

Request for Proposals(RFP's)

The Town of Union is accepting RFP's for gravel road reconstruction, plans and RFP details may be downloaded from the town web site at www.union.maine.gov . All RFP's must be received no later than 3:00 PM September 11, 2014 .

REQUEST FOR PROPOSALS

DAVIS ROAD RECONSTRUCTION RFP DETAILS

A: All RFP's must be received no later than 3:00 PM on September 11, 2014 and placed in a sealed envelope clearly marked RFP DAVIS ROAD RECONSTRUCTION.

B: Contractors shall use the maximum amounts of subgrade and surface materials as listed in the engineering documents. Ex: 6-8" of subgrade, we will be using 8"

C: Prices shall be per 100 yards of road surface, total length to be decided based on funds available (approx. 75K). Contractors are urged to measure the width of the road which is approximately 21'. Construction shall begin at the Wottons Mill end.

D: Contractor shall be responsible to notify all residents of times and dates of any road closure which shall not exceed 30 minutes.

E: Contractor shall be responsible for all construction signs, flaggers and all other construction zone requirements for signage and safety.

F: The successful contractor shall provide the Town of Union with proof of insurance both liability and workers compensation in amount agreed upon by the Town and Contractor. The Contractor shall also provide the Town of Union with copies of insurance and workers compensation from any sub-contractors used.

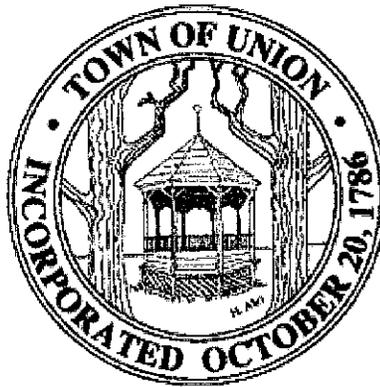
G: Timeframe of construction shall be negotiable with the Town of Union with penalties assessed if the timeframe is not met.

H: Contractor shall be responsible for the cost of testing of aggregate to ensure the material meets the specifications listed. The Town of Union may make additional test at Town cost unless the material fails and then additional test will be at the cost of the contractor.

I: All changes to the contract shall be in writing only.

**ADDITIONAL INFORMATION MAY BE REQUESTED FROM JAY FEYLER, 785-3658
JAYUNION@ROADRUNNER.COM**

TOWN OF UNION
DETAILS AND SPECIFICATIONS
FOR
DAVIS ROAD
RECONSTRUCTION



Town of Union
PO Box 186
Union, ME 04862

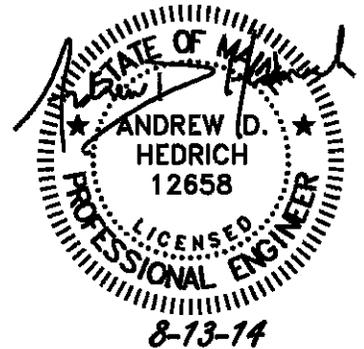
August 13, 2014

Town Manager:
Jay Feyler
(207) 785-3658

Prepared By:

Gartley & Dorsky
ENGINEERING SURVEYING

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165 Maine Street Suite 2F P.O. Box 1072 Damariscotta, ME 04543
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**TOWN OF UNION
DAVIS ROAD RECONSTRUCTION
PROJECT DIRECTORY**

OWNER

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CIVIL ENGINEER

Gartley & Dorsky Engineering & Surveying
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PROJECT MANAGER

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**TOWN OF UNION
DAVIS ROAD RECONSTRUCTION
PROJECT SUMMARY**

The Town of Union has budgeted to extend the life of a portion of Davis Road which is to include the possible removal of 3" of existing surface material, placement of geotechnical fabric and the addition of base and surface material.

The work includes but is not limited to the placement of erosion control measures, some removal of existing surface material, re-grading, placement of new surface aggregate and drainage improvements as indicated on the specifications as directed by the Town.

The Town may hold a pre- RFP meeting with the contractors and engineers to describe any proposed improvements that will not be clearly identified in the typical details, such as stormwater management improvements.

TOWN OF UNION
DAVIS ROAD RECONSTRUCTION
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4) SPECIAL CONDITIONS

TOWN OF UNION
DAVIS ROAD RECONSTRUCTION
PROJECT DETAILS

Erosion and Sedimentation Control Notes (D-1)

General Notes (D-2)

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Typical Graded Road Section with Culvert (D-8)

TOWN OF UNION
DAVIS ROAD RECONSTRUCTION
PROJECT SPECIFICATIONS

Division 01 – General Requirements

01 35 43 Environmental Procedures

Division 31 – Earthwork

31 05 13 Soils for Earthwork
31 05 16 Aggregates for Earthwork
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Division 32 – Exterior Improvements

32 11 23 Aggregate Base Courses
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EROSION & SEDIMENTATION CONTROL NOTES

IN ORDER TO PROTECT THE SOIL AND WATER
RESOURCES OF THIS DEVELOPMENT AND ADJACENT LANDS,
THE FOLLOWING ACTIONS SHALL BE TAKEN:

(WHEN CONSTRUCTION IS INITIATED ON FROZEN GROUND,
WOOD WASTE COMPOST/BARK FILTER BERM SHALL BE UTILIZED IN LIEU OF
SILT FENCE. SEE DETAIL, THIS SHEET.)

A. EROSION CONTROL/TEMPORARY MEASURES

THE FOLLOWING TEMPORARY MEASURES TO CONTROL EROSION AND
SEDIMENTATION SHALL BE USED.

1. SEDIMENT BARRIER (SILT FENCE OR WOOD WASTE COMPOST/BARK FILTER (BERM) WILL BE INSTALLED AROUND THE LIMITS OF CLEARING ASSOCIATED WITH EACH PORTION OF THIS PROJECT. THE CONTRIBUTING DRAINAGE AREA IS LESS THAN 1/4 ACRE PER 100 FT. OF BARRIER LENGTH (THE MAXIMUM LENGTH OF SLOPE ABOVE THE BARRIER IS 100 FEET AND THE MAXIMUM GRADIENT BEHIND THE BARRIER IS 50 PERCENT (2:1). IF THE SLOPE IS GREATER, OTHER MEASURES SUCH AS DIVERSIONS MAY BE NECESSARY TO REDUCE THE SLOPE LENGTH. SEDIMENT BARRIER SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED. SEDIMENT BARRIER WILL BE INSTALLED TO SPECIFICATIONS OUTLINED IN THE MOST RECENT MAINE EROSION AND SEDIMENTATION CONTROL HANDBOOK FOR CONSTRUCTION BEST MANAGEMENT PRACTICES.
2. EACH GROUND AREA OPENED OR EXPOSED, WHETHER DIRECTLY OR INDIRECTLY DUE TO THE PROJECT CONSTRUCTION, SHALL BE MINIMIZED AND SHALL BE STABILIZED WITHIN 15 DAYS OF THE INITIAL DISTURBANCE OF THE MINERAL SOIL, AND SHALL BE PERMANENTLY STABILIZED WITHIN 7 DAYS OF FINAL GRADING.
3. TEMPORARY SOIL STABILIZATION SHALL BE EITHER BY TEMPORARY MULCHING, TEMPORARY SEEDING, PERMANENT BASE GRAVEL, OR ASPHALT BASE COURSE AS FOLLOWS:
 - TEMPORARY SEEDING SEED SHALL BE AROOSTOOK RYE APPLIED AT 3.0#/1000 sf. LIME SHALL BE AGRICULTURAL GROUND LIMESTONE APPLIED AT 13.8#/1000 sf. FERTILIZER SHALL BE 10-10-10 CLASSIFICATION APPLIED AT 13.8#/1000 sf. MULCH SHALL CONSIST OF HAY OR STRAW MULCH AND SPREAD EVENLY AT A RATE OF 70-90#/1000 sf. TEMPORARY SEEDINGS SHALL ONLY BE MADE BETWEEN APRIL 15TH AND OCTOBER 15TH, AND SHALL NOT BE PLACED OVER SNOW. IF THE SEEDING IS NOT COMPLETED BY OCTOBER 15TH, ADDITIONAL MULCH SHALL BE ADDED TO PROVIDE ADEQUATE WINTER PROTECTION.
 - TEMPORARY MULCHING MULCH SHALL CONSIST OF CHOPPED HAY OR STRAW MULCH AND SPREAD BY MECHANICAL BLOWER, OR BY HAND IF ADJACENT TO WETLAND HABITAT, EVENLY AT A RATE OF 150-200#/1000 sf. TEMPORARY MULCH SHALL BE REMOVED PRIOR TO PERMANENT SOIL STABILIZATION. MULCH MUST NOT BE PLACED OVER SNOW.
 - PERMANENT BASE GRAVEL BASE GRAVEL UNDER PAVEMENT SHALL BE SUITABLE AS TEMPORARY SOIL STABILIZATION UNDER THE FOLLOWING CONDITIONS:
 - A. SLOPES SHALL BE LESS THAN 5 PERCENT.
 - B. GRAVEL SHALL MEET THE SPECIFICATIONS FOR BASE OR SUB-BASE GRAVEL FOR THE PROPOSED COMPLETED PAVEMENT.
 - ASPHALT BASE COURSE ASPHALT SHALL MEET THE SPECIFICATIONS FOR THE ASPHALT BASE COURSE FOR THE PROPOSED COMPLETED PAVEMENT.
4. PRIOR TO TOPSOIL REMOVAL, SILT FENCING SHALL BE STAKED AS SHOWN ON THE PLAN.
5. STRIPPED TOPSOIL SHALL BE STOCKPILED FOR REUSE DURING FINAL GRADING. THE PILE SHALL BE HEAVILY MULCHED WITH HAY WHILE STOCKPILED.
6. TO REDUCE OR ELIMINATE THE TRACKING OF EARTH MATERIALS ONTO PUBLIC RIGHT-OF-WAYS, A STABILIZED PAD OF CRUSHED STONE LOCATED AT THE DESIGNATED ACCESS POINT SHALL BE ESTABLISHED.

B. EROSION CONTROL/PERMANENT MEASURES

1. EXCESSIVELY STEEP SLOPES (2:1 OR GREATER) SHALL BE PROTECTED BY EROSION CONTROL EXCELSIOR BLANKET WITH BIODEGRADABLE PLASTIC OR JUTE MESH AFTER SEEDING.
2. PERMANENT SEEDING SHALL BE PERFORMED DURING CONSTRUCTION OPERATIONS AS EACH DISTURBED AREA HAS BEEN BROUGHT TO FINISH GRADE. ALL AREAS SHALL BE SEED WITH ONE OF THE FOLLOWING:
 - A. CONSERVATION/WILDLIFE MIX

20% KENTUCKY BLUEGRASS	6% WHITE CLOVER
30% CREEPING RED FESCUE	15% ANNUAL RYEGRASS
15% PERENNIAL RYEGRASS	14% PENNFINE RYEGRASS
 - B. COTTAGE MIX

50% CREEPING RED FESCUE	20% ANNUAL RYEGRASS
15% PERENNIAL RYEGRASS	15% TALL FESCUE
 - C. PARK MIX

25% KENTUCKY BLUEGRASS	20% ANNUAL RYEGRASS
30% CREEPING RED FESCUE	10% PERENNIAL RYEGRASS
15% CHEWING FESCUE	
 - D. NORTHEAST WILDFLOWER MIX (SEE NOTE 4 THIS SECTION)

3. THE CONTRACTOR SHALL MAINTAIN THE SEEDED AND MULCHED AREAS UNTIL FINAL ACCEPTANCE OF THE WORK. MAINTENANCE SHALL CONSIST OF PROVIDING PROTECTION AGAINST TRAFFIC AND REPAIRING ANY AREAS DAMAGED DUE TO WIND, WATER, EROSION, FIRE OR OTHER CAUSES. SUCH DAMAGED AREAS SHALL BE REPAIRED TO RE-ESTABLISH THE CONDITION AND GRADE OF THE SOIL PRIOR TO SEEDING AND SHALL THEN BE RE-FERTILIZED, RE-SEEDED AND RE-MULCHED.
4. PERMANENT WILDFLOWER STABILIZATION: PROVIDE 3" OF LOAM OVER DISTURBED OR NEWLY GRADED SLOPES. APPLY WILDFLOWER SEED MIX ACCORDING TO THE FOLLOWING MIX SPECIFICATIONS. ESTABLISH WILDFLOWER MIX PRIOR TO SEPTEMBER 1. MULCH SHALL BE WEED-SEED FREE STRAW MULCH, APPLIED AT THE RATE OF 4 BALES PER 1000 SQUARE FEET, AS DESCRIBED IN SECTION D, WINTER STABILIZATION. JUTE MULCH NETTING ANCHORING SHALL BE PROVIDED, APPLIED IN CONTINUOUS OVERLAPPING ROLLS WITH THE CONTOUR. NETTING SHALL BE APPLIED FROM THE BOTTOM OF SLOPES UP. 8 GAUGE, 6" PLAIN IRON WIRE STAPLES SHALL BE APPLIED PER THE MANUFACTURER'S RECOMMENDATION.

NORTHEAST WILDFLOWER MIX:

14% PERENNIAL LUPINE	12% BACHELORS BUTTONS
7% LANCE LEAF COREOPSIS	8% BABY'S BREATH
6% DAVEY'S ROCKET	8% ROCKET LARKSPUR
6% PURPLE CONEFLOWER	8% SCARLET FLAX
5% BLACK EYED SUSAN	2% CATCHFLY
5% SIBERIAN WALLFLOWER	1% SPURRED SNAPDRAGON
4% CORN POPPY	
4% EVENING PRIMROSE	
2% BLANKET FLOWER	
2% SHASTA DAISY	
1% NEW ENGLAND ASTER	
1% WHITE YARROW	

ANNUALS:

12% BACHELORS BUTTONS	8% BABY'S BREATH
8% ROCKET LARKSPUR	8% SCARLET FLAX
2% CATCHFLY	1% SPURRED SNAPDRAGON

C. EROSION CONTROL MAINTENANCE

THE FACILITY OPERATOR WILL BE RESPONSIBLE FOR THE PROPER OPERATION AND MAINTENANCE OF ALL EROSION CONTROL MEASURES; EACH SHOULD BE KEPT FREE OF DEBRIS.

D. WINTER STABILIZATION

PROVIDE WINTER STABILIZATION IN LIEU OF PERMANENT SEEDING AFTER SEPTEMBER 1, IN LIEU OF SODDING AFTER NOVEMBER 15, AND FOR ALL WORK REQUIRING TEMPORARY STABILIZATION AFTER OCTOBER 15 AS FOLLOWS:

STRAW MULCH: PLACE STRAW MULCH AT THE APPLICATION RATE OF 150 LBS/1000 sf ON DISTURBED AREAS LESS THAN 8% SLOPE AND NOT SUBJECT TO FLOWING WATER REQUIRING STABILIZATION. ANCHOR ALL MULCH WITH MULCH NETTING AND STAPLES OR WITH STAKES AND TWINE. STAKES AND TWINE SHALL BE APPLIED AT THE RATE OF 4 TO 6 PEGS PER SQUARE YARD WITH CRISS-CROSSED TWINE STRUNG TAUT BETWEEN ALL PEGS AND SECURED AT EACH PEG WITH ONE OR MORE TURNS OF TWINE.

EROSION CONTROL MIX MULCH: APPLY EROSION CONTROL MIX MULCH AS AN ALTERNATIVE TO STRAW MULCH OR MATS ON STEEP SLOPES ONLY AT RATES SPECIFIED IN DEP PUBLICATION "MAINE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES" (MOST RECENT EDITION).

MATS: PLACE FABRICATED MULCH AND NETTING CONTROL MATS WITH ANCHORING AS SPECIFIED BY THE MANUFACTURER, TO STABILIZE DISTURBED AREAS AND SLOPES GREATER THAN 8%. SUBJECT TO FLOWING WATER (SUCH AS SWALE OR DITCH SECTIONS), OR CUT SLOPE SUBJECT TO WEEPING GROUNDWATER.

