

ORDINANCE NO.

AN ORDINANCE OF THE CITY OF THE SOUTH OGDEN, UTAH AMENDING THE CODE OF THE CITY OF SOUTH OGDEN DEALING WITH SUBDIVISIONS AND PROVIDING FOR AN EFFECTIVE DATE.

BE IT ENACTED BY THE CITY COUNCIL OF SOUTH OGDEN, UTAH:

CHAPTER 22, CODE OF THE CITY OF SOUTH OGDEN, UTAH AND ALL ARTICLES AND SECTIONS THEREIN ARE AMENDED TO READ AS FOLLOWS:

**CHAPTER 22**

**SUBDIVISIONS**

**SOUTH OGDEN CITY**

**SUBDIVISION ORDINANCE**

**CITY OF SOUTH OGDEN**

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## **ARTICLE 1 - IN GENERAL**

### **SECTION 22 – 1; GENERAL PROVISIONS**

A. The underlying purpose and intent of this Ordinance is to promote the health, safety, convenience, and general welfare of the inhabitants of the City of South Ogden in the matter of subdivision land and related matters affected by such subdivision.

B. Any proposed subdivision and its ultimate use shall be in the best interest of the public welfare and the neighborhood development of the area concerned and the Subdivider shall present evidence to this effect when requested to do so by the Planning Commission.

C. In cases where unusual topographical or other exceptional conditions exist, variations and exceptions from this Ordinance may be made by the City Council after recommendation by the Planning Commission.

### **SECTION 22 – 2; SCOPE OF ORDINANCE**

A. No person shall subdivide any tract of land which is located wholly or in part in the City, except in compliance with this Ordinance.

B. No person shall sell or exchange or offer to sell or exchange any parcel of land which is part of a subdivision of a larger tract of land, nor offer for recording in the office of the County Recorder and deed conveying such a parcel of land, or any interest therein, unless such subdivision has been created pursuant to and in accordance with the provisions of the Ordinance; provided that this Ordinance shall not apply to any lot or lots forming a part of a subdivision created and recorded prior to the effective date of the initial subdivision regulations adopted by the City of South Ogden on the 10<sup>th</sup> of August, 1955.

### **SECTION 22 – 3; DEFINITIONS**

A. The following words and phrases used in this Ordinance shall have the respective meanings hereinafter set forth, unless a different meaning clearly appears from the context:

1. Alley – A public thoroughfare less than twenty-six (26) feet wide. (Approval of public alleys will be given by City Council only.)
2. Block – The land surrounded by streets and other right-of-way other than an alley, or land which is designated as a block on any recorded subdivision plat.

3. Bona Fide Division or Partition of Agricultural Land for Agricultural Development Purpose – The division of a parcel of land into two (2) or more lots of parcels, none of which is less than five (5) acres in area, and provided that no dedication of any street is required to serve any such lots or parcels of agricultural land so created.
4. City – City of South Ogden, Utah.
5. City Council – City Council of the City of South Ogden, Utah.
6. City Engineer – Any registered civil engineer appointed by the City Council to accomplish the objectives of this Ordinance, provided that no such person may serve the City and a Subdivider in the City simultaneously where he would have to check his own work or the work of a member of his firm in connection with any subdivision in the City.
7. Easement – That portion of a lot or lots reserved, granted or arising in behalf of and for the present or future use by a person or agency other than the legal owner or owners of said property or properties. The easement may be for the use under, use on, or use above said lot or lots.
8. Half Streets – Approval and construction of half streets is not allowed in the City.
9. Lots – A parcel of land comprising a unit within a subdivision or a unit of land for building development or transfer of ownership together with such yards, open spaces, lot width and area as required by the Zoning Ordinance of the City of South Ogden having frontage upon street or upon right-of-way approved by the Planning Commission or the Board of Adjustment.
10. Lot Right-of-Way – An easement of not less than sixteen (16) feet wide reserved by the lot owners as private access to serve the lots of through which it passes.
11. Master Street Plan – A plan, labeled “Master Street Plan of the City of South Ogden,” approved by the City Council.
12. Official Map – A map adopted by the City Council under the provisions of 10-9-23, Utah Code 1953 as amended.
13. Parcel of Land – “Parcel of Land” shall mean a contiguous quantity of land, in the possession of, or owned by, or recorded as the property of the same claimant or person.
14. Person -- Any individual, corporation, partnership, firm or association of individual however styled or designated.
15. Planning Commission – The South Ogden City Planning Commission.

16. Protection Strip -- A strip of land running parallel and adjacent to a public street and the abutting private property, created for the purpose of controlling the access of property owners abutting the street.
17. Streets –
  1. Street – a thoroughfare which has been dedicated to the public and accepted by proper public authority, or a thoroughfare of standard width which has become a public thoroughfare by right of use and which affords the principal access to the abutting property.
  2. Street, Major or Minor Arterial – A street existing or proposed, which serves or is intended to serve as a major traffic way and is designated on the Master Street Plan, may be classified a controlled-access highway, major street, parkway or other equivalent term to identify those streets comprising the basic structure of the street plan. A major arterial not less than one hundred (100) feet width of right-of-way, and a minor arterial not less than eighty (80) feet width of right-of-way.
  3. Street, Collector – A street existing or proposed, of considerable continuity which is the main means of access to the Major Street System. A thoroughfare not less than sixty-six (66) feet width of right-of-way.
  4. Street, Standard Residential – A street, existing or proposed which is supplementary to a collector street and of limited continuity which serves or is intended to serve the local needs of a neighborhood. A thoroughfare less than sixty-six (66) feet width of right-of-way.
  5. Street, Marginal Access (frontage roadway) – A street which is parallel to and adjacent to a limited access major or minor arterial street and which provides access to abutting properties on one side of the street. A thoroughfare not less than forty (40) feet wide of right-of-way.
  6. Street, Private – A street, existing or proposed within a subdivision and/or planned residential development which has been reserved by dedication unto the Subdivider, lot owners or home owners association; to be used as private access to serve the lots of homes within the subdivision and/or planned residential development. This street may be less than standard width upon review and approval by the City. This private street shall be maintained by the Subdivider or other private agency.
  7. Street, Cul-de-sac – A terminal street provided with a turnaround.
18. Subdivision – Any land that is divided, re-subdivided or proposed to be divided into two or more lots, parcels, sites, units, plots, or other division of land for the purpose

whether immediate or future, for offer, sale, lease, or development either on the installment plan or upon any and all other plans, terms, and conditions.

1. “Subdivision” includes:
  - (1) The division or development of land whether by deed, metes and bounds description, devise and testacy, lease, map, plat, or other recorded instrument; and
  - (2) except as provided in state law Subsection (1)(s)(iii), divisions of land for all residential and nonresidential uses, including land used for or to be used for commercial, agricultural, and industrial purposes.
  
2. “Subdivision” does not include:
  - (1) a bona fide division or partition of agricultural land for the purpose of joining one of the resulting separate parcels to a contiguous parcel of unsubdivided agricultural land, if neither the resulting combined parcel nor the parcel remaining from the division or partition violates an applicable zoning ordinance:
  - (2) a recorded agreement between owners of adjoining properties adjusting their mutual boundary if: 1) no new lot is created; and 2) the adjustment does not result in a violation of applicable zoning ordinances.
  - (3) a recorded document, executed by the owner of record, revising the legal description of more than one contiguous parcel of property into one legal description encompassing all such parcels of property.
  
3. The joining of a subdivided parcel of property to another parcel of property that has not been subdivided does not constitute a “subdivision” under state law Subsection (1)(s) as to the unsubdivided parcel of property or subject the unsubdivided parcel to the municipality’s subdivision ordinance.
  
4. Subdivision, Cluster – A subdivision of land in which the residential lots have areas less than the minimum lot area of the zone in which the subdivision is located, but which complies with the Cluster Subdivision provisions of the Zoning Ordinance and in which a significant part of the land is privately reserved or dedicated as permanent open space to provide an attractive low density character for the residential lots in the subdivision.
  
5. Zoning Ordinance – The Zoning Ordinance of the City of South Ogden as adopted by the City Council of the City of South Ogden, on January 8, 1980, as amended from time to time.

## ARTICLE II - PROCEDURES

### SECTION 22 – 4, PRELIMINARY PLAN

A. Preliminary Information – Each person who proposes to subdivide land in the City of South Ogden shall confer with the Planning Commission staff before preparing any plats, charts, or plans in order to become familiar with the City Subdivision requirements and existing master plans for the territory in which the proposed subdivision lies and to discuss the proposed plan of development of the tract.

B. Preliminary Plan Filing -- A preliminary plan shall be prepared in conformance with the standards, rules and regulations contained herein and “the current required number of copies” thereof shall be submitted to the Planning Commission for approval or disapproval. One print shall be delivered by the Planning Commission for approval or disapproval. One print shall be delivered by the Planning Commission to each of the following for their information and recommendations from such officials and departments: City Engineer, City Fire Department, City Public Works, and other pertinent agencies.

#### C. Preliminary Plan Requirements –

1. All drawings and/or prints shall be clear and legible, drawn in waterproof, black ink. Size of drawing shall be 24" X 36" with ½ inch border on top, bottom, and right sides, left side border shall be 1½ inches. The preliminary plan shall be drawn to a scale not smaller than one hundred (100) feet to the inch and shall show:
  - a. The location of property with respect to surrounding property and streets, the name of all adjoining property owners of record, or the names of adjoining developments; the names of adjoining streets.
  - b. The location and dimensions of all boundary lines of the property to be expressed in feet and decimals of a foot.
  - c. The location of existing streets, easements, water bodies, streams, and other pertinent features such as wetlands, buildings, parks, cemeteries, drainage ditches, irrigation ditches, fences, bridges, etc. as determined by the Planning Commission.
  - d. The location, width and details of all existing and proposed streets, curb, gutter, sidewalk, easements, alleys, other public ways and easement and proposed street right-of-ways and building setback lines.
  - e. The locations, dimensions, and areas of all proposed or existing lots, illustrating their relationship to surrounding properties.



- f. The location and dimensions of all property proposed to be set aside for park or playground use, or other public or private reservation, with designation of the purpose thereof and conditions, if any, of the dedication or reservation.
- g. The name and address of the owner or owners of land to be laid out and platted, the name, address and phone number of the developer if other than the owner, and the name, address and phone number of the land surveyor or engineer.
- h. The date of the plat, approximate true north direction, scale, and title of the subdivision.
- i. Sufficient data acceptable to the City Engineer to readily determine the location, bearing, and length of all lines, and to reproduce such lines upon the ground, and the location of all proposed monuments, including contours at intervals of 2 feet, 5 feet, or 10 feet as determined by the City Engineer.
- j. The proposed name of the subdivision. (Such name must be cleared through the County Recorder's Office.) and name and number of all new streets.
- k. Indication of the use of any lot (single-family, two-family, multifamily, townhouse) and all uses other than residential as proposed by the developer.
- l. All lots consecutively numbered.
- m. Existing water supply and sanitary sewage systems.
- n. Detailed provisions for collecting and discharging surface water drainage.
- o. Location and size of all proposed water, secondary water, sanitary sewer, storm sewer, irrigation or drainage ditch piping or other sub-surface improvements as deemed necessary by the City Engineer.
- p. Preliminary plats shall contain the following notations:
  - (1) Explanation of drainage easements, if any.
  - (2) Explanation of irrigation easements, if any.
  - (3) Explanation of site easements, if any.
  - (4) Explanation of reservations, if any.
- q. Plans or written statements regarding the proposed storm water drainage facilities and other proposed improvements, such as planting and parks, and any grading of individual lots.

D. Preliminary Plan Approval – The preliminary plan shall be reviewed by the Planning Commission which shall act on the plan as submitted or modified within three (3) Planning Commission agendas after its presentation. If approved, the Planning Commission shall express its written approval with or without specific conditions. If the preliminary plan is disapproved, the Planning Commission shall indicate its disapproval in writing and list the reasons for such disapproval. Approval of the preliminary plan shall be authorization for the Subdivider to proceed with the preparation of the final plat improvement drawings and specifications for the minimum improvements required per the written sections and the drawings of this Ordinance.

E. Time Limitation – Approval of the preliminary plan by the Planning Commission shall be valid for a maximum period of two (2) years after approval, unless upon application of the Subdivider the Planning Commission grants an extension. If the final plat has not been submitted within the two (2) years or approved extended period, the preliminary plan must again be submitted to the Planning Commission for re-approval; however, preliminary approval of a large tract shall not be voided provided that the final plat of the first section is submitted for final approval within the two (2) year period.

F. Grading Limitation – No excavation, grading or re-grading shall take place on any land for which a subdivision preliminary plan has been submitted until such plan has been given preliminary approval by the Planning Commission, the grading approved by the City Engineer, and a Storm Water Construction Activity Permit has been obtained as required by the State of Utah and City ordinance.

## **SECTION 22 – 5, FINAL PLAT**

### A. Tentative Final Plat Required –

1. Prior to the submission of the final plat, the Subdivider shall submit two (2) copies of the tentative final plat to the City Engineer who shall check the tentative final plat against the requirements and conditions of approval of the preliminary plan.
2. The City Engineer shall return one (1) copy of the checked tentative final plat to the Subdivider indicating any changes required by the Planning Commission and/or the City Engineer and/or other departments.

### B. Final Plat Required –

1. After compliance with the provisions of Section 22-4 of this Ordinance, the Subdivider shall submit a final plat with the “current required number of copies” thereof to the Planning Commission. Such plat shall be accompanied by a “Letter of Certification” by the Subdivider’s engineer and/or surveyor, indicating that all lots meet the requirements of the Zoning Ordinance.

2. The final plat and accompanying information shall be submitted to the Planning Staff at least ten (10) days prior to a regularly scheduled Planning Commission meeting in order to be considered at said meeting.

C. Final Plat Requirements –

1. The final plat shall be submitted on a sheet of approved mylar. The outside or trim dimensions shall be twenty-four (24) by thirty-six (36) inches and the border line of the plat shall be drawn in heavy lines leaving a space of at least one-half ( $\frac{1}{2}$ ) inch margin on all four sides of the sheet. The plat shall be so drawn that the top of the sheet faces either north or east, which accommodates the drawing best. All lines, dimensions, and markings shall be made on approved mylar with black waterproof ink. The plat shall be made to a scale large enough to clearly show all details, in any case not smaller than one hundred (100) feet to the inch, and the workmanship on the finished drawing shall be neat, clean cut and legible. The plat shall be signed by all parties mentioned in subparagraph g. of this section, duly authorized and required to sign, and shall contain the following information.
  1. The subdivision name, and the general location of the subdivision, in bold letters at the top of the sheet.
  2. Where a subdivision complies with the Cluster Subdivision provisions of the Zoning Ordinance and the provisions of this chapter, the final plat shall indicate underneath the subdivision name, the words, “Cluster Subdivision.”
  3. A north arrow and scale of the drawing and the current date.
  4. Accurately drawn boundaries, showing the proper bearings and dimensions of all boundary lines of the subdivision. These lines should be slightly heavier than street and lot lines.
  5. The name, widths, lengths, bearings and curve data on the center lines of proposed streets, alleys and easements; also the boundaries, bearing and dimensions of all portions within the subdivision as intended to be dedicated to the use of the public; the lines, dimensions, bearings, and numbers of all lots, address of lots within the subdivision. The street naming/numbering and lot addressing shall be provided by the City Engineer and written on the plat by the Subdivider’s engineer and/or surveyor.
  6. Parcels of land to be dedicated as public park, storm water detention basins, or to be permanently reserved for private common open space shall be included in the lot numbering system and shall also be titled “Public Park” or “Private Common Open Space,” whichever is applicable.

7. The standard forms approved by the City Engineer for all subdivision plats lettered for the following:
  - (1) Description of land to be included in subdivision, with total acres.
  - (2) Land Surveyors' "Certificate of Survey."
  - (3) Owner's Dedication Certificate.
  - (4) Notary Public's Acknowledgment(s).
  - (5) City Planning Commission Certificate of Approval.
  - (6) City Engineer's Certificate of Approval.
  - (7) City Attorney's Certificate of Approval.
  - (8) City Council Certificate of Acceptance signed by the Mayor and attested by the City Recorder.
  
8. A three (3) inch by three (3) inch space in the lower right-hand corner of the drawing for recording information.

D. Construction Drawings – The Subdivider shall cause to be prepared by a qualified Civil Engineer registered in the State of Utah and not in the employ of the City, a complete set of plans and profiles, streets, existing and proposed, and all utilities and improvements to be constructed within the subdivision and furnish such information to the City Engineer with the final plat. Size of drawings shall be 24" X 36" with ½ inch border on top, bottom, and right sides. Left side shall be 1½ inches. The plans shall be drawn at a scale of not more than fifty (50) feet to an inch. The final drawings shall show all lines, dimensions, and markings on approved mylar with black ink.

In general, the following shall be included on the construction drawings:

1. North arrow (plan).
2. Profiles showing existing and proposed elevations and stationing along center lines of all roads. Where a proposed road intersects an existing road or roads, the elevation along the center line of the existing road or roads within one hundred (100) feet of the intersection, shall be shown. Approximate radii of all curves, lengths of tangents, and central angles on all streets.
3. Plan and profiles showing the locations and typical cross-sections of street pavements including curbs and gutters, sidewalks, drainage easements, rights-of-way, irrigation ditches, manholes and catch basins; the locations of street signs; the location, size and invert elevations of existing and proposed sanitary sewers, storm water drains, and fire hydrants, showing connection to any existing or proposed utility systems; and exact location and size of all water, gas, sewer, secondary water, cable T.V., or other underground utilities or structures.
3. Location, size, elevation, and other appropriate description of any existing facilities or utilities, including but not limited to, existing streets, sewers, drains, water mains,

easements, fences, street lights, water bodies, streams, wetlands, irrigation and drain ditches and any other pertinent features at the point of connection to proposed facilities and utilities within the subdivision.

4. All specifications and references required by the City's Public Works Standards, including a site-grading plan and erosion control plan for the entire subdivision when required by the City Engineer.
5. Once the improvement drawings are approved, the drawings should be submitted to the City Engineer in electronic format in order to update the South Ogden City base map.
6. All Improvement Plans shall be prepared and stamped by a Civil Engineer, registered in the State of Utah.

Upon completion of all construction improvements and prior to conditional final acceptance, the developer shall cause to be submitted one (1) set of drawings marked "As Constructed," construction drawings for filing in the office of the City Engineer.

E. Engineer's Cost Estimate – The Subdivider shall cause to be prepared by a qualified Civil Engineer registered in the State of Utah and not in the employ of the City a complete cost estimate which shall indicate a list of all the required construction items, quantities and estimated unit bid prices and/or lump sum bid prices. This estimate shall be submitted to the City Engineer in order to assist in determining the amount of the escrow, or other agreements required of the developer. (This estimate shall include any contingencies and/or inflation factor as determined applicable by the City Engineer).

F. Approval of Final Plat –

1. Prior to approving and signing the final plat by the Planning Commission, the City Engineer shall check the engineering requirements of the drawings, and approve the amount of the escrow, or other agreements, to assure construction of the improvements where necessary. After approval and signature by the City Engineer, the plat shall be submitted to the Planning Commission for approval and signing by the Chairman. The plat and financial guarantee shall then be submitted to the City Attorney and the City Council, respectively for their approval. The final plat, bearing all official approvals as above required, shall be deposited in the offices of the County Recorder for recording at the expense of the Subdivider who shall be notified of such deposit by the office of the County Recorder. No building construction shall be started until after the recording of the final plat.
2. No plats shall be recorded in the office of the County Recorder and no lots included in such plat shall be sold or exchanged unless and until the plat is so approved, signed and accepted by the City.

3. At the time of recording, the Subdivider shall pay all costs associated with supplying a reproducible mylar of the plat for filing to the City.

## **SECTION 22 – 6; FILING**

A. General: This Section provides a summary of the procedures required by the City for submitting Preliminary and Final Plats, utility construction drawings and other supporting data for construction of subdivisions within the corporate boundaries of the City.

B. Preliminary Plat: The Following procedure shall be followed in submittal and review of the Preliminary Plat:

1. Master Plan Review – A review shall be made by the Subdivider with the City Planning Commission to determine the master plan requirements for the area proposed to be subdivided.
2. Plat Submittal – The current required amount of copies of the Preliminary Plat shall be submitted to the Planning Commission for review. Copies shall be distributed by the City Engineer for review by utility companies (power, telephone, gas, television, irrigation) or as directed by the City Engineer.
3. Engineer’s Report – After completion of his review, the City Engineer will prepare and transmit to the Planning Commission a report summarizing the requirements for utilities and surface improvements together with results of his review of the Preliminary Plat.
4. Approval/Rejection – After completion of its review, the Planning Commission shall either approve, reject, or conditionally approve the Preliminary Plat. Approval or conditional approval is authorization for the Subdivider to proceed with preparation of the Final Plat.

