

GENERAL IMPROVEMENTS HANDBOOK



GARDEN CITY
— KANSAS —

2017

INTRODUCTION

This handbook contains the standards, specifications and regulations for construction activities and improvements within public right-of-way. The regulations are pursuant to Chapter 78, Streets, Sidewalks and Other Public Places, Code of Ordinances of the City of Garden City. This handbook was originally issued in November 2003, revised in November 2006, and revised in June 2017.

Driveways and other construction activity within public right-of way along state highways also requires separate permits and approval from the Kansas Department of Transportation; contractors are referred to the *KDOT Corridor Management Policy* and/or the *KDOT Utility Accommodation Policy* for specific requirements. The City of Garden City, Finney County and KDOT have developed corridor management master plans for certain sections of state highways, appropriate provisions of these plans are also provided

This handbook also includes some recommended and/or required details for surface improvements on private property, such as site grading and drainage and parking lot layout. ADA parking space and signage requirements are provided.

This handbook is divided into five sections. **SECTION I** contains the **Standards for Excavations in Public Rights-of-Way**. **SECTION II** contains the technical specifications, provisions, and standard drawings for **Surface Improvements in Public Rights-of-Way**. **Section III** contains standards for placement of **Utilities in public rights-of-way**. **SECTION IV, Improvements on Private Property**, contains information on parking lot layout, drainage, and other improvements to private property that impact the use of public rights-of-way. **SECTION V, Permits and Inspections**, provides a checklist of the items inspected by Public Works Department personnel and a listing of department contacts.

APPENDIX A, Standard Specifications and **APPENDIX B, Contact Information** will be updated periodically as changes and revisions are made.

These requirements shall be effective on the 5th day of September 2017, the effective date by Ordinance No. 2770-2017.

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SECTION I

STANDARDS for EXCAVATIONS In PUBLIC RIGHTS-of-WAY

CITY OF GARDEN CITY
Standards for Excavations
In
Public Rights-of -Way

1. EXCAVATIONS

A. General

1. Only General Contractors or Plumbing Contractors, Telecommunications/Video Service Providers, or Franchised Utilities are permitted to perform excavations within the public rights-of way. Before making any excavation, demolition, patch, stockpile, or other improvement within the public rights-of-way, an Excavation permit shall be obtained from the City Inspection Department.

If there is an emergency necessitating response work or repair, any utility, which has been granted permission to occupy the public right-of-way, may begin that repair or emergency response work or take any action required under the circumstances, provided that the utility notifies the city promptly after beginning the work and timely thereafter meets any permit or other requirement had there not been such an emergency.

2. Permit holder shall be responsible for locating utilities before excavation begins, utilizing the Kansas One Call “811” system. The City of Garden City is not responsible for damages to utilities caused by the Permit holder.
3. Inspections: When inspections are required, the Permit holder shall contact the City Office during normal office hours. A 24-hour advance notice is requested. The Inspector will respond as quickly as possible. A job foreman, authorized to act on behalf of the Permit holder, shall be present during the inspection. If any work is not approved, the Permit holder shall correct the deficiency and reschedule the inspection. Approval does not limit the Permit holder’s responsibility to meet these standards; or extend any warranty to the permit holder, owner, or others about the workmanship, methods, or equipment used; or waives the City’s right to enforce these standards if work previously approved is subsequently proven defective.
4. Where utilities cross under state highways, county roads or railroads, the requirements of those agencies shall also be met and applicable permits shall be obtained and displayed before construction begins. Permit holder shall provide copies of such permits to the City, if requested.
5. Utility mains shall be located within alley rights-of-way and public easements as shown in Section III. Deviation from standard locations requires approval by the Public Works Department. Utility main locations within street rights-of-way shall be subject to approval by the Public Works Department.

6. The permit holder shall maintain all gutters, and other drainage facilities of the city, free and unobstructed for the full depth of the adjacent curb and for at least two feet from the face of the curb at any gutter.
7. The permit holder shall be required to take measures to protect the storm sewer system from excessive contamination from permitted activities.
8. The permit holder shall be required to take measures to protect the sanitary sewer and water systems from contamination from permitted activities.
9. Excavations within or in close proximity of street or alley improvements may be required to be loosely backfilled, to prevent damage to the street or alley improvement from cave ins, overnight or during periods of no activity.

