TOWN OF EAST HARTFORD
PLANNING & ZONING COMMISSION
APPLICATION FORM

DATE: 9/25/19

Official Receipt Date: ___/___/___

1. APPLICATION TYPE: (CHECK ALL THAT APPLY) *COMPLETE SECTION ON PAGE 2 OR 3

- ☐ SITE PLAN APPLICATION
- ☐ SITE PLAN MODIFICATION
- ☐ FLOOD HAZARD – MAJOR*
- ☑ FLOOD HAZARD – MINOR*
- ☐ NATURAL RESOURCES REMOVAL AND FILLING
- ☐ SPECIAL USE PERMIT*
- ☐ ZONING MAP CHANGE*
- ☐ TEXT AMENDMENT*
- ☐ SOIL EROSION AND SEDIMENTATION - Cumulative disturbed area (sq. ft.): ___

2. SITE AND PROJECT INFORMATION

PROPERTY ADDRESS: 400 Main Street ZONE: DDD1

ASSESSORS MAP AND LOT: 20-45 PARCEL SIZE (ACRES OR SQ. FT.): 788.82

PROJECT NAME: Pratt & Whitney Sanitary Sewer Force Main

PROJECT DESCRIPTION (ATTACH ADDITIONAL SHEETS IF NEEDED):

The project includes the installation of approximately 2,000 feet of new sanitary force main. The trenching for the new force main will be approximately 4 feet wide by 5 feet deep and will cross grass areas and paved areas. A portion of the work is within a flood hazard zone and upland review area; no work will be conducted in the wetlands. Erosion control will be installed prior to the start of construction. All areas disturbed by construction will be restored to match existing conditions.

3. PROPERTY OWNER INFORMATION ☐ CHECK IF PRIMARY CONTACT

OWNER OF RECORD: United Technologies Corporation/Pratt & Whitney

OWNER ADDRESS: 400 Main Street, East Hartford, CT

OWNER PHONE: 860-557-3268 OWNER EMAIL: Erich.Uhlan@pw.utc.com

OWNER SIGNATURE: Erich Uhlan PRINT NAME: Erich Uhlan

The undersigned owner hereby authorizes: **(1)** this application, and **(2)** the Planning and Zoning Commission and Town of East Hartford staff the right to enter upon the property for the purposes of inspection associated with this application.

4. APPLICANT INFORMATION ☐ CHECK IF PRIMARY CONTACT

☑ CHECK IF APPLICANT IS SAME AS PROPERTY OWNER

APPLICANT: ___

APPLICANT ADDRESS: ___

APPLICANT PHONE: ___ APPLICANT EMAIL: ___

APPLICANT SIGNATURE: ___ PRINT NAME: ___

5. DESIGN PROFESSIONAL INFORMATION ☐ CHECK IF PRIMARY CONTACT

FIRM: Loureiro Engineering Associates, Inc PHONE: 860-747-6181

CONTACT PERSON: Chris Winter EMAIL: ccwinter@loureiro.com

- COMPLETE ONLY THE SECTIONS THAT APPLY TO YOUR APPLICATION TYPE -

A. SPECIAL USE PERMIT (ATTACH ADDITIONAL SHEETS IF NEEDED)

1) **Applicable Section of the Zoning Regulations:** _____

2) **Describe how the proposed Special Use Permit relates to the Plan of Conservation and Development:**

3) **Describe how the proposed Special Use Permit will benefit the Town of East Hartford:**

B. FLOOD HAZARD ZONE – MAJOR DEVELOPMENT OR MINOR DEVELOPMENT

1) **Name of associated watercourse:** Pewterpot Brook

2) **Total amount of land (in sq. ft.) to be affected within the:**

   a. **Flood Hazard Zone:** 888 sq. ft.

   b. **Floodway:** 58 sq. ft.

   c. **Floodway fringe:** 830 sq. ft

3) **Enumerate methods of compliance with Sections 601.10, 601.11, and 601.12 of the Zoning Regulations:**

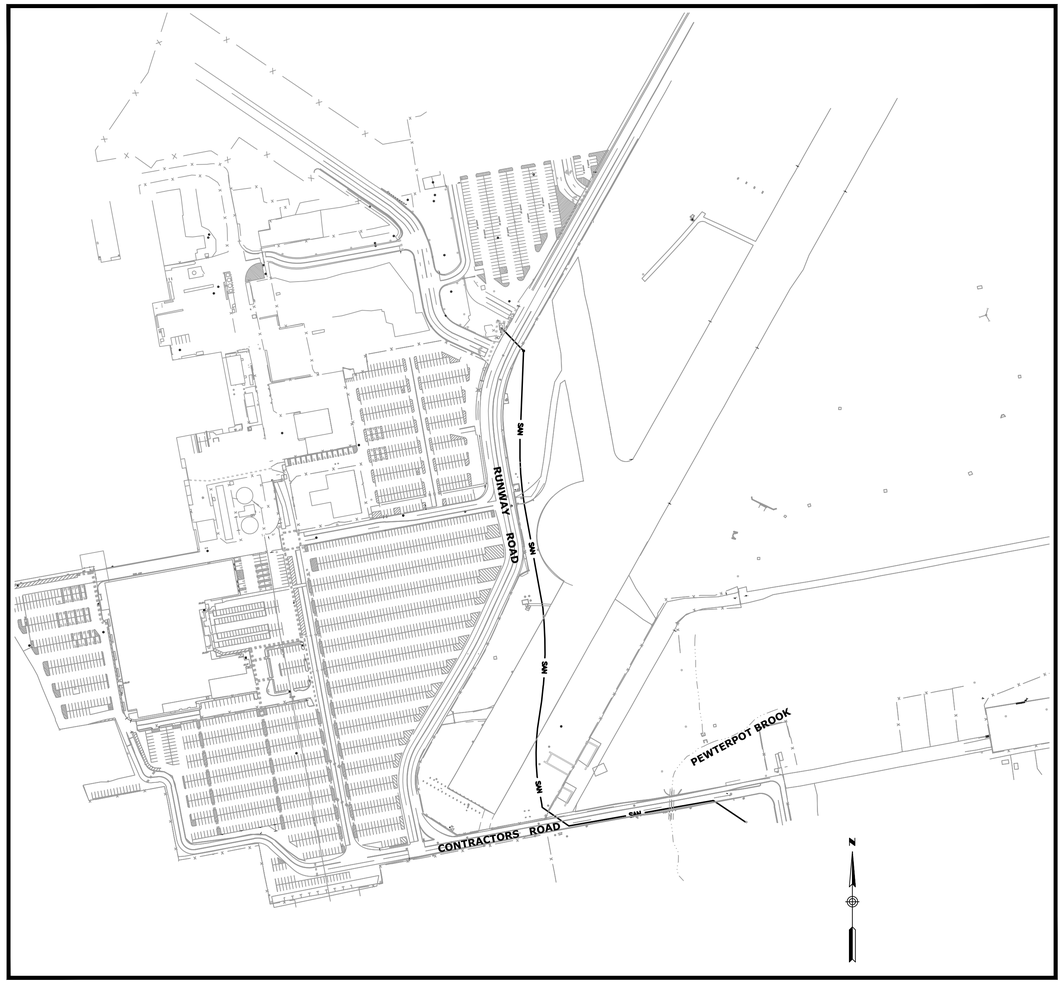
Areas disturbed by construction will be restored to match existing conditions with no changes to flood storage or conveyance. The new piping will be constructed using watertight joints to eliminate infiltration and exfiltration.

