



**CITY STANDARD SPECIFICATIONS
FOR PUBLIC INFRASTRUCTURE**

CITY OF VICTORIA, MINNESOTA

Revision Date: February 2019

It is the intent that these Engineering Standards supersede any prior standards adopted by the City of Victoria.

SECTION 0010

CITY OF VICTORIA, MINNESOTA CITY STANDARD SPECIFICATIONS FOR PUBLIC INFRASTRUCTURE

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SECTION 1100 – SUMMARY OF WORK

SCOPE:

Under this Section of the Specifications shall be general Project definitions and requirements applicable to the Work to be completed.

DEFINITIONS:

Wherever used in these specifications, the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

1. **CITY.** The City of Victoria acting through its legally constituted officials, officers or employees, or duly designated assigns, executors, or representatives.
2. **CONTRACTOR.** The individual, firm or corporation contracting for and undertaking prosecution of the prescribed Work; the party of the second part to the Contract, acting directly or through a duly authorized representative.
3. **ENGINEER.** The City Engineer, including duly authorized assistants and representatives, who represents the City during construction activities.
4. **WORK.** The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

GENERAL REQUIREMENTS:

1. **Construction Limits.** The Contractor's operations shall be confined to the plat and areas covered in right-of-way and easements granted to the Developer. Any procedures by the Contractor of any sort beyond the limits indicated shall be the sole responsibility of the Contractor who shall save the City harmless from any claim for damages due to trespassing.
2. **City Standard Specifications and Details.** All Work on this Project is governed by the standard Specifications and details of the City. No deviation from the Specifications and details is permitted without written permission of the Engineer.

Except as amended in the standard Specifications and details of the City, the 2018 Edition of the MnDOT Standard Specifications for Construction shall govern all work on this project.

3. **Acceptance and Approval of Improvements.** All construction and installations must be inspected and accepted by the Engineer, prior to starting subsequent phases of construction or installation.
4. **Non-compliance.** Non-compliance with the Specifications and details may result in discontinuance of inspections, non-acceptance of Work, and subject to the default provisions of the Developer's Agreement with the City.
5. **Plans and Specifications Coordination.** The drawings, specifications and other parts of the Plans are all essential and complementary. A requirement occurring in one is binding as though occurring in all. The Contractor shall provide all work and materials clearly implied in the contract documents, even if they are not mentioned specifically. The Contractor shall immediately notify the Engineer in writing upon the discovery of any discrepancies, errors or omissions in the Contract documents. The Contractor shall not proceed with any work affected by such discrepancies, errors or omissions until receiving direction to do so from the Engineer.

In any case of ambiguity or dispute over the interpretation of the provisions of the Contract, Plans or Specifications, the decision of the Engineer shall be final and binding on all parties concerned.

END OF SECTION

SECTION 1310 – PROJECT MEETING REQUIREMENTS

SCOPE

Under this Section of the Specifications shall list the minimum Project meeting requirements and related tasks.

GENERAL REQUIREMENTS

1. **SUMMARY.** A preconstruction meeting shall be conducted prior to the start of construction. Regular progress meetings shall be conducted throughout the progress of the Work to provide coordination and direction necessary for efficient and timely execution, and to minimize and mitigate the burdens that construction activity places upon its surroundings.
2. **REPRESENTATION.** Representatives of the Contractor, Subcontractors, and Suppliers attending the meetings shall be qualified and authorized to act on behalf of the entity being represented. An Engineer's representative may attend meetings to receive progress reports and to understand proposed scheduling of Work, but does not have the authority of the Engineer or the City. The Engineer may attend meetings.

EXECUTION

1. **PRECONSTRUCTION MEETING:**
 - A. **REQUIRED:** A preconstruction meeting must be conducted before any work on the project is allowed.
 - B. **SCHEDULE:** The City Engineer will schedule the preconstruction meeting upon written request of the Developer, or Developer's representative, and upon receipt of the following documentation;
 1. Complete sets of the City approved Plans and Specifications on file at the City.
 2. Copies of all applicable permits necessary for the execution of the proposed Work.
 3. Fully executed Developer's Agreement with the City.
 4. Proof of fully established security requirements as provided in the Developer's Agreement.
 - C. **LOCATION.** The preconstruction meeting will be held at Victoria City Hall.
 - D. **ATTENDANCE.** Attendance is required by the following representatives:
 1. Developer's Engineer
 2. Contractor's Project Manager
 3. Contractor's Resident Superintendent
 4. Subcontractors' or Suppliers' representatives that Contractor may invite or the Engineer may request
 5. Engineer's representatives
 6. City's representatives

7. Local utility representatives, as applicable
 8. Regulatory Permit Authorities representatives, as applicable
 - E. NOTICE. Notice of the preconstruction meeting shall be sent out by the Developer or Developer's representative to each required Attendee with a minimum advance notification of seven days. Notice shall not be sent out without the Engineer's approval.
 - F. REQUIRED INFORMATION. The Developer, Developer's Engineer and Contractor shall provide the following minimum information at the preconstruction meeting:
 1. Project Schedule with estimated number of working days to complete each major Project phase and providing the proposed sequence of operations.
 2. Submittals and Shop Drawings called for in these Specifications, as well as those listed below, including a copy to the City Engineer after they have been reviewed and certified by both the Contractor and Design Engineer. No manufacturing or shipping of materials shall occur prior to City Engineer review.
 - a. List of subcontractors with phone numbers
 - b. List of material suppliers with phone numbers
 - c. Contractor's traffic control and dust control implementation plans
 - d. Contractor's erosion control and SWPPP plans
 - e. Contractor's staging and materials storage plan
 - f. Contractor's emergency telephone numbers including the responsible party for Erosion and Sedimentation Control. Include numbers for all subcontractors.
2. REGULAR PROGRESS MEETINGS:
- A. Regular Progress meetings will be held throughout the progress of the Work.
 - B. The schedule, location, and attendance requirements will be identified for each Project as determined necessary by the Engineer.

END OF SECTION

SECTION 1330 – SUBMITTALS

GENERAL REQUIREMENTS

1. SUBMITTALS. To assist the Contractor, the following summary of submittals is given. This list is not necessarily complete and items specified elsewhere shall be submitted as required even though not listed hereinafter. If not otherwise specified in the referenced Specification or paragraph or article, or if not otherwise directed, make all submittals to the Engineer.

<u>Item</u>	<u>Specification Reference</u>	<u>When Required</u>
Subcontractor List		At Preconstruction Meeting
Project Construction Schedule		At Preconstruction Meeting
Shop Drawings	All Applicable	One Copy, PDF File, stamped reviewed by Contractor, to meet construction schedule
Permits	Section 1410	One Copy, PDF File, prior to scheduling Preconstruction meeting
Stormwater Pollution Prevention Plan (SWPPP)	Section 1570	One Copy, PDF File, prior to scheduling Preconstruction meeting
Weekly NPDES Inspection Reports	Section 1570	Immediately Upon Completion
Geotextile Certificate of Compliance	Section 3132	One Copy, PDF File, stamped reviewed by Contractor, to meet construction schedule
Select Granular Borrow Gradation and Pit Location	Section 3210	At Preconstruction Meeting
Aggregate Base Class6 Gradation and Pit Location	Section 3210	At Preconstruction Meeting
Aggregate Base Class 6 Recycled Aggregate %	Section 3210	At Preconstruction Meeting
Aggregate Base Class 6 Bitumen Extraction Results	Section 3210	At Preconstruction Meeting
Retaining Wall Plans - Walls over 4-feet	Section 3232	At Preconstruction Meeting
Retaining Wall Material Submittal – All Walls	Section 3232	At Preconstruction Meeting
Watermain and Appurtenances Shop Drawings	Section 3310	One Copy, PDF File, stamped reviewed by Contractor, to meet construction schedule
Sanitary Sewer Manhole Detail Book	Section 3330	One Copy, PDF File, stamped reviewed by Contractor, to meet construction schedule
Storm Sewer Manhole and Catch Basin	Section 3340	One Copy, PDF File, stamped reviewed by Contractor, to meet construction schedule

END OF SECTION

SECTION 1410 – REGULATORY REQUIREMENTS

SCOPE:

Under this Section of the Specifications shall be listed all permits that are applicable and required to complete the Work under this Project and as provided in the Plans and Specifications.

GENERAL REQUIREMENTS:

1. **ACQUISITION.** As may be required, the Contractor, Developer, and/or Developer's Engineer shall submit applications and pay filing fees for all required permits, and shall be responsible for governmental charges and inspection fees. All permits must be acquired with copies on file at the City before any work may begin. The Contractor shall procure copies of all permits and licenses, appropriately display them on the Project site, and give all notices necessary and incidental as directed by the permit.
2. **BONDS.** The Contractor shall furnish the respective permit authorities with any required performance bonds and proof of insurance.

WORK REQUIREMENTS:

1. **WORKING HOURS.** All Work shall be done between the hours 7:00 a.m. and 7:00 p.m. Monday through Friday, and between 8:00 a.m. and 5:00 p.m. on Saturdays, including starting and warming up equipment, loading and unloading equipment, and material delivery operations. Work outside of these hours and on holidays is permitted only with prior written authorization by the Engineer.
2. **PERMITS.** All Work shall be constructed under the following permits and the Contractor shall comply with all conditions and limitations of the permit.
 - A. **Right-of-Way Excavations and Obstructions**
 - City of Victoria, Right-of-Way Utility Installation(s)
 - City of Victoria, Right-of-Way Obstruction(s)
 - Carver County, Utility Installation(s)
 - Carver County, Street or Driveway Access(s)
 - Minnesota Department of Transportation, Utility Installation
 - Minnesota Department of Transportation, Right-of-Way Permit
 - B. **Watermain Extensions**
 - Minnesota Department of Health
 - C. **Sanitary Sewer Extensions**
 - Minnesota Pollution Control Agency
 - Metropolitan Council Environmental Services

D. Stormwater Management

Minnehaha Creek Watershed District or Carver Country Water Management Organization

E. Erosion, Sedimentation Control

Minnehaha Creek Watershed District or Carver Country Water Management Organization

Minnesota Pollution Control Agency, General NPDES Stormwater Permit
SWPPP (Stormwater Pollution Prevention Plan)

F. Wetland Protection

Minnehaha Creek Watershed District or Carver Country Water Management Organization

Board of Water and Soil Resources, WCA

G. Construction Dewatering

Minnesota Department of Natural Resources

H. Floodplain Alteration

Minnehaha Creek Watershed District or Carver Country Water Management Organization

I. Waterbody Crossing

Minnehaha Creek Watershed District or Carver Country Water Management Organization

END OF SECTION

SECTION 1450 – TESTING

GENERAL REQUIREMENTS

1. TESTING: To assist the Contractor, the following summary of testing requirements is provided. This list is not necessarily complete and tests specified elsewhere in these Specifications shall be performed as required even though not listed hereinafter. If not otherwise stated in the referenced Specification or paragraph or article, or not otherwise directed, signed copies of all test reports from independent testing services shall be sent at once to the City and Engineer. Verbal test results shall be provided on-site to the Engineer, when applicable.

Test samples and locations shall be selected by the Contractor and approved by the Engineer, however, it is the Contractor's responsibility to coordinate, plan and schedule all testing operations to ensure sufficient testing is completed in accordance with the requirements herein. Test samples shall be delivered to the testing laboratory as soon as is practicable and within the specified requirements. Should any of the specified tests fail to meet the requirements of the Specifications, the Contractor shall take such additional tests as may be required to satisfy the Engineer that the specified test requirements have been obtained.

Test	Reference	Requirements	Frequency
Subgrade Compaction	Section 3122 Subgrade Preparation	100% Standard Proctor Density in Upper three feet	1/500 Feet, or fraction thereof
		Test roll - yielding of one inch or less driven over with fully loaded aggregate truck	Prior to placement granular sub-base
Pipe Zone Bedding and Backfill		95% Standard Proctor Density in pipe zone	1/500 Feet, or fraction thereof per lift
Type "B" Backfill	Section 3123 Trench Excavation and Backfilling	95% Standard Proctor Density from pipe encasement zone to three feet below surface	1/500 Feet, or fraction thereof per lift
		100% Standard Proctor Density in upper three feet	1/500 Feet, or fraction thereof per lift
Type "D" Backfill	Section 3123 Trench Excavation and Backfilling	95% Standard Proctor Density above pipe encasement zone	1/500 Feet, or fraction thereof per lift

Test	Reference	Requirements	Frequency
Subgrade Compaction	Section 3124 Excavation and Embankment	95% of Standard Proctor Density below the upper three feet	1/500 Feet, or fraction thereof
		100% Standard Proctor Density below the upper three feet	1/500 Feet, or fraction thereof
		Test roll – no yielding when driven over with fully loaded aggregate truck	Prior to aggregate base placement
Bituminous Trail Design Mixture	Section 3218 Bituminous Trails	ASTM D-1559	1/Project
Select Granular Borrow	Section 3210 Street Grading, Select Granular and Gravel Base and Bituminous Surface Construction	MnDOT Gradation Requirements	1/500 Tons, or fraction thereof
Aggregate Gradation	Section 3210 Street Grading, Select Granular and Gravel Base and Bituminous Surface Construction	MnDOT Gradation Requirements	1/500 Tons, or fraction thereof
<p>Note: If recycled substitute aggregate base materials are selected such as recycled concrete, but not limited to, the Contractor shall provide the Engineer with a gradation report following MnDOT 3138 prior to construction commencement. Companion testing may be required by an independent testing company if so determined by the Engineer.</p>			
Aggregate Base Compaction	Section 3210 Street Grading, Select Granular and Gravel Base and Bituminous Surface Construction	100% Standard Proctor Density	1/500 Feet, or fraction thereof
		Test roll – no yielding when driven over with fully loaded aggregate truck	Prior to curb and gutter/ bituminous paving
Bituminous Mixture	Section 3210 Street Grading, Select Granular and Gravel Base and Bituminous Surface Construction	Asphalt Content and Aggregate Gradation	1/500 Ton, or fraction thereof

Test	Reference	Requirements	Frequency
Bituminous Paving Sample	Section 3210 Street Grading, Select Granular and Gravel Base and Bituminous Surface Construction	Maximum Density Method MnDOT 2360	1/1,000 Feet, or fraction thereof
Bituminous Non Wearing Compaction	Section 3210 Street Grading, Select Granular and Gravel Base and Bituminous Surface Construction	MnDOT 2360 Maximum Density Method	1/1,000 Feet, or fraction thereof
Bituminous Wearing Compaction	Section 3210 Street Grading, Select Granular and Gravel Base and Bituminous Surface Construction	ASTM D2950 Nuclear Density Gauge	1/500 Feet, or fraction thereof
Concrete Tests	Section 3216 Concrete Curb & Gutter, Sidewalks and Driveways	MnDOT 2461 Cylinders, Air Tests & Slump Tests	1/1500 Feet, or fraction thereof (three cyl./ test area)
Chlorination and Disinfection	Section 3310 Water Utility Distribution System and CEAM Standard Watermain Specifications	AWWA C651 and as specified 2 samples, 24 hrs apart, taken & tested by MDH Accredited Lab	All New Pipe Every 1200 feet, end of the line, and each branch
Pressure and Leakage Test	CEAM Standard Watermain Specifications	150 psi for two hours Max. drop of 2 psi within last hour of test not below 150 psi.	All New Pipe
Air Test	Section 3330 Sanitary Sewer Utility System and CEAM Standard Sanitary Specifications	3.5 psig with 1 psig pressure drop in specified time period per CEAM spec based on pipe diameter and length.	All New Pipe
Tracer Wire Continuity Test	Section 3310 Water Utility Distribution System Specifications	Locate piping and appurtenances to within 2 feet of installed locations prior to subgrade roll test.	All New PVC and HDPE Pipe
Deflection Test	Section 3330 Sanitary Sewer Utility System and CEAM Standard Sanitary Specifications	5% Maximum	All New PVC Pipe

Note: The test shall be performed without using mechanical pulling devices.

Forcemain Pressure	Section 3330 Sanitary Sewer Utility System	100 psi for one hour	All New Pipe
Televising	Section 3330 Sanitary Sewer Utility System	Completed after flushing of all main line pipe	All New Pipe
	Section 3340 Storm Drainage Utilities	Completed after flushing of all main line pipe	All New Pipe

END OF SECTION

SECTION 1550 – TRAFFIC CONTROL

SCOPE:

Under this Section of the Specifications shall be included the regulation of traffic within and around the construction site.

GENERAL REQUIREMENTS:

1. **PROJECT REQUIREMENTS:**

- A. **MAINTAIN TRAFFIC:** The Contractor is required to maintain traffic flow and access, keeping all public street right-of-ways, trails, and sidewalks open to pedestrian and vehicular traffic, including safe passage of said traffic and continuous access of emergency vehicles, except as specifically allowed by formal permit.
- B. **RIGHT-OF-WAY OBSTRUCTION PERMIT REQUIRED:** The Contractor must apply for and obtain all necessary State, County, and City permits prior to obstructing public right-of-ways, with copies of any required permits provided to the City and Engineer.
- C. **TRAFFIC CONTROL PLAN:** The Contractor must provide a traffic control plan for any street, trail or sidewalk closing, partial closing, and detour, with said plan and schedule subject to Engineer approval and City issuance of a Right-of-Way Obstruction Permit.

PRODUCTS:

1. **MATERIAL:** All traffic control materials shall conform to the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD), latest revision thereof, and applicable provisions of the Occupational Safety and Health Act (OSHA).

EXECUTION:

1. **PERMITTED RIGHT-OF-WAY OBSTRUCTIONS:** The Contractor shall provide 24-hour advance notification for all permitted street right-of-way closures, partial closures, or detours. Notification shall be made to the City of Victoria (952) 443-4210.
2. **DEVELOPMENT RIGHT-OF-WAY:** If the Development streets and right-of-way is open to public access for any reason, the Contractor shall install and maintain traffic flow and access in accordance with MnMUTCD requirements even if the City has not yet accepted the improvements and the right-of-way has not yet been turned over to the City.
3. **SEQUENCING:** Installation of traffic control devices shall be placed just prior to initiating the construction Work in order to minimize the obstruction period of the right-of-way. Also, Work shall be planned and coordinated in a manner to minimize the right-of-way obstruction period.

The Contractor shall inspect, on a daily basis, all traffic control devices, which the Contractor has furnished and installed, and verify that the devices are placed in accordance with the Traffic Control Layouts and/or the MnMUTCD. Any discrepancy between the placement and the required placement shall be immediately corrected.

The Contractor shall be responsible for the immediate repair or replacement of all traffic control devices that become damaged, moved or destroyed, of all lights that cease to function properly, and of all barricade weights that are damaged, destroyed, or otherwise fail to stabilize the barricades. The

Contractor shall further provide sufficient surveillance of all traffic control devices at least once every 24 hours.

The Contractor shall furnish names, addresses, and phone numbers of at least two (2) individuals responsible for the placement and maintenance of traffic control devices. These individuals shall be "on call" 24 hours per day, seven days per week during the times any traffic control devices, furnished and installed by the Contractor, are in place. The required information shall be submitted to the Engineer at the Pre-construction Meeting.

END OF SECTION

SECTION 1570 – EROSION, SEDIMENTATION AND POLLUTION CONTROL

SCOPE:

Under this Section of the Specifications shall be included the furnishing and installation of all temporary erosion, sedimentation and pollution control measures and Work incidental in connection therewith as shown on the Plans.

The Contractor, in executing the Work, shall maintain the Work areas and areas adjacent to the site free from environmental pollution that would in any way violate Federal, State, or Local regulations.

1. Related Sections. See Section 3111 for protection of existing trees indicated to remain and Section 3292 for turf establishment requirements including topsoil, seeding and sodding.

GENERAL REQUIREMENTS:

1. SUBMITTALS:

- A. Permits. Submit copies of executed permits required by State, County, Watershed and Local Authorities.
- B. SWPPP. Submit copies of the Project Storm Water Pollution Prevention Plan as required by NPDES/SDS Stormwater Construction permit.

