STANDARD CONSTRUCTION SPECIFICATIONS FOR EARTHWORK DIVISION 20 INDEX

SECTION 20.01	GENERAL	1
Article 1.1	Scope of Work	1
Article 1.2	Definitions	1
Article 1.3	Applicable Standards	2
Article 1.4	Equipment	3
Article 1.5	Compaction Standards	3
Article 1.6	Subsurface Investigation	4
Article 1.7	Weather Limitations	5
Article 1.8	Underground Utilities	5
Article 1.9	Contaminated Material	5
SECTION 20.02	STORM WATER POLLUTION PREVENTION PLAN	6
Article 2.1	General	6
Article 2.2	Definitions and Web References	6
Article 2.3	Plan and Permit Submittals	9
Article 2.4	Personnel Qualifications and Authority	10
Article 2.5	Control and Prevention Plan Contents	11
Article 2.6	Materials	14
Article 2.7	Construction	14
Article 2.8	SWPPP Inspections. Reports and Amendments	16
Article 2.9	Measurement	19
Article 2.10	Basis of Payment	19
SECTION 20.03	EXPLORATORY TEST PITS	20
Article 3.1	General	20
Article 3.2	Materials	20
Article 3.3	Construction	20
Article 3.4	Measurement	20
Article 3.5	Basis of Payment	20
SECTION 20.04	CLEARING AND GRUBBING	21
Article 4.1	General	21
Article 4.2	Construction	21
Article 4.3	Measurement	21
Article 4.4	Basis of Payment	21
SECTION 20.05	CLEARING	22
Article 5.1	General	22
Article 5.2	Construction	22
Article 5.3	Measurement	22
Article 5.4	Basis of Payment	23

SECTION 20.06	REMOVAL OF TREES	24
Article 6.1	General	24
Article 6.2	Construction	24
Article 6.3	Measurement	24
Article 6.4	Basis of Payment	24
SECTION 20.07	REMOVAL OF SIDEWALK AND CONCRETE APRON	25
Article 7.1	General	25
Article 7.2	Construction	25
Article 7.3	Measurement	25
Article 7.4	Basis of Payment	25
SECTION 20.08	REMOVAL OF CURB AND GUTTER	26
Article 8.1	General	26
Article 8.2	Construction	26
Article 8.3	Measurement	26
Article 8.4	Basis of Pavment	26
	, ,	
SECTION 20.09	REMOVAL OF PAVEMENT	27
Article 9.1	General	27
Article 9.2	Construction	27
Article 9.3	Measurement	27
Article 9.4	Basis of Payment	28
SECTION 20.10	EXCAVATION FOR TRAFFIC WAYS	29
SECTION 20.10 Article 10.1	EXCAVATION FOR TRAFFIC WAYS	29 29
SECTION 20.10 Article 10.1 Article 10.2	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes	29 29 29
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous	29 29 29 29
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation	29 29 29 29 30
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material	29 29 29 29 30 30
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.6	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation	29 29 29 29 30 30 31
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.6 Article 10.7	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement	29 29 29 29 30 30 31 31
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.6 Article 10.7 Article 10.8	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment	29 29 29 30 30 31 31 32
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.5 Article 10.6 Article 10.7 Article 10.8	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment	29 29 29 30 30 31 31 32
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.5 Article 10.6 Article 10.7 Article 10.8 SECTION 20.11	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment GRADING EXISTING SURFACES Canaral	29 29 29 30 30 31 31 32 33
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.5 Article 10.6 Article 10.7 Article 10.8 SECTION 20.11 Article 11.1 Article 11.1	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment GRADING EXISTING SURFACES General Construction	29 29 29 30 30 31 31 32 33 33
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.5 Article 10.6 Article 10.7 Article 10.7 Article 10.8 SECTION 20.11 Article 11.1 Article 11.2 Article 11.2	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment GRADING EXISTING SURFACES General Construction	29 29 29 30 30 31 31 32 33 33 33
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.5 Article 10.6 Article 10.7 Article 10.7 Article 10.8 SECTION 20.11 Article 11.1 Article 11.2 Article 11.3 Article 11.4	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment GRADING EXISTING SURFACES General Construction Measurement Basis of Payment	29 29 29 30 30 31 31 32 33 33 33 33
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.5 Article 10.6 Article 10.7 Article 10.7 Article 10.8 SECTION 20.11 Article 11.1 Article 11.2 Article 11.3 Article 11.4	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment GRADING EXISTING SURFACES General Construction Measurement Basis of Payment	29 29 29 30 30 31 31 32 33 33 33 33 33
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.5 Article 10.6 Article 10.7 Article 10.7 Article 10.8 SECTION 20.11 Article 11.1 Article 11.2 Article 11.3 Article 11.4	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment GRADING EXISTING SURFACES General Construction Measurement Basis of Payment DEWATERING	29 29 29 30 30 31 31 32 33 33 33 33 33 33
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.5 Article 10.6 Article 10.7 Article 10.7 Article 10.8 SECTION 20.11 Article 11.2 Article 11.3 Article 11.4 SECTION 20.12 Article 12.1	EXCAVATION FOR TRAFFIC WAYS General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment GRADING EXISTING SURFACES General Construction Measurement Basis of Payment DEWATERING General	29 29 29 30 30 31 31 32 33 33 33 33 33 33 33 33
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.5 Article 10.6 Article 10.7 Article 10.7 Article 10.7 Article 11.8 SECTION 20.11 Article 11.1 Article 11.2 Article 11.3 Article 11.4	EXCAVATION FOR TRAFFIC WAYS. General Survey Stakes. Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment GRADING EXISTING SURFACES General Construction Measurement Basis of Payment DEWATERING General DEWATERING General	29 29 29 30 30 30 31 31 32 33 33 33 33 33 33 34 34 34
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.5 Article 10.7 Article 10.7 Article 10.7 Article 11.7 Article 11.1 Article 11.1 Article 11.2 Article 11.3 Article 11.4 SECTION 20.12 Article 12.1 Article 12.2 Article 12.3	EXCAVATION FOR TRAFFIC WAYS. General Survey Stakes Miscellaneous Unusable and Usable Excavation Utilization or Disposal of Excavated Material Excavation Measurement Basis of Payment GRADING EXISTING SURFACES General Construction Measurement Basis of Payment DEWATERING General DEWATERING General Materials Construction	29 29 29 30 30 31 31 32 33 33 33 33 33 33 33 34 34 34 34
SECTION 20.10 Article 10.1 Article 10.2 Article 10.3 Article 10.4 Article 10.5 Article 10.6 Article 10.7 Article 10.7 Article 10.7 Article 11.8 SECTION 20.11 Article 11.1 Article 11.2 Article 11.3 Article 11.4 SECTION 20.12 Article 12.1 Article 12.2 Article 12.3 Article 12.4	EXCAVATION FOR TRAFFIC WAYS	29 29 29 30 31 31 31 32 33 33 33 33 33 33 33 34 34 34 34 35

SECTION 20.13 Article 13.1 Article 13.2 Article 13.2	TRENCH EXCAVATION AND BACKFILL General Trench Excavation and Backfill - Description	
Article 13.4 Article 13.5	Measurement Basis of Payment	
SECTION 20.14	TRENCH EXCAVATION, BACKFILL AND COMPACTION FOR SERVICE CONNECTIONS	41
Article 14.1	General	
Article 14.2	Construction	41
Article 14.3	Measurement	
Article 14.4	Basis of Payment	
SECTION 20.15	FURNISH TRENCH BACKFILL	
Article 15.1	General	
Article 15.2	Construction	
Article 15.3	Measurement	
Article 15.4	Basis of Payment	44
SECTION 20.16	FURNISH BEDDING MATERIAL	45
Article 16.1	General	45
Article 16.2	Materials	45
Article 16.3	Construction	
Article 16.4	Measurement	
Article 16.5	Basis of Payment	
SECTION 20.17	FURNISH FILTER MATERIAL	
Article 17.1	General	
Article 17.2	Materials	
Article 17.3	Construction	
Article 17.4	Measurement	
Article 17.5	Basis of Payment	49
SECTION 20.18	DRAIN/FILTER ROCK	
Article 18.1	General	50
Article 18.2	Materials	50
Article 18.3	Construction	50
Article 18.4	Measurement	50
Article 18.5	Basis of Payment	51
SECTION 20.19	FURNISH FOUNDATION BACKFILL	
Article 19.1	General	
Article 19.2	Materials	
Article 19.3	Construction	
Article 19.4	Measurement	52
Article 19.5	Basis of Payment	

SECTION 20.20 Article 20.1 Article 20.2 Article 20.3 Article 20.4 Article 20.5	UNCLASSIFIED FILL AND BACKFILL General Material Construction Measurement Basis of Payment	53 53 53 53 53 53 53
SECTION 20.21 Article 21.1 Article 21.2 Article 21.3 Article 21.3 Article 21.4 Article 21.5	CLASSIFIED FILL AND BACKFILL General Material Construction Measurement Basis of Payment	54 54 54 56 58 58
SECTION 20.22 Article 22.1 Article 22.2 Article 22.3 Article 22.4 Article 22.5	LEVELING COURSE	59 59 59 60 61 62
SECTION 20.23 Article 23.1 Article 23.2 Article 23.3 Article 23.4 Article 23.5	COBBLES General Materials Construction Measurement Basis of Payment	63 63 63 63 63 63
SECTION 20.24 Article 24.1 Article 24.2 Article 24.3 Article 24.4 Article 24.5	RIPRAP General Materials Construction Method of Measurement Basis of Payment	64 64 64 64 65 65
SECTION 20.25 Article 25.1 Article 25.2 Article 25.3 Article 25.4 Article 25.5	GEOTEXTILE FABRIC Description Materials Construction Method of Measurement Basis of Payment	66 66 71 73 73
SECTION 20.26 Article 26.1 Article 26.2 Article 26.3 Article 26.4 Article 26.5	ROADWAY INSULATION	74 74 74 74 75 75

DISPOSAL OF UNUSABLE OR SURPLUS MATERIAL	76
General	76
Construction	76
Measurement	76
Basis of Payment	77
RECONSTRUCT DRIVEWAY	78
Description	78
Materials	78
Construction	78
Measurement	79
Basis of Payment	79
PIPE CASING	80
General	80
Materials	80
Construction	80
Measurement	80
Basis of Payment	80
SHORING, SHEETING AND BRACING/SHORING AND	
SHEETING LEFT IN THE TRENCH AND PORTABLE	81
General	81
Materials	81
Construction	81
Measurement	81
Basis of Payment	82
	DISPOSAL OF UNUSABLE OR SURPLUS MATERIAL General Construction Measurement Basis of Payment Basis of Payment RECONSTRUCT DRIVEWAY Description Materials Construction Measurement Basis of Payment PIPE CASING General Materials Construction Measurement Basis of Payment SHORING, SHEETING AND BRACING/SHORING AND SHEETING LEFT IN THE TRENCH AND PORTABLE General Materials Construction Measurement Basis of Payment SHORING SHEETING AND BRACING/SHORING AND SHEETING LEFT IN THE TRENCH AND PORTABLE General Materials

STANDARD CONSTRUCTION SPECIFICATIONS FOR EARTHWORK DIVISION 20

SECTION 20.01 GENERAL

Article 1.1 Scope of Work

The Work covered by this Division consists of providing all plant, labor, equipment, supplies, material, transportation, handling, and storage, and performing all operations pertaining to the: 1) construction of subbase for parking lots, streets, alleys, curbs, gutters, sidewalks and bike trails, 2) construction for all trench excavation, backfill, bedding, and foundation material for utility installation; and 3) excavation and backfill for building structures and retaining walls.

Article 1.2 Definitions

A. Backfill

Material placed in an excavated area.

B. Bedding

Ground or support in which pipe is laid.

C. Borrow

Material used as fill and/or backfill which is obtained from a source other than required excavation.

D. Compaction

Tamping by hand or machine to achieve required density in soils.

E. Disposal Site

Any area where waste, unsuitable, unusable or surplus material from construction is placed. Contractor provided disposal sites are delineated in Division 10, Section 10.04, Article 4.9 – Disposal Sites.

F. Excavation

Area or material removed to provide a suitable base for improvement.

G. Fill

Fill is considered the material placed above the original or natural ground line.

H. Leveling Course

Leveling course is compacted material placed above the subbase and below the finishing surface of the improvement.

I. Non-Frost-Susceptible Material

Non-organic soil containing less than three percent (3%) by weight of grains smaller than .02 mm obtained from minus three inches (-3") material.

J. Service Connection

Any connection from a main line utility or storm drain to a property line for the purpose of providing service to an individual property

K. Subbase

The subbase is compacted material placed above the subgrade and below the leveling course.

L. Subgrade or Bottom Excavation

The subgrade is material below the bottom of excavation and upon which the subbase material is placed.

M. Trench

Any excavation for a utility or drainage system.

N. Unsuitable or Unusable Material

Unsuitable or unusable material may consist of any material which is, in the opinion of the Engineer, inadequate for use in the proposed construction.

Article 1.3 Applicable Standards

The latest revision of the following standards of the American Society for Testing and Materials (ASTM) and the American Association of State Highway Transportation Officials (AASHTO) are hereby made a part of these specifications:

ASTM C-29	Test for Unit Weight of Aggregate
ASTM C-117	Test for Materials Finer than No. 200 Sieve in Aggregates by Washing
ASTM C-131	Test for Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine

ASTM C-136	Test for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM D-422	Test for Particle Size Analysis of Soil
ASTM D-424	Test for Plastic Limit and Plasticity Index of Soils
AASHTO M-147	Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses
AASHTO T-180-D	Test for Moisture-Density Relations of Soils
AASHTO T-205	Test for Field Determination of Density of Soil In-Place
AASHTO T-238	Test for Density of Soil In-Place by Nuclear Method.

Article 1.4 Equipment

All equipment, tools, and machines used in the performance of the Work covered by these Specifications shall be subject to the approval of the Engineer and shall comply with all applicable safety requirements. All equipment used on the project shall be adequately maintained and shall be the proper equipment for the Work being accomplished so as to produce the result required by the Contract Documents.

Article 1.5 Compaction Standards

The required density of fill and backfill shall meet the requirements as outlined in Section 20.21 - Classified Fill and Backfill. In areas outside of road rights-of-way, the density shall be as required by the Contract Documents or as directed by the Engineer.

Where compaction density is specified, the maximum density shall be determined in accordance with the current requirements of AASHTO Standard Method T-180-D.

The Diameter of the test mold in AASHTO T-180 Method D limits the size of particles which may be included in the test to that passing the three-quarter inch (3/4") sieve. In those instances where the particles are retained on the three-quarter inch (3/4") sieve, a correction must be applied to the standard laboratory density prior to calculating the percent compaction. To expedite field result the plus three-quarter inch (3/4") material may be sieved wet and the weight computed as a percent of the total weight of the material from the hole. The corrected laboratory density shall be computed in each instance by the formula:

Corrected Lab Density =
$$\frac{\frac{62.4}{A}}{\frac{A}{C} + \frac{62.4(B)}{r D}}$$

- Where: A = Percent by weight of original material retained on the 3/4-inch sieve, expressed as a decimal.
 - B = Percent by weight of original material passing the 3/4-inch sieve, expressed as a decimal.
 - C = Specific gravity of +3/4-inch material (apparent specific gravity) as determined by AASHTO T-85.
 - D = Uncorrected laboratory density (minimum 3/4-inch material).
 - r = Coefficient with value depending A, as follows:

for A = 0.18 or less, r = 1.00A = 0.19 or more, r = 1.036 - 0.2A

Backfill under traffic and building structures and trench backfill in the public rights-of-way from six inches (6") over the top of the pipe to the surface shall be compacted to ninety-five percent (95%) of maximum density, unless otherwise noted and approved by the Engineer.