RIP RAP: ALL RIP RAP MINIMUM D50=2", PLACED IN 4" LIFTS AS AN ALTERNATIVE TO STRAW MATS ON STEEP SLOPES OR FLOWING WATER CONDITIONS.

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DAVIS ROAD - CIVIL DETAILS & SPECIFICATIONS

UNION, MAINE

AUGUST 11, 2014

PROJ. NO. 2014-214

D-1

GENERAL NOTES

1. AGGREGATE FOR GRAVEL BASE

AGGREGATE FOR GRAVEL BASE SHALL BE SCREENED OR CRUSHED GRAVEL OF HARD DURABLE PARTICLES FREE FROM VEGETABLE MATTER, LUMPS OR BALLS OF CLAY AND OTHER DELETERIOUS SUBSTANCES. THE GRADATION OF THE PART THAT PASSES A 3 INCH SIEVE SHALL MEET THE GRADING REQUIREMENTS OF THE FOLLOWING TABLE:

SIEVE DESIGNATION	PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES			
	TYPE A AGGREGATE	TYPE B AGGREGATE	TYPE C AGGREGATE	TYPE D AGGREGATE
1/2 INCH	45-70	35-75	---	---
1/4 INCH	30-55	25-60	25-70	25-70
No. 40	0-20	0-25	0-30	0-30
No. 200	0-5	0-5	0-5	0-7

TYPE A AGGREGATE SHALL NOT CONTAIN PARTICLES WHICH WILL NOT PASS THE 2 INCH SQUARE MESH SIEVE.

TYPE B AGGREGATE SHALL NOT CONTAIN PARTICLES WHICH WILL NOT PASS THE 4 INCH SQUARE MESH SIEVE.

TYPE C & D AGGREGATE SHALL NOT CONTAIN PARTICLES WHICH WILL NOT PASS THE 6 INCH SQUARE MESH SIEVE.

EACH LAYER AS APPLIED SHALL BE ROLLED WITH A 20 TON ROLLER. THE MATERIAL AS SPREAD SHALL BE WELL MIXED WITH NO POCKETS OF EITHER FINE OR COARSE MATERIAL. OVERSIZED STONES SHALL BE REMOVED FROM THE AGGREGATE.

EACH LAYER OF AGGREGATE SHALL BE PLACED OVER THE FULL WIDTH OF THE SECTION. AGGREGATE BASE AND SUB-BASE COURSES MAY BE PLACED UPON FROZEN SURFACES WHEN SUCH SURFACES HAVE BEEN PROPERLY CONSTRUCTED.

THE SURFACE OF EACH LAYER SHALL BE MAINTAINED DURING COMPACTION OPERATIONS IN SUCH A MANNER THAT A UNIFORM TEXTURE IS PRODUCED AND THE AGGREGATE IS FIRMLY KEYED. THE MOISTURE CONTENT OF THE MATERIAL SHALL BE MAINTAINED AT THE PROPER PERCENTAGE TO ATTAIN THE REQUIRED COMPACTION AND STABILITY. COMPACTION OF EACH LAYER SHALL BE CONTINUED UNTIL DENSITY OF NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557 "MODIFIED PROCTOR DENSITY" HAS BEEN ACHIEVED FOR THE FULL WIDTH AND DEPTH OF EACH LAYER AS APPLIED.

THE SURFACE TOLERANCE OF EACH BASE COURSE AS APPLIED SHALL BE 3/8 INCHES ABOVE OR BELOW THE REQUIRED TEMPLATE LINES.

2. AGGREGATE FOR SUB-BASE

AGGREGATE FOR SUB-BASE SHALL BE TYPE "D" (MDOT). IT SHALL BE FREE FROM VEGETABLE MATTER, LUMPS OR BALLS OF CLAY AND OTHER DELETERIOUS SUBSTANCES. SEE CHART ABOVE FOR TYPE "D" SIEVE DESIGNATION.

3. COMMON BORROW

COMMON BORROW SHALL CONSIST OF EARTH, SUITABLE FOR EMBANKMENT CONSTRUCTION. IT SHALL BE FREE FROM FROZEN MATERIAL, PERISHABLE RUBBISH, PEAT AND OTHER UNSUITABLE MATERIAL.

THE MOISTURE CONTENT SHALL BE SUFFICIENT TO PROVIDE THE REQUIRED COMPACTION AND STABLE EMBANKMENT. IN NO CASE SHALL THE MOISTURE CONTENT EXCEED 4 PERCENT ABOVE OPTIMUM.

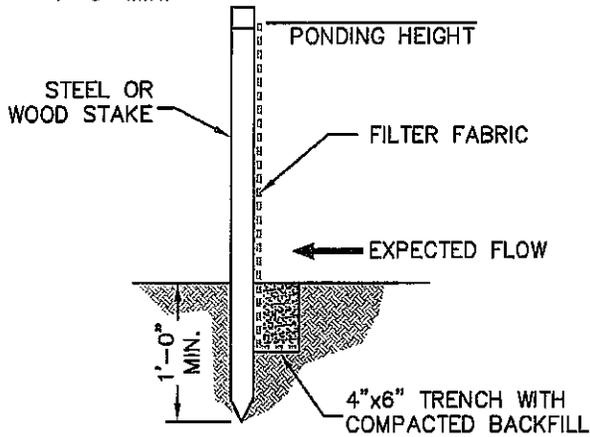
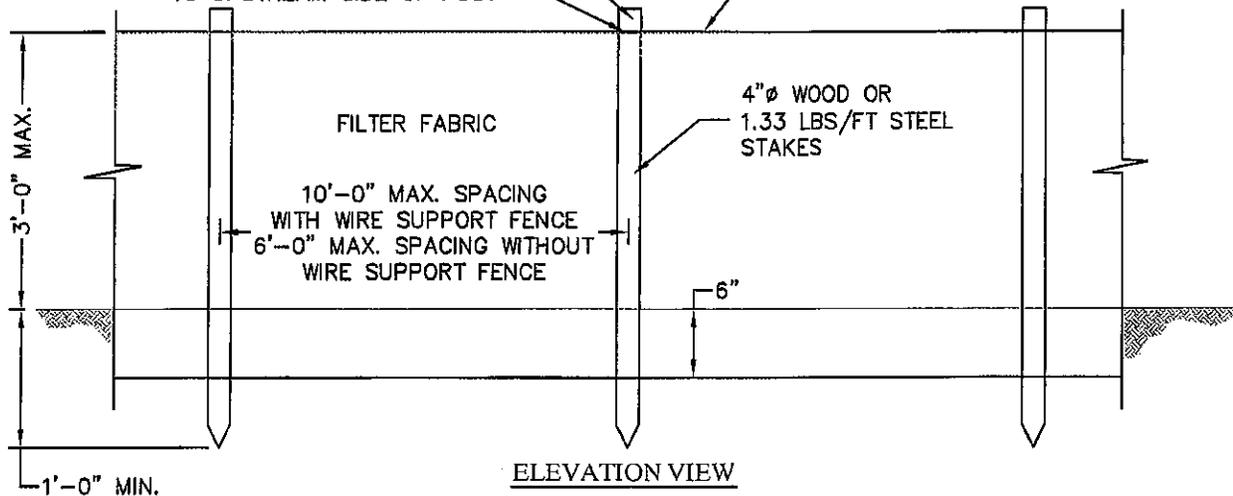
4. STRUCTURAL BACKFILL

STRUCTURAL BACKFILL CONFORMING TO MDOT 703.20 SHALL BE UTILIZED IN THE ABSENCE OF GEOTECHNICAL REPORT RECOMMENDATIONS FOR FILL BELOW AND ADVANCE TO FOUNDATIONS, FOOTINGS AND SLABS. PROVIDE DEWATERING AND PERMANENT DRAINS WHERE INDICATED. COMPACT ALL STRUCTURAL BACKFILL TO 95% MODIFIED PROCTOR DENSITY. PLACE STRUCTURAL BACKFILL IN LIFTS OF 10"-12" MAXIMUM DEPTH.

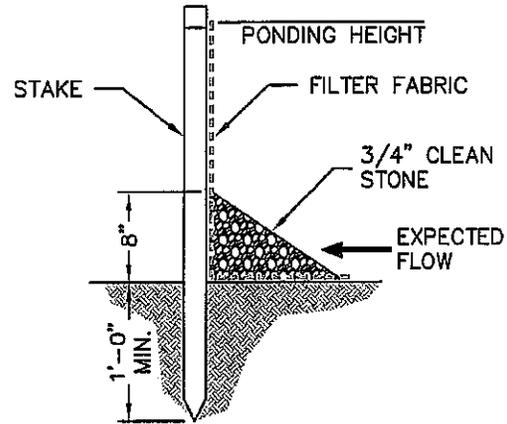
IF PONDING IS ANTICIPATED OR OCCURS
DOUBLE NUMBER OF STAKES FOR SUPPORT

ATTACH FILTER FABRIC SECURELY
TO UPSTREAM SIDE OF POST

EXTRA STRENGTH FILTER FABRIC
NEEDED UNLESS WIRE MESH SUPPORT
IS PROVIDED



TYPICAL INSTALLATION:
SECTION VIEW



INSTALLATION WITHOUT TRENCHING
OVER FROZEN GROUND OR HEAVY ROOTS:
SECTION VIEW

NOTES:

PREFABRICATED SILT FENCE IS ACCEPTABLE IF INSTALLED PER MANUFACTURER'S INSTRUCTIONS.

SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.

INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.
MAXIMUM RECOMMENDED SEDIMENT STORAGE HEIGHT IS 9".

REMOVED SEDIMENT SHALL BE DEPOSITED IN AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.

SHOULD THE SILT FENCE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL IS NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.

DO NOT PLACE SILT FENCE IN STREAMS OR CONCENTRATED FLOW CONDITIONS.

SILT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UP SLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

SILT FENCE DETAIL

NO SCALE

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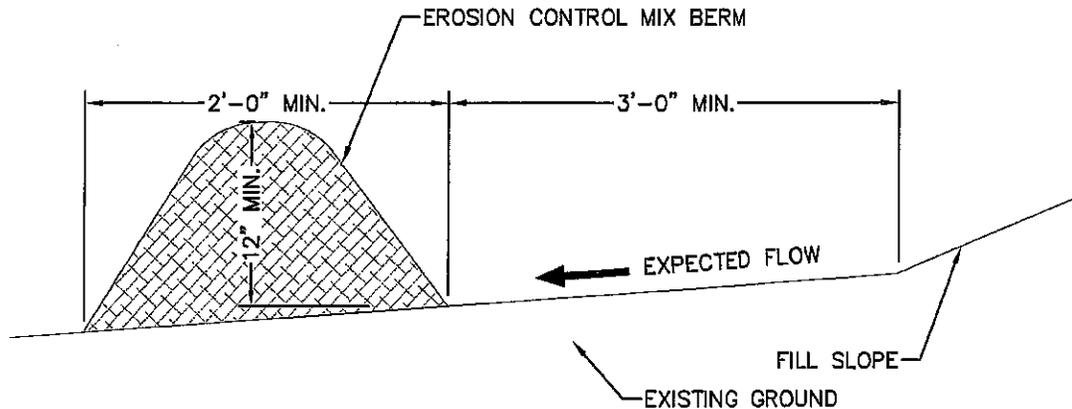
DAVIS ROAD - CIVIL DETAILS & SPECIFICATIONS

UNION, MAINE

AUGUST 11, 2014

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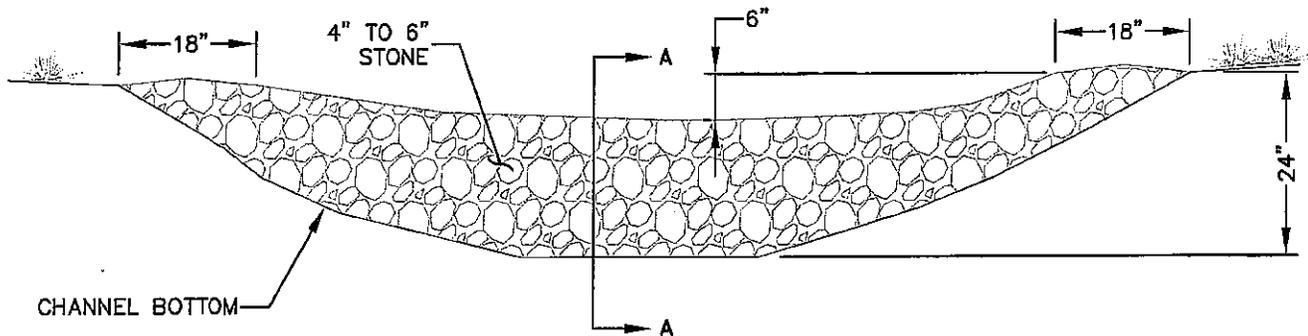


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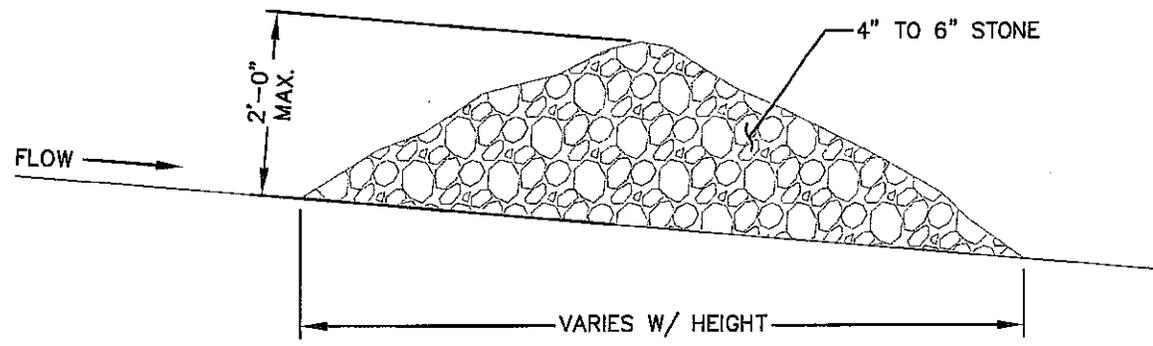
1. THE EROSION CONTROL MIX BERM SHALL CONSIST PRIMARILY OF ORGANIC MATERIAL INCLUDING SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR ACCEPTABLE MANUFACTURED PRODUCTS. WOOD OR BARK CHIPS, GROUND CONSTRUCTION DEBRIS, REPROCESSED WOOD PRODUCTS, REFUSE, PHYSICAL CONTAMINANTS, OR MATERIALS TOXIC TO PLANT GROWTH ARE NOT ACCEPTABLE.
2. THE MIX SHALL CONFORM TO THE FOLLOWING STANDARDS:
 - A. ORGANIC CONTENT: 80% TO 100% (DRY WEIGHT)
 - B. PARTICLE SIZE BY WEIGHT: 100% PASSING 6" SCREEN, 70%-85% PASSING ¾" SCREEN
 - C. ORGANIC CONTENT SHALL BE FIBROUS AND ELONGATED
 - D. NO STONES LARGER THAN 4" IN DIAMETER
 - E. NO LARGE PORTIONS OF SILTS, CLAYS, OR FINE SANDS
 - F. SOLUBLE SALTS CONTENT SHALL BE LESS THAN 4.0 mmhos/cm
 - G. pH SHALL BE BETWEEN 5.0 AND 8.0
3. THE COMPOSTED BERM SHALL BE PLACED, UNCOMPACTED, ALONG A RELATIVELY LEVEL CONTOUR.