B. Traffic Control (Barricades, Warning Signs, and Lights)

Temporary traffic control is the responsibility of the permit holder/contractor. The permit holder/contractor shall submit a plan to the Public Works Department for review. The temporary traffic control shall conform to Part 6, Temporary Traffic Control, of the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).

C. Trenching

The Permit holder is reminded of Federal regulations governing trench safety and confined space entry. Permit holder shall protect existing utilities and services and existing underground or surface improvements including, but not limited to, buildings, foundations, curbs, sidewalks and pavements, plantings, irrigation lines, utility poles, and light poles. Protective measures may include underpinning, shoring or other bracing. Permit holder shall repair or replace existing improvements damaged by construction work.

D. Boring/Directional Drilling

Utility placement by boring, or directional drilling, shall be approved by the Public Works Department prior to the issuance of a permit. The Director of Public Works may require references or a test bore to demonstrate the ability of the equipment to hold the line and grade for the proposed distance.

E. Plowing

Plowing is an acceptable method for installing buried cables, but extreme caution should be used. All plowed cables shall be placed in a straight line parallel with the other utilities. When crossing rights-of-way, buried cables must be within 10° of perpendicular to the right-of-way. The following depths must be met when burying cables:

1. Public Rights-of Way shall be 24 inches in depth, see Drawing No. I-1.
2. Carry 12 inches depth into private property for a minimum of 10 feet.

F. Initial Pavement Cut

1. Cut the existing pavement in straight, parallel lines, using a saw, air hammer or other approved method and carefully remove the material so as not to disturb the adjacent material.
2. After utility work is complete, and the trench has been backfilled, make the final pavement cut as specified in Section I.2.A.2 of these regulations. At the Permit holder's option the initial pavement cut may be made to the standards of the final pavement cut; care must be taken to avoid sloughing of the sub-grade shoulder.

G. Trench Backfill

1. Permit holder shall contact the Public Works Department or Inspector prior to the work to determine the backfill requirements for the specific location.
2. Earth backfill, if allowed, shall be brought to satisfactory moisture content during placing as required by the Public Works Department or Inspector. After placing, the material shall be firmly and satisfactorily compacted. The Public Works Department or Inspector will determine by visual inspection that satisfactory compaction is being obtained. If the backfill fails these requirements, the Permit holder shall be required to remove and replace the backfill and pay for testing.
3. If the trench extends into private property, the Permit holder shall compact the trench 10 feet into the private property according to these specifications.
4. Only mechanical rammers or tampers shall be used for compaction. Plate vibrators may be used for sand backfill. Water settlement (compaction) by flooding or puddling, is not allowed. Plate vibrators or other compaction equipment and methods are allowed only if the permit holder provides, at his expense, satisfactory compaction test results at subgrade and at a depth of one foot below subgrade.
5. The Public Works Department may require as a condition of the permit, the Permit holder to compact the trench backfill to a density of not less than 95% maximum density as determined by ASTM D698. Permit holder shall be responsible for providing the City with maximum density – optimum moisture content test data (Proctor test) on the subject backfill. Permit holder may also be required, as a condition of the permit, to provide compaction testing reports, prepared by an independent testing company, at specified frequencies.

