soil condition if eroded or otherwise disturbed after fine grading and prior to planting.

615.06 Method of Measurement

Loam, Seed, and Mulch will be paid for at the contract unit price per square yard.

615.07 Basis of Payment:

The accepted quantity will be paid for at the contract unit price per square yard. This item shall include the cost of excavation and all labor, materials, and equipment necessary to satisfactorily provide loam, seed, and mulch in all areas disturbed by Contractor's operations. All costs for watering, furnishing labor and equipment for mowing will not be paid for separately, but shall be considered as incidental to this pay item.

SPECIAL PROVISION

SECTION 633

UTILITY TRENCH

(Propane Service Trench)

633.01 Description

Work shall consist of excavating, hauling, disposing, backfilling and compacting of all materials for the construction of a utility trench in accordance with the Specifications and in reasonably close conformity with the lines, grades, thickness and typical sections shown on the Plans. The utility trench shall be constructed for the installation of propane gas lines.

633.02 Materials

Backfilling shall consist of placing suitable material in all spaces excavated and not occupied by the utility lines up to the loam elevation. Backfill shall be excavated material or select backfill as directed by the engineer, placed at or near optimum moisture content and shall not contain stones larger than three inches, frozen lumps, chunks of clay, organic matter or other objectionable material.

Sand borrow bedding material shall meet the requirements of Subsection 703.01. 633.03

Construction

The Contractor shall coordinate the construction of the utility trench with the Authority's current propane supplier, through the Resident. Backfill shall be in accordance with Section 206, Structural Excavation. Propane gas lines shall be furnished and installed by the Authority's propane gas supplier. Excavation, bedding and backfill shall be completed by the Contractor.

Warning tapes shall be a metallic/detectable type made of solid yellow film with continuously printed black-letter caption: "CAUTION—PROPANE GAS BURIED BELOW". The warning tape shall be acid and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, six inches wide and four mils thick, continuously inscribed with a description of the utility.

633.04 Method of Measurement

Propane Service Trench shall be measured by the linear foot along the centerline of the trench complete and accepted.

633.05 Basis of Payment

Payment shall be made for at the Contract unit price for the total number of linear feet of trench completed and accepted, which shall be full compensation for all excavation, backfill, compaction, coordination, materials, equipment and incidental items necessary to complete the work to the satisfaction of the Resident.

Payment will be made under:

Pay Item		Pay Unit
633.03	Propane Service Trench	Linear Foot

SPECIAL PROVISION

SECTION 655

ELECTRICAL WORK

655.01 Description

All work shall be governed by the Standard Specifications except for that work which applies to those sections of the Standard Specifications which are amended by the following modifications, additions and deletions.

Specifically, for the electrical work (in addition to standards specified in individual work sections), the following standards are imposed, as applicable to the work in each instance:

- § NEC, National Electrical Code (NFPA No. 70)
- § NFPA No. 101, Life Safety Code
- § ANSI C 2, National Electrical Safety Code
- § ANSI C 73, Dimensions of Attachment Plugs and Receptacles
- § NECA standards for installation
- § NEMA standards for materials and products
- § UL, Underwriters Laboratories

The Contractor will warranty the material supplied by them and their workmanship for a minimum of one (1) year from acceptance of the project.

655.02 General Provisions

RELATED DOCUMENTS

General provisions of this Contract, including General Provisions and Special Provisions, apply to work of this section.

SUMMARY

This Section specifies several categories of provisions for electrical work, including:

1. Certain adaptive expansions of requirements specified in the Special Provisions.
2. General performance requirements within the electrical systems.
3. General work to be performed as electrical work, because of its close association.

SUMMARY OF ELECTRICAL WORK

General Outline: The facilities and systems of the electrical work can be described (but not by way of limitation) as follows:

1. Installation of underground wiring in conduit, including the electrical connections to equipment.

2. Installation of temporary and interim provisions.

Permits and Fees: This work shall include the procurement of and payment for any andall permits and fees required for the performance of the electrical work including those that may be required from local utilities for services.

COORDINATION OF ELECTRICAL WORK

Refer to Part II, Special Provisions for general coordination requirements applicable to the entire work. It is recognized that the Contract documents are often diagrammatic in showing certain physical relationships, which shall be established within the electrical work, and in its interface with other work including utilities and mechanical work, and that such establishment is the exclusive responsibility of the Contractor.

Arrange electrical work in a neat, well organized manner with conduit and similar services running parallel with primary lines of the building construction, and with a minimum of 7'0" overhead clearance where physical limitations permit.

Locate operating and control equipment properly and in accordance with the NEC, to provide easy access, and arrange entire electrical work with adequate access for operation and maintenance.

Coordination of Options and Substitutions: Where the Contract documents permit the selection from several product options, and where it becomes necessary to authorize a substitution, the Contractor shall not proceed with purchases until coordination of all interface requirements has been checked and satisfactorily established. Substitutions are subject to approval by the Authority or designated representative per the requirements of the Contract documents.

SUBMITTALS FOR ELECTRICAL WORK

For electrical work, submittals are required for each category of items listed below.

- § Shop Drawings, Product Data, Certifications, Test Reports, Warranties, Guarantees, Installation Drawings, and Work Checklist in Appendix G.
- § Installation Drawings shall be modified and submitted to reflect any changes during installation of electrical equipment.

The Contractor, prior to forwarding shop drawings and product data to the Resident, shall check all conditions, make all corrections and sign and date each set. No shop drawings will be reviewed by the Resident without the signature of the Contractor, which shall signify that he has checked the submittals.

PRODUCTS, ELECTRICAL WORK

Refer to Divisions 600 and 700 of the Standard Specifications for general requirements on products, materials and equipment. The following provisions expand or modify the requirements as applicable to electrical work:

Compatibility: Provide products, which are compatible with other products of the electrical work and with other work requiring interface with the electrical work, including electrical connections and control devices. For exposed electrical work, coordinate colors and finishes with other work.

FLOOR AND WALL PENETRATIONS

Where electrical materials penetrate walls or floors that are a part of a fire separation or assembly, the opening shall be effectively sealed to maintain separation integrity. Openings shall be closed using General Electric RTV850 Silicone RTV Foam, or approved equal to form a fire rated, water-tight seal, and be installed with automatic mixing only. The penetration seal materials shall pass ASTM E 814 (UL 1479) Standard Method of Fire Tests for Through Penetration Fire Stops up to the required fire resistance.

Where conduits penetrate a wall, floor or ceiling that is part of a weatherproof barrier, a non-shrink weatherproof type grout and or Sika 1A caulking shall be used, in accordance with manufacturer's installation instructions.

All work, materials, labor to fireproof or waterproof conduit penetrations shall be incidental to the various pay items.

EXCAVATING FOR ELECTRICAL WORK

The work of this article is defined to include whatever excavating and back-filling is necessary to install the electrical work. Coordinate the work with other excavating and back-filling in the same area, including de-watering; flood protection provisions, and other temporary facilities. Coordinate the work with other work in the same area, including other underground services (existing and new), paving, and concrete work. Coordinate with weather conditions and provide temporary facilities needed for protection and proper performance of installations, excavating and back-filling.

General Standards: Except as otherwise required, comply with the applicable provisions of Divisions 600 and 700 of the Standard Specifications for information related to electrical-work excavating and back-filling. Refer instances of uncertain applicability to the Resident for resolution before proceeding.

ELECTRICAL WORK CLOSEOUT

Construction Equipment: After completion of performance testing with the Authority's representative, remove Contractor's tools, test facilities, construction equipment and similar devices and materials used in execution of the work but not incorporated in the work.

COMMUNICATIONS SYSTEMS

Provide wiring, wireways etc., in conformance with the applicable sections of this specification, as may be required.

RELATED DOCUMENTS

General provisions of the Contract, including General Provisions and Special provisions, apply to work of this section.

SUMMARY

The requirements of this section apply to electrical wireway work specified elsewhere in these Specifications.

The types of electrical wireways required for the project may include the following:

- § Electrical metallic tubing.
- § Intermediate metal conduit.
- § Liquid tight metallic flexible conduit.
- § Galvanized rigid metal conduit.
- § Nonmetallic conduit. (PVC)

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of electrical wireways of types and capacities required, whose products have been in satisfactory used in similar service for at least three years

Contractor: A firm with at least three years of successful installation experience on projects with electrical wiring installation work similar to that required for the project. Under this definition, Contractor can also be a subcontractor to the General Contractor for the Project.

NEMA Compliance: Comply with applicable portions of National Electrical Manufacturers Association standards pertaining to nonmetallic duct and fittings for underground installation.

UL Labels: Provide electrical wireways, which have been listed and labeled by Underwriters Laboratories.

NEC Compliance: Comply with National Electrical Code (NFPA No. 70) as applicable to construction and installation of electrical wireways.

PRODUCT DELIVERY, STORAGE AND HANDLING

Provide color-coded end-cap thread protectors on exposed threads of threaded metal conduit. Handle conduit and tubing carefully to prevent bending and end-damage and to avoid scoring finish. Store pipe and tubing inside and protect from weather. When necessary to store outdoors, elevate well above

grade and enclose with durable, watertight wrapping.

MATERIALS AND COMPONENTS

For each electrical wireway system required, provide a complete assembly of conduit or tubing with fittings including, but not necessarily limited to, connectors, nipples, couplings, elbows, expansion fittings, supports, and other components and accessories as needed to form a complete system for the type required.

Metal Conduit, Tubing and Fittings: Provide metal conduit, tubing and fittings of type, grade, size and weight (wall thickness) required for each service. Where type and grade are not indicated, provide proper selection determined to fulfill wiring requirements, and comply with National Electrical Code for electrical wireways.

Rigid Steel Conduit: FS WW-C-581 and ANSI C80.1.

Intermediate Steel Conduit: FS WW-C-581 and ANSI C80.1.

EMT – Electrical Metallic Tubing: FS WW-C-563A, ANSI C80.3 and UL 797. Installation shall comply with NEC Article 348. Provide high quality, hot dip galvanized, electrical metallic tubing conduit and fittings of type, size and weight (wall thickness) required for each application. EMT shall only be used in enclosed areas that are not subject to possible collision orinterference. Where type and grade are not indicated, provide proper selection determined to fulfill wiring requirements, and comply with National Electrical Code. Rain-tight compression type connectors shall be used in all cases. Set-screw type conduit connections or fittings shall not be used.

Galvanized Rigid Metal Conduit Fittings: FS W-F-408, Type and Classes as required.

Liquid-tight Flexible Metal Conduit: Provide liquid-tight flexible metal conduit comprised of single strip, continuous, flexible interlocked, double-wrapped steel, galvanized inside and outside; forming smooth internal wiring channel; with liquid-tight jacket of flexible polyvinyl chloride (PVC).

Liquid-tight Flexible Metal Conduit Fittings: FS W-F-406, Type as required.

Nonmetallic Conduit and Fittings (PVC): Provide nonmetallic conduit and fittings of type, size and weight (wall thickness) required for each service. Where type and grade are not indicated, provide proper selection determined to fulfill wiring requirements, and comply with National Electrical Code for electrical wireways, and with type selected in accordance with applicable standards.

Conduit and Tubing and Wireway Accessories: Provide conduit, tubing and wireway accessories including straps, hangers, angles expansion and deflection fittings as recommended by conduit, tubing and wireway manufacturers.

Mounting strut materials and hardware: Provide corrosion-resistant hot-dip galvanized strut members and stainless-steel hardware for all equipment and cabinet mounting applications.

INSTALLATION

Install conduit and tubing products as required, in accordance with manufacturer's written instructions, applicable requirements of NEC and National Electrical Contractors Association's "Standard of Installation", and in accordance with recognized industry practices to ensure that products serve intended function.

Complete the installation of electrical wireways before starting installation of cables within wireways.

Where conduit is installed in earth, it shall be Polyvinyl Chloride (PVC) conduit as specified in the Plans.

PVC conduit shall be used in concrete slabs on grade and where noted in the Plans. Metallic conduit is not permitted in the concrete slabs or in substitution of any PVC conduit locations specified on the Plans without specific authorization by the Authority.

Wherever possible, install horizontal wireway runs above water and steam piping.

At any point where a conduit crosses an expansion joint, or where movement between adjacent sections of conduit can be expected, bronze or alloy expansion fittings shall be installed equal to Type AX as made by the O.Z. Electrical Manufacturing Co., Inc., or equivalent by Hope or Spring City unless such locations are within conduit specified as non-metallic. Such locations shall be handled with a non-metallic equivalent or as specified in Plans.

The Contractor shall submit a proposed method of attaching all ancillary components to the space frame to the Resident for approval. The proposed attachment method shall not require drilling, welding or other attachment methods that will damage the space frame or its galvanized coating. Any areas of galvanized coating that are damaged by the Contractor during installation of ancillary components shall be repaired in accordance with ASTM A780.

655.03 Wires and Connectors

RELATED DOCUMENTS

The general provisions of the Contract, including General Provisions and Special Provisions, apply to the work specified in this section.

SUMMARY

The requirements of this section apply to the wire work specified elsewhere in these Specifications.

The applications for wire and connectors required on the project may include the following:

- Power distribution circuitry.
- Lighting circuitry.
- Appliance and equipment circuitry.

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in the manufacture of electrical products of the types and ratings required, whose products have been in satisfactory use in similar service for at least three years.

Contractor: A firm with at least three years of successful installation experience on projects with electrical wiring installation work similar to the work required for the project. Under this definition, Contractor can also be a subcontractor to the General Contractor for the Project.

NEC Compliance: Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of electrical cable, wire and connectors.

UL Labels: Provide electrical cable, wire and connectors, which have been listed and labeled by Underwriters Laboratories.

NEMA/ICEA Compliance: Comply with National Electrical Manufacturers Association/Insulated Power Cable Authorities Association Standards publications pertaining to materials, construction and testing wire cable, where applicable.

PRODUCT DELIVERY, STORAGE AND HANDLING

Provide factory-wrapped water-proof flexible barrier material for covering wire and cable on wood reels, where applicable; and weather resistant fiberboard containers for factory-packaging of cable, wire and connectors, to protect against physical damage in transit. Do not install damaged cable, wire or connectors. Damaged materials must be removed from project site as soon as possible after damage is discovered.

Store wire and connectors in factory-installed coverings in a clean, dry indoor space which provides protection against the weather and elements.

MANUFACTURERS

Provide products produced by one of the following or approved equal (for each type of cable, wire and connectors):

Cable and Wire:

- Anaconda Wire and Cable Co.
- Belden Corp.
- General Cable Corp.
- Phelps Dodge Cable and Wire Co.
- Wire and Cable Dept., General Electric Co.
- Rome Cable Corp.

Connectors:

- AMP Inc.
- Burndy Corp.
- Minnesota Mining and Mfg. Co.
- OZ/Gedney Co.
- Thomas & Betts Co.

WIRE AND CONNECTORS

Except as otherwise required, provide wire and connectors of manufacturer's standard materials, as required by published product information and designed and constructed as recommended by the manufacturer as required for the installation.

Wire: Provide factory-fabricated wire of the size, rating, material and type as required for each service. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and with NEC standards. Select from only the following types, materials, conductor configurations, insulations, and coverings for 120/208 Volt circuits for a 3- phase system:

UL Type: THW. (Sizes #6 AWG wire and larger) UL
Type: THHW. (Sizes up to #4 AWG wire) UL Type:
USE. (Underground installation) Material: Copper.

Conductors: (AWG wire 20 to AWG wire 16).

Note: All low voltage signal conductors (including CAT5e and CAT6 data cables) shall be stranded. Conductors for underground, below grade, or in conduit to lane devices shall be OSP grade, gel filled. Interior building communications cables may be plenum rated for interior wall or cable tray applications.

Concentric-lay-stranded (standard flexibility) (AWG wire 14 and larger).

Interconnection for data communication shall be performed with cables that shall be submitted for approval. The general cable types are designated on the Plans/ Specifications. Minimum bend radius should meet the requirements of the manufacturer and the requirements of the system.

Wire shall be color-coded as noted in the wiring schedules provided in the Plans.

INSTALLATION

Install electrical wire and connectors as required, in accordance with the manufacturer's written instructions, the applicable requirements of NEC and the National Electrical Contractors Association's "Standard of Installation", and in accordance with recognized industry practices to ensure that products serve the intended functions.

Coordinate cable and wire installation work with electrical wireway and equipment installation work, as necessary for proper interface.

All wire and cable shall be in first class condition when installed. Lo-leak lubricants manufactured for the purpose of a pulling lubricant may be used when necessary.

All wires shall be continuous from outlet and there shall be no unnecessary slack in the conductors.

FIELD QUALITY CONTROL

Prior to energizing, check wire for continuity of circuitry and for short circuits with ohmmeter type testing equipment. The Contractor shall correct any malfunctions when they are detected.

Subsequent to wire hook-ups, energize circuitry and demonstrate functioning in accordance with requirements.

655.04 Electrical Boxes and Fittings

RELATED DOCUMENTS

The general provisions of the Contract, including General Provisions and Special Provisions, apply to the work specified in this section.

SUMMARY

The types of electrical boxes and fittings required for the project may include the following:

- § Outlet boxes
- § Junction boxes
- § Pull boxes
- § Floor boxes
- § Conduit bodies
- § Bushings
- § Locknuts

QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in the manufacture of electrical units of types and sizes required, whose products have been in satisfactory use in similar service for at least three years.

Contractor: A firm with at least three years of successful installation experience on projects with electrical installation work similar to that required for the project. Under this definition, Contractor can also be a subcontractor to the General Contractor for the Project.

NEC Compliance: Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of electrical boxes and fittings.

UL. Labels: Provide boxes and fittings, which have been listed and labeled by Underwriters Laboratories.

NEMA Compliance: Comply with National Electrical Manufacturers Association standards as applicable to nonmetallic fittings for underground installation.

NECA Standard: Comply with applicable portions of the National Electrical Contractors Association's "Standard of Installation".

MANUFACTURERS

Provide products produced by one of the following or approved equal (for each type of box and fitting):

Interior Outlet Boxes:

- Appleton Electric Co.
- Arrow Conduit and Fittings Corp.
- National Electric Products Co.
- OZ/Gedney Co.
- Steel City, Midland-Ross Corp.

Junction and Pull Boxes:

- Arrow-Hart, Inc.
- General Electric Co.
- OZ/Gedney Co.
- Square D Co.
- Unitil

Conduit Bodies:

- Appleton Electric Co.
- Crouse-Hinds Co.
- Killark Electric Mfg. Co.
- Pyle-National Co.

Bushings, Knockout Closures and Locknuts:

- Allen-Stevens Conduit Fittings Corp.
- Allied Metal Stamping, Inc.
- Appleton Electric Co.
- Carr Co.
- Raco, Inc.
- Steel City, Midland-Ross Corp.
- Thomas and Betts Co., Inc.

FABRICATED MATERIALS

Junction and Pull Boxes: Provide galvanized sheet steel, PVC or concrete junction and pull boxes as called for in the Plans with screw-on covers; of the type shape and size, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

Conduit Bodies: Provide galvanized cast-metal conduit bodies, of the type, shape and size, to suit each respective location and installation, constructed with threaded conduit ends, removable cover, and corrosion-resistant screws.

Bushings, Knockout Closures and Locknuts: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and malleable iron conduit bushings of the type and size to suit each respective use and installation.

Mounting strut materials and hardware: Provide corrosion-resistant hot dipped galvanized members and stainless-steel hardware for all equipment mounting applications. Where strut material is exposed to the weather, and less than 10 feet off the ground, struts shall be stainless steel. If any galvanized strut member or hardware is cut or the galvanizing is compromised, the affected area shall be wire brushed and

cleaned to bare metal and the area shall be given two coats of cold galvanizing (following application instructions).

INSTALLATION OF BOXES AND FITTINGS

Install all equipment cabinets in compliance with NEC requirements, in accordance with the manufacturer's written instructions, and with recognized industry practices to ensure the boxes and fittings serve the intended purposes. Contractor shall coordinate all associated conduit, wiring and related work with the Resident and SI to confirm appropriate placement in coordination with ORT Control cabinet installation. Given the final installation of the ORT Control cabinets will likely take place several weeks following the placement of the cabinets in the plaza tunnel, the Contractor shall work with the Resident to provide adequate protection of the cabinets until they are mounted in their final location.

