



STANDARD SPECIFICATIONS

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CITY OF MUSKEGO
STANDARD SPECIFICATIONS

SECTION 02500 - ROADWAY AND APPURTENANCES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Earthwork.
- B. Base course.
- C. Pavement and surface course.
- D. Incidental construction.
 - 1. Curb and gutter.
 - 2. Sidewalks
 - 3. Drive approaches.
 - 4. Pavement sawing.
 - 5. Pavement markings.
 - 6. Drainage facilities.
 - 7. Signs
 - 8. Traffic control.
 - 9. Guardrails
 - 10. Retaining walls.
 - 11. Restoration

1.02 SUBMITTALS

- A. Base compaction test reports required.
- B. Subbase compaction test reports required.
- C. Paving mix delivery tickets.
 - 1. Asphaltic materials:
 - a. Furnish ticket before placing material.
 - b. Display on ticket:
 - 1) Project.
 - 2) Date.
 - 3) Time.
 - 4) Ticket number.
 - 5) Type of mix.
 - 6) Gross weight.
 - 7) Tare weight.
 - 8) Net weight.
 - 9) Job total.
 - 2. Concrete.
 - a. Furnish tickets after delivery.
 - b. Display on ticket:
 - 1) Project.
 - 2) Date.
 - 3) Time.
 - 4) Ticket number.
 - 5) Class of concrete.
 - 6) Grade of concrete.

- 7) Cement Weight.
- 8) Fly Ash type and weight.
- 9) Fine aggregate weight.
- 10) Coarse aggregate weight.
- 11) Gallons of water.
- 12) Time water was added.
- 13) Additives.

D. Base course delivery tickets that display:

1. Project.
2. Date.
3. Ticket number.
4. Type of material.
5. Gross weight.
6. Tare weight.
7. Net weight.
8. Job total.

E. Base course sieve analysis from one certified laboratory 7 days before placing material.

F. Written concrete cylinder compression test results.

1.03 REFERENCES

A. State Specifications: Standard Specifications for Highway and Structure Construction, State of Wisconsin Department of Transportation, 2003 Edition.

B. Code: Muskego Municipal Code.

1.04 REGULATORY REQUIREMENTS

A. Pay for local county or state permits for Work on right-of-ways. Damage to pavements and to all property, public and private, due to this Work shall be repaired to same condition before construction by CONTRACTOR.

PART 2 - PRODUCTS

2.01 EMBANKMENTS

A. Follow State Specifications 207. Do not use logs, stumps, brush, perishable material, frozen material or humus-bearing materials. No large stones or lumps within 2 feet of the surface within a one-to-one slope distance of the edge of shoulder.

2.02 BASE COURSE

A. Base Course: State Specification 301,305.

1. Lower Base Course: 4 Inches of 1 ¼" Crushed Limestone T.B. Gradation No. 1
2. Upper Base Course: 4 Inches of ¾" Crushed Limestone T.B. Gradation No. 2
3. Alternate: Crushed Concrete: As approved by owner
 - a. Lower Base Course: 4 Inches of 1 ¼" Crushed Concrete
 - b. Upper Base Course: 4 Inches of ¾" Crushed Concrete

2.03 ASPHALTIC CONCRETE PAVEMENT

- A. Binder course: State Specification 450,455,460 and:
 - 1. Binder gradation E-3 19mm
 - 2. Maximum recycled material content: 25 percent
 - 3. Asphalt material: AC, PG 58-28
 - 4. Asphalt Mix Design: State Specification 460.2.7
- B. Surface course: State Specification 450,455,460 and:
 - 1. Surface gradation E-3 12.5 mm
 - 2. Maximum recycled material content: 20 percent
 - 3. Asphaltic material: AC, PG 58-28Asphalt Mix Design: State Specification 460.2.7
- C. Tack coat: State Specification 455.3.2. Asphaltic material dependent on weather conditions.

2.04 CONCRETE PAVEMENT

- A. Concrete: State Specifications 415,501, GRADE A-FA with:
 - 1. Slump:
 - a. Hand consolidated: 1 to 3 inch.
 - b. Vibratory consolidation: 1 to 2 1/2 inches.
 - 2. Compressive strength: 3500 pounds per square inch minimum.
 - 3. Admixtures:
 - a. Set retarder: State Specifications 501.2.3.2.
 - b. Water reducer: State Specifications 501.2.3.3.
 - c. Air entrainment: State Specifications 501.2.2.
 - 4. High Early Strength Concrete: State Specifications 501.
- B. Steel reinforcement: State Specifications 505 and:
 - 1. Deformed tie bars:
 - a. Grade: 40.
 - b. Length: 2 feet.
 - c. Epoxy coated.
 - d. Size: No. 4.
 - 2. Metal chairs: Stainless steel.
 - 3. Dowel bars: Smooth and:
 - a. Grade: 40.
 - b. Length: 2 feet.
 - c. Size: 6.
 - d. Epoxy coated.
 - 4. Joint sealant: Hot poured elastic.

2.05 INCIDENTAL CONSTRUCTION

- A. Concrete curb and gutter: GRADE A-FA. State Specifications 601. Do not add calcium chloride.
- B. Concrete sidewalks: GRADE A-FA. State Specifications 602. Do not add calcium chloride.
- C. Driveways.
 - 1. Concrete: State Specifications 501&416. Do not add calcium chloride.
 - 2. Asphaltic concrete: State Specifications 450,455,460, surface course if directed by CITY.
 - 3. High early strength concrete; if directed by CITY.

- D. Pavement marking: State Specifications 646, as directed by CITY and:
 - 1. Hot paint.
 - 2. Hot thermoplastic.
 - 3. Cold preformed plastic.
 - 4. Epoxy.
 - 5. Glass spheres.
 - 6. Temporary pavement marking:
 - a. Removable tape.
 - b. Reflectorized paint.
 - c. Reflectorized tape.
 - 7. Permanent raised markers:
 - a. One way white.
 - b. One way red.
 - c. Two way red-white.
 - d. Two way yellow.

- E. Drainage facilities:
 - 1. Culvert pipe. See 02600 for new installations.
 - 2. Replace existing pipe in kind as directed by CITY.

- F. Signs: State Specifications 637 Type I.
 - 1. Posts: State Specifications 633,634,635.
 - 2. See: details for end of roads.

G. Traffic Control: State Specifications 643.

H. Guard Rails: State Specifications 614.

I. Restoration. See 02900.

2.06 SOURCE QUALITY CONTROL

- A. Quality Management Program: State Specification 460.2.8
 - a. CONTRACTOR shall be responsible for all source quality control and QMP testing required in accordance with the QMP Guide/Procedure Manual. CONTRACTOR shall provide the following:
 - 1. Quality Control Plan
 - 2. Quality Control Documentation
 - 3. Quality Control Testing Prior to Placement
 - 4. Quality Control Testing during Placement.
 - 5. The Contractor shall be responsible for all nuclear density testing required for the road portion of the project. Testing shall conform State Specification 460.3.3
 - b. Cost for all testing shall be included in the per ton, per square yard or per lineal foot unit price.
- B. Concrete paving materials scale: State Specification 415.
- C. Base course materials scale: State Specifications 301,305.

