

TOWN STANDARDS

TOWN OF WESTVILLE LaPORTE COUNTY, INDIANA

Approved May 14, 2002

TOWN OF WESTVILLE, INDIANA
STANDARDS
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SECTION I - MINIMUM STANDARDS FOR MUNICIPAL IMPROVEMENTS
PART A - STANDARDS

A. (1) Start of Construction

(a) No work shall commence on any infrastructure improvements covered by these Standards unless approved in the following manner:

(1) Three (3) full sets of plans for the infrastructure improvements shall be submitted to the Westville Building Commissioner at the Westville Town Hall;

(2) The Westville Building Commissioner shall notify all Town Department Heads of the plans and the Department Heads shall meet to review same;

(3) When the plans are approved, written notification of their approval shall be given to the applicant by the Westville Building Commissioner;

(4) Written notice of the start date of the construction shall be given by the applicant to the Westville Building Commissioner, which notification must include all required County, State, Federal or any other entity's approval that is required for the specific infrastructure improvement to be constructed, at least three (3) days prior to the anticipated start date; and

(5) In the event construction has ceased for ninety (90) days, notification as provided for in subparagraph 4 above is required.

Required inspections during construction for various phases of infrastructure improvement projects shall be as outlined in these Town Standards.

(b) In the event construction is commenced or proceeds in violation of these Town Standards, this conduct shall constitute a violation of the Westville Town Code subjecting the offender to the general penalty clause of same making the offense punishable by a fine of up to two thousand five hundred dollars (\$2,500.00). Every day any violation shall continue shall constitute a separate offense.

(c) The Town of Westville shall not be obligated to accept any work started prior to the approval plans or notification and inspection as outlined herein. Should a request for acceptance of such work be made, the criteria and requirements for acceptance shall be those in force and effect on the day of the request. Any remedial work determined to be necessary for acceptance by the Town of Westville shall always be done at the developer's expense.

A. (2) Governing Specifications: Certain sections of these Standards refer to the Indiana Department of Transportation Standard Specifications dated 1999. Additional sections of these Standards refer to the Recommended Standards for Water Works, 1992, and Recommended Standards for Wastewater Facilities, 1997 Edition. All of the aforementioned specifications are hereby incorporated into these Standards by reference. Any amendments or supplements made by the Indiana Department of Transportation or Ten State Standards shall be deemed to be a part of this Ordinance upon their taking effect Two (2) copies of these specifications are on file in the Office of the Westville Clerk-Treasurer. Any amendments or supplements made to the above described specifications shall be deemed a part of these Town Standards upon their taking effect. Finally, the building rules, codes and standards adopted by the Town of Westville pursuant to the Westville Town Code are likewise adopted by reference as part of these Town Standards.

PART B - MINIMUM STANDARDS FOR STREET DESIGN

B.(1) Designation of Street Classification

(a) The designation of street classification shall be approved by the Town in accordance with definitions of classification as specified by the Town of Westville Thoroughfare Plan as shown in the Comprehensive Plan.

(b) All streets designated as principal Arterial Streets shall have controlled access and shall be constructed as a joint effort between the Town of Westville and other appropriate governmental agency on right-of-way acquired for such purpose. Property owners and/or land developers shall be required to construct streets and dedicate right-of-way meeting Collector Street Standards.

(c) All streets designated as Minor Arterial Streets shall be controlled access and shall be constructed as a joint effort between the developer, property owners, the Town of Westville and any other appropriate governmental agency on right-of-way acquired for such purpose. Property owners and/or land developers shall be required to construct streets and dedicate right-of-way meeting Collector Street Standards.

(d) All streets designated as Collector Streets lying within land owned by the developer shall be constructed by the developer in accordance with plans approved by the Town of Westville.

(e) All streets designated as local Streets lying within land owned by the developer shall be constructed by the developer in accordance with plans approved by the Town of Westville.

B.(2) Streets

(a) No streets shall be approved unless all streets are of sufficient width and proper grade, and shall be so located as to accommodate the probable volumes of traffic thereon, afford adequate light and air, facilitate fire protection, provide access of fire fighting equipment to buildings, and provide a coordinated system of streets conforming to the town's major thoroughfares plan.

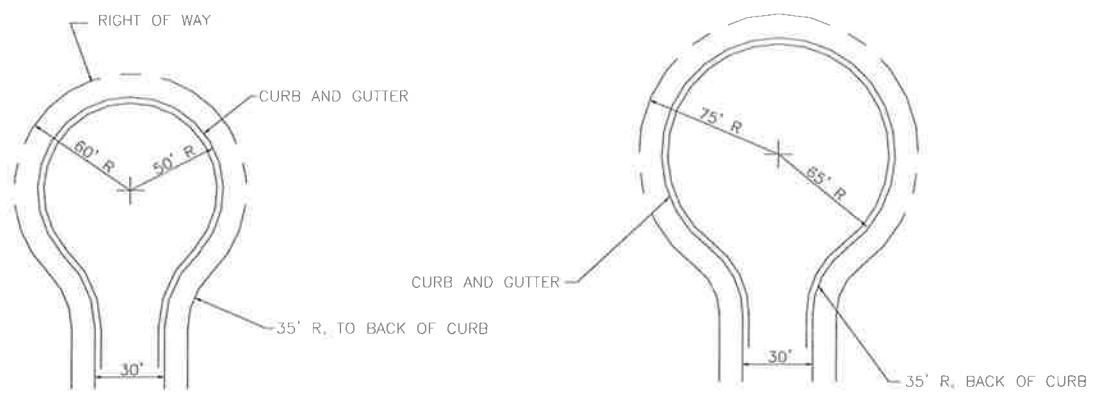
(b) Local street shall be so planned as to discourage through traffic.

(c) Wherever there exists a dedicated or platted portion of a street or alley along a boundary of the tract being subdivided, the remainder of such street or alley, to the prescribed width, shall be platted within the proposed subdivision.

(d) Half streets shall not be provided, except where it is essential to the reasonable development of the subdivision in conformity with the other requirements of these regulations, or where it becomes necessary to acquire the remaining half by condemnation so it may be approved in the public interest.

(e) Cul-de-sac streets not exceeding six hundred (600) feet in length shall include a completely paved turnaround which shall be provided at the closed end with an outside curb

radius of at least fifty (50) feet and a right-of-way radius of at least sixty (60) feet shown on Plan B-2-1. Cul-de-sac streets longer than six hundred (600) feet shall not be approved unless a variance is obtained prior to platting from the Town of Westville Board of Zoning Appeals, and if so approved shall include a completely paved turnaround which shall be provided at the closed end with an outside curb radius of at least sixty-five (65) feet and a right-of-way radius of at least seventy-five (75) feet shown on Plan B-2-1.



CUL-DE-SAC

CUL-DE-SAC OVER 600' WITH VARIANCE

B-2-1

Cul-de-sac streets longer than six hundred (600) feet shall not be approved unless a variance is obtained prior to platting from the board of zoning appeals, and if so approved shall include a completely paved turnaround which shall be provided at the closed end with an outside curb radius of at least sixty-five (65) feet and a right-of-way radius of at least seventy-five (75) feet shown on Plan B-2-1. The maximum grade of the turnaround portion of the cul-de-sac shall be five (5) per cent.

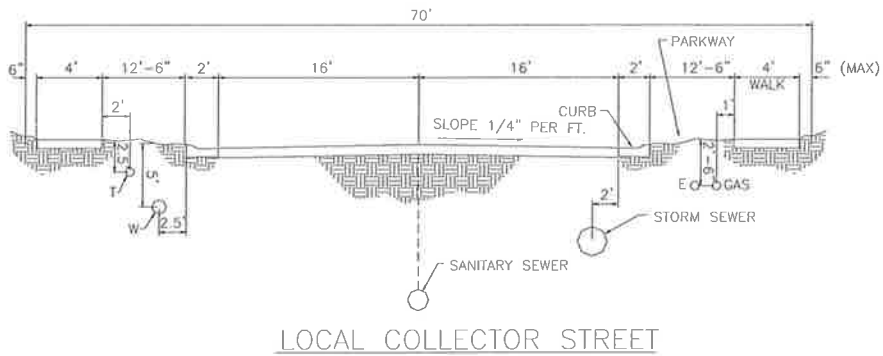
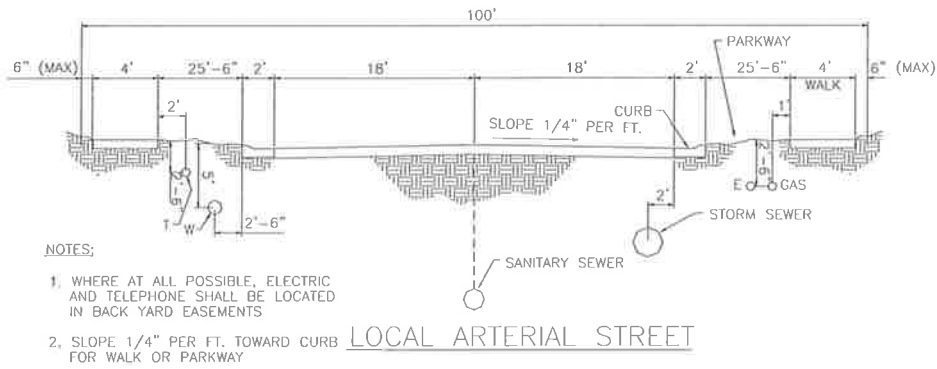
- (f) Alleys shall not be provided in residential districts, but shall be included in commercial and industrial areas where needed for access purpose.
- (g) The minimum distance between the centerlines of parallel or approximately parallel streets intersecting a cross-street from opposite direction shall be one hundred twenty-five (125) feet.
- (h) Intersection of more than two (2) streets at one point shall be avoided.

(i) Dead-end streets shall be prohibited unless provided with a turnaround or cul-de-sac arrangement. Temporary dead end streets will be permitted where the approved plat shows that the street will be extended to conform to the provisions of the Westville Town Code. A circular right-of-way at the termination of a temporary dead-end street must be shown on the approved plat. The excess right-of-way and paved turnaround shall be relinquished only at that time in which the dead-end street is extended.

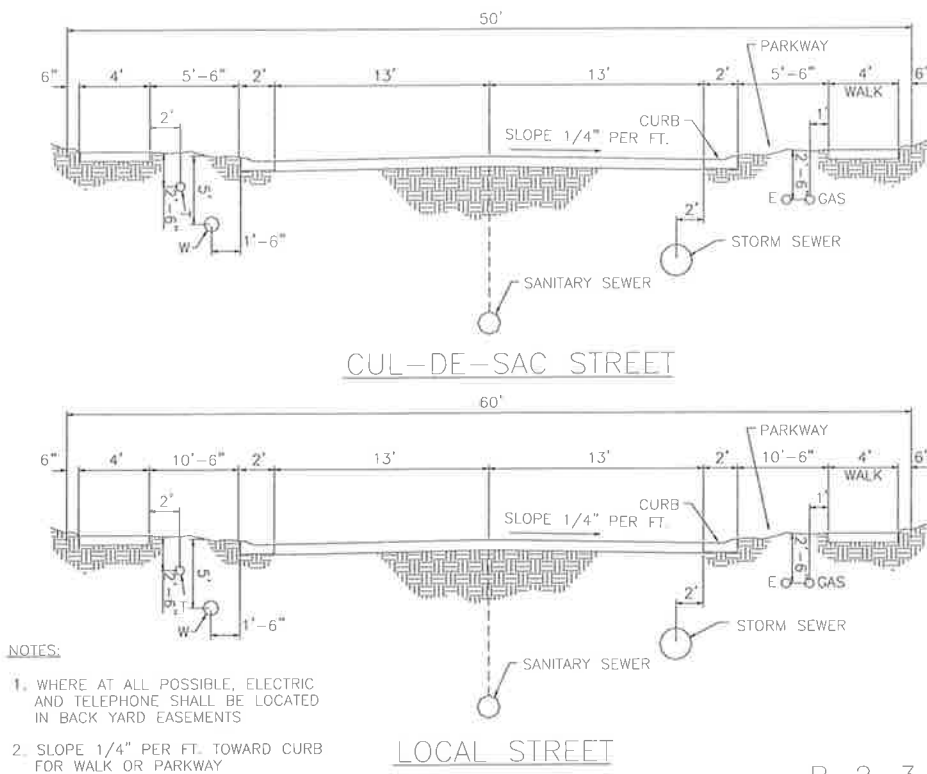
(j) Right-of-way requirements may be increased where anticipated traffic flow warrants it, or if drainage easements should reasonably parallel such thoroughfares. Such increased width will be established by the Town with the advice of the Town Engineer.

(k) Minimum right-of-way widths, paving widths, angle of intersection, curb radius, distance along sides of sight triangles, horizontal alignments, vertical alignments, as well as maximum grades shall be in accordance with the following table:

	Local. Aterial Streets	Local Collector Streets	Local Streets	Cul-De Sac Streets	Cross Walks	Alley
Right-of-way width (Feet)	100	70	60	50	12	33
Paving width streets.(Feet)	40	36	30	30	6	20
Maximum Grade	7.5%	10%	12%	12%	---	12%
Minimum angle for inter-section (degrees)	90	80	70	70	---	70
Minimum curb radius (feet)	35	25	15	15	---	5
Grades for 25' before Intersection	3%	3%	3%	3%	---	3%
Minimum Grade on Roadway	0.5%	0.5%	0.5%	0.5%	---	0.5%
Site triangles (distance along sides of) through streets/stop street (feet)	500/30	500/30	250/25	250/25	---	50/20
Horizontal alignment (min. radii of center-line) (feet)	600	400	200	100	---	100
Vertical curves (min sight distance) (ft.)	500	350	200	100	---	100
Plan	B-2-2	B-2-2	B-2-3	B-2-3		



B-2-2



B-2-3

B.(3) Normal Crown

The pavement crown for all streets shall be computed at a rate of one quarter (1/4) inch per foot.

B.(4) Minimum Stopping Sight Distances

- The stopping sight distance for arterial sheets shall be five hundred (500) feet.
- The stopping sight distance for collector streets shall be five hundred (500) feet.
- The stopping sight distance for local streets shall be two hundred fifty (250) feet.
- The stopping sight distance for all other streets shall be as determined by the Town with the advise from the Town Engineer.

B.(5) Intersections

- Street intersections shall be as nearly at right angles as is possible, and no intersection shall be at an angle of less than seventy (70) degrees.
- Street jogs with centerline offsets of less that one hundred fifty (150) feet shall not be permitted.
- Intersections of local and collector streets with thoroughfares shall be in accordance with a design in accordance with AASHTO.