Install electrical boxes and fittings in compliance with NEC requirements, in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that the boxes and fittings serve the intended purposes:

Provide weatherproof outlets for interior and exterior locations exposed to weather or moisture.

Provide knockout closures to cap unused knockout holes where blanks have been removed Locate

boxes and conduit bodies to ensure accessibility of electrical wiring.

All boxes shall be rigidly secured in position unless otherwise directed by the Resident.

Where standard boxes are not suitable, provide boxes of special design to suit space and function.

Conduit bushings shall be used on the end of all pipes terminated in a raceway or boxes.

The Contractor shall submit a proposed method of attaching all ancillary components to the space frame to the Resident for approval. The proposed attachment method shall not require drilling, welding or other attachment methods that will damage the space frame or its galvanized coating. Any areas of galvanized coating that are damaged by the Contractor during installation of ancillary components shall be repaired in accordance with ASTM A780.

EQUIPMENT

Furnish and install all boxes and/or access plates required for installation and inspection of grounding connections to cold water piping system or other made electrodes.

Provide brass identifying tags on all ground clamps.

INSTALLATION

Ground connections made to metallic cold-water piping system at such locations as will be readily available for inspection. Provide jumper connections around all meters and shut off devices.

Where cold water piping is not available for ground connections, use other available or made electrodes as described in NEC Sections 250-81 or 250-83.

Conduit Grounding: All grounding bushings within all enclosures, including equipment enclosures,

shall be wired together and connected internally to the enclosure grounding lug or grounding bus with bare copper conductor. Grounding conductors sized in accordance with NEC shall be used with all grounding bushings.

Equipment Grounding: All electrical equipment shall be grounded. Most other equipment will be furnished with grounding pads or grounding lugs. All ground connections shall be cleaned immediately prior to connection. The Contractor shall provide all grounding material required but not furnished with the equipment.

No grounding conductor shall be smaller than 12 AWG wire unless it is a part of an acceptable cable assembly.

SPECIAL PROVISION

SECTION 655

ELECTRICAL

(AWG Wire)

Description

This task shall include the providing and installation of the AWG wire, as described herein for clean and dirty power wiring, for grounding wires (where applicable) and other locations called for in the Plans and Specifications. All wire installed in conduit must be burial grade, suitable for wet locations.

Basis of Payment

Measurement and payment for the installation of the AWG wire as described herein will be per foot, to the nearest 10-foot interval per run. It shall include the furnishing, installation, routing, termination, splices and connection of the wire per the wiring schedule.

Payment will be made under:

Pay Item		Pay Unit
655.102	500 KCMIL	Linear Foot
655.104	#8 AWG Wire	Linear Foot
655.106	#6 AWG Wire	Linear Foot
655.11	#10 AWG Wire	Linear Foot
655.12	#12 AWG Wire	Linear Foot

SPECIAL PROVISION

SECTION 655

ELECTRICAL WORK

(Fiber Optic Cable)

The following Section is added:

655.01 Description

This task shall include the providing and installation of 62.5/125 micron multimode fiber optic backbone cable as shown on the Plan drawings and described herein. The following specifications for the selection and installation of fiber-optic cable and associated hardware are intended to ensure a reliable and consistent fiber optic media infrastructure for the MTA. All fiber optic cable termination will be incidental to the fiber optic cable.

655.02 Materials

Cable: 6-strand fiber backbone multi-mode, 100 mbs, 62.5/125 Microns, Indoor/Outdoor Riser Rater, ST (Male) Connection, as approved.

Specifications: Fiber installed must meet or exceed the following specifications:

- Multimode fiber installed cable shall be 62.5/125micron core/cladding, enhanced grade, multimode, and graded index glass fiber. All materials in the cable shall be dielectric.

- Installed fiber must meet or exceed the following performance specifications:

Wavelength (nm)	Max. Attn.(dB/Km)	Min. Bandwidth (Mhz*Km)
850	3.0	200
1,300	0.9	500

- Plenum rated cable shall be used for all interior installations. Plenum rated cable shall be:
  - Tight buffered 900 um
  - Mechanical strippable Teflon (for plenum applications)
  - EIA/TIA -598 color coding for fiber optic cable
  - Aramid yarn strength member
  - Capable of supporting a short-term tensile load of 400 lb. without stretching.
  - Capable of bend radii as small as 20 x outside cable diameter (under installation load) and 10 x outside cable diameter (long term load)
  - Capable of a minimum crush resistance of 850 lb./in.

- Corning fiber is currently required for installation. Cable from other manufacturers will not be considered.

All cable is to be fully supported throughout its entire run.

At no time shall more than 400 pounds of tension be placed on any fiber cable while it is being pulled through tray or conduit. It is preferred that all fiber cable be pulled with hand power only. If power winches or mechanical advantage devices are used to pull cable, a tensionometer must be used to insure that maximum tension is not exceeded. Alternatively, a "mechanical fuse" rated at 350 pounds may be included in the linkage. Torsion shall be avoided by the use of a swivel at the cable end. While under tension, a minimum bend radius of 20 times the outside cable diameter will be maintained through the use of pulleys and sheaves where required. After pulling, no bend may have a radius, at rest, of less than 10 times the outside cable diameter.

Each cable is to be permanently labeled at each end with a unique cable number. In addition, labels shall be affixed to the cable at every transition of a vault, hand hole, riser closet, or major pull box.

Each fiber optic strand shall be labeled with a unique identifier at the ST coupler.

Fiber ends are to be terminated in ST-type connectors. No splices will be permitted. The cable shall be continuous run from lane controller to server room fiber switch location.

At each end of the cable, sufficient slack (15 - 30') shall be left to facilitate reasonable future relocation of the fiber switch or lane controller. Slack shall be mounted on walls or upper ladder racks.

Testing: Contractor shall test all long reels with an OTDR for length and transmission anomalies while on the reel prior to installation. It is suggested that each individual fiber in a cable regardless of length be tested with an OTDR for length and transmission anomalies while on the reel before installation.

All multimode fiber strands shall be tested end-to-end for bi-directional attenuation, 850 nm/1300 nm for multimode. Tests should be conducted in compliance with EIA/TIA-526-14 or OFSTP 14, Method B, according to the manufacturer’s instructions for the test set being utilized.

Tests must ensure that the measured link loss for each strand does not exceed the “worst case” allowable loss defined as the sum of the connector loss (based on the number of mated connector pairs at the EIA/TIA-568 B maximum allowable loss of 0.75 dB per mated pair) and the optical loss (based on the performance standard above, 2.1.1 and 2.2.1).

After termination, each fiber shall be tested with an ODTR for length, transmission anomalies, and end-to-end attenuation. Results are to be recorded and supplied to MTA in the form of hard-copy printouts or photographs of screen traces.

After termination each terminated fiber is to be tested for end-to-end loss with a power meter/light source. As above, results are to be recorded and supplied to MTA.

5.2.4. The Contractor shall review all end faces of field terminated connectors with a fiber inspection scope following the final polish. Connector end faces with hackles, scratches, cracks, chips and or surface pitting shall be rejected and re-polished or replaced if re-polishing will not remove the end face surface defects. The recommended minimum viewing magnifications for connector ends are 100X for multimode fiber and 200X for single mode fiber.

655.05 Measurement of Payment

Measurement for the installation of the Fiber Optic cable will be by linear foot to the nearest 10 ft. interval. It shall include the furnishing, installation, routing and termination of the cableper the plan drawings.

655.06 Basis of Payment

The accepted quantity of 6 Strand Multi-modal Fiber Optic Cable will be paid for at the Contract unit price per linear foot for furnishing, installation, routing, and termination of the cable.

Payment will be made under:

Pay Item		Pay Unit
655.16	Fiber Optic Cable	Linear Foot

SPECIAL PROVISION

SECTION 655
ELECTRICAL
(PVC Conduit)

Description

This task shall include providing and the installation of PVC Conduit as shown on the Plan drawings and described herein. All conduit shall be installed per NEC specification. Connections to specialized fittings are to be compatible with adjoining conduit.

Joints shall be made in accordance with ASTM D 2855. Solvent cement shall meet the requirements of ASTM D 2564 with particular attention paid to matching the viscosity to the conduit size.

Joint adhesives shall be in accordance with ASTM D2517.

All conduit runs shall be watertight. Slope conduit to drain into junction boxes.

All empty conduits shall have a labeled pull string. Pull strings shall have length markings and should be used for long conduits over 50 feet or for all underground installations. Clean, plug and seal conduit ends after installation.

Basis of Payment

Measurement and payment for installing PVC Conduit as shown on the Plan drawings and described herein will be per linear foot of each type of underground or exposed conduit actually furnished, installed, and accepted at the Contract price per linear foot. It shall include the furnishing, installing, supporting and connection of the conduit and all various hardware necessary for the installation. This price shall include the cost of hand digging, trenching, or plowing; furnishing and installing the conduit; furnishing special backfilling materials, pull string, fittings, groundings and bonding; test cleaning interiors of conduits and all materials, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
655.2001	1½” Schedule 80 PVC Conduit	Linear Foot
655.2002	1” Schedule 80 PVC Conduit	Linear Foot
655.2003	2” Schedule 80 PVC Conduit	Linear Foot
655.201	3” Schedule 80 PVC Conduit	Linear Foot
655.202	4” Schedule 80 PVC Conduit	Linear Foot

SPECIAL PROVISION

SECTION 655

ELECTRICAL

(Galvanized Rigid Metal Conduit)

Description

This task shall include providing and the installation of Galvanized Rigid Metal Conduit (RMC) as shown on the Plan drawings and described herein. All fittings shall be threaded, or approved compression type (approved by the engineer and compatible with the conduit), and waterproof. Conduit shall be installed and grounded per NEC regulations. All supports shall be hot dipped galvanized or stainless steel (approved by the engineer and compatible with the conduit).

Basis of Payment

Measurement and payment for furnishing and installing the Galvanized RMC as shown on the plan drawings, where necessary, and described herein will be per foot. It shall include the furnishing, installing, supporting and connection of the conduit and misc. hardware necessary for the installation.

Payment will be made under:

Pay Item		Pay Unit
655.209	4” Galvanized Rigid Metal Conduit	Linear Foot

SPECIAL PROVISION

SECTION 655

ELECTRICAL

(Liquid Tight Metallic Flexible Conduit)

Description

This task shall include providing and the installation of Liquid Tight Metallic Flexible Conduit as shown on the Plan drawings and described herein. All conduit shall be watertight with flexible PVC coating over galvanized steel flex tubing. Conduit shall be installed and grounded per NEC regulations. All supports for shall be hot dipped galvanized or stainless steel. Connections shall be specialized fittings to be compatible with adjoining conduit and watertight.

Basis of Payment

Measurement and payment for installing the Liquid Tight Metallic Flexible Conduit as shown on the Plan drawings and described herein will be per linear foot furnished, installed, and accepted at the Contract price per linear foot. This price shall include the cost of: furnishing and installing the conduit; pull string, fittings, groundings and bonding; test cleaning interiors of conduits and all materials, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
655.2100	1” Liquid Tight Metallic Flexible Conduit	Linear Foot
655.2101	1½” Liquid Tight Metallic Flexible Conduit	Linear Foot
655.2102	2” Liquid Tight Metallic Flexible Conduit	Linear Foot

SPECIAL PROVISION

SECTION 655

ELECTRICAL

(Installation of Pull Boxes)

Description

This task shall include providing and installing:

- Pull box as shown on the Plan drawings and detailed herein. The F pull box shall be installed in building utility pits, or where this size is to be used in a wet location or in an exterior location.
- Materials: minimum 18” x 18” x 12” plastic, medium duty; equal to or better than Appleton JIC-2

Basis of Payment

Measurement and payment for installing the pull boxes as shown on the Plan drawings and described herein will be per each item. It shall include the furnishing, installation, mounting of the box, and the drilling of holes into the box for conduits.

Payment will be made under:

Pay Item		Pay Unit
655.31	Underground Pull Box	Each

SPECIAL PROVISION

SECTION 655

ELECTRICAL

(12” x 12” x 6” Junction Box)

Description

This task shall include providing and installing watertight junction boxes. Junction box shall be nonmetallic (Quazite or equivalent) and able to be placed in concrete. Access must be provided through the top cover which shall be flush with the top of barrier after placement. Junction boxes must be approved by Resident.

Basis of Payment

Measurement and payment for installing the junction boxes as shown on the Plan drawings and described herein will be per each item. It shall include the furnishing, installation, mounting of the box, and the drilling of holes into the box for conduits.

Payment will be made under:

Pay Item		Pay Unit
655.40	12” x 12” x 6” Junction Box	Each

SPECIAL PROVISION

SECTION 655

ELECTRICAL

(PVC Conduit Condulets)

Description

This task shall include the installation of PVC condulets where called for on the plans, or where required. Fittings for PVC condulets are to be joined using couplings and approved solvent, as recommended by the manufacturer. Types of condulets include, but are not limited to “LB”, “T”, “LR”, “LL”. All openings shall have rubber gaskets.

Basis of Payment

Measurement and payment for installing the PVC condulets as described herein will be per item. It shall include the furnishing, installation and mounting of the condulet, and all associated hardware.

Pay Items are as follows:

Pay Item		Pay Unit
655.50	2” PVC Conduit Condulets	Each
655.51	4” PVC Conduit Condulets	Each
655.52	1” PVC Conduit Condulets	Each
655.53	1 1/2” PVC Conduit Condulets	Each
655.55	3” PVC Conduit Condulets	Each

SPECIAL PROVISION

SECTION 655

ELECTRICAL

(Concrete Encased Conduit)

Description

This work shall consist of encasing all conduit within the limits of the proposed conduit raceway section between the penetration from the tunnel to the structural slab infill opening. This work shall be completed in accordance with the Specifications, in reasonably close conformity with the lines and grades shown on the Plans or as approved by the Resident.

Materials

Concrete shall conform to Section 502, Structural Concrete, using ¾-inch (19 mm) maximum size coarse aggregate (Class AAA).

PVC spacers shall be the interlocking type of strength and spacing to hold raceways straight and true with spacing between raceway outside diameter of no less than 3 inches, horizontal. Conduit must be laid out and spaced as depicted in the Plan drawings.

Duct-sealing compound shall be non-hardening, safe for contact with human skin, not deleterious to cable insulation, and workable at temperatures as low as 35°F. It shall be capable of withstanding temperature of 300°F without slump and of adhering to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.

Waterproof membrane used for sealing duct bank penetration into tunnel shall be Tremco – Paraseal Membrane or an approved equivalent. A waterstop will be used in conjunction with the membrane and shall be Tremco Parastop or an approved equivalent. Both membrane and waterstop will be installed as per manufactures guidelines.

Execution

All raceways shall be securely fastened in place during construction and progress of the work. Concrete wall penetrations shall be plugged to prevent seepage of grout, water, or soil into the tunnel.

Trenches for conduit may be excavated manually or with mechanical trenching equipment where practical. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. The Contractor shall ascertain the type of soil or rock to be excavated before bidding. All excavation shall be incidental to concrete encased conduit construction.

Saw cutting for slab penetrations shall be considered incidental. Excavation limits of the concrete encased conduit will in accordance with the details shown on the Plans.

Basis of Payment

Measurement and payment for work associated with the concrete encased conduit as shown on the Plan drawings and described herein will be per cubic yard of concrete, based on the concrete encased conduit section dimensions detailed with no deduction for the space occupied by the conduit.

All work and materials necessary to install the concrete encased conduit will be incidental to the item, including excavation and saw cutting of concrete wall penetrations and the structural slab infill locations. All new conduit, wireway, wires and data cables installed will be paid under its appropriate pay item.

Payment will be made under:

Pay Item		Unit
655.75	Concrete Encased Conduit	Cubic Yard

SPECIAL PROVISIONS

SECTION 800

Litchfield Maintenance Garage

800.1 Description

Division 800 specifies materials, procedures and requirements for the construction of the Maintenance Building, complete with all appurtenances, including any and all associated utilities and services within the limits as shown on the Drawings.

The Contractor shall submit to the Resident for approval a cost breakdown of the major components of work for the Litchfield Maintenance Garage by standard specification Division lines items from 01 to 41. This breakdown will be used as a basis for monthly pay estimates.

A building walk-thru shall occur 30 days prior to anticipated completion of the building. Contractor shall allow the MTA access to the new building to furnish and install necessary equipment for toll operations. This shall be one week prior to the completion of the building.

The Contractor shall ensure and be responsible for the total and complete coordination of all work in the Litchfield Vehicle Maintenance building. The Contractor shall generate coordination drawings for the Mechanical Room of the Building. Coordination drawings shall:

1. Be computer generated.
2. Show a dimensionally accurate representation of all equipment that was approved by the shop drawing process.
3. Show architectural features, structural features, piping, conduit, ductwork and any other items that require coordination which shall be accurately sized.
4. Be submitted to and approved by the MTA prior to the purchasing of any approved equipment.

800.2 Work Included

The work consists of the following:

1. Construction of an approximate 10,400 square foot pre-engineered building consisting of a 4-bay equipment maintenance garage, 1 drive-thru wash bay, and a 1,975 SF mezzanine.

2. All site work, grading, drainage, paving, septic field, underground power, power utility services and site utilities.

Litchfield Maintenance Garage construction includes, but is not necessarily limited to, the following:

- The work includes all building structure, mechanical, electrical, and plumbing, as well as all site work, grading, pavement, lighting, utilities, and all other work incidental thereto in accordance with the Plans and Specifications.

- Excavating, filling and backfilling for building utilities, services, foundations.

- Construction of reinforced concrete footings, pier, foundation walls, and slabs-on-grade including exterior concrete aprons and entry foundation/slab systems.

- Construction of the Litchfield Maintenance Garage proper, including all equipment and interior and exterior finishes.

- Furnishing and installing plumbing, heating, ventilating, air conditioning, electrical, and telephone, complete with all appurtenances and accessories.

- Coordinating with the utility to provide a transformer and connections.

- Furnishing and installing secondary power conduit and wiring from the nearby utility transformer to the building including trenching and backfilling, conduit, wire, supports, brackets, junction boxes, etc. required to provide all work.

  Note: The conduits outside of these limits are paid for separately.

800.3 Method of Measurement

The Litchfield Maintenance Garage will be measured for payment by the lump sum, complete and accepted.

The horizontal pay limit shall within 5 feet of the defined perimeter of the building, entries and concrete aprons. The vertical pay limit for this work shall be above the bottom of footing level or bottom of footing subbase, if required.

All work within this pay limit, including utilities, excavation, backfilling, etc., will be included in this pay item. Work outside of the horizontal pay limit shall be performed under other portions of the Contract documents with the exception of:

- All work associated with the installation of the utility transformer and secondary service line into the building.

The work described above which shall be included in the Litchfield Maintenance Garage pay item.

800.4 Basis of Payment

Litchfield Maintenance Garage construction will be paid for at the lump sum price bid which shall be full compensation for the cost of furnishing all materials, equipment, supplies, tools, incidentals, labor and supervision necessary to satisfactorily complete the work in all respects, to the satisfaction of the Resident.

Mobilization shall not be within the lump sum pay limit but will be paid for and meet the specifications of pay item 659.10.

Payment will be made under:

Pay Item	Pay Unit

800.01	Litchfield Maintenance Garage	Lump Sum

SPECIAL PROVISIONS

SECTION 800

(Concrete Generator and Waste Oil Pads)

800.1 Description

The work shall consist of installing a concrete pad for the backup generator as detailed in the project plans and these specifications.

800.2 Materials

Concrete shall be Class “A” concrete (4000 PSI) and shall meet the requirements of Section 502.

Reinforcing steel shall meet the requirements of Section 503.

800.3 Method of Measurement

The concrete Generator and Waste Oil Pads will be measured for payment by the lump sum, complete, in-place for the Generator Pad installation.

800.4 Basis of Payment

Concrete Generator and Waste Oil Pads will be paid for at the lump sum price bid which shall be full compensation for the cost of furnishing all materials, equipment, ground rods, grounding conductors, terminations, supplies, tools, incidentals, and labor and supervision necessary to satisfactorily complete all work.