EROSION CONTROL MIX BERM

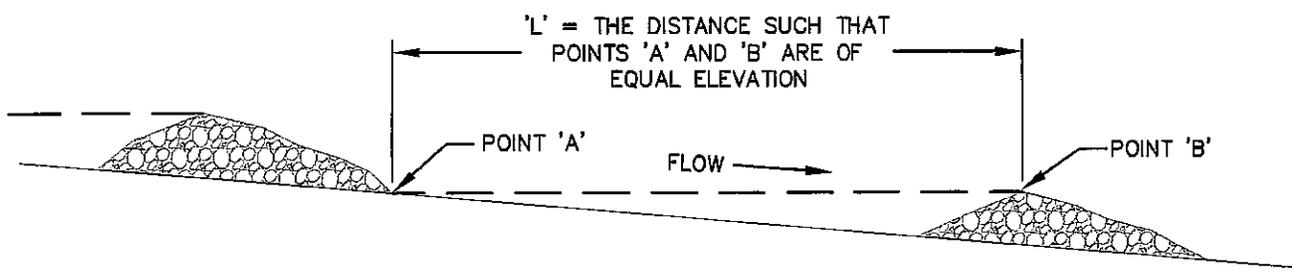
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VIEW LOOKING UPSTREAM



SECTION A-A



SPACING BETWEEN CHECK DAMS

NOTES:

1. CHECK DAMS SHALL BE INSTALLED IMMEDIATELY AFTER ROUGH GRADING OF THE DITCH.
2. CHECK DAMS SHALL BE CHECKED FOR SEDIMENT ACCUMULATION AFTER EACH SIGNIFICANT RAINFALL. SEDIMENT SHALL BE REMOVED BEFORE IT REACHES ONE HALF OF THE ORIGINAL HEIGHT OF THE DAM. REGULAR INSPECTION SHALL BE MADE TO INSURE THAT THE CENTER OF THE DAM IS LOWER THAN THE EDGES. EROSION CAUSED BY HIGH FLOWS AROUND THE EDGES OF THE DAM SHALL BE CORRECTED IMMEDIATELY.
3. IN PERMANENT DITCHES, CHECK DAMS MAY BE LEFT IN PLACE PERMANENTLY, OR THE MATERIAL MAY BE SPREAD EVENLY ALONG THE DITCH INVERT.
4. IN GRASS-LINED CHANNELS THAT WILL BE MOWED, CHECK DAMS SHALL BE REMOVED AFTER GRASS HAS BEEN ESTABLISHED. THE DISTURBED AREA BENEATH THE DAM SHALL IMMEDIATELY BE SEEDING AND MULCHED.

STONE CHECK DAM

NO SCALE

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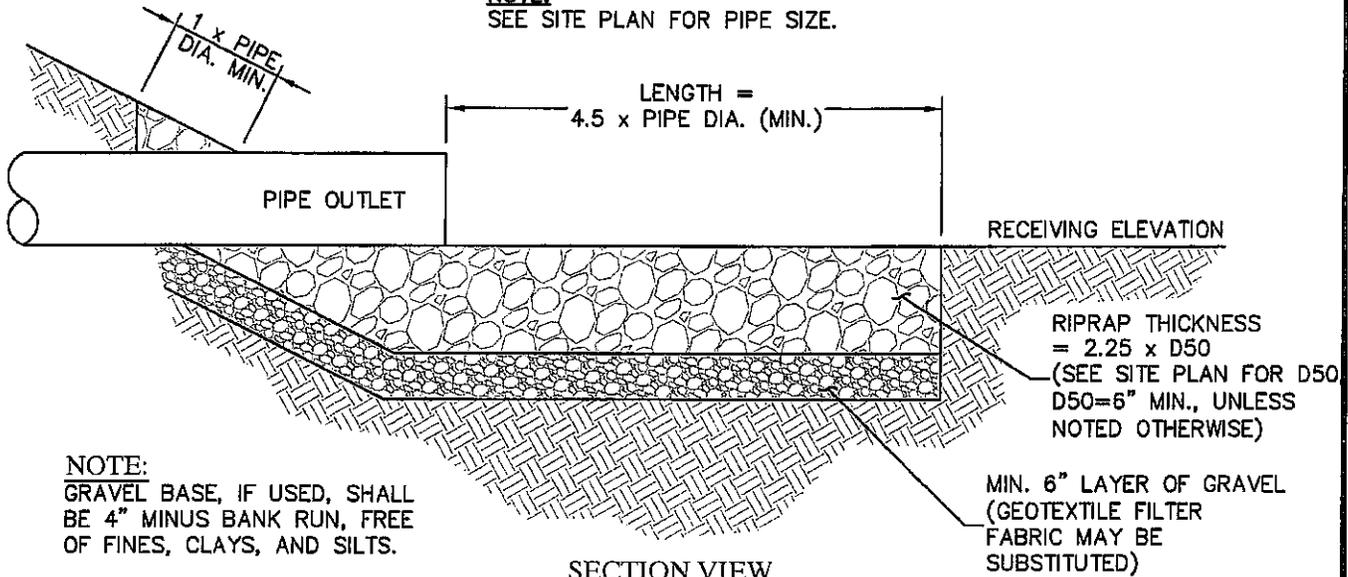
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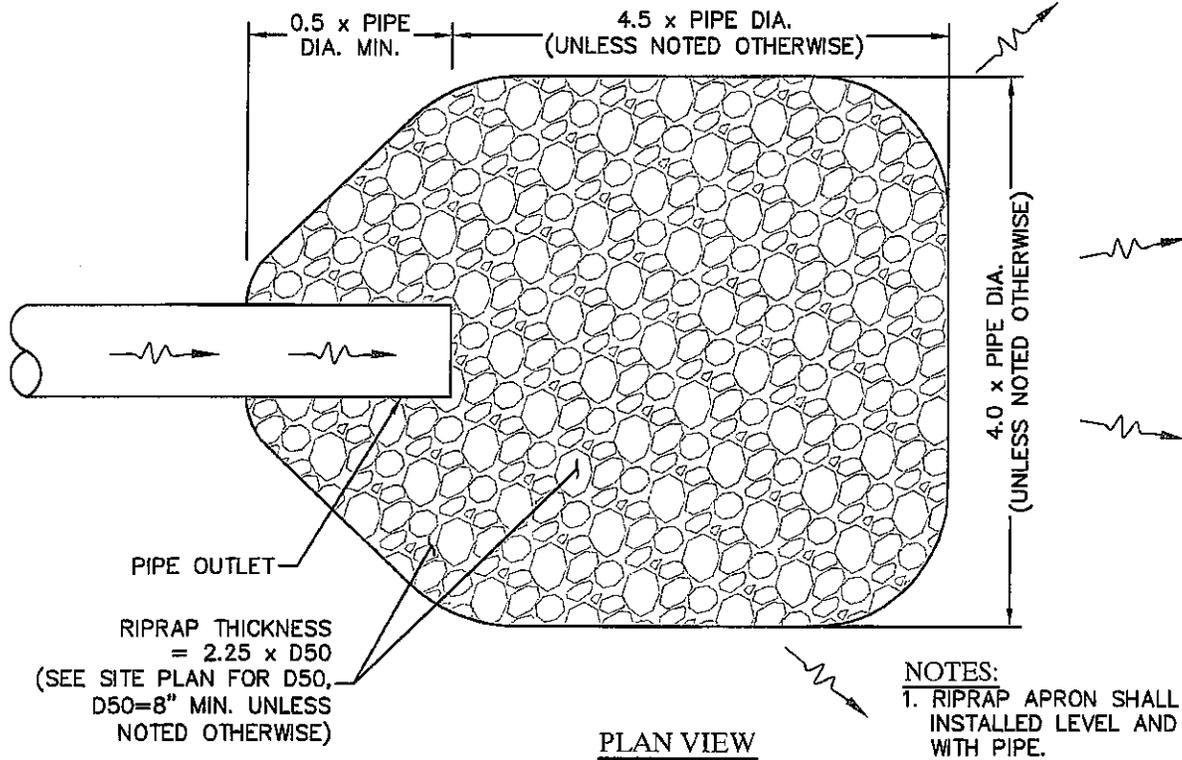
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NOTE:
SEE SITE PLAN FOR PIPE SIZE.



SECTION VIEW



PLAN VIEW

- NOTES:**
1. RIPRAP APRON SHALL BE INSTALLED LEVEL AND IN LINE WITH PIPE.
 2. IN DEFINED CHANNELS, APRON SHALL EXTEND FULL WIDTH OF BOTTOM AND ONE FOOT ABOVE MAX. TAILWATER OR UP TO BANK FULL, WHICHEVER IS LESS.

RIPRAP APRON
NO SCALE

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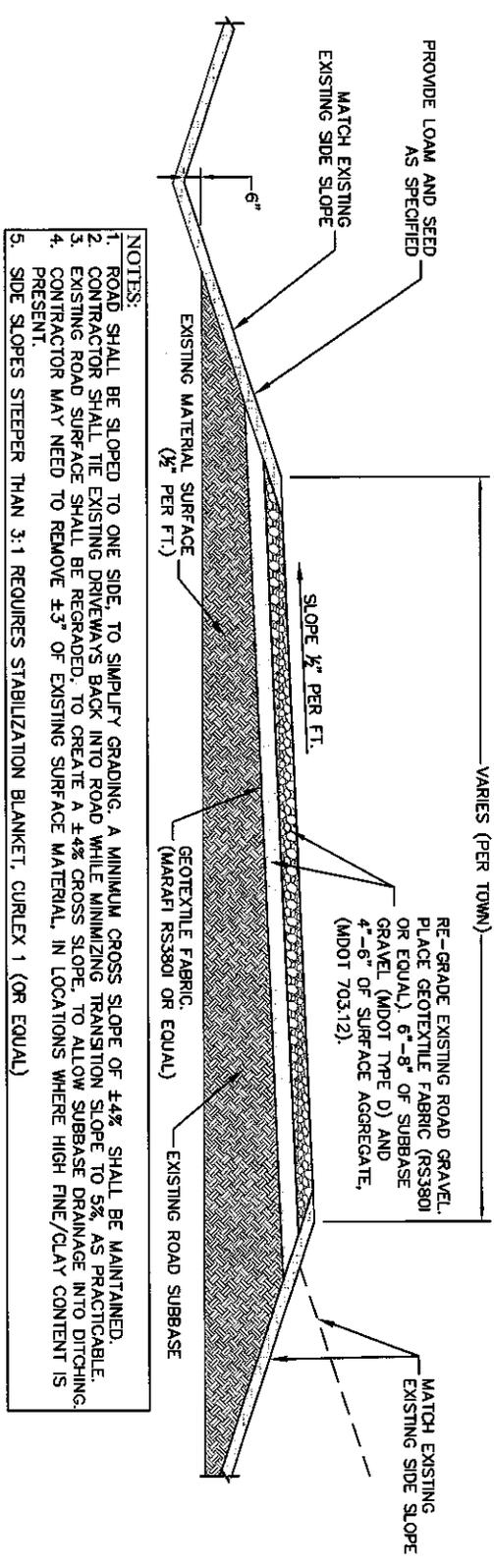
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AUGUST 11, 2014

PROJ. NO. 2014-214

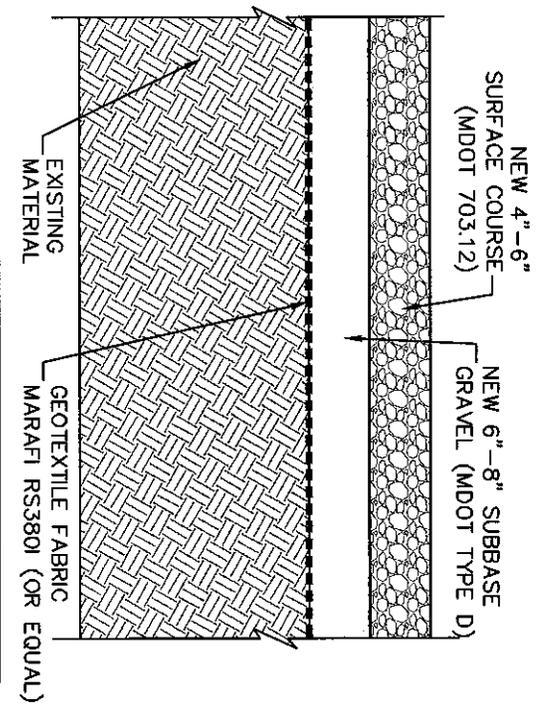
D-6



- NOTES:
1. ROAD SHALL BE SLOPED TO ONE SIDE TO SIMPLY GRADING. A MINIMUM CROSS SLOPE OF 4% SHALL BE MAINTAINED.
 2. CONTRACTOR SHALL TIE EXISTING DRIVEWAYS BACK INTO ROAD WHILE MINIMIZING TRANSITION SLOPE TO 5% AS PRACTICABLE.
 3. EXISTING ROAD SURFACE SHALL BE REGRADED TO CREATE A 4-4% CROSS SLOPE TO ALLOW SUBBASE DRAINAGE INTO DITCHING.
 4. CONTRACTOR MAY NEED TO REMOVE ±3" OF EXISTING SURFACE MATERIAL IN LOCATIONS WHERE HIGH FINE/CLAY CONTENT IS PRESENT.
 5. SIDE SLOPES STEEPER THAN 3:1 REQUIRES STABILIZATION BLANKET, CURLEX 1 (OR EQUAL)

TYPICAL GRAVEL ROAD SECTION

SCALE: 3/16" = 1'-0"



ALL STRUCTURAL FILL SHALL BE COMPACTED TO 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557 "MODIFIED PROCTOR DENSITY" IN 6"-8" LIFTS.

TYPICAL GRAVEL ROAD SECTION

SCALE 1" = 1'-0"

SURFACE AGGREGATE
(MDOT 703.12)

SIEVE DESIGNATION	% WEIGHT PASSING SQUARE MESH SIEVES
1"	100
3/4"	60-90
1/2"	10-35
3/8"	2-15
No. 4	0-5

DAVIS ROAD - CIVIL DETAILS & SPECIFICATIONS
UNION, MAINE

AUGUST 12, 2014

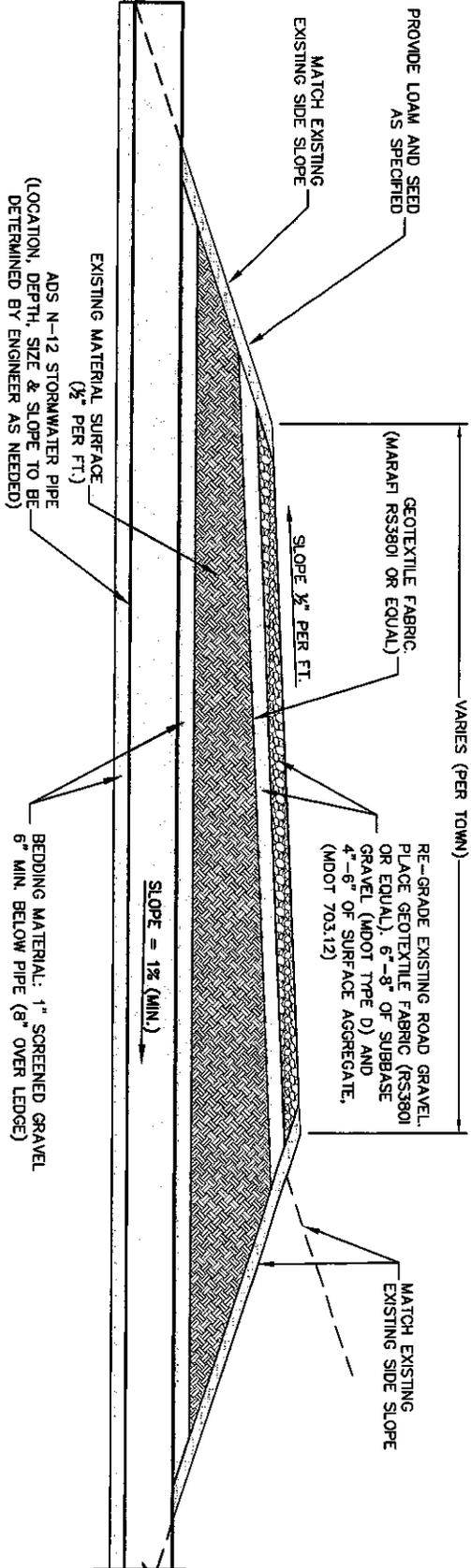
PROJ. NO. 2014-214

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Gartley & Dorsky
ENGINEERING SURVEYING

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11/11/2014 10:00 AM 10/11/2014 10:00 AM 10/11/2014 10:00 AM 10/11/2014 10:00 AM 10/11/2014 10:00 AM



- NOTES:**
1. ROAD SHALL BE SLOPED TO ONE SIDE, TO SIMPLIFY GRADING. A MINIMUM CROSS SLOPE OF $\pm 4\%$ SHALL BE MAINTAINED.
 2. CONTRACTOR SHALL THE EXISTING DRIVEWAYS BACK INTO ROAD WHILE MINIMIZING TRANSITION SLOPE TO 5% AS PRACTICABLE.
 3. EXISTING ROAD SURFACE SHALL BE REGRADED, TO CREATE A $\pm 4\%$ CROSS SLOPE, TO ALLOW SUBBASE DRAINAGE INTO DITCHING.
 4. CONTRACTOR MAY NEED TO REMOVE $\pm 3"$ OF EXISTING SURFACE MATERIAL, IN LOCATIONS WHERE HIGH FINE/CLAY CONTENT IS PRESENT.
 5. SIDE SLOPES STEEPER THAN 3:1 REQUIRES STABILIZATION BLANKET, CURLEX 1 (OR EQUAL).
 6. ROAD SIDE DITCHING MAY NEED TO BE REGRADED TO ENSURE PROPER DRAINAGE.
 7. CULVERT LOCATIONS TO BE FIELD DETERMINED AS NEEDED.