(d) No fence, wall, hedge or shrub planting which obstructs sight lines shall be placed or permitted to remain on any corner lot at the intersection of a collector street and local street within the triangular area formed by the street property lines and a line connecting points thirty (30) feet from the intersection of the property lines extended.

(e) No fence, wall, hedge or shrub planting which obstructs sight lines shall be placed or permitted to remain on any corner lot at the intersections of two (2) local streets or at the intersections of a street with an alley within the triangle area formed by the street property lines or alley property line and a line connecting points twenty-five (25) feet and twenty (20) feet respectively from said intersection of the property lines extended. No trees shall be permitted to remain within such triangles unless the foliage line is maintained at sufficient height to prevent obstruction of such sight lines. Trees shall not be planted within the public right-of-way unless approved by the Plan Commission in the case of a subdivision.

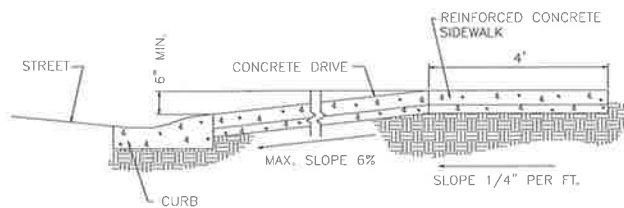
B.(6) Sidewalks

(a) Sidewalks shall be required on all new construction in the Town of Westville unless waived by the Westville Town Council or the Westville Board of Zoning Appeals by the granting of a variance for the sidewalk requirements contained in Chapter 7 – Town of Westville Subdivision Ordinance.

(b) Plans for sidewalk alignment and grade shall be in accordance with Plan B-6-1.



TYPICAL SIDEWALK



NOTE: DRIVEWAY AND SIDEWALK AT DRIVEWAY--5" CONCRETE WITH REINFORCEMENT MESH 6-10/10

TYPICAL SIDEWALK AT DRIVEWAY

SIDEWALKS

B-6-1

(c) The minimum width of sidewalks shall be five (5) feet in new commercial construction unless the adjacent sidewalks on either side are four (4) feet already. In that event, the sidewalks shall be constructed four (4) feet wide.

(d) The minimum width of sidewalks shall be four (4) feet in new residential construction.

(e) The desirable location of sidewalks shall be within six (6) inches of the right-of-way line. See Plan B-2-2 and B-2-3.

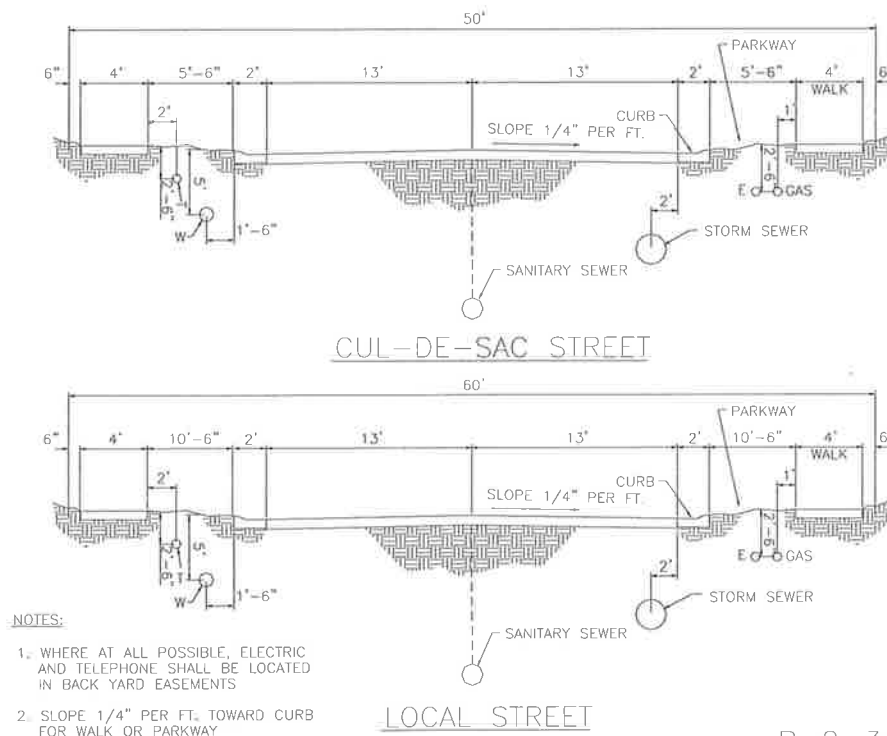
(f) Handicapped ramps shall be installed at corners per the latest State of Indiana approved ANSI codes.

B. (7) Curbs and Gutters

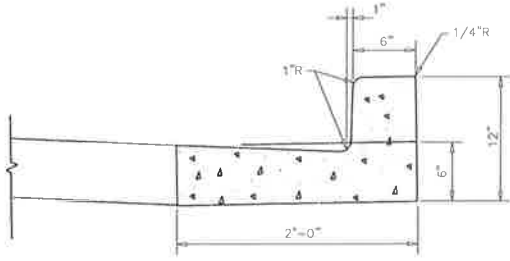
(a) Curbs and gutters shall be required on all new streets. Curbs and gutters also shall be required for all new construction in land adjacent to existing Town streets unless waived by the Town Council or the Board of Zoning Appeals, in the case of a subdivision. The street curbs will conform to Plan B-7-1 for residential curbs and commercial curbs.

(b) All parking lots are to be curbed to control drainage runoff. The curb shall conform to Plan B-7-1.

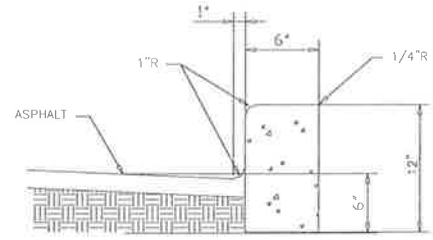
(c) In areas where curbing may prove to be detrimental to the existing drainage, curbs may be waived by the Town Council with advice from the Town Engineer.



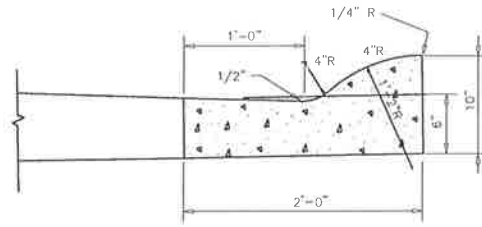
B-2-3



COMMERCIAL CONCRETE CURB & GUTTER



PARKING LOT CURBING



RESIDENTIAL CONCRETE CURB & GUTTER

B-7-1

PART C - MINIMUM STANDARDS FOR STREET CONSTRUCTION

C.(1) Subgrade Preparation

(a) Description: This work shall consist of the construction of that part of the roadbed below the grade intended to receive the base or surfacing material. No excavation of any existing Town street, alley or public way shall commence until a Permit to Excavate in a Street, Alley or Public Way has been approved for the proposed work.

(b) Construction Requirements: The subgrade shall be constructed in layers each no more than (6) inches. Each six (6) inch layer of the subgrade shall be compacted to at least ninety-five (95) percent of the maximum dry density as determined by the provisions of AASHTO T99, as modified.

(c) During the subgrade preparation and after its completion, adequate drainage shall be provided at all times to prevent water from standing on the subgrade.

(d) Unless otherwise provided, the roadbed below the subgrade shall be so constructed that it will have as nearly as possible, uniform density throughout. In both cuts and fills it shall be rolled with approved compacting equipment capable of providing a smooth, even subgrade surface. In areas not accessible to the roller or other equipment, the required compaction shall be obtained with mechanical tampers or vibrators.

(e) All soft, yielding, or other unsuitable material which cannot be compacted satisfactorily shall be removed if corrective measures are not effective. All rock encountered shall be removed or broken off at least six (6) inches below the subgrade surface.

(f) Any holes or depressions resulting from the removal of unsuitable material shall be filled with clean satisfactory material and compacted to conform with the surrounding subgrade surface.

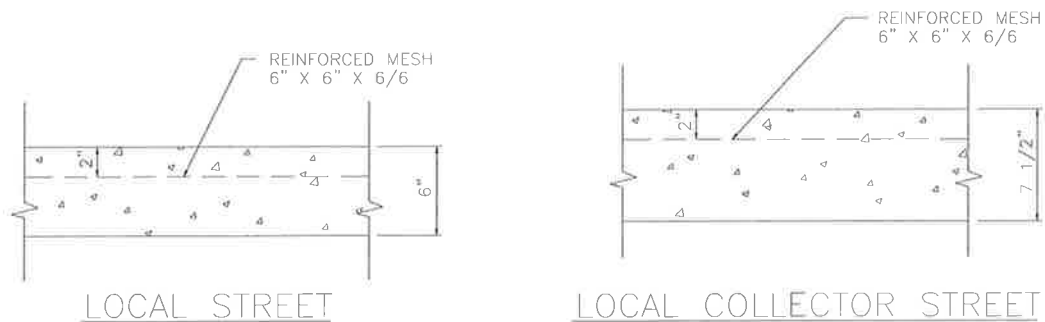
(g) Paving material shall not be placed before the subgrade is inspected and approved by the Street Department or Town Engineer, and at no time when the subgrade is frozen or muddy.

(h) No hauling shall be done nor equipment moved over the subgrade when its condition is such that undue distortion results, unless the subgrade is protected with adequate plank runways, mats, or other satisfactory means.

(i) The condition of the subgrade as finally and acceptably prepared shall prevail at the time any paving material is placed thereon and sufficient length kept so conditioned that paving operations will not be delayed.

C.(2) Rigid Pavement Thickness

(a) Thickness See Plan C-2-1.



STREET SECTIONS—CONCRETE

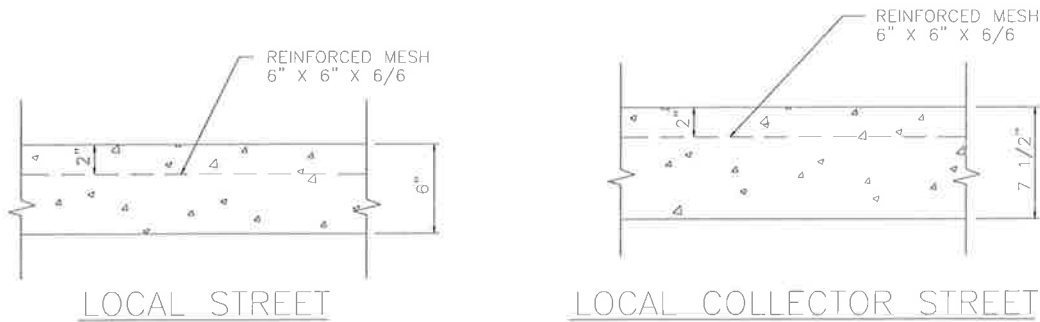
C-2-1

- (1) The minimum thickness of concrete pavement for local streets shall be six (6) inches.
- (2) The minimum thickness of concrete pavement for collector streets, and non-residential areas shall be seven and one-half (7 1/2) inches.
- (3) The minimum thickness of concrete pavement for all other streets shall be as determined by the Plan Commission.

(b) Construction Methods

- (1) Concrete pavement shall be reinforced with wire mesh and be constructed in accordance with Section 501 of the Standard Specifications, except as provided below.
- (2) Materials shall comply with Section 901 and subsections 903.01, 904.01, 909.10, 910.01, 912.01 and 912.03 of the INDOT Standard Specifications. Concrete shall be machine finished except on widened portions, intersections, or other places where hand finishing will be permitted if authorized by the Town with the advice of the Town Engineer.
- (3) Conditioning of subgrade shall be in accordance with Section 501.07 of the Standard Specifications.

- (4) All joints shall be constructed in accordance with Section 501.14 of the Standard Specifications, except:
- (a) Weakened plane or dummy transverse contraction joints shall be placed not to exceed twenty (20) feet spacing. Transverse contraction joints may be either formed or sawed dummy groove, ribbon or premolded strip type. One of the above-named joints shall be placed at every catch basin and manhole in line of pavement. The location of manholes, etc. in the pavement shall determine the exact location of joints. All joints must extend throughout side strips and curbs to full width of pavement.
 - (b) Expansion joints with approved dowel bar assembly shall be placed at street intersections and where shown on the plans.
 - (c) Whenever the width between forms of the pavement under construction is greater than fifteen (15) feet, longitudinal joints shall be constructed so as to divide the pavement into strips not to exceed thirteen (13) feet each.
 - (d) Finishing machines or vibrating strike-boards of design other than as specified in the INDOT Standard Specifications will be permitted only if work of equal quality as set out in these specifications is obtained in the opinion of the Town Engineer.
 - (e) Curing with approved impervious membrane or sealing compounds will be permitted if authorized by the Town Engineer.
 - (f) All concrete shall have seven (7) percent air entrainment.



STREET SECTIONS--CONCRETE

C-2-1

C.(3) Full Depth Asphalt Pavement

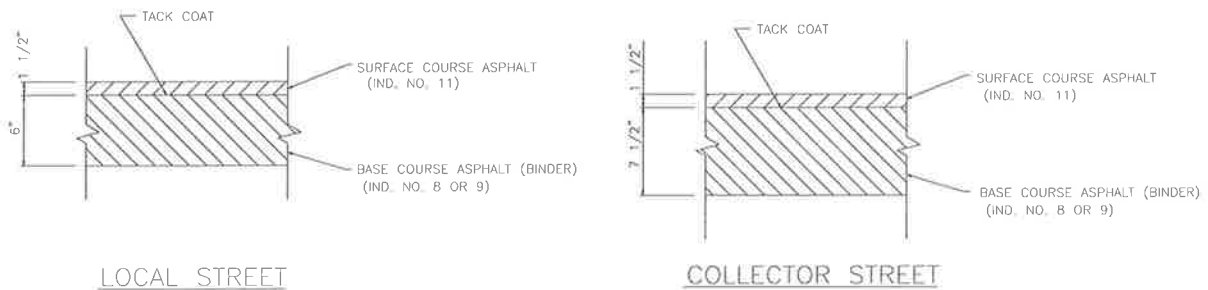
(a) Thickness See Plan C-3-1.

- (1) The minimum thickness of full depth hot asphalt concrete or hot asphalt emulsion for local street shall be seven and one-half (7 1/2) inches.
- (2) The minimum thickness of full depth hot asphalt concrete or hot asphalt emulsion for all collector streets and streets in R-3 zoned areas, and non-residential areas shall be nine (9) inches.
- (3) The minimum thickness for full depth hot asphalt concrete or hot asphalt emulsion for other streets shall be as determined by the Town with advice from the Town Engineer.