PART 3 - EXECUTION

3.01 EARTHWORK

- A. Clearing and Grubbing: Follow State Specifications 201.

- B. Removing old culverts and bridges. Follow State Specifications 203.
- C. Removing miscellaneous structures. Follow State Specifications 204 for:
 - 1. Curb and gutter.
 - 2. Asphaltic concrete pavement.
 - 3. Sidewalk.
 - 4. Guardrail.
 - 5. Other structures. Remove manholes, inlets, wells to 3 feet below existing or finished grade, whichever is lower.
 - 6. Follow Municipal Code Chapter 30 for tanks and building.
- D. Roadway and drainage excavation. Follow State Specifications 205 for:
 - 1. Unclassified excavation.
 - 2. Rock excavation.
 - 3. Marsh excavation.
 - 4. Excavation below subgrade backfill with: crushed aggregate base course material.
 - 5. Overhaul: No allowance for overhaul.
- E. Embankment: Follow State Specifications 207.
 - 1. Maximum layer thickness: 8 inches.
 - 2. Compaction: Standard.
 - a. 95 percent of maximum density determined by Modified Proctor.
 - b. Allow CITY to inspect prepared subgrade and to witness proof roll test by fully loaded dump truck. Truck shall be a quad-axle with minimum total weight of 70,000 pounds. Reconstruct where deflection is greater than 1/2 inch.
- F. Preparation of roadway foundation: Follow State Specifications 211.

3.02 BASE COURSE

- A. Crushed aggregate base course: Follow State Specifications 301,305.
 - 1. Compaction: Standard.
 - a. 95 percent of maximum density determined by Modified Proctor.
 - b. Allow CITY to inspect prepared base course and to witness proof roll test by a fully loaded dump truck. Truck shall be a quad-axle with minimum total weight of 70,000 pounds. Reconstruct where deflection is greater than 1/2 inch. Reconstruct where deflection is greater than 1/2 inch.
 - 2. Allowable deviation from design grade: 1/2 inch
 - 3. Manholes: Set to finish course elevation.
 - 4. Valve Boxes & Inlets: Set to binder elevation.

3.03 PAVEMENT AND SURFACE COURSES

- A. Tack coat: Follow State Specification 455.3.2.
 - 1. Apply at 0.1 gallons per square yard.
 - 2. Apply between each layer of asphaltic concrete.
 - 3. Allow to cure before paving.
- B. Mill butt joints: Mill and dispose of 2 inches or as directed by CITY of existing pavement at locations shown. Minimum width 4 feet.
- C. Asphaltic concrete pavement: Follow State Specifications 450,455,460.
 - 1. Maximum variations:
 - a. 1/8 inch across a 5 foot straight edge.
 - b. Thickness: Within 1/4 inch of design.
 - c. Finish elevation: Within 1/2 inch of design.
 - 2. Temperatures:

- a. Delivered binder course: 225 degrees Fahrenheit minimum.
 - b. Delivered surface course: 250 degrees Fahrenheit minimum.
 - c. Asphaltic concrete at placement: Between 235 and 330 degrees Fahrenheit.
 - d. Subgrade: Above 32 degrees Fahrenheit.
3. Layer thickness:
- a. Binder: 4 inch - 2 lifts. with tack between each lift
 - b. Surface: 1 1/2 inch lift.
 - c. Resurface: as directed by CITY.
 - d. Maximum lift thickness: 2 1/2 inches.
4. Compaction: Follow State Specifications Section 450.3.2.6 Maximum Density Method.
5. Use 30 foot ski to achieve uniform surface.
6. When interim binder pavement is to be used, wedging around manholes and curb face shall follow. Interim Inlets shall be used. See standard details #7A, 7B, & 7C in appendix.

3.04. CONCRETE PAVEMENT

- A. Follow State Specification 415.
- B. Placement delays.
1. If less than 30 minutes: Cover unfinished end with wet burlap.
 2. If greater than 30 minutes: Install construction joint.
 3. If concrete attains initial set: Install construction joint.
 4. If finishing equipment breaks down: Discontinue placement.
 5. If finishing and curing operations can not be kept within their time sequence: Discontinue placement.
- C. Maximum delivery time:
1. Below 60 degrees Fahrenheit: 1-1/2 hours.
 2. Above 60 degrees Fahrenheit: 1 hour.
 3. Begins with addition of water to cement or cement to aggregates. Time ends when completely discharged.
 4. Extend time above 60 degrees Fahrenheit to 1-1/2 hours with approved retarder.
- D. Joints.
1. Saw cut joints to prevent surface shrinkage cracks within 24 hours.
 2. Spacing: 10 feet minimum and as shown on Drawings.
 3. Longitudinal: 3 feet on center placed at mid depth of slab.
 4. Transverse: 2 feet on center placed at mid depth of slab.
 5. Width: 1/4 inch.
- E. Curing: Apply impervious coating. Follow State Specification 415.3.12.
- F. Cold weather concreting.
1. Do not place below 35 degrees Fahrenheit.
 2. Do not place on frozen grade.
 3. Cover completed Work: Follow State Specifications 415.5.14.
- G. Testing:
1. Follow State Specifications 501.
 2. Perform slump test.
 3. Measure air entrainment: Follow State Specifications 501, AASHTO T152.
 3. Cast 6 inch diameter by 12 inch high compression strength cylinders at CONTRACTORS cost.
 4. Cast 3 test cylinders for every 100 cubic yards placed.
 5. Allow ENGINEER to observe field testing.
 6. Test cylinders in lab at CONTRACTORS cost:

- a. 1 at 7 days.
 - b. 2 at 28 days.
 - c. Follow State Specifications 501, AASHTO T22 and T23.
 - H. Opening to traffic: Permitted when design compressive strength achieved by lab test samples and with ENGINEER's approval.
- 3.05 INCIDENTAL CONSTRUCTION
- A. Concrete curb and gutter: Follow State Specification 601.
 - 1. Joints.
 - a. Construct expansion joints at:
 - 1) 3 feet from inlets or catch basins.
 - 2) End of curves.
 - 3) 150 feet maximum intervals.
 - b. Construct contraction joints at 10 feet spacing.
 - 1) Minimum spacing: 6 feet.
 - 2) Maximum spacing: 20 feet.
 - 3) Match abutting concrete joints.
 - 2. Handicap ramp. Follow State Specification 416 & 601. Provide at all corners of intersections.
 - 3. Curing:
 - a. Apply impervious coating within one hour of placement.
 - b. Coat all sides of curb including exposed surface after forms removed.
 - c. Apply two coats in perpendicular directions.
 - B. Sidewalks: Follow State Specifications 602.
 - 1. Joints.
 - a. Provide expansion joints abutting existing construction and structures with 1/2 inch expansion joint filler.
 - b. Provide contraction joints at spacing equal to width of walk and:
 - 1) Minimum 3 feet.
 - 2) Maximum 12 feet.
 - 2. Handicap ramps: Follow State Specifications 416 & 601.
 - 3. Curing:
 - a. Apply impervious coating within one hour of placement.
 - b. Coat all sides of curb including exposed surface after forms removed.
 - c. Apply two coats in perpendicular directions.
 - C. Drive approaches: Follow State Specifications 416.
 - 1. Joints.
 - a. Expansion Joints abutting curb or walk: Use 1/2 inch expansion joint filler.
 - b. Contraction Joints: Locate at midpoint of drive, perpendicular to curb.
 - 1) Minimum spacing 6 feet.
 - 2) Maximum spacing 12 feet.
 - 2. Curing.
 - a. Apply impervious coating within one hour of placement.
 - b. Coat all sides of curb including exposed surface after forms removed.
 - c. Apply two coats in perpendicular directions.
 - D. Pavement sawing. Follow State Specifications 690. Cut depth: full pavement thickness.
 - E. Pavement marking: Follow State Specifications 646.
 - 1. Pavement surface temperature:
 - a. Painted: Above 35 degrees Fahrenheit.
 - b. Hot thermoplastic: Above 60 degrees Fahrenheit.
 - c. Epoxy: Above 50 degrees Fahrenheit.
 - 2. Provide clean pavement to ensure proper bonding.