PRATT & WHITNEY

SANITARY FORCE MAIN DESIGN

400 MAIN STREET
EAST HARTFORD, CONNECTICUT

AUGUST 12, 2019



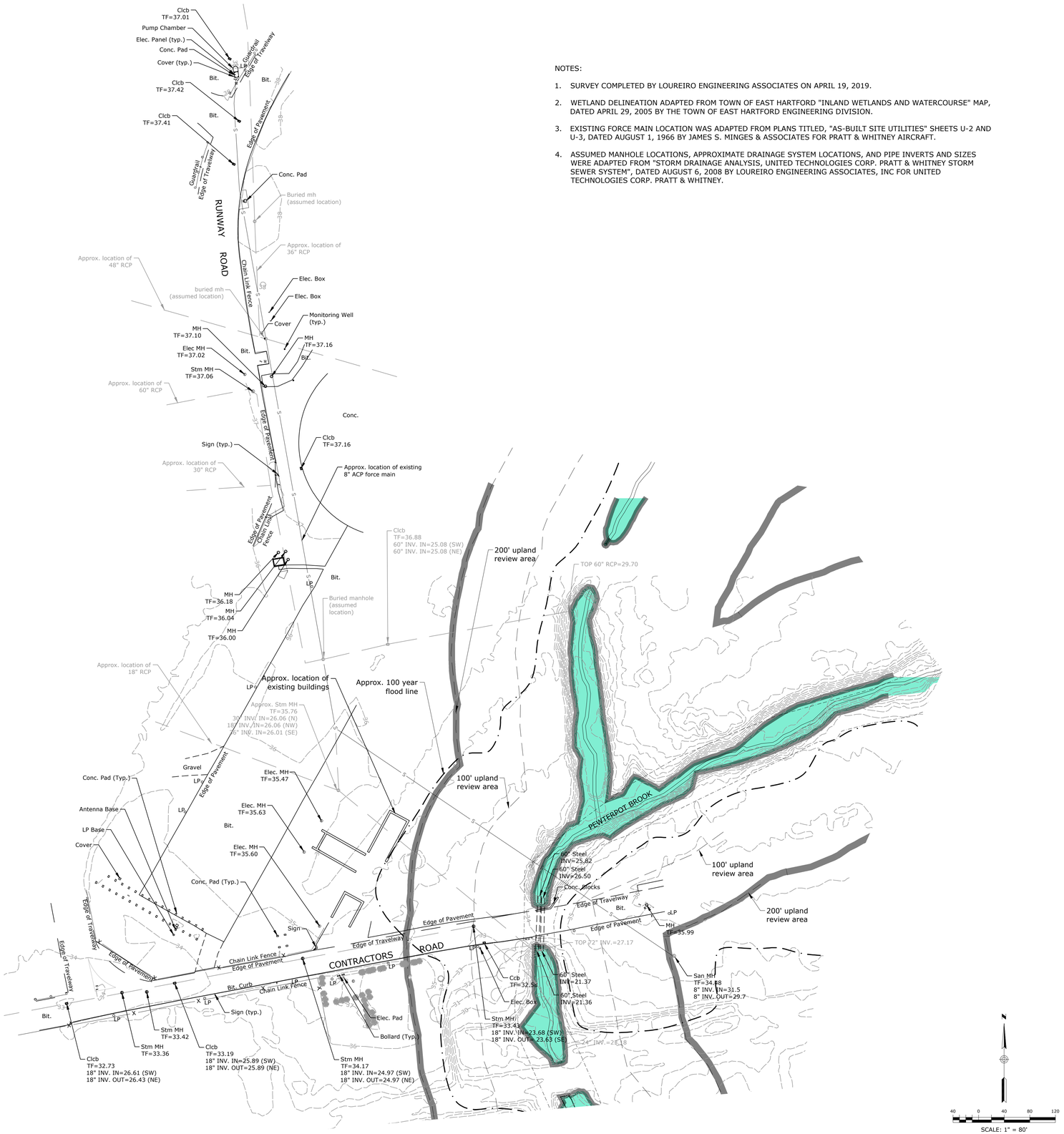
LOCATION MAP
SCALE: 1" = 1,500±

DRAWING INDEX

	COVER SHEET
EX	EXISTING CONDITIONS
S	FORCE MAIN LAYOUT
DE	SITE DETAILS
SESC	SOIL EROSIONS AND SEDIMENT CONTROL DETAILS
SP	TECHNICAL SPECIFICATIONS

Pratt & Whitney
400 Main Street
East Hartford, CT 06118

Prepared By:
Engineer:
Loureiro Engineering Associates, Inc.
100 Northwest Drive • Plainville, Connecticut 06062
Phone: 860-747-6181 • Fax: 860-747-8822
An Employee Owned Company • www.Loureiro.com
Engineering • Construction • EH&S • Energy
Waste • Facility Services • Laboratory



NOTES:

1. SURVEY COMPLETED BY LOUREIRO ENGINEERING ASSOCIATES ON APRIL 19, 2019.
2. WETLAND DELINEATION ADAPTED FROM TOWN OF EAST HARTFORD "INLAND WETLANDS AND WATERCOURSE" MAP, DATED APRIL 29, 2005 BY THE TOWN OF EAST HARTFORD ENGINEERING DIVISION.
3. EXISTING FORCE MAIN LOCATION WAS ADAPTED FROM PLANS TITLED, "AS-BUILT SITE UTILITIES" SHEETS U-2 AND U-3, DATED AUGUST 1, 1966 BY JAMES S. MINGES & ASSOCIATES FOR PRATT & WHITNEY AIRCRAFT.
4. ASSUMED MANHOLE LOCATIONS, APPROXIMATE DRAINAGE SYSTEM LOCATIONS, AND PIPE INVERTS AND SIZES WERE ADAPTED FROM "STORM DRAINAGE ANALYSIS, UNITED TECHNOLOGIES CORP. PRATT & WHITNEY STORM SEWER SYSTEM", DATED AUGUST 6, 2008 BY LOUREIRO ENGINEERING ASSOCIATES, INC FOR UNITED TECHNOLOGIES CORP. PRATT & WHITNEY.

REV.	DESCRIPTION OF REVISION	DATE	APPR.

STAMP

Loureiro
Engineering • Surveying • Planning • Energy
Waste • Facility Services • Laboratory
Loureiro Engineering Associates, Inc.
110 Hebron Avenue, Suite 3, Glastonbury, CT 06033
Phone: 860-747-6181 • Fax: 860-747-8822
An Employee-Owned Company • www.loureiro.com

©Loureiro Engineering Associates, Inc.
All rights reserved 2019

SCALE 1" = 80'
COMM. NO. 68PP9.97
DRAWN BY TRW
DATE 8/12/2019
APPROVED BY CCW
DATE 8/12/2019

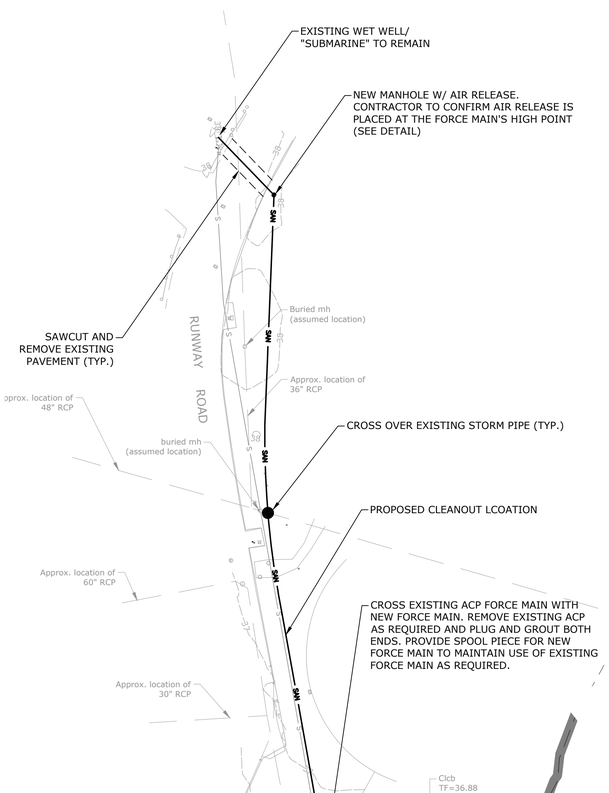
EXISTING CONDITIONS

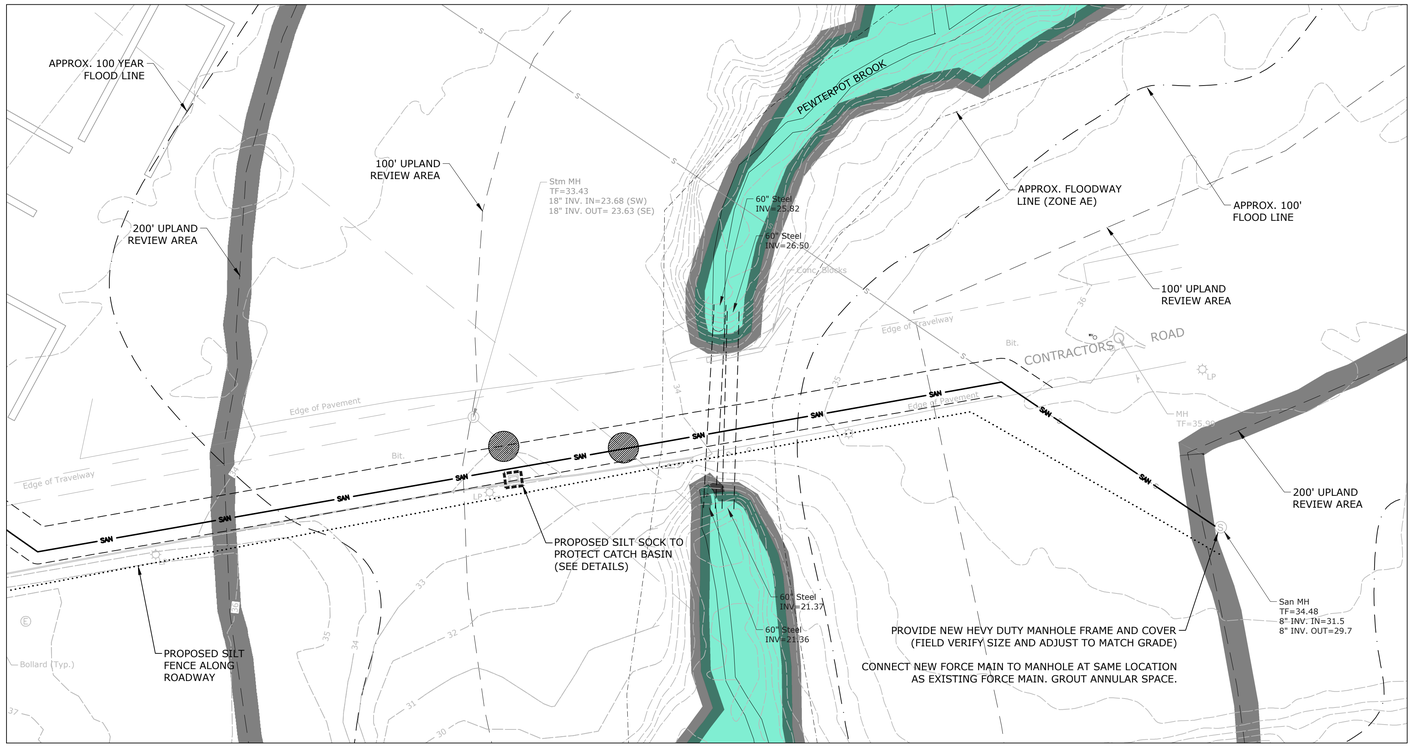
SANITARY FORCE MAIN DESIGN
400 MAIN STREET, EAST HARTFORD, CONNECTICUT
PREPARED FOR
PRATT & WHITNEY