**TYPICAL GRAVEL ROAD
SECTION WITH CULVERT**

SCALE: $3/16" = 1'-0"$

SURFACE AGGREGATE (MDOT 703.12)	
SIEVE DESIGNATION	% WEIGHT PASSING SQUARE MESH SIEVES
1"	100
$3/4"$	60-90
$1/2"$	10-35
$3/8"$	2-15
No. 4	0-5

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DAVIS ROAD - CIVIL DETAILS & SPECIFICATIONS
UNION, MAINE

AUGUST 12, 2014

PROJ. NO. 2014-214

D-8

SECTION 01 35 43 - ENVIRONMENTAL PROCEDURES

PART 1 GENERAL

1.1 DEFINITIONS OF CONTAMINANTS

- A. Sediment: Soil and other debris that has been eroded and transported by runoff water.
- B. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from construction activity.
- C. Chemical Wastes: Includes salts, acids, alkalis, herbicides, pesticides, and organic chemicals.
- D. Sanitary Wastes: Wastes characterized as domestic sanitary sewage.

1.2 ENVIRONMENTAL PROTECTION REQUIREMENTS

Contractor is advised that the project is subject to municipal standards and the standards of Maine Department of Environmental Protection Erosion and Sedimentation Control Law permit requirements (MRSA 38 § 420-C). Provide and maintain during the life of the Contract, environmental protection as defined herein. Provide environmental protective measures as required to prevent or control pollution that develops during normal construction practice. Provide environmental protection measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Prevent unauthorized placement of fill, any material, or any unauthorized disturbance of any natural resource. Comply with all federal, state, and local regulations pertaining to water, air, and noise pollution.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

The natural resources within the project boundaries and outside the limits of permanent work performed under this contract. No wetland shall be disturbed. Other natural areas shall be preserved in their existing condition or restored to an equivalent or improved condition upon completion of the work. Confine construction activities to areas defined by the work schedule, drawings, and specifications.

- A. Land Resources: Except in areas indicated to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without special approval of the owner's

representative. Do not fasten or attach ropes, cables, or guys to any existing nearby trees for anchorages unless specifically authorized. Where such special emergency use is authorized, the Contractor shall be responsible for any resultant damage.

1. Protection: Protect existing trees that are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operators. Remove displaced rocks from uncleared areas. Protect monuments and markers.
 2. Repair and Restoration: Repair or restore to their original condition all trees or other landscape features scarred or damaged by the equipment operations. Obtain approval of the repair or restoration from the Engineer prior to its initiation.
 3. Temporary Construction: Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and all other vestiges of construction. Temporary roads, parking areas, and similar temporary use areas shall be graded in conformance with surrounding areas and revegetated, seeded, or sodded as required by the plans.
- B. Water Resources: Perform all work in such a manner that any adverse environmental impact on water resources is avoided. Storage of hydraulic fluid is not permitted on-site. Quantities of bulk materials shall be reduced to a level acceptable to the owner's representative.

3.2 EROSION AND SEDIMENT CONTROL MEASURES

- A. Burn-off: Burn-off of ground cover is not permitted.
- B. Protection of Erodible Soils: All earthwork brought to final grade shall be immediately finished as indicated or specified. Protect immediately side slopes and backslopes upon completion of rough grading. Plan and conduct all earthwork in such a manner as to minimize the duration of exposure of unprotected soils, and in no case shall exposure exceed 7 days. Consult weather forecasts prior to exposing large areas of soil. Check erosion control measures before forecasted major storm events.
- C. Temporary Protection to Erodible Soils: Utilize the following methods to prevent erosion and control sedimentation.
 1. Vegetation and Mulch: Provide temporary protection on all side and back slopes as soon as rough grading is completed or sufficient soil is exposed to require protection to prevent erosion. Such protection shall be by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch

in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

3.3 CONTROL AND DISPOSAL OF SOLID, CHEMICAL AND SANITARY WASTES

Pick up solid wastes and place in containers that are emptied on a regular schedule. The preparation, cooking and disposing of food is strictly prohibited on the project site. Conduct handling and disposal of wastes to prevent contamination of the site and other areas. On completion, leave areas clean and natural looking. Remove signs of temporary construction and activities incidental to construction of permanent work in place

- A. Disposal of Rubbish, Garbage, and Debris: Dispose of rubbish, garbage and debris in accordance with the requirements specified herein.
- B. Sewage, Odor, and Pest Control: Dispose of sewage through chemical toilets or comparable effective units and periodically empty wastes. Include provisions for pest control and elimination of odors.
- C. Petroleum Products: Conduct fueling and lubricating of equipment and motor vehicles in a manner that affords the maximum protection against spills and evaporation. Dispose of lubricants to be discarded and excess oil in accordance with approved procedures meeting federal, state and local regulations.

3.4 DUST CONTROL

Keep dust down at all times, including nonworking hours, weekends, and holidays. Sprinkle or treat with dust suppressers, the soil at the site, haul roads, and other areas disturbed by operations. Petroleum products will not be used as suppressers. No dry power brooming is permitted. Instead use vacuuming, wet mopping, wet sweeping, or wet power brooming.

3.5 NOISE

No blasting or use of explosives is permitted without written permission of the owner's representative and then only during designated times.

END OF SECTION 01 35 43

SECTION 31 05 13 SOILS FOR EARTHWORK

PART 1 GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Provide, place and compact borrow and bedding material in authorized excavation(s) below normal depth and in other location(s) as shown on the Drawings and/or as specified herein.

B. Related Work Specified Elsewhere:

1. Trench Excavation - Earth, Trench Excavation - Ledge, Trench Backfilling, Compaction, Control and Testing are specified in the appropriate sections in this division.

PART 2 PRODUCTS

2.1 MATERIALS

All materials shall be applicable as specified in owner's geotechnical report. Utilize materials specified in the geotechnical report in all applicable locations. Materials otherwise not specified in owner's geotechnical report shall conform to the following minimum standards:

A. Gravel Borrow:

1. Well graded granular material having no rocks with a maximum dimension over 6-inches, except where it is used for pipe bedding in which case the maximum size shall be 2-inches.
2. Free from frozen material and other unsuitable material.
3. That portion passing a three inch square mesh sieve shall contain not more than 70 percent passing a 1/4 inch mesh sieve and not more than 10 percent passing a number 200 mesh sieve when used as pipe bedding material and not more than 5 percent passing a number 200 mesh sieve when used as backfill around structures.

B. Screened Stone (Bedding Material):

1. Shall be either screened stone or crushed stone and shall be well graded in size from 1/4 inch to 3/4 inch.
2. Clean, hard, and durable particles or fragments.
3. Free from dirt, vegetable, or other objectionable matter, and excess of soft, thin elongated, laminated or disintegrated pieces.

4. Sieve Analysis:

Sieve Designation	% Passing by Weight Square Opening
1"	100
3/4"	90-100
3/8"	20-50
No. 4	0-10
No. 8	0-5

C. Sand:

1. Clean, hard and durable particles or fragments.

2. Sieve Analysis:

Sieve Designation	% Passing by Weight Square Opening
3/8"	100
No. 4	95-100
No. 16	50-85
No. 50	10-30
No. 100	2-10

D. Underdrain Backfill Material:

1. Free from organic matter.

2. Gradations:

Sieve Designation	% by Weight Passing Square Mesh Sieves
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Type "B" Underdrain:

1 inch	95-100
1/2 inch	75-100
No. 4	50-100
No. 20	15-80
No. 50	0-15
No. 100	0-10

Sieve Designation	% by Weight Passing Square Mesh Sieves
-------------------	--

Type "C" Underdrain:

1 inch	100
3/4 inch	90-100
3/8 inch	0-75
No. 4	0-25
No. 10	0-5

Filter Fabric Lined Trench: 3"-6" coarse aggregate.
 Filter fabric in accordance with SECTION 31 32 19.23.

3. Shall conform to AASHTO T 27

- E. French Drain Stone:
1. Hard, durable rock.
 2. Gradations:

Sieve Designation	% by Weight Passing Square Mesh Sieves
6 inch	90-100
1½ inch	0-40
No. 4	0-5
 3. Shall conform to AASHTO T 27 except that the total material sampled shall be sieved and the minimum weight of the sample will be 120 pounds.
- F. ¾"-Crushed Stone: Crushed Stone shall be a uniform material, containing angular pieces, as are those which come from a mechanical crusher. Gradation requirements shall be as follows:
- | Sieve Designation | % by Weight Passing Square Mesh Sieve |
|-------------------|---------------------------------------|
| 1" | 98-100 |
| ¾" | 0-30 |
| No. 200 | 0-3 |
- G. Impervious Dam Material: As applicable, impervious dam material shall be uniform natural or selected cohesive soil with minimum of 30 percent of the material passing a No. 200 sieve. It shall not contain vegetation, masses of roots, individual roots larger than 12 in. long or 1/2 in. in diameter or other porous or organic matter.
- H. Unsuitable Soil Materials: Shall be those defined in AASHTO M145, soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7; also, peat and other highly organic soils.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Place bedding material, initial backfill, impervious dam material and fill below pipe bedding in layers of uniform thickness as specified or shown on the Drawings. Maximum lift thickness shall be as specified or shown on the drawings, but not greater than 12 inches.
- B. Thoroughly compact each layer by means of a suitable vibrator or mechanical tamper. Conform to the requirements of the geotechnical report, but in no case shall compaction be less than 95 percent of the fill material's maximum dry density determined in accordance with ASTM D1557.
- C. In excavations below normal depth or where unsuitable materials are excavated, gravel borrow shall be used unless ground water makes such usage not practical; if such is the case, then screened stone shall be used.

- D. No stone 2" in diameter or larger shall be allowed within 6 inches of the pipe.
- E. Where soft silt and clay soils are encountered the trench shall be excavated 6 inches below the normal bedding and backfilled with 6-inches of compacted sand.
- F. No stone or rock greater than 12 inches measured at any point shall be placed in the trench backfill.
- G. Bed from specified depth below pipe to top of pipe to support pipe and prevent damage. Unless otherwise specified in plan, detail, or applicable section, the following schedule gives the minimum bedding requirements for various types of pipe. Dimensions refer to distance below bottom of pipe.

D.I. Pipe	6 inches min. gravel borrow.
Concrete pipe	6 inches min. gravel borrow.
Culverts and Storm Drain Pipe	6 inches min. gravel borrow.
PVC or ABS Pipe	6 inches min. screened stone.
P.E. Pipe	6 inches min. screened stone.

- H. Unless otherwise specified in plan, detail, or applicable section, the following schedule gives the minimum initial backfill requirements for various types of pipes.

D.I. Pipe	Gravel borrow; 6 inches min. over top of pipe.
Concrete Pipe	Gravel borrow; 6 inches min. over top of pipe.
Culverts and Storm Drain Pipe	Gravel borrow; 6 inches min. over top of pipe.
PVC or ABS	Screened stone; 6 inches min. over the top of the pipe.
P.E. Pipe	Screened stone; 6 inches min. over the top of the pipe.

END OF SECTION 31 05 13

SECTION 31 05 16 – AGGREGATES FOR EARTHWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Building perimeter construction and backfilling, pond embankment construction and site structure backfilling.
- B. Fill under slabs-on-grade.
- C. Consolidation and compaction.

1.2 RELATED SECTIONS

- A. Section 31 23 16 - Excavation.

1.3 REFERENCES

- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 kg) Rammer and 12 inch (304.8 mm) Drop.
- C. ASTM D922 - Test Method for Density of Soil and Soil Aggregate in Place by the Nuclear Methods. (Shallow Depth)
- D. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

PART 2 - PRODUCTS

2.1 FILL MATERIAL (as applicable)

- A. Common Borrow: MDOT 703.18: (Only for site construction - not for building construction). Place and compact materials in continuous layers not exceeding 8 inches of compacted depth, compacted to 95 percent of its maximum dry density, in accordance with ASTM D1557 (modified proctor density).
- B. Structural Backfill: Furnish in accordance with geotechnical report or specific plan requirements. Gravel Borrow: as specified in the geotechnical report, these plans, or MDOT 703.20: Place at over excavations below slabs and footings. Place over native material after organic soils are removed to raise subgrade below slabs and footings. Utilize per Geotechnical Report, as applicable. As a minimum, construct a 12" layer in a single 12" lift or lifts, and compacted to 95% of its

maximum dry density, in accordance with ASTM D1557 (modified proctor density). In the case of footings set higher than original grade of competent mineral soil, first compact native material, use structural backfill to establish and compact fill slopes at 1:1 slopes from the edges of footings (entire backfill areas for retaining walls).

- C. Granular Backfill: Per MDOT 703.22 for utility excavations and backfilling operations.
- D. Crushed Stone: Per MDOT 703.31 for utility excavations and backfilling operations, except that 100% shall pass the 2" sieve.
- E. Detention Pond Embankment: Excavated or imported clay silt material, graded, free of lumps larger than 3 inches, rocks larger than 2 inches, and debris. Material shall have at least 20% fines, more than 20% by weight passing the No. 200 sieve, and shall be compacted to a minimum of 95% modified proctor density in 9-12" maximum lifts. The contractor may utilize glacial marine soil excavated on site with the approval of the owner's representative.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify fill materials to be reused are acceptable.
- B. Owner's designated representative shall observe the excavation and accept suitable borrow material for placement as pond embankment material. Sandy layers shall be excluded from use as embankment fill.
- C. Verify foundation perimeter drainage installation has been inspected.

3.2 PREPARATION

- A. Generally, compact subgrade to density requirements for subsequent backfill materials. The foundation and slab base soil should be placed directly on the existing proof-rolled native mineral soil. Proof rolling should consist of making 3 passes in a north-south direction followed by 3 passes in an east-west direction using a large (minimum 3 ton at drum static weight) vibratory roller in slab areas and narrow roller vibratory trench rollers at footings (all passes in same direction).
- B. Cut out soft areas of subgrade not capable of insitu compaction. Fill and compact to density equal to or greater than requirements for subsequent backfill material.

