TITLE 9:

ENGINEERING AND STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

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ENGINEERING AND STANDARD SPECIFICATIONS AND STANDARD DRAWINGS FOR CLINTON CITY CORPORATION

1. GENERAL REQUIREMENTS

1.01 Administration:[1] This ordinance consists of the engineering and standard specifications and the standard drawings for the City of Clinton. The ordinance may be referred to as "The City Standards" and the drawings may be referred to as the "Standard Drawings". All construction within the City that will or may eventually become the responsibility of the City shall be constructed to meet these standards unless in the opinion of the City Engineer more stringent standards are required.

(1)Amending**:**

(a) Amendments to this ordinance shall be made by the City Council during a regularly scheduled Council Meeting.

(b) The ordinance shall be amended by ordinance numbered with the format of: year-sequential number E such as 02-01E meaning the ordinance was the first adopted in 2002. The "E" indicates the ordinance is specifically related to the engineering standards.

(c) The drawings may be amended from time to time upon recommendation by the City Engineer to stay in compliance with good engineering practices or to agree with changes made to the written ordinance. If a drawing is changed such that it does not agree with the written ordinance a change to the ordinance shall be processed within a practical time period.

(2)Responsibility for Current Publication: It is the responsibility of each engineer, contractor, developer, person, corporation or representative of any entity doing work within the City to have a current copy of this ordinance and the standard drawings.

1.02 Purpose Of Documents:

(1)The purpose of these Standard Specifications and Standard Drawings is to govern any work done or improvements installed within Public right-of-ways or across easements. Developers/ Contractors should thoroughly read and understand these specifications and standards before constructing public improvements.

(2)The Developer/Contractor shall contact the Clinton City Community Development Department at 2267 North 1500 West, Clinton, UT 84015, for all matters dealing with construction work within a City right-of-way or with any work connecting onto a City utility. SPECIAL PERMITS AND BONDING ARE REQUIRED FOR ALL SUCH WORK.

1.03 Permit, Fees And Bonding Required:

(1)It shall be unlawful to do any construction, excavation work on any street, curb, gutter, sidewalk, sewer line, water line, pressure irrigation line, storm drain or other infra-structure addition or improvement or to dig in any right-of-way for any reason in the City of Clinton without a permit from the City to do such work. The City of Clinton and all utility companies are bound by these standard specifications. No work shall be started until a permit is secured. In order to obtain a permit, the Developer's/Contractor's authorized signature is required and all fees shall be paid. If a Subdivision Improvement Agreement with Clinton City or a contract to do such work for the City has been finalized, the agreement and/or contract fulfills the permit requirement.

(a) Applications:

(i) All permit applications shall include but not be limited to:

(A) Start and completion dates of the project;

(B) The exact address or location of the work to be done;

(C) The type of work to be done;

(D) A request to locate water, land drain, storm drain and sewer lines, notification 48 hours previous to start date of work;

(E) A request for all utility companies to be contacted through Blue Stakes 1-800-662-4111.

(b) Fees:

(i) Before a permit is issued, a permit fee and an inspection fee shall be paid to the City. These fees will be set by Council resolution. Fees may be assessed on the following items:

(A) Public works inspections associated with the improvements installed as part of any development;

(B) Sewer, Land Drain and Water Lateral Installation Inspection;

(C) Pressure irrigation service connection, as established by DWCC;

(D) Re-inspection (When an inspection has been requested, the inspection is performed and the work is not complete, a re-inspection fee may be assessed.);

(E) Barricades (provided by, or called out by the City); and

(F) Bonds.

(c) Bonds:

(i) Public improvement projects, under contract with the city shall be bonded as established in the competitive contract. Each contractor doing work in the City is required to maintain a bond with the City in the amount of $1000.00 or such amount set from time to time by the City Council and established in the Consolidated Fee Schedule. In cases where the actual replacement cost is greater than that set as a minimum the bond shall be established in an amount needed to protect City infrastructure within the construction area. Bond requirements are to guarantee the following:[1]

(A) Construction work is completed;

(B) Final inspection is conducted;

(C) Repairs and/or replacement of required public improvements are finished and accepted.

(D) Repairs and/or replacement of private property damaged during construction.

(ii) The bonds shall be in the form of an irrevocable letter of credit from a bank, a bond from a surety company, or a cash bond paid directly to the City. The City shall approve all bonds submitted. No bond shall be released until all improvements are completed and accepted by the City.

1.04 <u>Contractor and Construction Plan Approval</u>:

(1)Before a Contractor performs any work within the City, the City shall approve the Contractor. Approval is granted for a period of one (1) year upon submission of the following:

(a) License: A current Utah State Contractor's License. Work will be restricted to that authorized by the license;

(b) Insurance: Proof of comprehensive general liability insurance. Bodily injury insurance will be in an amount of not less than three hundred thousand dollars ($300,000.00) for any one occurrence. Property damage insurance will be in an amount of not less than two hundred thousand dollars ($200,000.00) for any one occurrence and shall include underground exposure. Combined liability insurance will be in an amount of not less than five hundred thousand dollars ($500,000.00) for any one occurrence;

(c) Bond: Bond shall be established as outlined elsewhere in this ordinance;[1]

(d) Inspection: The Public Facilities Inspector/Engineer shall approve construction plans and cut sheets before any work begins. Plans shall be stamped "Approved for Construction" by the Director and distributed at the preconstruction meeting. Developers/Contractors proceeding with work without such approvals shall have the project shut down until such approvals are obtained. Repeated offenses may result in the Contractor loosing its pre-qualification to perform work in the City.

1.05 <u>Pre-Construction Conference</u>: A pre-construction meeting with the Developer and the Contractor(s) involved in the subdivision construction shall be held with the Director/Public Facilities Inspector/Engineer and prior to commencement of any work. Representatives from the public utilities within the construction area will be invited to the pre-construction conference. The location of the meeting shall be at the Clinton City Center, 1906 W. 1800 N., Clinton, Utah 84015. The following items shall be furnished at the meeting:

(1)Construction Outline: A detailed outline showing the sequences of construction of principle items of work. The outline shall show the beginning and

ending dates of the major items of work on the Project.

(2)Contact List: A list of names, titles, addresses, and telephone numbers of the Developer/Contractor's responsible personnel, indicating those who may be reached outside normal working hours.

(3)Sub-Contractors List: A list of Sub-Contractors and Materials Suppliers to be involved with the project and the items of work they are going to perform or furnish materials for. The City will notify the Developer/Contractor of any concerns or pre-qualification deficiencies of the companies they plan to use.

(4)Minutes: Other items may be discussed at this pre-construction conference as determined by the Director/Public Facilities Inspector/Engineer. Official minutes of this meeting as prepared by the Community Development Department shall become part of the project file for the project.

1.06 Timely Compliance with the Issued Permit: The Developer/Contractor shall perform in accordance with the terms of the permit and the Standard Specifications and Standard Drawings in effect at the date of the permit. The work shall be done in a timely manner. Time limits may be a condition of the permit and may be shortened because of safety concerns. Permits may be suspended if compliance is not met.

(1)Inspections: All work covered by a Public Works' permit or as part of an "Approved for Construction" set of plans shall be inspected by the Public Facilities Inspector prior to the following:

(a) Digs referencing construction staking;

(b) Backfilling and compacting;

(c) Fill or cover of rough and final grades;

(d) Placing concrete and asphalt;

(e) Placing or covering any underground piping;

(f) Pipe integrity testing, (e.g. camera, camera);

(g) Making or covering any connection into a city utility line;

(h) Work done in a public right-of-way;

(i) Other inspections outlined during the preconstruction meeting; and

(j) After completion of construction and prior to leaving the construction site.

(2)Public Works shall also be notified prior to starting any Public Works project.

(3)Notification of Needed Inspections:

(a) Inspection performed during regular working hours requires at least two working days prior notification.

(b) Inspections needed after 3:30 p.m., require notification be given and fees paid, in advance for after hours inspections.

(c) Inspections needed on the weekend require that notification is given and fees paid, in advance for after hours inspections.

(d) A charge shall be assessed for inspection callbacks.

(e) The Clinton City Council shall set all inspection fees, from time to time by resolution.

(4)Responsibility of the Developer: The developer is responsible for the complete development, including construction of the entire subdivision/project, until it is finalized and accepted by the City.

(5)Conflict: These Standard Specifications and Standard Drawings are the minimum requirements of the City of Clinton. In the event that any provisions herein conflict with general industrial standards, "Approved Drawings", or with other requirements specified by the City, the more stringent of the standards will apply. Deviations from these standards are to be approved by the Clinton City Public Works Director upon review with the City Engineer. Authorization of deviation is to be obtained in writing; it is the developer's responsibility to insure that copies of authorization letters are filed in the permanent file maintained in the Community Development Department.

1.07 Electronic and Record Drawings:

(1)All drawings shall reference Davis County Coordinates.

(2)When the Developer's Engineer has the capability, plat and improvement drawings shall be furnished electronically in MicroStation Format (.dgn), AutoCAD format (.dwg) or Data Exchange Format (.dxf). These electronic files shall be provided to the City after final approval but before recording of the Plat.

(3)After completion of all public works improvements the Developer shall provide the City with a set of sepia (reproducible) "record drawings"

which have been corrected to show the constructed improvements. Final payment from the bond shall not be made until these records are received.

1.08 Temporary Services: Any temporary services and utilities such as telephone, electrical, water toilet facilities, etc., shall be the responsibility of the Developer/Contractor.

1.09 Codes And Standards: Where codes and standards are referred to they shall be current, approved copies. It shall be the duty of the supplier of any material on this work to submit evidence, if requested, that its material is in compliance with the applicable codes and standards.

1.10 State And Local Laws:

(1)The Developer/Contractor shall conform to all applicable state and local laws in carrying out its obligations under the Contract.

(2)This shall include, but is not limited to, compliance by the Developer/Contractor with the requirements of Chapter 30, of Title 34, of the Utah Code Annotated, 1953 as Amended. If the provisions of Section 34-30-1, of the Utah Code Annotated, 1953 as amended, are not complied with, this Contract shall be void.

1.11 Compliance With Governmental Regulations: The Developer/Contractor's personnel, equipment, and operations shall comply fully with all applicable standards, regulations, and requirements of existing Federal, Utah State, and local governmental agencies. This shall include, but not necessarily be limited to, the following:

(1)United States Occupational Safety and Health Administration Regulations: Title 29 of the Code of Federal Regulations, Part 1926 (29 CFR Part 1926), Safety and Health Regulations for Construction.

(2)Utah State Industrial Commission Regulations: The Utah Occupational Safety and Health Act (1973) and Employer-Employee Safe Practices for Excavations and Trenching Operations (Jan. 1, 1974), as published by the Utah State Industrial Commission, including any and all amendments or revisions effective prior to performance of the work.

(3)City Ordinances: The Developer/Contractor shall be required to comply with all Clinton City Ordinances.

(4)UDOT Requirements: When crossing or working within Utah Department of Transportation rights-of-way the Developer/Contractor shall be responsible to obtain all necessary permits and comply with all appropriate UDOT regulations including applicable sections in "State of Utah Standard Specifications for Road and Bridge Construction," latest edition and in accordance with Chapter 19 of this Ordinance.

(5)Permits: The Developer/Contractor is responsible to obtain all required business licenses and building permits applicable to this project. Developer/Contractor shall be subject to the conditions of all permits and agreements between the Owner and the permitting agencies. See Chapter 18, UDOT Rights-of-Way.

1.12 Federal, State, and Local Inspecting Agencies: The site of construction is to be open at all reasonable times and places for periodic observation by accredited representatives of the Federal, State, and local agencies who have regulatory or supervisory authority over any part of the work proposed or regulated thereto.

1.13 Public Safety and Convenience: The convenience of the general public and the protection of persons and property are of prime importance and shall be provided for by the Developer/Contractor during this project. The Developer/Contractor shall use every reasonable precaution to safeguard persons and property. Failure of the Owner or the Public Facilities Inspector/Engineer to notify the Developer/Contractor of any deficiencies in providing for public safety and convenience shall not relieve the Developer/Contractor from its responsibility. The Developer/Contractor shall be required to comply with the requirements of the Manual on Uniform Traffic Control Devices (MUTCD).

(1)Compliance with Rules and Regulations: The Developer/Contractor shall comply with all rules and regulations of the City, County, and State authorities regarding the closing of public streets, or highways, to the use of public traffic. If conditions justify, the Public Facilities Inspector/Engineer may authorize the Developer/Contractor to close general traffic to not more than one (1) city block at any given time. No such closure shall be made without authorization of the Public Facilities Inspector/Engineer. Closure of streets or highways shall be in conformance with the (MUTCD).

(2)Road Closures and Obstructions: No road shall be closed by the Developer/Contractor to the public except by express permission of the Public Facilities Inspector/Engineer. The Developer/Contractor shall,

at all times, conduct its work so as to insure the least possible obstruction to traffic and normal commercial pursuits.

(3)Road Closures Notification: No road shall be closed by the Developer/Contractor to the public without prior notification to the Clinton City Police Department. Prior notification shall be a minimum of forty-eight (48) hours. At the time of notification the Developer/Contractor shall provide the address, times of closure, and a phone number and name of a contact person working at the site of the closure. Notification shall be given to local residents as outlined in Section 1.14.

(4)Protection of the Traveling Public: Signs, barricades, and lights shall protect all obstructions within traveled roadways where necessary for the safety of the traveling public. All barricades and obstructions shall be protected at night by signal lights that shall be suitably distributed across the roadway and kept burning from one-hour prior to sunset to one-hour after sunrise the next day. Barricades shall be of substantial construction. Failure of the Owner or the Public Facilities Inspector/Engineer to notify the Developer/Contractor to maintain barricades, barriers, lights, flares, danger signals, or guards shall not relieve the Developer/Contractor from its responsibility.

(5)Hazardous Conditions: Whenever the Developer/Contractor's operations create a hazardous condition, it shall furnish flaggers and guards to give adequate warning to the public of any dangerous conditions to be encountered. It shall furnish, erect, and maintain fences, barricades, signs, lights, and other devices that may be necessary to prevent injury and damage to persons and property. Flaggers and guards shall be UDOT trained and shall hold current certification and shall be equipped with signs, flags, etc. as required by the Utah State Department of Transportation (UDOT) regulations.

(6)Dust and Debris Control: The Developer/Contractor shall control dust and debris that originates in the construction right-of-way or site. Dust, trash, and other debris shall be controlled on a daily basis by methods that shall include, but not be limited to, the use of a dust setting spray, a “pick-up broom or street sweeper and trash disposal. The Developer/Contractor shall maintain on the project site or have readily available a water truck with a minimum two thousand (2,000) gallon capacity to be used for dust control. The Developer/Contractor shall be responsible to secure a source of water and shall obtain the necessary permission for its use. Failure by the Developer/Contractor to adequately control dust and debris may result in the Owner initiating dust and debris control measures and deducting the cost from payment due to the Developer/Contractor.

(7)State Requirements: The Developer/Contractor shall be responsible for complying with the Utah Administrative Code, Rule R307-309. “Davis, Salt Lake and Utah Counties, Ogden City and any Nonattainment Area for PM10: Fugitive Emissions and Fugitive Dust.”

1.14 Confinement of Work and Access to Right-of-Way and Easements: The Developer/Contractor will be required to confine construction operations within the dedicated right-of-way for public thoroughfares or within areas for which construction easements have been obtained unless it has made special arrangements with the affected property owners in advance. The Developer/Contractor will be required to protect stored materials, lawn, trees, and other features located adjacent to the proposed construction site. During construction operations, the Developer/Contractor shall construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to their residences or places of business for a period exceeding eight (8) hours, unless the Developer/Contractor has made special arrangements with the affected persons prior to commencing work in the area.

1.15 Notification of Residents:

(1)All property owners and residents adjacent to the streets or easements affected by the construction shall be notified by the Developer/Contractor at least forty-eight (48) hours in advance of the time construction is planned to begin. The Developer/Contractor can satisfy this requirement by placing a written notice on the door of each residence or business reading:

"Notice of Construction Operation. (Developer/Contractor) will be working on the construction of street improvements on your street starting about (time and date) . Any questions may be called into the project contractor at (phone number) ."”

(2)The Developer/Contractor shall provide a copy of the notification form at the pre-construction meeting and the method to be used (hang on door, etc.)

(3)If an interruption of services is expected due to construction the Developer/Contractor shall notify residents affected by the interruption at least twenty-four (24) hours in advance of the interruption begins. The Developer/Contractor can satisfy this requirement by placing a written notice on the door of each residence or business reading:

"Notice of Construction Operation. (Developer/Contractor) will be working on the construction of street improvements on your street starting about (time and date) . Services disrupted may include (list, i.e. water, accessibility to property, etc) this condition is expected to continue until (time and date) . Any questions may be called into the project contractor at (phone number) ."

1.16 Weather Conditions: In the event of temporary suspension of work, or during inclement weather, the Developer/Contractor will, and will cause its SubDeveloper/Contractors to, protect any project work or materials against damage from the weather. If, in the opinion of the Public Facilities Inspector/Engineer, any Project work or materials become damaged by reason of failure on the part of the Developer/Contractor or any of its SubDeveloper/Contractors to so protect its work, such work or materials shall be removed and replaced at the expense of the Developer/Contractor.

1.17 Land Monuments: The Developer/Contractor shall preserve existing City, County, State, and Federal land monuments whenever possible. When these monuments cannot be preserved, the Developer/Contractor shall notify Davis County Surveyor at least two (2) weeks in advance of the proposed construction in order that the Davis County Surveyor will have ample opportunity to reference these monuments for later replacement. Proof of notification shall be provided to the Community Development Department for inclusion in the permanent record.

1.18 Source Of Materials:

(1)All materials furnished or incorporated in this project shall conform to the requirements of these Specifications.

(2)The Developer/Contractor shall acquire the necessary rights, at its own expense, to take material from aggregate sources and to use properties for plant site, hauling roads, and other purposes.

(3)The Developer/Contractor may select areas for disposal of surplus materials; however, the Developer/Contractor will be responsible for acquiring the necessary right, at its own expense, to use the property for such purpose. No materials shall be buried on the construction site or disposed of within Clinton City without written permission of the Community Development or Public Works Director.

1.19 Operation and Maintenance Manuals: The Developer/Contractor shall furnish the Public Facilities Inspector/Engineer with two (2) sets of all operation and maintenance manuals, drawings, diagrams, etc., for all pumps, motors, control panels, valves, meters, etc., for use in the Operation and Maintenance Manual.

1.20 Interfering Structures, Utilities and Facilities:

(1)The Developer/Contractor shall exercise all possible caution to prevent damage to existing structures and utilities, whether above ground or underground. While these structures and utilities may be shown on the improvements plans, the information has been compiled from the best available sources, its completeness and accuracy cannot be guaranteed, and it is presented simply as a guide to possible difficulties. The Developer/Contractor shall notify all utility offices concerned at least forty-eight (48) hours in advance of construction operations in which a utility agency's facility may be involved. Notification to blue stakes does not necessarily cover all buried lines. This shall include, but not be limited to, irrigation, water, telephone, electric, sewer, storm drain, gas, and cable television. The Developer/Contractor shall be responsible for any and all changes to, relocation of, or re-connection to public utility facilities encountered or interrupted during the prosecution of the work, and all costs relating thereto shall be at the Developer/Contractor's expense. The Developer/Contractor shall contract with and pay Public Utility Agencies for work required in connection with all utility interference's

and handle all necessary notifications, scheduling, coordination and details.

(2)It shall be the responsibility of the Developer/Contractor to relocate and expose all existing underground structures and utilities in such a manner as to prevent damage to the same. Any structure or utilities damaged by the Work shall be repaired or replaced at the Developer/Contractor's expense.

(3)If the Developer/Contractor encounters existing structures that will prevent construction, it shall notify the Public Facilities Inspector/Engineer before continuing with the construction in order that the Developer's Engineer or Public Facilities Inspector/Engineer may make such field revisions as necessary to avoid conflict with the existing structures.

1.21 Soil Analysis: The necessity of a soil analysis will be determined by the Director and/or City Engineer. If no soil analysis is submitted by the developer or required by the City, all minimum specifications herein shall be applicable. Should a soil analysis for a specific subdivision be requested by the City, or submitted by the developer under his own initiative, the minimum standards, or design equal contained herein shall be the minimum acceptable to the City. Only soil analysis submitted by recognized, reputable soils engineers would be acceptable to the City.

1.22 Material and Compaction Testing:

(1)During the course of the work, a Geotechnical Engineer/Testing Company may perform such tests as are required to identify materials, to determine gradation, to determine compaction characteristics, to determine moisture, to determine density of fills in place, to determine concrete strength, to determine density and mixture of asphalt. These tests will be used to verify that the construction conforms to the requirements of the specifications. Such tests are not intended to provide the Developer/Contractor with the information required by it for the proper execution of the work and their performance shall not relieve the Developer/Contractor of the necessity of completing the construction in accordance with these specifications and Standard Drawings.

(2)The cost of such testing will be included in the Developers bond posted with the City. Public Works shall contract with a geotechnical or certified testing company to perform the necessary tests. The Developer will pay for the cost of these tests from the bond. Copies of the test will be furnished to the Developer/Contractor upon request.

1.23 Enforcement: Enforcement of the provisions of this ordinance is the responsibility of the Public Works Department. Specifically the Public Works Director or his designee be it the Public Facilities Inspector or other city employee/representative. However, any city employee knowledgeable in the procedures and properties outlined in this ordinance is empowered to bring to the attention of a contractor/developer conditions that are in violation of this ordinance. That same employee is also responsible to notify the Public Works Director for follow up and any additional action that may be needed.

1.24 Powers and Duties of The Public Facilities Inspector: It shall be the duty of the Public Works Inspector to inspect or cause to be inspected at regular intervals and at required inspections all improvements being done in the city. Where it is determined by the Public Facilities Inspector that improvements are not proceeding in compliance with the provisions of this Ordinance, he shall notify the developer/contractor of said deficiency. The Public Facilities Inspector in enforcing the provisions of this ordinance and in performance of this duty may enter actions in the court where necessary. Failure on the part of the Public Facilities Inspector to perform his duties shall not legalize any violation of such provisions.

2. DEFINITIONS

2.01 General: For the purpose of these regulations certain numbers, abbreviations, terms, and words shall be used, interpreted, and defined as set forth in this Chapter 2. Unless the context clearly indicates to the contrary, words used in the present tense include the future tense and words used in the plural include singular.

2.02 Definitions:

"Applicant" means any Person who makes application for a permit.

"Business" means any place in the City in which there is conducted or carried on principally or exclusively any pursuit or occupation for the purpose of gaining a livelihood.

"City" means Clinton City, a municipal corporation of the State of Utah.

"City Engineer" means the City Engineer, or his /her authorized representative.

"Development Standards" mean the latest version of the Clinton City Corporation Development Standards or criteria published or adopted by the City Engineer.

"Director" means the Community Development Director, or Community Development staff and others as designated by the Community Development Director.

"Emergency" means any unforeseen circumstances or occurrence, the existence of which constitutes an immediate danger to persons or property, or which causes interruption of utility or public services.

"Excavation" means any digging into or under the surface of any street, sidewalk or public way, and includes any breading or undermining of the surface of any street, sidewalk or public way, any tunneling under such surface and any other activity affecting the physical characteristics of any street in a manner adverse to the common use of such street.

"Failure" means a Work Site Restoration which fails to meet Development Standards, or which results in a deteriorated or substandard condition within the duration of the warranty period. Failure may be settlement of surfaces, deterioration of materials, or other surface irregularities. Measurement of Failure shall be further defined in the Development Standards.

"Infrastructure Provider" means a Person providing to another, for the purpose of providing Telecommunication services to customers, all or part of the necessary System that uses the right-of-way.

"Lateral Excavation"

"Operator" means any Person who provides service over a Telecommunications System and directly or through one or more affiliates owns a controlling interest in such System, or who otherwise controls or is responsible for the operation of such a System.

"Permittee" means any Person that has been issued a permit and thereby has agreed to fulfill the requirements of this Chapter.

"Person" means and includes any natural Person, partnership, firm, association, Provider, corporation, company, organization, or entity of any kind.

"Pipe Driveway" means a driveway approach that uses a pipe or other means to bridge the gutter.

"Property Owner" means Person or Persons who have legal title to property and/or equitable interest in the property, or the ranking official or agent of a company having legal title to property and/or equitable interest in the property.

"Provider" means an Operator, Infrastructure Provider, Reseller, System Lessee, Telecommunications Company or Public Utility Company.

"Public Facilities Inspector" or **"Inspector"** means the appropriately appointed Clinton City employee designated to inspect and pass or fail work accomplished in a Public Way.

"Public Utility Company" means any company subject to the jurisdiction of the Utah State Public Service Commission, or any mutual corporation providing gas, electricity, water, telephone, or other utility product or services for use by the general public.

"Public Way" means and includes all public rights-of-way and easements, public footpaths, walkways and sidewalks, public streets, public roads, public highways, public alleys, and pubic drainage ways. It does not, however, include utility easements not within Public Ways of the City.

"Private Drain Line" means a pipe installed solely for the transmission of water collected or generated on private property such as drainage, spring, or storm water, or condensate into the public drainage system.

"Storm Drain" means a dedicated pipe, conduit, waterway, or ditch installed in a right-of-way or easement for the transmission of storm and drainage water. This term does not include Private Drain Lines.

"Street" includes not only any street but also any road, sidewalk or way, the title of which is held by Clinton city.

"Work Site Restoration" means and includes the restoring of the original ground or paved hard surface area to comply with Development Standards, and includes but is not limited to repair, cleanup, backfilling, compaction, and stabilization, paving and other work necessary to place the site in acceptable condition following the conclusion of the work, or the expiration or revocation of the permit.

3. CONSTRUCTION DRAWINGS

3.01 General: Complete and detailed construction plans and drawings of all improvements shall be submitted to the City for review prior to receiving final plat approval or site plan approval from the City and commencing construction. No construction shall be started until plans have been checked and approved by all responsible parties.

3.02 Standard Drawings: As part of this ordinance the Clinton City Standard Drawings are attached. These drawings are to be utilized in the development of construction plans. Deviation from these Standard Drawings shall only be upon approval of the City and as indicated on the "Approved for Construction" drawings or in written documentation approved by the City.

3.03 Required Drawings: The Director and City Engineer shall determine the minimum type and style of drawings necessary to be processed for a development. As a guide the requirements established in the Clinton City Subdivision Ordinance and those outlined here may be followed.

3.04 Standards For Construction Drawings:

(1) 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 outlined in this Ordinance.

(2) General Requirements:

(a) All drawings and/or prints shall be clear and legible, drawn with ink on approved mylar sheets and conform to good engineering and drafting room practice. Size of drawings shall be 24" x 36" with ½-inch border on top, bottom, and right sides, and 1 ½" on the left side.

(b) In general, the following shall be included on all drawings:

(i) North arrow (plan);

(ii) Scale and elevations referenced to Davis county Datum;

(iii) Stationing and elevations for profiles;

(iv) Title block, located in the lower right corner of the sheet to include:
Name of City;
Project title (subdivision, etc.)
Specific type and location of work;
Name of the engineer or firm preparing drawings with license number, stamp and signature;
Revision date;
Drawing number (1 of 14)

(3) Drawings Are To Show:

(a) Curb and gutter, surface drainage structures, sidewalks and street surfacing drawings shall show:

(i) Scale: 1"=20' or 40' horizontal; 1"=2' or 4' vertical;

(ii) Both plan view and profiles must be shown for each side of the street, street centerline profile must be shown;

(iii) Stationing and top of curb elevations with curve data must be shown at 50-foot intervals.

(iv) Flow direction and type of cross drainage structures at intersections with adequate flow line elevations;

(v) Bench Mark (B.M.) location and elevation (Davis county Datum);

(vi) Typical cross section for all street sizes and variations; and,

(vii) Site location of specific drawing relative to the overall project.

(b) Sewer, Storm Drain, and Land Drain drawings shall show:

(i) Scale: 1"=20' or 40' horizontal; 1"=2' or 4' vertical;

(ii) Location, size and slope of mains;

(iii) Manhole size, location, and flow line elevation;

(iv) Type of pipe;

(v) B.M. location and elevation (Davis county Datum);

(vi) An overall development plan view of the sewer (horizontal scale 1"=100');

(vii) Site location of specific drawing relative to the overall project.

(4) Non-Standard Details:

(a) Each set of plans shall be accompanied by a separate sheet of details for structures that are to be constructed as part of a development. All structures shall be designed in accordance with minimum requirements established by this ordinance.

(b) As a minimum the drawings shall have all information contained in the Clinton City Standard Drawings and include:

(i) Drawings size is to be 24" x 36" with ½-inch border on top, bottom, and right sides, and 1 ½" on the left side.