(b) Materials and Methods of Construction

- (1) Materials shall comply with subsections 902.01, 902.02, 902.03, 902.04, 904.01 and 904.02 of the Standard Specification.
- (2) Hot asphalt emulsion and hot asphalt concrete pavements shall be constructed in accordance with Sections 401 and 402, respectively, of the INDOT Standard Specifications. These pavements shall consist of a one and one-half (1 1/2) inch wearing surface and the rest of the total asphalt section as described in C3 above shall

be base placed in four (4) inch maximum compacted lifts: The hot asphalt emulsion surface shall be Indiana No. 11 mixture and base shall be either No. 8, or No. 9 mixture. The hot asphalt concrete surface shall be Type "B" mixture, and base shall be either No. 8 or No. 9 mixture. Construction joints in the same plane shall not be located within fifty (50) feet of a joint in the preceding lift.



STREET CROSS-SECTION;
BITUMINOUS BASE AND SURFACE
(FULL DEPTH ASPHALT)

C-3-1

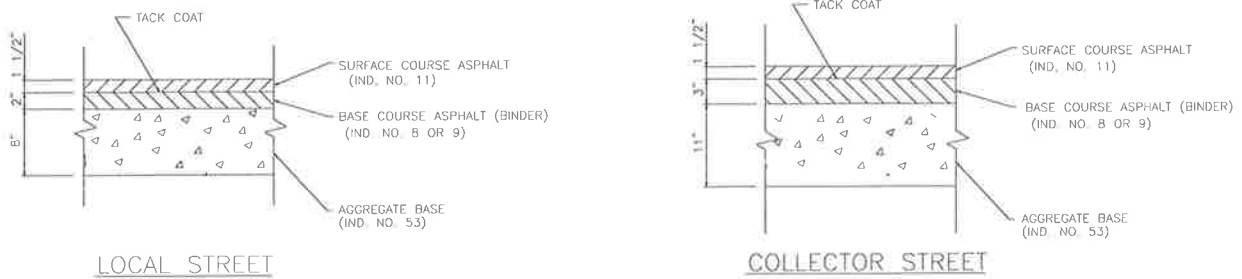
C.(4) Compacted Aggregate Base and Bituminous Surface

(a) Thickness See Plan C-4-1.

- (1) The minimum thickness of pavement using compacted aggregate base and hot asphalt or hot asphalt emulsion surface for local streets shall be eight (8) inches of base with two (2) inches of bituminous binder and one and one-half (1 1/2) inches of bituminous surface.
- (2) The minimum thickness of pavement using compacted base and hot asphalt concrete or hot asphalt emulsion surface for collector streets and non-residential areas shall be eleven (11) inches of base with three (3) inches of bituminous binder and one and one-half (1 1/2) inches of bituminous surface.

(b) Materials and Methods of Construction

- (1) Base course for the Compacted Aggregate Base shall be in accordance with Section 303 of the INDOT Standard Specification and the bituminous shall be in accordance with Sections 402 and 403 of the Standard Specifications.
- (2) Construction methods shall conform to Sections 303 and 304 for compacted Aggregate Base. Construction methods shall conform to Sections 401 and 402 for bituminous pavement.



STREET CROSS-SECTION:
COMPACTED AGGREGATE BASE AND
BITUMINOUS SURFACE

C-4-1

C.(5) Other Paving Materials

Upon application to the Town with supporting data from field tests, permission may be granted to use other paving materials or a different combination of base and bituminous that have shown satisfactory performance.

C.(6) Alternate Pavement Thickness

(a) Upon application to the Town with supporting data from field tests, alternate or lesser pavement thickness than those set forth in Parts C.(2), C.(3), and C.(4) may be approved.

(b) Based upon experience in the vicinity of a proposed street and with supporting data from field tests, the Town may require a pavement thickness greater than the minimums specified in Parts C.(2), C.(3) and C.(4).

C.(7) Curb and Gutter

(a) Curb and gutter shall be required for all streets.

(b) The shape of the curb and gutter and intersection crossdrains shall be in accordance with the Plan C-7-1.

(c) Construction requirements shall comply with Subsection 605.04 of the INDOT Standard Specifications.

(d) Materials and conditioning of subgrade shall be in accordance with the provisions of Part C, Subsection C.(1).

C.(8) Sidewalk

Sidewalks shall be a minimum of four (4) inches thick of Portland Cement concrete conforming to Subsections 604.02 and 604.03 of the INDOT Standard Specifications and be as shown on Plan B-6-1.

C.(9) Parkway

(a) The parkway (area between the curb and the sidewalk) shall be constructed in accordance with Section 621 of the INDOT Standard Specifications.

(b) The materials shall comply with Subsections 914.01, 914.03, 914.04, 914.05 and 914.07 of the INDOT Standard Specifications.

PART D - BRIDGES

D.(1) Plans and Design

Plans for bridges or structures having clear spans of twenty (20) feet or greater shall meet requirements of the LaPorte County Highway Department as interpreted by their Engineer.

PART E - ENTRANCES TO AND FROM PUBLIC HIGHWAYS AND PRIVATE PROPERTY

E.(1) Definitions

The following words and phrases shall have the meaning ascribed to them in this Section when used in this Part of this Standards.

(a) Class I - Residential Entrance: A driveway by which a street is connected to a R-1, R-2 or R-3 Zoned facility and is ordinarily used only by the owner or occupant of the premises such as a garage, barn residence or other improved property.

(b) Class II - Commercial Entrance: A driveway or driveways by which a street is connected to public or private property Business Zone or Industrial Zoned.

(c) Driveway: Every way or place not in the right-of-way of any public highway and which is used for vehicular traffic.

(d) Entrance: The connecting line of the driveway and the approach.

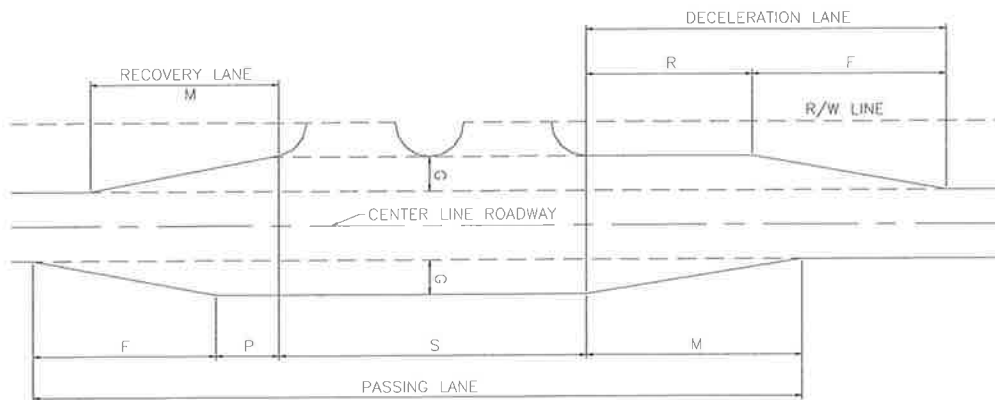
(e) Approach Pavement: Portion of roadway adjoining the traveled way including tapers for recovery lane, deceleration, speed change, turning movements or other purposes supplementary to the through traffic movement. The auxiliary lane may be existing or proposed to be constructed by the applicant. See Plan E-1-1

CONTROLLING DIMENSIONS (FT.)						
DIMENSION	POSTED SPEED LIMIT					
	30-35	35-40	40-45	45-50	50-60	65
F	120	150	190	250	300	350
G	12	12	12	12	12	12
M	144	144	144	144	144	144
P	20	20	50	50	75	75
R	150	175	200	250	300	370
S	REFER TO APPROPRIATE DRIVEWAY DRAWING					

NOTES:

RECOVERY AND DECELERATION LANES REQUIRED IF ROADWAY CLASSIFIED PRIMARY OR SECONDARY ARTERIAL

FOR DRIVEWAY DETAILS REFER TO APPROPRIATE TYPICAL APPROACH DRAWINGS



TYPICAL APPROACH PAVEMENT FOR UNDIVIDED HIGHWAY

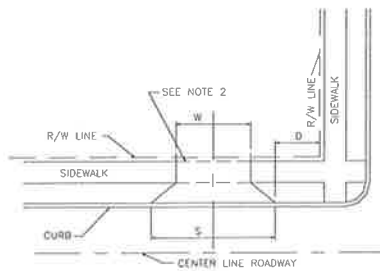
E-1-1

(f) Site: Shall mean one area consisting of one or more contiguous lots or parts of lots which is to be used as one consolidated area.

E.(2) Driveway Widths

All driveway widths shall be in accordance with Plan E-2-1, E-2-2, and E-2-3.

W = 10' MINIMUM
 S = 40' MAXIMUM
 D = 3' MINIMUM FROM PROPERTY LINE
 20' MINIMUM FROM STREET RIGHT OF WAY

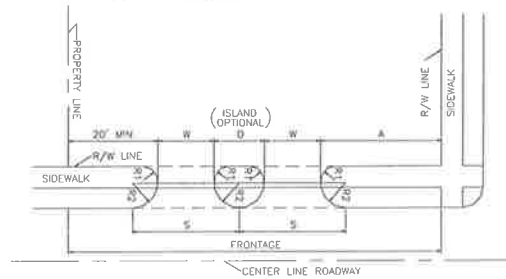


- NOTES:
1. DRIVEWAY APPROACH TO BE CONSTRUCTED AT THE SAME DEPTH REQUIREMENTS AS PROPOSED UNDER STREET SECTIONS
 2. IF ASPHALT IS USED FOR DRIVEWAY AND APPROACH THE CONCRETE SIDEWALK MUST PASS THROUGH

RESIDENTIAL APPROACH

E-2-1

A = 50' OR 25% OF FRONTAGE WHICHEVER GREATER
 D = 20' MINIMUM
 W = 12' MINIMUM
 S = 70' MAXIMUM
 R1 = 5' REQUIRED
 R2 = 20' MAXIMUM



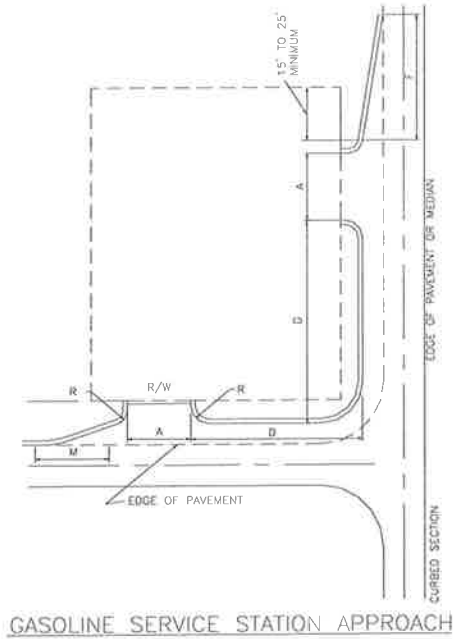
- NOTES:
1. DRIVEWAY APPROACH TO BE CONSTRUCTED AT SAME DEPTH REQUIREMENTS AS PROPOSED UNDER STREET SECTIONS
 2. IF ASPHALT IS USED FOR DRIVEWAY AND APPROACH THE CONCRETE SIDEWALK MUST PASS THROUGH
 3. TWO ENTRANCES MAY BE PERMITTED BY APPROVAL OF TOWN COUNCIL

COMMERCIAL APPROACH

E-2-2

A = 24' MAX, 12' MIN
 D = 100' MIN.
 R = 5' MAX.
 F = SEE DIMENSIONS PAGE E-1-1
 M = 144'

NOTE:
 DRIVEWAY APPROACH TO BE
 CONSTRUCTED AT SAME DEPTH
 REQUIREMENTS AS PROPOSED
 UNDER STREET SECTIONS



E-2-3

E.(3) Regulations

(a) Encroachment Upon Right-of-way: No portion of any approach at the intersection of streets or highways shall encroach upon right-of-way area between lines drawn to the pavement edge perpendicular to the right-of-way lines from points on the right-of-way lines twenty (20) feet back from the point of intersection of said right-of-way lines on their prolongation. No part of any such approach shall encroach on any intersection turning area with an edge radius of fifty-five (55) feet or less or interfere with sight distances, easy turning or traffic movement within the highway intersection.

(b) Distance from Adjacent Property: No Class II entrance shall be less than twenty (20) feet from adjacent property. Where an undue hardship exists the Town Engineer may reduce such requirement. No approach shall be so constructed that any part of it extends in front of property belonging to another person other than the permittee, unless a joint application is signed by both parties.

(c) Drainage: Provisions shall be made so that the drainage from the property shall be contained therein at the entrance. Such driveway or approach shall not interfere with the drainage of the street or roadway nor with the cross-section of the roadway.

(d) Number of Entrances Permitted: No more entrances or approaches shall be permitted than necessary to accommodate the traffic to and from the property, and shall be regulated by the Town of Westville through site plan review.

(e) Line of Visibility: All entrances and approaches shall be located as to provide adequate sight distance in both directions along the highway for safe access to the highway without interfering with the traffic on the highway.

(f) Change of Entrance: No entrance shall be altered, relocated or remodeled without permission of the Town with the advice of the Town Engineer.

(g) Type of Pavement Required: The approach shall be constructed in accordance with section II, Part C-2 and Plan E-3-1 and E-3-2.

(h) Parking Area Adjacent to Sidewalk: When the parking or driving area of a property is adjacent to a sidewalk then a suitable non-mountable barrier must be constructed to prevent encroachment.

(i) Angle of Drive or Approach: The angle of any drive or approach shall be 90 degrees unless otherwise approved by the Town with the advice of the Town Engineer.

(j) Approach to Loading Dock: When access is requested to a loading dock then there must be sufficient distance between the dock and the sidewalk or right-of-way to prevent encroachment while parking or maneuvering.

(k) Distance Between Approaches: The distance between any two approaches shall be at least twenty (20) feet and shall be so constructed so as to show clear definition of the approaches.

(l) No excavation of any existing Town street, alley or public way shall commence until a Permit to Excavate in a Street, Alley or Public Way has been approved for the proposed work.

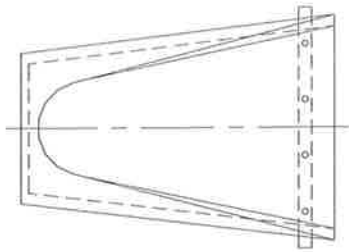
PART F - DRAINAGE

F.(1) Conformance with Master Plan

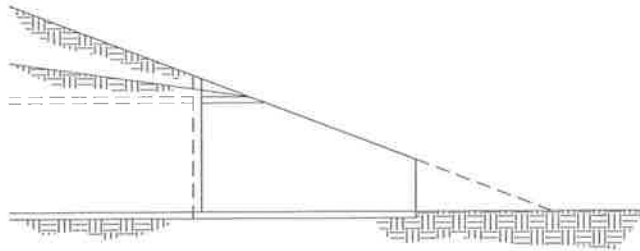
The Developer shall provide the development or site with a complete storm sewer system which must be approved by the Plan Commission in the case of a subdivision.