Payment will be made under:

Pay Item		Pay Unit
800.090	Concrete Generator Pad	Lump Sum
800.091	Concrete Waste Oil Tank Pad	Lump Sum

SPECIAL PROVISION

SECTION 801

SANITARY SEWER LINES

(PVC and HDPE Sewer Pipe)

The following Section is added:

801.01 Description

The following paragraphs are added:

All connections shall be made in conformance with the Maine State Plumbing Code.

801.02 Materials

Force Main shall consist of Polyethylene Pipe with a minimum pressure rating of 100 psi at 73.4 degrees F. Thermal butt fusion joints and fittings in accordance with the manufacturer's recommendations.

Gravity sewer sanitary lines shall consist of plastic pipe SDR 35 PolyVinyl Cloride (PVC) material, inside nominal diameter of 6", bell and spigot style solvent sealed joint end. Pipe shall be marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification.

801.033 Testing

Gravity sewers shall be tested by one of the following methods:

A. Low pressure air
B. Infiltration
C. Exfiltration

Pipes with diameters of 24-inch or smaller shall be tested for acceptance by one of following test methods: low pressure air, infiltration, or exfiltration. Pipes with diameters larger than 24-inch shall be tested for acceptance by one of the following test methods: infiltration or exfiltration.

SPECIAL PROVISION

SECTION 802

SUBSURFACE WASTEWATER SEPTIC SYSTEM
(Subsurface Wastewater Leach Field with Geotextile Sand Filter)
(1000 Gallon Septic Tank with Pump)

The following Section is added:

802.01 Description

This work shall consist of construction of the subsurface wastewater septic tank. pump, controls, wiring and leach field. The leach field includes geotextile sand filter and associated components as indicated on the drawings and as contained in the HHE-200, Subsurface Wastewater Disposal System Application.

All materials, construction methods and details, and approvals shall conform to these Specifications, the Rules, Maine Plumbing Code and all other applicable State and Local Laws and Ordinances.

Before beginning work, the Contractor shall verify that all site conditions and elevations that will have a bearing on the work are as shown on the Plans. If any discrepancies are found, the Contractor shall notify the Maine Turnpike Authority (MTA) immediately.

Before any portion of the work can be backfilled, the Contractor shall make arrangements to have the Local Plumbing Inspector (LPI) inspect the work. Backfilling shall proceed pursuant to approval of the work by the LPI.

The contractor will coordinate work with that of all other trades affecting, or affected by work of this Section. They will also cooperate with such trades to assure the steady progress of all Project work.

802.02 Materials

802.021 Precast Concrete Septic Tank, Risers and Distribution Box

Precast concrete septic tank, risers and distribution box shall be as shown on the plans. Conform to the applicable requirements of ASTM C478. Concrete strength shall be 5,000 psi after 28 days. Wire fabric for reinforcement shall conform to the requirements of ASTM A185 and steel reinforcement shall conform to the requirements of ASTM A615 with a minimum yield stress of 40,000 psi.

The precast structures shall be designed for hydrostatic head equal to depth of the structure and shall be capable of withstanding an H- 20 truck load. The chamber shall be installed watertight.

802.022 Pumps

Lift station shall be a 0.4 HP Barnes effluent pump operating at approximately 43 GPM and 14 Ft THD. The pumps are model EHV412, 1Phase, 60 Hz, 120 Volt, 3450 RPM and the installed impeller.

All lift station piping shall be 2” Sch 80 PVC.

802.023 Lift Station Pipe and Pipe Connections

All lift station piping shall be 2" Sch 80 PVC.

Use pre-molded elastomeric sealed joints at the joints between the pipe (such as but not limited to influent sewer) Pre-molded elastomeric sealed joints shall be A-Lok, Res-Seal, Press-Wedge II, Lock Joints Flexible Manhole Sleeve, Kor-N-Seal Joint Sleeve, or equal.

For pipes (such as but not limited to discharge pipe, vent) installed submerged or below grade, the annular space shall be sealed watertight with mechanically expanded interlocking synthetic rubber links of the Link-Seal type, or equal. Nuts and bolts shall be zinc coated steel.

For pipes installed non-submerged or above grade, pack the annular space with jute and caulked flush at both ends with a polysulfide sealant.

802.024 Level Sensors and Electrical Components:

Provide float type non-mercury switches, encapsulated within a solid polyurethane float ball. Provide level sensors with individual float weights to operate the pumps and to detect high water level in the basin addition. Provide a mounting bracket near the access opening to allow adjustment of the control and alarm levels. Furnish each non-mercury float switch with cable lengths to suit the installation without splices (control panel is remotely mounted). A properly rated electrical cable with a screwed, sealing type, cord-grip shall connect the switches to the electrical junction box. Float switches to be installed with Primex float switch connection system.

All underground electric power lines shall be installed in PVC conduit. Above ground services shall be installed in schedule 80 galvanized conduit. Sizes as required by electric company. All electrical wiring shall meet all State and NEC electrical code requirements.

Pump power/control cables and float cables shall be routed to the wet well in separate conduits with the proper expansion joints, seal offs, water-tight junction boxes with cord grips and expansion joints. Wire sizing and conduits feeding and leaving the control panel shall be properly sized, shall support the load of two pumps operating and meet all applicable State & NEC electrical codes.

802.025 Panel

The panel shall be equipped with an inner door that has an elapsed timed meter, warning lights/indicator lights for power, pump off, pump on, high water and alarm control switches for the (auto, off and run) and a control switch for the alarm with test and silence.

The panel shall have both a red visible alarm light and an audible piezo 80db alarm. The enclosure shall be a fiberglass NEMA 4x rated, UL508A compliant listed enclosure rated for the pumps with a wiring schematic provided on the inner face of the panel door. The door shall have a weather seal and lockable latches.

The panel shall have the required circuitry, controllers, circuit breakers, delays, motor starters, relays, terminal block and grounding required to operate the pump.

The panel shall be manufactured by Primex Controls or approved equivalent. The main breakers (control and pumps) and fuses for both the alarm and controls shall be accessible without opening the inner door.

802.03 Submittals

Shop and working drawing submittals shall include details of all piping, pipe fittings, subsurface disposal system materials, precast concrete structures and details of interfaces, connections, dimensions, layouts and other pertinent data, including:

Certificates of Compliance for all pipe and precast concrete structures

802.04 Special Fill for Disposal Bed

Soil fill material beneath, above and adjacent to the concrete chamber system, including fill extensions, shall meet the requirements of the Rules.

802.05 Insulation

Thermal insulation for the top of the distribution box shall be rigid cellular polystyrene in accordance with ASTM C578, Type VII, a minimum two inches thick. Insulate all sewer piping and septic tank system.

802.06 Bedding Material

Bedding material for pipe and structure subgrades shall be gravel borrow per Subsection 703.20 of the Standard Specifications, except that the largest size particle shall be two inches.

802.07 General Construction

Maintain all excavations in proper condition for carrying on the work, and performing all bailing, draining, or pumping as necessary to keep the excavation free of water.

It shall be the Contractor's responsibility to obtain all necessary permits and pay all fees at no additional cost to the Authority.

Excavation, bracing and sheeting for excavations, dewatering and backfilling shall conform to the requirements of Section 203, Excavation and Embankment, of the Standard Specifications. Trench widths shall be as shown on the Plans. Bedding for the pipes and structures shall be as shown on the Plans and as specified herein.

802.08 Excavation

Excavation for trenches and structures shall be as specified in Section 203, Excavation and Embankment, of the Standard Specifications.

Contractor shall provide adequate bracing and shoring of all excavations in accordance with the requirements of all governing codes and regulations.

All existing piping and structures exposed during excavation shall be adequately supported, braced or otherwise protected during construction activities.

802.09 Backfilling

Backfill and compaction for trenches and structures shall be as specified in Subsection 206.03, Backfilling, of the Standard Specifications.

802.10 Disposal Bed

The disposal bed shall be constructed as detailed on the Plans, as defined by the Rules. If

unsuitable material is encountered and removed at and below the disposal bed surface, granular fill shall be placed and compacted to bring the grade up to the required bed elevation. The LPI shall inspect and approve the prepared disposal field before placement of fill covering the disposal field. Fill shall be placed below and adjacent to the chambers as detailed on the Plans.

802.11 Installation of Pipe

Pipe and fittings shall be installed in conformance with Section 6M of the Rules, as detailed on the drawings and per manufacturer recommendations. Pipe shall be laid on a firm compacted gravel borrow foundation at the line and grade designated. A recess shall be excavated to receive the bell or coupling at each joint if necessary. The piping shall be jointed as specified by the manufacturer to form a watertight joint.

Immediately before laying any pipe, the interior surfaces and ends of sections of pipe shall be cleaned by wiping or other procedure as necessary. All pipe shall be firmly bedded in the underlying soil for its entire length. Joints shall be watertight, adjoining sections of pipe shall form a continuous and smooth invert, spigots shall be fully entered, and the joints shall be slightly flexible. Broken or otherwise damaged pipe shall be replaced at the Contractor's own expense. Pipes shall be kept free of any deposit or debris. The sewer pipe as laid shall be approved by the MTA before any trench is backfilled or embankment is placed.

Any pipe which is not in true alignment, or which shows any settlement after laying, shall be taken up and re-laid without additional cost to the MTA. Any cribbing or subgrade treatment necessary to prevent settlement shall be placed at the Contractor's own expense.

Any damage to the pipe or invert from any cause shall be promptly repaired by the Contractor at his own expense, before backfilling is commenced or water passes through the pipe.

Wherever water piping must cross sewer piping, a vertical separation of 12 inches shall be maintained. In no case shall a water pipe cross under a sewer pipe.

802.12 Testing

Testing/acceptance procedures for the sanitary sewer system shall equal or exceed all state and local requirements.

In case leakage exceeds the above specified amount, the Contractor shall locate the leaks and shall repair them at his own expense. Pipelines with shear-type breaks, fishmouths or damaged gaskets, cracked bells or couplings, hairline fractures, or structural damage of any type shall be replaced in kind. Mechanical sleeve couplings, poured concrete collars or similar repairs are not permitted. The use of pressure grouting repair techniques will not be allowed.

After repairs have been made, the line shall be re-tested and the process of repairing and re-testing shall be repeated until results within the above specified limits are obtained.

802.13 Method of Measurement

All the Sewage Disposal System work, including but not necessarily limited to, all labor, components, materials, equipment and incidental work necessary for the satisfactory completion of the system will be measured for payment as a lump sum, complete and accepted.

802.14 Basis of Payment

Payment will be made for the accepted Sewage Disposal System, including all excavation, bedding material, special fill, pipes, fittings, septic tank, backfill, and associated work at the Contract lump sum price, which price shall be full compensation for all labor, materials, equipment and incidental work necessary for the satisfactory completion of the work.

Payment will be made under:

Pay Item		Pay Unit
802.241	1000 Gallon Septic Tank with Lift Station	Each

SPECIAL PROVISION

SECTION 822

WATER SERVICE SUPPLY LINE

822.01 Description

This work shall consist of installing water service supply lines in reasonably close conformity with the lines and grades shown on the plans or established. The installation shall include the assembly of all components and materials shown on the plans or as directed.

822.02 General

The work in this Section shall also include the following:

- Furnishing and installation of pipe, tubing, valves, service boxes, fittings, insulation and any required accessories for a complete water service supply.
- Connections to existing well system.
- Disinfection and testing.

The Maine Turnpike Authority shall be notified prior to starting construction of any portion of the water service supply line.

822.03 Materials

Water Service Supply Lines

Water service supply lines shall be high density polyethylene plastic tubing and conform to AWWA standard C901-02 (PE 3608 Pressure Class 200), ASTM D3350, ASTM D2737 and be clearly marked. The product shall be rated for a minimum 200 working PSI and the standard dimension ratio (SDR) shall not exceed 9 for tubing size.

Tubing shall be approved for potable water service by the National Sanitation Foundation (NSF) and bear the NSF seal. Stainless steel inserts shall be used at all connections.

Necessary fittings, adaptors and reducers shall be furnished as required.

Curb Stops

Curb stops shall be ball valve type construction with compression type fittings on both ends. Curb stops shall open left (counter-clockwise) and shall conform to AWWA/ANSI C800, manufactured by Ford, Hayes, Mueller or an approved equivalent.

Curb stops shall be sized to receive the service tubing without the use of enlargement/ reduction fittings.

Fittings

All fittings shall be compression type, designed for use with high density polyethylene plastic tubing (CTS).

Bedding

Bedding material for water service supply lines shall be screened sand consisting of clean, inert, hard, durable grains of quartz or other hard, durable rock, free from loam, clay, surface coatings, frozen or deleterious materials and in conformance with the following gradation:

Sieve (ASTM D422)	Percent Passing by Weight
No. 4	100
No. 8	80 - 95
No. 16	55 - 85
No. 50	0 - 35
No. 200	0 - 5

Bedding material for water service supply lines shall be compacted to a minimum of 92% of the laboratory derived Maximum Density Values at optimum moisture content as determined by ASTM D1557, Method C.

822.04 Installation Service Pipe

Care shall be exercised in placing and laying of services to prevent kinks or sharp bends and to prevent contact with sharp stones or ledge which would damage to the pipe. At least 6 inches of sand shall be placed adjacent to, under, and above the pipe, and no stone larger than 2 inches shall be placed over the pipe until the depth of backfill above the pipe is in excess of 1 foot.

Separation from Structures

Whenever possible, water pipes shall maintain a minimum distance of three (3) feet from underground adjacent unheated structures, such as manholes, catch basins, retaining walls, bridge abutments, parking garages, etc.

When spacing described above is not possible, Contractor shall provide insulation for the water pipe for a minimum of three (3) feet beyond the limits of the adjacent structure.

Testing

Hydrostatic pressure and leakage test shall be conducted in accordance with AWWA Standard C600 Standards. Domestic water service lines without attached fire service supply shall meet the latest edition of AWWA C600 series leakage requirements for the type of pipe being installed. Testing shall be conducted by a certified independent water testing company.

Disinfection

Before being placed in service, all new water pipe shall be chlorinated in accordance with ANSI/AWWA C651 Standard for Disinfecting Water Mains.

The location of the chlorination and sampling points will be determined by the Engineer in the field. Taps for chlorination and sampling shall be installed by the Contractor. The Contractor shall uncover and backfill the taps as required.

The pipe section being disinfected shall be flushed to remove discolored water and sediment from the pipe. A 25 mg/l chlorine solution in approved dosages shall be inserted through a tap at one end while water is being withdrawn at the other end of the pipe section. The chlorine concentration in the water in the pipe shall be maintained at a minimum 25 mg/l available chlorine during filling. To assure that this concentration is maintained, the chlorine residual shall be measured at regular intervals in accordance with procedures described in Standard Methods and AWWA M12, Simplified Procedure for Water Examination, Section K.

During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the pipe supplying the water. Chlorine application shall not cease until the entire pipe section is filled with chlorine solution. The chlorinated water shall be retained in the pipe for at least a twenty-four hour period. The treated water shall contain a chlorine residual throughout the length of the pipe section as indicated in AWWA C651.

Following the chlorination period, all treated water shall be flushed from the pipe section and replaced with water from the distribution system. Prior to disposal of treated water, the Contractor shall check with local authorities to determine if the discharge will cause damage to the

receiving body or sewer and, if required, the Contractor shall neutralize the chlorinated water in accordance with Appendix B, AWWA C650. Bacteriological sampling and analysis of the replacement water shall then be made by the Contractor in full accordance with AWWA Specification C651. A minimum of three samples shall be taken by the Contractor at locations directed by the Engineer along the length of water pipe being chlorinated and sent to a state- approved private laboratory for analyses. The Contractor shall rechlorine if the samples show presence of coliform, and the pipe section shall not be placed in service until all of the repeat samples show no presence of coliform.

Furnish two (2) copies of a Certificate of Disinfection Report to the Engineer.

The Contractor shall pay all costs for all testing, flushing, chlorinating; laboratory analyses, sampling, water supply, and municipal charges.

822.05 Method of Measurement

Non-metallic pipe will be measured by the linear foot.

822.06 Basis of Payment

The accepted quantities of non-metallic pipe will be paid for at the contract unit price, complete and accepted in place, which payment shall be compensation for furnishing and installing all necessary fittings for connecting to existing systems, and for capping the ends of the pipe sleeve.

Excavation, backfill, bedding, compaction, sheeting and shoring, insulation, dewatering,

restoration of existing service connections, curb stops, curb boxes, fittings, stainless steel inserts, insulation, pressure testing, disinfection, flushing, maintaining water service, connections to existing water mains and services, restoration of property, loam and seed, as-built drawings and any other work necessary or required for a complete operational water supply service shall be considered included in the work of the contract items.

Restoration of pavement trench, including replacement of gravels shall be incidental to Pay Item

Payment will be made under the following:

Pay Item		Pay Unit
822.3213	2” Copper Service	Linear Foot

SPECIAL PROVISION

SECTION 825

SPECIALTY WATER SERVICE FACILITY

825.01 Description

This work shall consist of furnishing and installation of 5,000 gallon precast water tank, float leveler and pump controls for maintaining tank water levels from existing well pump system and new well pump system (installed by MTA). Coordinate the 5,000 gallon underground tank installation with the well pump(s) controls installation provided under separate owner contract. Well pump controls installation requires mounting level controls within the UG tank and wiring back to well pump central controller.

825.02 Materials

Acceptable Manufacturer: Xerxes Corporation, which is located at: 7901 Xerxes Ave. S.; Minneapolis, MN 55431; Tel: 952-887-1890; Fax: 952-887-1882; Email:info@xerxes.com; Web:www.xerxes.com

Tank shall be Fiberglass reinforced plastic (FRP). The tank size, fittings and accessories shall be as shown on the drawings. Tank shall be manufactured with structural ribs which are fabricated as in integral part of the tank wall. Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used. Tank shall be vented to atmospheric pressure. Tank shall be capable of handling liquids with specific gravity up to 1.1. Tank shall be compatible with liquids identified in the manufacturer's standard limited warranty.

Tank shall meet the following loading conditions. Tank shall be designed to withstand a 5-psig (35 kPa) air-pressure test with a 5:1 safety factor for internal loading. Tank shall be designed to withstand surface H-20 and HS-20 axle loads when properly installed according to manufacturer's current Installation Manual and Operating Guidelines. Tank shall be designed for 7 feet (2.1 m) of overburden over the top of the tank, the hole fully flooded, and a safety factor of 5:1 against general buckling.

Governing Standards, as applicable:

a. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.

b. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

c. NSF/ANSI Standard 61: Drinking Water System Components - Health Effects. Tank shall be NSF/ANSI Standard 61 listed and labeled.

d. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL-1316 standard.

Tank shall be a single wall vessel as specified in the drawings.

Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg). Galvanized turnbuckles shall be supplied by the tank manufacturer. Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

Potable water tank shall have at least one manway opening. The standard manway shall be flanged, 30 inches I.D. and complete with gaskets, bolts and cover. Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor. Manway extensions shall be FRP and shall be supplied by tank manufacturer.

Tank shall be equipped with internal factory-installed piping that meets NSF/ANSI Standard 61. All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5. Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.

Suction/fill tubes shall be manufactured with materials listed under NSF/ANSI Standard 61 and factory installed. Suction/fill tubes shall terminate 4 inches (102 mm) above the bottom of the tank.

Ladders shall be the standard FRP ladder listed under NSF/ANSI Standard 61 as supplied by tank manufacturer. Pump platforms shall be the pump platform listed under NSF/ANSI Standard 61 as supplied by tank manufacturer.

Contractor shall provide buoyancy calculations and shop drawings of the 5,000 gallon water tank system to engineer for review prior to ordering.

825.03 Installation

Comply with tank manufacturer's Installation and Operating Guidelines recommendations for delivery, storage, and tank handling. Tank shall be tested according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

825.04 Method of Measurement

Special Water Service Facility shall be measured as the Water Service Facility unit, and installation of said unit in accordance with the design and specifications of the project.

825.05 Basis of Payment

The accepted quantity of whole system installation will be paid for at the Contract unit price each. The bollards will be provided by MTA and installed by the Contractor at the Pay Item below.