3.3 BACKFILLING

- A. Backfill and compact areas to contours and elevations with unfrozen materials.
- B. Backfill and compact where footing elevations are higher than suitable native mineral soil with structural backfill below and at 1:1 slope from edge of footing (level for retaining walls). Structural fill should be placed in a maximum of 12-inch lifts and be compacted to 95 percent of its maximum dry density determined in accordance with ASTM D1557, Modified Proctor Density
- C. Backfill and compact pond embankment areas as early as possible to allow maximum time for settlement before shaping overflow structures.
- D. Systematically backfill and compact to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces. Work shall be scheduled so that the pond embankment shall be constructed 3 months prior to final setting of elevation sensitive components, such as the emergency spillway, allowing maximum time for settlement to occur.
- E. Place and compact materials in continuous layers not exceeding 6 inches compacted depth. Pond Embankment requirements: Pond embankment sections shall be constructed from 8 to 12 inch lifts. At each lift, a bulldozer or similar equipment shall mechanically break down clods of clay-silt material as each lift is shaped. The owner's representative shall verify that no sand layers remain in each lift. Unsuitable material shall be replaced. Each lift shall be compacted with a sheepsfoot roller to 90% modified proctor density. Water shall be added as may be required to reach compaction.
- F. Employ a placement method that does not disturb or damage foundation perimeter drainage, foundation damp proofing, and utilities in trenches.
- G. Maintain optimum moisture content of backfill materials to attain required compaction density.
- H. Make changes gradual. Blend slope into level areas.
- I. Remove surplus backfill materials from site.

3.4 FIELD QUALITY CONTROL

- A. Compaction testing will be performed in accordance with ANSI/ASTM D1556, ANSI/ASTM D1557, and ANSI/ASTM D698.
- B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.5 PROTECTION OF FINISHED WORK

- A. Re-compact fills subjected to vehicular traffic. Place and compact additional material of like kind and to equal compaction to re-establish suitable finished or subgrade.

END OF SECTION 31 05 16

SECTION 31 23 16 - EXCAVATION

1 PART 1 GENERAL

1.1 DESCRIPTION

A. Perform the following items of work, as shown on the Drawings and specified herein:

1. Do all excavating and furnish all material necessary for embankment construction, as required to complete the work of this Contract, including the furnishing and compaction of additional material as needed.
2. Completely remove from the site all excavated material which is not approved by the Engineer for use as embankment material. This provision does not apply to topsoil which will remain the property of the Owner.
3. Establish subgrades as indicated on the Drawings and specified hereunder.
4. Perform cutting and removal of existing pavements to the extent indicated on the Drawings and as required for the work under this Contract.
5. Protect all trees, shrubs and plantings not designated on the Drawings to be removed, for the duration of the Contract.
6. Protect all utilities on the site for the duration of the work.

B. Related Work Specified Elsewhere:

1. Quality Control

1.2 DEFINITIONS

A. The work involved includes removal, haul and disposal of materials to prepare for construction and the placing and compaction of material to construct embankments.

B. Excavation shall be designated as common, rock, unclassified or muck.

1. Common excavation shall consist of removal of earth, of boulders, solid mortared stone masonry and concrete masonry when each is less than two cubic yard in volume and of rock which can be removed with ordinary excavating machinery. Grubbing shall be considered as common excavation.
2. Rock excavation shall consist of removal of solid rock which cannot be excavated without the use of explosives or ripping equipment and of boulders, solid mortared stone masonry and concrete masonry having a volume of two cubic yard or more.
3. Unclassified excavation shall consist of removal of materials without consideration to their composition.

4. Muck excavation shall consist of excavation of soils and organic materials which are not suitable for use in embankment.
- C. Embankment construction shall consist of constructing roadway embankments, including preparation of the areas upon which they are to be placed; site grading around buildings and structures; the construction of parking areas, lawns, berms, and dikes; the placing and compacting of approved material within areas where unsuitable material has been removed; and the placing and compacting of embankment material in holes, pits and other depressions within the roadway area or construction site limits.
- D. Related Work Specified Elsewhere (When Applicable):
 1. Stripping and Stockpiling of Topsoil; Trench Excavation-Earth; Trench Excavation-Ledge; Borrow and Bedding Material; Trench Backfilling, Compaction, Control and Testing; Temporary Erosion Control and Dewatering are specified elsewhere in this division.

1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 1. All work shall be performed and completed in accordance with all local, state or federal regulations.
 2. The General Contractor shall secure all necessary permits from, and furnish proof of acceptance by, the local and state departments having jurisdiction and shall pay for all such permits, except as specifically stated elsewhere in the Contract Documents.
- B. Grade and Elevations:
 1. The Contractor shall establish the lines and grades in conformity with the Drawings and maintain same to properly perform the contract installation.
- C. Compaction:
 1. The Contractor shall compact all embankment materials in accordance with this specification.
 2. Density testing shall be performed by an Independent Testing Laboratory retained by the Owner and acceptable to the Engineer and Contractor.
 3. Independent Testing Laboratory shall determine in place densities in accordance with ASTM D1556 or other methods approved by the Engineer.

4. Independent Testing Laboratory shall submit one (1) copy of the following reports to each of the following: Engineer, Resident Project Representative, Contractor;
 - a. Test reports on material
 - b. Field density test reports
 - c. One moisture density curve for each type of soil encountered

5. Location of Tests: (OWNER WILL HANDLE ALL TESTING)
 - a. One test per 300 feet of completed roadway subgrade just prior to placement of subbase gravels and additional tests at depths as required by the Engineer.
 - b. Two tests on finished subgrade in parking area just prior to placing the subbase gravels and additional tests at depths as required by the Engineer.

6. If the test results fail to meet the requirements of these specifications, the Contractor shall correct the situation and obtain a passing test. The cost of reworking the material to obtain a passing test shall be borne by the Contractor and no allowance will be made for delays in the performance of the work. All testing and retesting shall be conducted by the Independent Testing laboratory. Costs of retesting will be paid by Owner. The cost of retesting will be determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price.

1.4 JOB CONDITIONS

A. Disposition of Utilities:

1. The locations of utilities shown on the plans are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warrants that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities within the project area.
2. Rules and regulations governing the respective utilities shall be observed in executing all work in this section. Active utilities shall be adequately protected from damage, and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged or capped. Report in writing to the Engineer, the locations of such abandoned utilities. Extreme care shall be taken when performing work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable. . If, in the progress of excavation, any utility should become damaged and result in any damage to public or private property, the

General Contractor shall restore to the original condition, at no additional cost to the Owner, anything which has been damaged or disturbed.

PART 2 PRODUCTS

2.1 DEFINITIONS OF GRAVEL, SAND, AND SILT CLAY

- A. The terms "gravel", "coarse sand," "fine sand" and "silt-clay," as determinable from the minimum test data required in this classification arrangement and as used in subsequent word descriptions, are defined as follows:
1. Gravel - Material passing sieve with 75 mm (3-inch) square openings and retained on the 2.00 mm (No. 10) sieve.
 2. Coarse Sand - Material passing the 2.00 mm (No. 10) sieve and retained on the 0.425 mm (No. 40) sieve.
 3. Fine Sand - Material passing the 0.425 mm (No. 40) sieve and retained on the 0.075 mm (No. 200) sieve.
 4. Silt-Clay (Combined silt and clay) - Material passing the 0.075 mm (No. 200) sieve.
 5. Boulders (retained on 75 mm (3-inch) sieve) should be excluded from the portion of the sample to which the classification is applied, but the percentage of such material, if any, in the sample should be recorded.
 6. The term "silty" is applied to fine material having plasticity index of 10 or less and the term "clayey" is applied to fine material having plasticity index of 11 or greater.

2.2 SOIL MATERIALS

- A. Use of Excavated Material:
1. To the extent they are needed, all suitable materials from the specified excavation may be used in the construction of required embankment and slope protective devices (riprap).
 2. Surplus excavated materials suitable for filling operations shall not be wasted, but will be stockpiled for future use as directed by the Engineer within the City's property. This specific location will be determined at the start of construction.
 3. Unsuitable material shall consist of grubbings or other materials which contain rock of size exceeding specifications, organic materials, or other materials of a deleterious nature as deemed by the Engineer. Silts, clays and granular materials with more than 8% passing the number 200 sieve shall be considered unsuitable for embankment in the Frost Penetration Zone under paved areas when sufficient water supply is available to cause heaving.
- B. Common borrow shall consist of approved material required for the construction of embankments or for other portions of the work as designated and shall be obtained from a source off-site, except as otherwise noted. Common borrow shall

be free from frozen material, clay, perishable rubbish, peat, organic and other deleterious materials.

- C. Gravel borrow shall be free of rocks with a maximum dimension over six inches, frozen material and other unsuitable material. That portion passing a three-inch square mesh sieve shall contain not more than 70% passing a 1/4 inch mesh sieve and not more than 10% passing a number 200 mesh sieve.
- D. Rock fill shall consist of rock for use in embankments which consists of hard durable particles broken to various sizes that will form a compact embankment with a minimum of voids. It shall contain no particles or fragments with a maximum dimension in excess of the compacted thickness of the layer being placed.
- E. Embankment material shall consist of suitable approved common excavation and/or common, or gravel borrow. Rock excavation may be used as embankment material if it is thoroughly mixed with common excavation and/or common borrow to eliminate voids.

PART 3 EXECUTION

3.1 SAFETY

- A. Comply with applicable local, state or federal safety regulations or in the absence thereof, with the provisions of the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc.
- B. Provide shoring, sheeting and/or bracing at excavations as required to prevent cave-ins of excavation, and to assure complete safety of existing structures, utilities and pavements that are to remain in place.
- C. Remove sheeting and shoring and bracing, as backfilling operations progress, taking all necessary precautions to prevent failure of excavation sides. Where sheeting is to be left in place, it shall not be within 2 feet of subgrade.

3.2 COMMON EXCAVATION

- A. The Contractor shall excavate material encountered to establish required grade elevations.
 - 1. Unauthorized Excavation:
 - a. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as

remedial work directed by the Engineer, shall be at the Contractor's expense.

- b. The Contractor shall backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.

2. Additional Excavation:

- a. When excavation has reached required subgrade elevations, notify the Engineer who will make an inspection of conditions.
 - b. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the Engineer.
 - c. Removal of unsuitable material and its replacement as directed will be paid on the basis of contract conditions relative to changes in work.
- B. Common excavation areas shall be maintained in such condition that the excavation will be well drained.
- C. Roadway excavation, in general, shall proceed in a direction upgrade. Subgrades shall be promptly rolled to prevent absorption of water.

3.3 EXCAVATION FOR UTILITY SERVICES

- A. Water, telephone, data, fire alarm, storm drainage, electric services, utility structures, sanitary sewer piping, manholes, and catch basins will be installed under the work of the respective Sections.

3.4 MINIMUM LIMITS FOR EARTH EXCAVATION

- A. Earth excavation must be carried to the following limits, unless otherwise indicated herein or on the drawings or authorized by the Engineer
 - 1. Subgrades for site work shall be as follows:
 - a. Areas to receive topsoil - Four (4) inches below finish grades.
 - b. Utility structures - Bottom of structure or as shown on the site details and eighteen (18) inches outside wall extremities.
 - c. On-site bituminous concrete paved surfaces, as noted on the Drawings.
 - d. Off-site paved areas, as noted on the Drawings.
 - e. Unspecified site improvements - To bottom elevation of item plus ample working space on all sides.

2. In non-specified areas - To the lines indicated on the Drawings plus proper side clearance for construction.

3.5 ROCK EXCAVATION

- A. In open excavations material will be classified as rock only when the following conditions prevail:
 1. When the natural compound, natural mixture, and/or chemical element cannot be broken and removed from its existing position and state by a 3/4-yard backhoe or D8 dozer and requires the use of drills, or the use of explosives.
 2. Boulders or old concrete foundations in excess of 2 cubic yards.
 3. Anything other is "earth" insofar as removal of the material to be excavated is concerned.
 4. NOTE: When during the process of excavation, rock is encountered such material shall be uncovered and exposed, and the Engineer shall be notified by the Contractor, before proceeding further. The areas in question shall then be measured as stipulated in paragraph B, following. The Contractor shall not proceed with excavation of material claimed as rock until the material has been classified by the Engineer. Should the Contractor proceed with the excavation without notifying the Engineer, or prior to the survey, he shall forfeit his right to extra payment in the subject area.
- B. The Contractor will provide qualified personnel, acceptable to both the Owner and the Engineer, to take cross-sections of rock before removal of same, and to provide computations of cross-sections within the payline limits.
- C. Excavate rock, encountered in grading areas within the contract, to depths as follows:
 1. Under pavements and surfaced areas - To six inches below the required subgrade for such areas.
 2. Under lawn areas - To two feet below finished grade, unless approved otherwise by the Engineer.
- D. Blasting - Obtain written permission and approval of method from the local authorities before proceeding with rock excavation. Explosives shall be stored, handled, and employed in accordance with the provisions of the "Manual of Accident Prevention in Construction: of the Associated General Contractors of America, Inc.

3.6 COLD WEATHER PROTECTION

- A. Protect excavations against freezing when atmospheric temperature is less than 35 degrees F.

3.7 COMPACTION

- A. General: Control soil compaction during construction to the satisfaction of the Engineer and/or Resident Project Representative by providing compaction to at least the minimum percentage of maximum density as specified for each area classification.
- B. Conform to the recommendations of the Owner's geotechnical report.
- C. Percentage of Maximum Density Requirements: Unless otherwise specified, compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship (determined in accordance with ASTM D1557) and to not less than the following percentages of relative dry density (determined in accordance with ASTM D2049) for soils which do not exhibit a well- defined moisture density relationship.
 - 1. Lawn or Vegetated Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material to 90 percent maximum dry density as determined by AASHTO T-180, Method C or D.
 - 2. Pavements: Compact top 12 inches of excavation subgrade and each layer of fill material to 95 percent maximum dry density as determined by AASHTO T-180, Method C or D.
- D. Moisture Control: Where subgrade or a layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material at a rate such that free water does not appear on surface during or subsequent to compaction operations.
- E. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
- F. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry.

3.8 EMBANKMENT

- A. Compaction Equipment
 - 1. Provide sufficient equipment units of suitable types to spread, level and compact fills promptly upon delivery of materials.
 - 2. The Contractor may use any compaction equipment or device which he finds convenient or economical, but the Engineer retains the right to

- disapprove equipment which, in his opinion, is of inadequate capacity or unsuited to character of material being compacted.
3. The Contractor shall be responsible for the proper placement and compaction of backfill material. Any settlement that occurs shall be repaired by the Contractor at his own cost and expense. If pipeline and/or structures are damaged or displaced, they shall be repaired at the Contractor's expense.
- B. Areas to be filled or backfilled shall be free of construction debris, refuse, compressible or decayable materials and standing water.
- C. Notify the Engineer when excavations are ready for inspection. Filling and backfilling shall not be started until conditions have been approved by the Engineer.
- D. Place acceptable soil materials in layers to required subgrade elevations, for each area classification listed below.
1. In excavations, use satisfactory excavated or borrow material.
 2. Under grassed areas, use satisfactory excavated or borrow material.
 3. Under pavements, use satisfactory excavated or borrow material or combination of both.
- E. Grub areas a depth of 12" where fills are to be less than five feet in depth as shown on the Drawings.
- F. When existing ground surface has a density less than that specified under "Compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
- G. Placement and Compaction: Place fill materials in layers no thicker than 10 inches.
- H. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification.
- I. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- J. Place backfill and fill materials evenly to required elevations adjacent to structures. Take care to prevent wedging action of fill against structures by carrying the material uniformly around structure to approximately the same elevation in each lift.
- K. When water and sewer piping is laid in filled areas, place the fill before any pipe is placed, and compact as specified to a depth or not more than two feet above the proposed top of the pipe. A trench shall then be excavated to the required grade,

and of sufficient width to permit thorough tamping of the fill under the bells and around the pipe.