PRODUCTS:

1. SILT FENCE shall conform to MnDOT 2573.3, Type MS or HI adjacent to vehicle/construction traffic and Type PA at other locations. Materials shall conform to MnDOT 3886. The color of all silt fencing shall be in accordance with Watershed District rules.
2. SILT FENCE POST shall be T-shaped metal post, five feet in length placed at six-foot maximum intervals when adjacent to vehicle/construction traffic. Posts may be two inch-by-two inch wood posts at all other locations.
3. STORM SEWER INLET PROTECTION shall be WIMCO road drain inlet protection system, Ess Brothers InfrSAFE debris collection device, or approved equal. A seven day notice is required for requests for approval of any alternate product. Inlet protection devices shall be in accordance with MnDOT 2573.3M.
4. ROCK CONSTRUCTION ENTRANCE shall be one inch to two inches washed rock placed to a depth of 12 inches over a geotextile fabric. The entrance shall be constructed to the dimensions shown on the Plans and City Standard Details.
5. DITCH CHECK (BIOROLL BLANKET SYSTEM) shall conform to MnDOT 2573.3 (F.3), Sediment Control Log/Erosion Control Blanket System. Bioroll or filter log products shall be in accordance with MnDOT 2573.F.1, Type Wood Fiber Sediment Control Log. Blanket products shall be in accordance with Section 3292 of these specifications.
6. FLOTATION SILT CURTAIN shall conform to MnDOT 2573.3I. Material shall conform to the requirements of MnDOT 3887, Type Light Duty or Type Heavy Duty.

7.

EXECUTION:

1. EROSION, SEDIMENTATION CONTROL MEASURES. The Contractor shall conduct operations and

implement Minnesota Pollution Control Agency Best Management Practices (BMP) to control site siltation and erosion into drainage ways. The Contractor shall comply with all conditions and completion dates relative to all permits issued for the Work to be completed. The Engineer may issue a stop Work order for all development Work and building construction for noncompliance with these measures.

- A. Sequencing. All silt fence and other erosion control measures shall be in place and approved by the Engineer prior to any removals, excavation or construction and shall be maintained until viable turf or ground cover has been established and approved by the Engineer.
- B. Silt Fence. The Contractor shall install silt fence at the locations shown on the Plans and in accordance with the City Standard Details. Silt fence dams and interim sumps shall be placed to intercept silt from concentrated runoff from open graded areas. Additional silt fence shall be required as directed by the Engineer.
- C. Stockpiles. All stockpile areas shall have silt fence or sediment trapping systems placed around the entire perimeter.
- D. Inlet Protection. The Contractor shall install inlet protection on all existing storm sewer inlets in accordance with the City Standard Details. Inlet protection shall also be provided on all proposed storm sewer inlets immediately following construction of the inlet. Inlet Protection must be installed in a manner that will not impound water for extended periods of time or in a manner that presents a hazard to vehicular or pedestrian traffic. Inlet protection removed for winter must be reinstalled prior to thaw.
- E. Temporary Sediment Basins. The Contractor shall incorporate temporary sediment basins throughout the construction site to capture runoff and slow the flow of water and allow sediment to settle out. Temporary sediment basins shall be installed as directed by the City Engineer.
- F. Rock Construction Entrance. A rock construction entrance shall be constructed and maintained as shown on the Plans to reduce tracking of silt and dirt onto the public streets. A geotextile fabric shall be placed underneath the rock. The rock shall be periodically replenished to maintain the intended performance. Mud and debris shall be removed or scrapped from tires and vehicle undercarriage prior to leaving the site.
- G. Street Sweeping. All streets used for access to the site and haul routes used for construction equipment and material supplies shall be cleaned at the end of each working day. The City or Engineer may order additional sweeping of the streets as deemed required. The City has the right to have this work completed by others at the Developer/Contractor's expense if the work is not completed in a timely manner per the City Engineer.
- H. Dewatering. Each excavation shall be kept dry during the course of all work herein, including subgrade correction, pipe installation, structure construction and backfilling, to the extent that no damage from hydrostatic pressure, flotation or other damage results. All excavations shall be dewatered to a depth of at least 3 inches below the bottom of the concrete slab or pipe to be installed therein. The Contractor may use any method or combination of methods for dewatering he chooses; however, all dewatering methods and equipment which, in the opinion of the Engineer, are ineffective shall be abandoned, improved, replaced or otherwise altered to obtain effective dewatering. The Contractor shall provide all power, pumps, materials and apparatus necessary, and shall be responsible for disposing of the water pumped from the excavation in a manner which will not interfere with other work within the area and not to damage public or private property. The Contractor will be held responsible for the condition of any pipe, conduit, ditch, channel or natural watercourse utilized for drainage purposes, and all erosion, sediment or other adverse results of their use shall be repaired.

- I. Positive Drainage and Protection. The Contractor shall maintain positive drainage throughout the site at all times. Low points within and along roadways are expressly prohibited. The Contractor shall be responsible for temporary ditches, piping or other means to facilitate proper drainage during construction. To protect previously graded areas from erosion, wood fiber blanket shall be placed immediately on steep slopes and embankments, permanent and temporary ponds, and outlets and overflows to protect the completed grade and minimize silt in the runoff.
 - J. Drainage Ditches. The normal wetted perimeter of any temporary or permanent drainage ditch or swale that drains water from any portion of the construction site, or diverts water around the site, must be stabilized within 200 lineal feet from the property edge, or from the point of discharge into any surface water. Stabilization of the last 200 lineal feet must be completed within 24 hours after connecting to a surface water. Stabilization of the remaining portions of any temporary or permanent ditches or swales must be complete within 14 days after connecting to a surface water and construction in that portion of the ditch has temporarily or permanently ceased. Temporary or permanent ditches or swales that are being used as a sediment containment system (with properly designed rock ditch checks, bio rolls, silt dikes etc.) do not need to be stabilized. These areas must be stabilized within 24 hours after no longer being used as a sediment containment system.
 - K. Turf Establishment. All exposed soil areas must be stabilized as soon as possible to limit soil erosion but in no case later than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. Turf establishment shall be in accordance with Section 3292 of these specifications.
 - L. Maintenance and Inspection. Erosion control measures shall be maintained throughout the construction and until satisfactory establishment of permanent ground cover is obtained. All erosion and sedimentation control measures, and stormwater outfalls shall be inspected weekly, and within 24 hours of the site receiving 0.5 inches of rain. Repairs shall be made on the same day or following day of the inspection. Unsatisfactory conditions not repaired or cleaned up within 48 hours of notification shall result in a stop Work order, and/or said Work shall be completed at Contractor's expense.
 - M. Removal. The Contractor shall remove and dispose of all temporary erosion control measures, structures and devices only after receiving Engineer approval. All debris, stakes, and silts along silt fences shall be removed and disposed off site. The Contractor shall hand rake silted areas along the fence locations to provide a smooth final grade and shall restore the ground surface with seed or sod, as required, to match the finished grade to the adjacent area.
 - N. Final Storm Sewer System. At the completion of the Work and before the final walk through, the Contractor shall remove storm sewer inlet protection measures and thoroughly flush the storm sewer system. Sediment and debris shall be completely removed and cleaned at the inlets, outlets and downstream of each outlet. Riprap and geotextile fabric may require replacement as directed by the Engineer to obtain a like new storm outlet installation acceptable to the City.
 - O. Ditch Check (Bioroll Blanket System). Bioroll and blanket systems shall be installed as ditch checks only in specified locations as approved by the City Engineer. Biorolls are not to be utilized in areas where vehicle and construction traffic occur.
 - P. Flotation Silt Curtain. Flotation Silt Curtain shall be utilized when construction activities occur directly adjacent to lakes, streams or wetlands in order to contain sediments near the banks of working areas. The installation of flotation silt curtains will be required as directed by the City Engineer.
2. POLLUTION CONTROL MEASURES. The Contractor shall conduct operations and implement Minnesota

Pollution Control Agency Best Management Practices (BMP) to minimize or prevent noise, dust, spillage, air emissions and other pollutants generated from the construction activities related to the Project, and shall schedule operations whenever possible to cause the least disturbance to neighboring residents and businesses. The Engineer may issue a stop Work order for all development work and building construction for noncompliance with these measures.

- A. Noise Control and Working Hours. Work site operations are restricted to the days and times specified in Section 1410 of these Specifications. No Work is allowed outside of these working hours except with prior written approval by the Engineer. This restriction applies to the loading, delivery and routing of equipment and materials on site and on public streets. Working hours may be further restricted during winter months unless City approval is granted for use of artificial lighting for construction operations for outdoor use.
 - B. Dust Control. The Contractor shall take special care in providing and maintaining dust control operations appropriate for the proximity and geographic location of the site to residential homes and other nearby developed and active facilities. The Engineer may require Contractor to take additional dust control measures if considered inadequate.
 - C. Disposal of Waste Materials. Excess excavated materials not suitable for backfill, and other waste materials shall be disposed of in accordance with local regulatory requirements. Watertight conveyance shall be provided for liquid, semi-liquid or saturated materials to prevent liquid loss or bleeding along transport routes.
 - D. Protection of Air Quality. The Contractor shall conduct operations to minimize air pollution by requiring the use of properly operating combustion emission control devices on construction equipment and encourage the shut-down of motorized equipment not in use. No burning operations are allowed on site without permit from the Fire Chief.
 - E. Chemicals, Fuels, and Lubricants. The Contractor shall comply with all Federal, State, and Local regulations concerning the transportation, storage and handling of chemicals, fuels and lubricants. No dumping of waste materials is permitted on the Project site. Leaks and spills must be immediately reported to the Engineer and appropriate government agency.
 - F. Concrete Washout. All liquid and solid wastes generated by concrete washout operations must be contained in a leak-proof containment facility or impermeable liner. A compacted clay liner that does not allow washout liquids to enter ground water is considered an impermeable liner. The liquid and solid wastes must not contact the ground, and there must not be runoff from the concrete washout operations or areas. Liquid and solid wastes must be disposed of properly and in compliance with MPCA regulations. A sign must be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
3. MAINTENANCE AND RECORD KEEPING. The Contractor shall maintain erosion, sedimentation and pollution control measures throughout the duration of the Work being completed and until City has issued final acceptance of the improvements and turf has been established over all disturbed areas. The Contractor shall also maintain all weather logs and daily inspection reports required by applicable permitting authorities. Said records and logs shall be maintained at the site, with copies provided to Engineer immediately.
 4. DEWATERING. Dewatering or basin draining (e.g., pumped discharges, trench/ditch cuts for drainage) related to the construction activity that may have turbid or sediment laden discharge water must be discharged to a temporary or permanent sedimentation basin on the project site whenever possible. Discharge from the temporary or permanent sedimentation basin must be visually checked to ensure adequate treatment is obtained in the basin and that nuisance conditions (see Minn. R. 7050.0210, subp. 2) will not result from the discharge. If the water cannot be discharged to a sedimentation basin prior to entering the surface water, it must be treated with the appropriate BMPs, such that the discharge does

not adversely affect the receiving water or downstream landowners. The Permittee(s) must ensure that discharge points are adequately protected from erosion and scour. The discharge must be dispersed over natural rock riprap, sand bags, plastic sheeting, or other accepted energy dissipation measures. Adequate sedimentation control measures are required for discharge water that contains suspended solids.

All water from dewatering or basin draining activities must be discharged in a manner that does not cause nuisance conditions, erosion in receiving channels or on downslope properties, or inundation in wetlands causing significant adverse impact to the wetland.

END OF SECTION

SECTION 1700 – CLOSEOUT REQUIREMENTS

SCOPE:

Under this Section shall be included the administrative procedure for final completion of the Project.

GENERAL REQUIREMENTS:

1. **RECORD GRADING PLANS:** Upon completion of the grading work, the Developer or Developer's Engineer shall submit record grading plans in accordance with the Developer Agreement.
2. **RECORD DRAWINGS:** Upon completion of Work, prior to final acceptance, the Contractor shall deliver to the Engineer Record Construction Drawings in accordance with the Developer Agreement and the requirements of the Engineering Design and Construction Standard Manual, which have been annotated to show changes made during construction. The Contractor shall also provide maintenance and operating instructions for any equipment installed as part of the public improvements.
3. **SUBSTANTIAL COMPLETION INSPECTION,:** Upon written notice from the Contractor that all punch-list items are complete in accordance with the Developer Agreement, including a final clean-up of all construction debris and flushing and televising of the storm sewer system, and that the entire project is complete for its intended use with the exception of the bituminous wear course, the Engineer and City will schedule and make an inspection of the Work. If the Work is found to be complete, the Engineer will issue a letter of substantial completion of the Work with the exception of the bituminous wear course.
4. **FINAL INSPECTION AND ACCEPTANCE, INCLUDING BITUMINOUS WEAR COURSE:** Upon written notice from the Contractor that all punch-list items are complete in accordance with the Developer agreement, including a final clean-up of all construction debris, and that the entire Project is complete for its intended use, the Engineer and City will schedule and make an inspection of the Work. If the Work is found to be complete, the Engineer will issue a letter of acceptance of the entire Work and the public improvements will become the property of the City.
5. **PARTIAL CITY ACCEPTANCE AND APPROVALS:** With the exception of City, Acceptance issued under Sections 3 and 4 above, no additional partial acceptance of the public improvements will be issued.

END OF SECTION

SECTION 3111 – CLEARING AND GRUBBING

SCOPE:

Under this Section of the Specifications shall be included the Clearing and Grubbing operation within the construction limits and areas for excavation and grading.

EXECUTION:

1. **CLEARING.** The clearing operation shall consist of cutting and removing the trees, shrubs, bushes, windfalls, and other vegetation designated for removal and within the construction limits. Trees not designated for removal shall be protected and saved from damage. Tree removal shall be only allowed in accordance with the City approved Tree Preservation and Replacement Plans.
2. **GRUBBING.** The grubbing operation shall consist of removing and disposing of the stumps, roots, and other remains. Unless otherwise permitted, stumps shall be removed completely. If any stumps are permitted to remain, they shall be cut off not more than six inches above ground.
3. **TREE PRESERVATION.** Trees not designated for removal shall be protected and saved from damage during construction. All trees shall be protected by placing brightly colored high density polyethylene safety fence around or along the trees. The protective fencing must be placed to protect the critical root zone of the trees. Should any damage happen to occur to the trunks or branches of trees along the project, the damage shall be treated in accordance with nursery approved methods. Any broken branches shall be trimmed as per Engineer's direction. All bruise and cut wounds shall be treated with asphalt base tree paint. Removal of tree fence may result in a Stop Work Order.
4. **DISPOSAL OPERATIONS.** All timber, stumps, roots, and other debris or byproducts resulting from the clearing and grubbing operations shall be disposed of by the Contractor in accordance with the provisions of MnDOT Specification 2101.3 as applied to combustible materials, subject to the additional requirements and limitations set forth herein.

All Elmwood timber, stumps, roots, and debris, together with the bark and any byproducts with adhering bark of Elm tree origin, that are not disposed of within the right-of-way by burning or burying shall be disposed of in accordance with MnDOT Specification 2101.3D2. All timber, stumps, roots, and debris from oak wilt infested trees of the Red Oak family shall be disposed of in accordance with MnDOT Specification 2101.3D2.

If any wood is run through a chipping machine, the wood chips shall be recovered, removed, and disposed of properly. Materials shall not be left on-site unless otherwise approved by Engineer.

END OF SECTION

SECTION 3114 – SUBGRADE CORRECTION

SCOPE:

Under this Section of the Specifications shall be included the furnishing of all labor and equipment necessary for the excavation, embankment, and disposal of excess unsuitable materials from the roadbed, replacing such material with sand, gravel, or crushed rock, together with any other work necessary to provide drainage for the excavation.

PRODUCTS:

1. **MATERIALS.** The granular backfill material shall be MnDOT 3149.2B - Granular Borrow.

EXECUTION:

1. **SUBGRADE EXCAVATION.** The excavation shall be made to the grade and cross sections shown on the Plans or as directed by the Engineer. Subgrade soil must be scarified and recompacted to testing requirements in Section 3122 prior to backfilling. If unsuitable subgrade soil is encountered, additional excavation must be made as directed by the Engineer prior to backfilling.

Sand, gravel, or crushed rock encountered in the excavation shall, to the extent directed by the Engineer, be salvaged and placed in the bottom of the excavation. All materials which the Engineer considers unsuitable for backfill shall be used for other embankment construction on site, with any surplus material to be disposed of at designated disposal sites on the Project, or, if none is designated, outside of the Project limits in accordance with a satisfactory Disposal Plan. The Disposal Plan shall constitute the Contractor's proposal for acceptable disposition of surplus materials outside of the Project limits in compliance with applicable environmental regulations, permit requirements, and any requirements or limitations imposed by the Contract. A satisfactory Disposal Plan shall be submitted to the Engineer prior to starting the disposal operations.

2. **DRAINAGE.** If so indicated on the Plans or directed by the Engineer, seepage trenches shall be excavated to provide drainage, and those trench excavations shall be backfilled with the same kind of material as that used for backfilling the subgrade excavations.
3. **BACKFILLING OPERATIONS IN THE ROADBED.** All materials used for backfill shall be placed in layers not more than six inches thick, except that if the depth of the excavation is more than 18 inches, and the bottom of the excavation is, in the opinion of the Engineer, so unstable that there would be intrusion or displacement of the underlying material into the lower layer of backfill constructed six inches in thickness, the bottom layer may be increased to 12 inches in thickness.

Backfill and compaction shall be so done that there will be no displacement of any in place drainage pipe.

The top layer shall be shaped to the cross section shown on the Plans.

END OF SECTION

SECTION 3122 – SUBGRADE PREPARATION

SCOPE:

Under this Section shall be included the furnishing of all equipment, labor, and skill necessary for shaping and compacting the subgrade prior to placing of the select granular subbase and/or aggregate base course in accordance with MnDOT Section 2112.

EXECUTION:

1. **CONSTRUCTION.** This Work shall be done after any unstable sections of the subgrade have been repaired and after any existing base or surface courses required to be removed have been removed.
2. **SUBGRADE COMPACTION AND STABILITY TESTS.** The streets on which select granular and/or aggregate base is to be constructed shall be tested for density in the subgrade. Compaction shall be by the MnDOT Specified Density Method where 100% of the Standard Proctor Density is required in the upper three feet of the roadway. One test for each block or 500 feet of street, or fraction thereof, is required. A minimum of one test daily when preparing roadway.

Prior to placement of the select granular subbase or aggregate base, the Contractor shall perform a test roll on the prepared subgrade in the presence of the Engineer. An independent soils engineer, provided and paid for by the Contractor, shall also be present for all test rolls. The Contractor shall provide a fully loaded tandem axle truck. The Contractor shall provide a weight ticket for the test roll vehicle to the Engineer prior to the test roll. The test rolling shall be at the direction of the Engineer and shall be completed in areas as directed by the Engineer. The Engineer shall determine which sections of the roadway are unstable. In general, a one inch maximum deflection will be allowed. All road sections determined to be unstable shall be reworked (including farming of the subgrade) until a test roll is passed.

3. **CONDITIONS.** No subgrade preparation shall occur when frost is present.

END OF SECTION

SECTION 3123 – TRENCH EXCAVATION AND BACKFILLING

SCOPE:

This Section of the Specifications shall include the excavation, trenching, and backfill required for the underground utility systems.

EXECUTION:

1. CONSTRUCTION REQUIREMENTS.

- A. Trench Preparation. The sewer or watermain excavation and trench preparation shall be in accordance with Article 2600.3B, Excavation and Preparation of Trench in the City Engineer Association of Minnesota Standard Specifications. The Earth Foundation Bedding Method as shown in the Standard Detail Drawings shall be used for all pipe installation (excluding PVC sanitary sewer) where groundwater or unstable material does not create a problem. PVC sanitary sewer shall be installed in accordance with the Granular Material Bedding Method Standard Detail. Where unstable material prevents use of standard bedding methods, the Contractor shall install Granular Bedding or Trench Stabilization Rock as directed by the Engineer.
- B. Backfilling. Backfill of the utility trenches shall be in accordance with the following methods. Utilize Type "B" backfilling methods within any street or roadway and shoulders and also within all driveways. Utilize Type "D" backfilling methods in the ditches or open areas where roadways or proposed housepads will not be affected.