3. Provide temporary centerline marking at 50 foot interval between paving operations and application of final pavement marking.
 4. Temporary pavement marking: Follow State Specification 649 and Drawings.
- F. Drainage facilities:
1. Pipe culverts: Follow 02600.
- G. Signs: Follow State Specifications 637.
1. Relocating signs: Follow State Specifications 638.
- H. Traffic control: Follow State Specification 643.
1. Warning lights: Type A.
- I. Guardrail: Follow State Specification 614.

END OF SECTION

CITY OF MUSKEGO
STANDARD SPECIFICATIONS

SECTION 02600 – BURIED PIPELINES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Water mains, control and distribution appurtenances.
- B. Sanitary sewer mains, force mains and maintenance and collection appurtenances.
- C. Storm sewer mains maintenance and collection appurtenances.
- D. Bedding and backfill.
- E. Televising sanitary sewers.
- F. Casing pipe.

1.02 REFERENCES

- A. SWS: Standard Specifications for Sewer and Water Construction in Wisconsin, Sixth Edition.
- B. State Specifications: State Specifications: Standard Specifications for Highway and Structure Construction, State of Wisconsin Department of Transportation, 2003 Edition.
- C. Code: Muskego Municipal Code.

1.03 SUBMITTALS

- A. Provide to CITY Engineering and Utility Departments:
 - 1. Water main safe sample test reports.
 - 2. Sewer Mandrel test reports.
 - 3. Sewer Vacuum test reports.

PART 2 - PRODUCTS

2.01 WATER MAIN AND RESERVOIR OVERFLOW PIPING

- A. Pipe, 2-1/2 inch and larger. Provide one type from following:
 - 1. Ductile iron:
 - a. AWWA C-151, thickness Class 52 with cement lining.
 - b. Tyton gasketed joint pipe.
 - c. Cable bond connectors.
 - d. SWS 8.18.0.
 - e. Polyethylene Film wrap per SWS 8.21.0.
 - f. Detector wire required per 2.01(M).
 - g. Warning Tape per 2.01(L).
 - 2. PVC:

- a. For 4 through 12 inch diameter: AWWA C-900, Class 150 pressure pipe with DR 18 or less.
 - b. Integral elastomeric bell and spigot joints.
 - c. SWS 8.20.0.
 - d. Detector wire required per 2.01(M).
 - e. Warning Tape per 2.01(L).
3. PVC:
- a. For 14 through 36 inch diameter: AWWA C-905, Class 150 pressure pipe with DR 18 or less.
 - b. Integral elastomeric bell and spigot joints
 - c. SWS 8.20.0
 - d. Detector wire required per 2.01(M).
 - e. Warning Tape per 2.01(L).
- B. Butterfly valves:
- 1. AWWA C-504 including:
 - a. Mechanical joint ends.
 - b. Turn counterclockwise to open.
 - c. 2 inch square operating nut.
 - d. All stainless steel hardware.
 - e. Epoxy Coated interior and exterior surfaces per AWWA C-550
 - 2. Clow M&H 450.
 - 3. Pratt Groundhog HP250.
 - 4. Mueller Lineseal XP
 - 5. K-Flo Wolverine 506
 - 6. Val-Matic Series 2000
 - 7. SWS 8.28.0.
- C. Resilient seat gate valves (use with tapping tees only):
- 1. AWWA C-515 including:
 - a. Nonrising stem.
 - b. Mechanical joint.
 - c. Actuator: wrench nut.
 - d. Opens counterclockwise.
 - e. Stem seals: O-ring.
 - f. Epoxy interior and exterior coating per ANSI/AWWA C550.
 - g. 250 p.s.i.g operating rating
 - h. SWS 8.27.0.
 - i. All stainless steel hardware.
 - 2. Clow M&H Valve Company 4067-01.
 - 3. American Flow Control Series 2500.
 - 4. Kennedy 4571.
 - 5. Clow F-6100.
- D. Valve enclosures:
- 1. Boxes:
 - a. Cast iron assembly, size DD, cover marked "water".
 - b. Manufacturers:
 - i. Tyler 6860S
 - ii. Sigma VB630DD,
 - iii. Star VB DHD DW.
 - c. SWS 8.29.0.
 - d. Valve box adaptors: Adaptors, Inc.
 - 2. Manholes:
 - a. Precast.
 - b. Frame: Per SWS File No. 40 or 40A.
 - c. 60 inch diameter (minimum).

- E. Valve stem extenders (for valves greater than 10' bury depth):
 1. Securely attached to valve operating nut.
 2. Extend to 4 feet (plus or minus 3 inches) below finished grade.
 3. Provide solid shaft.
 4. Stainless steel.
 5. Epoxy coated iron with stainless steel pins or bolt.
 6. Spacer ring at 3 inch below operating nut.
 7. Set screws: Conical pointed, 2 minimum.
 8. One piece unit construction

- F. Hydrant assembly:
 1. AWWA C-502 and SWS 8.26.0:
 - a. Bury depth: 6 foot minimum.
 - b. Opens counterclockwise.
 - c. Break-flange.
 - d. 5-1/4 inch minimum main valve opening, 2 each National Standard 2-1/2 inch hose nozzle and one 4-1/2 inch pumper nozzle.
 - e. Painted red.
 - f. Mechanical joint connection.
 - g. Barrel extensions: Same manufacturer as hydrants.
 - h. Installation per 3.01(D).
 2. Clow Medalion
 3. American Flow Control. Waterous Pacer WB-67-250
 4. Kennedy Guardian K-81.
 5. Hydrant lead:
 - a. Ductile iron Class 52.
 - b. PVC AWWA C-900 Class 150 SDR 18 or less.
 6. Marker Flag:
 - a. "HYDRAFINDER".
 - b. 5 feet long.
 - c. Fiberglass, red and white.
 - d. Springload action.

- G. Fittings: SWS 8.22.0.
 1. Joints:
 - a. Buried: Mechanical.
 - b. In structures: Flanged.
 2. Pressure rating:
 - a. Full body: 250 PSI.
 - b. Compact: 350 PSI.
 3. Material:
 - a. Ductile iron:
 - 1) Class 52 wall thickness.
 - 2) Bituminous exterior coating per ANSI/AWWA C110/A21.10.
 - 3) Cement lined and bituminous coated interior per ANSI/AWWA C104/A21.4.
 - 4) Cor-Blue tee bolts.

