Main Line Water Main Construction			
Material	**Standards**	**Type**	**Description**
PVC (Tracer Wire Req'd)	AWWA C900	DR18	Integral elastomeric bell and spigot joints with ductile iron fittings.
Ductile Iron (Poly Wrap Req'd)	AWWA C151	Class 52	Cement lined, push-on joint, rubber gasket, conductivity strap, nitrile or fluorocarbon gaskets near contaminated soils
Polyethylene Wrap	AWWA C105	V-Bio Enhanced, Class C	8 mil min. thickness, three layers of linear low-density polyethylene, taped at 3-foot intervals with 1-foot overlap
Tracer Wire	N/A	No. 12 gauge insulated solid copper wire	Wire shall be blue and continuous
Tracer Wire Access Box	N/A	Copperhead Snake Pit Access Box	Color coded blue magnetized top, corrosion resistant brass wire lugs and wax pad
Mechanical Fittings	AWWA C110 (Ductile Iron ang Gray Iron), AWWA C153 (Ductile Iron Compact)	Megalug Series, EBBA Iron, 350 psi working pressure	Conductivity strap, cement lined
Restrained Joints (PVC and Ductile Iron Pipe)	AWWA C110, AWWA C153, AWWA C111 (Nuts and Bolts)	Megalug Series, EBBA Iron	Nuts and bolts shall be coated with 7-mil fusion bonded epoxy.
Tapping Sleeve, Cutting-In Repair Sleeve	AWWA C110 (Ductile Iron ang Gray Iron), AWWA C153 (Ductile Iron Compact)	Mechanical Joint Fitting, Ductile Iron	Same rated working pressure as the mechanical fittings.
Fire Hydrants	AWWA C502	Waterous Pacer with RoDon High-Visibility Locating Device with a Bolt-on Flat Steel Mounting Bracket.	7-foot bury depth to traffic flange, 5 1/4"-inch valve opening, one 4-1/2-inch pumper nozzle, two 2-1/2-inch nozzle, painted red.
Gate Valve (4" to 16" Wedge Valve) (18" and over butterfly valve)	AWWA C515	Waterous Series 2500	Right close, mechanical joints, non-rising stem, o-ring packing, 2-inch square operating nut
Valve Boxes	ASTM A48	Tyler 6860DD, or equal	5-1/4" inside diameter, 3-piece screw type, covers labeled "WATER"
Valve Box Adaptor	N/A	Adaptor Inc.	Metal fame with 3/4-inch rubber gasket
Pipe Bedding and Cover	N/A	Compacted sand for PVC pipe Crushed washed stone, all of which passes the 1-1/2" sieve for DI pipe	4-inch below bottom of pipe, 1-foot above top of pipe, compaction: 95% of max. density
Pipe Backfill	WisDOT Spec.	Granular Backfill	Compaction: 90% of max density to 3-feet of bottom of subgrade then 95% of max density

Water Main Service Construction			
Material	**Standards**	**Type**	**Description**
Water Service Pipe	AWWA C800	Type K Copper	1" diameter, unless otherwise specified.
Water Service Saddle - D.I. Pipe	AWWA C800, ASTM A536	Smith-Blair 317, A.Y. McDonald 4855A	Stainless steel, full circle, required for 1.5" and 2" services
Water Service Saddle - PVC Pipe	AWWA C800 ASTM A536	Smith-Blair 397 Wide stainless-steel strap	Stainless steel, full circle, one piece, required for all services.
Couplings	AWWA C800	Mueller H15403N, Ford C44 and AY, McDonald 74758Q	Copper to copper fittings as approved by Village
Corporation Stop	AWWA C800	Mueller B-25008N	Copper compression outlet ball corporation valve
Curb Stops	AWWA C800	Mueller B-25209N	Compression fitting
Curb Box	Arch Pattern Base	Mueller H-10385	Covers marked with "WATER", curb stamped with "W"

General Water Main Specifications:

1. Water main shall be minimum 6.5-feet bury to top of pipe. If less than 6.5-feet of bury, water main shall be insulated with 4'x8'x2" Styrofoam. No water main shall be buried with less than 5-feet of cover.
2. All mechanical joints shall be restrained with mechanical joint-restraints. In leu of joint restraints, thrust blocking and rodding may be used together to support the joints. Restrain all joints in both directions beyond all mechanical joints per the following table:

REQUIRED JOINT RESTRAINT DISTANCE FROM FITTING (FEET)								
FITTING TYPE	**4-IN**	**6-IN**	**8-IN**	**10-IN**	**12-IN**	**16-IN**	**20-IN**	**24-IN**
TEE: RUN OR CROSS: PLUGGED	10	10	10	10	10	20	20	20
TEE: BRANCH	10	10	10	10	10	10	10	10
DEAD END (*Valve/Cap/Plug/Hydrant/etc.*)	30	45	60	70	80	110	140	160
90° HORIZONTAL BEND	10	15	20	25	25	30	40	50
45° HORIZONTAL BEND	5	10	10	10	15	15	20	25
22.5° HORIZONTAL BEND	5	5	5	5	10	10	10	15
11.25° HORIZONTAL BEND	3	3	3	3	5	5	5	5
REDUCER: SIZE x 4"	-	25	45	60	75	100	130	150
REDUCER: SIZE x 6"	-	-	25	45	60	90	120	145
REDUCER: SIZE x 8"	-	-	-	25	45	80	110	135
REDUCER: SIZE x 10"	-	-	-	-	25	65	100	125
REDUCER: SIZE x 12"	-	-	-	-	-	50	85	115
REDUCER: SIZE x 16"	-	-	-	-	-	-	50	90
REDUCER: SIZE x 20"	-	-	-	-	-	-	-	50
HYDRANT	RESTRAIN ALL JOINTS ON HYDRANT LEAD							
NOTES: SOIL TYPE = GM (SILTY GRAVELS & GRAVEL/SILT/SAND MIXES) DEPTH OF BURY = 6-FT SAFETY FACTOR = 1.5 TRENCH TYPE = 4 TEST PRESSURE = 150 PSI								

3. Newly installed water mains shall undergo water quality testing (2 safe tests per 1,200 LF segment of water main at least 24-hours apart) and hydrostatic pressure testing and leakage test (max test segment of 1,200 LF at 150 psi for 2-hours) per AWWA C600 or AWWA C605 prior to final acceptance by the Village. The ductile iron mains may also be tested for electrical conductivity through the joints. Contractor shall furnish all equipment, materials, labor, and other work necessary to complete the tests. Repairs or replacement of any defective work is to be done at no additional cost to the Village.
4. All abandoned fire hydrants shall be returned to the Village.

Sanitary Sewer Construction			
Material	**Standards**	**Type**	**Description**
PVC (Gravity Sewer)	ASTM D3034	SDR 35 greater than 15-feet deep SDR 26	Solid wall, elastomeric or solvent cement joints
Ductile Iron (Gravity Sewer)	AWWA C151	Class 52	Tar coated and cement lined with AWWA C104
PVC (Force Main)	AWWA C900	DR 18	Elastomeric gasket joints. Fittings shall meet AWWA C110 as listed above
Ductile Iron (Force Main)	ANSI/AWWA C151	Class 52	Tar coated and cement lined with AWWA C104
Mechanical Fittings	AWWA C110	Class 52	Tar coated and cement lined with AWWA C104
Tracer Wire (Force Main)	N/A	No. 12 gauge insulated solid copper wire	Wire shall be green and continuous
Tracer Wire Access Box	N/A	Copperhead Snake Pit Access Box	Color coded green. magnetized lid, corrosion resistant brass wire lugs and wax pad
Sanitary Sewer Laterals	Same standard as the sewer main pipe	Same material as the sewer main pipe	Min. Grade: 1/4-inch per foot Max. Grade: 1/2-inch per foot Minimum depth of 10-feet at the property line.
Wyes	Same standard as the sewer main pipe	Same material as the sewer main pipe	All saddle type wyes for PVC shall be manufacture approved and attached to the sewer main with a rubber gasket and two stainless steel clamps
Cleanouts	Wisconsin Plumbing Code	For 4-inch and 6-inch	Required for laterals exceeding 100-feet
Pipe Couplings	ASTM C1173	Strongback Fernco	Coupling will be required at junctions of new pipe to an existing pipe.
Pipe Bedding and Cover	N/A	Crushed washed stone, all of which passes the 1-1/2” sieve	4-inch below bottom of pipe, 1-foot above top of pipe
Pipe Backfill	WisDOT Spec.	Granular backfill	Compaction: 90% of max density to 3-feet of bottom of subgrade then 95% of max density