Mixtures of gravel meeting the Granular Material Gradation Classifications for those zones as outlined in the Standard Utility Specification shall be spread in three-inch layers and hand tamped or compacted by approved mechanical methods to a density of 95% of Standard Proctor Density by the MnDOT "Specified Density Method." Care shall be taken to deposit the material simultaneously on both sides of the pipe for the full width of the trench. At the top of the encasement zone, the backfill shall be well compacted by using mechanical tamping equipment in such manner so as not to damage the pipe joints or shift the pipe alignment. The Contractor may not use water to obtain compaction at the pipe zone.

All surplus and unusable or waste material shall be disposed of in conformance with MnDOT 2105. Backfilling shall not be done in freezing weather except by permission of the Engineer, and it shall not be made with frozen material nor where the material already in the trench is frozen. After backfilling has been accomplished, the Contractor shall be responsible for furnishing backfill or surfacing material as necessary and filling settlement depressions resulting from inadequate compaction or any other construction defect until the acceptance of the Work.

In areas receiving Type "B" backfilling, settlement after one year of one inch or more from finish grade shall be considered evidence of inadequate compaction and the area shall be restored at the Contractor's expense.

1. Type "B" Backfilling. Type "B" backfilling consists of placing suitable materials excavated from the trench in succeeding 12 inch thick layers from a point 12 inch from the top of the pipe. Each 12 inch thick layer shall be compacted before additional backfill material is placed in the excavation.

The top 12 inch of this backfill shall be compacted with the use of a sheepsfoot roller or approved similar compaction equipment. Only approved mechanical tamping or compacting will be allowed. Use of bucket compaction or wheel rolling will not be permitted.

The density of the backfilled material after compaction shall be 95% of Standard Proctor Density from the encasement zone to three feet below the surface and 100% of Standard Proctor Density in the upper three feet. One test for each 500 feet, or fraction thereof, of pipe installed is required. A minimum of one test daily when backfilling is required. The testing shall be repeated for each three-foot vertical lift. Additional testing may be required where deemed necessary in the opinion of the Engineer.

If the existing moisture content of the backfill material below three feet of subgrade is greater than 3 percentage points above the optimum moisture content, the soil shall be compacted to a minimum density of 3 pounds per cubic feet less than the standard Proctor curve at that moisture content. At no time shall the density be less than 90 percent of the standard Proctor density. This modification of the compaction specification shall at no time be used or applied to the upper 3 feet of the subgrade or the aggregate base. This modification of the compaction specification may not be used without prior written approval from the City Engineer. This modification of the compaction specification will not be allowed to be used if the contractor does not implement appropriate construction techniques to dry or keep dry all backfill material prior to the written request.

Suitable backfill material may contain any mixture of loam, clay, sand, or coarse gravel, but shall be free of stones, boulders, chunks, or lumps with any dimension greater than eight inches and shall contain no ashes, refuse, rubbish, roots, frozen material, or vegetation or organic material that would cause settlement. In any case, where rocks are present in the backfill material, adequate sand shall also be present and mixed in to fill all voids.

2. Type "D" Backfilling. The backfill material shall be free from boulders, rock, concrete and bituminous chunks, and clay lumps more than one-foot in any dimension and shall contain no stumps, rubbish, decayed vegetation, or frozen materials and other similar articles where presence in the backfill would cause excessive settlement. The backfill may be placed in three-foot layers and compacted by wheel type equipment weighing not less than six tons.

If the compaction of the backfill material is specifically authorized by the Engineer to be done by flooding the trench, the Contractor shall exercise due precautions so as not to float the pipe or permit water to enter the pipe, causing mud to be deposited in the pipe. The Contractor shall be wholly responsible for neglect of his workmen in carrying out the proper precautions.

If the existing moisture content of the backfill material below three feet of subgrade is greater than 3 percentage points above the optimum moisture content, the soil shall be compacted to a minimum density of 3 pounds per cubic feet less than the standard Proctor curve at that moisture content. At no time shall the density be less than 90 percent of the standard Proctor density. This modification of the compaction specification may not be used without prior written approval from the City Engineer. This modification of the compaction specification will not be allowed to be used if the contractor does not implement appropriate construction techniques to dry or keep dry all backfill material prior to the written request.

The density obtained in Type "D" trench backfilling shall be 95% of Standard Proctor Density above the pipe encasement zone. One test for each 500 feet, or fraction thereof, of pipe

installed is required. The testing shall be repeated for each three-foot vertical lift.

- C. Trench Limits. When the trench excavation limits exceed the right-of-way/easement boundaries and/or there are obstructions (trees, private/public utilities, etc.) that need to be left in place undamaged, the contractor will be responsible for adjusting the trench limits accordingly to protect these items shown on the plans, or as directed by the Engineer.
- D. Trench Safety. The Contractor shall be responsible for trench/stockpiling safety at all times during the construction process. Further, the Contractor shall backfill all trench excavations at the end of the work day and for weekends. If the Engineer concurs that a trench location may be left unbackfilled overnight or on weekends, then the Contractor shall be responsible for securing the trench area in accordance with OSHA regulations and guidelines (e.g., safety fencing, etc.).

END OF SECTION

SECTION 3124 – EXCAVATION AND EMBANKMENT

SCOPE:

This Work shall consist of constructing roadway excavations and embankments as shown on the Plans, and in accordance with MnDOT Specification 2105.

PRODUCTS:

1. MATERIALS. Granular borrow material shall be in accordance with the requirements of MnDOT Specification 2105.

EXECUTION

1. EXCAVATION shall conform to the planned grades and cross sections. All topsoil and organic material shall be removed below the typical section.
2. EMBANKMENTS shall be constructed from approved excess excavation material. Compaction shall be as follows:
 - A. 100% Standard Proctor Density in the upper three feet of the planned subgrade. One test for each 500 feet, or fraction thereof, of roadway prepared is required with a minimum of one test each work day.
 - B. 95% Standard Proctor Density below three feet from the planned subgrade. One test for each 500 feet, or fraction thereof, of roadway prepared is required with a minimum of one test each work day. The testing shall be repeated for each three-foot vertical lift.
3. TOPSOIL shall be salvaged and placed to a six inch minimum depth on all disturbed areas outside the finished roadway.

END OF SECTION

SECTION 3132 – GEOTEXTILE MATERIALS

SCOPE:

Under this Section shall be included the installation of geotextile for separating materials in light/medium basic roadway construction.

PRODUCTS:

1. **GEOTEXTILE.** Geotextile for use in separating materials (stabilization) shall be MnDOT Type V, woven, and shall be furnished in accordance with all requirements of MnDOT Specification 3733. A Certificate of Compliance shall be furnished by the supplier in accordance with MnDOT Specification 1603 and shall be delivered to the Engineer prior to any fabric installation.

EXECUTION:

1. **FABRIC PLACEMENT.** Fabric shall be placed on a smooth graded surface. Fabric seams shall be overlapped from 18 inches to 36 inches, as directed by the Engineer. Fabric shall be pulled flat with no wrinkles, folds or creases. Fabric shall be free from tension and stress. Aggregate shall be backdumped and spread in a uniform lift maintaining the required aggregate thickness at all times. At no time shall equipment be driven directly on the fabric.

END OF SECTION

SECTION 3210 – STREET GRADING, SELECT GRANULAR AND GRAVEL BASE, AND BITUMINOUS SURFACE CONSTRUCTION

SCOPE:

Under this Section of the Specifications shall be included the furnishing of all material, equipment, labor, and skill necessary to construct a pavement course of hot plant-mixed bituminous aggregate mixture on an aggregate base.

PRODUCTS:

1. **GRANULAR BORROW.** The material shall be a sand subbase suitable as a subsurface drainage layer and shall be "Select Granular Borrow" per MnDOT Specification 3149.2B, except that no recycled materials shall be allowed.
2. **AGGREGATE BASE CLASS 6.** The material shall be in accordance with MnDOT 2018 Spec 3138, Class 6 Aggregate, except as modified below:
 - A. The Contractor shall submit the composition breakdown of the proposed material by percent.
 - B. The maximum percentage of recycled concrete shall be 30%.
 - C. Contractor shall submit gradation and bituminous extraction reports per Section 1330 and receive approval from the Engineer prior to placement of any material. The gradations shall be in conformance with MnDOT Spec 1503.
3. **NON-WEARING COURSE MIXTURES.** The non-wearing course mixtures shall be in accordance with MnDOT Specification 2360, Type SP, Maximum Aggregate Size B, Traffic Level 2 for Local Roads, and Traffic Level 3 for Collector Roads.
4. **WEARING COURSE MIXTURES.** The wearing course mixtures shall be in accordance with MnDOT Specification 2360, Type SP, Maximum Aggregate Size A, Traffic Level 2 for all driveways, trails, and street wear course(s), and Traffic Level 3 for Collector Roads.
5. **BITUMINOUS MATERIAL FOR TACK COAT.** The material to be used shall be Tack Coat SS-1, applied at 0.07 gallons per square yard.
6. **BITUMINOUS MATERIAL.** Asphalt binder shall be performance grade (PG) 58S-28 for Local Roads and (PG) 58H-34 for Collector Roads, except where modified for RAP mixtures in MnDOT 2360.2 (E7), and shall meet MnDOT 3151.

EXECUTION:

1. **TESTING.** All bituminous testing shall be in accordance with MnDOT 2360. The test procedure shall be the Quality Assurance (QA) method for streets, and the Quality Control (QC) method for patching, driveways, parking lots, and trails. The Contractor shall provide an independent, MnDOT trained and certified, testing company to provide QA testing for the Engineer.

Aggregate gradation testing shall be as specified in MnDOT 2211 and MnDOT 3138. One test for gradation for each 500 tons, or fraction thereof, of material delivered.

Select granular gradation testing shall be as specified in MnDOT 3149.2. One test for gradation for each

500 tons, or fraction thereof, of material delivered.

- A. Compaction - Bituminous. Pavement density for streets shall be by the Maximum Density Method. Test samples and locations shall be selected or approved by the Engineer. Cores shall be taken in the non-wearing course and the asphalt repaired within 48 hours of the paving. Nuclear Density Gauge testing per ASTM D2950 shall be completed in the wearing course.

Compaction for a bituminous patch, driveway, parking lot, or trail shall be by the Ordinary Compaction Method.

For finish wear courses on streets, trails and parking lots shall be compacted by initial rolling with a tandem steel wheel roller, followed by pneumatic-tired rollers until there is no further sign of consolidation; and finally, finish rolling with a tandem steel wheel roller until all marks are eliminated.

- B. Compaction - Aggregate. Quality Compaction Method is specified. Testing shall be performed by driving a fully loaded aggregate truck over the street and areas which deflect shall be reworked.

Water shall be applied at such times and in such amounts as necessary for proper aggregate compaction.

2. BITUMINOUS SURFACE REMOVAL. The limits of bituminous removal shall be marked in the field. In areas where new bituminous construction meets the existing surfacing, the cutting of the existing roadway surface shall be done in a manner as to provide a straight vertical edge such that the new bituminous surface will properly match the in-place surfacing.

3. GRANULAR DRAINAGE. The Contractor shall take all precautions to assure the prepared subgrade is not rutted or otherwise disturbed during placement of granular drainage material. In the event subgrade is disturbed, the Contractor will stop placement of granular material and restore subgrade to required density and cross-section prior to resuming placement of granular material.

Granular material shall be placed on prepared and approved subgrade with track equipment. Wheeled equipment shall not be driven on prepared subgrade.

4. AGGREGATE BASE. The Contractor shall take all precautions to assure that the granular drainage section is not rutted or otherwise disturbed while aggregate base is being placed. In the event that the granular drainage section is disturbed, the Contractor shall restore it to the required density and cross-section prior to placing additional aggregate base thereon.

Aggregate base material shall be placed on granular drainage material with track equipment. Wheeled equipment shall not be driven on granular material.

If during fine grading, excess rock or coarse aggregate appears at the surface of the aggregate base, the coarse rock shall be removed from the Project and be replaced with aggregate base material conforming to the specified gradation.

5. BITUMINOUS BASE COURSE. No bituminous base course shall be placed on a new roadway until all concrete curb is completely backfilled with suitable material. No bituminous base course shall be placed when frost is present.

6. BITUMINOUS WEARING COURSE. If wearing course is to be installed one year following non-wearing course installation, a transitional ramp (winter ramp) of non-wearing course shall be provided at juncture with existing bituminous surface.

Wearing course shall not be placed after October 31.

A minimum of 18-inches milled overlap joint shall be provided at juncture with existing bituminous surface.

Wearing course shall be 1/4 inch above concrete curb and cross gutters and overlap them by 1/2 inch.

END OF SECTION

SECTION 3216 – CONCRETE CURB AND GUTTER, DRIVEWAYS AND WALKS

SCOPE:

Under this Section shall be included the furnishing of all equipment, labor, and skill necessary for placing of concrete curb and gutter, driveways, and walks.

PRODUCTS:

1. CONCRETE CURB AND GUTTER shall be in accordance with the requirements of MnDOT Specification 2531, with a minimum 28-day compressive strength of 4,500 psi.
2. CONCRETE DRIVEWAYS shall be in accordance with the requirements of MnDOT Specification 2531, with a minimum 28-day compressive strength of 4,500 psi.
3. CONCRETE WALKS shall be in accordance with the requirements of MnDOT Specification 2521, with a minimum 28-day compressive strength of 4,500 psi.

EXECUTION:

1. CONCRETE CURB AND GUTTER. All curb and gutter materials and construction will be as specified in MnDOT Specification 2531 except that contraction joints shall be placed at 10-foot intervals and expansion joints shall be placed at 200-foot intervals, at curb radius points, at each catch basin, at points where curb face starts to taper from standard height, and at all existing concrete surfaces. Joints need not be sealed.

When surmountable curb is specified, the Contractor shall transition to B618 curb and gutter at all intersection radius and catch basins. B618 curb and gutter shall be installed from end radius to end radius with a 10-foot transition back to surmountable curb and gutter on each end. A 10-foot transition shall be used on each side of catch basins to change from surmountable to B618 style curb and gutter.

The Contractor shall construct depressions in or modify curb to accommodate ramps for handicapped persons at locations and in accordance with details shown on Drawings. Depressed curb sections and pedestrian ramps must meet Americans with Disabilities Act (ADA) requirements.

Where curb ends, taper curb face from its standard height to zero inches in height in the last three feet.

The Contractor shall imprint freshly poured curb and gutter with a City provided iron marking stamp "SP" for sump pump lead, "W" for water service, "CO" for daintile cleanout, and "S" for sanitary service.

2. CONCRETE DRIVEWAYS. Driveway materials and construction will be as specified in MnDOT Specification 2531. Contraction and expansion joints shall match existing construction where feasible.
3. CONCRETE WALKS. Concrete walk materials and construction will be as specified in MnDOT Specification 2521.
 - A. Contraction and Expansion Joints shall match existing construction where feasible.
 - B. Contraction Joints shall be constructed as follows:
 - a. Slot or groove minimum depth of 1/3 walk thickness one inch deep and 1/4 inch wide formed by inserting metal parting strip in concrete after it has been struck off and consolidated and while concrete is still plastic. Remove parting strip when concrete will retain its shape and finish joint edge. Scoring tool shall leave minimum two inch smooth border on each side.

- b. Construct transverse joints at right angles to centerline of sidewalk and longitudinal joints parallel to sidewalk centerline.
 - c. Divide sidewalk into sections with contraction joints. Spacing shall not be less than three feet nor greater than 12 feet in any dimension, or as shown on Drawings.
 - d. On slabs constructed in partial widths, place transverse joints in line with like joints in previously constructed slabs.
- C. Expansion Joints shall be constructed as follows:
- a. Hand tool concrete with edging tool with 1/4 inch radius and two inch smooth border.
 - b. Place 1/2 inch expansion joint filler between sidewalk and back of parallel curb and gutter.
 - c. Place 1/2 inch expansion joint filler at 50 foot (maximum) intervals.
 - d. Place 1/2 inch expansion joint filler where new sidewalk meets existing sidewalks and driveways.
 - e. Place one inch expansion joint filler between sidewalk and building or other rigid structure.
 - f. Place one inch expansion joint filler between sidewalk approach and back of curb and gutter or edge of pavement.
 - g. Extend expansion joint filler full depth of sidewalk with top slightly below finished surface of sidewalk.
 - h. Install joint filler. Abut expansion material tightly against existing concrete surfaces taking care to ensure that the expansion material remains tightly compressed to prevent the migration of water into the joint.
4. CONDITIONS. No concrete curb and gutter, driveways, or walks shall be poured when frost is present. Contractor shall follow MnDOT 2531.3 and 2521.3 for cold-weather measures.
5. POLY-ALPHA METHYLSTYRENE (AMS) MEMBRANE CURING COMPOUND. All concrete curb and gutter, driveways, and walks shall be completely coated on all exposed surfaces with white pigmented curing compound immediately after finishing is complete in accordance with MnDOT Specification 3754.
6. BACKFILLING. As soon as the concrete (including, but not limited to, curb and gutter and sidewalk) has attained sufficient strength, the area around and adjacent to the concrete shall be backfilled immediately with suitable material.
7. TESTS. Compression strength testing shall be completed by molding three cylinders according to ASTM C-31. One set of three cylinders shall be taken for every 1500 feet, or fraction thereof, of curb and gutter constructed. One set of three cylinders shall be taken for every 100 cubic yards, or fraction thereof, of concrete placed. A minimum of one set of three is required daily and per source of concrete.
- Air testing and slump testing shall be completed with each cylinder set that is molded.
- In the event that the 28-day compressive strength does not meet or exceed the required strength of 3,900 psi, all concrete that was placed as represented by the failed cylinder shall be considered defective concrete and shall be removed and replaced at the Contractor's expense.
8. PROTECTION. The Contractor shall erect and maintain barricades to exclude traffic from newly constructed

curb and gutter. Curb and gutter damaged prior to acceptance shall be repaired or replaced by and at expense of Contractor.

9. ACCEPTANCE. A walk through will take place one year after final acceptance of the Project by the City. At that time all curb and gutter, concrete walks, and concrete drives that are damaged or cracked shall be replaced prior to City acceptance of the Work.

The City will deem concrete aggregate popouts exceeding 7 occurrences per square yard on concrete flatwork as excessive and require the section be removed and replaced prior to the City acceptance of the work. Full panel removal and replacement is required.

The City will deem mortar flaking as excessive and require the section identified in the field by the Engineer to be removed and replaced prior to the City acceptance of the work. Full panel removal and replacement is required.

10. ADA COMPLIANCE SUPERVISOR. The Contractor shall designate a responsible person familiar with PROWAG and ADA requirements. This person shall be responsible for fulfilling the requirements and guidelines outlined in the PROWAG standards.

11. PROWAG AND ADA REQUIREMENTS. All pedestrian facilities and shared trails on this Project must be constructed according to Public Rights-of-Way Accessibility Guidelines (PROWAG) which can be found at: <http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/background/revised-draft-guidelines> and the 2010 ADA Standards for Accessible Design, which can be found at: http://www.ada.gov/2010ADASTandards_index.htm. The appropriate pedestrian ramp details for each quadrant are included in the Plan. The Engineer may provide additional details to those provided in the Plan that meet the guidelines as the need arises and field conditions dictate.

- A. The Contractor must designate a responsible person familiar with PROWAG to assess proposed sidewalk layouts at each site before work begins. Any time the Contractor is performing work that concerns pedestrian facilities; the Contractor's representative shall be on site.

- B. Construct Pedestrian facilities to meet the following criteria:

- a. Pedestrian Access Routes (PAR) must be constructed to meet the following:

- i. Minimum 4 feet width.
- ii. A maximum cross slope of 2.0%.
- iii. Vertical discontinuities must be less than 0.25 inches.
- iv. Must provide positive drainage without allowing any ponding.
- v. All grade breaks shall be constructed perpendicular to the path of travel.