C. Final Plat: The following procedure shall be followed in submittal and review of the final plat:

1. Plat Sumittal – A black line mylar reproducible drawing and eight (8) (or the current required amount) blue prints shall be submitted to the City Engineer.
2. Fees – There shall be paid to the City by the owners or developers of the land petitioning for subdivision approval such sum of money as the City Council may require to cover engineering review and field inspection costs. Fees shall be paid to the City as per current adopted fee schedule.

3. Construction Drawings – Three (3) (or the current required amount) sets of prints of the drawings showing proposed construction shall be sent to the City Engineer for his review, comments and approval.
4. Subdivision Agreement – An agreement between the City Council and Subdivider shall be approved by the City Attorney. This agreement shall include the Subdivider's estimate of improvement costs, approved by the City Engineer. The approved estimate shall be the basis for determination of the amount of required security to cover said improvements.
5. Notice of Approval – After review and approval of the Planning Commission, City Council, City Engineer and City Attorney the Subdivider will be notified by the City that the plat has been approved.
6. Recording – The plat shall be recorded by the County Recorder after completion of all approvals. The owners or developers shall pay all recording fees, along with the cost to provide the City with a reproducible copy of the recording plat.
7. Construction – Construction of buildings shall not proceed until recording of the plat has been accomplished.
8. Intermediate Inspection – At completion of construction, the City Engineer shall make an inspection of all improvements and shall inform the Subdivider and City Council of the results of the inspection. "As Built Drawing" prints shall be submitted to the City Engineer prior to his making this inspection. Record mylar reproducibles for City files, shall be submitted following the City Engineer's approval of the "As Built Drawing" prints.
9. Final Inspection – One (1) year after the completion of construction of improvements (date of Intermediate Inspection) a final inspection shall be made by the City Engineer. The results of this inspection shall be made known to the City Council and Subdivider and if all work is satisfactory a recommendation will be made to release the escrow or other security held by the City Council.

## **SECTION 22 – 7; MINIMUM IMPROVEMENT REQUIREMENTS**

A. General: This Section provides a summary of minimum improvement requirements for Subdivisions including roads, sidewalks, curbs and gutters, culinary water, sanitary sewer, storm drainage, pressure irrigation and other required utilities.

B. Drawings: Construction drawings and cost estimates prepared by the Subdivider's Engineer must accompany submission of the Final Plat. These drawings must show all proposed construction of surface improvements and underground utilities. These drawings shall be reviewed and approved by the City Engineer prior to his signing the Final Plat. Construction shall not proceed prior to his approval of the construction drawings.

A reproducible mylar copy (sepia) and two (2) prints of "As Built Drawings" shall be prepared and submitted to the City by the Subdivider's Engineer to accurately define for permanent record the surface improvements and underground utilities as they were actually constructed.

C. Guarantee: All improvements constructed by the Subdivider shall be guaranteed for a period of one (1) year after complete installation (date of Conditional Final Inspection). Prior to the City Council accepting the improvements for purpose of perpetual maintenance, the City Engineer shall review the condition of all construction (Final Inspection) and prepare a report of recommendation to the Council. All pavements or other improvements requiring replacement or repair shall be defined by the City Engineer and the Subdivider shall complete all required replacement or repairs at his own expense prior to acceptance by the City Council.

D. Roads: Roads shall conform to the following:

1. Total Width – Shall be standard from property to property line. Major 80 feet and 100 feet wide roads will be required when requested by the Planning Commission. All costs of the roadways shall be borne by the Subdivider. Where an 80 or 100 foot road is required the extra construction cost (not land cost) will be paid by the City unless otherwise agreed upon with subdivision/annexation approvals.
2. Grades of Roads – Shall be a minimum of 0.5% and a maximum of 12.0% for standard Right-of-way Roads and 8.0% maximum for Arterial and Collector Roads.
3. Asphalt Surfacing – Shall be provided on all roads with a 3-inch minimum asphalt pavement thickness over a 10-inch thick gravel base.

E. Sidewalks: Sidewalks shall be provided along both sides of all roads and in all subdivisions. Sidewalks shall be 4 feet wide and 4 inches thick except at driveways where the thickness shall be increased to 6 inches.

F. Curb and Gutter: Concrete curb and gutter (30 inches wide) shall be provided along both sides of all roads and in all subdivisions.



G. Culinary Water Lines: Culinary water pipe liens shall be of ductile iron class 51 and 8 inch minimum size. Valves and 5-inch hydrants shall be provided at locations defined by the City Engineer. Where larger than 10-inch pipe lines are requested by the City for future development, the additional cost of materials shall be paid by the City unless otherwise agreed upon with the subdivision/annexation approvals.

The Subdivider will be required, at his own expense, to install all required “off site” pipelines to connect with the existing distribution system of the City unless otherwise agreed upon with subdivision/annexation approvals.

Service lines to the property line touch read meter, meter box and cover with 2" hole will be furnished and installed by the Subdivider.

H. Sanitary Sewer Pipe Lines: Sanitary sewer pipe lines shall be of concrete or PVC pipe of 8-inch minimum size. Manholes shall be installed at all changes in grade and alignment and at a maximum spacing of 400 feet. Where larger than 12-inch sewers are requested by the City to accommodate future development, the additional material cost will be paid by the City unless otherwise agreed upon with subdivision/annexation approvals. The Subdivider will be required at his own expense to install all required “off site” sewer extensions necessary to connect with the existing sanitary sewer system of the City.

I. Storm Drains: Storm drains, cross gutters, dip stones, oil separators, silt containment, catch basins, and other appurtenant structures shall be provided by the Subdivider as required to adequately convey and discharge storm drainage and comply with existing and anticipated State and Federal Regulations for storm drainage discharge. Storm drainage facilities shall adequately convey and discharge flows developed within the limits of the subdivision and the existing flows entering the proposed subdivision from adjacent properties. The Subdivider shall be responsible to adequately convey and discharge 10-year frequency storm flows without significantly impacting vehicle and pedestrian traffic, and 100-year frequency storm flows without flooding dwellings and buildings or significantly damaging property. Storm drain piping shall be of concrete pipe of 15-inch diameter minimum size. Manholes shall be installed at all changes in grade and alignment and at maximum spacing of 400 feet. Where storm drains larger than 36-inch diameter are requested by the City to accommodate future development, the additional material cost will be paid by the City unless otherwise agreed upon with subdivision/annexation approvals.

J. Street Signs: To assure uniformity, the City shall furnish and install all required street signs and the cost thereof shall be charged to and paid for by the Subdivider within a period of thirty (30) days after installation. The cost associated with sign installation shall be fixed with the Engineer’s cost estimate at time of subdivision approval.

K. Monuments: Permanent monuments shall be furnished, accurately established and set by the Subdivider’s Engineer at such points as are stipulated by the City Engineer.

L. Street Lighting: Street lighting shall be furnished and installed by the Subdivider in such location as determined by the City Engineer per the requirements shown on the drawings.

## ARTICLE III - DESIGN AND STANDARDS

### SECTION 22 – 8; GENERAL PROVISIONS

#### A. Relation to Adjoining Street System –

1. The arrangement of streets in new subdivisions shall make provision for the continuation of the existing streets in adjoining areas (or their proper protection where adjoining land is not subdivided) insofar as such may be deemed necessary by the Planning Commission for public requirements. The street arrangement must be such as to cause no unnecessary hardship to owners of adjoining property when they plat their own land and seek to provide for convenient access to it. Half streets along the boundary of land proposed for subdivision will not be permitted.
2. Minor streets shall approach the major or collector streets at an angle of not less than eighty (80) degrees.

#### B. Street Widths, Cul-de-sacs, Easements, Etc. –

1. Street Dedication – All public streets in subdivisions in the City of South Ogden shall be dedicated to the City.
2. Arterial and Collector Streets – Shall conform to the width designated on the Master Street Plan wherever a subdivision falls in an area for which a Master Street Plan has been adopted. For territory where such street plan has not been completed at the time the preliminary plan is submitted to the Planning Commission, arterial and/or collector streets provided as required by the Planning Commission, with minimum widths of eighty (80) and one hundred (100) feet for major and minor arterial streets and sixty-six (66) feet for collector streets.
3. Standard Residential Streets and Terminal Streets – Shall have a minimum standard width.
4. Terminal Streets (cul-de-sacs) – Shall not be longer than four hundred (400) feet to the beginning of the turnaround. Each cul-de-sac must be terminated by a turnaround of not less than one hundred ten (110) feet in diameter, right-of-way dimension. If surface water drainage is into the turnaround, due to the grade of the street, necessary catch basins and drainage systems and easements shall be provided. Where a street is designed to remain only temporarily as a dead-end street, an adequate asphalt/road base temporary turning area shall be provided at the dead-end thereof to remain and be available for public use so long as the dead-end condition exists.

5. Marginal Access Streets (frontage roadway) of not less than forty (40) feet in right-of-way width shall be required paralleling all limited access arterial streets, unless the subdivision is so designed that lots back onto such limited access streets. (All standard improvements per the typical cross section are required.)
6. Half Streets – proposed along a subdivision boundary or within any part of a subdivision shall not be approved.
7. Standard Street Sections – All proposed streets shall conform to the “Standard South Ogden City Roadway Section” as depicted in the South Ogden City Standards as recommended by the City Engineer and adopted by the City Council.
8. Street Grades – Except where due to special circumstances, street grades over any sustained length shall not exceed the following percentages; on arterial and collector streets 8 percent; on standard residential and private streets 12 percent.
9. Alleys – shall have a minimum easement width of twenty (20) feet. Alleys may be required in the rear of business lots, but will not be accepted in residential blocks except under unusual conditions where such alleys are considered necessary by the Planning Commission and approved by the City Council. The alley cross section shall be approved by the Planning Commission.
10. Protection Strips – Where subdivision streets parallel contiguous property of other owners, the Subdivider may place in trust a protection strip of not less than one (1) foot in width between said street and adjacent property, provided that an agreement with the City, and approved by the City Attorney, has been made with the Subdivider, contracting to place in trust the one (1) foot or larger protection strip free of charge to the City to be dedicated for street purposes upon payment by the then heirs of a consideration named in the agreement, such consideration to be equal to the current cost of the street improvements properly chargeable to the contiguous property, plus the value of one-half (½) the land in the street at the time of the agreement, until time of subdivision of such contiguous property.

C. Blocks –

1. The maximum length of blocks generally shall be thirteen hundred (1300) feet and the maximum length of blocks shall be five hundred (500) feet. Blocks over eight hundred (800) feet in length may, at the discretion of the Planning Commission, be provided with a dedicated walkway through the block at approximately the center of the block. Such walkway shall not be less than ten (10) feet in width and shall be fenced.

2. The width of blocks shall be sufficient to allow two (2) tiers of lots or as otherwise approved by the Planning Commission because of design, terrain or other unusual conditions.
3. Blocks intended for business or industrial use shall be designed specifically for such purposes with adequate space set aside for off-street parking and delivery facilities.

D. Lots –

1. The lot arrangement and design shall be such that lots will provide satisfactory and desirable sites for buildings, and be properly related to topography, and to existing and probable future requirements.
2. All lots shown on the subdivision plat must conform to the minimum area and width requirements of the Zoning Ordinance for the zone in which the subdivision is located or,
  1. Except as otherwise permitted by the Board of Adjustment, or
  2. As in accordance with Cluster Subdivision or PRUD provisions of the Zoning Ordinance.
3. Each lot shall abut on a street, dedicated by the subdivision plat or an existing publicly dedicated street, or on a street which has become public by right of use with the asphalt width at least thirty-six (36) feet wide, and having a standard right-of-way, except as provided in Paragraph 4 of this Section. Interior lots having frontage on two streets shall be allowed access on only one street except where unusual conditions make other design undesirable and only with Planning Commission approval. (The Planning Commission shall cause a note to be placed on the plat indicating the no access side).
4. Flag Lots – shall be approved by the Planning Commission. A lot or lots not having frontage or not having adequate frontage (Flag lot) on a street as required by the Zoning Ordinance for the zone in which the subdivision is located but upon a right-of-way, may be included within a subdivision provided the following requirements are met:
  1. The Planning Commission determines that it is impractical to extend streets to serve such lots.
  2. The area of the right-of-way shall be in addition to the minimum lot area requirements of the zone in which the lot is located.

3. The grade of any portion of the right-of-way not to exceed fifteen (15) percent.
  4. Lots so created shall be large enough to comply with all yard and area requirements of the zone in which the lot is located.
  5. The building set back line shall be established and approved by the Planning Commission and indicated on the plat.
5. Corner lots shall have extra width sufficient for maintenance of required building lines on both streets.
  6. Sidelines of lots shall be approximately at right angles, or approximately radial to the street line. Lot lines not radial shall be so noted on the final recording plat.
  7. All remnants of lots below the minimum size left over after subdividing a larger tract must be added to adjacent lots, rather than allowed to remain as non-conforming or unusable parcels.
  8. Where the land covered by a subdivision includes two or more parcels in separate ownership and the lot arrangement is such that a property ownership line divides one or more lots, the land in each lot so divided shall be transferred by deed to either single or joint ownership before approval of the final plat, and such transfer certified to the Planning Commission by the County Recorder.
  9. Natural Drainage and Other Easements – The Planning Commission may require that easements for drainage through this and adjoining property be provided by the Subdivider, and easements of not less than fourteen (14) feet in width for water, sewers, drainage, power lines, and other utilities shall be provided in the subdivision when required by the Planning Commission.

E. Parks, School Sites, and Other Public Places –

1. In subdivision property, the Planning Commission shall give consideration to suitable sites for schools, parks playgrounds, and other areas for similar public use.
2. Such sites shall be indicated on the preliminary plan, which shall be referred to the City Council and/or School Board for their concurring approval.
3. If approved, the site shall be indicated on the approved preliminary subdivision plan in order that the City Council and/or School Board and Subdivider may commence negotiations in exercising the option on the site granted by the Subdivider to the City and/or School Board at the time of annexation of the land to South Ogden in accordance with the current Annexation Ordinance of the City in force at the time.

F. Cluster Subdivision – Special Provisions –

1. Design Standards –

1. The design of the preliminary and final plat of the subdivision in relation to streets, blocks, lots, common open spaces and other design factors shall be in harmony with the intent of zoning regulations, elements of the Master Plans that have been adopted by the City Council and design standards recommended by the Planning Commission and approved by the City Council.
2. Streets shall be so designed as to take advantage of open space vistas and to create drives with a rural or open space character.

2. Providing for Common Open Space –

1. The Subdivider of a cluster subdivision shall submit plans of landscaping and improvements for the common open space.
  2. The Subdivider shall also explain the intended use of the open space and provide detailed provisions of how the improvements thereon are to be financed and the area maintained.
  3. A Cluster Subdivision must meet the requirements of the Zoning Ordinance, must assure proper use, construction, and maintenance of open space facilities and must result in a development superior to conventional development in terms of its benefits to future residents of the subdivision, surrounding residents and the general public.
  4. The Planning Commission may place whatever additional conditions or restrictions it may deem necessary to insure development and maintenance of the desired residential character, including plans for disposition or re-use of property if the open space used is not maintained in the manner agreed upon or is abandoned by the owners.
3. Guarantee of Common Open Space Improvements – As assurance of the completion of common open space improvements, the Subdivider at the request of the City Council may be required to file with the City Council a bond or cash surety, or other agreement, in a form satisfactory to the City Attorney guaranteeing such completion within two (2) years after such filing. Upon completion of the improvements for which a bond or cash surety, or other agreement, has been filed, the Subdivider shall call for inspection by the City Engineer, such inspection to be made within thirty (30) days from the date of request. If inspection shows that

landscaping and construction have been completed in compliance with the approved plan, the bonds therefor shall be released. If the bonds are not released, refusal to release and reasons therefor shall be given the Subdivider in writing.

4. Continuation of Common Open Space – As assurance of continuation of common open space used in accordance with the plans approved by the Planning Commission, the Subdivider shall grant to the City of South Ogden an “Open Space Easement” on and over the common open space prior to the recording of the final plat, which easement will not give the general public the right of access but will provide that the common open space remains open.
5. Maintenance of Common Open Space, Etc. –
  1. In order to insure maintenance of the common open space and other improvements where so required, the Subdivider, prior to the recording of the final plat, shall cause to be incorporated under the laws of the State of Utah, a Lot/Home Owner’s Association. By proper covenants running with the land and through the articles of incorporation and By Laws of said Association it shall, among other things, be provided:
    - (1) Membership in said Association shall be mandatory for each lot/home purchaser, their grantees, successors and assigns.
    - (2) The common open space restrictions shall be permanent and not just for a period of years.
    - (3) That the Association be responsible for maintaining liability insurance, paying general property taxes, and maintaining recreational and all other facilities.
    - (4) That all lot owners shall pay their pro rata share of the costs of upkeep, maintenance, and operation.
    - (5) That any assessment levied by the Association may become a lien on the real property of any lot owner, which may be foreclosed, and the property sold as on sales under execution.
    - (6) That the Association shall be able to levy and to adjust assessments on the lot owners to meet current conditions.



## **SECTION 22 – 9; SUBDIVISION IMPROVEMENTS REQUIRED**

A. The owner of any land to be platted as a subdivision shall, at their own expense, install all improvements within a two (2) year time table following the date of recording of the final plat in accordance with the Public Works Specifications adopted by the City Council, except for septic tanks (See Section 7.b) which must be installed according to the specifications and under the inspection of the County Board of Health.

1. Water Lines – Where an approved public water supply is reasonably accessible or procurable the Subdivider shall install water lines, to make the water supply available to each lot within the subdivision, including laterals to the property line of each lot. The location and size of water mains shall be approved by the City Engineer.
2. Sewage Disposal –
  1. Where a public sanitary sewer is within four hundred (400) feet or is close enough in the opinion of the City Council, after recommendation of the City Engineer, to require a connection, the Subdivider shall connect with such sanitary sewer and provide adequate lateral lines to the property line of each lot. Such sewer connections and subdivision sewer systems shall comply with the regulations and specifications of, and shall be approved by, the City Council and City Engineer.
  2. Where a public sanitary sewer is not reasonably accessible, the Subdivider shall obtain approval from the State Department of Health for sewage disposal by means of a septic tank and drain field for each of the lots. Subdividers shall furnish to the Board of Health a report of percolation tests completed on the property proposed for subdivision in accordance with the Regulations of the Utah State Department of Public Health governing individual sewage disposal systems as currently adopted. A tentative final plat of the subdivision shall accompany the report showing thereon the location of test holes used in completing the tests. Percolation tests shall be completed and reports prepared and signed by a qualified, registered sanitarian or a licensed engineer not in the employ of the City. Written approval from the Board of Health shall be submitted to the Planning Commission before consideration of the final plat. Design of an individual system will be such that at the time a public sanitary sewer system is installed the private system will be able to connect to the public sanitary sewer system.
3. Storm Water – The City Council will require the Subdivider to manage and dispose of storm water per the City Engineer’s recommendations. If easements are required across abutting property to permit drainage of the subdivision, it shall be the responsibility of the Subdivider to acquire such easements.

4. Street Grading and Surfacing – All public streets shall be graded and surfaced in accordance with these Specifications and Drawings adopted by the City Council.
5. Curbs and Gutters – Curbs and gutters shall be installed on existing and proposed streets by the Subdivider in accordance with these Specifications and Drawings adopted by the City Council.
6. Street Drainage and Drainage Structures – shall be required where necessary in the opinion of the City Council after recommendation by the City Engineer in accordance with these Specifications and Drawings adopted by the City Council.
7. Sidewalks – shall be required and installed in accordance with these Specifications and Drawings adopted by the City Council.
8. Monuments – Permanent monuments shall be accurately set and established at such point as are necessary to definitely establish all lines of the plat except those outlining individual lots. Monuments shall be of a type shown on the Drawings and all subdivision plats shall be tied to a survey monument of record.
9. Street Trees – Street trees may be provided at the option of the Subdivider, but when so provided the variety and location of such trees shall be approved by the Planning Commission, Urban Forestry, and in accordance with the current City Shady Tree Policy.
10. Fire Hydrants – Fire hydrants shall be installed. Such fire hydrants shall be of the type, size, number and installed in such locations as determined by recommendation of the Fire Department and/or City Engineer.
11. Street Signs – The City will furnish and install necessary street signs. The cost will be charged to the Subdivider. (Street signs shall include regulatory and address signs).
12. Fencing Hazards – A solid board, chain link, or other non-climbable fence, not less than six feet or greater than seven feet in height shall be installed on both sides of existing irrigation ditches or canals which carry five second feet or more of water, or bordering open reservoirs, railroad rights-of-way or non-access streets, and which are located within or adjacent to a subdivision, except where the Planning Commission and City Council determines that park areas including streams or bodies of water shall remain unfenced.
13. Staking of Lots – Survey stakes shall be placed at all lot corners so as to completely identify the lot boundaries on the ground.
14. Street Lighting – Street lighting shall be installed by the Subdivider/developer in such locations as determined by the City Engineer.