- H. Service lines, valves and fittings.
 1. Lines, 2 inch and smaller (1-1/4 inch minimum):
 - a. Type K copper tubing. Do not use compression fittings.
 2. Corporation valves for copper:
 - a. Flared fitting. Must withstand 150 PSI pressure test.
 - b. Mueller B-25000
 - c. Ford F-5600
 - d. A.Y. McDonald 4701.
 3. Curb valves for copper:
 - a. Must withstand 150 PSI pressure test.
 - b. Mueller B-25154
 - c. Ford B22-M

- d. A.Y. McDonald 6104
 - 4. Curb boxes:
 - a. Screw-on style.
 - b. Mueller H-10300
 - c. Ford EM 2-65-56
 - d. A.Y. McDonald 5614.
 - 5. Teflon tape on threaded joints.
 - 6. Valve stem extenders
 - a. Securely attached to valve operating nut.
 - b. Extend to 2 feet (plus or minus 3 inches) below finished grade.
 - c. Provide solid shaft.
 - d. Stainless steel.
 - e. Epoxy coated iron with stainless steel pins or bolt.

 - I. PVC main tapping saddle for service lines 2-inch and smaller:
 - 1. Wide Band Single Piece Body.
 - 2. Stainless steel
 - 3. Cascade CS-22
 - 4. Cascade CSC-2
 - 5. Mueller SS Series.

 - J. Tapping sleeves with gate valve 16 inch and under:
 - 1. Stainless steel with ductile iron flange.
 - 2. Cascade CST-SL
 - 3. Romac 306
 - 4. Smith Blair 662

 - K. Air release assemblies:
 - 1. In valve box: SWS 4.12.0
 - 2. In vault: SWS 4.11.0., except provide HS20 load-rated flat top slab.

 - L. Warning tape:
 - 1. "TERRA TAPE STANDARD 250" by Reef Industries, Inc. or "Shieldtec: by Empire Level Manufacturing Corporation.
 - 2. Tape shall read: "CAUTION - WATER LINE BURIED BELOW".
 - 3. Color: Blue.
 - 4. Width: 3 inches.

 - M. Detector wire:
 - 1. Direct burial rated insulated AWS #12 copper conductor.
 - 2. Splices: Plymouth Plyflex low voltage splice kit. Graybar catalog number 2635.
 - 3. Color: Blue.

 - N. Buttress concrete: Class F SWS 8.35.3. Use one of the following:
 - 1. Ready-mixed.
 - 2. Job site mixed above grade.

 - O. Restrained joints:
 - 1. Strapping following SWS 4.9.0.
 - 2. EBAA Iron Megalug.
 - 3. Star Pipe Products Allgrip 3600.

 - P. Location boxes:
 - 1. Top section valve box, size DD, 26-inch length.
 - 2. Cover marked "water".
 - 3. Hardwood blocking.
 - 4. Per Detail Drawing #4C.
- 2.02 GRAVITY SANITARY SEWER

- A. Pipe. Use one type from following:
 - 1. Polyvinyl chloride and fittings solid wall:
 - a. 4 inch through 15 inch and bury depth 16' or less: Type PSM, ASTM D-3034, SDR 35.
 - b. 4 inch through 15 inch and bury depth 16' thru 22': Type PSM, ASTM D-3034, SDR 18.
 - c. SWS 8.3.0 and 8.10.0.
 - 2. Reinforced concrete:
 - a. 18 inch and larger or bury depth 22' or greater: Circular Pipe, ASTM C-76, wall thickness C, Class as per drawings.
 - b. Joints: Type R-4 Air Test Gasket, ASTM C-361.
 - c. SWS 8.3.0 and 8.6.0.

- B. Pressure-rated pipe. Use one type from following:
 - 1. Polyvinyl chloride pipe:
 - a. 4 inch through 12 inch AWWA C900 SDR18 or less.
 - b. 14 inch and 16 inch AWWA C905 SDR18 or less.
 - 2. 18 inch and larger: Concrete.
 - 3. Fittings for PVC pipe shall follow SWS 8.22 and:
 - a. Joints:
 - 1) Buried:
 - a. Mechanical.
 - b. Push-on.
 - 2) In structures: Flanged.
 - b. Pressure rating:
 - 1) Full body: 250 PSI.
 - 2) Compact: 350 PSI.
 - c. Material ductile iron:
 - 1) Class 52 wall thickness.
 - 2) Bituminous exterior coating per ANSI/AWWA C110/A21.10.
 - 3) Cement lined and bituminous coated interior per ANSI/AWWA C104/A21.4.
 - 4) Cor-Blue tee bolts.
 - d. Material PVC Pressure Fittings:
 - 1) AWWA C907 for water.
 - 2) PVC cell classification 12454-B per ASTM D1784 with minimum design basis 4,000 psi.
 - 3) Pressure class must match pipe.
 - 4) Third party certified to CSA B1373.
 - 5) Conform to AWWA C900/C905.
 - 6) SDR18 or less.
 - 7) Blue Brute.

- C. Bulkhead and Plug: SWS 3.2.25.

- D. Structures:
 - 1. Manholes: SWS 3.5.0. and 8.39.0.
 - 2. Frame: SWS File No. 14A approximate weight 385 pounds.
 - a. Neenah R-1661-B (non-modernized).
 - b. East Jordan 1641.
 - 3. Cover: Self sealing, concealed pick hole, no vents. SWS File No. 14B, approximate weight 108 pounds.
 - a. Bolt-down covers required outside of pavement areas.
 - 4. Internal rubber sleeves for frame/chimney seal:
 - a. Cretex Specialty Products.
 - b. NPC FlexRib Seal
 - 5. Pipe to manhole connection: Follow SWS 3.5.7.
 - a. NPC Kor-N-Seal High Pressure Series
 - 6. Frame and chimney sealants: SWS 8.42.0.

7. Flat decks - HS20 loading.
 8. External joint wrap manholes.
 - a. Follow SWS 3.2.12.
 - b. MacWrap External Joint Sealer
 - c. Esky Wrap
 - d. Caddilloc Inc.
 9. Anchored manhole frame and cover: SWS File No. 32.
- E. Risers:
1. SWS 3.2.26.
 2. Flexible riser to flexible main greater than 6 feet, or main greater than 16 feet deep, see Standard Details #5B & #5C.
- F. Laterals:
1. SWS 5.3.10 and 5.3.11 and same material as main.
 2. 6 inch.
 3. Test tee with plugs.
 4. Connection to main: Wyes.
 5. Adapt pressure rated pipe to SDR35 with manufactured (molded) fittings.
- G. Warning tape:
1. "TERRA TAPE STANDARD 250" by Reef Industries, Inc. or "Shieldtec" by Empire Level Manufacturing Corporation.
 2. Tape shall read: "CAUTION - BURIED SANITARY SEWER".
 3. Color: Orange.
 4. Width: 3 inches.