The backfill material shall be placed in horizontal lifts not exceeding twelve inches (12") in thickness and compacted. Any excavations improperly filled shall be reopened to the depth required for proper compaction, then refilled and compacted at the Contractor's expense. The use of water in excess of the quantity required to obtain specified density (optimum moisture content) to settle or compact the backfill will not be permitted.

Article 1.6 Subsurface Investigation

Information pertaining to subsurface exploration, borings, test pit locations, and other preliminary investigation may appear in the Bidding Documents or be available at selected locations for review by the Bidder. This information was acquired for design purposes only and is not considered adequate for construction.

The soils classifications and geotechnical designations recorded are informational only and represent only those subsurface conditions on the particular date, at the specific location, as indicated on each soils log and on the plans. The ground water levels indicated on the test hole logs and shown on the Drawings were recorded at the time the test holes were performed. These water levels may vary seasonally and are shown for design and informational purposes only. Contractor shall assume responsibility for any conclusions that may be drawn from such information and the conclusions shall not be considered just cause for a claim for additional compensation or contract time extension. Contractor

should obtain and analyze such additional information as the Contractor may feel necessary and shall be responsible for any conclusions drawn from that information.

The Owner does not warrant the correctness of the soils investigation or of any interpretation, deduction, or conclusion given in the report relative to subsurface conditions. The Bidder shall make his own deductions and conclusions as to the nature of the materials to be excavated, the difficulties of making and maintaining the required excavations, the difficulties which may arise from subsurface conditions, and of doing any other Work affected by the subsurface conditions, and shall accept full responsibility therefore.

Article 1.7 Weather Limitations

Unless otherwise authorized by the Engineer, fill and backfill material, base course, and leveling course shall not be placed when the atmospheric temperature is below thirty-five degrees Fahrenheit (35°F). When the temperature falls below thirty-five degrees Fahrenheit (35°F), it shall be the responsibility of the Contractor to protect all areas of completed Work against any detrimental effects. Any areas of Work not completed in accordance with the Contract Documents that are damaged by weather shall be reconditioned, reshaped, and recompacted by the Contractor in conformance with the requirements of the Contract Document without additional cost to the Owner.

Article 1.8 Underground Utilities

The Contractor shall continuously support underground utilities during backfill placement and compaction. During backfill placement and compaction, the Contractor shall place geotextile fabric with a minimum twelve inch (12") separation from underground utilities, unless directed otherwise by the Engineer.

Article 1.9 Contaminated Material

Unless otherwise noted in the Contract Documents, the Owner is not aware of any contaminated material within the project limits. If such material is encountered, Contractor shall notify the Engineer immediately for direction. Unless the contamination was caused by Contractor's operation, discovery of contaminated material will be treated as a changed condition per Division 10, Section 10.05, Article 5.18 – Changed Conditions.

SECTION 20.02 STORM WATER POLLUTION PREVENTION PLAN

Article 2.1 General

The Work described in this Section shall consist of providing all labor, equipment, materials, and services to prepare, implement, and maintain a Storm Water Pollution Prevention Plan (SWPPP) for projects that may adversely impact receiving waters or waters of the United States. The type of plan required depends on the area disturbed by the project including the construction site and off-site activities which include, but may not be limited to, material sites, waste disposal sites, borrow and fill sites, and equipment and material storage areas.

For Projects that impact an area greater than five hundred (500) square feet or are deeper than four feet (4'), and less than ten thousand (10,000) square feet, a Type 1 SWPPP is required and the cost of the SWPPP is considered incidental to the Contract and no separate payment shall be made. A Type 2 SWPPP is required for Projects that disturb a project area between ten thousand (10,000) square feet and one (1) acre. A Type 3 SWPPP is required for all Projects that disturb one or more acres of land.

Article 2.2 Definitions and Web References

A. Area of Land Disturbance

The calculation of the acres of land (soil) that will be disturbed by any construction activity including clearing, grading, and excavating. Material and waste disposal sites must either have their own eNOI and SWPPP, or their disturbed land area must be included in the Project. Pavement area is not included if aggregate underlying the pavement is not removed.

B. BMPs (Best Management Practices)

BMPs are schedules of activities, prohibition of practices, maintenance procedures and other management practices. They include temporary or permanent structural and non-structural devices. BMPs, when used alone or in combination, minimize erosion and contain sediment within the project site, and prevent discharge of pollutants to water bodies and wetlands. Pollutant is defined in 40 CFR 122.2 (a partial listing of this definition includes solid waste, garbage, chemical wastes, dredged spoil, rock, sand).

C. CGP (Construction General Permit)

The Storm Water Construction General Permit for Discharges from Large and Small Construction Activities, issued by the Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES).

D. eNOI

Electronic Notice of Intent to begin construction activities under the Construction General Permit.

E. eNOT

Electronic Notice of Termination to end coverage under the Construction General Permit.

F. **Final Stabilization**

Final stabilization occurs when soil disturbing activities at the site have been completed and the following two criteria are met: (a) establish a uniform and evenly distributed perennial vegetative cover with a density of seventy percent (70%) of the native background vegetative cover for the area, on unpaved areas that are not covered by non-erodible permanent stabilization, and (b) equivalent non-erodible permanent stabilization, and (c) equivalent non-erodible permanent stabilization, and (c) equivalent non-erodible permanent stabilization measures have been constructed (such as riprap, gabions, geotextiles, and crushed aggregate base course) where vegetative cover is not required.

G. HMCP (Hazardous Material Control Plan)

The Contractor's detailed plan for prevention of pollution that stems from the storage, use, containment, cleanup, and disposal of hazardous material, including oil products related to construction activities and equipment.

H. SPCC Plan (Spill Prevention, Control and Countermeasure)

The Contractor's detailed plan for oil spill prevention and control measures that meets the requirements of 40 CFR 112.

I. SWPPP (Storm Water Pollution Prevention Plan)

The Contractor's detailed plan and record of activities, to prevent pollution and minimize erosion, and to contain sediment before it leaves the project site or enters waterways or wetlands.

- 1. SWPPP Amendment. A document that adds to, deletes from, or changes the SWPPP.
- 2. SWPPP Manager. The Contractor's representative in the field who supervises implementation of the SWPPP.
- 3. SWPPP Preparer. The person who prepares the initial SWPPP.
- 4. SWPPP Template. A template provided by the EPA for a uniform SWPPP format.

- 5. Type 1 SWPPP. A project-specific SWPPP developed by the Contractor in accordance with the Municipality's Storm Water Treatment Plan Review Guidance (SWTPRG) Manual that illustrates measures to minimize erosion and control sediment on a project. A completed and signed checklist, available in the SWTPRG Manual, is the basis for a Type 1 SWPPP.
- 6. Type 2 SWPPP. A SWPPP developed by the Contractor in accordance with the Municipality's Storm Water Treatment Plan Review Guidance Manual and based on the CGP SWPPP requirements. It is similar to a Type 3 SWPPP except that endangered species need not be documented and an eNOI is not required.
- 7. Type 3 SWPPP. A SWPPP developed by the Contractor in accordance with the EPA's CGP and fully meets the requirements of that permit.

J. Temporary Stabilization

Temporary stabilization measures are BMPs that protect disturbed land, material stockpiles, material sources, and waste disposal sites; until the next land disturbance, grading, material movement, or final stabilization occurs.

K. Internet References

The following websites about erosion, sediment and pollution control are referenced in this document or are considered good resources for information:

- 1. The EPA's "Developing your SWPPP, A Guide for Construction Sites," which includes a SWPPP template, is at www.epa.gov/npdes/swpppguide
- 2. The EPA National Menu of Storm Water Best Management Practices, is at www.epa.gov/npdes/stormwater/menuofbmps
- 3. The International Erosion Control Association website is at www.ieca.org
- 4. The Construction Industry Compliance Assistance Center website is at www.cicacenter.org
- 5. The Alaska SWPPP Guide, including template and inspection form is at www.dot.state.ak.us/stwddes/dcspubs/otherpubs.shtml
- 6. The EPA Construction General Permit, is at www.epa.gov/npdes/stormwater/cgp
- 7. The EPA eNOI Form 3510-9 is at www.epa.gov/npdes/stormwater/enoi
- 8. The status of EPA eNOI is at www.epa.gov/npdes/noisearch
- 9. The Municipality's Storm Water Treatment Plan Review Guidance Manual, including the Type 1 SWPPP checklist and an example inspection form is at http://www.muni.org/projectmgmt/publications.cfm.

Article 2.3 Plan and Permit Submittals

A. Hazardous Material Control Plan (HMCP) and Spill Prevention, Control and Countermeasure Plan (SPCC)

Submit two signed copies of the HMCP to the Engineer for approval. Submit one signed copy of the SPCC Plan (if required under Section 20.02, Article 2.5, SubArticle C - Hazardous Material Control Plan (HMCP) Requirements) to the Engineer. Deliver these documents to the Engineer no less than fourteen (14) calendar days before the Preconstruction Conference.

The Engineer will review the HMCP submittals within fourteen (14) calendar days. HMCP Submittals will be returned to the Contractor, and marked as either requiring modification or as approved by the Engineer. The Engineer will keep the SPCC Plan as a record document, and reserves the right to review it and require modifications.

B. All Storm Water Pollution Prevention Plans

Submit two signed copies of your SWPPP to the Engineer for approval. Deliver these documents to the Engineer no less than fourteen (14) calendar days before the preconstruction conference.

The Engineer will review the SWPPP submittals within fourteen (14) calendar days. Submittals will be returned to the Contractor, and marked as either requiring modification or as approved by the Engineer.

C. Type 3 Storm Water Pollution Prevention Plan Requirements

Sign and certify the approved SWPPP according to the Construction General Permit requirements, Appendix G, before submitting your eNOI. The SWPPP must also be signed and certified by the Engineer.

Submit your eNOI to EPA and submit a copy of your eNOI to the Engineer at the same time. The Engineer will submit the Municipality's eNOI to the EPA. Allow adequate time to receive coverage for State and Federal processing of both eNOIs, before beginning construction activities.

D. Additional Type 3 SWPPP submittal requirements for projects that disturb five acres or more of land.

Submit a copy of the Engineer-approved, signed and certified SWPPP, and copies of your eNOI and the Municipality's eNOI, with the required permit fee to the Alaska Department of Environmental Conservation (ADEC) Storm Water Coordinator. Transmit a copy of the ADEC acceptance letter to the Engineer.

E. Basis of Work.

The active status eNOIs, Engineer-approved SWPPP, Engineer-approved HMCP, submitted SPCC Plan (when required), and EPA Construction General Permit are the basis of the Work required for the Project's erosion, sediment, and pollution control.

F. Ending Permit Coverage for Type 3 SWPPPs.

Within thirty (30) days of when the Project is stabilized as determined by the Engineer, submit your eNOT to EPA and send a copy of the eNOT to the Engineer. Upon receipt of your eNOT, the Municipality will submit the Municipality's eNOT to the EPA, and will terminate the Construction General Permit coverage.

Article 2.4 Personnel Qualifications and Authority

- A. The SWPPP Preparer must meet the following qualifications:
 - a current certification as a Certified Erosion and Sediment Control Lead (CESCL), or as a Certified Professional in Erosion and Sediment Control (CPESC)
 - two years experience in erosion and sediment control
- B. SWPPP Manager:
 - 1. The SWPPP Manager must meet the following qualifications:
 - a. current certification as a Certified Erosion and Sediment Control Lead (CESCL), or as a Certified Inspector of Sediment and Erosion control (CISEC), or as a Certified Professional in Erosion and Sediment Control (CPESC)
 - b. two years experience in earthwork construction
 - c. a duly authorized representative, as defined in the Construction General Permit, Appendix G
 - d. knowledgeable in the principles and practices of erosion and sediment controls
 - e. in possession of the skills to assess conditions at the construction site that could impact storm water quality, and to assess the effectiveness of any pollution, sediment and erosion control measures selected
 - 2. Responsibilities:

The SWPPP Manager must be knowledgeable in the requirements of this Section, the SWPPP, the Best Management Practices, and, for Type 2 and

Type 3 SWPPPs, the Construction General Permit. The SWPPP Manager shall be responsible for and oversee the installation, maintenance and removal of erosion and pollution control BMPs, as detailed in the SWPPP or as directed by the Engineer.

The primary job of the SWPPP Manager shall be Work related to this Section. The SWPPP manager shall be on-site whenever land is being disturbed, moved, stockpiled, or disposed and shall inspect BMPs and update the SWPPP.

The SWPPP Manager must have the Contractor's authority to order immediate corrective action.

Article 2.5 Control and Prevention Plan Contents

A. Type 1 Storm Water Pollution Prevention Plan (SWPPP) Requirements

Use a SWPPP Preparer to visit the Project site and then develop a project specific Storm Water Pollution Prevention Plan, using the checklist in the Municipality's Storm Water Treatment Plan Review Guidance Manual.

Within the SWPPP include copies of:

- The HMCP
- A reference to SPCC Plan location (if required)
- Contractor signed certification of SWPPP
- B. Type 2 and 3 SWPPP Requirements

Follow the format of the SWPPP template presented in the EPA's Developing your SWPPP, A Guide for Construction Sites. Incorporate into the SWPPP the requirements of the project permits and the Contractor's progress schedule, equipment, and preferred BMPs. The Project site includes the construction site, material sites, waste disposal sites, haul roads, and other affected areas whether public or private.

The SWPPP must address preventing pollution, minimizing erosion, and containing sediment before it leaves the project site, or enters waterways or wetlands. Identify specific areas where pollution or erosion may occur, and describe BMPs including site-specific controls and procedures. Establish a record of land disturbance, and the installation, maintenance, and removal of BMPs. Describe temporary and permanent stabilization measures.

The SWPPP must address the activities of subcontractors, and of utility companies performing Work in the Project area. The SWPPP must describe the roles and responsibilities of the Contractor, subcontractors, utility companies and the Municipality with regard to implementation of the SWPPP.

All material and waste disposal sites must be included in the Project SWPPP, except when they have their own eNOI and SWPPP. Commercial material sites and waste sites that sell to both public and private purchasers usually have their own eNOI and SWPPP.

Specify the line of authority and designate a SWPPP Manager for implementing SWPPP compliance. Designate one representative for each subcontractor who performs land disturbing activities, or who installs and maintains erosion and sediment control measures.

Once construction begins, the SWPPP must be updated with records of land disturbance and erosion and sediment control activity.

Within the SWPPP include copies of:

- The HMCP
- A reference to SPCC Plan location (if required)
- Inspection reports, record updates and amendments required during construction
- Contractor signed certification of SWPPP

In addition, within a Type 3 SWPPP include:

- Contractor's eNOI
- Municipality's eNOI
- eNOIs submitted by other on-site operators
- EPA acknowledgement of receipt of each eNOI
- Contractor delegation of signature authority
- Municipality's delegation of signature authority
- Municipality's signed certification of SWPPP

C. Hazardous Material Control Plan (HMCP) Requirements

Prepare a HMCP for prevention of pollution that stems from the storage, use, containment, cleanup, and disposal of hazardous material, including oil products related to construction activities and equipment. (See 40 CFR 117 and 302 for listing of hazardous materials.) Collate Material Safety Data Sheets in one location and reference location in HMCP.

List the types and quantities of equipment and cleanup materials available on site. Include a list and location map of cleanup materials, at each different work site and readily available off site (main site, material site, batch plant, storage yard, explosives dump, equipment or fueling yard, etc). Specify the line of authority and designate a field representative for spill response, and one representative for each subcontractor.

List and give the location of hazardous materials, including office materials, to be used or stored on site, and estimated quantities. Store hazardous materials in covered storage areas.

Detail methods of disposing of waste petroleum products and other hazardous materials generated by the project.

Identify the locations where storage, fueling and maintenance activities will take place, describe the maintenance activities, and list controls to prevent the accidental spillage of oil, petroleum products and other hazardous materials.