2. Guarantee of Improvements –

1. In lieu of actual installation of the improvements required by this Chapter, the Subdivider may guarantee the installation thereof by one of the methods specified as follows:
  1. The Subdivider may furnish and file with the City Recorder a bond with Corporate Surety in an amount to the cost of the improvements plus a 10% contingency/inflation factor for improvements not previously installed as estimated by the City Engineer to assure the installation of such improvements within a period of two (2) years immediately following the approval of the subdivision plat by the City Council, which bond shall be approved by the City Council and City attorney.
  2. The Subdivider may deposit an escrow with an escrow holder approved by the City Council an amount of money equal to the cost of the improvements plus a 10% contingency/inflation factor for improvements not then installed as approved by the City Engineer, as aforesaid, under an escrow agreement to assure the installation of said improvements within two (2) years from the approval of the subdivision plat by the City Council as aforesaid. The escrow agreement aforesaid shall be approved by the City Council and City Attorney and shall be filed with the City Recorder.
2. The City Council is authorized and directed from time-to-time, at the request of the Subdivider or his successors in the interest to release of record from the burden of the covenant and lien aforesaid all lots and parcels of land as to which the covenant and agreement has been fully performed, either by installation of improvements, by the deposit of a bond or the deposit of funds in escrow as aforesaid. The covenant and agreement aforesaid shall be approved as to form by the City Council and by the City Attorney. The City Council is authorized to prescribe by administrative rule or regulation, forms and procedures to insure the orderly, regular and efficient processing of applications for the approval of a proposed subdivision and the strict compliance with the requirements of this Ordinance.
3. Whenever the Subdivider develops a subdivision, a portion at a time, as contemplated by Paragraph 1.C of this Sub-Section B., such development shall be in an orderly manner and in such a way that the required improvements will be continuous and all of the said improvements will be made available for the full, effective practical use and enjoyment thereof by the lessees or grantees of any of the lands subdivided within the time hereinbefore specified.

C. Engineering Checking Fee – there shall be paid to the City by the owners of the land petitioning for subdivision approval such sums of money as the City Council may require to cover engineering review and field inspection costs. Fees shall be paid to the City Treasurer as per adopted fee schedule which may be amended from time to time by the City Council.

D. Inspection of Improvements – The Public Works Inspector and City Engineer shall inspect or cause to be inspected all buildings, structures, streets, fire hydrants and water supply, and sewage disposal systems and other improvements in the course of construction, installation, or repair. All concrete forms are to be inspected and approval given by an authorized public works official prior to the placement of any concrete. Excavations for fire hydrants and water and sewer mains and lateral shall not be covered over or back-filled until such installations shall have been approved by the an authorized South Ogden City Public Works Official. Any pavement to be laid on any street must also receive prior approval from an authorized South Ogden City Public Works Official. If any such installation is covered before being inspected and approved, it shall be uncovered after notice to uncover has been issued to the responsible person by the Inspector and if any paving of any street is done without prior notification and approval of the City Engineer then the Subdivider and any other responsible person would be liable for any costs incurred by the City in inspecting, repairing, or inadequate paving by the subdivision or other responsible person(s).

## **SECTION 22 – 11; ENFORCEMENT AND PERMITS**

The City Building Inspector shall not issue any permit unless the plans for the proposed erection, construction, reconstruction, alteration, or use fully conforms to all provisions of this Ordinance. No officer of the City of South Ogden shall grant any permit or license for the use of any building structure or land when such land is a part of a subdivision and has been approved and recorded in the County Recorder’s Office. Any license or permit issued in conflict with this Ordinance shall be null and void.

## ARTICLE IV - IMPROVEMENTS

### **SECTION 22-12; GENERAL IMPROVEMENT REQUIREMENTS**

A. SCOPE: This section defines the general requirements for improvements to be built by a Subdivider, or contractor working within the public way.

The required improvements shall include all street improvements in front of all lots along all dedicated streets to a connection with existing improvements of the same kind or to the boundary or the subdivision nearest existing improvements. Design must provide for future extension to adjacent development and to be compatible with the contour of the ground for proper drainage. All water lines, sewer lines, and any other buried conduit shall be installed to the boundary lines of the subdivision.

B. CONSTRUCTION DRAWINGS: Complete and detailed construction plans and drawings of improvements shall be submitted to the City for the review by the City Engineer prior to receiving final plat approval and prior to commencing construction. No construction shall be started until plans have been checked and approved by the City Engineer.

C. STANDARDS FOR CONSTRUCTION DRAWINGS: The following instructions are for the purpose of standardizing the preparation of drawings to obtain uniformity in appearance, clarity, size, and style. These plans and designs shall meet the standards defined in the specifications and drawings hereinafter outlined. The minimum information required on drawings for improvements is as follows:

1. All drawings and/or prints shall be clear and legible and conform to good engineering and drafting room practice drawn with ink on approved mylar sheets. Size of drawings shall be 24" x 36" with ½ inch border on top, bottom and right sides, left side 1-1/2 inches.
2. In general, the following shall be included on drawings:
  1. North arrow (plan)
  2. Scale and elevations referenced to an approved datum
  3. Stationing and elevations for profiles
  4. Title block, located in the lower right corner of sheet to include:
    - (1) Name of City
    - (2) Project title (subdivision, etc.)
    - (3) Specific type and location of work
    - (4) Space for the date and approval signature of City Engineer, City Attorney, Planning Commission, and South Ogden City
    - (5) Name of engineer or firm preparing drawings with license number, P.E. stamp and signature

3. Curb and gutter, drains and drainage structures, sidewalks and street surfacing drawings shall show:
  1. Scale: 1" = 20',30',40' or 50' horizontal; 1" = 2',3',4', 5', or 10' vertical
  2. Both plan view and centerline profile must be shown. On subdivisions along steep cross slopes, profiles for each side of the street may be required to be shown.
  3. Stationing and top of curb elevations with curve data must be shown at the beginning and end of all curves and at all intersection curb return points
  4. Flow direction and type of cross drainage structures at intersections with adequate flow line elevations
  5. Bench Mark (B.M.) Location and elevation (use approved datum) shall be noted
  6. Typical cross-section for all street sizes and variations
  7. Street survey monument locations shall be required by the City Engineer
  8. Plan and Profiles shall indicate design and/or existing grades a minimum of 200 feet beyond the limits of the proposed project
  
4. Sanitary and Storm Sewer drawings shall show:
  1. Scale: 1" = 20',30',40' or 50' horizontal; 1" = 2',3',4', 5', or 10' vertical (may be shown on street drawings)
  2. Location, size and slope of mains
  3. Manhole size, location and flow line elevation
  4. Type of pipe
  5. B.M. location and elevation (use approved datum) shall be noted
  
5. Culinary water drawings shall show:
  6. Scale: 1" = 20',30',40' or 50' horizontal; (may be shown on street drawings)
  7. Size and location of water mains, valves and hydrants and minimum cover
  8. Type of pipe
  
6. Irrigation Water Facility drawings shall show:
  4. Scale: 1" = 20',30',40' or 50' horizontal; 1" = 2',3',4', 5', or 10' vertical (may be shown on street drawings)
  5. Location, size and slope of irrigation pipe
  6. Clean out and control box locations
  7. Type of pipe
  8. B.M. location and elevation (use approved datum) shall be noted
  
7. Each set of plans shall be accompanied by a separate sheet of details for special structures which are to be constructed and are not covered by the City Standards. All structures shall be designed in accordance with the minimum South Ogden City Standards.

8. Separate drawings of elements of the South Ogden City Standards shall not be required to be redrawn and submitted with the construction drawings unless the specific deviations from the standards are requested for approval; however, the construction drawings shall refer to the specific items of the Standards that are to be incorporated into the work.
9. The mylar plan and profile construction plans shall be submitted in duplicate (minimum) with one set being retained by the City and one set returned to the Subdivider, Developer, Contractor or Project Manager. This approved set shall bear the signature of the City Engineer and shall be kept available at the construction site. In addition to the mylar construction plans, the developer's engineer shall provide the City Engineer with electronic files of the final plat and improvement plans in "Auto CAD" version 14 or other City Engineer approved format. Prior to final acceptance by the City, the subdivider, developer, contractor or project engineer shall submit to the City Building Department a set of reproducible mylar "as constructed" drawings for permanent City file record.

D. PRECONSTRUCTION CONFERENCE: The preconstruction conference shall be held only after the City Engineer has approved and signed the construction plans. A preconstruction conference shall be held before any excavation or other work is begun in the subdivision or Project. The preconstruction conference will be held in the City Municipal Building and will include: (a) City Engineer; (b) Developer; (c) Project Manager; (d) Subdivision or Project Engineer, (e) all Contractors and Subcontractors involved with installing the subdivision or project improvements; (f) representatives of affected South Ogden City Departments; (g) representatives of local utility companies as may be required by South Ogden City. Items pertaining to the construction and inspection of the subdivision or Project improvements will be discussed.

E. INSPECTIONS: All construction work involving the installation of improvements in the subdivision or project shall be subject to inspection by the City. It shall be the responsibility of the person responsible for construction to insure that inspections take place where and when required. Certain types of construction shall have continuous inspection, while others may have only periodic inspections.

1. Continuous inspection may be required on (but not limited to) the following types of work:
  1. Laying of street surfacing
  2. Placing of concrete for curb and gutter, sidewalks, and other structures
  3. Laying of sewer pipe, irrigation pipe, drainage pipe, water mains, water service laterals and testing
2. Periodic inspections shall be required on (but no limited to) the following types of work:

1. Street grading and gravel base
  2. Excavations for curb and gutter and sidewalks
  3. Excavations for structures
  4. Trenches for laying pipe
  5. Forms for curb and gutter, sidewalks and structures
3. On construction requiring continuous inspection, no work shall be done except in the presence or by permission of the City Engineer.

F. REQUEST FOR INSPECTION: Requests for inspections shall be made to the City Building Department by the person responsible for the construction. Requests for inspection on work requiring continuous inspection shall be made three (3) working days prior to the commencing of the work. Notice shall also be given one (1) day in advance of the starting of work requiring periodic inspection, unless specific approval is given otherwise by the City Engineer, or his duly authorized representatives.

G. CONSTRUCTION COMPLETION INSPECTION: An inspection shall be made by the City Engineer or authorized representative after all construction work is completed. Any faulty or defective work shall be corrected by the persons responsible for the work within a period of thirty (30) days of the date of the City Engineer's or authorized representative's Inspection Report defining the faulty or defective work.

H. CONSTRUCTION TESTING: All in-place density testing shall be performed by a materials testing laboratory that is certified by the State of Utah, and paid for by the Subdivider, Developer, Contractor or Project Manager. The cost of obtaining necessary soil "proctors," asphalt extractions, gradations, "Marshall" Asphalt densities, and concrete test cylinders shall be provided by and paid for directly by the Subdivider, Developer, Contractor or Project Manager.

I. APPROVAL BY CITY ENGINEER: All references within these specifications to the "City Engineer" shall be construed to refer to "The City Engineer or his duly authorized representative."

J. DRAWINGS: All references within these specifications to "The Drawings" shall mean the City approved construction drawings or the South Ogden City Public Works Standards and Technical Specifications as is applicable.

K. AMENDMENT PROCESS: Whenever, in the opinion of the City Building Department, the City Engineer, or the Superintendent having jurisdiction, a literal enforcement of these regulations may work an undue hardship or a literal enforcement of the provisions may be



unnecessary to meet the goals and standards of the City, the City may modify those standards in the following manner:

Modifications may be granted when there are practical difficulties involving carrying out the provisions of the Public Works Standards and Technical Specifications and a panel consisting of the City Engineer, Building Department Official, and the Public Works Director or his Representative determine that granting of a modification for an individual case will meet the goals and requirements of the City without unduly jeopardizing the public and the individual's interest. The City shall first receive a written request for a modification to the standards from any interested party. Upon receipt of the request the panel of three discussed above shall find that a special individual reason makes the strict letter of the standard impractical, and shall find the modification is in conformance with the intent and purpose of the standards and shall find that such modification does not in any way lessen the integrity of the standards. When such findings of fact are made, the panel may grant such modification as it deems appropriate. The details of any action granted as modification by this panel shall be recorded and entered in the files of the City, with the specific reason for the granting of said modification.

L. GUARANTEE OF WORK: The Subdivider shall warrant and guarantee (and post bond or other security) that the improvements provided for hereunder, and every part thereof, will remain in good condition for a period of one (1) year, after the date of conditional acceptance by the City, and agrees to make all repairs to and maintain the improvements and every part thereof in good condition during the time with no cost to the City.

It is further agreed and understood that the determination for necessity of repairs and maintenance of the work rests with the City Engineer. His decision upon the matter shall be final and binding upon the Subdivider, and the guarantee hereby stipulated shall extend to and include, but shall not be limited to, the entire street base, and all pipes, joints, valves, backfill and compaction, as well as the working surface, curbs, gutters, sidewalks, and other accessories that are, or may be affected by the construction operations. Whenever, in the judgment of the City Engineer, said work shall be in need of repairs, maintenance, or rebuilding, he shall cause written notice to be served to the Subdivider, and thereupon the Subdivider shall undertake and complete such repairs, maintenance or re-building. If the Subdivider fails to do so within thirty (30) days from the date of the service of such notice, the City Engineer shall have such repairs made, and the cost of such repairs shall be paid by the Subdivider together with 25 percent in addition thereto as and for stipulated damages for such failure on the part of the Subdivider to make the repairs.

## **SECTION 22-13; EARTHWORK**

A. GENERAL: This section defines the requirements for excavation and backfill for structures, construction requirements for embankments and fills, and subgrade preparation for pavements and other surface improvements.

B. EXCAVATION FOR STRUCTURES: All structures shall be founded on undisturbed original subsoil. All unauthorized excavation below the specified structure subgrade shall be replaced with concrete monolithic with that of the slab above or with coarse gravel compacted to 95% of maximum dry density as measured by ASTM D-1557 in lifts not to exceed 10".

Subgrade soil for all concrete structures, regardless of type or location, shall be firm, dense, thoroughly compacted and consolidated; shall be free from mud and shall be compacted to 95% of maximum dry density as measured by ASTM D-1557. Coarse gravel or crushed stone may be used for subsoils reinforcement if satisfactory results can be obtained thereby. Such material shall be applied in thin layers not to exceed 4", each layer being embedded in the subsoil by thorough tamping. All excess soil shall be removed to compensate for the displacement of the gravel or crushed stone, and the finished elevation of any subsoil reinforced in this manner shall not be above the subgrade elevation.

C. BACKFILL AROUND STRUCTURES: Backfill around structures shall be placed to the lines shown on the approved drawings, or as directed. After completion of foundation footings and walls and other construction below the elevation of the final grades, and prior to backfilling, all forms shall be removed and the excavation shall be cleaned of all trash and debris. Material for backfilling shall consist of excavated material or borrow of sand, gravel, or other suitable material, and shall be placed in layers not exceeding ten (10) inches in uncompacted thickness. Each layer shall be compacted by hand or machine tampers or by other suitable equipment to a density equal to 95% of maximum dry density as measured by ASTM D-1557.

D. CONSTRUCTION OF EMBANKMENTS AND FILLS: Unsuitable materials that occur in the foundations for embankments and fills shall be removed by clearing, stripping, and/or grubbing. Where suitable materials occur, after stripping, the subgrade soil shall be scarified to a depth of not less than six inches, and the loosened material shall be moistened and compacted as hereinafter specified for each layer. All materials in embankments and fills shall be placed, moistened, and compacted as provided in the following paragraphs.

When the embankment or fill exceeds the amount of excavation, sufficient additional material shall be obtained from borrow pits provided by the Contractor. All material proposed to be imported shall be subject to the review and approval of the City Engineer or his representative prior to start of hauling operations.

The materials used for embankment and fill construction shall be free from sod, grass, trash, rocks larger than four inches in diameter, and all other material unsuitable for construction of compacted fills.

Grading of completed embankments and fills shall bring the surfaces to a smooth, uniform condition with final grades being within 0.1 foot of the design grade. In no case shall embankment slopes have a steeper horizontal to vertical slope of 3:1.

E. COMPACTING EARTH MATERIALS: The material shall be deposited in horizontal layers having a thickness of not more than 10 inches after being compacted as hereinafter specified; provided that, when mechanical equipment is used for placing and compacting the material on a sloping foundation, the layers may be placed parallel to the foundations. The distribution of materials shall be such that the compacted material will be homogenous and free from lenses, pockets, or other imperfections.

During compaction operations the material shall have the optimum moisture content required for the purpose of compaction, and the moisture content shall be uniform throughout the layers, insofar as practicable. Moistening of the material shall be performed at the site of excavation, but such moistening shall be supplemented as required by sprinkling at the site of construction. If the moisture content is more than optimum for compaction, the compaction operations shall be delayed until such time as the material has dried to the optimum moisture content. When the material has been conditioned as hereinbefore specified, the backfill or embankment shall be compacted as follows.

1. Under Roadways and extending one foot beyond the proposed curb line, the fill or embankment material shall be compacted to a density equal to not less than 95% of maximum dry density as measured by ASTM D-1557.
2. Under Sidewalk and Drive Approaches, the fill or embankment material (to at least one foot each side of the edge of the slab) shall be compacted to a density equal to not less than 95% of maximum dry density as measured by ASTM D-1557.
3. Other Fills and Embankments not listed above shall be compacted to a density equal to not less than 85% of maximum dry density as measured by ASTM D-1557.

F. ROAD SUBGRADE PREPARATION: In both cut and fill areas the paving subgrade shall be scarified to a depth of eight inches and compacted to the equivalent of 95% of maximum dry density as measured by ASTM D-1557. No rocks larger than two (2) inches in diameter, organic material, soft clay, spongy material, or other deleterious material will be permitted on this scarified subgrade layer. Rough subgrades shall be shaped and graded to within a tolerance of 0.10 foot of design grade, and drainage shall be maintained at all times.

During the rolling operation, moisture content of the subgrade layer shall be maintained at not less than 97% or more than 105% of optimum moisture content. Rolling shall be continued until the entire roadbed is compacted to the specified density to a minimum depth of eight inches.

## **SECTION 22-14; BITUMINOUS PAVING**

A. GENERAL: This section covers the requirements for bituminous surface paving on roads. All streets shall be surfaced in accordance with the following specifications, unless otherwise specified by the City Engineer.

1. 10-inch minimum compacted thickness of untreated base course gravel over prepared subgrade. When subgrade soils have a C.B.R. (California Bearing Ratio) less than 10, additional gravel base shall be required as dictated by a pavement design approved by the City Engineer. Alternate designs may be considered if submitted by a registered geotechnical engineer.
2. 3-inch minimum compacted thickness of plant mix bituminous surface course.
3. UDOT Type A Bituminous Seal Coat, Slag Type A Chip and Seal or Type II or III Slurry Seal Coat as directed by the City Engineer.
4. When a geotextile fabric is required on subgrade for stabilization and/or separation purposes, the fabric shall be "Geotex" 315-ST or a City Engineer approved equal.

These pavement thicknesses shall be considered as City Standards and necessary to provide sufficient stability. The designer and/or developer may submit an alternative pavement design based on a detailed soils analysis for approval by the City Engineer which may modify pavement thicknesses, but in no case shall the bituminous surface course be less than 3" thick and the untreated base course less than 4" thick.

B. UNTREATED BASE COURSE: Untreated Base course for all streets shall consist of select material, either natural or crushed, and shall be graded to either one of the following:

**1-Inch Gradation**

<u>Sieve Size</u>	<u>Ideal Gradation (Percent Passing)</u>	<u>Ideal Gradation (Tolerance)</u>
1 inch	100	0
½ inch	85	+/- 6
No. 4 sieve	55	+/- 6
No. 16 sieve	31	+/- 4
No. 200 sieve	9	+/- 2

**¾-Inch Gradation**

<u>Sieve Size</u>	¾ inch	¾ inch No. 4 sieve
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No. 16 sieve No. 200 sieve	Ideal Gradation (Percent Passing)	Ideal Gradation (Tolerance)
	100	0
	85	+/- 7
	61	+/- 6
	33	+/- 5
	9	+/- 2

The material shall be deposited and spread in a uniform layer, without segregation of size, with such depth that when compacted the layer will have the required thickness as stated above.

Each layer shall be compacted for the full width and depth. Alternate blading and rolling will be required to provide a smooth even and uniformly compacted course true to cross section and grade. Places unaccessible to rolling shall be compacted with mechanically operated hand tampers.

The gravel base course shall be compacted to not less than 95% maximum dry density as determined by ASTM D-1557. During rolling operation, moisture content of the base course layer shall be maintained at not less than 97% or more than 105% of optimum moisture content. Surfaces shall be true to the established grade with the thickness being not less than 1/4 inch from the required layer thickness and with the surface elevation varying not more than 3/8 inch in ten feet from the true profile and cross section.

C. BITUMINOUS SURFACE COURSE: Over the dry, dust-free compacted base course, the Contractor shall place and compact a bituminous surface course. The surface course shall consist of a mixture of mineral aggregate and binder.