6. Flowable fill may be required when working in paved streets and to 12 inches behind the back of curb or edge of pavement for trench backfill. Most utilities will require common earth material between the utility and the flowable fill. No more than 12 inches of dirt above the utility shall be used unless otherwise approved by the Public Works Department. Flowable fill material shall meet the requirements of City Standard Specifications, Section Str-6, Concrete Mixtures. Care should be taken to secure the utility in the trench so that the pouring of flowable fill will not cause the utility to float toward the surface.
7. Backfill material for excavations in other than paved streets and buffers below flowable fill shall consist of approved imported material or approved earth material from the excavation. Backfill shall be free from trash, lumber, construction debris, wet or frozen material, and excessive amounts of organic matter. Highly plastic clay shall not be used.
8. Inspection: Contact Public Works Department to schedule pre-backfill inspection. Please provide 24-hour advance notice. Sub-grade condition, backfill material, compaction equipment and methods will be reviewed. Complete backfill and compaction operations may be inspected.
9. The bottom of trenches in unpaved areas shall be compacted by hand to a point 2 to 6 inches above the top of the utility, using lifts no greater than 4" (loose measurement) in depth, unless otherwise instructed by that utility company, to protect from damage. Place subsequent lifts to complete the trench in layers of uniform thickness which will insure proper compaction, but not greater than 8 inches in depth. Water shall be added, if required by the Public Works Department, or to obtain the optimum moisture content for compaction. Water shall not be added to frozen ground or when the air temperature is 32° F or below.
10. Upon completion of the work, the Permit holder shall be responsible for the cleanup of all the residual construction debris in the work area.
11. STATE HIGHWAYS
If the work is on a state highway, a KDOT permit is required. Permits are obtained at the KDOT District 6 office at 121 N. Campus Drive. The City must sign the KDOT permit.
12. TEMPORARY TRAFFIC CONTROL (Barricades, Warning Signs, and Lights)
Temporary traffic control is the responsibility of the permit holder/contractor. The permit holder/contractor shall submit a plan to the Public Works Department for review. The temporary traffic control shall conform to Part 6, Temporary Traffic Control, of the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).

2. SURFACE RESTORATION

A. General

1. Inspections:

- a. **Prepaving Inspection:** Contact the Public Works Department to schedule a prepaving inspection. Final pavement cut, subgrade preparation and paving equipment and methods will be reviewed at the prepaving inspection.
- b. **Paving observations:** Immediately upon ordering paving materials notify the Public Works Department of estimated delivery time. Permit holder is not required to wait for the Inspector to commence placement.

2. **Final Paving Cut:** Cut shall have straight edges and rectangular shape. The cut in the asphalt or concrete shall be a vertical saw cut to full depth or 6 inches. On pavements greater than six inches, the remainder of the depth may be cut with an air hammer. Gravel surfaces may be cut by backhoe and shall be cut as near vertical as possible. To create a bridging effect onto undisturbed soil, the asphalt and concrete pavements shall be cut back a minimum of 12 inches from the edge of the excavation made into the subgrade. Concrete pavement patching shall be half panel or full panel in size, with square corners. Tie bars and dowels are required on concrete surfaced streets and alleys. Minimum of ½ inch tie bars shall be placed at 24-inch centers on patch edges perpendicular to the direction of traffic. Dowels may be required if patch covers more than one panel. Use ¾” smooth steel bars with dowel cap on one end.

3. **Pavement Type:** The Permit holder shall use the City’s concrete mix for all surface patches except, on brick streets, or where otherwise specifically permitted. Edges shall be made to match the adjacent, existing pavement. Patching of brick streets shall be accomplished per Section I.2.D. The thickness of the concrete patch surface shall be at least as thick as the adjacent concrete or asphalt surfacing, but not less than 7 inches thick. Asphalt patching, if allowed, shall be at least as thick as the existing, but not less than 7” thick.

B. Alley or Gravel Surfaces

Material shall meet the existing surface and be of the same type. If the existing material has a high amount of plastic, clays, trash, and construction debris or is wet or frozen material, the permit holder shall import new approved material. The compaction of the surface shall be to the satisfaction of the City Inspector.

C. Concrete Patching

Concrete shall meet the requirements of City Standard Specifications, Section Str-4, Concrete Pavement, and Section Str-5, Patching.

D. Brick Pavement Patching

1. The Permit Holder shall exercise care in removing paving bricks for reuse in patching. The City may furnish additional replacement brick, at no cost, for damaged bricks.
2. Concrete Base: Base shall be a minimum of 6" thick; shall meet the requirements of City Standard Specifications, Section Str-4, Concrete Pavement, and Section Str-5, Patching. Requirements for placing, consolidating, curing and finishing concrete pavement shall apply, except a float finish may be used.
3. Cushion: Place a ½" to 1" sand cushion over the concrete base. Set the bricks with tightly butted joints; seat against adjacent bricks and into the sand cushion with a rubber mallet.
4. Joints: Fill the joints with dry fine sand. Work the sand into place using a plate vibrator. Place sufficient sand over the brick so that the units are not in direct contact with the plate vibrator to reduce the possibility of chipping the brick.