Detail procedures for containment and cleanup of hazardous substances. Detail a plan for the prevention, containment, cleanup, and disposal of soil and water contaminated by accidental spills. Detail a plan for dealing with unexpected contaminated soil and water encountered during construction.

D. Spill Prevention, Control and Countermeasure (SPCC) Plan Requirements.

If the Project is subject to 40 CFR 112, then add a reference to the SPCC Plan in the SWPPP.

You may self-certify the SPCC Plan if total above ground oil storage capacity is 10,000 gallons or less, and you meet all the requirements for self-certification in 40 CFR 112. Otherwise the SPCC Plan must be certified by, stamped with the seal of, dated by, and signed by a Professional Engineer registered in the State of Alaska.

- 1. Prepare and implement a SPCC Plan when required by 40 CFR 112, including:
 - a. When oil spills may reach navigable waters; and
 - b. Total above ground oil storage capacity is greater than 1,320 gallons (including vehicle and equipment fuel tanks, but not counting containers that have a capacity less than 55 gallons).
- 2. Comply with 40 CFR 112 and address the following issues in your SPCC Plan:
 - a. Operating procedures that prevent oil spills;
 - b. Control measures installed to prevent a spill from reaching navigable waters; and
 - c. Countermeasures to contain, clean up, and mitigate the effects of an oil spill.

Article 2.6 Materials

Use materials approved by the Engineer.

Straw must be certified as free of noxious weed by the United States Department of Agriculture, Natural Resources Conservation Service, Local Soil and Water Conservative District, Alaska Weed Free Forage Certification Program.

Silt fence must conform to the Storm Water Treatment Plan Review Guidance Manual or as approved by the Engineer.

Construct rock check dams with clean, well-graded stone that conforms to Sections 20.18 – Drain/Filter Rock and 20.23 – Cobbles or as approved by the Engineer.

Temporary seed must consist of annual rye grass or a specified permanent seeding mixture.

Article 2.7 Construction

- A. Prior to Construction
 - 1. Projects with less than one acre of land disturbing activity: Contractor shall not begin construction activity until authorized by the Engineer.
 - 2. Projects that disturb one acre or more of land: Contractor shall not begin construction activity until the EPA has listed both your eNOI and the Municipality's eNOI as active status, and you are authorized by the Engineer. The EPA will post the status of the eNOIs on the EPA website.
 - 3. Post notices at publicly accessible locations near the active part of the Project. The posting must be protected from the weather, and located where the public can read it easily without obstructing construction activities (for example, at an existing pullout). Post notices near the beginning and end of the Project, and the project office, that include the following information:
 - Copy of eNOIs in effect;
 - Name and phone number of SWPPP Manager; and
 - Location of a SWPPP available for public viewing.
 - 4. Keep a copy of the updated SWPPP, HMCP and SPCC Plan at the Project site or locally available.
 - 5. Install an outdoor rain gauge and thermometer on the project site in a readily accessible location.
 - 6. The SWPPP Manager shall ensure that subcontractors and utility companies, understand and comply with the SWPPP, and avoid disturbing installed BMPs.

B. During Construction.

Comply with requirements of the approved HMCP, the submitted SPCC Plan, and all State and Federal regulations that pertain to the handling, storage, cleanup, and disposal of oil products or other hazardous substances. Contain, clean up, and dispose of discharges of oil and other hazardous materials. Perform fueling operations in a safe and environmentally responsible manner. Comply with the requirements of 18 AAC 75 and AS 46, Oil and Hazardous Substances Pollution Control. Report oil spills as required by federal, state and local law, and as described in the HMCP and SPCC Plan.

If storm water discharges threaten water quality, take immediate suitable action to preclude erosion and pollution.

BMPs that have been damaged or undercut, shall be repaired or replaced. If maintenance or modifications to existing BMPs are necessary following a storm or inspection, complete implementation as soon as possible and before the next storm event whenever practicable.

Maintain BMPs so they properly perform their function. Remove accumulated sediment and debris before the BMP loses fifty percent (50%) of its storage capacity, except silt fence shall be cleaned before it loses thirty percent (30%) of its storage capacity.

Maintain temporary and permanent erosion and sediment control measures in effective operating condition. Coordinate BMPs with subcontractors and utility companies doing Work in the Project area.

If you fail to install and maintain effective BMPs then payment may be withheld according to Division 10, Section 10.07, Article 7.5 – Progress Payments.

Additional requirements for projects with Type 3 SWPPPs:

- Keep the official updated SWPPP at the construction site.
- Comply with the requirements of the Construction General Permit, implement temporary and permanent erosion and sediment control measures identified in the SWPPP, and ensure that the SWPPP remains current.
- Report noncompliance which may endanger health or the environment to the EPA. Information must be provided orally within twenty-four (24) hours from the time the Contractor becomes aware of the circumstances. Submit written notice as described in the standard permit conditions #12 of the CGP.

C. Stabilization.

Land may be disturbed multiple times during a project. Stabilize disturbed areas as soon as practicable but no later than fourteen (14) days after each cessation of land-disturbing activities. Stabilization may be accomplished using temporary or permanent measures.

Temporary measures of stabilization could include a combination of temporary seeding, mulch, stabilizing emulsions, cover of gravel sub-base, cover with tarp or other methods.

Temporary seeding may be done by any application method at a rate of one-half pound per thousand square feet (0.5lb/1000sf). Roughen the surface to be seeded and apply seed. Maintain seeded areas and reseed areas not showing evidence of satisfactory growth. Within twenty-four (24) hours of installing a culvert, temporary seed the disturbed area or within a twenty-five foot (25') radius of the inlet and outlet of the culvert, whichever is greater.

When the land-disturbing activity is permanently ceased, apply permanent seed according to Division 75 – Landscaping.

D. Ending SWPPP Activities and Maintenance.

You may end SWPPP activities when the Engineer has determined:

- 1. That land disturbing activities authorized by the CGP have ceased;
- 2. The project site (including material sources, waste disposal sites, etc.) has achieved final stabilization;
- 3. Storm water discharges from construction activities have ceased; and
- 4. Temporary BMPs have been removed.

See Article 2.3 – Plan and Permit Submittals for submitting eNOTs and ending CGP coverage.

E. Record Retention for Type 3 SWPPPs

Retain copies of the SWPPP and other records required by the Construction General Permit, for at least three years after the date of eNOT.

Article 2.8 SWPPP Inspections, Reports and Amendments

Perform inspections, prepare inspection reports, and prepare SWPPP amendments in compliance with the project SWPPP and the Construction General Permit. The Contractor's SWPPP is the SWPPP of record that regulatory agencies will examine.

A. Construction Site Inspections. The SWPPP Manager shall conduct joint site inspections with the Engineer and additional personnel named at the following times:

- 1. Before starting construction with the SWPPP Preparer. Discuss implementation of the SWPPP, and placement dates of BMPs in relation to the progress schedule.
- 2. At least once per month during construction, with the SWPPP Preparer. Review the BMPs and SWPPP for conformance with the Construction General Permit. This meeting may be combined with other required meetings.
- At least once every seven (7) days during construction and within twenty-four (24) hours of the end of a storm exceeding one-half inch (1/2") in twenty-four (24) hours (as recorded at the Project site).
- 4. Before winter shutdown, to ensure that the site has been adequately stabilized and BMP devices are functional.
- 5. At project completion, to ensure final stabilization of the project.
- B. Winter Site Inspections. The SWPPP Manager shall conduct joint site inspections with the Engineer, at least once every month and within twenty-four (24) hours of a storm resulting in rainfall of one-half inch (1/2") or greater in twenty-four (24) hours if the following requirements are met:
 - 1. The entire site is temporarily stabilized; and
 - 2. Runoff is unlikely due to winter conditions (e.g. the site is covered with snow, ice or the ground is frozen).

The Engineer may waive winter monthly inspection requirements until one month before thawing conditions are expected to result in a discharge, if the following requirements are met:

- Below-freezing conditions are anticipated to continue for more than one month;
- Land disturbance activities have been suspended; and
- The beginning and ending dates of the waiver period are documented in the SWPPP
- C. Items to Inspect. Inspect the following items during a construction or winter site inspection:
 - 1. Disturbed areas that have not been finally stabilized
 - 2. Areas used for storage of erodible materials that are exposed to precipitation
 - 3. BMPs
 - 4. Locations where vehicles enter or exit the site
 - 5. Offsite material sources and waste disposal sites

- 6. Staging and equipment storage areas
- 7. Petroleum storage, handling and fueling sites
- 8. Hazardous material storage sites
- D. Inspection Reports.

Type 2 SWPPPs: Prepare reports on forms prepared and provided in the SWPPP.

Type 3 SWPPPs: Sign and certify the report according to the Construction General Permit Appendix G. Include reports as an appendix to the SWPPP. If the report identifies incidents of non-compliance with either the SWPPP or the Construction General Permit, then implement corrective action and record when the action was taken.

E. Updating Type 2 or Type 3 SWPPPs.

The SWPPP Manager shall keep the Contractor's SWPPP up to date at all times. Keep SWPPP amendments in the SWPPP document, with a summary of amendments. Keep inspection reports in the SWPPP document.

- 1. Record in the SWPPP:
 - a. The location, date of installation, date maintenance was performed and the date of removal for all BMPs;
 - b. The dates when major grading activities occur (begin and end dates);
 - c. The dates when construction activities temporarily or permanently cease on a portion of the site;
 - d. The dates when stabilization measures are initiated; and
 - e. The rainfall and outside air temperature each day.
- 2. Prepare SWPPP amendments, and initial and date them, within seven (7) days following an inspection:
 - a. whenever there is a change in design, construction, operation, or maintenance that could have a significant effect on the discharge of pollutants in storm water leaving the project site;
 - b. if during inspections it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in storm water discharges from the project site; and
 - c. Whenever inspections identify a problem that requires additional or modified BMPs.
- F. Submittals for Type 2 and 3 SWPPPs:
 - 1. SWPPP inspection reports within three working days of the inspection.

- 2. SWPPP amendments within three working days from date they were initialed.
- 3. Record of updates within seven working days of recording them in the SWPPP.
- 4. Contractor's SWPP to Engineer within 30 days of filing NOT.

Article 2.9 Measurement

The Work in this Section is measured by lump sum and will consist of all labor, materials, and equipment required to prepare and implement a SWPPP, including all required SWPPP amendments, revisions, inspections, and all other measures necessary to complete the Work.

Article 2.10 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment will be made under the following item:

ITEM	UNIT
Storm Water Pollution Prevention Plan (Type)	Lump Sum

SECTION 20.03 EXPLORATORY TEST PITS

Article 3.1 General

Work under this Section consists of furnishing an excavator, operator, and all related supplies in order to dig and fill exploratory test pits as directed by the Engineer prior to the commencement of construction activities.

Article 3.2 Materials

Contractor shall furnish an excavator capable of excavating to a minimum depth of twelve feet (12').

Article 3.3 Construction

Contractor shall excavate as directed by the Engineer. After inspection of the test pit is complete, Contractor shall backfill test pits with native material and compact them so that the ground is returned to its original condition. If directed by the Engineer, Contractor shall segregate the cast piles to avoid contamination.

Article 3.4 Measurement

Work performed under this Section is measured by the cost per hour for all personnel, equipment, and supplies necessary for completion of said Work. Down time or delays caused by equipment failure is included in the measurement and no additional payment will be made.

Article 3.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment is made under the following item:

ITEM	UNIT
Exploratory Excavation	Hour

SECTION 20.04 CLEARING AND GRUBBING

Article 4.1 General

The Work under this Section consists of removing all vegetation, brush, trees, logs, tree stumps, roots, and root mat to a Contractor-provided disposal site, and the preservation from damage of all items designated to remain. Limits of clearing and grubbing shall be in conformance with right-of-way easements, and stipulations, and as shown on the Drawings, staked by the Contractor, and approved by the Engineer.

Article 4.2 Construction

The Contractor shall do all clearing and grubbing necessary in the construction of roadways, bike trails, and utilities. Prior to clearing and grubbing, the Contractor shall stake the clearing limits. Trees, brush, roots, and root mat removed in the clearing, and grubbing operations shall be hauled to a disposal site provided by the Contractor as delineated in Division 10, Section 10.04, Article 4.9 – Disposal Sites.

Any areas designated to remain shall be protected per Division 75, Section 75.02, Article 2.3 – Construction.

Article 4.3 Measurement

The measurement of clearing and grubbing shall be by the acre or portion thereof as shown on the Drawings and staked by the Contractor and approved by the Engineer, or lump sum.

Article 4.4 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM	UNIT
Clearing and Grubbing	Acre
Clearing and Grubbing	Lump Sum

SECTION 20.05 CLEARING

Article 5.1 General

The Work under this Section consists of clearing the areas shown on the Drawings, staked by the Contractor, and approved by the Engineer of all logs, trees, brush, and other vegetation, and removal to a Contractor-provided disposal site, and the preservation from damage of all items designated to remain.

Article 5.2 Construction

The Contractor shall perform all clearing necessary within the areas shown on the Drawings and staked by the Contractor. All stumps shall be cut off a maximum of two inches (2") above the ground.

Any areas designated to remain shall be protected per Division 75, Section 75.02, Article 2.3 – Construction.

All material removed in the clearing operation shall be hauled to a disposal site provided by the Contractor as delineated in Division 10, Section 10.04, Article 4.9 – Disposal Sites. With prior approval of the Engineer, chipping may be an acceptable alternate to clearing and hauling away of spoils.

A. Clearing for Bike Trails

Overhanging limbs shall be pruned and treated to give a six foot (6') clear corridor on either side of the centerline with a nine foot (9') clearance above finished trail. Where filter fabric is specified, the stumps shall be cut flush with existing ground, or fill material may be placed to create a level surface for fabric placement.

B. Clearing for Sidewalks/Curb Ramps

Contractor shall prune and treat overhanging limbs and other vegetation to give full clearance of the sidewalk to a minimum height of ten feet (10') above and a minimum width of two feet (2') from the outside edges of the sidewalk, unless otherwise specified on the Drawings or directed by the Engineer.

Article 5.3 Measurement

The measurement of clearing shall be measured by the acre or portions thereof, as shown on the Drawings and staked by the Contractor, or lump sum. Clearing for bike trails, sidewalks, and curb ramps shall be measured by linear feet along the centerline of the improvement.

Article 5.4 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following units:

ITEM	UNIT
Clearing	Acre
Clearing	Lump Sum
Clearing for Bike Trail/Sidewalk/Curb Ramp	Linear Foot

SECTION 20.06 REMOVAL OF TREES

Article 6.1 General

The Work under this Section consists of the performance of all operations pertaining to the removal and disposal of trees nine and one-half inches (9 1/2") or greater in diameter measured at a point one foot (1') above the natural ground. This item will not be a pay item if clearing or clearing and grubbing is included in the Bid Schedule.

Article 6.2 Construction

Trees of the size described above which interfere with construction under this Contract shall be disposed of at a disposal site provided by the Contractor as delineated in Division 10, Section 10.04, Article 4.9 – Disposal Sites.

Removal and disposal of all trees less than nine and one-half inches (9 1/2") in diameter one foot (1') above the natural ground will be considered an incidental part of the excavation unless either the items clearing and/or clearing and grubbing are included in the Bid Schedule.

Article 6.3 Measurement

Each tree removed in the size range described will be counted.

Article 6.4 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following units:

ITEM	UNIT
Tree Removal	Each

SECTION 20.07 REMOVAL OF SIDEWALK AND CONCRETE APRON

Article 7.1 General

The Work under this Section consists of performing all operations pertaining to the removal and disposal of sidewalks and concrete aprons designated for removal, including wire mesh or steel reinforcement within the concrete sidewalk and apron, in accordance with the limits shown on the Drawings or as directed by the Engineer.