- L. At the end of each days work the embankment shall be shaped and rolled to minimize infiltration of water.

3.9 GRADING

- A. General: Uniformly grade areas within limits of construction. Smooth finished surface within specified tolerances.
 - 1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 feet above or below the required subgrade elevations.
 - 2. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2 inch above or below the required subgrade elevation.

3.10 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances in settled, eroded or rutted areas.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, reshape, and compact to required density prior to further construction.

3.11 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of it off the Owner's property. This provision does not apply to stockpiled topsoil which shall remain on site unless written authorization for its removal is provided by the Engineer.

END OF SECTION 31 23 16

SECTION 31 23 16.13 - TRENCHING

PART 1 GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Trench excavation work in earth includes the removal of sand, gravel, existing sewers and manholes, ashes, loam, clay, swamp muck, trolley tracks, soft or disintegrated rock or hard pan existing sewers and manholes which can be removed with a backhoe, or a combination of such materials, and boulders measuring less than one cubic yard for the installation of pipes and appurtenant structures.
2. All trench excavation shall be classed as earth or ledge.

B. Related Work - Specified Elsewhere:

1. Traffic regulation and pedestrian protection is specified in the appropriate division.
2. Clearing, removal and replacement of paving, trench excavation ledge, borrow and bedding, material, manholes, and catch basins, trench backfilling, compaction, control and testing, when applicable, are specified in the appropriate sections in this division.
3. Pipe and pipe fittings, valves, gates, and hydrants, when applicable, are specified the applicable sections.

1.2 JOB CONDITIONS

A. Utilities:

1. The locations of utilities shown on the plans are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warrants that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities within the project area.
2. Rules and regulations governing the respective utilities shall be observed in executing all work in this section. Active utilities shall be adequately protected from damage, and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged or capped only with written authorization from the Utility Company. Report in writing to the Engineer the locations of all such abandoned utilities. Extreme care shall be taken when performing work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable. If, in the progress of excavation, any utility should become damaged and result in any damage

to public or private property, the General Contractor shall restore to the original condition, at no additional cost to the Owner, anything which has been damaged or disturbed.

B. Existing Structures:

1. Perform excavation in such a manner that will prevent any possibility of undermining and disturbing the foundations of any existing structures and any work previously completed under this Contract.
2. Where existing buildings and other structures are in proximity to the proposed construction, exercise extreme caution and utilize sheeting, bracing, and whatever other precautionary measures, that may be required.

C. Repairing Damage:

1. Repair, or have repaired, all damage to existing utilities, structures, lawns, other public and private property which results from construction operations, at no additional expense to the Owner, to the complete satisfaction of the Engineer, the utility company, the property owners and the Owner.

PART 2 PRODUCTS

2.1 MATERIALS

A. The Contractor shall not have any right of property in any suitable materials taken from any excavation. Do not remove any such materials from the construction site without the approval of the Engineer. This provision shall in no way relieve the Contractor of his obligations to remove and dispose of any material determined by the Engineer to be unsuitable for backfilling.

B. Unsuitable Material:

1. If, in the opinion of the Engineer, the material encountered above the indicated grade, shown on the Drawings, for excavation is unsuitable material, remove the material to the widths and depths as directed by the Engineer. Replace this material as specified in the "Trench Backfilling, Compaction, Control and Testing" section of this division.
2. If, in the opinion of the Engineer, the material encountered at or below the grade shown on the Drawings for excavation is unstable material, remove the material to the full width of the trench and to a minimum depth of twelve inches below the pipe. Replace this material with thoroughly compacted suitably screened gravel bedding material.
3. All excavated materials designated by the Engineer as unsuitable shall become the property of the Contractor and disposed of at locations acceptable to or designated by the Owner, at no additional cost to the Owner.

C. Embankment Material:

1. Obtain prior approval and instructions from the Engineer prior to undertaking the excavation for pipe placement of any fill material that has been in an embankment less than one year.

PART 3 EXECUTION

3.1 PERFORMANCE

A. General:

1. Unless otherwise specifically directed or permitted by the Engineer, begin excavation at the low end of sewer and storm lines and proceed upgrade.
2. Perform excavation for force mains and water mains in a logical sequence.

B. Amount of Excavation:

1. Trench width: As shown on the Drawings.
2. Trench depth: As shown on the Drawings.
3. Open Excavation:
 - a. The extent of open excavation shall be controlled by prevailing conditions.
 - b. Open excavation shall, at all times, be confined to the limits prescribed by the Engineer.
 - c. No trenches shall be left open during non-working hours unless adequate provisions are made to prevent injury to the work or persons. Appropriate barricades and warning devices shall be used to alert the public of hazardous areas.
4. Unauthorized Excavation:
 - a. Backfill to the specified grade, any excavation beyond the limits stated above and as shown on the Drawings (unless specifically ordered by the Engineer) with thoroughly compacted gravel borrow or screened gravel.
 - b. Backfilling unauthorized excavation shall be at no additional cost to the Owner.

C. Shoring and Bracing:

1. As the excavation progresses, install such shoring and bracing necessary to prevent caving and sliding and to meet the requirements of the state and OSHA safety standards.

END OF SECTION 31 23 16.13

SECTION 31 25 13 - EROSION CONTROLS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work Included:

1. The work under this section shall include provision of all labor, equipment, materials and maintenance of temporary erosion control devices as specified herein, as shown on the Drawings and as directed by the Engineer.
2. Erosion control measures shall be provided as necessary to correct conditions that develop prior to the completion of permanent erosion control devices or as required to control erosion that occurs during normal construction operations.
3. Construction operations shall comply with all federal, state and local regulations pertaining to erosion control.
4. After award of the Contract, prior to commencement of construction activities, meet with the Engineer to discuss erosion control requirements and develop a mutual understanding relative to details of erosion control.

B. Related Work Specified Elsewhere:

1. Site work is specified in appropriate sections of this Division.
2. Provisions stipulated in Environmental Protection.

C. Design Criteria:

1. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment. Protect existing vegetation designated to remain.
2. Stabilize disturbed earth surfaces in the shortest time and employ such temporary erosion control devices as may be necessary until such time as adequate soil stabilization has been achieved.

1.2 SUBMITTALS

- A. The Contractor shall furnish the Engineer, in writing, his work plan giving proposed locations for storage of topsoil and excavated material before beginning construction. A schedule of work shall accompany the work plan. Acceptance of this plan will not relieve the Contractor of the responsibility of completion of the work as specified.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Baled Hay:
 - 1. At least 14" by 18" by 30" securely tied to form a firm bale, staked as necessary.
- B. Sand Bags:
 - 1. Heavy cloth bags of approximately one cubic foot capacity filled with sand or gravel.
- C. Mulches:
 - 1. Loose hay, straw, peat moss, wood chips, bark mulch, crushed stone, wood excelsior, or wood fiber cellulose. Provide specified item by type and use as and where specified.
 - 2. Type and use shall be as specified by the "Maine Erosion and Sedimentation Control Handbook for Construction - Best Management Practices" prepared by the Maine DEP and the Soil and Water Conservation Commission herein after referred to as the BMP.
- D. Mats and Nettings:
 - 1. Twisted Craft paper, yarn, jute, excelsior wood fiber mats, glass fiber and plastic film.
 - 2. Type and use shall be as specified on the plan and consistent with the BMP manual.
- E. Permanent Seed:
 - 1. Conservation mix appropriate to the predominant soil conditions as specified in the BMP and subject to approval by the Engineer.
- F. Temporary Seeding:
 - 1. Use species appropriate for soil conditions and season as specified in the BMP and subject to approval by the Engineer.
- H. Water:
 - 1. The Contractor shall provide water and equipment to control dust, as directed by the Engineer.

I. Filter Fabrics:

1. Filter fabric shall be of one of the commercially available brands such as Mirafi, Typar or equivalent. Fabric types for particular applications shall be approved by the Engineer prior to installation.

J. Silt Fence:

1. Consistent with BMPs.

K. Bark Mulch Berm:

1. Consistent with BMPs.

L. Stone Check Dam:

1. Consistent with BMPs.

2.2 CONSTRUCTION REQUIREMENTS

A. Temporary Erosion Checks:

1. Temporary erosion checks shall be constructed in ditches and other locations as necessary. Stones shall be used for check dams as specified.
2. Baled hay or sediment barrier may be used to fit local conditions.

B. Temporary Berms:

1. Temporary barriers shall be constructed along the toe of embankments when necessary to prevent erosion and sedimentation.

C. Temporary Seeding:

1. Areas to remain exposed for a time exceeding 3 weeks shall receive temporary seeding as indicated below:

Season	Seed	Rate
Summer (5/15 - 8/15)	Sudangrass	40 lbs/acre
Late Summer/Early Fall (8/15 - 9/15)	Oats	80 lbs/acre
Fall (9/15 - 10/1)	Annual Ryegrass	40 lbs/acre
Winter (10/1 - 4/1)	Winter Rye	112 lbs/acre
Spring (4/1 - 7/1)	Mulch w/Dormant Seed	80 lbs/acre*
	Oats	80 lbs/acre
	Annual Ryegrass	40 lbs/acre

* seed rate only

- D. Construct silt fence in accordance with details provided prior to soil disturbance.
- E. Mulch All Areas Receiving Seeding: Use either wood cellulose fiber mulch (750 lbs/acre); or straw mulch with chemical tack (as per manufacturers specifications). Wetting for small areas may be permitted. Biodegradable netting is recommended in areas to be exposed to drainage flow.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Temporary Erosion Checks:
 - 1. Temporary erosion checks shall be constructed in ditches and at other locations designated by the Engineer. The Engineer may modify the Contractor's arrangement of silt fences, bales and bags to fit local conditions.
 - 2. Baled hay, silt fences, or sandbags, or some combination, may be used in other areas as necessary to inhibit soil erosion.
 - 3. Siltation fence, if called for in the plans, shall be located and installed as shown.
 - 4. Sedimentation ponds shall be sited and constructed to the grades and dimensions as shown on the Drawings and will include drainage pipe and an emergency spillway.
- B. Maintenance: Erosion control features shall be installed prior to excavation wherever appropriate. Temporary erosion control features shall remain in place and shall be maintained until a satisfactory growth of grass is established. The Contractor shall be responsible for maintaining erosion control features throughout the life of the construction contract. Maintenance will include periodic inspections by the Owner or Engineer for effectiveness of location, installation and condition with corrective action taken by the Contractor as appropriate.
- C. Removing and Disposing of Materials:
 - 1. When no longer needed, material and devices for temporary erosion control shall be removed and disposed of as approved by the Engineer.
 - 2. When removed, such devices may be reused in other locations provided they are in good condition and suitable to perform the erosion control for which they are intended.

END OF SECTION 31 25 13

SECTION 31 32 19.23 - GEOTEXTILE LAYER SEPARATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Furnish all materials and install filter fabric of the types, dimensions and in the location(s) shown on the Drawings and specified herein.

B. Related Work Specified Elsewhere:

1. Temporary Erosion Control, Riprap and Stone Ditch Protection, and Gabions and Revet Mattresses are specified in the appropriate sections of this Division.

1.2 QUALITY ASSURANCE

- ##### A. A competent laboratory must be maintained by the manufacturer of the fabric at the point of manufacture to insure quality control.

- ##### B. During all periods of shipment and storage, the fabric shall be wrapped in a heavy duty protective covering to protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140oF, mud, dirt, dust and debris.

1.3 SUBMITTALS

- ##### A. Manufacturer shall furnish certified test reports with each shipment of material attesting that the fabric meets the requirements of this Specification.

PART 2 - PRODUCTS

2.1 MATERIALS

- ##### A. Filter fabric for use in stabilization, drainage, underdrains, erosion control, landscaping and beneath structures shall be formed in widths of not less than six (6) feet and shall meet the requirements of Table 1. Both woven and non-woven geotextiles are acceptable; however no "slit-tape" woven fabrics will be permitted for drainage, underdrain, and erosion control applications.

Table 1 - Geotextile Minimum

Mechanical Property	Test Method	Permissible Value
Grab Tensile Strength (both directions)	ASTM D4595-86	120 pounds
Grab Elongation	ASTM D4632-86	50 percent
Mullen Burst Strength	ASTM D3786-87	210 psi
Puncture Strength	ASTM D3787	60 pounds
Trapezoid Tear Strength	ASTM D4533-85	50 pounds
Water Flow Rate	ASTM D4491-85	120 gal/min/sf
Equivalent Opening Size	ASTM D4751	80 (EOS)
Coefficient of Permeability	ASTM D4491-85	0.2 cm/sec

The geotextile shall have property values expressed in "typical" values that meet or exceed the values stated above as determined by the most recent test methods specified above.

- B. Filter fabric for use in reinforcement and under riprap shall meet the requirements of Table 2. Woven and non-woven geotextiles are acceptable.

Table 2 - Geotextile Minimum

Mechanical Property	Test Method	Permissible Value
Grab Tensile Strength (both directions)	ASTM 4595-86	195 pounds
Grab Elongation	ASTM D4632-86	20 percent
Mullen Burst Strength	ASTM D3786-87	340 psi
Puncture Strength	ASTM D3787	85 pounds
Trapezoid Tear Strength	ASTM D4533-85	85 pounds
Equivalent Opening Size	ASTM D4751	between #20 and #100 (EOS) U.S. Std. Sieve number(s)

The geotextile shall meet or exceed the "typical" values stated above as determined by the most recent test methods specified above.

PART 3 - EXECUTION

- 3.1 Install filter fabric as shown on the drawings or as directed in appropriate specifications in this division or in accordance with manufacturer's instructions or as directed by the Engineer.

END OF SECTION 31 32 19.23

SECTION 32 11 23 - AGGREGATE BASE COURSES

1 PART 1 GENERAL

1.1 DESCRIPTION

- A. The aggregate base and subbase courses for use below pavement shall be composed of layers of aggregate of different gradations.
- B. Related Work Specified Elsewhere: (When Applicable):
 - 1. Excavation and Embankment, Bituminous Concrete Paving.

1.2 SUBMITTALS

- A. Contractor shall certify that materials comply with the specification requirements by submitting either laboratory test results or certificates of compliance.

1.3 QUALITY ASSURANCE

- A. Compact aggregate base and subbase course materials to a density of at least 95 percent of the maximum density as determined in accordance with ASTM D-1557, Method D.
- B. Work shall be halted when the Engineer or Resident Project Representative is not satisfied with the apparent results of the Contractor's compaction operation. A testing laboratory acceptable to the Engineer shall then be obtained by the Owner to determine, by conducting density tests, if the Contractor is complying with these compaction specifications.
 - 1. If the test results fail to meet the requirements of these Specifications, the Contractor shall undertake whatever action is necessary, to obtain the required compaction. The cost of the testing service will be borne by the Contractor and no allowance will be considered for delays in the performance of the work.
 - 2. If the test results pass and meet the requirements of these Specifications, the direct invoice cost of the testing service will be borne by the Owner, but no allowance will be considered for delays in the performance of the work.