- b. Landings are part of the PAR and must be constructed to meet the following:

- vi. 4 feet by 4 feet minimum width.
- vii. Maximum slope of 2.0% in all directions.
- viii. Required at all locations where the PAR changes directions.
- ix. Must be connected to the PAR.
- x. All grade breaks shall be constructed perpendicular to the path of travel.

- c. Ramps are part of the PAR and must be constructed to meet either of the following criteria:

- xi. Longitudinal slopes less than 5% in the direction of travel requires no landing at the top of the ramp (unless the PAR changes direction).

- xii. Longitudinal slopes between 5 - 8.3% in the direction of travel require a landing at the top of the ramp.
- C. If the Contractor constructs any pedestrian or shared-use trail facilities that are not per Plan, do not meet the above requirements, or do not follow the agreed upon resolution, the Contractor shall be responsible for correcting the deficient facilities with no compensation paid for the corrective work. To ensure that the pedestrian facilities are constructed in compliance with PROWAG, the Contractor shall follow the following three steps:
 - a. The Contractor shall use the appropriate ramp details in the Plan and identify the removal limits for the sidewalk and curb and gutter. If Contractor determines the removal limits are not adequate to meet PROWAG, the Contractor shall stop work immediately and consult the Engineer to determine the best solution. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may finish the removals.
 - b. The Contractor shall not alter any existing drainage patterns unless called for in the plan or approved by the Engineer.
 - c. Prior to pouring each curb and gutter segment, the Contractor must verify the zero height curb and curb transitions will be located as shown in the Plans and will provide an adequate detectable edge as shown on Standard Plan Sheet No. 5-297.250 (Sheet 5 of 5). The Contractor shall also verify the proposed curb flow lines will provide positive drainage as well as maintain existing gutter inflows/outflows. The curb and gutter shall be constructed as detailed in the Plan with a defined flowline and no vertical discontinuities. The Contractor shall consult with the Engineer to determine a resolution if any of these conditions cannot be met. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may proceed with pouring the curb and gutter.
 - d. After the curb has been correctly poured, the Contractor has set the sidewalk forms, and prior to placing the concrete curb ramps/sidewalks, the Contractor shall verify the requirements in Section (B) will be achieved. If any of these requirements cannot be met the Contractor shall meet with the Engineer to determine the best solution. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may proceed with the curb ramp/sidewalk pour.
- D. It shall be the responsibility of the Contractor, or Contractor's Surveyor if applicable, to layout all proposed work at each intersection in accordance with the Plan and requirements listed in this Special Provision. The Contractor may confer with the Engineer for guidance in laying out the proposed work, but it will be the Contractor's responsibility to ensure the proposed work meets all the requirements of this Special Provision. This layout includes, but is not limited to placement of grade breaks, curb transitions, gutter flow lines, truncated dome placement, crosswalk marking placement, flares, landing limits, and ramp limits. It is important that the Contractor layout this work properly to achieve the construction of a compliant pedestrian facility. This layout work shall be incidental.
- E. The Contractor shall utilize measures and methods when working near existing buildings and/or private landscaping that will avoid damaging the building's face or structure or other private property. The Contractor will be responsible for any damage to the building's face or structure, or other private property. Any damage resulting from Contractor operations will be repaired at the Contractor's expense to the satisfaction of the Engineer.

- F. The Contractor shall round all joints and edges of the walk with a ¼ inch radius edging tool, contraction joints shall extend to at least 30 percent of walk thickness and shall be approximately 1/8 inch wide as per MnDOT 2521. The Contractor shall also have the option of providing saw cuts to construct the sidewalk joints. This work shall be considered incidental.

- G. In areas where the sidewalk is to be constructed around fixed structures and the grade has been changed, the sidewalk shall be finished around these structures to the satisfaction of the Engineer at no additional cost.

END OF SECTION

SECTION 3217 – PAVEMENT MARKINGS

SCOPE:

This Work shall consist of furnishing and applying pavement markings for control and guidance of traffic in accordance with these Specifications, at locations shown in the Plans, and as directed by the Engineer.

PRODUCTS:

1. EPOXY RESIN. Epoxy resin for pavement markings shall meet the requirements of MnDOT Standard Specifications for Construction, 2018 Edition.
2. DROP-ON GLASS BEADS: Drop-on glass beads for pavement markings shall meet the requirements of MnDOT Standard Specifications for Construction, 2018 Edition.
3. POLYMER PREFORMED MATERIAL:
 - A. Crosswalk and Stop Bar pavement markings shall be 3M Stamark Intersection Grade Tape, Series A420, or approved equal.
 - B. All other pavement marking symbols shall be 3M Stamark High Performance Pavement Marking Tape, Series 380, or approved equal.
4. ACRYLIC WATERBORNE TRAFFIC MARKING PAINT. Acrylic latex waterborne traffic marking paint for pavement markings shall conform to MNDOT 3591 Water-based Traffic Paint or approved equal.

EXECUTION:

1. TRAFFIC CONTROLS: The Contractor shall provide Traffic Control for the pavement marking operations in conformance with the Minnesota Manual of Uniform Traffic Control Devices. Suitable warning signs shall be placed near the beginning of the worksite and well ahead of the worksite for alerting approaching traffic from both directions. Small markers shall be placed along newly marked lines to control traffic and prevent damage to newly marked surfaces. Pavement marking equipment shall be identified with large warning signs indicating slow-moving equipment in operation.
2. SURFACE PREPARATION: All surfaces to be marked shall be thoroughly cleaned immediately prior to an application of pavement marking. Dust, dirt, and other granular surface deposits shall be removed by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods as required. Rubber deposits, surface laitance, existing paint markings, and other coatings adhering to the pavement shall be completely removed with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion as directed. Where oil or grease is present, affected areas shall be scrubbed with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinsed thoroughly after each application. After cleaning, oil-soaked areas shall be sealed with cut shellac to prevent bleeding. Pavement surfaces shall be allowed to dry when water is used for cleaning. Surfaces shall be re-cleaned when work has been stopped due to rain.
 - A. Cleaning Existing Pavement Markings. In general, markings shall not be placed over existing pavement marking patterns. Existing pavement markings shall be removed that are in good condition but interfere or conflict with the newly applied markings. Deteriorated or obscured markings that are not misleading or confusing or interfere with the adhesion of the new marking material do not require removal. New preformed and thermoplastic pavement markings shall not be applied over existing preformed or thermoplastic markings. Whenever grinding, scraping, sandblasting, or other operations are performed, the Work must be conducted in such a manner

that the finished pavement surface is not damaged or left in a pattern that is misleading or confusing.

- B. When surface preparation operations are completed, the pavement surface shall be blown-off with compressed air to remove residue resulting from the cleaning work.
3. **APPLICATION:** Pavement markings shall be placed in accordance with the details shown in the Plans and as directed by the Engineer. The Contractor shall place spotting at appropriate points to provide horizontal control for striping, and determine necessary starting and cutoff points. The Contractor must request Engineer review and approval prior to proceeding with striping operations. Material shall not be applied over a longitudinal joint.
- A. **Epoxy.** The epoxy material application shall immediately follow the pavement cleaning and shall be applied in accordance with MnDOT specifications. When epoxy pavement is applied to a MnDOT 2360 SUPERPAVE wearing course surface, the epoxy pavement marking wet film thicknesses shall be increased from a 15 mil to a 20 mil minimum wet film thickness.
- Placement of epoxy materials shall be permitted only on a clean, dry pavement surface and air and pavement temperatures must be at least 50 degrees F. Markings shall not be applied when the wind or other conditions cause a film of dust to be deposited on the pavement surface before the material can be applied. Permanent pavement markings shall not be placed over temporary tape markings.
- B. **Glass Beads.** Glass beads shall be applied immediately after application of the epoxy resin line to provide an immediate no-track system. For 20 mil applications, glass beads shall be applied at a rate of at least 25 LB/GAL.
- C. **Polymer Preformed Material.** 3M Stamark Pavement Marking Tape shall be inlaid in the newly paved asphalt surfaces by a compaction roller during the pavement operation and while the pavement is still above 140 degrees F. Installation shall be in accordance with 3M Informational folder 2000. Compaction shall be accomplished with at least a five ton compaction roller with no turning allowed over the marking.
- D. **Acrylic Waterborne Traffic Marking Paint.** The paint application shall immediately follow the pavement cleaning and shall be applied in accordance with the Manufacturer's specifications. Placement shall be permitted only on a clean, dry pavement surface and air and pavement temperatures must be at least 50 degrees F. Markings shall not be applied when the wind or other conditions cause a film of dust to be deposited on the pavement surface before the material can be applied.
- E. **Tolerances.** A tolerance of ¼-inch under or ¼-inch over the specified width will be allowed for striping provided the variation is gradual and does not detract from the general appearance. Broken line segments may vary up to ½-foot from the specified lengths provided the over and under variations are reasonably compensatory. Alignment deviations from the specified lane widths shall not exceed 1-inch. Establishment of application tolerances shall not relieve the Contractor of their responsibility to comply closely with the planned dimensions.
4. **PROTECTION OF PAVEMENT MARKINGS:** The Contractor shall furnish and install all necessary warning and directional signs and devices in order to maintain traffic while pavement markings are being applied in the presence of traffic, and to protect uncured markings as needed until traffic can cross markings without damaging markings. When necessary, a pilot car and flaggers shall be used to provide adequate control and direction of traffic. Warning signs and barricades shall be placed only where marking operations are in progress, shall be relocated as often as necessary, and shall not be left in place over night. Unless approved by the Engineer, traffic shall be allowed to keep moving at all times and the striping equipment shall be operated in a manner that will not make it necessary for traffic to cross

uncured markings.

5. CLEANING: Waste materials shall be removed or destroyed at the end of each work day. Upon completion of the Work, all containers and debris shall be removed from the site. Epoxy/paint spots upon adjacent surfaces shall be carefully removed by approved procedures which will not damage the surfaces and the entire job shall be left clean and acceptable to the City.
6. CERTIFICATION: The Contractor shall furnish a certified report on the quality of materials shipped to the Project. This report shall not be interpreted as a basis for final acceptance. When required, all emptied containers shall be returned to the epoxy material storage area or made available for checking by the Engineer. The Contractor shall make accurate accounting of the epoxy materials used in the Work.
7. CORRECTION OF DEFECTS: All pavement markings not conforming to the requirements of the Contract shall be removed and replaced or otherwise repaired to the satisfaction of the Engineer. Removal of unacceptable work shall be accomplished with suitable blasting or grinding equipment unless other means are authorized by the Engineer.

If the Engineer requires removal and replacement, the Contractor shall remove, by an approved process, at least 90% of the deficient line, with no excessive scarring of the existing pavement. The removal width shall be one inch wider all around the nominal width of the pavement marking to be removed.

END OF SECTION

SECTION 3218 – BITUMINOUS TRAILS

SCOPE:

Under this Section shall be included the furnishing of all materials, equipment, labor, and skills necessary for constructing a bituminous surfaced pathway.

PRODUCTS:

1. AGGREGATE BASE CLASS 6. The material shall be in accordance with MnDOT Spec 3138, Class 6 Aggregate, except as modified below:
 - A. The Contractor shall submit the composition breakdown of the proposed material by percent.
 - B. The maximum percentage of recycled concrete shall be 30%.
 - C. Contractor shall submit gradation and bituminous extraction reports per Section 1330 and receive approval from the Engineer prior to placement of any material. The gradations shall be in conformance with MnDOT Spec 1503.
2. BITUMINOUS MIXTURE. Bituminous mixture for surface shall conform to MnDOT Specification 2360, gradation Mixture No. A, Type SP, Maximum Aggregate Size A, and Traffic Level 2.
3. BITUMINOUS MATERIAL. Asphalt binder shall be performance grade (PG) 58-28, except where modified for RAP mixtures in MnDOT 2360.2 (E7), and shall meet MnDOT 3151.

EXECUTION:

1. GENERAL. The Contractor shall prepare the location of the proposed pathway by clearing and grubbing trees, performing common excavation, placing embankment (borrow), shaping, and compacting subgrade prior to placing aggregate base course. The Contractor shall not proceed to the next phase of construction until the current phase has been inspected and accepted by the Engineer. Failure to schedule inspection or proceed without approval will result in non-acceptance of Work.
2. EXCAVATION shall conform to the planned grades and cross sections. All topsoil and organic material shall be removed below the typical section. Pathway construction in wooded areas and other areas NOT adjacent to mass grading shall have all excess materials removed to the mass grading areas or removed from the development site. Disposal of excess materials along the pathway in these areas is prohibited.
3. SUBGRADE PREPARATION. The Contractor shall prepare the subgrade in accordance with Section 3122, Subgrade Preparation, of these Specifications, prior to placement of the aggregate base. Roll testing of the subgrade will be required prior to placement of the aggregate base and shall conform to Section 3122 of these Specifications.
4. AGGREGATE BASE. The Contractor shall construct a one course aggregate base on the prepared subgrade. The aggregate base material shall be spread and compacted in accordance with MnDOT Specification 2211. Roll testing of the aggregate base will be required prior to placement of concrete curb and gutter or bituminous surface. No aggregate base shall be placed when frost is present.
5. BITUMINOUS SURFACE. The Contractor shall construct a single course of hot plant-mixed compacted bituminous surface on a prepared aggregate base. Bituminous surface shall not be placed after October 31.

6. TURF ESTABLISHMENT. The Contractor shall spread topsoil on the designated areas outside of the pathway, till, fertilize, seed, mulch, and water in accordance with MnDOT Specification 2575 and Sections 3290 and 3292 of these Specifications. Sod restoration shall be placed in street boulevard areas, adjacent to private lawn areas and as designated on the Restoration Plans.
7. DRAINAGE. Storm water runoff should be directed around or under pathways and sidewalks, placing culverts when appropriate. No channeled drainage will be allowed to flow over or across the pathways. Sheet flow drainage runoff may cross the pathways but may not be directed to flow along the pathway or pathway edge.
8. PROTECTION. Use of construction equipment on pathways must be kept to a minimum. The Contractor must take every precaution to avoid pathway damage when completing final restoration work. Track equipment is not allowed. No quick or excessive turns should be made by equipment on the bituminous surface. The Contractor must repair all damage to pathways prior to final acceptance of the Project.

END OF SECTION

SECTION 3232 – RETAINING WALLS

SCOPE:

This Work shall consist of constructing retaining walls.

PRODUCTS

- A. City Owned Walls shall be ReCon “Series 50” retaining wall units in Le Sueur County Limestone color/texture with stain, or approved equal, per manufacturer’s specifications.
- B. Other Wall Systems shall be of a material approved by City Engineer.
- C. Fences installed on retaining walls shall be Ameristar Montage 3-R Majestic or approved equal.

EXECUTION

1. RETAINING WALLS exceeding four feet in height, including stage walls which cumulatively exceed four feet, must be constructed in accordance with Plans prepared by a Professional Engineer experienced in retaining wall design who is registered in the State of Minnesota. The design computations and plans (three copies) shall be submitted to the City.
 - A. The Detailed Drawings shall contain all the necessary information for the construction of the wall. Included shall be a typical section detailing excavation limits, geotextile locations, block embedments, leveling pad dimensions, backfill, etc. Include as many sections and other views necessary for the construction and inspection of the wall. The information on embedment, geotextile locations, and geotextile lengths as they relate to wall heights may be shown in tabular form. Also included shall be the pertinent information on the individual blocks, the geotextile material, and compaction requirements.
 - B. All Plan Sheets shall clearly identify the name of the responsible engineering firm and the name of the person certifying the Plan. Each sheet shall be certified.
2. FENCES shall be installed on retaining walls as directed by Engineer in accordance with the Manufacturer’s specifications.
 - A. FENCE TYPE: Fence shall be Ameristar Montage Residential Ornamental Steel Fence or City approved equal. Posts must bolted to concrete foundation. Fence must be installed with a 6” wide concrete maintenance strip beneath the fence.
3. FIELD CHANGES. No deviations or changes in the wall construction are allowed without a Plan resubmittal. Revised Plans reflecting proposed field changes must be submitted to the City for approval. The plans must contain revision dates and be prepared and signed by a Professional Engineer experienced in retaining wall design who is registered in the State of Minnesota.
4. ACCEPTANCE OF WORK. The Design Engineer of Record for the wall shall observe construction to verify that the intent of their design is met and will be required to provide a certified letter to the City stating that the wall has been constructed in accordance with the approved Plans on file at the City with reference made to the specific date of the Plans.

END OF SECTION

SECTION 3290 – LANDSCAPING

SCOPE:

1. Under this Section of the Specifications shall be included the furnishing and installation of landscape plant materials and native prairie style turf establishment.
 - A. This Section covers tree and shrub planting materials for berms, center islands, medians, boulevards, monument and sign area plantings, development entrances, and other landscaping work incidental in connection therewith as shown on the Landscape Plans.
 - B. Native prairie style turf establishment as designated on the Plans and for natural berm areas is addressed in this Specification.
 - C. Related Sections. See Section 3292 for topsoil requirements and turf establishment including seeding and sodding for right-of-way boulevards and general restoration areas as shown on the Grading Plans.

GENERAL REQUIREMENTS:

1. REFERENCES.
 - A. American National Standards Institute (ANSI)
 1. Z60.1 American Standard for Nursery Stock, Latest Addition
 - B. American Society for Testing and Materials (ASTM)
 - C. Minnesota Department of Transportation (MnDOT) Standard Specifications for Construction, Latest Addition thereof.
 1. 2571 Plant Installation and Establishment
 2. 3149 Granular Material
 3. 3861 Plant Stock
 4. 3877 Topsoil Material
 5. 3882 Mulch Material
2. SUBMITTALS. As a condition for delivery and approval of the plant stock, the Contractor shall furnish the following documentation:
 - A. Copies of a valid nursery stock certificate registered with the Minnesota Department of Agriculture.
 - B. A Certificate of Compliance stating the species, sizes and quantities furnished, and the name and location of the original nursery growing operation.
 - C. Bills of lading for all plant stock delivered to the project site.
 - D. Copies of permits required by State, County and Local Authorities approving transportation, handling and use of plant materials and chemicals.
3. QUALITY ASSURANCE. Contractor shall be responsible for all inspection of plant material required by the Public Authorities having jurisdiction, and shall secure required permits.

For the prairie style turf, the seed mix design, seed preparation, and the turf establishment shall be performed by a company and personnel with a minimum of ten years of experience in the specialty field of prairie restoration and establishment.

4. DELIVERY, STORAGE AND HANDLING. Plant stock shall be installed on the day of delivery to the Project site unless properly stored as approved by the City.
 - A. Fertilizer shall be delivered to the job in manufacturer's original, unopened containers, with labels intact and legible.
 - B. Seed shall be delivered in suitable sealed containers labeled in accordance with applicable laws and regulations and including name and location of the producer.

5. MAINTENANCE. The Contractor shall maintain all plantings and turf covered by this Specification until final acceptance by the City, including mulching, mowing, watering, and pruning. Maintenance shall immediately follow planting operations and shall continue, as applicable, except that no maintenance will be required between November 15 or freeze-up, whichever is earlier, and April 15. The Contractor shall consult with material suppliers, if erosion or extremely dry or wet conditions jeopardize the turf or plantings.
 - A. Trees, Shrubs, and Other Plantings shall be kept in a healthy, growing condition by watering, weeding, cultivating, pruning, spraying and trimming, as applicable or recommended by the nursery supplying the materials.
 - B. Seeded or Sodded Prairie Style Turf is designed to be resistant to marginal climatic conditions, however, the Contractor shall take precautions necessary to assure proper establishment.

