RULES, REGULATIONS AND

TECHNICAL SPECIFICATIONS FOR INSTALLATION OF

SANITARY SEWER IN

MT. OLYMPUS IMPROVEMENT DISTRICT

AUGUST 2016

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MT. OLYMPUS IMPROVEMENT DISTRICT

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PART 1

RULES AND REGULATIONS FOR

MT OLYMPUS IMPROVEMENT DISTRICT

A. PROCEDURES FOR INSTALLING SEWER LATERAL IN MT OLYMPUS IMPROVEMENT DISTRICT

Acceptable Pipe: SDR-35 PVC sewer pipe.

More than one sewer lateral can be in the same trench. There needs to be 6" between pipes and pipe and trench wall.

Clean-outs: SDR-35 PVC wye's, SDR-35 PVC risers, cast iron cap with brass plug. One clean-out at property line and one every 50-feet thereafter on a 4-inch line. Every 100-feet on a 6-inch line. If more than a 45-degree bend, there must be a clean-out. A clean-out is also required at every 90 degree bend and between (2) 45 degree bends. Fernco couplings required between Cast Iron and PVC. No-hubs can be used between cast to cast. A 4" lateral needs a 4" clean-out, a 6" lateral needs a 6" clean-out.

Imported 3/4" minus gravel 4" to 6" around pipe.

2% minimum grade on 4", 1% on 6", uniform grade from start to finish.

No glued fittings allowed except in sampling manhole.

Test tee in front of property line clean-out.

Water test to be run on all laterals. A ten foot head required.

Contractor must be properly bonded with the District prior to any work beginning.

Proper connection and inspection fees must be paid prior to any work beginning.

The District inspects laterals from 2 feet outside of the building to the sewer main.

The District installs the 4" nose-on's, but the customer pays for the nose-on and coordinates the work. The 4" nose-on is a SDR-35 PVC bell. A trench box is required for a nose-on or the trench must be vee'd to OSHA standards. Trench needs to be de-watered, as we use an electric drill to core in the nose-on. One nose-on per length of pipe.

Cap-offs: Dig up line as close to the street as possible without disturbing sidewalk or road asphalt, in front of property line clean-out. Expandable plug the size of the line to be capped-off is needed along with a bag of concrete mix. The pipe to be capped-off needs to be cut off square. Put in expandable plug. Call for an inspection by the District Inspector. Mix concrete and place around plug, while Inspector is onsite. Only if the Inspector see's the cap-off will the account be closed.

A sampling manhole is required for all commercial buildings.

An outside sand/grease trap may be required for certain commercial buildings. Minimum size 750 gallons (See District Engineer, Inspector, or Pre-treatment Specialist.)

B. PROCEDURES FOR EXTENSION OF MT. OLYMPUS IMPROVEMENT DISTRICT MAIN LINES

NO.	DESCRIPTION
1	Developer provides the District with a site plan and a utility plan. The utility plan shall include a plan and profile of the proposed sewer main for review by District Engineer and approval. After review and corrections, Developer to provide: Two full size (24" X 36") copies of plan and profile along with Electronic AutoCAD files of plan and profile.
2	Easements shall be provided by Developer on all main lines. A 10-foot wide public utility easement, 5-feet on each side of the main, shown on the plat is preferred. A meets & bounds easement is also acceptable. The Developer will provide legal description and tax number of property where easement is located. A one line Easement description will be provided by Developer's engineer/surveyor. District will prepare document. Developer will provide name or names of property owners to sign easement.
3	A line extension agreement will be signed by the Developer. All necessary fee's and deposits will be paid before work can begin.
4	A Main Line Bond on the District's bond form is specific to the job for the amount of installing the main line. The amount includes all materials, manholes, pipe, labor to complete the job. Based on the main line cost, a 2% + $50.00 fee is charged. A manhole deposit for each new and any existing manholes affected is charged. Manhole deposits are returned to Developer at the time of the final inspection of the sewer main lines is completed. This includes manholes cleaned-out, invert boards removed, and the manhole to final grade in existing asphalt or landscaped areas.
5	A pre-construction meeting with the Contractor/Developer and District will take place before work begins.
6	All pipe to be laid with the use of an in-pipe laser.
7	5/8" invert boards will be installed in all new manholes when they are stacked. Eccentric manhole cones will have the flat side of the core on the outlet side (i.e., downstream) of the manhole invert. No steps in manholes.
9	The inlet and outlet pipes of the manhole will be grouted.
10	All new laterals will need to be inspected before they are backfilled.
11	Laterals are covered by contractors "lateral bond" with the District.
12	An air test of all new main lines will be performed by a qualified pipe tester and witnessed by the District.
13	After the main line has passed the air test, the District will dump water at the top of all new main lines and perform a TV inspection of the main lines.
14	A final inspection on the manholes will be done by the District after the asphalt is finished; manholes are to grade and cleaned-out. New manholes will have District lids.
15	Copy of "Line Extension Agreement" signed and returned to owner along with letter reducing bond to 25% for the warranty period. Remaining manhole deposits returned.

