



SPECIFICATIONS  
for the  
CONSTRUCTION  
of  
SEWER COLLECTION,  
SEWER TRANSMISSION  
and  
WATER DISTRIBUTION LINES

QUEEN ANNE'S COUNTY, MARYLAND  
DEPARTMENT OF PUBLIC WORKS

January 1998  
(as amended October 2011)

# **SPECIFICATIONS**

## **DIVISION 1 - GENERAL REQUIREMENTS**

01010

General Requirements

**SPECIFICATION 01010 - GENERAL REQUIREMENTS**

**PART 1 - GENERAL**

1.01 DEFINITIONS

- A. Contractor - as used herein refers to the firm or company selected to perform the construction of the improvements by the Owner.
- B. County - as used herein refers to Queen Anne's County and / or a representative of the County. Inspector and Sanitary District shall be considered synonymous with County.
- C. Engineer - as used herein refers to the Owner's representative who typically designed the improvements and acts on the Owner's behalf to ensure the construction is acceptable to the Owner and the County
- D. Owner - as used herein shall refer to the entity for which the construction is required in order to improve a property. Developer shall be considered synonymous with Owner.

1.02 GENERAL

- A. The Contractor and / or Owner shall provide all materials, labor, equipment and services necessary for furnishing and installing all lines, valve pits, manholes, valves, fittings, and appurtenant items to the size, dimensions, lines, grades, elevations and types as shown on the approved contract drawings or as directed by the Engineer with the County's approval.
- B. All work shall be completed in a workmanlike manner and shall be fully functional as designed when completed and free of defects.
- C. The Contractor shall submit to the Engineer samples of the various types of materials that are proposed for use in construction of the above mentioned work. The Engineer in turn shall submit his recommendation to the County for approval. These samples must be approved by both parties prior to the initiation of work. During the progress of the work, the Engineer or County may require that a sufficient number of samples be tested to ascertain the size, type and quality of the actual materials that are being used in construction. Two calendar weeks is to be considered the normal turnover

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times for each agency's review.

- D. The Contractor shall submit certification as requested to the County that all items are as specified.
- E. All materials to be used shall be new and stored in an approved manner that will protect them from harmful exposure to the elements and the hazards of construction procedures.
- F. As - built drawings shall be the Owner/Contractors's responsibility. During the progress of the work, the Contractor shall maintain an accurate record of the locations of the piping with reference to job base lines, grades, and elevations showing all changes made in the approved plans or shop drawings. One set of completed as-builts shall be submitted to the County prior to final acceptance of the project (one blueprint, one mylar, and one electronic in either Adobe pdf or AutoCadd format, as directed by the County).
- G. Where maintenance of traffic is required, all signs, lights, barricades, etc., shall be erected and maintained by the Contractor in accordance with of the SHA's Manual on Uniform Traffic Control. Roads shall be kept with one lane open to traffic whenever possible. No road shall be completely closed without written permission from the State Highway Administration, if applicable, and the Sanitary District.
- H. All water and sewer connections to be constructed within private property shall be installed under the direction of a Master Plumber licensed in Queen Anne's County.
- I. Contractor must attend a pre construction meeting at least two weeks prior to beginning construction. Meeting shall be attended by Owner, Engineer, Contractor and Sanitary District.

1.03 PERMITS

- A. The Contractor/Owner shall obtain and pay for all permits, certificates of inspection, etc., which are required for the actual construction by authorities having jurisdiction over this work. They shall be delivered to the County before the initiation of construction. Permits which may be required depending on the scope of the project are: SHA Utility Construction, Queen Anne's County Roads Board Construction, Sewer and Water Connection, MDE Construction etc.

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1.04 LINES AND GRADES

- A. All lines and grades will be furnished by the Engineer. Permanent benchmarks are to be established and protected on the construction site at the cost to the Owner in accordance with the executed Public Works Agreement for a particular project.

1.05 EXISTING UTILITIES

- A. Contractor shall test pit to determine the actual conditions and locations of underground utilities. Contractor shall be responsible for the repair of all damage occasioned by his excavation or other activities.
- B. The Contractor shall notify the Maryland State Highway Administration and/or the Queen Anne's County Department of Public Works in writing for permission 3 days prior to excavating for location of existing utilities. Inspector is required to be present during digging.
- C. When crossing and/or working in the vicinity of existing utilities, it will be the Contractor's responsibility to properly support and maintain the operation of the utilities. Extreme care must be exercised in excavation and refill operation.
- D. The Contractor shall be solely responsible for all damage to any marked underground or above ground utilities encountered in any manner during construction and will make immediate repairs to said damaged utilities.

1.06 SPARE PARTS FOR VACUUM AND WATER SYSTEM

- A. The Contractor shall furnish the spare parts listed below for the vacuum sewer and water distribution system's at the completion of the project based on 5% of the total number of Vacuum Interface Valves, Fire Hydrants, and Division Valves when 10 or more of each exist on a project rounded to the nearest whole number (minimum of 1).

| <u>Description of Spare Part</u>             | <u>Quantity</u> |
|--|-----------------|
| Gate Valve Tee Keys                          | 5% or 1         |
| Meter Pit Keys                               | 5% or 1         |
| Curb Stop Valve Keys                         | 5% or 1         |
| Fire Hydrant Wrench & Rebuild Kits           | 5% or 1         |
| Vacuum Sewage Interface Valves w/ Controller | 5% or 1         |
| Manhole Hooks                                | 5% or 1         |

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1.07 LEGAL HOLIDAYS

- A. The Contractor shall not carry on regular construction activities on Saturdays, Sundays, or legal holidays recognized by the County without the written authorization of the County. Requests for working on Saturdays, Sundays, or legal holidays shall be submitted to the County at least seven (7) full days in advance.
- B. The following shall be legal holidays:
1. New Year's Day
  2. Martin Luther King, Jr. Day
  3. President's Day
  4. Good Friday
  5. Memorial Day
  6. Independence Day
  7. Labor Day
  8. Columbus Day
  9. Election Day (if applicable)
  10. Veteran's Day
  11. Thanksgiving Day
  12. Day After Thanksgiving Day
  13. Christmas Day
- C. The list of legal holidays will vary year to year and the Contractor must obtain a revised holiday list prior to construction.
- D. If the Contractor is approved to work on weekends or holidays, he will pay the applicable overtime/holiday wage rate of \$50/hour per inspector for inspection.

END OF SPECIFICATION

## **SPECIFICATIONS**

### **DIVISION 2 - SITE WORK**

#### General

- 02100 Clearing and Grubbing
- 02150 Boring/Jacking/Tunneling
- 02220 Excavation For Structures
- 02221 Trenching
- 02300 HDPE Pipe
- 02350 Horizontal Directional Drilling
- 02485 Finish Grading and Seeding
- 02575 Paving Restoration

#### Sewer

- 02610 Pressure and Gravity Sewer Pipe
- 02620 Vacuum Sewer Mains and Crossovers
- 02651 Sewer Testing

#### Water

- 02715 Water Mains
- 02740 Water Valves and Fire Hydrants
- 02742 Water Service Connections
- 02753 Testing and Disinfecting Water Mains

**SPECIFICATION 02100 - CLEARING AND GRUBBING**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

A. The Work of this Specification includes, but is not limited to:

1. Clearing
2. Grubbing
3. Stripping and stockpiling topsoil
4. Debris disposal

B. Related Work specified elsewhere:

1. Specification 02150 - Boring/Jacking/Tunnels
2. Specification 02220 - Excavation for Structures
3. Specification 02221 - Trenching
4. Specification 02485 - Finish Grading and Seeding

C. Definitions:

1. Clearing is defined as the removal of trees, brush, down timber, rotten wood, rubbish, any other vegetation, and objectionable material at or above original ground elevation not designated to be saved; clearing also includes removal of fences, walls, guard posts, guard rail, signs, and other obstructions interfering with the proposed work.
2. Grubbing is digging for the removal from below the surface of the natural ground of stumps, roots and stubs, brush, other organic materials' debris, footers, slabs, post bottoms, ground anchors and similar manmade objects.

**1.02 JOB CONDITIONS**

A. The Contractor may clear and grub (if applicable) only those obstructions within the permanent and construction rights-of-way which prevent or discourage the utility construction activities.

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- B. Obstructions specifically designated to be saved or restored will be marked by the Engineer in the field.
- C. It is the intent of these specifications to maintain minimal disturbance to the existing site and restore construction areas to pre-existing conditions.

1.03 SUBMITTALS

- A. Burning Permits:
  - 1. Submit two copies of each on-site burning permit if such permits are required by local jurisdictional authorities.
- B. Permits for Disposal of Debris:
  - 1. Arrange for disposal of debris resulting from clearing and grubbing to locations outside the Owner's property and obtain written agreements with the owners of the property where the debris will be deposited if not a permitted landfill or rubble fill.
  - 2. Submit two copies of the agreement with each property owner releasing the County from responsibility in connection with the disposal of the debris.

**PART 2 - PRODUCTS**

2.01 MATERIALS

- A. Temporary Fencing:
  - 1. Undamaged picket snow fence, 4' high, formed of wooden slats, tightly woven with wire cable.
  - 2. Soil-set fence posts, studded "T" type, 6' high.
- B. Wood Tree Guards:
  - 1. Wood posts: 2" x 4"
  - 2. Wood stringers: 2" x 2"

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- C. Wrapping Materials:
  - 1. Burlap: AASHTO M182, Class 1
  - 2. Krinkle-kraft waterproof paper: 4" width
- D. Tree Wound Dressing: Antiseptic and waterproof, asphalt base.

**PART 3 - EXECUTION**

**3.01 PREPARATION**

- A. Mark areas to be cleared, the areas to be grubbed, and items to be saved with stakes, flags, paint or plastic colored ribbon.
- B. Protect benchmarks, utilities, existing trees, shrubs and other landscape features designated for preservation with temporary fencing or barricades.
- C. No material shall be stored or construction operation carried on within 4-feet of any tree to be saved or within the tree protection fencing.
- D. When a private enclosure fence encroaches on the work area, notify the property owner at least 5 days in advance of the clearing/grubbing operations to permit the owner to remove it, construct a supplemental fence, or make such other arrangements as may be necessary for security purposes; in failure of the property owner to reasonably proceed with the work required to secure his property, carefully remove the fence, in whole or in part, and neatly pile the materials onto the owner's property.
- E. Install sediment & erosion control measures as shown on the approved plans or as required by Maryland Department of the Environment personnel.