(ii) Scale of each detail;

(iii) Completely dimensioned and described;

(iv) Title block, located in the lower right corner of the sheet to include as in Section 2.04.1.4 above.

3.05 Drawings to Be Submitted: The number of sets of drawings to be submitted shall be no less than seven (7), however this number may be adjusted by the Director to fill the requirements of a specific project.

(1) Sketch Plat: The sketch plat is a tool utilized by the developer to gather input from the Community Development Department. Information may include sizes of existing infrastructure, proposed streets, acceptability of initial design, and any master planned infrastructure or other city requirements that are planned for the proposed development area.

(2) Preliminary Plat: The preliminary plat is to be presented to the Planning Commission for approval of the overall plan. The preliminary plat is to be a three page, 24" x 36" standard drawing presentation. The three pages are to represent:

(a) Page One is to contain all information that would normally be on a plat of a subdivision to include: legal description; name and location of subdivision; addresses; street numbers; lot sizes and dimensions; lot numbers; phase lines; and any other information determined necessary by the Director.

(b) Page Two is to be a survey of the property and adjacent area designed to show existing conditions to include: topographic lines; irrigation structures; utilities and infrastructure with sizes; streets; structures; rights-of-way; easements; and any other information determined necessary by the Director.

(c) Page Three is to show the streets, lot design and all additions to be made as part of the subdivision to include: street numbers; lot numbers; utilities and infrastructure with sizes; disposition of existing structures, utilities, infrastructure, easements and rights-of-way; and any other information determined necessary by the Director.

(3) Final Plat and Drawings: The final plat and drawings are to be prepared for presentation to the Planning Commission and City Council for approval. The plat is to meet the requirements of the Davis County Recorders Office and engineering drawings are to meet the requirements of Section 3.04 above as well as any requirements determined necessary by the Director.

3.06 "Approved for Construction" Drawings: Once reviewed and approved through the required processes the Director will return one set of drawings to the developer marked "Approved for Construction". Approved drawings may contain notes and or redline corrections specific to the approval. The approved set shall be kept available at the construction site, copies of the approved set may be made, however it is the original set, with all notes and comments attached that will be the reference set of record.

3.07 Drawings of Record: The City may require a developer/contractor to provide a set of "Drawings of Record" containing all information that is different from the "Approved for Construction" drawings. These drawings may be submitted with neat and readable redline corrections. If, in the opinion of the Director the drawings are not clear or neat the developer shall have his engineer provide corrected drawings.

3.08 Preconstruction Conference: A preconstruction conference shall be held before any excavation or other work is begun in the development. The meeting will be held at Clinton City Hall and will include, when possible representatives from the utilities, Clinton City Community Development, developer, developer's contractor, and representatives from Clinton City Public Works. Additionally, representatives from the City Engineer and other subcontractors may be required to attend.

4. TRENCH EXCAVATION AND BACKFILL

4.01 General: This section covers the requirements for trenching and backfilling for underground pipelines. Unless otherwise shown or ordered, pipe shall be laid in an open trench. All incidental clearing, preliminary grading, structure removal, and benching shall be considered a part of the trenching operation.

4.02 Barricades: Barriers shall be placed at each end of all excavations, and at such places as may be necessary along excavations, to warn all pedestrians and vehicular traffic of such excavations. Lights shall also be placed along excavations from one hour before sunset each day to one hour after sunrise of the next day, until such excavations are entirely refilled, compacted, and surfaced or final graded. All excavations shall be barricaded in such a manner as to prevent persons from walking into, falling into, or otherwise entering those excavations.

4.03 Blasting: Blasting will not be allowed except by permission from the Public Facilities Inspector/Engineer. The Developer/Contractor shall comply with all laws, regulations, ordinances, and safety codes relative to the handling, storage, and use of explosives. The Developer/Contractor shall be fully responsible for all damage to life and property attributable to its blasting operations. Excessive blasting or overshooting will not be permitted. The Developer/Contractor shall remove any material outside the authorized cross section, which may be shattered or loosened by blasting.

4.04 Sheeting, Bracing and Shoring of Excavations:

(1) Excavations shall be sheeted, braced, and shored as required to support the walls of the excavations. These measures shall be taken to protect the workers, the work in progress, existing utilities, structures, and improvements, from damage due to sliding and settling of trench walls. All such sheeting, bracing, and shoring shall comply with the regulations of the Utah State Industrial Commission, and accident prevention and safety provisions of the Contract.

(2) The Developer/Contractor shall be fully responsible for the adequacy of methods and materials used in trench sheeting, bracing, shoring, and other systems provided to protect workers. Injury to or death of workers resulting from inadequate trench safety measures shall be the full and complete responsibility of the Developer/Contractor. All damages resulting from lack of adequate sheeting, bracing and shoring shall be the responsibility of the Developer/Contractor, and the Developer/Contractor shall affect all necessary repairs or reconstruction at its own expense resulting from such damage.

(3) Sheeting or shoring that does not extend below the centerline of the pipe may be removed at the discretion and responsibility of the Developer/Contractor after the pipe embedment has been placed and compacted to a level twelve inches (12") above the top of the pipe. Following removal of the sheeting or bracing, the trench shall be immediately backfilled and compacted or consolidated.

4.05 Control of Groundwater: All trenches shall be kept free from water during excavation, fine grading, pipe laying and jointing, and pipe embedment operations. Where the trench bottom is mucky or otherwise unstable because of the presence of groundwater, and in all cases where the static groundwater 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 excavation dewatering shall be conducted to natural drainage channels, gutters, drains, or storm sewers. The discharge from excavation dewatering shall be filtered through straw bails or other median, to remove silts and debris prior to entering natural drainage channels, gutters, drains, or storm sewers. No sanitary sewer shall be used for disposal of trench water. Surface water shall be prevented from entering trenches.

4.06 Trench Excavation: Excavation for pipelines shall be located as shown on the Drawings or as staked in the field. Trenches shall be excavated to the depths and widths required to accommodate the construction of the pipelines, as follows:

(1) Normal Excavation: Except in ledge-rock, cobbles, stones, or water-saturated earth, mechanical excavation of trenches shall not extend below the

bottom of the pipe after placement in its final position.

(2) Authorized Over-Excavation:

(a) Where ledge-rock, cobble rock, stones or other material render the trench material unsuitable for pipe bedding, as determined by the Public Facilities Inspector/Engineer, bedding material shall be imported and placed. The trench shall be excavated to a minimum of four-inches (4”) below the bottom of the pipe after placement in its final position.

(b) Where unstable material is encountered in the excavation, foundation material may be required, as determined by the Public Facilities Inspector/Engineer. In such cases, a minimum of eight inches (8") below the bottom of the pipe after placement in its final position shall be removed. Over-excavation not ordered, specified, or shown shall be considered to be unauthorized excavation.

(3) Unauthorized Over-Excavation: Any excavation carried below the elevation required to install the pipe as specified in these Specifications, or directed by the Public Facilities Inspector/Engineer, shall be considered to be unauthorized. Such excavation shall be backfilled in accordance with these Specifications for "Imported Granular Material" and "Gravel Foundation for Pipelines and Pipeline Structures," all at the Developer/Contractor's expense.

(4) Trench Width:

(a) The trench shall be excavated such that the pipe is always centered in the trench. The minimum clear trench width at the horizontal diameter of the pipe must not be less than the outside diameter of the pipe plus twelve inches (12"). The maximum clear width of trench at the top of the pipe must not be more than the outside diameter of the pipe plus eighteen inches (18"). If a trench is excavated to a greater width, the Developer/Contractor will be required to restore the trench to an acceptable condition by following the steps outlined in these Specifications for "Trenches in Embankments."

(b) Trench width for pipeline structures, valves, or other accessories shall be sufficient to leave at least twelve inches (12") clear between their outer surfaces and the trench. Backfill with earth under structures or valves will not be permitted. Any unauthorized excess excavation below the elevation indicated for foundation of any structures shall be backfilled in accordance with these specifications for "Imported Granular Materials," and "Gravel Foundation for Pipe & Pipeline Structures," at the Developer/Contractor's expense.

(5) Trenches in Embankments: Before laying pipes that are to be in fill or embankment areas, the embankment shall first be placed and compacted to the specified density to a depth of not less than two feet (2') above the top of the proposed pipe. After placing and compacting the embankment, the trench for the pipe or conduit shall be excavated through the fill and fine graded and the pipe installed as specified.

(6) Placement of Excavated Material:

(a) All excess material shall be hauled away from the construction site and disposed of in an area obtained by the Developer/Contractor and approved by the Public Facilities Inspector/Engineer. The Developer/Contractor shall be responsible for all rights-of-way, easements, and access associated with the disposal of excess excavated material. It shall further be responsible to obtain permission from the property owner or person controlling the property where the Developer/Contractor plans to dispose of excavated material. No compensation will be made to the Developer/Contractor for disposal of excess excavated material.

(b) Non-excess excavated material shall be piled in a manner that will not endanger the work and will avoid obstructing sidewalks and driveways. Gutters and irrigation ditches shall be kept clear or other satisfactory provisions shall be made for street drainage and continuity of irrigation.

(c) Grading of the area surrounding the trenches, including excavated materials, shall be performed as necessary to prevent surface water from flowing into trenches, or other excavations. Control of groundwater shall be as specified in section 3.05, Control of Groundwater.

(7) Fine Grading the Trench Bottom: The bottom of the trench shall be accurately graded and prepared to provide uniform bearing and support on undisturbed soil or compacted granular bedding at every point along the entire length of the pipe. Bell holes shall be hand excavated after the trench bottom has been fine graded. Bell holes shall be only large enough to permit making the joints and to assure that any portion of the joint or bell does not support the pipe.

4.07 Trench Backfill:

(1) Trench backfill for piping consists of four zones: foundation, bedding, initial backfill, and final backfill. “Pipe embedment” is a commonly used term that refers to the region including the bedding and initial backfill zones, or any region within one foot (1’) of any pipe, pipeline structure, or accessory. The foundation is defined as the region below four

inches (4”) below the bottom of the pipe. The bedding is defined as the region between four inches (4”) below the bottom of the pipe and the bottom of the pipe. The initial backfill is defined as the region between the bottom of the pipe and twelve inches (12”) above the top of the pipe. The final backfill is defined as the region above twelve inches (12”) above the pipe.

(2) All fill materials shall be compacted as specified in this section.

(3) Excavated materials are not satisfactory for foundation, bedding, or backfill, when located within the public right-of-way or where established during the plan review process. The Developer/Contractor shall be responsible for providing imported granular material.

(4) Use of excavated materials as backfill shall require that a proctor be accomplished on excavated materials. Due to the constant changing nature of the soil within the area the Public Facilities Inspector/Engineer may require a new proctor be accomplished anytime there is an apparent change in the composition of the soil. The Developer/Contractor shall be responsible for paying for all soils engineering and testing.

(5) Imported Granular Material: Imported granular material for foundation, bedding, and backfill shall be cleaned crushed rock or gravel, free from sod, vegetation, and other organic or deleterious material. Slag will not be allowed in the pipe embedment.

(a) Imported granular material shall conform to the following gradation specifications:

(i) Foundation Material: One hundred percent (100%) less than one and one half-inch (1 ½”) and maximum of five percent (5%) less than one-half-inch (1/2”).

(ii) Embedment Material:

(A) Ductile-iron pipe - One hundred percent (100%) less than one and one half-inch (1 ½”) and maximum of five percent (5%) passing a No. 200 sieve.

(B) PVC or polyethylene pipe – Sand and maximum five percent (5%) passing a No. 200 sieve.

(C) One hundred percent (100%) less than two-inch (2”) and maximum of fifteen percent (15%) passing a No. 200 sieve.

(b) Foundation Placement:

(i) When the Public Facilities Inspector/Engineer authorizes over-excavation, foundation material shall be placed in the foundation zone. The foundation material shall be placed so that the trench can be properly fine graded as specified. The foundation material shall be deposited over the entire trench width and compacted in layers. The layers shall have a maximum uncompacted thickness of six-inches (6”).

(ii) The material shall then be fine graded in accordance with the specification for Fine Grading in § 4.06(7) above.

(c) Pipe Embedment: Embedment material for other than PVC pipe shall have no material larger than one and one half-inch (1 ½”) in any dimension. For PVC pipe, the material must be sand.

(i) Bedding: The bedding material shall be deposited over the entire trench width to a compacted thickness of no less than four inches (4”). The material shall have a maximum uncompacted thickness of six inches (6”).

(ii) Initial Backfill: After the pipe is in place, initial backfill material shall be placed at any point below the mid-point of the pipe simultaneously and uniformly on both sides of the pipe in un-compacted layers not to exceed ten-inches (10”) or one-half the diameter of the pipe, whichever is less. Initial backfill material shall be placed with care to prevent displacement of or damage to the pipe during the embedment process. Initial backfill material shall be scattered alongside the pipe and not dropped into the trench in compact masses.

(iii) That section of the pipe zone from the mid-point of the pipe to twelve inches (12”) above the top of the pipe shall then be filled with initial backfill materials and compacted.

(d) Final Backfill: Final backfill shall be from twelve inches (12") above the top of the pipe to the level shown on the Drawings. Excavated materials consisting of fines, sand, and gravel shall be used for final backfill. No oil cake, bituminous pavement, concrete, rock, or other lumpy material shall be used in the final backfill unless these materials are scattered and do not exceed six inches (6") in any dimension. Perishable or spongy material shall not be used in final backfilling.

(e) Compaction: Backfill shall be compacted by means of sheepsfoot rollers, pneumatic tire rollers, vibrating rollers, or mechanical tampers.

(i) Under pavements or other surface improvements the in-place density shall be a minimum of ninety-six percent (96%) of laboratory standard the maximum dry density as determined by AASHTO T-99. In shoulders and other areas the in-place density shall be a minimum of ninety percent (95%) of the maximum dry density as determined by AASHTO T-99.

(ii) Fill material shall be placed at a moisture content and un-compacted lift thickness such that after compaction the required densities will be produced. In no event will the material be placed in lifts that, prior to compaction, exceed six inches (6") for foundation and embedment and twelve inches (12") for final backfill.

(iii) Prior to compaction each layer shall be evenly spread, moistened, and worked by disk harrowing or other equivalent means.

(iv) If the required density is not attained, test sections will be required to determine any adjustments in compaction equipment, thickness of layers, moisture content and compactive effort necessary to attain the specified minimum density.

(v) Approval of equipment, thickness of layers, moisture content, and compactive effort shall not be deemed to relieve the Developer/Contractor of the responsibility for attaining the specified minimum densities. The Developer/Contractor, in planning its work, shall allow sufficient time to perform the work connected with test sections and to permit the Public Facilities Inspector/Engineer to make tests for relative densities.

4.08 Trench Crossings and Easements:

(1) At road crossings or where existing driveways occur on a road, the Developer/Contractor shall make provisions for trench crossings either by means of backfill, tunnels, or temporary bridges.

(2) Any disturbance to property caused by the Developer/Contractor's activity within easements shall be restored to the satisfaction of the owner of the property. If necessary, shrubs, fences, or other objects shall be removed carefully. If work must occur on a lawn, the lawn shall be cut to a width of two feet (2') wider than the intended work area (one foot (1') on each side). The lawn sod shall be stacked separately from and shall not be mixed with other excavated material.

(3) After the sod is removed, if excavation is necessary, the topsoil shall be removed to a depth of twelve inches (12"), or the actual depth of the topsoil, whichever is less. The topsoil shall be stored separately from and shall not be mixed with other excavated material.

(4) Following completion of the backfilling and the compaction of the trench, the Developer/Contractor shall replace topsoil, lawn sod, shrubs, fences, and other items that may have been removed from within the easement area and shall clean up and remove any rocks, dirt or any other debris that remain from the construction work. The Developer/Contractor shall obtain a release from the property owner stating that the repairs have been made to the satisfaction of the Owner. A copy of said release shall be delivered to the Public Facilities Inspector/Engineer.

4.09 Restoration of Construction Site: During the progress of the Work, the Developer/Contractor shall clean up all construction debris, excess excavation, and excess materials, and shall restore all fences, irrigation structures, ditches, culverts, and similar items. The Developer/Contractor shall stockpile the excavated trench material so as to do the least damage to adjacent grassed areas, or fences, regardless of whether these are on private property or public rights-of-way. All excavated materials shall be removed from grassed and planted areas and these surfaces shall be left in a conditions equivalent to their original surface and free from all rocks, gravel, boulders, or other foreign materials.

4.10 Developer/Contractor's Responsibility: The Developer/Contractor will be responsible to see that the backfilling and compaction are properly and adequately done. Settlement of trenches within a period of two- (2) years after final acceptance of the project shall be considered incontrovertible evidence of inadequate compaction, and the Developer/ Contractor shall be responsible for correcting the condition in accordance with the provisions of these Specifications. This includes the replacement of sidewalk, curb and gutter, and other surface improvements.

5. PRESSURE PIPE CULINARY WATER

5.01 General: This Chapter covers furnishing and installing pressure pipe to the lines and grades shown on the drawings and/or established in the field, and all flushing, testing, and repairing required ensuring adequate and safe operation of the water system. Either PVC C-900 200 DR-14 or ductile iron pipe shall be used in all areas east of 2000 West and PVC C-900 200 DR-14 pipe will be used in all areas west of 2000 West unless soil corrosivity evaluation, as reviewed and approved by the City Public Works Director/Engineer/Public Facilities Inspector dictates otherwise. All fittings shall be brass or brass and stainless steel construction. No galvanized, epoxy coated or similar fittings shall be allowed.

5.02 Ductile Iron Pipe:

(1) Materials:

(a) Ductile iron pipe shall conform to all requirements of ANSI/AWWA C151/A21.51, "American National Standard for Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined molds, for Water or Other Liquids." Minimum pressure Class will be 250 for pipes larger than 12-inch diameter. Pipes of 12-inch diameter and smaller shall be pressure Class 350. If thickness class pipe is used, pipes of diameters from 4-inches through 10-inches shall be minimum Class 51 and pipe from 12-inch diameter and larger shall be minimum Class 52.

(b) All pipe shall be made of good quality Ductile Cast Iron and of such chemical composition and structure as is required to meet the physical and mechanical property requirements of the standard.

(2) Joints:

(a) Mechanical Joints: All mechanical joints shall meet requirements of ANSI/AWWA C111/A21.11. 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.

(b) Push-on Joints: All push-on joints shall meet the requirements of ANSI/AWWA C111/A21.11. Gaskets shall be free from defects and not over one year old. 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 21.1

(c) Flanged Joints: Flanges shall meet the requirements of ANSI/AWWA C110/A21.10, "American National Standard for Ductile Iron and Gray Iron Fittings, 3-inch through 48-inch for Water and Other Liquids." Flanged joints shall be bolted firmly with machine, stud or cap bolts of proper size. Flange maybe 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. Bolts and nuts, unless otherwise specified, shall be made of the best quality refined iron or metal steel and have clean, well-fitting 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 of length so that no more than 3/8-inch nor less than 1/8-inch extends past face of nut. All buried fittings having steel bolts shall be coated with a non-oxide wax and wrapped with polyethylene. Gaskets shall be rubber, either ring or full face, and are 1/8th-inch thick. A gasket for each flanged joint of proper size as shown on the drawings.

(3) Coatings and Linings for Ductile Iron Pipe:

(a) All exterior surfaces of pipe and fittings shall be coated with hot coal tar approximately 1 mil thick. All interior surfaces shall be cement mortar lined with a standard thickness according to ANSI/AWWA C104/A21.4-80.

(b) All interior surfaces or coatings shall consist of products that are certified to comply with ANSI/NSF Standard 61. This requirement applies to any pipes and fittings, protective materials (e.g. paints, coatings, concrete admixtures, concrete release agents, concrete sealers), joining and scaling materials (e.g. adhesives, caulks, gaskets, primers and sealants) and mechanical devices (e.g. electrical wire, switches, sensors, valves) that are located so as to come in contact with the drinking water.

(4) Corrosion Protection and Soil Tests: When the Public Facilities Inspector/Engineer determines that a potential for corrosive conditions exists such as poor drainage or reactive soils, pipe and fittings shall be incased in polyethylene wrap. Polyethylene encasement of ductile iron pipe shall meet the requirements of ANSI A21.5 or AWWA C105.

(5) Flanges: Flanges when required shall conform to ANSI/AWWA C115/A21.15-83.

(6) Fittings: Fittings for Ductile Iron Pipe shall conform to the provisions of ANSI/AWWA C110/A21.10-82 or C153/A21.53-58.

(7) Magnetic Locator Tape:

(a) All pipe shall include a 3-inch magnetic locator tape installed in the pipeline trench approximately 12-inches below the ground surface.

(b) Identification tape shall be furnished with white or black printing on a colored field having the words:

(c) CAUTION: POTABLE WATER - BELOW.

5.03 PVC Pipe:

(1) Materials: Pipe for the transmission and distribution of water shall be manufactured in accordance with AWWA C900 (latest edition), "AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch, for Water". The PVC pipe shall have a cast-iron-pipe-equivalent outside diameter. PVC pipe 14-inches and larger shall be manufactured in accordance with AWWA C905-88, "AWWA Standard for Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14-inch through 36-inch" all PVC pipe 4-inch and larger shall be DR. 14 with a working pressure of 200 PSI. Pipe smaller than 4-inch shall be schedule 40 PVC.

(2) Joints: Joints shall be push on rubber gasket type. Lubrication shall be water soluble, non-toxic, non-objectionable in taste and odor imparted to the water, non-supporting of bacteria growth, and have no deteriorating effect on the PVC pipe or rubber gaskets.

(3) Fittings: All fittings to be used with the PVC pipe shall be the same as fittings for Ductile Iron Pipe and shall conform to the provisions of ANSI/AWWA C110/A21.10-82 or C153/A21.53-58.

(4) Magnetic Locator Tape:

(a) All pipe shall include a 3-inch magnetic locator tape installed in the pipeline trench approximately 12-inches below the ground surface.

(b) Identification tape shall be furnished with white or black printing on a colored field having the words:

(c) CAUTION: POTABLE WATER - BELOW.

5.04 Pipe Installation:

(1) Cutting: Cutting of pipe for closure pieces or for other reasons shall be done in a neat and workmanlike manner by a method recommended by the manufacturer. After cutting, the pipe shall be beveled and filed to prevent gasket damage in joint assembly.

(2) Dewatering of Trench: Where water is encountered in the trench, it shall be removed during pipe laying operations and the trench so maintained until the ends of the pipe are sealed. See "Control of Groundwater" in Chapter 3 Trench - Excavation and Backfill.

(3) Laying of Pipe:

(a) The pipe and pipe coating (where applicable) shall be inspected for defects before installation. Any defects shall be repaired or the pipe shall be replaced, whichever the Public Facilities Inspector/Engineer deem necessary.

(b) All pipe shall be laid and maintained to the required lines and grades with fittings and valves at the required locations. The pipes shall be installed with a 48-inch minimum cover from finished road surface for culinary water. The Developer/Contractor shall be responsible to install the pipeline to the alignment set by the Public Facilities Inspector/Engineer or as shown on the Approved Drawings.

(c) All pipes, fittings and valves shall be carefully lowered from the truck when unloading or when installing into the trench. This should be done one piece at a time in order to prevent damage to pipe materials and protective coatings and linings. Under no circumstances shall materials be dropped or dumped from the truck or into the trench.

(d) The Developer/Contractor shall take the necessary precautions such that foreign materials do not enter into the pipe. No debris, tools, or other materials shall be placed in the pipe during laying operations. When laying of pipe is not in progress, a watertight plug shall close the pipe.

(e) Maximum deflections at pipe joints shall not exceed the joint specifications of AWWA C900 of latest revision, or the recommendations of the pipe manufacturer.

(f) Deflections in PVC pipe shall be made by longitudinal bending of the barrel of the pipe rather than deflecting the pipe joints. Longitudinal bending shall be limited to eighty percent (80%) of the manufactures recommended minimum-bending radius.

(4) Pipe Bedding:

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

(b) In the event trench materials are not, in the judgment of the Public Facilities Inspector/Engineer,

satisfactory for pipe bedding, imported granular bedding will be required. See Chapter 3 of these specifications.

(5) Thrust Blocking: Thrust blocking shall be applied at all tees, valves, plugs, caps and at bends deflecting 11 1/4 degrees or more. The fitting shall be encased in a 12 mil protective plastic wrap before the thrust block is poured. Reaction blocking shall be concrete having a compressive strength of not less than 4000 pounds per square inch at 28 days. Blocking shall be placed between undisturbed soil and the fitting to be anchored. The area of bearing on the pipe and on the ground shall be as shown in the Drawings. The blocking shall be so placed that the pipe and the fittings will be accessible for repair.

(6) Connections to Existing Water Lines: Information on the drawings regarding existing water lines is taken from "record" drawings from the city or utility company files and may or may not be accurate as to size, type of material or location. The Developer/Contractor will be responsible to determine the proper fittings and materials required, obtain the Public Facilities Inspector/Engineer's approval of the planned connection, and perform the construction in a suitable fashion. Where fitting sizes, such as tees and crosses, are shown on the plans, those sizes will be used. However, no attempt has been made to show all needed fittings or materials.

(7) Separation:[2] The horizontal distance between pressure water mains and sanitary sewer lines shall be at least ten feet. Where a water main and a sewer line must cross, the water main shall be at least 18 inches above the sewer line. Separation distances shall be measured edge-to-edge (i.e. from the nearest edges of the facilities). Water mains and sewer lines shall not be installed in the same trench.

5.05 Water Service Laterals: Water service laterals shall be constructed with materials specified and at the locations shown on the Standard Drawings.

(1) Laterals: Pipe for water service laterals shall be three-quarter-inch (3/4") Type K-soft copper tubing or larger and shall comply with ASTM Specification B88.

(2) Extent of Laterals:

(a) New water service laterals shall extend from the water main to ten-feet (10') past the property line. Type K-soft copper tubing water services shall not have any joints between the corporation stop at the main and the meter setter.

(b) Water service laterals relocated during construction of new pipelines shall extend from the water main to the water meter shall not have any joints between the corporation stop and the meter unless approved by Public Facilities Inspector/Engineer. If the existing service is other than copper or is in poor condition the service shall be replaced with Type K-soft copper tubing from the main to the meter setter. Corporation stops and or saddles shall be replaced unless approved by the Public Facilities Inspector/Engineer.

(3) Excavation and Backfill: Trench excavation and backfill shall conform to the applicable paragraphs of Chapter 3. Bedding shall meet the requirements of §4.07(5)(a)(ii) above.

(a) Connection to Main:

(i) Connections of services to main lines shall be direct tap on ductile iron mains and through an OD controlled bonze service saddle on PVC mains, corporation type stop and 24-inch gooseneck formed with the tubing. All connections shall be made using compression type fittings. The service saddle shall be a Mueller service saddle with three-quarter-inch (3/4") IPT outlet or equivalent. The corporation stop shall be a three-quarter-inch (3/4") Mueller H-15008 "CC" thread for direct tap and a Mueller H15028 IP threaded for a service saddle tap.

(ii) On existing services the existing connection to main will be used unless damaged or leaking.

(b) Meter Setter, Box and Cover:

(i) Residential:

(A) Meter sets shall be three-quarter-inch (3/4") Iron Yoke assemblies with an angle meter valve, Mueller 110 or equivalent conductive compression connection for CTS O.D. tubing.

(B) The outlet coupling shall be a top entry dual check device with a conductive compression connection for CTS O.D. tubing. It must also be on the Utah Division of Drinking Water approved Backflow Prevention Assemblies/Devices list.

(C) The meter box shall be eighteen-inches (18") in diameter by thirty-inches (30") high corrugated plastic with grooves to fit over the inlet and outlet lines. The meter cover is to be a D&L eighteen-inch (18") ring cover with a two-inch (2") hole in a raised cast center rim.

(D) The cover is to be three-eighths-inch (3/8") above top back of curb centered two-and-one-quarter-feet (2.25') from the back of curb.

(ii) Non-residential Meter Sets: Water main sizes and meter sets will be approved during the sight plan and building permit approval processes. General

specifications for non-residential meter setter, box and cover are outlined in the following table.

CLINTON CITY CORPORATION WATER SERVICE INFORMATION					
Service Size	Meter Box Size	Type of material for Meter Box	Water Meter	Connection Type	Bypass
¾"	18" Dia	Concrete, Corrugated, Polyethylene	By City	Compress	No
1"	24" Dia	Concrete, Corrugated, Polyethylene	By City	Compress	No
1 ½"	48" Dia	Concrete	By City	Flange	Yes
2"	48" Dia	Concrete	By City	Flange	Yes
3"	60" Dia	Concrete	By City	Flange	Yes
4"	4'x6' Box	Concrete	By City	Flange	Yes

Meters larger than 4" shall be approved only for specific uses and the design will be approved during the sight plan and building permit approval processes.