C. GENERAL DESIGN STANDARDS

1. DEFINITIONS

   a) Main line: Any sewer pipe which serves more than one building.

   b) Lateral: Service line from 2 feet outside of a building to the main line. There must be a separate lateral for each building. Duplexes and twin homes will have two (2) laterals.

2. MAIN LINES AND LATERALS

   Must be of a size, alignment and grade meeting District standards.

   a) Main lines will be 8" or larger.

   b) Laterals will be of size and slope determined by mechanical engineer or plumber who designs plumbing within the building. Must be 4" diameter or larger.

   c) Minimum Grades and Access for Pipes:

Size	Minimum Grade	Type of Access	Maximum Spacing of Access	Comments
4"	2%	4" Cleanout	50'	
6"	1%	6" Cleanout	100'	
8"	0.40%	4' Manhole	400'	Increased grade desirable in upper reaches
10"	0.28%	4' Manhole	400'	Increased grade desirable in upper reaches
12"	0.22%	4' Manhole	400'	Increased grade desirable in upper reaches
15"	0.15%	5' Manhole	400'	Increased grade desirable in upper reaches
18"	0.12%	5' Manhole	400'	Increased grade desirable in upper reaches
21"	0.10%	5' Manhole	400'	Increased grade desirable in upper reaches
24"	0.08%	5' Manhole	400'	Increased grade desirable in upper reaches

A manhole or cleanout, as noted above, will also be required at all changes in grade and alignment except that 1 - 1/8 bend will be allowed in lateral.

D. MAINTENANCE

Generally the District will maintain any main line that is located in a public street or any main line for which the District has an easement, which serves more than one owner or association of owners, and has a formal line extension agreement.

E. PREVAILING CONNECTION AND INSPECTION FEES

These are available in the District office at 3932 South 500 East, Salt Lake City, Utah.

F. WORK SCHEDULE

There will be no work performed on Sunday involving inspection. Inspector, if required on Saturday or Holiday and for more than eight hours per day during weekdays, will be charged at the rate of time and one-half. The Contractor agrees to conform with the rules and regulations of the District and will pay for all inspection costs over and above the normal eight hours per day for a five day week. Monday through Friday, at time and one-half. The Contractor shall notify the District when they are going to work, if for any reason, they cannot work as previously scheduled, they will notify the District to reschedule their inspectors.

G. OTHER REQUIREMENTS

All work done in the Mt. Olympus Improvement District must conform with all requirements of the various Federal, State and County Agencies involved, such as the Utah State Division of Health and S.L. City-County Health Department, Utah Plumbing Code, Utah Department of Transportation, Salt Lake County Department of Public Works, etc. All work must also satisfy all requirements of the Wastewater Control Ordinance/Rules and Regulations.

H. WASTEWATER CONTROL ORDINANCE/RULES AND REGULATIONS

Where any conflicts exist between the requirements of this document and the Wastewater Control Ordinance/Rules and the most current Regulations as adopted by the Board of Trustees of Mt. Olympus Improvement District, the latter shall govern.

PART 2

SPECIFICATIONS & SITE WORK

GENERAL REQUIREMENTS

SPECIAL CONDITIONS

1. WORK INCLUDED:

   The work under this Section includes the furnishing of all labor, materials, equipment, transportation, hauling and services necessary for compliance with the requirements of the sanitary sewer line extension.

2. SALT LAKE COUNTY REQUIREMENTS:

   Apply to any construction within an existing Salt Lake County road.

   a) Standards: All work shall conform to the applicable standards, regulations and requirements of the Salt Lake County Public Works Department.

   b) Permits: All permits shall be obtained and paid for by the Contractor.

   c) License and Permit Bond: Without cancellation clause, in an amount and form prescribed by the Salt Lake County Department of Public Works, shall be provided by the Contractor in connection with his excavation in Salt Lake County Right-of-Way.

3. UTAH DEPARTMENT OF TRANSPORTATION REQUIREMENTS:

   Apply to any construction within an existing Utah Department of Transportation Right-of-Way.

   a) Standards: All work shall conform to the applicable standards, regulations and requirements of the Utah Department of Transportation, including the Specifications for Excavation on State Highways.

   b) Permits: All permits shall be obtained and paid for by the Contractor.

   c) License and Permit Bond: Without cancellation clause, in an amount and form prescribed by the Utah Department of Transportation, shall be provided by the Contractor in connection with his excavations on Utah Department of Transportation Right-of-Way.

4. UTAH DEPARTMENT OF TRANSPORTATION REQUIREMENTS IN SALT LAKE COUNTY ROADS:

   Where reference is made to Utah Department of Transportation standards in these specifications for work in Salt Lake County roads, the work will conform to the applicable Utah Department of Transportation standards.

5. PUBLIC CONVENIENCE:

The Contractor shall at all times so conduct his work as to insure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission of the proper authorities. Fire hydrants on or adjacent to the work shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the Contractor to insure the use of sidewalks and proper functioning of all gutter, sewer inlets, drainage ditches and irrigation ditches, which shall not be obstructed.