E. Handicap Ramps

The Permit holder shall be responsible for constructing handicap ramps if the permitted work requires curb and gutter repair or reconstruction within 100 feet of a corner location where a handicap ramp is required. Contact the Public Works Department or Inspector for specific requirements.

F. Landscaped areas and easements on private property

Any disturbance or damage to landscaped areas of public right-of-way, and the adjacent impacted area, including easements on private property, caused by the activities of a permit holder or any agent, affiliate, employee, or subcontractor, while occupying, installing, repairing or maintaining facilities in a public right-of-way shall be returned or restored to its functional equivalence before the damage pursuant to the reasonable requirements and specifications of the City. If the permit holder fails to make the repairs required by the City, the City may make those repairs and charge the actual repair costs to the permit holder.

3. FIELD QUALITY CONTROL

The provisions of this section shall apply when the concrete patch is 16 cubic yards or greater.

- A. The Permit holder shall provide the City with a copy of the Ready Mix Company's batch ticket for the concrete delivered to the job site. The Permit holder shall provide the City with a copy of test results of testing done on the job site, if any.
- B. The Permit holder shall provide 3, 7 and 28 day concrete cylinder break test results, unless otherwise specified. Test cylinders shall be made in accordance with ACI 301. A slump test will be taken for each set of test cylinders.

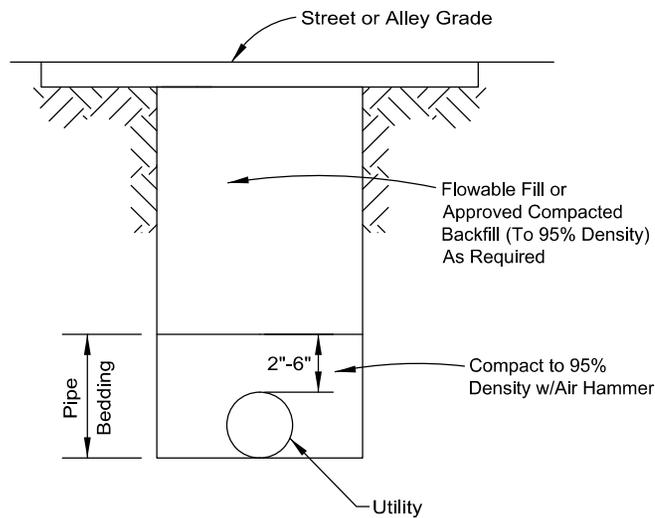
4. OTHER

- A. **Cleaning:** After paving is complete and sufficiently set to resist sweeping operations, clean all areas soiled by construction.
- B. **Guarantee:** The Permit holder shall guarantee materials and work performed on street or alley patches for a period of one year from the date of completion. The Permit holder shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The City will give notice of observed defects with reasonable promptness within the warranty period. In the event that the Permit holder fails to make such repairs, the City may do so and charge the Permit holder or the Permit holder's surety for the cost thereby incurred.

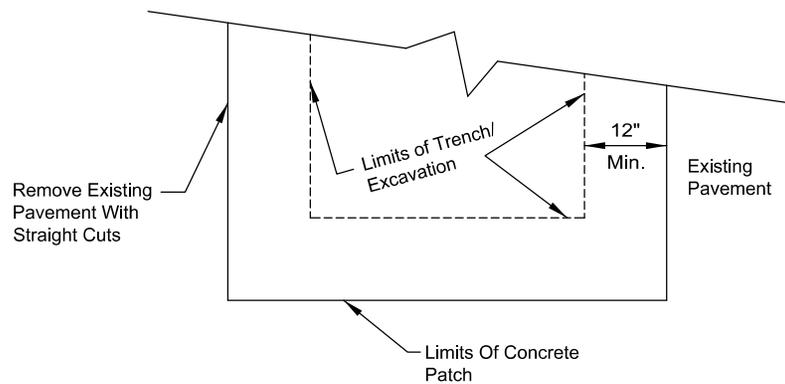
5. ALTERNATES

The Public Works Department may vary or waive any of these specifications, in writing, for the following instances:

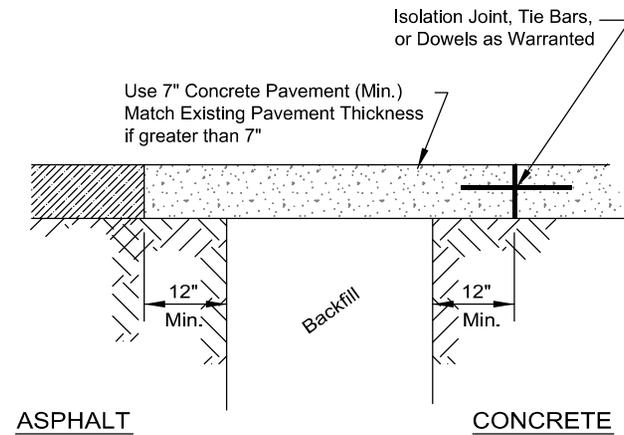
- A. Strict conformance to specification presents a safety or health hazard.
- B. Emergency conditions exist; such as weather extremes, supply disruptions, or other acts that could not have been reasonably anticipated and cannot be mitigated by the Permit holder.
- C. These specifications are general standards and any deviations will be required to be submitted to the City for review and approval.



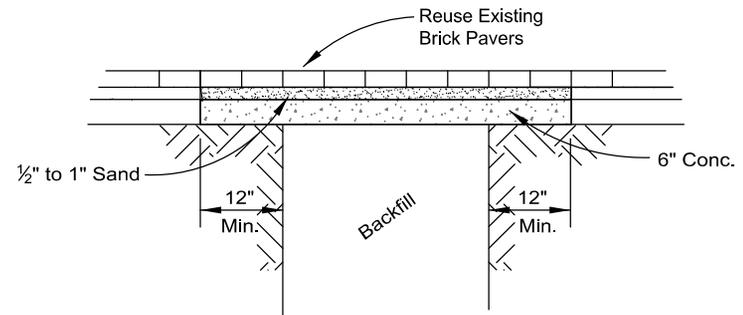
TRENCH BACKFILL



PAVEMENT PATCH PLAN VIEW



PAVEMENT PATCHING



BRICK PAVEMENT PATCHING

CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

BACKFILL AND PATCHING

Revisions:

Date: JUNE 2017

Dr. No.: 1-1

SECTION II

SURFACE IMPROVEMENTS In PUBLIC RIGHTS-of-WAY

CITY OF GARDEN CITY
Standards for Driveway
and
Sidewalk Construction

TECHNICAL PROVISIONS

1. SCOPE

The following specifications are for the construction, reconstruction and repair of concrete sidewalks, driveways, and alley approaches within the City of Garden City. On major construction contracts, additional or supplemental specifications and standards may be used.

2. SIDEWALKS

All sidewalks shall be constructed of concrete as herein specified. Paving bricks, decorative concrete and other material may be used under certain conditions as approved by the Public Works Department.

- a) Residential sidewalk width shall be 5 feet wide or match existing within a block, and be a minimum of 5 inches thick. Sidewalks shall be 6 inches thick for residential driveways, 7 inches thick for commercial driveways and 8 inches thick for alley approaches.
- b) The Public Works Department will inspect forms before placement of concrete if requested by the contractor or required by the Public Works Department on the permit. It shall be the responsibility of the contractor to notify the Public Works Department 24-hours before form inspections are needed.
- c) The sidewalk shall set above the curb $\frac{3}{16}$ inch for each foot of distance from the curb to the property side edge, with a maximum of 4 inches above the curb in residential districts, and shall have a slope of $\frac{3}{16}$ inch per foot (2% Maximum) towards the street. The maximum longitudinal slope shall be 1 inch per linear foot unless otherwise specifically approved by the Public Works Department.
- d) Sidewalks shall be cut into stones at intervals as shown on the standard drawings or as directed by the Public Works Department. This shall be accomplished by cutting through the concrete, before it has attained initial set, with a trowel or 'dummy groove' cutter, or by saw-cuts after the concrete has set. The edges of the stones, tooled contraction joints and isolation joints shall be finished with an edging tool and the joint shall be raked clean of concrete. Sidewalks shall receive a medium to rough broom finish.
- e) Temporary traffic control is the responsibility of the permit holder/contractor. The permit holder/contractor shall submit a plan to the Public Works Department for review. The temporary traffic control shall conform to Part 6, Temporary Traffic Control, of the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).
- f) Final inspection of sidewalks, constructed with new buildings, shall be conducted after the Building Inspection Department has signed off on the Certificate of Occupancy. In other cases, the contractor shall request final inspections by the Public Works Department.