1. MATERIALS: Gradation of aggregate shall conform to the following:

#### **3/4 Inch Gradation**

<u>Sieve Size</u>	<u>Ideal Gradation (Percent Passing)</u>	<u>Ideal Gradation (Tolerance)</u>
3/4 inch	100	0
3/8 inch	80	+/- 11
No. 4 sieve	50	+/- 8
No. 16 sieve	24	+/- 7
No. 50 sieve	15	+/- 6
No. 200 sieve	6	+/- 2

The Contractor shall establish a mix gradation, and the amount of bituminous material shall be subject to the approval of the City Engineer and shall meet the requirements of the gradation selected. Regardless of the bituminous content, there shall not be more than 3% voids in the aggregate.

The bituminous material for the surface course shall be AC-10 asphalt cement conforming to the requirements of ASTM M20 - 60 or an approved City Engineer equal.

The bituminous surface course shall be mixed at a mixing plant and spread and compacted on the prepared base in conformance with the lines and dimensions shown on the plans and in accordance with these Specifications.

All traffic shall be kept off the completed surface for a minimum period of 24 hours, or as directed by a representative of South Ogden Public Works Department or City Engineer.

2. CONSTRUCTION METHODS AND EQUIPMENT: The methods employed in performing the work, all equipment, tools and machinery, and other appliances used in handling the materials and executing the work shall be the responsibility of the Contractor. The Contractor shall make such changes in the methods employed and in the equipment used as are necessary whenever the bituminous material being produced does not meet the specifications herein established.
3. SPREADING AND COMPACTION: The bituminous mixture shall be spread with self-propelled, mechanical spreading and conditioning equipment capable of distributing at least a 12-foot width. The mixture shall be spread and struck off in such a manner that the finished surface shall result in a uniform, smooth surface. The longitudinal joints in succeeding courses shall be offset at least six inches transversely to avoid a vertical joint through more than one course. Compacted surface course lifts shall be limited to a maximum of 3". Prior to placement of bituminous material, all exposed vertical facings on curb and existing pavement shall receive a thorough asphalt tack coat at a rate of 0.08 gal/per square yard. Care shall be exercised to prevent over spraying on finish concrete surfaces. The temperature of the bituminous mix shall be between 250° F and 325° F when being placed.

After the mixture has been spread, the surface shall be rolled in a longitudinal direction, commencing at the outside edge or lower side and proceeding to the higher side. Each pass of the roller shall overlap the proceeding pass at least one-half the width of the roller. Rolling shall continue until 95% of the laboratory density, as determined in accordance with ASTM Designation D-1559 (Marshall Test), for the bituminous mixture being used has been obtained. Rolling operations shall be conducted in such a manner that shoving or distortion will not develop beneath the roller.

The surface of the pavement, after compaction, shall be uniform and true to the established crown and grade. When tested with a ten (10) foot straight-edge placed parallel to the centerline of the pavement, the surface of the pavement at any point shall not deviate from the lower edge of the straight-edge by more than one-eighth of an inch. All high and low spots shall be remedied immediately by removing the wearing course

material over the affected areas and replacing it with fresh, hot wearing course and surface finish material and immediately compacting it to conform with surrounding area.

4. WEATHER LIMITATIONS: No bituminous surface course shall be placed when the temperature of the air or roadbed is 50° F or below, during rainy weather, when the base is wet, or during other unfavorable weather conditions as determined by the City Engineer. No bituminous plant mix seal coat shall be placed when the temperature of the air or roadbed is less than 70° F, during rainy weather, when the pavement surface is wet, or during other unfavorable weather conditions as determined by the City Engineer. The air temperature shall be measured in the shade.

D. BITUMINOUS SEAL COAT: Following installation of surface course, all completed asphalt areas shall receive seal coat consisting of Type III emulsified asphalt slurry seal, preferably a minimum of 12 months after bituminous paving or as directed by the City Engineer. On some high-traffic collector or arterial roads, the City Engineer may require a Type C chip seal instead of a slurry seal. A notice must be distributed to every home and/or business at least 24 hours before the seal coat project begins. The notice must include the name of the Contractor, telephone number, the day or days of the construction and the latest hour of the day by which vehicles must be moved from the street.

1. SLURRY SEAL REQUIREMENTS:

1. SLURRY SEAL - GENERAL: The Type III emulsified asphalt slurry seal shall consist of a mixture of an approved emulsified asphalt, mineral aggregate, water, and specified additives, proportioned, mixed and uniformly spread over a properly prepared surface. The completed slurry seal shall leave a homogeneous mat which is firmly adhered to the prepared surface, and shall have a friction-resistant surface texture throughout its service life.
2. SLURRY SEAL - MATERIALS: Materials used in the emulsified asphalt slurry seal mixture shall meet the following requirements:

Emulsified Asphalt: The emulsified asphalt shall be Grade CQS-1H or CSS-1H. Each load of emulsified asphalt from the manufacturer shall be accompanied by a Certificate of Analysis/Quality Assurance to verify product compliance with the specifications given herein.

Mineral Aggregate: The aggregate shall be manufactured crushed stone such as granite, slag, limestone, chat, or other high-quality aggregate, or combination thereof; aggregate shall be free from dirt, organic matter, clay balls, adherent films of clay, dust, or other objectionable matter. To assure the material is totally crushed, 100 percent of the parent aggregate will be larger than the largest stone in the gradation to be used. When tested according to the following, the aggregate shall meet these requirements:

<b>AASHTO TEST NO.</b>	<b>ASTM TEST NO.</b>	<b>QUALITY</b>	<b>SPECIFICATION</b>
AASHTO T176	ASTM D2419	Sand Equivalent	45 Minimum
AASHTO T104	ASTM C88	Soundness	15% Maximum using Na <sub>2</sub> SO <sub>4</sub> or 25% Maximum using MgSO <sub>4</sub>
AASHTO T96	ASTM C131	Abrasion Resistance	35% Maximum

When tested in accordance to AASHTO T27 (ASTM C136), AASHTO T2 (ASTM D75), and AASHTO T11 (ASTM C117), the mix design for Type III aggregate gradation (including the mineral filler) shall be within the following band:

Sieve Size	% Passing	Stockpile Tolerance
3/8" (9.5 mm)	100	+/- 5%
#4 (4.75 mm)	70 - 90	+/- 5%
#8 (2.36 mm)	45 - 70	+/- 5%
#16 (1.18 mm)	28 - 50	+/- 5%
#30 (600 mm)	19 - 34	+/- 5%
#50 (300 mm)	12 - 25	+/- 4%
#100 (150 mm)	7 - 18	+/- 3%
#200 (75 mm)	5 - 15	+/- 2%

If the tests show the material to be out of tolerance, the contractor will be given the choice to either remove the material or blend other aggregates with the stockpile material in order to meet the specified requirements. No field blending will be allowed. Materials used in blending must meet the quality test before blending and must be blended in a manner to produce a consistent gradation. This may require a new mix design. Screening shall be required at the stockpile if there are any problems created by having oversize materials in the mix. Sampling of the mineral aggregate and mineral filler shall conform to AASHTO T2 / ASTM D75 methods.



Mineral Filler: The mineral filler shall be hydrated lime or Portland Cement (Type I - II) and shall be considered as part of the dry mineral aggregate.

Set Control Additive: Set control additive shall be used to accelerate or retard the break and set of the slurry mixture. The quantity and type of set control additive, if required, shall be determined by the proposed mix design and conform to the applicable sections of ASTM D3910 and ISSA T102. Quantity of set control additive may be field adjusted if required, after approval of the City Engineer, to maintain consistent stability and workability of the slurry mixture.

Water: Water for the slurry mixture shall be clear, potable, free from harmful soluble salts and contaminants, and shall be compatible with the mix design.

- c. SLURRY SEAL - MIX DESIGN: The Contractor shall submit a signed mix design covering the specific materials to be used on the project. After the mix design has been approved, no substitution will be permitted unless approved by the City Engineer. The component materials shall be within the following limits:

<b>Description</b>	<b>Test Method</b>	<b>Requirements</b>
<b>Test On Emulsion</b>		
Viscosity @ 77F, SFS sec.	AASHTO T59 ASTM D244	20 - 100
Residue by distillation, weight %	AASHTO T59 ASTM D244	60 (min)
Sieve Test	AASHTO T59 ASTM D244	0.10 (max)
Settlement, 24 hour, weight %	AASHTO T59 ASTM D244	1 (max)
<b>Test On Residue</b>		
Penetration @ 77F, 100 g, 5 sec.	AASHTO T49 ASTM D2397	40 - 90
Solubility in trichloroethylene, %	ASTM D2042	97.5 (min)
Ductility @ 77F, cm.	ASTM D113	40 (min)
<b>Test On Slurry Seal Mixture</b>		
Residual Asphalt, % of dry weight of aggregate		6.5 - 12
System Compatibility	ISSA T116	Pass
Mix Time @ 77F	ASTM D3910 ISSA T113	Controllable to 180 sec (min)
Consistency, flow	ASTM D3910 ISSA T106	2 - 3 cm
Set Time, minutes	ASTM D3910	30 (max)
Wet Cohesion, 30 minutes	ISSA T139	12 kg cm *
Wet Cohesion, 60 minutes	ISSA T139	20 kg cm *
Wet Track Abrasion Loss	ASTM D3910 ISSA T100	75 g./sf (max)
Wet Stripping	ISSA T114	90 (min)

\* Cohesion values may be reported using “Mode of Rupture” evaluation detailed in ISSA T139.

d. SLURRY SEAL - CONSTRUCTION METHODS AND EQUIPMENT: The methods employed in performing the work, all equipment, tools and machinery, and other appliances used in handling the materials and executing the work shall be the responsibility of the Contractor. The Contractor shall have the capability to average a minimum of 20,000 square yards of slurry seal application per working day. The Contractor shall make changes in methods employed and in equipment used as necessary whenever the slurry material being produced does not meet the requirements herein established. The slurry seal shall not be applied if either the pavement or air temperature is below 50°F (10°C) and falling, but may be applied when both pavement and air temperatures are above 45°F (7°C) and rising. No slurry seal shall be applied when there is danger that the finished product will freeze before 24 hours. The mixture shall not be applied when weather conditions prolong opening to traffic beyond a reasonable time.

The slurry seal shall be mixed and applied with a machine designed and manufactured to lay slurry seal with a minimum aggregate capacity of eight (8) cubic yards to reduce the number of transverse joints. The slurry seal mixing machine shall be a continuous flow mixing unit, capable of delivering accurately predetermined proportions of aggregate, asphalt emulsion, and required materials to a revolving spiraled multi-blade mixer and of discharging the thoroughly mixed product on a continuous basis. The mixing unit shall be capable of thoroughly blending all ingredients together without violent action. The mixing machine shall be equipped with an approved fines feeder that provides an accurate metering device or method of introducing a predetermined proportion of mineral filler to the aggregate. The fines feeder shall be used only when mineral filler is part of the mix design. The mixing machine shall be equipped with a water pressure system and fog type spray bar. The machine shall be capable of mixing materials at preset proportions regardless of the speed of the machine and without changing machine settings.

Each mixing unit to be used in performance of the work shall be calibrated prior to construction. Documentation of such calibrations should be available for review and be performed on an annual basis. The documentation shall include an individual calibration of each material at various settings which can be related to the machine metering device(s).

The mixture shall be spread uniformly by means of a conventional surfacing spreader box attached to the mixer and equipped to agitate and spread the material evenly throughout the box. A front seal shall be provided to insure no loss of the mixture at the road contact point. The rear seal shall act as final strike-off and shall be adjustable and shall prevent loss of slurry on varying grades and crown by adjustments to assure uniform spread. The spreader box and rear strikeoff shall be so designed and operated that a uniform consistency is achieved to produce a free

flow of material to the rear strike-off. The spreader box shall have suitable means provided to side shift the box to compensate for variations in the pavement geometry, and shall be adjustable to widths from eight (8) to fifteen (15) feet to minimize the number of longitudinal joints. Broken slurry seal mixture shall not be allowed to collect in the spreader box or on the flexible strike-off. A burlap drag or other approved screed may be attached to the rear of the spreader box to provide a uniform, highly textured mat.

- e. SLURRY SEAL - SURFACE PREPARATION: Prior to application of the slurry seal, the existing pavement surface shall be cleaned of silt deposits, oil spots, vegetation, and loose or objectionable material. Traffic paint not tightly bonded to the surface shall be removed. Loose material in cracks and on the pavement surface shall be removed by sweeping and vacuuming operations. Water flushing may be required, but shall not be permitted in areas where considerable cracks are present in the pavement surface. If water is used, cracks shall be allowed to dry thoroughly before slurry surfacing. The City Engineer shall approve the surface preparation prior to surfacing.

Manholes, valve boxes, drop inlets, and other service entrances shall be protected from the slurry seal by placing Fibreen Grade 208-SD-10 reinforced, waterproof, all-purpose paper as manufactured by the Fortifiber Corporation or other suitable material approved by the City Engineer, and shall be noted as to their location prior to covering. The paper shall be held in place with spray glue and removed within 24 hours after the slurry seal has cured.

- f. SLURRY SEAL - APPLICATION: The slurry seal shall be of the desired consistency upon leaving the mixer. A sufficient amount of material shall be carried in all parts of the spreader at all times so that a complete coverage is obtained. Overloading of the spreader shall be avoided. No lumping, balling, or unmixed aggregate shall be permitted. No streaks, such as those caused by oversized aggregate, shall be left in the finished surface. If streaks, voids, or other undesirable conditions develop, the job will be stopped until the Contractor proves to the City Engineer that the situation has been corrected.

The slurry seal shall possess sufficient stability so that premature breaking of the material in the spreader box does not occur. The mixture shall be homogeneous during and following mixing and spreading. It shall be free of excess water and emulsion and free of segregation of the emulsion and aggregate fines from the coarser aggregate. Spraying of additional water into the spreader box will not be permitted.

Sufficient quantities of the slurry seal mixture shall be fed into the spreader box so that uniform and complete coverage of the pavement is obtained. The slurry seal machine shall be operated at such a speed that the slurry in the spreader box shall

not exceed a total mixing time of four (4) minutes and the volume shall remain essentially constant. The slurry seal shall be placed at a rate of 8 - 12 pounds per square yard using Type I gradation; 12 - 18 pounds per square yard using Type II gradation; 15 - 25 pounds per square yard using Type III gradation. The unit weight of the aggregate, the gradation of the aggregate, and the condition of the surface to which the slurry seal is applied may affect application rates.

- g. SLURRY SEAL - FINISHING: The Contractor shall have a foreman/supervisor on site during spreading of the slurry seal. The foreman/supervisor shall have experience with slurry seal and a working knowledge of the equipment, materials, and application procedures.

The longitudinal joint between adjacent lanes shall have no visible lap, pinholes, or uncovered areas. Thick application caused by overlapping shall be smoothed immediately with hand squeegees before the slurry seal mixture breaks. When possible, longitudinal joints shall be placed on lane lines. The Contractor shall provide suitable spreading equipment to minimize the number of longitudinal joints. Overlays that occur at transverse joints shall be smoothed before the slurry seal mixture breaks, so that a uniform surface is obtained.

Care shall be taken to ensure straight lines along curbs and shoulders. No runoff on these areas will be permitted. Lines at intersections shall be kept straight and provide a good appearance. Approved hand squeegees, with burlap drags, shall be used to spread slurry in areas not accessible to the slurry spreader box. Care shall be exercised in leaving no unsightly appearance from handwork.

- h. SLURRY SEAL - CURING: Treated areas will be allowed to cure from four (4) to twenty-four (24) hours or until the treated pavement will not be damaged by traffic loading. The Contractor will protect the area for the full curing period with suitable barricades or markers. Areas damaged, as a result of insufficient curing, within 24 hours or prior to moving to a new location shall be repaired at the Contractor's expense.

The slurry seal shall be applied to alternating streets to allow sufficient time for the emulsified material to set and bond to the existing street. Traffic will not be allowed on the newly placed bituminous material until, in the opinion of the City Engineer, the bituminous material has sufficiently set and bonded or the material has been allowed to set and bond for a minimum of four (4) hours to prevent damage by traffic loading. Areas subject to an increased rate of sharp-turning vehicles may require additional time to allow for a more complete cure of the slurry seal mat to prevent damage. Opening to traffic does not constitute acceptance of the work.

1. SLURRY SEAL - QUALITY CONTROL: Suitable sized samples of aggregate, asphalt emulsion, and mineral filler shall be submitted, when requested by the City Engineer, for approval not less than ten (10) days prior to the beginning of construction. All samples of materials shall be supplied by the Contractor at his expense. Additional samples of materials shall be furnished as directed by the City Engineer during progress of the work.

The City Engineer will notify the Contractor immediately if any test fails to meet the requirements herein specified. If any two successive tests fail on the stockpile material, the job shall be stopped. If it is established that a satisfactory slurry seal mixture meeting the requirements specified herein cannot be produced from the materials furnished, the materials shall be rejected and the Contractor shall submit new samples. It is the responsibility of the Contractor, at his own expense, to prove to the City Engineer that the conditions have been corrected.

Slurry seal placement requires conscientious workmanship and shall be performed under careful supervision and inspection, employing only experienced workman. The Contractor shall provide supervision during all hours of slurry seal placement. Said supervision shall consist of a foreman with not less than two years as an equipment operator. The foreman and equipment operator should be conscientious and recognize immediately that the equipment or materials are not within the prescribed tolerances. The foreman shall have the authority to stop on site production in the event that a quality slurry seal mixture is not being supplied, produced, or applied. Equipment operators should have completed competent training and have certification of such.

In the event that the slurry seal placed or being produced at the job site appears to have a questionable quality, the City Engineer may order the taking of suitable test samples to verify that the materials meet the requirements of this specification. Any retesting or slurry seal replacement required because of test failures shall be the responsibility of the Contractor.

- j. SLURRY SEAL - CLEAN-UP: All material swept or blown onto sidewalks; trash; discarded slurry seal material; or other debris caused by construction activities shall be cleaned up and removed on a daily basis and legally disposed of at the Contractor's expense.

## 2. CHIP SEAL REQUIREMENTS:

1. CHIP SEAL - GENERAL: The bituminous chip and seal coat consists of an applied course of an approved emulsified asphalt followed by a cover course of mineral aggregate spread over a properly prepared surface as directed by the City Engineer. The completed bituminous chip and seal coat shall be followed by a flushed seal coat to complete a homogeneous mat which is firmly adhered to the prepared surface, and shall have a friction-resistant texture throughout its service life.

2. CHIP SEAL - MATERIALS: Materials used in the bituminous chip and seal coat shall meet the following requirements:

Emulsified Asphalt: The asphalt emulsion shall be LMCRS-2A. The latex modified cationic rapid set emulsion shall be derived from a base asphalt that meets the requirements of SHRP 58/28 base criteria prior to the 3% latex addition. Three one-liter samples should be held by the Contractor from each batch delivered to the site. Said samples will be tested for proper chemical content if emulsion does not perform satisfactorily.

Mineral Aggregate: The aggregate shall be manufactured crushed stone such as granite, slag, limestone, chat, or other high-quality aggregate, or combination thereof; aggregate shall be free from dirt, organic matter, clay balls, adherent films of clay, dust, or other objectionable matter. To assure the material is totally crushed, 100 percent of the parent aggregate will be larger than the largest stone in the gradation to be used.

The dry mineral aggregate shall be uniformly graded to the gradation limits specified below, when tested in accordance with AASHTO T 27 “Sieve Analysis of Fine and Course Aggregates” (UDOT Type "C" aggregate).

Sieve Size	% Passing
½ inch	100
3/8 inch	70-90
No. 4	0-5
No. 8	0-3
No. 200	0-1

Acceptance of cover material with respect to gradation shall be based on the average gradation of five samples taken from a test lot of 5,000 tons. The samples shall be obtained from the stockpile prior to use. A test lot shall be obtained when the average gradation of the five samples is within the specified gradation band and when the number of individual samples in each test lot outside the gradation band does not exceed two, and when they are not outside the band by more than two percentage points on any one sieve.

The total amount of material passing the No.200 sieve shall be determined by washing with water in accordance with AASHTO T 11 “Materials Finer Than 75mm (No. 200) Sieve in Mineral Aggregates by Washing.”

That portion of the aggregate retained on the No.4 sieve shall be clean and free of clay coatings and shall have not less than 80 percent by weight, of particles with at least one clean mechanically fractured face, when tested in accordance with UDOT Materials Manual 8-929.

The aggregate shall have a percentage of wear not exceeding 30 when tested in accordance with AASHTO T 96 “Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine”, and shall have a weighted percent of loss not exceeding 10 percent by weight when subjected to five cycles of sodium sulfate and tested in accordance with AASHTO T 104 “Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.” The aggregate shall be of such nature that when the particles are thoroughly coated with the bituminous material specified for the project not less than 90 percent of the coating shall be retained when tested in accordance with UDOT Materials Manual 8-945.