Pay Item		Pay Unit
825.343	Special Water Service Facility	Lump Sum

SPECIAL PROVISION

SECTION 832

SITE BOLLARDS

832.01 Description

This work shall consist of furnishing and installation of Type A Steel Site Bollards with cast in place concrete base and LDPE bollard sleeves in accordance with these specifications, and as shown on the Plans.

832.04 Basis of Payment

The accepted quantity of bollards will be paid for at the Contract unit price each. The bollards will be provided by MTA and installed by the Contractor at the Pay Item provided in the bid form.

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART III – DIVISION 800

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE FACILITY
MILE MARKER 92.7

DIVISION 800 - TABLE OF CONTENTS

The specification sections listed below, and all State of Maine Department of Transportation "Standard Specifications for Highways and Bridges" referenced therein, comprise Division 800:

DRAWING LIST

SHEET NO.	DESCRIPTION
CIVIL:	
C-001	EXISTING CONDITIONS PLAN
C-100	OVERALL SITE PLAN AND UTILITY PLAN
C-101	SITE AND UTILITY PLAN
C-102	GRADING, DRAINAGE, EROSION CONTROL PLAN
C-103	GRADING PLAN
C-401	DETAILS-1
C-402	DETAILS-2
ARCHITECTURAL	
A-0	ARCHITECTURAL COVER SHEET
A-1	CODE COMPLIANCE PLANS
A-2	FIRST FLOOR & MEZZANINE PLANS
A-3	REFLECTED CEILING PLANS
A-4	ROOF PLAN & DETAILS
A-5	NORTH AND SOUTH EXTERIOR ELEVATIONS
A-6	EAST AND WEST EXTERIOR ELEVATIONS
A-7	BUILDING SECTIONS
A-8	WALL SECTIONS
A-9	DOOR, WINDOW & FINISH SCHEDULES
A-10	WET CORE PLAN & ELEVATIONS
A-11	PARTITION TYPES & DETAILS
A-12	STAIR PLAN, SECTION & DETAILS
A-13	DETAILS
A-14	ACCESSIBILITY DETAILS & NOTES
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S-001	STRUCTURAL – TYPICAL DETAILS
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SB-500	STRUCTURAL - FOUNDATION DETAILS
SF-100	STRUCTURAL - FRAMING PLAN
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PLUMBING	
P-000	PLUMBING AND HVAC NOTES, LEGEND AND ABBREVIATIONS
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PP-100	DOMESTIC PIPING PLAN
MECHANICAL	
MH-100	MECHANICAL PLANS
MP-100	MECHANICAL PIPING PLANS
M-500	MECHANICAL DETAILS AND SCHEDULES

ELECTRICAL

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E-001	ELECTRICAL GENERAL NOTES AND SCHEDULES
EL-100	LIGHTING PLAN
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EP-100	POWER AND SYSTEMS PLAN
EP-500	ELECTRICAL RISER DIAGRAM
EP-600	ELECTRICAL SCHEDULES
ES-100	ELECTRICAL SITE PLAN

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART IV – APPENDICES

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE FACILITY
MILE MARKER 92.7

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART IV – APPENDICES

CONTRACT 2019.12

NEW MECHANICS GARAGE
LITCHFIELD MAINTENANCE FACILITY
MILE MARKER 92.7

REPORT

18-1562

April 18, 2019

Explorations and Geotechnical Engineering Services

Proposed Vehicle Maintenance Garage
MTA Litchfield Maintenance Yard
I-95 Mile Marker 92.7
Litchfield, Maine

Prepared For:
Allied Engineering, Inc.
Attention: William Faucher, P.E.
160 Veranda Street
Portland, ME 04103

Prepared By:
S. W. Cole Engineering, Inc.
26 Coles Crossing Drive
Sidney, ME 04330
T: (207) 626-0600

S.W.COLE ENGINEERING, INC.

- *Geotechnical Engineering*
- *Construction Materials Testing and Special Inspections*
- *GeoEnvironmental Services*
- *Test Boring Explorations*

www.swcole.com

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18-1562

April 18, 2019

Allied Engineering, Inc.
Attention: William Faucher, P.E.
160 Veranda Street
Portland, ME 04103

Subject: Explorations and Geotechnical Engineering Services
Proposed Vehicle Maintenance Garage
MTA Litchfield Maintenance Yard
I-95 Mile Marker 92.7
Litchfield, Maine

Dear Bill:

In accordance with our Proposal, dated January 2, 2019, we have performed subsurface explorations for the subject project. This report summarizes our findings and geotechnical recommendations and its contents are subject to the limitations set forth in Appendix A. Our services do not include environmental consultation and assessment on suitability of reuse or disposal of impacted site soils.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to obtain subsurface information at the site in order to develop geotechnical recommendations relative to foundations, earthwork and pavement associated with the proposed construction. Our scope of services included eight test borings and five test pit explorations, soils laboratory testing, a geotechnical analysis of the subsurface findings and preparation of this report.

1.2 Site and Proposed Construction

The site is located on the eastern boundary of the existing Maine Turnpike Authority (MTA) maintenance yard at Mile Marker (MM) 92.7 in Litchfield, Maine. The site is relatively open with an existing outbuilding and brine tanks in the northerly corner of the

proposed building area. Existing grades generally slope down from northwest to southeast from about Elevation (El.) 349 feet to 346 feet (project datum). We understand the site had previously been used as laydown and stockpile area.

Based on the provided information, we understand development plans call for construction of a new light and heavy vehicle service garage at the existing maintenance yard at Mile Marker (MM) 92.7 in Litchfield, Maine. We understand development will include a new 8,000 square foot service garage with associated paved and stormwater management areas. We understand the service garage will include office space, 4 repair bays with overhead crane, and a single drive through wash bay. Details regarding proposed finish floor, structural loading and site grading are not available at this time.

Proposed and existing site features are shown on the "Exploration Location Plan" attached in Appendix B.

2.0 EXPLORATION AND TESTING

2.1 Explorations

Five test pits (TP-101 through TP-105) were made at the site on February 6, 2019 and eight test borings (B-101 through B-108) were made at the site on March 26, 2019. The test borings were made by S. W. Cole Explorations, LLC. The test pits were made by MTA. The test pit locations were selected and established in the field by Gorrill-Palmer (Project Civil Engineers) and MTA. The test boring locations were selected and established in the field by S. W. Cole Engineering, Inc. (S.W.COLE) using measurements from existing site features. The approximate exploration locations are shown on the "Exploration Location Plan" attached in Appendix B. Logs of the explorations and a key to the notes and symbols used on the logs are attached in Appendix C. The elevations shown on the logs were estimated based on topographic information shown on the "Exploration Location Plan".

2.2 Testing

The test borings were drilled using hollow-stem augers. The test pits were excavated using a Volvo EC150 excavator. The soils in the test borings were sampled at 2 to 5 foot intervals using a split spoon sampler and Standard Penetration Testing (SPT)

methods. The soil samples were field screened using a Photo-Ionization Detector (PID). SPT blow counts and PID readings, where detected, are shown on the logs.

The test pits were also observed and logged by Soil Solutions of Orrington, Maine working under subcontract to S.W.COLE. A report and logs of these test pits are attached in Appendix D.

Soil samples obtained from the explorations were returned to our laboratory for further classification and testing. The results of two gradation tests are attached in Appendix E.

3.0 SUBSURFACE CONDITIONS

3.1 Soil and Bedrock

Test borings B-101 through B-104 were made in the area of the proposed building and borings B-105 through B-108 were made in the proposed paved areas. The explorations encountered a soils profile generally consisting of undocumented fills consisting of sand with varying amounts of gravel and silt with scattered construction debris to depths of about 3.5 to 7 feet overlying probable native sand and silt to about 4.5 to 8 feet overlying glacial till. A 1 to 2-foot thick probable relic topsoil layer was observed below the fill in borings B-101, B-107 and B-108.

Test pits TP-101 through TP-105 were made for proposed stormwater management areas. The test pits encountered undocumented fills to depths of about 3 to 4.5 feet overlying probable reworked native silts and sands.

Not all the strata were encountered at each exploration; refer to the attached logs for more detailed subsurface information.

3.2 Groundwater

The soils encountered at the test borings were moist to wet from the ground surface. Saturated soils were encountered at depths varying from 5 to 7 feet. Groundwater likely becomes perched on the relatively impervious glacial till encountered at the test borings. Long term groundwater information is not available. It should be anticipated that groundwater levels will fluctuate, particularly in response to periods of snowmelt and precipitation, as well as changes in site use.

4.0 EVALUATION AND RECOMMENDATIONS

4.1 General Findings

Based on the subsurface findings, the proposed construction appears feasible from a geotechnical standpoint. The principle geotechnical considerations include:

- The site has been previously developed. Fills, soils with organics, structures, foundations, debris and relic topsoil must be completely removed from beneath the proposed building footprint. The extent of removal should extend 1 foot laterally outward from outside edge of perimeter footings for every 1 foot of excavation depth (1H:1V bearing splay). The over-excavated area should be backfilled with compacted Granular Borrow or Structural Fill.

- Following over-excavations, spread footing foundations and a slab-on-grade floors bearing on properly prepared subgrades appear suitable for the proposed building. Footings should bear on at least 6-inches of compacted Crushed Stone wrapped in geotextile fabric overlying undisturbed native non-organic soils. On-grade floor slabs should bear on at least 12-inches of compacted Structural Fill overlying properly prepared subgrades.

- We recommend removal and replacement of fills to bottom of pavement subbase gravels as well as pipe and utility bedding. The subgrade soils below the proposed paved areas should be proof-rolled with a smooth drum vibratory roller having a static weight of at least 10 kips prior to the placement of new pavement gravels. Stumps, wood and organics would require complete removal and replacement.

- Subgrades across the site will consist of moisture-sensitive silts and sands. Earthwork and grading activities should occur during drier, non-freezing weather of Spring, Summer and Fall. Excavation of bearing surfaces should be completed with a smooth-edged bucket to lessen subgrade disturbance.

4.2 Site and Subgrade Preparation

We recommend site preparation begin with the construction of an erosion control system to protect adjacent drainage ways and areas outside the construction limits. Site disturbance outside the construction areas should be kept to a minimum to lessen the potential for erosion and site disturbance.

Building Pad and Footings: As discussed, the site has been previously developed. Fills, soils with organics, structures, foundations, debris and relic topsoil must be completely removed from beneath the proposed building footprint. The extent of removal should extend 1 foot laterally outward from outside edge of perimeter footings for every 1-foot of excavation depth (1H:1V bearing splay). The over-excavated area should be backfilled with compacted Granular Borrow or Structural Fill.

We recommend excavations to subgrade be made using a smooth-edged bucket and that footings be underlain by at least 6 inches of compacted Crushed Stone wrapped in non-woven geotextile filter fabric, such as Mirafi 180N.

Paved Areas: Uncontrolled fills encountered beneath proposed paved areas should be removed to the bottom of proposed pavement gravels. Uncontrolled fill areas with organics should be completely removed. Uncontrolled granular fills should be proof-rolled and densified. Areas that become soft or continue to yield after densification should be removed and replaced with compacted Granular Borrow or Structural Fill.

4.3 Excavation and Dewatering

Excavations will generally encounter uncontrolled fills, debris, relic topsoil, silty sand and silt soils. Care must be exercised during construction to limit disturbance of the bearing soils. Earthwork and grading activities should occur during drier, non-freezing weather of Spring, Summer and Fall. Final cuts to subgrade should be performed with a smooth-edged bucket to help reduce strength loss from soil disturbance.

Sumping and pumping dewatering techniques should be adequate to control groundwater in excavations. Controlling the water levels to at least one foot below planned excavation depths will help stabilize subgrades during construction. Excavations must be properly shored or sloped in accordance with OSHA Regulations to prevent sloughing and caving of the sidewalls during construction. Care must be taken to preclude undermining adjacent structures, utilities and roadways. The design and planning of excavations, excavation support systems, and dewatering is the responsibility of the contractor.

4.4 Foundations

We recommend the proposed building be supported on spread footings founded on at least 6-inches of compacted Crushed Stone fully wrapped in non-woven geotextile

fabric, such as Mirafi 180N, bearing on undisturbed native sands and silts or compacted fills in over-excavated areas. For foundations bearing on properly prepared subgrades, we recommend the following geotechnical parameters for design consideration:

Geotechnical Parameters for Spread Footings and Foundation Walls	
Design Frost Depth (100 year AFI)	5 feet
Net Allowable Soil Bearing Pressure	3.5 ksf
Base Friction Factor	0.35
Total Unit Weight of Backfill	125 pcf
At-Rest Lateral Earth Pressure Coefficient	0.5
Internal Friction Angle of Backfill	30°
Seismic Soil Site Class	D (IBC 2015)
Estimated Total Settlement	1-inch
Differential Settlement	½-inch

4.5 Foundation Drainage

We recommend an underdrain system be installed on the outside edge of the geotextile fabric wrapped Crushed Stone layer recommended below perimeter footings. The underdrain pipe should consist of 4-inch diameter, perforated SDR-35 foundation drain pipe bedded in Crushed Stone and wrapped in non-woven geotextile fabric. The underdrain pipe must have a positive gravity outlet protected from freezing, clogging and backflow. Surface grades should be sloped away from the building for positive surface water drainage. General underdrain details are illustrated on the "Foundation Detail Sketch" attached in Appendix B.

4.6 Slab-On-Grade

On-grade floor slabs in heated areas may be designed using a subgrade reaction modulus of 100 pci (pounds per cubic inch) provided the slab is underlain by at least 12-inches of compacted Structural Fill placed over properly prepared subgrades. The structural engineer or concrete consultant must design steel reinforcing and joint spacing appropriate to slab thickness and function.

We recommend a sub-slab vapor retarder particularly in areas of the building where the concrete slab will be covered with an impermeable surface treatment or floor covering that may be sensitive to moisture vapors. The vapor retarder must have a permeance that is less than the floor cover or surface treatment that is applied to the slab. The vapor retarder must have sufficient durability to withstand direct contact with the sub-

slab base material and construction activity. The vapor retarder material should be placed according to the manufacturer's recommended method, including the taping and lapping of all joints and wall connections. The architect and/or flooring consultant should select the vapor retarder products compatible with flooring and adhesive materials.

The floor slab should be appropriately cured using moisture retention methods after casting. Typical floor slab curing methods should be used for at least 7 days. The architect or flooring consultant should assign curing methods consistent with current applicable American Concrete Institute (ACI) procedures with consideration of curing method compatibility to proposed surface treatments, flooring and adhesive materials.

4.7 Entrance Slabs and Sidewalks

Entrance slabs and sidewalks adjacent to the building must be designed to reduce the effects of differential frost action between adjacent pavement, doorways, and entrances. We recommend that non-frost susceptible Structural Fill be provided to a depth of at least 5 feet below the top of entrance slabs. This thickness of Structural Fill should extend the full width of the entrance slab and outward at least 5 feet, thereafter transitioning up to the bottom of the adjacent sidewalk or pavement gravels at a 3H:1V or flatter slope. General details of this frost transition zone are shown on the "Foundation Detail Sketch" attached in Appendix B.

4.8 Fill, Backfill and Compaction

We recommend the following fill and backfill materials. Recycled products must be tested in accordance with applicable environmental regulations and approved by a qualified environmental consultant.

Common Borrow: Fill to raise grades in paved and landscape areas should be non-organic compactable earth meeting the requirements of 2014 MaineDOT Standard Specification 703.18 Common Borrow. Where used beneath paved areas, Common Borrow fills with a Plasticity Index greater than 10 shall be capped with a 12 inch layer of Granular Borrow prior to installing Pavement Subbase materials.

Granular Borrow: Fill to raise grades in building and paved areas, as well as to repair soft areas, should be sand or silty sand meeting the requirements of 2014 MaineDOT Standard Specification 703.19 Granular Borrow.

Structural Fill: Backfill for foundations, slab base material and material below exterior entrances slabs should be clean, non-frost susceptible sand and gravel meeting the gradation requirements for Structural Fill as given below:

Structural Fill	
Sieve Size	**Percent Finer by Weight**
4 inch	100
3 inch	90 to 100
¼ inch	25 to 90
No. 40	0 to 30
No. 200	0 to 6

Crushed Stone: Crushed Stone, used beneath foundations and for underdrain aggregate should be washed ¾-inch crushed stone meeting the requirements of 2014 MaineDOT Standard Specification 703.22 Underdrain Backfill Material Type C.

Reuse of Site Soils: From a geotechnical standpoint, the non-organic on-site granular fills soils are unsuitable for reuse in building areas, but may be suitable for reuse as Common Borrow in paved and landscape areas, provided they are at a compactable moisture content at the time of reuse.

Placement and Compaction: Fill should be placed in horizontal lifts and compacted such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. Loose lift thicknesses for grading, fill and backfill activities should not exceed 12 inches. We recommend that fill and backfill in building and paved areas be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557. Crushed Stone should be compacted with 3 to 5 passes of a vibratory plate compactor having a static weight of at least 500 pounds.

4.9 Paved Areas

We anticipate paved areas will be subjected primarily to passenger vehicle and heavy truck traffic. Considering the site soils, and proposed usage, we offer the following pavement section for consideration.

FLEXIBLE (HMA) PAVEMENT SECTION 2014 MaineDOT Standard Specs	
Pavement Layer	**Material Thickness**
MaineDOT 9.5 mm Hot Mix Asphalt	1 ½ inches
MaineDOT 19.0 mm Hot Mix Asphalt	2 ¾ inches
MaineDOT 703.06 Aggregate Base Type A	6 inches
MaineDOT 703.06 Aggregate Subbase Type D	12 inches

The base and subbase materials should be compacted to at least 95 percent of their maximum dry density as determined by ASTM D-1557. Hot mix asphalt pavement should be compacted to 92 to 97 percent of its theoretical maximum density as determined by ASTM D-2041. A tack coat should be used between successive lifts of bituminous pavement.

4.10 Weather Considerations

Construction activity should be limited during wet and freezing weather and the site soils may require drying or thawing before construction activities may continue. The contractor should anticipate the need for water to temper fills in order to facilitate compaction during dry weather. If construction takes place during cold weather, subgrades, foundations and floor slabs must be protected during freezing conditions. Concrete and fill must not be placed on frozen soil; and once placed, the concrete and soil beneath the structure must be protected from freezing.

4.11 Design Review and Construction Testing

S.W.COLE should be retained to review the construction documents prior to bidding to determine that our earthwork, foundation and pavement recommendations have been properly interpreted and implemented.

A soils and concrete testing program should be implemented during construction to observe compliance with the design concepts, plans, and specifications. S.W.COLE is available to observe earthwork activities, the preparation of foundation bearing surfaces and pavement subgrades, as well as to provide testing and IBC Special Inspection services for soils, concrete, steel, spray-applied fireproofing, structural masonry and asphalt construction materials.

4.12 Recommendations For Additional Study

Uncontrolled fills were encountered at the site which may require removal and replacement with imported fills. We recommend an environmental consultant be engaged to evaluate fill soils. Additionally, the construction documents should include unit price rates for removal and disposal of uncontrolled fills and backfilling with compacted MaineDOT Type D Subbase Gravel, Crushed Stone and Structural Fill.

5.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you during the construction phase of the project.