6. WARRANTY. Turf and plantings shall be subject to warranty in accordance with the Developer Agreement beginning upon final written acceptance of the total Project by the City. Defective workmanship or materials as identified by the following procedures and within the two year warranty shall be repaired or replaced. The City shall inspect dead plant materials and determine if planting was the cause of death. Trees not watered will void all warranty.
 - A. Seeded Turf. At the conclusion of the first growing season after planting, an inspection of turf will be made to determine its condition. Bare patches in excess of one square foot, and other defects, as determined by the City, will be noted. During the next available planting season, the Contractor shall overseed as may be necessary to obtain a satisfactory stand of grass.
 - B. Trees, Shrubs and Other Plantings. At the conclusion of the warranty period, an inspection of plantings will be made to determine the condition of trees, shrubs and ground cover. All materials not evidencing new growth and sound health, as determined by the City will be noted. This material shall be removed, and new material shall be supplied and planted within the first 30 days of the next growing season. At any point during the warranty period prior to the scheduled inspection, the City reserves the right to order all plant material exhibiting more than 10% crown death at any point during the warranty period and during the growing season shall be replaced within 30 days.

Trees shall further be warranted to remain upright for the full two year warranty period. Trees that are found to be objectionably out of plumb, during the acceptance inspection, shall be replanted. The two year warranty shall be extended for such specimens, to include the next growing season after replanting.

PRODUCTS:

1. ROOT BARRIER. Root Barrier shall be DeepRoot Tree Root Barrier or approved equal.

2. SEED. Prairie Seed Mixtures shall meet MnDOT Specification 3876, for the applicable area to be restored. Turf Seed Mixtures shall meet City Specification 3292, for the applicable area to be restored. Unless otherwise called for on the Plans, the grass seed shall meet MnDOT Specification 3876, Native Grass and Forb Mixtures (mixtures beginning with the number 3, except 32-241 which is only allowed for temporary seeding with City approval). The various kinds of seeds shall conform to the purity and germination percentages of MnDOT Spec 3876, as applicable. Provide grass seed mixture and flower seed mixture in separate packages.
3. TREES, SHRUBS AND PLANTINGS.
 - A. General. Plant materials shall conform to the requirements of American Standard for Nursery Stock ANSI Z60.1 and to requirements elsewhere in this Section. Plant materials not satisfying all requirements of this specification shall be removed by the Contractor and replaced with material as specified.
 - B. Purchasing. Trees of all species specified on the landscape plan shall be purchased at a Minnesota Department of Agriculture licensed nursery. The contractor shall purchase trees in the exact variety, grade and size as specified in the landscape plan. Substitutions may only be made if the plant stock is unavailable and is approved in writing by the City.
 - C. Quality. The City may inspect all tree stock at the nursery prior to delivery. All trees, shrubs and the like shall be sound, healthy, free from disease and shall have healthy normal root systems. The tree shall have good branch structure and have a good bud set in the fall or full set of green leaves relatively free of damage. Approved plant stock shall have no more than 4 inches of soil over the first order root at the root flare. All plant material shall have been grown under climatic conditions similar to those in the locality of the project site. All specimens shall be compact, true to form.
 - D. Delivery. Plants shall not be pruned prior to delivery and planting. All trees shall have been transplanted or root pruned at least once in the past three years. The Contractor shall establish a holding area near or on the site as all plant material delivered to the site must be planted that day.
4. PLANTING SOIL shall be topsoil in conformance with the requirements of MnDOT 3877-A Common Topsoil Borrow, with 6.0% organic material.
5. WATER shall be potable (or as otherwise approved) and shall be suitable for plant growth.
6. FERTILIZER shall be MnDOT Specification 3881, Type 4 – Natural Based Fertilizer.
7. MULCH
 - A. Gravel Mulch shall only be used with written City approval
 - B. Bark Mulch shall be commercial grade shredded bark material, 100% natural dye and color free with shredded material, shreds measuring 3 inches in length. Sample to be provided to City for approval.
 - C. Mulch for Seeding shall conform to the requirements of MnDOT 3882, Types 3. Mulch materials shall not contain weed seeds.
8. LANDSCAPE FABRIC shall only be used with written permission of the City.
9. EDGING shall be stone edger (4" x 4" by various lengths), commercial grade steel edging, or PVC edging..

EXECUTION:

1. PREPARATION AND SEEDING FOR TURF GRASS SEEDING. Shall be in accordance with City Specifications

3292.

2. PREPARATION FOR PRAIRIE STYLE TURF SEEDING. Clear the areas indicated for prairie style turf of existing vegetation, except for trees indicated to remain. Trees indicated to remain shall be protected from clearing operations. Disk the areas with less than 4:1 slope. Seeding shall begin after seven days from the clearing and preparation operations, but not more than 21 days. Trees shall be protected from spraying and burning operations.

Burn operations must be conducted with the applicable permits and the local fire authority. Burn only when prevailing winds are away from the buildings, parking and pedestrian areas. Keep the size of the fire and smoke developed to a minimum. Use backfire (fire progresses into the wind) to completely burn area, do not use headfire (fire progresses in same direction as wind). If burning cannot be performed in a timely manner to accomplish this Work, mowing may be used in lieu of burning.

- A. Spring Clearing Procedure. Spray full area with herbicide to kill existing vegetation. Repeat if necessary. Burn off stubble and thatch.
 - B. Fall Clearing Procedure. Burn off existing vegetation. Wait for area to "green up" then spray with herbicide. Repeat if necessary
3. SEEDING FOR PRAIRIE STYLE TURF. Seeding shall be done between May 15 and July 15 for spring seeding and between October 1 and freeze-up for fall seeding. Seeded areas shall be moist when seeding. Grass seed shall be planted by drill-in type seeder wherever the slope permits. A hand operated mechanical broadcast spreader shall be used elsewhere. Flower seed shall be placed by hand operated broadcast spreader. All seeding equipment shall continuously mix the seeds to prevent segregation. Sow seed uniformly at the rates per MnDOT 3876.2.

In areas seeded by drill-in planter, use harrow following the planting operations to break up the row effect and yield a more natural appearance. Seeding by hand shall be performed in two passes at approximately right angles, each pass placing approximately half of the seed. Grass seed and flower seeds shall be placed in separate operations, with the grass seed being placed first. After the grass seed has been placed and harrowed if applicable, broadcast the flower seeds into the appropriate micro habitats, directly on top of the soil. Do not cover flower seeds.

Newly seeded areas on steep slopes (4:1 or greater) shall be mulched or covered to control erosion. Secure written approval of materials and methods, and have material on hand prior to seeding operations. Apply uniformly at a rate which will provide adequate cover to protect seeds and prevent washing but will not hinder the growth of the grass.

4. PLANTING TREES, SHRUBS AND OTHER PLANTINGS. Plant trees, shrubs and other landscape plant materials in the locations shown on the Plans. The City shall inspect tree stock as it is planted by the Contractor.
 - A. Planting holes, when dug, shall be in the shape of a saucer, circular in form, and be twice as wide as the root ball of the tree. Excess and poor soil from planting areas shall be removed and disposed of from the site.
 - B. Tree planting holes within City right-of-way, and as directed by City staff, shall be lined with root barrier at least 4-feet deep on sides adjacent to bituminous or concrete walkways and curb. The bottom 2-inches of the root barrier trench shall consist of a bentonite seal. The remainder of the root barrier trench shall be backfilled with native material.
 - C. Trees shall be placed straight and plumb in the hole so the first root and root collar (the bulge right above the root system) are right at ground level or slightly higher. Trees shall be lifted by the container or root ball to prevent damage to the root ball or stem. To determine how deep to dig the hole, excess soil from the root ball or the top of the burlap may have to be removed to locate the

first major root coming out of the root collar.

- D. The burlap, twine and wire shall be removed and discarded. If containerized stock is used, the pot shall be removed before placing the root ball in the hole and the root ball scored so circling roots are stopped.
- E. The hole shall be backfilled with the original soil if it meets or exceeds the MnDOT 3877 Topsoil Borrow Requirements. As the soil is added to the hole, the shovel end shall be lightly pushed into the soil around the root ball to eliminate air pockets. The hole shall be filled to the level of the root collar. No soil in a frozen or muddy condition shall be used for planting or backfilling
- F. The planting hole shall be covered with a minimum of 4-inches of mulch. Pull the mulch a few inches away from the trunk so that the mulch extends to the edge of the root ball, but is not piled on top.
- G. The tree shall be watered after planting using a slow trickle to remove any air pockets in the soil.

The planting shall be done within the periods of May 1 to June 1, and September 15 to November 1 when practicable. The preparation of plant areas may begin at any time after the subgrade has been established.

Upon completion of landscape planting the grounds shall be cleared of debris, materials, and equipment, which shall be removed from the grounds.

5. AFTER PLANTING CARE.

- A. Pruning shall only be done at the time of planting or directly after planting if there are broken branches at the time of delivery or planting. ANSI A300 shall be followed for any pruning that is required.
- B. Trees shall be watered on an as needed basis to provide the healthy growth during the growing season for the establishment and warranty period.
- C. If staking is required due to high winds or vandalism, staking approach and methods to be approved in writing by City. Use smooth materials that will not cut into the bark. Take the staking materials off the tree after one season.

6. PLANTING BED EDGING. Edging shall be installed to provide a termination between the gravel/wood chip mulch and the adjacent finish (turf, walkway, etc.). Provide and install PVC Edging as indicated for in the Plans. Edging shall be continuous around each planting area. The PVC Edging shall be set flush with the finished grade and secured in place with stakes (if an edging system). Stakes shall be fastened to the Edging System at the edge conditions and at 48 inches O.C. maximum. Stakes shall be non-corrosive and shall have 12 inch minimum embedment. The finished work shall be neatly installed, well anchored and shall follow the finished contours of the land.

END OF SECTION

SECTION 3292 – TURF ESTABLISHMENT AND RESTORATION

SCOPE:

Under this Section of the Specifications shall be included the general clean-up and restoration of areas disturbed by construction, and the temporary and permanent turf establishment measures for seeding and sodding.

GENERAL REQUIREMENTS:

1. **RESTORATION OF PAVED SURFACES.** If the Project requires cutting through a sidewalk, trail, street or private property, the Contractor will be required to restore these areas within five working days after completing the work or installation.

PRODUCTS:

1. **FERTILIZER.** Commercial fertilizer, analysis 23-0-30, MnDOT Specification 3881, shall be spread at the rate of 350 pounds per acre.
2. **TOPSOIL.** The topsoil shall meet MnDOT Specification 3877, for the applicable area to be restored. Unless otherwise called for on the Plans, the topsoil shall meet MnDOT Specification 3877-A Common Topsoil Borrow.
3. **SEED.** The grass seed mixtures shall meet MnDOT Specification 3876, for the applicable area to be restored. Unless otherwise called for on the Plans, the grass seed shall meet MnDOT Specification 3876, Seed Mixture 25-141 applied at a rate of 59 pounds per acre. In high maintained areas such as residential and commercial lawns, Seed Mixture 25-131 shall be applied at a rate of 220 pounds per acre. The seed mixture for City owned property/outlots shall be MNDOT 3876, Category 25, Mix 151, high maintenance turf mix with PLS (Pure Live Seed) rate of 200 pounds/acre. The seed mixture for temporary erosion control shall comply with MnDOT Specification 3876, Seed Mixture series 21-112 as applicable and only with prior approval by the Engineer.
4. **SOD.** All sod shall meet the requirements of MnDOT Specification 3878 for the applicable area to be restored. Unless otherwise called for on the Plans, the sod shall meet MnDOT Specification 3878.2A Lawn Sod, a premium quality sod for use in high maintained areas, such as lawns. Native Sod, MnDOT Specification 3878.2E, an average to high density sod with low maintenance requirements, may be used in ditch bottoms and at pipe inlets or outlets.
5. **WOOD FIBER BLANKET.**
 - A. Permanent Erosion Control Blanket: Erosion Control Blanket placed within City owned and maintained property/outlots shall be MnDOT 3885-1 Category 3N , Type 1S (natural netting & stitching), and shall be made of wood fiber material. Straw fiber material will not be allowed without prior approval by the Engineer.
 - B. Temporary Erosion Control Blanket: The erosion control blanket shall be MnDOT 3885-1 Category 0, Type 1S (netting on one side), and shall be made of wood fiber material. Straw fiber material will not be allowed without prior approval by the Engineer.
6. **MULCH.** Type 3 Mulch meeting the requirements of MnDOT Specification 3882.
7. **HYDRAULIC EROSION CONTROL PRODUCTS.** Type Bonded Fiber Matrix (BFM) meeting the requirements of MnDOT Specification 3884, dyed green.

EXECUTION:

1. **TURF ESTABLISHMENT.** The requirements and operations for tilling, fertilizing, seeding, sodding and mulching shall be in accordance with MnDOT Specification 2575. Seed or sod restoration shall be applied as designated on the Plans.

Boulevards shall be graded upon completion of curb work and graded to allow for placement of six inches of topsoil. The Contractor shall place hand installed silt fence along each lot line and seed the boulevard and disturbed areas. When a platted lot is not adjacent to the boulevard the entire boulevard shall be restored with quality lawn sod. Seeding shall be completed beyond designated sod limits.

Rear yard drainage swales shall be protected with silt fence (or similar delineator) until adjacent areas are permanently and fully established.

Permanent Turf establishment within and adjacent to City owned property/outlots:

- A. Boulevards adjacent to City owned property/outlots shall be permanently established with 6-inches of topsoil and sod. This includes the entire area between the back of curb and sidewalk, or between back of curb and right of way line where sidewalks do not exist.
 - B. All other areas where sod is not required shall be established with 6-inches topsoil, graded to a smooth mowable condition and seeded per Part 3 above
 - C. Erosion Control blanket shall be as noted in Part 5A above.
2. **SOIL PREPARATION.** Finished grades shall slope uniformly between elevations shown and shall meet flush with walks and pavement. Allow for the thickness of sod, as applicable. The finished Work shall be true, smooth and sightly.

Topsoil shall be spread smooth but shall not be compacted. Topsoil shall be raked or disked free of lumps and rocks to provide a smooth, mowable surface. Sticks and trash over one inch, and all stones shall be removed. The surface shall be finished to the designated slope and contour. The topsoil shall be loosened and thoroughly pulverized by discing to a depth of six inches.

Fertilizer shall be spread and worked into the soil during preparation. Apply fertilizer in two passes at approximately right angles to each other, each pass placing approximately half of the fertilizer.

3. **SEEDING.** Seeding shall be done between April 1 and June 1 or between July 20 and September 20, except as otherwise may be allowed by the Engineer. Reseeding will be required as may be necessary to obtain a satisfactory stand of grass. Sow seed (for lawn areas) uniformly at the seed mixture specified application rate, adjusting for the certified purity and germination.

Seeds are to be sown by hand operated or machine operated mechanical seeder, which shall continuously mix the seeds to prevent segregation. Seeding shall be performed in two passes at approximately right angles, each pass placing approximately half of the seed. Immediately after the seed has been sown, the entire area shall be raked lightly and rolled lightly to pack the soil firmly around the seed.

4. **WOOD FIBER BLANKET.** Erosion control fabric shall be placed on all slopes at 3:1 or greater, where indicated on the plans, and in ditches. Erosion control fabric shall be placed over newly seeded areas within 24 hours of seeding. Install in accordance with the manufacturer's instructions, including spacing anchors.
5. **MULCH.** Seeded areas shall be mulched and disc-anchored with the specified mulch type, except where plastic netting or hydraulic erosion control products for stabilization is specified. Mulch shall be spread by

mechanical means to provide a uniform distribution at the target application rate. When poor mulch distribution occurs The Contractor will be required to remulch areas where coverage is too light and remove excess where coverage is too heavy, as determined by the Engineer.

6. SODDING. Sod operations shall not be started until all necessary equipment, supplies, and labor forces are available to sufficiently place the sod without avoidable delays. Immediately before the sod is laid, the prepared bed shall be sprinkled until all of the loose material is moist. Sodding shall be done only when soil and weather conditions are favorable. The sod strips shall be carefully placed by hand beginning at the toes of the slopes and progressing upwards, the length of the strips as nearly as practical at right angles to the direction of the flow of the surface water. All joints shall be tightly butted and the end joints shall be staggered at least 12 inches. After sod has been placed, the sod shall be pressed into the underlying soil by rolling or tamping. The sod shall be pegged with suitable wood stakes as necessary to keep it in place.

7. MAINTENANCE. The Contractor shall water and maintain seeded and sodded areas on a timely basis as the need arises and without the Engineer having to so order. Seed, Mulch, Erosion Control Fabric and Sod shall be maintained until final acceptance of the public improvements by the City. The Contractor shall promptly replace all sod that dries out, or is damaged, displaced, or weakened, or is heavily infected by weed growth. Seeded areas shall be reseeded as necessary to establish a permanent vegetative cover acceptable to the City.

END OF SECTION

SECTION 3301 – CASE PIPE JACKING

SCOPE:

This Section of the Specifications shall include, but is not limited to, construction of the jacking pit, furnishing and installing the casing pipe and carrier pipe, sand fill, end seal, and all appurtenances as shown on the Drawings.

1. PERMITS BONDS AND INSURANCE. It shall be the responsibility of the Contractor to obtain and provide any required permits, bonds, and insurance before beginning construction of the crossing. The Contractor shall contact the permitting agency prior to bidding to ascertain the amount required for the bond.

PRODUCTS:

1. MATERIALS. Casing pipe shall be welded or seamless steel pipe. Steel pipe shall be minimum 35,000 psi yield strength and shall have a wall thickness as listed below:

Nominal Pipe Diameter (Inches)	Minimum Wall Thickness (Inches)
Under 14	0.250
14 and 16	0.282
18	0.312
20	0.344
22	0.375
24	0.406
26	0.438
28 and 30	0.469
32	0.500
34 and 36	0.531

EXECUTION:

1. GENERAL. The casing pipe shall be placed as shown on the Plan sheets and as staked by the Engineer. The method of jacking or augering shall be approved by the Engineer and the agency issuing the permit.

All crossings of roadbeds or railroads shall be made by boring inside a casing pipe, or by jacking. The auger shall not lead the casing pipe by more than one inch. Open trenching shall be restricted to the area from five feet beyond the shoulder to the right-of-way line (10 feet for interstate crossings).

All voids caused by jacking or boring shall be filled by grouting. A simultaneous grouting and jacking or boring procedure shall be used. The jacking system shall be provided with an integral grouting and casing tube with positive piston pressure on the grout throughout the jacking operations. The grout material shall consist of a sand-cement slurry of at least two sacks of cement per cubic yard and a minimum of water to assure satisfactory placement.

The annular space between the casing pipe and the carried pipe shall be filled with sand and the end sealed with cement grout. The sand filler pipe shall be cut off below grade and capped with a watertight cap.

It shall be the Contractor's responsibility to maintain the proper grade and elevation of the carrier pipe.

The Contractor shall inspect and verify soil conditions as necessary in order to determine the type of construction to employ. Natural and/or manmade obstructions may be encountered in the soil. These contract documents do not warrant the nature or condition of the soils, and do not warrant that natural or manmade obstructions will not be encountered, nor guarantee the extent to which rocks, boulders, or

other obstructions, regardless of size, may be encountered during boring operations. The Contractor shall not be entitled to additional compensation for any natural or manmade obstructions encountered during trenchless construction.

The Contractor shall be responsible for protecting all existing utilities within the construction limits.

2. SPACING IN CASING PIPE. The carrier pipe shall be supported within the casing pipe to the proper grade by means of commercially available spacers or treated lumber with metal bands. The spacing of such supports should be in accordance with the pipe manufacturer's recommendations. Special care should be taken to ensure that spacers are correctly assembled and evenly tightened.

END OF SECTION

SECTION 3307 – HORIZONTAL DIRECTIONAL DRILLING

SCOPE:

Under this Section shall be included the furnishing and installation of pipe to be installed by Horizontal Directional Drilling (HDD) as shown on the plans, and all other Work associated with the Horizontal Directional Drilling operation. This Section amends or supplements Section 3310 (Water Distribution System), Section 3330 (Sanitary Sewer Utility System) and Section 3340 (Storm Drainage Utilities). All provisions which are not so amended or supplemented remain in full force and effect.

MATERIALS TO BE FURNISHED:

All materials required for the complete construction of the specified Work shall be furnished by the Contractor and all materials shall be new, of first grade and shall be products of reputable manufacturers known to the trade.

