



City of Hamilton Development Guidebook

February 23, 2011

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INTRODUCTION

This booklet is provided in order to aid you in the development process. The goal is to provide you with all of the information you need to submit development and construction plans that will expedite the review process and the issuance of all required permits.

Please review this information and share it with all in your organization that are involved in the plan submittal process. Please encourage the use of the checklist prior to each submittal of any proposed work to ensure all required information is included.

All plan submittals for major projects and developments should be submitted as eight individual and complete sets of plans. This allows us to route the plans to all the required city departments for review and approval.

If you have questions pertaining to a specific guidebook item, please contact the specific departments as listed below:

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SKETCH PLAN POLICY

Sketch Plans for all Planned Developments, Subdivisions, or projects of five or more lots or five or more acres; shall be submitted to Construction Services, consisting of eight (8) copies and a completed application. Staff is available to meet to discuss the Sketch Plan with the owner, developer, and or said representative, if desired, prior to its official submission.

- Purpose: To allow for the review and modification of proposed developments prior to action being required.
- The Sketch Plan should provide information on site location, such as: adjacent subdivisions, adjacent thoroughfares, or a vicinity map.
- The Sketch Plan shall clearly show the following items and information:
 - 1. The total acreage of the tract to be developed;
 - 2. Proposed use;
 - 3. North point, scale and date of drawings;
 - 4. Lot and roadway dimensions;
 - 5. The location and names of adjacent thoroughfares. Also show where access is planned to the development, including pertinent driveway connections for multi-family, commercial, and industrial uses;

 - 6. Show the existing electric, sanitary sewer, storm sewer, gas lines and water lines which can be confirmed through contact with the appropriate utility department.
 - 7. Proposed drainage location(s). Show any drainage information that may affect the overall development layout including streams, creeks, ponds, etc.
 - 8. Completed Planning Department application with and required fee payable to the City of Hamilton

PRELIMINARY PLAN/PLAT SUBMITTAL

The following information must be shown on all plans submitted for preliminary plat review. Any required information not submitted may result in a request for revisions which will delay the approval of the preliminary plat.

- 1. Completed application with preliminary plat and required fee payable to the City of Hamilton
- 2. Eight (8) black line or blue prints prepared by a registered professional engineer or surveyor, authorized to practice under the laws of the State of Ohio
- 3. A vicinity sketch at 1"=400', drawn on or accompanying the Preliminary Plat showing;
 - a. All existing subdivisions and the street and tract lines, parcels of land; or acreage shown on plans
 - b. The names of record for owners of all parcels immediately adjoining the proposed development and all parcels between it and the nearest existing highways or thoroughfares
 - c. Streets and alleys in neighboring subdivisions or unplatted property, to produce the most advantageous development of the entire neighborhood
- 4. Horizontal scale of the Preliminary Plat at one hundred (100) feet or less to the inch.
- 5. Vertical scale of street and sewer profiles at twenty (20) feet or less to the inch
- 6. Proposed name of the subdivision, which shall not duplicate or closely approximate the name of any other subdivision in Butler County
- 7. The tract designation according to real estate records of the Recorder of Butler County
- 8. The names and addresses of the owner of record, the Sub-divider and the engineer or surveyor
- 9. The names of adjacent subdivisions and the names of record owners of adjacent parcels of unplatted land
- 10. The boundary lines, accurate in scales, of the tract to be subdivided
- 11. The location, widths and names of all existing or platted streets or other public ways within or adjacent to the tract, and other important features such as existing permanent buildings, all existing trees 18-inches in diameter and greater, water courses, railroads, corporation lines, township lines, pipe lines, high tension lines, section lines, etc.
- 12. Existing sewers, water mains, culverts and other underground structures within the tract and immediately adjacent thereto with pipe sizes and grades indicated
- 13. Bench marks and contours, normally with intervals of two (2) feet referenced to U.S.G.S. Datum, or as required by the Planning Commission

- 14. The layout, proposed name and widths of proposed streets, alleys and easements, the layout, numbers and approximate dimensions of proposed lots. (Proposed street names shall not duplicate or closely approximate any existing street names in Hamilton and vicinity except extensions of existing streets. A street may be named avenue, street, lane, drive or court, but not road
- 15. Zoning Boundary Lines, if any; proposed uses of property and proposed front, rear and side yard setback lines
- 16. All parcels of land intended to be dedicated or temporarily reserved for public use, or to be reserved in the deeds for the common use of property owners in the subdivision, with the purpose, condition or limitations of such reservation indicated
- 17. The total acreage of the subdivision
- 18. North point, scale and date
- 19. Copies of any private restrictions to be included in the deeds should be attached to the Preliminary Plat
- 20. A preliminary storm drainage plan on a separate sheet that provides adequate, complete and satisfactory drainage for the entire area being platted for all projected land uses. The storm drainage study and plan information submitted shall include watershed areas, overall design calculations and boundaries, contours at two (2) foot intervals or less and the location and size of all existing and the location of proposed storm sewers, underdrains, inlets, culverts, bridges, creeks, open ditches, swales, existing watercourses to be relocated or abandoned, drainage outlets and their adequacy, and other pertinent drainage facilities. The information submitted shall include adjacent areas, when deemed necessary for design and review purposes.
- 21. All normal title and identifying information shall be shown on the plan along with a statement by the engineer or surveyor certifying that the plan submitted provides adequate and complete storm drainage service for the parts of the entire area being platted and comments on the impact, if any, that the proposed development will have on drainage of adjacent areas. Arrows shall be used to indicate the direction of flow of all drainage.
- 22. Home Owners' Agreement for maintenance of storm drainage facilities and such other infrastructure as appropriate.

**PUBLIC WORKS CONSTRUCTION
PLAN REQUIREMENT CHECKLIST**

The proposed construction plans and the official drainage plan shall include the following required information. Any required information not submitted will result in a request for revisions, which will delay the approval of the construction plans. All improvements to be installed shall be furnished in accordance with the specifications of the official having jurisdiction and shall receive approval of these officials before improvements are installed.

- 1. Drawing Title page includes Index of Drawings, Revisions Block, Revisions are dated and numbered in the Block, and surrounded by a cloud with a number indicating the revision
- 2. Final construction Plans are stamped and signed by a Registered Professional Engineer
- 3. The center line profile of each proposed street at the scale of Fifty (50) feet or less to the inch, with tentative grades indicated
- 4. Street grades which exceed 7% require Planning Commission approval
- 5. Cul-de-sacs which exceed 600 feet in length require Planning Commission approval.
- 6. No offset street intersections less than 300 feet apart
- 7. The cross-section of each proposed street, showing the width of pavement, the location and width of sidewalks and the location and size of utility mains.
- 8. Provide additional right-of-way and turn lanes and/or pavement widening as appropriate for collector streets.
- 9. Traffic markings are ODOT 644 Thermoplastic. Layout design complies with ODOT standards.
- 10. 8' Utility Easement (U.E.) shown on either side of the Typical Street Right-of-Way Detail with the electrical conduit in the middle of the easement
- 11. Compliance with OEPA and "Ten State Standards" for optimum sanitary sewer design including, but not limited to:
 - Sanitary laterals connect to the main, not the manholes
 - Outside drops only on manholes
 - Lengths of sewer main between manholes not to exceed 400'.
- 12. The plans and profiles of proposed sanitary sewers, with grades and sizes indicated, or method of sewage disposal in lieu of sewers.
- 13. Sanitary sewer main pipe material and installation are to be per City of Hamilton specifications and, as follows: 12" diameter and smaller, PVC Composite Truss pipe (ASTM D-2680), solvent weld joints (ASTM D-2564), and installation (ASTM-2321). All Sanitary Sewer joints are to be solvent weld, unless approved by City Engineer
- 14. Sanitary sewer service connections made by 8" x 6" Wye with 6" x SDR 35 pipe to be extended 5 feet beyond the utility easement and capped. Identify cap location with hardwood lumber marker painted green and a ½" x 4' steel rod planted vertically within 6" of the ground surface next to the lumber marker
- 15. Sanitary manholes shall be precast concrete. Sanitary Sewer Manholes with <=24" difference in inverts can be accomplished with a slide. Larger differences are to be accomplished by concrete encased exterior drop pipe assemblies. Provide proper PVC fitting for transition between drop pipe and truss pipe main

- 16. Manhole and valve box castings shall be flush with street pavement by Nov. 15 to facilitate snow removal. Manhole and valve box castings must be set at the leveling course and subsequently adjusted prior to the final course of asphalt.
- 17. Show location of sanitary sewer lateral capped/plugged ends, i.e. station, left/right, elevation
- 18. Control joint spacing in curbs and sidewalks to be 5'. Expansion joint material shall be closed cell foam, resistant to petroleum products ILO asphalt impregnated fiberboard.
- 19. Sidewalk handicap ramps comply with all Federal ADA requirements, including contrasting color and tactile detectable pads.
- 20. All storm structures are to be ODOT Standards. Storm sewer pipe to be PE or PVC corrugated with smooth interior liner per the latest edition of the ODOT/C&MS#707.33, 707.42, or 707.43, reinforced concrete, or aluminized corrugated metal, unless otherwise noted.
- 21. Storm sewer mains and catch basin leads are to be located within right-of-way so as not to encroach upon utility easement behind right-of-way line.
- 22. The plans and profiles of proposed storm sewers, with grades and sizes indicated.
- 23. Roadway subgrade and trench compaction shall be in accordance with ODOT C&MS requirements at the Developer's expense.
- 24. Construct paved gutter through the bottom of detention basin as a pilot channel between the inlet(s) and outlet to increase mosquito control. This will reduce pockets of standing water.
- 25. A 10' minimum Utility/Drainage Easement provided around the perimeter of the subdivision section.
- 26. A detailed storm drainage plan that provides adequate, complete and satisfactory drainage for the entire area and for all projected land uses. The plan includes all information required by Section (E)(15) for the preliminary drainage plan and such other data and information as may be required by the Director of Public Works and shall be sufficiently complete and detailed to thoroughly review the design needed to completely drain the area, including design calculations. The drainage plan shall clearly show the method to be used for the adequate disposal of all storm water, including drainage outlets and the impact that the proposed development will have on drainage of adjacent areas. The plan shall be on a reproducible separate sheet. The construction plans shall be sufficiently complete and detailed to construct all facilities shown on the drainage plan.
- 27. Establish first floor elevations
- 28. All swales that carry accumulating surface flows are designated public swales and are constructed by the Developer. Swales by Developer are to be lined by Developer, i.e. grass or sod, as per Subdivision Regulations, Ordinance 6038, Section 1197.06 Storm Drainage System, and Drainage Policy, Storm Sewer Design Policy, Paragraph I.
- 29. Side lot swales shown to control storm water flows between lots to be constructed by builder.
- 30. Provision for sump pump drain discharge to avoid problems with winter icing and summer wet spots. Sump drain lines carry subsurface water and are not permitted to "daylight" and drain to a swale. They must be connected to the stormwater system. Indicate the maintenance responsibility of the sump drain lines inside the

R/W. The City of Hamilton will not provide maintenance for sump drains that are smaller than 8 inches in diameter. Sump pump discharge drain lines should be a minimum 8 inches diameter, with tees or wyes installed at the low end of each lot, and a 24" long stub and cap for future use. Drains shall have 24" of cover and be a minimum of 24" behind the curb. Provide cleanouts at end of drain with metal lid.

- 31. As soon as mass excavation and embankment have been completed, and rough subgrade work is complete (and prior to the sewer and other related work) perennial grasses need to be established in all areas outside of the Right-of-Way and the adjacent Utility Easements in accordance with the latest edition of the ODOT C/M, 659.09, Class 2, Roadside Mixture. Grass seed shall be sown in accordance with 659.12, Seeding, and Mulched in accordance with 659.13, 659.14, or 659.15.
- 32. OEPA Storm Water Permit is required per OEPA's regulations regarding storm water erosion and siltation control, which became effective April 21, 2003. Provide copy of Notice of Intent (NOI).
- 33. Bonding Estimate which correctly reflects quantities and costs for ALL public improvements, including erosion and siltation control, submitted for review and approval.
- 34. Application for Permit to Install (PTI) sanitary sewers submitted for review by City Engineer's Office prior to submission to OEPA for approval. City Engineer to provide letter, which documents Infiltration/Inflow credits for proposed development. Developer responsible for submitting all required plans, specifications and fees to OEPA.
- 35. A plan of the proposed water distribution system, showing pipe sizes and the location of valves and fire hydrants
- 36. A plan of the proposed gas distribution system, showing pipe sizes, location of valves and other facilities.
- 37. A plan for any proposed electric distribution system and a plan for any proposed telephone, data, cable and telecommunication service systems. Said plans shall show the size and location of the aforesaid systems, together with any appurtenances, which may be associated with such systems
- 38. General constructability of facilities for ease of future maintenance
- 39. Preconstruction meeting held with City of Hamilton personnel (Electric, Gas, Water, Planning, Public Works), contractor, developer, and developer's engineer (as required). Meeting will cover construction schedule, subcontractors, material suppliers, names and telephone numbers for 24-hour emergencies, inspections, fees, responsibilities, location of construction entrance, and discuss all the ramifications of the project.
- 40. Provisions must be made for trash collection and snow and ice removal during housing construction.
- 41. Existing streets shall be kept clean of mud, stones, gravel, or other similar materials during construction as per Section 339.08 of the Codified Ordinances of the City of Hamilton. Although it is the duty of the driver of the vehicle to immediately remove any material which drops or is tracked onto the pavement, the City will hold the general contractor and/or developer and/or home builder responsible to maintain the cleanliness of the streets. Developer/home builder will be billed by the City for any costs incurred by the Public Works Department if Street Division personnel must clean the street. Issuance of Occupancy Permit

may be withheld for non-compliance.

- 42. Prior to the issuance of Occupancy Permit, curbs damaged during home construction shall be repaired, and yard drainage as per the Official Drainage Plan shall be confirmed.
- 43. "As-built" drawings must be provided before release of bonds and final acceptance. Developer shall document all drainage and sanitary structure inverts, ends of all sanitary unused laterals, and all water and gas main valves and service boxes.
- 44. Whenever a roadway needs to be closed (or partially closed) traffic shall be maintained in accordance with standards described in the Ohio Manual of Uniform Traffic Control Devices (MUTCD) and shall be approved in advance by the City Public Works Director. Any deviation from the MUTCD must be approved by the City Transportation and Traffic Engineer. A Traffic Control Plan shall be provided.

The Official Drainage Plan may be altered or revised provided that adequate and satisfactory alternate facilities are provided. Any person requesting an alteration or revision must file a written request with the City Engineer and all owners affected by the change; the request shall include an explanation and plan in sufficient detail to adequately review the requested alteration or revision. Any change must be approved by the City Engineer and be endorsed by him/her on the Official Drainage Plan and he/she shall take the views of all affected parties into consideration in making a determination. Any owner that takes any action not in conformance with the Official Drainage Plan shall be liable for any resulting damage and responsible for any corrective work necessary to conform to the Official Drainage Plan, including approved revisions.

**FINAL PLAT
REQUIREMENTS CHECKLIST**

The following information must be shown on all plans submitted for final plat review. Any required information not submitted may result in a request for revisions which will delay the approval of the final plat.

- 1. Eight (8) black line or blue prints of the final or record plat, at the scale of one hundred (100) feet or less to the inch.
- 2. All plat boundary lines with lengths of courses to hundreds of a foot and bearing to half minutes. These boundaries shall be determined by an accurate survey in the field, which shall be balanced and closed with an error of closure of not to exceed 1 to 10,000.
- 3. The exact location and the width along the property line of all existing recorded streets intersecting or paralleling the boundaries of the tract.
- 4. True bearing and distances to nearest established street bounds, patent or other established survey lines, or other official monuments, which monuments shall be located or accurately described on the plat. Any patent or other established survey or corporation lines shall be accurately monument-marked and located on the plat, and their names shall be lettered on them.
- 5. The accurate location and material of all permanent reference monuments.
- 6. The exact layout including: **(a)** street and alley lines- their names, bearing, length (along center line), angles of intersection and widths (including widths along the line of any obliquely-intersecting street); **(b)** the length of all arcs - radii, points of curvature and tangent bearings; **(c)** all easements of rights-of-way, when provided for or owned by public services (with the limitation of the easement rights definitely stated on the plat); **(d)** all lot lines with dimensions in feet and hundredths, and with bearings and angles to minutes if other than right angles to the street and alley lines.
- 7. Lots numbered in numerical order. In tracts containing more than one block, the blocks shall be lettered in alphabetical order. In case there is a re-subdivision of lots in any block, such re-subdivided lots shall be designated by their original number prefixed with the term most accurately describing such division, such as: W ½ of 3, N 40' of 5, etc., or they shall be designated numerically beginning with the number following the highest lot number in the block.
- 8. In case the subdivision is traversed by a water course, channel, stream or creek, the prior or present location of such water course, channel, stream or creek
- 9. The accurate outline of all property which is offered for dedication for public use, and of all property that may be reserved by Covenant in the deeds for the common use of the property owners in the Subdivision, with the purpose indicated thereon.

- 10. All setback building lines as fixed by the Zoning Ordinance and any other set back lines or street lines established by public authority, and those stipulated in the deed restrictions
- 11. Private restrictions if any: (1) boundaries of each type of use restrictions; (2) other private restrictions for each definitely restricted section of the subdivisions
- 12. Name of the subdivision and name or number of the largest subdivision or tract of which the tract now subdivided forms a part
- 13. Names and locations of adjoining subdivisions and location and ownership of adjoining undivided property
- 14. Names and addresses of the owner of record, the subdivider, and of the engineer or surveyor
- 15. North point, scale and date.
- 16. Statement that any lot transferred will have a minimum width and area substantially the same as those shown on the plat,
- 17. Certification by a registered professional engineer or surveyor to the effect that (1) the plat represents a survey made by him and that all monuments indicated thereon actually exist and their location, size and material are correctly shown; and (2) that all requirements of these subdivision regulations have been fully complied with.
- 18. Acknowledgment of the owners and witnesses before an officer authorized to take the acknowledgment of deeds, which officer shall certify his official act on the plat.
- 19. 10% Maintenance Bond for all completed infrastructure and 100% Performance Bond for uncompleted items prior to recording final plat.
- 20. Drainage Plat shall be recorded with the Final Subdivision Plat
- 21. Certification from the Auditor of Butler County, Ohio, that all taxes and assessments have been paid on the land within the Subdivision
- 22. Home Owners' Agreement for maintenance of storm drainage facilities and such other infrastructure as appropriate.
- 23. Original Tax Increment Funding (TIF) document signed by authorized representative of development company.
- 24. Completed Planning Department application with and required fee payable to the City of Hamilton
- 25. A check for 75% of the per lot sewer impact fee for new residential lots to cover developer's portion of the fee The remaining 25% of the fee to be paid by builder when building permit is issued.