DRAWING
EX

SHEET NO. 1 NO. OF SHEETS 5

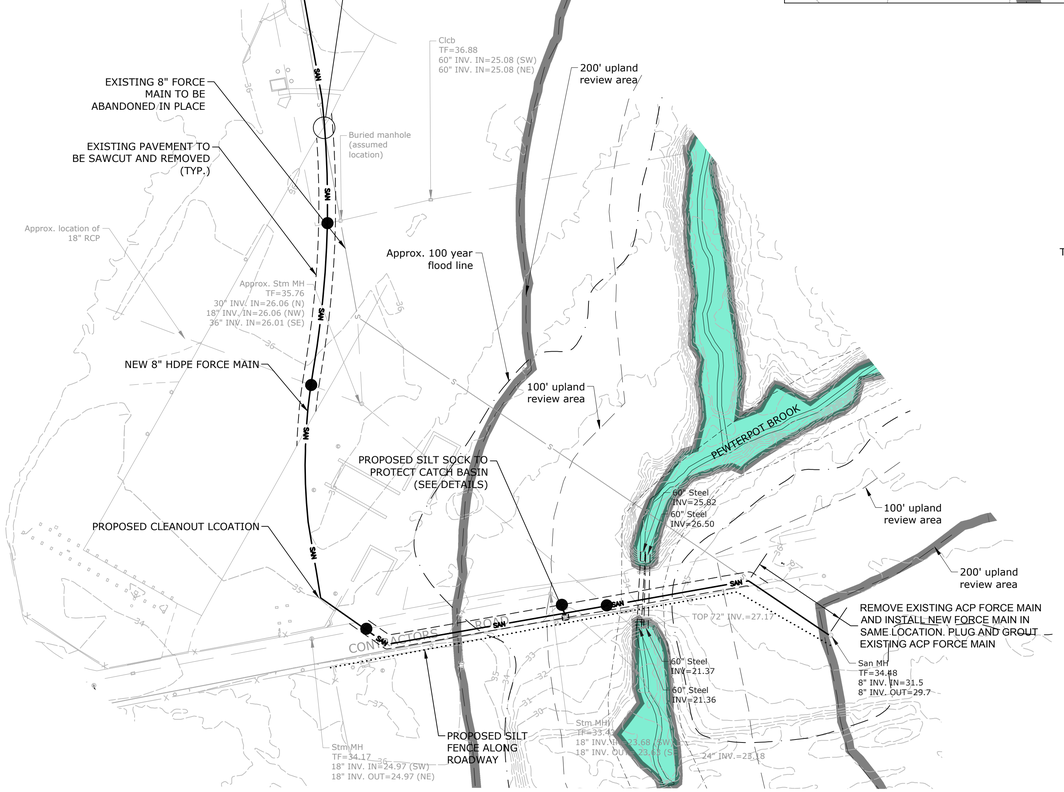
U:\FILES\PROJECTS\CT\EAST HARTFORD\MAIN ST-400\SANITARY FORCE MAIN DESIGN 68PP9\DWGS\EXISTING CONDITIONS.DWG Tab: EX Saved: 8/12/2019 9:18 AM Printed: 8/12/2019 9:19 AM





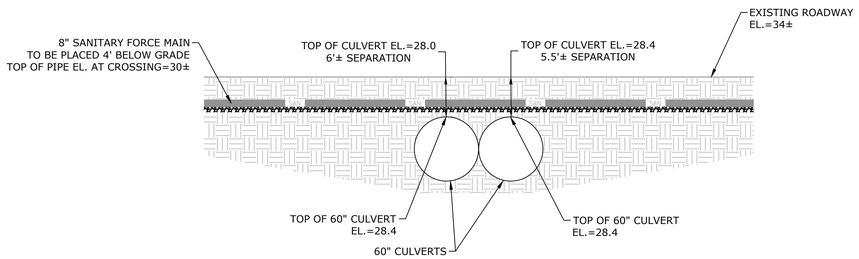
CULVERT CROSSING

SCALE: 1" = 30'



FORCE MAIN LAYOUT

SCALE: 1" = 80'



CULVERT CROSSING CROSS SECTION

SCALE: NONE

SCALE: 1" = 80'

REV.	DESCRIPTION OF REVISION	DATE	APPR.

STAMP

Loureiro
Engineering • Surveying • Planning • Energy
Waste • Facility Services • Laboratory
Loureiro Engineering Associates, Inc.
100 Northfield Street • Greenwich, CT 06830
Phone: 860-747-6181 • Fax: 860-747-8822
An Employee-Owned Company • www.loureiro.com
©Loureiro Engineering Associates, Inc.
All rights reserved 2019

SCALE: AS SHOWN
COMM. NO.: 68PP9.97
DRAWN BY: TRW — DATE: 8/12/2019
APPROVED BY: CCW — DATE: 8/12/2019

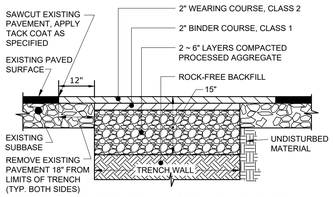
FORCE MAIN LAYOUT

SANITARY FORCE MAIN DESIGN
400 MAIN STREET, EAST HARTFORD, CONNECTICUT
PRATT & WHITNEY

DRAWING: S

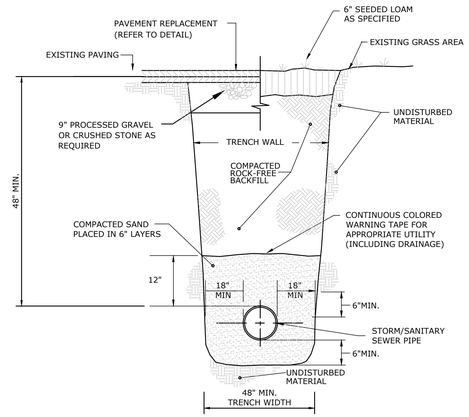
SHEET NO. 2 — NO. OF SHEETS 5

U:\FILES\PROJECTS\EAST HARTFORD\MAIN ST 400\SANITARY FORCE MAIN DESIGN 68PP9\DWGS\FORCE MAIN LAYOUT.DWG Tab: FORCE MAIN LAYOUT Saved: 8/12/2019 9:45 AM Printed: 8/12/2019 9:27 AM



PAVEMENT REPLACEMENT DETAIL

SCALE: NONE

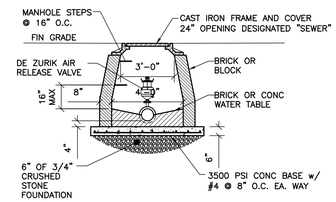


NOTES:

1. SEE STATE AND/OR LOCAL HIGHWAY DEPARTMENT SPECIFICATIONS FOR ADDITIONAL PAVING REQUIRED WHEREVER APPLICABLE.
2. DEEP FOUNDATIONS: WHERE SPECIAL DEEP FOUNDATIONS ARE REQUIRED, BECAUSE OF VERY SOFT SOIL FOUNDATION, CRUSHED STONE OR PROCESSED GRAVEL SHALL BE USED TO A POINT 24" DEEPER THAN FLOW LINE OF PIPE. ADDITIONAL FOUNDATION DEPTH BELOW THIS POINT MAY BE OTHER SELECTED MATERIAL, AS SPECIFIED AND AS REQUIRED BY THE ENGINEER IN THE FIELD.

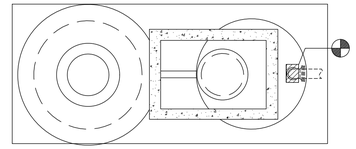
TYPICAL SANITARY FORCE MAIN TRENCH DETAIL

SCALE: NONE

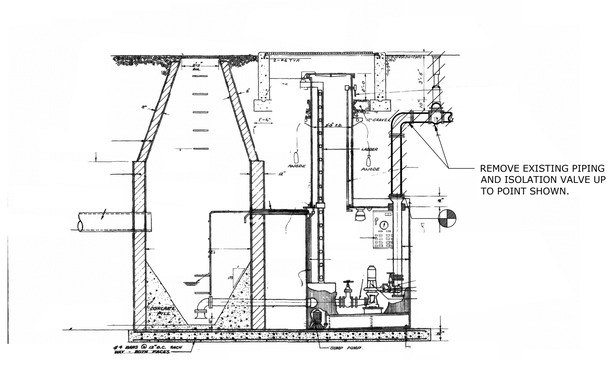


FORCE MAIN AIR RELEASE MANHOLE DETAIL

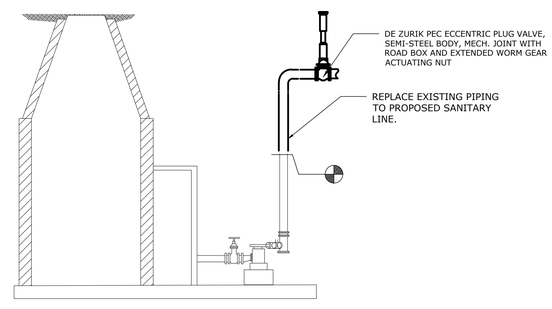
SCALE: NONE



PLAN VIEW



PUMP HOUSE DEMO - SECTION VIEW



FORCE MAIN REPLACEMENT

PUMP HOUSE FORCE MAIN REPLACEMENT DETAIL

SCALE: NONE

NOTE:

1. EXISTING PUMP HOUSE DETAIL REFERENCED FROM PLANS TITLED, "SITE UTILITIES DETAILS MATERIAL CENTER BUILDING" SHEETS U-6, REVISED NOVEMBER 8, 1965 BY JAMES S. MINGES & ASSOCIATES FOR PRATT & WHITNEY AIRCRAFT.
2. THE EXISTING PUMP HOUSE DETAIL SHOWS THE APPROXIMATE LOCATION AND CONFIGURATION. THE PUMP HOUSE HAS BEEN ALTERED TO INCLUDE ABOVEGROUND PUMPS, ENCLOSURE AND BYPASS PIPING. CONTRACTOR SHALL PROVIDE A TEST PIT TO VERIFY LOCATION AND CONFIGURATION OF CONNECTION POINT.