F.(2) Culverts

A minimum of a 15" culvert shall be installed under any driveway which must cross a drainage ditch or swale. See Plan F-2-1 and F-2-2.



PLAN VIEW

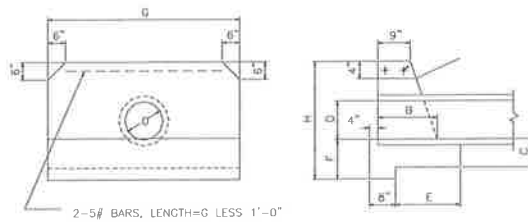


SLOPE DETAIL

PLASTIC, CONCRETE, OR METAL
END SECTIONS SHOULD MATCH
CULVERT BEING USED AND BE
GRADED TO AVOID SCOURING

PIPE CULVERT END SECTION

F-2-1



CIRCULAR PIPE CULVERTS							CU. YDS. CONC.
D	H	C	F	E	B	G	2 HEADWALLS
12"	3'-3"	1'-0"	1'-6"	1'-0"	1'-2"	4'-6"	1.28
15"	3'-5"	1'-0"	1'-6"	1'-0"	1'-3"	5'-0"	1.71
18"	3'-9"	1'-0"	1'-6"	1'-0"	1'-3"	5'-6"	2.19
24"	4'-5"	1'-2"	1'-6"	1'-0"	1'-6"	6'-6"	3.75
30"	5'-1"	1'-3"	1'-6"	1'-0"	1'-7"	11'-0"	5.78
36"	5'-10"	1'-5"	1'-11"	1'-0.5"	1'-9"	12'-0"	8.12

C.S. PIPE ARCH							CU. YDS. CONC.
PIPE	H	C	F	E	B	G	2 HEADWALLS
SPAN RISE							
18"	11"	3'-3"	1'-0"	1'-6"	1'-2"	5'-0"	1.41
22"	13"	3'-9"	1'-0"	1'-6"	1'-3"	5'-6"	1.93
24"	16"	3'-6"	1'-0"	1'-6"	1'-3"	7'-0"	2.28
29"	18"	3'-10"	1'-0"	1'-6"	1'-4"	8'-0"	2.92
36"	22"	4'-3"	1'-0"	1'-6"	1'-4"	10'-4"	5.12
43"	27"	5'-0"	1'-3"	1'-9"	1'-7"	11'-6"	8.09

RICHM. ELLIPTICAL CONC. CULVERT PIPE							CU. YDS. CONC.
PIPE	H	C	F	E	B	G	2 HEADWALLS
SPAN RISE							
24"	14"	3'-6"	1'-0"	1'-6"	1'-3"	6'-3"	1.93
30"	19"	3'-10"	1'-0"	1'-6"	1'-4"	8'-6"	2.92
36"	24"	4'-3"	1'-0"	1'-6"	1'-5"	10'-0"	3.75
42"	27"	5'-0"	1'-3"	1'-9"	1'-6"	11'-9"	5.01

PIPE CULVERT HEADWALLS

F-2-2

F.(3) Storm Drainage

(a) Abbreviations: The following organizations may be referred to in these specifications by abbreviations of their titles.

ASTM - American Society for Testing and Materials

AWWA- American Water Works Association

ACI - American Concrete Institute

ANSI - American National Standards Institute

ASA - American Standards Association

AASHTO- American Association of State Highway and Transportation Officials.

(b) Excavations: All excavation shall be true to line and grade as shown on the approved plans. Excavation shall include excavation for trench, backfill, and disposal of surplus material, if required. Any objectionable material encountered, such as stumps, roots, concrete, etc. shall be removed and hauled away. Trenches for sewer pipes shall be dug to a minimum of 4 inches below grade and backfilled with clean sand to provide a minimum of 4 inches of sand bedding below the pipe. Grade shall be held to within 0.1 foot plus or minus between manhole and the deviation per pipe length shall not exceed 1/2 inch plus or minus. See Plan G-2-1 and G-2-2. Backfill around the pipe and to grade shall be made with clean sand placed in one foot lifts where sewer pipe is installed under streets. Where pipe is installed other than under streets,

backfill around and to 1.0 foot over the pipe shall be made with clean sand. Remaining backfill may be existing earth, placed in one foot lifts. Backfill shall be carefully placed to avoid displacing the pipe in the trench. Should the pipe be displaced more than 0.2 foot between manholes it shall be excavated and relayed. Backfill shall be mechanically compacted with a vibratory compactor as work proceeds to 95% modified proctor dry density. No excavation of any existing Town street, alley or public way shall commence until a Permit to Excavate in a Street, Alley or Public Way has been approved for the proposed work.

(c) Storm Sewers: All storm sewers shall be constructed of one of the following materials:

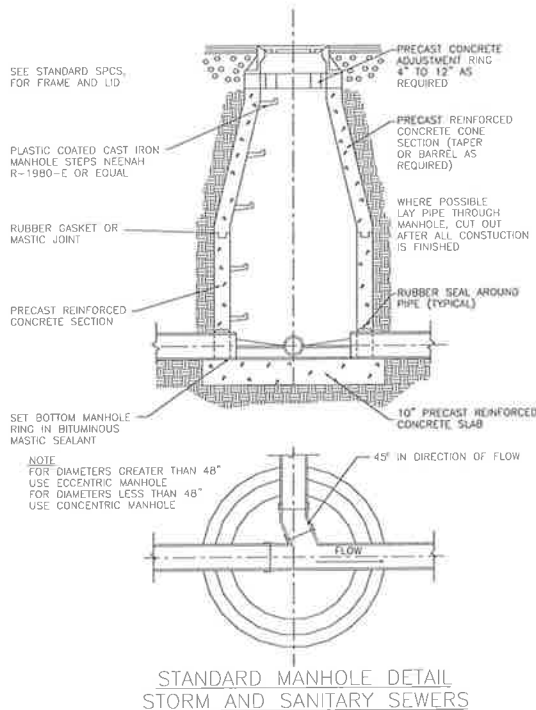
<u>Name</u>	<u>Standard</u>	<u>Joint</u>
Concrete Sewer Pipe	ASTM C-14-90	ASTM C443-85a
Reinforced Concrete Sewer Pipe	ASTM C-76-90	ASTM C443-85a
Reinforced Concrete Elliptical	ASTM C-507-90	
Corrugated Metal Pipe	AASHTO M-36-70	AASHTO M-218-70
Corrugated Metal Pipe (21 inches in diameter +)	AASHTO M-36	
Corrugated Metal Pipe Arch (21 inches in Diameter or More)	AASHTO M-36	
Extra Strength Vit. Clay Pipe	ASTM C-200	ASTM 425, Type I, Type II or Type III
Plastic Pipe (ABS) Sizes 4" - 6"	ASTM D2751	
Sizes 8"- 15"	ASTM D2680	
Plastic Pipe (PVC) SDR 35	ASTM D3034	ASTM 3212
Polyethylene (HDPE)	ASTM D1248	ASTM F405

Other materials may be used if approved by the Town with the advice of the Town Engineer.

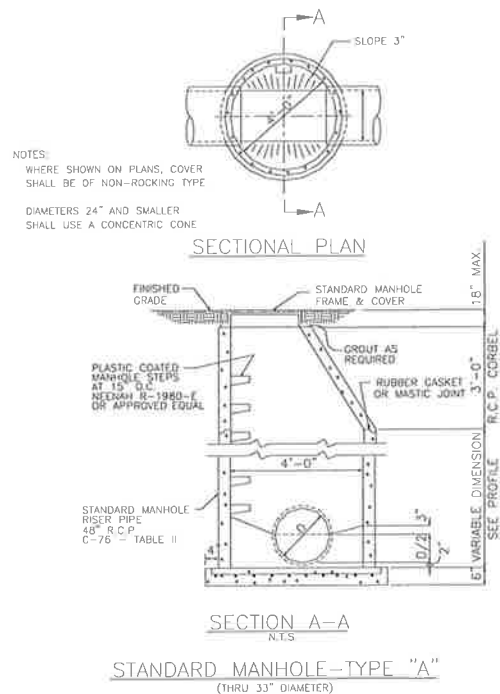
All pipe shall be laid in such a manner as to form a close, concentric joint with the adjoining pipe and to bring the invert of each section to the required grade. Bell holes shall be dug in

advance of the pipe being laid. Supporting of the pipe on blocks will not be permitted. Joints shall be watertight.

(d) Structures: The structures shall be constructed using precast, reinforced manhole sections, conforming to ASTM C-478, latest edition. All structure joints shall be watertight. The bottom section shall be set in a bituminous mastic on the concrete pad. Bottoms of structures may be precast reinforce concrete integral with the bottom section. Sewer pipe shall be sealed where it enters the manhole with a rubber seal seated in a precast groove in the manhole. All grout shall contain a minimum of 11 bags of Portland Cement per cubic yard. Concrete for bottom pads shall contain 5 bags of Portland Cement per cubic yard. See Plans F-3-2, F-3-3, F-3-4 and F-3-5.

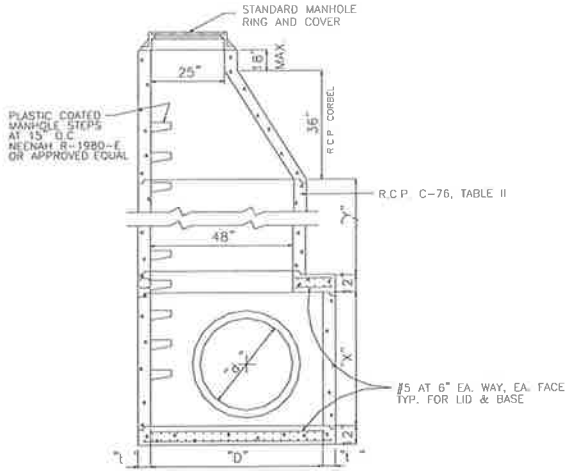


F-3-2



F-3-3

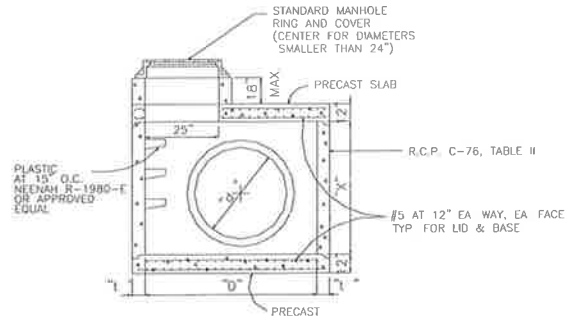
d	D	H	X	AS REQUIRED
36"	60"	6"	60"	
42"	72"	7"	72"	
48"	72"	7"	72"	
54"	84"	8"	84"	
60"	84"	8"	84"	
66"	96"	9"	96"	
72"	96"	9"	96"	
78"	108"	10"	108"	
84"	108"	10"	108"	AS REQUIRED



STANDARD MANHOLE-TYPE "B"
36" SEWER & LARGER

F-3-4

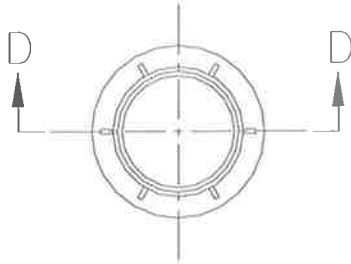
d	D	H	AS REQUIRED
36"	60"	6"	
42"	72"	7"	
48"	72"	7"	
54"	84"	8"	
60"	84"	8"	
66"	96"	9"	
72"	96"	9"	
78"	108"	10"	
84"	108"	10"	AS REQUIRED



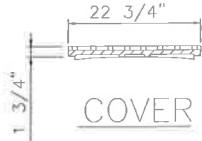
STANDARD MANHOLE-TYPE "B"
36" SEWER & LARGER
(RESTRICTED HEADROOM)

F-3-5

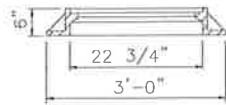
(e) Castings: Castings and lids shall be per Plan F-3-6 or approved equal. Casting shall be joined to manholes with cement grout. The top elevations of manholes located in streets shall conform to the profile. Those located elsewhere shall conform to final ground grade.



PLAN of RING



COVER



SECTION D-D

TOTAL WEIGHT 400 LBS.

SANITARY M.H. RING SHALL BE EJW 1020 OR EQUAL WITH HEAVY DUTY TYPE "A" COVER, WITH GASKET SEAL, MARKED "SANITARY".

STORM M.H. RING SHALL BE EJW 1020 OR EQUAL WITH HEAVY DUTY TYPE "A", TYPE "B", TYPE "M2" OR TYPE "01" COVER DEPENDING ON APPLICATION. IF TYPE "A" IS USED IT MUST BE MARKED "STORM".

STANDARD M.H. RING & COVER
N.T.S.

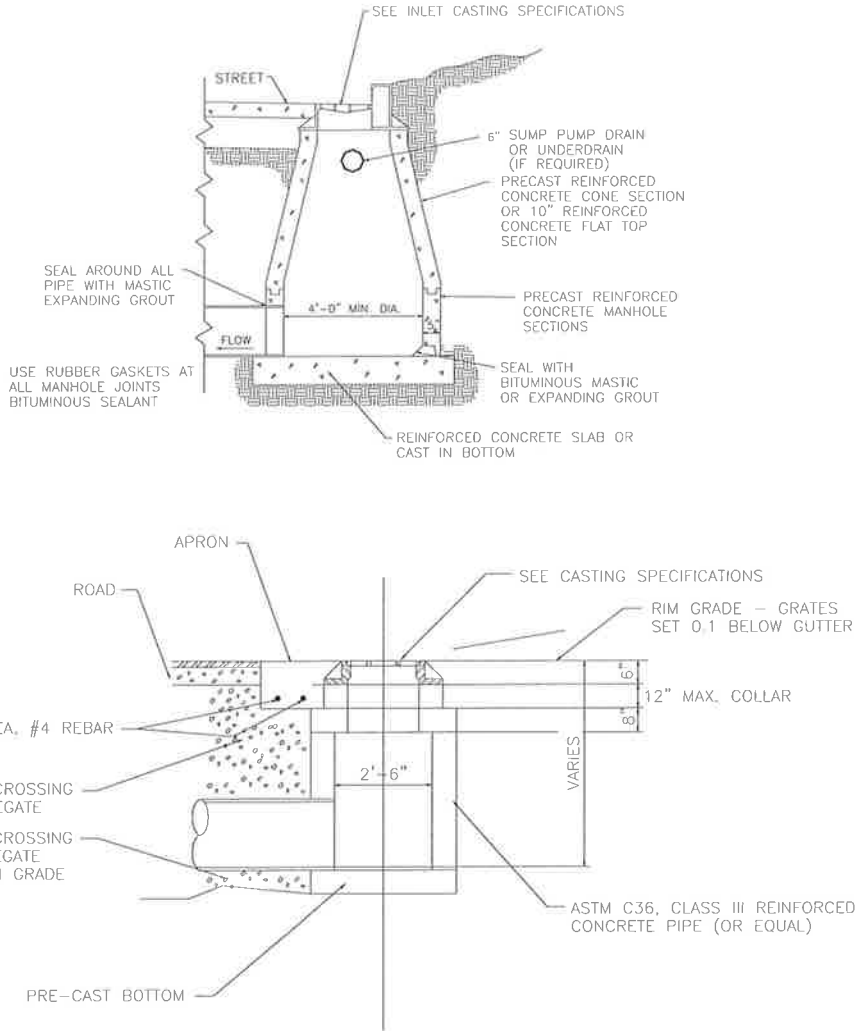
F-3-6

(f) Joints shall be water tight.