Flange meters shall be installed with an approved bypass system.

(4) Special Joints and Fittings:

(a) Solder and Sweat Joints: Solder joints are not permitted underground.

(b) Copper Tubing to Screw Pipe Joints: Joints from copper tubing to threaded pipe shall be made by the use of brass adapter fittings.

(5) Separation: Water service lines shall not be run or laid in the same trench as the building sewer lateral, unless the water service line is placed on a solid shelf excavated at one side of the common trench. At all locations there shall be at least twelve (12) inches of separation **horizontally and vertically** above the sewer lateral.

(6) Flushing, Testing and Disinfecting:

(a) Flushing, testing and disinfecting shall conform to the applicable paragraphs of this division. The end of the trench where the stub-out past the meter is located shall be left open to allow for discharging water out of the service line for proper flushing and to insure that the line has been adequately disinfected. The line shall be flushed thoroughly following installation.

(b) On existing services the Developer/Contractor shall take precautions to prevent contamination of the pipe and connections during installation. The line shall be flushed thoroughly following installation.

(7) Damage and Repair of Water Mains and Appurtenances:

(a) The Developer/Contractor shall be responsible for any damage to water mains and water facilities caused by his operations. The Developer/Contractor may be relieved of the responsibility under the following conditions:

(i) He has not excavated below or beyond the required excavation lines, and

(ii) He has given proper and timely notice of his work plans, and

(iii) He has used reasonable care, and cooperated, minimizing the damage.

(b) Any damage to water gates, hydrants, valve chambers, meter boxes, and other surface appurtenances that result from the Developer/Contractor's operation shall be its sole responsibility.

5.06 Flushing, Disinfecting, and Testing of Main Lines:

(1) Flushing:

(2)

(i) All new water systems or extensions to existing systems shall be thoroughly flushed before being placed in service. Flushing shall be accomplished through hydrants, or end of line blow-off assemblies

at a minimum flushing velocity of 2.5-cubic feet per second. See chart below.

FLOW RATE AND OPENINGS TO FLUSH PIPELINES (40- psi Residual Pressure)	
Pipe Size (inches)	Flow Required to Produce 2.5 fps velocity (gpm)
2	26
4	100
6	220
8	390
10	610
12	880
14	1,200
16	1,565
18	1,980
20	2,450
24	3,525
30	5,507

(b) **Disinfection:**

(i) After flushing, all culinary water lines shall be disinfected by chlorination. Chlorination shall provide a minimum of 25-ppm residual after 24-hours contact in the pipeline. 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 according to Section 1 above and, if necessary, rechlorinated until a satisfactory bacteriological test is obtained.

(ii) Disinfection shall conform to the requirements of AWWA C651-86 (or latest edition). After complete disinfection and flushing the Clinton City Public Facilities Inspector/Engineer shall be notified so a Chlorine Residual Test can be taken.

(iii) Disinfection by Granular Calcium Hypochlorite: Placement of granular calcium hypochlorite (TH perchloron, Pittchlor, etc. which is 65% available chlorine by weight) shall be put into new lines at 500-foot intervals. The following table provides information as to the required quantity of granular chlorine to be used to provide a chlorine concentration of 50 ppm.

Pipe Size (inches)	Required Amount of Granular Calcium Hypochlorite every 500 feet
6	0.48 lbs
8	0.83 lbs
10	1.30 lbs
12	1.88 lbs

After all lines are filled with water, through a temporary connection, a Public Facilities Inspector/Engineer will take a chlorine test.

(iv) Disinfection by Slurry Calcium Hypochlorite: 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. (A 1% slurry – 10,000 ppm – results from mixing one pound of calcium hypochlorite with 8.40 gallons of water.)

The following table provides information as to the required quantity of slurry to be used per 100 feet of pipe to provide a chlorine concentration of 55 ppm.

Pipe Size (in.)	Vol. of 100 ft. Length (gal)	Required Amount of 1 % Chlorine Slurry (gal)
1 ½	9.18	0.07
2	16.32	0.12
½	25.50	0.18
3	36.73	0.26
4	65.28	0.47
6	146.90	1.05
8	261.10	1.87
10	408.10	2.92
12	587.60	4.20

(3) Bacteria Test: After the disinfected line is flushed a Public Facilities Inspector/Engineer will take a bacteria test. After the bacteria samples come back satisfactory (normally 24 – 48 hours) a pressure test must be performed. Bacteria tests will only be accomplished Monday through Wednesday, on regular working days to allow for results to be accomplished prior to the end of the week.

(4) Pressure Test: All newly laid pipes or any valved section thereof shall be subjected to a hydrostatic

pressure. A leakage test shall be conducted concurrently with the pressure test.

(a) Test Pressure Restrictions: Test pressures shall:

(i) Be two (2) times the normal operating pressure as determined by the Public Facilities Inspector/Engineer;

(ii) Not exceed pipe or thrust restraint design pressures;

(iii) Be of at least 2-hour duration;

(iv) Not vary by more than plus or minus five (± 5) psi for the duration of the test;

(v) Not exceed twice the rated pressure of the valves or hydrants when the pressure boundary of the test section includes closed gate valves or hydrants;

(vi) Not exceed the rated pressure of the valves when the test boundary of the test section includes closed, resilient-seated gate valves or butterfly valves.

(b) Pressurization: Each valved section of pipe shall be slowly filled with water and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gage, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Public Facilities Inspector/Engineer.

(c) Air Removal: 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 Developer/Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged.

(d) Examination: All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound materials and the test shall be repeated until it is satisfactory to the Owner.

6. CONCRETE PIPE

6.01 GENERAL:

This section covers the requirements for concrete pipe materials and installation in sanitary sewer, storm drain, and other gravity line construction.

6.02 PIPE:

Concrete pipe used in sewer line, storm drain line and other gravity line construction shall be reinforced concrete pipe or non-reinforced concrete pipe, as required by design loading and fill heights and as follows:

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 Drawings. The minimum joint length of all pipes provided shall be 7 1/2 feet. All pipe 12-inch diameter and larger shall be reinforced concrete.

2. Non-Reinforced Concrete Pipe:

All non-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-14. Pipe class shall be as shown on the Drawings. The minimum joint length for pipe shall be four feet for pipe up to ten inches and seven and a half feet for all other pipe.

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.

4. Minimum Size and Slope Requirements:

In no case shall sanitary sewer mains be less than eight (8") inches in diameter or storm drain lines less than fifteen (15") inches in diameter. Exception: Storm drainpipes servicing a single curb inlet box may be twelve (12") inches in diameter if the flow does not exceed the pipe size. Concrete pipe shall be laid with uniform slope between manholes. All concrete pipes shall be designed and constructed to give mean velocities of not less than 2 feet per second when flowing full, based on Manning's formula using an n value of .013. Absolute minimum slope allowed shall be those published by the Utah Department of Environmental Quality, Division of Water Quality as Administrative Rules for Design Requirements for Wastewater Collection, Treatment and Disposal System, R317-3, **Table R317-3-2.3 (D)(4) Minimum Slopes**.

Whenever possible the slope should exceed 0.005 ft/ft. The pipe should be sized to meet anticipated hydraulic loads, increasing the pipe size to reduce the minimum slope requirements shall not be allowed. Sewer slopes shall not exceed 0.12 ft/ft, drop manholes shall be used when steeper slopes are needed, drop manholes shall be used to keep line grade below maximum grade allowed.

6.03 PIPE LAYING:

All concrete pipe installation shall proceed up grade 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 re-jointed 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.

6.04 GRAVEL FOUNDATION FOR PIPE:

Wherever the subgrade material does not afford a sufficiently solid foundation to support the pipe and superimposed load, or 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 concrete pipe foundation shall be clean crushed rock or gravel with one hundred percent (100%) passing a one-inch (1") screen and five percent (5%) passing a No. 4 sieve.

6.05 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 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 (1/2) inch maximum.

6.06 SPRING LINE:

All pipes shall be backfilled to the spring line with imported fill no greater than one and one-half inch (1 ½") in size.

6.07 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.

Pipe bedding materials placed at any point below the mid-point of the pipe shall be deposited and compacted in layers not to exceed ten-inches (10") in uncompacted depth. Deposition and compaction of bedding materials shall be done simultaneously and uniformly on both sides of the pipe. Compaction shall be accomplished with hand or mechanical compactors. All bedding materials shall be placed in the trench 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 or gravel, free from rocks larger than one and one-half inch (1 ½") diameter. All materials shall be free from roots, sod, or other vegetable 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-inches (12") above the top of the pipe.

Modified bedding material shall be graded as follows: One-hundred percent (100%) passing a one and one-half inch (1-1/2") screen and no more than five percent (5%) passing a No. 4 sieve.

6.08 TESTS:

The Developer/Contractor or his representative shall contract with a third party to have a video evaluation of the entire sewer/storm drain system and provide a copy of the video to the Public Works Department for evaluation. The video shall indicate manhole numbers relative to the "Approved Drawings" and a running record of the footage of the pipe being evaluated. Final approval of the installation of the pipe system will not be given until the video has been evaluated and work approved by the Public Facilities Inspector/Engineer.

In the event that the video inspection is inconclusive, any or all of the other required tests shall be conducted in the presence of the Public Facilities Inspector/Engineer or his representative. Tests shall be performed as follows:

1. **<u>Displacement Test</u>:**

   In conducting the displacement test a light will be flashed between manholes or, if the manholes have not as yet been constructed, between the locations of the manholes, by means of a flashlight or by reflecting sunlight with a mirror. If the illuminated interior of the pipe shows broken, misaligned or displaced pipe or other

defects, the defects designated by the Public Facilities Inspector/Engineer shall be remedied at the Developer/Contractor's expense.

2. Infiltration Test:

The Developer/Contractor shall furnish labor, equipment, and materials, including pumps, and shall assist the Public Facilities Inspector/Engineer in making infiltration tests of the completed line before it can be placed into service. The Developer/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 Public Facilities Inspector/Engineer. The maximum allowable infiltration shall not exceed one-hundred-fifty (150) gallons per inch diameter per mile per twenty-four hours (24 hrs) for all installed pipe. If the quantity of infiltration is in excess of the maximum allowable, the leaking joints shall be repaired to the satisfaction of the Public Facilities Inspector/Engineer at the expense of the Developer/Contractor.

3. Exfiltration Test:

The Developer/Contractor shall furnish labor, equipment, and materials, including pumps, and shall assist the Public Facilities Inspector/Engineer in making ex-filtration tests of the completed line before it can be placed into service. The length of line to be tested at one time shall be limited to the length between adjacent manholes. The maximum allowable ex-filtration shall not exceed one-hundred-fifty (150) gallons per inch diameter per mile per 24 hours for all installed pipe. The end of the line that projects into the manhole shall be plugged. The pipe shall then be filled with water from the upper manhole, and the line maintained under a light pressure of four feet (4') of head. The inflow of water necessary to maintain this head shall be recorded as the leakage of the system. If the quantity of ex-filtration is in excess of the maximum allowable, the leaking joints shall be repaired to the satisfaction of the Public Facilities Inspector/Engineer at the expense of the Developer/Contractor.

6.09 MANHOLE CONNECTIONS:

Concrete pipe connections to manholes shall be achieved by use of manhole coupling adapters, rubber gaskets, positive seal gasket system with 300 series nonmagnetic corrosion-resistant steel bands, or grouting a bell or spigot pipe at the appropriate locations. Connections shall meet the requirements of Chapter 9, Manholes.

6.10 SERVICE LATERALS:

Concrete service laterals are not permitted.

6.11 DAMAGE AND REPAIR OF EXISTING SYSTEMS AND APPURTENANCES:

The Developer/Contractor shall be responsible for the protection of existing improvements, and any damage resulting from its operations shall be its sole responsibility.

Damage to the existing systems, laterals, or appurtenances shall be repaired by acceptable and approved methods.

7. PVC PLASTIC PIPE

7.01 GENERAL:

This section covers the requirements for PVC plastic sewer and land drain pipe materials and installation in sanitary sewer, land drain, storm drain, and other gravity line construction.

7.02 PIPE:

PVC gravity sewer and land drain pipe and fittings shall conform to ASTM D-3034, for diameters from four-inch (4") to fifteen-inch (15") and ASTM F-679 for eighteen-inch (18") to twenty-seven-inch (27"), with integral bell gasket joints. Rubber gaskets shall be factory installed and conform to ASTM F-477. Pipe shall be made of PVC plastic having a cell classification of 12454A or 13364B (with minimum tensile modulus of 500,000 PSI) as defined in ASTM D-1784 and shall have a SDR of 35 and minimum pipe stiffness of 46PSI according to ASTM test D-2412.

Pipe shall be installed in compliance with ASTM D-2321 and the manufacturer's requirements.

1. Minimum Size and Slope Requirements:

In no case shall sanitary sewer or land drain mains be less than eight inches in diameter. Sewers and land drains shall be laid with uniform slope between manholes. All PVC plastic pipe systems shall be designed and constructed to give mean velocities of not less than 2 feet per second when flowing full, based on Manning's formula using an n value of .013. Absolute minimum slope allowed for sanitary sewers shall be those published by the Utah Department of Environmental Quality, Division of Water Quality as Administrative Rules for Design Requirements for Wastewater Collection, Treatment and Disposal System, R317-3, **Table R317-3-2.3 (D)(4) Minimum Slopes**.

Whenever possible the slope should exceed 0.005 ft/ft. The pipe should be sized to meet anticipated hydraulic loads, increasing the pipe size to reduce the minimum slope requirements shall not be allowed. Sewer slopes shall not exceed 0.12 ft/ft, drop manholes shall be used when steeper slopes are needed, drop manholes shall be used to keep line grade below maximum grade allowed.

7.03 FITTINGS:

Fittings shall be made of PVC plastic conforming to ASTM D-1784 and a cell classification as outlined in ASTM D-3034.

7.04 PIPE LAYING:

All pipe installation shall proceed upgrade 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.

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. Haunching material (bed to springline) should be carefully worked under the haunches of the pipe and compacted from the pipe to the trench wall or two and one half (2-1/2) pipe diameters on each side of the pipe to ensure support. If adjustment of position of a pipe length is required after being laid, it shall be removed and re-jointed as for a new pipe. When pipe 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 rigidly adhere to the specific requirements of the pipe manufacturer.

7.05 GRAVEL 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 depth as may be necessary and replaced with crushed rock or gravel compacted into place.

Gravel for PVC pipe foundation shall be clean crushed rock or gravel with one hundred percent (100%) passing a one-inch (1") screen and less than five percent (5%) passing a No. 4 sieve.

7.06 INSTALLATION REQUIREMENTS FOR LINE AND GRADE:

All PVC 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 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 (1/2) inch maximum.

7.07 PIPE BEDDING:

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.

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 mid-point of the pipe shall be deposited and compacted in layers not to exceed ten-inches (10") in uncompacted depth. Deposition and compaction of bedding materials shall be done simultaneously and uniformly on both sides of the pipe. Compaction shall be accomplished with hand or mechanical compactors. All bedding materials shall be placed in the trench with hand tools or other approved method in such a manner that they will be scattered alongside the pipe and not dropped into the trench in compact masses. Bedding materials shall be loose earth, free from lumps; sand or gravel, free from rocks larger than one-inch (1") diameter; with all materials free from roots, sod, or other vegetable 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-inches (12") above the top of the pipe.

Modified bedding material shall be graded as follows: One-hundred percent (100%) passing a one and one-half inch (1-1/2") screen and five percent (5%) passing a No. 4 sieve.

7.08 TESTS:

The Developer/Contractor will be required to conduct an exfiltration and displacement test in the presence of the Public Facilities Inspector/Engineer or his representative. If these tests prove to be inconclusive, any or all of the other required tests shall be conducted in the presence of the Public Facilities Inspector/Engineer or his representative. Tests shall be performed as follows:

1. <u>Displacement Test</u>:

In conducting the displacement test a light will be flashed between manholes or, if the manholes have not as yet been constructed, between the locations of the manholes, by means of a flashlight or by reflecting sunlight with a mirror. If the illuminated interior of the pipe shows broken, misaligned or displaced pipe or other defects, the defects designated by the Public Facilities Inspector/Engineer shall be remedied at the Developer/Contractor's expense.

2. <u>Infiltration Test</u>:

The Developer/Contractor shall furnish labor, equipment, and materials, including pumps, and shall assist the Public Facilities Inspector/Engineer in making infiltration tests of the completed system before it can be placed into service. The Developer/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 Public Facilities Inspector/Engineer. The maximum allowable infiltration shall not exceed one-hundred-fifty (150) gallons per inch diameter per mile per twenty-four hours (24 hrs) for all installed pipe. If the quantity of infiltration is in

excess of the maximum allowable, the leaking joints shall be repaired to the satisfaction of the Public Facilities Inspector/Engineer at the expense of the Developer/Contractor.

3. Exfiltration Test:

The Developer/Contractor shall furnish labor, equipment, and materials, including pumps, and shall assist the Public Facilities Inspector/Engineer in making exfiltration tests of the completed system before it can be placed into service. The length of line to be tested at one time shall be limited to the length between adjacent manholes. The maximum allowable exfiltration shall not exceed one-hundred-fifty (150) gallons per inch diameter per mile per 24 hours for all installed pipe. The end of the system line that projects into the manhole shall be plugged. The pipe shall then be filled with water from the upper manhole, and the line maintained under a light pressure of four feet (4') of head. The inflow of water necessary to maintain this head shall be recorded as the leakage of the system. If the quantity of exfiltration is in excess of the maximum allowable, the leaking joints shall be repaired to the satisfaction of the Public Facilities Inspector/Engineer at the expense of the Developer/Contractor.

4. Video Evaluation:

The Developer/Contractor or his representative shall contract with a third party to have a video evaluation of the entire PVC plastic pipe system and provide a copy of the video to the Public Works Department for evaluation. The video shall indicate manhole numbers relative to the "Approved Drawings" and a running record of the footage of the PVC plastic pipe system pipe being evaluated. Final approval of the installation of the PVC plastic pipe system will not be given until the video has been evaluated and work approved by the Public Facilities Inspector/Engineer.

7.09 MANHOLE CONNECTIONS:

PVC pipe connections to manholes shall be achieved by use of manhole coupling adapters, rubber gaskets, or positive seal gasket system with 300 series nonmagnetic corrosion-resistant steel bands. PVC may not be grouted directly to concrete. Connections shall meet the requirements of Chapter 9, Manholes.

7.10 LATERAL CONNECTIONS:

All lateral connections onto system mains shall be made through preformed tee fittings installed in the main line at the time of main line installation. Recommendations of manufacturer of the materials used shall be carefully followed.

Connections onto existing system mains shall be made with field installed service saddles (gasketed and clamped). All connections by field installed service saddles on existing system mains shall be done with a sewer tapping machine and all required fittings and materials. Connections shall be made as shown on the Standard Drawing and at the location specified herein, shown on the "Approved Drawings" or as staked in the field.

1. Sewer Service Laterals:

New sanitary sewer service laterals shall be constructed with materials and procedures as specified herein.

Existing service laterals shall be constructed with materials compatible with the existing laterals with appropriate connections for joining the ends of existing laterals. All laterals shall be four-inch (4") in diameter unless shown otherwise.

a. Extent of Sewer Laterals and Location of Laterals: New sewer laterals installed to lots shall be located ten-foot (10') uphill of the lowest front property corner. Service laterals shall extend from the sewer main to a point ten-foot (10') beyond the street right-of-way line unless shown or staked otherwise. A two-inch (2") by four-inch (4") by six-foot (6') marker, with the top twelve-inches (12") painted green, shall be installed to clearly mark the end of each lateral line. Said marker shall extend a minimum of twenty-four inches (24") above the lateral and be at least twelve-inches (12") below the surface of the rough graded lot. In addition to the marker, the Developer/Contractor shall provide to the Community Development Department a typed station (give a distance) sheet indicating the location of the lateral on the lot relative to the closest side lot line. Laterals shall be capped with a cap suitable to withstand test pressure and prevent any leakage into or out of the lateral.

b. Existing Laterals: When an existing sewer lateral is encountered along the line and grade of a new pipeline it shall be relocated using appropriate pipe and fittings and graded

to insure adequate slope to drain properly. Minimum slope shall be one-quarter-inch (1/4") per foot.

c. Excavation and Backfill: Trench excavation and backfill shall conform to the applicable paragraphs of Chapter 3 and the bedding requirements of this Chapter.

d. Pipe: Pipe used for new service or replacement laterals shall be **white** PVC Plastic Pipe conforming to the International Plumbing Code.[2]

e. Cover Over Sewer Lateral Lines: There shall be a minimum of 3 feet of cover over all sewer lateral lines (3'6" minimum at property line.)

f. Sewer Clean Outs: There shall be a maximum distance of 5 feet from the foundation wall to the first exterior clean out with a maximum distance between clean-outs of one hundred (100) feet. There shall be a clean out when a combination of bends is ninety degree (90^{o}) or greater. Sewer clean outs shall be PVC Plastic Pipe or ABS Plastic Pipe conforming to the International Plumbing Code, clean out lids shall be brass for ease of detection.[2]

g. Testing: The service laterals shall be tested as a part of the sewer main to which they are connected.

h. Magnetic Locator Tape: All pipe shall include a 3-inch magnetic locator tape installed in the pipeline trench. Tape shall run from the curb line to the end of the pipe, run up the marker board and is to be stapled in place. The tape shall be located approximately 12-inches above the pipe. Identification tape shall be furnished with white or black printing on a colored field having the words "CAUTION: SEWER LATERAL – BELOW" or other wording clearly defining the lateral approved by the Public Works Department.[2]

2. Land Drain Service Laterals:

New land drain service laterals shall be constructed with materials and procedures as specified herein.

Existing service laterals shall be constructed with materials compatible with the existing laterals with appropriate connections for joining the ends of existing laterals. All laterals shall be four-inch (4") in diameter unless shown otherwise.

a. Extent of Land Drain Laterals and Location of Laterals: New land drain laterals installed to lots shall be located a minimum of ten-foot (10') from any sanitary sewer lateral. Service laterals shall extend from the main to a point ten-foot (10') beyond the property line. A two-inch (2") by four-inch (4") by six-foot (6') marker, with the top twelve-inches (12") painted red, shall be installed to clearly mark the end of each lateral line. Said marker shall extend a minimum of twenty-four inches (24") above the lateral and be at least twelve-inches (12") below the surface of the rough graded lot. In addition to the marker, the Developer/Contractor shall provide to the Community Development Department a typed station (give a distance) sheet indicating the location of the lateral on the lot relative to the closest side lot line. Laterals shall be capped with a cap suitable to withstand test pressure and prevent any leakage into or out of the lateral.

b. Existing Land Drain Lateral: When an existing land drain lateral is encountered along the line and grade of a new pipeline it shall be relocated using appropriate pipe and fittings and graded to insure adequate slope to drain properly. Minimum slope shall be one-quarter-inch (1/4") per foot.

c. Excavation and Backfill: Trench excavation and backfill shall conform to the applicable paragraphs of Chapter 3 and the bedding requirements of this Chapter.

d. Pipe: Pipe used for new service or replacement laterals shall be **green** PVC Plastic Pipe conforming to the International Plumbing Code.[2]

e. Cover Over Land Drain Lateral Lines: There shall be a minimum of 3 feet of cover over all land drain lateral lines (3'6" minimum at property line.)

f. Land Drain Clean Outs: There shall be a maximum distance between clean-outs of one hundred (100) feet. There shall be a clean out when a combination of bends is ninety degree

(90^{o}) or greater. Land drain clean outs shall be PVC Plastic Pipe conforming to the International Plumbing Code, clean out lids shall be brass for ease of detection.[2]

g. Openings into a Land Drain: Land drains shall extend without openings under dwelling footings into gravel located under dwelling slabs. In no instance shall perforated pipe be placed where roots can infiltrate it.

h. Testing: The service laterals shall be tested as a part of the land drain main to which they are connected.

i. Introduction of Other Water Sources: Land drain systems shall not have direct connections to rain gutters, floor drains, garage drains, window wells or other sources that may contain contaminates, vegetation or silts. Sump pumps may be connected to land drains with a permit and inspection by the building department.

j. Magnetic Locator Tape: All pipe shall include a 3-inch magnetic locator tape installed in the pipeline trench. Tape shall run from the curb line to the end of the pipe, run up the marker board and is to be stapled in place. The tape shall be located approximately 12-inches above the pipe. Identification tape shall be furnished with white or black printing on a colored field having the words “CAUTION: LAND DRAIN – BELOW” or other wording clearly defining the lateral approved by the Public Works Department.[2]

7.11 DAMAGE AND REPAIR OF EXISTING SYSTEMS AND APPURTENANCES:

The Developer/Contractor shall be responsible for the protection of existing improvements, and any damage resulting from its operations shall be its sole responsibility.

Damage to the existing PVC plastic pipe system, laterals, or appurtenances shall be repaired by acceptable and approved methods.

7.12 "GO/NO-GO" MANDREL PROOF TESTING:

Not less than thirty (30) days after installation of the flexible sewer or drain pipe, the Developer/Contractor shall test the buried pipe to insure that ring-deflection of the pipe does not exceed five percent (5%) of the pipe's specified minimum inside diameter (ID). This proof test shall establish that the Developer/Contractor has installed the flexible pipe in full compliance with the Project Specifications thereby providing required pipe/soil structural strength.

The Developer/Contractor, with Inspector present, shall pull a "Go/No-Go" Mandrel, inspected and approved by the Public Facilities Inspector/Engineer, through the full length of installed flexible pipe. The Mandrel shall be fabricated from suitable metal with a minimum of nine (9) properly sized radial fins mounted upon a center-pulling shaft. In any case, the Mandrel shall be provided with an odd number of rigidly mounted radial fins. The Mandrel shall be provided with a proof-sizing ring that can demonstrate that the Mandrel's minimum outside diameter (OD) is not less than ninety-five percent (95%) of the specified minimum inside diameter of the installed flexible pipe. The Mandrel shall be pulled by the Developer/Contractor through one hundred percent (100%) of the installed flexible pipe without using mechanical equipment. Failure of the Mandrel to pass through a pipeline shall be deemed evidence of inadequate installation by the Developer/Contractor not in compliance with the Project Specifications.

The Public Facilities Inspector/Engineer may require, if deemed appropriate or necessary, additional proof testing of designated lengths of the buried flexible pipe approximately one year (1 yr.) after installation but prior to the expiration of the Developer/Contractor's Maintenance Bond. The flexible pipeline shall be cleaned adequately prior to performing the "Go/No-Go" Mandrel ring deflection proof test. The Developer/Contractor, with Inspector present, shall pull a Mandrel, approved by the Public Facilities Inspector/Engineer, through the designated length of pipeline without using mechanical equipment. Failure of the Mandrel to pass through the pipeline shall be deemed evidence of inadequate installation by the Developer/Contractor not in compliance with the Project Specifications.

8. POLYETHYLENE CORRUGATED PIPE

8.01 GENERAL:

This section covers the requirements for high-density polyethylene corrugated pipe with integrally formed smooth interior for use in land drain systems. High-density polyethylene corrugated pipe with integrally formed smooth interior shall not be used in Clinton City except in cases where the approval has been given as part of the "Approved Drawings" or the Public Facilities Inspector/Engineer during on site changes to the plans. Written documentation shall be provided to the Community Development Department for inclusion in the permanent file.

8.02 PIPE:

This specification is applicable to nominal sizes 12 - 36 inch diameter. Requirements for test methods, dimensions, and markings are those found in AASHTO Designation M-252 (3" – 10") and M-294 (12" – 48") and ASTM F-405 and F-667.

Pipe and fittings shall be made of polyethylene compounds that meet or exceed the requirements of Type III, Category 4 or 5, Grade P33 or P34, Class C per ASTM Designation D-1248 with the applicable requirements defined in ASTM D-1248. Clean reworked material may be used.

Minimum parallel plate pipe stiffness values at 5% deflection shall be as follows:

Diameter	Pipe Stiffness*
12"	45 psi
15"	42 psi
18"	40 psi
24"	34 psi
30"	28 psi *Per ASTM Test
36"	22 psi Method D-2412

The pipe and fittings shall be free of foreign inclusions and visible defects. The ends of the pipe shall be cut squarely and cleanly so as not to adversely effect joining.

The nominal size for the pipe and fittings is based on the nominal inside diameter of the pipe. Corrugated fittings maybe either molded or fabricated by the manufacturer. Fittings produced by manufacturers other than the supplier of the pipe shall not be permitted without the approval of the Public Facilities Inspector/Engineer. A manufacturers' certification that the product was manufactured, tested, and supplied in accordance with this specification shall be furnished to the Public Facilities Inspector/Engineer upon request.