6. SAFETY AND PROTECTION:

Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. Contractor shall take all necessary protection to prevent damage, injury or loss to:

a) All employees on the work and other persons who may be affected hereby.

b) All the work and all material or equipment to be incorporated herein, whether in storage on or off the site, and

c) Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavement, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

Contractor shall comply with all applicable laws, ordinances, rules, regulations and others of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and utilities when prosecution of work may affect them. All damage, injury or loss to any property referred to in paragraph "b" or "c" caused, directly or indirectly, in whole or in part, by Contractor, any subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor). Contractor's duties and responsibilities for the safety and protection of the work shall continue until such time as all the work is completed and the Engineer has issued a notice to Owner and Contractor that the work is acceptable.

Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be Contractor's superintendent unless otherwise designated in writing by Contractor to Owner.

SITE WORK

EXCAVATION, TRENCHING & BACKFILLING FOR PIPING

1. WORK INCLUDED:

   The work under this Section includes the furnishing of all labor, materials, equipment, transportation, hauling and services required to construct the excavation, trenching and backfill for piping in place, complete, including but not limited to the following general classifications of work:

   Existing Utilities and Improvements
   General Excavation Requirements
   Trench Excavation
   Trench Backfilling
   Schedule of Trench Backfill Materials
   Cleaning Up

2. EXISTING UTILITIES AND IMPROVEMENTS:

   It shall be the Contractor's sole responsibility to locate all existing water, sanitary sewer, storm drain, and gas lines, electrical and telephone conduit and other underground structures in order that no damage or loss of service will result from interference with existing lines. The Contractor shall review all available maps, notes, and information on the location of these underground lines and structures in determining the location of the existing facilities. The Contractor shall have an electronic pipe finder on the job at all times and shall mark all lines on the road ahead of the excavating machine.

   a) Protection of Existing Construction: All gas, sanitary sewer, storm drain, culinary water and other pipelines, flumes and ditches of metal, wood or concrete, underground electrical conduits and telephone cable, and all walks, curbs, and other improvements encountered in excavating trenches carefully shall be supported, maintained and protected from injury or interruption of service until backfill is complete and settlement has taken place.

      1) Alignment: Care shall be exercised so that when backfilling is complete and settlement has taken place, the existing pipes, flumes, ditches, conduits, cables, walks, curbs, and other improvements will be on the same alignment and grade as they were before work commenced.

      2) Blue Stakes Location Center shall be contacted 48 hours before any excavation is commenced. Telephone 811 for assistance.

   b) Pipelines and Ditches: Pipelines and ditches which are interrupted shall be repaired immediately at the Contractor's expense to the complete satisfaction of the owners of the pipelines and ditches, and the Contractor shall indemnify the Owner from any and all damages resulting from damaged facilities.

2. EXISTING UTILITIES AND IMPROVEMENTS (CONTINUED):

c) Fences shall be returned to their original condition except that damaged portions will be replaced with new fencing at the Contractor's expense.

d) Existing Concrete Improvements: It shall be the responsibility of the Contractor to mark with paint any existing cracks on concrete along which his work may take place, in order to determine after the construction is completed whether such damage was caused by the operations of the Contractor or had occurred previously. Any concrete showing unmarked cracks upon completion of construction will be evidence of damage by the Contractor's forces, and shall be replaced or repaired to the satisfaction of the Owners of the concrete.

e) Existing Pavement Materials: All existing pavement materials, whether bituminous or portland cement concrete must be cut so as to provide a straight, neat line along the edge of the patch that will be made at the completion of the project.

3. GENERAL EXCAVATION REQUIREMENTS:

Excavation for pipelines, concrete valve boxes, manholes and appurtenant structures shall include the work of removing all earth, sand, gravel, quicksand, stone, loose rock, solid rock, clay, shale, cement, hardpan, bounders, and all other materials necessary to be moved in excavating the trench for the pipe; maintaining the excavation by shoring, bracing, and sheeting or well pointing to prevent the sides of the trench from caving in while pipe laying is in progress; and removing sheeting from the trench after pipe has been laid.

a) Ground Water: The Contractor shall do all pumping, shall build all drains and do all the work necessary to keep the trench and pipes free from water during the progress of the work. In wet trenches, a channel shall be kept open along the side of the pipe for conducting the water to a sump hole, from which it shall be pumped out of the trench. No water shall be allowed to enter the pipe.

4. TRENCH EXCAVATION:

Trenches shall be of the necessary width for proper laying of pipe. Care shall be taken not to over-excavate. The bottom of the trenches shall be accurately graded to provide uniform bedding and support for each section of the pipe on undisturbed soil or on sewer rock foundation along the entire length of the barrel of the pipe.

a) Depth of Excavation: Trenches shall be excavated to the depths shown on the Drawings, including any required allowances for the sewer rock foundation, when required, and for the pipe groove.

1) Minimum Cover: Over the top of the pipe, including any paving, shall be as follows unless noted otherwise on plans:

Sanitary Sewer Piping: 2 feet minimum

4. TRENCH EXCAVATION (CONTINUED):

   2) Width of Trench: The width of trench, measured at the top of the pipe, shall be as narrow as possible but not wider than 15 inches on each side of the sanitary sewer pipe.