(g) Inlet Structures: Catch basins and inlets shall be pre-cast, reinforced conforming to ASTM C-478 latest edition. See Plan F-3-7. All joints shall be watertight. Castings shall be per Plan F-3-8 and F-3-9 depending on curb type.

NOTE

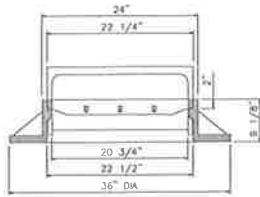
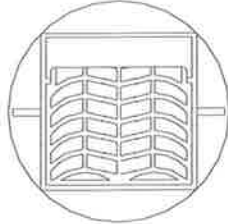
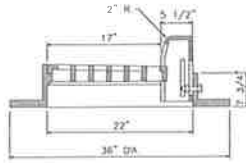
IN CASES WHERE MORE THAN ONE PIPE CONNECTION IS MADE AT AN INLET A MANHOLE OR CATCH BASIN TYPE STRUCTURE MAY BE REQUIRED



INLET AND CATCH BASIN DETAIL

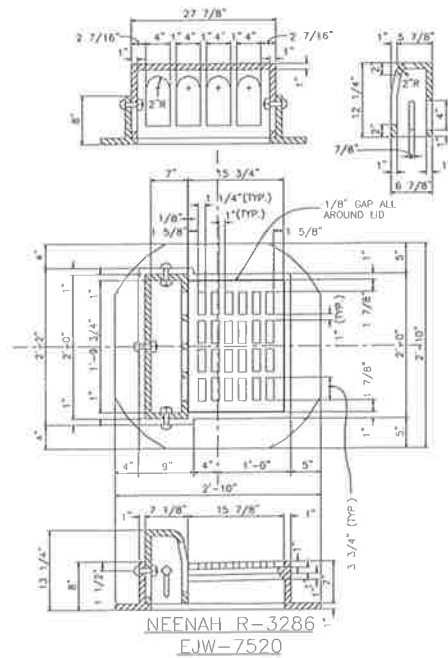
F-3-7

(h) Castings shall be per Plan F-3-8 and Plan F-3-9 depending on curb type.



NEENAH R-3031-B
EJW-7045
RESIDENTIAL CURB & GUTTER INLET CASTING

F-3-8



NEENAH R-3286
EJW-7520
COMMERCIAL CURB & GUTTER INLET CASTING

F-3-9

F.(4) Drainage Design Criteria

(a) Quantity of Runoff: The estimated storm runoff or design discharge for areas less than Two Hundred (200) acres in size shall be determined by the Rational Method or TR55.

The equation is $Q = CiA$

Where Q = rate of runoff or discharge, in cfs

C = weighted runoff coefficient, expressing the ration of rate of runoff to rate of rainfall

i = average intensity of rainfall (for a selected storm frequency and duration equal to the time of concentration) in inches per hour

A = drainage area tributary to point under design in acres

(b) Runoff Coefficient: The runoff coefficients for defined surfaces and uses shall be as follows:

Character of Surface	Runoff Coefficients
Pavement	
Asphaltic and Concrete	0.9
Brick	0.8
Roofs	0.8
Lawns, sandy soil	
flat, 2 percent	0.10
average, 2 to 7 percent	0.15
steep, 7 percent	0.4

In areas for which development plans have not been prepared, the following runoff coefficients shall be:

USES	Rational Formula Runoff Coefficient "C"
Business, Industrial and Commercial	0.85
Schools	0.6
Multi-family residential	0.55
Single-family residential	0.4

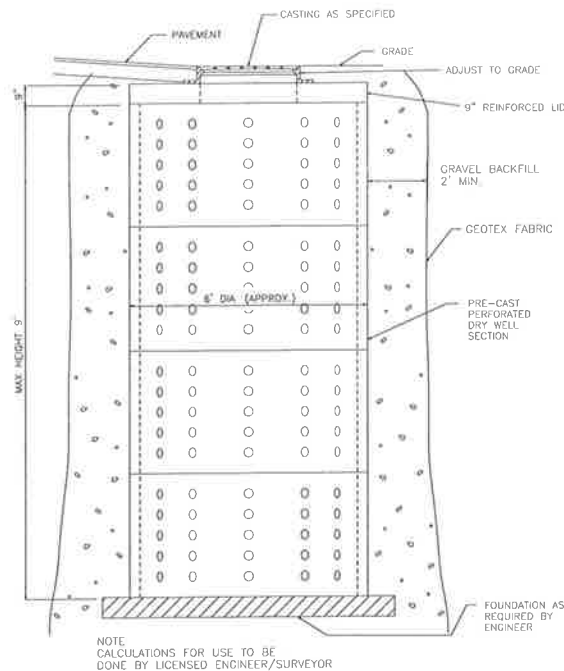
Parks and Open Spaces

0.3

Unimproved Areas

0.25

(b) Storage: The required storage shall be designed to control the runoff for the difference of a ten (10) year storm frequency undeveloped versus a 100 year storm post development. The maximum allowable outlet should be considered for the given area based on a ten (10) year storm. If no natural outlet is available, retention ponds may be allowed with permission of the Town and advise of the Engineer. If no natural outlet is available with permission of the Town with the advice of the Town Engineer dry wells per Plan F-4-1 may be allowed.



STANDARD PRECAST
PERFORATED DRY WELL

F-4-1

F.(5) Minimum Design Standards - Street Drainage

(a) Maximum Spacing of Collection Points: Storm water runoff shall not be carried in the streets for a distance of more than Three Hundred Fifty (350) feet. Inlets, curb turnouts or other types of runoff collection methods shall be so located as to intercept the flow within the distance specified.

(b) Miscellaneous Drain Design Standards

(1) Catch Basins:

A catch basin or other approved type of debris retainer shall be located so as to intercept debris collected by the drainage system.

(2) Velocities:

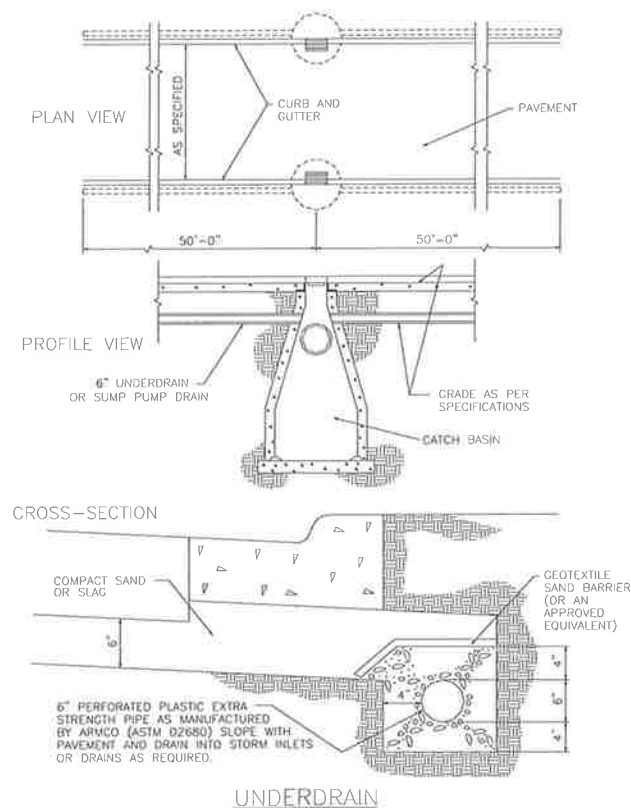
The minimum velocities used in designing storm sewers shall be three (3) feet per second when flowing full, and under no circumstances be less than two (2) feet per second. The maximum design velocity shall be eight (8) feet per second.

(3) Casting, Lids and Inlets:

The acceptable casting, lids and inlets are as shown on Plan F-3-7 through F-3-9.

(4) For catch basins in grassy areas a "beehive" type grate shall be used.

(c) Underdrains: The use of underdrains to reduce the accumulations of sub-surface water shall be required in all depressed areas. Such drains shall meet the requirements of Standard Plan F-5-1.



F-5-1

(d) *Detention Ponds:* Detention ponds shall be constructed as required by the Plan Commission in the case of subdivision and by the Town in all other cases to control the rate of runoff from a given area. Detention ponds shall be designed to control the runoff for a minimum storm recurrence frequency of one hundred (100) years. The maximum outlet from the detention pond shall be sized to carry the storm water runoff from given area in its natural unimproved condition based on a ten (10) year storm.

(e) Where basements will be below water table, direct drainage to a storm sewer will be provided for the sump pump. In no way shall a sump pump be connected to a sanitary sewer.

F.(6) Minimum Design Standards - Lot Drainage

(a) Minimum Lot Grades

(1) Primary Lot:

The primary lot is that portion of the lot between the rear face of the residence or building and the frontage road.

The minimum grades permissible in the primary lot are as follows:

- (a) surface grades: 2% recommended, 1% minimum
- (b) lot line swale grades: 2% recommended, 1% minimum
- (c) cross lot swale grades: 1% recommended, 0.5% minimum

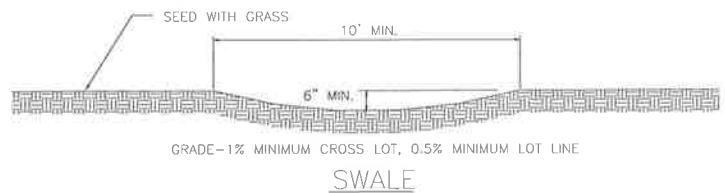
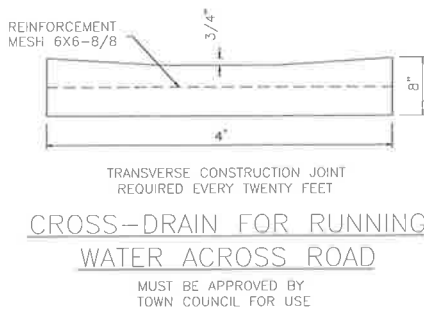
(2) Secondary Lot:

The secondary lot is that portion of the lot between the rear face of the residence or building and the rear property line.

The minimum grades permissible in the secondary lot are as follows:

- (a) surface grades: 1.5% recommended, 1% minimum
- (b) lot line swale grades: 1% recommended, 0.5% minimum
- (c) cross lot swale grades: 1% recommended, 0.5% minimum
- (d) surface grades over septic field, 2% recommended, 1% minimum

(b) Common Swales: A common swale is one that serves as a drainage course for two (2) or more lots of properties. See Plan F-6-1. The minimum width for a common swale shall be ten (10) feet and the minimum depth shall be six (6) inches. All common swales shall be protected with an easement dedicated to the proper authority for that swale's maintenance and repair. A cross-drain may be provided to allow a shallow swale to cross a local roadway. This must be approved by the Town with advice from the Town Engineer. See Plan F-6-1



F-6-1

(c) Minimum Design Frequency of Recurrence and Runoff Coefficients: Minimum design frequencies for lot drainage shall correspond to those used for the drainage design on the streets serving those lots. In no event shall the finished grade of the ground surrounding the residence or building on the lot be lower than eighteen (18) inches above top of curb on the street side of the house or twenty-four (24) inches above flowline of a major drainage swale on the swale side of the house.

(d) Typical Lot Grading Configurations: Typical lot grading shall be as shown on Plan F-6-2, F-6-3.

PART G - STREET EXCAVATION REPAIR

G.(1) Description

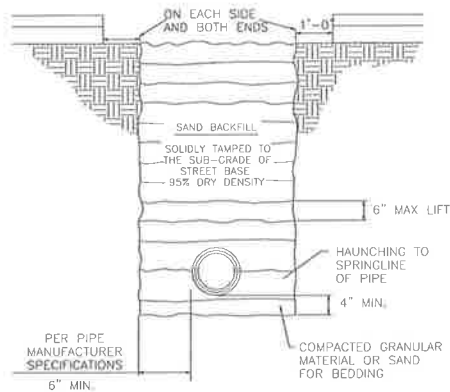
It shall be the obligation of any person, firm or corporation obtaining a permit for an opening or excavation in the public right-of-way to backfill the excavation and replace the pavement as set forth in these specifications. All public right-of-way work requires a Right of Way Permit, in advance, as required by the Westville Town Code.

G.(2) Backfill

All excavations under pavement and other conditions as indicated on Standard Plan shall be backfilled with clean granular material meeting the requirements of Section 211 of the Standard Specifications. Each layer shall be compacted to at least 95% of the maximum dry density as determined by AASHTO T99, as modified. Special care shall be taken in filling around sewers, water pipes, gas lines, etc. to keep the earth at the same height on both sides to avoid shifting of the pipe line. No removed paving materials or debris shall be used in backfilling the excavation unless approved by the Town of Westville Per Plan G-2-1. Excavations not under a pavement may be backfilled with virgin material removed from the excavation. Per Plan G-2-2.