Pipe installation shall be in accordance with ASTM Recommended Practice D-2321 and the manufacturer's requirements.

8.03 JOINTS:

Joints shall be made with bell and spigot meeting full ASTM D3212 and ASTM F-477 (Elastomeric gasket).

8.04 PERFORATIONS:

All perforated pipe used in the construction shall have either circular or slotted perforations. Circular perforations shall not be more that 5/16 in. nor less than 3/16 in. in diameter, and arranged in rows parallel to the axis of the pipe. Perforations shall be 3 in. center-to-center, along rows. The spigot or tongue end shall not be perforated for a length equal to the depth of the socket, or depth of the groove plus 3/4 in. and perforations shall continue at uniform spacing along the entire length of the barrel. There shall be a total of 8 rows for an 18-inch pipe. The rows shall be spaced over not more than 165 deg of circumference. Rows shall be symmetrically arranged with respect to the intended top of bottom of the pipe.

Slots shall be circumferential in direction, not more than 3/16 in. or less than 1/8 in. in width, and 3 in. long. The slots shall be spaced 6 in. apart. There shall be two rows of slots, spaced 120^{o} apart. The distance from the spigot end, or from the shoulder of the tongue end, to the first pair of slots shall be not more than 1 in. greater than the specified slot spacing, nor less than 1 in. less than the specified slot

spacing. Slots shall continue at uniform spacing along the entire length of the barrel.

8.05 PIPE LAYING:

All pipe installation shall proceed upgrade on a stable foundation, with joints closely and accurately fitted.

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

Select material shall be compacted around the pipe to firmly bed the pipe in position. Haunching material (bed to springline) should be carefully worked under the haunches of the pipe and compacted from the pipe to the trench wall, or two and one-half (2-1/2) pipe diameters on each side of the pipe, to ensure support. If adjustment of position of a pipe length is required after being laid, it shall be removed and re-jointed as for a new pipe. When pipe 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 rigidly adhere to the specific requirements of the pipe manufacturer.

8.06 GRAVEL 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 depth as may be necessary and replaced with crushed rock or gravel compacted into place.

Gravel for pipe foundation shall be clean crushed rock or gravel with one hundred percent (100%) passing a one-inch (1") screen and less than five percent (5%) passing a No. 4 sieve.

8.07 INSTALLATION REQUIREMENTS FOR LINE AND GRADE:

All 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 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 (1/2) inch maximum.

8.08 PIPE BEDDING:

Pipe bedding shall be in accordance with the manufactures requirements. Generally all pipe 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. Joint 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 mid-point of the pipe shall be deposited and compacted in layers not to exceed ten-inches (10") in uncompacted depth. Deposition and compaction of bedding materials shall be done simultaneously and uniformly on both sides of the pipe. Compaction shall be accomplished with hand or mechanical compactors. All bedding materials shall be placed in the trench with hand tools or other approved method in such a manner that they will be scattered alongside the pipe and not dropped into the trench in compact masses. Bedding materials shall be loose earth, free from lumps; sand or gravel, free from rocks larger than one and one-half inch (1-1/2") diameter; with all materials free from roots, sod, or other vegetable 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-inches (12") above the top of the pipe.

Modified bedding material shall be graded as follows: One hundred percent (100%) passing a No. 4 sieve and less than five percent (5%) passing a No. 200 sieve.

8.09 TESTS:

The Developer/Contractor will be required to conduct a displacement test in the presence of the Public Facilities Inspector/Engineer or his representative. If

this test proves to be inconclusive, other required tests shall be conducted in the presence of the Public Facilities Inspector/Engineer or his representative. The test shall be performed as follows:

1. **Displacement Test:**

   In conducting the displacement test a light will be flashed between manholes or, if the manholes have not as yet been constructed, between the locations of the manholes, by means of a flashlight or by reflecting sunlight with a mirror.

2. **Manufactures Suggested Procedures:**

   If the Public Facilities Inspector/Engineer has doubts as to the successful results of a displacement test the manufactures recommended procedures shall be followed.

3. **Test Failure:**

   If the test results show broken, misaligned, or displaced pipe or other defects, the defects designated by the Public Facilities Inspector/Engineer shall be remedied at the Developer/Contractor's expense.

8.10 MANHOLE CONNECTIONS:

Corrugated polyethylene pipe connections to manholes shall be achieved by use of manhole coupling adapters, rubber boots with 300 series nonmagnetic corrosion-resistant steel bands, or grouted directly to concrete.

8.11 LATERAL CONNECTIONS:

All lateral connections into new mains shall be through preformed tee fittings installed in the main line or with field installed service saddles. All connections by field installed service saddles on new or existing mains shall be done in accordance with manufacturer recommendations and with all required fittings and materials. Connections shall be at the locations shown in the Drawings.

9. POLYETHYLENE CORRUGATED PIPE WITH WATER TIGHT JOINTS

9.01 GENERAL:

This section covers the requirements for high-density polyethylene corrugated pipe with integrally formed smooth interior for use in storm drains with watertight joints. High-density polyethylene corrugated pipe with integrally formed smooth interior shall not be used in Clinton City except in cases where the approval has been given as part of the "Approved Drawings" or the Public Facilities Inspector/Engineer during on site changes to the plans. Written documentation shall be provided to the Community Development Department for inclusion in the permanent file.

9.02 PIPE:

This specification is applicable to nominal sizes 14 - 18 inch diameter. Requirements for test methods, dimensions, and markings are those found in AASHTO Designation M-252 (3" – 10") and M-294 (12" – 48") and ASTM F-405 and F-667.

Pipe shall be made of polyethylene compounds that meet or exceed the requirements of Type III, Category 4 or 5, Grade P33 or P34, Class C per ASTM Designation D-1248 with the applicable requirements defined in ASTM D-1248. Clean reworked material may be used.

Minimum parallel plate pipe stiffness values shall be as follows:

Diameter	Pipe Stiffness*
4"	50 psi
6"	50 psi
8"	50 psi
10"	50 psi
12"	45 psi *Per ASTM Test
15"	42 psi Method D-2412
18"	40 psi

The pipe and fittings shall be free of foreign inclusions and visible defects. For pipe sizes 12" diameter and greater, holes of any kind in the corrugation crests or sidewalls shall be considered unacceptable. The ends of the pipe shall be cut squarely and cleanly so as not to adversely effect joining.

The nominal size for the pipe and fittings is based on the nominal inside diameter of the pipe. Fittings shall be molded by the manufacturer. Fittings produced by manufacturers other than the supplier of the pipe shall not be permitted.

A manufacturer's certification that the product was manufactured, tested, and supplied in accordance with this specification shall be furnished to the Project Public Facilities Inspector/Engineer upon request.

Pipe installation shall be in accordance with ASTM Recommended Practice D-2321 and the manufacturer's requirements.

9.03 FITTINGS:

Fittings shall be molded from SDR-35 PVC pipe manufactured in accordance with the applicable requirements defined in ASTM D-3034.

9.04 JOINTS:

Joints shall be made with bell and spigot meeting full ASTM D3212 and ASTM F-477 (Elastomeric gasket).

9.05 PIPE LAYING:

All pipe installation shall proceed upgrade on a stable foundation, with joints closely and accurately fitted.

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

Select material shall be compacted around the pipe to firmly bed the pipe in position. Haunching material (bed to springline) should be carefully worked under the haunches of the pipe and compacted from the pipe to the trench wall or two and one half (2-1/2) pipe diameters on each side of the pipe to ensure support. If adjustment of position of a pipe length is required after

being laid, it shall be removed and re-jointed 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 rigidly adhere to the specific requirements of the pipe manufacturer.

9.06 GRAVEL FOUNDATION FOR PIPE:

Wherever the subgrade material does not afford a sufficiently solid foundation to support the pipe and superimposed load, or 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 pipe foundation shall be clean crushed rock or gravel with one hundred percent (100%) passing a one-inch (1") screen and less than five percent (5%) passing a No. 4 sieve.

9.07 INSTALLATION REQUIREMENTS FOR LINE AND GRADE:

All 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 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 (1/2) inch maximum.

9.08 PIPE BEDDING:

All pipe systems and drains 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. Joint 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 mid-point of the pipe shall be deposited and compacted in layers not to exceed ten-inches (10") in uncompacted depth. Deposition and compaction of bedding materials shall be done simultaneously and uniformly on both sides of the pipe. Compaction shall be accomplished with hand or mechanical compactors. All bedding materials shall be placed in the trench with hand tools or other approved method in such a manner that they will be scattered alongside the pipe and not dropped into the trench in compact masses. Bedding materials shall be loose earth, free from lumps; sand or gravel, free from rocks larger than one and one-half inch (1-1/2") diameter; with all materials free from roots, sod, or other vegetable 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-inches (12") above the top of the pipe.

Modified bedding material shall be graded as follows: One-hundred percent (100%) passing a No. 4 sieve and less than five percent (5%) passing a No. 200 sieve.

9.09 TESTS:

The Developer/Contractor will be required to conduct an exfiltration and displacement test in the presence of the Public Facilities Inspector/Engineer or his representative. If these tests prove to be inconclusive, any or all of the other required tests shall be conducted in the presence of the Public Facilities Inspector/Engineer or his representative. Tests shall be performed as follows:

1. **Displacement Test:**

   In conducting the displacement test a light will be flashed between manholes or, if the manholes have not as yet been constructed, between the locations of the manholes, by means of a flashlight or by reflecting sunlight with a mirror. If the illuminated interior of the pipe shows broken, misaligned or displaced pipe or other defects, the defects designated by the Public Facilities Inspector/Engineer shall be remedied at the Developer/Contractor's expense.

2. **Infiltration Test:**

   The Developer/Contractor shall furnish labor, equipment, and materials, including pumps, and shall assist the Public Facilities Inspector/Engineer in making infiltration tests of

the completed line before it can be placed into service. The Developer/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 Public Facilities Inspector/Engineer. The maximum allowable infiltration shall not exceed one-hundred-fifty (150) gallons per inch diameter per mile per twenty-four hours (24 hrs) for all installed pipe. If the quantity of infiltration is in excess of the maximum allowable, the leaking joints shall be repaired to the satisfaction of the Public Facilities Inspector/Engineer at the expense of the Developer/Contractor.

3. Ex-filtration Test:

The Developer/Contractor shall furnish labor, equipment, and materials, including pumps, and shall assist the Public Facilities Inspector/Engineer in making ex-filtration tests of the completed line before it can be placed into service. The length of line to be tested at one time shall be limited to the length between adjacent manholes. The maximum allowable ex-filtration shall not exceed one-hundred-fifty (150) gallons per inch diameter per mile per 24 hours for all installed pipe. The end of the line that projects into the manhole shall be plugged. The pipe shall then be filled with water from the upper manhole, and the line maintained under a light pressure of four feet (4') of head. The inflow of water necessary to maintain this head shall be recorded as the leakage of the system. If the quantity of ex-filtration is in excess of the maximum allowable, the leaking joints shall be repaired to the satisfaction of the Public Facilities Inspector/Engineer at the expense of the Developer/Contractor.

4. Video Evaluation:

The Developer/Contractor or his representative shall contract with a third party to have a video evaluation of the entire system and provide a copy of the video to the Public Works Department for evaluation. The video shall indicate manhole numbers relative to the “Approved Drawings” and a running record of the footage of the pipe being evaluated. Final approval of the installation of the system will not be given until the video has been evaluated and work approved by the Public Facilities Inspector/Engineer.

9.10 MANHOLE CONNECTIONS:

Corrugated polyethylene pipe connections to manholes shall be achieved by use of manhole coupling adapters, rubber boots with 300 series nonmagnetic corrosion-resistant steel bands, or grouted directly to concrete.

9.11 LATERAL CONNECTIONS:

All lateral connections into new mains shall be through preformed tee fittings installed in the main line or with field installed service saddles. All connections by field installed service saddles on new or existing mains shall be done in accordance with manufacturers recommendations and with all required fittings and materials. Connections shall be at the locations shown in the Drawings.

9.12 "GO/NO-GO" MANDREL PROOF TESTING:

Not less than thirty (30) days after installation of the flexible polyethylene corrugated pipe or drain pipe, the Developer/Contractor shall test the buried pipe to insure that ring-deflection of the pipe does not exceed five percent (5%) of the pipe's specified minimum inside diameter (ID). This proof test shall establish that the Developer/Contractor has installed the flexible pipe in full compliance with the Project Specifications thereby providing required pipe/soil structural strength.

The Developer/Contractor, with Inspector present, shall pull a "Go/No-Go" Mandrel, inspected and approved by the Public Facilities Inspector/Engineer, through the full length of installed flexible pipe. The Mandrel shall be fabricated from suitable metal with a minimum of nine (9) properly sized radial fins mounted upon a center-pulling shaft. In any case, the Mandrel shall be provided with an odd number of rigidly mounted radial fins. The Mandrel shall be provided with a proof-sizing ring that can demonstrate that the Mandrel's minimum outside diameter (OD) is not less than ninety-five percent (95%)of the specified minimum inside diameter of the installed flexible pipe. The Mandrel shall be pulled by the Developer/Contractor through one-hundred percent (100%) of the installed flexible pipe without using mechanical equipment. Failure of the Mandrel to pass through a pipeline shall be deemed evidence of inadequate installation by the Developer/Contractor not in compliance with the Project Specifications.

The Public Facilities Inspector/Engineer may require, if deemed appropriate or necessary, additional proof testing of designated lengths of the buried flexible

pipe approximately one year (1 yr) after installation but prior to the expiration of the Developer/Contractor's Maintenance Bond. The flexible pipeline shall be cleaned adequately prior to performing the "Go/No-Go" Mandrel ring deflection proof test. The Developer/Contractor, with Inspector present, shall pull a Mandrel, approved by the Public Facilities Inspector/Engineer, through the designated length of pipeline without using mechanical equipment. Failure of the Mandrel to pass through the pipeline shall be deemed evidence of inadequate installation by the Developer/Contractor not in compliance with the Project Specifications.

10. MANHOLES

10.01 GENERAL:

This division covers the requirements for manhole materials and installation. Manholes shall be installed at the locations and at the depth shown on the drawings. Manholes shall be furnished complete with cast-iron rings and covers. These requirements apply to all manholes unless specifically detailed otherwise.

10.02 CONCRETE BASE:

Unless otherwise noted manhole bases shall be precast and shall have pipe inverts and a resilient connection between pipe and manhole for each pipe connecting to the manhole.

Where piped lines pass through or enter manholes, the invert channels shall be smooth and semi-circular in cross section, conforming to the details shown on the Drawings. Changes of direction of flow within the manholes shall be made with a smooth curve with as long a radius as possible. The floor of the manhole outside the flow channels shall be smooth and slope toward the channel at not less than one-half inch (1/2“) per foot.

Concrete pipe connections to manholes shall be achieved by use of manhole coupling adapters, rubber gaskets, positive seal gasket system, or grouting a bell or spigot pipe at the appropriate locations. Rubber gaskets or boots shall be made of rubber compound meeting ASTM C-923 Specifications for resilient connections between pipe and manhole. They shall meet all other applicable ASTM specifications, including ASTM F-477.

Positive seal gasket systems boot shall have a wall thickness of three-eighths inch (3/8”). 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 (take-up clamp) shall be supplied and used to clamp and seal the boot to the pipe. The band shall be made of 300 series nonmagnetic corrosion-resistant steel. After the band has been placed, it shall be completely coated with a bituminous material approved by the Public Facilities Inspector/Engineer.

PVC pipe connections to manholes shall be achieved by use of manhole coupling adapters, rubber gaskets, or positive seal gasket system. PVC may not be grouted directly to concrete.

The maximum size pipe that can be used in a 48-inch manhole is twenty-four (24”) inch PVC or twenty-one (21”) inch concrete. For pipes larger than these require a 60-inch manhole or concrete box.

Concrete for manhole bases shall comply with the requirements of Chapter 12, Portland Cement Concrete, of these Specifications.

10.03 MANHOLE SPACING:[2]

Manholes shall be spaced a maximum of 500 feet apart or whenever there is a change in direction as outlined in this ordinance.

10.04 MANHOLE SIZE:

1. **Sanitary Sewer:**

   Whenever a sewer main changes direction 135° or less in a manhole or where more than two mains come together in a manhole the manhole shall be 60” diameter. Manholes that are spaced for clean out distance requirements and the sewer main is straight through the manhole shall be 48”. Dead end manholes, as in the case of a cul-de-sac where laterals enter into the manhole the manhole shall be 60”.[2]

2. **Land Drain:**

   Whenever a land drain main changes direction 135° or less in a manhole or where more than two mains come together in a manhole the manhole shall be 60” diameter. Manholes that are spaced for clean out distance requirements and the land drain main is straight through the manhole shall be 48”. Dead end manholes, as in the case of a cul-de-sac where laterals enter into the manhole the manhole may be 48”.[2]

10.05 WALL AND CONE SECTIONS:

1. Precast:

All manholes shall be precast, sectional, reinforced concrete pipe of forty-eight-inch (48") or sixty-inch (60") diameter as specified. Both cylindrical and taper sections shall conform to all requirements of ASTM Designation C-478-88 (or latest revision) for Precast Reinforced Concrete Manhole Sections.

EXCEPTIONS:

a. The throat section of the manhole shall be adjustable, by use of manhole sections, up to forty-eight inches (48") in height.

b. The taper section shall be a maximum of thirty-six inches (36") in height for 48-inch manholes and thirty-nine inches (39") for 60-inch manholes, shall be of eccentric conical design, and shall taper uniformly to thirty inches (30") inside diameter.

c. The pipe used in the base section shall be furnished in section lengths of one, two, three, and four-feet (1, 2, 3, and 4 feet) as required.

All joint surfaces of precast sections and the face of the manhole base shall be thoroughly cleaned and wet prior to setting precast sections. All joints, including grade rings, shall be set in mortar or butyl rubber gasket. The mortar shall consist of one (1) part cement and one and one-half (1-1/2) parts sand with sufficient water added to bring the mixture to workable consistency or the joints shall be sealed with a butyl rubber gasket that is permanently flexible and non-shrinking. All joints shall be water tight and free from appreciable irregularities in the interior wall surface.

2. Manholes Shall Be Furnished With Steps:

The steps are to be made of co-polymer polypropylene. The co-polymer polypropylene used shall conform to ASTM D-4101-82 PP200B33450Z02. The steel used in manufacturing of this product shall be a deformed ½" reinforcing rod. This material shall be grade 60 and conform to the requirements of ASTM A-615.

10.06 DROP MANHOLES:

When the difference in elevation of an incoming sewer is 24-inches or greater a drop manhole shall be used. The drop manhole shall be constructed as shown in the Standard Drawings. The piping from the wye to the manhole on both legs shall be ductile iron or PVC pipe with appropriate fittings. If the sewer main that the drop manhole is a part of is concrete, then a transition coupling (Fernco) shall be used to connect the main with the drop pipe assembly.

The drop pipe assembly shall be encased in flowable fill. The flowable fill shall be placed to the minimum thickness as shown on the Standard Drawings.

1. Cement:

Use Portland Cement, Type II per Chapter 12, Portland Cement Concrete.

2. Fly Ash:

Supply fly ash that complies with ASTM C-618 Class F except that the loss on ignition must be 3 percent or less.

3. Fine Aggregate:

Use natural sand. The sand shall meet the following gradation when tested in accordance with AASHTO T-27.

Fine Aggregate

Sieve Size	Percent Passing
No. ¾	100
No. 100	0-10

4. Mix Design:

The mix design shall meet the following requirements:

a. Mix design compressive strength (28 day) – between 50 to 150 psi.

b. Portland Cement – at least 50 pounds per cubic yard.

c. Fly Ash – at least 300 pounds per cubic yard.

d. Slump – 6 to 10 inches maximum.

10.07 MANHOLE RINGS AND COVERS:

All iron casting shall conform to the requirements of ASTM Designation A-48 (Class 35) for gray iron castings, free from blowholes and shrinkage defects. Castings shall be free from fins and burrs and shall be shot-blasted to remove sand and other foreign matter.

Rings and covers shall be equal to the twenty-four inch (24") Standard circular, with machined bearing surfaces, gravity, solid, non-rocking type. The minimum weight of the cover shall be one hundred sixty (160) pounds. The minimum weight of the ring shall be two hundred eighty (280 lbs.). **Other than sanitary sewer manhole lids, which shall be the vented type each cover shall contain one (1) pick hole but shall not contain air vent holes**. The tops of the cover and ring shall be flush and there shall be 1/8-inch clearance between the cover and the ring. In addition to the foundry name and year of manufacture, the cover shall be marked "SEWER," "STORM DRAIN," "DRAIN," or "IRRIGATION" as appropriate.

1. Setting of Manhole Frames and Covers:

Manhole rings shall be set in place with the shaft in Kent Seal. Covers shall be set to the finished grade and contour of the existing street. Rings and covers shall be protected during backfilling and compaction of the soil and during the placing or replacing of road surfaces. Any rings or covers loosened from the manhole sections shall be reset in cement mortar and any rings or covers damaged or broken shall be replace by the Developer/Contractor at its expense. Manholes placed in asphalt surfacing shall be constructed such that the cast iron ring is one-sixteenth inch (1/16") lower than the pavement. Brick shall not be used to raise the manhole. Cones shall not be broken out to lower the ring to meet the road grade. Sections shall be removed and grade rings or adapter rings (riser) used.

10.08 CONNECTIONS TO EXISTING SYSTEMS:

Manholes used to connect into an existing system shall be plumb and centered on the existing pipe at the elevation designated and the base placed as specified. Care shall be taken not to disturb the alignment of the existing system.

The cutting of the existing pipe shall be done in the presence of the Public Facilities Inspector/Engineer. The cut shall be full area of the new pipe and shall be finished so as to leave no projections that will restrict the flow or catch solids.

Every precaution shall be taken to prevent any material from entering the main. Any such materials entering the system shall be removed.

10.09 INCOMING SEWER LINES:

In no case shall an incoming sanitary sewer be allowed to drop more that 24-inches to the base. Sewer lines where the grade is higher than 24-inches above the existing base; a drop manhole connection shall be used. In all cases the base shall have a channel for the incoming sewage.

11. VALVES, COUPLINGS, AND FIRE HYDRANTS

11.01 GENERAL:

This section covers distribution valves to be used in the water system, couplings, and fire hydrants.

11.02 RESILIENT SEATED GATE VALVE:

Valves in sizes 4" through 12" shall be of the iron body, non rising bronze stem, resilient seated type, manufactured to equal or exceed all applicable AWWA standards of C-509 latest revision and all specific requirements outlined in these specifications.

a. Valves shall open left and be provided with 2" square operating wrench nuts unless otherwise specified.

b. When valves have Mechanical Joints, they shall be furnished with all necessary glands, followers, and bolts and nuts to complete installation.

c. The disc shall have integrally cast ASTM B-62 bronze stem nut to prevent twisting, binding or angling of the stem. Designs with loose stem nuts are not acceptable.

d. Bronze valve stems shall be interchangeable with stems of the double disc valves of the same size, direction of opening and manufacture.

e. All internal ferrous surfaces shall be coated, holiday free, to a minimum thickness of 4 mills with a two part thermo setting epoxy coating. Said coating shall be non-toxic, impart no taste to the water, formulated from materials deemed acceptable in the Food and Drug Administration Document Title 21 of the Federal Regulations on food additives, Section 121.2514 entitled Resins and Polymeric Coatings. It shall protect all seating and adjacent surfaces from corrosion and prevent build-up of scale or tuberculation.

f. The sealing element shall be secured to the disc with self-locking stainless steel screws, and it shall be field replaceable, and shall be such that it cannot be installed improperly.

g. Stem failure from excessive torque in either the open or closing position shall occur externally at such a point as to enable the stem to be safely turned by use of a readily available tool after exposure of the valve through excavation.

h. Valve design shall incorporate a positive metal-to-metal stop to prevent over-compression of the sealing element.

i. A full-faced composition gasket placed between machined body and bonnet flanges is required to eliminate cold flow or creep action present with "O" ring gasketed bodies.

j. Valves shall have a test plug in the bonnet area to vent air and allow line pressure testing.

k. The exterior of the valves shall be Asphalt Varnish, JAN-P-450. If exterior epoxy is used, all bolts and nuts shall be made of Stainless Steel to prevent galvanic corrosion of said nuts and bolts due to insulation from the ferrous valve and line.

11.03 BUTTERFLY VALVE:

All butterfly valves shall conform to the latest revision of AWWA Standard C-504, Class 150-B, and comply with the following:

a. Valve bodies shall be cast iron, ASTM A-126 Class B. Body ends shall be flanged with facing and drilling in accordance with ANSI B16.1, Class 125; or mechanical joint in accordance with AWWA C-111. All mechanical joint end valves shall be furnished complete with joint accessories (bolts, nuts, gaskets, and glands). All valves shall conform to AWWA Standard C-504, Table 3, Laying Lengths for Flanged Valves and Minimum Body Shell Thickness for all Body Types.

b. Valve disc shall be ductile iron ASTM A-536, grade 65-45-12. Valve disc shall be of

the offset design providing 360 degree uninterrupted seating.

c. The resilient seat shall be natural rubber bonded to an 18-8, Type 304 stainless steel retaining ring secured to the disc by 18-8, Type 304 stainless steel screws. The seat shall be capable of mechanical adjustment in the field and field replaceable without the need for special tools. Valve body seat shall be 18-8, Type 304 Stainless Steel.

d. Valve shafts shall be 18-8, Type 304 stainless steel. Shafts shall be of the two-piece stub design and attached to the disc by means of "O" ring sealed taper pins with lock nuts.

e. The valve assembly shall be furnished with a non-adjustable factory set thrust bearing designed to center the valve disc at all times.

f. Shaft bearings shall be contained in the integral hubs of the valve body and shall be self-lubricated sleeve type.

g. Valve shaft seal shall consist of "O" Rings. Where the valve shaft projects through the valve body for actuator connection, the "O" Ring packing seal shall be field replaceable as a part of a removable bronze cartridge.

h. When manual actuators are required they shall be of the traveling nut design capable of withstanding 450 foot pounds of input torque against the open and closed stops. All actuators shall have adjustable mechanical stop limits. The closed position stop shall be externally adjustable. Valves shall be installed with the shaft horizontal unless otherwise directed by the Public Facilities Inspector/Engineer and shall be provided with a 2-inch square operating nut for manually operating the valve with a "T" handle wrench.

i. All valves shall be coated with epoxy in conformance to AWWA Standard C-550, latest revision. Interior wetted ferrous surfaces shall be coated nominal 10 mils thick for long life; and body exterior shall have a minimum of 3 to 4 mils coating thickness in order to provide superior base for field-applied finish coats.

11.04 VALVE BOXES:

All buried valves shall be installed complete with two-piece, cast iron, telescoping type, 5-1/4-inch shaft valve box. The lid shall have the words "Water" cast in the metal.

Valves and valve boxes shall be installed where shown on the drawings. Valves and valve boxes shall be set plumb. Valve boxes shall be centered directly over the valve. Valves shall be aligned with property lines where possible. Earth fill shall be carefully tamped around the valve box to a distance of four (4) feet on all sides of the box, or to the undisturbed trench face if less than four (4) feet. Valves shall have the interiors cleaned of all foreign matter before installation. All valve boxes located in streets shall be installed to grade. Valves placed in asphalt surfacing shall be constructed such that the cast iron ring is one-sixteenth inch (1/16”) lower than the pavement.

Valve boxes in off-road areas shall extend six (6) inches above grade.

11.05 COUPLINGS:

Couplings shall be equal to the product of Smith-Blair or Dresser with ductile iron couplings being used on all ductile iron and PVC pipe. Couplings shall be of the straight, transition, or reducing style as required by the specific installation. Where the coupling is used to join a ductile iron line to a PVC line appropriate transition gaskets will be used. All steel fittings and bolts shall be coated with a non-oxide coating and wrapped with polyethylene as outlined in § 3.02.D above.

11.06 FIRE HYDRANTS:

Fire hydrants shall be "traffic model" type designed to conform to AWWA Specification C-502 and shall be of the compression type. Hydrants shall be Mueller "Super Centurion 200" or equal.

Hydrant valves shall be a minimum of 9-inch size. Hydrants shall be supplied complete with two 2 1/2-inch hose nozzles and one 4 1/2-inch pumper nozzle. All nozzles shall be provided with National Standard Threading. A one cubic yard gravel sump shall be provided at each hydrant. All hydrants shall be mechanical joint end and shall be connected to the main by means of a mechanical joint by flanged tee and flanged by mechanical joint auxiliary gate valve and box as shown on the Standard Drawings. Each hydrant shall also be supplied with O-ring seals, a

National Standard pentagon operating nut that is designed for clockwise rotation closing, and a 9-inch mechanical joint inlet. All hydrants shall be flanged and be connected to a gate valve that is "flanged x mechanical joint" and shall be connected to the main line by a "tee' that is mechanical joint.