**PUBLIC WORKS DRAINAGE PLAT
REQUIREMENTS CHECKLIST**

The following information must be shown on all plans submitted for final drainage plat review. Any required information not submitted may result in a request for revisions which will delay the approval of the drainage plat.

- 1. Drainage Plat shall be recorded with the Final Subdivision Plat.
- 2. Five copies of blackline or blueline plans prepared and sealed by professional engineer.
Application in writing for tentative approval.
- 3. Drainage Plat at 100 or less feet to the inch.
 - a) Name of Subdivision
 - b) Tract designation of record.
 - c) Name of owner of record, developer for the tract and date.
 - d) Names of the adjacent subdivisions.
 - e) Boundary lines, accurate in scale, of tract platted.
 - f) Location and names of existing or platted streets and roads.
 - g) Permanent buildings, size and location of large trees, railroads, etc.
 - h) Corporation lines, township and section lines.
 - i) Existing water courses.
 - j) Existing storm sewers, in or adjacent to the tract, with pipe sizes and grades.
 - k) Existing culverts and underground structures in or adjacent to the tract.
 - l) Contours at two foot intervals referenced to USGS Datum.
 - m) Major swales to be constructed by developer and indicated on drawing as such.
 - n) Minor swales usually along side lot lines.
 - o) Layout: Names of proposed streets and alleys.
 - p) Proposed lots with approximate dimensions.
 - q) Approximate location, size, and grade of proposed storm drainage facilities.
 - r) Parcels dedicated or temporarily reserved for public use with conditions
 - s) North arrow, scale and date.
- 4. Standard paragraphs and legend
- 5. Certification of the Developer that all grading and drainage facilities will be completed in conformance with the Official Drainage Plan
- 6. Certification of the engineer that the drainage system has been designed to provide complete and adequate storm drainage service for the entire area being Platted.
- 7. Signature block for the approval of the City Engineer. Plat shall not be revised or altered without the approval and endorsement by the City Engineer

DRAINAGE POLICY

Preface

Section 343.20 of the City of Hamilton! Subdivision Regulations, entitled Requirement for Storm Drainage System stipulates that "every development shall be provided with a storm drainage system that provides adequate, complete and satisfactory drainage service for the entire area being platted for all projected land uses and otherwise meeting the approval of the officials having jurisdiction." This section stipulates that the City Engineer must finally approve the drawings, plans and specifications for the drainage system. Natural streams and water courses should be left as undisturbed as practical. All natural streams and water courses shall be inspected by the City Engineer and the Developer's Engineer prior to final plan approval. Any necessary stabilization and erosion protection deemed necessary by the City Engineer shall be included in the development plans.

It is the responsibility of the developer's engineer to design this drainage system and it is the responsibility of the City Engineer to judge the adequacy of the design. The following has been written to clarify the standards that will be judged by the City Engineer as adequate. These should be considered minimum standards and certain conditions may require exceeding these standards. The Ohio Department of Natural Resources "Rainwater and Land Development" manual is a comprehensive source of general standards to use to avoid, minimize, or compensate for impacts to water resources. The manual is available at the Public Works web site under Drainage Policy for Development or from ODNR: <http://www.dnr.state.oh.us/water/rainwater/>

General Principles

- A. Every development shall have an adequate drainage system to provide complete drainage for the entire development.
- B. The development shall be graded so that each building site is protected from damage due to storm water runoff from adjacent lots.
- C. The development shall be constructed so that the new construction does not increase the risk of flooding to downstream property.

Storm Sewer Design Policy

- A. Storm sewers and open ditches are to be designed for a 10 year storm.
- B. Roadway culverts are to be designed for a 25 year storm. Minimum floor elevations shall be shown for any lot which may be subject to flooding from the headwater upstream from a culvert.
- C. In all locations where the potential exists for flooding and property damage, drainage facilities shall be designed for 50 year storms.
- D. The Rational Method shall be used to estimate runoff for drainage areas of 250 acres or less. The "rainfall intensity-duration-frequency curves" Plate No. 1 attached to this document shall be used for determining the rainfall intensity factor in the Rational Method formula.
- E. The State of Ohio, Department of Natural Resources publication "Floods in Ohio" shall be used to estimate runoff from larger areas.
- F. When using the Rational Method for estimating storm water runoff, the following run-off coefficients are typical for the City of Hamilton!. The coefficients may be reduced

for those areas of the City with flat slopes that are underlain with porous sand and gravel.

Type of Area	Run-Off Coefficient	Type of Area	Run-Off Coefficient
Business	.70 - .80	Parks & Cemeteries	.30 - .40
Residential (single family)	.50 - .60	Woodland	.20 - .40
Residential (multi-family)	.60 - .80	Grassland	.25 - .45
Industrial (light)	.70 - .80	Cropland	.40 - .50
Industrial (heavy)	.70 - .90		

G. Pipe used for storm sewers may be PE or PVC corrugated pipe with smooth interior liner, concrete pipe or aluminized corrugated metal pipe. Pipe will have a minimum inside diameter of 12 inches and a minimum slope of 0.5 percent. The capacity of the pipe shall be determined using the Manning Formula. The following Roughness Coefficients (n) shall be used with the Manning Formula.

PE or PVC Corrugated pipe with smooth interior liner	0.015
Concrete Pipe	0.015
Corrugated Metal Pipe (2 2/3" x 1/2") Unpaved	0.024
Corrugated Metal Pipe Paved Invert	0.021

H. Culverts shall cross under streets at the angle which is most compatible with the upstream and downstream channels. Culverts shall be designed using approved nomographs. Outlet velocities shall be checked on all culverts and erosion control measures provided when velocity exceeds 5 feet per second.

I. Open ditches shall be avoided wherever possible in residential subdivisions. Ditches may be permitted when the required pipe size exceeds 36 inches. Natural streams and water courses should be left as undisturbed as practical. Open ditches, when permitted, shall be constructed with 4:1 or flatter side slopes. The minimum grade for all ditches shall be 1.0 percent except for natural streams or paved bottom ditches. The Manning Formula shall be used for determining the capacity of open channels. The following coefficients will be used:

Rock Lined Channels	0.08
Grassed Channels	0.03
Paved Channels (concrete or asphalt)	0.015

Open channels shall be properly lined to prevent erosion. All ditches having a velocity of 5 feet per second or less shall be sodded, except that ditches may be seeded if the velocity is under 2 feet per second. All ditches with a velocity over 5 feet per second shall be lined.

Storm Water Detention

A. In general, no development shall discharge a greater peak stormwater runoff than the peak rate of runoff from the same area prior to development. In order to control this peak discharge it will be necessary to detain or retain a portion of the storm water runoff temporarily on the site.

B. For the purposes of this section a development will be defined as a subdivision, a major condominium project, a major commercial or industrial facility any development or

redevelopment of five or more lots or five or more acres, or any other new construction which the City Engineer judges as appropriate for inclusion.

C. A plan shall be submitted to the City Engineer for approval for every development showing the method for detaining storm water unless a written waiver is approved as stated below.

D. All plans submitted must show the location and size of detention facilities and must be accompanied by calculations used to determine the design of the facilities. All calculations shall be based on the methods described in the United States Soil Conservation Service Publication TR-55. In using this method, the 50 year post development peak discharge shall not exceed the 10 year pre-development peak discharge. Emergency spillways shall be designed for 50 year storms.

E. Detention facilities will typically be dry-bed basins. Fencing will be required around all basins which are within lots to be deeded to the City or within easements to be granted to the City.

F. Retention basins which are partially filled with water during dry weather will be permitted where future ownership and all maintenance responsibilities rest with an individual, a private company, a Condominium Association or some other private organization.

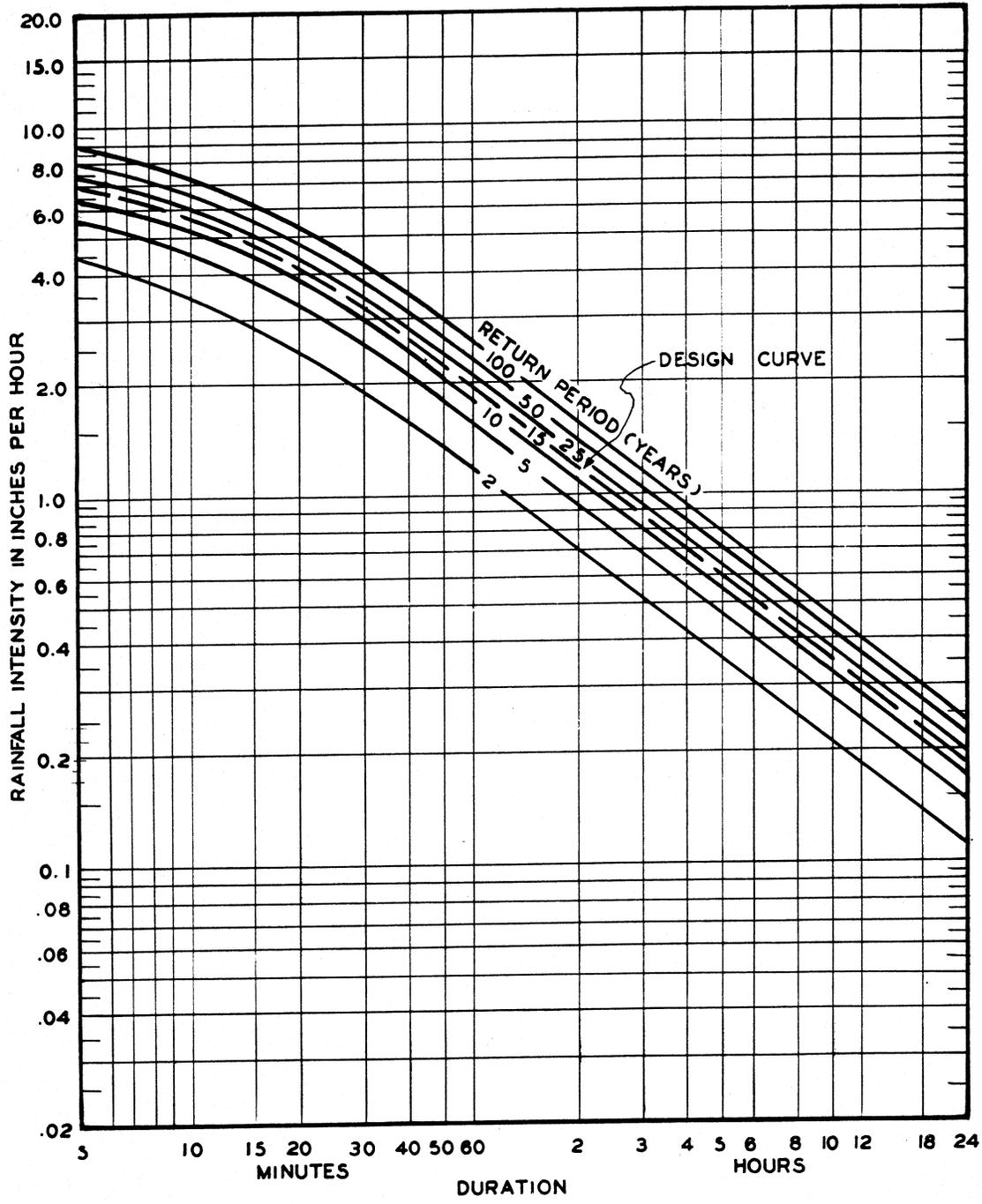
G. A waiver of the requirements for detention facilities may be granted by the City Engineer for the following:

1. Very small increases in runoff due to the development.
2. The presence of adequate existing downstream storm sewers and channels capable of handling the increased runoff.
3. Unusual and abnormal conditions making it impossible to construct the proper facilities.

Erosion and Sediment Control

In order to control pollution of streams and public waters the design engineer shall include in the construction plans sufficient requirements to control erosion and sedimentation during development. These requirements may include a designated sequence of operations, limits on area of surface to be disturbed, and temporary or permanent erosion control devices such as settling ponds or silt traps. The developer and his contractor(s) shall abide by the requirements set forth in the Ohio Department of Natural Resources Division of soil and water districts "Urban Sediment Pollution Abatement Rules" chapter 1501: 15-1-03, 15-1-04 and 15-1-05 of the Ohio Revised Code (Dated 11-1-79)

HAMILTON, OHIO



RAINFALL INTENSITY - DURATION - FREQUENCY CURVES

58-162

PLATE NO. I

**LOT SPLIT AND COMBINATIONS
CHECK LIST**

The following information must be shown on all plans prior to approval of a lot split or combination. Any required information not submitted will result in a request for revisions, which will delay the approval of all permits.

Lot Split

- 1. Plat drawn and sealed (stamped) by a registered engineer or land surveyor
- 2. Six copies of the drawing, size must be 18" x 24" and show the following:
- 3. Plat drawing indicates lot numbers and lot dimensions
- 4. Plat drawing indicates existing and proposed lot and split lines
- 5. Plat drawing indicates all structures and setbacks between structures and existing and proposed property lines
- 6. Plat drawing indicates width of the lot at the building setback line, minimum lot widths vary with zoning districts. Minimum lot widths are required unless the split portion is to be combined with an adjacent lot.
- 7. Original deed transferring the split parcel. The deed may be approved either before or after being executed.
- 8. Completed Planning Department application with and required fee payable to the City of Hamilton

Lot Combination

- 1. Plat drawn and sealed (stamped) by a registered engineer or land surveyor
- 2. Six copies of the drawing, size must be 18" x 24" and show the following:
- 3. Plat drawing indicates lot numbers and lot dimensions
- 4. Plat drawing indicates existing and proposed lot and split lines
- 5. Plat drawing indicates all structures and setbacks between structures and existing and proposed property lines
- 6. Plat drawing indicates all easements of record
- 7. Completed Planning Department application with and required fee payable to the City of Hamilton

After the Hamilton Planning Commission approves the lot combination/split plat, it is not a completed action until it is recorded at the Butler County Recorder's Office. This is the responsibility of the lot owner(s). Issuance of a building permit through the City of Hamilton requires two (2) copies of the recorded lot combination/split plat be submitted with the permit application.

OBC PLAN REQUIREMENTS

Commercial Permit Drawing Requirements

Commercial and Multi-Family (over three-family) Building Permits

Most commercial building permits require anywhere from 4 to 8 copies of plans to be submitted for approval. It is always best to contact our office before you prepare your submission so that we can let you know exactly how many copies will be required.

The following refers to information that is required to be shown on the plans for **commercial** and **multi-family** projects regulated by the Ohio Building Code (OBC). Multi-family projects are those associated with buildings that consist of four or more dwelling units.

All plans should be drawn to scale on suitable material. Plans need to include all information necessary for the Plans Examiner to determine the scope of work of the project and its compliance with all aspects of the applicable state codes. It is always recommended to hire a design professional, such as an architect or engineer, to prepare the drawings for your permit application. These individuals possess knowledge and experience with the required codes as well as the permit process, which may help prevent the requirement of additional plan submissions. In some cases, the plans will be required to be signed and sealed by a design professional.

Plans should include the following:

Index: An index of drawings located on the first sheet which must include all occupancy classifications, types of construction, the area in gross square feet for each level, the maximum occupant load and the structural design loads.

Site Plan: A site plan showing to scale the size and location of new construction and all existing structures on the site, including setback and side yard dimensions, all property and interior lot lines, distances from lot lines and other buildings on the same lot, street names and locations, the established street grades, types and sizes of all utility lines, and the elevations of all proposed finished grades. The site plan must be drawn in accordance with an accurate boundary line survey. In the case of demolitions, the site plan must show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot. The building official is authorized to waive or modify requirements for a site plan when the application for approval is for alteration or repair or when otherwise warranted.

The following utility information shall be supplied on the site plan in order to process through the Utility Departments:

- Electric service, location, voltage, wire and conduit size
- Total electric loads in KW

- Total gas loads in BTU
- Size and location of gas and water service lines and meters
- Size and location of storm and sanitary lines

Floor Plans: Complete floor plans, including plans of full or partial basements and full or partial attics and penthouses. Floor plans must show all relevant information such as door swings, stairs and ramps, windows, shafts, all portions of the means of egress, etc. and shall be sufficiently dimensioned to describe all relevant space sizes. Wall materials must be described by cross-hatching with explanatory key, by notation or by other clearly understandable method. Spaces must be identified by code appellation. The construction documents must designate the number of occupants to be accommodated on every floor, and in all rooms and spaces.

Sections: Cross sections, wall sections, details including typical connections as required to fully describe the building construction showing wall, ceiling, floor and roof materials. Construction documents must describe the exterior wall envelope in sufficient detail to determine compliance with the code. An energy-efficiency analysis of the total building envelope may also be required.

General Building Code Information: The fire resistance ratings of all structural elements as required by the code, data substantiating all required fire resistance ratings including details showing how penetrations will be made for electrical, mechanical, plumbing and communication conduits, pipes and systems and the materials and methods for maintaining the required structural integrity, fire resistance rating and fire stopping.

System Plans / Descriptions: Complete description of the plumbing, HVAC, gas and electrical systems. This includes the location, materials and sizes of all piping, fixtures, equipment, schematics, ductwork, lighting and power.

Fire Alarm & Sprinkler Systems: These drawings are required to be prepared by individuals certified in the state of Ohio to design these systems. The drawings for these will need to be submitted under separate permits.

Statement of Special Inspections: Where structural tests and special inspections are required by the Ohio Building Code, the applicant must submit a statement of special inspections prepared by the registered design professional as a condition for the issuance of the plan approval. This statement will include a complete list of materials and work requiring special inspections; the inspections to be performed; and a list of individuals, approved agencies, or firms intended to be retained for conducting such inspections.

Additional drawings or information may be required in order to determine compliance with the applicable state codes.