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. Aggregate subbase course shall be gravel consisting of hard, durable particles which are free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the portion which will pass a three inch sieve shall meet the grading requirements of the following tables:

TABLE 1 GRADATION REQUIREMENTS - AGGREGATE SUBBASE COURSE:

Sieve Designation	Furnish only when specified			
	Percent by Weight			
	Passing Square Mesh Sieve			
	Type D	Type E	Type F	Type G
1/4 inch	25-70	25-100	60-100	--
No. 40	0-50	0-30	0-50	0-70
No. 200	0-7	0-7	0-7	0-10

- B. Aggregate for base shall be screened or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a 3-inch sieve shall meet the grading requirements of the following table:

TABLE 2 GRADATION REQUIREMENT - AGGREGATE BASE COURSE

Sieve Designation	Percent by Weight		
	Passing Square Mesh Sieves		
	Type A (Crushed) Aggregate	Type B (Screened) Aggregate	Type C (Bank Run) Aggregate
1/2 inch	45-70	35-75	----
1/4 inch	30-55	25-60	25-70
No. 40	0-20	0-25	0-30
No. 200	0-5	0-5	0-5

- C. Gradation tests shall conform to AASHTO Method T-27, except that the material may be separated on the 1/2 inch sieve. The subbase shall not contain particles of rock which will not pass the six inch square mesh sieve. Type A aggregate for base shall not contain particles of rock which will not pass the 2-inch square mesh. Type B aggregate for base shall not contain particles of rock which will not pass the 4-inch sieve. Type C aggregate for base shall not contain particles of rock which will not pass the 6-inch square mesh sieve.

3 PART 3 EXECUTION

3.1 PLACING

- A. The subbase course may be constructed full depth in two lifts provided compaction is achieved. Fine grading the lower layer will not be required.
- B. Aggregate base course shall be placed full depth in one lift.

3.2 SHAPING AND COMPACTING

- A. All layers of aggregate subbase course shall be compacted to the required density immediately after placing. As soon as the compaction of any layer has been completed, the next layer shall be placed.
- B. The Contractor shall bear full responsibility for and make all necessary repairs to the base and subbase courses and the subgrade until the full depth of the base and subbase courses is placed and compacted. Repairs shall be considered incidental to other contract items and shall be made at no cost to the Owner.
- C. If the top of any layer of the aggregate base or subbase course becomes contaminated by degradation of the aggregate or addition of foreign materials, the contaminated material shall be removed and replaced with the specified material at the Contractor's expense.
- D. The top of any aggregate subbase course layer shall be scarified and loosened for a minimum depth of one inch immediately prior to the placing of the next layer of aggregate base course. This scarifying shall be considered incidental to placing the course, and no separate payment will be made.

3.3 SURFACE TOLERANCE

- A. The completed surface of the aggregate base and subbase courses shall be shaped and maintained to a tolerance, above or below the required cross sectional shape, of 3/8 inch for aggregate base course and 1/2 inch for aggregate subbase.

END OF SECTION 32 11 23

SECTION 32 92 19 - SEEDING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work Included: Furnish, place, and test topsoil, seed, lime, and fertilizer where shown on the drawings and protect and maintain seeded areas disturbed by construction work, as directed by the Engineer.
- B. Related Work Specified Elsewhere (When Applicable): Earthwork, excavation, backfill, compaction, site grading and temporary erosion control are specified in the appropriate Sections of this Division.

1.2 SUBMITTALS AND TESTING

A. Seed:

1. Furnish the Engineer with duplicate signed copies of a statement from the vendor, certifying that each container of seed delivered to the project site is fully labeled in accordance with the Federal Seed Act and is at least equal to the specification requirements.
2. This certification shall appear in, or with, all copies of invoices for the seed.
3. The certification shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates and certificates have been approved.
4. Each lot of seed shall be subject to sampling and testing, at the discretion of the Engineer, in accordance with the latest rules and regulations under the Federal Seed Act.

B. Topsoil:

1. Inform the Engineer, within 30 days after the award of the Contract, of the sources from which the topsoil is to be furnished.
2. Obtain representative soil samples, taken from several locations in the area under consideration for topsoil removal, to the full stripping depth.
3. Have soil samples tested by an independent soils testing laboratory, approved by the Engineer, and directed by owner at owners expense.
4. Have soil samples tested for physical properties and pH (or lime requirement), for organic matter, available phosphoric acid, and available potash, in accordance with standard practices of soil testing.
5. Approval, by the Engineer, to use topsoil for the work will be dependent upon the results of the soils tests.

C. Lime & Fertilizer:

1. Furnish the Engineer with duplicate copies of invoices for all lime and fertilizer used on the project showing the total minimum carbonates and minimum percentages of the material furnished that pass the 90 and 20 mesh sieves and the grade furnished.
2. Each lot of lime and fertilizer shall be subject to sampling and testing at the discretion of the Engineer.
3. Sampling and testing shall be in accordance with the official methods of the Association of Official Agricultural Chemists.
4. Upon completion of the project, a final check may be made comparing the total quantities of fertilizer and lime used to the total area seeded. If the minimum rates of application have not been met, the Engineer may require the Contractor to distribute additional quantities of these materials to meet the minimum rates.

1.3 DELIVERY, STORAGE & HANDLING

A. Seed:

1. Furnish all seed in sealed standard containers, unless exception is granted in writing by the Engineer.
2. Containers shall be labeled in accordance with the United States Department of Agriculture's rules and regulations under the Federal Seed Act in effect at the time of purchase.

B. Fertilizer:

1. Furnish all fertilizer in unopened original containers.
2. Containers shall be labeled with the manufacturer's statement of analysis.

1.4 JOB CONDITIONS

A. Topsoil: Do not place or spread topsoil when the subgrade is frozen, excessively wet or dry, or in any condition otherwise detrimental, in the opinion of the Engineer, to the proposed planting or to proper grading. Do not use excessively wet topsoil.

B. Seeding:

1. Planting Seasons: The recommended seeding time is from April 1 to September 15. The Contractor may seed at other times. Regardless of the time of seeding, the Contractor shall be responsible for each seeded area until it is accepted.
2. Weather Conditions:

- a. Do not perform seeding work when weather conditions are such that beneficial results are not likely to be obtained, such as drought, excessive moisture, or high winds.
- b. Stop the seeding work when, in the opinion of the Engineer, weather conditions are not favorable.
- c. Resume the work only when, in the opinion of the Engineer, conditions become favorable, or when approved alternate or corrective measures and procedures are placed into effect.

PART 2 PRODUCTS

2.1 MATERIALS

A. Seed:

1. Provide the grass or plant material seed mixture specified on the drawings. When unspecified, provide a mix approved by the Engineer, having the following composition:
 - a. Roadside Mixture:
 - 50 percent Creeping Red Fescue
 - 15 percent Kentucky Bluegrass
 - 5 percent White Clover
 - 2 percent Red Top
 - 3 percent Birdsfoot Trefoil
 - 25 percent Annual Ryegrass
 - b. Alternate Mixture:
 - 50 percent Creeping Red Fescue
 - 30 percent Kentucky Bluegrass
 - 20 percent Annual Ryegrass
2. Do not use seed which has become wet, moldy, or otherwise damaged in transit or during storage.

B. Topsoil:

1. Provide the quantity of topsoil necessary, in the opinion of the Engineer, to complete the work.
2. Provide topsoil that is natural, friable clay-loam soil possessing the characteristics of representative soils in the vicinity which produce heavy growths of crops, grass, or other vegetation.
3. Provide topsoil which is reasonably free from subsoil, brush, objectionable weeds, other litter, clay lumps, stones, stumps, roots, objects larger than 2 inches in diameter, and toxic substances which might be harmful to plant growth or be a hindrance to grading, planting, and maintenance operations.

4. Obtain topsoil from naturally well drained areas.

C. Lime:

1. Provide lime which is ground limestone containing not less than 85% of total carbonate and of such fineness that 90% will pass a No. 20 sieve and 50% will pass a No. 100 sieve.
2. Coarser materials will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing a No. 100 sieve. No additional payment will be made to the Contractor for the increased quantity.

D. Fertilizer:

1. Provide a commercial fertilizer approved by the Engineer.
2. Provide fertilizer containing the following minimum percentage of nutrients by weight:

10 % Available phosphoric acid
10 % Available potash
10 % Available nitrogen (75% of the nitrogen shall be organic)

PART 3 EXECUTION

3.1 PREPARATION

A. Equipment:

1. Provide all equipment necessary for the proper preparation of the ground surface and for the handling and placing of all required materials.
2. Demonstrate to the Engineer that the equipment will apply materials at the specified rates.

B. Soil: Perform the following work prior to the application of lime, fertilizer or seed.

1. Scarify the subgrade to a depth of 2 inches to allow the bonding of the topsoil with the subsoil.
2. Apply topsoil to a depth of 4 inches or as directed on areas to be seeded.
3. Trim and rake the topsoil to true grades free from unsightly variations, humps, ridges or depressions.
4. Remove all objectionable material and form a finely pulverized seed bed.

3.2 PERFORMANCE

A. Grading:

1. Grade the areas to be seeded as shown on the Drawings or as directed by the Engineer.
2. Leave all surfaces in even and properly compacted condition.
3. Maintain grades on the areas to be seeded in true and even conditions, including any necessary repairs to previously graded areas.

B. Placing Topsoil:

1. Uniformly distribute and evenly spread topsoil on the designated areas.
2. Spread the topsoil in such a manner that planting work can be performed with little additional soil preparation or tillage.
3. Correct any irregularities in the surface resulting from topsoiling or other operations to prevent the formation of depressions where water may stand.
4. Thoroughly till the topsoil to a depth of at least 3 inches by plowing, discing, harrowing, or other approved method until the condition of the soil is acceptable to the Engineer.

C. Placing Fertilizer:

1. Distribute fertilizer uniformly at a rate determined by the soils test over the areas to be seeded.
 2. Incorporate fertilizer into the soil to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.
 3. The incorporation of fertilizer may be a part of the tillage operation specified above.
4. Distribution by means of an approved seed drill equipped to sow seed and distribute fertilizer at the same time will be acceptable.

D. Placing Lime:

1. Uniformly distribute lime immediately following or simultaneously with the incorporation of fertilizer.
2. Distribute lime at a rate determined from the pH test, to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.

E. Seeding:

1. Level out any undulations or irregularities in the surface resulting from tillage, fertilizing, liming or other operations before starting seeding operations.
2. Hydroseeding:

- a. Hydroseeding may be performed where approved and with equipment approved by the Engineer.
 - b. Sow the seed over designated areas at a minimum rate of 5 pounds per 1000 square feet.
 - c. Seed and fertilizing materials shall be kept thoroughly agitated in order to maintain a uniform suspension within the tank of the hydroseeder.
 - d. The spraying equipment must be designed and operated to distribute seed and fertilizing materials evenly and uniformly on the designated areas at the required rates.
3. Drill Seeding:
- a. Drill seeding may be performed with approved equipment having drills not more than 2 inches apart.
 - b. Sow the seed uniformly over the designated areas to a depth of 1/2 inch and at a rate of 5 pounds per 1,000 square feet.
4. Broadcast Seeding:
- a. Broadcast seeding may be performed by equipment approved by the Engineer.
 - b. Sow the seed uniformly over the designated areas at a rate of 5 pounds per 1,000 square feet.
 - c. Sow half the seed with the equipment moving in one direction and the remainder of the seed with the equipment moving at right angles to the first sowing.
 - d. Cover the seed to an average depth of 1/2 inch by means of a brush harrow, spike-tooth harrow, chain harrow, cultipacker, or other approved devices.
 - e. Do not perform broadcast seeding work during windy weather.
- F. Compacting:
1. Seeded areas must be raked lightly after sowing unless seeding is to be directly followed by application of an approved mulch.
 2. Compact the entire area immediately after the seeding operations have been completed.
 3. Compact by means of a cultipacker, roller, or other equipment approved by the Engineer weighing 60 to 90 pounds per linear foot of roller.
 4. If the soil is of such type that a smooth or corrugated roller cannot be operated satisfactorily, use a pneumatic roller (not wobbly wheel) that has tires of sufficient size to obtain complete coverage of the soil.
 5. When using a cultipacker or similar equipment, perform the final rolling at right angles to the prevailing slopes to prevent water erosion, or at right angles to the prevailing wind to prevent dust.

3.3 PROTECTION & MAINTENANCE

A. Protection:

1. Protect the seeded area against traffic or other use.
2. Erect barricades and place warning signs as needed.

B. Maintenance:

1. Properly care for the seeded areas during the period when the grass is becoming established.
2. The protection period shall extend for 12 months after the completion of the entire project, unless the desired cover, in the opinion of the Engineer, is established in a shorter period of time.

3.4 ACCEPTANCE

- A. At final acceptance of the project all areas shall have a close stand of grass with no weeds present and no bare spots greater than three inches (3") in diameter over greater than five percent (5%) of the overall seeded area.

END OF SECTION 32 92 19

SECTION 33 05 16 - UTILITY PIPING STRUCTURES

PART 1 GENERAL

1.1 WORK OF OTHER SECTIONS

- A. Excavation: Section 31 23 16.

1.2 APPLICABLE STANDARDS

- A. General: Comply with standards specified in this Section.

1.3 QUALIFICATIONS OF INSTALLERS

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.4 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the work and materials of all other trades.
- B. Protection of Utilities: Protect existing utilities as specified in the appropriate sections.
- C. Delivery and Storage: Deliver all materials to the job site in their original containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturers' recommendations as approved by the ENGINEER.
- D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the ENGINEER and at no additional cost to the OWNER.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Foundation (perimeter-inside and out) drains shall be no less than 4" diameter perforated rigid ABS pipe, SDR 35. All perimeter drains shall be covered with filter fabric. Fabric to be laid 1'0" above top of pipe over 1-1 1/2" fill as shown on DRAWINGS. Pipe shall have 5/8" holes and be "underdrain" type pipe.

- B. Foundation drain outfalls shall be 4" diameter solid rigid ABS pipe, SDR 23.5, sloped to drain. Stone-in end of drainage pipes with drainage fill material in order to protect pipe from freeze-up but allow drainage.
- C. Polyvinyl Chloride (PVC) Pipe: Pipe and fittings shall comply with ASTM D 3034, rated SDR 35. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D 3034 classification. Pipe joints shall be integrally molded bell ends in accordance with ASTM D 3034, Table 2, with factory supplied elastomeric gaskets and lubricant. PVC shall not be used for any drainage pipe, which will be permanently exposed to sunlight.
- D. Storm drain pipe shall be H.D.P.E. dual wall solid wall or perforated drainage pipe as shown or directed. Pipe shall have a smooth interior and be fitted with a bell and gasket joint assembly. Pipe shall be ADS N-12 ST IB, soil tight. Storm drain accessories shall include catch basin assemblies where indicated with cast iron grate and H.D.P.E. flared end for pipe outlet. Equal to Nyloplast inline drain or TPO Plus by Plasti-Drain LTEE available from Public Works Supply Co., Inc. (1-800-291-5000).

2.2 DRAINAGE STRUCTURES

- A. General: Construct drainage structures of precast reinforced concrete to the dimensions and profiles capacities as approved by the ENGINEER. Provide metal frames, covers or gratings, and fixed ladders as shown.
- B. Mortar: Comply with ASTM C270, Type M, for mortar for pipe joints and connections to drainage structures, and for manhole construction. Place within one hour after addition of water. Hydrated lime complying with ASTM C141, Type B, may be added to the mixture of sand and cement in an amount equal to 25 percent of the volume of cement. Provide a quantity of water in the mixture sufficient to produce a stiff workable mortar, clean and free from harmful acids, alkalies, and organic impurities.
- C. Reinforcing Bars and Dowels: Intermediate grade billet steel; comply with ASTM A615, Grade 40.
- D. Frames and Covers or Grating: Standard black finish, supplied as a total unit, sized as indicated on the DRAWINGS. Provide all items from the same manufacturer.
- E. Precast Concrete Catch Basins: Shall be designed to assure slope through the structure.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 EXCAVATING, TRENCHING, AND BEDDING FOR PIPES

- A. General: Provide excavating, trenching and bedding for storm drains in accordance with the provisions of the appropriate section and as follows:
- B. Movement of Construction Machinery: Use all means necessary to avoid displacement of, and injury to, the pipe and structures while compacting by rolling or operating equipment parallel with the pipe. Movement of equipment over a culvert or storm drain at any stage of construction is solely at the risk of the Contractor.
- C. Bedding: Provide a bedding surface for the pipe with a firm foundation of uniform density throughout the entire length of the pipe. Bed pipes carefully in a soil foundation accurately shaped and rounded to conform to the lower one-quarter of the outside perimeter of the circular pipe, or set the pipe in a bed of sand. Tamp bedding when necessary. Provide bell holes and depressions for pipe joints of only the length, depth, and width required for properly making the particular joint.