2.03 SANITARY SEWER FORCE MAIN

- A. Pipe. Use one type from following:
1. PVC Class 150, AWWA C-900, SDR 18 or less with integral bell and spigot joints with an elastomeric seal.
 2. Ductile iron:
 - a. SWS 8.18.0.
 - b. AWWA thickness Class.
 - c. Bell and spigot push-on joint SWS 8.18.2.
 - d. Exterior/lining: Ceramic epoxy
 1. Nominal Thickness: 40 mils.
 2. All cut ends and bell fittings protected with factory supplied field applied touch-up coating.
 3. Protecto 401.
 - e. Polyethylene film wrap: SWS 8.21.0.
 3. Polyethylene:
 - a. Material designation: PPI PE3408.
 - b. Material classification: Type III, Class C, Category 5, Grade P34.
 - c. Cell classification: 345434C per ASTM D3350.
 - d. Pressure class: As shown on Drawings.
- B. Fittings for ductile iron and PVC pipe:
1. Joints:
 - a. Buried: Mechanical.
 - b. In structures: Flanged.
 2. Pressure Rating:
 - a. Full body: 250 PSI.
 - b. Compact: 350 PSI.
 3. Material:
 - a. Ductile iron:
 - 1) Class 52 wall thickness.
 - 2) Bituminous exterior coating per ANSI/AWWA C110/A21.10.

- 3) Interior lining: Ceramic epoxy
 - a. Nominal Thickness: 40 mils.
 - b. All cut ends and bell fittings protected with factory supplied field applied touch-up coating.
 - c. Protecto 401.
 - 4) Buried: Cor-Blue tee bolts. Exposed: Stainless steel.
- C. Restrained joints:
 - 1. Strapping following SWS 4.9.0.
 - 2. EBAA Iron Megalug
 - 3. Star Pipe Products Allgrip 3600.
- D. Fittings for polyethylene pipe:
 - 1. ASTM D3261.
 - 2. Pressure class:
 - a. Molded fittings: Match pipe.
 - b. Fabricated fittings: Increase pressure rating one class.
 - 3. Butt fused or flanged.
 - 4. Exposed: Molded flange adaptor with ductile iron or stainless steel backup ring and stainless steel bolts.
 - 5. Buried: Molded mechanical restrained joint adaptor with stainless steel internal stiffener and ductile iron or stainless steel backup ring with Cor-Ten hardware.
- E. Plug valves.
 - 1. Manufacturers: (Valves 8" and less)
 - a. DeZurik Series 100.
 - b. Val-Matic Cam-Centric.
 Manufacturers: (Valves greater than 8")
 - a. DeZurik Series 100 or other OWNER approved series.
 - b. No equal or substitutions permitted.
 - 2. Valve boxes:
 - a. Cast iron, size DD, cover marked "sewer".
 - b. Manufacturers:
 - 1. Tyler 6860S
 - 2. Sigma VB630DD
 - 3. Star VB DHD DW.
 - c. SWS 8.29.0.
 - d. Valve box adaptors: Adaptors, Inc.
 - 3. Actuator: Rotary gear type for valves 8 inches and larger.
 - 4. Valve stem extenders:
 - a. Securely attached to valve operating nut.
 - b. Extend to 2 feet (plus or minus 3 inches) below finished grade.
 - c. Provide solid shaft.
 - d. Stainless steel.
 - e. Epoxy coated iron with stainless steel pins or bolts.
 - f. Spacer ring at 3 inch below operating nut.
 - e. Set screws: Conical pointed, 2 minimum
 - f. One Piece unit construction
- F. Structures:
 - 1. Valve manholes: SWS 3.5.0 and 8.39.0.
 - 2. Frame: SWS File No. 14A. Approximate weight 385 pounds.
 - a. Neenah 1660 (non-modernized).
 - b. East Jordan 1641.
 - 3. Cover: Self sealing, concealed pick hole, no vents. SWS File No. 14B, approximate weight 108 pounds. Bolt down as required by City.
 - 6. Internal rubber sleeves for frame/chimney seal:
 - a. Cretex Specialty Products.
 - b. NPC FlexRib Seal
 - 5. Pipe to manhole connection: Follow SWS 3.5.7.

6. Frame and chimney sealants: SWS 8.42.0.
7. Flat decks - HS20 loading.
8. Frame adjusting rings: Schneider Fuel & Supply.
9. External joint wrap:
 - a. Follow SWS 3.2.12.
 - b. Mac Wrap external joint sealers.
 - c. Esky Wrap
 - d. Caddilloc Inc
10. Anchored manhole frame and cover: SWS File No. 32.

G. Air release assemblies:

1. In valve box: SWS 4.12.0 except include:
 - a. Valve stem extenders.
 - b. Lid: marked "sewer".
 - c. Drain stop: Female iron pipe inlet and flared copper outlet. Ford B21-333.
 - d. Drain stop: A.Y. McDonald 6105 with A.Y. McDonald 4753 copper flare by male iron pipe thread.
2. In vault: SWS 4.11.0, except provide HS20 load-rated flat top slab.

H. Warning tape:

1. "TERRA TAPE STANDARD 250" by Reef Industries, Inc..
2. Tape shall read: "CAUTION - BURIED PRESSURE SEWAGE FORCE MAIN".
3. Color: Orange.
4. Width: 3 inches.

I. Detector wire:

1. Direct burial rated insulated AWG #12 copper conductor.
2. Splices: Plymouth Plyflex low voltage splice kit. Graybar catalog number 2635.
4. Use different color insulation for each pipeline.
 - a. Color: Orange

J. Location boxes:

1. Top section valve box, size DD, 26-inch length.
2. Cover marked "sewer".
3. Hardwood blocking.
4. Per Standard Detail #5A.

2.04 SANITARY PRESSURE SEWER

A. Pipe. Use one type from following:

1. Polyethylene:
 - a. Class 160.
 - b. ASTM Ds2239.
 - c. SDR 11 HDPE.
2. PVC:
 - a. SDR 18
 - b. SCHED 40.D.W.V.

B. Fittings for polyethylene pipe:

1. ASTM D3261.
 - a. Molded fittings: Match pipe.
 - b. Fabricated fittings: Increase pressure rating one class.
2. Pressure class:
3. Butt fused or flanged
4. Exposed: Molded flange adaptor with ductile iron or stainless steel backup ring.
5. Buried: Molded mechanical restrained joint adaptor with stainless steel internal stiffener and ductile iron or stainless steel backup ring with Cor-Ten hardware.
6. Threaded transition fittings.
 - a. Stainless steel HDPE.
 - b. Brass to HDPE.