**3.02 UTILITY RELOCATIONS**

- A. Inform utility companies, individuals and others owning or controlling facilities or structures within the limits of the work which have to be relocated, adjusted or reconstructed in sufficient time for the utility to organize and perform such work in conjunction with or in advance of the Contractor's operations.

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3.03 CLEARING

- A. Confine clearing to within the permanent and construction rights-of-way or property.
- B. Fell trees in a manner that will avoid damage to trees, shrubs, and other installations which are to be retained.
- C. Where stumps are not required to be grubbed, flush-cut with ground elevation.

3.04 GRUBBING

- A. Grub areas within the construction limits to remove roots and other objectionable material to a minimum depth of 8".
- B. Remove all stumps within the cleared areas.

3.05 STRIPPING AND STOCKPILING TOPSOIL

- A. Strip topsoil to whatever depth it may occur from areas to be excavated, filled, or graded and stockpile at a location approved by the County for use in finish grading.
- B. The topsoil is the property of the Owner and shall not be used as backfill.

3.06 DEBRIS DISPOSAL

- A. Trees, logs, branches, brush, stumps, and other debris resulting from clearing and grubbing operations shall become the property of the Contractor and shall be legally disposed of.
- B. Do not deposit or bury on the site debris resulting from the clearing and grubbing work.
- C. Debris may be burned on-site if local ordinances allow open-air burning, if required permits are obtained, and if burning operations are conducted in compliance with local ordinances and regulations.

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3.07 RESTORATION

- A. Repair all injuries to bark, trunk, limbs, and roots of remaining plants by properly dressing, cutting, tracing and painting, using approved arboricultural practices and materials.
- B. Replace trees, shrubs and plants designated to be saved which are permanently injured or die during the life of the Contract as a result of construction operations with like species.
- C. Remove protective fences, enclosures and guards upon the completion of the project.
- D. Restore fences, guard posts, guard rail, signs and other interferences to the condition equal to that existing before construction operations.

END OF SPECIFICATION

**SPECIFICATION 02150 - BORING/JACKING/TUNNELING**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

A. The Work of this Specification includes, but is not limited to:

1. Approach trench excavation
2. Installation of casing pipe or liner
3. Installation of carrier pipe

B. Related work specified elsewhere:

1. Specification 02100 - Clearing and Grubbing
2. Specification 02220 - Excavation for Structures
3. Specification 02221 - Trenching
4. Specification 02485 - Finish Grading and Seeding
5. Specification 02800 – Horizontal Directional Drilling

C. Applicable Standard Details

Jack and Bore

**1.02 QUALITY ASSURANCE**

A. Contractor Qualifications:

Construction operations shall be undertaken only by a contractor well experienced in operations of similar magnitude and condition under transportation arteries and surface areas which cannot be disturbed.

B. Design Criteria:

Pipe and joints of leak proof construction, designed for the earth and/or other pressures present, plus highway H2O live loading with the associated recommended impact loading.

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Design bracing, backstops, and use jacks of sufficient rating so that the jacking can proceed without stoppage, except for adding pipe sections and as conditions permit, to minimize the tendency of the ground material to 'freeze' around the casing pipe.

C. Allowable Tolerances:

Do not overcut excavation by more than 1" greater than the outside diameter of the casing pipe.

Install casing pipe with the determined vertical and horizontal alignment prior to installation of the carrier pipe.

D. Reference Codes and Specifications:

Comply with applicable federal, state and local ordinances, codes, statutes, rules and regulations, and affected jurisdictional bodies.

### 1.03 SUBMITTALS

- A. Submit description of proposed construction methods, including methods to establish and maintain vertical and horizontal alignment.

### 1.04 JOB CONDITIONS

- A. Conduct operations so as not to interfere with, interrupt, damage, destroy, or endanger the integrity of surface or subsurface structures or utilities, and landscape in the immediate or adjacent areas.
- B. When boring, jacking or tunneling under state highways comply with applicable right-of-way occupancy permits.
- C. If boring is obstructed, relocate or jack or tunnel crossing as approved by the County.

## PART 2 - PRODUCTS

### 2.01 STEEL CASING PIPE

- A. ASTM A53; ASTM A-139 Grade B; 35,000 psi minimum yield strength, asphalt coated, full circumference welded joints. Diameter and wall thickness shall be 24

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inches and 1/2 inch, respectfully, if not otherwise shown on the Drawings. Joints shall be electric resistance welded.

2.02 CARRIER PIPE

- A. Ductile iron, AWWA C151, Class as indicated on the Contract Drawings.

2.03 TIMBER SKIDS

- A. Pressure treated, cut to a cross-sectional size to allow placement of the carrier pipe in the casing and to support the barrel of the carrier pipe. Provided with notches to accommodate fastening. Treat notches at time of pipe installation.
- B. Creosoting: AASHTO M133.

2.04 STEEL STRAPPING: ASTM A36

2.05 SAND

- A. Section 903.09 Standard Specifications for Construction and Materials, Maryland Department of Transportation, State Highway Administration, January 1982, or latest applicable revision.

2.06 GROUT

- A. One part Portland cement (ASTM C150), and 6 parts mortar sand mixed with water to a consistency applicable for pressure grouting.

2.07 PATENT SKIDS: Submit to Engineer for approval.

**PART 3 - EXECUTION**

3.01 APPROACH TRENCH

- A. Excavate approach trench using methods as site conditions require.
- B. Ensure pipe entrance face as near perpendicular to alignment as conditions permit.
- C. Establish a vertical entrance face at least 1-foot above top of casing.

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- D. Install adequate excavation supports as specified in Specification 02221 - Trenching.

3.02 CASING PIPE INSTALLATION METHODS

- A. Boring:

Push the pipe into the ground with a boring auger rotating within the pipe to remove the spoil. Do not advance the cutting head ahead of the casing pipe except for that distance necessary to permit the cutting teeth to cut clearance for the pipe. The machine bore and cutting head arrangement shall be removable from within the pipe. Arrange the face of the cutting head to provide a barrier to the free flow of soft material.

If unstable soil is encountered during boring retract the cutting head into the casing to permit a balance between the pushing pressure and the ratio of pipe advancement to quantity of soil.

If voids should develop greater than the outside diameter of the pipe by approximately one inch, grout to fill voids. Grouting to fill voids will be at the expense of the Contractor.

- B. Jacking:

Construct adequate thrust wall normal to the proposed line of thrust.

Impart thrust load to the pipe through a suitable thrust ring that is sufficiently rigid to ensure distribution of the thrust load on the pipe.

- C. Drilling and Jacking:

Use an oil field type rock roller bit or plate bit made up of individual roller cutter units solidly welded to the pipe which is turned and pushed for its entire length by the drilling machine to give the bit the necessary cutting action.

Inject a high density slurry (oil field drilling mud) to the head as a cutter lubricant. Inject slurry at the rear of the cutter units to prevent jetting action ahead of the pipe.

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D. Mining and Jacking:

Utilize manual hand-mining excavation from within the casing pipe as it is advanced with jacks, allowing minimum ground standup time ahead of the casing pipe.

3.03 DEWATERING

- A. Intercept and divert surface drainage, precipitation and groundwater away from excavation through the use of dikes, curb walls, ditches, pipes, sumps or other means.
- B. Develop a substantially dry subgrade for the prosecution of subsequent operations.
- C. Comply with Federal and State requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

3.04 PRESSURE GROUTING

- A. Pressure grout the annular space between the casing pipe and surrounding earth.

3.05 CARRIER PIPE INSTALLATION

- A. All provisions regarding cleaning, inspection and handling specified under pipe material sections apply to this work.
- B. Place the carrier as shown on Standard Details. Exercise care to prevent damage to pipe joints when carrier pipe is placed in casing.
- C. Support pipeline within casing so that no external loads are transmitted to carrier pipe. Attach wooden skids or approved plastic spacers to barrel of carrier pipe; do not rest carrier pipe on bells.
- D. Fill the annular space between the carrier and casing pipe with sand or provide other positive means to prevent carrier pipe flotation.
- E. Close ends of casing with brick & mortar or other approved method. Provide drain hole in the downstream end and vent on the upstream end.
- F. Place a permanent marker at each end of the carrier pipe, as directed by the County, to aid in its future location.

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3.06 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. Coordinate the work to ensure the least inconvenience to traffic and maintain traffic in one or more unobstructed lanes unless closing the street is authorized.
- B. Maintain access to all streets and private drives.
- C. Provide and maintain signs, flashing warning lights, barricades, markers and other protective devices as required to conform with construction operations and to keep traffic flowing with minimum restrictions.
- D. Comply with state and local codes, permits and regulations.
- E. When working within the Maryland State Highway Administration right-of-way, the Contractor shall maintain and protect the traffic as detailed in the SHA construction permit, if any, or as directed by SHA.

END OF SPECIFICATION

**SPECIFICATION 02220 - EXCAVATION FOR STRUCTURES**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. The Work of this Specification includes, but is not limited to:

Excavation and Backfill for Structures  
Dewatering  
Sheeting and Shoring  
Site Grading

- B. Related work specified elsewhere:

1. Specification 02100 - Clearing and Grubbing
2. Specification 02150 - Boring/Jacking/Tunneling
3. Specification 02221 - Trenching
4. Specification 02485 - Finish Grading and Seeding

**1.02 QUALITY ASSURANCE**

- A. Testing Agency:

Compaction testing shall be performed by an independent soils testing laboratory. If the results of any test indicate a non-compliance with the requirements of the Drawings the Contractor shall, at the Contractor's expense, correct the condition. The Contractor shall be responsible for the cost of any retesting required due to failure and to show compliance with compaction requirements.