REV.	DESCRIPTION OF REVISION	DATE	APPR.

STAMP

Loureiro Engineering Associates, Inc.
Engineering • Surveying • Planning • Design
Waste • Facility Services • Laboratory
Loureiro Engineering Associates, Inc.
110 Hartford Turnpike • Tolland, Connecticut 06084
Phone: 860-747-6181 • Fax: 860-747-8822
An Employee-Owned Company • www.loureiro.com
©Loureiro Engineering Associates, Inc.
All rights reserved 2019

SCALE: N.T.S.
CORR. NO.: 68PP9.97
DATE: 8/12/2019
DRAWN BY: TRW
DATE: 8/12/2019
APPROVED BY: CCW

DETAILS

SANITARY FORCE MAIN DESIGN
400 MAIN STREET, EAST HARTFORD, CONNECTICUT
PRATT & WHITNEY

DRAWING
DE

SHEET NO. 3 NO. OF SHEETS 5

V:\FILES\PROJECTS\CT\EAST HARTFORD\MAIN ST-400\SANITARY FORCE MAIN DESIGN 68PP9\97\DWGS\DETAILS.DWG Tab: SITE DETAILS Saved: 8/12/2019 8:46 PM Plotted: 8/12/2019 8:38 AM

SOIL EROSION AND SEDIMENT CONTROL NOTES

GENERAL PROVISIONS

All applicable regulations and requirements of the State of Connecticut Department of Energy & Environmental Protection (DEEP) and the local Inland Wetlands Commission shall be adhered to including the placement of the proposed sedimentation/detention basin and SESC barriers as depicted on this plan and as specified herein. When the construction work is completed, the Contractor shall remove all sediment from the sedimentation/detention basin and restore the natural drainage areas affected by his operations to their original condition unless otherwise directed by the Engineer.

Prior to construction , all SESC barriers should be placed to confine sediment as shown on drawings and where otherwise required based on the Contractor's means/methods and construction sequencing. All SESC barriers shall be left in place and maintained until the work has been completed and surfaces stabilized.

It shall be the responsibility of the Contractor to monitor the condition of the SESC structures. If the effectiveness or integrity of the structures is found to be insufficient or if the structures are damaged in any way, the Contractor shall make whatever repairs are necessary to ensure that proper erosion control is maintained. Monitoring of the erosion control structures is particularly important in the areas where excavation or construction is taking place or following periods of rainfall. All repairs of erosion control structures shall be made by the Contractor as soon as the damage is discovered. If additional SESC control structures are necessary to minimize erosion and sedimentation, as determined in the field, the Contractor shall install said additional structures as required at no extra cost to the Owner or the Engineer.

SPECIFIC PROVISIONS

In addition to the above general provisions, the Contractor shall comply with the following special requirements:

1. Land disturbance shall be kept to a minimum; restabilization shall be scheduled as soon as practicable following construction. Project sequencing will be necessary to minimize SESC control liabilities. The Contractor shall sequence his operations so as to provide manageable work areas with limited opportunity for soil erosion to occur.

2. All graded areas are to be loamed and seeded as soon as possible after construction work is completed. Interim seeding, mulching and/or erosion control blankets may be required throughout construction for stabilization of disturbed areas. All other areas affected by construction and not to be regraded or filled are to be restored to original grade and seeded as shown on the site drawing.

3. For specific details on the design, application and installation of the SESC structures the Contractor shall refer to the Connecticut Guidelines for Soil Erosion and Sediment Control, dated May 2002, as amended or otherwise replaced.

4. The Contractor shall be fully responsible for ownership of all soil erosion and sediment controls as necessary to protect the project site. During the progress of construction, interim erosion controls may be necessary based on the Contractors means, methods and sequencing. The erosion control measures presented on these plans represent the minimum controls deemed necessary based on the expected final project grades and features. Interim measures required to stabilize the site during construction shall be installed by the Contractor as needed based upon his assessment of the site through his own site inspections and observations.

5. Fabric for SESC barriers shall consist of woven polypropylene, 36" in width and fastened to hardwood posts with three, one inch wide crown staples. Posts shall be of sound hardwood, forty eight inches (48") in length with a minimum cross section of 1.125 square inches. Staked hay bales may be substituted for silt fence. All SESC barriers shall be installed as shown on this drawing and at the toe of all slopes located down gradient of the construction work.

6. Sediment removed from SESC barriers and sediment/detention basin ID shall be disposed of in a manner which is consistent with the intent of the plan.

7. Groundwater sampling and dewatering shall meet DEEP standards, if required. Groundwater is to be sampled prior to discharging stored water.

8. The Contractor shall use approved methods and materials for prevention of dispersion of dust.

9. The Contractor shall inspect all erosion control measures daily during construction and after each significant rain storm event. In the event that a rain event occurs and the Contractor provided SE&SC controls fail to maintain the site in a stabilized condition, the Contractor shall be fully responsible for any and all remediation, mitigation or other damage that may occur.

CONSTRUCTION SEQUENCE NOTES

Low Impact Construction practices should be adopted to further mitigate erosion and sedimentation.

1. Utility survey of proposed trenched areas should be completed prior to construction.

2. Install perimeter and catch basin SE&SC. Clear any areas of brush upon land surface, as needed, to facilitate the construction activities defines. Install perimeter SE&SC as notes on plan.

3. Trench proposed pipe route per plans.

4. Excavate culvert crossing to elevation shown on plans. Contractor shall be responsible for any damage done to the culvert.

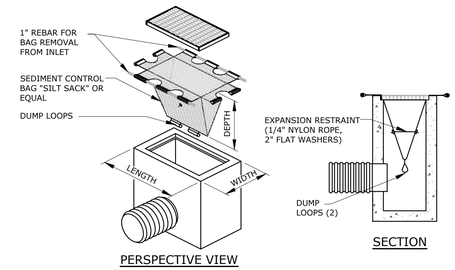
5. Connect force main to existing submarine, pump house, with new valve as specified in details.

6. Contractor shall follow directions on handling existing force main where indicated on plan.

7. Install new force main pipe in existing manhole at same elevation. Existing frame and cover to be replaced.

8. Trench to be backfilled to existing grade along the entire pipe route.

9. Any changes to routing or installation shall be approved by Pratt & Whitney and the engineer.

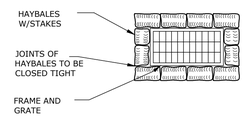


NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE CORRECT SIZE DEVICE FOR EACH INLET. FOR NON-STANDARD CATCH BASINS AND INLETS, THE CONTRACTOR SHALL MEASURE DIMENSIONS IN THE FIELD AND ORDER THE APPROPRIATE SIZE(S).
2. THE INLET SEDIMENT CONTROL DEVICE SHALL BE OF HIGH FLOW DESIGN (200 GAL/MIN/FT), AS PER THE MANUFACTURER'S SPECS.
3. THE SEDIMENT CONTROL DEVICE SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND CLEANED AND MAINTAINED A MINIMUM ONCE PER MONTH OR WITHIN THE 48 HOURS FOLLOWING A STORM EVENT. THE FILTER SHALL BE REPLACED OR CLEANED WHEN THE BAG BECOMES HALF FULL. THE FILTER SHALL BE CLEANED IN A MANNER WHICH ENSURES THAT ALL SEDIMENT REMAINS ON SITE.
4. SUBSTITUTION OF A SHEET OF FILTER FABRIC PLACED OVER THE OPENING OF THE INLET IS NOT APPROVED.
5. RECESSED CURB INLET CATCH BASINS MUST BE BLOCKED WHEN USING FILTER FABRIC INLET SACKS, SIZE OF FILTER INLET SACK TO BE DETERMINED BY MANUFACTURER.
6. THE FILTER DEVICE SHALL BE MANUFACTURED BY ACF ENVIRONMENTAL OR APPROVED EQUAL.

CATCH BASIN FILTER (SILT SACK)

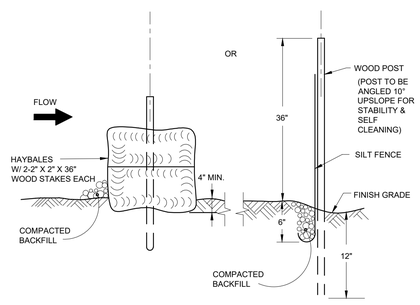
SCALE: NONE



NOTE:
CATCH BASIN GRATES TO BE WRAPPED W/MARAFI 500 FILTER CLOTH OR APPROVED EQUAL AND BULKHEADED WITH HAYBALES IMMEDIATELY PRIOR TO CONSTRUCTION

SEDIMENT BARRIER AT CATCH BASIN

SCALE: NONE

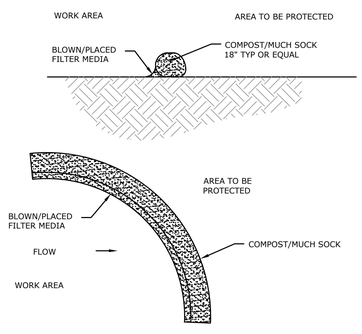


TYPICAL SEDIMENT BARRIER DETAIL

SCALE: NONE

INSTALLATION NOTES FOR HAY BALES:

1. PLACE HAY BALES ON CONTOUR AND WITH LAST HAY BALES UPSLOPE TO THAT TOP OF LAST SEVERAL HAY BALES ARE HIGHER THAN LINE OF HAY BALES.
2. EXCAVATE TRENCH 4" MIN. AND PLACE FILL UPSLOPE OF TRENCH
3. PLACE HAY BALE AND STAKE FIRST STAKE AT ANGLE TOWARDS FIRST BAKE. STAKES ARE 18" MIN. INTO GROUND.
4. WEDGE LOOSE HAY BETWEEN BALES.
5. BACKFILL & COMPACT EXCAVATED FILL ALONG UPHILL SIDE OF HAY BALE.