The maximum dry unit weight of the mineral aggregate shall not exceed 100 pounds per cubic foot when measured according to the loose weight determination as described in AASHTO T 19 “Unit Weight and Voids in Aggregate” and the moisture content shall be determined according to ASTM D2216.

Emulsified Flushed Coat: The emulsified asphalt flushed coat seal shall be Grade CQS-1H or CSS-1H. The emulsified flush coat material shall be diluted two parts concentrate to one part water by the supplier or manufacturer before being delivered to the site. Each load of emulsified asphalt from the manufacturer shall be accompanied by a Certificate of Analysis/Quality Assurance to verify product compliance with the specifications given herein.

Water: Water for the bituminous flush coat mixture shall be clear, potable, free from soluble salts and contaminants, and shall be compatible with the specified mix design.

- c. CHIP SEAL - CONSTRUCTION METHODS AND EQUIPMENT: Prior to application of the bituminous chip and seal coat, the existing pavement surface shall be cleaned of silt deposits, oil spots, vegetation, and loose or objectionable material. Traffic paint not tightly bonded to the surface shall be removed. Loose material in cracks and on the pavement surface shall be removed by sweeping and vacuuming operations. Water flushing may be required, but shall not be permitted in areas where considerable cracks are present in the pavement surface. If water is used, cracks shall be allowed to dry thoroughly before chip and seal coat surfacing. The City Engineer shall approve the surface preparation prior to surfacing.

Manholes, valve boxes, drop inlets, and other roadway maintenance access structures shall be protected from the bituminous asphalt emulsion by placing suitable material approved by the City Engineer, and shall be noted as to their



location prior to covering. The approved protection material shall be held securely in place and removed within 24 hours after the chip and seal coat has cured.

Existing roadway striping should be adequately marked using reflective tabs prior to the commencement of chip and seal operations. All roadway striping marker placement should be coordinated with the Street Superintendent.

4. CHIP SEAL - APPLICATION: The bituminous asphalt material shall be placed in accordance with UDOT Standard Specifications. Bituminous material shall be placed with a distributor equipped with a hydrostatic system and full circulating spray bar to spray emulsion. The emulsion shall be spread constant and evenly across the roadway surface. Distribution equipment shall be self-propelled and shall possess sufficient power to maintain a constant and uniform speed; and shall be equipped with a thermometer well, adjustable spray bar and positive shut-off valves. Distribution equipment shall also be equipped with devices such as gauges, charts or meters to provide accurate and rapid determination and control of bituminous asphalt material being applied per square yard of surface. Distribution equipment shall also provide a means to control the rate of uniform application of material ranging from 0.05 to 0.75 gallons per square yard of surface; to a width of 12 feet. The Contractor shall distribute bituminous asphalt material at a rate sufficient to adequately coat 50 to 70% of the cover aggregate as determined by the City Engineer. If streaks, puddles, voids, or other undesirable conditions develop, the work will be stopped until the Contractor demonstrates to the satisfaction of the City Engineer that the situation has been corrected.

Cover aggregate shall be placed by means of a spreader box, which can be adjusted to uniformly spread cover material at the required rate per square yard, as required and as directed by the City Engineer. Cover aggregate shall be placed at a rate of approximately 20 to 25 pounds per square yard. Loose cover aggregate shall be hand broomed, as required, to distribute the material uniformly over the surface.

Cover material shall be rolled using pneumatic-tire rollers in a longitudinal direction. Compaction equipment shall have at least two front rollers and one rear finish roller. Contractor shall apply sufficient compaction effort to thoroughly embed cover aggregate into the bituminous asphalt emulsion.

Chip and seal surface shall be cleaned of all dirt, sand, dust, loose chips and other objectionable materials to the satisfaction of the City Engineer within 24 hours of applying the chip and seal coat. Bituminous flush coat shall then be applied at a rate of 0.12 gallons per square yard. Traffic should be diverted off the newly flushed surface until the bituminous material has set sufficiently to prevent tracking or pick-up.

No bituminous chip and seal coat shall be placed when the temperature of the air or roadbed is 70 degrees F. or below, during rainy weather, when the base is wet, or during other unfavorable weather conditions as determined by the City Engineer. The air temperature shall be measured in the shade.

5. CHIP SEAL - FINISHING: The Contractor shall have a foreman/supervisor on site during placement of bituminous chip and seal coat. The foreman/supervisor shall have experience with chip and seal and a working knowledge of the equipment, materials, and application procedures.

The longitudinal joint between adjacent lanes shall have no visible lap, pinholes, or uncovered areas. Thick application caused by overlapping shall be smoothed. Longitudinal joints within six inches of the traffic lane line location or within twelve inches of the center of the center of a traffic lane should be offset away from the wheel path. Construct the meet lines with no skips or voids between adjacent passes. Avoid a double thickness of material. Overlays that occur at transverse joints shall be smoothed before the slurry seal mixture breaks, so that a uniform surface is obtained.

Care shall be taken to ensure straight lines along curbs and shoulders. Street ends and intersections shall be masked off to provide straight transition lines. No runoff on these areas will be permitted. Care shall be exercised in leaving no unsightly appearance from handwork.

- f. CHIP SEAL - QUALITY CONTROL: Suitable sized samples of the aggregate and the asphalt emulsion shall be tested and the results shall be submitted to the City Engineer for approval not less than ten (10) days prior to the beginning of construction. All samples of materials shall be supplied by the Contractor at his expense. Additional samples of materials shall be furnished as directed by the City Engineer during progress of the work.

The City Engineer will notify the Contractor immediately if any test fails to meet the requirements herein specified. If any two successive tests fail on the stockpile material, the job shall be stopped. If it is established that a satisfactory chip and seal mixture meeting the requirements specified herein cannot be produced from the materials furnished, the materials shall be rejected and the Contractor shall submit new samples. It is the responsibility of the Contractor, at his own expense, to prove to the City Engineer that the conditions have been corrected.

Bituminous chip and seal placement requires conscientious workmanship and shall be performed under careful supervision and inspection, employing only experienced workman. The Contractor shall provide supervision during all hours of chip and seal placement. Said supervision shall consist of a foreman with not less than two years as an equipment operator. The foreman and equipment operator should be conscientious and recognize immediately that the equipment or materials

are not within the prescribed tolerances. The foreman shall have the authority to stop on site production in the event that a quality chip and seal surface is not being supplied, produced, or applied. Equipment operators should have completed competent training and have certification of such.

In the event that the chip and seal placed or being produced at the job site appears to have a questionable quality, the City Engineer may order the taking of suitable test samples to verify that the materials meet the requirements of this specification.

Cost of all laboratory testing of such samples shall be the responsibility of the Owner. Any retesting or slurry seal replacement required because of test failures shall be the responsibility of the Contractor.

7. CHIP SEAL - CURING & PROTECTION: Treated areas will be allowed to cure from four (4) to twenty-four (24) hours or until the treated pavement will not be damaged by traffic loading. The Contractor will protect the area for the full curing period with suitable barricades or markers. Areas damaged, as a result of insufficient curing, within 24 hours or prior to moving to a new location shall be repaired at the Contractor's expense.

The bituminous chip and seal shall be applied to alternating streets to allow sufficient time for the emulsified material to set and bond to the existing street. Traffic will not be allowed on the newly placed bituminous material until, in the opinion of the City Engineer, the bituminous material has sufficiently set and bonded or the material has been allowed to set and bond for a minimum of four (4) hours to prevent damage by traffic loading. Areas subject to an increased rate of sharp-turning vehicles may require additional time to allow for a more complete cure of the chip and seal mat to prevent damage. Opening to traffic does not constitute acceptance of the work.

Chips shall be swept or otherwise removed from the roadway prior to allowing uncontrolled traffic to traverse the roadway. Bituminous flushed seal coat shall be applied to the roadway within 24 hours of placing chips.

8. CHIP SEAL - CLEAN-UP: All material swept or blown onto sidewalks; trash; discarded asphalt material; or other debris caused by construction activities shall be cleaned up and removed on a daily basis and legally disposed of at the Contractor's expense.

## **SECTION 22 - 15; PORTLAND CEMENT CONCRETE**

A. GENERAL: This section of the specifications defines materials to be used in all Portland cement concrete work and requirements for mixing, placing, finishing, and curing.

B. MATERIALS: Materials used in Portland cement concrete and reinforcing of Portland cement concrete shall meet the following requirements.

1. Cement: Portland cement shall be Type II or as approved by the City Engineer and shall comply with the Standard Specification for Portland Cement, ASTM C-150.
2. Aggregates: Concrete aggregates shall conform to Tentative Specifications for Concrete Aggregates, ASTM C-33.
3. Water: Water used in mixing concrete shall be clean and free from oil, acid, salt, injurious amounts of alkali, organic matter or other deleterious substances.
4. Entraining Agent: An air-entraining agent shall be used in all concrete exposed to the weather. The agent shall conform to ASTM Standard Specification D-175 and C-260.
5. Admixtures: No admixture (except calcium chloride) will be permitted to be used in Portland cement concrete unless such use is specifically authorized by the City Engineer. Calcium chloride shall conform to ASTM Standard Specification D-98.
6. Reinforced Steel: All bar material used for reinforcement of concrete shall be grade 60 steel conforming to the requirements of ASTM Designation A-615 and shall be deformed in accordance with ASTM Designation A-305.
7. Welded Wire Fabric: Welded wire fabric for concrete reinforcement shall conform to the requirements of ASTM A-185.

C. CONCRETE MIX: For the purpose of practical identification, concrete has been divided into three classes: Class A, B, and C. Basic requirements and use for each class are as defined below:

<b>Class</b>	<b>Minimum Cement (sacks/yd<sup>3</sup>)</b>	<b>Minimum 28-day Strength (psi)</b>	<b>Primary Use</b>
A	6-1/2	4,000	Reinforced Structural Concrete
B	6	3,500	Sidewalk, curb, gutter, cross gutter, pavement, unreinforced footings and foundations
C	5	2,500	Thrust blocks, anchors, mass concrete

All concrete mixes shall also comply with the following requirements.

1. Aggregates: The maximum size of the aggregate shall not be larger than one-fifth of the narrowest dimension between forms within which the concrete is to be cast, nor larger than three-fourths of the minimum clear spacing between reinforcing bars or between

reinforcing bars and forms. For unreinforced concrete slabs, the maximum size of aggregates shall not be larger than one-fourth the slab thickness.

2. **Water:** Sufficient water shall be added to the mix to produce concrete with the minimum practicable slump. The slump of mechanically vibrated concrete shall not exceed four inches. No concrete shall be placed with a slump in excess of five inches. The maximum permissible water-cement ratio (including free moisture on aggregates) shall be 5 and 5 3/4 gallons per bag of cement respectively for Class A and B air entrained concrete.
3. **Air-Entraining:** The air-entraining agent shall be added as liquid to the mixing water by means of mechanical equipment capable of accurate measurement and control. Air content for air-entrained concrete shall comply with the following:

Course Aggregate Size <u>(in)</u>	Air Content <u>%</u>
1 1/2 to 2 1/2	5 +/- 1
3/4 or 1	6 +/- 1
3/8 or 1/2	7 +/- 1

4. **Calcium Chloride:** Calcium chloride may be added as an accelerator with prior approval of the City Engineer during cold weather, with maximum amount being two pounds per sack of cement.

D. **FORMS:** Forms shall be substantially built and adequately braced so as to withstand the liquid weight of concrete. All linings, studding, walling and bracing shall be such as to prevent bulging, spreading, or loss of true alignment while pouring and displacement of concrete while setting. Metal forms shall be used for curb and gutter work unless otherwise specified by the City Engineer. All edge forms for sidewalk pavements, curbs, and gutters shall be of sufficient rigidity and adequately braced to accurately maintain line and grade. Prior to concrete placement, all forms shall be lightly coated with oil to prevent concrete adhesion to form material. Forms for curved sections shall be so constructed and placed that the finish surface of walls and edge of sidewalks, curbs, and gutters will not deviate appreciably from the arc of the curve. Exposed vertical and horizontal edges of the concrete in structures shall be chamfered by the placing of moldings in the corners of the forms.

E. **JOINTS:** Joints shall be provided for sidewalk and curb and gutter as follows:

1. **Sidewalks:** Shall have scribed joints at intervals of 4 feet which joints shall be approximately 1/16" wide and be approximately 1/4 of the total slab thickness. Expansion joints are to be placed at 48' intervals (min.) or wherever new sidewalks ajoin existing sidewalks, driveways or aprons.

2. Curb and Gutter: Shall be cut into lengths of 10 feet by the use of 1/8 inch steel division plates of the exact cross section of the curb and gutter when constructed by hand methods. Curb and gutter constructed with a lay down machine shall be hand scribed with joints which shall be approximately 1/16" wide and be approximately 1/4 of the total curb thickness.

F. REINFORCEMENT AND EMBEDDED ITEMS: Reinforcing steel shall be lean and free from rust, scale, paint, grease, or other foreign matter which might impair the bond. It shall be accurately bent and shall be tied to prevent displacement when concrete is poured. Reinforcing steel shall be held in place by only metal or concrete ties, braces, and supports, no steel shall extend from or be visible on any finished surface and shall have a minimum of 1 ½ inch concrete cover. The Contractor shall use concrete chairs for holding the steel away from the subgrade, and spreader or other type bars for securing the steel in place. The spreader bars shall be not less than 3/8 inch in diameter.

G. PREPARATIONS: Before batching and placing concrete, all equipment for mixing and transporting the concrete shall be cleaned, all debris and ice shall be removed from the places to be occupied by the concrete, forms shall be thoroughly wetted (except in freezing weather) or oiled, and masonry filler units that will be in contact with concrete shall be adequately coated (except in freezing weather), and the reinforcements shall be thoroughly cleaned of ice or other coatings. Water shall be removed from spaces to receive concrete.

When placing concrete on earth surfaces, the surfaces shall be free from frost, ice, mud, and water. When the subgrade surface is dry soil or pervious material, it shall be sprayed with water immediately before placing of concrete or shall be covered with waterproof sheathing paper or a plastic membrane. No concrete shall be placed until the surfaces have been inspected and approved by the City Engineer or City Inspector.

H. CONCRETE MIXING: All concrete shall be ready-mixed and delivered in accordance with ASTM C-94. The concrete shall be mixed until there is a uniform distribution of the materials. Sufficient water shall be used in mixing concrete to produce a mixture which will flatten and quake when deposited in place, but not enough to cause it to flow. Sufficient water shall be used in concrete in which reinforcement is to be embedded, to produce a mixture which will flow sluggishly when worked and which, at the same time, can be conveyed from a mixer to the forms without separation of the coarse aggregate from the mortar. In no case shall the quantity of water used be sufficient to cause the collection of a surplus in the forms or exceed the maximum allowable slump as specified in 5.3 (b).

I. DEPOSITING: Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to re-handling or flowing. The concrete placing shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the corners of forms and reinforcing bars. No concrete that has partially hardened or been contaminated by foreign material shall be deposited in the work, nor shall re-tempered concrete be used. No concrete shall be dropped more than 3 feet. Concrete delivered to the job site having a temperature which exceeds 90° F shall not be placed. Concrete cooling methods during hot weather will be approved by the City Engineer.

All concrete in structures shall be vibrator compacted during the operation of placing and shall be thoroughly worked around reinforcement and embedded fixtures and into the corners of the forms.

J. PLACING CONCRETE IN COLD WEATHER: No concrete shall be poured where the air temperature is lower than 40° F at a location where the concrete cannot be covered or protected from the surrounding air. When concrete is poured below a temperature of 35° F the ingredients of the concrete shall be heated so that the temperature of the mixture shall not be less than 50° or more than 100° F. Before mixing, the heated aggregates shall not exceed 125° F and the temperature of the heated water shall not exceed 175° F. Cement shall not be added while the temperature of the mixed aggregates and water is greater than 100° F. When there is likelihood of freezing during the curing period, the concrete shall be protected by means of an insulating covering and/or heating to prevent freezing of the concrete for a period of not less than 7 days after placing. Concrete shall not be placed on frozen soil.

Equipment for protecting concrete from freezing shall be available at the job site prior to placing concrete. Particular care shall be exercised to protect edges and exposed corners from freezing. In the event heating is employed, care shall be taken to insure that no part of the concrete becomes dried out or is heated to temperatures above 90° F. The housing, covering, or other protection used shall remain in place and intact at least 24 hours after the artificial heating is discontinued. Combustion heaters shall not be used during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.

K. FINISHING: All concrete finish work shall be carefully performed and shall produce a top quality visual appearance as is common to the industry. After the concrete for slabs has been brought to the established grade and screened it shall be worked with a magnesium float and then given a light broom finish. In no case shall dry cement or a mixture of dry cement and sand be sprinkled on the surface to absorb moisture or hasten hardening. Surface edges of all slabs shall be rounded to a radius of ½ inch.

After concrete has been poured in curb and gutter forms it shall be puddled and spaded so as to insure a thorough mixture, eliminate air pockets, and create uniform and smooth sides. Before the concrete has thoroughly set and while the concrete is still green, the forms shall be removed and the front and top sides shall be finished with a flat or steel trowel to make a uniform finished surface. Wherever corners are to be rounded, special steel trowels shall be used while the concrete is workable and the corners constructed to the dimensions specified.

The top and face of the curb and also the top of the apron on combined curb and gutter must be finished true to line and grade and without any irregularities of surface noticeable to the eye. The gutter shall not hold water to a depth of more than one fourth (¼) of an inch, nor shall any portion of the surface or face of the curb or gutter depart more than one-fourth (¼) of an inch from a straight edge ten (10) feet in length, placed on the curb parallel to the center line of the street nor shall any part of the exposed surface present a wavy appearance.

L. CURING AND PROTECTION: As soon as the concrete has hardened sufficiently to prevent damage, the finished surface shall be protected for curing using one of the following ways:

1. Ponding of water on the surface or continuous sprinkling.
2. Application of absorptive mats such as 3-inch of cured hay, clean straw or fabric kept continuously wet.
3. Application of two inches of moist earth or sand uniformly distributed on the surface and kept saturated by spraying with water.
4. Application of light colored waterproof plastic materials, conforming to “Specifications for Waterproof Sheet Materials for Curing Concrete” ASTM C-171, placed and maintained in contact with the surface of the concrete.
5. Application of a curing compound, conforming to “Specifications for Liquid Membrane - Forming Compounds for Curing Concrete” ASTM C-309. The compound shall be light in color and shall be applied in accordance with the manufacturers recommendations immediately after any water sheen, which may develop after finishing has disappeared from the concrete surface.

The freshly finished surface shall be protected from hot sun and drying winds until it can be sprinkled or covered as above specified. The concrete surface must not be damaged or pitted by rain. The Contractor shall provide and use, when necessary, sufficient tarpaulins to completely cover all sections that have been placed within the preceding twelve (12) hours.

The Contractor shall erect and maintain suitable barriers to protect the finished surface. Any section damaged from traffic or other causes occurring prior to its official acceptance, shall be repaired or replaced by the Contractor at his own expense in a manner satisfactory to the City Engineer. Defective concrete conditions or surfaces shall be removed, replaced, or repaired as directed to meet the approval of the City Engineer.

M. CONCRETE TESTING: In the event that the concrete placed or delivered to the job site appears to have questionable quality, the City Engineer may order the taking of concrete test cylinders to check required compressive strengths. In place concrete may be cored for testing. Cost of all required laboratory testing shall be the responsibility of the Subdivider/Developer, Contractor or ready-mix supplier. All concrete delivered to the job site shall be accompanied by a ticket specifying bag mix, air content, etc. Said tickets shall be given to the City Inspector who may field check slump, temperature and air entrainment compliance.



## **SECTION 22 - 16; EXCAVATION AND BACKFILL FOR PIPELINES**

A. GENERAL: The work covered by this specification consists of furnishing all labor, tools, materials, equipment, and in performing all operations in connection with the excavation, trenching, and backfilling for underground pipelines and appurtenances.

B. CONTROL OF GROUNDWATER: Trenches shall be kept free from water during excavation, fine grading, pipe laying and jointing, and pipe embedment operations in an adequate and acceptable manner. Where the trench bottom is mucky or otherwise unstable because of the presence of groundwater, and in all cases where the static groundwater elevation is above the bottom of any trench or bell hole excavation, such groundwater 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. The discharge from trench dewatering shall be conducted to natural drainage channels, gutters, or drains. Surface water shall be prevented from entering trenches.

C. EXCAVATION FOR PIPELINES: Excavation for pipelines shall follow lines parallel to and equidistant from the location of the pipe centerline. Trenches shall be excavated to the depths and widths required to accommodate the construction of the pipelines, as follows:

1. Except in ledge rock, cobble rock, stones or water-saturated earth, mechanical excavation of trenches shall not extend below an elevation four inches above the bottom of the pipe after placement in its final position. All additional excavation necessary for preparing of the trench bottom shall be made manually. Excavation shall not be carried below the grade shown on the drawings. Any unauthorized excavation made below grade for any reason shall be backfilled in accordance with these specifications.
2. 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 four inches below the bottom of the pipe. A bedding of special material shall be placed and thoroughly compacted with pneumatic or mechanical tampers in four-inch thick lifts to provide a smooth, stable foundation. Special foundation material shall consist of suitable earth materials free from roots, sod, or organic matter. Trench bottoms shall be hand-shaped as specified in paragraph (A) above.