Article 7.2 Construction

Sidewalks or concrete aprons to be removed shall be saw cut or broken at a joint. Broken joints shall be finished, as required by the Engineer, to eliminate jagged edges. The Contractor shall dispose of this material at a Contractor-provided disposal site as delineated in Division 10, Section 10.04, Article 4.9 – Disposal Sites.

Article 7.3 Measurement

Sidewalk and concrete apron designated for removal will be measured in square yards regardless of thickness.

Article 7.4 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM	UNIT
Remove Sidewalk	Square Yard
Remove Concrete Apron	Square Yard

SECTION 20.08 REMOVAL OF CURB AND GUTTER

Article 8.1 General

The Work under this Section consists of performing all operations pertaining to the removal and disposal of existing curb and gutter designated for removal, including any wire mesh or steel reinforcement within the curb and gutter, in accordance with the limits shown on the Drawings or as directed by the Engineer.

Article 8.2 Construction

Curb and gutter to be removed shall be saw cut or broken at a joint. Broken joints shall be finished, as required by the Engineer, to eliminate jagged edges. The Contractor shall dispose of removed curb and gutter at a Contractor-provided disposal site as delineated in Division 10, Section 10.04, Article 4.9 – Disposal Sites.

Article 8.3 Measurement

Curb and gutter removal designated for removal will be measured in linear feet removed, measured along the face of the curb.

Article 8.4 Basis of Payment

Payment for this item shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM

UNIT

Remove Curb and Gutter

Linear Foot

SECTION 20.09 REMOVAL OF PAVEMENT

Article 9.1 General

The Work under this Section consists of performance of all operations pertaining to the removal and disposal of existing pavement in accordance with the limits indicated on the Drawings and as directed by the Engineer.

The Contractor will remove existing pavement (parking areas, driveways, etc.) within the right-of-way to a line one foot (1') back of the proposed improvements during the initial clearing/excavation operations. Further removal will be as directed by the Engineer in order to provide a proper transition between new and existing pavement. The intent is to minimize unnecessary removal of pavement.

The Contractor shall remove all pavement designated for removal, including pavement placed within the gutter pan. Removal of the pavement within the gutter pan shall be considered incidental to the bid item "Remove Existing Pavement" and no separate payment shall be made.

Article 9.2 Construction

Pavement shall be removed by the Contractor in a manner that will produce a straight, uniform edge along the section removed. The method of producing the straight edge shall be by cutting the section with an air chisel, wheel, power-driven saw, or other methods approved by the Engineer.

Contractor shall keep all pavement that is designated for removal free from objectionable material (concrete, steel, etc.) and shall dispose of pavement designated for removal at the Kloep Maintenance Station, 5701 Northwood Street. Contractor shall coordinate exact location and time of delivery with the General Foreman, Maintenance & Operations Department, Street Maintenance Division. If the removed pavement material under this Section contains objectionable material, as identified by the Engineer, then Contractor shall dispose of this material in accordance with Division 10, Section 10.04, Article 4.9 - Disposal Sites.

Article 9.3 Measurement

Pavement removed will be measured by the square yard of pavement designated for removal, regardless of thickness, except that no measurement will be made of pavement less than one inch (1") thick.

Article 9.4 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM

UNIT

Remove Pavement

Square Yard

SECTION 20.10 EXCAVATION FOR TRAFFIC WAYS

Article 10.1 General

The Work under this Section consists of furnishing all plant, labor, equipment, supplies, and material in performance of all operations pertaining to the excavation of unsuitable and/or surplus material for street, alleys, access roads, parking lots, sidewalks, curbs, gutter, and bike trails.

Additional excavation for roadways may be required when authorized in writing by the Engineer. Contractor shall not be entitled to additional compensation for performing excavation not previously authorized by the Engineer.

Article 10.2 Survey Stakes

The Contractor shall place control stakes on each side of, and beyond the limits of, the proposed excavation. Stakes will be set at grade breaks and on even grades at intervals not to exceed fifty feet (50'), with additional stakes on vertical curves. These shall be marked with the station, offset, and show the cut or fill to centerline or grid design grade.

Article 10.3 Miscellaneous

Public property lying within the right-of-way, such as signs and markers, that interferes with construction shall be removed and reset at the time and place as directed by the Engineer. Any damage by the Contractor shall be repaired or the item replaced in kind at the Contractor's expense.

Contractor shall remove culverts designated for salvage. Contractor shall deliver salvaged culverts to the location specified in the Contract Documents or as directed by the Engineer.

A disposal site for non-salvageable materials shall be provided by the Contractor per Division 10, Section 10.04, Article 4.9 – Disposal Sites

All existing valve boxes, cleanouts, manholes, etc. shall be located and exposed by the Contractor and carefully protected during the course of the Work. The Contractor, in conjunction with the Engineer, shall check all utilities prior to the start of the construction and record their condition. All manholes, catch basins, cleanouts, etc. will be checked for damage resulting from the Contractor's operation prior to final acceptance by the Owner. The Contractor is responsible for restoring all existing utilities to pre-existing conditions, and shall coordinate with the affected utility in having any necessary repairs completed.

All existing utilities requiring adjustment to grade shall be adjusted by the Contractor in accordance with the applicable Standard Details. Payment for such adjustment shall be as specified under the applicable Section of these Specifications.

Article 10.4 Unusable and Usable Excavation

Unusable excavation shall consist of all excavation which is excess or not suitable for classified fill or backfill as determined by the Engineer. When grubbing of the surface organic or root mat is not required elsewhere on the Drawings or Specifications, unusable excavation shall include the surface mat.

Usable excavation shall consist of material from excavation that is designated by the Engineer as suitable for fill or backfill.

If usable soil conditions are encountered at elevations different from those indicated on the Drawings, the Engineer may direct, in writing, that the excavation be altered to elevations either above or below those specified.

Any unauthorized excavation beyond the specified lines, grades, and cross sections shall be filled with classified fill or backfill and compacted without additional cost to the Owner. The Contractor shall control the banks of all excavated areas as necessary to prevent movement of soil in areas supporting existing foundations, slabs, poles or other structures.

Where unusable soils are encountered in the subgrade within the specified depth below finish grade as indicated on the Drawings, the Contractor shall excavate to a depth such that usable soils are uncovered or the depth below finished grade as directed by the Engineer. The excavations shall be uniformly shaped so that classified backfill material can be properly placed and compacted. The area shall be feathered to adjoining areas where usable material is found. Excavated area shall not be backfilled cross sectional elevations and measurements of the area excavated have been taken.

The Contractor shall be responsible for keeping all embankments and excavation well shaped and drained. The subgrade shall be maintained, compacted in cut sections if required, and kept free of leaves, sticks, or other debris.

The Contractor shall perform whatever work necessary to prevent flow and accumulation of surface water or ground water in excavations. Unless otherwise provided in the Special Provisions, all Work associated with pumping or dewatering shall be considered incidental to the Contract and no separate payment shall be made.

Article 10.5 Utilization or Disposal of Excavated Material

Excavated material conforming to the specifications for classified fill and backfill shall be used where practical for fill and backfill as directed by the Engineer. When this material is used, it shall be considered usable excavation. Usable excavation shall be compacted in accordance with Section 20.01, Article 1.5 - Compaction Standards. When not used on the Project site, the material shall be hauled away and treated as unusable excavation. Unless otherwise specified in the Special Provisions, the Contractor will not be required to transport usable excavation from one schedule of a Contract for use in another schedule of the same Contract unless they are continuous or adjacent.
Article 10.6 Excavation

The Contractor shall utilize whatever methods and equipment necessary to excavate to the limits designated by the Drawings and Specifications and authorized by the Engineer, except that no equipment or method may be utilized that because of its action deteriorates the subgrade making additional excavation necessary beyond the limits originally authorized.

Article 10.7 Measurement

The measurement of excavation will not include water or other liquids but will include topsoil, mud, muck, or other similar semi-solid material which cannot be drained or pumped away.

Usable excavation will be measured per cubic yard by cross section or at the option of the Engineer per cubic yard by truck count. Computation of truck volumes will be by actual measurement to arrive at truck loading, adjusted by an appropriate swell factor.

Unusable excavation will be measured per cubic yard by cross section, or per ton; or at the option of the Engineer per cubic yard by truck count. Computation of truck volumes will be by actual measurement to arrive at truck loading, adjusted by an appropriate swell factor.

Cross-section measurement of usable or unusable excavation shall be based on in-place volumes as determined by the average end areas of cross sections.

For all scale measured quantities, the Contractor shall furnish a scale certified by the State of Alaska for weighing excavation at a location agreeable to the Engineer. Weight tickets will be serialized and witnessed at the time of weighing by a Contractor-furnished weighman. The Engineer may at any time verify load weights and weighing process. Tickets shall be presented for each load at time of delivery to the Engineer or his designated representative.

Article 10.8 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment for usable excavation includes the costs of subsequent placement and compaction of the excavated material and shall not be paid separately as Classified Fill or Backfill. Payment for unusable excavation includes removal from the project site and disposal in accordance with Section 20.27 – Disposal of Unusable or Surplus Material.

Payment shall be made under the following units:

ITEM	UNIT
Usable Excavation	Cubic Yard
Unusable Excavation	Cubic Yard
Unusable Excavation	Ton

SECTION 20.11 GRADING EXISTING SURFACES

Article 11.1 General

The Work under this Section consists of performing all operations necessary to shape the existing ground prior to placement of the fill or surfacing material.

Article 11.2 Construction

To the extent indicated on the Drawings, and as directed by the Engineer, the Contractor shall grade the existing ground. Material removed from the high areas shall be used to fill the depressions. Where the existing ground has a slope greater than one vertical to four horizontal, the surface of such ground shall be plowed, steeped or broken up in such a manner that graded material will blend with the existing surface.

On trails, the graded material shall be compacted to ninety percent (90%) of the maximum density; for roads, the required compaction shall be ninety-five percent (95%) of the maximum density. Graded material which is excessively wet shall be aerated by means of blade graders, harrows, or other suitable equipment until the moisture content is satisfactory.

When the bid item is "Grading Existing Surfaces," no separate payment will be made for "Usable Excavation."

Article 11.3 Measurement

Measurement for grading shall be per lineal foot along the centerline of the constructed trail or roadway.

Article 11.4 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM

UNIT

Linear Foot

Grading Existing Surfaces

SECTION 20.12 DEWATERING

Article 12.1 General

The Work under this Section consists of performing all operations pertaining to the dewatering of Work areas or diversion of surface and subsurface water flows for excavation and backfill during construction operations.

Article 12.2 Materials

Contractor shall be responsible for the Dewatering Plan preparation, selection of materials and equipment, mobilization, operation, maintenance, removal of pumping facilities, piping, etc., used in dewatering operations.

Article 12.3 Construction

All construction requirements for design, installation, and operation of dewatering systems shall comply with current safety and environmental regulations.

The Contractor shall submit his Dewatering Plan to the Engineer a minimum of seven (7) days prior to beginning dewatering activities. The Dewatering Plan shall contain copies of all Contractor obtained permits and approvals. Dewatering activities shall not commence until the Engineer has approved the Plan.

Acceptance of Contractor's Dewatering Plan by the Engineer shall not relieve the Contractor of responsibility for the exercise of reasonable precaution, sound engineering judgment, prudent construction practices, overloading or misuse of existing or new structures, the adequacy and safety of such Works, and potential damage or undermining of existing or completed Work.

Water resulting from Contractor's dewatering effort may not be pumped or otherwise diverted into existing storm drains unless required permits, including, but not limited to, the Alaska Department of Environmental Conservation and Environmental Protection Agency, are obtained by Contractor. Under no circumstances will Contractor be allowed to divert water from the excavation onto roadways. Contractor shall provide disposal site for excess water and shall be responsible for securing all necessary permits and approvals. Contractor shall provide copies of permits and approvals to the Engineer.

The Contractor shall dispose <u>all</u> water from trench dewatering in accordance with Anchorage Municipal Code, Section 15.40, an ADEC-approved dewatering plan, and in a manner approved by the Engineer. All ground water shall be screened to prevent debris from entering creeks, lakes, ponds, wetlands areas and drainage systems. The Contractor shall furnish and install a silt fence at the perimeter of the easement area within the wetlands areas as an incidental item of construction. When dewatering is required during the course of construction, the Contractor shall submit an ADEC-approved dewatering plan prior to any dewatering activity.

Article 12.4 Measurement

The method of measurement for dewatering shall be lump sum for all Work.

Article 12.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM

UNIT

Dewatering

Lump Sum

SECTION 20.13 TRENCH EXCAVATION AND BACKFILL

Article 13.1 General

The Work under this Section consists of providing all materials and performance of all operations pertaining to items of Work involved in excavation, bedding, backfill, and compaction of trenches. When unsuitable or surplus material is removed from the job site, it will be paid for under the appropriate item. When material is imported, it will be paid for under the appropriate item.

The Contractor is subject to the same utilities check requirements as described under Section 20.10, Article 10.3 - Miscellaneous.

Article 13.2 Trench Excavation and Backfill - Description

This Work shall consist of all excavation and backfill of trenches as specified for pipe installation and all other miscellaneous items as specified in this Section.

Trench limits shall be shown on the Drawings, and staked in the field. Trench width at or below the top of the pipe shall be of a width that will allow compaction equipment to be utilized at the sides of the pipe. Trenches shall be of the necessary width for proper laying of pipe, conduit, or cable and the banks shall be sloped so as to conform to the prevailing safety requirements.

Trench depth shall be excavated not less than six inches (6") below the barrel of the pipe unless otherwise directed by the Engineer. Where maximum trench width is limited, as shown on the Drawings, the Contractor shall provide trench shoring or supports systems as necessary to ensure that the trench width does not exceed the established limits. The Contractor shall erect and maintain continuous trench barricades to prevent access around all excavations left open at the end of the workday. The Contractor shall provide and maintain adequate barricades to insure public safety at all times during the prosecution of the Work. All excavated material shall be stockpiled on geotextile fabric to limit damage to the existing vegetation.

If at any time the Engineer determines that the construction trench section is greater than the pay limits as shown on the Drawings and described herein, the Contractor may be required to implement appropriate construction techniques to reduce the trench section or absorb all costs associated with the greater trench section, including, but not limited to: replacement of pavement, curb and gutter, sidewalk, street amenities, landscaping, disposal of surplus material and furnishing classified backfill. The pay limits as shown on the Drawings and described herein are to limit pay quantities and incidental costs only and are not intended to limit or in any way alter the requirements of Occupational Safety and Health Administration (OSHA) or State of Alaska safety regulations. The Contractor is required to conduct all trenching operations in accordance with current safety standards.

The Contractor shall be responsible for any and all costs resulting from over excavation, including the need for additional backfill beyond the maximum pay limits as shown on the Drawings or described herein. In addition, the Contractor shall be responsible for the repair

or replacement of streets, alleys, driveways, buildings, sidewalks, curb and gutter, drainage patterns, gravel pads, fences, lawns, property corner markers, survey monumentation, street name signs, traffic control signs, light poles, trees, utilities, shrubbery, gardens, retaining walls, utility markers, rockeries, landscaping, or other public or private improvements damaged by the Contractor which are located outside of the horizontal pay limits defined above. The cost of repairing damage or replacing such facilities within the horizontal pay limits shall be included as part of the unit price for the pay item under construction or shall otherwise be considered incidental to the Contract.

Resurfacing of trench excavation and backfill shall conform to the appropriate sections of this Division, Division 40 – Asphalt Surfacing, and the Standard Details, as appropriate.

Article 13.3 Construction

A. Trench Excavation

The Contractor shall perform all excavation of every description and whatever substance encountered including rock and permafrost. Excavation will be to the extent indicated on the Drawings, and as staked in the field. All excavated materials for backfill shall be placed in an orderly manner and placed at a distance from the trench section which conforms to all state and/or federal safety codes.