COMPOST/MULCH SOCK DETAIL

SCALE: NONE

REV.	DESCRIPTION OF REVISION	DATE	APPR.

STAMP

Loureiro
Engineering • Surveying • Title • Energy
Waste • Facility Services • Laboratory
Loureiro Engineering Associates, Inc.
100 Nutmeg Drive • Trumbull, CT 06611-5502
Phone: 860-747-6181 • Fax: 860-747-8822
An Employee-Owned Company • www.loureiroeng.com

©Loureiro Engineering Associates, Inc.
All rights reserved 2019

SCALE: N.T.S.
COMM. NO. 68PP9.97
DRAWN BY TRW — DATE 8/12/2019
APPROVED BY CCW — DATE 8/12/2019

SOIL EROSION AND SEDIMENT CONTROL DETAILS

SANITARY FORCE MAIN DESIGN
400 MAIN STREET, EAST HARTFORD, CONNECTICUT
INDEX NO. 68PP9.97
PRATT & WHITNEY

DRAWING
SESC

SHEET NO. 4 — NO. OF SHEETS 5

V:\FILES\PROJECTS\CT\EAST HARTFORD\MAIN ST-400\SANITARY FORCE MAIN DESIGN 68PP97\DWGS\DETAILS.DWG Tab: SESC_DETAILS Saved: 8/9/2019 8:46 PM Plotted: 8/12/2019 8:39 AM

DIVISION 01000 - GENERAL REQUIREMENTS

GENERAL SPECIFICATIONS

1.1 DESCRIPTION OF WORK: PROVIDE ALL LABOR, MATERIALS, SERVICES, AND EQUIPMENT FOR THE WORK INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN. IN GENERAL, THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT, MATERIALS, TOOLS, POWER, TESTING AND START-UP SERVICES, AND MISCELLANEOUS SUPPLIES AS NECESSARY AND PROPER FOR FURNISHING AND INSTALLING THE PROPOSED FORCE MAIN AS SHOWN ON THE CONTRACT DRAWINGS AND AS HEREIN SPECIFIED. THE WORK SHALL INCLUDE, BUT NOT NECESSARILY BE LIMITED TO THE FOLLOWING:

A. THE COMPLETE INSTALLATION OF A PREFABRICATED DE-ZURIK PLUG VALVE.

B. ALL RELATED SITE WORK, UTILITIES AND MISCELLANEOUS CONSTRUCTION INCLUDING ALL REQUIRED SOIL EROSION & SEDIMENT CONTROLS; CLEARING & GRUBBING; EXCAVATION AND BACKFILL; SHEETING, SHORING AND DEWATERING OPERATIONS; REGRADING; AND PAVEMENT RESTORATION FOR THE PROPOSED FORCE MAIN INSTALLATION.

C. PROJECT DESIGN, LOCATION & SUBSURFACE CONDITIONS. THE BACKGROUND INFORMATION SHOWN ON THE DRAWINGS INCLUDING THE EXISTING TOPOGRAPHY, UNDERGROUND UTILITIES, ETC. IS BASED ON THE BEST INFORMATION AVAILABLE.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EXECUTION OF A COMPREHENSIVE SUBSURFACE UTILITY SURVEY AND MARK OUT SPECIFICALLY FOR THIS PROJECT BY A PRIVATE UTILITY LOCATING COMPANY THAT WILL MARK OUT THE UTILITIES ON PRIVATE PROPERTY. THE CONTRACTOR SHALL ALSO ACTUATE CALLBEFORE-YOU-DIG AS REQUIRED FOR THE ROADWAY UTILITIES.

1.2 MISCELLANEOUS MINOR COMPONENTS AND ACCESSORIES REQUIRED TO COMPLETE THE WORK BUT NOT SHOWN OR SEPCIFIED SHALL BE CONSIDERED INCLUDED WITHOUT ANY ADITIONAL CHARGE.

1.3 BEFORE SUBMITTING PROPOSALS, EACH BIDDER SHALL VISIT THE SITE OF THE WORK AND ACQUAINT THEMSELVES FULLY WITH ALL EXISTING CONDITIONS AND LIMITATIONS. FAILURE TO DO SO SHALL IN NO MANNER RELIEVE ANY CONTRACTOR FROM OBLIGATIONS WHICH THIS CONTRACT IMPLIES.

1.4 CONTRACTOR IS RESPONSIBLE FOR FOLLOWING OWNER'S EH&S SECURITY CLEARANCE REQUIREMENTS FOR ALL WORKERS. NO ADDITIONAL COST SHALL BE CONSIDERED FOR DELAYS IN GETTING WORKERS ON SITE.

1.5 CONTRACTOR SHALL DETERMINE OR VERIFY SIZES, SERVICE, LOCATIONS, AND DIMENSIONS OF WALLS, EQUIPMENT, PIPING, AND OTHER WORK TO BE JOINED AND SHALL BE RESPONSIBLE FOR THEIR ACCURACY.

1.6 CONTRACTOR SHALL CONSULT WITH THE OWNER AS TO THE METHODS OF CARRYING ON THE WORK SO AS NOT TO INTERFERE WITH THE OWNER'S OPERATIONS. THE INSTALLATION WILL BE PHASED AS AREAS TO WORK IN ARE AVAILABLE. COORDINATE PHASING WITH OWNER.

1.7 CONTRACTOR SHALL PROTECT OWNER'S PROPERTY FROM DAMAGE; ANY DAMAGE SHALL BE MADE GOOD WITHOUT DELAY. PROVIDE TEMPORARY ENCLOSURES, COVERINGS, ETC., FOR PROTECTION OF FACILITIES DURING CONSTRUCTION. EQUIPMENT OR FACILITIES DAMAGED BY THE CONTRACTOR DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER AT NO ADDITIONAL COST.

1.8 CONTRACTOR SHALL DO ALL NECESSARY CUTTING AND PATCHING THAT MAY BE REQUIRED TO PROPERLY COMPLETE THE WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PATCHING OF ALL SURFACES, NO MATTER WHAT THE MATERIAL.

1.9 THE CONTRACTOR SHALL KEEP THE PREMISES FREE FROM ACCUMULATION OF DEBRIS, WASTE MATERIALS AND RUBBISH. UPON COMPLETION OF THE WORK, LEAVE THE PREMISES BROOM-CLEAN TO THE SATISFACTION OF THE OWNER.

1.10 SCHEDULE OF OPERATIONS: WORK SHALL BE ACCOMPLISHED DURING NORMAL WORKING HOURS, AND EQUIPMENT SHUTDOWN AND FINAL CONNECTIONS TO EXISTING EQUIPMENT MUST BE SCHEDULED FOR TIME CONVENIENT TO THE OWNER. CONTRACTOR SHALL PROVIDE BYPASS PUMPING AS REQUIRED TO MAINTAIN SEWER OPERATIONS.

1.11 ALL WORK SHALL COMPLY WITH APPLICABLE NATIONAL, STATE, AND LOCAL CODES.

1.12 DIMENSIONS AND ELEVATIONS OF EXISTING SURFACES AND FACILITIES SHOWN ON THE DRAWINGS ARE BASED ON EXISTING DRAWINGS AND INFORMATION FROM OTHER SOURCES. CONTRACTOR SHALL LAYOUT THE WORK FROM INFORMATION SHOWN ON THE DRAWINGS, SHALL ESTABLISH BASE LINES AND BENCH MARKS FOR HORIZONTAL AND VERTICAL CONTROL, AND SHALL COORDINATE THE WORK OF ALL TRADES FOR PROPER CLEARANCES FOR OPERATION AND TO AVOID OBSTRUCTIONS.

1.13 CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED BUILDING PERMITS.

1.14 CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A REDLINED SET OF THE CONSTRUCTION DRAWINGS ON SITE INDICATING ALL FIELD CHANGES. CONTRACTOR SHALL PROVIDE A COPY OF THE REDLINE SET TO THE OWNER AT THE COMPLETION OF CONSTRUCTION FOR THE PURPOSES OF DEVELOPING AS-BUILT DRAWINGS.

SECTION 221313 - FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 SUMMARY
A. SECTION INCLUDES:
1. 8" HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS.
2. CLEANOUTS.
3. MANHOLE
4. DEZURIK AIR RELEASE & PLUG VALVES.

1.2 ACTION SUBMITTALS
A. SHOP DRAWINGS: PROVIDE FOR ALL ITEMS SUPPLIED UNDER THIS CONTRACT. FOR MANHOLES, INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND FRAMES AND COVERS.

1.3 INFORMATIONAL SUBMITTALS
A. COORDINATION DRAWINGS: SHOW PIPE SIZES, LOCATIONS, AND ELEVATIONS. SHOW OTHER PIPING IN SAME TRENCH AND CLEARANCES FROM SEWER SYSTEM PIPING. INDICATE INTERFACE AND SPATIAL RELATIONSHIP BETWEEN MANHOLES, PIPING, AND PROXIMATE STRUCTURES.
B. PRODUCT CERTIFICATES: FOR EACH TYPE OF PIPE AND FITTING, FROM MANUFACTURER.
C. FIELD QUALITY-CONTROL REPORTS.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS
A. HDPE PIPING:
1. HDPE SHALL MEET ASTM D 3350 SPECIFICATIONS.
2. DIAMETER: 8-INCH, UNLESS OTHERWISE SPECIFIED.
3. SHALL MEET SDR-11 AS MINIMUM STRENGTH.
B. BUTT FUSION FITTINGS:
1. SHALL MEETING ASTM D 3350 AND ASTM D 3261 SPECIFICATIONS.
2. MOLDED PE FITTINGS: ASTM D 3350, PE RESIN, SOCKET- OR BUTT-FUSION TYPE, MADE TO MATCH PE PIPE DIMENSIONS AND CLASS.