All of the Standards and Specifications of the American Society for Testing and Materials (ASTM), the American National Standard Institute (ANSI) and all other similar societies and associations for testing, materials, dimensions, methods of construction, etc., are intended in all cases to refer to and should be understood to mean the latest revisions thereto at the time Work is bid unless definitely specified otherwise in the Special Provisions.

PRODUCTS:

1. **POLYETHYLENE WATERMAIN.** Polyethylene watermain pipe shall be High Density (HDPE) SDR 11 for use for potable water distribution, in accordance with AWWA C-906. Materials used for the manufacture of polyethylene pipe and fittings shall be extra high molecular weight, high density PE 3408 polyethylene resin.

HDPE pipe shall have a nominal DIPS (Ductile Iron Pipe Size) OD unless otherwise specified. Pipe having a diameter 3 inches and larger will be made to the dimensions and tolerances specified in ASTM F 714. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant. The pipe shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity. The material shall be listed by the Plastics Pipe Institute (PPI), a division of the Society of the Plastics Industry in PPI TR-4 with a 73°F hydrostatic design basis of 1,600 psi and a 140°F hydrostatic design basis of 800 psi. The PPI listing shall be in the name of the pipe manufacturer and shall be based on ASTM D 2837 testing.

- A. **Butt Fusion Fittings.** HDPE fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99, and approved for AWWA use. Butt fusion fittings shall have a manufacturing standard of ASTM D3261. Molded & fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans. Fabricated fittings are to be manufactured using Data Loggers. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the Quality Control records. All fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR) of the fitting.
 - B. **Flanged and Mechanical Joint Adapters.** Flanged and Mechanical Joint Adapters shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D3261. Fittings shall have a pressure rating equal to or greater than the pipe unless otherwise specified on the plans. Backer rings for flanged and mechanical joint adaptors shall be ductile iron, and bolts for fasteners shall be Cor-Blue T-Bolts with matching nuts.
2. **POLYETHYLENE FORCEMAIN & SANITARY SEWER.** Polyethylene forcemain & sanitary sewer pipe shall be High Density (HDPE) and conform to the latest edition of ASTM D1248, ASTM D3350, and ASTM F714. The pipe dimension ratio shall be designed for the conditions of each pipe run. Materials used for the manufacture of polyethylene pipe and fittings shall be extra high molecular weight, high density PE 3408 polyethylene resin.

HDPE pipe shall have DIPS (Ductile Iron Pipe Size) OD unless otherwise specified. Pipe having a diameter 3 inches and larger will be made to the dimensions and tolerances specified in ASTM F 714. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant. The pipe shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity. The material shall be listed by the Plastics Pipe Institute (PPI), a division of the Society of the Plastics Industry in PPI TR-4 with a 73°F hydrostatic design basis of 1,600 psi and a 140°F hydrostatic design basis of 800 psi. The PPI listing shall be in the name of the pipe manufacturer and shall be based on ASTM D 2837 testing.

- A. Butt Fusion Fittings. HDPE fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99, and approved for AWWA use. Butt fusion fittings shall have a manufacturing standard of ASTM D3261. Molded & fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans. Fabricated fittings are to be manufactured using Data Loggers. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the Quality Control records. All fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR) of the fitting.
 - B. Flanged and Mechanical Joint Adapters. Flanged and Mechanical Joint Adapters shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D3261. Fittings shall have a pressure rating equal to or greater than the pipe unless otherwise specified on the plans. Backer rings for flanged and mechanical joint adaptors shall be ductile iron, and bolts for fasteners shall be Cor-Blue T-Bolts with matching nuts.
3. POLYETHYLENE STORM SEWER. Polyethylene storm sewer pipe shall be High Density (HDPE) and conform to the latest edition of ASTM D1248, ASTM D3350, and ASTM F714. The pipe dimension ratio shall be designed for the conditions of each pipe run. Materials used for the manufacture of polyethylene pipe and fittings shall be extra high molecular weight, high density PE 3408 polyethylene resin.

HDPE pipe shall have DIPS (Ductile Iron Pipe Size) OD unless otherwise specified. Pipe having a diameter 3 inches and larger will be made to the dimensions and tolerances specified in ASTM F 714. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant. The pipe shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity. The material shall be listed by the Plastics Pipe Institute (PPI), a division of the Society of the Plastics Industry in PPI TR-4 with a 73°F hydrostatic design basis of 1,600 psi and a 140°F hydrostatic design basis of 800 psi. The PPI listing shall be in the name of the pipe manufacturer and shall be based on ASTM D 2837 testing.

- A. Butt Fusion Fittings. HDPE fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99, and approved for AWWA use. Butt fusion fittings shall have a manufacturing standard of ASTM D3261. Molded & fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans. Fabricated fittings are to be manufactured using Data Loggers. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the Quality Control records. All fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR) of the fitting.
- B. Flanged and Mechanical Joint Adapters. Flanged and Mechanical Joint Adapters shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D3261. Fittings shall have a pressure rating equal to or greater than the pipe unless otherwise specified on the plans. Backer rings for flanged and mechanical joint adaptors shall be ductile iron, and bolts for fasteners shall be Cor-Blue T-Bolts with matching nuts.

4. TRACER WIRE. Tracer wire shall be installed with all new Horizontal Directionally Drilled pipe. Wire connectors shall be lockable, 3-way, and dielectric silicon filled to seal out moisture and corrosion. Non-locking friction fit, twist on or taped connectors are prohibited.
 - A. Directional Drilling Installation. Tracer wire for directional drilling installation shall be Copperhead Extra High Strength part #1245B-HS for watermain, part #1245G-HS for sanitary sewer, or approved equal. Connectors shall be Copperhead 3-way locking connector part #3WB-01 or approved equal.
5. CORPORATION STOPS. A heat fused saddle shall be used for all corporation stops. The saddle/corporation stop shall be tested at 150 psi along with the rest of the watermain.
6. POLYETHYLENE ENCASEMENT. Polyethylene encasement material shall conform to the requirements of AWWA C-105 for tube type installation and 8 mil nominal film thickness.

EXECUTION:

1. ALIGNMENT AND GRADE. All pipe shall be laid and maintained to the required lines and grades, with manholes, fittings and special structures at the required locations.

No deviation from line or grade shall be made without the consent of the Engineer.

2. HDPE PIPE DEPTH. Pipe shall be installed to such depth as indicated on the plans. The depth shall be measured from top of the pipe vertically to the finished grade of the street or the ditch line. The minimum depth shall be 7-1/2 feet for all watermain and forcemain.
3. REACTION BACKING. Reaction backing shall be provided at all fittings and at hydrants in accordance with the Standard Details. In any instance where the Engineer determines that solid backing against undisturbed earth is not obtainable for fittings or hydrants, the Contractor shall use steel tie rods or mechanical joint retainer glands as directed by the Engineer. Valves on branch lines or on hydrant leads shall in all cases be tied to an adjacent tee or cross fitting or back one full length of pipe.
4. HDPE PIPE PACKAGING, HANDLING, AND STORAGE. The manufacturer shall package the pipe in a manner designed to deliver the pipe to the project neatly, intact, and without physical damage. The transportation carrier shall use appropriate methods and intermittent checks to insure the pipe is properly supported, stacked, and restrained during transport such that the pipe is not nicked, gouged, or physically damaged.

Pipe shall be stored on clean, level ground to prevent undue scratching or gouging. If the pipe must be stacked for storage, such stacking shall be done in accordance with the pipe manufacturer's recommendations. The pipe shall be handled in such a manner that it is not pulled over sharp objects or cut by chokers or lifting equipment.

Sections of pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed. The undamaged portions of the pipe shall be rejoined using the butt fusion joining method.

Fused segments of pipe shall be handled so as to avoid damage to the pipe. Chains or cable type chokers must be avoided when lifting fused sections of pipe. Nylon slings are preferred. Spreader bars are recommended when lifting long fused sections.

5. HORIZONTAL DIRECTIONAL BORING. Direction boring/drilling installation shall be accomplished where required on the Plans or in the Supplementary Conditions to minimize disturbance of existing surface improvements. The Contractor shall be compensated for restoration work only within the areas at the connection points, or other locations as may be approved by the Engineer. The Contractor shall be responsible for repairs, without compensation, for any other repair areas, including pit/boring points and areas above the drilled pipe where underground pressures may cause heaving or damages to pavement and ground surfaces.

The Contractor must submit boring/drilling pit locations to the City and the Engineer for approval before beginning construction. Boring pits may be located within roadway right-of-way and easements as authorized by the City of Victoria. Any other locations that may be desired by the Contractor for boring pits or other uses shall be the responsibility of the Contractor to attain authorization, including County and private property as may be required.

The drilling equipment shall be capable of placing the pipe as shown on the plans. The installation shall be by a steerable drilling tool capable of installing continuous runs of pipe without intermediate pits, at a minimum distance and radius requirements per the manufacturer's specifications and recommendations. The guidance system shall be capable of installing pipe within 2-inches of the plan vertical dimensions and 6-inches of the plan horizontal dimensions for watermain and forcemain. The Contractor shall be required to remove and reinstall pipes, which vary in depth and alignment from these tolerances.

A single continuous wire shall be pulled along with the HDPE pipe in order to locate it in the future. Conductivity between HDPE and ductile iron pipe shall be continuous.

Pull back forces shall not exceed the allowable pulling forces for the pipe being installed. The Contractor shall be responsible, without compensation, for replacement of pipe damaged during pull back and any additional connection points required to do the repairs, as directed by the Engineer. The minimum radius of the pipe shall be per the manufacturer's specifications and recommendations. Drilling fluid shall be a mixture of water and bentonite clay. Disposal of excess fluid and spoils shall be the responsibility of the Contractor.

Pull back through wetland areas shall proceed so that buoyancy does not cause a change in grade. This may require the Contractor to fill the pipe with water during pull back to achieve neutral buoyancy.

The Contractor shall be responsible for protecting all existing utilities within the construction limits.

6. CONNECTIONS TO EXISTING UTILITIES. Connections between existing and new watermains and existing and new forcemains shall be as directed by the Engineer.

- A. The Contractor shall arrange his Work for a minimum number of shutdowns to the existing water and sewer service and shall schedule the shutdowns so that all present water and customers will have water and service from 6 a.m. to 9 a.m. and from 2 p.m. to 9 p.m. every day. When this is not possible, temporary service supplies may be ordered by the Engineer and shall be furnished and installed by the Contractor. Water and sewer service interruptions must have prior approval by the Engineer.
- B. The Contractor will be required to schedule shutdown of the watermain or forcemain with the City 48 hours in advance of interruption of water service.
- C. The Contractor will notify residents affected by shutdown in writing 24 hours in advance. Notice will inform residents what day and expected times water or sewer will be off. Notice is not required for emergency situations.
- D. All Fittings and Piping used for making connection shall be thoroughly cleaned using a solution of chlorine mixed with water.
- E. Loading and flushing of watermain is allowed between the hours of 9:00 AM and 2:00 PM, Monday through Friday.

7. JOINING OF HDPE PIPE. Sections of polyethylene pipe shall be joined by the butt fusion process into continuous lengths at the job site. Butt fusion shall be performed only by a certified thermal fusion Contractor. The Contractor's certification shall be submitted to the Engineer, for review and approval consideration, prior to the start of construction. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer. The Contractor shall be responsible to verify that the fusion equipment is in good

operating condition and that the operator has been trained within the past twelve months. All welds will be made using a Data Logger to record temperature, fusion pressure, with a graphic representation of the fusion cycle shall be part of the Quality Control records.

Flanges/MJ adapters shall be attached to pipe and fittings using butt fusion. The flanges/MJ adapters shall be aligned and centered relative to the pipe. Flanges/MJ adapters should be square with the valve or other flange before tightening of bolts. Bolts should not be used to draw flanges into alignment. Bolt threads shall be lubricated, and flat washers shall be used under flange nuts. Bolts shall be tightened using a "star tightening pattern." See manufacturer's recommendations. Twenty-four hours after first tightening the flange bolts, they must be re-tightened using the same "start tightening pattern" used above. The final tightening torque shall be as indicated by the manufacturer.

Polyethylene pipe and fittings may be joined using approved electrofusion couplings where the butt fusion method cannot be used. Fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All electrofusion fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR) of the fitting.

Mechanical joining may be used where the butt fusion or electrofusion methods cannot be used. Mechanical joining will be accomplished by either using a HDPE flange adapter with a Ductile Iron back-up ring or HDPE Mechanical Joint adapter with a Ductile Iron back-up ring. Refer to the manufacturer's recommendations.

Pipe stiffeners shall be used where stiffening of the pipe is necessary for proper gasket seal. Pipe Stiffeners shall be ASTM - 240 - TP 304 Stainless Steel or 316 Stainless Steel.

Extrusion welding or hot gas welding of HDPE shall not be used.

8. MAINTAIN TRAFFIC. The Contractor shall ensure that continuous lengths of fused polyethylene pipe remain in the public right-of-way or utility easement and do not block access to any streets, driveways, sidewalks or trails.
9. TRACER WIRE CONTINUITY TEST. Prior to approval to build the street section, the Contractor shall coordinate a tracer wire continuity test of the entire tracer wire system with the Engineer and City Public Works department. The test shall be conducted with a locator, using a low voltage circuit. The test shall consist of a continuous above ground trace of the piping and appurtenances installed to within 2 feet of installed locations. All areas failing the location test shall be corrected at the Contractor's expense.
10. POLYETHYLENE ENCASEMENT. Valves, fittings, hydrants, and appurtenances shall be fully encased in polyethylene film in accordance with the latest version of the Standard Utility Specification for Watermain and Service Installation and Sanitary and Storm Sewer Installation published by the City Engineer's Association of Minnesota.
11. TESTING. Testing shall be in accordance with Section 3310 for watermain and Section 3330 for sanitary sewer. Deflection testing shall not be required.
12. TELEVISIONING. Televisioning shall not be required for directionally drilled pipe.

END OF SECTION

SECTION 3310 – WATER UTILITY DISTRIBUTION SYSTEM

SCOPE:

Under this Section shall be included the complete construction of watermain within street right-of-way and easements. The watermain will be laid as shown on the Plans, including all necessary excavation and backfilling.

GENERAL REQUIREMENTS:

1. **MATERIALS TO BE FURNISHED.** All materials required for the complete construction of the specified Work shall be furnished by the Contractor and all materials shall be new, of first grade and shall be products of reputable manufacturers known to the trade.

Prior to ordering watermain and appurtenances, the Contractor shall submit for review drawings on gate valves, valve boxes, hydrants, corporation stops, curb stops, curb boxes, and all other watermain appurtenances in order that verification can be made that the supplied materials are compatible to those specified or the approved equals.

All the Standards and Specifications of the American Society for Testing and Materials (ASTM), the American National Standard Institute (ANSI) and all other similar societies and associations for testing, materials, dimensions, methods of construction, etc., are intended in all cases to refer to and should be understood to mean the latest revisions thereto at the time Work is bid unless definitely specified otherwise in the Special Provisions.

PRODUCTS:

1. **WATERMAIN.** Watermain pipe shall be of the kind, size, and class indicated for each particular line segment as shown on the Plans. When PVC pipe is specified, metallic tracer wire, Copperhead #12 High Strength part #1230B-HS, shall be furnished and installed throughout the pipe length, buried directly underneath the pipe. Joints shall be push-on type except that mechanical joints shall be used at all valves, fittings, and hydrants. Fittings shall be ductile iron, bolts and nuts shall be Cor-Blue T-Bolts with matching nuts.
2. **FLEXIBLE JOINT PIPE** shall meet all applicable requirements of AWWA C151.
3. **SERVICES.** Watermain service pipe shall be SIDR 7 IPS PE pipe conforming to ASTM D3350, except that carbon black content should not exceed 3.0%.
4. **HYDRANTS.** Hydrants shall be mechanical joint Waterous Company Pacer, Model WB-67, or approved equal and shall conform to AWWA Specifications C502. The hydrants shall be furnished for 8'-6" bury (for watermain with 7-1/2 feet of cover) or 9'-0" bury (for watermain with eight feet of cover) with heavy duty operating rod. Six inch or 12 inch extensions will be added as required to match existing ground.

The hydrants shall have two 2-1/2 inch hose connections (thread size 3-2/32 inch O.D., 7-1/2 T.P.I.) and one 4-1/2 inch pumper connection (thread size 5-24/32 inch O.D., 4 T.P.I.). Threads shall be National Standard. The cap nuts shall be pentagon, 1-1/2 inch point to flat, counter clockwise opening. The hydrants shall be furnished with a 16 inch traffic section (24 inches from ground line to centerline of nozzle). Valve opening shall be 5-1/4 inch.

Hydrants shall be painted one coat of red primer paint and two finish coats of an approved paint of red color. Hydrants shall be touched up at the end of construction. Each hydrant shall be furnished with a spring-mounted snow flag, E-Z Guide Fire Hydrant Safety Marker & Locator (Premium Fiberglass Rod), to be mounted on the top flange of the hydrant.

Drain holes shall be plugged when placed below the water table. A tag shall be attached to the hydrant

stating "Drain Holes Plugged" and the hydrant pumper nozzle shall be painted per the Standard Plates.

One extra, new six inch hydrant extension or one gate valve rod extension shall be provided per Project, as directed by the Engineer. One extra hydrant flag shall be provided for each five hydrants; minimum one per Project. One hydrant wrench or repair kit shall be provided per Project.

5. VALVES. Gate valves shall be resilient wedge American Flow Control Series 2500, or approved equal, with mechanical joint ends, meeting AWWA Specification C515. All bolts shall be stainless steel. All gate valves shall be left in the open position except as directed by the Engineer. Valves shall have "O-Ring" construction and be designed for 250 psi working pressure. Valves larger than 12 inches in size shall be butterfly valves, equal to Mueller Linseal 111, meeting AWWA Specification C504. All bolts shall be stainless steel. All valves shall be equipped with an extension stem manufactured for the valve to within 1 foot of the finished valve box height.

One four-foot gate valve key or one extra gate valve rod extension shall be provided per Project, as directed by the Engineer.

6. VALVE BOXES. Valve boxes shall be Tyler G-Box 6860, or approved equal, and furnished with VB2600 drop lid marked water. Valve boxes shall be designed for 7'-6" depth of cover over watermain (minimum).
7. GATE VALVE ADAPTORS shall be 1/4 inch steel with protective coating manufactured by Adaptor, Inc., or approved equal.
8. CORPORATION STOPS. Corporation stops shall be A.Y. McDonald 74701B, or approved equal for one inch and two inch diameter PE tubing.
9. TAPPING SADDLES. Double studded tapping saddles shall be used for all corporation connections to PVC watermains. Saddles shall be stainless steel of the wraparound kind with rubber gasket, Smith-Blair 372 or approved equal.
10. CURB STOPS. Curb stops shall be A.Y. McDonald 76104 with stationary rod, or equal, Minneapolis thread and pattern, with inlet and outlet each one inch or two inches in diameter for flared connections.
11. CURB BOXES. Curb boxes shall be A.Y. McDonald 5614 or equal, with rods and with Minneapolis top, for one inch and two inch size. Boxes shall be 7'-0" - 8'-0" adjustable.
12. CURB BOX CASTING. Neenah R-1914-A with "WATER" stamped on lid.
13. POLYETHYLENE ENCASEMENT. Polyethylene encasement material shall conform to the requirements of AWWA C-105 for tube type installation and 8 mil nominal film thickness.
14. TRACER WIRE. Tracer wire shall be installed with all watermain pipe (including all services). Wire connectors shall be, lockable, 3-way, and dielectric silicon filled to seal out moisture and corrosion. Non-locking friction fit, twist on or taped connectors are prohibited.
 - A. Open-Trench Installation. Tracer wire for open-trench installation shall be #12 AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with 30 mil HDPE insulation thickness. (Copperhead #12 High Strength part #1230B-HS or approved equal)
 - B. Horizontal Directional Drilling. Tracer wire for horizontal directional drilling shall be #12 AWG Copper Clad Steel, Extra High Strength with minimum 1,150 lb. break load, with minimum 50 mil HDPE insulation thickness. (Copperhead Extra High Strength part #1245B-EHS or approved equal)
15. HYDRANT TRACER WIRE ACCESS BOX. Tracer wire shall be connected to hydrants with an above ground tracer wire access box per City Detail 201. (Copperhead part #T2R-FLPKG-5/8 or approved equal.)