All excavated organic or other unsuitable backfill materials shall be placed in a similar manner, but shall be kept separate from all excavated sandy, silty, or gravelly material. In addition, excavated materials suitable for bedding, foundation material, Type II or Type III material, shall be stockpiled separate from each other.

Time is of the essence; therefore, the Contractor shall not begin excavation of the trench until all materials, equipment, and personnel are present to complete the Work in the most expedient manner. Not more than four hundred feet (400') of trench shall be open in advance of pipe or conduit installation unless authorized, in writing, by the Engineer. Unless otherwise indicated in the Drawings and Specifications, all excavation will be open cut.

Where rock or permafrost is encountered, it shall be removed as shown on the Drawings or as directed by the Engineer, and shall be replaced with approved material.

B. Trench Dewatering

Contractor shall protect adjacent utilities and property by trench dewatering and to successfully install the new utility lines. Dewatering shall be performed in accordance with Section 20.12 - Dewatering.

C. Bedding

All pipe shall be placed in Class B or C bedding, as specified.

Bedding materials for the type specified shall conform to the requirements of Section 20.16 – Furnish Bedding Material.

Where Class B or C bedding material is available from trench excavation, the Contractor shall use care to separate it from unsuitable material. Class B or C bedding material shall be placed under and around the pipe in lifts not to exceed twelve inches (12"), and compacted to ninety-five percent (95%) of maximum density. In no case shall bedding material be placed above the spring line of the pipe in a single lift.

Where Class B or C bedding materials are encountered in the trench bottom, the trench shall be accurately graded to provide uniform bearing and support for each section of the pipe for its entire length, except for the portion of the pipe sections where it is necessary to excavate for the bell holes and other type joints and for the proper sealing of the joints. Bell holes and depressions for joints shall be dug after the trench bottom has been graded and, in order that the pipe will rest on the prepared bottom for as nearly its full length as practical, bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. Where unsuitable material such as, but not limited to hard pan or rock is encountered, the trench shall be over-excavated so a minimum of six inch (6") depth of bedding material is required to bring the trench bottom up to the specified grade. This bedding material shall be compacted to a minimum of ninety-five percent (95%) of maximum density prior to the installation of the pipe. If the Engineer determines that excavated material is unsuitable for bedding, he may direct the Contractor to "Furnish Bedding Material."

D. Trench Backfill

Trench backfill is defined as the placement of material above the level of bedding material. Material for backfill shall be obtained from trench excavation if the material is suitable or conforms to the specifications for backfill. If the Engineer determines that excavated material is unsuitable for trench backfill, he may direct the Contractor to "Furnish Trench Backfill." Backfill shall be placed in lifts and compacted in such a manner that ninety-five percent (95%) of maximum density is obtained unless otherwise specified in the Contract Documents. No separate payment will be made for compaction to ninety-five percent (95%) of maximum density. Where mechanical compaction is required, compaction shall be accomplished in accordance with Section 20.01, Article 1.5 - Compaction Standards. Backfill shall not contain broken bituminous pavement or Portland Cement Concrete, and shall be placed in accordance with Section 20.21 - Classified Fill and Backfill.

E. Locator Tape

Contractor shall provide and install a detectable locator tape properly coded and labeled identifying the utility or utilities installed in the trench. The locator tape shall not be less than five (5) mil, foil backed, and six inch (6") wide vinyl tape. The Contractor shall install the locator tape above and parallel to the axis of the utility

with no breaks in continuity. The Contractor shall install the locator tape three feet (3') below finish grade or two feet (2') deep in the street structural section. Installation of the locator tape is considered incidental to Trench Excavation and no separate payment shall be made.

F. Cleanup

This item consists of cleanup and finishing of all construction areas to their original condition or better. All Work shall be in accordance with Division 10, Section 10.05, Article 5.25 - Final Trimming of Work.

G. Insulation

Refer to Standard Detail XX for insulation installation.

Article 13.4 Measurement

Measurement of trench excavation and backfill will be per linear foot of horizontal distance for the various depths as set forth in the Bid Schedule. On sanitary sewer and storm drain construction, measurement will be from center to center of manholes, from center of manhole to center of catch basins, from center of manhole to center of cleanout wye, from center of manhole to end of out-fall piping. On all other construction, measurement will be from station to station as shown on the Drawings. Trench depth shall be measured from original ground to the bottom of bedding along centerline of pipe. If the trench excavation is performed under the same Contract with a roadway project, the depth of trench shall be measured from the bottom of bedding to the subgrade as it exists after the excavation necessary under the roadway project is complete.

If trench excavation is performed under the same Contract with a roadway project, the depth of trench shall be measured from the bottom of bedding to the subgrade as it exists after the excavation necessary under the roadway project is complete.

When rock or permafrost is encountered for the full depth of trench, it will be measured as stated above. When the rock or permafrost is encountered in the lower part of the trench only, measurement will be by the cubic yard of material excavated. The material overlying the rock or permafrost will also be paid by the cubic yard of material excavated.

Locator tape is incidental to this Bid Item.

Article 13.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following units:

ITEM	UNIT
Trench Excavation and Backfill (various depths)	Linear Foot
Trench Excavation and Backfill (various depths)	Cubic Yard
Rock Excavation and Backfill	Linear Foot
Rock Excavation and Backfill	Cubic Yard
Permafrost Excavation & Backfill	Linear Foot
Permafrost Excavation & Backfill	Cubic Yard
Trench Dewatering	Lump Sum
Insulation (R-Value)	Square Foot

SECTION 20.14 TRENCH EXCAVATION, BACKFILL AND COMPACTION FOR SERVICE CONNECTIONS

Article 14.1 General

The Work under this Section consists of performing all operations necessary for excavation, backfill, and compaction required for service connections and all other miscellaneous items as specified in this Section.

Article 14.2 Construction

A. Excavation

Excavation for service connections shall be unclassified and the Contractor shall excavate whatever substances that are encountered to the depth required for the connections. However, if rock or permafrost is encountered in the trench section different from what is shown on the Drawings, measurement and payment will be as delineated in Section 20.13, Articles 13.4 - Measurement and 13.5 - Basis of Payment.

Depth for service connections shall be as required by the utility. Variations in required depth will not be grounds for additional payment. It shall be the Contractor's responsibility to familiarize himself with the depth of the main line utilities and storm drain systems for the project. The Contractor shall excavate for service connections in such a manner that the excavation is ninety (90) degrees to the street line, whenever possible. The ditch shall be long enough to allow the service connection to be stubbed at the property line.

Trenches shall be of sufficient width at the bottom to allow for laying of the particular service (minimum two and one-half feet [2-1/2'] for single service). Excavation of all fill materials to virgin ground is required to provide safety for workmen utilizing the trench.

The Contractor shall be responsible for, and shall bear expenses incurred, in the event that a main line utility should be damaged during excavation or backfilling.

It shall be the responsibility of the Contractor during construction to keep all embankments and excavation well shaped and drained. The subgrade shall be maintained, compacted in cut sections if required, and kept free of leaves, sticks, and other debris.

The Contractor shall perform all Work necessary to prevent flow and accumulation of surface water or ground water in trenches. Unless otherwise provided in the Special Provisions, all Work associated with pumping or dewatering shall be considered a responsibility of the Contractor and shall be accomplished at no additional cost to the Owner. The Contractor shall submit as a part of his proposal the method to be used in the dewatering of the trench section.

B. Backfill

At such time as the Engineer may direct, but only after the service lines and appurtenances have been properly completed and inspected, the trenches and appurtenant structures shall be backfilled. The backfill material, free from clods or boulders, shall be placed by the Contractor in conformance with the codes and regulations of the Municipality. Backfill shall be placed and compacted in conformance with Section 20.13 - Trench Excavation and Backfill.

The material shall be placed and spread uniformly in successive layers not exceeding twelve inches (12") in loose thickness. The Engineer may approve lifts of greater thickness provided the equipment and method used will consistently achieve the specified density. The layers shall be carried up full width from the bottom of the fill to avoid the necessity of widening the edges after the center has been brought to grade. Each layer shall be compacted to a minimum of ninety-five percent (95%) of the maximum density at optimum moisture as determined by the method of testing noted in Section 20.01, Article 1.5 - Compaction Standards. Reasonable time shall be provided the Engineer to make field density determinations prior to placement of successive layers of material.

The maximum dimensions of any particle of the embankment material shall not be greater than two-thirds (2/3) of the compacted thickness of the layer in which it is placed. The top six inches (6") of embankment material for streets shall be Type II-A classified fill and backfill. Oversize material shall be removed. Portions of any layer in which the embankment material becomes segregated shall be removed and replaced with satisfactory material or shall be added to and remixed to secure proper gradation as directed by the Engineer. No separate payment will be made for any material removed or regraded in areas where material becomes segregated.

The Engineer may permit lifts in excess of twelve inch (12") thickness when fill or backfill is placed over swampy or saturated ground, or where he is satisfied that the Contractor's method and equipment will consistently produce the specified density. No frozen material shall be used for backfill. Backfill shall not be placed in frozen trench.

C. Notification

The Contractor shall notify the Engineer forty-eight (48) hours before starting excavation (excluding Saturday, Sunday and holidays) on all service connection requests which involve twelve (12) or less connections. On connection requested for subdivisions involving more than twelve (12) connections, one (1) week notification prior to excavating is required.

Article 14.3 Measurement

Trench excavation, backfill and compaction for service connections shall be measured as completed units. A standard connection will be considered fifty feet (50'). The Contractor will be allowed additional compensation if the distance from the main line utility to the property line exceeds fifty feet (50'). The additional compensation will be per linear foot.

Article 14.4 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM	UNIT
Trench Excavation, Backfill, and Compaction for Service Connections (up to fifty feet [50']) Single Service in Trench	Each
Trench Excavation, Backfill, and Compaction per Linear Foot of Trench (in excess of fifty feet [50']) Single Service in Trench	Linear Foot

SECTION 20.15 FURNISH TRENCH BACKFILL

Article 15.1 General

The work under this Section consists of performing all operations necessary to furnish trench backfill.

Article 15.2 Construction

The Engineer shall order in writing the amount and type of backfill material to be transported to the Project site. No payment will be made for backfill material under this item that has not been ordered in writing. Material hauled to the Project site shall meet the requirements for the type specified in Section 20.21 - Classified Fill and Backfill.

Article 15.3 Measurement

Trench backfill material furnished to the Project site shall be measured in tons (2000 lbs.) delivered to the Project site. Weights shall be obtained on a scale certified by the State of Alaska. All loads shall be accompanied with a serialized weight ticket witnessed at the time of weighing by a Contractor-furnished weighman. The Engineer may at any time verify load weights and the weighing process. Measurement of delivered material may include moisture up to a maximum of four percent (4.0%) of dry weight of material. When tests by the Engineer indicate that moisture contents in excess of four percent (4.0%) may be occurring consistently, the frequency of testing will be increased as necessary and the results averaged over a period of one week. When the average is greater than four percent (4.0%), the tonnage, as measured over the above period, shall be reduced by the difference. No credit will be due the Contractor when moisture content is less than four percent (4.0%). Testing will be done in accordance with standards provided in this Specification.

Article 15.4 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall be full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM Furnish Trench Backfill (Type)

> Page 44 Standard Construction Specifications Division 20 - Earthwork

UNIT

Ton

SECTION 20.16 FURNISH BEDDING MATERIAL

Article 16.1 General

The Work under this Section consists of performance of all operations pertaining to providing Class B and C bedding material for underground utilities.

Article 16.2 Materials

The coarse aggregate material conforming to the requirements specified below shall have a percentage of wear not to exceed thirty (30) after five hundred (500) revolutions, as determined by the current requirements of ASTM C-131.

A. Class "B" Bedding

Materials furnished by the Contractor for use as "B" bedding classified fill and/or backfill shall be graded within the limitations delineated below:

Class "B" Bedding

U.S. Std. Sieve	Cumulative % Passing by Weight
1"	100
3/8"	60-100
#4	40-85
#10	25-70
#40	5-40
#200	0-6

In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than thirty-five percent (35%) of that fraction passing the #4 sieve. The bedding material shall not include mechanically fractured materials.

B. Class "C" Bedding

Materials furnished by the Contractor for use as "C" bedding classified fill and/or backfill shall be graded within the limitations delineated below:

Class "C" Bedding

Cumulative % Passing by Weight
100
40-100
20-75
12-60
2-30
0-6

In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than twenty percent (20%) of that fraction passing the #4 sieve. The bedding material shall not include mechanically fractured materials.

C. Class "D" Bedding

Materials furnished by the Contractor for use as "D" bedding classified fill and/or backfill shall be graded within the limitations delineated below:

Class "D" Bedding

U.S. Std. Sieve	Cumulative % Passing <u>by Weight</u>
1"	100
3/4"	90-100
1/2"	50-70
3/8"	20-50
#4	0-10
#200	0-1

The bedding material shall not include mechanically fractured materials.

Article 16.3 Construction

Placement of Class B, C, or D bedding shall conform to the requirements of Section 20.13, Article 13.3 - Construction.

Article 16.4 Measurement

Measurement of Class B, Class C, and Class D bedding shall be per ton or per linear foot of bedding material placed in the trench.

Article 16.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following units:

ITEM	UNIT
Bedding Material (Class)	Ton
Bedding Material (Class)	Linear Foot

SECTION 20.17 FURNISH FILTER MATERIAL

Article 17.1 General

This Work under this Section consists of performance of all operations pertaining to providing filter material.

Article 17.2 Materials

Filter material shall be gravel or sand consisting of crushed or naturally-occurring granular material. It shall be free of clay particles and conforming to the gradation requirements below.

The coarse aggregate material conforming to the requirements specified below shall have a percentage of wear not to exceed thirty (30) after five hundred (500) revolutions, as determined by the current requirements of ASTM C-131.

Requirements for Grading of Filter Material Gradation (% Passing)

<u>Sieve</u>	<u>2"</u>	<u>1-1/2"</u>	<u>1"</u>	<u>3/4"</u>	<u>1/2"</u>	<u>3/8"</u>	<u>#4</u>	<u>#16</u>	<u>#50</u>	<u>#100</u>	<u>#200</u>
Туре А						100	95-100	45-80	10-30	0-10	0-3
Туре В						100		0-5			
Type C	100	95-100		0-20		0-5					
Type D			100	90-100	50-70	20-50	0-10				0-1

Foundry sand and other material which may be cementitous or not suitable for water percolation shall not be used.

Article 17.3 Construction

Filter material is defined as the material which is placed below, above, and on each side of a perforated pipe to form a subdrain. Filter material may also be used directly in the trenches without a perforated pipe to form a French drain. Refer to Standard Detail 55-3 for construction of a subdrain.

Article 17.4 Measurement

Measurement of filer material shall be per ton or per linear foot of material placed in the trench.

Article 17.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment for placing filter material for French drains is included in Section 20.13 - Trench Excavation and Backfill.

Payment for furnishing and placing filter material for subdrains is included in payment for Division 55, Section 55.03 - Subdrains.

Payment for this item includes furnishing the required type of filter material.

Payment shall be made under the following unit:

ITEM	UNIT
Filter Material (Type)	Ton
Filter Material (Type)	Linear Foot

SECTION 20.18 DRAIN/FILTER ROCK

Article 18.1 General

The Work under this Section consists of performing all operations pertaining to furnishing and placing a layer of drain/filter rock as shown on the plans or as directed by the Engineer.

Article 18.2 Materials

Materials furnished by the Contractor for drain/filter rock shall be graded within the limitations delineated below:

<u>U.S. Std. Sieve</u>	Cumulative <u>by W</u> <u>Drain Rock</u>	% Passing / <u>eight</u> <u>Filter Rock</u>
8"	100	-
6"	50-80	100
4"	25-50	50-80
3"	0-25	-
2"	0-10	
1"	-	0-10
#200	0-1	0-1

Drain/Filter Rock

Article 18.3 Construction

The drain/filter rock shall be handled, dumped, or spread into place so as to secure a stone mass of the dimensions shown on the Drawings.