**FIRE DEPARTMENT
CHECK LIST**

The following information must be shown on all plans prior to permit submittal. Any required information not submitted will result in a request for revisions, which will delay the approval of all permits

- 1. Fire alarm control panel or remote annunciator panel located in an accessible area near main entrance and shown on plans.
- 2. Location and type of portable fire extinguishers as required by the Ohio Fire Code per occupancy type.
- 3. Fire hydrant locations and water main sizes shown on site plans.
- 4. Site plans show cul-de-sacs have a minimum clear pavement radius of 50 feet for fire apparatus turnaround. Dead end streets over 600 feet require Planning Department Approval.
- 5. The location of all Fire Department connections for sprinkler or standpipe systems is at the front of the building, preferably remote from the building, in a visible location with access from the street or parking area or as otherwise pre-approved in writing by the Fire Department.
- 6. All Fire Department connections supplying fire sprinkler or standpipe systems are 4 inch by 4 inch, thirty degree angle Storz. Fire Department standpipe connections supplying Fire Department water supply hose, such as that located in stairwells or other interior locations, and which are 2 and one half inch diameter, shall have special "Hamilton" threads. All details are to be shown on submitted plans.
- 7. Modifications to existing fire suppression or fire alarm systems that are impacted by renovations to existing buildings, shown in detail on plans for the systems.

**WATER MAIN & SERVICES
CHECKLIST**

The following information must be shown on all plans prior to approval of a lot spit or combination. Any required information not submitted will result in a request for revisions, which will delay the approval of all permits.

- 1. Location, size and material of all existing water mains and services shown on Utility or Site Plan.
- 2. Location, size and material of all proposed water mains and services shown on Utility or Site Plan
- 3. Plans indicate minimum depth of cover is 4 feet for mains, 3 feet for services.
- 4. Location and size of proposed and existing water meter shown on Utility or Site Plan
- 5. Plans indicate proposed water meter located inside building, meter pits not permitted unless length of service is over 200 feet.
- 6. Plans for proposed multi-metered buildings indicate an individual shut off valve for each meter accessible from outside the building or meters in a common room accessible year round.
- 7. Plans indicate proposed curb box is located in right-of-way (between sidewalk & curb).
- 8. Plans indicate proposed Reduced Pressure Backflow Prevention Device to be installed immediately downstream of water meter for non-residential use.
- 9. Plans indicate proposed fire line have a double detector check
- 10. Plans indicate minimum of 18" vertical clearance at locations where other utilities are crossed
- 11. Plans indicate proposed minimum 10-foot horizontal separation between new main and storm and sanitary mains or manholes.
- 12. Plans indicate proposed mains 12" and over are Ductile Iron, Class 53, with push on joints and fittings. All ductile iron pipe shall have a polyethylene encasement (minimum 8 mil thick and 2" wide plastic backed adhesive tape)
- 13. Plans indicate proposed mains 8" and under are either Ductile Iron as described above or Polyethylene (P.E.). P.E. mains shall be designated HDPE-3408, Schedule SDR-11.0
- 14. Plans indicate proposed services less than 2" are Type K copper tubing; services over 2" are Ductile Iron as described above.
- 15. Plans indicate valves provided on each leg of all proposed tees and crosses
- 16. Plan indicate maximum valve spacing of 800 feet
- 17. Plans indicate proposed valves 12" and under are gate valves; valves over 12" are butterfly valves.
- 18. Plans indicate maximum fire hydrant spacing is 400 feet. A valve is placed near the tee off the main. Fire hydrant leads are 6" in diameter.
- 19. If fire hydrant lead is >40 feet in length an additional control valve is required at the hydrant.

- 20. PVC water main or services are not permitted.
- 21. Plans indicate water mains are looped where possible. On long cul-de-sacs mains are to be looped between streets along property lines.
- 22. General Note to the plans added stating: "For Detailed Specifications for Water Installations contact the City of Hamilton Gas and Water Department at (513) 785-7206."

GAS MAINS AND SERVICES CHECKLIST

The following information must be shown on all plans prior to permit submittal. Any required information not submitted will result in a request for revisions, which will delay the approval of all permits.

- 1. Location, size and material of all existing gas mains and services shown on Utility or Site Plan.
- 2. Location, size and material of all proposed gas mains and services (only one gas service per building) shown on Utility or Site Plan
- 3. Plans indicate minimum depth of cover is 3 feet for mains, two 2 feet for services.
- 4. Total existing gas load per building in CFH shown on Utility or Site Plan
- 5. Total proposed gas load per building in CFH shown on Utility or Site Plan
- 6. Location and size (in CFH) of existing gas meter shown on Utility or Site Plan
- 7. Plans indicate proposed gas meter is outside and no closer than 3 feet to any building opening and electrical devices as required
- 8. Plans indicate proposed gas meter is directly in line with curb box.
- 9. Curb box located in right-of-way (between sidewalk & curb if present).
- 10. Plans indicate multi-metered buildings have only one service with an individual shut off valve for each meter
- 11. Plans indicate size and pressure system of existing gas mains
- 12. Plans indicate gas mains looped where possible. Looping avoided thru easements on lot lines if possible (long cul-de-sacs).
- 13. Plans indicate required valves at tees on intermediate and medium pressure. Valves are manufactured by **Kerotest** or approved equal. No valves are needed on distribution pressure gas mains.
- 14. Plans indicate gas main material as **Polyethylene (P.E.) designated PE-2406, Schedule SDR-11.5.**
- 15. Plans indicate minimum depth of cover is **3-ft. for mains, 2-ft. for services**
- 16. Plans indicate Minimum of 18" vertical clearance at locations where other utilities are crossed.
- 17. General Note to the plans added stating: "For Detailed Specifications for Gas Installations contact the City of Hamilton Gas and Water Department at (513) 785-7206."

**ELECTRIC SERVICE
CHECKLIST**

The following information must be shown on electrical plans prior to permit submittal. Any required information not submitted will result in a request for revisions which, will delay the approval of all permits

- 1. Size and voltage of proposed electrical service shown in detail on plans
- 2. Service wire size, phase and type, shown in detail on plans
- 3. Service conduit size and type shown in detail on plans
- 4. Metering type i.e. primary or secondary and location shown in detail on plans
- 5. Wire size, type, location and number of circuits for lighting layout shown in detail on plans
- 6. Wire size, type, location and number of circuits for power layout shown in detail on plans
- 7. Total horsepower of all proposed electrical motors shown on plans
- 8. Horsepower of each individual proposed electrical motor shown on plans
- 9. Complete load calculation indicating electrical demand load in kilowatts indicated for both single phase and three phase electric service shown on plans
- 10. Proposed location of Main Service Disconnect(s) shown on plans
- 11. Proposed service routing and whether it will be overhead or underground shown on site plans
- 12. Location of all existing area electrical facilities shown on site plans

**ZONING REVIEW
CHECKLIST**

All plan submittals for new buildings, parking lots, building additions, fences, swimming pools, changes of use, and building alterations must include a minimum of three copies. For large residential projects and most commercial projects six copies of plans are required including the information listed below, as well as a COMPLETED BUILDING PERMIT APPLICATION. Any required information not submitted will result in a request for revisions, which will delay the approval of all permits

Site plan to include the following information:

- 1. North orientation arrow and drawing scale information
- 2. Property/lot lines and dimensions drawn to scale
- 3. Street locations and names
- 4. Building, fencing, and pool locations including setback dimensions to all property lines
- 5. Exterior dimensions of all existing and proposed buildings on the property
- 6. Description of building use, i.e. single-family residence, multi-family apartments, bedroom addition, detached garage, warehouse, retail store, doctor's office, church, restaurant etc
- 7. If a business use, list the number of staff/employees on maximum shift
- 8. If multiple tenants/uses on same property list all exiting and proposed uses and building square footage for each use
- 9. Available off-street parking locations, parking space dimensions, required 10-ft front setback and landscaping buffer and setback dimensions to all other property lines.
- 10. Surfacing material for all parking areas as well as applicable parking curb blocks and landscape screening of parking lots for more than 10 vehicles
- 11. Location and setback distances to the front edge of all signs from the property lines (separate plans and application for sign permit is required)
- 12. Location, size and setback from property lines of all existing signs that are to remain on the property
- 13. Detailed landscape plan including plant list

Building plans drawn to scale, to include the following information:

- 1. Elevation drawings showing building heights above final grade
- 2. Interior floorplan showing room/area uses and interior dimensions
- 3. Seating layouts for churches, schools and restaurants
- 4. Number of beds for convalescent/nursing homes and hospitals
- 5. Fencing heights materials (if applicable)
- 6. Pool size, depth, and whether in or above ground
- 7. For those facilities that include the use, manufacture, or storage of chemicals, the plans should include the appropriate MSDS sheets, quantities, and method of storage/packaging (i.e. 50-gallon drums, 25-lb. bags etc.)

If you have any questions concerning this information or questions about zoning in general please contact the Planning Department by telephone at 785-7350.

SIGN PERMIT CHECKLIST

All plan submittals for any new sign or for altering existing signs must include a minimum of three copies including the information listed below, as well as a **COMPLETED SIGN PERMIT APPLICATION**

Site plan to include the following information:

- 1. Property/lot lines and dimensions drawn to scale
- 2. Street locations and names
- 3. Building and parking space locations
- 4. Building street frontage dimensions (if building fronts on more than one street show building dimensions along all frontages)
- 5. Location and setback distances to the front edge of all signs from the property lines
- 6. Location, size and setback from property lines of all existing signs that are to remain on the property
- 7. Detailed landscape plan to include plant listing for the area immediately surrounding all freestanding signs

Structural drawings for all new signs or sign alterations to include the following information:

- 1. Elevation drawings showing sign dimensions, text, color scheme and height from ground level to the bottom of the sign
- 2. Material the sign is made from
- 3. Method of attachment/anchoring of sign
- 4. Method of illumination and wiring schematic if applicable
- 5. All new signs larger than 16-sq.ft. or 3-inches thick or freestanding signs more than 8-ft. in height require the seal of design professional (architect or engineer) licensed in the State of Ohio

In addition to the information listed above permits for any new sign with the following characteristics must have plans submitted, permits obtained and signs erected by a current licensed sign erector.

- Signs that are internally illuminated
- Wall signs not painted directly on the wall surface that has panels or individual components larger than 16-sq. ft. in area
- Ground signs larger than 16-sq.ft. in area or more than 8-ft. height
- Any sign which is in or over a public right of way

If you have any questions concerning this information or questions about signs in general please contact the City Zoning Inspector by telephone at 785-7367 or by e-mail at bagfordl@ci.hamilton.oh.us

**HEALTH DEPARTMENT
CHECKLIST**

The proposed construction plans shall include the following required information. Any required information not submitted will result in a request for revisions, which will delay the approval of permits. Complete laws and rules can be found at odh.ohio.gov

Food service/vending operations

- 1. Plans drawn to scale noted on plans
- 2. Copy of menu provided with plans
- 3. Interior kitchen floorplan indicates workflow, in kitchen hand-washing facility, food storage facilities, and all entrances and exits
- 4. Plans indicate if water and sewer are supplied by City of Hamilton or other source
- 5. Plans indicate surface finishes of all walls, floors, ceilings, and counter tops in all areas
- 6. Location of all major equipment and appliances to include manufacturer's name and model number
- 7. Location of all toilet facilities to include water closet, lavatory inside restroom, self closing doors, and ventilation
- 8. Indicate location, size and maximum water temperature of water heater
- 9. Location of janitorial facilities to include mop sink, and storage of equipment and cleaning chemicals
- 10. Lighting plan to include type, foot-candles and shielding
- 11. Waste disposal storage areas inside and out to include size, type, and containment method

Tattoo parlors and body piercing facilities

- 1. If the operator is an individual, his or her name, address, telephone number, business address, business telephone number, and occupation. If the operator is an association, corporation, or partnership, the address and telephone number of the entity and the name of every person who has an ownership interest of five percent or more in the entity.
- 2. If the operator does not own the place of business, or if he or she owns only part of the place of business, the name of each person who has an ownership interest of five per cent or more in the business;
- 3. Statement of attestation that the operator intends to comply with all requirements established by sections 3730.01 to 3730.11 of the Revised Code and the rules of this chapter.
- 4. Plans and specifications of the place of business to clearly show that applicable provisions of the rules in this chapter can be met and shall include the following:
 - (a) The total area to be used for the business;

- (b) Entrances and exits;
- (c) Number, location and types of plumbing fixtures, including all water supply facilities;
- (d) A lighting plan;
- (e) A floor plan showing the general layout of fixtures and equipment;
- (f) Listing of all equipment to be used.

- 5. The operator shall maintain procedures ensuring that all persons performing body piercing or tattooing services on the business premises have received appropriate training in tattooing or body piercing, as evidenced by:

- (i) Records of completion of courses or seminars in tattooing or body piercing offered by authorities recognized by the board of health as qualified to provide such instruction;

- (ii) Written statements of attestation by individuals offering tattoo or body piercing apprenticeships that the person has received sufficient training of adequate duration to competently perform tattoo or body piercing services; or

- (iii) Other documentation acceptable to the board of health.

STANDARD PLAT LANGUAGE

KNOW ALL MEN BY THESE PRESENTS:

That the undersigned, being the owners of _____ acres of land, being part of Lots _____ in the _____ Ward, City of Hamilton, Butler County, Ohio, as described in Deed Books _____ and _____, Pages _____ and _____ do respectively hereby assent to and adopt this plat of subdivision, the same to be known as _____ and do hereby dedicate to the public forever, in accordance with the laws in such cases made and provided, the streets and roadways as shown on said plat, and declare the same to be free and unencumbered.

The streets in said subdivision shall be constructed by their subdivider in accordance with the specifications of the City of Hamilton, Ohio, with the drainage structures installed in accordance with plans approved and on file in the office of the City Engineer. Street signs and monuments shall be placed by the subdivider as required by the City. Base course and street pavement shall meet City specifications and all streets shall be surfaced with a 3” thick course of compacted asphaltic concrete pavement on 5” minimum thick course of bituminous aggregate base. All streets shall be kept in repair by the subdivider for a period of one (1) year after approval by the City.

For valuable consideration, we the undersigned do hereby permanently grant to the City of Hamilton, for the benefit of all public utility providers and successors and assigns, forever, non-exclusive easements, as shown on the within plat and designated as “Utility Easement” for the construction, operation, maintenance, repair or replacement of any and all necessary fixtures for the overhead or underground distribution of water, gas, electric, telephone, telecommunications, or other utilities including the installation of necessary attachments thereto; and for the construction and maintenance of surface and underground storm water and sanitary sewer, pipelines, structures and necessary lateral connections.

The above public utility easements are dedicated to the City of Hamilton for the benefit of all public utility providers including but not limited to the City of Hamilton, Cincinnati Bell and Time Warner Cable.

Said grantees shall have the right to ingress to and egress from and also the right to cut, trim, or remove any trees, underground or overhanging branches within said easement.

No buildings or other structures may be built within said easements, nor may the easement area be physically altered so as to 1) reduce clearances of either overhead or underground facilities; 2) impair the land support of said facilities; 3) impair ability to maintain the facilities or 4) create a hazard. We acknowledge having full power to convey these easements and will defend the same against all claims.

All lots shown on the accompanying plat shall be subject to the declaration of covenants, conditions and restrictions and reservation of easements for _____, Homeowners Association as set forth in the Miscellaneous Records Volume _____, Page _____, of the Butler County, Ohio Records, which covenants and provisions are hereby made a part of this deed of subdivision as if fully rewritten herein.

In Witness Whereof, _____, a corporation organized under the Laws of the State of _____, have hereunto set their hand by _____ and _____, being duly authorized in the premises by resolution of its Board of Director, this _____ day of _____, A.D., 20____.

Witness

Owner and Developers

STATE OF OHIO, BUTLER COUNTY, SS;

Be it Remembered that on this _____ day of _____, 20____, before me a Notary Public, in and for said county and state, personally came

_____, an _____

Corporation, by _____ and

_____, who acknowledged the signing of the foregoing instrument to be the free act and deed of said corporation and of themselves as individuals for the uses and purposed herein mentioned.

In Testimony whereof, I have set my hand and affixed my Notarial Seal on the day and year last aforesaid.

Notary Public, State of Ohio

My Commission Expires _____

INSTALLATION OF WATER MAINS DETAILS SPECIFICATIONS

GENERAL INFORMATION TO BIDDERS

These specifications are intended to describe the scope of materials, labor, tools, equipment and expendable materials to be supplied by the contractor to install water mains for projects funded by the City of Hamilton and also funded by others.

The work to be performed under this contract shall be coordinated with the work of the Gas and Water Department of the City of Hamilton, Ohio.

All work described in the following paragraphs and shown on the drawings is included in the work to be done by the Contractor, unless specifically noted to the contrary in the specifications or on the drawings.

No trenching or laying of pipe or fittings shall be done until the curb and gutter on at least one side of the street shall have been installed or until curb grade stakes have been set. Trench cut stakes, may in certain installations, be substituted for curb grade stakes, but only when approved by the Engineer.

The Contractor shall use digging equipment that produces even bedding and foundation on which the pipe and/or fittings shall be installed. The bottom of the trench shall be level and free from humps or voids, excessive loose dirt and large stones. The bottom of the trench shall be backfilled with four (4) inches of tamped ODOT 703.11, Type 2 prior to laying of pipe.

All work during its progress and at its completion shall conform to the lines and grades given by the Engineer and shall be done in accordance with the drawings and specifications subject to such modifications as the Engineer may determine to be necessary during the execution of the work. Water mains shall have a minimum of 48" of cover under existing or proposed grades, whichever lower, except at such points where the grade must be adjusted to meet existing conditions of unforeseeable obstacles, and except where otherwise indicated on the plans. The Contractor shall maintain a minimum clearance of 18" between the water and any other utility line or structure.

Caution must be exercised in trenching/excavation so as not to damage existing structures. Any piping exposed during trenching excavation that is to remain unchanged in elevation or location, and is to remain in service during construction, shall be properly protected and supported to insure maintenance of service **and its location and depth shall be drawn on an "as built" drawing**. This shall include all pipes and services for gas, water, sewer, telephone or electricity where the same are encountered in the prosecution of the work. In the event any such services for gas, water, electric, sewer or telephone are disturbed, damaged, or destroyed, the Contractor shall arrange with the Owner of such service or facility for its replacement and restoration at the Contractor's expense, and in a manner and with material approved by the Engineer.

Any abandoned mains that may interfere with the installation of the new mains shall be removed and disposed of by the Contractor at his expense.

Broken pavement, rock and slag shall be removed and disposed of and shall not be used for backfill.