16. NON-ROADWAY TRACER WIRE ACCESS BOX (Snakepit). Copperhead grade level adjustable, Light duty, Product Number LD14GTP-ADJ or approved equal.
17. TRACER WIRE GROUNDING ROD. Tracer wire grounding rod shall be a drive-in magnesium anode and connected to approved tracer wire access boxes. (Copperhead part #ANO-12, 1.5 lb or approved equal)
18. PIPE INSULATION. Insulation shall be extruded rigid board material having a thermal conductivity of 0.23 BTU/hour/square foot/degree Fahrenheit/per inch thickness, maximum at 40°F mean, a compressive strength of 35 psi minimum, and water absorption of 0.25 percent by volume minimum. Board dimensions shall be measured 8 feet long, 2 or 4 feet wide, and 2 inches thick.

EXECUTION:

1. DEPTH. Watermain shall be laid to such depth as indicated on the plans. The depth shall be measured from top of the pipe vertically to the finished grade of the street or the ditch line. The minimum depth shall be 7-1/2 feet for all watermain.
2. REACTION BACKING. Reaction backing shall be provided at all watermain fittings and at hydrants in accordance with the Standard Details. In any instance where the Engineer determines that solid backing against undisturbed earth is not obtainable for fittings or hydrants, the Contractor shall use steel tie rods or mechanical joint retainer glands as directed by the Engineer. Valves on branch lines or on hydrant leads shall in all cases be tied to an adjacent tee or cross fitting or back one full length of pipe.
3. WATER SERVICES. All services shall be tapped with the watermain under working pressure. Curb boxes shall be installed fully extended with tops extending six inches above finished grade. Casting to be installed when curb stop is located in a hard surface.
4. ALIGNING AND FITTING OF PIPE. Alignment and fitting of the pipe shall conform to the following AWWA table:

AWWA C-600
TABLE FOR
MAXIMUM DEFLECTION FOR DUCTILE IRON WATER PIPE

Nominal Pipe Diameter	Push-On Joints, Deflection- Inches/Length			Mechanical Joints, Deflection- Inches/Length		
	6	18	20	16	18	20
6	17	19	21	24	27	--
8	17	19	21	18	20	--
10	17	19	21	18	20	--
12	17	19	21	18	20	22

5. TRENCH PREPARATION. Trench Preparation shall be completed in accordance with Section 3123 of these Specifications. Compaction of pipe zone backfill in all areas shall meet requirements of MnDOT Specification 2105.3F1, 95% Specified Density method.
6. VALVE BOXES. The Contractor shall be responsible for keeping all new and existing valve boxes clean and free of dirt at all times.

The Contractor shall adjust all castings located within the street section including existing castings. Adjustments shall be as follows:

Valve Boxes: .04 feet below finished grade

Valve boxes located in the bituminous section shall be coated with a material which allows removal of bituminous material applied to the casting lid. Valve boxes shall have a wooden cut-out or other approved material placed over the structure during the paving operation. The cut-out shall allow pavement to be placed around the structure causing a uniform lip after rolling conforming to the information given above. The top of the castings shall be adjusted to the finished elevation just prior to paving.

Upon completion of compacting bituminous pavement, all valve box covers shall be removed and surfaces and casting lips cleaned of all bituminous materials.

Interim adjustment of castings to the surface will be required to allow for access during lengthy periods of work suspension. Cuts in the bituminous pavement resulting from interim adjustments shall be restored with a minimum compacted thickness of three inches of bituminous mixture. In conjunction with final adjustments, patches from interim adjustments shall be removed in their entirety and the roadway structure restored to the plan thicknesses.

7. CONNECTIONS TO EXISTING UTILITIES. Connections between existing and new watermains shall be as directed by the Engineer.

A. The Contractor shall arrange his Work for a minimum number of shutdowns to the existing water service and shall schedule the shutdowns so that all present water customers will have water service from 6 a.m. to 9 a.m. and from 2 p.m. to 9 p.m. every day. When this is not possible, temporary service supplies may be ordered by the Engineer and shall be furnished and installed by the Contractor. Water service interruptions must have prior approval by the Engineer.

B. The Contractor will be required to schedule shutdown of the watermain with the City 48 hours in advance of interruption of water service.

C. All Fittings and Piping used for making connection shall be thoroughly cleaned using a solution of chlorine mixed with water.

D. Loading and flushing of watermain is allowed between the hours of 9 a.m. and 2 p.m., Monday through Friday.

8. SEPARATION OF WATERMAINS AND SEWERS.

A. Parallel Installation. Watermains shall be laid at least 10 feet horizontally from any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a 10-foot separation, the reviewing authority may allow deviation on a case by case basis, if supported by data from the design Engineer. Such deviation may allow installation of the watermain closer to a sewer, provided that the watermain is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the watermain is at least 18 inches above the top of the sewer.

B. Crossings. Watermains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the watermain and the outside of the sewer. This shall be the case where the watermain is either above or below the sewer. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. In addition, if the sanitary sewer crosses over the watermain, the pipes shall be centered at the crossing so that the joints will be equidistant and as far from the crossing as possible. Special structural support for the water and sewer pipes may be required.

C. Exception. Where sewers are being installed and the above requirements cannot be met, the sewer materials shall be watermain pipe or equivalent and shall be pressure tested to ensure water tightness.

- D. Forcemains. There shall be at least a 10-foot horizontal separation between watermains and sanitary sewer forcemains. There shall be an 18 inch vertical separation at crossings as required above.
9. TRACER WIRE SYSTEM. Tracer wire shall be installed with all PVC and HDPE watermain (including all services). Tracer wire must be installed as a single continuous wire, except were using approved connectors. No looping or coiling of wire is allowed. Tracer wire shall be installed at the bottom half of the pipe to prevent damage. At tees, wires shall be joined using a single 3-way connector. At 4-way intersections, use of a 4-way connector or two 3-way connectors with a short jumper wire between is acceptable.
- Tracer wire shall be connected to hydrants with an above ground tracer wire access box and grounded by use of approved magnesium anode grounding rod.
- Tracer wire shall be grounded at all mainline stubs by use of a drive-in magnesium grounding anode rod, and brought up in a “snake-pit” adjacent to above ground post.
- An extra 2’-0” of tracer wire shall be furnished above ground at each curb stop for future connection by others.
10. METHODS OF CHLORINATION (AWWA C651). Chlorination shall be performed in accordance with AWWA C651.
11. PRESSURE TEST. A hydrostatic pressure of not less than 150 pounds per square inch (psi) shall be held for a minimum duration of two hours.
12. BACTERIOLOGICAL TEST. After final flushing and before the new (or repaired) main is connected to the distribution system, two consecutive sets of acceptable samples, taken 24 hours apart, shall be collected from the new main by a Minnesota Department of Health accredited laboratory, under the observation of the City. One set of samples every 1200 ft of new main, one set from the end of the line, and one set from each branch. All testing must be in compliance with AWWA C651.
13. TRACER WIRE CONTINUITY TEST. Prior to approval to build the street section, the Contractor shall coordinate a tracer wire continuity test of the entire tracer wire system with the Engineer and City Public Works department. The test shall be conducted with a locator, using a low voltage circuit. The test shall consist of a continuous above ground trace of the piping and appurtenances installed to within 2 feet of installed locations. All areas failing the location test shall be corrected at the Contractor’s expense.
14. WATERMAIN STUBS. The end of any watermain stub shall be marked with a treated four inch by four inch hardwood post with metal spike. The post should be placed in the ground deep enough to withstand normal construction traffic, but extend one inch to two inches above the ground with the top painted blue. A six-foot T-shaped metal fence post shall be tied to the 4 inch by 4 inch hardwood post, painted blue and extended 48 inches above finished grade.
15. POLYETHYLENE ENCASEMENT. Valves, fittings, hydrants, and appurtenances shall be fully encased in polyethylene film in accordance with the latest version of the Standard Utility Specification for Watermain and Service Installation and Sanitary and Storm Sewer Installation published by the City Engineer’s Association of Minnesota.
16. WATERMAIN MARKER
- A. A Steel Post, “T-shaped” style, painted blue shall be placed by each curb box. The post must extend 48 inches above surrounding ground.
- B. The Above-Referenced Steel Posts shall be placed by all valve boxes in off-road areas, except for hydrant valves.

END OF SECTION

SECTION 3330 – SANITARY SEWER UTILITY SYSTEM

SCOPE:

Under this Section of the Specifications shall be included the complete construction of sanitary sewer extension within street right-of-way and easements. The sewers are to be laid as shown on the Plans, including manholes, all necessary excavation, backfilling and dewatering of trench, and trench shoring as required.

GENERAL REQUIREMENTS:

1. MATERIALS TO BE FURNISHED. All materials required for the complete construction of the specified Work shall be furnished by the Contractor and all materials shall be new, of first grade, and shall be products of reputable manufacturers known to the trade.

Prior to ordering precast manhole components, Contractor shall submit for review a manhole detail book in order that verification can be made that the materials to be supplied are in conformance with the design concept of the Project and in compliance with the information given in the Contract Documents.

PRODUCTS:

1. SANITARY SEWER.
 - A. PVC SDR 35 shall conform to ASTM D3034 for 4"-15" sizes and ASTM F679 for 18"-27" sizes with gasketed joint and the following:

<u>Nominal Size</u>	<u>Outside Diameter</u>	<u>Min. Wall Thickness</u>
4"	4.215"	0.120"
6"	6.275"	0.180"
8"	8.400"	0.240"
10"	10.500"	0.300"
12"	12.500"	0.360"
15"	15.300"	0.437"
18"	18.701"	0.536"
21"	22.047"	0.632"
24"	24.803"	0.711"
27"	27.953"	0.801"

- B. PVC SDR 26 shall conform to ASTM D2241 or ASTM D3034 with gasketed joints and the following:

<u>Nominal Size</u>	<u>Outside Diameter</u>	<u>Min. Wall Thickness</u>
4"	4.215"	0.162"
6"	6.275"	0.241"
8"	8.400"	0.323"
10"	10.500"	0.404"
12"	12.500"	0.481"
15"	15.300"	0.588"

- C. PVC Sewer Services, Risers and All Related Fittings shall be PVC Schedule 40.
 - D. Ductile Iron. Conform to the requirements of SJDIP watermain class 50.
 - E. Reinforced Concrete Pipe. Joints shall be Bureau of Reclamation Type R-4 or equal with molded rubber gasket meeting the requirements of ASTM C443.
2. SANITARY SEWER MANHOLES shall be constructed of precast concrete sections with O-ring type, press seal, Type 1, joints and shall be sealed with a 9-inch wide external rubber sleeve similar to the Infi-Shield Gator Wrap as manufactured by Sealing Systems, Inc. or approved equal. A 1'-0" or 1'-4" manhole section shall be installed under the cone section on all manholes to allow for height adjustment.

Pipes shall be connected to manholes by precast in rubber boots. The manholes and pipe connections shall be watertight in every way.

3. MANHOLE STEPS. Manholes shall be furnished with aluminum, polypropylene plastic reinforced, or approved equal, steps and shall be in accordance with MnDOT Standard Plate No. 4180 Steps shall be located over the downstream pipe.
4. MANHOLE CASTINGS. Manhole casting shall be Neenah Catalog No. R-1642 Specialized solid cover with concealed pickholes, or equal. Casting covers shall have no positioning lugs. See Standard Detail #107.

Sanitary sewer manholes shall have lids furnished with "SANITARY SEWER" cast in two inch high letters.

Full bearing surfaces of frame and cover shall be machined to provide true bearing surfaces.

5. TRACER WIRE. Tracer wire shall be installed with all sanitary sewer mainline pipe (not including sewer service stubs). Wire connectors shall be, lockable, 3-way, and dielectric silicon filled to seal out moisture and corrosion. Non-locking friction fit, twist on or taped connectors are prohibited.
- A. Open-Trench Installation. Tracer wire for open-trench installation shall be #12 AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with 30 mil HDPE insulation thickness. (Copperhead #12 High Strength part #1230G-HS or approved equal)
 - B. Horizontal Directional Drilling. Tracer wire for horizontal directional drilling shall be #12 AWG Copper Clad Steel, Extra High Strength with minimum 1,150 lb. break load, with minimum 50 mil HDPE insulation thickness. (Copperhead Extra High Strength part #1245G-EHS or approved equal)
6. NON-ROADWAY TRACER WIRE ACCESS BOX (Snake-pit). Copperhead grade level adjustable, Light duty, Product Number LD14GTP-ADJ or approved equal.
7. TRACER WIRE GROUNDING ROD. Tracer wire grounding rod shall be a drive-in magnesium anode and connected to approved tracer wire access boxes. (Copperhead part #ANO-12, 1.5 lb or approved equal)
8. PIPE INSULATION. Insulation shall be 2-1/2 inch thick boards of expanded polystyrene specifically designed for use in highway construction equal to "Styrofoam Hi 35" as manufactured by Dow Chemical Company. Special note is to be taken that this type is different than the type used in ordinary building construction. The insulation board shall comply with MnDOT Specification 3760.

EXECUTION:

1. ALIGNMENT AND GRADE. All pipe shall be laid and maintained to the required lines and grades, with manholes, fittings and special structures at the required locations.

No deviation from line or grade shall be made without the consent of the Engineer.

2. PIPELAYING. The alignment of pipe between manholes shall be such as to permit the entire inside circumference being seen from any manhole to the next adjacent manhole. Piping that does not conform to line and grade shall be relaid at the Contractor's expense.

Pipe shall be laid against the grade of the sewer. The spigot end of the pipe shall be inserted full depth into the bell and, when completed, each line of pipe shall have a uniform and smooth invert.

The Contractor shall assume total responsibility for assuring that segments of the pipe which have been bypassed during construction shall be installed to match the line and grade as shown on the Plans.

Laser Beam Grade Control: When the Contractor uses laser beam control for grade and alignment, the Contractor shall verify grades using provided grade stakes. Any discrepancies found between the laser beam elevation and grade stake elevation shall be immediately brought to the Engineer's attention before continuing pipe installation. If the Contractor fails to follow these steps, the Contractor shall be responsible for any removal and reinstallation of pipe as necessary to conform to the line and grade shown on the plans.

Joints for all sewers shall be made watertight. As soon as the joint is made, the bell depression shall be filled with granular bedding material which shall be pressed under and around the joint, by hand, in such a way as to protect it from sagging or being disturbed. The interior of all pipe shall, as the work progresses, be cleaned of all dirt and superfluous materials. The exposed end of the pipes shall be protected with suitable temporary covers. Pipe laid in place shall be protected from injury and disturbance.

Compaction of pipe zone backfill in all areas shall meet requirements of MnDOT Specification 2015.3F1, 95% Specified Density method.

3. TRACER WIRE. A single continuous wire shall be installed with all new sanitary sewer pipe. Tracer wire must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed. Tracer wire shall be installed at the bottom half of the pipe to prevent damage. At tees, wires shall be joined using a single 3-way connector. At 4-way intersections, two 3-way connectors with a short jumper wire between is acceptable.

Tracer wire located shall be grounded by use of an approved drive-in magnesium grounding anode rod and shall terminate at the surface as follows:

- A. Inside the manhole structure through the adjusting rings when a sewer run ends in a paved surface.
 - B. At an approved tracer wire access box ("snake-pit") located adjacent to manhole and structure marker for manholes in a pervious surface.
 - C. At an approved tracer wire access box ("snake-pit") located adjacent to above ground post for mainline stubs in a pervious surface.
4. SANITARY SEWER AND WATERMAIN CROSSING CONFLICTS. Watermain crossings shall be constructed to provide a vertical separation of at least 18 inches between the outside of the watermain and the outside of the sewer. When conditions prevent a vertical separation as described, the following construction shall be used:
 - A. Sewers passing over or under watermain shall be constructed of materials equal to watermain standards of construction for a distance of 10' from the watermain as measured perpendicular to the watermain.
 - B. A length of the watermain pipe shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer.

5. MANHOLE INSTALLATION. Manholes shall be constructed as detailed and set plumb with a maximum deviation of ± 0.1 -foot from vertical. All rows of steps shall be set vertical through the height of the manholes.

Manholes shall be constructed on a minimum 6-inch thickness of granular bedding material. If additional stabilization is required, a minimum 6-inch thickness of 1 1/2" crushed rock or washed rock shall be used as directed by the Engineer.

Channels for the flow of sewage through the manholes shall be formed in the floor and grouted smooth to conform to the inverts of the sewers as shown. All lift holes, and any manhole joints which indicate infiltration, shall be filled with expanding grout.

The adjusting rights and the castings shall be set in a bed of mortar, and the exterior of the adjusting rings shall be given a mortar covering. The joints of the adjusting rings shall be completely filled with mortar and the interior joints struck smooth.

The Contractor shall adjust all castings located within the street section, including existing castings. Adjustments shall be as follows:

Non-Inlet Castings: .04 feet below finished grade

Castings located in the bituminous section shall be coated with a material which allows removal of bituminous material applied to the casting lid. Castings shall have a wooden cut-out or other approved material placed over the structure during the paving operation. The cut-out shall allow pavement to be placed around the structure causing a uniform lip after rolling conforming to the information given above. The top of the castings shall be adjusted to the finished elevation just prior to paving.

Upon completion of compacting bituminous pavement, all manhole covers shall be removed and surfaces, lift holes, and casting lips cleaned of all bituminous materials.

Interim adjustment of castings to the surface will be required to allow for access during lengthy periods of work suspension. Cuts in the bituminous pavement resulting from interim adjustments shall be restored with a minimum compacted thickness of three inches of bituminous mixture. In conjunction with final adjustments, patches from interim adjustments shall be removed in their entirety and the roadway structure restored to the plan thicknesses.

The Contractor shall be responsible for keeping all new and existing manholes clean and free of dirt at all times.

Infi-shield external seals shall be installed on the outside surface adjustment ring area covering all rings. Installation shall be in accordance with manufacturer recommendations. Primer shall be applied to areas where attaching non-hardening butyl mastic to casting flange and cone section inspection tabs shall be attached to manhole lid before backfilling.

Infi-shield external seals, or approved equal, shall be installed on the outside surface at each barrel joint.

6. SERVICE LINES. Sewer service lines may be constructed in a common trench with water service lines. If the sewer service elevation, as staked by the Engineer in the field, has a 1'-10" vertical clearance between pipes with the top of the sewer laid 1'-6" below the bottom of the water service, the sewer service may be PVC Schedule 40. If the sewer service cannot be laid below the water service with 1'-6" clearance between pipes, then a 10-foot horizontal separation must be maintained or the sewer service shall be constructed of watermain type materials.

Each new service shall be laid from the wye branch to the property line at a minimum of 1% slope. Each service shall be inspected and the invert elevation at the end of the service shall be determined by the

Engineer prior to backfill. A vertical riser shall be installed at the end of the service as detailed. Fitting at the end of service shall be solvent weld.

Sanitary sewer service lines shall not be connected into a manhole.

The end of each service line stub shall be marked with a two inch by two inch hardwood marker with metal spike, extending from the end of the pipe to finished grade elevation. A six-foot T-shaped metal fence post shall be tied to the two inch by two inch hardwood marker, painted green and extend 48 inches above finished grade.