Article 18.4 Measurement

Drain/filter rock shall be measured in tons complete and accepted in place.

Article 18.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM	UNIT
Drain Rock	Ton
Filter Rock	Ton

SECTION 20.19 FURNISH FOUNDATION BACKFILL

Article 19.1 General

The Work under this Section consists of performing all operations necessary for excavation, backfilling, compacting foundation materials and trenches.

Article 19.2 Materials

Foundation material for backfill shall consist of Type II, II-A, III, V, or VI classified backfill as specified in the Contract Documents or by the Engineer.

Article 19.3 Construction

If the trench material at the bottom of bedding does not furnish a suitable foundation, the Contractor shall remove the unsuitable material to whatever depth the Engineer determines and replace with foundation material from borrow. Foundation material shall be placed the full width of trench, in lifts not to exceed twelve inches (12") in thickness and compacted to a minimum of ninety-five percent (95%) of maximum density.

In the event of unauthorized over-excavation, the Contractor shall backfill with foundation material to the proper grade and compact to a minimum of ninety-five percent (95%) of maximum density for the full length of the over-excavated trench, all at no additional expense to the Owner.

Article 19.4 Measurement

Where the Contractor is ordered to remove unsuitable material below grade and replace it with foundation material, the material shall be paid for on a cubic yard or ton basis.

Article 19.5 Basis of Payment

Payment for the Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following units:

ITEM	UNIT
Foundation Backfill (Type)	Cubic Yard
Foundation Backfill (Type)	Ton

SECTION 20.20 UNCLASSIFIED FILL AND BACKFILL

Article 20.1 General

The Work under this Section consists of furnishing all plant, labor, equipment, supplies, and material in performance of all operations pertaining to the excavation, stockpiling on site, and placement of Unclassified Fill and Backfill.

Article 20.2 Material

Unclassified Fill and Backfill shall be defined as excavated non-organic material that is determined by the Engineer to be unsuitable for Classified Fill and Backfill and suitable for deposition in non-structural fill zones.

Article 20.3 Construction

Excavated material not conforming to the specifications of Section 20.21 - Classified Fill and Backfill shall be used as Unclassified Fill and Backfill adjacent to the fill-slopes to provide additional slope stability to the fill-slopes. Excess Unclassified Fill and Backfill not used shall be disposed of at a Contractor-furnished disposal site as delineated in Division 10, Section 10.04, Article 4.9 – Disposal Sites.

Article 20.4 Measurement

The measurement of excavation will not include water or other liquids, but will include topsoil, mud, muck, or other similar semi-solid material which cannot be drained or pumped away.

Unclassified Fill and Backfill will be measured per cubic yard by cross section.

Cross section measurement of Unclassified Fill and Backfill shall be based on in-place volumes as determined by the average end areas of cross sections.

Article 20.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM

UNIT

Unclassified Fill and Backfill

Cubic Yard

SECTION 20.21 CLASSIFIED FILL AND BACKFILL

Article 21.1 General

The Work under this Section consists of performing all operations necessary to furnish, place, and compact classified fill and backfill.

Article 21.2 Material

Classified fill and backfill shall contain no lumps, frozen material, organic matter, or other deleterious matter, and shall be durable and sound. It shall have a plasticity index not greater than six (6) as determined by ASTM D-424 and shall conform to one of the following types as required by the Drawings and Specifications. The coarse aggregate material conforming to the requirements specified below shall have a percentage of wear not to exceed thirty (30) after five hundred (500) revolutions, as determined by the current requirements of ASTM C-131.

The portion of the material retained on a #4 sieve shall be known as coarse aggregate. Both coarse and fine aggregates shall conform to the quality requirements of AASHTO M-147.

A. Type II

Materials furnished by the Contractor for use as Type II classified fill and/or backfill shall be graded within the limitations delineated below:

U.S. Std. Sieve	Cumulative % Passing <u>by Weight</u>
8"	100
3"	70-100
1-1/2"	55-100
3/4"	45-85
#4	20-60
#10	12-50
#40	4-30
#200	2-6

Type II

* In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than fifteen percent (15%) of that fraction passing the #4 sieve.

B. Type II-A

Materials furnished by the Contractor for use as Type II-A classified fill and/or backfill shall be graded within the limitations delineated below:

Type II-A

U.S. Std. Sieve	Cumulative % Passing by Weight
3"	100
3/4"	50-100
#4	25-60
#10	15-50
#40	4-30
#200	2-6

* In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than twenty percent (20%) of that fraction passing the #4 sieve.

C. Type III

Materials furnished by the Contractor for use as Type III classified fill and/or backfill shall be approved sand or gravel with a maximum of ten percent (10%) passing the #200 sieve.

D. Type IV

Materials furnished by the Contractor for use as Type IV classified fill and/or backfill shall be an approved material consisting of sand or gravel with a maximum of twenty-five percent (25%) passing the #200 sieve.

E. Type V

Materials furnished by the Contractor for use as Type V classified fill and/or backfill shall be graded within the limitations delineated below:

Type V

U.S. Std. Sieve	Cumulative % Passing by Weight
3"	100
1 1/2"	60-90
3/4"	40-80
#4	25-55
#10	15-45
#40	4-30
#200	2-6

* In addition to the grading limits listed above, at least thirty percent (30%) of the coarse aggregate particles shall have one or more mechanically fractured face.

F. Type VI

Materials furnished by the Contractor for use as Type VI classified fill and/or backfill shall be graded within the limitations delineated below:

Type VI

U.S. Std. Sieve	Cumulative % Passing by Weight
2"	100
1 1/2"	65-95
3/4"	50-80
1/2"	30-60
#4	20-50
#10	10-30
#40	5-25
#200	2-6

* In addition to the grading limits listed above, at least forty percent (40%) of the coarse aggregate particles shall have one or more mechanically fractured face.

Article 21.3 Construction

The subgrade shall be cleared of all debris and organic material. All depressions or holes below the general area surface level, whether caused by removal of debris or

unacceptable material, or otherwise, shall be backfilled with approved material and compacted to specified density and to a level, uniform surface before the placement of other layers. Embankment shall not be placed on frozen ground, nor on ground having a slope greater than one vertical to four horizontal (slope 1:4).

The specified material shall be constructed at the locations and to the lines and grades indicated on the Drawings. The material shall be placed and spread uniformly in successive layers not exceeding twelve inches (12") in loose thickness. The Engineer may approve lifts of greater thickness provided the equipment and method used will consistently achieve the specified density. The layers shall be carried up full width from the bottom of the fill to avoid the necessity of widening the edges after the center has been brought to grade. Each layer shall be compacted to not less than ninety-five percent (95%) of the maximum density at optimum moisture as determined by the method of testing noted in Section 20.01, Article 1.5 – Compaction Standards. Reasonable time shall be provided the Engineer to make field density determinations prior to placement of successive layers of material.

Blading, rolling, and tamping shall continue until the surface is smooth, free from waves and irregularities, and conforms to elevations shown on the Drawings. If at any time the material is excessively wet, it shall be aerated by means of blade graders, harrows, or other suitable equipment until the moisture content is satisfactory. The surface shall then be compacted and finished as specified above.

Contractor shall submit a processing and blending plan to the Engineer for review and approval prior to utilization of classified fill or backfill from more than one source. The plan must be accompanied by materials analysis reports for each material source and fully describe how the material will be placed and blended to ensure that timely and accurate in-place density testing can be achieved.

The maximum dimensions of any particle of the embankment material shall not be greater than two-thirds (2/3) of the compacted thickness of the layer in which it is placed unless specified elsewhere. The top six inches (6") of embankment material for roads, streets, parking lots, and bike trails, shall be Type II-A classified fill and backfill. Oversize material shall be removed. Portions of any layer in which the embankment material becomes segregated shall be removed and replaced with satisfactory material or shall be added to and remixed to secure proper gradation as directed by the Engineer. No separate payment will be made for any material removed or regraded in areas where material becomes segregated.

The Engineer may permit lifts in excess of twelve inch (12") thickness when classified fill or backfill is placed over swampy or saturated ground, or where he is satisfied that the Contractor's method and equipment will consistently produce the specified density.

Embankments for bike trail sections will be brought to grade in one (1) single lift for embankments less than eighteen inches (18") to finish grade. Trail embankments over eighteen inches (18") shall be brought to grade in lifts as directed by the Engineer.

Article 21.4 Measurement

Classified fill or backfill material, obtained from borrow pits, will be measured in tons (2000 lbs.) of material delivered and placed in accordance with these Specifications. The measurement may include moisture up to a maximum of four percent (4.0%) of dry weight of the material. When tests by the Engineer indicate that moisture contents in excess of four percent (4.0%) may be occurring consistently, the frequency of testing will be increased as necessary and the results averaged over a period of one week. When this average is greater than four percent (4.0%), the tonnage as measured over the above period, shall be reduced by the difference. No credit will be due the Contractor when moisture content is less than four percent (4.0%). Testing shall be done in accordance with Section 20.01, Article 1.3 - Applicable Standards.

Imported classified fill and backfill will be weighed on a scale certified by the State of Alaska. Weight tickets will be serialized and witnessed at the time of weighing by a Contractor-furnished weighman. The Engineer may at any time verify load weights and the weighing process.

Where excavation of unsuitable material beyond the lines and grades shown on the Drawings is ordered in writing, the measurement of classified backfill will include the material required for replacement. No measurement will be made for quantities placed beyond the lines and grade authorized or for quantities placed outside the limits of required excavation.

The Contractor and the Engineer shall verify daily the quantity of material delivered to the Project site. Weight tickets not presented at time of delivery will require special verification by the Contractor before payment can be made.

Article 21.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment for the placement and compaction of usable excavation shall not be paid under this Section.

Payment shall be made under the following units:

ITEM	UNIT
Classified Fill and Backfill (Type)	Ton

SECTION 20.22 LEVELING COURSE

Article 22.1 General

The Work under this Section consists of performing all operations necessary to complete construction of the leveling course on the prepared subbase.

Article 22.2 Material

The leveling course shall consist of crushed gravel, rock, sand, or other approved material. The aggregate shall be free from lumps, balls of clay, or other objectionable matter, and shall be durable and sound. The portion of the material retained on a No. 4 sieve shall be known as coarse aggregate. Both coarse and fine aggregates shall conform to the quality requirements of AASHTO M-147.

Upon written approval by the Engineer, recycled asphalt concrete pavement (RAP) may be substituted for leveling course, on an inch for inch basis. All RAP shall conform to Division 40, Section 40.08 – Recycled Asphalt Pavement. RAP which has been derived from environmentally contaminated aggregates shall not be accepted.

A. Coarse Aggregate

The coarse aggregate material conforming to the requirements specified above shall have a percentage of wear not to exceed thirty-five (35) after five hundred (500) revolutions, as determined by the current requirements of ASTM C-131. It shall consist of angular fragments reasonably uniform in density and quality, and reasonably free from thin and elongated pieces, dirt, and other objectionable material. At least fifty percent (50%) of the coarse aggregate particles shall have two or more mechanically fractured faces.

B. Fine Aggregate

The fine aggregate shall consist of material free of organic or other objectionable matter. The fine aggregate, either naturally combined with the coarse aggregate or separately obtained and mixed therewith, shall be of such character that the composite material will conform to the gradation and other requirements specified.

C. Gradation

The composite mixture of coarse aggregate and fine aggregate, processed as hereinafter specified, shall conform to the following gradation limits as required by the Drawings:

Leveling Course

U.S. Std. Sieve	Cumulative % Passing by Weight
1"	100
3/4"	70-100
3/8"	50-80
#4	35-65
#8	20-50
#50	8-28
#200	*2-6

*In addition to the grading limits stipulated above, fractions passing the #200 sieve shall not be greater than seventy-five percent (75%) of the fractions passing the #50 sieve.

Article 22.3 Construction

The leveling course shall be placed to the lines, grades, and thicknesses shown on the Drawings and shall consist of the materials hereinbefore specified. The leveling course shall provide a smooth stabilized surface on which to place the pavement.

A. Preparation of Subbase

Subbase preparation shall consist of dressing, shaping, wetting, and compacting of the subbase to a minimum density of ninety-five percent (95%) in accordance with Section 20.01, Article 1.5 - Compaction Standards. Surfaces shall be cleaned of all foreign substances and debris. Any ruts or soft yielding spots that may appear in the subbase surface shall be corrected by loosening, removing and adding approved material, reshaping, and recompacting the affected areas to the line, grade, and to the specified density requirements.

B. Surveying

Subbase and leveling course control stakes shall be wooden bluetops set to finish subbase. The subbase bluetops will be the reference used by the Contractor to set top of leveling course. Subbase bluetops shall be set at breaks in grade and on even grade at intervals not to exceed fifty feet (50'), with additional stakes at vertical curves. Side control will be from the lip or gutter, or in the case of strip paving, additional bluetops shall be provided.

C. Placing

The approved leveling course material shall be deposited and spread in a uniform layer to the required contour and grades and to such loose depth that when compacted to the density required will achieve the specified thickness. The material shall be spread uniformly on the prepared subbase from moving vehicles or spreading boxes, then leveled to the required contour and graded with blade graders. Portions of the layer which become segregated in spreading shall be remixed to the required gradation.

D. Compacting

The leveling course shall be compacted to a minimum of ninety-five percent (95%) of maximum density. In all places not accessible to the rolling equipment, the mixture shall be compacted with tamping equipment. Blading, rolling and tamping shall continue until the surface is smooth and free from waves and inequalities. If at any time the mixture is excessively moistened by rain, it shall be aerated by means of blade graders, harrows or other approved equipment until the moisture content is such that the surface can be recompacted and finished as above. The finished leveling course shall be maintained by the Contractor in the above condition until the pavement is applied.

E. Smoothness Test

The surface of the leveling course, when finished, shall not show any deviation in excess of three-eighths inch (3/8") when tested with a ten foot (10') straightedge applied parallel with, and at right angles to, the centerline of the area to be paved. Any deviation in excess of this amount shall be corrected by loosening, adding, or removing material and reshaping and compacting to satisfy the above requirement.

Contractor shall obtain written approval from the Engineer for the final leveling course grade prior to pavement placement.

Article 22.4 Measurement

The leveling course shall be measured in tons of materials delivered and placed in accordance with these Specifications . The measurement may include moisture up to a maximum of four percent (4.0%) of dry weight of the material. When tests by the Engineer indicate that moisture contents in excess of four percent (4.0%) may be occurring consistently, the frequency of testing will be increased as necessary and the results averaged over a period of one week. When this average is greater than four percent (4.0%), the tonnage as measured over the above period, shall be reduced by the difference. No credit will be due the Contractor when moisture content is less than four percent (4.0%). Testing shall be done in accordance with Section 20.01, Article 1.3 – Applicable Standards.

Article 22.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

UNIT

Leveling Course

ITEM

Ton

SECTION 20.23 COBBLES

Article 23.1 General

The Work under this Section consists of performing all operations pertaining to furnishing and placing a layer of cobbles as shown on the Drawings or as directed by the Engineer.

Article 23.2 Materials

Materials furnished by the Contractor for cobbles shall be graded within the limitations delineated below:

Cobbles

U.S. Std. Sieve	Cumulative % Passing <u>by Weight</u>
12"	100
8"	50-80
6"	25-50
3"	0-25
2"	0-10
#200	0-1

Article 23.3 Construction

The cobbles shall be handled, dumped, or spread into place so as to secure a stone mass of the dimensions shown on the Drawings.

Article 23.4 Measurement

Cobbles shall be measured in tons complete and accepted in place.

Article 23.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM	UNIT
Cobbles	Ton

SECTION 20.24 RIPRAP

Article 24.1 General

This work shall consist of furnishing and placing a protective covering of stone as shown on the Drawings or as directed by the Engineer.