Proper and satisfactory means shall be provided for the prompt removal of any/all water entering the trench/excavation. Water shall be removed as fast as it collects and disposed of in such a manner so as not to injure the suitability of the ground for a foundation for the proposed main, and so that it will not interfere with the protection of the work, or the proper placing of and support for concrete blocking.

Sheeting and bracing shall be placed and maintained to properly support the sides and ends of the excavation, and to prevent injury to existing structures or facilities and/or to persons or property as directed by the most demanding criterion of OSHA or Ordinance No. 5138 of the Hamilton Municipal Code.

All curb valves and boxes shall be installed within the public right-of-way and between the sidewalk and curb.

INSTALLATION OF WATER MAINS

1.0 CUTTING OF PAVEMENT

- a. Asphalt/Bituminous Pavement, with or without stone or slag base, must be cut with an approved concrete saw and shall, upon repair have a one (1) foot bearing on undisturbed ground. (Class II & III paving)
- b. Asphalt/Bituminous Pavement with a concrete base must be cut with an approved concrete saw and shall, upon repair have a one (1) foot bearing on undisturbed ground unless the cutback requirement is specifically waived by the Engineer. (Class III paving)
- c. Concrete paving must be cut with an approved concrete saw and removed to an existing joint. The saw-cut must penetrate at least 90 percent of the thickness of the concrete to be cut. An air spade may be used, if specifically approved in writing by the City Engineer, where the existing concrete is in bad condition and would therefore not lend itself to saw cutting.
- d. The Contractor will make two (2) saw cuts for temporary asphalt placement (for water main placement), followed by two (2) additional saw cuts in the undisturbed ground (one foot on each side of the trench for temporary pavement) for final paving.

Drop balling of all pavements is prohibited and a pavement breaker may be used only after saw cutting or cutting the concrete with an air spade as specified above.

Any adjacent pavement, curb, or sidewalk that is damaged due to negligence on the part of the Contractor, is to be replaced at the Contractor expense.

Payment for cutting of pavement for water main installation shall be included in the unit price bid per lineal foot of water main installed. This payment should include all necessary labor, materials and equipment necessary to cut pavement.

2.0 PIPE AND FITTINGS

a. Ductile Iron

Ductile iron, Class 53 shall conform to ANSI Specification A 21.51 (AWWA C151) cement lined with push-on gaskets conforming to ANSI Specification A 21.11 (AWWA C111) must be used. Ductile iron fittings shall be mechanical joint and must conform to ANSI Specification A21.10 (AWWA C153).

Restrained joints shall be Megalug as manufactured by EBAA Iron, Inc. or equal. Use of restrained joints shall not eliminate the requirements for thrust blocks.

Type K copper tubing, shall be used for services.

b. Plastic (P.E.)

Plastic pipe and plastic fittings shall be thermoplastic, designated HDPE-3408, Schedule SDR-11.0, and DIPS size, for buried installations in accordance with AWWA C 906-90. A blue stripe shall be embedded in the outside of all plastic pipes. Acceptable manufacturers are Performance Pipe and Arncos Pipe. The contractor must submit detailed specifications for approval prior to beginning construction if a different pipe manufacturer is desired.

Water Services through 2" shall be type K copper tubing.

Water Service Tapping Tees ¾" through 2" Copper Tube Size Outlets (CTS) Thermoplastic HDPE – 3408 Butt Fusion Tapping Tees, with a full-size Stainless Steel or Brass Cutters, with double o-ring sealing cap.

All compression fittings used on PE water service tubing will require a Tapered End, Stainless Steel Stiffener, or approved equal.

Regardless of the type of material used for installation of water main, payment for pipe and fittings shall be made at the unit price bid per lineal foot of water main installed and should include all labor, materials, and equipment necessary to install and connect the water main.

3.0 LAYING AND PADDING/BACKFILLING

a. Ductile Iron

The excavation and preparation of the trench and the laying of the pipe shall be done to conform to the applicable parts of the latest revision of the standard specifications for installing Ductile Iron Pipe, AWWA C-600. All Ductile Iron Pipe shall have polyethylene encasement in accordance with AWWA C105, polyethylene tube, minimum 8 mil thick, 2 inch wide plastic backed adhesive tape, bond to both metal surfaces and polyethylene film.

Suitable bell-holes shall be excavated for the bell of each pipe so that the bells will not support the weight of the pipe only. The pipes shall be fitted and matched so that when laid in the work, they will form a conduit with a smooth and uniform invert.

b. Plastic (P.E.)

Plastic Pipe will require the placement of No. 10, insulated solid tracer wire and marking tape one foot overtop of the main and services. All costs for labor, materials, and equipment to place tracer wire and marking tape shall be included in the unit price bid per lineal foot of plastic main and services installed.

The tracer wire shall also be extended up into all valve boxes and along water services and up into the curb box utilizing "DryConn® Direct Bury Lug" as manufactured by King Innovation or approved equal.

Regardless of the type of pipe utilized:

Piping materials shall be carefully lowered into the trench in a manner that will prevent damage to materials, protective coatings and lining. Pipe and fitting shall be clean when laid and open ends shall be kept plugged with bulkheads during construction. It is highly recommended to "swab" the pipe prior to laying. Precautions shall be taken to prevent floating. All piping, whether Ductile Iron or Plastic shall be placed on firm, well compacted bedding (See trench detail). No piping shall be placed in mud or "muck". The suitability of placement shall be at the discretion of the Engineer.

The water service tubing should be laid in a serpentine fashion in the ditch. Sand or ODOT 703.11 bedding and padding should be used. A minimum of 2' of bedding below and on the sides, and 6" of padding above the tubing.

Concrete blocking and supports shall be provided at all tees, bends and valves and at any other locations shown on the plans or directed by the Engineer. The above concrete structures shall be built to the lines, grades and dimensions shown on the standard construction drawings, constructed with Class "C" concrete per ODOT 499 and paid for as hereinafter provided. The cost of concrete blocking for tees and bends, supports, and the cost of excavating to line and grade shown for the supports shall be included in the unit price bid per lineal foot of main installed. The costs associated with

concrete blocking for valves shall be included in the unit price bid per valves and fittings installed.

Whenever it becomes necessary to cut a length of pipe for any purpose, care shall be taken to leave a smooth and uniform surface and the cut shall be performed so that the cut surface is at right angles to the pipe axis.

All connections with existing structures or pipes shall be made in a thorough, first class, neat and workmanlike manner. The cost of this work shall be included in the price bid for the various pipe items unless specifically itemized for payment elsewhere in the plans or proposal.

All bedding and backfill shall be placed and compacted in accordance with Section 603.10 and 603.11 of the Ohio Department of Transportation Construction and Materials Specification. In general, this requires granular material, ODOT CMS Item 703.11 Structural Backfill, Type 2, to be placed in eight (8") maximum height lifts with each lift being compacted to 96 percent density by mechanical devices as approved by the Engineer. Backfill under pavement shall be ODOT 613 Low Strength Mortar Backfill, Type 1.

This procedure shall be as follows:

1. Place 4" of bedding at trench bottom
2. Compact 4" bedding to 96 percent density
3. Lay new water main
4. Place bedding around new pipe and a minimum 12" atop
5. Compact to 96 percent density
6. Begin placement in 8" compacted lifts (ODOT 603.11) or place Low Strength Mortar Backfill.

Surplus excavated materials must be removed daily unless specific approval is obtained from the Engineer.

The Contractor guarantees the backfilling of the ditch (and/or paving) for one (1) year after the project is completed and accepted. If surface settlement occurs within this period, upon notice, Contractor will repair all settlements and resurface the pavement at his expense.

"Jetting" of backfill will not be permitted under any circumstances.

Backfill in roads, streets, driveways or any other improved traffic bearing areas shall be as outlined above and approved by the Engineer. Any portion of a trench that is within two (2) feet of the edge of pavement shall be considered "in the pavement".

Backfill shall be maintained in good condition as determined by the Department of Public Works of the City of Hamilton under traffic considering that the Gas and Water

Department has 1) established a performance criterion for quality of backfill and 2) does not normally provide full time inspection of contractor activity. The Gas and Water Department reserves the right to test the percent of compaction of the backfill at any time between the time an excavation is backfilled and the time immediately prior to final repaving.

The Contractor will be required to submit a sample of the backfill material that he proposes to use before any work can commence. That sample will be used to establish the basis of future test for that backfill material. The contractor will not be allowed to change the source or kind of backfill material without prior approval of the Engineer and completion of the testing of the new backfill material. The cost of any test for an alternative backfill source and or kind shall be paid by the contractor reinstalling permanent pavement.

The Contractor shall provide proper and satisfactory means and devices for the removal of all water entering the excavations and shall remove all water as fast as it may collect in such manner as shall not interfere with the prosecution of the work, the proper placing of masonry or other work. No pipe shall be laid under water. No water shall be allowed to enter the pipe being laid.

Precautions shall be taken to protect pipe interiors, fittings, and valves against contamination. When pipe laying is not in progress, as for example, at the close of the day's work, all openings in the pipeline shall be closed by water-tight plugs. Joints on all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.

Laying and Padding/Backfilling of water main shall be included in the contract unit price per lineal foot of water main installed as stated in the bidding schedule. This payment should include all of the labor, materials and equipment necessary for Laying and Padding/Backfilling of trenches.

3.1 FLASH FILL (TO BE USED ONLY WHEN SPECIFIED ON THE DRAWINGS)

1. Description: This work shall consist of furnishing and placing of a flowable mixture of fly ash and sand with water for backfilling trenches under various combinations of pavement within the public right of way or other locations.

2. Materials: 1. Cement - None 2. Fly Ash - Shall meet A.S.T.M. C-618, Class C or Class F except that requirement for moisture and pozzolanic activity are waived for Class F Fly Ash. 3. Sand shall be natural. 4. Water used for the mixture shall be free of oil, salts, acids and other impurities that would have adverse effect on the quality of the backfill.

3. Mixing Proportioning: ASTM C-618 Class "C" Fly Ash 400 lbs., ASTM C-138

concrete sand 2930 lbs. Potable water 430 lbs. Unit weight (fresh weight) 135 lbs./ ft.

4. **Mixing Equipment:** Sufficient mixing capacity and delivery equipment shall be provided to permit the mixture to be placed without interruption as much as practical. Mixtures shall be delivered and placed from volumetric mobile mixers. Volumetric mixers shall be calibrated so as to combine the mix materials.

5. **Placing Mixtures:** Once 12" of compacted ODOT 703.11 is placed above the pipe, the Flash Fill can be used. The fill material shall be brought up uniformly to the lines or limits shown on the plans. Placing of materials over Flash Fill may pavement can be performed one (1) hour after backfill has been placed. The placing of asphalt concrete pavement over the same mixture shall not occur until a minimum of two (2) hours has elapsed following placing of the backfill unless a penetrometer test in accordance with ASTM C-403-88 indicates average strength of 400 psi in less time.

6. **Limitations of Operations:** The mixture shall not be placed on frozen ground, the placed mixture shall be protected from freezing, each filling stage shall be as continuous as possible, and the curing time of flash fill may be affected by temperature. At temperatures near freezing or below additional time may be needed for proper cure of the material prior to any type of paving operations.

Payment for flashfill shall be made at the contract unit price per lineal foot of water main installed as stated in the bidding schedule. This payment shall include all labor, materials, and equipment necessary to install flashfill when specified for water main.

4.0 PIPE JOINTS

a. Ductile Iron Pipe

All joint surfaces shall be cleaned before joint lubricants are applied. Joints shall be made in accordance with the pipe manufacturer's recommendations and procedures and in accordance with the latest revision of AWWA C-600. All workmen must have clean hands or use sterile gloves when applying lubricant.

b. Plastic Pipe (P.E.)

Joints shall be made as detailed in Sections 4.4 and 4.5 of AWWA C 906-07.

Note: Regardless of the type of pipe installed, no joints shall be made under water. If any irregularity is found, the joint shall be taken apart and remade, if necessary.

Payment for pipe joints shall be included in the unit price bid per lineal foot of main installed. This payment should include all labor, materials, and equipment necessary to install pipe joints.

5.0 VALVES AND FITTINGS

All valves 12" and under shall be totally encapsulated disk gate valves with a red operating nut, which open when turned clockwise. Acceptable manufacturers include: American Flow Control, U.S. Pipe, Ken.Sel.-2, Clow, Mueller or approved equal.

All valves over 12" shall be butterfly valves with a red operating nut, which open when turned clockwise. Acceptable manufactures include: Henry Pratt Company (Groundhog Valves) or approved equal.

Valves shall have a pressure rating of 150 psi.

Acceptable manufacturers for tapping sleeves include: American Flow Control, Mueller, PowerSeal or approved equal.

Air release valves shall be 2" air & vacuum valves and shall be set in a manhole for access. Acceptable manufacturers include: Crispin Valve (AL20) or approved equal.

When installing Plastic Pipe (P.E.), it will be necessary to use mechanical joint adaptors and transition fittings into and out of all valves, unless otherwise noted on the drawings. The use of mechanical joint adaptors and transition fittings should be included in the unit price bid for valves and fittings. All main line valves will be polyethylene encased per AWWA C 105/A21.5-05.

Fittings (tees, bends, etc.) shall be of the same material as the pipe.

Payment for all material, labor, and equipment necessary to install valves and fittings, concrete blocking, compacted backfill, and polyethylene encasement shall be made at the contract unit price for valves as stated in the bidding schedule.

6.0 FIRE HYDRANTS (INSTALLATION AND REMOVAL)

a. Installation of Hydrants

All hydrants shall have two (2), two and one-half (2½) inch hose nozzles and one (1) four and one-half (4½) inch steamer or pumper connection threaded to conform to the Hamilton City Standards now in use as follows:

2 1/2" hose nozzle threads	- 3 3/16" outside diameter, 7 threads per inch
Pumper nozzle threads	- 5 23/32" outside diameter, 4 threads per inch

The operating nut and the nuts of the nozzle caps shall be pentagonal in shape, at least one (1) inch high and measuring one and one-half (1 1/2) inches from point to flat at the base, conforming to the standard now in use.

All hydrants shall turn to the left or counter-clockwise to open, to conform to present standards. Approved hydrants furnished under the above specifications shall be Darling B-62-B Quick Fix, or Mueller Super Centurion 250, or approved equal.

The gravel fill around the hydrant should be No. 57's as defined by the latest version of ODOT Specifications and the hydrant should be set on stone, brick, or concrete (See hydrant detail). Any hydrant installation that has a run greater than 100 feet from the main will require an additional valve at the main (i.e. 2 valves would be required per hydrant setting with greater than 100 feet of run).

When installing Plastic Pipe (P.E.), a molded tee will be used for the branch to the hydrant. MJ Adapters will be used to install the watch valve and to make the connection to the hydrant.

Each hydrant installation shall include anchor tee, 6" fire hydrant lead, 6" gate valve, hydrant and concrete blocking and all other material required for the installation. Payment shall be made at the contract unit price per hydrant installed as stated in the bidding schedule and shall include all labor, materials, and equipment necessary for hydrant installation.

b. Removal of Hydrants

Removal of hydrants shall include removal of the entire hydrant assembly including but not limited to hydrant, upper and lower barrel, and base. Upon the removal of existing hydrants, the main shall be thoroughly capped or plugged (See item 7.0 b., "Capping of Mains" for details). The capping and plugging of the main for hydrant removal shall be included in the unit price bid per fire hydrant removed.

Upon removing an existing hydrant, the hydrant shall be returned to the City Garage at 2210 South Erie Highway, Hamilton, Ohio 45011.

Payment for hydrant removal shall be made at the contract unit price as stated in the bidding schedule and shall include all labor, materials, and equipment necessary for hydrant removal.

7.0 THRUST BLOCKING

a. Tees, Bends, and Valves

All bends over five (5) degrees and all tees, bends, and valves shall be securely blocked against movement with concrete piers placed against undisturbed earth, as shown on the drawings and/or as approved by the Engineer. Utilization of meg-a-lugs **will not** constitute a waiver of concrete blocking.

The Engineer may require the installation of steel materials for blocking, rodding and/or clamping at fittings where proper construction so indicates. Such extra steel shall be placed to the satisfaction of the Engineer in accordance with the "Standard Details."

Concrete used for blocking shall be Class "C" concrete which shall consist of one (1) sack (94 lbs.) of cement to not more than seven (7) cubic feet of aggregate. A cubic yard of concrete in place shall contain not less than four and one-half (4 1/2) sacks of cement.

All coarse aggregate used in the concrete shall pass a standard one and one-half (1 1/2) inch sieve.

Water shall be removed from the work place before concrete is poured. Concrete shall not be poured until authorized by the Engineer, and it shall be poured in the presence of the Engineer.

Concrete shall not be poured during rain unless adequately protected and, in any case, shall be protected from rain until it has hardened sufficiently, so that it will not be damaged.

Concrete shall be protected against freezing for 24 hours after placement if temperatures below 40 degree F are expected.

Any concrete work not performed in complete compliance with this contract document shall be considered defective and shall be removed and replaced by the Contractor at his expense.

Forms used in conjunction with concrete blocking shall not be removed.

Concrete blocking shall be placed at least three (3) days in advance of testing of mains. The Engineer may waive this requirement provided that proper hardwood blocking is installed, at the Contractor's expense (for testing only). Only concrete blocking may be installed as "final blocking" after the successful completion of the test.

Payment for all labor, material (inclusive of steel), and equipment necessary for thrust blocking of **tees and bends** shall be included in the unit price bid per lineal foot of water main installed .

Payment for all labor, material, and equipment necessary for thrust blocking of **valves** shall be included in the contract unit price bid for the installation of water main valves.

b. Capping Mains

The Contractor shall properly install watertight caps or plugs in the ends of all mains when the mains are not in the actual progress of construction. The plugs and/or caps

used shall be mechanical joint and shall be manufactured in accordance with AWWA Specification C110.

After the plug or cap is installed, the Contractor shall install required blocking to adequately brace the plug or cap. Blocking may be used temporarily against the abandoned pipe; however, the permanent blocking shall be installed such that future disturbances of the abandoned pipe shall not affect the permanent blocking. After the water line has been plugged or capped and the permanent blocking has been installed, the hole shall be backfilled as specified.

All securing and blocking of caps or plugs shall be inspected by the Engineer before the main is subjected to the pressure test. Blocking shall be placed against undisturbed earth and must have the approval of the Engineer. Hardwood is an approved alternative to concrete for pressure testing, but concrete must be used for final blocking.