2.2 CLEANOUTS
A. CAST-IRON CLEANOUTS: ASME A112.36.2M, ROUND, GRAY-IRON HOUSING WITH CLAMPING DEVICE AND ROUND, SECURED, SCORIATED, GRAY-IRON COVER. INCLUDE GRAY-IRON FERRULE WITH INSIDE CALK OR SPIGOT CONNECTION AND COUNTERSUNK, TAPERED-THREAD, BRASS CLOSURE PLUG.
1. TOP-LOADING CLASSIFICATION: HEAVY DUTY.
2. SEWER PIPE FITTING AND RISER TO CLEANOUT: ASTM D3350 AND ASTM D 3261 SPECIFICATIONS AND BE RATED FOR THE SAME PRESSURE SPECIFICATIONS AS THE PIPE.

2.3 MANHOLES
A. STANDARD PRECAST CONCRETE MANHOLES:
1. DESCRIPTION: ASTM C 478, PRECAST, REINFORCED CONCRETE, OF DEPTH INDICATED, WITH PROVISION FOR SEALANT JOINTS.
2. DIAMETER: 48 INCHES MINIMUM UNLESS OTHERWISE INDICATED.
3. BASE SECTION: 6-INCH MINIMUM THICKNESS FOR FLOOR SLAB AND 6-INCH MINIMUM THICKNESS FOR WALLS AND BASE RISER SECTION; WITH SEPARATE BASE SLAB OR BASE SECTION WITH INTEGRAL FLOOR.
4. RISER SECTIONS: 6-INCH MINIMUM THICKNESS, OF LENGTH TO PROVIDE DEPTH INDICATED.
5. TOP SECTION: ECCENTRIC-CONE TYPE UNLESS CONCENTRIC-CONE OR FLAT-SLAB-TOP TYPE IS INDICATED; WITH TOP OF CONE OF SIZE THAT MATCHES GRADE RINGS.
6. JOINT SEALANT: ASTM C 990, BITUMEN OR BUTYL RUBBER.
7. RESILIENT PIPE CONNECTORS: ASTM C 923, CAST OR FITTED INTO MANHOLE WALLS, FOR EACH PIPE CONNECTION.
8. STEPS: INDIVIDUAL FRP STEPS, FRP LADDER, OR ASTM A 615/A 615M, DEFORMED, 1/2-INCH STEEL REINFORCING RODS ENCASED IN ASTM D 4101, PP; WIDE ENOUGH TO ALLOW WORKER TO PLACE BOTH FEET ON ONE STEP AND DESIGNED TO PREVENT LATERAL SLIPPAGE OFF STEP. CAST OR ANCHOR STEPS INTO SIDEWALLS AT 12- TO 16-INCH INTERVALS. OMIT STEPS IF TOTAL DEPTH FROM FLOOR OF MANHOLE TO FINISHED GRADE IS LESS THAN 60 INCHES.

2.4 DEZURIK VALVES
A. DEZURIK AIR RELEASE VALVE PER MANUFACTURING SPECIFICATION; OR APPROVED EQUAL.
B. DEZURIK PLUG VALVE PER MANUFACTURING SPECIFICATIONS; OR APPROVED EQUAL.

PART 3 - EXECUTION

3.1 EARTHWORK
A. EXCAVATING, TRENCHING, AND BACKFILLING ARE SPECIFIED IN SECTION 312000 "EARTH MOVING."

3.2 PIPING INSTALLATION
A. GENERAL LOCATIONS AND ARRANGEMENTS: DRAWING PLANS AND DETAILS INDICATE GENERAL LOCATION AND ARRANGEMENT OF UNDERGROUND SANITARY SEWER PIPING. LOCATION AND ARRANGEMENT OF PIPING LAYOUT TAKE INTO ACCOUNT DESIGN CONSIDERATIONS. INSTALL PIPING AS INDICATED, TO EXTENT PRACTICAL. WHERE SPECIFIC INSTALLATION IS NOT INDICATED, FOLLOW PIPING MANUFACTURER'S WRITTEN INSTRUCTIONS.
B. INSTALL PIPING TRUE TO GRADES AND ALIGNMENT INDICATED WITH UNBROKEN CONTINUITY OF INVERT. INSTALL PIPE AND FITTINGS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND REQUIREMENTS.
C. INSTALL FITTINGS FOR CHANGES IN DIRECTION UNLESS MANHOLES ARE INDICATED. USE FITTINGS FOR BRANCH CONNECTIONS UNLESS DIRECT TAP INTO EXISTING SEWER IS INDICATED.
D. INSTALL PROPER SIZE INCREASERS, REDUCERS, AND COUPLINGS WHERE DIFFERENT SIZES OR MATERIALS OF PIPES AND FITTINGS ARE CONNECTED. REDUCING SIZE OF PIPING IN DIRECTION OF FLOW IS PROHIBITED.
E. INSTALL PIPING ACCORDING TO THE FOLLOWING:
1. INSTALL PIPING WITH 48-INCH MINIMUM COVER.
2. INSTALL HDPE PIPING IN ACCORDANCE WITH ASTM D 3350 AND ASTM 2774.
F. CLEAN INTERIOR OF PIPING AND MANHOLES OF DIRT AND SUPERFLUOUS MATERIAL AS WORK PROGRESSES. MAINTAIN SWAB OR DRAG IN PIPING, AND PULL PAST EACH JOINT AS IT IS COMPLETED. PLACE PLUG IN END OF INCOMPLETE PIPING AT END OF DAY AND WHEN WORK STOPS.

3.3 PIPE JOINT CONSTRUCTION
A. JOIN HDPE PIPING ACCORDING TO THE FOLLOWING:
1. PIPE SEGMENTS, CONNECTIONS AND JOINTS ARE TO BE INSTALLED BY BUTT FUSION PROCEDURES OUTLINED IN ASTM F 2620.
2. MECHANICAL CONNECTIONS, WHERE REQUIRED, FOR VALVES OR DEVICES SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.

3.4 MANHOLE INSTALLATION
A. GENERAL: INSTALL MANHOLES COMPLETE WITH APPURTENANCES AND ACCESSORIES INDICATED.
B. INSTALL PRECAST CONCRETE MANHOLE SECTIONS WITH SEALANTS ACCORDING TO ASTM C 891.
C. FORM CONTINUOUS CONCRETE CHANNELS AND BENCHES BETWEEN INLETS AND OUTLET.
D. SET TOPS OF FRAMES AND COVERS FLUSH WITH FINISHED SURFACE OF MANHOLES THAT OCCUR IN PAVEMENTS. SET TOPS 1 INCH ABOVE FINISHED SURFACE ELSEWHERE UNLESS OTHERWISE INDICATED.
E. INSTALL MANHOLE-COVER INSERTS IN FRAME AND IMMEDIATELY BELOW COVER.

3.5 CLEANOUT INSTALLATION
A. INSTALL CLEANOUTS AND RISER EXTENSIONS FROM SEWER PIPES TO CLEANOUTS AT GRADE. INSTALL PIPING SO CLEANOUTS OPEN IN DIRECTION OF FLOW IN SEWER PIPE.
1. USE HEAVY-DUTY, TOP-LOADING CLASSIFICATION CLEANOUTS IN VEHICLE-TRAFFIC SERVICE AREAS.
2. USE EXTRA-HEAVY-DUTY, TOP-LOADING CLASSIFICATION CLEANOUTS IN ROADS.
B. SET CLEANOUT FRAMES AND COVERS IN EARTH IN CAST-IN-PLACE-CONCRETE BLOCK, 18 BY 18 BY 12 INCHES DEEP. SET WITH TOPS 1 INCH ABOVE SURROUNDING GRADE.
C. SET CLEANOUT FRAMES AND COVERS IN CONCRETE PAVEMENT AND ROADS WITH TOPS FLUSH WITH PAVEMENT SURFACE.

3.6 IDENTIFICATION
A. USE DETECTABLE WARNING TAPE OVER NONFERROUS PIPING AND OVER EDGES OF UNDERGROUND MANHOLES.

3.7 FIELD QUALITY CONTROL
A. INSPECT INTERIOR OF PIPING TO DETERMINE WHETHER LINE DISPLACEMENT OR OTHER DAMAGE HAS OCCURRED. INSPECT AFTER APPROXIMATELY 24 INCHES OF BACKFILL IS IN PLACE, AND AGAIN AT COMPLETION OF PROJECT.
1. SUBMIT SEPARATE REPORT FOR EACH SYSTEM INSPECTION.
2. DEFECTS REQUIRING CORRECTION INCLUDE THE FOLLOWING:
a. ALIGNMENT: LESS THAN FULL DIAMETER OF INSIDE OF PIPE IS VISIBLE BETWEEN STRUCTURES.
b. DEFLECTION: FLEXIBLE PIPING WITH DEFLECTION THAT PREVENTS PASSAGE OF BALL OR CYLINDER OF SIZE NOT LESS THAN 92.5 PERCENT OF PIPING DIAMETER.
c. DAMAGE: CRUSHED, BROKEN, CRACKED, OR OTHERWISE DAMAGED PIPING.
d. INFILTRATION: WATER LEAKAGE INTO PIPING.
e. EXFILTRATION: WATER LEAKAGE FROM OR AROUND PIPING.
3. REPLACE DEFECTIVE PIPING AND APPURTENANCES USING NEW MATERIALS, AND REPEAT INSPECTIONS UNTIL DEFECTS ARE WITHIN ALLOWANCES SPECIFIED.
4. REINSPECT AND REPEAT PROCEDURE UNTIL RESULTS ARE SATISFACTORY.
B. HYDROSTATIC TESTS:
1. DO NOT ENCLOSE, COVER, OR PUT INTO SERVICE BEFORE INSPECTION AND APPROVAL.
2. SCHEDULE TESTS AND INSPECTIONS BY AUTHORITIES HAVING JURISDICTION WITH AT LEAST 24 HOURS' ADVANCE NOTICE.
3. SUBMIT SEPARATE REPORT FOR EACH TEST.
4. TEST PIPING SYSTEM ACCORDING TO REQUIREMENTS OF ASTM F 2164,MDC AND MANUFACTURER'S GUIDELINES.
5. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED.
C. REPLACE LEAKING PIPING USING NEW MATERIALS, AND REPEAT TESTING UNTIL LEAKAGE IS WITHIN ALLOWANCES SPECIFIED.