11.07 BLOWOFF VALVE:

A blow-off valve is required on the culinary system in cul-de-sac's and in temporary dead-end streets. The installation in cul-de-sacs shall be permanent and shall come off the end of the culinary water line. On temporary dead-ended streets the connection shall be made using a main size by three-inch MJ tee.

The blow-off valve shall be a Mueller 2" x 3' bury A-410 hydrant with a stop and waste two-inch (2") Mueller Mark II Oriseal Valve shut-off and two-and-one-half-inch (2 ½") hose nozzle.

The blow off will be placed in a standard water meter box eighteen-inches (18") in diameter by thirty-inches (30") high-corrugated plastic with groves to fit over the inlet and outlet lines. The cover is to be a D&L eighteen-inch (18") ring cover with a raised cast center rim.

The cover is to be three-eighths-inch (3/8") above top back of curb-centered two-and-one-quarter-feet (2.25') from the back of curb.

12. EARTHWORK

12.01 GENERAL:

This section defines the requirements for excavation and backfill for structures, construction requirements of earth embankments and earth fills, and subgrade preparation required by the Standard Drawings and Specifications.

12.02 EXCAVATION FOR STRUCTURES:

Where suitable subgrade soils exist, structures shall be founded on undisturbed original subsoil. All unauthorized excavation below the specified subgrade shall be replaced with concrete, monolithic with that of the slab above or with coarse gravel thoroughly compacted into place.

Subgrade soils for structures not suitable for proper support shall be replaced with firm, dense, thoroughly compacted and consolidated material free from mud and muck. Coarse gravel or crushed stone may be used for subsoil reinforcement if satisfactory results can be obtained thereby. Such material shall be applied in thin layers, 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 specified subgrade elevation.

12.03 GRANULAR FOUNDATION BORROW:

Granular foundation borrow shall be compacted to not less than 95% of maximum dry density as determined by ASTM D-1557.

12.04 BACKFILL AROUND STRUCTURES:

No backfilling around or behind structures shall be initiated until the concrete is fully cured for **seven days**. Backfill around structures shall be placed to the lines shown on the 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. Hand compacted fill, including fill compacted by manually directed power tampers, shall be placed in layers whose thickness before compaction is not greater than four (4) inches. Material for backfilling shall consist of suitable excavated material or imported sand, gravel, or other suitable material with no rocks whose greatest dimension is larger than two (2) inches.

Fill shall be placed in a manner that will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure. 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 D1557.

12.05 CONSTRUCTION OF EMBANKMENTS AND FILLS:

1. Foundation Preparation:

Earth fill for foundations shall have unsuitable materials, such as weeds, sod, roots larger than 1/4-inch in diameter, vegetation, or other organic material removed by clearing, stripping, and/or grubbing. Except as otherwise specified, earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of six inches. The moisture content of the loosened material shall be controlled as specified for the earth fill, and the surface materials of the foundation shall be compacted and bonded with the first layer of earth fill as specified for subsequent layers of earth fill.

Earth abutment surfaces shall be free of loose, uncompacted earth in excess of 2 inches in depth normal to the slope and shall be at such moisture content that the earth fill can be compacted against them to affect a good bond between the fill and the abutments.

Rock foundation and abutment surfaces shall be cleared of all loose material by hand or other effective means and shall be free of standing water when fill is placed upon them. Occasional

rock outcrops in earth foundations for earth fill, except in dams and other structures designed to restrain the movement of water, shall not require special treatment if they do not interfere with compaction of the foundation and initial layers of the fill or the bond between the foundation and the fill.

2. Placement:

Fill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the Public Facilities Inspector/Engineer and any Regulatory Agency having authority over the project. Fill shall not be placed upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.

Fill shall be placed in approximately horizontal layers. The thickness of each layer before compaction shall not exceed the maximum thickness specified. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted. Hand compacted fill, including fill compacted by manually directed power tampers, shall be placed in layers whose thickness before compaction is not greater than four (4) inches. All rock whose greatest dimension is larger than two-inch (2") shall be removed from the material receiving compaction by manually directed power tampers.

Earth fill designed to restrain the movement of water shall be placed so as to meet the following additional requirements:

a. The distribution of materials throughout each zone shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material.

b. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill, to a depth of not less than 2 inches before the next layer is placed.

c. The top surfaces of embankments shall be maintained approximately level during construction, except that a crown or cross-slope of not less than 2 percent shall be maintained to ensure effective drainage, and except as otherwise specified for drain fill zones. If the Drawings or specifications require or the Public Facilities Inspector/Engineer directs that fill be placed at a higher level in one part of the embankment than another is, the top surface of each part shall be maintained as specified above.

d. Dam embankments shall be constructed in continuous layers from abutment to abutment except where openings to facilitate construction of inlet and outlet pipes are specifically authorized in the contract.

e. Embankments built at different levels as described in 3 and 4 shall be constructed so that the slope of the bonding surfaces between the embankment in place and embankment to be placed is not steeper than 2 feet horizontal to 1-foot vertical. The bonding surface of the embankment in place shall be stripped of all loose material, scarified, moistened and recompacted when the new fill is placed against it. This is needed to ensure a good bond with the new fill, to obtain the specified moisture content and specified density at the junction of the in-place and new fill.

3. Borrow:

When the embankment or fill exceeds the amount of excavation, sufficient additional material shall be obtained from borrow pits provided by the Developer/Contractor. All material proposed to be imported shall be subject to the review and approval of the Public Facilities Inspector/Engineer prior to starting of hauling operations.

The materials used for embankment and fill construction shall be free from sod, grass, roots larger than 1/4-inch diameter, trash, clods, rocks larger than six inches in diameter, and all other material unsuitable for construction of compacted fills. Rotomilled asphalt meeting the large rock requirement may be used as borrow.

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.

12.06 COMPACTION OF MATERIALS:

The material shall be deposited in horizontal layers having a thickness of not more than eight-inches (8")

prior to being compacted as hereinafter specified. The distribution of materials shall be such that the compacted material will be homogeneous and free from lenses, pockets, or other imperfections.

During placement and compaction of fill, the moisture content of the materials being placed shall be maintained within the specified range, and the moisture content shall be uniform throughout the layers. Disking, blading or other approved methods prior to compaction of the layer shall obtain uniform moisture distribution. The moisture shall be controlled at a level to permit compaction of the fill as specified, but in no case greater or less than two percent plus or minus of the optimum moisture as determined by AASHTO T-99.

The application of water to the fill materials shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement on the fill, if necessary.

Material that is too wet when deposited on the fill shall either be removed or dried to specified moisture content prior to compaction.

If the top surface of the preceding layer, a foundation or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond it shall be scarified and moistened by sprinkling to the required moisture content prior to placement of the next layer of fill.

When the material has been conditioned as here in before specified the backfill or embankment shall be compacted to a minimum of 96% of maximum dry density as determined by AASHTO T-99. Densification of earth fill shall be performed by equipment designated solely for that purpose. Each layer of fill shall be compacted as necessary to make the density of the fill matrix not less than the minimum density specified. The fill matrix is defined as the portion of the fill material finer than the maximum particle size used in the compaction test method specified.

1. **<u>Under Roadways</u>:**

   Under roadways and extending one foot beyond the proposed curb-line the fill or embankment material shall be compacted to a minimum of 96% of maximum density specified above.

2. **<u>Under Sidewalks and Driveways</u>:**

   Under sidewalks and driveways extending one foot each side of the edge of slab the fill or embankment material shall be compacted to a minimum of 96% of maximum density specified above.

12.07 REMOVAL AND PLACEMENT OF DEFECTIVE FILL:

Fill placement at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the specifications shall be reworked to meet the requirements or removed and replaced with acceptable fill. The replacement fill and the foundation, abutment and fill surfaces upon which it is place shall conform to all requirements of this specification for foundation preparation, approval, placement, moisture control and compaction.

13. PORTLAND CEMENT CONCRETE

13.01 GENERAL:

The work shall consist of furnishing, forming, placing, finishing, and curing Portland cement concrete, as required.

13.02 MATERIALS:

1. <u>Portland Cement</u>:

<u>Portland cement</u> shall be Type II and shall comply with the Standard Specification for Portland Cement, ASTM C-150.

If air-entraining cement is to be used, the Developer/Contractor shall furnish the manufacturers written statement giving the source, amount and brand name of the air-entraining addition.

Cement shall be stored in such a manner as to be protected from weather, dampness or other destructive agents. Cement that is partially hydrated or otherwise damaged will be rejected.

2. <u>Aggregate</u>:

Aggregates shall conform to Tentative Specifications for Concrete Aggregates, ASTM C-33 for the specified sizes. Aggregates that fail to meet any requirement may be accepted only when: (1) the specified alternate conditions of acceptance can be proved prior to the use of the aggregates on the job and within a period of time such that no work under the contract will be delayed by the requirements of such proof; or, (2) the specification for concrete expressly contains a provision of special mix requirements to compensate for the effects of the deficiencies.

The potential reactivity of aggregates with the alkalis in cement shall be evaluated by petrographic examination and, where applicable, the chemical method of test, ASTM Designation C 289, or by the results of previous tests or service records of concrete made from similar aggregates from the same source. The standards for evaluating potential reactivity shall be as described in ASTM Specification C-33, Appendix A1. Aggregates indicated by any of the above to be potentially reactive shall not be used, except under one of the following conditions:

a. Applicable test results of mortar bar tests, made according to ASTM Method C-227, are available which indicate an expansion of less than 0.10 per cent at six months in mortar bars made with cement containing not less than 0.8 per cent alkalis expressed as sodium oxide; or

b. Concrete made from similar aggregates from the same source has been demonstrated to be sound after 3 years or more of service under conditions of exposure to moisture and weather similar to those anticipated for the concrete under these specifications.

Aggregates indicated to be potentially reactive, but within acceptable limits as determined by mortar bar test results or service records, shall be used only with "low alkali" cement, containing less than 0.60 per cent alkalis expressed as sodium oxide.

Aggregate of each class and size shall be stored and handled by methods that prevent segregation of particle sizes or contamination by intermixing with other materials.

3. <u>Water</u>:

Water shall be cleaned and free from injurious amounts of oil, salt, acid, alkali, organic matter or other deleterious substances.

4. Air-entrainment:

Air-entraining agent shall be used in all concrete exposed to the weather. The agent shall conform to ASTM Designation C-175 and C-260, except that the relative durability factor in the freezing and thawing test shall be not less than 95.

5. Steel Reinforcement:

Steel reinforcement shall be free from rust, oil, grease, dirt, paint or other deleterious matter.

Steel bars for concrete reinforcement requiring bends shall be deformed billet-steel bars conforming to ASTM Specification A-615, Grade 40 or Grade 60. Straight steel bars shall be deformed bars conforming to one of the following specifications:

a. Deformed Billet-Steel Bars for Concrete Reinforcement (Grade 40 or Grade 60) - ASTM Designation A-615.

b. Rail-Steel Deformed Bars for Concrete Reinforcement (Grade 50 or Grade 60) - ASTM Designation A-616.

c. Axle-Steel Deformed Bars for Concrete Reinforcement (Grade 40 or Grade 60) - ASTM Designation A-617.

d. Fabricated Steel bar mats shall conform to the requirements of ASTM Specification A-184.

e. Welded steel wire fabric reinforcement shall conform to the requirements of ASTM Specification A-185.

f. Welded deformed steel wire fabric for concrete reinforcement shall conform to the requirements of ASTM Specification A-497.

g. Cold-drawn steel wire reinforcement shall conform to the requirements of ASTM Specification A-82.

h. Deformed steel wire for concrete reinforcement shall conform to the requirements of ASTM Specification A-496.

i. Gages, spacing and arrangement of wires in welded steel wire fabric shall be as defined in ACI Standard 315 of the American Concrete Institute for the specified style designations.

j. Steel reinforcement stored at the site of the work shall be stored above the ground surface on platforms, skids or other supports and shall be protected from mechanical injury and corrosion.

6. Admixtures:

Water-reducing and set-retarding admixtures shall conform to the requirements of ASTM Specification C-494, except that resistance to freezing and thawing shall be determined in all cases, and the minimum relative durability factor shall be 95.

Admixtures shall be Type A, Water-Reducing or Type D, Water-Reducing and Retarding, as defined in ASTM Specification C-494.

When added, in the manner and amount recommended by the manufacturer, to the concrete used on the job, with no change in the cement content or proportions of the aggregates, admixtures shall have the following effects:

a. Type A or Type D: The water content at the required slump shall be at least 5 per cent less with the admixture than without. The air content shall remain within the range specified, but shall not exceed 8 per-cent in any case.

b. Type D: The time of initial setting, determined as prescribed in ASTM C-494, shall be from 1 to 3 hours longer with the admixture than without.

7. Curing Compound:

Curing compound for concrete shall meet the requirements of ASTM Specification C-309. Unless otherwise specified, the compound shall be Type 2.

All curing compound shall be delivered to the site of the work in the original container bearing the name of the manufacturer and the brand name. The compound shall be stored in a manner to

prevent damage to the containers and to protect water-emulsion types from freezing.

13.03 CLASS OF CONCRETE:

For the purpose of practical identification, concrete has been divided into four classes: Class AA(AE), A(AE), B(AE) and C(AE). The specific use for each Class is identified in the Chapter in which the concrete is used. The symbol (AE) designates air-entrainment. Basic requirements for each class are as follows:

Concrete	Maximum Net Class Of Water Content (gallons/bag)	Minimum Cement Content (bags/cu.yd.)	Minimum 28-day Comp Strength (psi)
AA (AE)	5	6 ½	4000
A (AE)	6	6	3500
B (AE)	7	5	2500
C (AE)	8	4	2000

13.04 COMPOSITION OF CONCRETE:

1. Aggregate:

Aggregates maximum size shall be not larger than one-fifth (1/5) of the narrowest dimension between forms within which the concrete is to be cast, nor larger than three-fourths (3/4) of the minimum clear spacing between reinforcing bars or between reinforcing bars and forms. For un-reinforced concrete slabs, the maximum size of aggregates shall not be larger than one-fourth (1/4) the slab thickness.

2. Water:

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-inch (4"). No concrete shall be placed with a slump in excess of five-inch (5").

3. Air-Entrainment:

Air-Content for air-entrained concrete shall comply with the following:

Course Aggregate Size (in.)	Air Content (percent)
1 1/2 to 2 1/2	5 ± 1
3/4 or 1	6 ± 1
3/8 or 1/2	7 ± 1

The air-entraining agent shall be added as liquid to the mixing water by means of mechanical equipment capable of accurate measurement and control.

4. Admixtures:

Water reducing, set retarding admixtures shall not be used except with previous approval from the Public Facilities Inspector/Engineer and shall in such a case, conform to the standards of materials set forth in the specification.

13.05 DESIGN OF THE CONCRETE MIX:

The proportions of the aggregates shall be such as to produce a concrete mixture that will work readily into the corners and angles of the forms and around reinforcement when consolidated, but will not segregate or exclude free water during consolidation.

Prior to placement of concrete, the Developer/Contractor shall furnish the Public Facilities Inspector/Engineer, for approval, a statement of the materials and mix proportions (including admixtures, if any) it intends to use. The statement shall include evidence satisfactory to the Public Facilities Inspector/Engineer that the materials and proportions will produce concrete conforming to this specification. The materials and proportions so stated shall constitute the "job mix." After the job mix has been reviewed for conformance to specification by the Public Facilities Inspector/Engineer, neither the source, character, grading of the aggregates, the type and brand of cement, nor admixture shall be changed without prior notice to the Public Facilities Inspector/Engineer. If such changes are necessary, no concrete containing such new or altered materials shall be placed until the Public Facilities Inspector/Engineer has approved a revised job mix.

13.06 OBSERVATION AND TESTING:

The Public Facilities Inspector/Engineer shall have free entry to the plant and equipment furnishing concrete under the contract. Proper facilities shall be provided for the Public Facilities Inspector/Engineer to observe the materials, equipment and processes

and to obtain samples of the concrete. All tests and observations will be conducted so as not to interfere unnecessarily with manufacture and delivery of the concrete.

13.07 HANDLING AND MEASUREMENT OF MATERIALS:

Materials shall be stockpiled and batched by methods that will prevent segregation or contamination of aggregates and insure accurate proportioning of the ingredients of the mix.

Except as otherwise provided in this chapter, cement and aggregates shall be measured as follows:

1. Cement shall be measured by weight or in bags of 94 pounds each. When cement is measured in bags, no fraction of a bag shall be used unless weighed.

2. Aggregates shall be measured by weight. Mix proportions shall be based on saturated, surface-dry weights. The batch weight of each aggregate shall be the required saturated, surface-dry weight plus the weight of surface moisture it contains.

3. Water shall be measured by weight, to accuracy within one per cent of the total quantity of water required for the batch.

4. Admixtures shall be measured within a limit of accuracy of 3 per cent.

13.08 MIXERS AND MIXING:

Concrete shall be uniform and thoroughly mixed when delivered to the work. Variations in slump of more than 1 inch within a batch will be considered evidence of inadequate mixing and shall be corrected by increasing mixing time or other means. For stationary mixers, the mixing time after all cement and aggregates are in the mixer drum shall be not less than 1 1/2 minutes. When concrete is mixed in a truck mixer, the number of revolutions of the drum or blades at mixing speed shall be not less than 70 or more than 100.

Unless otherwise specified, volumetric batching and continuous mixing at the construction site will be permitted if approved by Public Facilities Inspector/Engineer. The batching and mixing equipment shall conform to the requirements of ASTM Specification C-685 and shall be demonstrated prior to placement of concrete, by tests with the job mix, to produce concrete meeting the specified proportioning and uniformity requirements. Concrete made by this method shall be produced, inspected, and certified in conformance with Sections 6, 7, 8, 13, and 14 of ASTM Specification C-685.

No mixing water in excess of the amount called for by the job mix shall be added to the concrete during mixing or hauling or after arrival at the delivery point.

13.09 FORMS:

Forms shall be of wood, plywood, steel or other approved material and shall be mortar tight. The forms and associated falsework shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours. Form surfaces shall be smooth and free from holes, dents, sags or other irregularities. Forms shall be coated with non-staining form oil before being set into place.

Metal ties or anchors within the forms shall be equipped with cones, she-bolts or other devices that permit their removal to a depth of at least one inch without injury to the concrete.

All edges that will be exposed to view when the structure is completed shall be chamfered by placing molding in the forms, unless finishing with molding tools.

13.10 PREPARATION OF FORMS AND SUBGRADE:

Prior to placement of concrete the forms and subgrade shall be free of chips, sawdust, debris, water, ice, snow, extraneous oil, mortar, or other harmful substances or coatings. Any oil on the reinforcing steel or other surfaces required to be bonded to the concrete shall be removed. Rock surfaces shall be cleaned by air-water cutting, wet sandblasting or wire brush scrubbing, as necessary, and shall be wetted immediately prior to placement of concrete. Earth surfaces shall be firm and damp. Placement of concrete on mud, dried earth or uncompacted fill or frozen subgrade will not be permitted.

Unless otherwise specified, when concrete is to be placed over drain fill, the contact surface of the drain fill shall be covered with a layer of asphalt-impregnated building paper or polyvinyl sheeting prior to placement of the concrete. Forms for

weepholes shall extend through this layer into the drain fill.

Items to be embedded in the concrete shall be positioned accurately and anchored firmly. Weepholes in walls or slabs shall be formed with nonferrous materials.

13.11 CONVEYING:

Concrete shall be delivered to the site and discharged into the forms within 1 1/2 hours after the introduction of the cement to the aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes. The Public Facilities Inspector/Engineer may allow a longer time, provided the setting time of the concrete is increased a corresponding amount by the addition of an approved set-retarding admixture. In any case, concrete shall be conveyed from the mixer to the forms as rapidly as practicable by methods that will prevent segregation of the aggregates or loss of mortar.

Concrete shall not be dropped more than five feet vertically unless suitable equipment is used to prevent segregation.

13.12 PLACING:

Concrete shall not be placed until the subgrade, forms and steel reinforcement have been inspected and approved. No concrete shall be placed except in the presence of the Public Facilities Inspector/Engineer. The Developer/Contractor shall give 48-hour notice to the Public Facilities Inspector/Engineer each time it intends to place concrete. Such notice will give the Public Facilities Inspector/Engineer adequate time to inspect the subgrade, forms, steel reinforcement and other preparations for compliance with the specifications before concrete is delivered for placing.

The concrete shall be deposited as closely as possible to its final position in the forms and shall be worked into the corners and angles of the forms and around all reinforcements and embedded items in a manner to prevent segregation of aggregates or excessive laitance. Unless otherwise specified, slab concrete shall be placed to design thickness in one continuous layer. Formed concrete shall be placed in horizontal layers not more than 20 inches thick. Hoppers and chutes, pipes or "elephant trunks" shall be used as necessary to prevent splashing of mortar on the forms and reinforcing steel above the layers being placed.

Immediately after the concrete is placed in the forms, it shall be consolidated by spading, hand tramping or vibration as necessary to insure smooth surfaces and dense concrete. Each layer shall be consolidated to insure monolithic bond with the preceding layer. If the surface of a layer of concrete in place sets to the degree that it will not flow and merge with the succeeding layer when spaded or vibrated, the Developer/Contractor shall discontinue placing concrete and shall make a construction joint according to the procedure specified.

If placing is discontinued when an incomplete horizontal layer is in place, the unfinished end of the layer shall be formed by a vertical bulkhead.

13.13 CONSTRUCTION JOINTS:

Construction joints shall be made at the locations shown on the Drawings. If construction joints are needed which are not shown on the Drawings, they shall be placed in locations approved by the Public Facilities Inspector/Engineer.

Where a featheredge would be produced at a construction joint, as in the top surface of a sloping wall, an inset form shall be used so that the resulting edge thickness on either side of the joint is not less than six-inches (6").

In walls and columns, as each lift is completed, the top surfaces shall be immediately and carefully protected from any condition that might adversely affect the hardening of the concrete.

Steel tying and form construction adjacent to concrete in place shall not be started until the concrete has cured at least 12 hours. Before new concrete is deposited on or against concrete that has hardened, the forms shall be retightened. New concrete shall not be placed until the hardening concrete has cured at least 12 hours.

Surfaces of construction joints shall be cleaned of all unsatisfactory concrete, laitance, coatings or debris by washing and scrubbing with a wire brush or wire broom or by other means approved by the Public Facilities Inspector/Engineer. The surfaces shall be kept moist for at least one hour prior to placement of the new concrete.

13.14 EXPANSION AND CONTRACTION JOINTS:

Expansion and contraction joints shall be made only at locations shown on the drawings.

Exposed concrete edges at expansion and contraction joints shall be carefully tooled or chamfered, and the joints shall be free of mortar and concrete. Joint filler shall be left exposed for its full length with clean and true edges.

Preformed expansion joint filler shall be held firmly in the correct position as the concrete is placed.

Open joints, when specified, shall be constructed by the insertion and subsequent removal of a wooden strip, metal plate or other suitable template in such a manner that the corners of the concrete will not be chipped or broken. The edges of open joints shall be finished with an edging tool prior to removal of the joint strips.

13.15 WATERSTOP:

Waterstops shall be held firmly in the correct position as the concrete is placed. Joints in metal waterstops shall be soldered, brazed or welded. Joints in rubber or plastic waterstops shall be cemented, welded or vulcanized as recommended by the manufacturer.

13.16 REMOVAL OF FORMS:

Forms shall not be removed without the approval of the Public Facilities Inspector/Engineer. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that will permit the concrete to take the stresses due to its own weight uniformly and gradually.

13.17 FINISHING FORMED SURFACES:

Immediately after the removal of the forms:

1. <u>Projections</u>:

All fins and irregular projections shall be removed from exposed surfaces.

2. <u>Imperfections</u>:

On all surfaces, the holes produced by the removal of form ties, cone-bolts, and she-bolts shall be cleaned, wetted and filled with a dry-pack mortar consisting of one part Portland cement, three parts sand that will pass a No. 16 sieve, and water just sufficient to produce a consistency such that the filling is at the point of becoming rubbery when the material is solidly packed.

13.18 FINISHING UNFORMED SURFACES:

All exposed surfaces on the concrete shall be accurately screeded to grade and then float finished, unless specified otherwise.

Excessive floating or troweling of surfaces while the concrete is soft will not be permitted.

The addition of dry cement or water to the surface of the screeded concrete to expedite finishing will not be allowed.

Joints and edges on unformed surfaces that will be exposed to view shall be chamfered or finished with molding tools.

13.19 CURING AND PROTECTION:

Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period, or until curing compound is applied as specified below. Sprinkling, flooding or fog spraying shall maintain moisture or by covering with continuously moistened canvas, cloth mats, straw, sand or other approved material. Wood forms (except plywood) left in place during the curing period shall be kept wet. Formed surfaces shall be thoroughly wetted immediately after forms are removed and shall be kept wet until patching and repairs are completed. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged.

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

1. Ponding of water on the surface or continuous sprinkling.

2. Application of absorptive mats such as three-inches (3") of cured hay, clean straw or fabric kept continuously wet.

3. Application of two-inches (2") 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.

Curing compound shall not be applied to surfaces requiring bond to subsequently placed concrete, such as construction joints, shear plates, reinforcing steel and other embedded items. If the membrane is damaged during the curing period, the damaged area shall be re-sprayed at the rate of application specified above.

13.20 REMOVAL OR REPAIR:

When concrete is honey combed, damaged or otherwise defective, the Developer/Contractor shall remove and replace the structure or structural member containing the defective concrete or, where feasible, correct or repair the defective concrete. Prior to starting repair work the Developer/Contractor shall obtain the Public Facilities Inspector/Engineer's approval of its plan for affecting the repair. The Developer/Contractor shall perform all repair work in the presence of the Public Facilities Inspector/Engineer.

13.21 CONCRETING IN COLD WEATHER:

Concrete shall not be mixed nor placed when the daily minimum atmospheric temperature is less than forty degrees Fahrenheit (40°) unless facilities are provided to prevent the concrete from freezing. When concrete is poured at a temperature below thirty five degrees Fahrenheit (35° F), the ingredients of the concrete shall be heated so that the temperature of the mixture shall be not less than fifty degrees Fahrenheit (50°) or more than one hundred degrees Fahrenheit (100°). Before mixing, the heated aggregates shall not exceed one hundred twenty five degrees Fahrenheit (125°) and the temperature of heated water shall not exceed one hundred seventy five degrees Fahrenheit (175°). Cement shall not be added while the temperature of the mixed aggregate and water is greater than one hundred degrees Fahrenheit (100°). When there is a likelihood of freezing during the curing period, the concrete shall be protected by means of an insulated covering and/or heating to prevent freezing of the concrete for a period of not less than four (4) days after placing. Concrete shall not be placed on frozen soil. The use of accelerators or antifreeze compounds will not be allowed.

13.22 CONCRETING IN HOT WEATHER:

The Developer/Contractor shall apply effective means to maintain the temperature of the concrete below 90 degrees during mixing, conveying and placing.

14. REINFORCING STEEL

14.01 GENERAL:

Furnish and place reinforcing steel and reinforcing steel (epoxy-coated). Use deformed billet-steel bars as specified. All reinforcing bars shall be Grade 40 or Grade 60 as required. Wire Fabric shall conform to ASTM A185-70.

Before ordering the supply of steel, the Developer/Contractor shall provide all order lists and bending diagrams for approval of the Public Facilities Inspector/Engineer. The approval of such lists and diagrams shall in no way relieve the Developer/Contractor of responsibility for the correctness of reinforcing supplied and all expenses incidental to revision of furnished reinforcing steel shall be carried by the Developer/Contractor.

14.02 FABRICATION AND PLACING REINFORCEMENT:

1. Fabrication:

Reinforcement shall be cold bent to the shapes shown in accordance with ACI 1977 Standard Code (ACI 318-77) Chapter 7 Section 7.1.