7. SEWER LINE TEST. All testing shall be scheduled with the Engineer a minimum of 48 hours prior to testing. Leakage tests and PVC deflection tests for sanitary sewer pipelines are detailed in the Standard Utilities Specifications bound with these documents. In addition to those tests, the following test shall be required:
 - A. Forcemain Test. Forcemain testing shall be in accordance with Section 2611.3, Hydrostatic Testing of Watermains, in the Standard Utilities Specifications, bound with these documents. A pressure of not less than 100 pounds per square inch shall be held for a minimum of one hour with 0 (zero) pounds allowable pressure loss. Gauge to be used shall have a dial diameter of 4-1/2" with one psi increments
8. TRACER WIRE CONTINUITY TEST. Prior to approval to build the street section, the Contractor shall coordinate a tracer wire continuity test of the entire tracer wire system with the Engineer and City Public Works department. The test shall be conducted with a locator, using a low voltage circuit. The test shall consist of a continuous above ground trace of the piping and appurtenances installed to within 2 feet of installed locations. All areas failing the location test shall be corrected at the Contractor's expense.
9. SANITARY SEWER STUBS. The end of any main line sanitary sewer stubs shall be marked with a treated four inch by four inch hardwood post with metal spike. The post should be placed in the ground deep enough to withstand normal construction traffic, but extend one inch to two inches above the ground and shall be painted green. A six-foot T-shaped metal fence post, painted green, shall be tied to the four inch by four inch hardwood post and extend 48 inches above the ground.
10. TELEVISIONING.
 - A. After Completion of all sanitary sewer construction, the Contractor shall flush and televise each sanitary sewer pipe section. If the system is not adequately flushed prior to televising, the Contractor may be required to re-flush the line at no expense to the Owner. The Contractor shall give the Engineer a minimum of 24 hour notice prior to flushing.
 - B. The Television Camera shall be mounted on a skid so that it is centered in the pipe.
 - C. The Camera shall have a cross-hair to maintain a constant reference on the image.
 - D. The Camera Lens shall be contained in an articulating housing that will permit direct viewing of the pipe interior on the entire 360° perimeter.
 - E. The Camera shall be equipped with sufficient lights to completely illuminate the interior of the pipe with the range of the camera.
 - F. A Monitor shall be provided with seating facilities to allow three or more persons to view the picture continuously.
 - G. The Television Camera, transmitting equipment, and monitoring equipment shall combine to provide a picture on the monitor screen which is free from distortion and clear enough to distinguish between hairline cracks, "pipe marks," etc.

- H. A USB DRIVE shall be made of the entire footage of pipe televised. A linear footage of pipe shall be integrated into the video tape for ease of identification of pipe being viewed.
- I. One Printed Copy and One Electronic Copy of a Report of televising results, including a diagram of the project with all televising indexed in it shall be provided within five working days following the last day of televising on the Project.

END OF SECTION

SECTION 3340 – STORM DRAINAGE UTILITIES

SCOPE:

Under this Section shall be included the complete construction of a storm sewer extension within the street right-of-way or easement. The sewer shall be laid as shown on the Plans, including manholes and all necessary excavation and backfilling, as required.

GENERAL REQUIREMENTS:

1. **MATERIALS TO BE FURNISHED.** All material required for the construction shall be furnished by the Contractor and all materials shall be new, of first grade, and shall be products of reputable manufacturers known to the trade.

Prior to ordering precast manhole or catch basin components, the Contractor shall submit for review manhole and catch basin detail books in order that verification can be made that the materials to be supplied are in conformance with the design concept of the Project and in compliance with the information given in the Contract Documents.

PRODUCTS:

1. **STORM SEWER PIPE.** Reinforced Concrete Pipe shall conform to ASTM Specification C76 with Bureau of Reclamation R-4 joint.
2. **CORRUGATED METAL PIPE CULVERT** shall have 2-2/3 inch by 1/2 inch corrugations and shall conform to the applicable requirements of AASHTO M36, as shown on the MnDOT Standard Plate No. 3040F.

Coupling bands shall be the same base metal and coating as the pipe. Bands shall have the same thickness as the pipe. Bands shall be 10-1/2 inch minimum width.

Corrugated metal aprons shall conform to the requirements shown on MnDOT Standard Plate No. 3123J.

3. **MANHOLE AND CATCH BASIN STRUCTURES.** The Contractor shall use precast sections whenever possible.

If the Contractor must construct the manholes and catch basins using segmental block, the following shall apply:

Block work shall be laid up in good workmanlike manner to the dimensions shown. All block shall be wetted thoroughly with water just before laying, and headers and vertical joints shall be broken from course to course. Each horizontal course shall be completed before starting the next course above. Horizontal joints shall be not more than 1/2 inch thick and vertical joints on inside face not more than 3/8 inch thick. All joints shall be completely filled with mortar. All joints on inside shall be plastered smooth with mortar, thickness to be not less than 1/4 inch at any point.

All Work shall be covered when not being worked upon. Masonry shall be kept at a temperature above freezing until mortar has attained sufficient strength and set so that it will not be damaged by freezing. In freezing weather, all materials shall be heated before laying and shall be protected as necessary to prevent damage after laying. No Work shall be done in unsuitable weather, unless suitable protection is provided.

The blocks shall be radial blocks and shall conform to the radius of the manhole as detailed. The blocks shall have a vertical groove with one inch radius on both ends. The batter blocks for the tapered tops shall be a minimum of five inches in thickness and the blocks used in the four-foot diameter manhole section shall be a minimum of six inches in thickness.

The manhole depth to which the six inch thickness blocks may be used shall not exceed 12 feet. Below this point, the block thickness shall be increased to 10 inch for manholes up to 20 feet in depth, and for manholes deeper than 20 feet, the block thickness shall be not less than 12 inches. A flat slab top may be required instead of a tapered top. Precast adjusting rings shall be used to form the upper eight inches of the structure.

4. MANHOLE/CATCH BASIN STEPS. Manholes and catch basins shall be furnished with aluminum steps, polypropylene plastic reinforced, or approved equal, and shall be in accordance with MnDOT Standard Plate No. 4180. Steps shall be located over the downstream pipe.
5. MANHOLE CASTINGS. Manhole casting shall be Neenah Catalog No. R-1642 Specialized solid cover with concealed pickholes, or equal. Casting covers shall have no positioning lugs. See standard detail #107
6. CATCH BASIN CASTINGS. Catch basin casting and grate shall be as follows:

Surmountable or B618 Concrete Curb and Gutter - Neenah Catalog No. R-3067-V
Ditch or Yard Area Inlet - Neenah Catalog No. R-4342

EXECUTION:

1. ALIGNMENT AND GRADE. All pipe shall be laid and maintained to the required lines and grades, with manholes, catch basins, and special structures at the required locations. No deviation from line or grade shall be made without the written consent of the Engineer.
2. PIPELAYING. The alignment of pipe between manholes shall be such as to permit the entire inside circumference being seen from any manhole to the next adjacent manhole. Piping that does not conform to line and grade shall be relaid at the Contractor's expense.

Laser Beam Grade Control: When the Contractor uses laser beam control for grade and alignment, the Contractor shall verify grades using provided grade stakes. Any discrepancies found between the laser beam elevation and grade stake elevation shall be immediately brought to the Engineer's attention before continuing pipe installation. If the Contractor fails to follow these steps, the Contractor shall be responsible for any removal and reinstallation of pipe as necessary to conform to the line and grade shown on the plans.

Pipe shall be laid against the grade of the sewer. The spigot end of the pipe shall be inserted full depth into the bell, and when completed, each line of pipe shall have a uniform and smooth invert.

Joints for all sewers shall be made watertight. As soon as the joint is made, the bell depression shall be filled with granular bedding material which shall be pressured under and around the joint, by hand, in such a way as to protect it from sagging or being disturbed.

Joint ties shall be installed on the last three joints at all end section locations.

The interior of all pipe shall, as the work progresses, be cleaned of all dirt and superfluous materials. The exposed end of the pipe shall be protected with suitable temporary covers. Pipe laid in place shall be protected from injury and disturbance.

Compaction of pipe zone backfill in all areas shall meet requirements of MnDOT Specification 2105.3F1, 95% Specified Density method.

3. MANHOLE AND CATCH BASIN INSTALLATION. Manholes and catch basins shall be constructed as detailed and set plumb with a maximum deviation of ± 0.1 -foot from vertical.

Catch basins and manholes shall be constructed on a minimum 6-inch thickness of granular bedding material. If additional stabilization is required, a minimum 6-inch thickness of 1 1/2" crushed rock or washed

rock shall be used as directed by the Engineer.

The adjusting rings and the castings shall be set in a bed of mortar, and the exterior of the adjusting rings shall be given a 1/2-inch mortar covering. The joints of the adjusting rings shall be completely filled with mortar and the interior joints struck smooth. Infi-Shield external watertight gasket shall be installed on all manholes and catch basins.

All rows of steps shall be set vertical through the height of the manholes.

Precast manholes over seven feet deep shall have a 1'-0" or 1'-4" manhole section installed under the cone section to allow for height adjustment.

4. MANHOLES AND CATCH BASINS. The Contractor shall be responsible for keeping all new and existing manholes and catch basins clean and free of dirt at all times.

The Contractor shall adjust all castings located within the street section including existing castings. Adjustments shall be as follows:

Non-Inlet Castings: .04 feet below finished grade

Inlet Castings: .10 feet below gutter line grade

Castings located in the bituminous section shall be coated with a material which allows removal of bituminous material applied to the casting lid. Castings shall have a wooden cut-out or other approved material placed over the structure during the paving operation. The cut-out shall allow pavement to be placed around the structure causing a uniform lip after rolling conforming to the information given above. The top of the castings shall be adjusted to the finished elevation just prior to paving.

Upon completion of compacting bituminous pavement, all manhole and valve box covers shall be removed and surfaces, lift holes, and casting lips cleaned of all bituminous materials.

Interim adjustment of castings to the surface will be required to allow for access during lengthy periods of work suspension. Cuts in the bituminous pavement resulting from interim adjustments shall be restored with a minimum compacted thickness of three inches of bituminous mixture. In conjunction with final adjustments, patches from interim adjustments shall be removed in their entirety and the roadway structure restored to the plan thicknesses.

Infi-shield external seals shall be installed on the outside surface adjustment ring area covering all rings. Installation shall be in accordance with manufacturer recommendations. Primer shall be applied to areas where attaching non-hardening butyl mastic to casting flanges and cone section. Inspection tab shall be attached to manhole lid before backfilling.

Storm structures within 10' of watermain are to have water tight connections per MDH requirements.

5. RIP RAP. Rip Rap shall be hand placed and conform to MnDOT 3601, Class III. The Contractor shall hand place Class III rip rap at the locations as shown on the Plans and as directed by the Engineer.
6. GEOTEXTILE FILTER. Contractor shall place MnDOT Type IV (Specification 3733) geotextile filter under all rip rap and extend three feet under the culvert apron.
7. TRASHGUARDS. Trashguards shall be installed on all flared end sections.
8. TELEVISIONING.
 - A. After Completion of all storm sewer construction, the Contractor shall flush and televise each storm

sewer pipe section. If the system is not adequately flushed prior to televising, the Contractor may be required to re-flush the line at no expense to the Owner. The Contractor shall give the Engineer a minimum of 24-hour notice prior to flushing.

- B. The Television Camera shall be mounted on a skid so that it is centered in the pipe.
- C. The Camera shall have a cross-hair to maintain a constant reference on the image.
- D. The Camera Lens shall be contained in an articulating housing that will permit direct viewing of the pipe interior on the entire 360° perimeter.
- E. The Camera shall be equipped with sufficient lights to completely illuminate the interior of the pipe with the range of the camera.
- F. A Monitor shall be provided with seating facilities to allow three or more persons to view the picture continuously.
- G. The Television Camera, transmitting equipment, and monitoring equipment shall combine to provide a picture on the monitor screen which is free from distortion and clear enough to distinguish between hairline cracks, "pipe marks," etc.
- H. A USB DRIVE shall be made of the entire footage of pipe televised. A linear footage of pipe shall be integrated into the video tape for ease of identification of pipe being viewed.
- I. One Printed Copy and One Electronic Copy of a Report of televising results, including a diagram of the project with all televising indexed in it shall be provided within five working days following the last day of televising on the Project.

END OF SECTION

SECTION 3346 – SUBSURFACE DRAINAGE SYSTEM

SCOPE:

Under this Section shall be included the installation of perforated pipe, coarse filter aggregate, and geotextile for subsurface drainage systems.

PRODUCTS:

1. **PIPE.** Pipe size and type shall be six inch Schedule 40 PVC perforated pipe with holes at ten and two o'clock positions and shall meet the requirements of MnDOT Specification 3245 for street subsurface drainage installations. Pipes used to connect into catch basins and manholes shall be non-perforated. Pipe size and type shall be a minimum six inch PVC perforated pipe and shall meet the requirements of MnDOT Specification 3245 for non-street subsurface drainage installations.
2. **COARSE FILTER AGGREGATE.** Coarse filter aggregate shall be washed and shall meet the requirements of MnDOT Specification 3149.2H.
3. **GEOTEXTILE.** Geotextile pipe wrap or coarse aggregate filter wrap, as specified or detailed, shall be MnDOT Type I and shall be furnished in accordance with all requirements of MnDOT Specification 3733. A Certificate of Compliance shall be furnished by the supplier in accordance with MnDOT Specification 1603 and shall be delivered to the Engineer prior to any drain tile installation.
4. **CLEANOUTS.** Pipe used for cleanouts shall be of the same size as the main line pipe and shall be PVC non-perforated per MnDOT Specification 3245. Castings shall be installed in accordance with the Standard Details and are only to be installed when the cleanout is surrounded by a hard surface area or as directed by the Engineer. Castings shall be Neenah R-1914-A and shall have the word "Storm" cast on the lid.

EXECUTION:

1. **ALIGNMENT AND GRADE.** Continuous edge drains shall be installed directly under the curb and gutter according to the typical details. Positive grade shall be maintained along the entire length of drain tile. Edge drains shall outlet into the storm sewer system at catch basins and manholes. Where connections are made to catch basins or manholes, care shall be taken to ensure positive drainage through the pipe into the structure. At connection points, the invert of the edge drain shall be above the top of the effluent storm pipe. No 90-degree bends shall be used. Changes in pipe direction must be made using no greater than 45-bends in combination.
2. **DRAIN TILE SERVICE STUB.** For each platted Lot, a four inch DIP non-perforated draintile service pipe shall be extended to the utility easement line beyond the right-of-way. Joints between DIP pipes shall be gasketed. The depths and locations of the service pipe shall be placed according to the Plans and Standard Details.
3. **DRAIN TILE SERVICE MARKER.** A six-foot T-shaped metal fence post marker shall be placed by each service stub. The post must extend 48 inches above surrounding ground and be painted pink.
4. **CLEANOUTS.** Cleanouts shall be placed at the end of each run of pipe and every 300-feet.

END OF SECTION

SECTION 3380 – UTILITY CONDUIT

SCOPE:

Under this Section of the Specifications shall be included the complete furnishing and installation of utility conduits within the street right-of-way or public easement. The conduit shall be placed as shown on the Plans, per the City Standard Details and at the locations as directed by the utility companies.

GENERAL REQUIREMENTS:

1. **MATERIALS.** All materials shall be furnished by the Contractor or the utility company and shall be new materials, of first grade, and shall be products of reputable manufacturers known to the trade.

PRODUCTS:

1. **UTILITY CONDUITS.** All conduits shall be minimum four inch diameter, PVC schedule 40 pipe with push-on caps at both ends with solvent welded joint.

EXECUTION:

1. **LOCATION.** Utility conduit pipe shall be installed at locations as directed by the Engineer or as requested by the utility companies under City permit. The Contractor, Developer and/or Developer's Engineer must coordinate with each utility company to identify utility conduit requirements, with locations to be verified at the preconstruction meeting and during regular progress meetings.
2. **ALIGNMENT AND GRADE.** Utility conduit shall be placed from right-of-way line to right-of-way line, perpendicular to the right-of-way or public easement. Conduits shall be installed in the street subgrade prior to constructing the granular drainage section and draitile. Neither laying the conduits on the top of the subgrade nor placing them in the granular drainage section will be allowed. Utility Conduit shall be placed below street draitile with 6 inches of separation between pipes.
3. **CONDUIT END MARKERS.** A six-foot T-shaped metal fence post marker shall be placed at each conduit end. The post must extend 48 inches above surrounding ground and be painted yellow.

END OF SECTION

SECTION 3440 – TRAFFIC SIGNS AND DEVICES

SCOPE:

This Work shall consist of furnishing and installing traffic sign panels, posts, and other devices for traffic control and street identification; including the relocation of in-place sign panels, posts and mounting hardware, and the salvage and reinstall of in-place sign panels, posts, and mounting hardware. The Work shall be in accordance with these Specifications, applicable MnDOT Specifications and Minnesota Uniform Traffic Control Devices (MnMUTCD) guidelines, at locations shown in the Plans, and as directed by the Engineer.

PRODUCTS:

1. **SIGN PANELS:** Sign panels shall be in accordance with the latest version of the MnDOT Standard Signs Manual, the Minnesota Traffic Engineering Manual, the Minnesota Manual on Uniform Traffic Control Devices (MMUTCD), and MnDOT Specifications 2564 and 3352. All regulatory and custom signs to be HIP 3M Material, Pedestrian signs and arrows to be DG3 FYG Sheeting, Private signs to have white lettering on blue background. Stop signs to be S3030R11(X)A, Speed Limit signs to be 24-inch X 30-inch. All sign panels shall be new. Sign face material shall be reflective sign sheeting meeting 3M Diamond Grade DG3, or approved equal. Sign Panels shall be of the Type and quantities as shown in the Plans.
2. **STREET NAME SIGNS:** All Street sign panels to be manufactured shall be approved by the Victoria Department of Public Works prior to fabrication.
 - A. Reflective Sheeting: Hi-Intensity, Single face.
 - B. Plate Length: Minimum 24-inches, Maximum 48-inches.
 - C. Size: 9" flat with E-Series Punching and Border.
 - D. Letter Format: B-series 6" white lettering with Green background in upper/lower case format.
 - E. Sign Mounting and Hardware:
 1. ¼" Stainless hardware nuts/bolts and nylon washers for street name blades.
 2. E650, E450, E250, triple, double and single stack sign brackets for U-Channel posts with adaptors.
 3. All street sign posts shall be green in color. All posts to be bolted using 3/8-inch bolts with 9/16-inch heads with locking nuts.
 4. For light post mounting, 3/4-inch X .030-inch stainless steel strapping shall be used.
3. **TRAFFIC AND STREET SIGN POSTS:** Top posts shall be 7' high, 2 lbs/ft or 2.5 lbs/ft. Galvanized U-Channel posts. Base posts shall be 7' high 3lbs./ft. galvanized U-Channel posts installed a minimum of 3-feet deep. Posts shall be provided in the quantity called for in the Plans or as required to facilitate a complete installation for all signs shown in the Plans.

EXECUTION:

1. **INSTALLATION:** The Contractor shall install sign panels as shown in the Plans and/or as staked by Victoria Public Works Department. Post shall be mounted vertically and plumb. All sign panels shall be mounted on new 3 lb/ft galvanized flanged channel posts with new mounting hardware. The edge of the sign panel shall be mounted a minimum of 24-inches from the curb face or adjacent traveled roadway. Any post bent or damaged during post driving operations shall be removed from the site and replaced at no expense to the City. After installation of the post in the post hole, void areas shall be filled with select

backfill material free from rocks and organic materials. Backfill material shall be moistened and thoroughly compacted.

2. SIGN ACCEPTANCE: Signs and posts installed by the developer to be inspected for any damage at warranty walkthrough. Any damaged signage shall be the responsibility of the developer.

SALVAGE AND REINSTALL SIGN PANELS: No in-place sign panel or materials shall be removed unless called for on the Plans; construction deems it necessary; or as approved or directed by the Engineer. Remove in-place sign panels and posts, including the stub post, and mounting hardware in a manner so as not to damage sign panels. If Contractor damages a sign panel, a deduction of the salvage value of the sign panel will be made. If a sign panel exhibits damage prior to removal it must be brought to the attention of the Engineer prior to Contractor removal to avoid a damage deduction.

Salvaged sign panels, posts and mounting hardware shall be delivered to the Victoria Department of Public Works for salvage or for storage until the materials are ready for re-install. Materials deemed non-salvageable by the engineer shall be removed completely from the site and disposed of. Any damage to the salvaged materials during the removal and hauling operations shall be repaired or replaced at no expense to the City.

Install salvaged sign panels with new posts and new mounting hardware at the locations shown in the Plans and in accordance with the Specifications above for sign panel installation.

END OF SECTION