General Sanitary Sewer Specifications:

1. Sanitary Sewer shall be minimum 6-feet bury to top of pipe. If less than 6-feet of bury, sanitary sewer shall be insulated with 4’x8’x2” Styrofoam. No sanitary sewer shall be buried with less than 5-feet of cover.
2. All gravity sanitary sewers shall be required to pass a leakage test (water infiltration or low-pressure air test) per ASTM F1417, mandrel test (not less than 30 days after pipe installation) and inspection by a closed-circuit internal television system prior to acceptance by the Village. Contractor shall furnish all equipment, materials, labor, and other work necessary to complete the tests. All sewer mains and manholes shall be cleaned prior to testing. Repairs or replacement of any defective work is to be done at no additional cost to the Village.
3. All completed sections of force main shall be hydrostatically field tested per AWWA C600 or AWWA C605 for exfiltration of water (max test segment of 1,200 LF at 100 psi for 1-hours).
4. All lift station design standards shall be discussed with the Village Engineer on a case-by-case basis.

Storm Sewer Construction			
Material	**Standards**	**Type**	**Description**
Reinforced Concrete Pipe (RCP)	ASTM C76, ASTM C443 (rubber gaskets)	Minimum Class III	Sealed rubber gaskets of continuous o-ring cross section
RCP Elliptical	ASTM C507, ASTM C443	Minimum Class HE-III	Sealed rubber gaskets of continuous o-ring cross section
RCP Endwalls	ASTM C507	Class II, Wall B	3 sections upstream to be joint tied, pipe grate, cut off wall included on all downstream endwalls 24" or greater
Pipe Gates	City of Madison Spec.	City of Madison Spec.	Steel gates with epoxy paint on endwalls 15-inches or greater
Pipe Bedding	N/A	Crushed washed stone, all of which passes the 1-1/2" sieve	4-inches below bottom of pipe to spring line
Pipe Backfill	WisDOT	Granular Material	Compaction: 90% of max density to 3-feet of bottom of subgrade then 95% of max density
Rip Rap Stone	WisDOT Standard	Rip Rap Medium	Geotextile placed below; minimum 6-inches thick

General Storm Sewer Specifications:

1. All storm sewers shall be inspection by a closed-circuit internal television system prior to acceptance by the Village (not less than 30 days after pipe installation). Contractor shall furnish all equipment, materials, labor and other work necessary to complete the tests. All storm sewer mains and manholes shall be cleaned prior to testing. Repairs or replacement of any defective work is to be done at no additional cost to the Village.
2. Storm sewer easements between property lines shall have linked grass pavers or permanent turf reinforcement matting to allow for Village maintenance access.