2. Clearances:

All bars shall be of the size specified and shall be placed in the positions shown on the Drawings in such a manner as to be firmly held during the placing of the concrete. Where not otherwise indicated, minimum clearance and cover as required by the ACI Code, Section 7.7 shall be maintained:

Reinforced Clearances	Minimum Cover Inches
Cast In Place Concrete (Non Prestressed)	
Concrete cast against and permanently exposed to earth	3
Concrete exposed to earth or weather:	
No. 6 through No. 18 Bar	2
No. 5 Bar, W31 or D31 wire, and smaller	1 ½
Concrete not exposed to weather or in contact with ground:	
- Slabs, Walls, and Joists:	
No. 14 and no. 18 Bar	1 ½
No. 11 Bar and smaller	¾
- Beams, Columns:	
Primary reinforcements, ties, stirrups, spirals	1 ½
- Shells, Folded Plate Members:	
No. 6 Bar and larger	¾
No. 5 Bar, W31 or D31 wire, and smaller	½

Reinforcement Clearances	Minimum Cover Inches
Precast Concrete (Manufactured Under Plant Controlled Conditions)	
Concrete exposed to earth or weather:	
- Wall Panels:	
No. 6 through No. 18 Bar	1 ½
No. 5 Bar, W31 or D31 wire, and smaller	¾
-Other Members:	
No. 14 and No. 18 Bars	2
No. 6 through No. 11 Bars	1 ½
No. 5 Bar, W31 or D31 wire, and smaller	1 ¼
Concrete not exposed to weather or in contact with ground:	
- Slabs, Walls, and Joists:	
No. 14 and no. 18 Bar	1 ¼
No. 11 Bar and smaller	5/8
- Beams, Columns:	
Primary reinforcements	1 ½
Ties, stirrups, spirals	3/8
- Shells, Folded Plate Members:	
No. 6 Bar and larger	5/8
No. 5 Bar, W31 or D31 wire, and smaller	3/8

3. Support:

Bars shall be tied at all intersections except where the spacing is less than twelve inches (12") where alternate intersections shall be tied. Distance from supports shall be by means of ties, hangers, or other approved supports. Metal chairs of approved design shall be used to hold

reinforcement from contact with the forms. Metal chairs that are in contact with the exterior surface of the concrete shall be galvanized. Layers of bars or when placing concrete directly on a prepared subgrade reinforcing shall be separated by precast mortar blocks or by other equally suitable devices. The use of stones, pieces of broken brick, metal pipe, or wooden blocks shall not be permitted. Reinforcement in any member shall be placed and then inspected and approved by the Public Facilities Inspector/Engineer before the placement of concrete begins. Concrete placed in violation of this provision may be rejected in which case removal will be required.

If the fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.

4. Splicing:

All splices shall be staggered so that splices in adjacent bars shall be not less than four feet (4') apart, and shall conform to ACI Code Section 12.15.

14.03 EPOXY COATING:

1. Prequalify all Coatings:

Ensure that epoxy coating applicator has Concrete Reinforcing Steel Institute (CRSI) fusion bonded epoxy coating applicator plant certification. Furnish a copy of the Prequalification Test Report to the Public Facilities Inspector/Engineer. Provide an 8-ounce sample of the coating material from each batch.

2. Coat Bars as Specified:

The following requirements shall be followed:

a. Maintain the coating thickness between 8 and 12 mils.

b. Coat bars after bending, unless the fabricator can show that satisfactory results can be obtained by coating before bending.

c. Reject any bent bars with visible cracks or damage in the coating.

3. Handling:

Do not damage the bars or the coating during handling and storage.

a. Use systems with padded contact areas when handling coated bars.

b. Pad all bundling bands.

c. Lift all bundles with strong back, multiple supports, or a platform bridge.

d. Do not drop or drag bars.

e. Repair damaged bars or coating at no additional cost to the Owner.

f. Use patching material per manufacturer's recommendation to repair damaged coating.

g. Have the coated bars inspected for damage to the coating after the bars are in place and immediately before concrete placement.

h. Repair all visible defects using the specified patching or repair material.

14.04 FIELD CUTTING:

1. Cutting:

Saw or shear epoxy-coated bars that are specified to be cut in the field. Do not flame cut.

2. Repairing:

Repair the sawed or sheared end of epoxy-coated bars using the specified patching or repair material.

15. RESTORATION OF SURFACE IMPROVEMENTS

15.01 GENERAL:

The Developer/Contractor shall be responsible for the protection and the restoration or replacement of any improvements existing on public or private property at the start of work or placed there during the progress of the work.

Existing improvements shall include but not to be limited to permanent surfacing, curbs, gutters, sidewalks, planted areas, ditches, driveways, culverts, fences, and walls. All improvements shall be reconstructed to equal or better, in all respects, than the existing improvements removed.

15.02 FIELD VERIFICATION OF IMPROVEMENTS:

In submitting a bid, the Developer/Contractor will be deemed to have carefully examined the site of the work and to have acquainted itself with all conditions relating to the protection and restoration of existing improvements. The Public Facilities Inspector/Engineer does not guarantee that all improvements are shown on the Drawings, and it shall be the Developer/Contractor's responsibility to provide in its bid for the protection and restoration of all existing improvements whether or not each is provided for specifically on the Drawings and/or Bid Form.

15.03 REMOVAL OF PAVEMENT, SIDEWALKS, CURBS, ETC.:

The pavement, sidewalk, curb and gutter, driveway, etc. shall be cut vertically along the lines forming the trench, or nearest full joint, in such a manner as to not cause damage to adjoining pavement, sidewalk, curb and gutter, driveway, etc. An undercut level at the rate of one inch (1") per foot of thickness or an underlap joint will be provided at the proposed junction between old and new surfaces. The portion to be removed shall be broken up in a manner that will not cause damage to the pavement or concrete outside the limits of the trench; however, any pavement damaged by operations outside the limits of the trench shall be replaced at the Developer/Contractor's expense. Broken paving materials shall be removed immediately from the site of the work.

15.04 MATERIALS:

Materials used for repair or replacement of surface improvements shall be equal to or better than the material removed.

1. Untreated Base Course:

Untreated base course shall comply with the requirements of Chapter 16, Section 16.08, Base Course. The Public Facilities Inspector/Engineer shall take samples of the untreated base course on a random basis. All materials not meeting the tolerance requirements shall be removed from the project and replaced with specification material.[1]

2. Bituminous Surface Course:

The bituminous surface shall be hot-rolled plant mix in accordance with Chapter 15, Section 15.09, Bituminous Asphalt Cement Pavement.

3. Concrete:

Concrete shall comply with Chapter 11 of these Standard Specifications. Concrete shall be Class AA(AE).

15.05 RESTORING BITUMINOUS, CONCRETE, OR ASPHALT STREET SURFACES:

Where trenches are in or cross bituminous or concrete surfaced roads, traffic lanes, driveways, parking areas, etc., the bituminous or concrete surface shall be cut, restored as quickly as there is sufficient quantity to make it practical, weather permitting, and maintained as follows:

1. Before Excavation:

All existing asphalt or concrete surfaces shall be saw cut or roto-milled to a square edge before excavation.

2. Temporary Graded Surface:

Until resurfacing can be done in paved areas a temporary gravel surface shall be placed deep enough to provide a minimum of eight inches (8") below the bottom of the bituminous surface and shall be brought flush with the paved surface.

The untreated base shall be placed in the trench at the time it is backfilled. Excess material shall be removed from the premises immediately. The Developer/Contractor will maintain the temporary gravel surface until the asphalt is placed.

3. Preparation for Paving:

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

Before any permanent resurfacing is placed, the Developer/Contractor shall trim the existing paving to clean straight lines as nearly parallel to the centerline of the trench as practicable. Said straight lines shall be thirty feet minimum lengths and no deviations from such lines shall be made except as specifically permitted by the Public Facilities Inspector/Engineer.

Existing bituminous paving shall be saw cut or roto-milled back a minimum of twelve-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-inches (12") of undisturbed soil.

4. Bituminous Surface:

The bituminous surface over trenches shall be restored by standard paving practices to a minimum thickness of three inches (3”) or one inch (1”) thicker than existing, whichever is greater. Gradation of aggregate shall conform to the ¾-inch gradation limits as defined in the Standard Specifications for Road and Bridge Construction.[1]

Pavement restoration shall include priming of pavement and concrete edges with Type MC-70 bituminous material and placing rolled plant hot mix bituminous material to the level of the adjacent pavement surfaces.[1]

15.06 GRAVEL SURFACE:

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

- The gravel shall be placed deep enough to provide a minimum of six inches of material.
- The gravel shall be placed in the trench at the time it is backfilled. The surface shall be maintained by blading, sprinkling, rolling, adding gravel, etc., to maintain a safe, uniform surface. Excess material shall be removed from the premises immediately.
- Material for use on gravel surfaces shall be obtained from sound, tough, durable gravel or rock meeting the following requirements for gradation:

Passing 1-inch sieve	100%
Passing 1/2-inch sieve	79-91%
Passing No. 4 sieve	49-61%
Passing No. 16 sieve	27-35%
Passing No. 200 sieve	7-11%

15.07 MISCELLANEOUS IMPROVEMENTS:

It shall be the Developer/Contractor's responsibility to restore to their original condition all irrigation canals, levees, culverts, gates, fences, drainage ditches, and all such improvements that are cut or disturbed during construction. Topsoil in farming areas or along road edges shall be stored separate from subsoil during pipe trench excavation. Topsoil shall be replaced during backfill operations as nearly as possible to its original condition, thereby assuring suitable soil for reseeding.

15.08 RESTORATION OF SURFACES:

Unless otherwise directed, all street surfacing, curbs, gutters, sidewalks, driveways, or other hard surface that must be removed in the performance of the work shall be restored in kind by the Developer/Contractor in accordance with the Specifications contained herein. Deviation of more than one-fourth inch (1/4") between old and new work or within new construction shall be corrected. Such measurement shall be made from a ten-foot (10') minimum length straight edge. Adjoining surfaces between old and new must be flush.

15.09 CLEANUP:

At the completion of each area of work all equipment, barricades, and similar items shall be removed from the area. All excess material will be removed. All rocks larger than one and one-half inch (1 ½") shall be removed from the surface. Adjacent borrow pits and road shoulders used for storage of excavating materials will be smoothed and returned to its original contour.

15.10 PAVEMENT MARKINGS:

The Developer/Contractor shall be responsible for restoration of pavement markings on all City and/or County roadways. Restoration of pavement markings shall conform to the applicable local and state specifications.

On roadways under UDOT jurisdiction temporary pavement markings shall be provided for any removed or obliterated markings. The temporary markings shall conform to UDOT standards and specifications. Permanent pavement markings will be replaced by UDOT.

16. ROADWAY CONSTRUCTION

16.01 GENERAL:

This Chapter covers roadway construction. Work shall consist of pulverizing existing asphalt, earthwork, roadway excavation, 6-inch curb walls, 24-inch curb and gutter, 6-foot monolithic curb gutter and sidewalk, and drive approaches. It will also include imported granular borrow, curb face inlet boxes including connection to existing storm drain, subgrade preparation, untreated base course, asphalt surface and raising manholes and valve boxes to grade.

16.02 PULVERIZING:

The Developer/Contractor shall pulverize the existing asphalt and roadbase to a depth of 6 to 8 inches. The limits of the area to be pulverized will be as shown on the improvement drawings. This material will be used for granular borrow or untreated roadbase. The Developer/Contractor has the option of methods he feels will result in the least work and best product in breaking up the existing asphalt, provided that the maximum size for a single piece of asphalt does not exceed 3-inches. Placing, grading and compacting of this material shall comply with the requirements of borrow or roadbase. The existing asphalt edges where the pulverizing terminates shall be saw cut following or prior to being pulverized.

16.03 EARTHWORK:

The earthwork needed for roadway construction shall meet the requirements of Chapter 10, Earthwork.

16.04 ROADWAY EXCAVATION:

Following completion of the curb and gutter improvements the roadway between lip of gutters shall be excavated to the lines and grades shown on the improvement drawings. Materials not suitable for use as granular borrow or roadbase shall be removed from the road section. Excavation may be done on one-half of the road at a time.

16.05 SUBGRADE PREPARATION:

This work shall consist of the shaping and compacting of the subgrade in accordance with these specifications and in conformity with the lines, grades, and typical cross sections shown on the Drawings or as established by the Public Facilities Inspector/Engineer.

Following roadway excavation the subgrade shall be proof rolled by running moderate-weight rubber tire-mounted construction equipment uniformly over the surface at least twice. During the rolling operation moisture content of the subgrade layer shall be maintained at not less than 97% or more than 105% of the optimum moisture content. Rolling shall be continued until the entire roadbed is compacted to the specified density to a minimum depth of 8 inches.

16.06 GRANULAR BORROW:

Granular borrow (foundation or roadway) material shall consist of well graded granular bank run natural aggregate material with a maximum size of 3 inches and less than 15% passing a No. 200 sieve. The material shall meet the following gradation:

Sieve Size	Percent Passing
No. 10	50 Max
No. 40	30 Max
No. 200	15 Max

The granular borrow material shall be compacted to not less than 96% maximum dry density as determined by AASHTO T-99. Granular foundation borrow shall be compacted to not less than 95% of maximum dry density as determined by ASTM D-1557. Surfaces shall be true to the established grade with 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.

16.07 GRANULAR BACKFILL BORROW:

Granular backfill borrow shall be free draining natural aggregate material meeting the following gradation:

Sieve Size	Percent Passing
1 - ½ inch	100
1 inch	95-100
½ inch	25-60
No. 4	0-10

16.08 BASE COURSE:

Base for all streets shall consist of select material, either natural aggregate or crushed slag, and shall be graded as follows:

Sieve Size	Percent Passing
3/4 inch	100
3/8 inch	78-92
No. 4 sieve	55-67
No. 16 sieve	28-38
No. 200 sieve	7-11

Slag 4133 (3/4 inch minus) and slag 4120 (3/4 inch minus) can be used.

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 below.

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 inaccessible to rolling shall be compacted with mechanically operated hand tampers.

The gravel base shall be compacted to not less than 96% maximum dry density as determined by AASHTO T-180. Surfaces shall be true to the established grade with 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.

16.09 BITUMINOUS ASPHALT CEMENT PAVEMENT:

Over the dry, dust-free compacted base course the Developer/Contractor shall place and compact a bituminous asphalt cement surface course. The surface course shall consist of a mixture of mineral aggregate and binder. Gradation of aggregate shall conform to the following:

Sieve Size	Percent Passing
3/4 inch	100
3/8 inch	69-91
No. 4	42-58
No. 16	17-31
No. 50	9-21
No. 200	4-8

The Developer/Contractor shall establish a mix gradation, and the amount of bituminous material shall be subject to the approval of the Public Facilities Inspector/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 penetration asphalt cement conforming to the requirements of ASTM M20-60.

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 Drawings and in accordance with these Specifications.

The bituminous mixtures 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 6-inches transversely to avoid a vertical joint through more than one course.

The temperature of the bituminous mix shall be between 270 deg. F. and 325 deg. F. when placing.

After the mixture has been spread, the surface shall be rolled in longitudinal direction commencing at the outside edge or lower side and proceeding to the higher side. Each pass of the roller shall overlap the preceding 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 for the bituminous mixture being used has been obtained. Density tests shall be done following the procedures of ASTM D-2950.

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 grade. When tested with a ten-foot straight edge placed on the surface of the pavement, at any point, the surface shall not deviate more than one-eighth of an inch from the lower edge of the straight edge. 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.

It is the responsibility of the Developer/Contractor to control traffic. All traffic shall be kept off the completed surface for a minimum period of 24 hours.

No bituminous surface course shall be placed when the temperature of the air or roadbed is 50 deg. F. or below, during rainy weather, when the base is wet, or during other unfavorable weather conditions as determined by the Public Facilities Inspector/Engineer. The air temperature shall be measured in the shade.

16.10 CONTACT SURFACE:

Contact surface of curbing, gutters, waterways manholes and other structures, shall be painted with tack coat consisting of a cut back asphalt grade RC-250 or SS-1 immediately before the paving materials are placed against them. Care should be taken during application to prevent the tack coat from being applied to exposed concrete above the contact surfaces.

Any overlay of existing asphalt with or without paving fabric shall have a tack coat applied prior to application of any bituminous asphalt material.

Immediately adjacent to gutters, manholes and other structures, the bituminous surface course shall be spread uniformly high, so that after compaction it will be slightly above the edges of such structures

Along curbs, gutters, manholes and other places inaccessible to the roller, the materials shall be thoroughly compacted with hand tampers, but extreme care shall be exercised to prevent damaging the adjacent surfaces.

16.11 ADJUSTING MANHOLES AND VALVE BOXES TO FINAL GRADE:

This section covers the requirements for adjusting manholes and valves to final grade. The adjustment shall be made with cast-iron ring inserts concrete grade rings or cast-in-place concrete rings or squares. Cast-in-place concrete rings or squares shall be constructed after the asphalt surface has been placed.

When concrete rings are used the concrete shall conform to the requirements of Chapter 12. Concrete shall be Class AA(AE). The concrete mix shall be one part cement to two parts sand or Kent Seal.

Manholes and valves in asphalt surfaces shall have the cast iron ring and cover constructed such that the cast iron ring is one-sixteenth inch (1/16th") lower than the existing or new pavement. Manhole rings shall be set to the grade and slope of the road – shim and grout ring into place.

Where manholes are to be raised this is be accomplished by removing the cover and frame and raising the manhole to proper elevation with concrete.

Rings and covers shall be protected during backfilling and compaction of the soil and during the placing or replacing of road surfaces. Any ring or cover loosened from the manhole section shall be resent in cement mortar and any ring or cover damaged or broken shall be replaced by the Developer/Developer/Contractor at its expense.

17. CONCRETE CURB AND GUTTER AND SIDEWALK

17.01 GENERAL:

This section covers installation of curb and gutter, sidewalk, combination of curb, gutter and sidewalk, cross gutter, drive approaches handicap ramps and curb returns. All improvements shall be constructed to the dimensions and thickness shown on the Standard Drawings.

17.02 CONCRETE:

Concrete shall be Class AA(AE) and shall meet all of the requirements of Chapter 12, Portland Cement Concrete. Under no condition shall the water cement ratio exceed 0.53.

17.03 GRADE:

After construction, gutters shall be checked by flowing water. The Public Facilities Inspector/Public Facilities Inspector/Engineer shall be present during the flow test. Removing concrete and replacing to the correct grade shall repair any high spots or depressions (which exceed 0.02 feet). (Minimum flow line grade shall be 0.5 percent.)

17.04 FORMS:

All forms shall be steel, except at curves with a radius smaller than 200 feet. They shall be of a size to match the sections shown on the Drawings. Forms shall be held firmly in place with stakes or other approved means and shall be true to line and grade.

All forms shall be clean and coated with a light oil to prevent the concrete from adhering to them. Clamps, spreaders and braces shall be used where required to insure rigidity in the forms.

Forms shall not vary from vertical grade by more than 0.02 feet and from horizontal alignment by more than 0.05 feet. All forms shall have smooth even lines in both the horizontal and vertical plane.

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 from the arc of the curve.

17.05 SUBGRADE PREPARATION:

The developer/Developer/Contractor shall grade to the line and grade approved by the City. No concrete shall be placed without approved cut sheets. The sub-grade shall be properly shaped to conform to the cross section shown on the Standard Drawings, graded and compacted. Compaction shall meet the requirements of Chapter 11, Earthwork.

All excess material excavated by the Developer/Developer/Contractor shall be removed from the site. Removal of the excavated material shall be done before or immediately after the concrete is placed. The Developer/Contractor shall maintain adequate barricades and other devices to protect the public until excavated material is removed.

Placement of concrete on unsuitable materials shall not be permitted. The subgrade surface shall have a 4-inch roadbase foundation as shown on the Standard Drawings. Immediately prior to the placing of concrete, the subgrade shall be compacted using a mechanical foot compactor, with compaction being at least ninety-six percent (96%) density.

17.06 CONSTRUCTION OF CURB, GUTTER AND SIDEWALK:

Concrete curb, gutter and sidewalk may be constructed by first constructing the curb and gutter and then constructing the sidewalk behind it. If this method is used the joint between the back of curb and front edge of sidewalk shall be sealed. The curb and gutter may be placed using stationary forms or the slip method of forming. Concrete curb, gutter and sidewalk may be constructed at the same time, combination curb, gutter and sidewalk. Stationary forms can be used to place combination curb, gutter and sidewalk or the slip form method can be used if it can be demonstrated that the tolerances specified herein can be met.

Curb and gutter to be installed with bituminous asphalt cement pavement shall have contraction joints placed every 10 feet by use of 1/8-inch steel template of the exact cross section of the curb and gutter. Remove the templates as the concrete takes initial set. Cut the joint 1-1/2 inches deep when using the slip form method to place the concrete. Use 1/2-inch thick, pre-molded, expansion joint filler at curb and gutter radii, where the curb and gutter abuts a solid object and at intervals not to exceed 50 feet, unless otherwise specified by the Public Facilities Inspector/Engineer.

Joints in sidewalk, when placed separately and adjacent to the curb shall match the contraction and expansion joints in the curb and gutter as well as where the sidewalk abuts a solid object. Sidewalks not placed adjacent the curb shall have contraction joints at 10-foot intervals. The joints shall be approximately 3/16 inch wide and approximately one-half of the total slab thickness in depth. Expansion joints shall be 1/2-inch thick, shall be placed every 50 feet, adjoins existing sidewalks, or abuts a solid object.

Material for 1/2-inch expansion joints shall be as specified in AASHTO M-153 and AASHTO M-213, and shall be installed with its top approximately 1/4-inch below the concrete surface.

After the concrete placed for a sidewalk has been brought to the established grade and screeded, it shall be float finished, edged 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 1/2 inch.

After concrete has been placed in curb and gutter forms, it shall be consolidated so as to insure a thorough mixture, eliminate air pockets, and create uniform, smooth sides. As the concrete takes its initial set the forms shall be removed and all exposed surfaces shall be float finished, edged and broomed lightly. The curb and gutter shall be constructed to the dimensions shown in the Standard Drawings.

The top and face of the curb and also the top of the apron on combination curb and gutter must be finished true to line and grade and without any noticeable irregularities of surface. No portion of the surface or face of the curb and gutter shall depart more than 1/4 inch from a straight edge ten feet in length, placed on the curb parallel to the street center line nor shall any part of the exposed surface present a wavy appearance.

17.07 CONCRETE CURB WALL:

Concrete curb wall shall be Class AA(AE) and shall meet all of the requirements of Chapter 12, Portland Cement Concrete.

Reinforcing steel shall meet the requirements of Chapter 13, Reinforcing Steel.

Excavation for and backfill around the curb walls shall meet all the requirements of Chapter 11, Earthwork.

The curb walls shall be constructed to the dimensions and grades shown on the Standard Drawings or improvement drawings or as determined by the Public Facilities Inspector/Engineer.

17.08 6-INCH CONCRETE DRIVE APPROACH:

The concrete to be used for the drive approach shall be Class AA(AE) and shall meet the requirements of Chapter 12, Portland Cement Concrete.

The driveways shall be a minimum of 6-inch thick. They shall be constructed to the dimensions shown on the Standard Drawings. The concrete shall be finished as described above for sidewalks.

The driveways shall have a compacted 4-inch untreated base course under them.

17.09 AMERICAN DISABILITIES ACCESSIBILITY STANDARDS IN PUBLIC STREET RIGHT OF-WAYS:

This section sets guidelines for accessibility to places of public accommodation and commercial facilities by individuals with disabilities. These guidelines are to be applied during the design, construction, and alteration of street construction or public buildings. The construction of curb ramps and drive approaches shall conform to the Standard Drawings.

1. Curb Ramp Location:

Curb ramps complying with Section 16.09 shall be provided wherever an accessible route crosses a curb or as determined necessary during the project review process.

2. Curb Ramp Slope:

Slope of curb ramps shall be the least possible slope. The maximum slope of a ramp in new construction shall be 1:12. The maximum rise for any run shall be thirty (30) inches. Transitions from ramps to walks, gutters, or streets shall be flush and free of abrupt changes. Maximum slopes of adjoining gutters, road surface immediately adjacent to the curb ramp, or accessible route shall not exceed 1:20.

3. Curb Ramp Width:

The minimum width of a curb ramp shall be thirty-six (36) inches, exclusive of flared sides.

4. Curb Ramp Surface:

Surface of curb ramps shall be stable, firm, and slip resistant.

5. Sides of Curb Ramps:

If a curb ramp is located where pedestrians must walk across the ramp, or where it is not protected by hand rails or guardrails, it shall have flared sides: the maximum slope of the flare shall be 1:12 (see Standard Drawings). Curb ramps with returned curbs may be used where pedestrians would not normally walk across the ramp.

6. Built up Curb Ramps:

Built-up curb ramps shall be located so that they do not project into vehicular traffic lanes.

7. Obstructions:

Curb ramps shall be located or protected to prevent their obstruction by parked vehicles.

8. Location of Marked Crossings:

Curb ramps at marked crossings shall be wholly contained within the markings, excluding any flared sides.

9. Diagonal Curb Ramps:

If diagonal (or corner type) curb ramps have returned curbs or other well-defined edges, such edges shall be parallel to the direction of pedestrian flow. The bottom of diagonal curb ramps shall have a forty-eight (48) inch minimum clear space. If diagonal curb ramps are provided at marked crossings, the forty-eight (48) inch clear space shall be within the markings. If diagonal curb ramps have flared sides, they shall also have at least a twenty-four (24) inch long segment of straight curb located on each side of the curb ramp and within the marked crossing.

10. Islands:

Any raised islands in crossing shall be cut through level with the street or have curb ramps at both sides and a level area at least forty-eight (48) inches long between the curb ramp in the part of the island intersected by the crossing.

17.10 LANDSCAPE RESTORATION:

Areas of new construction that cover or disturb existing landscaped areas with fills and cuts or areas disturbed by construction of retaining walls shall have the landscape restored. Areas that have lawn or flower beds shall be restored including sprinkling systems that might be damaged or relocated because of construction. Lawn covered or removed shall be replaced by sod.

The topsoil shall be fertile, sandy loam topsoil, obtained from well-drained areas. It shall be without admixture of subsoil or slag and shall be free of stones, lumps, sticks, plants or their roots, toxic substances or other extraneous matter that may be harmful to plant growth and would interfere with future maintenance. Topsoil pH range shall be 5.3 to 6.0.

18. STORM DRAINS

18.01 GENERAL:

This section covers installation of storm drainpipe, manholes, and curb face inlet boxes. All improvements shall be constructed to the dimension and thickness shown on the Standard Drawings.

18.02 PIPE INSTALLATION:

Installation of pipe shall be in an open trench unless otherwise shown. Trench and backfill shall meet the requirements of Chapter 3, Trench Excavation and Backfill.

18.03 PIPE:

Pipe and pipe laying shall meet the requirements of Chapter 5, Concrete Pipe, Chapter 6, PVC Plastic Pipe, Chapter 7, Polyethylene Corrugated Pipe, Chapter 8, Polyethylene Corrugated Pipe with Water Tight Joints. Pipe shall be laid with the bells up grade.

18.04 MANHOLES:

Manholes shall meet the requirements of Chapter 9, Manholes. Where the size of the storm drain does not permit use of manholes, precast or cast-in-place reinforced concrete boxes shall be used. Concrete used in precast or cast-in-place boxes shall be Class AA(AE).

18.05 CONCRETE:

Concrete shall meet the requirements of Chapter 12, Portland Cement Concrete.

18.06 REINFORCING STEEL:

Reinforcing steel shall meet the requirements of Chapter 13, Reinforcing Steel.

18.07 STORM DRAIN INLET BOXES:

The concrete to be used for the storm drain inlet boxes shall be Class AA(AE). The boxes shall be built to the dimensions and reinforced as shown on the Standard Drawings. The boxes may be precast or cast-in-place.

Excavation and backfill of the boxes shall meet the requirements of Chapter 11, Earthwork.

The storm drain inlet grate and frame shall be a D & L Supply I-3518 single unit with curb box with type "V" grate or equal. Grates and frames are to be dipped in cold tar epoxy following fabrication.

18.08 PIPE CONNECTING INLET BOXES TO EXISTING STORM DRAINS:

The pipe to be used for connecting a new inlet box to an existing storm drain shall be of the same type of pipe as the existing pipe to which it is being connected. Where possible such connections shall be made by installation of a manhole. The Public Facilities Inspector/Engineer shall approve connection locations and methods.

Connections to concrete pipe shall be by coring a hole in the pipe and then grouting the connecting pipe to the concrete pipe. Connections to PVC or HDPE pipe shall be as per manufacture's recommendations. These recommendations will be reviewed with the Public Facilities Inspector/Engineer prior to construction.

19. UTAH DEPARTMENT OF TRANSPORTATION RIGHTS-OF-WAY

19.01 GENERAL:

Work to be performed within UDOT rights-of-way shall be done in accordance with "SPECIFICATIONS FOR EXCAVATION ON STATE HIGHWAY RIGHT-OF-WAY", latest revision. The Developer/Contractor shall be responsible to obtain all necessary permits and meet any bond requirements imposed by that agency.