3.8 CLEANING
A. CLEAN DIRT AND SUPERFLUOUS MATERIAL FROM INTERIOR OF PIPING. FLUSH WITH POTABLE WATER.

END OF SECTION 221313

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY
A. SECTION INCLUDES:
1. EXCAVATING AND FILLING FOR ROUGH GRADING THE SITE.
2. PREPARING SUBGRADES FOR PAVEMENT AND GRASSES.
3. SUBBASE COURSE AND BASE COURSE FOR ASPHALT PAVING.
4. EXCAVATING AND BACKFILLING TRENCHES FOR UTILITIES AND PITS FOR BURIED UTILITY STRUCTURES.

1.2 DEFINITIONS
A. BACKFILL: SOIL MATERIAL USED TO FILL AN EXCAVATION.
1. INITIAL BACKFILL: BACKFILL PLACED BESIDE AND OVER PIPE IN A TRENCH, INCLUDING HAUNCHES TO SUPPORT SIDES OF PIPE.
2. FINAL BACKFILL: BACKFILL PLACED OVER INITIAL BACKFILL TO FILL A TRENCH.
B. BASE COURSE: AGGREGATE LAYER PLACED BETWEEN THE SUBBASE COURSE AND HOT-MIX ASPHALT PAVING.
C. CRUSHED STONE: AGGREGATE LAYER PLACED OVER THE EXCAVATED SUBGRADE IN A TRENCH BEFORE INSTALLING STRUCTURES. MATERIAL ALSO USED FOR DRAINAGE AND INFILTRATION TRENCHES WHEN WRAPPED WITH FILTER FABRIC.
D. EXCAVATION: REMOVAL OF MATERIAL ENCOUNTERED ABOVE SUBGRADE ELEVATIONS AND TO LINES AND DIMENSIONS INDICATED.
1. AUTHORIZED ADDITIONAL EXCAVATION: EXCAVATION BELOW SUBGRADE ELEVATIONS OR BEYOND INDICATED LINES AND DIMENSIONS AS DIRECTED BY ARCHITECT. AUTHORIZED ADDITIONAL EXCAVATION AND REPLACEMENT MATERIAL WILL BE PAID FOR ACCORDING TO CONTRACT PROVISIONS FOR CHANGES IN THE WORK.
2. UNAUTHORIZED EXCAVATION: EXCAVATION BELOW SUBGRADE ELEVATIONS OR BEYOND INDICATED LINES AND DIMENSIONS WITHOUT DIRECTION BY ARCHITECT. UNAUTHORIZED EXCAVATION, AS WELL AS REMEDIAL WORK DIRECTED BY ARCHITECT, SHALL BE WITHOUT ADDITIONAL COMPENSATION.
E. SAND: AGGREGATE LAYER PLACED UNDER AND OVER UTILITIES AND AS INDICATED.
F. FILL: SOIL MATERIALS USED TO RAISE EXISTING GRADES.
G. STRUCTURES: BUILDINGS, FOOTINGS, FOUNDATIONS, RETAINING WALLS, SLABS, TANKS, CURBS, MECHANICAL AND ELECTRICAL APPURTENANCES, OR OTHER MAN-MADE STATIONARY FEATURES CONSTRUCTED ABOVE OR BELOW THE GROUND SURFACE.
H. SUBBASE COURSE: AGGREGATE LAYER PLACED BETWEEN THE SUBGRADE AND BASE COURSE FOR HOT-MIX ASPHALT PAVEMENT, OR AGGREGATE LAYER PLACED BETWEEN THE SUBGRADE AND A CEMENT CONCRETE PAVEMENT OR A CEMENT CONCRETE OR HOT-MIX ASPHALT WALK.
I. SUBGRADE: UPPERMOST SURFACE OF AN EXCAVATION OR THE TOP SURFACE OF A FILL OR BACKFILL IMMEDIATELY BELOW SUBBASE, DRAINAGE FILL, DRAINAGE COURSE, OR TOPSOIL MATERIALS.
J. UTILITIES: ON-SITE UNDERGROUND PIPES, CONDUITS, DUCTS, AND CABLES AS WELL AS UNDERGROUND SERVICES WITHIN BUILDINGS.

1.3 PREINSTALLATION MEETINGS
A. PREINSTALLATION CONFERENCE: CONDUCT PREEXCAVATION CONFERENCE AT PRATT & WHITNEY EAST HARTFORD.

1.4 INFORMATIONAL SUBMITTALS
A. MATERIAL TEST REPORTS.

1.5 FIELD CONDITIONS
A. UTILITY LOCATOR SERVICE: NOTIFY UTILITY LOCATOR SERVICE FOR AREA WHERE PROJECT IS LOCATED BEFORE BEGINNING EARTH-MOVING OPERATIONS.
B. CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR DAMAGE TO ANY EXISTING UTILITY LINES DURING THE COURSE OF WORK AND BE LIABLE FOR DAMAGES AS A RESULT THEREOF. THE CONTRACTOR SHALL NOTIFY THE OWNER OF ALL EXISTING UTILITIES IN THE VICINITY OF THE CONSTRUCTION.
C. THE LOCATIONS OF THE EXISTING UTILITIES INDICATED ARE APPROXIMATE BASED ON THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL PHYSICAL VERIFY THE LOCATION OF THE EXISTING UTILITIES INDICATED PRIOR TO STARTING CONSTRUCTION AND RETAIN THE SERVICES OF AN INDEPENDENT UTILITY LOCATING COMPANY TO IDENTIFY UNDERGROUND UTILITIES.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS
A. GENERAL: PROVIDE BORROW SOIL MATERIALS WHEN SUFFICIENT SATISFACTORY SOIL MATERIALS ARE NOT AVAILABLE FROM EXCAVATIONS.
B. BACKFILL: CONFORM TO CT DOT FORM 816, DIVISION III, SECTION M.02.06, GRADING A.
C. BASE COURSE: CONFORM TO CT DOT FORM 816, DIVISION III, SECTION M.05, ARTICLE M.05.01.
D. CRUSHED STONE: CONFORM TO CT DOT FORM 816, DIVISION III, SECTION M.01.01, NO. 6.
E. FILTER FABRIC: 8 OZ/SY NON-WOVEN GEOTEXTILE, US FABRICS, US 205NW, OR APPROVED EQUAL.
F. SAND COURSE: CONFORM TO CT DOT FORM 816, DIVISION III, SECTION M.05.02 (SAND).
G. SUBBASE COURSE: CONFORM TO CT DOT FORM 816, DIVISION III, SECTION M.02.06, GRADING A.
H. STRUCTURAL FILL: SHALL CONFORM TO THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3"	100
NO. 4	40-85
NO. 40	10-50
NO. 200	0-12

2.2 ACCESSORIES
A. DETECTABLE WARNING TAPE: ACID- AND ALKALI-RESISTANT, POLYETHYLENE FILM WARNING TAPE MANUFACTURED FOR MARKING AND IDENTIFYING UNDERGROUND UTILITIES, A MINIMUM OF 6 INCHES WIDE AND 4 MILS THICK, CONTINUOUSLY INSCRIBED WITH A DESCRIPTION OF THE UTILITY, WITH METALLIC CORE ENCASED IN A PROTECTIVE JACKET FOR CORROSION PROTECTION, DETECTABLE BY METAL DETECTOR WHEN TAPE IS BURIED UP TO 30 INCHES DEEP; COLORED TO COMPLY WITH LOCAL PRACTICE OR REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

PART 3 - EXECUTION

3.1 PREPARATION
A. PROTECT STRUCTURES, UTILITIES, SIDEWALKS, PAVEMENTS, AND OTHER FACILITIES FROM DAMAGE CAUSED BY SETTLEMENT, LATERAL MOVEMENT, UNDERMINING, WASHOUT, AND OTHER HAZARDS CREATED BY EARTH-MOVING OPERATIONS.
B. PROTECT AND MAINTAIN EROSION AND SEDIMENTATION CONTROLS DURING EARTH-MOVING OPERATIONS.
C. PROTECT SUBGRADES AND FOUNDATION SOILS FROM FREEZING TEMPERATURES AND FROST. REMOVE TEMPORARY PROTECTION BEFORE PLACING SUBSEQUENT MATERIALS.

3.2 EXCAVATION, GENERAL
A. UNCLASSIFIED EXCAVATION: EXCAVATE TO SUBGRADE ELEVATIONS REGARDLESS OF THE CHARACTER OF SURFACE AND SUBSURFACE CONDITIONS ENCOUNTERED. UNCLASSIFIED EXCAVATED MATERIALS MAY INCLUDE ROCK, SOIL MATERIALS, AND OBSTRUCTIONS. NO CHANGES IN THE CONTRACT SUM OR THE CONTRACT TIME WILL BE AUTHORIZED FOR ROCK EXCAVATION OR REMOVAL OF OBSTRUCTIONS.
1. IF EXCAVATED MATERIALS INTENDED FOR FILL AND BACKFILL INCLUDE UNSATISFACTORY SOIL MATERIALS AND ROCK, REPLACE WITH SATISFACTORY SOIL MATERIALS.

