CONSTRUCTION STANDARDS

FOR

ASH CREEK SPECIAL SERVICE DISTRICT

Revised and Adopted

February 24, 2014

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SECTION I.
GENERAL INFORMATION

A. INTRODUCTORY

Ash Creek Special Service District was organized by the Washington County Commission in 1980 as a general purpose special service district in Washington County, Utah. The District is administered by a 6-member Administrative Control Board consisting of the mayor and 1 city council member from each of the municipalities of Hurricane, LaVerkin and Toquerville.

The District was originally organized so that its boundaries coincided with the municipal boundaries of Hurricane, LaVerkin, and Toquerville, the residents of which are served by a sewer collection and disposal system which is owned and operated by the District. The District has enacted Rules of Operation and Construction Standards, which are subject to amendment from time to time, governing the use of the system.

In 2008, the Washington County Commission expanded the District by annexing into its boundaries certain unincorporated territory in the east half of Washington County. The District's Rules of Operation were amended to provide a framework of rules and regulations governing sewer facilities in these areas.

B. DEFINITIONS

As used herein, the following words or phrases shall have the following meanings:

1. "District"- means Ash Creek Special Service District, and any officer, employee or other agent duly authorized by District to act in its behalf.

2. "Superintendent"- means the person designated by the Administrative Control Board of the District to have the charge, supervision, and administration of District's daily operation. The superintendent may, at his option, designate a person or persons to represent him for inspecting, and reporting on the work as it progresses.

3. "District Engineer" - means any registered professional engineer designated by the District to provide general engineering services for the District and shall include any independent professional consultant retained by the District on an ongoing basis to perform engineering services on behalf of the District and to advise the District's Administrative Control Board and District staff on engineering matters.

4. "District Rules and Regulations" shall mean District's Rules of Operation and

Construction Standards for Ash Creek Special Service District, as amended from time to time.

5. "Developer or Owner's Engineer" - means the registered professional engineer which is designated and retained by a developer or owner to design the proposed sewer system facilities in accordance with District rules and regulations.

6. "Developer"- means any person or entity seeking permission to construct a sewer system for a particular development or parcel of property.

7. "County" - means Washington County, Utah.

8. "City" or "Municipality"- shall mean Hurricane, LaVerkin or Toquerville.

9. "Work" - that which is proposed to be constructed or done under a contract or permit, including all activities related to the construction, installation, inspection and testing of sewer facilities for a project or development.

10. "Sewer facilities" - means all aspects of an existing or proposed sewer system, including sewer lines and all related facilities.

11. "Subdivision" - means any division of property where a residential, commercial or industrial unit is to be built. Any subdivision of property approved or recorded before January 22, 2000 is approved for a residential septic tank.

C. COMPLIANCE WITH RULES OF OPERATION AND CONSTRUCTION STANDARDS

All requests for sewer service or approval of sewer facilities shall be governed by and subject to compliance with the District's rules and regulations as they now exist or as they may be amended from time to time.

D. GENERAL OVERVIEW

As a general matter, any developer or owner who desires to construct and install any building or structure requiring sewer facilities shall, at his expense, be responsible to:

1. Submit to the District all plans, designs, and specifications for any proposed sewer system or facilities.

2. Obtain in the name of the District and/or dedicate to the District all sewer right-of-way

easements or deeds necessary for construction, installation and maintenance of sewer facilities.

3. Obtain approval from District and any other governmental entity having control or jurisdiction over any matter related to construction, installation and maintenance of sewer facilities.

4. Pay all impact fees, plan review fees, inspection fees, monthly fees, and all other fees required by District's rules and regulations.

5. Construct and install approved sewer facilities in accordance with District's rules and regulations.

6. Where required, enter into an agreement for private maintenance, repair and replacement of sewer facilities.

7. Where required, dedicate and convey, at no expense to the District, completed sewer facilities to the District.

8. A owner of any property where a sewer main line is installed on private property shall sign a private sewer agreement.

E. GENERAL PROCEDURE

The general procedure for obtaining approval of a proposed sewer system is as follows:

1. Developer shall submit two (2) copies of a plat or map showing the property or area for which sewer service is desired and shall request a "sewer availability" letter from District.

2. District shall issue or deny issuance of a "sewer availability" letter, depending on the location of the property or area to be served, and the sewer main line capacity and treatment capacity as determined by the Board.

3. Developer shall prepare and submit all sewer plans and specifications in accordance with District's rules and regulations.

4. Developer shall provide sewer alignment and submit all necessary deeds or right-of-way easements.

5. Developer's Engineer shall submit to District engineered drawings along with plan review fee or other required fees. Plan review fee shall be $25.00 per lot. In areas not

within Hurricane, LaVerkin, and Toquerville, there is an additional $400.00 per lot fee.

6. District shall review all plans and specification, and, if appropriate, give approval for said plans and specifications.

7. District shall give written approval, either by separate letter or by signing the plans and specifications, for developer to proceed with construction and installation of sewer lines and facilities.

8. Developer shall give District two working days notice before commencement of construction or installation of sewer lines and facilities..

9. Written acknowledgment of notification from the District will be required before excavation.

10. District shall inspect construction and installation of sewer lines and facilities.

11. Upon completion of construction and installation of sewer lines and facilities in accordance with District's rules and regulations, District's superintendent shall issue "Notice of Final Inspection" or other letter accepting the sewer lines and facilities as completed.

12. Developer shall transfer and convey the sewer lines and facilities to District at no cost to District.

F. REQUIREMENTS OF OTHER PUBLIC AGENCIES

The requirements for the design, construction and installation of sewer facilities, as specified herein, shall be in addition to and shall be deemed supplemental to the requirements of any other rules and regulations of any other governmental entity or public agency having jurisdiction or control over any aspect related to the approval, construction, installation and maintenance of such sewer facilities. Any person or entity who undertakes the preparation of plans and specifications for the construction and installation of a sewer system shall be charged with the knowledge of such rules and regulations and shall be required to comply with the same.

SECTION II
PLAN DESIGN AND REVIEW

A. GENERAL

The developer, at his expense, shall be responsible to design all sewer facilities in accordance with all District rules and regulations and District's Capital Facilities Plans. Developer shall submit all plans and specifications for review and approval by District in accordance with the following provisions:

B. FORMAT OF PLANS AND REVIEW PROCEDURE

The following procedure and format shall be followed in submitting plans and specifications for District review and approval:

1. Order of sequence shall be as specified in Section I, General Procedure.

2. Sewer system plans and specifications submitted to the District shall be in the following format:

   (a) All plan sheets shall be in ink on reproducible paper of 24" x 36" in size. Profile scale shall be 1" = 10', 20' or 40' horizontal and 1" = 5' vertical. A general map showing all vicinity properties, road and sewer lines shall be included.

   (b) Plan sheets shall include overall layout (1" = 100' unless otherwise approved by District) of the sewer system showing streets and lots, any other utilities, manholes and any existing facilities involved; sewer certifications, general notes, legend estimate of quantities and a location map.

   (c). Plan and profile sheets shall include all proposed and existing utility lines, both plan view and elevation; existing ground surface and proposed street grade, existing and proposed sewer lines, laterals and street cross section with all utilities listed, with the flowline plotted in the profile, and the slope indicated between each vertical point of intersection.

   (d) Self-adhesive or add on labels, certifications, details, etc. are not acceptable on final plans.

   (e) All manholes shall be numbered on the plans.

3. The following shall be submitted as part of the First Plan Check (as applicable):
   (a) For Residential Developments:

   -Sewer Plans 3 copies

-Street plans	1 copy
-Storm Drain Plans	1 copy
-Grading Plans	1 copy
-Erosion Control Plans	1 copy
-Easements, Documents and Plats	2 copies
-For phased projects, map of overall plan for water and sewer, including size and type of lines	2 copies
-Title Report, Deeds, Etc.	1 copy
-Any Appropriate Survey Notes	1 copy
-Any Referenced PM/RS/Etc.	1 copy

(b) For Commercial/Industrial Development:

-Items listed in 3(a) above (if applicable)	
-Site plan/plot plan (with water, sewer and fire systems shown)	2 copies
-Building floor plan/plumbing plan.	1 copy
-Completed District industrial form with pretreatment data.	1 copy
-Submittal of data indicating typical waste discharge contents.	1 copy
-Calculation of Number of Units	1 copy
-Grease trap/industrial waste clarifier sizing calculations	1 copy
-Number of employees	1 copy
-Water usage of a similar type installation	1 copy

-For restaurants and bars- number of seats,
daily meals and/or peak hour meals 1 copy

4. Developer shall pay all applicable fees and charges required by District's rules and regulations prior to final approval of subdivision construction.