- B. Referenced Standards:

American Society for Testing and Materials (ASTM):

- C33 Specification for Concrete Aggregates  
D698 Tests for Moisture-Density Relations of Soils Using 5.5 Lb. Rammer and 12" Drop  
D1194 Test for Bearing Capacity of Soil for Static Load on Spread Footings  
D1556 Test for Density of Soil-in-Place by the Sand-Cone Method

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1.03 JOB CONDITIONS

- A. The locations shown for utility facilities are approximate. Proceed with caution in the areas of utility facilities and expose them by hand or other excavation methods acceptable to the utility owner. Contact Miss Utility at least 5 working days prior to beginning excavation.
- B. Erect sheeting, shoring, and bracing as necessary for protection of persons, improvements, and excavations.
- C. Furnish and maintain barricades, signs and markings for excavated areas.
- D. Select and install a system of dewatering to accomplish groundwater control in excavations.
- E. Preserve, protect and maintain operable existing drainage ways, drains and sewers.

1.04 SUBMITTALS

- A. Certificates:

Submit a Certificate of Compliance, together with supporting data, from the materials supplier attesting that the composition analysis of backfill materials meet specification requirements.

Submit certified compaction testing results from the soils testing laboratory.

**PART 2 - PRODUCTS**

2.01 MATERIALS FOR BACKFILLING, EMBANKMENT OR FILLS

- A. Well-graded soil aggregate mixture consisting of Groups SW, SC, and SP soils of the Unified Soils Classification.
- B. Total content of gravel or rock fragments larger than 1/2" shall not exceed 20% by weight of the mass.
- C. Backfill shall not contain topsoil, organic matter, debris, cinders, or frozen material.

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2.02 PERVIOUS MATERIAL

- A. Natural, clean, free-draining sand or gravel conforming to the requirements of ASTM C33 except:

Material passing a No. 100 sieve not to exceed 8%

Material passing a No. 200 sieve not to exceed 5%

2.03 SOURCE OF MATERIALS

- A. Use materials for fill if they meet the requirements specified herein. If sufficient material meeting these requirements is not available from required excavation, obtain requisite material from other sources.
- B. Use only material which has been approved as to quality, location of source and zone of placement in the fill.
- C. The County has the right to reject material at the job site by visual inspection, pending sampling and testing.

**PART 3 - EXECUTION**

3.01 EXCAVATION

- A. Excavate to the neat lines or set back lines for mixed face conditions and grades indicated on the Drawings.
- B. Excavate in sequence and stages which will not subject permanent or temporary structures, installations, or surfaces to unstable conditions.
- C. Excavate as required to provide sufficient working space to permit placing, inspection, and completion of the structures.
- D. Shape excavations accurately to the cross-sections and grades indicated.
- E. Support the sides of excavations as specified.
- F. Keep excavations free from water.

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- G. Where excess excavation is required to remove unsuitable material, carry footings down to rest on undisturbed soil or rock having a minimum safe bearing capacity of 2,000 pounds per square foot determined by testing soil in accordance with ASTM D1194.
- H. Haul excavated materials to fill, stockpile or disposal locations.

3.02 BLASTING

- A. No blasting will be permitted.

3.03 BACKFILLING STRUCTURES

- A. Do not commence backfilling around any structure until such structure has been examined and approved by the County.
- B. Do not place backfill until the requirements for concrete curing and waterproofing have been complied with and, if required, until the test cylinders for the particular structure indicate that the concrete has attained the compressive strength specified.
- C. When backfilling against structures and where applicable, place backfill material in equal lifts and to similar elevations on opposite sides of structures in order to equalize opposing horizontal pressures. Place material in uniform increments over fill area.
- D. Protect structures from damage by construction activity, equipment, and vehicles. Repair or replace damaged structures to the satisfaction of the owner.
- E. Lift Thickness Limitations: Place fill in 6" layers of uniform thickness for the entire width so that each layer can be uniformly compacted.
- F. Adjust moisture content of the material to within the specified limits by disking or harrowing, if excessively wet; by wetting and thoroughly mixing, if excessively dry. Any fill in place that is disturbed by adjustment of moisture shall be re-compacted to the specified range of compaction before placement of the next lift of backfill.
- G. Leave sheeting and shoring in place as long as possible, compatible with the placing and compacting of backfill.

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3.04 DISPOSAL OF EXCAVATED MATERIAL

- A. Surplus excavated materials shall become the property of the Contractor and removed from the project site.

3.05 EMBANKMENT AND FILLS

- A. Do not place fill on any part of the embankment foundation until such areas have been examined and approved.
- B. Do not place fill on frozen surface.
- C. Place embankment fill in layers of 6" thickness for entire width so that each layer can be uniformly compacted.
- D. Avoid accumulation of large pieces of material at one location. Fill voids and interstices with fine materials.
- E. Maintain embankments and fills in a stable well drained condition.
- F. Compact embankment materials of fills within 5' of structures using lightweight compactors. Do not over stress the structures.
- G. Construct the finished subgrade to vary not more than 1/2" above or 1" below the elevation shown.
- H. Complete embankment slopes to vary not more than 6" from the slope line shown.

3.06 COMPACTION

- A. Compact each layer of material to 95% of the maximum density at optimum moisture content as determined by ASTM D698, Method D.
- B. Compaction Testing: Conduct compaction tests at locations as directed by the County during backfilling operations. Determine compaction by the testing procedure contained in ASTM D1556.

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3.07 ROUGH GRADING

- A. Rough grade to uniform finish contours. Form the bases for terraces, banks and paved areas.
- B. Grade areas to be paved to depths required for placing sub base and paving materials.
- C. Grade embankments and fills to smooth compact surface.
- D. The minimum degree of finish for all graded areas shall be that ordinarily obtained from blade grader operations.

3.08 SHORING, SHEETING AND BRACING

- A. Install shoring, sheeting and bracing to comply with federal, state and local code requirements. Responsibility for the safety of the work, personnel and structures rests solely with the Contractor.
- B. Carry the boom of the support system to depth below the main excavation, adequate to prevent ground movement.
- C. Follow the excavation closely with sheeting and shoring placement. Do not allow the maximum height of the unsheeted excavations to exceed five feet in predominantly clayey soils and three feet in sandy soils.
- D. Perform excavation for the installation of sheeting carefully to minimize the formation of voids.
- E. If unstable material is encountered during excavation, take measures to contain it in place and prevent ground displacement.
- F. Have sufficient quantity of material on hand at all times for sheeting, shoring, bracing and other operations for the protection of the work and for use in case of accident or emergency.

3.09 SURFACE DRAINAGE

- A. Intercept and divert surface drainage away from the excavation by the use of dikes, curb walls, ditches, pipes, sumps or other means.

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- B. Design surface drainage systems so that they do not cause erosion on or off the site, or cause unwanted flow of water.
- C. Remove the surface drainage system when no longer required.
- D. Remove debris and restore the site or sites to original condition.

3.10 DRAINAGE AND DEWATERING OF EXCAVATED AREAS

- A. Provide and maintain ditches to collect surface water and seepage which may enter the excavations and divert the water into a sump so that it can be pumped into drainage channels.
- B. Install a dewatering system to keep excavations dry and free of water. Dewatering system must discharge into an approved de-silting structure as shown on the Contract Drawings.
- C. Maintain continuous and complete effectiveness of the installation at all times.
- D. Maintain water level below subgrade until concrete work or backfill, or both, have been completed to offset uplift pressures.
- E. Dispose of precipitation and subsurface water clear of the work. Comply with provisions of the Sediment and Erosion Control Plan Rules and Regulations.
- F. During dewatering operations, water discharged to a watercourse must be clear and free of silt, mud and other deleterious materials. Construct and maintain settling ponds to prevent stream degradation. Comply with the requirements for dewatering or discharging to a watercourse as required by Federal, state or local codes.
- G. Backfill drainage ditches, sumps, and settling basins when no longer required with granular material, or other material as approved by the County.
- H. Structures have been designed against uplift due to groundwater when their construction is complete. It shall be the Contractor's responsibility to prevent uplift of the uncompleted structure.

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3.11 FINISHING

- A. On completion of the work, clean ditches and channels and finish the site in a neat and presentable condition. Slope areas to provide positive drainage.
- B. Place topsoil and seed all areas disturbed by construction as specified in Specification 02485, Finish Grading and Seeding, unless otherwise indicated.

END OF SPECIFICATION

**SPECIFICATION 02221 - TRENCHING**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. The Work of this Specification includes, but is not limited to:

Trench excavation, backfill and compaction  
Support of excavation  
Pipe bedding requirements  
Control of excavated material  
Rough grading  
Restoration of unpaved surfaces

- B. Related work specified elsewhere:

Specification 02100 - Clearing and Grubbing  
Specification 02150 - Boring, Jacking, Tunneling  
Specification 02220 - Excavation for Structures  
Specification 02485 - Finish Grading and Seeding  
Specification 02575 - Paving Restoration

- C. Applicable Standard Details:

Pipe Bedding and Concrete Encasement

**1.02 QUALITY ASSURANCE**

- A. Testing Agency:

Compaction testing shall be performed by an independent soils testing laboratory. If the results of any test indicate a non-compliance with the requirements of the Drawings, the Contractor shall, at the Contractor's expense, correct the condition.

- B. Referenced Standards:

American Society for Testing and Materials (ASTM):

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- D698 Tests for Moisture-Density Relations of Soils
- D1556 Test for Density of Soil-in-Place by the Sand-Cone Method
- D2922 Test for Density of Soil and Soil Aggregate in Place by Nuclear Methods

C. Compaction Testing:

The approved independent soils testing laboratory shall conduct five compaction tests for each 1,000 linear feet of pipeline during backfilling operations.

Determine compaction in areas other than state highways and shoulders by the testing procedure contained in ASTM D1556 or ASTM D2922.

1.03 SUBMITTALS

A. Certificates:

Submit, prior to delivery of the material to the job site, a Statement of Compliance from the materials supplier, together with supporting data, attesting that the composition analysis of pipe bedding and select material backfill materials meet specification requirements. Should a change in source of materials be made during construction, submit a new Statement of Compliance from the new source for approval before the material is delivered to the job site.

Submit certified compaction testing results from the soils testing laboratory.

B. Compaction Equipment List:

Submit a list of all equipment to be utilized for compacting, including the equipment manufacturer's lift thickness limitations for each backfill material employed.

C. Agreements with Property Owners:

Prior to storing or disposing of excavated materials on private property, submit a copy of the written agreement with the property owner.

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1.04 JOB CONDITIONS

A. Control of Traffic:

Employ traffic control measures in accordance with Section 814, Standard Specifications for Construction and Materials, Maryland Department of Transportation, State Highway Administration, January, 1982, or its latest revision.