Sincerely,

S. W. Cole Engineering, Inc.

Michael St. Pierre, P.E. 2019.04.18 14:42:22 -04'00

STATE OF MAINE
MICHAEL A. ST. PIERRE No. 12519
LICENSED PROFESSIONAL ENGINEER

Michael A. St. Pierre, P.E.
Senior Geotechnical Engineer

MAS:rec

APPENDIX A

Limitations

This report has been prepared for the exclusive use of Allied Engineering, Inc. for specific application to the proposed Vehicle Maintenance Garage at the Maine Turnpike Authority Litchfield Maintenance Yard at I-95 Mile Marker 92.7 in Litchfield, Maine. S. W. Cole Engineering, Inc. (S.W.COLE) has endeavored to conduct our services in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

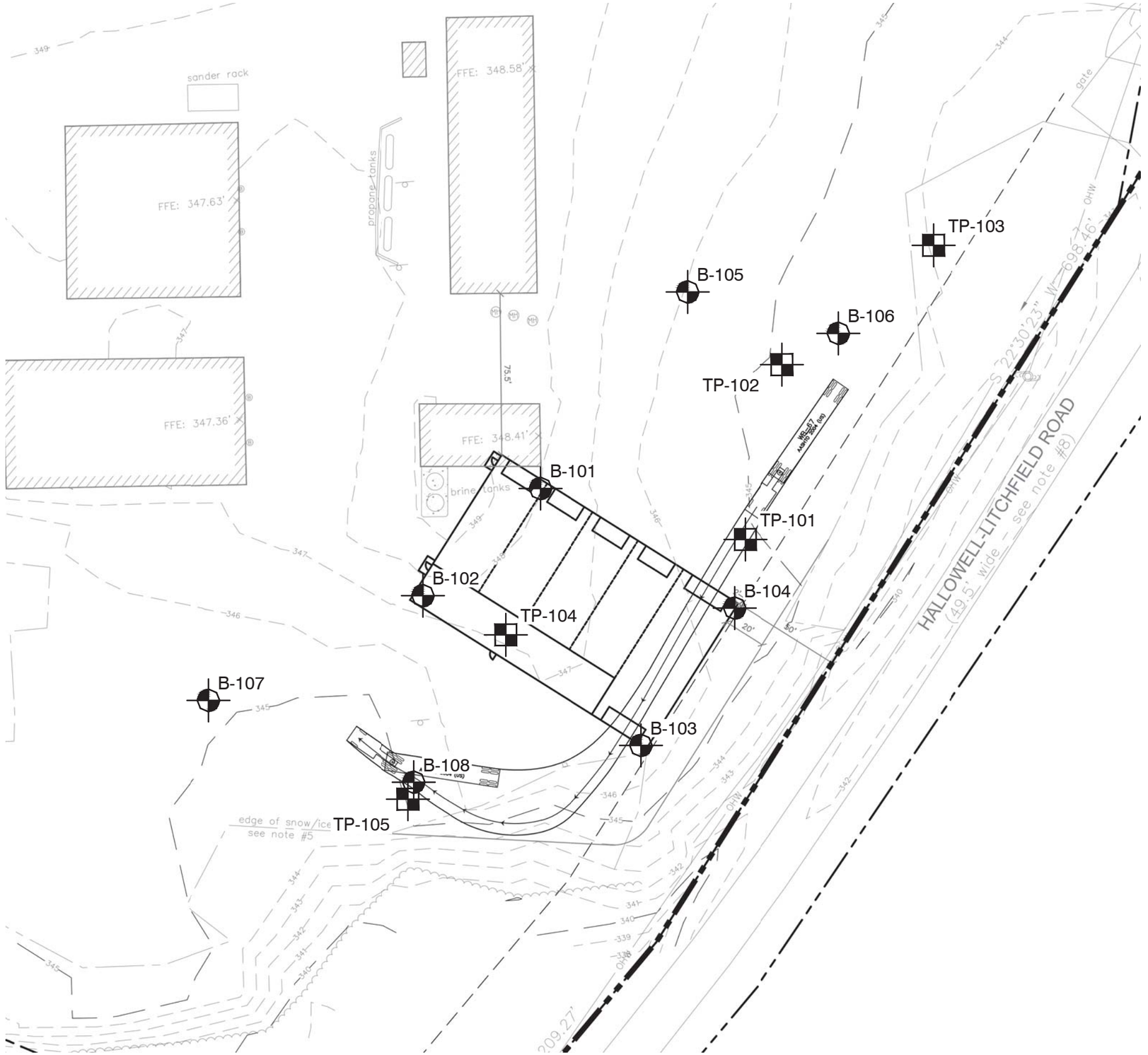
Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S.W.COLE's scope of services has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S.W.COLE should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S.W.COLE.

APPENDIX B

Figures



LEGEND:

APPROXIMATE BORING LOCATION

APPROXIMATE TEST PIT LOCATION

NOTES:

1. EXPLORATION LOCATION PLAN WAS PREPARED FROM A 1"=30' SCALE PLAN OF THE SITE ENTITLED "GRADING, DRAINAGE, EROSION CONTROL PLAN," PREPARED BY GORRILL PALMER, DATED 03/12/2019 AND PROVIDED AS A PORTABLE DOCUMENT FORMAT (PDF) FILE.
2. THE EXPLORATIONS WERE LOCATED IN THE FIELD BY TAPED MEASUREMENTS FROM EXISTING SITE FEATURES.
3. TEAST PITS TP-101 THROUGH TP-105 WERE PERFORMED UNDER THE DIRECTION OF S. W. COLE ENGINEERING, INC. IN FEBRUARY 2019.
4. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
5. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.

0 50 100 Feet

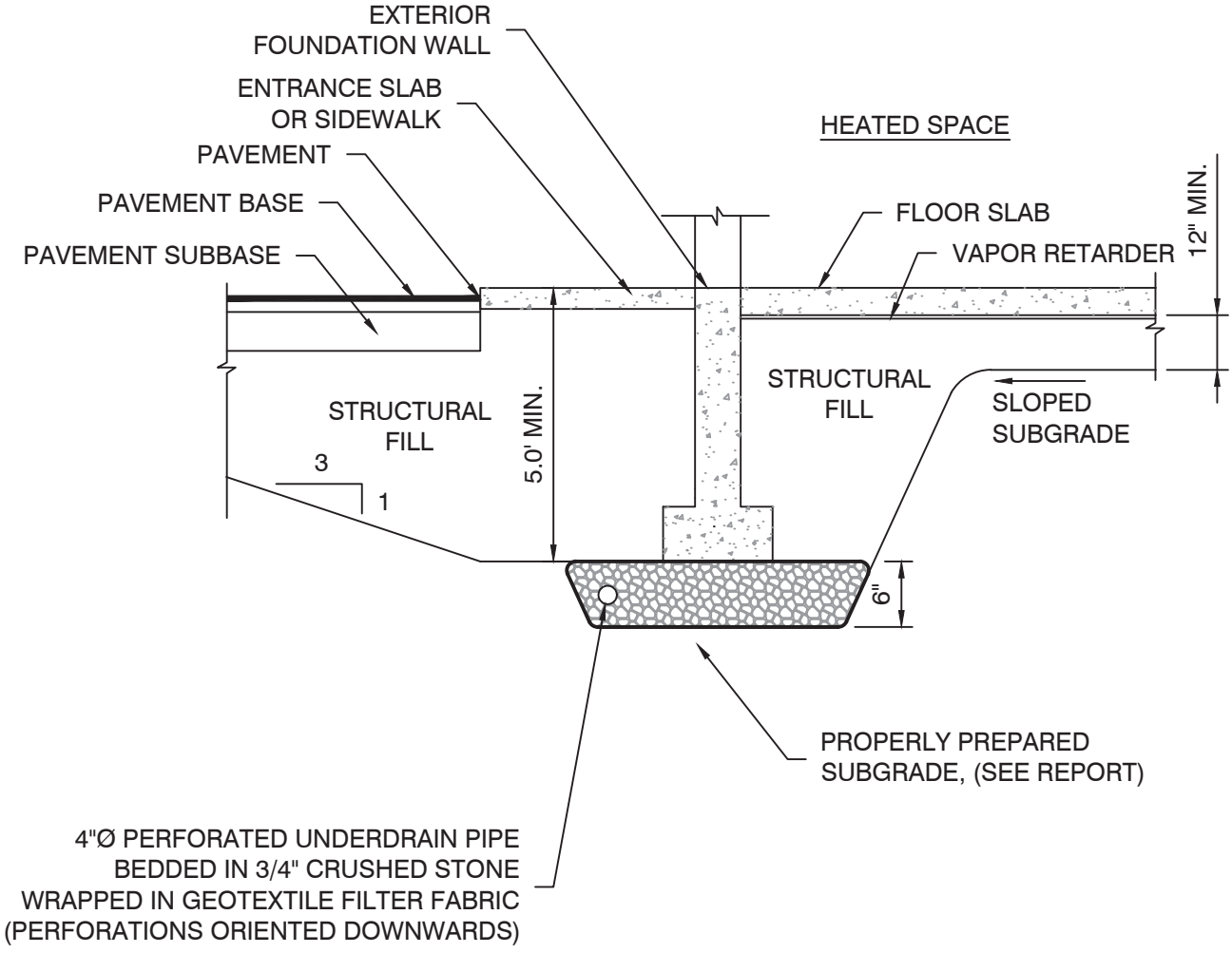
S.W.COLE ENGINEERING, INC.

ALLIED ENGINEERING, INC.

EXPLORATION LOCATION PLAN

PROPOSED VEHICLE MAINTENANCE GARAGE
MTA LITCHFIELD MAINTENANCE YARD
I-95 MARKER 92.7
LITCHFIELD, MAINE

Job No.:	18-1562	Scale:	1" = 50'
Date :	04/18/2019	Sheet:	1



NOTE:

1. UNDERDRAIN INSTALLATION AND MATERIAL GRADATION RECOMMENDATIONS ARE CONTAINED WITHIN THIS REPORT.

2. DETAIL IS PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY, NOT FOR CONSTRUCTION.

S.W.COLE ENGINEERING, INC.

ALLIED ENGINEERING, INC.

FOUNDATION DETAIL SKETCH

PROPOSED VEHICLE MAINTENANCE GARAGE
MTA LITCHFIELD MAINTENANCE YARD
I-95 MARKER 92.7
LITCHFIELD, MAINE

Job No.:	18-1562	Scale:	Not to Scale
Date :	04/18/2019	Sheet:	2

APPENDIX C

Exploration Logs and Key

S.W.COLE ENGINEERING, INC.

BORING LOG

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

BORING NO.: B-101
SHEET: 1 of 1
PROJECT NO. 18-1562
DATE START: 3/26/2019
DATE FINISH: 3/26/2019

Drilling Information

LOCATION: See Exploration Location Plan | **ELEVATION (FT):** 348' Estimated | **TOTAL DEPTH (FT):** 17.0 | **LOGGED BY:** Patrick Otto
DRILLING CO.: S. W. Cole Explorations, LLC | **DRILLER:** Matt Leonard | **DRILLING METHOD:** Hollow Stem Auger
RIG TYPE: Track Mounted Mobile Drill B-53 | **AUGER ID/OD:** 2 1/4 in / 5 5/8 in | **SAMPLER:** Standard Split-Spoon
HAMMER TYPE: Automatic / Automatic | **HAMMER WEIGHT (lbs):** 140 / 140 | **CASING ID/OD:** N/A /N/A | **CORE BARREL:**
HAMMER EFFICIENCY FACTOR: | **HAMMER DROP (inch):** 30 / 16
WATER LEVEL DEPTHS (ft): 3/26/2019 Soils wet/saturated at 7' - perched
GENERAL NOTES: Frost to ±2 ft

KEY TO NOTES AND SYMBOLS:
Water Level: ▽ At time of Drilling; ▼ At Completion of Drilling; ▼ After Drilling
D = Split Spoon Sample; U = Thin Walled Tube Sample; R = Rock Core Sample; V = Field Vane Shear
Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.; q_u = Unconfined Compressive Strength, kips/sq.ft.; Ø = Friction Angle (Estimated); N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_2O Depth	Remarks
			1D		0.5-2.5	24/12	15-15-14-12			2" Asphalt / Medium dense, brown SAND and GRAVEL, some silt (FILL)		
345			2D		2.5-4.5	24/10	12-9-6-7	ID 24983G				
	5		3D		5-7	24/24	1-1 FOR 12"-2			4.5 Very loose, dark brown sandy SILT with organics (relic topsoil layer)		
			4D		7-9	24/18	2-2-6-9			6.5 Loose, light brown-gray SAND and SILT		
340										8.0 Medium dense, gray-brown silty SAND, trace gravel		
	10		5D		10-12	24/15	6-8-10-23			10.0 Medium dense to dense, brown silty SAND, some gravel		
335												
	15		6D		15-17	24/24	6-14-17-20					

Bottom of Exploration at 17.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING LOG

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

BORING NO.: B-102
SHEET: 1 of 1
PROJECT NO. 18-1562
DATE START: 3/26/2019
DATE FINISH: 3/26/2019

Drilling Information

LOCATION: See Exploration Location Plan | **ELEVATION (FT):** 347.5' Estimated | **TOTAL DEPTH (FT):** 21.4 | **LOGGED BY:** Patrick Otto
DRILLING CO.: S. W. Cole Explorations, LLC | **DRILLER:** Matt Leonard | **DRILLING METHOD:** Hollow Stem Auger
RIG TYPE: Track Mounted Mobile Drill B-53 | **AUGER ID/OD:** 2 1/4 in / 5 5/8 in | **SAMPLER:** Standard Split-Spoon
HAMMER TYPE: Automatic / Automatic | **HAMMER WEIGHT (lbs):** 140 / 140 | **CASING ID/OD:** N/A /N/A | **CORE BARREL:**
HAMMER EFFICIENCY FACTOR: | **HAMMER DROP (inch):** 30 / 16
WATER LEVEL DEPTHS (ft): ▽ 11 ft 3/26/2019 Soils wet/saturated at 5' - perched
GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level: ▽ At time of Drilling; ▼ At Completion of Drilling; ▼ After Drilling
D = Split Spoon Sample; U = Thin Walled Tube Sample; R = Rock Core Sample; V = Field Vane Shear
Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.; q_u = Unconfined Compressive Strength, kips/sq.ft.; Ø = Friction Angle (Estimated); N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_20 Depth	Remarks
			1D		0.5-2.5	24/10	7-5-2-3			3" Asphalt / loose, brown silty SAND, some gravel (FILL)		
345			2D		2.5-4.5	24/10	3-2-2-2			2.0 Very loose, gray silty SAND (FILL)		
	5		3D		5-6.8	21/2	1 FOR 12"-2-50			4.5 Very loose to very dense, brown sandy SILT with boulders and tire chunks (FILL) auger refusal at 6.8', moved boring 10' - auger disconnected at 8.4', no sample		
340												
	10		4D		11-13	24/18	6-10-17-27			9.5 Medium dense, gray silty SAND, some gravel	▽	
335												
	15		5D		15-17	24/15	12-20-32-35			14.0 Dense, brown silty SAND, some gravel		
330												
	20		6D		20-21.4	17/17	12-22-50/5"			18.0 Very dense, gray silty SAND, some gravel		

Bottom of Exploration at 21.4 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING LOG

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

BORING NO.: B-103
SHEET: 1 of 1
PROJECT NO. 18-1562
DATE START: 3/26/2019
DATE FINISH: 3/26/2019

Drilling Information

LOCATION: See Exploration Location Plan
ELEVATION (FT): 346' Estimated
TOTAL DEPTH (FT): 17.0
LOGGED BY: Patrick Otto
DRILLING CO.: S. W. Cole Explorations, LLC
DRILLER: Matt Leonard
DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Mobile Drill B-53
AUGER ID/OD: 2 1/4 in / 5 5/8 in
SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic / Automatic
HAMMER WEIGHT (lbs): 140 / 140
CASING ID/OD: N/A /N/A
CORE BARREL:
HAMMER EFFICIENCY FACTOR:
HAMMER DROP (inch): 30 / 16
WATER LEVEL DEPTHS (ft): 3/26/2019 No free water observed
GENERAL NOTES: Frost to ±2 ft

KEY TO NOTES AND SYMBOLS:
Water Level: ▽ At time of Drilling; ▼ At Completion of Drilling; ▼ After Drilling
D = Split Spoon Sample; U = Thin Walled Tube Sample; R = Rock Core Sample; V = Field Vane Shear
Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.; q_u = Unconfined Compressive Strength, kips/sq.ft.; Ø = Friction Angle (Estimated); N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_2O Depth	Remarks
345			1D		0-2	24/24	5-21-27-26			1.0 Loose, brown silty SAND, some gravel with organics (rootlets), (FILL)		
			2D		2-2.4	5/1	50/5"			Dense, brown gravelly SAND, some silt with cobbles (FILL)		
	5		3D		5-7	24/24	4-2-2-6			4.5 Very loose, brown-rust brown, silty SAND with frequent silt layers		
340			4D		7-9	24/24	10-15-12-12			7.0 Medium dense to dense, light brown silty SAND, trace gravel		
	10		5D		10-12	24/20	8-9-12-15			10.0 Medium dense to dense, gray-brown silty SAND, some gravel		
335												
	15		6D		15-17	24/24	16-16-16-18					
330												

Bottom of Exploration at 17.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING LOG

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

BORING NO.: B-104
SHEET: 1 of 1
PROJECT NO. 18-1562
DATE START: 3/26/2019
DATE FINISH: 3/26/2019

Drilling Information

LOCATION: See Exploration Location Plan | **ELEVATION (FT):** 345.5' Estimated | **TOTAL DEPTH (FT):** 17.0 | **LOGGED BY:** Patrick Otto
DRILLING CO.: S. W. Cole Explorations, LLC | **DRILLER:** | **DRILLING METHOD:** Hollow Stem Auger
RIG TYPE: Track Mounted Mobile Drill B-53 | **AUGER ID/OD:** 2 1/4 in / 5 5/8 in | **SAMPLER:** Standard Split-Spoon
HAMMER TYPE: Automatic / Automatic | **HAMMER WEIGHT (lbs):** 140 / 140 | **CASING ID/OD:** N/A /N/A | **CORE BARREL:**
HAMMER EFFICIENCY FACTOR: | **HAMMER DROP (inch):** 30 / 16
WATER LEVEL DEPTHS (ft): ▽ 5 ft 3/26/2019 Soils saturated at 5'
GENERAL NOTES:

KEY TO NOTES AND SYMBOLS:
Water Level: ▽ At time of Drilling; ▼ At Completion of Drilling; ▼ After Drilling
D = Split Spoon Sample; U = Thin Walled Tube Sample; R = Rock Core Sample; V = Field Vane Shear
Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.; q_u = Unconfined Compressive Strength, kips/sq.ft.; Ø = Friction Angle (Estimated); N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_20 Depth	Remarks
345			1D		0-2	24/20	12-28-34-48	ID 24984G		Very dense to medium dense, brown gravelly silty SAND with brick (FILL)		
			2D		2-4	24/12	19-10-9-8				▽	
	5											
340			3D		5-7	24/8	4-9-3-4			5.5 Medium dense, brown silty SAND (probable reworked native)		
			4D		7-9	24/17	6-10-12-15			7.0 Medium dense, brown silty SAND, some gravel		
	10											
335			5D		10-12	24/18	8-10-11-21					
										14.0 Dense, gray-brown silty SAND, some gravel		
	15											
330			6D		15-17	24/18	13-16-17-20					

Bottom of Exploration at 17.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING LOG

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

BORING NO.: B-105
SHEET: 1 of 1
PROJECT NO. 18-1562
DATE START: 3/26/2019
DATE FINISH: 3/26/2019

Drilling Information

LOCATION: See Exploration Location Plan | **ELEVATION (FT):** 346' Estimated | **TOTAL DEPTH (FT):** 11.3 | **LOGGED BY:** Patrick Otto
DRILLING CO.: S. W. Cole Explorations, LLC | **DRILLER:** | **DRILLING METHOD:** Hollow Stem Auger
RIG TYPE: Track Mounted Mobile Drill B-53 | **AUGER ID/OD:** 2 1/4 in / 5 5/8 in | **SAMPLER:** Standard Split-Spoon
HAMMER TYPE: Automatic / Automatic | **HAMMER WEIGHT (lbs):** 140 / 140 | **CASING ID/OD:** N/A /N/A | **CORE BARREL:**
HAMMER EFFICIENCY FACTOR: | **HAMMER DROP (inch):** 30 / 16
WATER LEVEL DEPTHS (ft): 3/26/2019 No free water observed
GENERAL NOTES:

KEY TO NOTES AND SYMBOLS:
Water Level: ▽ At time of Drilling; ▼ At Completion of Drilling; ▼ After Drilling
D = Split Spoon Sample; U = Thin Walled Tube Sample; R = Rock Core Sample; V = Field Vane Shear
Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.; q_u = Unconfined Compressive Strength, kips/sq.ft.; Ø = Friction Angle (Estimated); N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_20 Depth	Remarks
345			1D		0-2	24/15	4-6-6-6			Medium dense, brown SAND, some gravel, some silt with black staining and petroleum-like odor (FILL)		
			2D		2-4	24/18	1-1-2-6	PID=59.3 ppm				
										3.5 Loose, brown silty SAND (reworked)		
	5		3D		5-7	24/18	6-9-14-16	PID=2.1 ppm		4.5 Medium dense, gray-brown silty SAND, some gravel		
340												
	10		4D		10-12	24/16	11-16-50					
335										Bottom of Exploration at 11.3 feet		

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

S.W.COLE ENGINEERING, INC.