5. Incomplete submittals will not be considered. (If any of the above items listed in subparagraphs 3 (a) or (b) above are not applicable to the project, please note the reason in the transmittal letter.)

6. When the initial review is complete, the developer or developer's engineer will be notified to pick up "red-lined" prints from the District office or appropriate municipal office. Whenever changes other than District corrections are made, these changes shall also be indicated on the check print in order to expedite the processing of the plans. Additionally, developer shall resubmit to the District office all street plan, storm drain plan etc., whenever revisions to these drawings occur.

C. CERTIFICATE OF REVIEW AND APPROVAL

The following certificate shall be placed on the cover sheet of the construction plans or drawings. No construction of sewer improvements shall be permitted until all sewer plans and specifications have been reviewed and approved by the District, as evidenced by the District's signature on such certificate:

CERTIFICATE OF REVIEW AND APPROVAL

This is to certify that on the _____ day of _____, 20_____ the above plans and specifications were reviewed and approved by the Ash Creek Special Service District. The District's review of said plans and specifications covers only general conformity of the design with the standards and specifications outlined herein. The District's approval of said plans and specifications does not constitute blanket approval of all dimensions, quantities, physical properties, materials, equipment, devices, or items show, and does not relieve the developer or it's engineer from any responsibility for errors, deviations, or defects in design therefor.

_____
Superintendent, Ash Creek SSD

D. CONSTRUCTION RULES AND REQUIREMENTS

1. The contractor shall notify the District at least two working days prior to commencement of construction and installation of any sewer improvements.

2. Separation requirements between all utilities and sewer lines shall be at least 10 horizontal feet, inside to inside.

3. All construction methods and materials shall comply with District rules and regulations. Any construction methods and/or materials not covered in the District's rules and regulations shall be approved by the District Superintendent prior to construction.

4. Prior to construction of the sewer lines, the contractor shall expose the existing sewer lines where connections will occur and verify their elevation and location. Approval by the District of a proposed connection to a District facility does not imply approval of correctness of the flow line elevation and/or location shown on the plans. Contractor shall not backfill any sewer trench until the inspector has inspected stationing on all structures. It shall be the contractor's responsibility to provide accurate "record" drawings to the District immediately after construction.

5. Approval by the District implies no permission other than that within the District's jurisdiction. All permits required by law shall be acquired by the applicant or his contractor. Requirements of the District shall take precedence over requirements of other agencies only where District requirements are greater.

6. Contractor should shore all trenches and conduct all construction and operations in accordance with OSHA requirements and/or Utah Industrial commission.

7. No subdivision plat shall be recorded at the office of the Washington County Recorder until said plat has been approved and signed by the Chairman or Superintendent of Ash Creek Special Service District

E. RIGHT OF WAY EASEMENTS AND DRAWINGS

The developer shall be responsible to obtain all right-of-way easements or deeds necessary for the construction, installation and maintenance of sewer facilities in accordance with Section I.D.2. these Construction Standards. In connection therewith, Developer shall submit for review and approval a proposed subdivision plat, or, if said right-of-way easement is not a part of a subdivision, a proposed Right-of-Way Easement Agreement and map, which contains and conforms to the following:

1. Required information:
   (a) north arrow (orientation to upper half of plat)
   (b) scale
   (c) track numbers
   (d) lot numbers
   (e) lot lines

(f) ownership lines
(g) sections corner
(h) street R/W and street names
(i) section, township & range and base & meridian Data
(j) call out of easement
(k) parcel numbers
(l) dimensions
(m) title block
(n) drawing number
(o) District signature block

2. Additional Information When Bearings are Used:
   (a) basis of bearings
   (b) T.P.O.B. (True Point of Beginning)
   (c) bearing and distances
   (d) curve data
   (e) designated point
   (f) existing easement data

3. Additional Right-of-Way Easement Requirements:

   (a) All sewer right-of-way easements shall be obtained in the name of the District, as Grantee, or shall be assigned to District.

   (b) All right-of-way easements shall contain legal description of the desired right of way which is prepared by a licensed surveyor.

   (c) Unless otherwise approved by District, all main sewer lines and related facilities must be located in public roadways, or, if approved by separate written agreement, in utility corridors which are dedicated to the use and benefit of the public.

   (d) Unless otherwise approved by District, construction right-of-way easements shall be 50 feet in width, and permanent right-of-way easements shall be 25 feet in width..

   (e) Unless otherwise approved by District, all sewer pipelines shall be installed along the centerline of the easement. For good cause shown, the pipeline may be installed no less than 5 feet from either easement boundary.

   (f) All easement property must be graded so that every manhole will be accessible to maintenance equipment.

(g) All necessary sewer right-of-way easements shall be obtained and recorded at the office of the Washington County Recorder prior to construction and installation of sewer facilities.

(h) No other public utility shall be permitted in the sewer right-of-way easement, except that storm drain facilities may be installed in the same easement if the minimum easement width is 30 feet and the storm drain facilities are installed in the outer-most 5 feet.

4. Right-of-Way Easements Within Subdivision Plat:

(a) Where sewer right-of-way easements are included in public roadways, the plat shall contain general dedicatory language dedicating said roadway to the municipality in which it is located for the use and benefit of the public as a public roadway and to Ash Creek Special Service District for construction, installation, maintenance, replacement and repair of sewer lines and related facilities.

(b) Except as approved by the District, all sewer main lines shall be constructed in public or private streets as shown on the plat. Upon request of the developer and for good cause shown, a main sewer line may be permitted between lots, provided that a sewer corridor of at least 25 feet in width shall be provided by deed or right-of-way easement agreement, or shown on the plat as open space which is dedicated and conveyed to the District.

(c) In subdivisions or developments where sewer lines are to be constructed in private streets or upon other private property, the developer/owner and District shall enter into a written agreement satisfactory to the District which, among other things:

i. grants to District a right-of-way easement conforming to the requirements of these rules,

ii. requires construction and installation the developer/owner of sewer lines and related facilities in accordance with Districts rules and regulations,

iii. provides for the ownership, maintenance, replacement and repair of sewer lines and related facilities within the development by the developer/owner, homeowner's association or lot owners within the development, and

iv. requires a notation on the subdivision plat giving notice to prospective purchasers and lot owners that ownership, maintenance, replacement and repair of said lines and related facilities will be the responsibility and liability of the developer/owner, homeowner's association or lot owners within the development.

5. Right-of-Way Easement Agreements:

A sewer right-of-way easement shall be obtained by separate Right-of-Way Easement Agreement which conforms to the requirements of these rules where:

(a) Sewer facilities are to be constructed and maintained on property which is not included in a subdivision plat, or

(b) The developer desires to construct and install sewer facilities prior to the time a subdivision plat is recorded at the office of the Washington County Recorder.

SECTION III
GENERAL SPECIFICATIONS

A. INSPECTION

The developer shall make the necessary arrangements for inspection of contractor's work during the regular 40 hour work week. If the contractor works more than a 40-hour week, the financial responsibility for added inspection shall be the responsibility of the developer. The prevailing hourly rates for inspection are on file with the District. Such prevailing rates will be applied at 1-1/2 times the regular rates for periods over 40 hours per week.

B. DEFECTIVE WORKMANSHIP AND MATERIAL

1. The contractor shall promptly remove from the premises all work and materials determined by the District to be defective or as failing to conform to the approved plans, whether operational or not, and the contractor shall promptly replace and re-execute his own work in accordance with the District specifications.

2. If the contractor does not remove such work or materials within a reasonable time after notice, the District may cause such work or materials to be removed and stored at the expense of the developer. If the developer does not pay the expenses of such removal within 10 days' time after such removal, the District may, upon

thirty days' written notice, sell such materials at private sale and shall account for the net proceeds thereof after deducting all the costs and expenses that should have been borne by the developer.

C. EXPOSURE OF UTILITIES IN ADVANCE OF WORK

It shall be the contractor's responsibility to determine the exact location and depth of all utilities and service connections. He shall also determine the type, material, and condition of any utility which may be affected by or affect the work. The contractor shall have all utility companies field locate all underground lines before start of construction. NO EXCAVATION WILL TAKE PLACE NEAR THE DISTRICT SYSTEM WITHOUT WRITTEN PERMISSION FROM THE DISTRICT.