- c. HDPE same as sanitary pressure sewer material.
 - d. ASTM 2513D.
 - C. Material PVC Pressure Fittings:
 - 1. AWWA C907 for water.
 - 2. PVC cell classification 12454-B per ASTM D1784 with minimum design basis 4,000 psi.
 - 3. Pressure class must match pipe.
 - 4. Third party certified to CSA B1373.
 - 5. Conform to AWWA C900/C905.
 - 6. SDR18 or less.
 - 7. Blue Brute.
 - D. Sanitary pressure laterals:
 - 1. Pipe material same as pressure sewer.
 - 2. Curb valves.
 - a. Must withstand 150 psi pressure test.
 - b. Mueller H-10287.
 - c. Ford B11-M.
 - d. A.Y. McDonald 6105.
 - 3. Curb boxes.
 - a. Screw on style.
 - b. Plain lid or "sewer".
 - b. Mueller H-10300-99002.
 - c. Ford EM 2-65-57R.
 - d. A.Y. McDonald 5615.
 - 4. Teflon tape on threaded joints.
 - 5. Valve stem extension (also known as stationary rod or shut off rod).
 - E. Air release assemblies:
 - 1. Valve Box: SWS 4.12.0.
 - a. Valve stem extenders.
 - b. Plain lid or "sewer".
 - 2. Drain stop.
 - a. F.I.P. inlet.
 - b. Flared copper outlet.
 - c. Ford B21-333.
 - d. A.Y. McDonald 6105 with A.Y. McDonald 4753 copper flare by M.I.P. thread.
 - F. Warning tape:
 - 1. "TERRA TAPE STANDARD 250" by Reef Industries, Inc. or "Shieldtec" by Empire Level Manufacturing Corporation.
 - 2. Tape shall read : "CAUTION-BURIED PRESSURE SEWAGE FORCE MAIN."
 - 3. Color: Orange.
 - 4. Width: 3 inches.
 - G. Detector wire:
 - 1. Direct burial rated insulated AWS #12 copper conductor.
 - 2. Splices: Plymouth Plyflex low voltage splice kit. Graybar catalog number 2635.
 - 3. Use different color insulation for each pipeline.
 - a. Color: Orange
 - H. Location boxes:
 - 1. Top section valve box, size DD, 26-inch length.
 - 2. Cover marked "sewer".
 - 3. Hardwood blocking.
 - 4. Per Standard Detail #5A.
- 2.05 STORM SEWER

- A. Main lines:
 - 1. Reinforced concrete pipe (RCP): ASTM C-76 and SWS 8.6.0 with Mastic or rubber-gasket ASTM C-443 joints.
 - 2. Nonreinforced concrete pipe: SWS 8.5.0.
 - 3. Reinforced concrete horizontal elliptical pipe: ASTM C-507 and SWS 8.6.0.
 - 4. Provide Internal Safety Cage at all outlet pipes 15 inch or greater.

- B. Sump lines and sump line cleanouts:
 - 1. SWS 8.10.0.
 - 2. PVC SDR 35.
 - 3. Cleanout frost sleeves: Neenah R1977.
 - 4. See Standard Details #6A, #6B, #6C.
 - 5. Follow 2.03.I. for detector wire.

- C. Structures:
 - 1. Manholes: SWS 3.5.0 and 8.39.0.
 - 2. Inlet frame and cover: Neenah R-3501R with Type C grate.
 - 3. Inlet: SWS 3.6.0 for precast.
 - 4. Manhole frame and cover: Neenah R-2471D open grate, approximate weight 500 pounds.
 - 5. Concrete block: State Specifications 519.2.2 (salt resistant pink block.).
 - 6. Inlet and catch basin mortar: State Specifications 519.2.3.
 - 7. Flat Decks: HS20 Design Loading.

- D. Rural section culverts when approved by the CITY.
 - 1. Road crossing culverts: minimum 18 inch diameter.
 - 2. Driveway culverts: minimum 15 inch diameter.
 - 3. Arch pipe equivalent may be used.
 - 4. Gauge: Follow DOT minimums per size.
 - 5. Materials:
 - a. Reinforced Concrete: State Specification 522.2
 - b. Reinforced Concrete Horizontal Elliptical: State Specification 523.2.

- E. Apron endwalls: State Specifications Sections 520 through 525 for apron endwalls and same material as pipe.
- F. Pipe grates: SWS 8.16.0. Lead paint shall not be used.

- G. Storm Drain Markers:
 - 1. Markers manufactured by Almetek Industries, Inc.-Available from City of Muskego.
 - 2. Markers installed adjacent to all storm inlets at time of final curb pour.
 - 3. Shall be installed using supplied hardware into wet concrete on upslope of curb head flush with surface.

2.06 BEDDING AND COVER MATERIALS

- A. Limestone chips: SWS 6.43.2.
- B. Around and over Underground Facilities: Follow respective owner's requirements.
- C. Polyethylene pipe embedment: Sand. SWS 6.43.2.
- D. Cover: Same material as bedding.
- E. Crushed stone screenings, follow SWS 8.43.2(b), water main, storm sewer or force main, and allowed with CITY approval for sanitary sewer.

2.07 BACKFILL

- A. Spoil: SWS 8.43.5.
- B. Aggregate slurry: SWS 8.43.8.
- C. Crushed road gravel: 3/4 inch crushed road gravel state gradation No. 2
- D. Crushed stone screenings in accordance SWS 843.2.(b).

2.08 CASING PIPE

- A. Material: ASTM A-53 steel, Grade B, 35000 PSI minimum yield strength.
- B. Dimensions:
 - 1. Follow SWS drawing file no. 49.
 - 2. Follow Permit requirements.
- C. Cellular concrete fill: SWS 8.35.5.

2.09 SURFACE RESTORATION

- A. Pavement: See 02500.
- B. Lawn: See 02900.
- C. Curb and gutter: See 02500.
- D. Concrete sidewalk: See 02500.

2.10 INSULATION

- A. SWS 8.50.0.

PART 3 - EXECUTION

3.01 WATER MAIN INSTALLATION

- A. Follow SWS Part IV.
- B. Ductile iron:
 - 1. Provide electric continuity using strapping or metallic retainer glands.
 - 2. Wrap ductile iron pipe and fittings with polyethylene film.
 - 3. Provide detector wire.
 - a. Color: Blue
 - 4. Provide strapping on all mechanical joints on water mains 16" and larger.
- C. PVC pipe:
 - 1. Remove beveled pipe end at connections to mechanical joint or flanged fittings.
 - 2. Use tapping saddles for services for service lines 2 inch and smaller.
 - 3. Provide detector wire.
 - a. Color: Blue
 - 4. Provide strapping for all mechanical joints on water mains 16" and larger.
- D. Hydrants:
 - 1. Secure hydrant valves directly to main lines with one of following:
 - a. Mechanical joint anchoring type hydrant tees.
 - b. Strapping.
 - c. EBAA Iron Megalug or Star Pipe Products Allgrip devices.
 - 2. Provide minimum 6 foot cover over lead.

3. Position centerline of lowest hydrant outlet nozzle 20 inches (plus or minus 2) above finish grade.
4. Use six foot original height assembly with adjustment sections to appropriate height above grade.
5. Provide detector wire same as mainline pipe detector wire color.
6. Provide concrete buttresses at each hydrant unless strapped per SWS 4.9.0

E. Buttresses: Follow SWS 4.3.13.

F. Services.

1. Wet tap service connections at normal operating system pressure.
2. Lateral locations on Drawings are tentative. Actual locations shall be marked by property owners with wooden stakes.
3. For 2 inch and smaller follow SWS Part V and:
 - a. Provide curb stop and box at right-of-way line.
 - b. Provide 2 by 6 inch hardwood marker at curb box location from invert of service to 2 feet above finished grade.
 - c. Provide tail piece. Follow SWS File No. 51 drawing.
4. For 2-1/2 inch and larger follow SWS Part IV and V and:
 - a. Provide tee connection.
 - b. Anchor valve to tee with anchor tee or strapping.
 - c. Provide plug and buttress.
 - d. Provide 2 by 6 inch hardwood marker at end of service from invert of service to 2 feet above finished grade.