Payment for capping of mains shall be included in the unit price bid per lineal foot of water main installed. This payment should include all labor, materials, and equipment necessary to cap water mains.

8.0 TESTING, FLUSHING, STERILIZING AND DISINFECTING WATER MAINS

A. HYDROSTATIC TESTING

1. Ductile Iron - The Contractor shall test the water mains installed by him as directed by the Engineer and as hereinafter specified in accordance with the latest revision of AWWA C-600, Section 4 "hydrostatic pressure test." Ductile Iron water main laid pursuant to this contract shall be hydrostatically tested at a pressure of 1.5 times the operating pressure or 150 psi, whichever is greater for a period of four (4) hours. The total test time including, initial pressurization, and time at test pressure, must not exceed eight (8) hours. The start and completion of the test must also be witnessed by the Engineer.

2. Plastic Pipe (P.E.) - The Contractor shall pressure test the piping system at 1.5 times the system operating pressure or 150 psi, whichever greater, at the lowest point of the test section. The total test time including initial pressurization, initial expansion, and time at test pressure, must not exceed eight (8) hours. If the test is not completed due to leakage, equipment failure, etc., depressurize the test section, and allow it to "relax" for at least eight (8) hours before bringing the test section up to pressure test again.

Regardless of the type of pipe utilized:

THE CONTRACTOR SHALL "PIG" THE NEW WATER MAIN PRIOR TO BEGINNING THE HYDROSTATIC TEST. THE PIGGING PROCESS SHALL BE REPEATED AS NECESSARY TO THE SATISFACTION OF THE CITY OF HAMILTON.

Payment for pigging, testing, flushing, sterilizing, and disinfecting of water mains shall be included in the unit price bid per lineal foot of water main installed, and shall include all labor, materials, and equipment necessary to test, flush, sterilize, and disinfect water mains.

After the ends of the main have been securely plugged or capped, the procedure shall be to pump chlorinated ("bacteria free") water into the newly constructed mains through a tapped test plug by means of a hydraulic pump. A recording pressure gauge, to be furnished by the City, (which the Contractor shall return in satisfactory condition) shall be installed on the main as directed. The amount of permissible leakage shall be determined by the Engineer. In the event that leakage, if any, exceeds that permitted by the Engineer, the location of the leak shall be determined, appropriate repairs shall be made, and the test shall be rerun until a satisfactory leakage rate is achieved. All such investigation and repair work shall be at the Contractor's Expense. The repair of all leaks shall be made using accepted repair materials and methods approved by the Engineer.

If a leak is located and repaired by the City, the City will deduct the cost of locating and repairing said leak from the amount due the contractor under the terms of this contract.

Hydrostatic testing may be conducted simultaneously with the sterilizing required in this section.

No testing shall be done within three (3) days of installation of concrete blocking in the main being tested, except where temporary hardwood blocking is permitted by the Engineer.

No testing shall be done against a valve in a water main that is either in service or temporarily out of service.

B. FLUSHING

After completion of the hydrostatic testing and sterilizing procedures, the mains shall be thoroughly flushed by the Contractor until the chlorine concentration is reduced to a level approved by the Engineer. Flushing of chlorine must be approved by the Engineer before concentrated chlorine is flushed. The Contractor shall make the necessary taps for flushing. The taps should be as close as is possible between the existing and proposed mains. The taps should be removed or capped after the flushing process has completed. The chlorinated water used for flushing must be properly disposed at a location approved by the Engineer. The costs associated with making the tap and chlorine disposal should be included in the unit price bid per lineal foot of installation of water main.

Since this specification does not provide for a preliminary and a final flushing, the contract must comply with the AWWA guidelines for preliminary flushing in Section 4.4.3.2 of AWWA C 651-05 which specifies a minimum rate of 2.5 FT/S. The City would prefer a minimum of 3.5 FT/S, if conditions dictate. AWWA's flow rates and flush openings for a 40 PSIG residual pressure are:

No. & Size <u>Pipe Size</u>	No. of 2 1/2 <u>GPM</u>	<u>Tap Outlets</u>	<u>F.H. Outlets</u>
6" 200		1 - 1 1/2"	1
8" 400		1 - 2"	1
12" 900		2 - 2"	2
> 12"	At discretion of Engineer		

Note that flushing is not an alternative to preventative measures during construction. Flushing will not remove certain contaminants, such as caked deposits. Therefore flushing will not necessarily be adequate to reduce the bacteria level to the City's guidelines.

C. STERILIZATION AND DISINFECTION

The Contractor shall disinfect water mains installed by him in accordance with the procedure prescribed by the latest revision of AWWA Specification C651-05, using either liquid chlorine or calcium hypochlorite, such as "HTH", "Perchloron", "Pittchlor", or equal except that the chlorine residual must be at least fifty (50) P.P.M. at the end of twenty-four (24) hours throughout the main.

If when testing, the Contractor does not meet or exceed those standards as defined by AWWA, the Contractor must repeat, at his expense, chlorination treatment until a satisfactory sample is obtained.

Upon satisfactory completion of the above check, the City will, at its own expense, conduct a bacteriological test of the water line. Samples collected on two (2) consecutive days with acceptable (i.e. negative) results will indicate successful installation and disinfection of the main.

An acceptable bacteria test will be a total coliform plate with no total coliform colonies, no background colonies and no appreciable debris on the filter. If the initial test shows total coliform colonies (positive test), the main should be re-disinfected until a negative result is obtained.

If the initial test shows background colonies or appreciable debris with no coliform, the lines should receive further flushing. Acceptable results will be determined by the City of Hamilton Laboratory Supervisor or an appointed designate.

If the test is positive, the Contractor must, at his own expense, re-disinfect the line until the test is negative. If, after two (2) unsuccessful attempts to collect bacteria samples,

acceptable standards are not met, it will be necessary for the Contractor to “pig” the line at his expense.

Bacteria samples **will not** be collected by City personnel any later than Wednesday, 12 noon of a full week. If this timeframe cannot be met by the Contractor, he should plan to conduct his disinfection the following week.

The Contractor must provide test connection(s) and suitable access from which the City's designated representative can draw water samples for a bacteriological test.

9.0 TIE-INS OF WATER MAINS

Wherever, in this specification, the term "Furnished and Installed by Others" is used, it shall mean by the City of Hamilton Water Distribution Department.

Tie-ins must be completed within 14 days of passing the bacteriological test. If the tie-ins are not completed within this 14-day period then the City will require that the bacteriological test be repeated prior to completing the tie-in.

The City shall, where necessary, valve off the existing mains where work is to be performed on same and/or where required to maintain operation of the active mains. The Contractor shall notify the Engineer or the City's representative a minimum of 48 hours before the anticipated date of the tie-in. Upon receiving said notification, the City will provide to the Contractor, a standard form of notification to distribute to all of the affected property owners. The notification of the property owners shall be no sooner than 24 hours before the actual time of water main “shut down”. No additional payment will be made to the Contractor for notification. The City of Hamilton does not guarantee a “dry” shut down for tie-ins due to the age of the existing system.

Once all new mains have been “tied-in”, all final "Flushing" and actual placing of mains in service shall be done by the City.

The Contractor shall do all excavating, exposing and cleaning existing pipe in preparation for making all taps and shall afterward make all connections to main extensions and service laterals.

The Contractor shall provide a "tie-in" pit, for each connection to be made with a bottom elevation which is a minimum of 24" below the bottom of the main and pumping capacity which will maintain the water level in the pit a minimum of 12" below the bottom of the pipe.

All exposed piping and "tie-in" pieces must be swabbed with a suitable disinfectant.

Payment for tie-ins shall be included in the unit price bid per lineal foot of water main installed. This payment should include all labor, materials, and equipment necessary to

tie-in mains, excavate and backfill test holes, notification to property owners or excavate for unanticipated circumstances.

SECTION 10 - SAFETY ISSUES

10.0 PUBLIC SAFETY

The Contractor shall conduct his work so as to interfere as little as possible with the public travel. Whenever it is necessary to cross under or interfere with railroads, intersecting streets, driveways (public or private), crosswalks or approaches to any building, he shall, in a manner satisfactory to the City Engineer (City Public Works Department, 785-7280), provide and maintain suitable and safe bridges or other temporary arrangements for the accommodation of public travel. The Contractor shall promptly remove, at completion of the work, any temporary bridges or crossings, erected/maintained by him, when ordered to do so by the City Engineer. The Contractor shall provide capable watchmen in sufficient number to safeguard the public and the work.

All excavations and obstructions shall be properly barricaded. Barricades with lamps, traffic cones, flare or lanterns shall be furnished, placed and maintained by this Contractor for the protection of vehicles and pedestrians during the progress of the work. This Contractor shall conform to all state, federal and local safety regulations in connection with the work.

No allowance will be made for bridging, barricading, lighting, watchmen and/or flagging, as same is assumed to be included in the price bid on the Proposal Forms for installing pipe or for extra excavation for tie-ins, testholes, or unanticipated circumstances, whichever applies.

The Contractor shall conduct his work so that all fire hydrants and hydrant valves adjacent to the work shall be kept readily accessible to fire apparatus. No materials, equipment, or other obstructions shall be placed within ten (10) feet of any fire hydrant or control valve, unless by special permission from the Engineer.

10.1 CLOSING OF STREETS

The Contractor shall exercise care at all times to keep the work area as clean as possible and to permit traffic to use the roadways whenever possible. If, during the process of construction, it becomes necessary to close streets or alleys to traffic, the Contractor shall notify the City Engineer at least forty-eight (48) hours in advance of the day or dates said streets and alleys are to be closed. No street closing barricades are to be installed until permission is obtained from the Public Works Director. No detour shall be established unless it is approved in advance by the Public Works Director.

The Contractor shall have equipment available and men on call at all times to correct any/all hazardous conditions which may be created or occur by reason of the construction work and to assist in any emergency or accident that may arise in connection with the work on its contract.

The Contractor shall have equipment available and men on call at all times to correct any/all hazardous conditions which may be created or occur by reason of the construction work and to assist in any emergency or accident that may arise in connection with the work on its contract.

10.2 PERSONNEL LIST

The Contractor shall furnish the Engineer a list of Personnel who will be available and subject to call at hours other than normal working hours. Telephone numbers shall be included in this listing.

The Contractor shall plan his work in such a manner that pipe fittings and other readily removal materials delivered to the job site are installed on the day of delivery. If excess material other than pipe remains at the end of the work day, such excess material shall be removed.

SECTION 11 RESTORATION FOR DAMAGE TO PROPERTY

The Contractor shall be responsible for any and all damage to private property, to public property, or other facilities such as sewers, water lines, gas lines, underground or overhead electric power or communication lines and the like, due to the negligence of the Contractor or his employees.

The Contractor shall promptly repair and/or restore damages to all public and private structures, including fences damaged by the Contractor during the progress of the work. In lieu of such repairs, and if agreeable to the Owner of the damaged structures, the Contractor may make a fair and equitable monetary compensation to such owner. The Contractor must provide evidence of each monetary compensation to the Engineer.

Whenever lawns, shrubs, decorative growth, or other public or private property is damaged during the progress of the work, this Contractor shall promptly compensate the owner of such property by replacing the damaged property. In lieu of such replacement and if agreeable to the owner of the damaged growth, the Contractor may make a fair and equitable monetary compensation to such owner. The Contractor must provide evidence of each monetary compensation to the Engineer.

Where grass areas have been damaged or destroyed by the installation of main, sod or seeding shall be used to restore these areas to their original condition. The use of seeding and strawing/sodding shall be determined by the Engineer and shall be in accordance with Section 13.

SECTION 12 - PAVEMENTS

12.1 TEMPORARY PAVEMENT FOR STREETS TO BE RESURFACED

All trenches, excavations at street intersections, driveways and elsewhere, as may be directed by the Engineer, that are to receive concrete or asphalt pavement replacement (resurfacing), shall be treated with temporary pavement replacement, applied immediately after the trench/excavation is backfilled.

Temporary pavement shall consist of 8-inches of ODOT 448. Unless otherwise directed, this temporary pavement shall not be removed until permanent paving begins. The width of temporary pavement is considered to be that of the excavated trench. Specifically, the Contractor will not be afforded payment for temporary pavement in the "Cut Back" areas (i.e. one foot on each side of the trench).

Payment for the item shall be made at the contract unit price for ODOT 301 and shall include all labor, materials, and equipment necessary to install, maintain, remove and dispose of temporary pavement.

12.2 TEMPORARY WEARING COURSE

See previous item regarding Work During Winter Months for information regarding the temporary wearing course.

12.3 CONCRETE PAVEMENT OR CONCRETE BASE

All concrete used in concrete pavement shall conform to ODOT construction and materials specifications, Section 499-Class "C" concrete. All coarse aggregate used in the concrete shall pass a standard one and one-half (1 1/2) inch sieve.

All concrete shall be ready-mixed or mixed in a batch mixer.

Water shall be removed from the work site before concrete is poured.

Concrete shall not be poured during rain unless adequately protected and, in any case, shall be protected from rain until it has hardened sufficiently so that it will not be damaged.

If the temperature is below 40 degrees F. at any time during the 24-hour period following pouring of concrete, precautions must be taken to prevent the concrete from freezing. Adequate equipment shall be provided for heating and protecting the concrete.

Any concrete work not formed in a fashion which is acceptable to the Engineer shall be considered as defective work not conforming with the intent of these specifications and shall be removed and replaced by the Contractor at his expense.

Concrete pavement and concrete base, where installed in highways, roads, streets, alleys or driveways, shall be (9) inches in thickness for pavement and eight (8) inches for base, except that in driveways where the original driveway thickness was less than nine (9) inches of concrete it shall be restored to the original thickness. However, a minimum driveway thickness of six (6) inches shall be required.

Driveways shall be restored with material similar to, or the approved equal of, the existing driveway and shall be the same width and configuration as the original construction.

12.4 ASPHALT CONCRETE PAVEMENT

Asphalt/Bituminous pavement shall be restored with Bituminous (asphaltic) concrete ODOT 301 and 448 which shall be placed over a prepared stone base (ODOT 304) that is in two-four (4) inch, compacted "lifts", carefully rolled and finished to the adjoining roadway surface.

Bituminous (asphaltic) concrete shall be "plant mixed" and shall be ODOT 301 and 448 as specified in Ohio State Highway Specifications.

Where surface is to be asphalt concrete pavement, face of the old pavement, castings, curb, etc., against which the new pavement is to be placed shall be sealed with hot applied joint sealer as per ODOT CMS Item 705.04, before and after.

For a description of payment items associated with asphalt pavements, see item 12.5 below

12.5 PAYMENT FOR PAVEMENT RESTORATION

It is the intent that the pavement restoration be at least equal to that of the existing street.

No payment will be made for pavement, curb, driveway, sidewalk, or any other type surface replacement unless it is necessary to remove or destroy the same in order to satisfactorily install the mains or services.

The area of asphalt/bituminous pavement on stone base to be restored under this contract shall for payment purposes be determined as being the actual area of the repaving except that it shall not be greater than the length of trench multiplied by a width of three (3) feet plus the outside diameter of the pipe. No extra payment will be made when the restoration exceeds the dimensions set forth in this paragraph, unless authorized by the Engineer.

Any and all replacement outside such defined lines made necessary by excavation or settlement of ground adjacent to the premises, or by storing of materials, or by operation of equipment shall be done by the Contractor at his own expense.

The Contractor shall take such measures as are necessary to protect new pavement until it is in condition to support traffic. The time for concrete curing shall be twenty-eight (28) days, unless quick set cement is used, in which case the Engineer shall determine the allowable time.

The Contractor shall be responsible to the City for any settlement occurring within one (1) year after the date of final billing, and in case of settlement during this period, he shall resurface or re-pave the damaged area or areas to the satisfaction of the Engineer.

Payment for ODOT 301 shall be made at the contract unit price per cubic yard installed as stated in the bidding schedule and shall include all labor, materials, and equipment necessary to place ODOT 301.

Payment for ODOT 304 shall be made at the contract unit price per cubic yard installed as stated in the bidding schedule and shall include all labor, materials, and equipment necessary to place ODOT 304.

Payment for ODOT 448 shall be made at the contract unit price per cubic yard installed as stated in the bidding schedule and shall include all labor, materials, and equipment necessary to place ODOT 448.

Payment for saw cutting and removal of existing pavement (asphalt or concrete) shall be included in the contract unit price per lineal foot of main and services installed as stated in the bidding schedule and shall include all labor, materials, and equipment.

SECTION 13 - RESTORATION OF SIDEWALK, DRIVEWAYS, CURBS & GUTTERS

Any sidewalks and/or curbs and gutters necessarily damaged or destroyed by the installation of the work under this contract shall be replaced in kind by the Contractor and be a subject for compensation. Sidewalks and/or curbs & gutters unnecessarily damaged by the work shall be replaced at contractor's expense.

Sidewalks shall be restored with Class "C" concrete (see Section 12.3) of the same width as the existing walk, shall be four (4) inches in thickness; and shall be placed on a well compacted, ODOT 304 gravel base, 4-inches in thickness.

Curbs and/or curbs and gutters shall be restored with Class (C) concrete (See Section 12.3) and shall be the same form and dimensions as the existing.

Payment for sidewalk and driveway restoration (removal and replacement) shall be made at the contract unit price as stated in the bidding schedule. This payment shall include all labor and materials necessary to restore sidewalks and driveways.

Payment for curb and gutter restoration (removal and replacement) shall be made at the contract unit price per lineal foot of curb and gutter restored. This payment shall include all labor, materials, and equipment necessary to restore curb and gutter.

SECTION 14 -SEEDING AND STRAWING/ SODDING

If suitable topsoil is available as part of the material excavated, it shall be removed and stored separately and used to backfill the top four (4) inches of lawn areas. After the backfill has been given a reasonable time to settle, it shall be spread to finished grade, and then raked to remove all weeds, roots, sticks, stones, etc. An application of not less than one (1) pound per 100 square feet of 10-10-10 lawn or turf grade fertilizer shall be uniformly distributed and raked in. If there is no suitable topsoil available, the contractor shall furnish and apply not less than two (2) pounds per 100 square feet of 10-10-10 lawn grade fertilizer in the method above specified.

Immediately after the preparation and fertilization of the seed bed, the seed shall be thoroughly mixed and evenly sown over the prepared areas at the rate of three (3) pounds per 1,000 square feet.