D. CROSSING, PROTECTION AND/OR RELOCATION OF UTILITIES

1. Special Water/Sewer Crossings:

At the locations shown on the plans or if the vertical separation between the outside of the sewer pipe and the outside of existing water pipes at crossings is less than eighteen inches (18"), and when directed by the District, the contractor shall provide the construction required per the detail shown on the plans and per the State Health Department Water/Sewer Special Construction Requirements. Such special construction shall be required every time a sewer line crosses over a water line. The special construction will be deleted at locations shown if the vertical separation of the waterline above the sewer line is eighteen inches or greater.

2. Relocation of Utilities by Contractor for His Own Convenience:

The temporary relocation or the alteration of any utility desired by a contractor solely for his own convenience in the performance of the contract work, to a position or condition other than that provided for in the specifications or shown on the drawings, shall be the contractor's own responsibility, and he shall make all the arrangements with the utility owners regarding such work.

3. At the completion of the contract work, the contractor will leave all utilities and appurtenances in a condition satisfactory to the utility owners and the owner.

E. PROTECTION OF FACILITIES OTHER THAN UTILITIES

1. It shall be the contractor's responsibility to protect in place or remove and

replace to original condition all existing facilities. It shall be the contractor's responsibility to familiarize himself with the conditions of proposed work and to identify by field investigation those features, whether or not shown on the plans, which require removal and replacement or protection in place. These features include, but are not limited to, fences, cross gutters, roads, sidewalks, driveways, curbs and gutters, power poles, signs, drainage structures, trees, landscaping, etc.

2. The contractor shall repair all existing structures which may be damaged as a result of the work under the contract. Reconstruction shall be of the same type and material as the existing facility and shall be of equal quality or better than the original work.

F. RECORD DRAWINGS

The contractor shall provide, and keep up-to-date, a complete record drawings set of blueline prints, which shall be corrected daily and show every change from the original Drawings and Specifications and the exact locations, measurements, sizes, and kinds of equipment. Prints for this purpose shall be obtained from the developer. This set of Drawings shall be kept on the work site and shall be used only as a record set. The District shall require that these drawings be presented upon completion of construction, or as directed by the District. At the completion of construction, the contractor shall deliver said final record set of prints to the district and will be required to certify the accuracy of the Record Drawings.

SECTION 1V
DESIGN STANDARDS

A. GENERAL

This section defines design requirements for sewer line installation within the Ash Creek Special Service District. It is not the intent of these specifications to restrict professional judgment, but, rather, to serve as a guide and to establish consistency in design. Sewer system improvements proposed for inclusion into the District's service area shall be designed in accordance with the criteria set forth herein, unless otherwise approved in writing by the District.
The design shall take into consideration physical conditions known to exist at the time and place of each installation and the probable operating requirements. Where such conditions render sections of these specifications inapplicable, may be incorporated in the plan.

B. SANITARY SEWER DESIGN

1. Design Flows:

(a) All sanitary sewers and appurtenances shall be designed to carry the design flows from all contiguous or adjacent areas which may, within a reasonable period in the future, be tributary thereto.

(b) Sanitary sewers must be designed to carry the peak discharge and to transport suspended material so that deposits in the sewer are precluded. Hydraulic jumps shall be avoided whenever possible. Where velocities greater than fifteen (15) feet per second are attained, special provision shall be made to protect against displacement by erosion and shock.

(c) New sewer systems shall be designed on the basis of an average daily per capita flow of not less than 100 gallons per day. This figure is assumed to provide for normal infiltration, but an additional allowance should be made where groundwater conditions are unfavorable. To provide for peak loads sanitary sewers should be designed to carry, when full, not less than the following:

Laterals and Sub Mains	400 gal. Per capita/day
Mains, trunks, and outfall	250 gal. Per capita/day

(d) The following sewage flow parameters shall be used as a general guideline for minimum estimated flows generated from future land use.

Future Residential Areas	1250 gal. Per/acre/day
Commercial Areas	1000 gal. Per/acre/day
Infiltration-inflow allowance	500 gal. Per/acre/day

(e) All sewers shall be designed and constructed with hydraulic slopes sufficient to give average daily cleaning velocities of not less than 2.0 feet per second, based on Manning's formula, using a value for "n" of 0.013. The following shall be the minimum slopes to be provided:

Sewer size (inches)	Minimum slope (ft/100 feet)
6	1.00
8	0.50
10	0.40
12	0.35
15	0.30

18	0.25
21	0.20
24	0.15

2. Pipe Velocities:

   (a) Minimum
   - Sewer mains: 2 fps
   - Force mains: 2.5 fps

   (b) Maximum
   - Sewer mains: 10 fps

3. Minimum Size and Depth:

   (a) No public sanitary sewer shall be less than 8 inches in diameter. Minimum size of house connections shall be 4 inch diameter or larger. Only one (1) residence, structure, building, or office shall be served by each 4 inch diameter sewer lateral connected to the public main.

   (b) In general, sanitary sewers shall be designed of sufficient depth to permit floor drains from basements to be connected, unless in subdivisions or areas in which basement-less houses are to be constructed. In which instance the developer shall sign a statement to this fact on all plans presented for approval and noted on the subdivision plat which is recorded at the county office. An 8' minimum of cover sewer depth is standard, shallower depths will be approved on a case by case basis by the District. Where shallower depths are unavoidable, consideration may be given to the construction of a concrete-encased, or similarly protected sewer pipeline, with or without insulation as circumstance may direct. Proper allowance for loads on the sewer shall be made because of width and depth of trench.

   (c) Minimum cover over sewer pipe should be sufficient to service adjacent property by gravity, and cover shall not be less than 8.0' to finish grade of street, unless otherwise approved by the District. In addition, sewer mains must be sufficiently deep in subdivisions to allow water lines to be set with 3' minimum cover without interference from sewer laterals.

4. Alignment:

   (a) Sewers shall be designed for uniform slope and alignment between manholes and located parallel to and at least 10 feet distant from any

waterline or any other utilities.

(b) When one sewer joins a larger one, the invert of the smaller sewer should be sufficiently high to maintain the same energy gradient. The 0.8 depth point of the smaller sewer should not be below the 0.8 depth point of the larger sewer. The tops of the pipes shall be at the same elevation. All sewers shall be designed to prevent damage from superimposed loads as well as trench loading conditions.

5. Manholes:

(a) Manholes shall be installed at the end of each line; at all changes in grade, size or alignment; at all intersections; and at distances not greater than 400 feet apart for sewers 15-inches in diameter or less, and not greater than 450 feet apart for sewers 18-inches in diameter or larger. All service lateral connections, 6" and larger and all sewer collection lines shall be made with the installation of a manhole. Manholes installed at the end of a line will be installed with a 2 foot bell end stub for future extensions. All concrete used in the manholes shall be alkali resistant concrete, as provided in these basic construction standards, unless otherwise indicated herein.

(b) All manholes shall conform to the detailed dimensions, construction details, and materials as shown on the drawing entitled “Standard Manholes” provided in the Appendix Drawings. All manholes will have a .5 to 1 inch drop through manholes.

(c) Inverts

i. Unless otherwise approved by the District, junction manholes shall have the crowns (soffits) of the intersecting pipes at the same elevation where their projections intersect the manhole centerline.

ii. When connecting to existing facilities, elevations shall be verified in the field during the design stage.

(d) Drop manholes may be utilized only upon prior approval by the District. Drops shall not be less than 3 feet. (“Steep” slopes from the first manhole upstream are preferred to drop manholes.) Drop manholes are discouraged.

(e) Manholes shall not be buried except where approved by District. Manholes shall be raised above ground level where necessary to maintain

them in farmed areas and in waterways.

(f) Manholes shall be five foot (5') in diameter, or larger, where:

i. They are more than 12' deep.
ii. Three or more pipes join in the manhole, regardless of pipe size.
iii. Pipes are larger than 8".
iv. A 45 degree bend or greater is required through the manhole.

(g) When any connection is made to an existing manhole, the core drill method shall be used.

(h) All manhole covers installed within the District shall bear the name of "Ash Creek Special Service District", or such other inscription or means of designating the manhole as part of the District's system as may be approved by the District Superintendent.

(i) Low profile rings and covers are not allowed where a concrete ring is required unless the manhole cone is modified to allow six inches of solid concrete. Flat manhole lids cannot have low profile ring and covers.

(j) All main sewer lines ending within a subdivision shall end with a manhole and necessary two foot bell stubs at the end or near the upper end of the subdivision.

(k) No manhole chimney shall exceed 22" in overall height; only 16" of grade rings shall be allowed.