G. Pressure test main line before and after services 2-inch and smaller are installed. Follow SWS 4.15.0.

H. Disinfect pipelines: SWS 4.16.0.

I. Bacteriological testing shall be done after successful pressure test by: CONTRACTOR with Wisconsin DNR-certified independent laboratory.

J. Water wasted from pipeline that may reach bodies of surface water may not contain any substances in concentrations that adversely affect the water as determined by the Wisconsin Administrative Code NR 105 and 106. For chlorine, no total residual chlorine may be measured in water being discharged to a surface water. Advise UTILITY of proposed discharge schedule to arrange DNR-required measurements.

K. Connections to existing mains and services: Make after all services are installed, tests passed, and safe sample report is submitted and approved by UTILITY.

3.02 GRAVITY SANITARY SEWER INSTALLATION

A. Before starting, install and brace bulkhead and/or plug in the connection to existing sewer. Leave in place until new sewer has been cleaned and accepted. After first span of sewer is installed, install a second plug in the discharge pipe of the first upstream manhole. Anchor installed plugs. Verify condition of plugs with on-site review technician daily and prior to precipitation events.

B. Follow SWS Part III.

C. Set manhole frames to finish grade after placement of curb and gutter and before asphalt placement.

D. Laterals. Follow SWS Part V and:

1. 1/4 inch per foot maximum slope.
2. Provide 2 by 6 inch hardwood marker at end of lateral from invert of lateral to 2 feet above finish grade.

3. Lateral locations on Drawings are tentative. Actual locations shall be marked by property owners with wooden stakes.
 4. Provide test tee at end of lateral or right-of-way line, whichever is further.
- E. Air test: SWS 3.7.3.
- F. Go-No-Go Test: SWS 3.2.6(i)4.
- G. Manhole chimney seals.
1. Prepare chimney, cone, mortar, and frame following seal manufacturer's requirements.
 2. Install seals with AASHTO M-198-type B butyl rubber caulk.
 3. Test seals in CITY's presence following SWS 3.5.4(f)1.a.
 4. Install seals with an approved hydraulic installation tool to ensure positive seal.
- H. Manhole vacuum test.
1. Follow SWS 3.7.6. and MMSD rules, Chapter 2.
 2. Test after backfilling.
- I. Manhole correction period tests: Water test all seals. Follow SWS 3.5.4(f)1.a.
- J. Televising and videotaping of mains. Shall be videotaped by the Muskego Sewer UTILITY after:
1. Manhole benches installed.
 2. After binder course placement and prior to surface course placement.
 3. Pipework successfully tested.
 4. Lines are thoroughly cleaned.
 5. Contact UTILITY Department at 262-679-4128 after completion of 1-4 to schedule.
 6. Prior to acceptance for use.
- 3.03 SANITARY SEWER FORCE MAIN INSTALLATION
- A. Follow SWS Part IV (Delete 4.3.12.).
- B. Pressure test. Follow SWS 4.15.2 except test at pipe pressure rating or 150 PSI whichever is less.
- C. Polyethylene:
1. Butt-fuse joints following ASTM D2657 and manufacturer's recommendations.
 2. Connect to flanged pipe with molded flange adaptor with ductile iron backup ring.
 3. Install following ASTM D2321, SWS, and manufacturer's recommendations.
 4. Provide embedment material from 6 inches below pipe to 12 inches above top of pipe and compact to 85 percent Standard Proctor density (AASHTO T-99).
- 3.04 SANITARY SEWER PRESSURE MAIN INSTALLATION
- A. Follow SWS Part IV (Delete 4.3.12.)
- B. Pressure test. Follow SWS 4.15.2 except test at pipe pressure rating or 150 PSI whichever is less.
- C. Polyethylene:
1. Butt-fuse joints following ASTM D2657 and manufacturer's recommendations.
 2. Connect to flanged pipe with molded flange adaptor with ductile iron backup ring.
 3. Install following ASTM D2321, SWS, and manufacturer's recommendations.
 4. Provide embedment material from 6 inches below pipe to 12 inches above top of pipe and compact to 85 percent Standard Proctor density (AASHTO T-99).
- 3.05 STORM SEWER INSTALLATION

- A. Follow SWS Part III.
 - B. Set manhole frames to finish grade after placement of curb and gutter and before asphalt placement or final grading if in terrace area.
 - C. Set inlet frames to interim grade per City standard detail #7A.
 - D. Catch basin or inlet frames may not be corbelled to meet curb and gutter. Catch basin or inlet structures shall be replaced if the offset is greater than 1 inch.
 - E. Sump lines.
 - 1. Pitch to inlet or manhole.
 - 2. Bed and cover PVC following SWS 3.2.6.i.
 - 3. Provide detector wire.
 - a. Color: Yellow
 - F. End grates to be placed on all outlets 15 inches and greater.
 - G. All apron endwall inlets shall have trash racks.
- 3.06 RURAL SECTION – CULVERTS: If Permitted By City.
- A. Follow State Specifications: 520.3, except 520.3.1
 - B. Driveways:
 - 1. Private entrance and temporary culverts. Provide minimum 6 inches of 3/8 inch crushed stone chips below pipe.
 - 2. Provide concrete headwalls.
 - C. Road crossing culverts:
 - 1. Provide minimum 6 inches of 3/4 inch crushed stone chips below pipe.
- 3.07 LOCATION AIDS
- A. Warning tape: Place 18 inches below finished grade for:
 - 1. All force mains.
 - 2. All water mains.
 - 3. All sump lines.
 - 4. All sanitary pressure sewers.
 - B. Detector wire:
 - 1. Attach with tape to:
 - a. All force mains.
 - i. Color: Green
 - b. All water mains.
 - i. Color: Blue
 - d. All sump lines.
 - i. Color: Yellow
 - All sanitary pressure sewers.
 - i. Color: Green
 - 2. Do not splice between location boxes without CITY's approval.
 - C. Install location boxes at:
 - 1. 1000 feet maximum intervals.
 - 2. At every hydrant.
 - 3. For sump lines install detector wire in each frost sleeve.
 - D. City requires detector wire to be tested and traceable over all proposed utilities with no traceable breaks along the utility alignment. City presence is required during all tests. Standard industry equipment is required for testing. If traceable test fails, Contractor shall fix the issue and notify the City when ready to retest.

3.08 CASING PIPE

- A. Follow SWS drawing file no. 49.
- B. Fill annular space in casing pipe with cellular concrete.
- C. Provide bulkheads at each end of casing pipe.
- D. For sewer pipe follow SWS 2.4.0.
- E. For water pipe follow SWS 4.13.2.
- F. Required for all stream crossings.

3.09 EXCAVATED MATERIAL

- A. Excavated Material: Deliver surplus excavated material to CITY designated locations within 4 radial miles from Work. If CITY designates in writing that disposal be made more than 4 radial miles from the Work, CONTRACTOR will be paid for that portion of the haul exceeding 4 radial miles by Change Order. Surplus excavated material for which CITY does not designate a disposal site shall be disposed at CONTRACTOR's cost. After delivery to the designated location, such material shall be graded level by CONTRACTOR.