19.02 UTILITY LINE AGREEMENT:

The improvements to be placed along or across UDOT rights-of-way are subject to the conditions of Utility Line Agreements between the UTAH DEPARTMENT OF TRANSPORTATION and CLINTON CITY. The Developer/Contractor is bound by all conditions of the Agreement. The Developer shall be responsible for completing the Utility Line Agreement and furnishing the necessary Drawings and other information, including meeting with UDOT to insure requirements are met, required by UDOT. The Developer shall then submit the completed agreement to the City for signature and forwarding to UDOT. The Developer/Contractor shall not proceed with any work in a UDOT right-of-way until it has obtained a permit from UDOT, posted the required bond (if one is required) and provided any other information, such as traffic control plans, required by UDOT.

19.03 INSPECTION FEES:

The Developer/Contractor will pay UDOT fees for any UDOT inspectors.

19.04 PERMITS:

A copy of all UDOT applications and permits issued to the Developer/Contractor by UDOT will be provided to the Clinton City Community Development Department for inclusion in the permanent file.

20. CASINGS

20.01 GENERAL:

This division defines the materials and construction requirements for steel casings under canals, railroad tracks, highways and Interstates. All construction operations shall be subject to the approval of the canal, Railroad Company or UDOT whose facility is being crossed. The Developer/Contractor shall make application to and secure permission from the canal, Railroad Company or UDOT before commencing work within the right-of-way. The Developer/Contractor shall provide all insurance and the services of all watchmen and flagmen required by the Railroad Company or UDOT. The Developer/Contractor will pay the Railroad Company and UDOT for their inspection services.

20.02 MATERIALS:

The pipe shall be welded steel pipe conforming to ASTM Designation A-139, Grade A. Pipe wall thickness shall be a minimum of point three seven five inches (0.375") or as shown on the Drawings.

20.03 CONSTRUCTION METHODS:

The steel pipe casing shall be jacked under the railroad tracks, highway or Interstate using methods submitted to the Public Facilities Inspector/Engineer for review by the Public Facilities Inspector/Engineer. Circular pipe joints shall be field welded as the jacking process progresses. The pipe interior shall be completely excavated and cleaned prior to installation of the carrier pipe.

Steel pipe casing shall be installed by open cut under canals. These installations shall be as per details approved by the Canal Company.

All required approach trenches or working pits shall be excavated and shored as defined in Chapter 3, Trench Excavation and Backfill. Provisions shall be made for a drain sump in one corner of the working pit to allow for the accumulation and pumping of seepage water, if ground water is expected to be encountered.

20.04 LINE AND GRADE:

Casings shall be installed accurately to the line and grade shown on the Drawings. Casings shall be installed to grade with sufficient accuracy to permit installation of the carrier pipe to the design grade shown on the Drawings or to the cover depth required. The Developer's Public Facilities Inspector/Engineer will provide base lines and benchmarks at each casing location. Instrument checks of the line and grade shall be made by the Developer/Contractor at intervals sufficient to maintain the casing on line and grade.

20.05 CARRIER PIPE INSTALLATION THROUGH CASINGS:

The carrier pipe shall be installed to the grade shown on the Drawings. Casing insulators or chocks shall be fastened to the carrier pipe as per the manufacturer's recommendations. For ductile iron pipe or PVC pipe, insulators shall be installed within one foot on each side of the bell and one in the center of the joint when 18' or 20' long joints are used. Metal components of the insulators or chocks shall be manufactured from 14 Ga. Steel, hot rolled and pickled and plastic coated or Type 304(18-8) stainless steel. The liner shall be polyvinyl chloride or Neoprene Rubber with antioxidant and antiozonant properties for extended service life. Runners shall be glass-reinforced plastic or UHMW polyethylene. Runners shall have high abrasion resistance and a low friction coefficient. Following installation of the carrier pipe the annular space between the inside of the casing and the outside of the carrier pipe shall be blown full of sand. The sanding operation shall be carried out such that sand is placed in the center of the casing first and the annular space filled as the placing pipe is withdrawn. The Developer/Contractor shall not be allowed to wash sand in from the end of the casing.

20.06 PERMITS:

A copy of all UDOT, railroad or similar applications and permits issued to the Developer/Contractor by a controlling agency other than the City will be provided to the Clinton City Community Development Department for inclusion in the permanent file.

21. STREET EXCAVATION/ROAD CUTS

21.01 PERMIT REQUIRED, BASIS FOR ISSUANCE:

Any Person desiring to perform work of any kind in a Public Way within the City shall make application for a permit. The decision by the City to issue a permit shall include, among other factors determined by the City, the following:

1. The capacity of the Public Way to accommodate the facilities or structures proposed to be installed in the Public Way;

2. The capacity of the Public Way to accommodate multiple wire in addition to cables, conduits, pipes or other facilities or structures of other users of the Public Way, such as electrical power, telephone, gas, sewer, secondary water (pressure irrigation) and water;

3. The damage or disruption, if any of public or private facilities, improvements, or landscaping previously existing in the Public Way;

4. The public interest in minimizing the cost and disruption of construction from numerous excavations of the Public Way.

21.02 PERMIT APPLICATION REQUIREMENTS:

Application for a permit shall be filed with the Director on a form or forms to be furnished by the City. Property owners and/or tenants for whom work is being done shall be responsible for obtaining the permits, provided, however, contractors may obtain the permit in the contractor's name.

No Person shall be eligible to apply for or receive permits to do work within the Public Ways of the City, save and except the following:

1. Contractors licensed by the state as general contractors;

2. Providers;

3. Property owners installing, replacing, or maintaining less than five hundred square feet or one hundred linear feet of sidewalk, curb, and gutter, or driveway approach, or other work approved by the Director, upon a portion of the Public Way adjacent to their residence; or

4. Persons offering a service which requires occupation of the Public Way, such as scaffold or staging, staging of a crane, installation or maintenance of electric signs, glass, awnings, and painting or cleaning of buildings or sign boards or other structures.

The Director may deny the issuance of permits to contractors, utility companies, or other permit Applicants who have shown by past performance that

in the opinion of the Director they will not consistently conform to the Development Standards, or the requirements of this Chapter.

When necessary, in the judgment of the Director, to fully determine the relationship of the work proposed to existing or proposed facilities within the Public Ways, or to determine whether the work proposed complies with the Development Standards, the Director may require the filing of engineering plans, Specifications and sketches showing the proposed work in sufficient detail to permit determination of such relationship or compliance, or both, and the application shall be deemed suspended until such plans and sketches are filed and approved.

It shall be unlawful for any Person to commence work upon any Public Way until the Director has approved the application and until a permit has been issued for such work, except as specifically approved to the contrary in this Chapter.

The disapproval or denial of an application by the Director may be appealed by the Applicant to the City Council by filing of a written notice of appeal within ten days of the action of the Director. The City Council shall hear such appeal, if written request therefore be timely filed as soon as practicable, and render its decision within two weeks following notice of such appeal.

In approving or disapproving work within any Public Way, or permits therefore, in the inspection of such work; in reviewing plans, sketches or Specifications; and generally in the exercise of the authority conferred upon him/her by this Chapter, the Public Facilities Inspector shall act in such manner as to preserve and protect the Public Way and the use thereof, but shall have no authority to govern the actions or inaction of Permittees and Applicants or other Persons which have no relationship to the use, preservation or protection of the Public Way.

It shall be unlawful for a City, County, State, Federal or other government employee to perform routine maintenance work, not involving excavations, without first having obtained a permit therefore.

A permit is not required from the Director for hand digging excavations for installation or repair of sprinkler systems and landscaping within the non-paved areas of the Public Way. However, conformance to all City Specifications is required.

21.03 EMERGENCY WORK:

Any Person maintaining pipes, lines, or facilities in the Public Way may proceed with work upon existing facilities without a permit when Emergency circumstances demand the work to be done immediately; provided a permit could not reasonably and practicably have been obtained beforehand.

In the event that Emergency work is commenced on or within any Public Way of the City during regular business hours, the Director shall be notified within one-half hour from the time the work is commenced. The Person commencing and conducting such work shall take all necessary safety precautions for the protection of the public and the direction and control of traffic, and shall insure that work is accomplished according to City Development Standards, the Manual on Uniform Traffic Control Devices and other applicable laws, regulations, or generally recognized practices in the industry.

Any Person commencing Emergency work in the Public Way during other than business hours without a permit shall immediately thereafter apply for a permit or give notice during the first hour of the first regular business day on which City offices are open for business after such work is commenced. A permit for such Emergency work may be issued which shall be retroactive to the date when the work was begun, at the discretion of the Director.

21.04 PERMIT FEES:

The City shall charge and the Permittee shall pay upon issuance of the permit, fees for costs associated with the work performed under the permit as outlined in the Consolidated Fee Schedule. Such costs could include costs for reviewing the project and issuing the permit, inspections of the project, deterioration of the Public Way or diminution of the useful life of the Public Way, and other costs to the City associated with the work to be done under the permit. All costs shall be assessed in a non-discriminatory manner.

The Council may waive permit fees or penalties or portion thereof provided for in this Chapter, when he/she determines that such permit fee or penalty:

1. Pertains to construction or rehabilitation of housing for Persons whose income is below the median income level for the City; or

2. Pertains to an encroachment on the Public Way involving a beautification project which furthers specific goals and objectives set forth in the City's strategic plan, master plans, or other official documents, including decorative street

lighting, building facade lighting, flower and planter boxes, and landscaping.

Additional charges to cover the reasonable cost and expenses of any required engineering review, inspection, and Work Site Restoration associated with each undertaking may be charged by the City to each Permittee, in addition to the permit fee.

21.05 PERMIT - CONTENTS - DURATION AND EXTENSIONS:

Each permit application shall state the starting date and estimated completion date. Work shall be completed within five days from the starting date or as determined by the Director. Such determination shall be based upon factors reasonable related to the work to be performed under the permit. Such factors may include, in addition to other factors related to the work to be performed, the following:

1. The scope of work to be performed under the permit;

2. Maintaining the safe and effective flow of pedestrian and vehicular traffic on the Public Way affected by the work;

3. Protecting the existing improvements to the Public Way impacted by the work;

4. The season of the year during which the work is to be performed as well as the current weather and its impact on public safety and the use of the Public Way by the public;

5. Use of the Public Way for extraordinary events anticipated by the City.

The Director shall be notified by the Permittee of commencement of the work within twenty-four hours prior to commencing work. The permit shall be valid for the time period specified in the permit.

If the work is not completed during such period, prior to the expiration of the permit, the Permittee may apply to the Director for an additional permit or an extension, which may be granted by the Director for good cause shown.

The length of the extension requested by the Permittee shall be subject to the approval of the Director. No extension shall be made that allows work to be completed in the winter period without payment of winter fees.

21.06 PERMIT - NO TRANSFER OR ASSIGNMENT:

Permits shall not be transferable or assignable, and work shall not be performed under a permit in any place other than that specified in the permit. Nothing herein contained shall prevent a Permittee from subcontracting the work to be performed under a permit; provided, however, that the holder of the permit shall be and remain responsible for the performance of the work under the permit, and for all bonding, insurance and other requirements of this Chapter and under said permit.

21.07 COMPLIANCE WITH SPECIFICATIONS, STANDARDS, TRAFFIC-CONTROL REGULATIONS; SITE PERMITTEE IDENTIFICATION:

The work performed in the Public Way shall conform to the requirements of the Engineering and Standard Specifications and Drawings, copies of which shall be available from the Director, kept on file in the office of the City Recorder and are open to public inspection during office hours.

Where a job site is left unattended, before completion of the work, signage with minimum two inch high letters shall be attached to a barricade or otherwise posted at the site, indicating the Permittee's name, or company name, telephone number, and after hours telephone number.

All excavations shall be conducted in a manner resulting in a minimum amount of interference or interruption of street or pedestrian traffic. Inconvenience to Residents and Businesses fronting on the Public Way shall be minimized. Suitable, adequate and sufficient barricades and/or other structures will be available and used where necessary to prevent accidents involving property or Persons. Barricades must be in place until all of the Permittee's equipment is removed from the site and the excavation has been backfilled and proper temporary gravel surface is in place, except where backfilling and resurfacing is to be done by the City; in which case the barricades, together with any necessary lights, flares or torches, must remain in place until the backfill work is actually commenced by the City. From sunset to sunrise, all barricades and excavations must be clearly outlined by adequate signal lights, torches, etc. The Police Department and Fire Department shall be notified at least 24 hours in advance of any planned excavation requiring street closure or traffic detour.

21.08 OTHER HIGHWAY PERMITS:

Holders of permits for work on highways owned or under the jurisdiction of other government entities, but located within the City limits, shall not be required to obtain permits from the City under the provisions of this Chapter, unless the work extends beyond the back side of the curb, or beyond any other designated jurisdictional boundary. Any City permit shall not be construed to permit or allow work on a County road on a State highway within the City without an applicable County or State permit.

The Director, in his or her discretion, shall have the right and authority to regulate work under permits issued by other governmental entities with respect to hours and days of work, and measures required to be taken by the Permittee of said governmental entity for the protection of traffic and safety of Persons and property. Notwithstanding the foregoing, nothing in this Chapter shall be construed to impose any duty, implied or express, on the City or its employees, officers, agents or assigns, relative to the protection of traffic and safety of Persons or property, arising out of the issuance of any permit issued by government entities other than the City, or arising out of any work performed on any Public Way owned or within the jurisdiction of the City.

21.09 RELOCATION OF STRUCTURES IN PUBLIC WAYS:

The Director may direct any Person owning or maintaining facilities or structures in the Public Way to alter, modify or relocate such facilities or structures as the Director may require as set forth herein. Sewers, pipes, drains, tunnels, conduits, Pipe Driveways, vaults, trash receptacles and overhead and underground gas, electric, telephone, telecommunication and communication facilities shall specifically be subject to such directives. The Person owning or maintaining the facilities or structures shall, at their own cost and expense and upon reasonable written notice by the City, promptly protect, or promptly alter or relocate such facilities or structures, or part thereof, as directed by the City. In the event that such Person refuses or neglects to conform to the directive of the City, the City shall have the right to break through, remove, alter or relocate such part of the facilities or structures without liability to such Person. Such Person shall pay to the City all costs incurred by the City in connection with such work performed by the City, including also design, engineering, construction, materials, insurance, court costs and attorneys fees.

Any directive by the Director shall be based upon of the following:

1. Input from the City Engineer and Public Works Department.

2. The facility or structure was installed, erected or is being maintained contrary to law, or determined by the Building Official to be structurally unsound or defective;

3. The facility or structure constitutes a nuisance as defined under State statute;

4. The permit under which the facility or structure was installed has expired or has been revoked;

5. The Public Way is about to be repaired or improved and such facilities or structures may pose a hindrance to construction; or

6. The grades or lines of the Public Way are to be altered or changed.

Any directive of the Director/Public Facilities Inspector under this Section shall be under and consistent with the City's police power. Unless an emergency condition exists, the Director/Public Facilities Inspector shall make a good faith effort to consult with the Person regarding any condition that may result in a removal or relocation of facilities in the Public Way to consider possible avoidance or minimization of removal or relocation requirements and provide the directive as far enough in advance of the required removal or relocation to allow the Person a reasonable opportunity to plan and minimize cost associated with the required removal or relocation.

This obligation does not apply to facilities or structures originally located on private property pursuant to a private easement, which property was later incorporated into the Public Way, if that prior private easement grants a superior vested right.

Any Person owning or maintaining facilities or structures in the Public Way who fails to alter, modify or relocate such facilities or structures upon notice to do so by the Director/Public Facilities Inspector shall be guilty of a class C misdemeanor. All costs of alteration, modification or relocation shall be borne by the Person owning or maintaining the facilities or structures involved.

The City may, at any time, in case of fire, disaster or other emergency, as determined by the City in its reasonable discretion, cut or move any parts of the System and appurtenances on, over or under the Public Way, in which event the City shall not be liable therefore to a Person. The City shall notify a Person in writing prior to, if practicable, but in any event as soon as possible and in no case later than the next business day following any action taken under this subsection.

21.10 IMPACT OF EXCAVATION ON EXISTING IMPROVEMENTS:

If any sidewalk or curb ramp is blocked by excavation work, a temporary sidewalk or curb ramp shall be constructed or provided. Said temporary improvement shall be safe for travel and convenient for users, and consistent with City standards for such.

Where excavations are made in paved areas, the surface shall be replaced with a temporary gravel surface until such time as the permanent repairs are completed.

Protection of personal property of a private property owner or city is the responsibility of the permitee.

1. At any time a Permittee disturbs the yard, residence or the real or Personal property of a private Property Owner or the City, such Permittee shall insure that such property is returned, replaced and/or restored to a condition that is comparable to the condition that existed prior to the commencement of the work.

2. The costs associated with the disturbance and the return, replacement and/or restoration shall be borne by the Permittee. Further, a Permittee shall reimburse a Property Owner or the City, for any actual damage caused by the Permittee, its subcontractor, or its independent contractor, in connection with the disturbance of such property. However, nothing in this Subsection shall require the Permittee to pay a subscriber or private Property Owner when that subscriber or private Property Owner requests that the Permittee remove, replace or relocate improvements associated with the service provided by the Permittee to the Property Owner and when the Permittee exercises due care in the performance of that service, or when the subscriber or private Property Owner provided false information to the Permittee on which the Permittee relied to its detriment.

Examples of types of acts specifically included in this Section are the following:

1. Removal of sod, lawn, shrubbery, flowers, trees, driveways, or fence, to install, trench, repair, replace, remove or locate, equipment, cable or other Appurtenances of the Permittee;

2. Installation or removal of equipment or other Appurtenances of the Permittee's System within a private Property Owner's property or residence which requires drilling, excavating, plastering, or the like on the part of the Permittee;

3. Temporarily relocating or moving a piece of personal property or a fixture of a private Property Owner (such as a motor vehicle, fence, air conditioning, heating unit, or the like) in order to perform some sort of construction, maintenance or repair by the Permittee; or

4. Permanently removing a Permittee's equipment or other Appurtenances due to the revocation, termination or non-renewal of the franchise (if applicable).

Existing drainage channels, such as gutters or ditches, shall be kept free of dirt or other debris so that natural flow will not be interrupted. When it is necessary to block or otherwise interrupt flow of the drainage channel, a method of rerouting the flow must be submitted for approval by the Director prior to the blockage of the channel.

The requirements imposed upon the Permittee extend to any subcontractor or independent contractor that the Permittee might employee to perform the tasks pursuant to the permit.

The requirements of this Section shall not apply to the removal by a Permittee, of a permanent structure placed by a Property Owner in a Public Way, unless such Property Owner has received prior written permission from the City granting the Property Owner the right to install a permanent structure on a Public Way, and such written permission has been recorded in the office of the County Recorder.

21.11 RESTORATION OF PUBLIC PROPERTY:[1]

1. The Permitteee shall, at its own expense, restore the surface of any Public Way to its original condition and replace any removed or damaged pavement with the same type and depth

of pavement as that which is adjoining, including the gravel base material or as stated in 15.05.4 whichever is greater.

2. Each applicant shall:

a. For single excavated areas less than fifty feet (50') in length and twenty feet (20') in width, all materials that are dug out of the trench or excavation shall be hauled off and disposed of at an approved site. The trench or excavation shall be refilled with new crushed road base and compacted to ninety six percent (96%) and made ready for the asphalt finish surface. The trench or excavation shall be patched by the contractor with a minimum of three (3) inches of asphalt or as outlined in Section 15.04.1 whichever is greater.

b. Before any excavation begins under this permit and at all times during the excavation, make proper provisions for protecting the public with necessary guards, barricades, lights, signals and with all other appurtenances necessary to safeguard the lives and property of the users of such roadway, sidewalk and other facilities. Visible flasher lights shall be used in hours of darkness.

c. Be responsible for any liability or personal injury resulting from neglect. The applicant shall indemnify Clinton City against all claims, demands, costs, damages, attorney's fees or other expenses of any kind occasioned by such neglect. The applicant shall, upon request of the City, produce evidence of insurance adequate to cover such claims.

d. Be responsible for restoring all Public Ways, including sidewalk surfaces, curb and gutter, driveways, ditches, and other landscaping, to their original condition in a manner conforming to current Clinton City specifications.

e. On any project, regardless of the age or condition of the pavement, keep excavations to a minimum and, wherever possible, locate excavations so that one "common" patch can cover as many excavations as possible.

f. Restore roads to a passable and safe condition within sixteen (16) hours. All remaining repairs and restoration shall take place within ten (10) calendar days from the date of the first excavation, except as outlined herein for winter restoration. All debris generated as a result of said excavation will be removed immediately from the area upon completion of the excavation. If, within the standard ten (10) days, or other time period authorized by the City Public Facilities Inspector, the road cut or excavation has not been repaired as required, Clinton City may revoke the excavation bond and cause the repairs to be made. The costs of repair shall include administrative costs. The Permitteee shall be responsible for trench maintenance for one (1) year after the date it was inspected and approved by the City Public Facilities Inspector. If repair of the road cut or trench is necessary within the one-year period, the City shall notify the Permitteee in writing with a copy provided to the Bonding Agent, if applicable. If the defects are not corrected within thirty (30) days after the City sends the notice, the City may revoke the excavation bond and cause the repairs to be made. The guarantee funds shall be applied toward 1) construction or installation of the improvements in accordance with City standards; or 2) repair of the improvements to bring them into conformity with City standards; and 3) for payment of legal costs and administrative charges incurred or assessed by the city. Notwithstanding the foregoing, the Permitteee will remain liable to the City for any deficiency after application bond and shall pay the difference to the City on demand. The City may refuse all future road cut permit request to the Permitteee or any company that the Permitteee may represent if funds are owed to the City for necessary repairs.

g. Winter restoration shall consist of "cold patch repairs" as outlined by the City Public Facilities Inspector. The Permitteee shall remove all cold patch repairs as soon as conditions are in compliance with the Clinton City Engineering and Standard Specifications and Standard Drawings and as authorized by the City Public facilities Inspector. Permitteee shall remove and replace all cold patch repairs within ten (10) days of notice by the City that conditions are acceptable. Once work on replacing the cold patch has started all remaining repairs and restoration shall take place within ten (10) calendar days from the date work recommenced. All debris generated as a result of said excavation will be removed immediately from the area upon completion of

the excavation. If, within the standard ten (10) days, or other time period authorized by the City Public Facilities Inspector, the cold patch has not been repaired as required, Clinton City may revoke the excavation bond and cause the repairs to be made. The costs of repair shall include administrative costs. The Permitteee shall be responsible for trench maintenance for one (1) year after the date of inspection for replacement of the cold patch has been approved by the City Public Facilities Inspector. If repair of the road cut or trench is necessary within the one-year period, the City shall notify the Permitteee in writing with a copy provided to the Bonding Agent, if applicable. If the defects are not corrected within thirty (30) days after the City sends the notice, the City may revoke the excavation bond and cause the repairs to be made. The guarantee funds shall be applied toward 1) construction or installation of the improvements in accordance with City standards; or 2) repair of the improvements to bring them into conformity with City standards; and 3) for payment of legal costs and administrative charges incurred or assessed by the city. Notwithstanding the foregoing, the Permitteee will remain liable to the City for any deficiency after application bond and shall pay the difference to the City on demand. The City may refuse all future road cut permit request to the Permitteee or any company that the Permitteee may represent if funds are owed to the City for necessary repairs.

h. All repairs required within the one-year guarantee period shall be commenced within ten (10) days of notification by the city and all work completed within ten (10) days from the date repairs are initiated, or other time period authorized by the City Public Facilities Inspector.

i. If in the determination of the City Engineer or authorized representative repairs are required sooner than outlined in “h” above due to public health, safety, and/or welfare the City will call the Permittee if possible in an attempt to have the Permittee make repairs immediately. If repairs can not or are not made by the Permittee within a satisfactory time period the City will go ahead with repairs and bill the cost of such repairs, to include but not be limited to material, man hours and equipment hours to the Permittee. If the Permittee does not repay the City within thirty (30) days of invoice, the City may revoke the excavation bond for payment of repairs made. The guarantee funds shall be applied toward 1) construction or installation of the improvements in accordance with City standards; or 2) repair of the improvements to bring them into conformity with City standards; and 3) for payment of legal costs and administrative charges incurred or assessed by the city. Notwithstanding the foregoing, the Permitteee will remain liable to the City for any deficiency after application bond and shall pay the difference to the City on demand. The City may refuse all future road cut permit request to the Permitteee or any company that the Permitteee may represent if funds are owed to the City for necessary repairs.

j. Limit the trench length left at grade but unpaved to a maximum of one thousand feet (1000'). No excavation shall be allowed to continue until the one thousand feet (1000') of trench has been restored with proper asphalt surface, and inspected and accepted by the City.

k. All excavations of twelve inches (12“) or less in width shall be required to use flowable fill prior to the application of an asphalt-finished surface.

l. All excavation, when refilled, shall be compacted to ninety-six percent (96%). The contractor shall submit tests to the City confirming that compaction.

m. Bore pits adjacent to or which may be hazardous to traffic shall not be left open or unshielded (covered) overnight. Shielding in conformance with the appropriate OSHA and Federal Highway Administration Manuals shall be allowed in the case of large pits or extensive bore and jack operations. Small bores under two lane roadways should be completed in one continuous operation.

n. Common trenching shall be required in all subdivisions, unless otherwise approved or accepted by the City Public Facilities Inspector.

o. All utility excavation shall be bored whenever possible.

3. For any asphalt surface three years old or less, new asphalt must be provided for the length

of the cut and the width of all lanes affected by the construction or other activity. For any asphalt surface where thirty percent (30%) or more of the width of any lane is affected by the construction or other activity, new asphalt shall be provided for the length of the cut and the width of all lanes affected. For all other asphalt surfaces, new asphalt shall be provided for the length and width of the affected area as required in this chapter. The City Public Facilities Inspector may require that the surface of the street receiving new asphalt be rotomilled prior to resurfacing. For the purpose of this section a lane is determined to extend from edge of asphalt or curb to the center of the right-of-way.

21.12 RESTORATION OF PRIVATE PROPERTY:

The Permittee shall, at its own expense, restore any Private Property to its as good or better than the original condition and replace any removed or damaged vegetation, surfaces, systems, structures or other private property. All restoration shall conform to the quality and material originally installed and shall be accomplished within the time limits set forth in the permit, unless the Department grants additional time in writing.

The Permittee shall obtain and provide to the city written acceptance by the owner of any restored property indicating that the owner accepts all work conducted and holds the City harmless for any discrepancies related to the restored property.

21.13 INSURANCE REQUIREMENTS.

Before a permit is issued, the Applicant shall furnish to the City evidence that such Applicant has a comprehensive general liability and property damage policy that includes contractual liability coverage endorsed with the following limits and provisions or with such alternative limits and provisions as may be approved by the City:

1. A minimum of One Million Dollars ($1,000,000) combined single limit per occurrence for bodily injury, personal injury, and property damage and not less than One Million Dollars ($1,000,000) in the aggregate. The general aggregate limit shall apply separately to the permit, or the general aggregate limit shall be two times the required occurrence limit. The coverage shall be in the nature of Broad From Commercial General Liability coverage. The City Attorney may increase or decrease minimum insurance limits, depending on the potential liability of any project.

2. All policies shall include the City, its employees, officers, officials, agents, volunteers and assigns, as insureds. Any reference to the "City" shall include the City, its employees, officers, officials, agents, volunteers and assigns.

3. The coverage shall be primary insurance as respects the City, its employees, officers, officials, agents, volunteers, and assigns. Any insurance or self-insurance maintained by the City, its employees, officers, officials, agents, volunteers, and assigns shall be in excess of the Permittee's insurance and shall not contribute to or with it.

4. Any Failure to comply with reporting provisions of the policy shall not effect coverage provided to the City, its employees, officers, officials, agents, volunteers, and assigns.

5. Coverage shall state that the Permittee's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

6. Underwriters shall have no right of recovery or subrogation against the City, it being the intent of the parties that the insurance policy so affected shall protect both parties and be primary coverage for any and all losses covered by the described insurance.

7. The insurance companies issuing the policy or policies shall have no recourse against the City for payment of any premiums due or for any assessments under any form of any policy.

8. Each insurance policy shall be endorsed to state that the coverage shall not be suspended, voided, canceled, or reduced in coverage or in limits, except after thirty (30) days' prior written notice by certified mail, return receipt requested sent to the City.

9. Each policy shall be endorsed to indemnify, save harmless and defend the City and its officers and employees against any claim or loss, damage or expense sustained on account of damages to Persons or property occurring by reason of permit work done by the Permittee, his/her subcontractor or agent, whether or not the work has been

completed and whether or not the right-of-way has been opened to public travel.