All areas shall be seeded with the following mixture (percentages are by weight):

44 percent Kentucky Bluegrass (*pao pratensis*)
12 percent Creeping Red Fescue (*Festuca rubra*)
44 percent Annual Rye Grass (*Lolium Italicum*)

Following the seeding, the surface shall be lightly raked and rolled with a light roller. Following the rolling, the area seeded shall be covered with two (2) inches, loose measurement, of vegetative mulch, tied down or kept in place by other acceptable methods.

All seeded areas shall be carefully looked after and tended by the Contractor, watering as necessary to secure a good turf; settled areas shall be filled, graded and re-seeded for a period of one (1) year after final acceptance of the project.

Payment for seeding and strawing shall be made at the contract unit price per square yard as stated in the bidding documents and shall include all labor, materials, and equipment necessary to seed and straw.

Payment for sodding, if applicable, shall be paid separately from seeding and strawing and be made at the contract unit price per square yard as stated in the bidding documents. This payment shall include all labor, materials, and equipment necessary to place sod.

SECTION 15- CLEANING UP

Before final acceptance, the Contractor shall clean up and remove all of the debris, construction material, signs, equipment, tools and barricades, as well as excess earth, rubbish and gravel that may accumulate in connection with the work under this contract. Streets and private property must be kept clear and free from rubbish at all times and must be left in a neat and orderly condition at the end of each workday.

SECTION 16- FIELD NOTES AND RECORDS

The Contractor shall furnish to the Engineer at the completion of each project a set of accurate and complete "As Built" drawings. These drawings shall accurately locate the gas or water main and services in reference to known structures, such as power poles, curb lines, storm sewers, buildings, etc. These locations must be made both horizontally and vertically. All new curb boxes and length of plastic services must be included on these drawings. **On a monthly basis the contractor must prove to the Inspector or Engineer that the As Built drawings are being kept up to date prior to approving the monthly pay estimate.**

Final payment will not be made until the Engineer has received an acceptable set of "As-Builts" and "Curb Box Location Cards" (blank cards will be provided by the City of Hamilton). If the Engineer deems the "As-Builts" unacceptable, he will notify the Contractor as to the necessary changes and/or additions to be made.

The Contractor must also complete a daily report, on forms provided by the Engineer, which must be signed by the Contractor's Field Supervisor and the City's Project Representative (Engineer or Inspector). The Contractor's Field Supervisor may report under "Remarks" any work payments that the Engineer will not approve. These items will be given further consideration by the City's Department of Gas and Water.

SECTION 17- TRAFFIC CONSIDERATIONS

*General: The Contractor should plan, if necessary, to utilize traffic control measures during construction and should prepare his bid price accordingly.

17.1 TRAFFIC CONTROL

The Contractor shall furnish, erect, maintain and remove lights, signs, barricades, temporary guardrails, other traffic control devices, and furnish watchmen and flag men as may be necessary to maintain safe traffic conditions in accordance with the Ohio Manual of Uniform Traffic Control Devices (OMUTCD).

The Contractor shall supply the Engineer, City Engineer, City Traffic Engineer and the Police Division with a name and telephone number of a representative that will be available 24 hours a day, 7 days per week, for emergency work. Any costs for traffic control incurred by the City will be billed to the contractor at the City's option.

17.2 MAINTAINING TRAFFIC

Traffic Diversion

When it is necessary to divert traffic from its normal channel into another channel, such diversion shall be clearly marked by cones, drums, barricades or temporary guardrails in the day time. If the need for markers continues overnight, reflectorized drums must be provided and maintained and positioned at intervals (in feet) equivalent to the speed limits. All devices must conform to OMUTCD requirements.

Two Way Traffic In One Lane

Whenever one travel lane is established for two-way traffic, two flag persons shall be used. Ideally, they should be in continuous visual contact with each other and one shall be positioned on each end of the work area. If visual contact is not possible, the Contractor must provide radio communications to the flag persons to safely facilitate opposing directions of travel. Off-duty police officers may be used/required for flagging.

17.3 CLOSED TO TRAFFIC

Street Closing

If it is necessary to close any street, the Contractor must obtain authorization from the City Traffic Engineer not less than forty-eight (48) hours prior to closure. If the City Traffic Engineer authorizes a street closure, he will notify the City Engineer (Dept. Of Public Works) who will issue a notice to the public safety departments, other affected City operations and to the press. The Contractor shall so schedule his work that the time of closure is minimal and shall, whenever possible, make suitable provisions for access by local residents, school buses, and mail delivery vehicles. All trenches, excavations, etc. are to be backfilled at nights, on holidays and on weekends unless otherwise authorized by the Engineer. The Contractor shall provide access for police, fire and emergency vehicles at all times. Fire hydrant and other public utility valves shall be accessible at all times. Streets shall be open to all traffic during non-working hours and signs covered.

17.4 DETOURS

When it is required that a street or road be closed to traffic, the Contractor shall furnish, erect, maintain, and remove signs, barricades, etc., as per the OMUTCD and the Traffic Engineering Division. The Contractor shall furnish, erect, and maintain advance warning signs, detour signs, and barricades, etc. on all streets including side streets that are affected by the work. If the Contractor requires assistance, it shall be his

responsibility to contact the City Traffic Engineering Department at (513) 785-7290 forty-eight (48) hours prior to work.

16.5 CITY OR PRIVATELY FUNDED PROJECTS

For City-funded installations and if, in the opinion of the Gas and Water Engineer, Traffic Engineer, or their representative, proper maintenance of traffic facilities and proper provisions for traffic control are not adequately being provided for the safety of the public, the Contractor shall be notified immediately. If necessary, the Gas and Water Engineer, Traffic Engineer or their representative may take the necessary steps to place them in an acceptable condition and the cost of doing such will be deducted from any payment which may be due or become due to the Contractor. The Traffic Engineer may also stop a privately funded project immediately without notice if these requirements are not followed or if a hazard exists in his opinion.

17.6 NOTICE TO CONTRACTOR

Traffic control requirements in construction zones within the City are extensive and adherence to them is mandatory. The Contractor is fully responsible for all requirements. If he is unclear as to the requirements for bidding purposes, or during construction, it is his full responsibility to contact the City Traffic Engineer to determine the requirements.

17.7 LOOP DETECTOR REPLACEMENT BY THE CONTRACTOR

Prior to work at intersections that may affect the traffic signal loop detector wire, the maintaining agency shall locate them within 48 hours after notification by the contractor. They shall be checked to insure that they are working properly by having a review of the existing facilities with the Maintaining Agency and the Contractor.

If a properly working traffic loop detector wire is disturbed during repair of the pavement, the contractor shall notify the City Traffic Engineer at (513) 785-7290, immediately. The Contractor will be required to replace the damaged loop detector at his expense within 48 hours after pavement restoration. All work must conform to Ohio Department of Transportation Bureau of Design Services Standard Construction Drawing 82.10. The wire used shall be #14 AWG copper and meet IMSA Specifications 51-3-1984 (XHHW). The City Traffic Engineer will determine the loop configuration and layout the location of the loop for the Contractor.

After the loop detector wire has been installed, the loop detector shall be connected to the lead-in cable by City Traffic Division forces and tested to make certain that it is operational.

SECTION 18 - DRAWINGS

The drawings, as prepared by the Engineer, are intended to be self-explanatory and are intended to indicate and provide for the construction of the various related parts of the improvement in a complete and connected manner, using the best engineering principles and workmanship throughout. Should any details be omitted, any discrepancies or errors appear, or misunderstandings arise, the Contractor shall submit a written request for an inspection, and any explanations given by the Engineer shall be final and binding.

SECTION 19 - DRUG TESTING

We hereby certify that we will comply with the U.S. Department of Transportation, Office of Pipeline Safety Regulations pertaining to Drug Testing Part 199, Paragraph 199.21.

Notary

Company

Officer

INSTALLATION OF GAS MAINS DETAILS SPECIFICATIONS

GENERAL INFORMATION TO BIDDERS

The Contractor shall furnish, erect, maintain and remove lights, signs, barricades; temporary guardrails, other traffic control devices, and furnish watchmen and flagmen as may be necessary to maintain safe traffic conditions in accordance with the Ohio Manual of Uniform Traffic Control Devices (OMUTCD).

These specifications are intended to describe the scope of materials, labor, tools, equipment and expendable materials to be supplied by the contractor to install gas mains for projects funded by the City of Hamilton and also funded by others.

The work to be performed under this contract shall be coordinated with the work of the Gas and Water Department of the City of Hamilton, Ohio.

All work described in the following paragraphs and shown on the drawings is included in the work to be done by the Contractor, unless specifically noted to the contrary in the specifications or on the drawings.

No trenching or laying of pipe or fittings shall be done until the curb and gutter on at least one side of the street shall have been installed or until curb grade stakes have been set. Trench cut stakes, may in certain installations, be substituted for curb grade stakes, but only when approved by the Engineer.

The Contractor shall use digging equipment that produces even bedding and foundation on which the pipe and/or fittings shall be installed. The bottom of the trench shall be level and free from humps or voids, excessive loose dirt and large stones. The bottom of the trench shall be backfilled with four (4) inches of tamped ODOT 310 prior to laying of pipe.

All work during its progress and at its completion shall conform to the lines and grades given by the Engineer and shall be done in accordance with the drawings and specifications subject to such modifications as the Engineer may determine to be necessary during the execution of the work. Gas mains shall have a minimum cover of 36" under existing or proposed grades, whichever lower, except at such points where the grade must be adjusted to meet existing conditions of unforeseeable obstacles, and except where otherwise indicated on the plans. The Contractor shall maintain a minimum clearance of 18" between the gas and any other utility line or structure.

Caution must be exercised in trenching/excavation so as not to damage existing structures. Any piping exposed during trenching excavation that is to remain unchanged in elevation or location, and is to remain in service during construction, shall be properly protected and supported to insure maintenance of service **and its location and depth shall be drawn on an "as built" drawing.** This shall include all pipes and

services for gas, water, sewer, telephone or electricity where the same are encountered in the prosecution of the work. In the event any such services for gas, water, electric, sewer or telephone are disturbed, damaged, or destroyed, the Contractor shall arrange with the Owner of such service or facility for its replacement and restoration at the Contractor's expense, and in a manner and with material approved by the Engineer.

Any abandoned mains that may interfere with the installation of the new mains shall be removed and disposed of by the Contractor at his expense.

Broken pavement, rock and slag shall be removed and disposed of and shall not be used for backfill.

Proper and satisfactory means shall be provided for the prompt removal of any/all water entering the trench/excavation. Water shall be removed as fast as it collects and disposed of in such a manner so as not to injure the suitability of the ground for a foundation for the proposed main, and so that it will not interfere with the protection of the work.

Plastic gas mains shall be installed and inspected in accordance with Administrative Order #200 Public Utilities Commission of Ohio.

Sheeting and bracing shall be placed and maintained to properly support the sides and ends of the excavation, and to prevent injury to existing structures or facilities and/or to persons or property as directed by the most demanding criterion of OSHA or Ordinance No. 5138 of the Hamilton Municipal Code

The Contractor shall allow no smoking, matches or open lights in the vicinity of the work. The Contractor shall keep ready for immediate use, a thirty (30) pound portable dry chemical fire extinguisher at each location where work is being performed.

All curb valves and boxes shall be installed within the public right-of-way and between the sidewalk and curb.

Operator Qualification of Contractor Personnel

Operator Qualification of Contractor Personnel is required by the pipeline safety regulations defined in 49 CFR Part 192, Subpart N and prior to commencement of any work on a City of Hamilton pipeline system. A contractor whose employees perform any identified covered task must submit:

1. A copy of the contractor's covered task qualifying program, and
2. Documentation of the qualifications of all contractor employees performing identified covered tasks as defined in The City of Hamilton Operator Qualification Program.
3. Contractor employees must be qualified to perform covered tasks on their own merits.

The Director of Gas and Water Operations is responsible for examining and certifying contractor qualification programs and contractor employee qualification documentation. This contractor program and contractor employee qualification documentation will be maintained on file at the City of Hamilton Municipal Garage Gas & Water Distribution Division.

INSTALLATION OF GAS MAINS

0.0 CUTTING OF PAVEMENT

a. Asphalt/Bituminous Pavement, with or without stone or slag base, must be cut with an approved concrete saw and shall have a one (1) foot bearing on undisturbed ground. (Class II & III paving)

b. Asphalt/Bituminous Pavement with a concrete base must be cut with an approved concrete saw and shall have a one (1) foot bearing on undisturbed ground unless the cutback requirement is specifically waived by the Engineer. (Class III paving)

c. Concrete paving must be cut with an approved concrete saw and removed to an existing joint. The saw-cut must penetrate at least 90 percent of the thickness of the concrete to be cut. An air spade may be used, if specifically approved in writing by the City Engineer, where the existing concrete is in bad condition and would therefore not lend itself to saw cutting.

d. The Contractor will make two (2) saw cuts for temporary asphalt placement (for gas main placement), followed by two (2) additional saw cuts in the undisturbed ground (one foot on each side of the excavated trench) for final paving.

Drop balling of all pavements is prohibited and a pavement breaker may be used only after saw cutting or cutting the concrete with an air spade as specified above.

Any adjacent pavement, curb, or sidewalk that is damaged due to negligence on the part of the Contractor, is to be replaced at the Contractor expense.

Payment for cutting of pavement for gas main installation shall be included in the unit price bid per lineal foot of gas main installed. This payment should include all necessary labor, materials and equipment necessary to cut pavement.

1.0 PIPE AND FITTINGS

A. Plastic Pipe.

Plastic pipe and plastic fittings shall be thermoplastic, designated PE-2406, Schedule SDR-11.5, for buried installations and manufactured by Performance Pipe. Services shall be 1" C.T.S., unless otherwise noted on the plans.

Hauling, unloading and stringing of plastic pipe must be done with care to prevent damage to the pipe. Since all plastics are relatively softer than steel, rough or poor handling techniques can result in gouges, cuts or punctures. When hauling plastic pipe, care shall be taken that it is not damaged by sharp projections from other equipment or from the truck bed itself.

Plastic pipe and tubing shall not be pushed or pulled over sharp projections, dropped or have other objects dropped upon it. Caution shall be taken to prevent kinking or buckling, and any kinks or buckles, which occur, shall be removed by cutting out as a cylinder.

Care shall be exercised at all times to protect the plastic material from fire, excessive heat or harmful chemicals.

B. Steel Pipe

Steel pipe and fittings should be 8" with a wall thickness of .250", API-5L-Grade B with Scotch coat 206, thin epoxy coating, with minimum cutback.

All exposed steel pipe must be protected from corrosion using Royston Roybond Spray 747 plus the Greenline Tape or the Royston Quick Seal Tape plus Primer or any approved equal primer and tape combination. Steel pipe shall be protected from corrosion using cathodic protection.

Regardless of the type of pipe utilized:

The field inspection provided on each installation shall be suitable to prevent the chance that any pipe (Steel or Plastic) or tubing containing harmful imperfections will be installed as part of a main or service line.

Injurious gouges or grooves may be removed by cutting out a cylinder containing the damaged portion, and then replacing it with a good piece, if so approved by the Engineer. The Contractor for cuts, scratches, gouges and other imperfections shall carefully inspect both Steel and Plastic Pipe and tubing before use, and any pipe or tubing containing harmful imperfections shall be rejected. If any of those listed are greater (in depth) than 10 percent of the overall thickness, the pipe will be deemed rejected and the Contractor shall replace the defected pipe at **no additional cost to the City.**

2.0 A. BUTT (HEAT) FUSION JOINING FOR PLASTIC PIPE

Before the installation of heat fused thermoplastic pipe may proceed, the Contractor shall ensure that the ends of each pipe are squared and faced with a facing tool, which is part of the fusion equipment.

When it is necessary to cut the pipe to a shorter length, it can easily be cut with special plastic pipe cutters, with a fine-toothed hand saw or hack saw. Plastic pipe cutters are fast and provide a smooth square cut that gives a satisfactory surface for fusion. Cuts made with a saw generally require the pipe end to be subsequently faced in order to obtain a clean square end, free of burrs, for fusion joining. Square saw cuts are required and may be obtained with a miter box and burrs can be removed with a sharp knife or a fine tooth file to obtain a relatively smooth face for the facing tool.

The Contractor shall supply all equipment and certified labor necessary to perform the Butt (Heat) Fusion of joints on all thermoplastic mains and services.

Any personnel operating fusion equipment must be certified by the City's Gas and Water Operating Department at the City Garage before any fusion may be completed. Other certification however, may be acceptable to the City, at the discretion of the Engineer. Proof of certification must be on the job site at all times.

The Butt Fusion method of joining thermoplastic pipe shall be used and the following procedure is to be followed:

- a. Wipe each pipe end clean, inside and outside to remove dirt, water, grease and other foreign material.
- b. Square the end of each pipe section to be fused using facing tool of the fusion machine or plastic pipe cutters. Remove cuttings and burrs from pipe ends.
- c. Check line up of pipe ends in fusion machine to see that pipe ends meet squarely and completely over the entire surface to be fused. Proper alignment is necessary to obtain uniform heating of the pipe ends and uniform bead at the fused joint.
- d. Insert the heat plate between the aligned pipe ends, making sure that both surfaces of the heat plate are clean. The temperature should be maintained at 475 degrees F to 490 degrees F. Bring and hold the pipe ends firmly in contact with the heat plate. Maintain pressure and allow pipe to heat and soften about 1/16 inch back from the end of the pipe. Softening can be judged by the upset appearance of the pipe end as the material softens.
- e. Carefully move the pipe ends away from the plate and remove the plate. If the softened material sticks to the heat plate, discontinue the joint. Clean heat plate, resquare pipe ends and start over.
- f. Bring the heated pipe ends together with a firm pressure. (Do not slam ends together) to form a uniform upset flash around the entire circumference of the pipe about 1/8 inch to 3/16 inch wide. The bead will have the appearance of a double upset flash. Pressure is necessary to cause the heated material to flow together, thus giving a fusion bead that is distinctive in appearance to this type material.

g. Allow the joint to cool and solidify until the bead feels hard, and then remove from the lineup clamps. Inspect the joint for a uniform nonporous appearance. A joint can have a proper appearance even if made at too high a temperature. Thus, it is very important to maintain the proper temperature of the heating plate.

h. If there is any reason to question the quality of a heat fused joint, it shall be cut out and fused again.