   3) Trench Support System: Shall be suitable for the soil structure, dept of cut, water content of soil, weather conditions, superimposed loads, vibration. Contractor may select one of the following methods of ensuring the safety of workers in the trench, as approved by the Utah State Industrial Commission or its safety inspectors.

      a) Sloping Side of Trench: To the angle of repose required by State OSHA, at which the soil will remain safely at rest.

      b) Shoring sides of Trench: By placing sheeting, timber shores, trench jacks, bracing, piles, or other materials to resist pressures surrounding the excavation.

      c) Using a Movable Trench Box: Built up of steel plates and a heavy steel frame of sufficient strength to resist the pressure surrounding the excavation.

   4) Inadequate Support: All damage resulting from lack of adequate sheeting, bracing and shoring shall be the responsibility of the Contractor; and the Contractor shall effect all necessary repairs for reconstruction resulting from such damage.

   5) Excavation for Appurtenances: Excavation for manholes, concrete valve boxes, and similar structures shall be sufficient to leave at least 12 inches in the clear between the outer surface and the embankment or timber that may be used to hold and protect the banks.

   6) Excess Materials: Shall be hauled away from the construction site or otherwise disposed of by the Contractor as approved by the Engineer.

5. TRENCHING BACKFILLING:

   The trenches shall not be backfilled until the utilities systems as installed conform to the requirements of the drawings and specifications. Where, in the opinion of the Engineer, damage is likely to result from withdrawing sheeting, the sheeting shall be left in place. Trenches shall be backfilled to the ground surface with material that is suitable for the specified compaction. Trenches improperly backfilled shall be reopened to the depth required for proper compaction, then refilled and compacted as specified, or the condition shall be otherwise corrected as approved. No material of a perishable, spongy or otherwise improper nature shall be used in backfilling.

   a) Pipe Bedding: Consists of preparing an acceptable pipe foundation, excavating the pipe groove in the prepared foundation and backfilling from the foundation to 12 inches above the top of the pipe. All piping shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfilling operations by being adequately bedded.

5. TRENCHING BACKFILLING (CONTINUED):

1) Pipe Foundation: Shall consist of undisturbed soil in the bottom of the trench or a built-up foundation.

a) Built-Up Foundations: Wherever the trench subgrade material does not afford a sufficiently solid foundation to support the pipe and superimposed load, and where groundwater must be drained, the trench shall be excavated below the bottom of the pipe to such depth as may be necessary, and this additional excavation filled with clean, compacted sewer rock.

2) Pipe Groove: A groove shall be excavated in the pipe foundation to receive the bottom quadrant of the pipe so that the installed pipe will be true to line and grade.

a) Bell Holes: Shall be dug after the trench bottom has been graded. Bell holes shall be excavated so that only the barrel of the pipe will be in contact with the soil.

3) Pipe Bedding from Pipe Foundation to 12 Inches Above Top of Pipe: Materials shall be deposited and compacted in layers not to exceed 8 inches in uncompacted depth. Deposition and compaction of bedding materials shall be done simultaneously and uniformly on other sides of the pipe. All bedding materials shall be placed in the trench with hand tools or other approved methods in such a manner that they will be scattered alongside the pipe and not dropped into the trench in compact masses.

a) Materials: Shall be from the trench excavation or sand as shown in the Schedule of Trench Backfill Materials. Bedding material from the trench excavation shall be free from roots, sod or other vegetable matter. Bedding material may be loose earth, free from lumps, or sand or gravel, with maximum size material as shown in the Schedule of Trench Backfill Materials.

b) Trenching Backfilling Above Pipe Bedding: Shall normally be accomplished with native excavated materials and shall be free from rocks larger than 4 inches in diameter.

c) Compaction: Under pavements, or other surface improvements, the in-place density shall be a minimum of 95% of laboratory standard maximum dry density as determined as AASHO T-99. In shoulders and other areas, the in-place density shall be a minimum of 90% of the maximum dry density as determined as AASHO T-99. Road base shall be 96% as determined by AASHO T-180.

1) Tests: The Contractor shall perform all tests required by the District Engineer to determine any adjustments in compacting equipment, thickness of layers, moisture content and compactive or other effort necessary to attain the specified minimum relative density.

5. TRENCHING BACKFILLING (CONTINUED):

d) Methods of Compaction: Are listed in the Schedule of Trench Backfill Materials, and include Mechanical Compaction (MC). Selection of method of compaction in each case will be made according to the requirements of the materials being placed. Authorization by the District Engineer to use any method does not relieve the Contractor of this responsibility to meet the specified density requirements. Compaction shall be performed in strict accordance with the manufacturer's recommendations for each type of pipe.

1) Mechanical Compaction: Shall be accomplished by the use of sheepsfoot rollers, pneumatic tire rollers, vibrating rollers, or other mechanical tampers of a size and type approved by the Engineer.

a) Placing of Material: Shall be in lifts which, prior to compaction, shall not exceed 8 inches. Each lift shall be evenly spread and moistened, and worked by disk harrowing so that the required density will be produced.