Site specific traffic control requirements may be issued by the State Highway Administration for any particular project and if so would take precedence.

B. Protection of Existing Utilities and Structures:

Take all precautions and utilize all facilities required to protect existing utilities and structures. Contact "Miss Utility" (1-800-257-7777) at least 5 working days in advance of intent to excavate and give the location of the job site. Request cooperative steps of the Utility and suggestions for procedures to avoid damage to its lines.

Advise each person in physical control of powered equipment used in excavation work of the type and location of utility lines at the job site, the assistance to expect, and procedures to follow to prevent damage.

Immediately report to the Utility and the County any break, leak or other damage to the lines or protective coatings made or discovered during the work and immediately alert the occupants of premises of any emergency created or discovered.

Provide free and safe access to Utility personnel at all times for purposes of maintenance, repair and inspection. Provide support to utility personnel as needed.

**PART 2 - PRODUCTS**

2.01 PIPE BEDDING MATERIAL

- A. Stone Bedding shall consist of ¾ inch washed gravel conforming to the following gradation requirements:

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| <u>Sieve</u> | <u>Percent Passing</u> |
|--------------|------------------------|
| 1-1/2"       | 100                    |
| 1"           | 90 - 100               |
| 2"           | 25 - 60                |
| No. 4        | 0 - 10                 |
| No. 8        | 0 - 5                  |

2.02 BACKFILL MATERIAL

A. Borrow for Select Backfill:

1. The uses, classification, characteristics, and definitions of terms for borrow materials obtained shall be in accordance with the requirements of AASHTO M 57, modified: M 145 modified, and M 147 modified. Materials having a dry weight less than 90 pounds per cubic foot, materials with liquid limits in excess of 50, and materials containing detrimental quantities of frozen material, rubbish, boulders in excess of 6 inches, or organic material such as leaves, roots, grass or sewage shall be excluded from use.
2. The method of testing materials shall be in accordance with the requirements of AASHTO T 88 modified; T 89 modified; T 90 modified; and T 99 method C modified.
3. Select backfill shall meet the following gradation:

| <u>Sieve</u> | <u>Percent Passing</u> |
|--------------|------------------------|
| 2"           | 95 - 100               |
| 1"           | 85 - 100               |
| 3/8"         | 50 - 85                |
| No. 4        | 35 - 65                |
| No. 10       | 25 - 50                |
| No. 40       | 15 - 30                |
| No. 200      | 5 - 15                 |

Note: The fraction passing the No. 200 sieve shall not be greater than two-thirds of the fraction passing the No. 40 sieve. The fraction passing No. 40

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sieve shall have a liquid limit not greater than 25 and a plasticity index not greater than 6, when tested according to AASHTO T 89 modified and T 90.

2.03 RIP RAP STONE

- A. Field stone or rough unhewn quarry stone of approximate rectangular shape; hard and angular and of such quality that it will not disintegrate on exposure to water or weathering.
- B. 6" minimum thickness, measured perpendicular to face, with no face dimension less than the thickness of the stone.
- C. Not less than 70% of the individual pieces weighing a minimum of 150 lbs; not more than 10% of the individual pieces weighing less than 100 lbs.

2.04 GAB (Graded Aggregate Base)

- A. GAB shall meet the following gradation requirements:

| <u>Sieve</u> | <u>Percent Passing</u> |
|--------------|------------------------|
| 2"           | 100                    |
| 1-1/2"       | 95 - 100               |
| 3/4"         | 70 - 92                |
| 3/8"         | 50 - 70                |
| No. 4        | 35 - 55                |
| No. 30       | 12 - 25                |
| No. 200      | 0 - 8                  |

2.05 MARKING TAPE

- A. ASTM D2103, ASTM D882, ASTM D2578, ASTM D671
- B. 6" wide, 5.0 mil thick, 50 gauge, metal detectable.
- C. Open trench constructed water pipelines shall be identified with blue labeled as "water" and sewer pipelines shall be identified with green labeled as "sewer".

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2.06 TRACER WIRE

- A. All open trench pipe runs, except straight runs between gravity sewer manholes, shall have a single strand 8-gauge un-coated copper wire run along with the pipe to aid in future locates.
- B. Wire shall be run to grade at all cleanouts, division valves, etc. in order to allow for tracer equipment to connect to the wire. Wire shall provide a continuous loop along the entire length of pipe not to exceed 900 feet without an access point to be able to reach and attach to the wire.

**PART 3 - EXECUTION**

3.01 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. Coordinate the work to ensure the least inconvenience to traffic and maintain traffic in one or more unobstructed lanes unless closing the street is authorized.
- B. Maintain access to all streets and private drives.
- C. Provide and maintain signs, flashing warning lights, barricades, markers, and other protective devices as required to conform with construction operations and to keep traffic flowing with minimum restrictions.
- D. Comply with state and local codes, permits and regulations.
- E. When working within the Maryland State Highway Administration right-of-way, the Contractor shall maintain and protect the traffic as outlined in the applicable SHA construction permit or as directed by SHA.

3.02 CUTTING PAVED SURFACES

- A. Where excavation includes breaking a paved surface, make cuts in a neat uniform fashion forming straight lines parallel with the centerline of the trench. Cut offsets at right angles to the centerline of the trench. Saw cut concrete surfaces; saw cut other

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hard surfaces or make straight cuts with jackhammer. No paving shall be broken except that which has been previously cut.

- B. Protect edges of cut pavement during excavation to prevent raveling or breaking; square edges prior to pavement replacement.

### 3.03 TRENCH EXCAVATION

- A. Topsoil Stripping and Stockpiling:

Strip topsoil encountered during trench excavation to its full depth and stockpiled for reuse. Installation of water & sewer utilities shall not be accomplished until the site is graded to subgrade limits.

- B. Depth of Excavation:

#### Gravity and Vacuum Pipelines:

Excavate trenches to the depth and grade shown on the profile drawings for the invert of the pipe plus that excavation necessary for placement of pipe bedding material if Type III bedding is specified. Refer to section 3.07 of this specification for additional information on the types of bedding.

Excavation for laterals shall provide a straight uniform grade from the main pipeline or riser stack to the elevation at the right-of-way line, plus that excavation necessary for placement of pipe bedding material.

#### Pressure Pipelines:

Excavate trenches to the minimum depth necessary to place required pipe bedding (if any) material and to provide 3'-6" from the top of the pipe to the finish ground elevation, except where specific depths are otherwise indicated on the Drawings.

Where Type I bedding is being utilized, excavate to the grade shown for the invert of the pipe. Shape trench bottom to the shape of the lower quadrant of the pipe and to support pipe evenly along the barrel. Provide recesses for the joints or bells of the pipe.

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Where unsuitable bearing material is encountered in the trench bottom, continue excavation until the unsuitable material is removed, solid bearing is obtained or can be established, or concrete cradle can be placed. If no concrete cradle is to be installed, refill the trench to required pipeline grade with pipe bedding material.

Where Type I pipe bedding is being utilized and rock is encountered in the trench bottom, remove the rock to a depth of 5" plus 0.1 O.D. of the pipe below design trench bottom and place pipe bedding material.

Where the Contractor, by error or intent, excavates beyond the minimum required depth, backfill the trench to the required pipeline grade with pipe bedding material at his expense.

Refer to section 3.07 of this specification for more detail on bedding.

C. Width of Excavation:

Excavate trenches, including laterals, to a width necessary for placing and jointing the pipe and for placing and compacting bedding and backfill around the pipe. (Complying with all safety regulations)

Shape trench walls completely vertical from trench bottom to at least 24" above the top of the pipe.

For pressure pipeline fittings, excavate trenches to a width that will permit placement of concrete thrust blocks. Provide native earth surfaces for thrust blocks that are perpendicular to the direction of thrust and are free of loose or soft material.

D. Length of Open Trench:

1. Excavation of all trenches shall be fully completed at least 20 feet in advance of the pipe laying operations. No trench shall be left open over night.

3.04 SUPPORT OF EXCAVATION

- A. Support excavations with sheeting, shoring, and bracing or a "trench box" as required to comply with Federal and State laws and codes. Install adequate excavation supports to prevent ground movement or settlement to adjacent structures, pipelines or utilities. Damage due to settlement because of failure to provide support or

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through negligence or fault of the Contractor in any other manner, shall be repaired at the Contractor's expense.

- B. Withdraw shoring, bracing, and sheeting as backfilling proceeds unless otherwise directed by the County.

### 3.05 CONTROL OF EXCAVATED MATERIAL

- A. Keep the ground surface, within a minimum of 2' of both sides of the excavation free of excavated material.
- B. Provide temporary barricades to prevent excavated material from encroaching on private property, walks, gutters, and storm drains.
- C. Maintain accessibility to all fire hydrants, valve pit covers, valve boxes, curb boxes, fire and police call boxes, and other utility controls at all times. Keep gutters clear or provide other satisfactory facilities for street drainage. Do not obstruct natural water courses. Where necessary, provide temporary channels to allow the flow of water either along or across the site of the work.
- D. Do not place or store excavated material on private property without a written agreement signed by the property owner.
- E. In areas where pipelines parallel or cross streams, ensure that no material slides, is washed, or dumped into the stream course. Remove cofferdams immediately upon completion of pipeline construction.

### 3.06 DEWATERING

- A. Keep excavations dry and free of water. Dispose of precipitation and subsurface water clear of the work.
- B. Maintain pipe trenches dry until pipe has been jointed, inspected, and backfilled, and concrete work has been completed. Prevent trench water from entering pipelines under construction.
- C. Intercept and divert surface drainage away from excavations. Maintain storm drainage facilities, gutters, and natural surface water courses open and in operation. Provide and install temporary facilities to maintain excavations free of water as

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required. Design surface drainage systems so that they do not cause erosion on or off the site, or cause unwanted flow of water. When mechanical equipment is utilized to control water conditions, provide and maintain sufficient standby units on site.

- D. Comply with Federal and State requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control. Comply with the Sediment and Erosion Control Plan.
- E. The Contractor shall perform dewatering activities ahead of trenching and excavation activities in order to maintain a dry excavation as specified herein.