(l) All manholes shall withstand tests as detailed in these standards.

6. Service Connections:

(a) Service connections to any public sanitary sewer shall be made to a wye installed at the time of the sewer main installation or by machine tap and approved saddle appropriate to the main line sewer material, or a 45 degree to 90 degree entrance into a manhole. All connections and service lines must be water tight. Clean-outs shall be made with a sanitary wye. Every sewer lateral trench shall be compacted and tested to 95%. Compaction tests are to be provided to the District every 7-10 days during construction. The end of the lateral shall be identified by a steel "T" post, which shall be long enough to reach from the lateral pipe flow line top to 3' above ground level. All lateral cleanouts shall have a metal cap

reinforced with concrete over the regular cleanout cap. The District shall approve a cleanout protection (concrete and steel lid) and notify the city before occupancy of a home or business.

(b) Under no circumstances shall roof drains, foundation drains, storm drains, or sub-drains be connected to the sanitary sewer system.

7. Sewage Injectors:

(a) In some extreme circumstances, the ability to service an individual lot by gravity may be uneconomical based on shallow depths of the mainline sewer. The definition of these circumstances shall be determined by the District. Should the District determine these conditions exist for a lot, and upon District approval, an individual sewage injector may be used.

(b) The injector shall be constructed to U.P.C. standards on private property by the property owner or developer. Maintenance of the injector shall be the responsibility of the property owner.

8. Industrial Waste Provisions:

(a) The developers of any commercial/industrial project or development shall provide the District with detailed information concerning the project's expected wastewater quality and quantity. The District will review this information and determine which of the following facilities are required:

i. Building sewer sampler.
ii. Wastewater flow monitoring station.
iii. Gravity separator
iv. Industrial waste clarifier.
v. Pretreatment facilities.

(b) Under certain circumstances, the district may require special pipe installation procedures or types of pipe, including special protective coating for pipe and fittings.

(c) All truck/car washes will be a recirculating non-discharge type.

(d). All industrial laterals shall run to a manhole.

SECTION V.
PUMP STATION REQUIREMENTS

A. GENERAL

All pump stations built within the boundaries of the District will be built according to the following specifications contained herein. Exact design is not stipulated because of individual circumstances. Correct construction practices shall be followed in all phases.

B. PUMPS

All pumps shall be the Gorman-Rupp surface mount, self priming type. At least two (2) self priming pumps set in a line, with each being large enough to pump the total peak design flow.

C. ALTERNATE POWER SOURCE

A backup natural gas or diesel fuel powered alternate power source shall be provided and installed. Following a thirty (30) second power outage, the alternate power source shall start. Power supply shall be adequate for the pumps to discharge the flow until normal power returns. When normal power returns the alternate power source shall automatically shut off.

D. PHONE SYSTEM

A cellular, or direct wire programmable phone shall be programed to call six (6) separate numbers in sequence with a message when the power fails or an un-pumped high flow is experienced at the pump station.

E. BACKUP PUMP

A complete back-up pump unit and/or a rotating assembly, as applicable, shall be provided in a crate ready for installation in the event that any of the pumps malfunction. A manufacturers recommended stock items packet shall also be included.

F. BELTS AND SHIMS

An extra set of belts and a set of shims, to be installed at a later date to make the pump station more economical when the flow is greater, will be delivered and

stored in the pump station. These belts and shims shall be packaged so they will remain damage free until they are put into use.

G. ELECTRICAL

An hour meter will be required for each pump. Gauges for the charge, discharge side of the pump, and all appropriate electrical panels, boxes, relays, and alarms with lights and sirens shall be provided and correctly installed. Power outage control, inside and out side lighting, outlet switches and electric winches shall be provided and properly installed. Lights, alarms, and phone shall be provided and correctly installed.

H. BUILDING

A building of block or brick or other comparable material shall be built over the wetwell. The building shall have doors (including garage doors), windows, piping (including a culinary water service), and floor drains. An all weather road, fencing and any other conveniences shall be installed to provide a good, safe working area in and around the pump station. An over flow pit large enough to handle the flow of the pump station inflow line for a minimum of two (2) hours shall also be provided inside the fenced area. All exterior doors shall be keyed to fit the existing District pump station locks. Vandal proof air circulation vents of adequate size shall be near the floor. The building shall be of sufficient size to contain all components, and provide adequate space for maintenance and repair of said components.

I. PRESSURE PIPE LINE

All piping shall comply with the following:

1. After the pipe has been laid and the line has been backfilled in accordance with the Section on “Backfilling and Grading” of these Construction Standards, the pipe, unless otherwise directed by the engineer, shall be subjected to hydrostatic pressure of not less than 200 pounds per square inch. The duration of each such test shall be two (2) hours. Water added to maintain the pressure shall not exceed 0.4 gallons per inch diameter per 1,000 lineal feet of main being tested during the 2-hour test period. The pipe shall be slowly filled with water and the specified test pressure, measured at the lowest point of elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, gauges and all necessary apparatus shall be furnished by the contractor. Gauges and measuring devices must meet with the acceptance of the engineer and the necessary pipe taps made as directed. Before applying the specified test pressure, all air shall be expelled from the pipe.

2. Any cracked or defective pipes, or fittings shall be removed and replaced by the contractor with sound material in the manner provided. The test shall be repeated until the main passes the pressure test and is accepted by the engineer. No metal fitting shall be allowed.

3. A corrosion proof tracer wire will be installed within 6 inches under the pipe, with one end attached to the pump house or pump and the other end to the manhole metal ring. The tracer wire shall be brought up and attached to the surface ring at each air release each manhole and inside the pump house. This wire shall be marked "tracer wire".

4. Grease filled wire nuts (direct bury wire nuts) shall be used for all connections and repairs.

J. WET WELL

Wet well construction and capacity shall be as recommended by the pump manufacturer, or as directed by the District. The developer's engineer shall provide all calculations necessary for the district to evaluate the wet well and related components.

K. PUMP STATION EXCLUSION

A pump station shall not be allowed if a gravity pipe line can be installed for less than approximately 5 times the estimated cost of the proposed pump station.

L. CLEANING OF PRESSURE SEWER LINES

All sewer lift stations shall be provided with a "Y" branch and gate valve of adequate opening size within the lift station for the launching of a "pig" for cleaning of the pressure sewer line.

M. SITE DEED

Any site used for a pump station shall be conveyed to District by warranty deed or other form of conveyance approved by District.

N. AIR VAC

A combination air vac shall be placed every 1,200 feet or less and at all high spots. Pipe shall, where possible, be installed in a constant uphill slope leaving pump house. The air vac shall be model D-025 plastic as manufactured by ARI, or an approved equal.

O. JOINT RESTRAINTS

Joint restraint schedule shall be the Hurricane City water main joint restraint schedule.

SECTION VI.
PIPELINE CONSTRUCTION

A. GENERAL

This section covers the requirements for trenching, backfilling, etc. for underground sewer pipelines. Backfill shall include filling of all trenches to the original ground level or as otherwise directed by the engineer. In any subdivision or other extension of sewer lines, a solid plug shall be installed in the lowest manhole as determined by District. The plug shall be removed by the developer at such time as may be directed by District after completion of the project.

B. CONTROL OF GROUND WATER

1. All trenches shall be kept free from water during excavation, fine grading, pipe laying, jointing, and embedment operations. Surface water shall be prevented from entering trenches.

2. Where the trench bottom is mucky or otherwise unstable because of the presence of ground water, and in cases where the static ground water elevation is above the bottom of any trench or bell hole excavation, such ground water shall be lowered to the extent necessary to keep the trench free from water and the trench bottom stable when the work within the trench is in progress.

3. The contractor shall provide and maintain at all times during construction, adequate means and devices with which to promptly remove and dispose of all water entering the excavations or other parts of the work. Ground water shall not be allowed to rise around pipe installations until the trench is backfilled.

4. The contractor shall dispose of the water from the work in a suitable manner without damage to adjacent property. No water shall be drained into work built or under construction. Water shall be disposed of in such a manner as not to be a menace to the public health.

5. De-watering for pipe lines shall commence when ground water is first encountered, and shall be continuous until such times as water may be allowed to rise in accordance with the provisions of this section.