6. SCHEDULE OF TRENCH MATERIALS:

Materials for trench backfill shall be as shown in the following schedule:

Type of Pipe	Trench Subgrade	Item	Material		Minimum Depth +	Compaction	
			In Planted or Unimproved Areas	In Streets, Roads, Parking Lots		Max Thick Uncom-pacted Layer	Acceptable Method - Mechanical Compaction (MC)
Sewer	Suitable for Pipe Support	Pipe Foundation	Undisturbed Soil	Undisturbed Soil	---	---	MC
		Pipe Bedding	Bedding Material	Bedding Material	Pipe OD + 12"	8"	
		Backfill Above Pipe Bedding	Excavated Materials 4"	Sand	---	8"	
Sewer	Unsuitable for Pipe Support	Pipe Foundation	Sewer Rock	Sewer Rock	By Engineer	One Course	MC
		Between Pipe & Sewer Rock	Bedding Material	Bedding Material	3"	One Course	
		Pipe Bedding	Bedding Material	Bedding Material	Pipe OD + 12"	8"	
		Backfill Above Pipe Bedding	Excavated Materials 4"	Sand	---	8"	

6. SCHEDULE OF TRENCH MATERIALS (CONTINUED):

a) Sewer Rock: Shall be hard, durable, broken stone or slag with the following gradation:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
1"	100
3/4"	85-100
1/2"	20-40
No. 4	10-20

b) Sand: Shall have the following gradation:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
2"	98-100
No. 4	80-100
No. 10	30-50
No. 40	10-30
No. 200	0-15

c) Bedding Material: Shall have the following gradation:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
1"	100
3/4"	90-100
3/8"	20-55
No. 4	0-10
No. 8	0-5

7. CLEANING UP:

The surface of the ground shall be restored to the condition in which it was found prior to construction. All excess materials shall be hauled from the site and properly disposed of.

SANITARY SEWER

1. GENERAL:

This section outlines the requirements for construction of the sanitary sewer, including the following general classifications of work:

Pipe Materials	Sewer Mains
Pipe Installation	Building Sewers
Manholes	Leakage Tests

SANITARY SEWER (CONTINUED)

2. GENERAL DESIGN STANDARDS:

1. Definitions:

a) Main Line: Any sewer pipe which serves more than one building.

b) Lateral: Service line from 2-feet outside of a building to the main line.

2. Main Lines and Laterals: Must be of a size, alignment and grade approved by the District Engineer.

a) Main Lines: Will generally be 8-inch or larger. Acceptable pipe: SDR-35 PVC for 8 to 15”

b) Laterals: Will be of a size and slope determined by mechanical engineer or plumber who designs plumbing within the building. Must be 4-inch or larger. Acceptable pipe: SDR-35 PVC.

c) Minimum Grades and Access for Pipes:

Size	Minimum Grade	Type of Access	Maximum Spacing of Access	Comments
4"	2%	4" Cleanout	50'	Must be a cleanout at property line
6"	1%	6" Cleanout	100'	
8"	0.40%	4' Manhole	400'	Increased grade desirable in upper reaches
10"	0.28%	4' Manhole	400'	Increased grade desirable in upper reaches
12"	0.22%	4' Manhole	400'	Increased grade desirable in upper reaches
15"	0.15%	5' Manhole	400'	Increased grade desirable in upper reaches
18"	0.12%	5' Manhole	400'	Increased grade desirable in upper reaches
21"	0.10%	5' Manhole	400'	Increased grade desirable in upper reaches
24"	0.08%	5' Manhole	400'	Increased grade desirable in upper reaches

A manhole or cleanout, as noted above, will also be required at all changes in grade and alignment except that (1) 1/8 bend will be allowed in laterals.

SANITARY SEWER (CONTINUED)

3. PIPE & FITTINGS:

For the various services:

TYPE OF SERVICE	PIPE			FITTINGS			JOINTS	
	MATERIAL	SPEC.	CLASS	MATERIAL	SPEC.	CLASS	TYPE	SPEC.
Mains	PVC* 8" to 15"	ASTM D-3034	SDR-35	PVC	ASTM D-3034	---	Push-on Gasket	ASTM D2000, AA820, AA625
	Concrete * 18" or Larger	ASTM C-76	Class 3 Minimum	Concrete	ASTM C-14	Extra Strength	Push-on Gasket	ASTM C-443
	DI**	AWWA C-151	50	Cast Iron	AWWA C-110	250 psi	Push-on Gasket	AWWA C-900 C-110
	VC**	ASTM C-700	Extra Strength	VC	ASTM C-700	Extra Strength	Push-on	ASTM C-425
Laterals	PVC*	ASTM D-3034	SDR-35	PVC	ASTM D-3034	---	Push-on Gasket	ASTM D2000, AA820, AA625
	VC**	ASTM C-700	Extra Strength	VC	ASTM C-700	Extra Strength	Push-on	ASTM C-425
	Cast Iron**	Federal Spec. WW-P-401	Service Weight	Cast Iron	AWWA C-110	250 psi	Push-on	ASTM C-425
Manholes	Concrete	ASTM C-478	---	---	---	---	---	---

* Used for new construction

** Used, if necessary and approved by District Engineer, for repair purposes

3. PIPE FITTINGS (CONTINUED):

   a) Vitrified Clay Pipe: Shall be unglazed, bell and spigot pipe.