### 3.07 PIPE BEDDING REQUIREMENTS

- A. Type I Bedding:

Trenches shall be excavated so as to provide a uniform and continuous bearing and support for the pipe on solid and undisturbed ground. Any part of the trench excavated below specified grade shall be filled with approved materials and compacted. Prepare trench bottom as shown on the Bedding Detail on the Contract Drawings for force main pipelines, water main pipelines and water service connection pipelines unless specified on drawings to be Type III Bedding.

- B. Type III Bedding:

Trenches shall be excavated to a width necessary to allow proper handling and installation of the pipe in the trench and to a depth sufficient to allow a minimum of 6 inches of 3/4 inch washed gravel below the pipe invert. Depth of bedding material aggregate as shown on the Bedding Detail on the Drawings.

Provide Type III bedding for all PVC vacuum sewer mains, vacuum pit crossovers, and gravity sewer pipelines.

- C. Shape recesses for the joints or bell of the pipe by hand. Assure that the pipe is supported on the lower quadrant for the entire length of the barrel.
- D. If the Contractor elects to install several mains in a common trench excavation (where applicable), bedding material aggregate shall be installed from the bottom of the trench excavation to the "spring line" of the most shallow main.

### 3.08 PIPE LAYING

- A. Lay pipe as specified in the appropriate Section of these Specifications for pipeline construction.

### 3.09 THRUST RESTRAINT

- A. Provide pressure pipe with concrete thrust blocking at all bends, tees, valves, and changes in direction, in accordance with Standard Buttress dimensions.

### 3.10 BACKFILLING TRENCHES

- A. After pipe installation and inspection, backfill trenches from trench bottom or from the top of pipe bedding material, whichever is greater, to 12" above the crown of the pipe with specified backfill material hand placed and carefully compacted with hand-operated mechanical tampers in layers of suitable thickness to provide specified compaction around and under the haunches of the pipe. Backfill and compact the remainder of the trench with specified backfill material.
- B. The Contractor shall refill, re-compact, and maintain all excavations in proper condition at the direction of the County throughout the life of the Contract and guarantee period.
- C. Backfill above the pipe lining in non-traffic bearing areas shall consist of suitable, dry, native material compacted to 85% modified Proctor maximum dry density or select material compacted to 90% modified Proctor maximum dry density.
- D. Backfill above the pipe lining in the existing paved limits of the County or other public roads shall consist of suitable, dry, native material compacted to 85% modified Proctor maximum dry density or select material compacted to 92% modified Proctor maximum dry density for lifts below the top foot of backfill, 95% modified Proctor maximum dry density for the top foot of backfill. In lieu of a laboratory determination of the maximum attainable dry density, a dry density of 120 pounds per cubic foot shall be assumed.

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- E. No backfill shall be installed on frozen surfaces, nor shall frozen materials, snow, or ice shall be placed as backfill.
- F. Exposed Joints for Testing:  
  
Testing shall be as specified in the Specifications 02651 and 02753.
- G. Lift Thickness Limitations:  
  
Backfill material shall not be placed in lifts exceeding two feet.  
  
Notwithstanding the specified requirements for trench backfill compaction, trenches that settle below the surrounding grade prior to final completion shall be filled to surrounding grade level with appropriate materials.
- H. Unsuitable Backfill Material:  
  
Where the County deems backfill material to be unsuitable and rejects all or part thereof due to conditions prevailing at the time of construction, remove the unsuitable material and replace with select material or suitable native material, previously excavated and dried.
- I. Special efforts of compaction, as directed by the County, are required when backfilling under and around any pipe or fittings, particularly vacuum sewer pipe where the slopes are so minimal and critical, to prevent differential settling of the pipe and fittings.

### 3.11 TRACER WIRE & MARKING TAPE

- A. An inert polyethylene tape having a metallic core shall be placed in the trench at a depth of 18 inches below grade during backfill along the entire length of the trench. Green tape shall be used to mark the sewer lines, blue to mark the water lines.
- B. An uncoated copper wire shall be placed along the invert of the trench, shall extend to grade at any features that come to grade (i.e. division valves, cleanouts, hydrants, etc.) and shall be tested at the completion of the job to ensure the wire provides a 'continuous loop' to allow the entire pipe run to be located from connecting to any one point of the tracer wire. Should the wire not be a continuous loop, Contractor shall take whatever actions as necessary to correct at no expense to the County.

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- C. Refer to section 2.05 and 2.06 of this specification for more information of the tape and wire to be used.

3.12 DISPOSAL OF EXCAVATED MATERIAL

- A. Excavated material remaining after completion of backfilling shall remain the property of the Contractor, removed from the construction area, and legally disposed of at no cost to the County.

3.13 ROUGH GRADING

- A. Rough grade areas disturbed by construction to a uniform finish. Form the bases for terraces, banks, lawns and paved areas.
- B. Grade areas to be paved to depths required for placing sub-base and paving materials. Rough grade areas to be top-soiled and seeded to 3" below indicated finish contours.

3.14 RESTORATION OF SURFACES

- A. Trench surface for paved and non-paved areas shall be restored to original conditions, or better.
- B. All surfaces not within the travel portion of the road or shoulders, or any surface that exists as grass, is to be restored to grass in accordance with Specification 02485, Finish Grading and Seeding.

END OF SPECIFICATION

**SPECIFICATION 02485 - FINISH GRADING AND SEEDING**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. The work of this Specification includes, but is not limited to:

- Placing topsoil
- Soil conditioning
- Finish grading
- Seeding
- Maintenance
- Termite control

- B. Related work specified elsewhere:

1. Specification 02100 - Clearing and Grubbing
2. Specification 02150 - Boring/Jacking/Tunneling
3. Specification 02220 - Excavation for Structures
4. Specification 02221 - Trenching

**1.02 QUALITY ASSURANCE**

- A. Soil and soil supplement testing shall be performed by a Soils Testing Laboratory engaged and paid for by the Contractor and approved by the County.

- B. Collect soil samples under the direction of the County.

- C. Reference Standards:

1. Maryland Department of Transportation - Standard Specifications for Construction and Materials, latest version and as Amended.
2. Maryland State Board of Agriculture, "Seed Regulations", as Amended.
3. Requirements of Turf Grass Law and Regulations, Publication No. 41.
4. Maryland Standard Method of Procedure.

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1.03 SUBMITTALS

A. Certificates:

1. Prior to use of placement of material, submit a Statement of Compliance from the materials suppliers, together with supporting data, attesting that the composition of the following products meet specification requirements.
  - a. Topsoil analysis - State pH, texture, and organic content.
  - b. Fertilizer analysis - content and percent of each.
  - c. Lime analysis - content and percent of each.
  - d. Seed mixture(s) - State percentage of mixtures, purity, germination and maximum weed seed content of each grass mixture.
2. If soil tests are performed to justify decreased liming and fertilizer rates, submit certified soil sample analyses, including laboratory's recommended soil supplement formulation.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Seed:

1. Deliver seed fully tagged and in separate packages according to species or seed mix.
2. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be accepted.

**PART 2 - PRODUCTS**

2.01 TOPSOIL

- A. All topsoil stripped from the site and stockpiled may be reused provided the following requirements are met:
1. Have a pH of between 6.0 and 7.0; contain not less than 2% nor more than 10% organic matter as determined by AASHTO T194.

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2. Fertile friable loam, sand loam, or clay loam which will hold a ball when squeezed with the hand, but which will crumble shortly after being released.
3. Free of clods, grass, roots, or other debris harmful to plant growth. Free of pests, pest larvae, and matter toxic to plants.

2.02 SEED

- A. Fresh, clean, dated material from the last available crop and within the date period specified, with a date of test not more than 9 months prior to the date of sowing.
- B. Percentage of pure seed present shall represent freedom from inert matter and from other seeds distinguishable by their appearance.
- C. All seeds will be subject to analysis and testing.
- D. Seed shall be certified by the Maryland State Board of Agriculture and shall conform to requirements of Maryland Turf Grass law and Regulations, Publication No. 41.
- E. Seed mix shall be in accordance with the Standard Specifications.
- F. Seeding shall be accomplished in accordance with Maryland Department of Transportation Standard Specifications, Section 701.01.03.
- G. Seed shall comply with Maryland Department of Transportation Standard Specifications, Section 920.04.01.

2.03 FERTILIZER

- A. Liquid formulations may be used in lieu of dry formulations, provided the rate of application is adjusted to apply the same quantities of nitrogen, phosphorus and potassium per unit area as specified for dry formulations.
- B. Fertilizer in accordance with the Standard Specifications and applied in accordance with Section 701.03.08 of the Standard Specifications for Construction and Materials, Maryland Department of Transportation, January 1982, or its most recent revision.

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- C. Contractor may submit soils samples to an approved laboratory for fertilizing recommendations. Recommendations shall be submitted to the County for review and decision relating to modifying the application rate as shown in the section below entitled SEEDING REQUIREMENTS.

2.04 LIME

- A. Conform to Section 920.02 of the Standard Specifications for Construction and Materials, Maryland Department of Transportation, January 1982, and applied in accordance with Section 701.03.07, or its most recent revision.
- B. All lime in accordance with application rates shown in the Restoration Table.

2.05 INOCULANT

- A. Inoculate leguminous seed before seeding with nitrogen fixing bacteria culture prepared specifically for the species.
- B. Do not use inoculant later than the date indicated by the manufacturer.
- C. Protect inoculated seed from prolonged exposure to sunlight prior to sowing.
- D. Reinoculate seed not sown within 24 hours following initial inoculation.

2.06 EROSION CONTROL FABRIC

- A. Shall be a knitted construction of yarn with uniform openings interwoven with strips of biodegradable paper, furnished in rolls with 4 mil opaque polyethylene base as protection for outdoor storage.
- B. Fabric 0.2 pound per square yard.

2.07 JUTE MATTING

- A. Shall be heavy weight, minimum 0-9 pound per square yard, jute mesh with 1" opening.

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2.08 FABRIC/MATTING ANCHORS

- A. Staples for fastening fabric to ground shall be minimum 11 gauge wire, "U" shaped, with a 1" crown and 6" legs.

2.09 MULCHING MATERIALS

- A. Hay: This type of mulch shall meet the requirements of specification 920.05.03 of the SHA Standard Specification.
- B. Straw: This mulch shall consist of thoroughly threshed wheat, rye or oat straw.
- C. Mulch Binder: Mulch shall be restrained from movement by such methods as crimping, asphalt binders, cellulose binders, or other methods as approved by the Soil Conservation Service.