Article 24.2 Materials

Stone for this work shall be hard angular quarry stones and have a percentage of wear of not more than fifty (50) at five hundred (500) revolutions as determined by ASTM C-535. The least dimension of any piece of stone shall be not less than one-fourth (1/4) its greatest dimension. Stones shall meet the following gradation requirement for the class specified:

A. Class I

No more than ten percent (10%) of the stones by total weight shall weigh more than fifty (50) pounds per piece and no more than fifty percent (50%) by total weight of the stones shall weigh less than twenty-five (25) pounds per piece.

B. Class II

No more than ten percent (10%) of the stones by total weight shall weigh more than four hundred (400) pounds per piece and no more than fifteen percent (15%) by weight of the stones shall weigh less than twenty-five (25) pounds per piece. The stones shall be evenly graded and a minimum of fifty percent (50%) by weight of the stones shall weight two hundred (200) pounds or more per piece.

C. Class III

No more than ten percent (10%) of the stones by total weight shall weigh more than one thousand four hundred (1,400) pounds per piece and no more than fifteen percent (15%) of the stones shall weigh less than twenty-five (25) pounds per piece. The stones shall be evenly graded and a minimum of fifty (50%) by weight of the stones shall weigh seven hundred (700) pounds or more per piece.

Article 24.3 Construction

A footing trench shall be excavated along the toe of the slope when shown on the plans. The stones shall be handled or dumped into place so as to secure a stone mass of the thickness, height and length shown on the plans, or as staked with a minimum of voids.

Undesirable voids shall be filled in with small stones or spalls. The rock shall be manipulated sufficiently by means of a bulldozer, rock tongs, or other suitable equipment to secure a reasonably regular surface and mass stability.

Riprap protection shall be placed to its full course thickness at one operation and in such manner as to avoid displacing the underlying material. Placing of riprap protection in layers or by dumping into chutes or by similar methods likely to cause segregation will not be permitted.

All material going into riprap protection shall be so placed and distributed that there will be no large accumulation or area composed largely of either the larger or smaller sizes of stone.

Unless otherwise authorized by the Engineer, the riprap protection shall be placed in conjunction with the construction of the embankment with only sufficient lag in construction of the riprap protection as may be necessary to prevent mixture of embankment and riprap material.

The Contractor shall provide a level compact area of sufficient size to dump and sort typical loads of riprap at approved location(s). He shall further dump loads specified in this area and assist the Engineer as needed to sort and measure the stones in the load for the purpose of determining if the riprap is within specifications. Mechanical equipment as needed to assist in this sorting shall be provided by the Contractor at no additional cost to the Owner.

Article 24.4 Method of Measurement

Riprap shall be measured in cubic yards measured by neat line measure, or tons, completed and accepted in place. Excavation and backfill required for placement of riprap is considered incidental to the bid item.

Article 24.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

When more than one class of riprap is specified for any pay item, letter suffixes shall be included within the parentheses of the item numbers in order to differentiate between the different classes.

Payment will be made under the following item:

ITEM	UNIT
Riprap (Class)	Cubic Yard
Riprap (Class)	Ton

SECTION 20.25 GEOTEXTILE FABRIC

Article 25.1 Description

The Work under this Section shall consist of furnishing and installing Geotextile Fabric for embankment separation, subgrade reinforcement of roadways, subsurface drainage, or riprap lining in a manner and at locations as shown in the Drawings or as directed by the Engineer.

Article 25.2 Materials

A. Type A Geotextile

Type A Geotextile shall be used for separation. The Type A Geotextile shall be a woven or nonwoven pervious fabric constructed from long chain polymeric filaments such as polypropylene, polyethylene, polyester, polyvinylidene chloride or polyamide formed into a stable network such that the filaments or yarns retain their relative position to each other. The geotextile shall be inert to commonly encountered chemicals and shall be free from defects.

Non-woven geotextile may be formed by the needle-punched, spun-bonded or melt-bonded process.

Woven geotextile shall be a pervious sheet of yarn woven into a uniform pattern with distinct and measurable openings. Edges of the cloth shall be salvaged to prevent the outer yarn from pulling away from the cloth.

Acceptance of geotextile material is to be determined according to ASTM D-4873.

Geotextile manufacturer shall provide a letter certifying that its geotextile product meets the specified requirements.

Type A Geotextile supplied shall meet the physical and mechanical properties as follows:
Type A Geotextile

Geotextile Property	Test Method	<u>Value</u> ⁽¹⁾
Tensile Strength, lbs., min.	ASTM D-4632	180
Tensile Elongation, %	ASTM D-4632	30
Burst Strength, psi.	ASTM D-3786	400
Trapezoid Tear, lbs.	ASTM D-4533	70
Puncture Strength, lbs.	ASTM D-4833	70
Permittivity, Sec ⁻¹	ASTM D-4491	0.02
Ultraviolet Resistance, % ⁽²⁾	ASTM D-4355	70
Apparent Opening Size (AOS), US Sieve	ASTM D-4751	50

Notes:

- ⁽¹⁾ Percent of tensile strength retained per ASTM D-4632 after conditioning of 500 hours in accordance with ASTM D-4355.
- ⁽²⁾ Minimum Average Roll Values

B. Type B Geotextile

Type B Geotextile shall consist of a regular grid structure formed by biaxially drawing a continuous sheet of select polypropylene material; it shall have aperture geometry and rib and junction cross sections sufficient to permit significant mechanical interlock with the material being reinforced.

Type B Geotextile shall have high flexural rigidity and high tensile strength at ribs and junctions of the grid structure.

Type B Geotextile shall maintain its reinforcement and interlock capabilities under repeated dynamic loads while in service and shall also be resistant to ultraviolet degradation, to damage under normal practices, and to all forms of biological or chemical degradation normally encountered in the material being reinforced.

Type B Geotextile shall meet the mechanical and physical properties listed below:

Type B Geotextile

Geotextile Property	Test Method	Value
INTERLOCK Aperture size ⁽¹⁾ - MD, inch - CMD, inch	ID Calipered ⁽²⁾	1.0 (nom) 1.3 (nom)
Open Area, %	COE Method ⁽³⁾	70 (min)
Thickness - ribs, inch - junctions, inch Secant aperture stability modulus @ 20cm-kg/deg ⁽⁴⁾	ASTM D-1777 Grid Aperture Test UAF ⁽⁵⁾	0.03 (nom) 0.11 (nom) 3.20
REINFORCEMENT		
Flexural rigidity - MD,mg-cm - CMD, mg-cm Tensile modulus - MD, pound/foot	ASTM D-1388 ⁽⁶⁾ GRI-GG1 ⁽⁷⁾	250,000 (min) 270,000 (min) 14 000 (min)
- CMD, pound/foot		20,000 (min)
Junctions - Strength - MD, pound/foot - CMD, pound/foot - Efficiency - MD, % - CMD, %	GRI-GG2 ⁽⁸⁾ GRI-GG2 ⁽⁸⁾	765 (min) 1,260 (min) 90 (min) 90 (min)
MATERIAL	ASTM D-4101 Group 1/Class 1/	98 (min)
	Grade 2	
Cardon black, %	ASTM D-4218	0.5 (min)

Notes:

- ⁽¹⁾ MD dimension is along roll length. CMD dimension is across roll width.
- ⁽²⁾ Maximum inside dimension in each principal direction measured by calipers.
- ⁽³⁾ Percent open area measured without magnification by Corps of Engineers method as specified in CW 02215 Civil Works Construction Guide, November 1977.
- ⁽⁴⁾ Secant aperture stability modulus value listed is equal to the mean value less approximately one standard deviation.
- ⁽⁵⁾ Grid Aperture Stability Test developed by Dr. T. Kinney at the University of Alaska, Fairbanks.
- ⁽⁶⁾ ASTM D-1388 modified to account for wide specimen testing.
- (7) Secant modulus at 2% elongation measured by Geosynthetic Research Institute test method GG1 "Geogrid Tensile Strength." No offset allowances are made in calculating secant modulus.
- ⁽⁸⁾ Geogrid junction strength and junction efficiency measured by Geosynthetic Research Institute test method GG2 "Geogrid Junction Strength."

Geotextile manufacturer shall provide a letter certifying that its geotextile product meets the specified requirements.

C. Type C Geotextile

Type C Geotextile shall be used for drainage or riprap lining. The geotextile shall be constructed from long chain polymeric filament or yarns such as polypropylene, polyethylene, polyester, nylon, polyvinylidene chloride or polyamide formed into a stable network such that the filaments or yarns retain their relative position to each other. The geotextile shall be inert to commonly encountered chemicals and shall be free from defects.

Non-woven geotextile may be formed by the needle punched, spun-bonded or melt-bonded process.

Woven geotextile shall be a pervious sheet of yarn woven into a uniform pattern with distinct and measurable openings. Edges of the cloth shall be salvaged to prevent the outer yarn from pulling away from the cloth.

The geotextile fabric supplied shall meet the physical and mechanical properties listed below:

		Subsurface	Riprap	Liner
Geotextile Property	Test Method	<u>Drainage</u>	<u>Unprotected</u> ⁽¹⁾	Protected ⁽²⁾
Tensile Strength, lbs.	ASTM D-4632	90	200	90
Elongation, %	ASTM D-4632	N/A	15-70	15-70
Burst Strength, psi	ASTM D-3786	125	320	140
Puncture Strength, lbs.	ASTM D-4833	25	80	40
Trapezoid Tear, lbs.	ASTM D-4533	25	50	30
Apparent Opening Size	ASTM D-4751	70 min.	(3)	(4)
Seam Strength, lbs.	ASTM D-4632	N/A	180	80
Permittivity	ASTM D-4491	50 (gal./min. ft.²)	0.5 (sec. ⁻¹)	0.5 (sec. ⁻¹)
Ultraviolet Degradation ⁽⁵⁾ , %	ASTM D-4355	70	70	70

Subsurface/Riprap Liner Geotextile

Notes:

- (1) Unprotected Erosion Control applications are those in which fabrics are used under conditions where installation stresses are more severe than Class B, i.e., stone placement height should be less than three feet (3') and stone weights should not exceed two hundred fifty (250) pounds.
- (2) Protected Erosion Control applications are those in which fabrics are used in structures or under conditions in which the fabric is protected by sand cushions or by "zero drop height" placement of stone.
- $^{(3)}$ Soil with 50% or less particles by weight passing US No. 200 Sieve.
- ⁽⁴⁾ Soil with more than 50% particles by weight passing US No. 200 Sieve.
- ⁽⁵⁾ Percent of minimum tensile strength (ASTM D-4632) retained after weathering per ASTM D-4533 for 500 hours.

Acceptance of geotextile material shall be determined according to ASTM D-4759.

Geotextile manufacturer shall provide a letter certifying that its geotextile product meets the specified requirements.

D. Submittal Requirements

The following information shall be submitted to the Engineer for review and acceptance:

1. Full-scale laboratory testing and in-ground testing of pavement structures reinforced with the proposed geotextile product which illustrates significant structural contribution of the geotextile product to the pavement structure.

- 2. Certified test results stating that the geotextile product meets the material and physical properties in all respects.
- 3. Guidelines to pavement design using proposed geotextile product.
- 4. A list of not less than ten (10) comparable projects, in terms of size and application, in the United States, with references and phone numbers, where the results of the proposed geotextile product's use can be verified after a minimum of three years continuous service life.
- 5. Geotextile product samples and certified material property data sheets.
- 6. Recommended installation instructions.

Article 25.3 Construction

A. Surface Preparation

Prepare surface by removal of stumps, boulders, and sharp objects in accordance with Section 20.05 - Clearing. Contractor shall fill holes and large ruts with material shown on the Drawings or as approved by the Engineer.

Clearing shall be considered incidental to this item. Material used to fill ruts and holes shall be paid for at the unit price for the type of material used, as shown on the Drawings or as approved by the Engineer.

In Areas to Be Surcharged: All trees and brush having a trunk base diameter greater than one-half inch (1/2") shall be cut to within two inches (2") of original ground surface. Grass shall be flattened with no more than two passes of a tracked vehicle.

B. Geotextile Placement

Unroll geotextile directly onto the prepared surface. Exposure of geotextile to the elements after removal of protective covering shall not exceed five days.

Unroll geotextile for embankment reinforcement parallel to the embankment centerline.

Geotextile shall be placed in daily work sections so the lap adjustment can be made should movement of the geotextile occur during placement of fill.

- C. Joining
 - 1. Type A Geotextile

Fabric shall be joined with adjacent pieces of fabric by sewing or overlapping.

If fabric is sewn, the fabric shall have all seams sewn by butterfly or J-seams and shall develop a minimum of eighty-five percent (85%) of the specified strength. Seams shall be sewn with a double-thread chain-lock stitch. High strength polyester, polypropylene or Kevlar thread shall be used. The seam shall be one and one-half inch plus or minus one-quarter inch $(1-1/2" \pm 1/4")$ from the outside edge of the geotextile.

2. Type B Geotextile

Sections shall be overlapped a minimum of three feet (3'), or as shown on the Drawings, to prevent shifting of geotextile during installation and filling.

Lap joints shall be tied with plastic ties specifically manufactured for this purpose at five foot (5') intervals.

3. Type C Geotextile

Fabric shall be joined with adjacent pieces of fabric by sewing or overlapping.

If fabric is sewn, the fabric shall have all seams sewn by butterfly or J-seams and shall develop a minimum of eighty-five percent (85%) of the specified strength. Seams shall be sewn with a double-thread chain-lock stitch. High strength polyester, polypropylene or Kevlar thread shall be used. The seam shall be one and one-half inch plus or minus one-quarter inch $(1-1/2" \pm 1/4")$ from the outside edge of the geotextile. If the fabric is overlapped, the sections shall be overlapped a minimum of three feet (3') or as shown on the Drawings.

D. Material Placing and Spreading

Fill material placement shall not occur until the Engineer accepts surface preparation and geotextile laps.

Contractor shall maintain minimum laps and fabric continuity without fabric loops or kinks during material placement and spreading.

Follow the manufacturer's recommendations for material placing and spreading of the geotextile. During placing and spreading, the Contractor shall maintain a minimum depth of one foot (1') of cover material at all times between the fabric and the wheels or tracks of the construction equipment. At no time shall equipment operate on the unprotected geotextile. Construction equipment shall not make sudden stops, starts, or turns on the over material. Use a smooth drum roller to achieve the specified density.

Spread the material in the direction of the fabric overlap.

On weak subgrades, spread the cover material simultaneously with dumping to minimize the potential of a localized subgrade failure.

E. Geotextile Repair

Should it be determined during or after embankment construction that specified geotextile lap widths have not been achieved, or that the Contractor otherwise damaged the installed geotextile, the Contractor shall correct the geotextile installation at no additional cost to the Municipality.

The Contractor shall expose the geotextile and add additional geotextile extending in all directions to achieve specified laps and anchorage. After correcting the geotextile, the embankment shall be reconstructed in accordance with the Contract Documents.

Article 25.4 Method of Measurement

Geotextile shall be measured in square yards of ground surface covered by fabric as shown on the Drawings or as approved by the Engineer. Overlapping and stitching of fabric will be considered incidental to this pay item and no additional payment will be made.

Material used to fill ruts and holes shall be paid for at the unit price of the appropriate bid item for the type material used, as shown on the Drawings or as approved by the Engineer.

Article 25.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM

Geotextile (Type)

UNIT

Square Yard

SECTION 20.26 ROADWAY INSULATION

Article 26.1 General

The Work under this Section consists of performing all operations including labor and material pertaining to the placement of insulation for roadway construction. Contractor shall provide polystyrene insulation board(s), extruded or expanded, in conformance with the Drawings and these Specifications.

The Work under this Section also includes shaping and compacting a level area under the horizontal insulation boards and placing the insulation as indicated on the drawings.