      1) Joints: Shall be factory-made, flexible compression.

      2) Quality Standard: Gladding, McBean and Company.

   b) Cast Iron Pipe: Provide redwood supports for cast iron clean-out branches to prevent breaking pipe when trench is backfilled.

   c) Main Line Installation of D.I.: For use only when required by Salt Lake County Health Department Regulations and as shown on construction drawings.

4. PIPE INSTALLATION:

   a) Pipe Laser: Is to be used to control the line and grade of main line pipes.

   b) Bedding: All pipes shall be laid on a firm bed, true to the line and grade furnished by the Engineer, and the end and shoulder of each pipe shall abut against the other in such a manner that there shall be no unevenness of any kind along the bottom half of the pipe line.

      1) Pipe Groove: Shall be as specified on page 10 Material under the pipe bell shall not be compacted.

      2) Materials: For pipe bedding shall conform to the manufacturer's recommendation for the pipe being installed. Large stones shall not be used for pipe bedding.

      3) Placing of pipe bedding shall be done carefully to prevent damage to the pipe.

   c) Floating: Care in all phases of pipe installation shall be taken to prevent floating of pipe.

   d) Use of Compaction Equipment: Care shall be taken to avoid contact between the pipe and compaction equipment. Compaction of bedding and backfill material should generally be done in such a way so that compaction equipment is not used directly above the pipe until sufficient backfill has been placed to assure that such compaction equipment will not have a damaging effect on the pipe.

   e) Laying: Pipe should be laid in the uphill direction with the bell-end pointing upgrade.

   f) Manufacturer's Recommendations: All work shall be performed in strict accordance with the manufacturer's recommendations for the type of pipe being installed.

5. MANHOLES:

   The Contractor shall construct the manhole at the specific stations shown on the drawings. Manholes shall be set so that the top of the manhole lid is level with the finished surface or grade.

5. MANHOLES (CONTINUED):

a) Watertightness: All manholes shall be watertight, both in the floor and the full height of the walls. All manhole grade rings shall be set on a full bed of concrete grout to insure watertightness between the rings. Maximum of 12" of grade rings can be used.

b) Pre-Cast Manholes: May be used for new manholes. These shall include standard sections, cone section, grade rings, and floors.

1) Joints: Shall be made tight by the use of Kent-seal or approved gasket.

2) 30" Grade Rings: Shall be limited to a total height of 12".

3) A Single Cast Iron Riser Ring: May be used as needed to fit in ring securely. (3) 3/8" set screw are to be used to lock riser ring into manhole ring.

c) Reinforcement: Circumferential reinforcement shall conform to ASTM C-478 Area of vertical reinforcement shall be at least 0.2% of the area of the horizontal concrete cross section.

d) Manhole Frames and Covers: All castings shall conform to the requirements of the American Society for Testing Materials specifications for gray iron castings. The bearing between the cover and the frame shall be machined so that it will be uniform all around, and any cover which tends to tip or rock will be rejected. No low profile rings will be allowed.

1) Cover Lettering: Shall read “Mt. Olympus Improvement District”.

e) Quality Standard: Manholes, frames, and covers shall be supplied by E. B. Moritz, model M 1254-S or equal. These lids will have no lugs, but will have a skid resistant surface.

f) Invert Covers: Shall be 5/8" thick exterior plywood and shall be placed over the top of pipe in all manholes to prevent debris from entering the sewer during the construction operations. Invert covers shall be removed after the manhole covers have been finally set at grade, and all construction operations have been completed.

g) Final Grade Adjustment: All manhole rings and lids shall be adjusted to make them flush with pavement, after pavement has been laid.

6. LATERALS AND HOUSE LATERALS:

The Contractor shall furnish and install wyes for new laterals from the sewer main to all structures and for vacant lots as directed. Use 4" inserta tees for laterals on existing PVC, Concrete, and Clay pipe. Minimum main size for 4" inserta tees is 8" and for 6" inserta tees is 12".

a) Location: Laterals and house laterals shall not be located under driveways or under extensive porch areas.

b) Clay Stopper or Expandable Plugs: Shall be placed in the end of the lateral.

6. LATERALS AND HOUSE LATERALS (CONTINUED):

c) Minimum Grade: Of laterals shall be 2% for 4" and 1% for 6" diameter laterals or as approved by District Engineer.

d) Clean-outs: Shall be installed 2 feet inside the property line and at 50-foot intervals along the lateral and at all changes in direction of the lateral. Clean-out branches shall be the same size as the lateral and shall be connected to wyes or combinations in the lateral.