3.3 PLACING PIPE

- A. General: Carefully examine each pipe prior to placing. Promptly set aside all defective pipe and all damage pipe. Clearly identify all defects. Do not install defective pipe or damaged pipe.
- B. Place all pipe to the grades and alignment shown, with a tolerance of one in 1000 vertical and one in 500 horizontal.
- C. Provide all required equipment for lowering pipe safely into the trenches.
- D. Do not place pipe in water, or place pipe when trench or weather is unsuitable for such work.
- E. Concrete Pipe: Lay by proceeding upgrade with the spigot ends of bell-and-spigot pipe, and the tongue ends of tongue-and-groove pipe pointing in the direction of flow.
- F. Asphalt Coated Corrugated Metal Pipe: The pipe shall be laid upgrade, beginning at the lower end of the pipeline. Pipelines shall be laid to grades and alignment shown on the DRAWINGS or as directed by the ENGINEER.
- G. Aluminized Type II Pipe: The pipe shall be laid upgrade, beginning at the lower end of the pipeline. Pipelines shall be laid to grade and alignment shown on the DRAWINGS or as directed by the ENGINEER.

- H. The pipe shall be laid in the prepared bed with the outside laps of circumferential joints pointing upgrade. Paved or partially lined culverts shall be laid with the lining on the bottom. The longitudinal laps parallel to the centerline of the pipe shall be placed on the sides of the pipeline with outside laps pointing down. Each section or joint of pipe shall be securely attached to the adjoining section or joint of pipe with connecting bands of other approved type of joint. The bands shall be tightly drawn or connected so that a rigid joint will be formed. Damage to the bituminous coating shall be repaired by applying hot asphalt to the exposed metal before any backfill is placed.

3.4 PIPE ASSEMBLY, JOINTS, TERMINAL TREATMENT

A. Joining Concrete Pipe:

1. Wipe the inside of the joint clean and smooth. In pipe too small for a person to work inside, perform wiping by dragging a suitable swab or long handled brush through the pipe as installation progresses. Protect the mortar bead on the outside from air and sun with suitable covering until cured.
2. Cement mortar bell and spigot joint: Bed the first pipe to the established grade line, with the bell end placed upstream. Clean surface of bell with wet brush, and fill lower portion with mortar to such depth as to bring the inner surface of the abutting pipes flush and even. Clean the spigot end of each subsequent pipe with a wet brush, and uniformly match into the bell so that sections are closely fitted. After laying each section, fill remainder of joint with mortar, and form a bead around the outside of the joint with mortar. If mortar can slump before setting, wrap or bandage the outside of the joint with cheesecloth to retain mortar in place.
3. Flexible watertight joints: Make flexible watertight joints with rubber gaskets for concrete pipe. Design joints and use gaskets complying with ASTM C443 and shore durometer hardness, Type A, 40-55 in lieu of hardness specified. Allow no more than one splice, except two splices are acceptable in rubber gaskets larger than 140 cm (54"). Install gaskets and joint materials in accordance with the manufacturer's recommendations as approved by the ENGINEER. Affix gaskets and jointing materials to the pipe not more than 24 hours prior to installation of the pipe. Align the pipe with the previously installed pipe, and pull the joint together. If, while making the joint, the gasket or jointing material becomes loose and can be seen through exterior joint recess when joint is pulled to within 1" of closure, remove pipe and remake joint.

- B. Asphalt Coated Corrugated Metal Pipe or Aluminized Type II Pipe: Provide couplings and fittings per manufacturer's recommendation.

- B. Backfilling Pipe in Fill Sections: For pipe placed in fill sections, after the backfill has reached at least 12" above the top of the pipe, place the remainder of the fill by compacting in layers not exceeding 8" in compacted depth.
- C. Compaction: Backfill over and around the pipe, backfill around and adjacent to all other drainage structures, and compact to the minimum densities specified in the appropriate section.

3.6 CLEAN UP AND REPAIR

- A. Upon completion of catch basin installation, each structure shall be cleaned of any accumulation of silt, debris, or foreign matter of any kind and shall be kept clear of such accumulation until final acceptance of the work.
- B. Any pipe which is not in true alignment or which shows any undue settlement after being laid shall be taken up and re-laid.
- C. Prior to placing the backfill, damaged areas of coupling bands and pipe shall be repaired with the type of coating used on the original pipe. Pipe on which the coating has been damaged to such an extent that satisfactory field repairs cannot be made shall be removed and replaced without additional cost to the OWNER.

3.7 TESTING AND INSPECTION

- A. General: Provide all equipment and personnel necessary, and make all tests required to demonstrate that the work of this Section has been completed in strict accordance with the design and the specified requirements.
- B. Closing in Uninspected Work: Do not cause or allow any of the work of the Section to be covered up or enclosed until after it has been completely tested, inspected, and approved by the ENGINEER.
- C. Hydrostatic Tests of Watertight Joints: Make a hydrostatic test on each watertight joint type proposed. Test one sample joint of each type. If a sample joint fails because of faulty workmanship, test an additional sample joint. During the test period, protect the joint from high temperatures that might soften or adversely affect the jointing materials.
- D. Demonstrate that joints in reinforced and non-reinforced concrete pipe comply with ASTM C443. Make test at an internal hydrostatic pressure of 10 psi for 24 hours.
- E. Only joints within the building area, and within 10 ft. of the building exterior walls or face, need be tested for water tightness.

END OF SECTION 33 05 16

**TOWN OF UNION
DAVIS ROAD RECONSTRUCTION
SPECIAL CONDITIONS**

1.1 HOURS OF OPERATION

- A. Regular work hours shall be at the contractor's option. No work shall be performed prior to 7 a.m. local time or dawn, whichever is later and all work shall end by 7 p.m. local time or dusk, whichever is earlier.

1.2 SCHEDULE OF OPERATIONS

- A. The Contractor shall provide a construction schedule indicating when access to the site shall be restricted to allow the Town to adequately notify the public.
- B. The Contractor shall, in good workmanlike manner, perform, or cause to be performed, all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to complete all the work required by this Contract, in accordance with the provisions of the Contract Documents, including all sub-divisions thereof, and in accordance with the directions of the Engineer as given from time-to-time during the progress of the work. He shall furnish, erect, maintain, and remove such construction plant and such temporary works as may be required. He alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation.

1.3 ACCIDENT PREVENTION

- A. Comply with all recommendations and requirements for accident prevention of the Associated General Contractors of America and the American Standards Association Standard A10.2. The Field Superintendent of the Contractor shall conduct regular and frequent inspections of the site for compliance with safety regulations, stating in writing to the Engineer each month that he has done so.

1.4 COORDINATION OF THE WORK

- A. The Contractor and all his Sub-Contractors shall coordinate their work with all adjacent work and shall cooperate with all other trades so as to facilitate general progress of the work. Each trade shall afford all other trades every reasonable opportunity for the installation of their respective work and for the storage of their materials and equipment. The Contractor shall be responsible for coordination.
- B. Each Sub-Contractor shall assume responsibility for the correctness and adequacy of his work. Each Sub-Contractor shall be responsible for and pay all damages done by his work or his workmen.
- C. The Contractor shall cooperate with, and provide access and working area to the Owner's Contractors for the performance of specific work assigned to them.

1.5 PROJECT MEETINGS

- A. The Contractor will be required to meet with the Engineer, and the owner's designated representative, if applicable, once each month during the course of the contract for purpose of progress review, coordination of shop drawing schedules, sample submittals, and other items of work requiring such coordination. The dates of such meetings shall be as mutually agreed upon between the Contractor, the Engineer, and the Owner.

1.6 TESTS AND INSPECTIONS

- A. The Contractor shall make such tests and inspections of his workmanship and materials as may be required by the Building Code, State or municipal laws, or as called for under the various SECTIONS of the SPECIFICATIONS.
- B. All expense attached to such tests and inspections, unless otherwise specified under the various SECTIONS of the SPECIFICATIONS, shall be borne by the Contractor, who shall furnish all labor, tools, instruments, water, temporary power and light, construction and equipment necessary for these tests and inspections. Records of all tests and inspections shall be furnished to the Engineer. The Contractor shall remove all temporary work, materials, and equipment upon completion of tests and inspections.
- C. Where in the various SECTIONS of the SPECIFICATIONS inspection and testing of materials, processes, and the like is called for, the selection of bureaus, laboratories, and/or agencies for such inspection and test shall be subject to approval of the Engineer.
- D. Should any material or work be found, after testing or inspection, to be defective or inferior, such material and/or work shall be removed and replaced with new sound materials and/or work as approved by the Engineer. The removal and replacement herein called for shall be at the Contractor's expense. Refer to the GENERAL CONDITIONS and SUPPLEMENTARY CONDITIONS for additional requirements regarding testing and inspection of materials.

1.7 FIRE PROTECTION AND PREVENTION

- A. Provide and maintain adequate fire protection including fire extinguishers, dry chemical, or other effective means of fire extinguishment, ready for instant use, distributed around the project, and in and about temporary structures during construction of work.
- B. The Contractor shall provide effective means of fire extinguishment to provide adequate fire fighting coverage of the new structure.
- C. Gasoline and other flammable liquids shall be stored in and dispensed from U. L. listed safety containers in conformance with National Board of Fire Underwriters' recommendations. Storage shall not be within the permanent buildings.
- D. The Contractor shall keep the site free of rubbish and debris as specified hereunder.
- E. Make arrangements for periodical inspection by local fire protection authorities and insurance underwriters' inspections. Cooperate with said authorities and promptly carry out their recommendations. Comply with all applicable laws and ordinances and with Owner's fire prevention requirements.
- F. Tarpaulins that may be used during construction of work shall be made of material which is resistant to fire, water, and weather. Tarpaulins shall have U. L. approval and comply with FS-CC-C-746.
- G. Torch-cutting and welding operations shall have approval of the Contractor before such work is started, and chemical extinguishers shall be available at location where work is in progress.
- H. Open fires of any kind will not be permitted in or about premises.

1.8 EXISTING UTILITIES

- A. Conform to DigSafe protocols.
- B. Existing utility lines indicated on the Drawings, such as cables, ducts, conduits, and piping shall, if damaged (unless they are to be abandoned), be immediately repaired, protected, and maintained in use until relocation of same has been completed, or shall be cut and capped where directed, or shall be prepared for service connections when so required. Damaged utilities shall be repaired by the Contractor at no extra cost to the Owner. Any utilities encountered which are not indicated on the Drawings shall be reported.

- C. The Contractor shall notify the Owner in writing three days in advance of the proposed time for shutting down or interrupting any utilities, services, or facilities which may affect the operation of other buildings, services, or facilities of the Owner. Unless otherwise authorized by the Owner, he shall so schedule and coordinate his work that such interruption will occur on weekends, holidays, or before or after the normal working day of the Owner's facilities. In no case shall any shutdown or interruption of any utilities, services, or facilities be made without the approval and authorization of the Owner. Both new and existing service and utility systems shall be complete and ready for service before connecting existing lines to new systems.
- D. The Owner will cooperate fully, at the Contractor's request, in assisting the Contractor in locating and identifying underground utilities.

1.9 TEMPORARY SCAFFOLDING AND CONVEYANCES

- A. The Contractor shall furnish, install, maintain, remove and pay for all temporary staging and planking, stairs, ladders, ramps, hoisting including operator, rigging, and safety devices for all work associated with this CONTRACT, at no cost to the Owner, unless specified to the contrary in a trade SECTION of the SPECIFICATIONS.
- B. All such apparatus, equipment and construction shall meet the requirements of the Labor Laws and State Laws and Regulations applicable thereto and/or the Authorities having jurisdiction over same.
- C. Hoists and chutes shall be so protected as to prevent damage, staining or marring of any permanent work.

1.10 AS BUILT DRAWINGS

- A. The Contractor, mechanical and electrical Sub-Contractors shall keep one set of prints up to date showing the actual work "as built" for all items of work. "As built" drawings will be turned over to the Engineer at the completion of the work.

1.11 WELDING AND CUTTING

- A. Where electric or gas welding or cutting work is done, above or within ten (10) feet of, combustible material or above space that may be occupied by persons, interposed shields or incombustible material shall be used to protect against fire damage or injury due to sparks and hot metal.
- B. Tanks supplying gases for gas welding or cutting shall be placed at no greater distance from the work than is necessary for safety, securely fastened and maintained in an upright positions where practicable. Such tanks, when stored for use, should be remote from any combustible material and free from exposure to the rays of the sun or too high temperatures.
- C. Suitable fire extinguishing equipment shall be maintained near all welding and cutting operations. When operations cease for the noon hour or at the end of the day, the surroundings adjacent to welding and cutting operations should be thoroughly wet down.
- D. A workman, equipped with suitable fire extinguishing equipment, shall be stationed near welding and cutting operations to see that sparks do not lodge in any combustible material. The workman shall be kept at the source of work offering special hazards for 30 minutes after the job is completed to make sure that smoldering fires have not been started.
- E. A qualified electrician shall be in charge of installing and repairing electric or arc welding equipment.

1.12 OVERLOADING

- A. Materials and fabricated work shall not be stacked on, or be transported over, floor and roof construction that would stress any of said construction beyond the designed live loads.

1.13 RUBBISH REMOVAL

- A. The Contractor shall require each of his Sub-Contractors engaged upon the work to bear his full responsibility for cleaning up during and immediately upon completion of his work on a daily basis, and shall remove all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of his work; but this shall in no way be construed to relieve the Contractor of his primary responsibility leaving all work in a clean and proper condition satisfactory to the Engineer and/or Owner.
- B. Immediately after unpacking, all packing materials, case lumber, excelsior, wrapping, or other rubbish, flammable or otherwise, shall be collected and removed from the buildings and premises.

1.14 SITE DRAINAGE AND PUMPING

- A. The Contractor shall take over the responsibility for site drainage upon entering the premises and shall maintain such drainage during the life of his Contract in a manner approved by the Engineer and so as not to adversely affect the adjacent areas.
- B. The Contractor shall during the progress of the work, provide and maintain all required pumps, suction and discharge lines, and power in sufficient number and capacity to keep all excavations, pits, trenches, foundations, and the entire property area free from accumulation of water from any source whatsoever, at all times, and under any and all circumstances and contingencies that may arise.

1.15 SNOW AND ICE REMOVAL

- A. The Contractor shall remove all snow and ice which may impede the work, damage the finishes or materials, be detrimental to workmen, or impede trucking, delivery, or moving of materials at the job site, or prevent adequate drainage of the site or adjoining areas.

1.16 CONSTRUCTION HOISTS

- A. The Contractor shall provide and pay for hoisting machinery and/or crane service as necessary to lift all personnel and materials for all operations, both his and his Sub-Contractors, of sufficient capacity and speed to produce no delay in the completion of the work.

1.17 PARKING

- A. Vehicles of persons employed on the construction project shall park in an area as mutually agreed upon by the Owner, Contractors and Engineer. At the conclusion of all work, and prior to Substantial Completion, the Contractor shall restore the selected on-site parking area to its original condition.

1.18 SITE ACCESS

- A. Safe passage shall be maintained for pedestrians during construction.

1.19 FINAL CLEANING

- A. Before the final inspection all finished surfaces shall be swept, dusted, and cleared of all construction debris.