NOTES:

1. COMPACTED GRANULAR MATERIAL SHALL CONSIST OF WELL-GRADED CRUSHED STONE, CRUSHED GRAVEL, OR WELL-GRADED GRAVEL MEETING THE REQUIREMENTS OF A.S.T.M. DESIGNATION C.33 GRADATION 67: 3/4 INCH TO NO 4
2. FOR PAVEMENT CUTTING AND REPLACEMENT SEE STREET CUT DETAIL

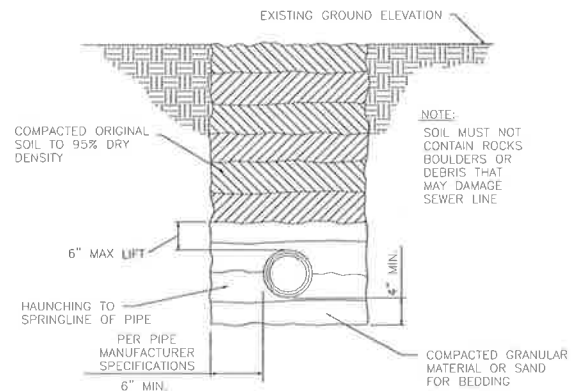


UNDER ROAD
TRENCH REQUIREMENTS
COMPACTED SAND BACKFILL
WITH COMPACTED
GRANULAR MATERIAL

G-2-1

NOTE:

- COMPACTED GRANULAR MATERIAL SHALL CONSIST OF WELL-GRADED CRUSHED STONE, CRUSHED GRAVEL, OR WELL-GRADED GRAVEL MEETING THE REQUIREMENTS OF A.S.T.M. DESIGNATION C.33 GRADATION 67: 3/4 INCH TO NO 4



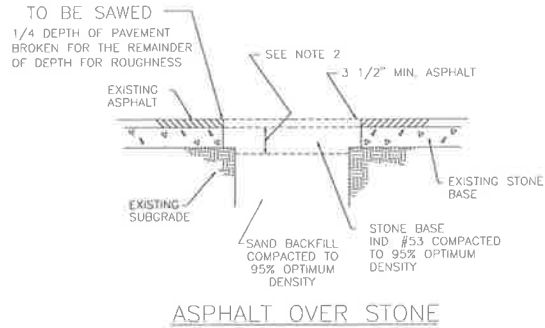
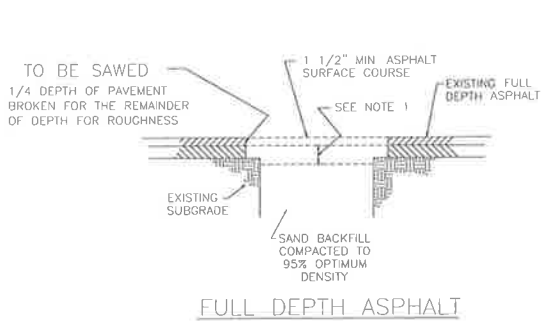
OFF STREET
TRENCH REQUIREMENTS
COMPACT ORIGINAL SOILS
WITH COMPACTED
GRANULAR MATERIAL

G-2-2

G.(3) Pavement Replacement

All pavement shall be replaced within fourteen (14) days with a type of construction equal to or better than that which is removed and as approved by the Street Commissioner and the Town

Engineer. All cuts in pavements shall be first outlined with a saw cut not less than 1 1/2 inches deep. Per Plan G-3-1 and G-3-2.

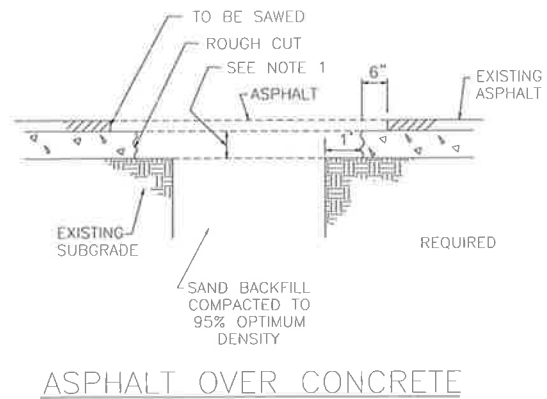
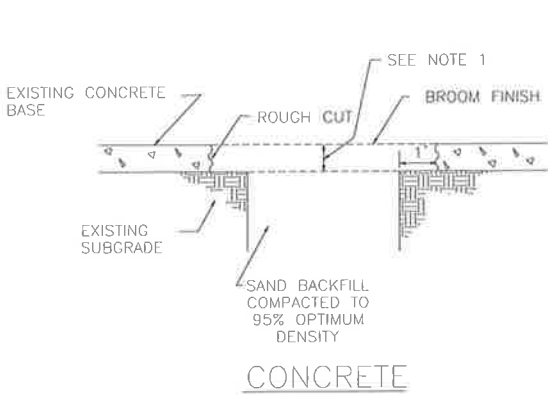


NOTES:

1. ASPHALT BASE
5" DEPTH FOR LOCAL STREETS
7" DEPTH FOR COLLECTOR STREETS
9" DEPTH FOR ARTERIAL STREETS
2. STONE BASE
11" DEPTH FOR LOCAL STREETS
15" DEPTH FOR COLLECTOR STREETS
18" DEPTH FOR ARTERIAL STREETS

STREET CUT

G-3-1



NOTES:

1. CONCRETE - 6 BAG MIX, AIR ENTRAINED
REINFORCEMENT MESH - 6X6 6X6 2" BELOW
SURFACE OF CONCRETE
7" DEPTH FOR LOCAL STREETS
8" DEPTH FOR COLLECTOR STREETS
9" DEPTH FOR ARTERIAL STREETS
OR FULL DEPTH ASPHALT FOR
ASPHALT OVER CONCRETE
2. CONCRETE CLOSED TO
TRAFFIC 7 DAYS AFTER
PLACED

STREET CUT

G-3-2

G.(4) Concrete

Concrete used in the replacement of concrete pavements not presently surfaced with an asphaltic material shall consist of 6-Bag Concrete with 7% air entrainment. Slump shall not exceed three (3) inches. Coarse aggregate shall be limestone or blast furnace slag. No natural gravel aggregate will be allowed. Where concrete that has an asphaltic concrete surface is replaced, Concrete used shall be 6-bag and the concrete shall be finished flush with the surface of the existing concrete and the asphaltic surface replaced.

G.(5) Hot Asphaltic Concrete, Sheet Asphalt, Emulsified, Asphalt, Chip Seals and Oil Mat Pavements.

All asphaltic and oil type pavements shall be replaced with a hot asphaltic concrete surface conforming to the Standard Specifications, Hot Asphaltic Concrete Base, Binder and Surface of these Prevailing Specifications. The thickness of the asphaltic pavement shall be equal to that which existed, but not less than three (3) inches. Not less than eleven (11) inches of Coarse Aggregate Class A or B, Size No. 53 shall be placed under any asphaltic concrete patch unless a concrete base is necessary. Asphalt placed over a concrete patch shall be cut back six (6) inches around the concrete patch so that the two joints are offset.

G.(6) Temporary Patch

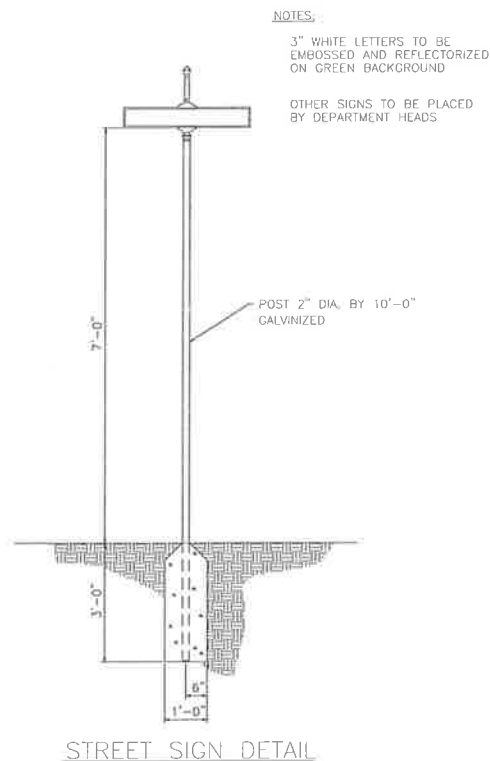
If it is not possible due to weather conditions for the contractor to replace the pavement within fourteen (14) days following completion of the work, a coarse aggregate base eight (8) inches thick and a cold asphaltic surface shall be applied and maintained as a temporary patch until permanent repairs can be made. In no case shall a temporary patch be maintained more than six (6) months before permanent repairs are made.

G. (7) Restoration: All restoration of disturbed areas shall be equal to or better than the existing conditions. All work shall comply with INDOT Standard Specifications Section 600.

PART H - STREET SIGNS AND LIGHTING

H.(1) Street Name Signs

Street name signs shall be installed at each street intersection by the subdivider at locations approved by the Street Commissioner. In business district, signs shall be placed on diagonally opposite corners so they are on the far right hand side of the intersection of the main street. Signs indicating both streets or roads should be erected at each location. They should be mounted as close to the corner as practical, their faces parallel to the street they name. In residential districts, street name signs should be mounted as in business districts, but a single location at each intersection will suffice on all but the most important thoroughfares. All signs per plan H-1-1.



H-1-1

H.(2) Warning and Regulatory Signs

Warning or regulatory signs shall be placed according to the Indiana Manual on Uniform Traffic Control Devices for Streets and Highways latest edition. The signs shall be reflective and shall conform to the configurations of the manual.

H.(3) Sign Post

(a) Sign posts and their foundations shall be constructed to hold signs rigidly in a proper and permanent position, to resist swaying, turning, or displacement by children, vandals, or wind.

(b) In some cases, especially in urban districts, signs can be correctly placed on existing supports used for other purposes, such as traffic signals, street lights, and public utility poles

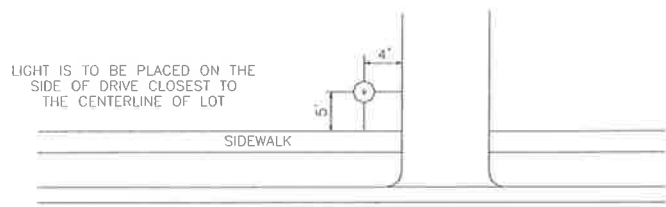
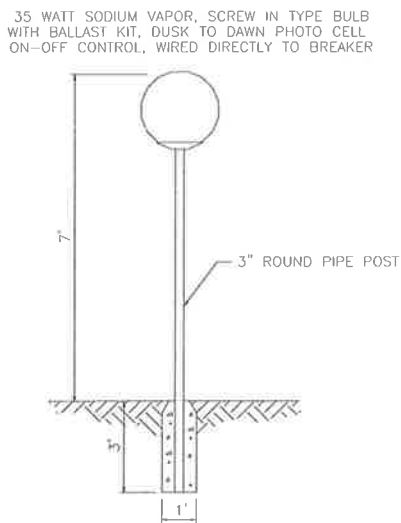
where permitted. Utility pole mountings shall only be permitted with a signed agreement from the appropriate utility company.

H.(4) Sign Materials

Signs shall be reflective, high intensity so that they can be seen at night.

H.(5) Street Lights

Street lights shall be dusk to dawn high pressure sodium mounted on mast arms. If yard lights are used instead of mast arms, they shall be 35W sodium vapor and must be wired directly to a breaker at the residence and shall not be wired to a switch. See Plan H-5-1.



AS AN ALTERNATE TO STREET LIGHTS (MAST AND ARM) THE DEVELOPER MAY USE STANDARD YARD LIGHTS THE BULBS AND THE STYLE OF LIGHTS SHALL BE THE SAME. THE DEVELOPER SHALL BE RESPONSIBLE FOR THIS.

RESIDENTIAL STREET LIGHT DETAIL
(ALTERNATE)

H-5-1

PART I- SANITARY SEWAGE FACILITIES

I.(1) General Requirements

The Developer shall provide a complete sanitary sewer system which has been approved by all necessary state and local agencies prior to any construction. All sewer installation must be inspected by the Utility Department before backfilling trench excavation. Failure to do so shall constitute a violation of Town Code and will subject the violator to fines as outlined in Town Code. Additionally, the violator shall uncover the sewer installation in question so that a proper inspection may be conducted. In the case of conflict between these standards and Westville Town Code or Ordinance, the strictest regulation applies.

I.(2) Building Sewers Connections

(a) Each building shall have a minimum 6" diameter sewer with a minimum slope of 1/8" per foot. It shall be installed conforming to the requirements of the building and plumbing codes or other applicable rules and regulations of the Town. Where possible the building drains shall be installed below basement floor level. If it is not possible to allow a gravity sewage flow system, sanitary sewage must be lifted by an approved means and discharged into the building sewer.

(b) No roof drains, basement drains, sump pumps, exterior foundation drains, or other sources of surface runoff inflow are allowed to enter a building sewer which is directly or indirectly connected to a public sewer.

(c) Connections off building sewers to public sewers shall be gastight and watertight.

(d) Anyone making a building sewer connection shall be required to obtain a permit pursuant to the Westville Town Code.

(e) Excavations made for the installation of a building sewer must be adequately protected by barricades and lights to protect the public from hazards. Any public improvements such as sidewalks, roads, parkway, etc. which must be disturbed for building sewer installation must be adequately restored to Town Standards and must be found satisfactory to the Town.

(f) All public right of way work requires a Right of Way Permit, in advance, as required by Westville Town Code. Applications are available at Town Hall.

(g) All commercial developments must consult with the appropriate utility personnel for pretreatment considerations prior to commencement of construction.

I.(3) Sanitary Sewers

(a) Abbreviations: The following organizations may be referred to in these specifications by abbreviations of their titles.

ASTM- American Society for Testing and Materials

AWWA - American Water Works Association

ACI - American Concrete Institute

ANSI - American National Standards Institute

ASA - American Standards Association

(b) Quality Of Work: The work shall conform to the Recommended Standards for Sewage Works, by the Great Lakes - Upper Mississippi River Board of State Sanitary Engineers, latest edition including the latest amendments.