7. SEWER MAINS:

a) Size: Sewer mains shall be 8 inches in diameter or larger.

b) Slope: The following are the minimum slopes permissible for sewer mains. Greater slopes than these minimums should be provided in the upper reaches of the system.

SEWER SIZE	MINIMUM SLOPES IN FEET PER 100 FEET
8"	0.40
10"	0.28
12"	0.22

c) Depth: Sewer mains should be installed below frost line, and where possible, below water lines in the same street.

1) Cover: Over the top of the pipe, including any paving shall be as follows unless noted otherwise on the plans.

Pipe	Minimum	Maximum
VC	4 feet	18 feet
Conc.	4 feet	16 feet
PVC	4 feet	16 feet

8. LEAKAGE TESTS:

All inspection tests shall be performed by the Contractor and all devices for testing purposes shall be furnished by him. Any material or workmanship proven defective shall be replaced with sound material and the test repeated if deemed necessary by the inspector. All tests shall be performed after backfill and compaction are completed. In addition, the District Inspection may also request an internal television inspection if he deems it necessary. This will be performed at the Contractor's expense.

a) Notice: The Contractor shall give the Engineer and the District at least 2 days notice of any test to be performed on the system.

b) Observations: Tests shall be observed by the Inspector. Any test performed and not so observed shall be repeated when observed by the Inspector.

8. LEAKAGE TESTS (CONTINUED):

c) Correction and Re-Testing: All corrections indicated by any unsuccessful tests shall be made and the tests repeated until the successful performance of all tests is achieved. Cost of making corrections and retesting shall be borne by the Contractor.

d) Length Tested: Shall be from manhole to manhole.

e) Method of Test: All sanitary sewer mains shall be air tested. The method of air testing shall be as follows:

1) Clean test section.

2) Plug all pipe outlets with suitable test plugs. Brace each plug securely.

3) Add air slowly to the portion of the pipe installation under test until the internal pressure is raised to 4.0 psig.

4) After an internal pressure of 4.0 psig is attained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.

5) After the two minutes period, disconnect the air supply.

6) When pressure decreases to 3.50 psig, start the stopwatch. Determine the time in seconds that is required for the internal air pressure to reach 2.5 psig.

a) If the stopwatch time is less than the time specified in the TIME HOLDING CHART, on next page the Contractor shall fill the line with water and hold for 60 minutes. The water is to be released from the test section and immediately retested.

b) If after all sources of air leakage have been corrected and there is still difficulty in meeting the minimum specification time requirements, a water exfiltration test shall be conducted to determine the acceptability of the test section.

7) Safety Provisions: Plugs used to close the sewer pipe for the air test must be securely braced to prevent the unintentional release of a plug. Gauges, air piping manifolds and valves shall be located at the top of the ground. No one shall enter a manhole when a plugged pipe is under pressure. Pipes larger than 24-inch diameter shall not be air tested. Air testing apparatus shall be equipped with pressure release devices such as a rupture disc or a pressure relief valve designed to release pressure at a maximum of 6 psi.

8) Time Holding Chart: (See Next Page)

TIME HOLDING CHART

Time in Seconds Required for
Pressure Drop from 3.5 to 2.5 psig

Wet Test Standards based on 0.003 cfm/sf
Dry Test Standards based on 0.005 cfm/sf

ASTM C-924

Length	0.003	0.005	0.003	0.005	0.003	0.005	0.003	0.005	0.003	0.005	0.003	0.005	0.003	0.005	0.003	0.005
	4"		6"		8"		10"		12"		15"		18"		21"		24"	
50	9 - 5		20 - 11		35 -20		55 -32		79 - 46		124 - 71		178 - 102		243 - 146		317 - 190	
75	13 - 8		30 - 17		53 -30		83 -47		119 - 69		186 - 106		267 - 153		364 - 218		475 - 285	
100	18 - 10		40 - 23		71 - 41		110 -64		158 - 91		248 - 142		356 - 204		485 - 291		639 - 383	
125	22 - 13		50 - 29		88 - 51		138 -79		198 - 114		309 - 177		446 - 255		595 - 357		680 - 408	
150	26 - 15		59 - 34		106 - 61		165 -95		238 - 137		371 - 212		510 - 306					
175	31 - 18		69 - 40		123 - 71		193 - 111		277 - 160		425 - 255							
200	35 - 20		79 - 46		141 - 81		220 - 127		317 - 188									
225	40 - 23		89 - 51		158 - 91		248 - 143		340 - 204									
250	44 - 25		99 - 57		176 - 102		275 - 159											
275	48 - 28		109 - 63		194 - 112		283 - 174											
300	53 - 31		119 - 69		211 - 122													
350	62 - 36		139 - 01		227 - 142													
450	79 - 46		170 - 103															
500	88 - 51																	
550	97 - 56																	
600	106 - 61		170 - 103		227 - 142		283 - 174		340 - 204		425 - 255		510 - 306		595 - 357		680 - 408	

8. LEAKAGE TESTS (CONTINUED):

   9) Exfiltration Tests: The length of pipe tested shall be limited so that the pressure on the invert of the lower end of the section tested shall not exceed 16 feet of water column, and in no case shall the length of the section tested be greater than 400 feet or the distance between manholes, where greater than 400 feet.

      a) Allowable Leakage: The measured rate of leakage during the test shall not exceed 500 gallons per inch of pipe diameter per mile of pipe per 24 hours, with a 6 foot head at the crown at the end of the test section.