C. EXCAVATION FOR PIPELINE

1. Trench excavation shall include all operations necessary for excavation of all materials of whatever nature coming within the designated alignment of the sewer pipeline. The bottom 2 feet of the trench shall be vertical. All finish grade excavation necessary for preparation of the trench bottom shall be made manually. No over-excavating shall be allowed without re-compaction of backfill in accordance with these specifications. Excavation for trenches in ledge rock, cobble rock, stones, mud or other material unsatisfactory for pipe foundation shall extend to a depth of at least 4 inches below the bottom of the pipe. A bedding of special material shall be placed and thoroughly compacted with pneumatic tampers in 4-inch lifts to provide a smooth, stable foundation. Special foundation material shall consist of suitable earth materials free from roots, sod or vegetable matter. Where unstable earth or muck is encountered in the excavation at the grade of the pipe, a minimum of 12 inches below grade will be removed and backfilled with crushed rock or gravel to provide a stable sub-grade.

2. The maximum width of trench, measured at the top of the pipe, shall not be less then 3 inches on each side of the sewer pipe, but not wider that 15 inches on each side of sewer pipe.

3. Wherever the sub-grade material does not afford a sufficiently solid foundation to support the pipe and superimposed load, where water must be drained to maintain a dry bottom for pipe installation, and at other locations as previously defined, the sub-grade shall be over-excavated to the specified depth and replaced with crushed rock or gravel. Gravel conforming to the following gradation shall be used:

SCREEN	PERCENT PASSING
1/4	100
NO. 50	5

The gravel material shall be deposited over the entire trench width in 6-inch maximum layers. Each layer shall be compacted by tamping, rolling vibrating, spading, slicing, rodding or by a combination of one or more of these methods. In addition the material shall be graded to produce a uniform and continuous support for the installed pipe.

D. PIPE LAYING AND BEDDING

1. Pipe will be carefully inspected in the field before and after laying. If the District finds any cause for rejection of a pipe after it has been laid, it shall be removed by the contractor at his expense.

2. When connections are to be made to any existing pipe, conduit or other appurtenances, the actual elevation or position of which cannot be determined without excavation, the contractor shall excavate for, and expose the existing improvement before laying any pipe or conduit. The District shall be given the opportunity to inspect the existing pipe or conduit before connections made. Any adjustments in line or grade which may be necessary to accomplish the intent of the plan will be made.

3. Pipe shall be laid upgrade with the socket or collar ends of the pipe upgrade unless otherwise authorized by the District.

4. Pipe shall be laid true to line and grade, with uniform bearing under the full length of the barrel of the pipe. Suitable excavation shall be made to receive the bell or collar. Any pipe which is not true to alignment or shows any settlement after laying shall be taken up and relaid at the contractor's expense.

5. The following line and grade requirements shall be met:

(a) All sewer pipe shall be installed accurately to the defined line and grade with the following limits: variance from established line and grade shall not be greater than 1/32 of an inch per inch of pipe diameter and not to exceed 1/4 inch, provided that such variation does not result in a level or reverse sloping invert; provided also that variation in the invert elevation between adjoining ends of pipe, due to nonconcentricity of joining surface and pipe interior surfaces does not exceed 1/64 inch per inch of pipe diameter, or 1/4 inch maximum.

(b) Wherever possible, sanitary sewer shall be installed on the downhill side of the street. If a different alignment is required by a municipality, the District will follow the rules of said municipality.

6. All pipe shall be laid in accordance with the following:

(a) The developer or contractor shall furnish and install all sewer pipeline material required for the construction of the sewer and appurtenances. All pipeline material shall be installed per manufacturer's published recommendations and per the applicable published standards for the particular material being installed unless otherwise modified herein. In case of any conflict, the most stringent and highest requirement shall govern, and the contractor shall adhere to said requirement.

(b) A groove shall be excavated in the bottom of the trench to receive the bottom quadrant of the pipe. Before preparing the groove, the trench

bottom shall be excavated or filled and compacted to an elevation sufficiently above the grade of the pipe so that, when completed, the pipe will be true to line and grade. Bell holes shall be excavated so that only the barrel of the pipe receives bearing from the trench bottom. Large rocks (over 6 inches) near the bottom of the trench shall be removed and the hole refilled with approved backfill.

(c) Sewer pipe shall be laid upgrade. All pipe installation shall proceed with joints closely and accurately fitted. Gaskets shall be fitted properly in place and care shall be taken in joining the pipe units to avoid twisting or pushing the gaskets out of the gasket groove. Joints shall be clean and dry and a joint lubricant, as recommended by the pipe supplier, shall be applied uniformly to the mating joint surfaces to facilitate easy, positive joint closures.

(d) Not withstanding prior factory or yard inspection, the District shall have the right to reject any damaged or defective pipe found on the job which in District opinion will affect the durability of the installation, and the District may order its removal from the work. If adjustments of position of pipe length is required after being laid, it shall be removed and rejointed as for a new pipe. When laying is not in progress, the ends of the pipe shall be closed with a tight-fitting stopper to prevent the entrance of foreign material. In addition to the above requirements, all pipe installation shall comply to the specified requirements of the pipe manufacturer.

(e) Pipe laying shall proceed upgrade with the spigot ends of bell-and - spigot pipe pointing in the direction of the flow. Each pipe shall be laid true to line and grade and in such manner as to form a close concentric joint with the adjoining pipe, following the manufacturer's instructions for the specific jointing method being used. Any pipe which is not in true alignment or shows any undo settlement after laying shall be taken up and relaid at the contractor's expense. The contractor shall clean the pipe by balling or use of a jet vacuum truck. No cleaning water shall be allowed in a sewer pipe line in service.

7. The following pipe bedding requirements shall be met:

(a) Pipe shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfilling operations by being adequately bedded.

(b) Pipe bedding materials placed at any point below an elevation 12

inches above the top of the pipe shall be deposited and compacted in layers not to exceed 6 inches in compacted depth. Deposition and compaction of bedding materials shall be done simultaneously and uniformly on both sides of the pipe. Compaction shall be accomplished with hand or mechanical compactors, until the bottom half of the pipe has been compacted. All bedding materials shall be placed in the trench with hand tools or other approved method in such a manner that they will be scattered alongside the pipe and not dropped into the trench in compact masses. Bedding materials shall be loose earth, free from lumps, and rocks larger than 1 inch diameter; with all materials free from roots, sod, or other vegetative matter.

(c) In the event trench materials are not satisfactory for pipe bedding, modified imported bedding will be required. Modified bedding shall consist of placing compacted granular material on each side of and to the level of 12 inches above the top of the pipe.

E. BACKFILLING

1. Backfill shall be carefully placed around and over pipes and shall not be permitted to fall directly on a pipe from such a height or in such a manner as to cause damage.

2. The backfill in all utility trenches shall be compacted. The in-place density shall be a minimum of 95 percent of laboratory standard maximum dry density as determined by ASTMD-1557

3. Backfill material shall be approved by the District and shall not contain any wood, grass, roots, broken concrete, trash or debris of any kind that may cause unequal settlement or improper consolidation. No gravel larger then 1 inch shall be used at the pipe zone.

4. Backfill procedure above the pipe zone shall be as follows: the backfill above a point 1 foot above the top of the pipe shall be backfilled in horizontal layers 12 inches thick or less with materials containing no brush, perishable or objectionable material, rocks, stones, or boulders larger that 4 inches in the greatest dimension.

5. When directed by District, mechanical compaction shall be completed in accordance with the following:

(a) Structural and trench backfill shall be deposited in horizontal layers and compacted so that the compacted material will be homogenous and

free from lenses, pockets, streaks, and other imperfections.

(b) The excavation and filling operations shall be such that the materials when compacted will be blended sufficiently to secure the best practicable degree of compaction, impermeability, and stability. Prior to and during compaction operations, material shall have the optimum moisture content and shall be uniform throughout each layer. Where feasible, moistening of the materials shall be performed at the site of excavation. If the moisture content is not optimum for compaction, the compaction operations shall be delayed until such time as the material has been brought to the optimum moisture content. When the material has been properly conditioned, it shall be compacted using mechanical equipment.

(c) When hand compacted methods are specified or required because of the location. Approved hand compaction equipment shall be used.

F. TRENCHES ON HIGHWAYS AND STREETS

Wherever trenches must cross state highways or major county or city streets, the contractor shall obtain such excavation permits as are required for these crossings and shall become familiar with and abide by the rules and directions of these public agencies while constructing lines in streets.

G. CLEARING AND GRUBBING

It shall be the contractor's responsibility to remove and depose of all excess material resulting from clearing and grubbing operations.

H. COMPACTION TESTS

1. Compaction tests shall be provided by the Contractor through an independent materials testing laboratory. Tests shall be made at intervals not greater than 250' and in addition every service laterals shall be tested. The tests shall be in accordance with the sand cone method or nuclear density method, and shall be made at varying depths at each test interval. The testing laboratory shall provide the District copies of the test results by mail, hand delivery, fax, or email. These results shall be provided every 7-10 days during construction.