Where unstable earth or muck is encountered in the excavation at the grade of the pipe, a minimum of twelve inches below grade will be removed and backfilled with crushed rock or gravel to provide a stable subgrade.

3. The maximum width of trench, measured at the top of the pipe, shall be as narrow as possible but not wider than twelve inches on each side of sewer pipe or drainage pipe and fifteen inches on each side of water pipe.
4. Excavation for pipelines under existing curb and gutter, concrete slabs or sidewalks shall be open cut. In no case shall tunneling be allowed. At the option of the City

Engineer, jacking under permanent facilities may be allowed based on his direction. Backfill of open cut areas shall be restored as specified in Section 6.7.

D. GRAVEL FOUNDATION FOR PIPE: 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 trench bottom for pipe installation, and at other locations as previously defined, the sub grade shall be excavated to the specified depth and replaced with crushed rock or gravel. Gravel for pipe foundation shall be clean, crushed rock or gravel conforming to the following gradation:

Screen	% Passing
1-1/2"	100
No. 4	5

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

E. BLASTING: Blasting will not be allowed except by special permission of the City Engineer. When the use of blasting is necessary, the Contractor shall use utmost care not to endanger life or property. The Contractor shall be licensed to do the work and shall comply with all laws, ordinances, and applicable safety code requirements and regulations relative to the handling, storage, and use of explosives and protection of life and property, and he shall be fully responsible for all damage attributable to his blasting operations. Signals warning persons of danger shall be given before any blast. Suitable weighted plank coverings of timber mats shall be provided to confine all materials lifted by blasting within the limits of the excavation or trench. Seismic instrumentation shall be provided by the contractor as required by the City Engineer.

Excessive blasting or overshooting will not be permitted, and any material outside the authorized cross section which may be shattered or loosened by blasting shall be removed at the Contractor's expense. The City Engineer shall have authority to order any method of blasting discontinued which leads to overshooting or is dangerous to the public or destructive to property or to natural features.

F. SHEETING, BRACING, AND SHORING OF EXCAVATIONS: Excavation shall be sheeted, braced, and shored as required to support the walls of the excavations to eliminate sliding and settling and as may be otherwise required to protect the workmen and existing utilities, structures, and improvements. All such sheeting, bracing, and shoring and side slopes shall comply with the requirements of the Utah State Industrial Commission and OSHA. All damage resulting from lack of adequate sheeting, bracing and shoring shall be the responsibility of the Contractor and the Contractor shall accomplish all necessary repairs or reconstruction resulting from such damage.

G. BACKFILLING: 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. In these specifications the process of preparing the trench bottom to receive the pipe and the backfilling on each side of the pipe to a level over the top of the pipe is defined as bedding. Bedding requirements are as defined on the South Ogden City Standard Drawings and in the Specifications for each pipe type. Backfill around the pipe to the level indicated in the Standard Drawings shall not contain rocks more than 2" in diameter and shall be free from sod, vegetation, and other organic or deleterious materials. Trench backfilling above the level of the pipe bedding shall normally be accomplished with native excavated materials and shall be free from rocks larger than four inches in diameter.

H. COMPACTION OF BACKFILL: Compacted backfill shall be placed by means of pneumatic tire rollers, hoe packs or other mechanical tampers of a size and type approved by the City Engineer. The backfill in all utility trenches shall be compacted according to the requirements of the materials being placed. Under pavements or other surface improvements the in-place density shall be a minimum of 95% of laboratory standard maximum dry density as determined by ASTM D-1557. In shoulders and other areas the in-place density shall be a minimum of 90% of laboratory standard maximum dry density, as determined by the same laboratory method. A City approved testing laboratory shall provide in-place density tests at various depths throughout the trench backfill. In-place density tests shall be taken every 200 lineal feet of trench section, per 2 vertical feet (mainline and service laterals) unless otherwise directed by the City Engineer. A copy of all in-place density tests shall be delivered to the City Public Works Department for review and approval. Any portion of the trench backfill which does not meet the minimum compaction requirements of this section, shall be removed, recompacted and retested at the cost of the Contractor until passing tests are obtained.

The material shall be placed at a moisture content such that after compaction the required relative densities will be produced; also, the material shall be placed in lifts which, prior to compaction, shall not exceed 12 inches (8" maximum lifts in the pipe bedding section) or as recommended by the project soils engineer. Prior to compaction, each layer shall be evenly spread and moistened, if required, as approved by the project soils engineer. Approval of equipment, thickness of layers, moisture content, and compactive effort shall not be deemed to relieve the Contractor of the responsibility for attaining the specified minimum relative densities. The Contractor, in planning his work, shall allow sufficient time to make tests for relative densities for the approval of the City Engineer.

I. IMPORTED BACKFILL MATERIAL: In the event the native excavated materials appear to be very difficult to compact or are unacceptable as backfill in the opinion of the City Engineer, the Contractor shall furnish and install imported granular material. This granular material shall pass a 2 inch square sieve and shall not contain more than 15% of material passing a 200 mesh sieve, and shall be free from sod, vegetation, and other organic or deleterious materials.

## **SECTION 22 - 17; CONCRETE PIPE**

A. **GENERAL**: This section covers the requirements for pipe materials and installation of concrete pipe. Concrete pipe may be used for storm drainage systems, irrigation piping and sanitary sewer (If the proposed sewer line is 21" in diameter or greater). The minimum size for concrete pipe in drainage systems is 15" diameter or as approved by the City Engineer.

B. **PIPE MATERIALS**: Selection of the appropriate concrete pipe design strength shall be according to the Concrete Pipe Design Manual (American Concrete Pipe Association, latest edition). The following minimum standards shall apply:

1. **Reinforced Concrete Pipe**: All reinforced concrete pipe used in the construction shall be of the rubber gasket type, bell and spigot joint design, conforming to the requirements of the latest revision of ASTM Designation C-76. Pipe class shall be as shown on the approved drawings. If pipe class is not shown, Class III pipe shall be used. The minimum joint length of all pipe provided shall be 7½ feet, or as approved by the City Engineer.
2. **Non-reinforced Conc. Pipe**: All non-reinforced concrete pipe shall be of the rubber gasket type bell and spigot joint design conforming to the latest revision of ASTM Designation C-14 - Class 3.
3. **Bell and Spigot Joints**: Bell and spigot joints, including rubber gaskets, shall conform to the requirements of the latest revision of ASTM Designation C-443. The Pipe joint shall be so designed as to provide for self centering, and when assembled, to compress the gasket to form a watertight seal. The gasket shall be confined in a groove on the spigot, so that pipe movement or hydrostatic pressure cannot displace the gasket.

C. **PIPE LAYING**: All pipe installation shall proceed upgrade on a stable foundation, with joints closely and accurately fitted. Rubber gaskets shall be fitted properly in place, and care shall be taken in joining the pipe units to avoid twisting of gaskets. 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 closure.

Pipe shall be installed with uniform bearing under the full length of the barrel, with suitable excavations being made to receive pipe bells.

Select material shall be compacted around the pipe to firmly bed the pipe in position. If adjustment of position of a 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 with the specific requirements of the pipe manufacturer and the American Concrete Pipe Association.

D. FOUNDATION FOR PIPE: Wherever the subgrade material does not afford a sufficiently solid foundation to support the pipe and superimposed load, and where groundwater must be drained, the subgrade shall be excavated to such a depth as may be necessary and replaced with crushed rock or gravel compacted into place.

Gravel for concrete pipe foundation shall be clean crushed rock or gravel with 100% passing a 1½ inch screen and 5% passing a No. 4 sieve.

The foundation material directly beneath the centerline of the pipe and extending one-sixth the pipe diameter on both sides of the centerline shall consist of loosely placed uncompacted bedding. Before preparing the foundation beneath the pipe, the trench bottom shall be excavated or filled and compacted to an elevation sufficiently above the grade of 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.

E. INSTALLATION REQUIREMENTS FOR LINE AND GRADE: All concrete 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 one -sixteenth (1/16) inch per inch of pipe diameter in ten feet, and not to exceed one-half (½) inch in ten feet, 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 non-concentricity of joining surface and pipe interior surfaces, does not exceed one sixty-fourth (1/64) inch per inch of pipe diameter, or one-half (½) inch maximum.

F. PIPE BEDDING: Pipe bedding is the material placed within the pipe bed zone as defined on the Public Works Standard Drawings. Pipe bedding shall conform to a Type 2 standard installation as defined by the Concrete Pipe Design Manual (American Concrete Pipe Association, latest edition).

All pipe sewers and drains shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfilling operations by being adequately bedded. Pipe Bedding materials shall be loose earth, free from lumps; sand or gravel, free from rocks larger than 1 ½ -inch in any dimension; with all materials free from roots, sod, or other vegetable matter.

Pipe bedding materials placed below the spring-line of the pipe shall be deposited and compacted in layers not to exceed 8 inches in uncompacted depth. Granular pipe bedding materials consisting of rock or gravel may be placed in thicker lifts if the Contractor can demonstrate adequate consolidation and compaction of the bedding material. 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 and vibrators. Compaction requirements for the pipe bedding materials below the spring line of the pipe shall conform to a Type 2 standard installation. Compaction of bedding materials above the spring line of the pipe shall be according to trench backfill requirements. All backfill in the pipe zone shall be placed in a manner that minimizes the risk of damage to the pipe.

In the event that trench materials are not satisfactory for pipe bedding, import pipe bedding material will be required. Import pipe bedding material below the spring-line of the pipe shall be graded as follows: 100% passing a 1-inch screen and no more than 5% passing a No. 4 sieve.

G. TESTS: As directed by the City Engineer and prior to acceptance by the City, the Contractor will be required to conduct and successfully pass a video pipe inspection. Testing shall only be completed after installation of main lines, branch lines, and manholes. If directed by the City Engineer, the contractor may also be required to conduct one or all of the following tests, an infiltration test, a pipe displacement test, and a pipe system air test. All testing shall be completed in the presence of the City Engineer or his representative. The cost of all pipe testing shall be borne by the Contractor, Developer, or Project Manager. Tests shall be performed as follows:

1. **Infiltration Test:** The Contractor shall furnish labor, equipment and materials, including pumps, and shall assist the City Representative in making infiltration tests of the completed sewer before it can be placed into service. The Contractor shall furnish and install the measuring weirs or other measuring devices. The length of line to be tested at any time shall be subject to the approval of the City Engineer. The maximum allowable infiltration shall not exceed 150 gallons per inch diameter per mile per 24 hours for all installed pipe. If pipe is used for sanitary sewer, no infiltration is allowed. If the quantity of infiltration is in excess of the maximum allowable, the leaking joints shall be repaired to the satisfaction of the City Engineer at the expense of the Contractor.
2. **Air Testing:** The Contractor or his representative (a qualified firm or individual agreed upon by the City Engineer and the Contractor) shall furnish labor, equipment, and materials, including pumps and compressors, and shall perform, in the presence of the City Representative, air tests of the completed pipe before it can be placed in service. Each section of sanitary sewer pipeline between manholes shall be tested after all the service laterals (and plugs) have been installed. Each test section shall be pressurized to 4.0 psi. For the purpose of stabilizing the air pressure in each test section, the 4.0 psi pressure shall be maintained for a two-minute period. Each test section shall then be re-pressurized to 4.0 psi for a period of four minutes. The test section shall be accepted if, after four minutes, the pressure gauge indicates 3.5 psi or greater. Failure of the Contractor's testing equipment to properly function shall render the test unacceptable. All faulty sections of pipe line shall be repaired and retested until the minimum air testing requirements have been met.
3. **Video Inspection:** The Contractor or his representative (a qualified firm or individual agreed up on by the City Engineer and the Contractor) shall furnish labor, equipment,

and materials, including camera and video tapes, and shall perform, in the presence of a City Representative, an internal video inspection of the completed pipe before it can be placed in service. Prior to the internal video inspection, the pipeline being tested shall be flushed with clean water and allowed to free drain. The residual water shall not be removed in any way prior to the test. If all of the flushing water is removed, an amount of water shall be introduced into the farthest upstream manhole and will be allowed to flow through the newly installed pipes to expose potential low spots or “bellies”. The Contractor shall supply the City with a copy of the video tape. The video inspection shall be subject to the approval by the City Engineer or authorized South Ogden City Public Works official. Any defects in the pipe or the pipe installation noted on the video inspection shall be corrected by the contractor and the repaired section shall be video inspected after the repair to verify that the defective section has been corrected.

H. SEWER LATERAL CONNECTIONS: All sewer lateral connections into new sewer mains shall be through pre-formed wye connections. All connections into existing sewer line shall be done with a sewer tapping machine and as shown on the City Standard Drawings. The Contractor shall furnish all materials and perform all labor to tap the existing main and install the required tapping saddle. In some cases the City Engineer may allow inserta-tee lateral connections in place of pre-formed wye connections. Inserta-tees shall be installed according to the manufacturers recommendations.

## **SECTION 22 - 18; PVC PLASTIC SEWER PIPE**

A. **GENERAL**: This section covers the requirements for PVC plastic sewer pipe. PVC plastic sewer pipe may be used in sanitary sewers and laterals.

B. **PIPE MATERIALS**: PVC plastic sewer pipe shall be made of compound conforming to ASTM D-1784 with a cell classification of 13364-B and a minimum tensile modular of 500,000 psi. PVC sewer pipe must meet all the dimensional, chemical, and physical requirements outlined in ASTM D-3034, and shall have a maximum SDR of 35.0 for diameters from 4 inches to 15 inches. Pipe diameters from 18 to 21 inches shall conform to ASTM F-679. Pipe shall be supplied in 20-foot laying lengths and carry the IAPMO UPC Seal of Approval. SDR and laying length may be modified as conditions dictate when approved by South Ogden Public Works or the City Engineer. PVC sewer pipe shall be installed according to the requirements of ASTM D-2321 and the manufacturer's requirements. Sanitary sewer shall be "white" in color to distinguish it from subsurface drain pipe which shall be "green" in color.

C. **JOINTS**: Joints for PVC plastic sewer pipe shall be of the rubber gasket bell and spigot type, and the rubber gaskets shall conform to ASTM D-1869.

D. **FITTINGS**: Fittings shall be made of PVC plastic conforming to ASTM D-1784, have a cell classification as outlined in ASTM D-3034, and carry the IAPMO UPC Seal of Approval.

E. **PIPE LAYING**: All pipe installation shall proceed up grade on a stable foundation with joints closely and accurately fitted. Manufacturers' installation requirements shall be rigidly observed.

Rubber gaskets shall be fitted properly in place and care shall be taken in joining the pipe units to avoid twisting of gaskets. Joints shall be clean and dry and a joint lubrication, as recommended by the pipe supplier, shall be applied uniformly to the mating jointing surfaces to facilitate easy positive joint closure.

Pipe shall be installed with uniform bearing under the full length of the barrel with suitable excavations being made to receive pipe bells. Select material shall be compacted around the pipe to firmly bed the pipe in position. If adjustment of position of a 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 specific requirements of the pipe manufacturer.

F. **FOUNDATION FOR PIPE**: Wherever the subgrade material does not afford a sufficiently solid foundation to support the pipe and superimposed load, it shall be excavated to such depth as may be necessary and replaced with crushed rock compacted into place. Gravel foundation material for pipe shall be placed only when, and to the depth, requested by the Engineer or as



specified on the Drawings. Gravel for PVC pipe foundations shall be clean crushed rock or gravel with 100% passing a 1 inch screen, a maximum of 5% passing a No. 4 sieve, and no more than 5% passing the #200 sieve.

G. INSTALLATION REQUIREMENTS FOR LINE AND GRADE: 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 on thirty-second (1/32) of an inch per inch of pipe diameter and not to exceed one-half (1/2) 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 non-concentricity of joining surface and pipe interior surfaces, does not exceed on sixty-fourth (1/64) inch per inch of pipe diameter, or one-half (1/2) inch maximum.

H. PIPE BEDDING: Pipe bedding is the material placed within the pipe bed zone as defined on the Public Works Standard Drawings. All pipe bedding materials, placement, and compaction shall conform to recommendations of the pipe manufacturer. All pipe shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfilling operations by carefully compacting suitable pipe bedding material (native or imported as approved by the City) in the pipe zone.

Pipe bedding material shall consist of select granular backfill material or satisfactory material free from rocks 1-1/2 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. Extra fine sand, clay, silt or large soil lumps shall not be allowed as pipe bedding. Backfill shall be placed in layers not exceeding 8-inches loose thickness and then carefully and uniformly compacted to 95% of ASTM D-1557 density using hand or mechanical compactors and vibrators. Granular pipe bedding materials consisting of rock or gravel may be placed in thicker lifts if the Contractor can demonstrate adequate consolidation and compaction of the bedding material. Backfill above the pipe bed zone shall be placed in accordance with requirements for excavation and backfill of trenches.

No pipe bedding material shall be used unless accepted by the City Engineer. Samples of the materials shall be submitted by the Contractor a sufficient time in advance of intended use to enable it's inspection and testing.

In the event that native trench materials are not satisfactory for pipe bedding, import bedding materials will be required. Import bedding shall consist of granular material graded as follows: 100% passing a 1-inch screen and no more than 5% passing a No. 4 sieve.

I. TESTS: Prior to acceptance by the City, the Contractor shall conduct and successfully pass a TV pipe inspection and a pipe system air test. Testing shall only be completed after installation of main lines and service laterals. If directed by South Ogden City Pubic Works, or the City Engineer, the contractor may also be required to conduct one or all of the following tests, an infiltration test, pipe displacement test, pipe system air test, or a pipe deflection test. All testing

must be completed in the presence of an authorized South Ogden City Public Works Official, the City Engineer or his representative. The cost of all pipe testing shall be borne by the contractor, developer, or project manager. Test shall be performed as follows:

1. Infiltration Test: The Contractor shall furnish labor, equipment and materials, including pumps, and shall assist the City Representative in making infiltration tests of the completed sewer before it can be placed into service. All equipment necessary to perform the test shall be provided by the Contractor. No infiltration will be allowed and all leaking joints shall be repaired to the satisfaction of the City Engineer at the expense of the Contractor.
2. Air Testing: The Contractor or his representative (a qualified firm or individual agreed upon by the City Engineer and the Contractor) shall furnish labor, equipment, and materials, including pumps and compressors, and shall perform, in the presence of the City Representative, air tests of the completed pipe before it can be placed in service. Each section of sanitary sewer pipeline between manholes shall be tested after all the service laterals (and plugs) have been installed. Each test section shall be pressurized to 4.0 p.s.i.. For the purpose of stabilizing the air pressure in each test section, the 4.0 p.s.i. pressure shall be maintained for a two-minute period. Each test section shall then be repressurized to 4.0 p.s.i. for a period of four minutes. The test section shall be accepted if, after four minutes, the pressure gauge indicates 3.5 p.s.i. or greater. Failure of the Contractor's testing equipment to properly function shall render the test unacceptable. All faulty sections of pipeline shall be repaired and retested until the minimum air testing requirements have been met.
3. Video Inspection: The Contractor or his representative (a qualified firm or individual agreed upon by the City Engineer and the Contractor) shall furnish labor, equipment, and materials including camera and video tapes, and shall perform, in the presence of a City Representative, an internal video inspection of the completed pipe before it can be placed in service. Prior to the video inspection, the pipeline shall be flushed with clean water and allowed to drain. The residual water shall not be removed prior to the video inspection. If all of the flushing water is removed, an amount of water shall be introduced into the farthest upstream manhole and allowed to flow through the newly installed pipes to expose potential low spots or "bellies". The Contractor shall supply the City with a copy of the video tape. The video inspection shall be subject to the City Engineer's approval. Any defects in the pipe or the pipe installation noted on the video inspection shall be corrected by the contractor and the repaired section shall be inspected again after the repair to verify that the defective section has been corrected.
2. Pipe Deflection Testing: The Contractor or his representative (a qualified firm or individual agreed upon by the City Engineer and the Contractor) shall furnish labor, equipment and materials to perform a pipe deflection test in the presence of a City Representative. Those performing this test shall pass a pipe mandrel or other approved devices through the completed pipe sections to determine the degree of pipe deflection in

the PVC pipe. Testing for pipe deflection in PVC pipe cannot be performed until the completed pipe section has been installed for a minimum period of 30 days complete with the total anticipated backfill height over the pipe sections being tested. Pipe deflection testing shall be considered passing when all tested pipe sections show a pipe deflection not exceeding 5% of the pipe diameter. The contractor shall provide the City with a copy of all pipe deflection results. Any excessive deflections in the completed pipe section shall be corrected by the contractor and the repaired section shall be retested after the repair to verify that the defective section has been corrected.