10. Each policy shall be endorsed to indemnify, hold harmless and defend the City, and its officers and employees against any claim or loss, damage or expense sustained by any Person occurring by reason of doing any work pursuant to the permit including, but not limited to falling objects or failure to maintain proper barricades and/or lights as required from the time work begins until the work is completed and right-of-way is opened for public use.

Insurance is to be placed with insurers with an AM Best rating of no less than an A carrier, with a rating of "7" or higher.

The Permittee shall furnish the City with certificates of insurance and original endorsements affecting coverage required by the permit. The certificates and endorsements for each insurance policy are to be signed by a Person authorized by that insurer to bind coverage on its behalf. The City expressly reserves the right to require complete, certified copies of all required insurance policies at any time. Consequently, the Permittee shall be prepared to provide such copies prior to the issuance of the permit.

If any of the required policies are, or at any time become, unsatisfactory to the City as to form or substance, or if a company issuing any such policy is, or at any time becomes, unsatisfactory to the City, the Permittee shall promptly obtain a new policy, submit the same to the City for approval, and thereafter submit verification of coverage as required by the City. Upon failure to furnish, deliver and maintain such insurance as provided herein, the City may declare the permit to be in default and pursue any and all remedies the City may have at law or in equity, including those actions outlined in this Chapter.

The Permittee shall include all subcontractors as insured under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

Any deductibles or self-insured retentions shall be declared to and approved by the City. At the option of the City, either the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the City, its employees, officers, officials, agents, volunteers or assigns, or the Permittee shall procure a bond, in a form acceptable to the City, guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

A Property Owner performing work adjacent to his/her residence may submit proof of a homeowner's insurance policy in lieu of the insurance requirements of this Section.

A Provider may be relieved of the obligation of submitting certificates of insurance under the following circumstances:

1. If such company shall submit satisfactory evidence in advance that:

a. It is insured in the amounts set forth in this Chapter, or has complied with State requirements to become self-insured. Public utilities may submit annually evidence of insurance coverage in lieu of individual submissions for each permit; and

b. Said coverage provides to the City the same scope of coverage that would otherwise be provided by a separate policy as required by this Chapter; or

2. The work to be performed under the permit issued to the Applicant is to be performed by the City, in which case insurance or other risk transfer issues shall be negotiated between the City and the Applicant by separate agreement.

21.14 BOND - WHEN REQUIRED, CONDITIONS, WARRANTY:

Except as noted in this Chapter, each Applicant, before being issued a permit, shall provide the City with an acceptable security (this may include a corporate surety bond, cash bond or letter of credit, as determined by the City) in an amount to be established by the City Council by resolution to guarantee faithful performance of the work authorized by a permit granted pursuant to this Chapter. The amount of the security required may be increased or decreased at the discretion of the Council whenever it appears that the amount and cost of the work to be performed, and not satisfactorily completed, may vary from the amount of security otherwise required under this Chapter. The form of the security and the entity issuing the security shall be subject to the approval of the City Attorney.

Public utilities franchised by the City shall not be required to file any security if such requirement is expressly waived in the franchise documents.

The security required by this Section shall be conditioned as follows:

1. That the Permittee shall fully comply with the requirements of the City ordinances and Regulations, Specifications and standards promulgated by the City relative to work in the Public Way, and respond to the City in damages for failure to conform therewith;

2. That after work is commenced, the Permittee shall proceed with diligence and expedition and shall promptly complete such work and restore the Public Way to Development Standards, so as not to obstruct the public place or travel thereon more than is reasonably necessary;

3. That the Permittee shall guarantee the materials and workmanship for a period of two years from completion of such work, with reasonable wear and tear excepted; and

4. That unless authorized by the Director on the permit, all paving, resurfacing or replacement of street facilities on major or collector streets shall be done in conformance with the regulations contained herein within three calendar days, and within seven calendar days from the time the excavation commences on all other streets, except as provided for during excavation in winter or during weather conditions which do not allow paving according to Development Standards. In winter, a temporary patch must be provided. In all excavations, restoration or pavement surfaces shall be made immediately after backfilling is completed or concrete is cured. If work is expected to exceed the above duration, the Permittee shall submit a detailed construction schedule for approval. The schedule will address means and methods to minimize traffic disruption and complete the construction as soon as reasonably possible.

21.15 HOLD HARMLESS AGREEMENT; LIMITATIONS ON CITY LIABILITY:

The Permittee agrees to save the City, its officers, employees and agents harmless from any and all costs, damages and liabilities that may accrue or be claimed to accrue by reason of any work performed under the permit. The issuance and acceptance of any permit under this Chapter shall constitute such an agreement by the Permittee to this Section.

This Chapter shall neither be construed as imposing upon the City, its officers, employees and agents, any liability or responsibility for damages to any Person injured by or by reason of the performance of any work within the Public Way, or under a permit issued pursuant to this Chapter; nor shall the City, its officers, officials, employees, agents, volunteers or assigns thereof be deemed to have assumed any such liability or responsibility by reason of inspection authorized hereunder, the issuance of any permit, or the approval of any work.

21.16 WORK WITHOUT PERMIT – PENALTY:

A stop work order may be issued by the Public Facilities Inspector directed to any Person or Persons doing or causing any work to be done in the pubic way without a permit. The abutting Property Owner shall be responsible for causing work to be done.

Any Person found to be doing work in the Public Way without having obtained a permit, as provided in this Chapter, shall be required to pay a permit fee equal to two times the normal permit fee. For replacement work, where a fee is not normally charged, the normal permit fee for new construction shall apply.

21.17 FAILURE TO COMPLY; DEFAULT IN PERFORMANCE:

Any permit may be revoked or suspended and a stop work order issued by the Public Facilities Inspector, after notice to the Permittee for:

1. Violation of any condition of the permit, the security, or of any provision of this Chapter;

2. Violation of any provision of any other ordinance of the City or law relating to the work; or

3. Existence of any condition or the doing of any act that does constitute, may constitute, or cause a condition endangering life or property.

A suspension or revocation by the Public Facilities Inspector, and a stop order, shall take effect immediately upon entry thereof by the Public Facilities Inspector and notice to the Person performing the work in the Public Way. Notice to

the Person performing the work shall be accomplished when the Public Facilities Inspector has posted a stop work order at the location of the work and written notice has been mailed, return receipt requested, to the address indicated by the Permittee on the permit.

Whenever the Director finds that a default has occurred in the performance of any term or condition of the permit, written notice thereof may be given to the principal and to the surety on the bond, if there is a surety bond. Such notice shall state the work to be done, the estimated cost thereof, and the period of time deemed by the Director to be reasonably necessary for the completion of the work.

In the event that the surety (or principal), within a reasonable time following the giving of such notice (taking into consideration the exigencies of the situation, the nature of the work, the requirements of public safety and for the protection of Persons and property), fails either to commence and cause the required work to be performed with due diligence, or to indemnify the City for the cost of doing the work, as set forth in the notice, the City may perform the work, at the discretion of the City Manager, with City forces or contract forces or both, and suit may be commenced by the City Attorney against the contractor and bonding company and such other Persons as may be liable, to recover the entire amount due to the City, including attorney fees, on account thereof. In the event that cash has been deposited, the cost of performing the work may be charged against the amount deposited, and suit brought for the balance due, if any.

21.18 FAILURE TO CONFORM TO DEVELOPMENT STANDARDS – PENALTY:

For failure to conform to the Development Standards and Regulations, the City may:

1. Suspend or revoke the permit;

2. Issue a stop order;

3. Order removal and replacement of faulty work;

4. Require an extended warranty period; and/or

5. Negotiate a cash settlement to be applied toward future maintenance costs.

21.19 APPEAL OF SUSPENSION, REVOCATION, OR STOP ORDER:

Any suspension, revocation or stop order by the Director may be appealed by the Permittee to the City Council by filing a written notice of appeal within ten days of the action of the Director. The City Council shall hear such appeal, if written request therefore be timely filed, as soon as practicable, and render its decision within a reasonable time following filing of notice of appeal.

21.20 TAMPERING WITH TRAFFIC BARRICADES:

It shall be unlawful for any Person to maliciously or wantonly or without authorization and legal cause, extinguish, remove or diminish any light illuminating any barricade or excavation, or to tear down, remove or in any manner alter any rail, fence or barricade protecting any excavation or other construction site.

21.21 CONFLICT WITH GOVERNING PROVISIONS:[1]

Should there be a conflict between the provisions of this Chapter and the provisions of any other ordinance, agreement, franchise, or other document governing the excavation of a public way, the more restrictive provisions of the aforesaid documents shall apply.

22. ROADWAY LIGHTING

22.01 GENERAL:

All outdoor artificial street illuminating devices shall be installed in conformance with the provisions of this ordinance, and applicable provisions of the Zoning Ordinance, the national Electric Code and the national Electric Safety Code. The spacing and arrangement of streetlights will be designed during the preliminary plat or sight plan review phases of a development.

22.02 APPROVED MATERIALS AND METHODS OF INSTALLATION:

The provisions of this ordinance are to prevent the use of any material or method of installation not specifically prescribed by this ordinance. The Director must approve any proposed alternatives.

1. Lamp Source:

High Pressure Sodium is the lamp source that will be utilized throughout the city for all roadway lighting.

2. Deviations:

Any material or method of installation not specifically prescribed in this article will be evaluated by the appropriate Director as stated above, for approval based on the following criteria:

a. It provides equivalence to the applicable specific requirements of this ordinance.

b. It is otherwise satisfactory in complying with the intent of this ordinance.

c. The plans, and variants to this ordinance for proposed lighting schemes, will be submitted to the Community Development Department for approval, and shall be sufficiently complete with all variants from this ordinance noted, to enable the Director, and/or Public Works Director, to readily determine whether compliance with the intent of this ordinance will be secured.

3. Variances:

Any person desiring to install an outdoor lighting fixture in violation of this Ordinance may apply to the City Council with recommendation from the Planning Commission for a variance from the regulation in question by applying through the Community Development Department.

22.03 ROADWAY LIGHTING:

1. Non-decorative Poles and Heads:

Non-decorative poles and heads shall only be utilized in the city where, upon the recommendation of the Planning Commission and approval of the City Council a specific lighting plan has been approved.

a. All roadway pole mounted fixtures shall not be mounted above thirty (30) feet, as measured from the top of the fixture to the adjacent grade or the horizontal plane being lit by the fixture.

b. The fixture should house a high-pressure sodium lamp, with a cut-off lens and no more than 150 watts/pole.

c. Fixtures will be standard equipment installed by UP&L, serviced and maintained by them.

2. Decorative Poles and Heads:

Decorative poles and heads shall be installed as outlined on plans approved through the Community Development Department.

a. All decorative roadway pole mounted fixtures shall not be mounted above eighteen (18) feet, as measured from the top of the fixture to the adjacent grade or the horizontal plane being lit by the fixture.

b. The fixture should house a high-pressure sodium lamp, with no more than 150 watts/pole.

c. Decorative roadway application fixtures should utilize highly refractive globes, which

have a minimum of 85 horizontal and 345 vertical prisms, to evenly direct the light, and evenly diffuse the light source. The fixture should have the ability to have internal light directing reflectors that can be field installed after fixture installation, to accommodate customization of the lighting output, and/or to redirect unwanted light to the traffic area.

d. The fixture should have photometrics so that when used on a 40 foot wide road, and placed on opposing 180 feet spacing, mounted on a 18 foot pole with a type III distribution, and 150 watt hps head, the following horizontal foot-candles should be produced on the roadway; (Using a .85 light loss factor)

i. Average Maintained = 1 foot-candle or more

ii. Maintained minimum = .4 foot-candles or more

iii. Max/Min Uniformity = 4.54 or less

e. At 40 feet away from the pole, the roadway should not have less than .1 horizontal foot-candle minimum maintained at any point on the road, and 1.5 vertical foot-candles as measured from ground level to six feet above the ground, in the middle of the road.

f. The refractor should be made of acrylic, and should be available in type III, and IV distributions, with a reflector in the top to eliminate uplight, and redirect the light downward towards the surface and a house light shield. It sets in die-cast aluminum polyester powdercoated pod, which will allow easy access to all of the internal electrical components. It should have internal twist-lock style photocell receptacle when needed, and, quick release wiring components on the socket, ballast, and igniter, with a Ground Fault Interrupted outlet mounted on the pod. Approved Manufacturers are as follows;

i. Hadco Streetscapes Refractive Globes UT33A150SE-150HPS style or Equal.

g. Light Posts: Light posts shall be sixteen (16) foot tall, 5”X3” smooth tapered aluminum pole with a .125” wall thickness. Bolt circle shall be 14” diameter, four (4) bolts, 90° apart, with a decorative base 12 3/4” square X 45” high, with a three (3) inch outside diameter fitter. Aluminum is to be polyester powdercoated black.

i. Hadco Streetscapes Posts - 2520 style or Equal.

3. <u>Road Light Levels</u>:

Roadway Lighting Maximum Levels, (as measured at the horizontal plane being lit).

a. The maximum point should not exceed 6 foot-candles within the circulation area being lit.

b. The average light level should not exceed 1 foot-candle within the circulation area being lit.

c. No more than 1 foot-candle will be allowed outside of 20 feet of the circulation area being lit.

d. No more than .05 foot-candles will be allowed outside the property lines of the easement.

e. No more than .01 foot-candles should be allowed to spill on any residential property as a result of another party lighting their own property.

22.04 WIRING:

1. <u>Lamp and Pole Wiring</u>:

All internal wiring of the lamps shall be accomplished at the manufacturer’s facilities. No alterations or modifications shall be accomplished as part of the instillation of the lamps.

2. <u>Applicable Codes</u>:

All underground wiring shall be accomplished in accordance with the National Electric Code as adopted by the State of Utah.

3. <u>Wire or Cable</u>:

Wire shall be a minimum eight (8) gauge copper wire and shall have appropriate coatings as required by the current Electrical Code. Wire and

cable placed in conduit or direct burial shall be rated for the applicable use.

4. Ground:

Pole will be grounded to grounding rod set in the footing as outlined in the Standard Drawings. Neutral line shall not be connected to the pole.

5. Depth of Bury:

Direct burial cable, conductors and non-metallic raceways shall be a minimum of twenty-four-inches (24") below the top back of curb or finished grade which ever is lower. All cable or conduit shall be inside a raceway where less than twenty-four-inches (24") below the top back of curb or finished grade which ever is lower. Cables, conductors, and raceways shall have their location identified by a warning ribbon that is placed in the trench at least twelve-inches (12") above the underground installation.

6. Splices and Taps:

Buried conductors or cables, either contained in a non-metallic raceway or direct bury shall have no splices or taps.

7. Backfill:

Backfill that contains large rocks, paving materials, cinders, large or sharply angular substances, or corrosive materials that may damage raceways, cables, or conductors or prevent adequate compaction of fill or contribute to corrosion of raceways, cables, or conduits shall not be utilized.

8. Raceway Seals:

Conduits or raceways through which moisture may contact energized live parts shall be sealed or plugged at both ends.

22.05 APPLICATION:

1. Responsibility:

Any person, developer or other entity applying for a subdivision shall be required to install outdoor street lighting fixtures, said person shall submit evidence that the proposed work will comply with this ordinance, or, take full responsibility for compliance.

2. Requirements:

The application shall contain, but not be limited to the following; (not required if a person will be installing the specific unit outlined in Section 20.05.2.5 above):

a. Plans indicating the location on the premises, and the type of illuminating devices, fixtures, lamps, supports, and other devices.

b. Description of the illuminating devices, fixtures, lamps supports, and other devices. This description may include but is not limited to manufacturers specifications and drawings including sections where required.

c. Photometry data such as that furnished by manufacturers, or similar, showing the angle of cutoff of light emissions for the proposed luminaire(s).

d. Computer generated point-to-point calculation on a scaled site plan indicating conformance to this Ordinance.

e. Such other information as the Director may determine is necessary to ensure compliance with this Ordinance.

f. When a development wishes to install equipment other than the unit outlined in Section 20.05.2 the city may require that the developer provide a maintenance supply of replacement equipment and parts that are not standard with the unit outlined.

3. Preliminary Design:

At the time of Preliminary Plat approval the City will provide a street lighting plan to the developer based upon the unit outlined in Section 20.05.2 or specific unit submitted by the developer as outlined in Section 20.06.2 above.

23. STREET SIGNAGE

23.01 GENERAL:

Street and informative signs dealing with traffic control and information shall be designed with cooperation between the developer and the City.

23.02 LAYOUT AND DESIGN:

The layout, design and requirement for all street signage will be determined during platting or site plan design portion of a project. The Director or his designee will determine street numbers and addresses while accomplishing the project review procedures. The requirement for caution, hazard, speed and other information signs will also be determined during the project review process.

23.03 SIGN PROCUREMENT:

The Developer/Contractor for any given project is responsible for the procurement of all street signage required within a project area or outside of a project area if the need for the sign is determined to be due to the nature of the project being developed.

1. **UDOT Required Signage:**

   All signage required for UDOT roadways shall be acquired by the developer through the UDOT District One offices.

2. **City Road Signage:**

   The Developer/Contractor shall purchase through the city all signage for City streets. City crews will install all road signage required as part of a project.

24. OTHER REQUIREMENTS

24.01 MAILBOXES:

When mailboxes are to be installed as a part of the design of a development or where a requirement for mailboxes exists as outlined in Clinton City Zoning Ordinance and Clinton City Subdivision Ordinance the following guidelines shall apply.

1. <u>Conventional Residential Subdivisions</u>:

a. The design of mailboxes or mailbox support installed by a developer shall be reviewed during the development of the preliminary plat.

b. Mailbox support shall be of sufficiently strong to support the box(es), however; it shall not present a hazard to traffic or pedestrian travel.

c. Mailboxes and mailbox supports shall be located in the parkstrip as outlined in the Zoning Ordinance or in other approved location designated for the pick-up and delivery of mail for a group of residences or structures. Areas for general delivery and pick-up of mail will be designated during the preliminary plat design of a subdivision or development.

d. The maximum depth of the mailbox and support shall not exceed 24". This is to prevent the mailbox interfering with pedestrian traffic on the sidewalk.

e. The mailbox support shall be designed to facilitate newspaper delivery.

2. <u>Non-Conventional Residential Subdivisions</u>:

The design of mailboxes in other than conventional residential subdivisions; planned developments of residential, multi-family, commercial or other use shall have the type and design of the mailbox or mail delivery system determined at the time of preliminary plat or site plan review.

24.02 DUMPSTERS:

All construction sites shall be provided with a dumpster or other means of controlling trash accumulation approved by the Director. Dumpsters shall be routinely emptied to keep the area from becoming a nuisance due to odors, insects or other undesirable conditions.

24.03 SANITARY FACILITIES:

Construction sites shall be provided with a minimum of one portable potty. Portables will also be provided in a quantity suitable for the number of workers on the site, (one unit per every 10 workers, working a 40 hour work week, at the site). Where a site is large the number of units may need to be increased above the standard worker to unit ratio because of travel distance.

24.04 FENCES:

Fences required as part of the processing of a subdivision shall comply with the requirements of this section unless other specific requirements are established as part of the approval process.

1. <u>Chain Link Fence</u>:

a. The fabric is to be chain link that has been galvanized after weaving with a minimum of 1.2 oz. Per square foot of wire surface. Fence shall be six-foot (6') high, eleven (11) gauge with two-inch (2") mesh.

b. All steel pipe members shall conform to the requirements of ASTM designation A-120, Schedule 40, hot dipped zinc coated steel pipe.

c. All posts shall be set in concrete and shall be topped with ball type or other approved ornament.

d. All end, corner, or pull posts shall be eight-foot (8') in length with a minimum diameter of 2 3/8 inches. All line posts shall be eight-foot (8') in length with a minimum diameter of 1 7/8 inches.

e. When required, privacy slats shall be of flat, tubular construction manufactured from

virgin polyethylene containing an ultraviolet inhibitor. The slats shall be retained by a retaining channel at the bottom of the fence fabric.

f. A #9 gauge tension wire, straight wire shall be installed at the bottom of the fence.

g. Gates required as part of the fence shall be as follows:

Gate Posts And Gate Frames			
Height	Gate Opening	Gate Post Sch. 40	Gate Frame 16 Ga.
6-Feet	Single to 4' or Double to 8'	2 3/8"	1 5/8"
	Single over 4' to 12' or double over 8' to 24'	2 7/8"	1 5/8"
	Single over 12' to 18' or double over 24' to 36'	4"	1 5/8"
	Single over 18' or double over 36'	8 5/8"	1 7/8"

h. Top rails shall be installed in all fences, 1 3/8" diameter.

i. Truss rods, 3/8" diameter shall be located at each end bay, corner and in all gates. Gates over eight-feet shall have two truss rods.

j. Prior to installation of posts or fencing the earth under the proposed fence shall be graded to natural grade and in as even a grade as is practical. Chain link shall be placed so that it is one-inch over natural ground or six-inches over a concrete under structure or mow-strip.

k. Fencing shall be placed so that twist ends or barbs are on the bottom of the fence.

2. <u>Other Fencing</u>:

The design and installation of other fencing, vinyl, block, etc. that may be required as part of the approval process shall be approved during the approval or by the Director. Design and installation shall meet good workman like practices and standards established by the industry. As a minimum fences shall be designed to withstand natural loading that may be placed upon them such as wind and seismic conditions.

24.05 SURVEY MONUMENTS.

Survey monuments shall be installed as indicated on the approved plans and drawings. Survey monuments include but are not limited to; protected monuments; unprotected monuments; and curb referencing.

1. <u>Protected monuments</u>:

Typically located in major streets a 2 1/2 " brass cap and anchor placed with a monument casting ring and cover with a concrete ring and base. Reference standard drawings.

2. <u>Unprotected monument</u>:

Typically located in minor streets a 2 1/2 " brass cap and anchor placed in a concrete base. Cap is to be set below finish pavement level to prevent damage from snow removal equipment. Reference standard drawings.

3. <u>Curb references</u>:

Curbs shall be marked with the location of side lot property lines with a nail or rivet shot into the top of the curb fronting the property.

25. AMENDMENTS

25.01 PURPOSE AND INTENT:

This Chapter lists ordinances which have effected a change upon this ordinance and the standard drawings when an ordinance is required as outlined in Chapter 1.

25.02 AMENDMENTS:

Amendments made to the Engineering and Standard Specifications and Standard Drawings are indicated by footnotes and references are as follows:

1. Ordinance 02-01E adds administrative procedures; amends bond requirements, references to untreated base course, trench repair requirements; rewrites restoration of public property; and, amends standard drawings. Adopted November 26, 2002.

2. Ordinance 05-01E adds minimum clearances between culinary water and sewer mains, replaces different pipe colors with magnetic tape on sewer and land drain laterals, stipulates manhole spacing and when 60” manholes are required rather than 48”. Adopted February 8, 2005.

26. VALIDITY, NOTICES AND EFFECTIVE DATE

26.08 VALIDITY:

This ordinance is a codification and complete rewrite of the existing Ordinance No. 85-1D, The Development Standards of the City of Clinton.

26.09 CONFLICT WITH GOVERNING PROVISIONS:

Should there be a conflict between the provisions of this Chapter and the provisions of any other ordinance, agreement, franchise, or other document governing the excavation of a Public Way, the more restrictive provisions of the aforesaid documents shall apply.

26.10 VIOLATION – PENALTY:[1]

1. Any person, firm, or corporation, whether as principal, agent, employee or otherwise, violating or causing or permitting the violation of any of the provisions of this Ordinance or failure to comply with an order of suspension, revocation, correction, restoration, repair, stop work or other direction from the Public Facilities Inspector or his representative, shall be guilty of a Class C misdemeanor unless otherwise classified in the Utah Code Annotated.

2. The violation of any provision of this code or any other ordinance of the city shall be punishable by fines and imprisonment according to state law.

3. Every day any violation of this code, or any other ordinance of the city, law, rule or regulation in conjunction with this Ordinance shall continue, it shall constitute a separate offense.

4. No criminal conviction shall excuse the Person from otherwise complying with the provisions of this Chapter.

26.11 SEVERABILITY:

In the event that any provision of this Ordinance is declared invalid for any reason, the remaining provisions shall remain in effect.

26.12 RECENSSION:

Upon adoption of this ordinance Clinton City Ordinance Number 85 – 1D, The Development Standards of the City of Clinton is rescinded along with all changes and amendments.

26.13 OFFICE OF RESPONSIBILITY:

The Community Development Director is charged with management of this ordinance. All recommended changes to this ordinance are to be processed through the Community Development Department.

26.14 EFFECTIVE DATE:

This Ordinance shall take effect upon its adoption and posting.

Chapter 27. Telecommunication Cable

9-27-1 General: This section covers installation of Underground Cables (Telecommunications and Fiber Optics) within the public right of way or in a public utility easement (PUE).

9-27-2 Permit Required: An Excavation Permit shall be obtained from Clinton City Public Works prior to commencing any installation of telecommunication conduits or cables.

(1) A permit application shall include the following:

(a) Plans showing the entire area where conduit is to be installed. Plans shall meet and show the following;

(b) Drawings shall be drawn to scale: 1"=20' or 40' horizontal; 1"=2' or 4' vertical;

(c) All existing and proposed infrastructure that the proposed construction would cross. To include but not be limited to storm drains, irrigation lines, sanitary sewer lines, waterlines, services, conduit systems and underground utilities;

(d) Minimum six (6) foot parallel separation from city infrastructure;

(e) Profile designs shall provide a minimum of 24 inches of vertical clearance between the outer edges of the conduit being bored to any city infrastructure;

(f) Clearances to all other utilities shall be a minimum of 12 inches;

(g) Identify all utility crossings (inclusive of water and sewer services) of the proposed conduit.

(h) An accurate profile for the conduit;

(i) Location of all surface infrastructure.

(2) Fees shall be paid as established, by resolution, by the Clinton City Council and published in the Clinton City Consolidated Fee Schedule.

(3) Any changes to the alignment as shown on the Approved for Construction Drawings of more that 6" must be approved by the City Engineer or his appointed representative.

9-27-3 Cable Installation:

(1) Telecommunications Trunk Lines.

(a) Conduit containing cable(s) providing telecommunications service by connecting regions or states or by connecting central offices within a metropolitan area, known as "Trunk Lines," shall be installed as described below:

(i) All cable being installed within an open trench shall be placed within an HDPE SCH 40 conduit;

(ii) Minimum depth of the conduit shall be 48 inches;

(iii) A 6-inch thick flowable fill cap shall be poured above the conduit;

(iv) Color coded plastic warning tape with a minimum thickness of 5 mil and a minimum width of 3 inches shall be installed in the trench above and centered over the flowable fill cap at a depth of 12 to 26 inches below the surface;

(b) Conduits crossing under existing paved streets may be accomplished by jacking or boring if authorized by the City Engineer.

(2) Telecommunications cables other than Trunk Lines.

(i) All cable shall be installed within an HDPE SCH 40 conduit;

(b) Conduits may be installed by open trench or by jacking or boring with approval from the City Engineer;

(i) Minimum depth of the conduit shall be 36 inches;

(c) Conduits crossing under existing paved streets may be accomplished by jacking or boring if authorized by the City Engineer.

9-27-4 Installation Methods "A" and "B": Two methods are available to a Utility Company for installation of conduit.

(1) Method "A" is the traditional method in which a bore profile for the conduit is shown, including the field verified location (horizontal and vertical) of all existing utilities.

(2) These requirements apply to not only longitudinal and lateral street bores but also utility bores outside paved areas that across existing utilities.

(a) In addition to requirements of § 9-27-2 plans for this method shall include:

(i) Plan and profile view are to include the location of existing utilities and the proposed location of the conduit;

(ii) Location of boring and receiving pits;

(iii) Existing utilities must be potholed in the field and their locations shown accurately on the plans. Pothole locations shall also be identified on the plans.

(iv) Elevations and proposed clearances of all utility crossings and structures including sewer and water lateral service lines.

(3) Method "B" is a two-part approval process in which the Plan Review is completed in the office and the Bore Profile approval is deferred to Field Approval. Method "B" is only allowed upon approval of the City Engineer or his designated representative.

(a) This method has the construction drawing being reviewed and permitted and the Bore Profile approval being deferred to Field Approval.

(b) A permit shall be obtained as outlined in § 9-27-2(1) with the following exception:

(i) Bore Profile: Field verify the exact location of each existing utility within the alignment before crossing (no blind boring) and with the approval of the engineer or his designated representative, install the conduit according to the alignment identified on the "Approved for Construction Drawing".

(ii) Changes to the alignment as shown on the Approved for Construction Drawings of more that 6" must be approved by the City engineer.

9-27-5 As Build Drawings: As built drawings showing the profile of the installed conduit shall be provided to the City before a permit is closed and any bonding is returned.