**PART 3 - EXECUTION**

3.01 PLACING TOPSOIL

- A. Place topsoil and spread over the prepared subgrade to obtain the required depth and grade elevation.
- B. Final compacted thickness of topsoil not less than 3 inches (three inches).
- C. Roller weighing over 120 pounds per foot of width shall not be used for compaction.
- D. Hand rake topsoil and remove all materials unsuitable or harmful to plant growth.
- E. Do not place topsoil when the subgrade is frozen, excessively wet, or extremely dry; do not handle topsoil when frozen or muddy.
- F. Material unsuitable for finish grading which accumulates during spreading and raking shall be removed and legally disposed of off site by Contractor.
- G. Finish surface of topsoil shall be smooth, even and true to lines and grades with no ponding areas.

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3.02 TILLAGE

- A. After seed bed areas have been brought to proper compacted elevation, thoroughly loosen to a minimum depth of 5" by disking, harrowing, or other approved methods.
- B. Do not work top-soiled areas when frozen or excessively wet.

3.03 FINISH GRADING

- A. Remove unsuitable material larger than 2" in any dimension.
- B. Uniformly grade surface to the required contours or as directed without the formation of water pockets.
- C. Rework areas which puddle by the addition of topsoil and fertilizer; re-rake.
- D. Distribute starter fertilizer at the rates indicated in the Standard Specifications.
- E. Incorporate starter fertilizer into the upper 1" of soil.

3.04 SEEDING REQUIREMENTS

- A. All areas disturbed during construction shall be seeded and mulched in strict accordance with the requirements of the Queen Anne's County Soil Conservation District and these specifications, to include seed bed preparation and all incidental work and material to complete the operation. The Contractor shall be responsible to maintain the disturbed area until it has acquired a thick stand of grass and is completely stable to resist erosion.
- B. Seed shall be Kentucky No. 31, spread in accordance with the Specification at 1.5 pounds per 1000 square feet.
- C. Lime shall be ground Dolomite Lime Stone spread at 100 pounds per 1000 square feet.
- D. 10-10-10 Fertilizer shall be spread at 25 pounds per 1000 square feet.
- E. Seeding dates shall be designated as:

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Spring ..... February 1 to May 1  
Fall ..... August 1 to November 1

- F. All work completed during the seeding dates will be seeded at that time. All work completed between May 1st and August 15th shall be seeded during the Fall seeding dates. All work completed between November 1st and February 1st shall be seeded during the Spring seeding dates. If construction is performed at a time, other than during the above acceptable dates, the seed bed shall be mulched with straw. The straw shall be cut into the seed bed with a mulch anchor tool.

3.05 MULCHING

- A. Mulching shall be performed in accordance with specification 920.05 of the SHA Standard Specification.

3.06 MAINTENANCE

- A. Contractor shall be responsible for maintenance of seeded work.
- B. Maintenance includes watering, weeding, initial mowing, cleanup, edging, and repair of washouts or gullies.
- C. Keep seeded areas wet, close to the saturation point, to a depth of 3" for a period of 10 days following seeding or sodding.
- D. Those areas which do not show a prompt catch or grass within 10 days of seeding or sodding shall be reseeded or re-sodded until complete grass catch occurs.
- E. When the grass reaches an average height of 2-1/2", cut to a height of 1-1/2"; irregularities or depressions which show up at this time shall be leveled and reseeded.
- F. Contractor's maintenance shall continue until all areas are grassed and free from bare spots or off-color areas, and all work under this Contract is complete and accepted.

END OF SPECIFICATION

**SPECIFICATION 02575 - PAVING RESTORATION**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. The work of this Specification includes, but is not limited to:

Temporary Paving  
Permanent Paving  
Shoulder Restoration  
Curb and Sidewalk Restoration

- B. When temporary pavement is required or placed, materials and placement shall be as specified herein except where otherwise required by jurisdictional requirements. Contractor shall be responsible to maintain the temporary pavement in a condition acceptable to the engineer until permanent pavement is placed. Should temporary pavement become defective and create an emergency, the contractor shall commence repair to rectify the situation within one hour after notification by the Engineer or the Engineer may arrange to have the work performed by others and deduct the costs thereof from monies owed the contractor.

- C. Related work specified elsewhere:

Specification 02221 - Trenching  
Specification 03310 - Concrete Work

- D. Applicable Standard Details:

Roadway Trench Repair – Temporary  
Roadway Trench Repair – Permanent – Tar & Chip

**1.02 QUALITY ASSURANCE**

- A. Use only materials which are furnished by a bulk bituminous concrete producer regularly engaged in production of hot-mix, hot-laid bituminous concrete and is listed in the current SHA Standard Specifications.

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B. Referenced Standards:

Maryland State Highway Administration (MSHA) Standard Specifications for Construction and Materials, October 1993, or its current version.

C. The applicable MSHA Permit for this contract supersedes these technical specifications should conflicts arise.

1.03 TESTING

A. Obtain a minimum of one 6" diameter core sample for each 1,000 linear feet of permanent paving, or fraction thereof, for test of depth of bituminous material courses.

B. Take core samples at locations as directed by the County or MSHA after final compaction rolling.

C. Bituminous or concrete courses deficient more than 1/4-inch from the specified depth in any one sample, or uniformly more than 1/8-inch in three or more samples, shall be removed and replaced to the correct depth.

D. Refill and compact test holes with material acceptable to, and under the direction of, the County or MSHA.

1.04 SUBMITTALS

A. Certificates:

Submit a Statement of Compliance, together with supporting data, from bituminous and aggregate suppliers attesting that the materials provided conform to the State specifications.

1.05 JOB CONDITIONS

A. Control of Traffic:

Take measures to control traffic during repaving operations. Do not allow traffic on repaved areas until authorized by the County or MSHA.

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Employ traffic control measures in accordance with Section 814, Standard Specifications for Construction and Materials, Maryland Department of Transportation, October 1993, or its current version.

- B. Restore existing paving outside the limits of the work, which is damaged by the Contractor's operations, to its original condition.

**PART 2 - PRODUCTS**

2.01 CONCRETE

- A. See Specification 03310

2.02 BITUMINOUS PAVING MATERIALS AND AGGREGATES

- A. Refer to Maryland Department of Transportation, State Highway Administration, Standard Specifications for Construction and Materials, October 1993, or its current version. All bituminous materials and aggregates used in paving and resurfacing are designated in these Specifications by, and shall conform to, the applicable portions of the State Specifications.
  - 1. Aggregate Base and Subbase, Section 304.
  - 2. Bituminous Surface Treatment, Section 404.
  - 3. Stabilized Shoulders, Section 307.
  - 4. Bituminous Concrete Shoulders, Section 401.03.12.
  - 5. Bituminous Concrete, Section 917.
  - 6. Bituminous Tack Coat, Section 401.03.02.

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**PART 3 - EXECUTION**

3.01 TEMPORARY PAVING

- A. Place temporary paving immediately upon completion of trench backfilling. Unpaved trenches shall not remain unpaved longer than five working days after backfilling.
- B. Shape and compact subgrade material, then place and compact crushed stone base course to the required thickness.
- C. Place temporary paving material. Compact to required minimum thickness with trench roller having minimum 300 pounds per inch-width of compaction roll.
- D. Continuously maintain temporary paving to the satisfaction of the County and the State and local road departments.

3.02 PERMANENT PAVING

- A. No permanent paving shall be performed until approved by the County. All paving disturbed shall be restored to its original or better condition.
- B. Trim existing paving to remove damaged areas. Cut straight joint lines and right angles offsets.
- C. Remove temporary paving material. Apply AC-20 joint sealer to cut edges of bituminous paving. Construct permanent base and surface courses to the required compacted thicknesses shown on the Drawings.
- D. Maintain permanent paving to the satisfaction of the County and the local and State road departments.
- E. Triple surface treatment to consist of: 1st course, 45 lbs. #7 stone per sq. yd. on ½ gal. binder asphalt; 2nd and 3rd courses, 35 lbs. MD #7 stone per sq. yd. on 1 gal. binder asphalt. Asphalt to be AE-5 or CRS-2.

3.03 SHOULDER RESTORATION

- A. Restore shoulders to original or better condition.

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3.04 DRIVEWAYS

- A. Trim concrete and bituminous driveway surfaces to remove damaged areas. Saw cut straight joint lines parallel to the centerline of the trench. Cut offsets at right angles to the trench centerline.
- B. Restore existing concrete driveways trenched through with a 6" layer of concrete reinforced with 6 x 6 W1.4/W1.4 wire mesh.
- C. Restore existing blacktop driveways trenched through in kind or with minimum 2" bituminous wearing course over 4" layer of stone crushed aggregate in accordance with Section 404 of Maryland Department of Transportation, Standard Specifications for Construction and Materials, January 1982, or its current version.
- D. Restore earth driveways with a 6" layer of select backfill material.
- E. Restore stone or gravel driveways in kind.
- F. Restore brick driveways with like bricks placed on a 4" thick wet sand bed. Place bricks in like pattern and spacing.

3.05 CONCRETE CURB AND SIDEWALK REPAIRS

- A. Replace curbs and sidewalks damaged by construction to match existing.
- B. Reconstruct curbs and sidewalks to the first expansion joint on either side of the damaged portion. Install expansion joint material.
- C. Reconstruct sidewalks to 4" thickness of concrete, reinforced with 6 x 6 W1.4/W1.4 wire mesh, placed on a 4" base of compacted select material (2RC) crushed aggregate. Driveways are to be as above but with a minimum of 6" thickness of concrete.