2.0 GENERAL WELDING REQUIREMENTS FOR STEEL PIPE

a. Welding must be performed by a qualified welder, in accordance with welding procedures qualified to produce welds meeting the requirements of Part 192 of the current Pipeline Safety Regulations. The quality of the test welds used to qualify the procedures shall be determined by destructive testing.

Regardless of the methodology used:

Payment for this item shall be included in the unit price bid per lineal foot of gas main installed and should include all labor, materials, and equipment necessary to install gas main. This will include all costs for laying and padding/backfilling and testing in addition to the cost per lineal foot of gas main installed.

3.0 LAYING AND PADDING/BACKFILLING

Thermoplastic piping must be laid and continuously supported on well-compacted backfill (See procedure below). The Contractor shall install the pipe with the first and last fifteen (15) feet of pipe along side of the existing main unless noted on the drawings to do otherwise.

An electrically conductive wire (#10 single copper conductor insulated) must be installed with the piping to facilitate locating it with an electronic pipe locator. This wire must be taped to the pipe at 10 ft. intervals (maximum). The tracer wire shall also be extended up into all valve boxes and along water services and up into the curb box utilizing "DryConn® Direct Bury Lug" as manufactured by King Innovation or approved equal. Connection capability must be provided in gas curb boxes at intervals not to exceed 200 feet.

Plastic warning tape shall be installed approximately 1 ft. below the finished grade in the trench backfill.

Whenever possible, thermoplastic pipe is to be joined above ground preferably along the side of the trench. When long sections of pipe that have been assembled alongside the ditch are lowered in, care shall be exercised to avoid any strain, which may overstress or buckle the piping or impose excessive stress on the joints.

That portion of plastic piping which spans disturbed earth shall be adequately protected, by a bridging piece or other means, from crushing or shearing from external loading or settling of backfill.

Before joining sections, sufficient pipe slack and time for contraction must be allowed in order for the pipe to assume ground temperature. Locations in the line shall be bell-holed to accommodate the valve so that the line can rest firmly on the ground. The valve shall rest on a suitable underground support.

Abrupt changes in directions of plastic piping shall be made using fittings such as bends and elbows. Thermoplastic pipe may be cold bent in the field to accommodate gradual changes in direction. The radius of the field bend should be a minimum of 25 times the diameter of the pipe. When a change in direction cannot be made by an acceptable quality field bend, it shall be made with an elbow-type fitting.

A "snaking" configuration shall be made by the Contractor when laying main (for expansion and contraction purposes) unless the Engineer grants a waiver.

The field made bends shall be free of buckle, cracks, or other evidence of damage.

Miter bends are not permitted.

Branch connections shall be made only with tees or other suitable fittings specifically designed for the purpose.

All bedding and backfill shall be placed and compacted in accordance with Sections 603.08 and 603.081 of the Ohio Department of Transportation Construction and Materials Specification. In general, this requires granular material, Item 310 (see below) or ODOT CMS 703.02, to be placed in eight (8") maximum height lifts with each lift being compacted to 96 percent density by mechanical devices as approved by the Engineer.

This procedure shall be as follows:

1. Place 6" of bedding (ODOT 310) at trench bottom
2. Compact 6" bedding to 96 percent density
3. Lay new gas main
4. Place ODOT 310 around new pipe and a minimum 12" atop.
5. Compact to 96 percent density
6. Begin placement in 8" compacted lifts (ODOT 603.08).
7. Begin Asphalt Subbase and Base Preparation.

Item 310 Total Percent Passing

Sieve Size	Grading A	Grading B
2 ½ inch	100	100
1 inch	70-100	70-100
No. 4	25-100	25-100

No. 40	5-50	10-50
No. 200	0-10	5-15

Surplus excavated materials must be removed daily unless specific approval is obtained from the Engineer.

The Contractor guarantees the backfilling of the ditch (and/or paving) for one (1) year after the project is completed and accepted. If surface settlement occurs within this period, upon notice, Contractor will repair all settlements and resurface the pavement at his expense.

“Jetting” of backfill will not be permitted under any circumstances.

Backfill in roads, streets, driveways or any other improved traffic bearing areas shall be as outlined above and approved by the Engineer. Any portion of a trench that is within two (2) feet of the edge of pavement shall be considered “in the pavement”.

Backfill shall be maintained in good condition as determined by the Department of Public Works of the City of Hamilton under traffic considering the Gas and Water Department has 1) established a performance criterion for quality of backfill and 2) does not normally provide full time inspection of Contractor activity. The Gas and Water Department reserves the right to test the percent of compaction of the backfill at any time between the time an excavation is backfilled and the time immediately prior to final repaving.

The Contractor will be required to submit a sample of the backfill material that he proposes to use before any work can commence. That sample will be used to establish the basis of future test for backfill material. The Contractor will not be allowed to change the source or kind of backfill material without prior approval of the Engineer and completion of the testing of the new backfill material. The Contractor reinstalling permanent pavement shall pay the cost of any test for an alternative backfill source and/or kind.

As stated in Section 2.0, Laying and Padding/Backfilling of gas main shall be included in the contract unit price per lineal foot of gas main installed as stated in the bidding schedule. This payment should include all of the labor, materials and equipment necessary for Laying and Padding/Backfilling of trenches.

4.0 VALVES AND FITTINGS

Valves shall be Kerotest, Natural Gas Valves, Model M-1, Weld End, rated at 275 psi. min. with one anode attached to each valve installed. Valves must also be Scotchkoted per the manufacturer’s specifications. All exposed steel pipe must be painted with an approved primer and wrapped with approved pipe wrap tape.

The transition from thermoplastic pipe to steel, ductile iron or cast iron, is generally made by either compression-type fittings or through a special transition fitting made for this specific purpose.

Special transition fittings are generally preferred. Any method other than the two mentioned must be approved by the Engineer in advance.

Payment for installation of valves and fittings shall be made at the contract unit price for valves and fittings and shall include all material, labor, and equipment necessary to install valves and transition fittings.

4.1 VALVE BOXES

All valve boxes that are in a paved area shall be cast iron as manufactured by Tyler/Union 6850 Series or approved equal.

The contractor shall set a 4" x 8" x 16" concrete pad to support the bottom of the curb box (roadway and curb boxes) or as approved by the Engineer.

5.0 INSERTION INTO EXISTING MAINS

Thermoplastic pipe and tubing can be inserted into existing mains when so provided in the contract documents or with the permission of the Engineer.

The casing pipe and inserted pipe shall be reamed or pigged and cleaned to remove any sharp edges, projection, or abrasive material which could damage the plastic during and after insertion. The Engineer prior to insertion may require a television camera scan of the interior of the casing pipe. The expense of the television camera scan will be included in the bid only if this service is specified on the construction drawing.

The plastic pipe shall be protected against damage or puncture while it is being inserted into the casing pipe. The leading end of the pipe should be closed (capped) before insertion. Care shall be taken to prevent the plastic piping from bearing on the end of the casing. Long "strings" of previously assembled plastic pipe shall be leak tested prior to insertion into mains.

The Contractor shall test the newly inserted main for 1 hour after insertion.

Where plastic pipe is inserted in a casing pipe, the ends of the casing pipe shall be plugged with foam approved by the Engineer. The length of casing pipe to be plugged is equal to one and one-half times the outside diameter of the casing pipe.

Note: If the circumstances are such that insertion is impossible, these areas shall be open cut or bored depending on the contractor's announced alternative installation plan.

Payment for insertion of new gas mains into existing gas mains shall be made at the contract price per lineal foot and include all labor, material and equipment necessary to insert and test new gas main into existing main.

6.0 INSERTION (WHEN APPLICABLE)/ RENEW/RECONNECT SERVICES

Thermoplastic pipe and tubing can be inserted into existing services when so provided in the contract documents or with the permission of the Engineer.

All specifications for insertion of mains would be identical to the insertion of services, where applicable (i.e. Pigging, removal of sharp edges, cleaning, damage, puncture, etc.)

At every location where an existing service is to be renewed by insertion, it is to be connected to the proposed main, including the curb cock (back of the curb).

In other areas where it is determined that the inside diameter of the existing service line is smaller than 1 1/8" it will be necessary for the Contractor to excavate from the proposed main to the existing curb cock and install the service.

Regardless of whether a service is inserted or not:

All renewed services must be leak tested at line pressure with natural gas. All joints at the main and at the curb cock must be swabbed with a soap water solution.

If the City has previously inserted services that are tapped into a main in which the Contractor is to replace, the Contractor will receive payment for excavating to make the "new" tap as well as the length of pipe (per lineal foot) needed to make the tap. Payment for the excavation will be made at the contract unit price per cubic yard of extra-excavated material.

*Note: If establishing a gas service **within a new development**, the Contractor will be responsible for installing "long" side services only, unless directed differently by the Engineer.

The Contractor shall re-light all existing gas appliances after installation of new service. All arrangements for re-lighting gas appliances shall be made by the Contractor.

The Contractor shall perform all excavation for tie-ins for service connections to the proposed mains, and shall perform all work necessary to locate, cut into and connect the existing services to the proposed mains.

Payment for installation of 1 1/8" services, **open cut**, shall be made at the contract unit price per lineal foot and shall include all labor, equipment, and materials (tapping tees, tracer wire, excavation, laying/backfilling) necessary to install 1 1/8" services, curb cock, and box.

Payment for **insertion** of 1 1/8" services shall be made at the contract unit price per lineal foot and shall include all labor, equipment and materials necessary to insert 1 1/8" services.

Payment for the curb cock and box shall be included in the contract unit price per lineal foot of 1 1/8" service pipe installed.

7.0 TESTING OF GAS MAINS

The Contractor shall test the gas mains it installs as directed by the Engineer and as hereinafter specified.

After completion of the entire main, or specified sections between valves thereof, it shall be cleaned of all dirt, and other foreign matter. This work will be accomplished with one or more cleaners furnished by the Contractor. The cleaners shall be propelled by compressed air. The Contractor shall prepare the line for cleaning and blowing by uncovering the line where necessary and installing blow joints, if necessary, and also if necessary, furnish radio sending and receiving equipment for conducting this work. Contractor shall exercise extreme care in this operation. The manipulation of all valves and the handling of air for blowing shall be done as directed by the Engineer. The test procedure shall be to pump air under pressure into the newly constructed main, through a test connection to a minimum of 90 PSIG. A recording pressure gauge, to be furnished by the City, (which the contractor shall return in satisfactory condition) shall be installed on the main as directed. The first 24 hours pressure record will not be considered as indicative of tightness or leakage as temperature stabilization of the air in the main affects the static pressure. The following 4 hours shall be considered the test period. The City's Inspector must witness the start and completion of every test.

Testing of new gas mains (when not replacing existing gas mains) shall be done after the services have been installed to the curb stop so that both mains and services can be tested at one time.

If the pressure charts indicate no pressure drop, the main shall be considered tight, free from leakage, and acceptable to the City. In the event that a pressure drop is recorded on the charts, it is an indication of a leak or leaks, which must be repaired. A main which fails a pressure test, must pass a subsequent pressure test after its repair to be considered acceptable

No testing shall be done against a valve in a gas main that is either in service or temporarily out of service.

No allowance will be made for testing gas mains, as same is assumed to be included in the price bid for installing pipe.

The Contractor shall locate all leaks, repair same, and retest the mains as previously specified.

The repair of all leaks shall be made using repair materials and methods approved by the Engineer.

If defective materials furnished by the City cause leaks, the City will pay the Contractor for all labor in connection with the locating of the leaks (if located by the Contractor) and the removal and replacement of defective materials, provided the Contractor has first conformed with General Contract Specifications regarding installation of the materials.

If defective materials furnished by the City do not cause a leak, locating, repairing and retesting the line for leaks shall be at the expense of the Contractor.

If it becomes necessary for the City to locate and repair leaks and said leaks are not caused by defective material furnished by the City, the City will deduct the cost of locating and repairing said leaks from the amount due the Contractor under the terms of this contract.

The testing of gas mains shall be included in the contract unit price bid per lineal foot of gas main installed.

8.0 TIE-INS OF GAS MAIN

The Contractor shall perform all work necessary to locate and uncover the existing distribution system in accordance with the contract drawings or as directed by the Engineer.

In anticipation of making a connection to an existing main, the Contractor shall give the City two (2) days' notice of intention to make such connection and City Gas Department shall plug or valve off the existing main to shut off the gas at the time of making connection with the existing main.

At every location where the proposed main is to be connected to an existing main, the Contractor shall excavate a test pit or pits, to locate the existing main and determine the required fittings.

Restoration of pavement destroyed for purposes of accomplishing tie-ins of mains shall be paid for under the item for the appropriate type of pavement restoration.

Payment for tie-ins shall be made at the contract unit price per cubic yard for extra excavation for tie-ins, test holes, and unanticipated circumstances. This payment should include all labor, materials, and equipment necessary to tie-in mains, excavate test holes or excavate for unanticipated circumstances.

8.1 GAS SERVICES

Long side gas services must have a fused dead end cap or perfection stab fitting with a dead end cap manufactured into the coupling at the end of the service line stub. Also, these services must be pressure tested and left in the "ON" position.

The curb boxes and end of stubs should be marked with a 2"x 4" or other suitable means.

Gas services shall have a minimum 12" vertical clearance and minimum 36" horizontal clearance from electric services.

SECTION 9 SAFETY ISSUES

9.0 PUBLIC SAFETY

The Contractor shall conduct his work so as to interfere as little as possible with the public travel. Whenever it is necessary to cross under or interfere with railroads, intersecting streets, driveways (public or private), crosswalks or approaches to any building, he shall, in a manner satisfactory to the City Engineer (City Public Works Department, 868-5975), provide and maintain suitable and safe bridges or other temporary arrangements for the accommodation of public travel. The Contractor shall promptly remove, at completion of the work, any temporary bridges or crossings, erected/maintained by him, when ordered to do so by the City Engineer. The Contractor shall provide capable watchmen in sufficient number to safeguard the public and the work.

All excavations and obstructions shall be properly barricaded. Barricades with lamps, traffic cones, flare or lanterns shall be furnished, placed and maintained by this Contractor for the protection of vehicles and pedestrians during the progress of the work. This Contractor shall conform to all state, federal and local safety regulations in connection with the work.

No allowance will be made for bridging, barricading, lighting and/or flagging, as same is assumed to be included in the price bid on the Proposal Forms for installing pipe or for extra excavation for tie-ins, test holes, or unanticipated circumstances, whichever applies.

The Contractor shall conduct his work so that all fire hydrants and hydrant valves adjacent to the work shall be kept readily accessible to fire apparatus. No materials, equipment, or other obstructions shall be placed within ten (10) feet of any fire hydrant or control valve, unless by special permission from the Engineer.

9.1 CLOSING OF STREETS

The Contractor shall exercise care at all times to keep the work area as clean as possible and to permit traffic to use the roadways whenever possible. If, during the process of construction, it becomes necessary to close streets or alleys to traffic, the Contractor shall notify the City Engineer at least forty-eight (48) hours in advance of the day or dates said streets and alleys are to be closed. No street closing barricades are to be installed until permission is obtained from the Public Works Director. No detour shall be established unless it is approved in advance by the Public Works Director.

The Contractor shall have equipment available and men on call at all times to correct any/all hazardous conditions which may be created or occur by reason of the construction work and to assist in any emergency or accident that may arise in connection with the work on its contract.

9.2 PERSONNEL LIST

The Contractor shall furnish the Engineer a list of Personnel who will be available and subject to call at hours other than normal working hours. Telephone numbers shall be included in this listing.

The Contractor shall plan his work in such a manner that pipe fittings and other readily removal materials delivered to the job site are installed on the day of delivery. If excess material other than pipe remains at the end of the workday, such excess material shall be removed.

SECTION 10 RESTORATION FOR DAMAGE TO PROPERTY

The Contractor shall be responsible for any and all damage to private property, to public property, or other facilities such as sewers, water lines, gas lines, underground or overhead electric power or communication lines and the like, due to the negligence of the Contractor or his employees.

The Contractor shall promptly repair and/or restore damages to all public and private structures, including fences damaged by the Contractor during the progress of the work. In lieu of such repairs, and if agreeable to the Owner of the damaged structures, the Contractor may make a fair and equitable monetary compensation to such owner. The Contractor must provide evidence of each monetary compensation to the Engineer.

Whenever lawns, shrubs, decorative growth, or other public or private property is damaged during the progress of the work, this Contractor shall promptly compensate the owner of such property by replacing the damaged property. In lieu of such replacement and if agreeable to the owner of the damaged growth, the Contractor may make a fair and equitable monetary compensation to such owner. The Contractor must provide evidence of each monetary compensation to the Engineer.

Where grass areas have been damaged or destroyed by the installation of main, sod or seeding shall be used to restore these areas to their original condition. The use of sod and seeding shall be determined by the Engineer and shall be in accordance with Section 12.

SECTION 11 PAVEMENTS

**** Special Note:** The City of Hamilton will not permit the Contractor to restore any trench with asphalt if a smog alert has been issued. It will be the responsibility of the Engineer to inform the Contractor when the alert has been lifted.

11.1 TEMPORARY PAVEMENT

All trenches, excavations at street intersections, driveways and elsewhere, as may be directed by the Engineer, that are to receive concrete or asphalt/bituminous pavement replacement, shall be treated with temporary pavement replacement, applied immediately after the trench/excavation is backfilled.

Temporary pavement shall consist of one course of ODOT 404. If it becomes impossible for the Contractor to obtain ODOT 404 (in the opinion of the Engineer) and install temporary pavement, he may request the use of an alternative "hot mix". The thickness of the temporary course shall be 2 inches. Unless otherwise directed, this temporary pavement shall not be removed until permanent paving begins.

The width of the temporary pavement is considered to be that of the excavated trench. This width should not exceed the outside diameter of the pipe plus twelve (12) inches. The Contractor will not be afforded payment for temporary pavement in the "Cut Back" areas (i.e. One foot on each side of the trench).

Payment for the item "Temporary Bituminous Pavement" shall be made at the contract unit price per cubic yard of temporary bituminous pavement and shall include all labor, materials, and equipment necessary to install, maintain, remove and dispose of temporary bituminous pavement.

11.2 CONCRETE PAVEMENT OR CONCRETE BASE

All concrete used in concrete pavement shall conform to ODOT construction and materials specifications, Section 499-Class "C" concrete. All coarse aggregate used in the concrete shall pass a standard one and one-half (1 1/2) inch sieve.

All concrete shall be ready-mixed or mixed in a batch mixer.

Water shall be removed from the work site before concrete is poured.