BORING LOG

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

BORING NO.: B-106
SHEET: 1 of 1
PROJECT NO. 18-1562
DATE START: 3/26/2019
DATE FINISH: 3/26/2019

Drilling Information

LOCATION: See Exploration Location Plan | **ELEVATION (FT):** 344.5' Estimated | **TOTAL DEPTH (FT):** 12.0 | **LOGGED BY:** Patrick Otto
DRILLING CO.: S. W. Cole Explorations, LLC | **DRILLER:** | **DRILLING METHOD:** Hollow Stem Auger
RIG TYPE: Track Mounted Mobile Drill B-53 | **AUGER ID/OD:** 2 1/4 in / 5 5/8 in | **SAMPLER:** Standard Split-Spoon
HAMMER TYPE: Automatic / Automatic | **HAMMER WEIGHT (lbs):** 140 / 140 | **CASING ID/OD:** N/A /N/A | **CORE BARREL:**
HAMMER EFFICIENCY FACTOR: | **HAMMER DROP (inch):** 30 / 16
WATER LEVEL DEPTHS (ft): 3/26/2019 No free water observed
GENERAL NOTES:

KEY TO NOTES AND SYMBOLS:
Water Level: ▽ At time of Drilling; ▼ At Completion of Drilling; ▼ After Drilling
D = Split Spoon Sample; U = Thin Walled Tube Sample; R = Rock Core Sample; V = Field Vane Shear
Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.; q_u = Unconfined Compressive Strength, kips/sq.ft.; Ø = Friction Angle (Estimated); N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_2O Depth	Remarks
			1D		0-2	24/14	6-8-12-19			1.0 Medium dense, brown gravelly SAND, some silt (FILL)		
			2D		2-4	24/15	4-3-1-2	PID=2.1 ppm		Very loose to medium dense, gray silty SAND with wire, black staining and petroleum-like odor (FILL)		
340	5		3D		5-7	24/18	2-5-7-11	PID=1600 ppm				
			4D		7-9	24/16	11-19-18-17	PID=47.3 ppm		6.5 Dense to medium dense, gray-brown silty SAND, some gravel		
335	10		5D		10-12	24/15	11-14-15-19	PID=1 ppm				

Bottom of Exploration at 12.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING LOG

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

BORING NO.: B-107
SHEET: 1 of 1
PROJECT NO. 18-1562
DATE START: 3/26/2019
DATE FINISH: 3/26/2019

Drilling Information

LOCATION: See Exploration Location Plan | **ELEVATION (FT):** 345' Estimated | **TOTAL DEPTH (FT):** 12.0 | **LOGGED BY:** Patrick Otto
DRILLING CO.: S. W. Cole Explorations, LLC | **DRILLER:** Matt Leonard | **DRILLING METHOD:** Hollow Stem Auger
RIG TYPE: Track Mounted Mobile Drill B-53 | **AUGER ID/OD:** 2 1/4 in / 5 5/8 in | **SAMPLER:** Standard Split-Spoon
HAMMER TYPE: Automatic / Automatic | **HAMMER WEIGHT (lbs):** 140 / 140 | **CASING ID/OD:** N/A /N/A | **CORE BARREL:**
HAMMER EFFICIENCY FACTOR: | **HAMMER DROP (inch):** 30 / 16
WATER LEVEL DEPTHS (ft): 3/20/2019 Soils saturated at 7'
GENERAL NOTES:

KEY TO NOTES AND SYMBOLS:
Water Level: ▽ At time of Drilling; ▼ At Completion of Drilling; ▼ After Drilling
D = Split Spoon Sample; U = Thin Walled Tube Sample; R = Rock Core Sample; V = Field Vane Shear
Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.; q_u = Unconfined Compressive Strength, kips/sq.ft.; Ø = Friction Angle (Estimated); N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_2O Depth	Remarks
			1D		0-2	24/15	7-8-9-11			Medium dense, gray silty SAND, some gravel (FILL)		
			2D		2-4	24/3	8-6-5-3	PID=2 ppm		faint petroleum-like odor		
										3.5 Medium dense, dark brown sandy SILT with trace organics (relic topsoil layer)		
340	5		3D		5-7	24/8	2-4-4-5			4.5 Loose, gray SAND and SILT, trace gravel		
			4D		7-9	24/15	8-8-7-12			7.0 Medium dense, gray silty SAND, some gravel		
335	10		5D		10-12	24/15	5-10-13-17			10.0 Medium dense, brown SAND and SILT, some gravel		

Bottom of Exploration at 12.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING LOG

S.W.COLE ENGINEERING, INC.

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

BORING NO.: B-108
SHEET: 1 of 1
PROJECT NO. 18-1562
DATE START: 3/26/2019
DATE FINISH: 3/26/2019

Drilling Information

LOCATION: See Exploration Location Plan
ELEVATION (FT): 345' Estimated
TOTAL DEPTH (FT): 12.0
LOGGED BY: Patrick Otto
DRILLING CO.: S. W. Cole Explorations, LLC
DRILLER: Matt Leonard
DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Mobile Drill B-53
AUGER ID/OD: 2 1/4 in / 5 5/8 in
SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic / Automatic
HAMMER WEIGHT (lbs): 140 / 140
CASING ID/OD: N/A /N/A
CORE BARREL:
HAMMER EFFICIENCY FACTOR:
HAMMER DROP (inch): 30 / 16
WATER LEVEL DEPTHS (ft): 3/26/2019 No free water observed
GENERAL NOTES: Frost to ±2 ft

KEY TO NOTES AND SYMBOLS:
Water Level: ▽ At time of Drilling; ▼ At Completion of Drilling; ▼ After Drilling
D = Split Spoon Sample; U = Thin Walled Tube Sample; R = Rock Core Sample; V = Field Vane Shear
Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.; q_u = Unconfined Compressive Strength, kips/sq.ft.; Ø = Friction Angle (Estimated); N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_2O Depth	Remarks
			1D		0-2	24/15	10-12-18-37			Medium dense, brown gravelly SAND, some silt (FILL)		
			2D		2-4	24/15	23-17-12-5					
340	5		3D		5-7	24/18	1-1-5-7			4.5 Very loose, dark brown sandy SILT (relic topsoil layer)		
										6.0 Medium dense, brown silty SAND, trace gravel		
335	10		4D		10-12	24/24	5-13-12-16					

Bottom of Exploration at 12.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

TEST PIT LOGS

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

PROJECT NO.: 18-1562
LOGGED BY: Patrick Otto
CONTRACTOR: MTA
EQUIPMENT: Volvo EC150

TEST PIT TP-101

DATE: 2/6/2019 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 345' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): ▽ 2 ft 2/6/2019 Perched water in fill, seepage at 2'+/- **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data / PID Readings
		Brown silty sandy GRAVEL (FILL)	▽ 2				
		2.4 Gray sandy SILT, some gravel with organics (FILL) ~Petroleum/chemical odor observed in test pit~				2.4- 3-	PID= 3.1 ppm OLEOPHILIC DYE TEST - Undetected
5		4.0 Gray-brown silty SAND, some gravel (possible FILL / Reworked) ~Petroleum/chemical odor observed in test pit~				4-	PID= 3.7 ppm

Bottom of Exploration at 6.0 feet

TEST PIT TP-102

DATE: 2/6/2019 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 345' Estimated **COMPLETION DEPTH (FT):** 5.5
WATER LEVEL DEPTHS (FT): ▽ 2 ft 2/6/2019 Perched water in fill, seepage at 2'+/- **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data / PID Readings
		Brown silty sandy GRAVEL (FILL)	▽ 2				
		2.0 Brown sandy SILT with roots (FILL)					
		2.9 Gray layered SAND and SILT, some gravel (probable FILL / Reworked) ~Petroleum/chemical odor observed in test pit~				3.5-	PID= 21.4 ppmOLEOPHILIC DYE TEST - Undetected
5							

Bottom of Exploration at 5.5 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT LOGS

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

PROJECT NO.: 18-1562
LOGGED BY: Patrick Otto
CONTRACTOR: MTA
EQUIPMENT: Volvo EC150

TEST PIT TP-103

DATE: 2/6/2019 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 344' Estimated **COMPLETION DEPTH (FT):** 5.5
WATER LEVEL DEPTHS (FT): ▽ 3.5 ft 2/6/2019 Seepage at 3.5'+/-, light sheen on free water in test pit **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data / PID Readings
		Brown silty SAND and GRAVEL (FILL) ~Petroleum/chemical odor in test pit~	▽ 3.5			3.5-	PID= 2 ppmOLEOPHILIC DYE TEST - Undetected
5		4.5 Gray sandy clayey SILT with organics (FILL) ~Petroleum/chemical odor observed in test pit~				4.5-	PID= 77 ppmOLEOPHILIC DYE TEST - Undetected
		Bottom of Exploration at 5.5 feet					

TEST PIT TP-104

DATE: 2/6/2019 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 347' Estimated **COMPLETION DEPTH (FT):** 5.5
WATER LEVEL DEPTHS (FT): 2/6/2019 No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Brown silty SAND and GRAVEL (FILL)					
5		4.5 Brown silty gravelly SAND with cobbles (FILL)					
		Bottom of Exploration at 5.5 feet					

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT LOGS

CLIENT: Allied Engineering, Inc.
PROJECT: Proposed Vehicle Maintenance Garage
LOCATION: I-95 Mile Marker 92.7, Litchfield, Maine

PROJECT NO.: 18-1562
LOGGED BY: Patrick Otto
CONTRACTOR: MTA
EQUIPMENT: Volvo EC150

TEST PIT TP-105

DATE: 2/6/2019 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 345' Estimated **COMPLETION DEPTH (FT):** 5.5
WATER LEVEL DEPTHS (FT): 2/6/2019 No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Brown silty SAND and GRAVEL (FILL)					
5		4.5 Brown silty gravelly SAND with cobbles (FILL)					

Bottom of Exploration at 5.5 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:

Water Level
- ▽ At time of Digging
- ▼ At Completion of Digging
- ▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

KEY TO NOTES & SYMBOLS
Test Boring and Test Pit Explorations

Stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Key to Symbols Used:

w	-	water content, percent (dry weight basis)
q_u	-	unconfined compressive strength, kips/sq. ft. - laboratory test
S_v	-	field vane shear strength, kips/sq. ft.
L_v	-	lab vane shear strength, kips/sq. ft.
q_p	-	unconfined compressive strength, kips/sq. ft. – pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W_L	-	liquid limit - Atterberg test
W_P	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass.
γ_T	-	total soil weight
γ_B	-	buoyant soil weight

Description of Proportions:

Trace:	0 to 5%
Some:	5 to 12%
"Y"	12 to 35%
And	35+%
With	Undifferentiated

Description of Stratified Soils

Parting:	0 to 1/16" thickness
Seam:	1/16" to 1/2" thickness
Layer:	½" to 12" thickness
Varved:	Alternating seams or layers
Occasional:	one or less per foot of thickness
Frequent:	more than one per foot of thickness

REFUSAL: **Test Boring Explorations** - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: **Test Pit Explorations** - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.

APPENDIX D

Laboratory Test Results

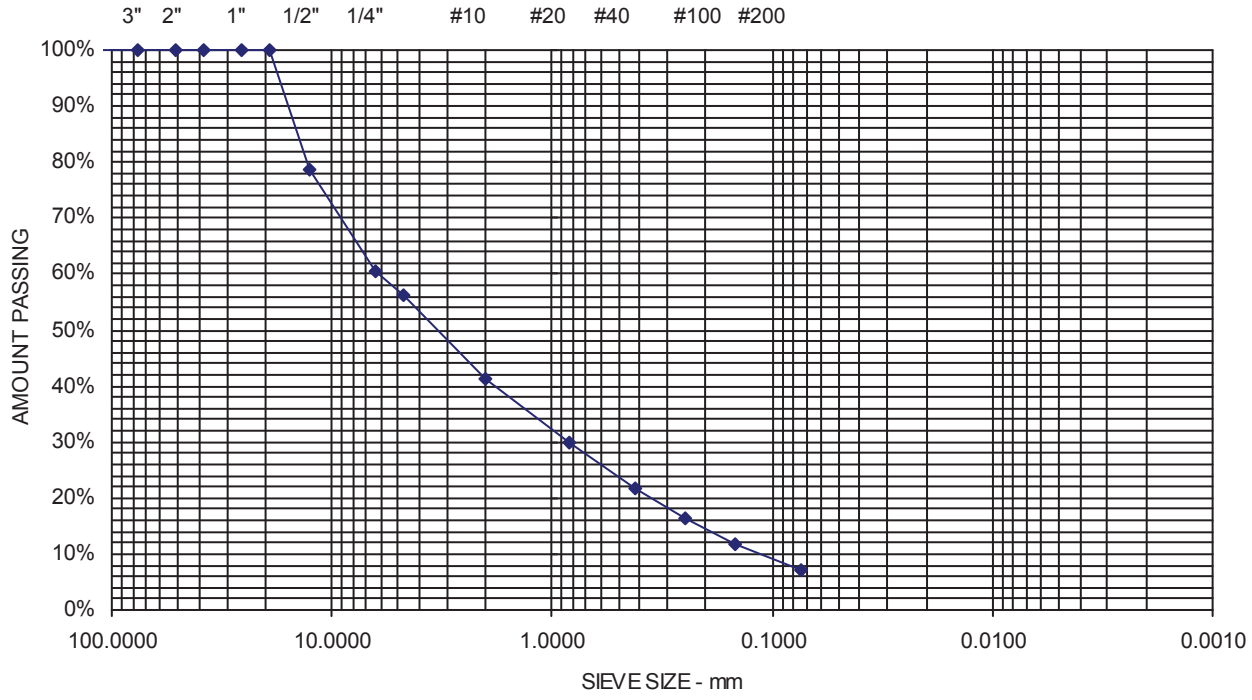
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	LITCHFIELD ME - PROPOSED VEHICLE MAINTENANCE GARAGE - GEOTECHNICAL ENGINEERING SERVICES	Project Number	18-1562
Client	ALLIED ENGINEERING, INC.	Lab ID	24983G
		Date Received	4/11/2019
		Date Completed	4/15/2019
Material Source	**B-101 2D 2.5-4.5**	Tested By	PAUL SHAFFER

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**79**	
6.3 mm	**1/4"**	**61**	
4.75 mm	**No. 4**	**56**	43.6% Gravel
2.00 mm	**No. 10**	**41**	
850 um	**No. 20**	**30**	
425 um	**No. 40**	**22**	49.3% Sand
250 um	**No. 60**	**16**	
150 um	**No. 100**	**12**	
75 um	**No. 200**	**7.1**	7.1% Fines



Comments:

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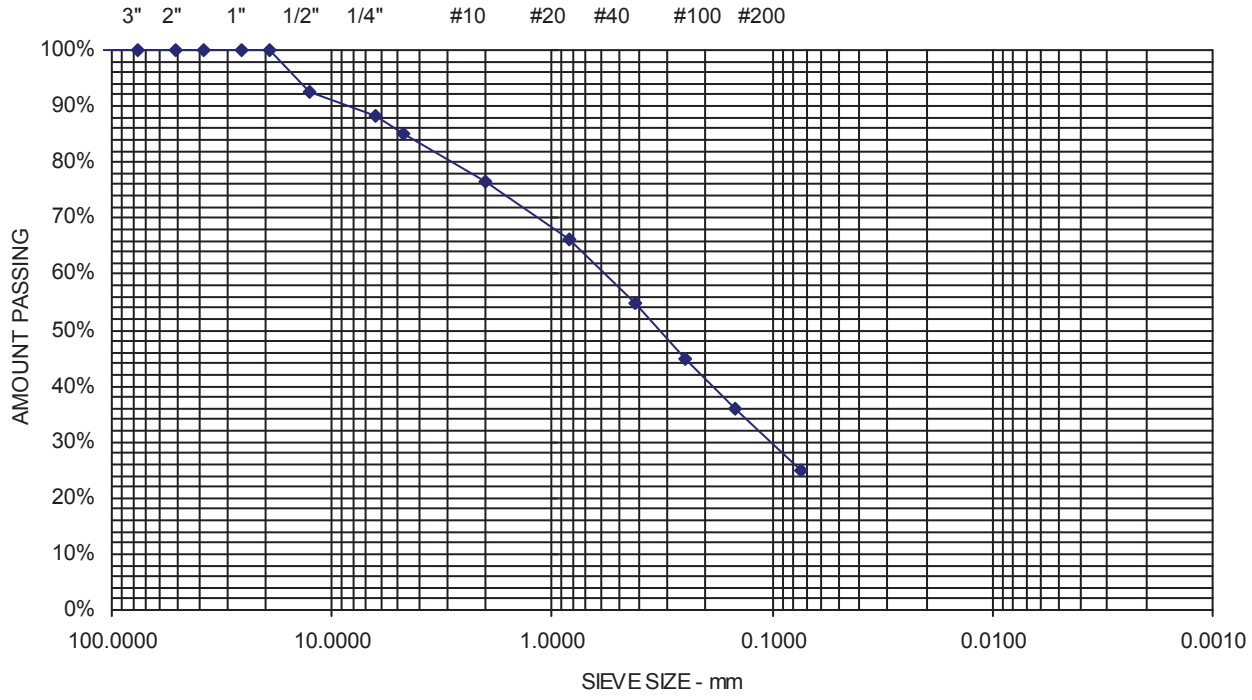
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	LITCHFIELD ME - PROPOSED VEHICLE MAINTENANCE GARAGE - GEOTECHNICAL ENGINEERING SERVICES	Project Number	18-1562
Client	ALLIED ENGINEERING, INC.	Lab ID	24984G
		Date Received	4/11/2019
		Date Completed	4/15/2019
Material Source	**B-104 1D 0-2**	Tested By	PETER PHELAN

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**93**	
6.3 mm	**1/4"**	**88**	
4.75 mm	**No. 4**	**85**	15% Gravel
2.00 mm	**No. 10**	**76**	
850 um	**No. 20**	**66**	
425 um	**No. 40**	**55**	60.2% Sand
250 um	**No. 60**	**45**	
150 um	**No. 100**	**36**	
75 um	**No. 200**	**24.9**	24.9% Fines



Comments:

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APPENDIX E

Soil Documentation Report (Soil Solutions)

REPORT

February 14, 2019

Test Pit Report

Litchfield Maintenance Facility Proposed Vehicle Maintenance Garage Project (SWC Job # 18-1562)

Hallowell/Litchfield Road and the Maine Turnpike

Litchfield, ME

PREPARED FOR:

Mr. Mike St. Pierre, P.E./Geotechnical Engineer

c/o S.W. Cole Engineering, Inc.

26 Coles Crossing Drive

Sidney, ME 04330

PREPARED BY:

Soil Solutions

Stephen H. Howell, Soil Scientist

276 Hoxie Hill Road

Orrington, ME 04474

February 14, 2019

Mr. Michael St. Pierre, P.E./ Geotechnical Engineer

c/o S.W. Cole Engineering, Inc.

26 Coles Crossing Drive

Sidney, ME 04330

Subject: Test Pit Report

Litchfield Maintenance Facility Proposed Vehicle Maintenance Garage Project

Hallowell/Litchfield Road and the Maine Turnpike

Litchfield, Maine

In accordance with your request, on February 6, 2019, we visited Litchfield Maintenance Facility Proposed Vehicle Maintenance Garage project site on the Hallowell/Litchfield Road and the Maine Turnpike in Litchfield, Maine. We understand the purpose of our site visit was to provide soil related information that can be utilized in developing recommendations regarding foundation design for the proposed garage. At the time of our site visit, the test pits were excavated with an excavator and operator provided by the owner and we examined, described, and evaluated the exposed soil profile. We understand you have prepared a project site plan that include the location of the test pit in relationship to proposed project. The following narrative and attachments, when used in conjunction with your site plan, represent our completed "Test Pit Report" for this project.