END OF SPECIFICATION

**SPECIFICATION 02610 - PRESSURE AND GRAVITY SEWER PIPE**

**PART 1 - GENERAL**

1.01 DESCRIPTION

A. The work of this Specification includes, but is not limited to:

1. Sanitary sewer pressure and gravity pipelines
2. Gravity sewer service connection pipelines and cleanouts.
3. Grease traps

B. Related work specified elsewhere:

Specification 02221 - Trenching, Backfilling & Compacting  
Specification 02615 - HDPE Pipe  
Specification 02651 - Sewer Testing

C. Applicable Standard Details

Pipe Bedding & Concrete Encasement  
Buttress for Caps and Horizontal Bends  
Buttress for Tees  
Buttress for Quarter Bends  
Jack & Bore  
Water Sewer Conflict

Sewer Service Tracer Wire  
Gravity Sewer Cleanouts  
Gravity Sewer Vent  
Gravity Sewer Vent at Right of Way  
Gravity Sewer Precast Manhole  
Gravity Sewer Splitter Manhole  
Gravity Sewer Splitter Manhole Warning Light  
Gravity Sewer Grease Trap

Pressure Sewer Air Release Valve  
Pressure Sewer Blow-off

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Force Main Testing Point Assembly  
Grinder Pump System Cleanout Assembly  
Grinder Pump System End of Line Cleanout Assembly

1.02 QUALITY ASSURANCE

A. Reference Standards:

American National Standards Institute (ANSI):

- |        |  |
|--------|--|
| A21.4  | Cement-Mortar Lining for Cast-Iron and Ductile-Iron Pipe and Fittings                                |
| A21.11 | Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings                       |
| A21.51 | Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for water or other liquids |

American Society for Testing and Materials (ASTM):

- D1785 Poly Vinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120
- D2241 Poly Vinyl Chloride (PVC) Plastic Pipe (SDR-35)
- D2466 Poly Vinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40
- D2564 Solvent Cements for Poly Vinyl Chloride (PVC) Pipe and Fittings

American Water Works Association (AWWA):

- C600 Installation of Ductile Cast-Iron Pipe and Appurtenances

- B. Materials contaminated with gasoline, lubricating oil, liquid or gaseous fuel, aromatic compounds, paint solvent, paint thinner, or acid solder will be rejected.

1.03 SUBMITTALS

A. Certificates:

Submit each manufacturer's certification attesting that the pipe, pipe fittings, joints, joint gaskets and lubricants meet or exceed specification requirements.

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1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery and Handling:

Do not place materials on private property without written permission of the property owner.

During loading, transporting and unloading, exercise care to prevent damage to materials.

Do not drop pipe or fittings. Avoid shock or damage at all times.

Take measures to prevent damage to the exterior surface or internal lining of the pipe.

B. Storage:

All pipe and fittings shall be stored in accordance with the manufacturer's recommendations.

Do not stack pipe higher than recommended by the pipe manufacturer.

Store gaskets for mechanical and push-on joints in a cool, dry location out of direct sunlight and not in contact with petroleum products.

**PART 2 - PRODUCTS**

2.01 DUCTILE IRON PIPE

**Note: Ductile Iron pipe is not a suitable 'or equal' due to the corrosive soils in the subject area. It can be used only when specifically called for on the approved plans or only with prior approval.**

A. Pipe:

ANSI A21.51, Minimum Thickness Class 51. Cement-mortar lining, ANSI A21.4, double thickness

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B. Fittings:

All fittings for use with ductile iron shall be Class 350 ductile iron. Ductile iron shall conform to ASTM A536-72, minimum grade 70-50-05. Nominal thicknesses of fittings shall be equal to or exceed Class 53 ductile iron pipe thicknesses. Radii of curvatures shall conform to ANSI A21.10-71 (AWWA C110-71). Fittings shall be cement lined in accordance with ANSI A21.4-74 (AWWA C104-74) and shall have mechanical joints in accordance with ANSI A21.11-72 (AWWA C111-72).

Fittings shall be coated on outside by a bituminous coating of either coal tar or asphaltic base 1 mil thick.

Fittings shall be cement mortar lined on inside in accordance with ANSI A21.10-82 (AWWA C110-82).

Compact fittings conforming to ANSI/AWWA C153/A21.53 are acceptable.

C. Joints: ANSI A21.11

Where not specifically indicated on the Drawings, joints may be either mechanical joint or push-on joint for pipe. For fittings joints shall be mechanical joint.

D. Rubber gaskets, Lubricants, Glands, Bolts and Nuts: ANSI A21.11

E. Polyethylene film for the ductile iron pipe and fittings shall be manufactured of virgin polyethylene material in accordance with AWWA C105. Film shall be Type 1, Class A or C, Grade E-1 with a tensile strength of 1200 psi. Film shall have a nominal thickness of 0.008 inches. Tube sheets shall be securely taped to the pipe every 3 feet and overlap by 1 foot at each joint with no loose or sagging areas. Tube and sheet sizes for each pipe diameter shall be as follows:

MINIMUM WIDTH

| NOMINAL PIPE DIAMETER<br><u>(inches)</u> | Flat Tube<br><u>(inches)</u> | Sheet<br><u>(inches)</u> |
|--|------------------------------|--------------------------|
| 3  | 14                           | 28                       |
| 4  | 16                           | 32                       |

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|    |    |    |
|----|----|----|
| 6  | 20 | 40 |
| 8  | 24 | 48 |
| 10 | 27 | 54 |
| 12 | 30 | 60 |
| 14 | 34 | 68 |
| 16 | 37 | 74 |
| 18 | 41 | 82 |

2.02 POLYVINYL CHLORIDE (PVC) SEWER PIPE - GRAVITY SEWER.

- A. Schedule 40 PVC with solvent weld connection, pressure fittings, pressure couplings and pressure caps. ASTM D1785, D2466, and D2564.
- B. PVC male pipe threads will not be allowed.
- C. PVC cell classification shall be 12454B or 12364C. No cellular core pipe is permitted.
- D. PVC sewer pipe and fittings shall be certified by Factory Mutual, Underwriters Laboratory, and National Sanitation Foundation.
- E. PVC sewer pipe shall be green in color if available.
- F. Allowable pipe deflection for PVC pipe provided under this specification shall be so installed that deflection of no more than 5 percent may be anticipated. Deflection shall be computed by dividing the amount of deflection (normal diameter computed by dividing the amount of deflection (normal diameter less minimum diameter when measured) by the nominal diameter of the pipe. Average deflection between two adjacent manholes shall not exceed 4 percent and no deflection at any point shall exceed 5 percent.
  - 1. If after initial inspection, in the opinion of the County the deflection may appear excessive, he may order the Contractor to arrange for and take accurate measurements of the pipe at whatever intervals and at whatever locations between adjacent manholes deemed advisable.
  - 2. Such measurements may be taken or ordered by the County at any time during the maintenance period and such measurements shall be performed in

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a manner and by methods approved by the ENGINEER. Sewer pipe will be tested for the maximum 5 percent deflection as per the pipe manufacturer's recommendations utilizing the go/no-go gauge method.

2.03 COMBINATION SEWAGE PRESSURE AIR-RELEASE AND AIR-VACUUM VALVE ASSEMBLY

- A. Combination of one air-release valve and one air-vacuum valve, each with back flushing and cleaning accessories, piped into a compact assembly.
- B. Epoxy-coated, cast iron bodies and covers. Stainless steel stems and floats. Stainless steel trim. Buna-N orifice seats.
- C. Constructed with long bodies and float stems so that operating mechanisms and orifice openings are kept free from contact with sewage during purging of air. Both valves shall permit re-entry of air whenever loss of pressure occurs.
- D. Provide each valve with back flushing and cleaning accessories comprised of:  
  
Shut-off valve at bottom inlet, blow-off valve near bottom of body, clear water inlet valve with quick-disconnect coupling and an air inlet with quick-disconnect in the valve cover, and hoses with quick disconnect couplings.
- E. CRISPIN Air-Vacuum Valve Model No. S-20AB as manufactured by Multiplex Manufacturing Co.
- F. CRISPIN Air-Release Valve Model No. S-20B as manufactured by Multiplex Manufacturing Co.

2.04 TRACER WIRE & MARKING TAPE

- A. All open trench pipe runs, except straight runs between gravity sewer manholes, shall have a single strand 8-gage un-coated copper wire run along with the pipe to aid in future locates.
- B. Wire shall be run to grade at all cleanouts, division valves, etc. in order to allow for tracer equipment to connect to the wire. Wire shall provide a continuous loop along

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the entire length of pipe not to exceed 900 feet without an access point to be able to reach and attach to the wire.

- C. Marking tape, in accordance with Specification 02221 shall be installed at a depth of 18 inches within the trench.

## 2.05 CONNECTORS

- A. Nuts, bolts, washers, tie rods, and any other connectors shall only be 304 stainless steel, or 'Tripac, Inc. 2000 Blue Coated', or approved equal, to resist corrosion.

## PART 3 - EXECUTION

### 3.01 EXCAVATION AND PIPE BEDDING

- A. Perform trench excavation to the line and grade indicated on the Contract Drawings and as specified in Specification 02221.
- B. Unless otherwise indicated on the Contract Drawings, provide for a minimum cover of 3.5 feet above the top of piping laid in trenches.
- C. Provide pipe bedding as specified on Drawings or in Specification 02221 for each type of pipe used. Place aggregate in a manner to avoid segregation, and compact to the maximum practical density so that the pipe can be laid to the required tolerances. Assure that the pipe is supported on the lower quadrant for the entire length of the barrel.

### 3.02 PIPE INSTALLATION

- A. All pipe, valves, fittings, and buttresses shall be installed as specified in AWWA standards C-900, the pipe manufacturer's recommended methods and as stated herein, unless otherwise specified by the County.
- B. All pipe, valves and fittings shall be thoroughly cleaned and shall be entirely free from grease or oil and substantially free from blacking, dirt, sand, rust, slag or fluxing materials.