J. SEWER LATERAL CONNECTIONS: All sewer lateral connections into new sewer mains shall be through pre-formed wye connections. All connections into existing sewer line shall be done with a sewer tapping machine and as shown on the City Standard Drawings. The Contractor shall furnish all materials and perform all labor to tap the existing main and installed the required tapping saddle. In some cases, the City Engineer may allow inserta-tee lateral connections. Inserta-tees shall be installed according to the manufacturers recommendations.

## **SECTION 22 - 19; SEWER MANHOLES**

A. **GENERAL**: Manhole bases may be either precast or cast-in-place unless otherwise specified. Precast manhole bases shall have pipe inverts, a neoprene boot with strap for each pipe connecting to the manhole, and a minimum of 6 inches of compacted gravel base under the manhole. Cast-in-place pipe connections may also be utilized as outlined on the drawings. Where sewer lines enter manholes, the invert channels shall be smooth and semi-circular in cross section, conforming to the details shown on the Standard Drawings. Changes of direction of flows within the manholes shall be made with a smooth curve with as long a radius as possible. The floor of the manhole outside the channels shall be smooth and slope toward the channel at not less than ½ inch per foot.

The connecting boots shall be made of neoprene compound meeting ASTM C-443 Specifications. The boot shall have a wall thickness of    inch. The boot shall either be “cast-in-place” in the precast base or attached to the precast base by means of an internal expanding band. When the boot is attached to the precast base, a watertight seal between the boot and the precast base must be accomplished. An external band shall be supplied and used to clamp and seal the boot to the pipe. The band shall be made of 300 series non-magnetic corrosion-resistant steel. After the band has been placed, it shall be completely coated with a bituminous material approved by the City Engineer.

All junction manholes with three or more pipes located in the base shall be 60 inch inside diameter. All manholes with the mainline size being 12 inch diameter or larger shall be 60 inch inside diameter. All other manholes shall be 48 inch inside diameter. Free drop inside the manholes is not permitted.

B. **STEPS**: Steps for precast manholes and cast-in-place vaults shall be polypropylene coated steel steps with 1'-0" maximum spacing.

C. **JOINTS**: Joints shall be cement mortar, or an approved mastic or rubber gasket, or an approved combination of these types. Manhole and vault joints shall be water tight. Mortar joints shall be completely filled and shall be smooth and free from surplus mortar on the inside of the manhole or vault. Mortar and mastic joints between precast rings shall be full-bedded in jointing compound and shall be smoothed to a uniform surface on both the interior and exterior of the manhole. Installation of rubber gasket joints between precast rings shall be in accordance with the recommendations of the manufacturer.

D. **FRAMES AND COVERS**: Unless otherwise indicated by the City Engineer, the frames and covers shall be so set that the top of the cover will be flush with finished pavement grade or 2 inches higher than finished grade in unpaved areas. Each cover shall contain one (1) pick hole but shall not contain air vent holes. The cover shall be marked “SEWER” or “STORM DRAIN” or “WATER,” as appropriate.

## **SECTION 22 – 20; DUCTILE IRON PRESSURE PIPE**

A. **GENERAL**: This section covers the requirements for ductile iron pressure pipe materials and installation.

B. **MATERIALS**: Ductile iron pipe shall conform to all requirements of AWWA C151, “Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water or Other Liquids.” Minimum thickness shall be Class 51.

### C: **JOINTS** -

1. **Mechanical Joints**: All mechanical joints shall meet the requirements of AWWA C110 and C111. All gasket surfaces shall be smooth and free from imperfections. Gaskets shall conform to tests in accordance with specifications and shall be less than one year old. Bolts shall meet all requirements of the above specification, honoring all characteristics, tolerances and tests.
2. **Push-on Joints**: All push-on joints shall meet the requirements of AWWA C111. Gaskets shall be free from defects and not over one (1) year old.
3. **Lubricants**: All Lubricants shall be non-toxic and have no deteriorating effects on gasket materials. It shall not impart taste to water in a pipe. It shall conform in every way to ANSI 21.11.
4. **Flanged Joints**: Flanged joints shall be bolted firmly with machine, stud or cap bolts of proper size. Flanges may be cast integrally with the pipe or may be screwed on threaded pipe. Flanges shall be faced and drilled and of proper dimensions for size and pressure required. All flanges shall meet requirements of AWWA C110 and C115.

Bolts and nuts, unless otherwise specified, shall be made of the best quality refined iron or metal steel and have clean, well-fitted threads. Bolts will be provided with standard hexagonal nuts and standard hexagonal heads. Bolts shall be of the diameter required for each flange, and, when installed, shall be length so that no more than three eighths (3/8) inch or less than one eighth (1/8) inch extends past face of nut.

Gaskets shall be one sixteenth (1/16) inch thick, made of best quality asbestos sheet gasket material or equal. A gasket for each flanged joint of proper size, ring type or full face as shown on the drawings.

5. **Compression Joints**: Compression joints shall be mechanical joint sleeve. Rockwell 441 of Flange adaptor Rockwell 912 or approved equal.

6. Conductivity Across Joints: Pipe shall be installed to provide electrical conductivity across joints using either armor tipped conductive gaskets or bronze wedges. Bronze wedges shall be have current capacity of 400 amps each and placed as follows:

<10" dia. pipe - 2 wedges  
10" dia. pipe - 3 wedges

12" dia. pipe - 4 wedges  
>12" dia. pipe - 6 wedges

D. FITTINGS -

1. Mechanical joint Fittings: Mechanical joint fittings shall be Class 250 and conform to ANSI/AWWA C-110 and C111. Mechanical joint fittings shall be coated with a petroleum asphaltic coating 1 mil thick.
2. Push-on Fittings: Push-on fittings shall conform to AWWA C111.
3. Flanged Fittings: Flanged fittings shall conform to AWWA C110 and C115. All flanges shall be faced and drilled. Where cap screws or stud bolts are needed, flanges shall be tapped to support cap screws or stud bolts. Flanged fittings shall be coated with a petroleum asphaltic coating 1 mil thick.

E. PIPE LAYING: Cast iron pipe shall be laid as specified in AWWA C-600, except as modified herein and in Special Conditions.

1. Tees, elbows and crosses, and reducers shall be used for changes in direction and outlets, as shown on the drawings.
2. Anchors and thrust blocks shall be placed at valves, elbows, tees, etc., as shown on the drawings as directed by City Engineer.
3. All ductile iron pipe installation shall proceed on a stable foundation with joints closely and accurately fitted. 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 closure.
4. Pipe shall be installed with uniform bearing under the full length of the barrel, with suitable excavations being made to receive pipe bells.
5. Select material shall be compacted around the pipe to firmly bed the pipe in position. If adjustment of position of a pipe length is required after being laid, it shall be removed and rejoined as for new pipe. In addition to the above requirements, all pipe installation shall comply with the specific requirements of pipe manufacturer.
6. Each pipe shall be laid true to line and grade and in such a manner as to form a close concentric joint with adjoining pipe and to prevent sudden offsets to the flow line. As work progresses, the interior of the pipe shall be cleared of dirt and superfluous materials of every description. Where a cleaning after laying is difficult because of small pipe

size, a suitable swab or drag shall be kept in the pipe and pulled forward past each joint immediately after jointing has been completed. Trenches shall be kept free from water until pipe jointing has set and pipe shall not be laid when condition of the trench weather is unsuitable for such work. At all times when work is not in progress, all open ends of the pipe and fittings shall be securely closed to the satisfaction of the South Ogden City Public Works or the City Engineer so that no water, earth, or other substance will enter the pipe or fittings.

F. GRAVEL FOUNDATION: Wherever the subgrade material does not afford a sufficiently solid foundation to support the pipe and superimposed load and where groundwater must be drained, the subgrade shall be excavated to such depth as may be necessary and replaced with crushed rock or gravel compacted into place. Gravel for ductile iron pipe foundations shall be clean, crushed rock or gravel with 100% passing one and a half (1½) inch screen and 5% passing a No. 4 sieve.

G. PIPE BEDDING: All pipes shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfilling operations by being adequately bedded.

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.

Pipe bedding materials placed at any point below the midpoint of the pipe shall be deposited and compacted in layers not to exceed six (6) inches in uncompacted depth. Depositions 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. 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. Bedding materials shall be loose earth, free from lumps; sand materials free from roots, sod, or other vegetative matter.

In the event trench materials are not satisfactory for pipe bedding, modified bedding will be required. Modified bedding shall consist of placing compacted granular material on each side of and to the level of twelve (12) inches above the top of the pipe. Modified bedding material shall be graded as follows: 100% passing a one (1) inch screen and 5% passing a No. 4 sieve.

H. CORROSION PROTECTION: In areas where corrosive soils may be present, ductile iron pipe materials shall be installed with encasement wrap of polyethylene plastic wrap for the entire length of the pipeline materials, including all fittings and valves, in accordance with the manufacturer's specifications, unless otherwise approved by the City Engineer. This shall be completed in order to provide the necessary corrosion protection. Polyethylene encasement wrap shall consist of one or more wraps of sheet polyethylene plastic to produce a minimum thickness of eight (8) mils over all surfaces. The wrap shall be sufficiently loose so that it will contact all surfaces without tension after backfilling. The wrap shall extend one foot over adjacent surfaces.

The overlap at edges of the plastic shall be a minimum of one foot and the laps shall be secured in place. Ends of the wrap shall be secured by circumferential bands on one (1) inch wide polyethylene plastic tape applied under light tension.

All compression couplings, mechanical joints, flanged joints, and valves exposed to soil shall be wrapped with eight (8) mil thick polyethylene film adhesive tape equal to Polyken No. 900 or Scotchrap No. 50. The tape shall be installed to adhere securely to both the pipe and polyethylene. Enough film shall be used to overlap the adjoining pipe a minimum of one (1) foot.

Valves shall be wrapped by bringing the wrap on the adjacent pipe over the bells of flanges of the valve and sealing with the adhesive tape. The valve bodies are then wrapped with a flat sheet of the film passed under the valve bottom and brought up around the body to the stem and fastened in place with the adhesive tape.

All fittings that require concrete blocking should be completely wrapped prior to pouring the concrete thrust block.

Polyethylene wrap shall be protected from the sun and weathering prior to use. Care shall be exercised during backfilling of the protected areas to prevent puncturing the film. The bottom of the trench shall be shaped to give substantially uniform circumferential support of the lower third of each pipe.

I. PIPE SIZES: If the size of any piping is not clearly evident in the drawings, the Contractor shall request instructions from the City Engineer as to the proper sizing. Any changes resulting from the Contractor's failure to request clarification shall be at the Contractor's expense.

J. CLEANING AND FLUSHING: The Contractor shall take every precaution to remove dirt, grease, and all other foreign matter from each length of piping before making connections in the field. After each section of piping is installed, it shall be thoroughly cleaned to remove rocks, dirt, and other foreign matter by washing, sweeping, scraping, or other method that will not harm the lining of the pipe.

The Contractor shall furnish water required for flushing. All temporary connections for flushing and drainage shall be furnished, installed, and subsequently removed by the Contractor.

All open ends of pipes shall be bulkhead or plugged when workmen are not on the job or in the immediate area to prevent rocks or other foreign matter from entering the pipe.

K. SERVICE CONNECTIONS: Service connections to ductile iron pressure pipe shall be through either tapped couplings (AWWA thread) with Teflon tape to be spirally wrapped completely around the thread area prior to insertion of the corporation stop, or by bronze double strap service saddles. Reducing bushings shall be of nylon. The minimum distance between taps is 36 inches with a 5 degree stagger. Do not make service taps within 36 inches of the end of the pipe.

## **SECTION 22 – 21; VALVES, HYDRANTS AND MISCELLANEOUS ITEMS**



A. GENERAL: This section covers requirements for gate valves, hydrants and miscellaneous items required in the construction of water lines and services.

B. GATE VALVES: Gate valves shall conform to AWWA C509. Valves shall be of iron body, resilient seat gate with modified wedge disc, non-rising stem design with O-ring seals. Unless otherwise shown or specified, valves shall be of mechanical joint connection design for buried service and flanged connection design for installation in structures. Gate valves shall be Mueller resilient seat gate valves, unless approved otherwise by the City Engineer. Buried valves shall have a two (2) inch operating nut; valves in structures shall have handwheels. Opening direction shall be “Open counterclockwise”.

C. BUTTERFLY VALVES: Valves 12-inch diameter and larger can be butterfly type valves if approved by the City Engineer. Butterfly valves shall comply with the following requirements:

7. Valves shall comply with the requirements of AWWA C504, Class 150 B.
8. Valve bodies shall be cast in conformance to ASTM A126, Class B. Ends shall be flanged unless otherwise specified.
2. Valve discs shall be streamlined and shall have a continuous 360 sealing surface of stainless steel, ASTM A276, type 304.
3. Valve shafts shall be stainless steel ASTM A276, type 304, of stub construction with at least 1½ shaft diameter engagement into the disc and shall be fastened to the disc with upset pins.
4. Valve seats shall be of Buna N material bonded to the valve body.
5. Valve bearings shall be self lubricating and non-corrosive and shall have a significant difference in hardness from the valve shaft.
6. Valve actuators shall be designed as an integral part of the valve and shall meet all the requirements of AWWA C504. All actuators shall be hermetically sealed and permanently lubricated with no exposed moving parts. All manual actuators will meet the requirements of AWWA C504 for nut input.

C. VALVE BOXES: All buried gate valves shall be installed complete with a cast iron, two (2) piece, slip type, five and a quarter (5¼) inch shaft valve box.

D. FIRE HYDRANTS: Hydrants shall be designed, manufactured, and tested in compliance with the latest edition of AWWA C-502 “Standard For Dry Barrel Fire Hydrants.” The hydrant main valve shall be a minimum diameter of five and a quarter (5¼) inch with two, two and a half (2½) inch NST hose nozzles, and one four and a half (4½) inch NST pumper nozzle. The hydrant

shall be supplied complete with a flanged by mechanical joint end auxiliary gate valve with box and installed per approved drawings.

E. WATER SERVICES: Pipe for residential water services up to 2-inch diameter service connections shall be type K soft copper tubing with compression type 200 psi fittings conforming to AWWA C800. Pipe materials for service connections larger than 2-inch diameter shall be as directed by the City Engineer. Copper tubing shall be installed per CDA "Copper Tube Handbook". A plastic nipple shall be used to separate copper from non-copper pipe materials. A gooseneck shall be formed with the copper tubing immediately adjacent to the corporation stop.

F. WATER METER BOX, RING AND COVER: Residential meter boxes shall be round eighteen (18) inch inside diameter pre-cast concrete box, thirty-six (36) inch in length, notched for service pipe. The ring and cover for the meter box shall be cast iron with two (2) inch hole and locking cover, operated by a large pentagon head and shall have a twelve (12) inch minimum opening diameter. For services larger than three quarter ( $\frac{3}{4}$ ) inch diameter ; see the public works Standard Drawings.

**SECTION 22 – 22; TESTING AND DISINFECTION OF WATERLINES**

A. GENERAL: All water lines shall be flushed, pressure tested, and disinfected as outlined in this section.

B. FLUSHING: All pipelines shall be flushed clean of sediment and debris. Flushing shall be accomplished through hydrants or, if a hydrant does not exist at the end of the line, the Contractor shall install a tap sufficient in size to provide for a 2.5-foot per second flushing velocity in the line. The following is the flow quantity required to provide a 2.5-foot per second flushing velocity:

Pipe Size (in.)	Flow (gpm)
4	100
6	220
8	390
10	610
12	880

C. TESTING: Tests shall be made upon completion of system installation or any valved portion thereof. All tests shall be made at the expense of the Contractor and in the presence of the City Inspector.

7. Pressure Test: After completion of the installation of the system, (including water mains and all service laterals) or any reasonable length thereof, and after thorough flushing of the portion to be tested, pressure tests shall be made as follows:
  1. The system to be tested shall be subjected to a hydrostatic pressure of 200 pounds per square inch, following AWWA C600-93 procedures, unless otherwise noted on the drawings, for a period of not less than 2 hours duration with no drop in pressure.
  2. The portion to be tested shall be filled with water slowly and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the City Inspector. The Contractor shall make the temporary connection for pressure testing.
  3. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points,

the contractor shall install corporation stops at such points so that the air can be expelled as the line is filling with water. After all the air has been expelled, the corporation stop valve shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation stop valve shall be removed and plugged by the Contractor with a brass plug.

4. All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the City Inspector, at no cost to the Owner.
2. LEAKAGE TESTING: A leakage test shall be conducted concurrently with the pressure test, following AWWA C600-93 procedures.
1. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 p.s.i. of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.
  2. Maximum leakage during the pressure test shall not exceed one gallon per inch diameter per 1000 feet of pipe. Acceptance of installation shall be determined on the basis of allowable leakage.
  3. If any test of pipe laid discloses leakage greater than that specified above, the contractor shall, at his own expense, locate and repair the defective material until the leakage is within the specified allowance.
  4. All visible leaks, other than a minor amount of sweating, shall require immediate stoppage of the test and tightening of the joints so that, when pressure is again put on the system, there will be no leakage.

D. DISINFECTION: After pressure and leakage testing, all culinary water lines shall be disinfected by chlorination as per AWWA C651 and the State of Utah, Public Drinking Water Regulations, Part 2, Section 12.

5. Chlorination shall provide a minimum of thirty (30) ppm residual after twenty-four (24) hours contact in the pipeline. This may be expected with an application of 50 ppm although some conditions may require more. Chlorine, in the form of a 1% slurry of high test calcium hypochlorite (HTH, Perchloron, Pittchlor, etc., which are 70% available chlorine by weight) shall be fed into the pipeline in such a manner as to mix with the water flowing in the pipeline.

6. The following table provides information as to the required quantity of slurry to be used per one hundred (100) feet of pipe to provide a chlorine concentration of fifty (50) ppm.

Pipe Size (in.)	Volume of 100 Ft. Length (gal.)	Required Amount of Slurry (gal.)
4	65	0.47
6	147	1.05
8	261	1.87
10	408	2.92
12	588	4.20

7. During the process of chlorinating the pipeline, all valves and other pipeline appurtenances shall be operated several times to provide sufficient contact with the chlorinating agent. Following chlorination, the water line shall be drained and thoroughly flushed and if necessary, re-chlorinated until a satisfactory bacteriological test is obtained.
8. The Contractor shall notify the City when disinfection is complete and the City shall obtain samples for laboratory testing of final disinfectant residuals.
9. The Contractor shall comply with Federal Clean Water Act and all other applicable regulations in disposal of all chlorinated water. If necessary, secure permission from Utah "DEQ" or County Health Department for disposal of heavily chlorinated water.

E. CLEAR WATER TEST: Following disinfection and flushing of the waterline, a clear water test shall be taken in the presence of the City Inspector. A maximum of one (1) ppm of chlorine will be allowed to be present in the pipeline. Should a higher residual of chlorine be present, the Contractor shall be required to re-flush the waterline and re-test.

Water samples shall also be obtained by the City for coliform bacterial testing approximately 24 hours after flushing the waterline. The Contractor will be required to complete the disinfection process again if laboratory test results fail to demonstrate that the water conforms to bacterial standards of the State of Utah public drinking water regulations.

## **SECTION 22 – 23: CONSTRUCTION AND PLACEMENT OF THRUST BLOCKS**

A. SCOPE: This section of the specifications defines the placement and the construction of thrust blocks where required. It also gives the concrete mix design requirements for the concrete required in the construction of the thrust blocks.

B. INSTALLATION: Thrust blocks are required at points where the pipe changes direction such as; at tall tees, elbows, wyes, caps, valves, hydrants, reducers, etc. Thrust blocks should be constructed so that the bearing surface is in direct line with the major force created in the pipe or fitting. The earth bearing surface should be undisturbed. See drawings for typical thrust block details. The pipeline shall not be pressurized until the concrete thrust blocks have cured for at least 5 days.

C. CONCRETE MIX DESIGN: The Portland Cement Concrete mixture requirements are given in Section 22 – 15. The concrete mixture shall have a minimum twenty-eight (28) day compressive strength of 3,000 pounds per square inch.

## **SECTION 22 – 24; 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 any work.

Existing improvements shall include, but are not limited to, permanent surfacing, curbs, ditches, driveways, culverts, fences, walls, landscaping, sprinkler systems, utilities, and mail boxes. All improvements shall be reconstructed to equal or better, in all respects, if the existing improvements are damaged or removed.

B. **ROAD SURFACE**: Where trenches are excavated through road base surfaced areas such as roads and driveways, etc., the road base surface shall be restored and maintained as follows:

1. The road base shall be placed deep enough to provide a minimum of ten (10) inches of material.
2. The road base 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 City Engineer. Excess material shall be removed from the premises immediately.
3. Material for use on road base surfaces shall consist of select material, either natural or crushed, and shall be installed and graded as per Section 22 – 14.