3.10 CLEANUP

- A. Clean dirt and construction material from haul roads:
 - 1. At end of each working day.
 - 2. As needed during the day to avoid creating hazards or complaints.
 - 3. As requested by CITY.
 - 4. In accordance with Municipal Code Chapter 29.

3.11 INSULATION

- A. Follow SWS 4.17.2 when depth of cover is less than 5 feet over sanitary sewer, water main and force main.
- B. Follow SWS 4.17.2. when depth of cover is less than 4 feet over sump lines.

3.12 BEDDING AND COVER

- A. Follow SWS 3.2.6(b) Class B.

3.13 TRENCH BACKFILLING AND CONSOLIDATION

- A. Material:
 - 1. New or proposed roadway: From 5 feet behind back of curb or edge of pavement in paved areas and driveways:
 - a. Aggregate slurry.
 - b. Crushed stone screenings.
 - c. Top 12 inches 1-1/2 inch T.B. crushed limestone.
 - 2. In existing roadways:
 - a. Aggregate slurry.
 - 3. Other areas: Spoil.
 - 4. Around and over Underground Facilities: Follow respective owner's requirements.
- B. Consolidation:

1. Mechanically compact trench backfill. Follow SWS 2.6.14(b), except CONTRACTOR shall pay for compaction testing.

3.14 SURFACE RESTORATION

- A. Pavement: See 02500.
- B. Lawn: See 02900.
- C. Curb and gutter: See 02500.
- D. Concrete sidewalk: See 02500.

3.15 CLEARING AND GRUBBING

- A. Follow SWS 2.2.15. Prune damaged trees and apply approved tree dressing to cut.

END OF SECTION

CITY OF MUSKEGO
STANDARD SPECIFICATIONS

SECTION 02900 - LANDSCAPING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Topsoil.
- B. Seeding.
- C. Sod.
- D. Fertilizing.
- E. Maintenance.
- F. Restoration of utility company trenches.

1.02 REFERENCES

- A. State Specifications: Standard Specifications for Highway and Structure Construction, State of Wisconsin Department of Transportation, 2003 Edition.
- B. ASNS: American Standard for Nursery Stock, ANSI; Z60.1 by the American Association of Nurserymen.

1.03 SUBMITTALS

- A. Seed bag certification tags showing grass species, mix composition, and weed content.
- B. Instructions for continuing CITY maintenance.
 - 1. Seeded lawn.
 - 2. Sodded lawn.

1.04 DEFINITIONS

- A. Weeds: Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy, Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

PART 2 - PRODUCTS

2.01 WATER

- A. State Specifications 632.2.5.

2.02 TOPSOIL

- A. State Specifications 625.2.

- B. Screened: Mechanically screened free of weeds, sticks, branches and stones greater than 1/2 inch diameter.

2.03 SEEDING MATERIALS

- A. Permanent seed:
 - 1. State Specifications 630.2.1. seed mix No. 40. Use Blue Tag certified seed. Each seed lot will be subject to sampling and testing by the State Seed and Testing Laboratory.
 - 2. State specifications 630.2.1. seed mix No. 5 only at the direction of the CITY.
- B. Temporary seed: State Specifications 630.2.1.5.1.2.
- C. Fertilizer: State Specifications 629.2.1 Type B.
- D. Erosion control mats.

2.04 SODDING MATERIALS

- A. Sod: State Specifications 631.2.1.
- B. Fertilizer: State Specifications 629.2.1 Type B.
- C. Netting or fabric for sod reinforcement: State Specifications 631.3.3.
- D. Anchorage stakes: State Specifications 631.3.3.

PART 3 - EXECUTION

3.01 TOPSOIL

- A. Preparation:
 - 1. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones in excess of 1/2 inch in size.
 - 2. Scarify subgrade to 3 inches depth where topsoil is scheduled and where equipment used for hauling and spreading topsoil has compacted subsoil.
- B. Placement schedule:
 - 1. Seeding and sod subgrade depth: 4 inches.
- C. Installation:
 - 1. Use topsoil in relatively dry state. Place during dry weather.
 - 2. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.
 - 3. Remove stone, roots, grass, weeds, debris, and foreign material while spreading.
 - 4. Manually spread topsoil around trees, plants and building to prevent damage.
 - 5. Lightly compact placed topsoil, so as to negate any detrimental differential settling.
 - 6. Remove surplus subsoil and topsoil from site. Leave stockpile areas ready to receive landscaping.
 - 7. Import topsoil if on site stripped topsoil is not adequate.
- D. Finish grade tolerance: Plus or minus 1/2 inch.

3.02 SEEDING

- A. Preparation:
 - 1. Before seeding, disk, harrow, drag and rake to form a level and loose seed bed. Lightly roll before final raking, to locate soft spots and mounds.
 - 2. Notify ENGINEER to allow inspection after fine grading and before seeding.

- B. Store seed following State Specification 630.2.1.4.
- C. Permanent installation:
 - 1. Use sowing method A following State Specifications 630.3.
 - 2. Use the following sowing rate for seeds:
 - a. Seed mix no. 40: 2 pounds per 1000 square feet.
 - b. Temporary: 2 pounds per 1000 square feet.
 - 3. Fertilize following State Specifications 629.3.1 for Type B.
 - 4. Mulch using State Specifications 627.3 Method B wide out tack.
 - 5. Protect seeded areas to prevent damage to completed installation.
 - 6. Place erosion control mats as directed by the CITY.
- D. Maintenance:
 - 1. Maintain seeded areas for 2 months after grass has shown "a catch" or uniform stand verified by CITY. Lawn areas shall receive at least two 2 inch mowings before acceptance.
 - 2. Reseed areas which fail to show adequate catch. Bare spots shall not exceed 1 square feet in area and not exceed 3 percent of the total seeded areas.
 - 3. Reseed areas which do not show a satisfactory stand of established grass, or areas which show erosion, dead grass, or other defects, to produce established, satisfactory grass.
 - 4. Correct damage resulting from erosion, gullies, washouts, or other causes by filling with topsoil, tamping, refertilizing, and reseeding, if damage occurs before Work acceptance.
 - 5. Repair ruts from traffic during seeding, mulching, and maintenance by filling with topsoil, tamping, refertilizing, and reseeding.
 - 6. Protect grass areas during maintenance period.
 - 7. Request inspection by CITY at end of maintenance period.

3.03 SODDING

- A. Preparation:
 - 1. Prepare earth bed per State Specifications 631.3.1.
 - 2. Apply fertilizer following State Specifications 631.3.4 for Type B.
- B. Installation:
 - 1. Sod. Follow State Specifications 631.3.2.
 - 2. Staking and cleanup. Follow State Specifications 631.3.3.
 - 3. Repair and resod damage resulting from erosion, gullies, washouts or other causes.
 - 4. Protect the sodded areas during the maintenance period. Maintain sodded areas by watering for 10 days. Resod and maintain areas that dry out or fail to establish.
 - 5. At end of maintenance period, request inspection by CITY. Resod areas which do not show a satisfactory establishment of grass, or areas which show erosion, dead grass, or other defects, to produce established, satisfactory grass.

END OF SECTION