2. The contractor shall provide, at his own expense, all labor and equipment necessary for all compaction test holes. Choice of location of all tests will be made by the District.

3. It shall be the contractor's responsibility to advise the District two working

days prior to completing compaction tests, so the District can be present during testing.

4. All fill areas under sewer pipelines shall be compacted to 100%, and tests shall be provided to District every 7-10 days while fill is under construction. Tests are to be at various depths and will not exceed a 250' distance from the last test.

I. COMPACTION REQUIREMENTS UNDER AGENCY PERMIT.

Where the permit of a governing agency sets forth requirements for compaction more stringent than those stated herein, the contractor shall adhere to the agency requirements.

SECTION VII
SEWER PIPE AND FITTINGS

A. GENERAL

This section specifies acceptable sewer pipe and accessories.

B. CONCRETE PIPE, ABS COMPOSITE AND SOLID WALL PIPE

Concrete pipe, ABS composite and solid wall pipe shall not be accepted in the construction and installation of sewer lines within the District.

C. PLASTIC SEWER PIPE

Rigid polyvinyl chloride pipe and fittings (hereinafter referred to as PVC pipe and PVC fittings) may be used in accordance with the following:

1. All PVC pipe and PVC fittings shall meet or exceed all of the requirements of ASTM specification SDR-35 and D-3034, and may be used in gravity sanitary sewers of 4" through 12" in diameter.

2. Samples of pipe and physical and chemical data sheets shall be submitted to the District for approval, and approval shall be obtained before pipe is purchased. All pipe shall be homogenous throughout and free from cracks, holes, foreign inclusions or other defects. The pipe shall be as uniform as commercially practical in color.

3. All PVC sewer pipe shall be made from clean, virgin, type 1, grade 1, PVC

conforming to ASTM resin specification D-1784. All pipe joints shall be bell and spigot type with rubber ring gasket to permit expansion and contraction. Pipe and fittings must be assembled with a nontoxic lubricant. 4-inch and 6-inch diameter pipe may be the solvent weld type. All pipe shall be less than 20 feet in length. Pipe shall have the following minimum dimensions:

NOMINAL PIPE SIZE INCHES	OUTSIDE DIAMETER INCHES	MINIMUM WALL THICKNESS, INCHES
4	4.250	0.125
6	6.275	0.180
8	8.400	0.240
10	10.500	0.300
12	12.500	0.360

4. Spigot ends will have 15 degrees tapered end with a memory mark around the diameter of the pipe to indicate proper insertion depth.

5. Wyes shall be of the same material as the pipe, and in no case shall have thinner walls than that of the pipe furnished. Sample wyes must be submitted for the District's approval, and approval must be obtained before purchase of wyes.

D. SEWER LATERALS

1. Sewer laterals shall be constructed as shown in the standard drawings. The contractor shall field reference each lateral connection with a surface marker. The marker shall be as specified on the standard drawing. A 3" tall or larger "S" shall also be stamped in curb. The end of the lateral shall be extended beyond all other utilities in the subdivision. Laterals will be left at grade and will be marked with a steel T post and will be placed at the end of the lateral and installed at least 3' above the ground. All laterals shall extend 20' in back of the curb and/or 15 feet from back of the property line and shall extend behind all other utilities. The District will require that the end of the laterals pass the same compaction test as those required in the roadway. The location of compaction tests and number of laterals tested will be decided by the District. A suitable plug shall be provided, glued and installed immediately after construction and prior to backfilling operations to insure a watertight lateral. The entire sewer lateral shall be the responsibility of the property owner. The property owner shall be responsible for cleaning, repairing and correcting any other problem associated with sewer laterals.

2. All sewer laterals shall be constructed of the same material as the sewer main to which it shall be connected, and shall meet the requirements of the section of

these specifications entitled “Basic Pipeline Materials Specifications.”

3. Tees and wyes shall be of the same material as the sewer main. The longitudinal barrel of the tee or wye shall be of the same size as the sewer main. A suitable plug shall be provided and installed prior to backfilling operations to ensure a watertight joint.

4. All sewer laterals shall be constructed and installed per the standard drawing. In no case shall any lateral be constructed at less than two percent (2%) slope and not less than a 90 degree angle to the main line, unless approved by the District. The sewer lateral shall be constructed a minimum distance of ten (10) feet from existing water services. All laterals shall be cleaned before main lines are cleaned. Using a fire hose to flush the lateral will be sufficient, or other methods can be approved.

5. Sewer lateral cleanouts shall be constructed at or near property line and at about 5 feet from the building foundation when houses are built, and shall be installed or replaced in such a manner so that the lateral can be located by house sheets, metal detector or electronic markers. The concrete protected metal lids over the PVC caps shall be inspected by the District before a certificate of occupancy shall be given. The contractor or person installing the sewer lateral cleanout shall notify the District of the location of the sewer lateral cleanout for record keeping purposes.

E. STEEL CASING

1. Steel casing shall be of sheets conforming to ASTM Specification A-283 Construction may be by open trench. If the contractor elect to install the casing pipe by jacking, the provisions of these specifications for jacked steel casing pipe shall apply.

2. The casing pipe shall have a steel thickness not less than 1/4 inches. It shall be the contractor’s responsibility for selecting a size of casing, at or above the minimum specified, in order that the installation may be done with a sufficient degree of accuracy.

3. Carrier pipe conforming to these specifications for the designated pipe shall be supported on redwood skids secured with stainless steel bands. The ends of the steel casing shall be sealed with a weephole installed at lower end for drainage. The annular space between the steel casings and carrier pipe shall be left empty unless grouting is specified by the District.

F. JACKED STEEL CASING

1. Jacked steel casing shall be of sheets conforming to ASTM Specification A-283. The casing pipe shall have a steel thickness not less than 3/8 inch. The casing pipe shall be minimum of 20 feet in length to a maximum of 40 feet in length.

2. Steel casing pipe of the minimum size and thickness specified shall be installed in place by jacking and boring methods without the use of water or air, and to grades required to install carrier pipe. If the bore casing is equal to or exceeds 18-inches in diameter and the length of the bore exceeds 80 feet in length, the boring shall be completed using a track machine, unless otherwise approved by the District.

3. The carrier pipe shall be supported on redwood skids secured with stainless steel bands. The ends of the steel casing shall be sealed with a weephole installed at lower end for drainage. The annular space between the steel casing and carrier pipe shall be left empty unless grouting is specified by the District

4. Voids, if developed outside the casing and within limits for boring or jacking, from any cause such as removal of rocks encountered in boring, shall be filled with lean grout forced in under pressure by insertion of a grout pipe outside of the casing. The lean grout shall consist of one part of Portland cement to not more than four parts of sand by volume placed at low pressure. Grout pressure is to be controlled so as to avoid deformation of the casing. Sand for grout to be placed outside the casing shall be of such fineness that 100% will pass a No. 8 sieve and no less than 35% will pass a No. 50 sieve.

SECTION VIII
MANHOLES

A. CONCRETE BASES

Manhole bases shall be of cast-in-place or precast concrete conforming to the requirements of Section V of these specifications. Where sewer lines pass through or enter manholes, the invert channels shall be smooth, grouted where necessary and semicircular in cross section. Changes of direction of flow within the manholes shall be made with a smooth curve with as long a radius as possible. The floor of the manhole outside the flow channels shall be smooth and slope toward the channel at not less than ½ inch per foot. Manholes shall have step rungs placed at a distance of no greater then 1 foot apart. Steps are to be installed not over but next to the inlet flow channel, as directed by the District inspector.

B. WALL AND CONE SECTION

All manholes shall have a minimum of 48 inches I.D. The cones shall be precast, sectional, reinforced concrete pipe or poly materials. Both cylindrical and taper sections shall conform to all requirements of ASTM Designation C-76 for Reinforced Concrete manhole sections.

1. The throat section of the manhole shall be adjustable, by use of grade rings. Grade rings rings will not exceed 16" in height

2. The taper section shall be a maximum of 3 feet in height, shall be of concentric conical design, and shall taper uniformly from 48 or 60 inches to 30 inches inside diameter.

3. The 48 or 60 inch inside diameter used in the base section shall be furnished in section lengths of 1, 2, 3, and 4 feet as required.

4. Reinforcing steel shall consist of a circular cage with a minimum cross-sectional area of 3/10 square inch of steel per foot in both directions.