This report is intended to provide certain soil related information that may be useful in developing recommendations regarding foundation design for the proposed project. Specifically, this soil related information includes soil conditions, such as, depth to seasonal high groundwater table, depth to hydraulically restrictive layer, and depth to bedrock and soil interpretations, such as, hydrologic soil group. This soil information is summarized below and is provided for each of the test pit in attached DEP Form E and DEP Form F. Soil conditions were identified and described in accordance with Maine Association of Soil Scientists Standards (2004).

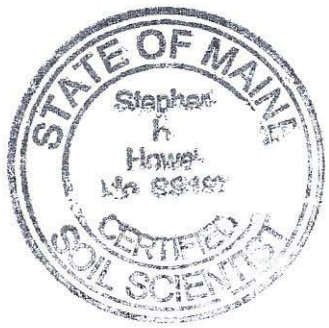
In summary, soils observed consisted of fill material, described as Udorthents and Udorthents, silty substratum in the attached DEP Form E and F. Typically, Udorthents are not assigned a hydrologic group. However, based on the soil

conditions observed and a comparison to similar native soils, the Udorthents soils observed have a hydrologic soil group of B and the Udorthents, silty substratum soils have a hydrologic soil group of C. We did not observe a seasonal groundwater water table, a hydraulically restrictive layer, or bedrock in the Udorthents soils to greater than 66" in depth. The Udorthents, silty substratum soils had a hydraulically restrictive layer observed at 52", 47", and 51" in depth in TP101, TP102, and TP103, respectively. These soils did not have a seasonal groundwater water table or bedrock observed to greater than 96" in TP101 and to greater than 66" in depth in TP102 through TP105. In TP101, TP102 and TP103 soil mottling and gleying was described in the silty substratum. However, it appears the mottling and gleying observed does not appear to be genetic. That is, these properties occur in nonnative fill materials and are not correlated to current site drainage conditions. Soil saturation and slight seepage, apparently due to melt water originating from melting snow and ice, was observed at 33" to 51" in depth in TP103. Detailed soil condition information is contained in the attached DEP Form F (Soil Profile Classification Information) and DEP Form E (Soil Condition Summary Table).

This report is subject to the attached Limitations section.

It has been a pleasure to be of assistance to you with this phase of your project. If you have any further questions, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,



SOIL SOLUTIONS

Stephen H. Howell

Maine Certified Soil Scientist # 187

LIMITATIONS

This report has been prepared for the exclusive use of S.W. Cole Engineering, Inc. for specific application to the proposed Maine Turnpike Litchfield Maintenance Facility Proposed Vehicle Maintenance Garage Project on the Hallowell/Litchfield Road and Maine Turnpike in Litchfield, Maine. Soil Solutions has conducted the work in accordance with generally accepted soil science practices. No warranty, expressed or implied, is made.

Out services were conducted, compiled and reported in general accordance with guidelines described in the National Soil Survey Handbook (1996), the Soil Survey Manual (1993), and the Guidelines for Maine Certified Soil Scientists for Soil Identification and Mapping (2004) for a Class B – High Intensity Soil Survey. Hydric soils were also identified using the Field Indicators of Hydric Soils in the United States (NRCS 2011) and the 2012 (Version 2.0) Supplement to the 1987 Corps of Engineers Wetland Delineation Manual.

The analyses performed during these services and the recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site, and published information from the USDA Natural Resources Conservation Service. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

FORM E Rev. 07/11

SOIL CONDITIONS SUMMARY TABLE

SUMMARY LOG OF SUBSURFACE EXPLORATIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality):
Maine Turnpike Proposed Garage	S.W. Cole Engineering, Inc.	Litchfield

Lot No.	Exploration Symbol (*TP 1, B 2, etc.*)	✘ if at SSWD Field	Description of subsurface materials by: ● Soil profile/condition *(if by S.E.)*, ● Soil series name *(if by C.S.S.)*, or by ● Geologic unit *(if by C.G.)*	Depths to *(inches)*: Redoximorphic Features	Bedrock	Hydraulically Restrictive Layer	Limit of Exploration	Ground Surface Slope (%)	Ground Surface Elevation
NA	TP-101	☒	Udorthents, silty substratum	52	>96	52	96	0-5	
NA	TP102	☐	Udorthents, silty substratum	47	>66	47	66	0-5	
NA	TP103	☐	Udorthents, silty substratum	51	>66	51	66	0-5	
NA	TP104	☐	Udorthents	>66	>66	>66	66	0-5	
NA	TP105	☐	Udorthents	>66	>66	>66	66	0-5	
		☐							
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INVESTIGATOR INFORMATION AND SIGNATURE

Signature	Date
	2/13/19
Name Printed	**Cert/Lic/Reg. #**
Stephen H. Howell	SS # 187

Qualification

☒ Licensed Site Evaluator ☒ Certified Soil Scientist
☐ Certified Geologist ☐ Other:

STATE OF MAINE Stephen H. Howell # 213 LICENSED SITE EVALUATOR

STATE OF MAINE Stephen H. Howell SS # 187 CERTIFIED SOIL SCIENTIST

affix professional seal

AMENDED DEP Form F Rev. 12/16

SOIL PROFILE CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name: LITCHFIELD MAINE TURNPIKE GARAGE

Applicant Name: S. W. COLE ENG.

Project Location (municipality): LITCHFIELD

Explortion Symbol TP101 ☒ Test Pit ☐ Boring

0" Organic horizon thickness Ground surface elev. _____"

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0–10	VERY GRAVELLY SANDY LOAM	FRIABLE	OLIVE BROWN	NONE
10–30	COBBLY LOAMY FINE SAND			
30–40	LOAMY FINE SAND		VERY DARK GRAYISH BROWN	COMMON GRAYISH BROWN *
40–50	VERY FINE SANDY LOAM		VERY DARK GRAY	MANY LIGHT OLIVE GRAY *
50–60	SILT LOAM	FIRM TO V. FIRM	VERY DARK GREENISH GRAY	GLEYED *
60–120				

LIMIT OF OBSERVATION = 96"

NOTES: ALL LAYERS APPEAR TO BE FILL MATERIAL NOT NATIVE SOIL.

* MOTTLING + GLEYING IS NOT GENETIC, ALL FILL RELATED

soil desc. by S.E. #	Soil Classification: Profile	Condition	Slope: Percent	Limiting Factor: Depth	
	12	B	1-5	52"	☐ Ground Water ☒ Restrictive Layer ☐ Bedrock

soil desc. by S.S. #	Soil series phase name:		Hydrologic: Soil Group
	UDORTHENTS, SILTY SUBSTRATUM	☐ Hydric ☒ Non-hydric	C

Explortion Symbol TP102 ☒ Test Pit ☐ Boring

0" Organic horizon thickness Ground surface elev. _____"

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0–10	COBBLY L.F. SAND	FRIABLE	V. DARK GRAYISH BROWN	NONE
10–30	VERY GRAVELLY LOAMY SAND		OLIVE BROWN	
30–40	V.F. S. LOAM		V. DARK GRAY. BROWN	FEW *
	GRAVELLY V.F. SANDY LOAM		OLIVE BROWN	GRAYISH BROWN
40–50			OLIVE GRAY	
50–60	SILT LOAM	VERY FIRM	DARK GRAY	GLEYED *
60–120				

LIMIT OF OBSERVATION = 66"

NOTES: ALL LAYERS APPEAR TO BE FILL MATERIAL NOT NATIVE SOIL.

* MOTTLING + GLEYING IS NOT GENETIC ALL FILL RELATED

soil desc. by S.E. #	Soil Classification: Profile	Condition	Slope: Percent	Limiting Factor: Depth	
	12	C	1-5	47"	☐ Ground Water ☒ Restrictive Layer ☐ Bedrock

soil desc. by S.S. #	Soil series phase name:		Hydrologic: Soil Group
	UDORTHENTS, SILTY SUBSTRATUM	☐ Hydric ☒ Non-hydric	C

INVESTIGATOR INFORMATION AND SIGNATURE

Signature: [signature]

Date: 2/13/19

Name Printed / Typed: STEPHEN H. HOWELL

Cer. / Lic. / Reg.: SS 187

Title: ☒ Licensed Site Evaluator ☒ Certified Soil Scientist ☐ Certified Geologist ☐ Other:

STATE OF MAINE — Stephen H. Howell #213 — LICENSED SITE EVALUATOR — CERTIFIED SOIL SCIENTIST

STATE OF MAINE — Stephen H. Howell — No. SS187

and professional seal

AMENDED DEP Form F Rev. 12/16

SOIL PROFILE CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name: LITCHFIELD MAINE TURNPIKE LOUAGE

Applicant Name: S.W. COLE ENG.

Project Location (municipality): LITCHFIELD

Explortion Symbol TP103 ☒ Test Pit ☐ Boring

0 " Organic horizon thickness Ground surface elev. _____ "

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0	PAVEMENT			
10	VERY GRAVELLY LOAMY FINE SAND	FRIABLE	LIGHT OLIVE BROWN	NONE
20				
30				
40	VERY GRAVELLY LOAMY SAND		DARK GRAYISH BROWN	*
50				
60	SILT LOAM	VERY FIRM	VERY DARK GRAY	GLEYED **
70	LIMIT OF OBSERVATION = 66"			
80				
90				
100				
110				
120				

NOTES: ALL LAYERS APPEAR TO BE FILL MATERIAL. NATIVE SOIL NOT ENCOUNTERED.

*33"-51" LAYER IS SATURATED WITH WHAT APPEARS TO BE MELT WATER.

**GLEYED HORIZON IS FILL NOT GENETIC HORIZON

soil desc. by S.E. #	Soil Classification: Profile 12 / Condition	Slope: 1-5 Percent	Limiting Factor: 51" Depth	☐ Ground Water ☒ Restrictive Layer ☐ Bedrock
soil desc. by S.S. #	Soil series phase name: UDORTHENTS, SILTY SUBSTRATUM	☐ Hydric ☒ Non-hydric	Hydrologic C Soil Group	

Explortion Symbol TP104 ☒ Test Pit ☐ Boring

0 " Organic horizon thickness Ground surface elev. _____ "

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0	GRAVELLY LOAMY F. SAND	FRIABLE	OLIVE BROWN	NONE
10	VERY GRAVELLY LOAMY FINE SAND			
20				
30				
40				
50				
60	COBBLY LOAMY SAND	LOOSE	YELLOWISH BROWN	
70	LIMIT OF OBSERVATION = 66"			
80				
90				
100				
110				
120				

NOTES: ALL LAYERS APPEAL TO BE FILL. NATIVE MATERIAL NOT ENCOUNTERED. NO SEEPAGE OR SATURATION OBSERVED.

soil desc. by S.E. #	Soil Classification: Profile 12 / Condition B	Slope: 1-5 Percent	Limiting Factor: >66" Depth	☐ Ground Water ☐ Restrictive Layer ☐ Bedrock
soil desc. by S.S. #	Soil series phase name: UDORTHENTS	☐ Hydric ☐ Non-hydric	Hydrologic B Soil Group	

INVESTIGATOR INFORMATION AND SIGNATURE

Signature :

Date: 2/13/19

Name Printed / Typed: STEPHEN H. HOWELL

Cer. / Lic. / Reg.: 55 187

Title: ☒ Licensed Site Evaluator ☒ Certified Soil Scientist ☐ Certified Geologist ☐ Other:

STATE OF MAINE Stephen H. Howell #213 LICENSED SITE EVALUATOR

STATE OF MAINE Stephen H. Howell #55 CERTIFIED SOIL SCIENTIST

AMENDED DEP Form F Rev. 12/16

SOIL PROFILE CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name: LITHFIELD MAINE TURNPIKE GARAGE

Applicant Name: S. W. COLE ENG.

Project Location (municipality): LITCHFIELD

Explortion Symbol TP105 ☒ Test Pit ☐ Boring

0 " Organic horizon thickness Ground surface elev. _____ "

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0–10	GRAV. L.F. SAND	FRIABLE	OLIVE BROWN	NONE
10–60	VERY GRAVELLY LOAMY FINE SAND			
60–66	COBBLY LOAMY SAND	LOOSE	YELLOWISH BROWN	

LIMIT OF OBSERVATION = 66"

NOTES: ALL LAYERS APPEAR TO BE FILL. NATIVE MATERIAL NOT ENCOUNTERED. NO SEEPAGE OR SATURATION OBSERVED.

soil desc. by S.E. #	Soil Classification: Profile	Condition	Slope: Percent	Limiting Factor: Depth	
	12	B	1-5	>66"	☐ Ground Water ☐ Restrictive Layer ☐ Bedrock

soil desc. by S.S. #	Soil series phase name:		Hydrologic: Soil Group
	UDORTHENTS	☐ Hydric ☒ Non-hydric	B

Explortion Symbol _____ ☐ Test Pit ☐ Boring

_____ " Organic horizon thickness Ground surface elev. _____ "

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Texture	Consistency	Color	Mottling

soil desc. by S.E. #	Soil Classification: Profile	Condition	Slope: Percent	Limiting Factor: Depth	
				"	☐ Ground Water ☐ Restrictive Layer ☐ Bedrock

soil desc. by S.S. #	Soil series phase name:		Hydrologic: Soil Group
		☐ Hydric ☐ Non-hydric	

INVESTIGATOR INFORMATION AND SIGNATURE

Signature: _____ Date: 2/13/19

Name Printed / Typed: STEPHEN H. HOWELL

Cer. / Lic. / Reg. 55 187

Title: ☐ Licensed Site Evaluator ☒ Certified Soil Scientist ☐ Certified Geologist ☐ Other:

affix professional seal

STATE OF MAINE — Stephen H. Howell # 213 — LICENSED SITE EVALUATOR

STATE OF MAINE — Stephen H. Howell — CERTIFIED SOIL SCIENTIST

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. Health & Human Services
Div of Environmental Health , 11 SHS
(207) 287-2070 FAX (207) 287-4172

PROPERTY LOCATION

City, Town, or Plantation	LITCHFIELD
Street or Road	HALLOWELL - LITCHFIELD ROAD
Subdivision, Lot #	

OWNER/APPLICANT INFORMATION

Name (last, first, MI): MAINE TURNPIKE AUTHORITY — ■ Owner ☐ Applicant

Mailing Address of Owner/Applicant	c/o DOUG REYNOLDS GORRILL PALMER 707 SABLE OAKS DRIVE SOUTH PORTLAND, ME 04106
Daytime Tel. #	772-2515

OWNER OR APPLICANT STATEMENT

I state and acknowledge that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department and/or Local Plumbing Inspector to deny a permit.

Signature of Owner/Applicant _____ Date _____

>>CAUTION: LPI APPROVAL REQUIRED<<

Town/City _____ Permit # _____

Date Permit Issued __/__/__ Fee $ _____ Double Fee Charged [ ]

Local Plumbing Inspector Signature _____ L.P.I.# _____

Fee $ _____ State Fee Fee $ _____ Locally Adopted Fee
Copy: [ ] Owner [ ] Town [ ] State

The Subsurface Wastewater Disposal System shall not be installed until a Permit is issued by the Local Plumbing Inspector. The Permit shall authorize the owner or installer to install the disposal system in accordance with this application and the Maine Subsurface Wastewater Disposal Rules.

Municipal Tax Map # R-2 Lot # 104

CAUTION: INSPECTION REQUIRED

I have inspected the installation authorized above and found it to be in compliance with the Subsurface Wastewater Disposal Rules Application.

Local Plumbing Inspector Signature _____ (1st) Date Approved _____ (2nd) Date Approved _____

PERMIT INFORMATION

TYPE OF APPLICATION

■ 1. First Time System
☐ 2. Replacement System
Type Replaced: _____
Year Installed: _____
☐ 3. Expanded System
☐ a. <25% Expansion
☐ b. >25% Expansion
☐ 4. Experimental System
☐ 5. Seasonal Conversion

THIS APPLICATION REQUIRES

■ 1.No Rule Variance
☐ 2.First Time System Variance
☐ a. Local Plumbing Inspector Approval
☐ b. State & Local Plumbing Inspector Approval
☐ 3.Replacement System Variance
☐ a. Local Plumbing Inspector Approval
☐ b. State & Local Plumbing Inspector Approval
☐ 4.Minimum Lot Size Variance
☐ 5.Seasonal Conversion Permit

DISPOSAL SYSTEM COMPONENTS

■ 1. Complete Non-Engineered System
☐ 2. Primitive System(graywater & alt toilet)
☐ 3. Alternative Toilet, specify: _____
☐ 4. Non-Engineered Treatment Tank (only)
☐ 5. Holding Tank, _____ gallons
☐ 6. Non-Engineered Disposal Field (only)
☐ 7. Separated Laundry System
☐ 8. Complete Engineered System(2000gpd+)
☐ 9. Engineered Treatment Tank (only)
☐ 10. Engineered Disposal Field (only)
☐ 11. Pre-treatment, specify: _____
☐ 12. Miscellaneous components

SIZE OF PROPERTY

17. 63 ☐ SQ. FT. ■ ACRES

SHORELAND ZONING

☐ Yes ■ No

DISPOSAL SYSTEM TO SERVE

☐ 1. Single Family Dwelling Unit, No. of Bedrooms: ____
☐ 2. Multiple Family Dwelling, No of Units: ____
■ 3. Other: MAINTENANCE FACILITY (specify)

Current Use ☐ Seasonal ☐ Year Round ■ Undeveloped

TYPE OF WATER SUPPLY

■ 1. Drilled Well ☐ 2. Dug Well ☐ 3. Private
☐ 4. Public ☐ 5. Other:

DESIGN DETAILS (SYSTEM LAYOUT SHOWN ON PAGE 3)

TREATMENT TANK

■ 1. Concrete
■ a. Regular
☐ b. Low Profile
☐ 2. Plastic
■ 3. Other: H-20 RATED
CAPACITY: 1000 GAL.
SEE NOTE ON PAGE 3

DISPOSAL FIELD TYPE & SIZE

☐ 1. Stone Bed ☐ 2. Stone Trench
■ 3. Proprietary Device
■ a. Cluster array ☐ c. Linear
☐ b. Regular ■ d. H-20 loaded
☐ 4. Other: _____
SIZE: 512 ■ sq. ft. ☐ lin. ft.
8 H-20 RATED CONCRETE CHAMBER UNITS

GARBAGE DISPOSAL UNIT

■ 1. No ☐ 2. Yes ☐ 3. Maybe
If Yes or Maybe, specify one below:
☐ a. Multi-compartment tank
☐ b. _____ tanks in series
☐ c. Increase in tank capacity
☐ d. Filter on tank outlet

DESIGN FLOW

100 gallons per day
BASED ON:
☐ 1. Table 4A (dwelling unit(s))
■ 2. Table 4C (other facilities)
SHOW CALCULATIONS for other facilities

5 EMPLOYEES (WITH SHOWERS) AT 20 GALLONS PER DAY EACH = 100 GPD

☐ 3. Section 4G (meter readings) ATTACH WATER-METER DATA

SOIL DATA & DESIGN CLASS

PROFILE 12 / CONDITION C
at Observation Hole # TP 101
Depth 26 "
of Most Limiting Soil Factor

DISPOSAL FIELD SIZING

☐ 1. Medium - 2.6 sq.ft./gpd
■ 2. Medium-Large - 3.3 sq.ft./gpd
☐ 3. Large - 4.1 sq.ft./gpd
☐ 4. Extra-Large - 5.0 sq.ft./gpd

EFFLUENT/EJECTOR PUMP

☐ 1. Not required
■ 2. May be required
☐ 3. Required
Specify only for engineered systems:
SEE NOTE ON PAGE 3
DOSE: _____ gallons

LATITUDE AND LONGITUDE

at center of disposal area
Lat. N44 d 7 m 29.32 s
Lon. W69 d 58 m 6.14 s
if g.p.s., state margin of error _____

SITE EVALUATOR STATEMENT

I certify that on 3/28/19 (date) I completed a site evaluation on this property and state that the data reported are accurate and that the proposed sytem is in compliance with the Subsurface Wastewater Disposal Rules (10-144A CMR 241).