9. CLEANING AND FLUSHING:

   All pipe lengths or units laid shall be thoroughly cleaned of all debris immediately after laying.

   a) At the end of the day's lay, or at any time the work is closed down for any reason, the Contractor shall plug all open ends of the pipe with material satisfactory to the Engineer to prevent the entrance of small animals and foreign material of any kind into the pipe. Plugs shall be furnished and placed by the Contractor at his expense.

   b) Before connection to existing sewer is made, all new sewer mains shall be thoroughly cleaned by flushing, and all debris removed, as approved by the Engineer.

RESTORATION OF SURFACE IMPROVEMENTS

1. Work Included:

   The work under this Section includes the furnishing of all labor, materials, equipment, transportation, hauling and services included in the following general classifications:

   General Requirements
   Gravel Surfaced Areas Bituminous Paved Surfaces
   Concrete Curbs, Gutters, Sidewalks, and Driveways
   Planted Areas Miscellaneous Improvements

2. GENERAL REQUIREMENTS:

   All surface improvements existing at the time of the start of the work, or placed during the construction period, which require interruption or removal to permit the construction specified herein shall be restored following completion of the work.

   a) Quality of Restoration Work: Shall equal or exceed that of the original surface improvements in every case.

3. GRAVEL SURFACED AREAS:

   Where trenches are excavated through gravel surfaced areas, such as roads and driveways and other areas, the gravel surface shall be restored by placing a gravel road base.

3. GRAVEL SURFACED AREAS (CONTINUED):

a) Subgrade Preparation: Immediately after the trench has been backfilled to the required road base subgrade, the subgrade shall be compacted to not less than an average dry density of 95% determined in accordance with AASHO Designation T-180 Method D. No test shall be less than 92%.

b) Gravel Road Base

1) Construction Methods: Mixing, placing, compaction and finishing shall conform to Paragraphs 301.04 though 301.06 of the State of Utah Standard Specifications for Road and Bridge Construction.

2) Material: Gradation of gravel and road base material shall be as follows:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
1"	100
1/2"	70-100
No. 4	41-68
No. 16	21-41
No. 50	10-27
No. 200	4-13

Materials shall conform to Paragraphs 301.02 and 301.03 of State of Utah Standard Specifications for Road and Bridge Construction.

3) Thickness: Of gravel road base course shall be 6 inches.

4) Compaction: Average dry density shall be not less than 95% of the dry density determined in accordance with AASHO Designation T-180 Method D. No test shall be less than 92%.

4. BITUMINOUS PAVED SURFACES:

Where trenches are excavated through bituminous surfaced roads, driveways or parking areas, the surface shall be restored as follows:

a) Subgrade Preparation: Shall be performed as specified above.

b) Gravel Road Base: Shall be constructed as specified above.

c) Bituminous Prime Coat: Shall be applied to the untreated base course. Materials and construction methods shall be in accordance with Paragraphs 404.02 through 404.08 of State of Utah Standard Specifications for Road and Bridge Construction.

d) Bituminous Surface Course: Shall be composed of a mineral aggregate and bituminous binder mixed at a central mixing plant and spread and compacted on the primed base course.

1) Thickness: Shall match existing thickness or shall be 3 inches whichever is greater.

4. BITUMINOUS PAVED SURFACES (CONTINUED):

   2) Materials and Construction Methods: Shall be in accordance with Paragraphs 403.02 through 403.11 of State of Utah Standard Specifications for Road and Bridge Construction. Dry mineral aggregate shall meet the requirements for 3/4" gradation.

   3) Compaction: Average density shall be at least 96% of the maximum laboratory density.

5. CONCRETE CURBS, GUTTERS, SIDEWALKS AND DRIVEWAYS:

   Shall be removed and replaced to the next joint or scoring lining beyond the actually damaged or broken sections; or in the event that joints or scoring lines do not exist or are three or more feet from the removed or damaged section, the damaged portions shall be removed and reconstructed to neat, place faces. All new concrete shall match, as nearly as possible, the appearance of adjacent concrete improvements. Where necessary, lampblack or other pigments shall be added to the new concrete to obtain the desired results.

   a) Concrete Work: Shall conform to the requirements of the Salt Lake County Building Codes.

6. PLANTED AREAS:

   a) Areas Owned by Others: Sodded areas shall be replanted with sod from sources approved by the Engineers and watered until growth is secure, or for at least two weeks.

7. MISCELLANEOUS IMPROVEMENTS:

   All other improvements interrupted or removed to permit the construction specified herein shall be restored. Miscellaneous improvements to be restored shall include, but shall not be limited to the following:

   Curverts
   Canals and Canal Structures
   Bridges and Bridge Abutments
   Fences
   Driveways
   Sidewalks
   Curbs
   Gutters
   Waterways