(c) Excavations: All excavation shall be true to line and grade as shown on the approved plans. Excavation shall include excavation for trench, backfill and disposal of surplus material, if required. Any objectionable material encountered, such as stumps, roots, concrete etc., shall be removed and hauled away. Trenches for sewer pipes shall be dug to a minimum of 4 inches below grade and backfilled with clean sand to provide a minimum of 4 inches of sand bedding below the pipe. Grade shall be held to within 0.1 foot plus or minus between manhole and the deviation per pipe length shall not exceed 1/2 inch plus or minus. Backfill around the pipe and to grade shall be made with clean sand placed in one foot lifts where sewer pipe is installed under streets. Where pipe is installed other than under streets, backfill around and to 1.0 foot over the pipe shall be made with clean sand. Remaining backfill may be existing earth, placed in one foot lifts. Backfill shall be carefully placed to avoid displacing the pipe in the trench. Should the pipe be displaced more than 0.2 foot between manholes it shall be excavated and relayed. Backfill shall be mechanically compacted with a vibratory compactor as work proceeds to 95% modified proctor dry density. See G-2-1 and G-2-2

(d) Sanitary Sewer Pipe: All sanitary sewers shall be constructed of one of the following materials:

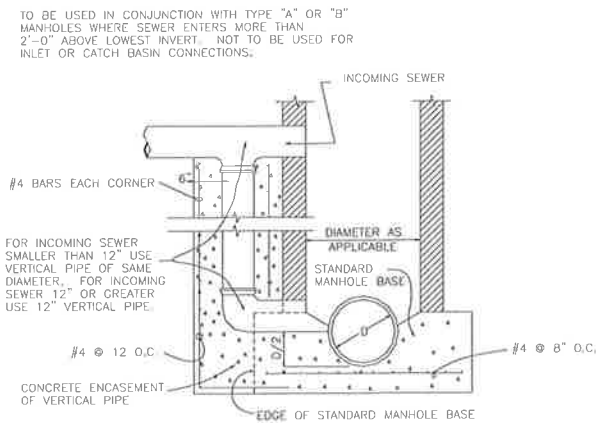
(c) Sanitary Sewer Pipe: All sanitary sewers shall be constructed of one of the following materials:

Name	Standard	Joint
Reinforced Concrete Sewer Pipe (Greater than 30")	ASTM C76-90	ASTM C443-85a
Ductile Iron	ASTM A746	
Plastic Pipe (PVC) SDR 26 (Gravity Sewer)	ASTM D3034	ASTM D-3212
Plastic Pipe (PVC) SDR 21 (Force Main)	ASTM D2241	ASTM D-3212
HDPE SDR 11 (Directional-Bored Force Main)	ASTM D3408	

All pipe shall be laid in such a manner as to form a close, concentric joint with the adjoining pipe and to bring the invert of each section to the required grade. Bell holes shall be dug in advance of the pipe being laid. Supporting of the pipe on blocks will not be permitted. Joints shall be water tight.

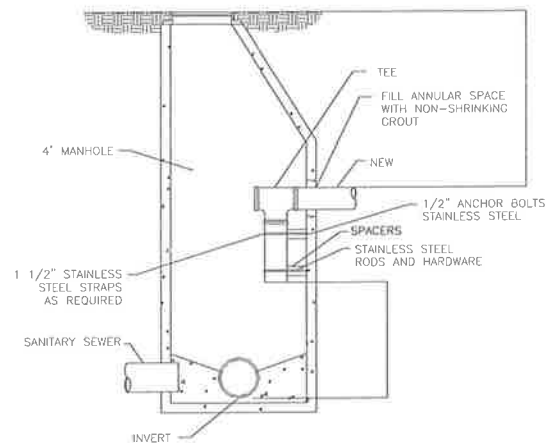
(e) Line Testing & Televising: Hydrostatic or infiltration tests shall be done and shall not exceed 200 gallons per inch of diameter per mile of sewer per day. Sewers which do not meet this requirement shall be repaired and retested. Sewers shall meet deflection testing according to the Standard ASTM deflection test for plastic sewer pipes. The deflection testing shall be performed after the final backfill has been in place at least 30 days. Deflection shall not exceed 5%. Prior to a sewer being accepted, the line must be televised by the developer and a copy of the tape must be submitted.

(f) Structures: The structures shall be constructed using precast, reinforced manhole sections, conforming to ASTM C-478, latest edition. All structure joints shall be watertight. The bottom section shall be set in a bituminous mastic on the concrete pad. Bottoms of structures may be precast reinforced concrete integral with the bottom section. Sewer pipe shall be sealed where it enters the manhole with a rubber seal seated in a precast groove in the manhole. All grout shall contain a minimum of 11 bags of Portland Cement per cubic yard. Concrete for bottom pads shall contain 5 bags of Portland Cement per cubic yard. See Plans F-3-2, F-3-3, F-3-4, F-3-5, I-5-1 and I-5-2.



OUTSIDE DROP MANHOLE CONNECTION

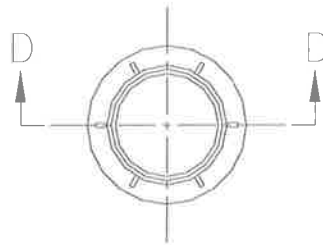
I-5-1



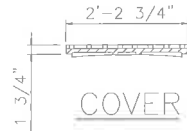
INSIDE DROP MANHOLE CONNECTION
FOR DISTANCES GREATER THAN 12'

I-5-2

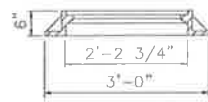
(g) Castings and lids shall be per Plan I-3-1. Casting shall be joined to manholes with cement grout. The top elevations of manholes located in streets shall conform to the profile. Those located elsewhere shall conform to final ground grade. Watertight manhole covers are to be used wherever the manhole top may be flooded by street or yard runoff or high water. The top of the cover shall be marked "sanitary sewer."



PLAN of RING



COVER



SECTION D-D

TOTAL WEIGHT 400 LBS.

SANITARY M.H. RING SHALL BE EJW 1020 OR EQUAL WITH HEAVY DUTY TYPE "A" COVER, WITH GASKET SEAL, MARKED "SANITARY".

STORM M.H. RING SHALL BE EJW 1020 OR EQUAL WITH HEAVY DUTY TYPE "A", TYPE "B", TYPE "M2" OR TYPE "01" COVER DEPENDING ON APPLICATION. IF TYPE "A" IS USED IT MUST BE MARKED "STORM".

STANDARD M.H. RING & COVER

N.T.S.

1-3-1

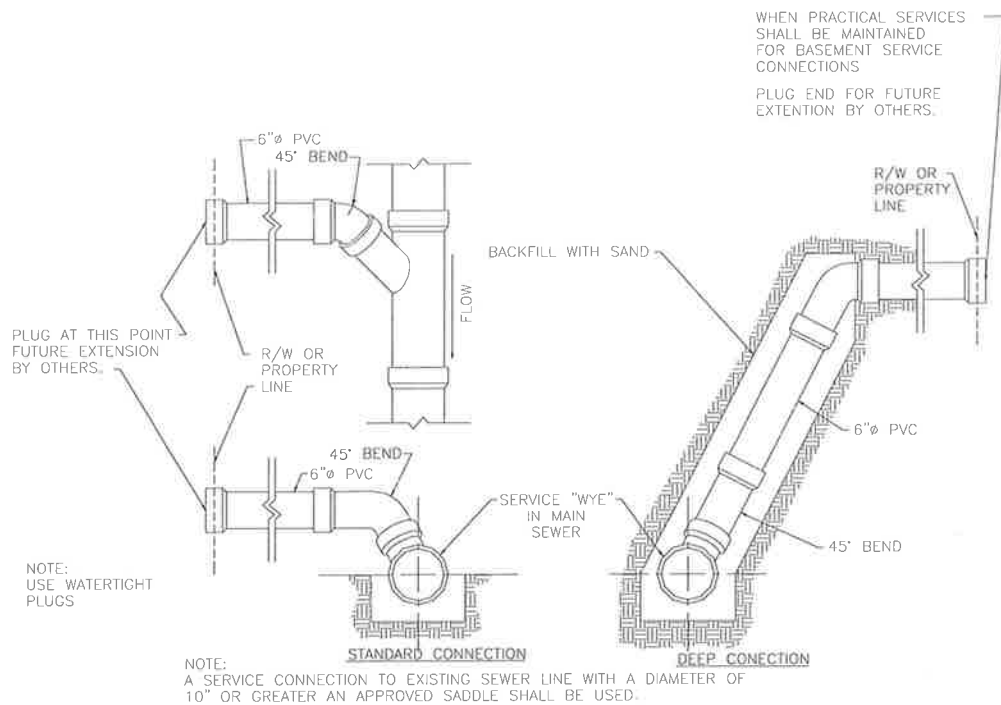
(h) Sewer and Water Separation: Parallel water and sewer lines shall have a minimum horizontal separation of 10 feet from any existing or proposed water main. The distance shall be measured edge to edge. In cases where this is not practical, the Town of Westville may allow deviation on a case by case basis, if supported by data from the design engineer. A deviation, to install the sewer line closer to the water line, will only be allowed if the water main is in a separate trench or on an undisturbed earth shelf located at an elevation so the bottom of the water main is at least 18 inches above the top of the sewer.

(i) Sewers crossing water mains must have a minimum vertical clearance of 18 inches from outside the sewer main to outside the water main. This shall be the case when the water main crosses either above or below the sewer. The crossing shall be arranged so sewer joints will be equidistant and as far as possible from the water main joints. When a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main.

(j) When it is impossible to achieve proper horizontal and vertical separation as stipulated above, the sewer shall be designed and constructed equal to water pipe, and shall be pressure tested prior to backfilling.

I.(4) Building Sewers

Each lot shall have a 6" building sewer tap made with plastic pipe meeting the above material specifications and the connection to the sewer main shall be by means of a wye rolled up at 45 degrees and connected to the 6" lateral by means of a 45 degree elbow. See Plan I-5-3.



SERVICE CONNECTION DETAILS

I-4-1

I.(5) Force Mains

(a) Force mains shall be constructed out of cast iron pipe, reinforced concrete pipe, or another approved material. The line shall be designed to have a minimum of 60 inches of cover. Automatic air relief valves shall be placed at high points in the force main to prevent air locking.

(b) The force main shall enter the gravity sewer system at a point not more than 2 feet above the flow line of the receiving manhole. Provisions shall be made to direct the incoming forcemain to the flow line.

(c) The force main shall be installed maintaining the same vertical and horizontal clearance as required for sanitary sewer lines.

(d) The force main, fittings, and reaction blocking shall be designed to withstand normal pressure and pressure surges caused by water hammer. The force main shall be hydrostatically tested for leaks at 150 p.s.i. for 2 hour duration. Any leaks that occur shall be repaired and the system shall be retested.

(e) When force mains are constructed of material which might cause the force main to be confused with potable water lines, the force main must be identified.

I.(6) Wet-Well Mounted Lift Station Specification

See Ordinance for lift station titled Wet Well Pump Station, latest revision.

I.(7) Submersible Lift Station Specification

See Ordinance for lift station titled Submersible Station, latest revision.

I.(8) Sewer Design Criteria

(a) Sanitary Sewers (Gravity)

Flow Per Capita	100 Gallons/day
Minimum Diameter	8"
Building Sewer Minimum	6"
Minimum Depth of Cover	48"
Minimum velocity flowing full	2.0 ft/sec
Maximum velocity flowing full	15.0 ft/sec
Desired design velocity	3.0 ft/sec

(b) Force Mains

Minimum design velocity	2.0 ft/sec
"C" for Hazen Williams Equation	
- unlined cast-iron pipe	100
- all other pipe	120

PART J- WATER FACILITIES

J.(1) Definitions

(a) The following organizations may be referred to in the specifications by abbreviations of their titles.

ASTM - American Society for Testing and Materials

AWWA - American Water Works Associations

ACI - American Concrete Institute

ANSI - American National Standards institute

ASA - American Standards Association

In the case of conflict between these standards and Westville Town Code or Ordinance, the strictest regulation applies.

J.(2) Materials

(a) Pipe, fittings, valves and fire hydrants shall conform to the latest standards issued by the AWWA, if such standards exist, and be acceptable to the reviewing authority. In the absence of such standards, materials meeting applicable Product Standards and acceptable to the Town may be selected.

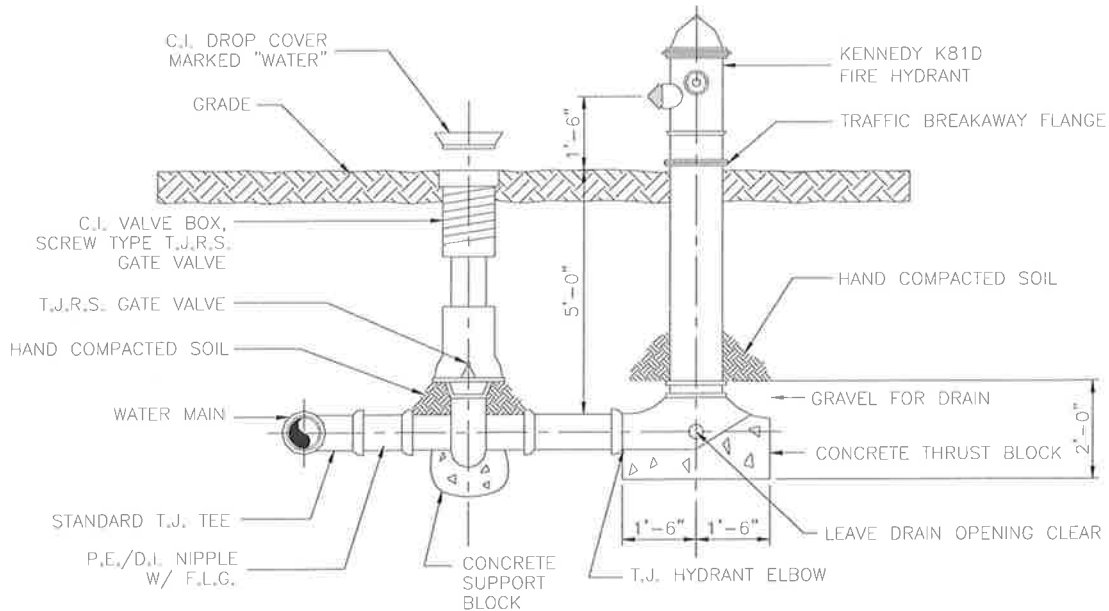
(b) Special attention shall be given to selecting pipe materials which will protect against both internal and external pipe corrosion.

(c) Where distribution systems are installed in areas of groundwater contaminated by organic compounds:

1. Pipe and joint materials which are not subject to permeation of the organic compounds shall be used.
 2. Non-permeable materials shall be used for all portions of the system including water main, service connections and hydrant leads.
1. (d) Water mains shall be ductile iron meeting AWWA 150 standard (latest edition), and shall be Class 52 pipe. Joints may be push on with rubber gaskets. Fitting joints shall be restrained push-on joints, and shall meet the requirements of ANSI/AWWA C111/A21.11. Restrained joints shall be used for a minimum 5 lengths either side of a bend, tee, or cap. The supporting of pipe on blocks will not be permitted.

(e) Water mains which have been used previously for conveying potable water may be reused provided they meet the above standards and have been restored practically to their original condition. No mains can be reused if they contain lead or have had lead joints.

(f) Fire hydrants shall be per plan J-2-1. Valves shall conform to AWWA Standard C-500 for gate valves and shall have resilient seats.