5. 6" to 8" pipe will require a 48" manhole, 10" to 21" will require a 60" manhole. Pipe larger than 21" will be decided by the District.

6. Manholes shall be five feet (5') in diameter where:
   (a) They are more then 12' deep.
   (b) Three or more pipes of any size join in the manhole, or
   (c) Pipes are larger than 8'.
   (d) A 90º bend or greater is required through the manhole.

7. All manhole cones and grade rings shall be carefully set to the grade.

8. Two foot bell end with short pipe, and glued cap stubs should be installed in all new manholes where future construction could hook on.

9. The minimum channel opening size should be at least 3' long by 1' wide. All channel openings should extend to within 6" of manhole wall. Grouting on pre-cast manhole bases is required.

10. The District may require re-bar in unusual manhole bases.

11. All poured (on site) concrete bases shall be wet poured around the bottom manhole section or Section placed in wet concrete. The junction joint is to be troweled smooth for a water tight seal.

12. All joint surfaces of precast sections and the face of the manhole base shall be thoroughly cleaned prior to setting precast sections. Joints shall be sealed with 1 inch flexible joint sealant equal to or exceeding AASHTO M-198.

C. WATER TIGHTNESS

1. Watertight concrete is required in all concrete manholes. Any cracks or imperfections developing at any point in the work shall be satisfactorily repaired. Materials and methods used shall be subject to approval by the District.

2. Manhole frame/rings shall be set in place on the shaft and shall be sealed with an approved flexible joint sealant equal to Federal Specification SS-S00210. Frames/rings, covers, and dust pans shall be protected during the backfill and compaction of trenches and during the replacing of road surfaces. Any frames/rings, covers, or dust pans loosened from the shaft shall be reset and any frames/rings, covers or dust pans damaged or broken shall be replaced by the Contractor at his expense. The manholes shall also be cleaned by the contractor.

D. IRON CASTING

1. All iron castings shall conform to the requirements of ASTM A-48 (Class 30) for grey iron castings.

2. Frames and covers shall be a minimum combined weight of 402 pounds.

3. The cover and frame/ring seat shall be machined so that the entire area of the seat will be in contact with the cover, in any position of the cover on the seat. Frames/rings and covers shall be so constructed and machined that the parts are interchangeable.

4. The tops of the cover and frames/rings shall be flush, and there shall be a 1/8-inch clearance all around between the frames and cover.

5. The top surface of each cover shall be cast with a studded pattern including the words “Ash Creek SSD” Letters and studs shall be raised 3/8 inch. The letters shall not be less then 2½ inches high. Each cover shall be provided with not less than 12 each 3/4-inch diameter ventilating holes.

E. DUST PANS

Dust pans are not allowed in the system.

F. MANHOLE LEAKAGE TEST

All manholes shall be tested for leakage. Allowable leakage shall be 1.0 gallon per hour per manhole. At least 20% of the manholes shall be tested and based on these tests and visual inspection of all manholes, additional tests may be required for other manholes. Any manhole whose test is unsatisfactory shall be repaired and retested until satisfactory results are obtained.

G. CONNECTIONS TO EXISTING MANHOLES

The contractor shall make connections to existing manholes as directed by the District. If a new opening is required, it shall be core drilled. Where new flow-through channels have to be cut in the existing manhole base, they shall be cut so that the resulting section is smooth and conforms to the intended shape. Deviation from form and grade shall not be greater than 1/4 inch. If rough, the channel surface shall be smoothed with epoxy mortar. The new sewer shall be firmly embedded in where it joins the existing manhole.

H. TEMPORARY HANDLING OF SEWAGE

Certain work in connection with tying into existing sewers and manholes may require the temporary handling of sewage either by temporary bypass lines, pumping, bulk heading at low flows, or other means. The method used shall be approved by the District prior to the commencement of construction. Sewage so diverted shall be handled in a manner so as not to create a public nuisance or health hazard.

SECTION IX

CLEANING AND TESTING SANITARY SEWER

A. GENERAL

This section specifies requirements for determining acceptability of sewer systems. All air testing and video inspection required hereafter shall be conducted after other utilities have been installed. No testing of the sewer systems shall be started until all other utilities have completed construction.

B. CLEANING

1. After the sewer lines have been installed and the trench backfilled, they shall

be thoroughly cleaned and tested for leakage and alignment in the presence of a District representative before acceptance by the District. All sewer facilities shall be visually checked and all foreign objects, materials or obstructions removed from the facilities. Cleaning shall be done using approved methods. Wastewater and debris shall not be permitted to enter sewer lines in service, but shall be removed at the lowest manhole of the extension. After the lines have been thoroughly cleaned, they shall be tested between all manholes for displacement, as described hereafter.

2. All manholes leading to or providing access to an existing sewer line shall have balls or plugs inserted to keep foreign objects out of existing sewer. They shall only be removed after cleaning and in the presence of the District representative.

C. DISPLACEMENT TEST

The displacement test shall be conducted by the contractor and shall consist of the following: a light will be flashed between manholes, or, if the manholes have not yet been constructed, between the locations of the manholes, by means of a flashlight or by reflecting sunlight with a mirror. If the illuminated interior of the pipe shows broken, misaligned or displaced pipe, or other defects, the defects designated by the District shall be remedied. After cleaning and inspection have been completed, the line shall be tested for leakage by the methods described hereafter.

D. AIR TESTING

An air test shall be completed in accordance with the following procedure and standards:

1. The reach or span of pipe to be tested shall be isolated by completely blocking all outlets in the section under test. Careful attention must be given to blocking all plugs. The pipe must be wetted to minimize any loss of air through the pipe wall as a result of permeability in the dry condition. One of the plugs used at the manhole must be equipped to control the air entry rate and to prevent the pressure from exceeding 5 psig. This can be done by means of a blow off valve set to operate at 5 psig.

2. After the pipe has been wetted and plugs installed, the air should be allowed to slowly fill the pipe until a constant pressure of 4.0 psig is attained. After 4.0 psi is attained, the air hose is disconnected and pressure maintained for at least 2 minutes.

3. Check during this 2-minute stabilization period, with a soap solution, all plugs and exposed fittings. If a leak is found, bleed off the air, repair the leak and start a new 2-minute stabilization period. When the temperature of the air has reached equilibrium with that of the pipe wall, bring the air pressure to 4 psig and disconnect the air supply. The gauge is then watched until the pressure reaches 3.5 psig, at which time a stop watch is started and then stopped when the pressure reaches 2.5 psig. The time required as shown on the watch for a loss of 1.0 psig at on average pressure of 3.0 psig is used to calculate the rate of air loss.

4. The pipeline may be considered to have passed the air loss test successfully if the loss of air is not greater than a rate of 0.0030 cubic feet per minute per square foot of internal pipe surface. The following table shows the allowable time for the pressure to go from 3.5 to 2.5 psig for respective pipe diameters.

Pipe Diameter	Time Min.	Sec.	Pipe Diameter	Time Min.	Sec.
6"	3	0	18"	8	30
8"	3	45	20"	9	30
10"	4	45	21"	10	0
12"	5	45	24"	11	15
14"	6	30	27"	12	45
15"	7	0	30"	14	0
16"	7	30	36"	17	0

If the time lapse exceeds that shown in the table, the pipe shall be presumed to be within acceptable limits; if the time lapse is less, the contractor shall make the necessary corrections to reduce the leakage to acceptable limits by repair methods.

E. EX-FILTRATION TEST

In lieu of the standard sanitary sewer air test, the contractor may perform an exfiltration test on sewer lines and facilities in accordance with the following: .

1. The test section shall be bulkheaded and the pipe subjected to a hydrostatic pressure produced by a head of water at a depth of 3 feet above the invert of the sewer at the upper manhole under test. In areas where ground water exists, this head of water shall be 3 feet above the existing water table.

2. The head of water shall be maintained for a period of 1 hour, during which it is presumed that full absorption of the pipe body and manhole has taken place, and thereafter for a further period of 1 hour for the actual test leakage. During this 1-

hour test period the measured maximum allowable rate of ex-filtration for any section of sewer, including service stubs, shall be as listed below:

MAIN SEWER DIAMETER (In Inches)	MAXIMUM ALLOWABLE EX-FILTRATION Gallons Per Hour Per 100 Feet
6	1.2
8	1.6
10	2.0
12	2.4
15	2.8
18	3.2
21	3.6
24 & Larger	4.0

3. In the event that measurements indicate an ex-filtration greater than the maximum allowable leakage, additional measurements shall be taken and continued until all leaks are located and the necessary repairs and corrective work have reduced the leakage to less than the maximum allowed by the specifications. For purposes of this test, the line between adjoining manholes will be considered a section and will be tested as such.