3.3 EXCAVATION FOR STRUCTURES
A. EXCAVATE TO INDICATED ELEVATIONS AND DIMENSIONS WITHIN A TOLERANCE OF PLUS OR MINUS 1 INCH. IF APPLICABLE, EXTEND EXCAVATIONS A SUFFICIENT DISTANCE FROM STRUCTURES FOR PLACING AND REMOVING CONCRETE FORMWORK, FOR INSTALLING SERVICES AND OTHER CONSTRUCTION, AND FOR INSPECTIONS.
B. EXCAVATIONS AT EDGES OF TREE- AND PLANT-PROTECTION ZONES:
1. EXCAVATE BY HAND OR WITH AN AIR SPADE TO INDICATED LINES, CROSS SECTIONS, ELEVATIONS, AND SUBGRADES. IF EXCAVATING BY HAND, USE NARROW-TINE SPADING FORKS TO COMB SOIL AND EXPOSE ROOTS. DO NOT BREAK, TEAR, OR CHOP EXPOSED ROOTS. DO NOT USE MECHANICAL EQUIPMENT THAT RIPS, TEARS, OR PULLS ROOTS.
2. CUT AND PROTECT ROOTS DURING EXCAVATION.

3.4 EXCAVATION FOR UTILITY TRENCHES
A. EXCAVATE TRENCHES TO REQUIRED GRADIENTS, LINES, DEPTHS, AND ELEVATIONS.
B. EXCAVATE TRENCHES TO UNIFORM WIDTHS TO PROVIDE THE FOLLOWING CLEARANCE ON EACH SIDE OF PIPE OR CONDUIT. EXCAVATE TRENCH WALLS VERTICALLY FROM TRENCH BOTTOM TO 12 INCHES HIGHER THAN TOP OF PIPE OR CONDUIT UNLESS OTHERWISE INDICATED.
1. CLEARANCE: 18 INCHES EACH SIDE OF PIPE MINIMUM.
C. TRENCH BOTTOMS: EXCAVATE AND SHAPE TRENCH BOTTOMS TO PROVIDE UNIFORM BEARING AND SUPPORT OF PIPES AND CONDUIT. SHAPE SUBGRADE TO PROVIDE CONTINUOUS SUPPORT FOR BELLS, JOINTS, AND BARRELS OF PIPES AND FOR JOINTS, FITTINGS, AND BODIES OF CONDUITS. REMOVE PROJECTING STONES AND SHARP OBJECTS ALONG TRENCH SUBGRADE.
1. EXCAVATE TRENCHES 6 INCHES DEEPER TO ALLOW FOR BEDDING.
D. TRENCHING OVER CULVERT CROSSING:
1. EXCAVATION OVER CULVERTS SHALL BE DONE TO A MINIMUM DEPTH.
2. EXTRA PRECAUTION REGARDING CULVERT INTEGRITY SHALL BE TAKEN IN CROSSING TRENCH.

3.5 SUBGRADE INSPECTION
A. PROOF-ROLL SUBGRADE BELOW PAVEMENTS WITH A PNEUMATIC-TIRED DUMP TRUCK TO IDENTIFY SOFT POCKETS AND AREAS OF EXCESS YIELDING. DO NOT PROOF-ROLL WET OR SATURATED SUBGRADES.
B. RECONSTRUCT SUBGRADES DAMAGED BY FREEZING TEMPERATURES, FROST, RAIN, ACCUMULATED WATER, OR CONSTRUCTION ACTIVITIES, AS DIRECTED BY ARCHITECT, WITHOUT ADDITIONAL COMPENSATION.

3.6 STORAGE OF SOIL MATERIALS
A. STOCKPILE BORROW SOIL MATERIALS AND EXCAVATED SATISFACTORY SOIL MATERIALS WITHOUT INTERMIXING. PLACE, GRADE, AND SHAPE STOCKPILES TO DRAIN SURFACE WATER. COVER TO PREVENT WINDBLOWN DUST.
1. STOCKPILE SOIL MATERIALS AWAY FROM EDGE OF EXCAVATIONS. DO NOT STORE WITHIN DRIP LINE OF REMAINING TREES, NEAR SLOPES TOWARDS BROOK OR WITHIN THE BROOK.

3.7 UTILITY TRENCH BACKFILL
A. PLACE BACKFILL ON SUBGRADES FREE OF MUD, FROST, SNOW, OR ICE.
B. PLACE AND COMPACT SAND ON TRENCH BOTTOMS AND WHERE INDICATED. SHAPE TO PROVIDE CONTINUOUS SUPPORT FOR BELLS, JOINTS, AND BARRELS OF PIPES AND FOR JOINTS, FITTINGS, AND BODIES OF CONDUITS.
C. INITIAL BACKFILL: PLACE AND COMPACT INITIAL BACKFILL TO A HEIGHT OF 12 INCHES OVER THE PIPE OR CONDUIT.
1. CAREFULLY COMPACT INITIAL BACKFILL UNDER PIPE HAUNCHES AND COMPACT EVENLY UP ON BOTH SIDES AND ALONG THE FULL LENGTH OF PIPING OR CONDUIT TO AVOID DAMAGE OR DISPLACEMENT OF PIPING OR CONDUIT. COORDINATE BACKFILLING WITH UTILITIES TESTING.
D. FINAL BACKFILL: PLACE AND COMPACT FINAL BACKFILL OF SATISFACTORY SOIL TO FINAL SUBGRADE ELEVATION.
E. WARNING TAPE: INSTALL WARNING TAPE DIRECTLY ABOVE UTILITIES, 12 INCHES BELOW FINISHED GRADE, EXCEPT 6 INCHES BELOW SUBGRADE UNDER PAVEMENTS AND SLABS.

3.8 SOIL FILL
A. PLOW, SCARIFY, BENCH, OR BREAK UP SLOPED SURFACES STEEPER THAN 1 VERTICAL TO 4 HORIZONTAL SO FILL MATERIAL WILL BOND WITH EXISTING MATERIAL.
B. PLACE AND COMPACT FILL MATERIAL IN LAYERS TO REQUIRED ELEVATIONS AS FOLLOWS:
1. UNDER GRASS AND PLANTED AREAS, USE SATISFACTORY SOIL MATERIAL.
2. UNDER WALKS AND PAVEMENTS, USE SATISFACTORY SOIL MATERIAL.
3. UNDER FOOTINGS AND FOUNDATIONS, USE ENGINEERED FILL.

3.9 SOIL MOISTURE CONTROL
A. UNIFORMLY MOISTEN OR AERATE SUBGRADE AND EACH SUBSEQUENT FILL OR BACKFILL SOIL LAYER BEFORE COMPACTION TO WITHIN 2 PERCENT OF OPTIMUM MOISTURE CONTENT.
1. DO NOT PLACE BACKFILL OR FILL SOIL MATERIAL ON SURFACES THAT ARE MUDDY, FROZEN, OR CONTAIN FROST OR ICE.
2. REMOVE AND REPLACE, OR SCARIFY AND AIR DRY, OTHERWISE SATISFACTORY SOIL MATERIAL THAT EXCEEDS OPTIMUM MOISTURE CONTENT BY 2 PERCENT AND IS TOO WET TO COMPACT TO SPECIFIED DRY UNIT WEIGHT.

3.10 COMPACTION OF SOIL BACKFILLS AND FILLS
A. PLACE BACKFILL AND FILL SOIL MATERIALS IN LAYERS NOT MORE THAN 8 INCHES IN LOOSE DEPTH FOR MATERIAL COMPACTED BY HEAVY COMPACTION EQUIPMENT AND NOT MORE THAN 4 INCHES IN LOOSE DEPTH FOR MATERIAL COMPACTED BY HAND-OPERATED TAMPERS.
B. PLACE BACKFILL AND FILL SOIL MATERIALS EVENLY ON ALL SIDES OF STRUCTURES TO REQUIRED ELEVATIONS AND UNIFORMLY ALONG THE FULL LENGTH OF EACH STRUCTURE.
C. COMPACT SOIL MATERIALS TO NOT LESS THAN THE FOLLOWING PERCENTAGES OF MAXIMUM DRY UNIT WEIGHT ACCORDING TO ASTM D 1557:
1. UNDER PAVEMENTS, SCARIFY AND RECOMPACT TOP 12 INCHES OF EXISTING SUBGRADE AND EACH LAYER OF BACKFILL OR FILL SOIL MATERIAL AT 95 PERCENT.
2. UNDER GRASS OR UNPAVED AREAS, SCARIFY AND RECOMPACT TOP 6 INCHES BELOW SUBGRADE AND COMPACT EACH LAYER OF BACKFILL OR FILL SOIL MATERIAL AT 90 PERCENT.
3. FOR UTILITY TRENCHES, COMPACT EACH LAYER OF INITIAL AND FINAL BACKFILL SOIL MATERIAL AT 95 PERCENT.

3.11 GRADING
A. GENERAL: UNIFORMLY GRADE AREAS TO A SMOOTH SURFACE, FREE OF IRREGULAR SURFACE CHANGES. COMPLY WITH COMPACTION REQUIREMENTS AND GRADE TO CROSS SECTIONS, LINES, AND ELEVATIONS INDICATED.
B. SITE ROUGH GRADING: SLOPE GRADES TO DIRECT WATER AWAY FROM STRUCTURES AND TO PREVENT PONDING. FINISH SUBGRADES TO ELEVATIONS REQUIRED TO ACHIEVE INDICATED FINISH ELEVATIONS, WITHIN THE FOLLOWING SUBGRADE TOLERANCES:
1. TURF OR UNPAVED AREAS: PLUS OR MINUS 1 INCH.
2. PAVEMENTS: PLUS OR MINUS 1/2 INCH.

3.12 SUBBASE AND BASE COURSES UNDER PAVEMENTS
A. PLACE SUBBASE COURSE AND BASE COURSE ON SUBGRADES FREE OF MUD, FROST, SNOW, OR ICE.
B. ON PREPARED SUBGRADE, PLACE SUBBASE COUR