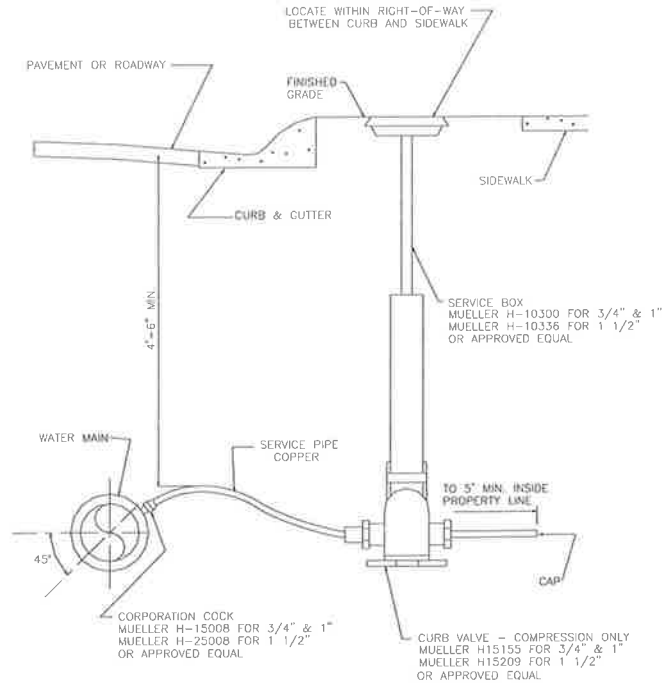


NOTE: FIRE HYDRANTS TO BE PAINTED FEDERAL SAFETY ORANGE. SEE VALVE DETAIL FOR PROPER HYDRANT VALVE INSTALLATION.

HYDRANT & AUXILIARY VALVE SETTING

J-2-1

(g) Valve boxes shall be per plan J-2-2.



WATER SERVICE CONNECTION

J-2-2

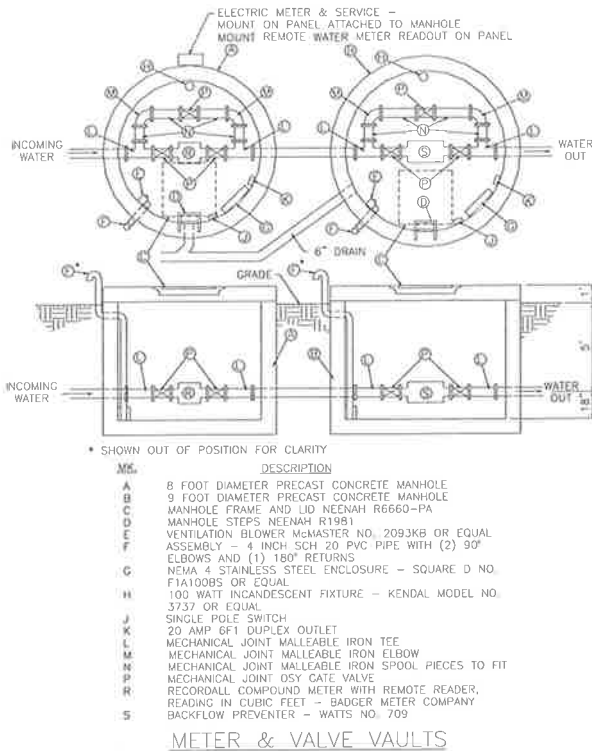
(h) Water taps for the various lots shall be made with Mueller Corporation Cock H-15008 1" and H-25008 for 1 1/2" or approved equal. The curb stop shall be Mueller H-15155 1" and H-15209 for 1 1/2" or approved equal. The service box shall be Mueller H-10300 for 1" and H-10336 for 1 1/2" or approved equal. Water shall be stubbed to each lot up to the building line with 1" copper pipe with compression fittings. The minimum water tap for any lot shall be 1". See Plan J-2-2

J.(3) Air Relief Valves

(a) At high points in water mains where air can accumulate provisions shall be made to remove the air by means of hydrants or air relief valves. Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur.

(b) The open end of an air relief pipe from automatic valves shall be extended to at least one foot above grade and provided with a screened, downward-facing elbow. The pipe from a manually operated valve should be extended to the top of the pit. Use of manual air relief valves is recommended wherever possible.

(c) Chambers, pits or manholes containing valves, blowoffs, meters, or other such appurtenances to a distribution system, shall not be connected directly to any storm drain or sanitary sewer, nor shall blowoffs or air relief valves be connected directly to any sewer. See Plan J-3-1. Such chambers or pits shall be drained to the surface of the ground where they are not subject to flooding by surface water, or to absorption pits underground.



J-3-1

J.(4) Installation of Mains

(a) Specifications shall incorporate the provisions of the AWWA standards and/or manufacturer's recommended installation procedures. A continuous and uniform bedding shall be provided in the trench for all buried pipes. Backfill around the pipe shall be made with clean sand placed in well compacted layers. Under streets the compacted layers should be in one foot lifts. Stones found in the trench shall be removed for a depth of at least six inches below the bottom of the pipe.

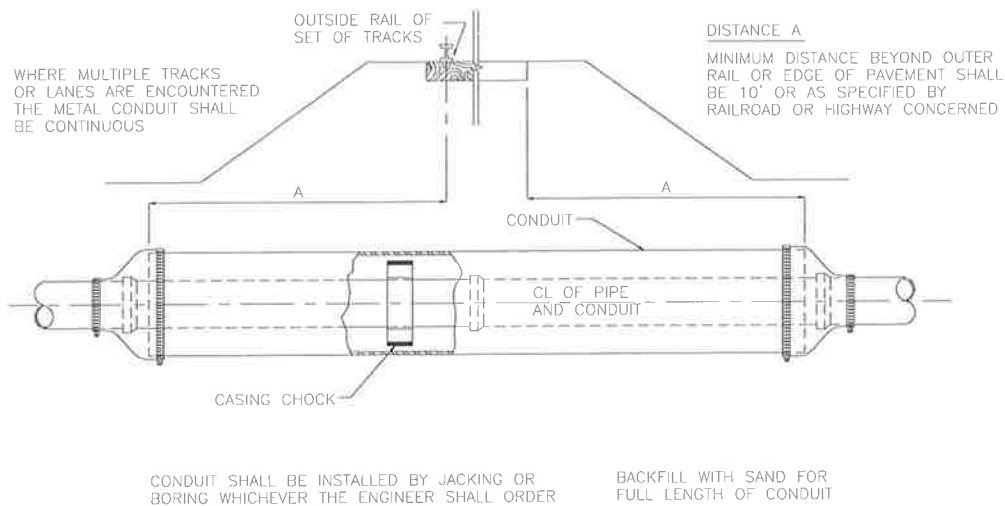
(b) Trenches for water pipe shall be dug to provide a minimum cover of 60 inches.

(c) All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement and to withstand water hammer.

(d) All types of installed pipe shall be pressure tested and leakage tested in accordance with the latest edition of AWWA Standard C600.

(e) All new, cleaned or repaired water mains shall be disinfected in accordance with AWWA Standard C651. The specifications shall include detailed procedures for the adequate flushing, disinfection, and microbiological testing of all water mains. The cost of water for flushing supplied by Westville Utilities shall be paid by the Contractor.

(f) Under some conditions the water main may require casing per Plan J-4-1.



RAILROAD AND STATE HIGHWAY CROSSING SIMILAR

TYPICAL DETAIL—PIPE IN CONDUIT

J-4--1

J.(5) Separation of Water Mains and Sanitary Sewers

(a) Water mains shall be laid at least 10 feet horizontally from any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten foot separation, the reviewing authority may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

(b) Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water and sewer pipes may be required.

(c) The reviewing authority must specifically approve any variance from the requirements for separation when it is impossible to obtain the specified separation distances. Where sewers are being installed separation requirements cannot be met, the sewer materials shall be water main pipe or equivalent and shall be pressure tested to ensure water tightness.

(d) There shall be at least a 10 foot horizontal separation between water mains and sanitary sewer force mains. There shall be an 18 inch vertical separation at crossings.

(e) No water pipe shall pass through, under, or come in contact with any part of a sewer manhole.

(f) Designers should exercise caution when locating water mains at or near certain sites such as sewage treatment plants or industrial complexes. Individual septic tanks must be located and avoided.

(g) Surface water crossings, whether over or under water, present special problems. The reviewing authority should be consulted before final plans are prepared.

(h) For above water crossings the pipe shall be adequately supported and anchored, protected from damage and freezing, and accessible for repair or replacement.

(i) For under water crossings a minimum cover of two feet shall be provided over the pipe. When crossing water courses which are greater than 15 feet in width, the following shall be provided:

1. The pipe shall be of special construction, having flexible watertight joints.
2. Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair; the valves shall be easily accessible, and not subject to flooding; and the valve closest to the supply source shall be in a manhole
3. Permanent taps shall be made on each side of the valve within the manhole to allow insertion of a small meter to determine leakage and for sampling purposes.

J.(6) Cross Connections and Interconnections

(a) There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contaminating materials may be discharge or drawn into the system. Each water utility shall have a program conforming to state requirements to detect and eliminate cross connections.

(b) Neither steam condensate nor cooling water from engine jackets or other heat exchange devices shall be returned to the potable water supply.

(c) The approval of the reviewing authority shall be obtained for interconnections between potable water supplies.

(d) Backflow preventers or double check valves shall be incorporated into all new water service installations.

J.(7) Water Main Design

(a) All water mains, including those not designed to provide fire protection, shall be sized after a hydraulic analysis based on flow demands and pressure requirements. The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. The normal working pressure in the distribution system should be approximately 55 psi and not less than 35 psi.

(b) The minimum size of water main for providing fire protection and serving fire hydrants shall be six (6) inch diameter. Larger size mains will be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure.

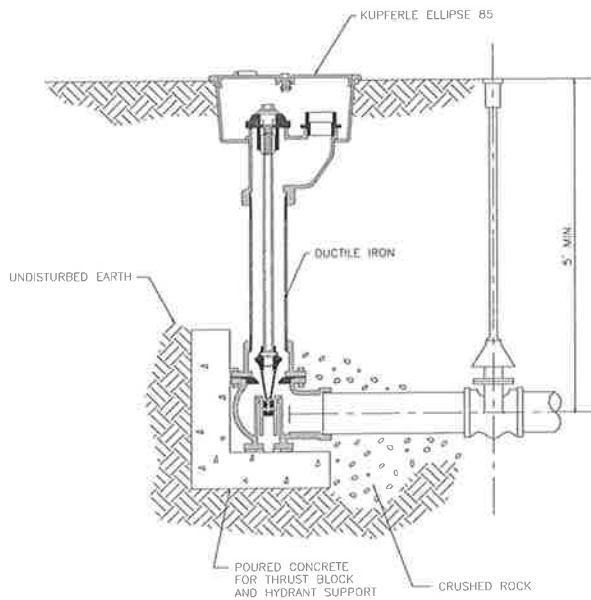
(c) When fire protection is to be provided, system design should be such that fire flows and facilities are in accordance with the requirements of the State or local authorities.

(d) Water mains not designed to carry fire-flows shall not have fire hydrants connected to them.

(e) Generally, hydrant spacing may range from 350 to 600 feet depending on the area being served and shall be approved by the Fire Chief.

(f) In order to provide increased reliability of service and reduce head loss, dead ends shall be minimized by making appropriate tie-ins whenever practical.

(g) Where dead-end mains occur, they shall be provided with an approved flushing hydrant or blow-off for flushing purposes. See Plan J-7-1. Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. No flushing device shall be directly connected to any sewer.

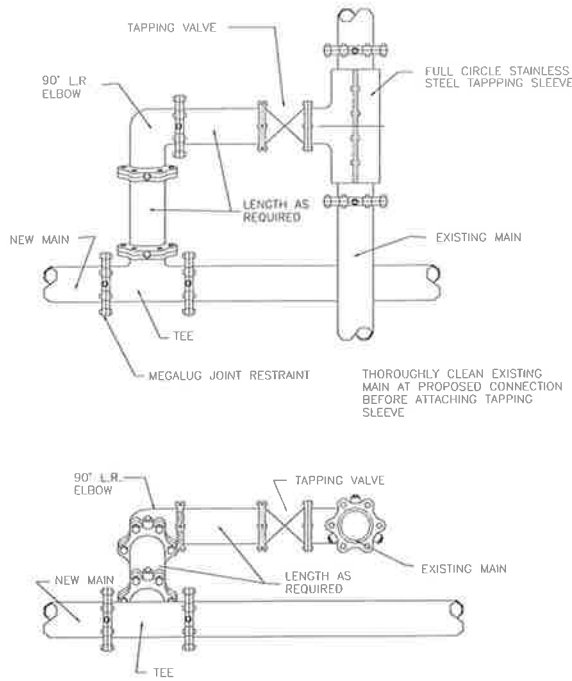


BLOW -- OFF HYDRANT

J-7-1

(h) Sufficient valves shall be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves should be located at not more than 500 foot

intervals in commercial districts and at not more than one block or 800 foot intervals in other districts. Where systems serve widely scattered customers and where future development is not expected, the valve spacing should not exceed one mile. See Plan J-7-2 and J-7-3.



WATER MAIN TAP

J-7-3

(i) 3/4" sampling stations with lockable, non-removable aluminum enclosure (Kupferle Foundry Co. Eclipse No. 88 or equal) complete with shut off valve and corporation stop shall be required at locations determined by the Water Department. One sample tap shall be require for every 20 lots in new subdivisions.

SECTION II- INSPECTIONS FOR MUNICIPAL AND PRIVATE IMPROVEMENTS

PART A - GENERAL REQUIREMENTS

A.(1) Inspection Procedure

All municipal and private improvements including but not limited to street subgrade, street base, street surface, curb, curb and gutter, sidewalk, bridges, driveways, storm sewers and appurtenances, sanitary sewers and appurtenances, detention ponds and swales shall be inspected periodically throughout the course of construction by the appropriate Town Inspector.

- (1) Notification:
Notice shall be given to the appropriate Town Inspector and the Town Engineer at least twenty-four (24) hours in advance of desired inspection.
- (2) On-Site Inspection:
The inspector shall visit the construction site with an authorized representative of the developer/owner.

All construction shall be inspected to insure that the standards found in Section II of this Ordinance have been met. The inspection shall consist of observations and tests made by the inspector.*

*Tests shall be made as determined by the Town Engineer and shall be by Standard ASTM methods.

A.(2) Record Filing

All inspection logs shall be written on standard forms as required by the Town. See Form A-2-1.

A.(3) Street Excavation Inspection

The Street Commissioner shall be empowered to act as a Street Excavation Inspector.

PROJECT INSPECTION FORM A-2-1

PROJECT _____

LOCATION _____

DATE INSPECTION REQUESTED _____ DATE INSPECTED _____

ATTENDANCE:

NAME _____ REPRESENTING _____

OBSERVATIONS:

UTILITIES _____

STREETS/SIDEWALKS/GRADING _____

MISCELLANEOUS _____

SIGNATURES:

TOWN REPRESENTATIVE

DEVELOPER REPRESENTATIVE