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- C. All sanitary sewer pressure pipes, fittings and valves to be connected by standard mechanical joints shall be installed by experienced pipe layers to the satisfaction of the County. Prior to making up joints the bells, pipe ends and rubber gaskets shall be thoroughly washed with soapy water. A cast iron gland shall be slid over the pipe and followed by a rubber gasket, thoroughly soaped, with its tapered side facing the bell. The pipe shall then be inserted fully into the bell. The rubber gasket shall be forced into position with the finger until it is flush with the face of the bell, the gland shall be slid against the face of the rubber gasket and the bolts inserted finger tight. Nuts shall be tightened with a torque wrench as specified by the manufacturer and AWWA. Bolts shall be drawn up evenly on alternate side, beginning at the top, keeping the gland parallel to the face of the bell at all times. In the event the use of ratchet wrenches is permitted, extreme care shall be taken to tighten the nuts to the specified tension without over tightening. Bell hole excavation may be required to allow proper wrench movement.
- D. Push on joints shall be made up in strict conformance with the manufacturer's recommendations and lubricants.
- E. Pipe and fittings shall be moved to the trench, carefully lowered, and set to line and grade. Pipe shall be laid on the subgrade. No blocking will be permitted. No pipe or fitting shall be installed until sufficient trench has been completely excavated to satisfy the County that no unforeseen obstructions of any kind are likely to be encountered. Where it is necessary to raise or lower the pipes due to obstructions or other causes, the County shall be notified and the change in grade shall be effected in accordance with details which will be furnished by the County. Said field adjustments will need County approval prior to construction.
- F. Joint deflections shall not exceed maximum deflections stated by the manufacturer for the specified joint and pipe sizes. No pipe shall be cut, nor cut pipe installed, except at the specific direction of the County. In cutting, the ends shall be cut at right angles to the axis and the edges filed to a smooth taper. Special care shall be exercised by the contractor to prevent damage to any pipe.
- G. Before placing in the trench each pipe or fitting shall be carefully cleaned of any foreign substance which may have collected therein and shall be kept clean at all times thereafter. No pipe shall be laid upon a foundation into which frost has penetrated, nor at any time when the County deems there to be a danger of the formation of ice or the penetration of frost at the bottom of the excavation. All

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requirements regarding the minimum length of open trench and promptness of refilling shall be observed. The open ends of all pipe and fittings in the trench shall be closed to the satisfaction of the County before leaving the work for the night and for all holidays or other times of interruption to the work.

- H. Any excessive settlement of the pipe requiring repairs shall be the sole responsibility of the Contractor (within the limits of the guarantee) and he shall make and do all required work as may be necessary to accomplish the required repairs and return the site to proper condition and appearance.
- I. Fittings and valves shall be placed along the force mains where shown on the drawings or where designated by the County in accordance with the requirements as provided elsewhere in these specifications.
- J. All fittings shall be firmly buttressed with concrete against undisturbed earth and/or mechanically restrained. See Buttress Standard Details.
- K. All trenches, except straight runs of gravity sewer between two manholes, are to have tracer wire placed in the invert of the trench and marking tape above the pipe as detailed in Section 2.05 of this specification and Specification 02221 - Trenching.

### 3.03 WYE BRANCHES AND TEES

- A. Install wye branches or pipe tees at locations indicated on the Contract Drawings concurrently with pipe laying operations. Use standard fittings of the same material and joint type as the pipeline into which they are installed. Tees will not be permitted for gravity sewer service connection pipelines.
- B. For taps into an existing pressure pipeline, use mechanical joint ductile iron tees or tapping tees. Layout holes with a template and cut holes with a mechanical hole cutter. Saddles will not be permitted.
- C. For taps into an existing PVC gravity sewer pipeline, use a PVC wye and couplings to cut in a lateral. Otherwise use a full-circle stainless steel clamp and mechanical cutter.

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3.04 CRADLES AND ENCASEMENT

- A. Provide concrete cradles and encasement for pipeline where indicated on the Contract Drawings, or as directed by the County, and in accordance with the Concrete Cradle and Encasement Detail.

3.05 THRUST RESTRAINT

- A. Provide concrete thrust blocking or restrained joints for pressure pipeline at all valves, tees, bends, caps, plugs, and changes in direction in accordance with the Buttress Details.
- B. Pour concrete thrust blocks against undisturbed earth.
- C. Locate thrust blocks to contain the resultant force and so pipe and fitting joints will be accessible for repair.
- D. Furnish and install, tie rods, clamps, set screw retainer glands, or restrained joints as indicated on the Contract Drawings.
- E. Protect metal restrained joint components against corrosion by applying a bituminous coating, encasing the entire assembly with an 8-mil thick polyethylene wrap in accordance with AWWA C105, or by concrete mortar encasement of metal area.

3.06 DEFLECTION

- A. When it is necessary to deflect pipes from a straight alignment horizontally or vertically, do not exceed limits given by the manufacturer.

3.07 BACKFILLING TRENCHES

- A. Backfill pipeline trenches only after acquiring as-built measurements and examination of the pipe laying by the County.
- B. Backfill trenches as specified in Specification 02221.

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3.08 INSTALLATION OF GRAVITY SYSTEM LINE AND CLEANOUTS

- A. Gravity sewers laid to collect and convey the sewage flow shall be Schedule 40 PVC only, with solvent weld connections from the building to the right-of-way cleanout. No cellular core variety pipe shall be allowed.
- B. Gravity sewers serving as service laterals shall be minimum 4" diameter and installed at a 1% slope. Gravity sewers serving more than 2 lots shall be upgraded to 6" diameter and installed at a 1% slope.
- C. A Canplas model #3284W sewer backflow preventer or approved equal shall be placed near the right of way line on all homes/structures with a lowest floor level less than 12 inches above grade (i.e.: split foyer or slab). Access via a traffic bearing frame & cover must be provided to allow for maintenance. Should the gravity lateral be connected to a vacuum sewer collection system, a vent must be placed between the backflow preventer and the vacuum valve pit in the street.
- D. When PVC cannot be solvent welded, a stainless steel shear ring band shall be used with a Fernco when burying pipe, as opposed to a Fernco coupling alone.
- E. A minimum of one cleanout on each gravity service line shall be installed at the right-of-way/easement/private property line. All cleanouts shall be of a diameter equal to the size of the pipe it serves, shall be capped with a threaded PVC cap, and protected by a traffic bearing frame and cover and set to finished grade.
- F. Cleanouts located in paved areas shall have a frame and cover suitable for HS-20 traffic loading. All cleanout caps shall be PVC and be threaded for simple installation. The cleanout cap shall be installed just below finished grade with access through the traffic bearing frame and cover. The traffic bearing frame and cover shall be supported on concrete or other approved bearing support such that the wheel loading of traffic is not transmitted to the PVC pipe.
- G. Cleanouts of a diameter equal to the size of the pipe they serve shall be installed as follows .
  - 1. every 75 feet of 4-inch straight run pipe and 100 feet of 6-inch
  - 2. upstream of any bends greater than 45 degrees but no more than one per 40 feet
  - 3. just outside the building foundation

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- H. Any 90 degree change of direction will be made by using two (2) 45 degree bends with a 1 foot nipple.
- I. All cleanout cap threads shall be sealed with pipe thread tape.
- J. Minimum cover requirements of sewer service laterals in traffic areas such as driveways and parking lots is 3 foot.
- K. Vacuum vents for each building connection shall be installed on all gravity sewer laterals connected to a vacuum collection system. Vents shall be at least 20 linear feet from the valve pit if possible. No vent terminal shall be located directly beneath any door, window, or other ventilating opening of the building or of an adjacent building, nor shall any such vent terminal be within 10 feet horizontally of such an opening. Vent shall be installed in accordance with standard detail and Maryland State Plumbing law.
- L. All fittings will be PVC as per Section 2.02 of this specification.
- M. No sump pumps, roof drains, yard drains, etc. shall be connected to the gravity sewer lines.
- N. All connections shall meet Queen Anne's County and State of Maryland Plumbing Codes.
- O. All trenches must be dewatered and stabilized at all times. When required washed gravel will be used to stabilize all trenches when unstable bedding exists. No trenches shall remain open overnight nor will any trench or pipe be backfilled without prior inspection by the County. Any pipe bedding compromised by water shall be removed and replaced with stone or dry bedding material.
- P. When connecting a structure to an existing gravity lateral, the existing and proposed laterals are subject to the same requirements. Their requirements include:
  - 1. Locating existing right-of-way cleanout or installing a new one.
  - 2. Air testing the gravity line for tightness.

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3. Inspecting the existing gravity line with a T.V. camera if so directed by the County. The cost of the camera rental will be borne by the property owner.
- Q. Before construction of a lateral connection begins, the invert elevations of the beginning and ending points must be determined to verify that the proper slope can be obtained. A test pit may be required in some cases at the Contractors expense.
  - R. When connecting an existing home, the septic tank must be completely disconnected from the house, cleaned out by a permitted septic hauler vacuum truck and backfilled with suitable material as per the State Environmental Health Department Regulations.
  - S. A minimum of 24 hour notice will be given to the Sanitary District before starting work.
  - T. All water and sewer laterals shall maintain a minimum of one ( 1 ) foot horizontal separation per Maryland Plumbing Law. The sewer lateral shall be below the water lateral.
  - U. Contractor will provide for all sewer laterals constructed within County or State rights of way or easements a detailed as built drawing showing location of piping with at least two dimensions from fixed points such as the center of a manhole or building corners, to all fittings and cleanouts. Drawing must indicate either North, South, East, or West. The County, or its agent, will provide as built for those laterals constructed on private property.

### 3.09 GREASE TRAPS

- A. Grease traps are used to remove excessive amounts of grease that may interfere with subsequent treatment. They shall be two compartment, top seam, 'septic tanks' equipped with baffles such that grease floats to the water surface and is retained while the clearer water underneath is discharged.
- B. Grease traps are rarely used for individual homes. Their main application is in treating kitchen wastewater from motels, restaurants, churches, schools and other institutions with large volumes of kitchen wastewater.

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- C. The design of grease traps shall be based on standards found below. In addition, the following general requirements apply for the proper use and installation of a grease trap.
1. Grease traps shall comply with the structural requirements applicable to traffic-bearing top seam septic tanks.
  2. Grease traps must be located so as to provide easy access for routine inspection, cleaning and maintenance. Cast iron manhole frames and covers shall be provided over the inlet and outlet of each grease trap and brought to grade out of the way of water ways to prevent inflow.
  3. Only kitchen wastewater shall pass through the interceptor and then be discharged into the collection system.
  4. The minimum size of a grease traps shall be 1500 gallons. Should it be determined that the use requires more than a single grease trap, additional 1500 gallon grease traps may be required.
- D. Grease traps must be cleaned out in accordance with following criteria.
1. They are to be totally vacuum cleaned out, not just the scum layer skimmed off, removing all solids, both floating and settled.
  2. They are to be cleaned once the floating scum layer of fat or oil is 3" thick or every 3 months whichever occurs first.
  3. They must be cleaned by a permitted service company and records and/or invoices must be kept to document the cleaning frequency.

END OF SPECIFICATION