Manhole Construction			
Material	**Standards**	**Type**	**Description**
Manholes	ASTM C478	Precast or cast in place.	Steps located over the manhole bench
Manhole Connections	N/A	Kor N Seal, A-Lock or equal	Flexible, Watertight Connection
Manhole Joints	N/A	Kent Seal, E-Z Stik, or equal	Butyl Rubber Gasket
Outside Sanitary Sewer Drop	Necessary for > 24-in between incoming and outlet piping	PVC or DI Pipe and fittings	Drop shall be the same diameter as incoming sewer, outside drop must be encased in concrete
Storm Inlets	ASTM C913	2'x3' rectangular	24-inch sump required
Adjustment Rings	ASTM C478	Precast Concrete	Min height: 4-inches Max height: 12-inches
HDPE Adjustment Rings	N/A	Cretex Specialty Products or Ladtech Inc.	Min height:4-inches Max height: 12-inches

Sanitary Sewer Chimney Seals	ASTM C923 ASTM F-593 (SS)	Cretex Specialty Products	Internal
Sanitary Manhole Casting - In Roadway	ASTM A48, Class 35B	Neenah R-1550	Type B, self-sealing, gasketed non-rocking lids, with concealed pick holes
Sanitary Manhole Casting - Remote Location	ASTM A48, Class 35B	Neenah R-1916-C	Gasketed and bolted lid with concealed pick holes
Storm Manholes Castings	ASTM A48, Class 35B	Neenah R-1550	Type B self-sealing, gasketed non-rocking lids, with concealed pick holes
Storm Inlets Castings	ASTM A48, Class 35B	Neenah R-3067 Type R or L Grates.	"Dump No Waste Drains to Stream"

General Manhole Specifications:

1. Casting manhole rim elevations shall be adjusted to be 3/8" below the final surface grade.
2. Abandon all existing structures 3-feet below the surface and backfilled according to pipe backfill specifications. Salvage existing castings to the Village.

Street Construction					
Dedicated ROW Width	**Face of Curb to Face of Curb**	**Dense Crushed Aggregate Lower Layer**	**Dense Crushed Aggregate Upper Layer**	**Asphalt Binder Course**	**Asphalt Surface Course**
Arterial Street Classification					
80-feet	48-feet	12-inches 3-inch stone	4-inches 1 1/4-inch stone	3-inches 3MT 58-28S	2-inches 4MT 58-28S
Collector Street Classification					
70-feet	32 - 40- feet	8-inches 3-inch stone	4-inches 1 1/4-inch stone	2 1/4-inches 3LT 58-28S	1 3/4-inches 4LT 58-28S
Minor Street Classification					
66-feet	28 - 36-feet	8-inches 3-inch stone	4-inches 1 1/4-inch stone	2 1/4-inches 3LT 58-28S	1 3/4-inches 4LT 58-28S
Alley Classification					
20-feet	20-feet		8-inches 1 1-4-inch stone		3-inches 4LT 58-28S
Pedestrian Way Classification					
10-feet	5-feet min. from the curb		8-inches 1 1-4-inch stone		3-inches 4LT 58-28S

General Street Construction Specifications:

1. Minimum base course depths are listed, any geotechnical recommendations that supersede the above depths should be met.

Curb and Gutter Construction			
Concrete Curb and Gutter	30" width	4-inch base course, 1-ft behind BOC	Cylinders taken by Contractor and reports sent to Village Engineer
Expansion Joints	Every 250-feet	4-feet on either side of curb inlet	Points of curvature and tangency

General Curb and Gutter Specifications:

1. Reinforcement shall be required in concrete curb and gutter at utility trench crossings. Reinforcement shall be installed with three (3), #4 rebar reinforcing rods fifteen (15) feet long, centered on each crossing.
2. Slip formed curb & gutter construction leaving a gap for the inlet shall install two #4 reinforcing bars into the pan section of the concrete. The rebars shall extend two feet in length beyond each side of the inlet and be equally spaced and set (6 inches) into each concrete segment.
3. The top of curb shall be stamped with an “S” and “W” stamp at the location of the sanitary and water lateral crossing.
4. A minimum of four (4) concrete test cylinders shall be taken for each concrete mix. Cylinders shall be made and tested according to ASTM C31 and ASTM C39. Cylinders shall be broken at 7 and 28 days, with test results sent to the Village and Village Engineer.