C. **BITUMINOUS SURFACE**: Where trenches are excavated through bituminous surfaced roads, driveways or parking areas, the surface shall be restored and maintained as follows:

1. A temporary road base surface shall be placed and maintained as required in Paragraph 2 above, after the required backfill and compaction of the trench has been accomplished.
2. The road base shall be placed to such depth as to provide a minimum of ten (10) 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 compacted. Mud or other soft or spongy material shall be removed and the space filled with gravel and rolled and compacted thoroughly in layers not exceeding six (8) inches in thickness. The edges of trenches which are broken down during the making or subgrade shall be removed and trimmed straight before resurfacing.
4. Before any permanent resurfacing is placed, the Contractor shall saw cut the existing paving to clean, straight lines as nearly parallel to the centerline of the trench as practical. Said straight lines shall be thirty (30) feet minimum length and no deviations from such lines shall be made except as specifically permitted by the Engineer.

5. Existing bituminous paving shall be cut back a minimum of twelve (12) inches 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 twelve (12) inches of undisturbed soil.
6. As soon as is practical, weather permitting, the bituminous surface shall be restored by standard paving practices to a minimum thickness of three (3) inches.
7. Pavement restoration shall include tacking of pavement edges and subbase with a bituminous material and placing a hot 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 line beyond the actually damaged or broken sections; or in the event that joints or scoring lines do not exist or are three (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.

All concrete work shall conform to the requirements of Section 22 – 15 of these Specifications.



## **SECTION 22 – 25; SUBSURFACE DRAIN PIPE MATERIALS**

A. GENERAL: Buried drain pipe with closed or open joints or perforated pipe shall be provided for the drains in the locations shown on the drawings. The Contractor shall furnish and lay the drain pipe.

B. MATERIALS: Drainpipe material shall be selected based upon the type of drainage system.

1. Closed Joint Subsurface Drain Pipe Systems: All closed joint subsurface drainage piping shall be PVC plastic drain pipe and shall be made of compound conforming to ASTM D-1784 with a cell classification of 13364-B. PVC drain pipe must meet all the dimensional, chemical, and physical requirements outlined in ASTM D-3034, shall have a SDR of 35.0 and shall be supplied in 13.0-foot laying lengths. Subsurface drain pipe shall be “green” in color to distinguish it from sanitary sewer pipe which shall be “white” in color. SDR and laying length may be modified as conditions dictate when approved by the City Engineer.
  1. Installation: PVC drain pipe shall be installed according to ASTM D-2321 and the manufacturer’s requirements.
  2. Joints: Joints for PVC plastic drain pipe shall be of the rubber gasket bell and spigot type, and the rubber gaskets shall conform to ASTM D-D1869.
  3. Fittings: All fittings shall be made of PVC plastic conforming to ASTM D-1784, have a cell classification as outlined in ASTM D-3034, and carry the IAPMO UPC Seal of Approval.
2. Open Joint Subsurface Drain Pipe Systems: Non-perforated pipe shall be extra-strength verified clay or extra strength non-reinforced concrete. The pipe may be furnished with either bell-and-spigot or tongue-and-groove joints. Laying lengths of the non-perforated pipe shall not exceed four feet. To insure open joints between lengths of pipe, spacer lugs approximately one eighth (  $\frac{1}{8}$  ) inch thick located on the one third (  $\frac{1}{3}$  ) or one quarter (  $\frac{1}{4}$  ) points around the perimeter shall be provided at each joint between lengths of drain pipe. The lugs may be case on one end of the pipe during manufacturing or may be gasket-type lugs of plastic, metal, or other suitable material cemented to the pipe by the Contractor and approved by the City Engineer.
3. Perforated Pipe Systems: Perforated pipe may be extra-strength vitrified clay pipe with one fourth (  $\frac{1}{4}$  ) inch diameter perforations, extra-strength non-reinforced concrete pipe, or reinforced concrete pipe, and may be furnished with bell-and-spigot or tongue-and-groove joints. Corrugated polyethylene pipe as per ASTM F-405 may also be used if installed with direct burial laser grade control equipment.

C. LAYING PIPE: For open joint or perforated pipe, gravel backfill shall be placed under and over the pipe to the minimum depth as shown on the drawings. The pipe shall be laid carefully on the gravel in a workmanlike manner and to the lines and grades shown on the drawings or established by the City Engineer. The open joints for un-perforated pipe shall be covered with an approved drainage fabric placed to extend over the upper half of the circumference of the pipe and to not less than 4½ inches in each direction from the joint.

The maximum allowable departure from grade shall not exceed 10 percent of the inside diameter of the drain pipe, and in no case shall the departure exceed 1 foot. Where departures occur, the rate of return to established grade shall not exceed 2 percent of the pipe diameter per joint of pipe. The maximum allowable departure from alignment shall not exceed 20 percent of the inside diameter of the drain pipe, with a rate of return to the established line not to exceed 5 percent per joint of pipe.

The finished bed for all pipe shall be made smooth, including removal of material under the bell, so that the full length of pipe will be evenly and uniformly supported. The pipe shall be laid and completed with adjacent ends closely abutted and with the bell ends up grade. Where necessary, as determined by the City Engineer, mechanical means shall be used to hold the pipe in place. Any pipe that is broken, cracked, or otherwise unsuitable, as determined by the City Engineer, shall be removed and replaced. The bottom of the trench area shall be maintained free of standing water while the pipe is being installed. The pipe shall not be covered with backfill until it has been inspected and approved by the City Engineer. After approval, the trench shall be backfilled as prescribed in Section 22 – 16.

The Contractor shall keep the pipe drain and manholes free from deposits of mud, sand, gravel, or other foreign matter and in good working condition until the construction is complete and accepted. Upon completion of the drain, if a clear and unobstructed view of the whole bore of the pipe cannot be obtained between manholes by use of a light or sun reflector, a device approved by the City Engineer, having a diameter one (1) inch less than the drain tile to be tested, shall be pulled through the drain between manholes. Any obstructions found in the drain shall be removed by the Contractor without cost to the City. Any methods used by the Contractor to remove deposits of mud, sand, gravel, or other foreign matter from the drains, such as use of water pressure, shall be subject to the approval of the City Engineer.

D. CONCRETE CULVERT PIPE: Concrete pipe shall be installed as per Section 22 - 17.

## **SECTION 22 - 26; GRATES AND FRAMES**

A. GENERAL: Grates and grate frames shall be the size and type shown on the standard drawings. Cast iron grates and frames shall be supplied with an approved paint or coating to retard rusting. All fabricated grates and frames shall be constructed of ASTM A-36 structural steel or an approved equal and the finished fabricated product shall be hot dip galvanized in accordance with ASTM A-123. Frames shall be securely embedded in concrete by use of approved anchors.

Any miscellaneous metal components required on Public Works projects and not shown on the Standard Drawings shall be reviewed and approved by the City Engineer prior to construction.

## **SECTION 22 – 27; SECONDARY WATER**

A. **SUPPLY**: Each secondary water system shall originate from a reliable water source capable of delivering a minimum annual supply of 3.0 acre-feet per acre of irrigable property. If the source of supply is a local irrigation company or water district, the developer shall obtain a written agreement which commits the water supply entity to provide the required supply. This agreement shall be reviewed and approved by the City prior to recording the subdivision.

B. **DISTRIBUTION AND DELIVERY**: Each secondary water system shall provide a complete pressure distribution system with minimum 1-inch diameter service connections to the property line of each lot. Service connections larger than 1- inch shall be required for lots exceeding one half (½) acre, or as approved by the City Engineer. A pressure irrigation system shall be required, with delivery pressures ranging from 40 psi to 100 psi. All facilities, including reservoirs, pump stations, distribution systems, and miscellaneous structures, shall be constructed in recorded easements, dedicated streets, or on property which has been conveyed to the irrigation company or water district. The pressure distribution system shall be constructed at the location shown on the Standard Drawings. Distribution systems shall be complete with sufficient gate valves and drains.

C. **MATERIALS**: Secondary water systems shall comply with the following minimum material specifications:

1. **Pipe**: The secondary water system shall be constructed using the following types of piping materials:
  1. **Ductile Iron pipe** shall be as per AWWA C 151-76 with a Class 50 minimum thickness class and rubber gasket slip-on pipe joints.
  2. **PVC pipe** shall conform to ASTM D 2241 with a 200 psi pressure class and bell and spigot type flexible elastomeric seals per ASTM D 3139.
  3. **Polyethylene pipe** shall have a polyethylene code designation PE 3408 as rated in ASTM D-2239 with a minimum wall thickness of SDR 7, unless otherwise approved by the City Engineer.
2. **Gate Valves**: Gate valves shall conform to AWWA Specification C-500. Valves shall be of cast iron body, resilient seat with modified wedge disc, non-rising stem, provided with O-ring and packing. Valves shall be of flange or mechanical design joint design with a two (2) inch square operating nut.
3. **Valve Boxes**: All buried valves shall be installed complete with two-piece, cast iron, slip type, five and a quarter (5¼) inch shaft valve boxes. A 12" by 12" square concrete collar is required for all irrigation valve boxes.
4. **Concrete**: All concrete used for irrigation system structures shall conform to the requirements of Section 22 – 15.

5. Reinforcing Steel: All reinforcing steel or embedment items shall conform to the requirements of Section 22 – 15.
6. Drain Valves: Drainage valves must be provided in the system to completely drain the piping and prevent damage from freezing. Drains shall be constructed in accordance with City approved construction drawings.
7. Air Release Valves: Air/vacuum release valves shall be provided at high points in the distribution system and at all pump stations in accordance with City approved construction drawings.
8. Pump Stations: Pump stations shall be constructed in accordance with City approved construction drawings and shall be capable of delivering sufficient flow and pressure to meet all peak demands on the system.

D. INSTALLATION, CLEANING, FLUSHING, AND PRESSURE TESTING: These items shall be in accordance with preceding sections on culinary water systems under the same heading. Disinfection of the irrigation system is not required.

E. APPROVAL AND ACCEPTANCE: Prior to construction of the secondary water system, all construction drawings shall be approved by the City Engineer. In the event that the secondary system will be an extension or a part of a local irrigation company or water district, the plans shall also be approved by the appropriate entity. The secondary water system shall be considered as a required subdivision improvement and shall be considered as a required subdivision improvement and shall be under the same construction guarantees, release of funds procedures, and acceptance as the regular subdivision improvements.

The City shall not release funds or grant formal acceptance until both the City and the irrigation company or water district have conducted final inspections and can certify that the completed system conforms to plans and specifications. Following final approval and acceptance, ownership, operation, and maintenance of the completed systems shall be the responsibility of the irrigation company or water district.

## **SECTION 22 - 28; FENCING SPECIFICATIONS**

A. GENERAL: Temporary construction fencing and permanent fencing shall be provided along boundaries, property lines or open ditches as required by the City.

### **B. CHAIN LINK FENCE SPECIFICATIONS:**

#### 9. Materials:

1. Fabric to be chain link which has been galvanized after weaving with a minimum of 1.2 oz. Per square foot of wire surface. Six (6) foot high of two (2) inch mesh, 9 gauge.
2. Tension wire for bottom only, No. 7 gauge spring coil.
3. Top Rail: 1\_ inch tubular rail
4. Corner, Gate, or End Posts: Minimum diameter 2\_ inch O.D. galvanized pipe at 2.65 lbs. per foot.
5. Line Posts: Minimum diameter of 1\_ inches O.D. galvanized pipe at 2.72 lbs. per foot.
6. Braces: For all corner and gate posts - 1\_ inch O.D. galvanized pipe and adjustable \_ inch truss rods.
7. Concrete: Shall conform to the provisions of Section 22 - 15, Class C.

#### 10. Installation:

1. The steel posts shall be set true to line and grade in concrete bases.
2. The distance between posts in any section shall be uniform, but shall not exceed the following spacing:
3. Tangent sections and curves down to 500 foot radius; not more than 10 feet.
4. Curves 500 foot radius to 200 foot radius; not more than 8 feet. Curves 200 foot radius to 100 foot radius; not more than 6 feet. Curves 100 foot radius; not more than 5 feet.
5. A minimum of six inches of concrete shall be provided below the bottom of each post. End posts, pull post, corner post, and gate posts shall have a concrete base at least 10 inches in diameter. Concrete bases for line posts shall be at least 8 inches in diameter.

6. Pull posts shall be provided at 500 foot maximum intervals. Changes in line of 30 degrees or more shall be considered as corners.
7. Fence fabric shall be placed on the roadway side of posts unless otherwise specified. The fabric shall be placed approximately one inch above the ground, and on a straight grade between posts by excavating high points of the ground. Filling depressions will be permitted only upon approval of the City Engineer.
8. The fabric shall be stretched taut and securely fastened to the posts. Fastening to end, gate, corner and pull posts shall be with stretcher bars and metal bands spaced at one foot intervals. The fabric shall be cut and each span fastened independently at all pull and corner posts. Fastening to line posts shall be with tie wire, metal bands, or other approved methods at 14 inch intervals. The top edge of fabric shall be attached to the top rail at approximately 24 inch intervals and shall be secured to the end or pull posts with brace bands.

C. WOOD FENCE SPECIFICATIONS:

1. Materials:

1. Slats: Redwood, cedar, combed spruce, or other wood covering acceptable to the City Engineer or his representative.
2. Bottom and Top Rail: Minimum 2 inch x 4 inch x 8 foot cedar stud.
3. Corner, Gate, End, or Line Posts: Minimum size 4 inch x 4 inch cedar wood post.
4. Concrete: All corner, gate, end, or line wood posts shall be set in concrete. All concrete used for post bases shall conform to the provisions of Section 22 - 15, Class C.

2. Installation:

1. The cedar posts shall be set true to line and grade in concrete bases at least two (2) feet in depth. All posts shall be sound and free from all decay, splits, multiple cracks, or any other defect which would weaken the posts or otherwise cause them to be structurally unsuitable for the purpose intended.
2. The maximum distance between posts in any section shall not exceed eight (8) feet.
3. The top and bottom railings shall be securely fastened to the posts with galvanized nails or other acceptable means.

4. Changes in line of 30 degrees or more shall be considered as corners.
5. A minimum of six (6) inches of concrete shall be provided below the bottom of each post. End posts, corner posts, and gate posts shall have a concrete base at least twelve (12) inches in diameter. Bases for line posts shall also be twelve (12) inches in diameter.
6. Fence slats shall be placed on the roadway side of the posts unless otherwise specified. The slats shall be placed approximately one (1) inch above the ground, and on a straight grade between posts by excavating high points of the ground. Filling depressions will be permitted only upon approval of the City Engineer.
7. The slats shall be sound and free from all major decay or defects which would weaken or otherwise cause them to be unsuitable for fence slats. Fastening to top and bottom railings shall be done with two (2) galvanized nails at both the top and bottom rail.

C. WIRE FENCE SPECIFICATIONS:

1. Material:

1. Fabric to be wire mesh which shall conform to ASTM Designation A-116, nominal 0.9999 inch Farm Grade with standard six (6) inch graduated spacing. The wire mesh shall have a Class 1, zinc coating.
2. Corner, gate, end or line posts shall be painted metal tee, U or Y channel, angular or other approved shapes 6' 6" in length.

2. Installation:

1. Metal fence posts shall be spaced a maximum interval of sixteen (16) feet. Post spacing measurements shall be made parallel to the ground slope. All posts shall be placed in a vertical position. As approved by the City Engineer or Public Works Director, metal posts may be installed by driving, if this can be done without damage to the post. Otherwise, they shall be installed to the specified depth (2' 6") in larger holes and placed in concrete.
2. Corner posts shall be braced in two directions. End and gate posts shall be braced in one direction.
3. Wire mesh fabric shall be drawn tight enough to eliminate all sag without causing the "tension crimps" to fail.
4. Any high points along the ground surface which interfere with the placing of wire mesh shall be excavated to provide at least two (2) inches of ground clearance.



Every alternate lateral wire in the mesh fabric shall be fastened to each post by means of a clamp.

## **SECTION 22 - 29; STREET LIGHTING**

A. GENERAL: This Section shall cover the requirements for street lighting.

B. POLICY: Streets and highways are intended to facilitate the safe movement of vehicle and pedestrian traffic both day and night. Night-time brings increased hazards to both pedestrian and vehicle traffic due to limited visibility.

Street lighting should be provided at locations where proper illumination is a recognized necessity for greater vehicle and pedestrian visibility. Therefore, the following conditions must be met for the consideration of installation of street lights:

19. Street lights will be considered for installation at all intersections with the following exceptions:
  - a. Intersections where street lights are located within 250 feet.
  - b. Minor intersections; which are defined as intersections with terminal streets less than 650 feet. Cul-de-sacs and dead-ends are considered terminal.
20. Mid-block street lighting will only be considered at:
  1. Locations where existing lighting is more than 1,300 feet.
  2. Established pedestrian walk throughs and crosswalks.
21. All street lights should be installed in accordance with these specifications.
22. All new developments will be responsible to install street lighting in accordance with this policy or as specified by the City Engineer, Public Works Director or his designated representative.
23. All new subdivisions shall have street lighting plans as approved by the City Engineer, Public Works Director or his designated representative. Street lights shall be provided at all street intersections and along new proposed streets at a maximum street light spacing of 600 feet, or as approved.

C. LIGHT POLES: Street light poles shall be constructed within the Residential and Commercial Districts within South Ogden City at locations approved by the City Engineer, Public Works Director or his designated representative, as follows:

1. Standard: Street light poles shall be 35 foot, Class 4 Wooden poles as approved by the City Engineer or Public Works Director.

2. Decorative: Street light poles shall be “Holophane” North Yorkshire Series, black, 17 inch diameter base, cast iron steel post (NY14/17-CIS/BK), with Northbrook Series, black, cast aluminum, 180 degree cross arm (NP28-CA/BK). The post shall also provide a 24" banner arm, eye bolt (BA24H/1/BO-EB/BO-CA/BK) and GFI Electrical Outlet Receptacle (RS/GFI/WPIS) or as approved by the City Engineer or Public Works Director.
3. Poles shall be located within the right-of-way in the parking strip, except where approved by South Ogden City Public Works.

D. LUMINAIRE: Luminaires shall be constructed within the Residential and Commercial Districts within South Ogden as approved by the City Engineer or Public Works Director, as follows:

1. Standard: Luminaries shall be “General Electric” 150 Watt High Pressure Sodium Cobra Head Design with cutoff optics.

Cobra Head style fixtures shall be General Electric Model No. M-250R2 Cobra Head Design with cutoff optics or a Cooper Lighting Company Equivalent. All fixtures shall be High Pressure Sodium, in the 150 Watt size. Fixtures shall operate on 120 VAC and provide a Type 3 Distribution pattern and photocontrol receptacle.

2. Decorative: Luminaries shall be a “Holophane” Utility Washington Postlite Series 175 Watt Metal Halide Ballast, 120 Volt, black, Type 5 Distribution Acorn Style Luminaire with Gold Spike Finial, Band, and Ribs and photocontrol receptacle (WAU175MH12B5G6-H).

Cobra Head style luminaires shall be “General Electric” Model No. M-250R2 Cobra Head Design with cutoff optics for 250 Watt fixtures and “General Electric” Model No. M-400R2 Luminaires with cutoff optics for 400 Watt fixtures or a Cooper Lighting Company Equivalent. Replacement bulbs shall be Metal Halide, in the 250 Watt and 400 Watt luminaires.

D. MOUNTING HEIGHTS: Mounting heights for acorn style lighting shall be established by the fixed mounting height associated with the specified poles. Luminaires constructed on wooden poles or commercial steel poles shall be mounted at heights as measured from the finished asphalt surface to the luminaire lens, as follows:

<b>Fixture</b>	Minimum	Maximum
150 Watt	25 Feet	27 Feet
250 Watt	30 Feet	32 Feet
400 Watt	35 Feet	37 Feet

E. PHOTO-ELECTRIC CONTROLS: Each light fixture shall be equipped with a photo-electric control which will automatically turn the light fixture off during daylight hours and on at dusk. The photo-electric control shall operate on 120 VAC. Photo-electric controls shall be of an electronic control design.

F. MAST ARMS: Mast arms for the 150 Watt HPS Luminaries shall be a minimum size of 2" X 8'. Mast arms for the 250 Watt MH Luminaires shall be a minimum size of 2" X 12'. Mast arms shall always extend to at least 10% of the back of curb roadway width, past the top back of curb nearest the pole. Mast arms shall extend on right angles from the intersection.

G. WIRING: All fixtures shall use #10 THHN from the light to the weather head or drip loop. Overhead wiring to the pole from the Utah Power Service shall be #4 A.A.C. AL duplex overhead conductor with ACSR neutral conductor. Underground wiring shall be #6 A.A.C. AL duplex underground conductor.

H. SERVICE BOX: Each light pole shall have a 13" X 24" service box located adjacent to the base of the pole for disconnect and servicing.

**SECTION 22 - 30; PUBLIC WORKS STANDARD DRAWINGS**