Concrete shall not be poured during rain unless adequately protected and, in any case, shall be protected from rain until it has hardened sufficiently so that it will not be damaged.

If the temperature is below 40 degrees F. at any time during the 24-hour period following pouring of concrete, precautions must be taken to prevent the concrete from freezing. Adequate equipment shall be provided for heating and protecting the concrete.

Any concrete work not formed in a fashion, which is acceptable to the Engineer, shall be considered as defective work not conforming to the intent of these specifications and shall be removed and replaced by the Contractor at his expense.

Concrete pavement and concrete base, where installed in highways, roads, streets, alleys or driveways, shall be (9) inches in thickness for pavement and eight (8) inches

for base, except that in driveways where the original driveway thickness was less than nine (9) inches of concrete it shall be restored to the original thickness. However, a minimum driveway thickness of six (6) inches shall be required.

Driveways shall be restored with material similar to, or the approved equal of, the existing driveway and shall be the same width and configuration as the original construction.

Payment for concrete pavement shall be made at the contract unit price per cubic yard as stated in the bidding schedule and shall include all labor, materials, and equipment necessary to place concrete pavement.

11.3 ASPHALT BITUMINOUS PAVEMENT

301 and 448 which shall be placed over a prepared stone base (ODOT 304) that is in two-four (4) inch, compacted "lifts", carefully rolled and finished to the adjoining roadway surface.

Bituminous (asphaltic) concrete shall be "plant mixed" and shall be ODOT 301 and 448 as specified in Ohio State Highway Specifications.

Where surface is to be bituminous pavement, face of the old pavement, castings, curb, etc., against which the new pavement is to be placed shall be sealed with asphalt concrete joint sealer as per Ohio State Highway Specifications Item 705.01 or 705.02, before and after.

Aggregate base shall be State of Ohio Highway Specification ODOT 304 of 2-4 inch compacted "lifts".

For a description of payment items associated with asphalt pavements, see item 11.4 below.

11.4 PAYMENT FOR PAVEMENT RESTORATION

It is the intent that the pavement restoration be at least equal to that of the existing street.

No payment will be made for pavement, curb, driveway, sidewalk, or any other type surface replacement unless it is necessary to remove or destroy the same in order to satisfactorily install the mains or services.

The area of asphalt/bituminous pavement on stone base to be restored under this contract shall for payment purposes be determined as being the actual area of the repaving except that it shall not be greater than the length of trench multiplied by a width of 3 feet plus the outside diameter of the pipe. No extra payment will be made when the restoration exceeds the dimensions set forth in this paragraph, unless authorized by the Engineer.

Any and all replacement outside such defined lines made necessary by excavation or settlement of ground adjacent to the premises, or by storing of materials, or by operation of equipment shall be done by the Contractor at his own expense.

The Contractor shall take such measures as are necessary to protect new pavement until it is in condition to support traffic. The time for concrete shall be twenty-eight (28) days, unless quick set cement is used, in which case the Engineer shall determine the allowable time.

The Contractor shall be responsible for any settlement occurring within one (1) year after the date of final billing, and in case of settlement during this period, he shall resurface or re-pave the damaged area or areas to the satisfaction of the Engineer.

Payment for ODOT 301 shall be made at the contract unit price per cubic yard installed as stated in the bidding schedule and shall include all labor, materials, and equipment necessary to place ODOT 301.

Payment for ODOT 304 shall be made at the contract unit price per cubic yard installed as stated in the bidding schedule and shall include all labor, materials, and equipment necessary to place ODOT 304.

Payment for ODOT 448 shall be made at the contract unit price per cubic yard installed as stated in the bidding schedule and shall include all labor, materials, and equipment necessary to place ODOT 448.

Payment for sawcutting and removal of existing pavement (asphalt or concrete) shall be made at the contract unit price per foot of main installed as stated in the bidding schedule and shall include all labor, materials, and equipment.

SECTION 12 RESTORATION OF SIDEWALK, DRIVEWAYS, and CURBS & GUTTERS

Any sidewalks and/or curbs and gutters necessarily damaged or destroyed by the installation of the work under this contract shall be replaced in kind by the Contractor and be a subject for compensation. Sidewalks and/or curbs & gutters unnecessarily damaged by the work shall be replaced at contractor's expense.

Sidewalks shall be restored with Class "C" concrete (see Section 11.2) of the same width as the existing walk, shall be four (4) inches in thickness; and shall be placed on a well compacted, ODOT 304 gravel base, 4-inches in thickness.

Curbs and/or curbs and gutters shall be restored with Class (C) concrete (See Section 11.2) and shall be the same form and dimensions as the existing.

Payment for sidewalk and driveway restoration (removal and replacement) shall be made at the contract unit price per cubic yard as stated in the bidding schedule. This

payment shall include all labor and materials necessary to restore sidewalks and driveways.

Payment for curb and gutter restoration (removal and replacement) shall be made at the contract unit price per lineal foot of curb and gutter restored. This payment shall include all labor, materials, and equipment necessary to restore curb and gutter.

SECTION 13 SEEDING AND STRAWING/ SODDING

If suitable topsoil is available as part of the material excavated, it shall be removed and stored separately and used to backfill the top four (4) inches of lawn areas. After the backfill has been given a reasonable time to settle, it shall be spread to finished grade, then raked to remove all weeds, roots, sticks, stones, etc. An application of not less than one (1) pound per 100 square feet of 10-10-10 lawns or turf grade fertilizer shall be uniformly distributed and raked in. If there is no suitable topsoil available, the contractor shall furnish and apply not less than two (2) pounds per 100 square feet of 10-10-10 lawn grade fertilizers in the method above specified.

Immediately after the preparation and fertilization of the seedbed, the seed shall be thoroughly mixed and evenly sown over the prepared areas at the rate of three (3) pounds per 1,000 square feet.

All areas shall be seeded with the following mixture (percentages are by weight):

44 percent	Kentucky Bluegrass (<i>pao pratensis</i>)
12 percent	Creeping Red Fescue (<i>Festuca rubra</i>)
44 percent	Annual Rye Grass (<i>Lolium Italicum</i>)

Following the seeding, the surface shall be lightly raked and rolled with a light roller. Following the rolling, the area seeded shall be covered with two (2) inches, loose measurement, of vegetative mulch, tied down or kept in place by other acceptable methods.

All seeded areas shall be carefully looked after and tended by the Contractor, watering as necessary to secure a good turf, settled areas shall be filled, graded and re-seeded for a period of one (1) year after final acceptance of the project.

Payment for seeding and strawing shall be made at the contract unit price per square yard as stated in the bidding documents and shall include all labor, materials, and equipment necessary to seed and straw.

Payment for sodding, if applicable, shall be paid separately from seeding and strawing and be made at the contract unit price per square yard as stated in the bidding documents. This payment

shall include all labor, materials, and equipment necessary to place sod.

SECTION 14 CLEANING UP

Before final acceptance, the Contractor shall clean up and remove all of the debris, construction material, signs, equipment, tools and barricades, as well as excess earth, rubbish and gravel that may accumulate in connection with the work under this contract. Streets and private property must be kept clear and free from rubbish at all times and must be left in a neat and orderly condition at the end of each workday.

SECTION 15 FIELD NOTES AND RECORDS

The Contractor shall furnish to the Engineer at the completion of each project a set of accurate and complete "As Built" drawings. These drawings shall accurately locate the gas or water main and services in reference to known structures, such as power poles, curb lines, storm sewers, buildings, etc. These locations must be made both horizontally and vertically. All new curb boxes and length of plastic services must be included on these drawings. No separate payment will be made for this item. However, on a monthly basis the contractor must prove to the Inspector or Engineer that the As Built drawings are being kept up to date prior to approving the monthly pay estimate.

Final payment will not be made until the Engineer has received an acceptable set of "As-Builts" and "Curb Box Location Cards" (blank cards will be provided by the City of Hamilton). If the Engineer deems the "As-Builts" unacceptable, he will notify the Contractor as to the necessary changes and/or additions to be made.

The Contractor must also complete a daily report, on forms provided by the Engineer, which must be signed by the Contractor's Field Supervisor and the City's Project Representative (Engineer or Inspector). The Contractor's Field Supervisor may report under "Remarks" any work payments that the Engineer will not approve. These items will be given further consideration by the City's Department of Gas and Water

SECTION 16 TRAFFIC CONSIDERATIONS

*General: The Contractor should plan, if necessary, to utilize traffic control measures during construction and should prepare his bid accordingly.

16.1 TRAFFIC CONTROL

The Contractor shall furnish, erect, maintain and remove lights, signs, barricades, temporary guardrails, other traffic control devices, and furnish watchmen and flagmen as may be necessary to maintain safe traffic conditions in accordance with the Ohio Manual of Uniform Traffic Control Devices (OMUTCD).

The Contractor shall supply the Engineer, City Engineer, City Traffic Engineer and the Police Division with a name and telephone number of a representative that will be

available 24 hours a day, 7 days per week, for emergency work. Any costs for traffic control incurred by the City will be billed to the contractor at the City's option.

16.2 MAINTAINING TRAFFIC

Traffic Diversion

When it is necessary to divert traffic from its normal channel into another channel, such diversion shall be clearly marked by cones, drums, barricades or temporary guardrails in the daytime. If the need for markers continues overnight, re-flectorized drums must be provided and maintained and positioned at intervals (in feet) equivalent to the speed limits. All devices must conform to OMUTCD requirements.

Two Way Traffic In One Lane

Whenever one travel lane is established for two-way traffic, two flag persons shall be used. Ideally, they should be in continuous visual contact with each other and one shall be positioned on each end of the work area. If visual contact is not possible, the Contractor must provide radio communications to the flag persons to safely facilitate opposing directions of travel. Off-duty police officers may be used/required for flagging.

16.3 CLOSED TO TRAFFIC

Street Closing

If it is necessary to close any street, the Contractor must obtain authorization from the City Traffic Engineer not less than forty-eight (48) hours prior to closure. If the City Traffic Engineer authorizes a street closure, he will notify the City Engineer (Dept. Of Public Works) who will issue a notice to the public safety departments, other affected City operations and to the press. The Contractor shall so schedule his work that the time of closure is minimal and shall, whenever possible, make suitable provisions for access by local residents, school buses, and mail delivery vehicles. All trenches, excavations, etc. are to be backfilled at nights, on holidays and on weekends unless otherwise authorized by the Engineer. The Contractor may, if approved by the Engineer, use steel plates if backfilling cannot be completed in such time as necessary to open the road for traffic. The Contractor shall provide access for police, fire and emergency vehicles at all times. Fire hydrant and other public utility valves shall be accessible at all times. Streets shall be open to all traffic during non-working hours and signs covered.

16.4 DETOURS

When it is required that a street or road be closed to traffic, the Contractor shall furnish, erect, maintain, and remove signs, barricades, etc., as per the OMUTCD and the Traffic Engineering Division. The Contractor shall furnish, erect, and maintain advance warning signs, detour signs, and barricades, etc. on all streets including side streets that are affected by the work. If the Contractor requires assistance, it shall be his responsibility to contact the City Traffic Engineering Department at (513) 785-7290 forty-eight (48) hours prior to work.

16.5 CITY OR PRIVATELY FUNDED PROJECTS

For City-funded installations and if, in the opinion of the Gas and Water Engineer, Traffic Engineer, or their representative, proper maintenance of traffic facilities and proper provisions for traffic control are not adequately being provided for the safety of the public, the Contractor shall be notified immediately. If necessary, the Gas and Water Engineer, Traffic Engineer or their representative may take the necessary steps to place them in an acceptable condition and the cost of doing such will be deducted from any payment which may be due or become due to the Contractor. The Traffic Engineer may also stop a privately funded project immediately without notice if these requirements are not followed or if a hazard exists in his opinion.

16.6 NOTICE TO CONTRACTOR

Traffic control requirements in construction zones within the City are extensive and adherence to them is mandatory. The Contractor is fully responsible for all requirements. If he is unclear as to the requirements for bidding purposes, or during construction, it is his full responsibility to contact the City Traffic Engineer to determine the requirements.

16.7 LOOP DETECTOR REPLACEMENT BY THE CONTRACTOR

Prior to work at intersections that may affect the traffic signal loop detector wire, the maintaining agency shall locate them within 48 hours after notification by the Contractor. They shall be checked to insure that they are working properly by having a review of the existing facilities with the Maintaining Agency and the Contractor.

If a properly working traffic loop detector wire is disturbed during repair of the pavement, the Contractor shall notify the City Traffic Engineer at (513) 785-7290, immediately. The Contractor will be required to replace the damaged loop detector at his expense within 48 hours after pavement restoration. All work must conform to Ohio Department of Transportation Bureau of Design Services Standard Construction Drawing 82.10. The wire used shall be #14 AWG copper and meet IMSA Specifications 51-3-1984 (XHHW). The City Traffic Engineer will determine the loop configuration and layout the location of the loop for the Contractor.

After the loop detector wire has been installed, the loop detector shall be connected to the lead-in cable by City Traffic Division forces and tested to make certain that it is operational.

SECTION 17 DRAWINGS

The drawings, as prepared by the Engineer, are intended to be self-explanatory and are intended to indicate and provide for the construction of the various related parts of the improvement in a complete and connected manner, using the best engineering principles and workmanship throughout. Should any details be omitted, any

discrepancies or errors appear, or misunderstandings arise, the Contractor shall submit a written request for an inspection, and any explanations given by the Engineer shall be final and binding on the contractor

SECTION 18 DRUG TESTING

We hereby certify that we will comply with the U.S. Department of Transportation, Office of Pipeline Safety Regulations pertaining to Drug Testing Part 199, Paragraph 199.21.

Notary

Company

Office

**CITY OF HAMILTON ELECTRIC DEPARTMENT
UNDERGROUND ELECTRIC REQUIREMENTS
Developer/Contractor Responsibilities**

- Provide utility easements along the perimeter of the development (10' wide) and along all street frontage (8' wide) adjacent to the right of way line.
- All conduit, junction boxes, and transformer pads are to be installed at the center of the utility easement.
- Provide trenching, backfilling, and boring.
- All conduit installed by boring shall be Carlon Bore-Gard or approved equivalent.
- Conduits installed by boring under roadways shall be schedule 80; others schedule 40.
- Provide and install schedule 40 PVC conduits, size as specified, for all primary and secondary conductors installed by trenching.
- Conduits shall be separated by 2" minimum.
- At intersections with other utilities and secondary electric, primary conduit shall maintain a 12" clearance and shall pass under other utilities where needed to maintain clearances.
- Concrete encased conduit shall maintain a 3" clearance.
- Conduit shall maintain a 36" clearance from water mains and gas lines on parallel runs.
- Provide and install schedule 40 PVC or galvanized steel elbows as specified.
- **Verify required locations for galvanized steel elbows.** All elbows shall be 90°, 36" bend radius, and shall be installed plumb.
- All PVC conduit joints are to be cleaned, primed, and glued.
- Primary conduits are to be at a minimum depth of 48" below curb height to the top of the conduit.
- Primary conduits under paved roadways are to be encased in concrete at least four-inch thickness above, and two-inch thickness on sides and below conduits.
- Concrete is to have a minimum 28-day strength of 2500 psi.
- Primary conduits not under paved roadways are to be covered with 12 inches minimum of ODOT 310 sand before backfilling.
- Secondary conduits are to be at a minimum depth of 36" below curb height to the top of the conduit.
- Secondary conduits under paved roadways are to be encased in concrete of the same thickness and strength as used for primary conduits.
- Secondary conduits not under paved roadways are to be covered with 12 inches minimum of ODOT 310 sand before backfilling.
- Each conduit shall be swabbed and have a minimum 200-lb test pull string installed.
- Provide and install a plug at each end of conduit and maintain the accessibility of the pull string.
- Plugs shall be IPEX Scepter, Part No. PP55, or approved equivalent.
- Construct transformer pad using Class 'C' or 4000 psi concrete, on ODOT 304 compacted gravel base.
- Provide level areas at transformer boxpads and junction boxes with ODOT 310 sand.

- Install all transformer boxpads, junction boxes, and ground rods, as well as standoff brackets, conduit straps, and bolts on riser poles. (These items to be provided by the City.)
- Spare conduits that are installed for future connections shall be stubbed-up above grade, plugged, and covered with a secondary junction box to be provided by the City.
- Provide and install red underground electric warning tape or foil 12" minimum above conduits.
- Contact City Electric Engineering Department for conduit inspection a minimum of 24 hours before covering conduit. **ALL CONDUITS IS TO BE INSPECTED BEFORE COVERING!**
- Install conductors for service laterals from transformer or secondary junction box to proposed residence or business.

City of Hamilton Responsibilities

- Provide drawings, specifications, and copies of City of Hamilton Electrical Construction Standards for all installations.
- Provide fiberglass transformer boxpads, junction boxes, ground rods, ground wire loops, ground clamps, as well as standoff brackets, conduit straps, and bolts and deliver to jobsite.
- Inspect all conduit, junction box and transformer boxpad installations before covering and/or backfilling.
- Inspect form and reinforcement placement for concrete transformer pad before concrete pour.
- Install all primary and secondary conductors, except for service laterals.
- Install and maintain streetlights on dedicated City of Hamilton streets.

LICENSED TRADE CONTRACTORS

The Hamilton Building Code requires licensing of all contractors and their staff who install or repair electrical, heating and air conditioning, plumbing systems (both inside and outside work), sewer taps and those who erect or replace signs. Each contracting company is required to be represented by an individual licensed by the State of Ohio and registered with the City of Hamilton in order to apply for and obtain a permit.

When the State of Ohio does not license a particular craft, such as Sewer Tappers and Sign Erectors, a local license is issued based on the required number of year of experience in the field and as regulated by code. An examination is required for these local licenses. Permits are issued based upon mechanical plans that are submitted and approved with the building plans. A list of all licensed contractors is available from the Construction Services Division.

All employees of the contractor that will be performing work at the site are required to be licensed by the City of Hamilton. In addition to the Master, the city licenses Journeyman and Apprentice.

- A Journeyman license requires a certain number of years practical experience for the field they are applying and as regulated by the code. This experience is required to be confirmed by the employer for which they have worked. Journeymen are also required to pass a designated examination.
- An Apprentice license requires no experience or examination. The Apprentice must be working under a Master who assumes responsibility for the Apprentice. At the job site, a one to one ratio of Apprentice to Master/Journeyman is required.

Construction Services Division can provide specific information, license applications and fees for all licenses required.