Article 26.2 Materials

The insulation board shall have a <u>minimum</u> full board size of two foot by eight foot (2' x 8'), have the specified R-Value or better, and shall conform to the requirements of AASHTO M230, except that extrusion is not required. R-Value of insulation shall be based on manufacturer's warranted R-Value. The insulation board shall be rigid, homogeneous, and conform to the following:

Property	Test Method	Value
Compressive Strength psi, minimum at yield or 5 percent strain	ASTM D-1621	60.0
Water Absorption, maximum percent by volume	ASTM C-272	0,3%
Thermal Resistance, minimum R-Value at 75°F, °F-Ft ² -Hr/BTU	ASTM C-177	As Specified

Article 26.3 Construction

Contractor shall install the insulation board with staggered joints. Layering of insulation to obtain the specified R-Value is allowed as long as joints are overlapped at least one foot (1'). Contractor shall blade, shape, and compact the area prior to placing the insulation board in accordance with this Division. Contractor shall shape the subgrade to the lines and grades shown on the Drawings and provide a smooth surface on which to place the insulation board. Prior to placing the insulation board on the prepared subgrade, the Contractor shall furnish straightedges to the Inspector for checking surface uniformity. Surface irregularities shall not exceed one inch (1") within eight feet (8'), or three-eighths inch (3/8") in two feet (2'). Contractor shall uniformly compact the subgrade. Contractor shall hand-rake smooth and recompact the ridges left by the compaction equipment. Contractor shall accurately set the horizontal insulation boards to the line and grade established and in such a manner as to hold the board firmly in place by mechanically connecting it to the subgrade.

Contractor shall replace or repair insulation panels broken, crushed, or cracked, as determined by the Engineer, at no additional cost to the Owner.

Contractor shall cover the insulation board with approved three inch (3"-) minus Classified Fill and Backfill material, placed in a twelve inch (12") lift, spread, and compacted for the full width of the insulation layer prior to placing subsequent lifts. Contractor shall place, spread, and compact in such a manner as not to damage the insulation board. Engineer will approve spreading and compacting equipment prior to its use.

Article 26.4 Measurement

The insulation board is measured per square foot regardless of thickness, complete and accepted in place.

Additional Work required for preparing the subgrade to the smoothness required is incidental to the bid item "Insulation Board" and no separate payment is made.

Article 26.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment will be made under the following unit:

ITEM

UNIT

Roadway Insulation Board (R-Value)

Square Foot

SECTION 20.27 DISPOSAL OF UNUSABLE OR SURPLUS MATERIAL

Article 27.1 General

The Work under this Section consists of performing all operations pertaining to the disposal of unusable or surplus material encountered in the excavation. This material may include peat, roots, large rocks, unstabilized soil, cesspools, privy pits, or any other material, which in the opinion of the Engineer is objectionable for use as fill or backfill.

Article 27.2 Construction

The Contractor shall use care in separating unusable material from usable material. When unusable material shall be disposed of, the Engineer will order the same in writing, stating the limitations of the Work. Should the trench be, in the opinion of the Engineer, wider than is necessary for the safety of the workmen, a deduction may be made for the excess width. Payment will not be made for disposal of unusable material unless the material is moved in excess of one hundred feet (100') from the excavation.

All unusable material shall be hauled to a disposal site provided by the Contractor as delineated in Division 10, Section 10.04, Article 4.9 – Disposal Sites.

Article 27.3 Cesspools, Privy Pits and Septic Tanks

If cesspools and privies are encountered in right-of-way areas and have to be removed to allow construction, the following procedures for removal are to be used.

In the case of a privy encountered, the Contractor shall remove the privy from the right-of-way area and set it over onto the private property where the privy belongs.

In the case of septic tanks, cesspools and privy pits, the liquid sewage and sludge from the cesspool or privy pit shall be pumped into a watertight container and disposed of at a designated manhole. Care shall be exercised in transporting cesspool and privy pit liquids and sludge so that spillage does not occur during transportation and disposal.

The Contractor shall then remove the remaining sludge, cesspool and privy pit logs or cribbing, and any saturated gravel remaining in the trench area, and shall dispose of this material at the Municipal Landfills. Disposal of this material will be coordinated with the Engineer, in order that the materials disposed of can be covered with fill material by others at the landfill site immediately after it is dumped. Care shall be exercised in transporting this material so that spillage does not occur during transportation and disposal.

Article 27.4 Measurement

The method of measurement for this item will be per cubic yard measured by truck count or by cross section measurement before and after removal of unusable materials. Unless otherwise noted in the Bid Schedule, measurement will be by truck count.

Article 27.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all work described in this Section.

Payment shall be made under the following unit:

ITEM

UNIT

Disposal of Unusable or Surplus Material

Cubic Yard

SECTION 20.28 RECONSTRUCT DRIVEWAY

Article 28.1 Description

The Work under this Section consists of performing all operations and furnishing all materials pertaining to removing, disposing of, re-grading and replacing existing driveway approaches, including removal and disposal of existing pavement, excavation, surfacing, classified fill and backfill, leveling course, and working adjacent to existing landscaping amenities, as indicated on the Drawings.

Driveway reconstruction consists of installing a section of driveway that provides a smooth transition from the existing driveway to the street improvements. The transition length is measured from the back of curb or back of sidewalk and shall be as shown on the Drawings or as directed by the Engineer.

Contractor shall not disturb existing driveways that have imbedded heating systems.

Article 28.2 Materials

All materials used in the reconstruction of driveways shall conform to the requirements for Portland cement concrete Class A-3 conforming with Division 30 –Portland Cement Concrete and asphalt concrete pavement conforming with Division 40 – Asphalt Surfacing for asphalt paved driveways. Subbase material shall conform to the requirements of this Division.

Article 28.3 Construction

All construction practices, tests and other controls shall conform to Division 20 –Earthwork, Division 30 – Portland Cement Concrete, and Division 40 – Asphalt Surfacing.

The Contractor shall neatly and cleanly saw cut and remove existing driveway surfacing. Contractor shall saw cut a minimum of two inches (2") deep for asphalt surfaces and three inches (3") deep for concrete surfaces. If any portion of the remaining asphalt or concrete surfacing is under-cut or damaged during construction operations, Contractor shall saw cut, remove, and replace the affected area at no additional cost to the Owner.

The Contractor shall reconstruct existing driveways with asphalt or concrete surfacing to match existing driveway surface. Contractor shall place two inches (2") of asphalt surfacing over two inches (2") of leveling course and concrete surfacing at a thickness of six inches (6"). Concrete driveways shall have a minimum six by six inch (6" x 6") woven wire mesh reinforcement installed. Contractor shall provide all areas of reconstructed driveway with a minimum eighteen inches (18") of Type II-A Classified Fill and Backfill subbase, and, when required on the Drawings, geotextile fabric.

Contractor shall perform asphalt paving by utilizing a mechanical spreader and compact by a mechanical roller weighing not less than ten (10) tons, except that where the area of the asphalt replacement patch is less than three hundred (300) square feet, a mechanical spreader need not be employed.

Contractor shall tamp small inaccessible areas to produce a compression and surface texture equivalent to that produced by the specified rolling. Hand tampers shall have a maximum tamping face of fifty (50) square inches and minimum weight of twenty-five (25) pounds.

Contractor shall maintain access and parking accommodations for each resident during driveway work. Contractor shall notify and coordinate with the affected resident(s) prior to necessary driveway closures.

Article 28.4 Measurement

Driveway reconstruction is measured per square yard of replaced driveway surface complete and in place for the specified type of surface. No separate measurement is to be made for asphalt, classified backfill, excavation, geotextile fabric, of leveling course as these items are incidental to the Work item. No measurement is made for temporary relocation of driveways or required driveway maintenance during construction as these items are incidental to the Work item.

Article 28.5 Basis of Payment

Payment for this item shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM	UNIT
Reconstruct Driveway, Asphalt (Class)	Square Yard
Reconstruct Driveway, Concrete (Class)	Square Yard

SECTION 20.29 PIPE CASING

Article 29.1 General

The Work under this Section consists of performing all operations necessary for furnishing and placing a casing by trenchless method under structures, roadways, railroad tracks, or runways.

Article 29.2 Materials

Materials shall be as required by the Contract Documents.

Article 29.3 Construction

Method of installing a pipe casing shall be optional to the Contractor, except that prior to commencing jacking or augering operations, the Contractor shall furnish a work plan to the Engineer and show that his planned method of installation has worked satisfactorily in other areas under similar conditions. The excavation at both ends of the casing shall be considered incidental to this bid item and no separate payment shall be made.

A vertical and horizontal tolerance shall be as shown on the Drawings, provided that the Contractor will be responsible, and use such fittings as are required to adjust alignment and grade to accomplish the connections.

The pipe within the casing (barrier pipe) shall be arrested from movement by sand filling or wood slats and banding according to Standard Detail 20-18.

Article 29.4 Measurement

Measurement shall be from end to end of pipe casing acceptably installed and completed. No measurement will be made for trench excavation and backfill where casing is installed. No compensation will be made for casing installations abandoned or aborted due to deviations in excess of allowable tolerances.

Article 29.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment and shall include full payment for all Work described in this Section, including arrestment of pipe.

Payment shall be made under the following unit:

ITEM

UNIT

Linear Foot

Furnish and Install Casing

SECTION 20.30 SHORING, SHEETING AND BRACING/SHORING AND SHEETING LEFT IN THE TRENCH AND PORTABLE

Article 30.1 General

The Work under this Section consists of all operations pertaining to furnishing and installing sheeting, shoring, and bracing to support the trench section to prevent any movement that might damage adjacent facilities or injure workmen or the public, and the use of portable steel shielding.

Article 30.2 Materials

The Contractor shall obtain approval from the Engineer for all sheeting, bracing and shoring materials and/or equipment to be used on the project. Materials used shall be in accordance with Section 1926.651, Subparagraph 1 of the Federal Register, Volume 37, No. 243, OSHA Regulations.

Article 30.3 Construction

All construction requirements for design, installation, and use of sheeting, shoring, bracing, and shielding shall be in accordance with current safety regulations. All sheeting, shoring, bracing, and shielding shall be designed by a Professional Engineer commissioned by the Contractor. All shop drawings and design data shall be submitted to the Engineer for approval.

When shoring and sheeting is left in the trench, sheeting must be driven lower than the bottom of the pipe and cut off one foot (1') below ground surface. No transverse bracing will be permitted to remain.

Article 30.4 Measurement

The method of measurement for sheeting, shoring, and bracing shall be per linear foot of trench section to be supported, per linear foot of shoring and sheeting authorized to be left in the trench, or lump sum.

Article 30.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall be full payment for all Work described in this Section.

Payment shall be made under the following units:

ITEM

Shoring, Sheeting and Bracing

Shoring, Sheeting and Bracing

Shoring and Sheeting Left in Trench

Portable Steel Shield

UNIT

Linear Foot of Trench Section Supported

Lump Sum

Linear Foot of Trench Section Supported

Linear Foot of Trench Section Supported

MUNICIPALITY OF ANCHORAGE STANDARD SPECIFICATIONS

DIVISION 20 EARTHWORK STANDARD DETAILS

STANDARD CONSTRUCTION SPECIFICATIONS MISCELLANEOUS DIVISION 20 INDEX OF STANDARD DETAILS

- 20-1 Typical Sections 20'/24' Strip Paved and R.A.P. Streets
- 20-2 Typical Sections Secondary Streets
- 20-3 Typical Sections Primary Streets
- 20-4 Typical Section Deep Excavation
- 20-5 Typical Section Alley
- 20-6 Typical Section Pathway
- 20-7 Driveway Connection Detail
- 20-8 Trench Backfill and Bedding Layout
- 20-9 Pipe Insulation
- 20-10 Class "B" Bedding Material
- 20-11 Class "C" Bedding Material
- 20-12 Class "D" Bedding Material
- 20-13 Foundation Materials
- 20-14 Type II Classified Fill and Backfill
- 20-15 Type II-A Classified Fill and Backfill
- 20-16 Type V Classified Fill and Backfill
- 20-17 Type VI Classified Fill and Backfill
- 20-18 Leveling Course
- 20-19 Pipe Encasement
- 20-20 Compaction of Backfill within the Right-of-Way















NOTES:

- 1. SURFACING SHALL MATCH EXISTING DRIVEWAY.
- 2. ASPHALT PAVEMENT SHALL CONSIST OF 2" LEVELING COURSE AND 2" AC PAVEMENT (CLASS D). APPLY TACK COAT AT SAWCUT AND BACK OF CURB.
- 3. CONCRETE PAVEMENT SHALL CONSIST OF 6" P.C.C. WITH BROOM FINISH PARELLEL TO CURB AND GUTTER. PROVIDE EXPANSION JOINT AT CURB.
- 4. LENGTH OF DRIVEWAY REMOVED AND REPLACED VARIES AS SHOWN IN THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.
- 5. INSULATION TRANSITION SHALL BE PROVIDED BELOW DRIVEWAY WHEN ADJACENT TO AN INSULATED ROADWAY.

MUNICIPALITY OF ANCHORAGE	SCALE: NTS APPROVED: REVISED: 11/08	DRIVEWAY CONNECTION DETAIL	SECTION # DIV 20 DETAIL # 20-7
------------------------------	-------------------------------------------------	-------------------------------	-----------------------------------------



NOTES:

- 1. TRENCH BACKFILL MATERIAL PLACED AND COMPACTED TO DEPTHS SHOWN IN THE DRAWINGS OR AS DETERMINED BY ENGINEER. COMPACT TRENCH BACKFILL TO A MINIMUM OF 95% MAXIMUM DENSITY.
- 2. TRENCH WALL SLOPES WILL VARY WITH SOIL STRENGTH AND CHARACTER. SLOPES SHALL CONFORM TO OSHA SAFETY STANDARDS.
- 3. WHEN DUCTILE IRON PIPE IS INSTALLED, BEDDING IS REQUIRED ONLY TO SPRING LINE.
- 4. BACKFILL SHALL BE FREE OF CLAYS AND ORGANIC MATERIALS.
- 5. SEE STANDARD DETAIL 20-9 FOR INSULATION DETAILS.





U.S. STANDARD SIEVE 1"
1"
100
3/8"
60–100
44
40–85
410
25–70
440
5–40
4200
*0–6

*IN ADDITION TO THE GRADING LIMITS LISTED ABOVE, THE FRACTION OF MATERIAL PASSING THE #200 SIEVE SHALL NOT BE GREATER THAN 35% OF THAT FRACTION PASSING THE #4 SIEVE. THE BEDDING MATERIAL SHALL NOT INCLUDE MECHANICALLY FRACTURED MATERIALS.



U.S. STANDARD SIEVE

2"

1/2"

#4 #10 #40 #200 CUMULATIVE % PASSING BY WEIGHT 100 40-100

100
40-100
20-75
12-60
2-30
*0-6

*IN ADDITION TO THE GRADING LIMITS LISTED ABOVE, THE FRACTION OF MATERIAL PASSING THE #200 SIEVE SHALL NOT BE GREATER THAN 20% OF THAT FRACTION PASSING THE #4 SIEVE.



U.S. STANDARD SIEVE

1" 3/4" 1/2" 3/8" #4 #200 CUMULATIVE % PASSING BY WEIGHT 100

90-100 50-70 20-50 0-10 0-1

THE BEDDING MATERIAL SHALL NOT INCLUDE MECHANICALLY FRACTURED MATERIALS.







U.S. STANDARD SIEVE

3" 3/4" #4 #10 #40 #200 CUMULATIVE % PASSING BY WEIGHT 100

100
50-100
25-60
15-50
4-30
*2-6

*IN ADDITION TO THE GRADING LIMITS LISTED ABOVE, THE FRACTION OF MATERIAL PASSING THE #200 SIEVE SHALL NOT BE GREATER THAN 20% OF THAT FRACTION PASSING THE #4 SIEVE.