4. The contractor shall furnish the plugs, standpipe, and other material and labor for placing the plugs and standpipe in the sewer and shall assist the District in making measurements.

5. The introduction of any substance into the water used for testing with the intent of sealing leaks will not be permitted. If results of either of these test are not satisfactory, repairs or pipe replacement will be required until the District is satisfied that the leakage requirements are being met. All repair methods and materials used must be accepted by the District.

F. PRESSURE PIPE LINE

All pressure lines shall be subjected to the following test and shall meet the following standards:

1. After the pipe has been laid, and the line has been backfilled in accordance with these Construction Standards, the pipe, unless otherwise directed by the District, shall be subjected to hydrostatic pressure of not less than 200 pounds per square inch. The duration of each such test shall be two (2) hours. Water added to maintain the pressure shall not exceed 0.4 gallons per inch diameter per 1,000

lineal feet of main being tested during the 2-hour test period. The pipe shall be slowly filled with water and the specified test pressure, measured at the lowest point of elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, gauges and all necessary apparatus shall be furnished by the contractor. Gauges and measuring devices must meet with the acceptance of the District and the necessary pipe taps made as directed. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary at points of highest elevations and air release valves installed.

2, Any cracked or defective pipes and fittings shall be removed and replaced by the contractor with sound material in the manner specified by these rules. The test shall be repeated until the sewer line passes the pressure test and is accepted by the District.

G. MAIN LINE DEFLECTION TEST

1. All main line pipe shall be mandrelled with a rigid device to pass 5 percent or less deflection of the pipe. These allowances shall include deformations due to all causes (wall thickness variations, shipping, production, heat, etc.). The mandrel (go/no go) device shall be cylindrical in shape and construction with 9 evenly spaced arms or prongs and dimensioned tolerance of $\pm$0.01 inch. The contact length at the mandrel's arms shall equal or exceed the pipe nominal diameter except that 10 inches and 12 inches shall be allowed for 12-inch and 15-inch pipe respectively.

2. The mandrel shall be hand pulled by the contractor through all sewer lines. Any sections of sewer not passing the mandrel shall be uncovered and the contractor shall re-round or replace the sewer pipe to the satisfaction of the District. All repaired sections shall be retested.

H. INSPECTION AND FLUSHING

1, Sewers can be cleaned by a jet-vacuum truck or other appropriate methods. All dirt and debris shall be prevented from entering the existing sewer system by means of watertight plugs or other suitable methods.

2. Upon completion of the pipeline installation, the District will carefully inspect all sewers and appurtenances. Any unsatisfactory work shall be removed and replaced in proper manner. The invert of the sewer and manholes shall be left smooth, clean, and free from any obstructions throughout the entire line. Manhole rings/frames and covers must be raised to finished grade before acceptance of the sewer.

J. VIDEO INSPECTION

The contractor shall be responsible for providing a video inspection of the sewer lines and related facilities in accordance with the following:

1. Upon successful completion of the final leakage test for the sewer and prior to paving, the contractor shall notify the District that the sewer pipelines and facilities are ready for video inspection. Said notification shall be made at least three working days in advance of the actual video inspection date. The District is to do the TV inspection. Prices will be by the hour as set by the District. Prior to the video inspection, the contractor shall be responsible to provide the following items.

    (a) Clean sewer pipelines free of all dirt, rock, debris, etc.

    (b) Water source with an adequate amount water, pipe, hose, etc, to place enough water in the pipelines to evaluate pipeline low spots.

    (c) Drive able truck access to each manhole within the system to be videoed.

    (d) Any necessary traffic control.

2. In the event that the contractor fails to provide any of the items by the time the video inspection is to occur, the contractor shall be required to reimburse District for any costs incurred.

3. The District shall;

    (a) notify the contractor that he may proceed with the completion of the project, or

    (b) provide to contractor a list of corrective measures that must occur prior to acceptance.

4. Should remedial activities or measures be necessary, the reconstruction methodology shall be approved by the District prior to commencement of the work. Upon completion of the remedial construction, the contractor shall once again notify the District that the sewer lines are ready for a video inspection. The District reserves the right to re-video any portions of the sewer system they determine may have been affected by the reconstruction work activities.

5. The District will, at no cost to the developer or contractor, perform a video inspection one time before 1 year final approval date. Any additional video inspections before or after said 1 year approval date shall be performed by District, subject to reimbursement from the developer or contractor.

SECTION X
CONCRETE SPECIFICATIONS

All concrete shall conform to the standards and specifications of the Utah Department of Transportation, which are incorporated herein by this reference.

SECTION XI
RESTORATION OF SURFACE IMPROVEMENTS

A. GENERAL

The contractor shall be responsible for the protection and the restoration or replacement of any improvements existing on public or private property at the start of work or placed there during the progress of the work. Such improvements shall include, but shall not be limited to, any permanent surfacing, curbs, ditches, driveways, culverts, fences, and walls. Any improvement removed or damaged shall be repaired, restored or reconstructed to a condition which is equal to or better than its preconstruction condition. Before acceptance of the work by the District, the agency having jurisdiction of such improvement (city or county) shall first approve all restoration, repair or reconstruction of such improvement.

B. ROAD BASE

Where trenches are excavated through gravel surfaced areas, such as roads and driveways, etc., the gravel surface shall be restored and maintained as follows:

1. The gravel shall be placed deep enough to provide a minimum of 6 inches of material.

2. The gravel shall be placed in the trench at the time it is backfilled. The surface shall be maintained by blading, sprinkling, rolling, adding gravel, etc., to maintain a safe uniform surface satisfactory to the agency having jurisdiction. Excess material shall be removed from the premises immediately.

3. Material for use on gravel surfaces shall conform to these Construction Standards.

C. BITUMINOUS SURFACE

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

1. A temporary gravel surface shall be placed and maintained, as provided in paragraph 2 above, after the required backfill and compaction of the trench has been completed.

2. The gravel shall be placed to a depth equal to the original but not less than 6 inches below the pavement, and shall be brought flush with the paved surface.

3. The area over trenches to be resurfaced shall be graded and rolled with a roller weighing not less than 12 tons, or with the rear wheels of a 5-yard truck loaded to capacity, until the subgrade is firm and unyielding. Mud or other soft, spongy material shall be removed and the space filled with gravel and rolled and tamped thoroughly in layers not exceeding 6 inches in thickness. The sides of trenches which are broken down during compaction of the subgrade shall be removed and trimmed neatly in accordance with municipal or county rules before resurfacing.

4. Before any permanent resurfacing is placed, the contractor shall trim or cut the existing paving to clean, straight lines as nearly parallel to the center line of the trench as practicable. Said straight lines shall be 30 feet minimum length and no deviations from such lines shall be made except as may be specifically permitted by the governmental entity having jurisdiction.

5. Existing bituminous paving shall be cut back a minimum of 6 inches or more, depending on municipal or county rules, beyond the limits of any excavation or cave-in along the trench so that the edges of the new paving will rest on at least 6 inches of undisturbed base.

6. As soon as practical, weather permitting, the bituminous surface shall be restored by standard paving practices to a thickness equal to the original, but not less than 2 inches in thickness.

7. Pavement restoration shall include priming of pavement edges and base material with type MC-70 bituminous material, and placing and rolling plant mix bituminous material to the level of the adjacent pavement surfaces.

D. CONCRETE SURFACES

All concrete curbs, gutter, sidewalks and driveways shall be removed and replaced to the next joint or scoring lines beyond the actually damaged or broken sections,

or in the event the joints or scoring lines do not exist or are 3 or more feet from the removed or damaged section, the damaged portions shall be removed and reconstructed to neat, plane faces. All new concrete shall match, as nearly as possible, the appearance of adjacent concrete improvements. Where necessary, lamp black or other pigments shall be added to the new concrete to obtain the desired results. All concrete work shall conform to the requirements of Section of these specifications and shall comply with all rules and regulations of the city or county in which such work may be located.

E. MAINTENANCE ROADS

Where sewer main lines are installed outside of improved public roads or right-of-way easements dedicated to the use and benefit of the public, the contractor shall provide an all-weather access or service road, which shall include a minimum of 6 inches of untreated base course with proper drainage. The base course shall meet the standards of the municipality in which the sewer line is located. The minimum width of the base course shall be 14 feet.