Site Evaluator Signature _____ SE # 352 Date 4/11/19

BRADY A. FRICK
Site Evaluator Name Printed

(207) 839-5563
Telephone Number

BRADY@ALBERTFRICK.COM
E-mail Address

ALBERT FRICK ASSOCIATES - 380B MAIN STREET, GORHAM, MAINE 04038 - (207) 839-5563

Note: Changes to or deviations from the design should be confirmed with the Site Evaluator

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Department of Health and Human Services
Division of Environmental Health
(207) 287-2070 FAX (207) 287-4172

Town, City, Plantation: LITCHFIELD

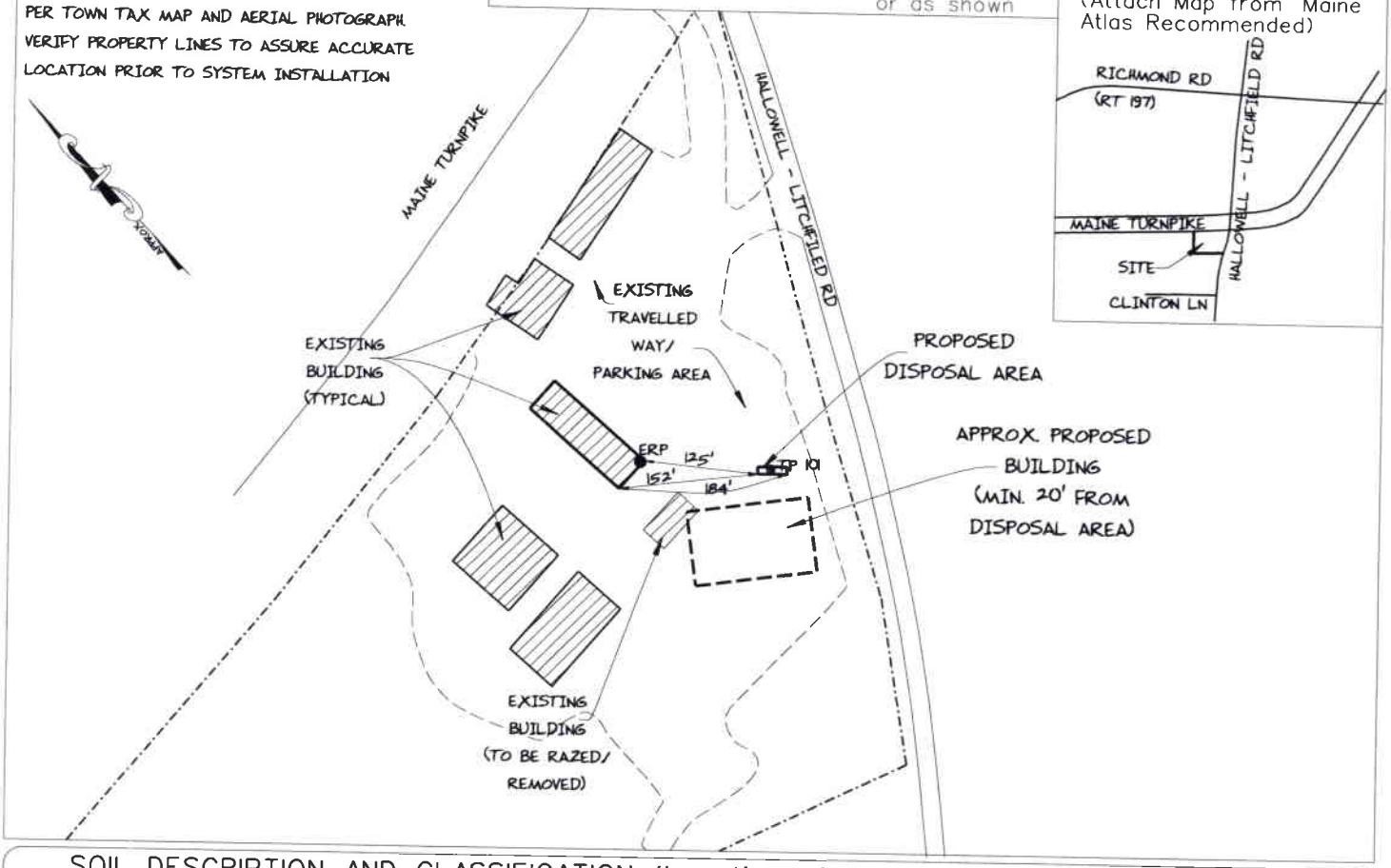
Street, Road Subdivision: HALLOWELL - LITCHFIELD ROAD

Owner's Name: MAINE TURNPIKE AUTHORITY

ALBERT FRICK ASSOCIATES ARE NOT SURVEYORS.
PROPERTY INFORMATION APPROXIMATED
PER TOWN TAX MAP AND AERIAL PHOTOGRAPH.
VERIFY PROPERTY LINES TO ASSURE ACCURATE
LOCATION PRIOR TO SYSTEM INSTALLATION

SITE PLAN

Scale 1" = 200 Ft. or as shown



SITE LOCATION PLAN
(Attach Map from Maine Atlas Recommended)

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 101 ■ Test Pit ☐ Boring

" Depth of Organic Horizon Above Mineral Soil

FILL PRE-DATES 1995 PER MAINE TURNPIKE AUTHORITY REPRESENTATIVE

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0–10	GRAVELLY SAND AND LOAMY SAND (FILL)	FRIABLE	LIGHT YELLOW-BROWN	
10–30	VERY FINE SANDY LOAM AND SILT	FIRM	DARK BROWN	COMMON, DISTINCT
30–40			OLIVE GRAY	
40–50	LIMIT OF EXCAVATION		GRAY	

Soil Classification	Slope	Limiting Factor	
12 Profile / B Condition	0-3 %	24 "	☐ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Observation Hole _____ ☐ Test Pit ☐ Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0–50				

Soil Classification	Slope	Limiting Factor	
Profile / Condition	%	"	☐ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Site Evaluator Signature

352
SE *

4/1/19
Date

ALBERT FRICK ASSOCIATES – 380B MAIN STREET GORHAM, MAINE 04038 – (207) 839-5563

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Department of Health and Human Services
Division of Environmental Health
(207) 287-2070 FAX (207) 287-4172

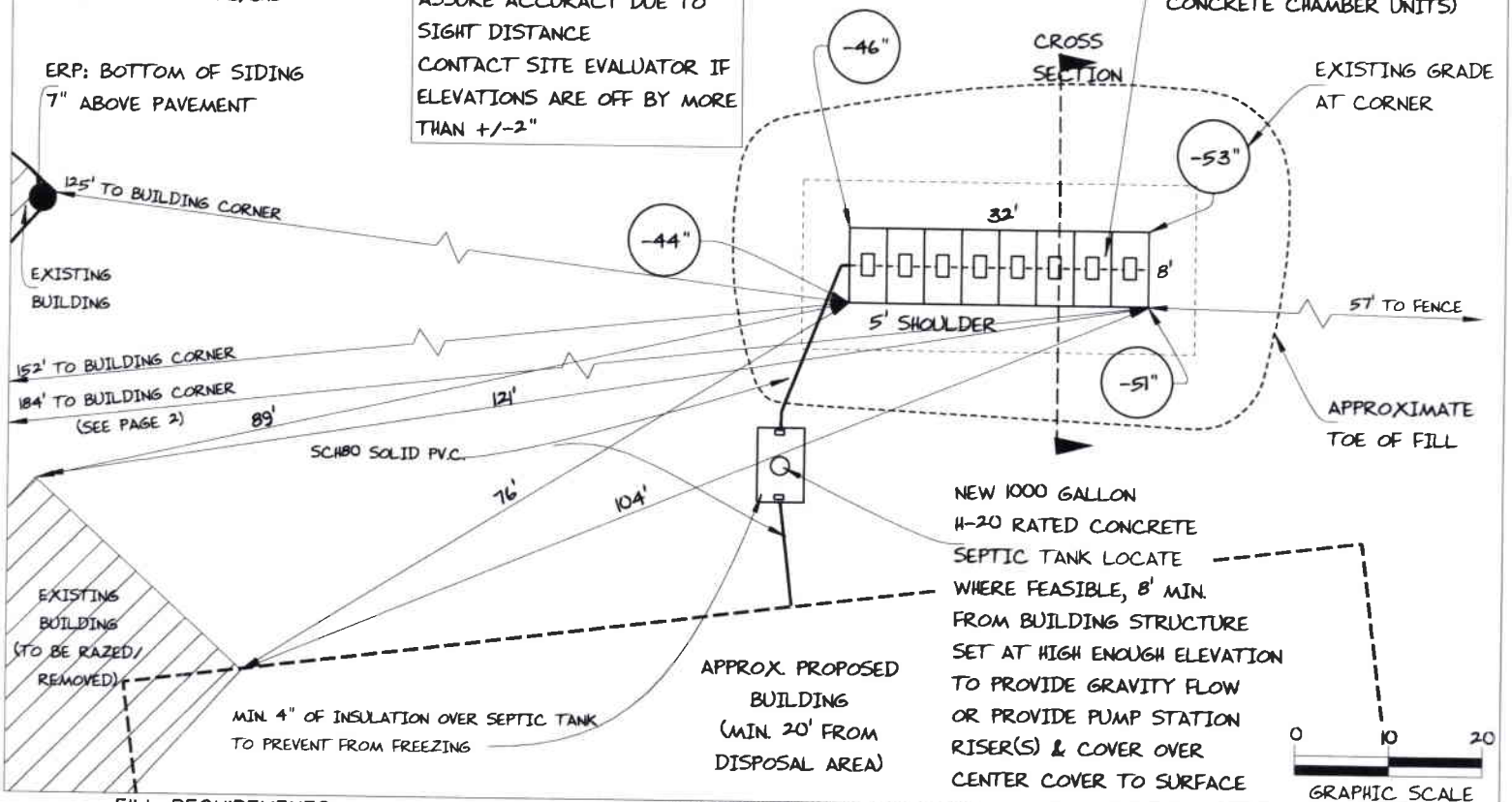
Town, City, Plantation	Street, Road, Subdivision	Owner's Name
LITCHFIELD	HALLOWELL - LITCHFIELD ROAD	MAINE TURNPIKE AUTHORITY

NOTE: THOROUGHLY SCARIFY UNDER ENTIRE DISPOSAL FIELD, SHOULDER AREA, & FILL EXTENSION AREA PRIOR TO FILL PLACEMENT, THEN BLEND FIRST 6" LIFT OF FILL INTO EXISTING SOIL SURFACE TO PROMOTE MIXING

SUBSURFACE WASTEWATER DISPOSAL PLAN

SCALE 1" = 20 FT.

NOTE: SHOOT EXISTING GRADES WITH A LASER TO ASSURE ACCURACY DUE TO SIGHT DISTANCE CONTACT SITE EVALUATOR IF ELEVATIONS ARE OFF BY MORE THAN +/-2"



FILL REQUIREMENTS

Depth of Fill (Upslope) : 17" - 24"
Depth of Fill (Downslope) : 19" - 26"
DEPTHS AT CROSS-SECTION (shown below)

CONSTRUCTION ELEVATIONS

Finished Grade Elevation
Top of Distribution Pipe or Proprietary Device
Bottom of Disposal Area

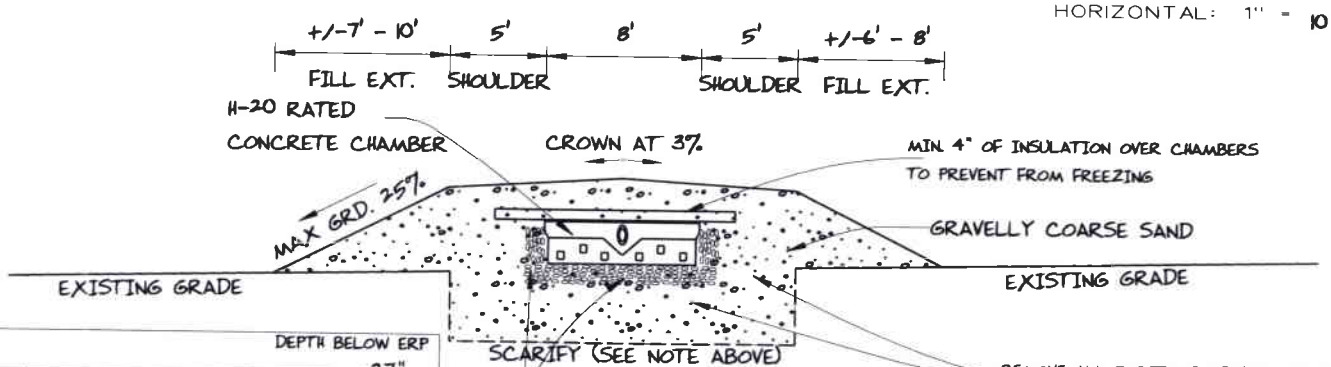
SEE DETAIL BELOW

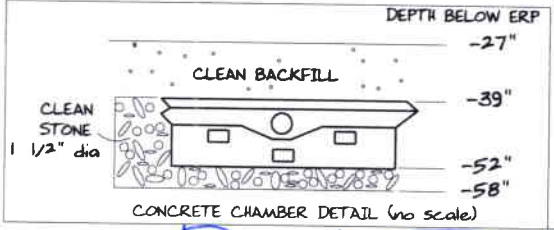
ELEVATION REFERENCE POINT

Location & Description BOTTOM OF SIDING, 7" ABOVE PAVEMENT
Reference Elevation is: 0.0" or _____

DISPOSAL AREA CROSS SECTION

SCALE:
VERTICAL: 1" = 5 FT
HORIZONTAL: 1" = 10 FT





CONCRETE CHAMBER DETAIL (no scale)

B F 21
Site Evaluator Signature

352
SE #

4/1/19
Date

ALBERT FRICK ASSOCIATES - 380B MAIN STREET; GORHAM, MAINE 04038 - (207) 839-5563

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
380-B Main Street Gorham, Maine 04038
(207) 839-5563

LITCHFIELD	HALLOWELL - LITCHFIELD ROAD	MAINE TURNPIKE AUTHORITY
TOWN	LOCATION	APPLICANT'S NAME

1) The Plumbing and Subsurface Wastewater Disposal Rules adopted by the State of Maine, Division of Health and Human Services pursuant to 22 M.R.S.A. § 42 (the "Rules") are incorporated herein by reference and made a part of this application and shall be consulted by the owner/applicant, the system installer and/or building contractor for further construction details and material specifications. The system Installer should contact Albert Frick Associates, Inc. 839-5563, if there are any questions concerning materials, procedures or designs. The system installer and/or building contractor installing the system shall be solely responsible for compliance with the Rules and with all state and municipal laws and ordinances pertaining to the permitting, inspection and construction of subsurface wastewater disposal systems.

2) This application is intended to represent facts pertinent to the Rules only. It shall be the responsibility of the owner/applicant, system Installer and/or building contractor to determine compliance with and to obtain permits under all applicable local, state and/or federal laws and regulations (including, without limitation, Natural Resources Protection Act, wetland regulations, zoning ordinances, subdivision regulations, Site Location of Development Act and Minimum Lot Size law) before installing this system or considering the property on which the system is to be installed a "buildable" lot. It is recommended that a wetland scientist be consulted regarding wetland regulations. Prior to the commencement of construction/installation, the local plumbing inspector or Code Enforcement Officer shall inform the owner/applicant and Albert Frick Associates, Inc of any local ordinances which are more restrictive than the Rules in order that the design may be amended. All designs are subject to review by local, state and/or federal authorities. Albert Frick Associates, Inc.'s liability shall be limited to revisions required by regulatory agencies pursuant to laws or regulations in effect at the time of preparation of this application.

3) All information shown on this application relating to property lines, well locations, subsurface structures and underground facilities (such as utility lines, drains, septic systems, water lines, etc.) are based upon information provided by the owner/applicant and has been relied upon by Albert Frick Associates, Inc. in preparing this application. The owner/applicant shall review this application prior to the start of construction and confirm this information. Well locations on abutting properties but not readily visible above grade should be confirmed by the owner/applicant prior to system installation to assure minimum setbacks.

4) Installation of a garbage (grinder) disposal is not recommended. If one is installed, an additional 1000 gallon septic tank or a septic tank filter shall be connected in series to the proposed septic tank. Risers and covers should be installed over the septic tank outlet per the "Rules" to allow for easy maintenance of filter.

5) The septic tank should be pumped within two years of installation and subsequently as recommended by the pump service, but in no event should the septic tank be pumped less often than every three years.

The system user shall avoid introducing kitchen grease or fats into this system. Chemicals such as septic tank cleaners and/or chlorine (such as from water treatment units) and controlled or hazardous substances shall not be disposed of in this system. Additives such as yeast or enzymes are discouraged, since they have not been proven to extend system life.

6) All septic tanks, pump stations and additional treatment tanks shall be installed to prevent ground water and surface water infiltration. Risers and covers should be properly installed to provide access while preventing surface water intrusion to within 6" of a finished ground surface.

Vehicular traffic over disposal system is prohibited unless specifically designed with H-20 rated components.

ATTACHMENT TO SUBSURFACE WASTEWATER DISPOSAL APPLICATION

LITCHFIELD	HALLOWELL - LITCHFIELD ROAD	MAINE TURNPIKE AUTHORITY
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7) The actual waste water flow or number of bedrooms shall not exceed the design criteria indicated on this application without a re-evaluation of the system as proposed

8) The general minimum setbacks between a well (public or private) and septic system serving a single family residence is 100-300 feet, unless the local municipality has a more stringent requirement. A well installed by an abutter within the minimum setback distances prior to the issuance of a permit for the proposed disposal system may void this design.

9) When a gravity system is proposed: BEFORE CONSTRUCTION/INSTALLATION BEGINS, the system installer or building contractor shall review the elevations of all points given in this application and the elevation of the existing and/or proposed building drain and septic tank inverts for compatibility to minimum pitch requirements. In gravity systems, the invert of the septic tank(s) outlet(s) should be at least 4 inches above the invert of the distribution box outlet at the disposal area.

10) When an effluent pump is required: Pump stations should be sized per manufacturer's specifications to meet lift requirements and friction loss. Provisions shall be made to make certain that surface and ground water does not enter the septic tank or pump station, by sealing/grouting all seams and connections, and by placement of a riser and lid at or above grade. An alarm device warning of a pump failure shall be installed. Also, when pumping is required of a chamber system, install a ' T' connection in the distribution box and place 3 inches of stone or a splash plate in the first chamber. Insulate gravity pipes, pump lines and the distribution box as necessary to prevent freezing.

11) On all systems, remove the vegetation, organic duff and old fill material from under the disposal area and any fill extension. Additional fill beyond indicated on plan may be necessary to replace organic matter. On sites where the proposed system is to be installed in natural soil, scarify the bottom and sides of the excavated disposal area with a rake. Do not use wheeled equipment on the scarified soil surface. For systems installed in fill, scarify the native soil by roto-tilling or scarifying with teeth of backhoe to a depth of at least 8 inches over the entire disposal and fill extension area to prevent glazing and to promote fill bonding. Place fill in loose layers no deeper than 8 inches and compact before placing more fill (this ensures that voids and loose pockets are eliminated to minimize the chance of leakage or differential settling). Do not use wheeled equipment on the scarified soil area until after 12 inches of fill is in place. Keep equipment off proprietary devices. Divert the surface water away from the disposal area by ditching or shallow landscape swales.

12) Unless noted otherwise, fill shall be gravelly coarse sand, which contains no more that 5% fines (silt and clay). Crushed stone shall be clean and free of any rock dust from the crushing process.

13) Do not install systems on loamy, silty, or clayey soils during wet periods since soil smearing/glazing may seal off the soil interface.

14) Seed all filled and disturbed surfaces with perennial grass seed, with 4" min. soil or soil amendment mix suitable for growing, then mulch with hay or equivalent material to prevent erosion. Alternatively, bark or permanent landscape mulch may be used to cover system. Woody trees or shrubs are not permitted on the disposal area or fill extensions.

15) If an advanced wastewater treatment unit is part of the design, the system shall be operated and maintained per manufacturer's specifications.

Albert Frick Associates, Inc.
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