Sidewalk and Driveway Construction			
Construction Item	**Base Course Thickness**	**Concrete Thickness**	**Description**
Residential Driveway and Sidewalk	6-inches 1-1/4-inch stone	6-inches	Sidewalk shall be 5-foot width
Commercial Driveway and Sidewalk	6-inches 1-1/4-inch stone	7-inches	Sidewalk shall be 5-foot width
Sidewalk (New Development)	4-inches 1-1/4-inch stone	5-inches	Sidewalk shall be 5-foot width
Sidewalk (Replacement)	4-inches 1-1/4-inch stone	5-inches	Sidewalk shall match existing width
Sidewalk Ramps	6-inches 1-1/4-inch stone	6-inches	Patina (no finish) cast iron Neenah Foundry truncated domes

General Sidewalk and Driveway Specifications:

1. Reinforcement shall be required in concrete sidewalk at utility trench crossings. Reinforcement shall be installed with three (3), #4 rebar reinforcing rods fifteen (15) feet long, centered on each crossing.
2. A minimum of four (4) concrete test cylinders shall be taken for each concrete mix. Cylinders shall be made and tested according to ASTM C31 and ASTM C39. Cylinders shall be broken at 7 and 28 days, with test results sent to the Village and Village Engineer.

Erosion Control Standards

1. Practices must comply with Village of Cottage Grove Erosion Control and Stormwater Management Ordinance and Land Disturbance permit and the requirements of the current version of the Wisconsin Department of Natural Resources Storm Water Management Technical Standards.

Utility Locate Potholes

1. Saw cut pavement to full depth with a bit 12” to 16” in diameter resulting in a “core”.
2. Remove core and save for reuse if structurally sound.
3. Place a protective steel ring to protect the edge of the opening from damage.
4. Use vacuum equipment to excavate compacted material from the bottom of base course to beneath the utility facility.
5. Perform utility work or confirm location and elevation.
6. Protect utility facility with fine granular material.
7. Place self-mixing flowable fill material from the top of the fine material to bottom of the base course (fill is designed to be traffic-bearing in approximately 90 minutes.
8. Place the removed core (or a generic equivalent replacement core) in the remaining opening (original alignment and orientation is maintained if removed core is used) forcing the grout to the surface to fill the annular space and core extraction hole.
9. Seal the restored opening.

Restoration

1. Minimum 6-inches of topsoil, seed, mulch, and fertilizer.
2. If erosion control matting is required, e-mat shall be in accordance with the WisDOT Erosion Control Product Acceptability List (PAL).
3. Restored areas shall be watered and maintained until grass has grown to a height of 2-inches.

Pavement Markings

1. Pavement markings shall be epoxy and refer to WisDOT Standard Detail Drawings and the MUTCD.

General Development Requirements

1. Preconstruction Conference between Contractor, Village, Village Engineer, Developer, and any Utilities.
2. Contractor may obtain water from Village hydrants only after obtaining approval from the Public Works Director. The meter for temporary water service shall be placed by the Village at a cost determined by the Village.
3. Contractors shall give 48-hour notice to the Village and Village Engineer notice of their intent to begin work.
4. Contractor shall be responsible for protecting and preserving all property pins during construction.
5. Village will hire a Geotechnical Consultant for public utility trench compaction testing, subgrade and/or base proof rolling, and stormwater management basin testing. Costs for these testing services shall be paid for by the Developer.

Development Public Infrastructure Transfer to Village

1. Contractor/Developer requests Substantial Completion to the Village and Village Engineer in writing. This can be done in phases depending on the development size. Until this has been completed, any utility Digger Hotline requests are completed by the owner of the development.
2. If substantial completion is granted by the Village, Village Engineer will provide the Developer with a Substantial Completion letter and a punch list of items to be completed. At that point, the warranty period begins, the letter of credit can be reduced, and the Village would take ownership of the public infrastructure.
3. Once the punch list items have been completed, a final completion letter is issued. At this time the Land Disturbance permit would be signed for completion and the letter of credit would be completed.