3. **CURB AND GUTTER, CURB CUTS, DRIVEWAY ENTRANCES, ALLEY APPROACHES**
Removal of all curb or curb and gutter and the construction of curb, curb and gutter, for driveway entrances, sidewalk ramps and alley approaches shall conform to the dimensions and layout of the plans and standard drawings and to these specifications. All such construction shall be of concrete as specified herein.
- a) When constructing a new driveway entrance, or reconstructing and/or widening an existing driveway, the driveway approach shall be completed at least to a point back of the curb equal to the radius, or taper length. The curb & gutter and the driveway approach shall be poured monolithically.
 - b) The driveway gradient shall be a uniform slope from the gutter flow line to the sidewalk grade at the street side edge, with a maximum 12:1 ratio.
 - c) When a driveway is paved to the property line, or beyond, the portion crossing the sidewalk, or where a sidewalk would be constructed, shall conform to the standard plan and specifications for sidewalks.
 - d) A driveway entrance from a street that does not have curb & gutter, shall include a culvert for drainage where deemed necessary by the Public Works Department. The Public Works Department shall determine the type, size and slope of the culvert. The culvert shall be aligned with the street drainage ditch, and shall extend, on each side of the driveway, two feet for every foot of ditch depth below the driveway surface.
 - e) Curb and gutter shall be completely removed to conform to the standard plan and section for driveways and/or sidewalk ramps. All removal of curb and gutter will be accomplished through clean saw-cuts. Care should be taken in the construction of the driveway entrance so as to maintain the correct gutter flow line.
 - f) On streets paved with asphalt, the asphalt shall be removed to allow placement of a toe board form. The asphalt removal shall not exceed 12 inches in width. The contractor shall place temporary surfacing and notify the Public Works Department when the approach has been completed. The City will patch the pavement at no cost to the contractor. However, if asphalt removed by the contractor exceeds 12 inches in width, the contractor will be charged for the asphalt patch.
 - g) On concrete paved streets, if the curb & gutter is removed carefully and no damage is done to the pavement, the pavement edge may be used as the form. Driveway entrances and alley approaches shall be tied to the concrete street pavement. Damage to the pavement shall be reported to the Public Works Department for determination of corrective measures.
 - h) Joint use driveways between adjacent property owners will be allowed only with specific approval of the City. A joint use driveway easement, signed by all property owners, shall be required as a condition of approval.

4. SUBGRADE

- a) The subgrade shall be free of all sod, weeds, brush, debris, or other undesirable material. All subgrade soil shall be uniformly compacted; soft, yielding material shall be removed and replaced with approved material. The subgrade shall be dampened prior to placing the concrete, but care shall be exercise to prevent puddling or muddy conditions.
- b) All fill material shall be approved material, placed in successive layers not exceeding 8 inches in depth for the full width of the subgrade, and compacted to 95% Standard Proctor or the satisfaction of the Public Works Department or Inspector.

5. MATERIAL DETAILS

Ready mixed concrete shall be used. Concrete shall meet the requirements of City Standard Specifications Section Str-4 Concrete Pavement, Section Str-5 Patching, and Section Str-6 Concrete Mixtures.

6. ALTERNATE MATERIAL

Bricks, pigmented and/or patterned concrete or a special cement-topping course may be used in the space between the back of curb and a setback sidewalk, and other areas approved by the City.

7. ISOLATION JOINTS

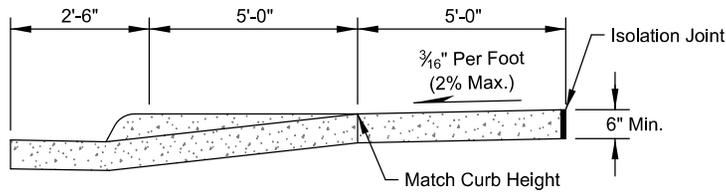
- a) All joints shall be pre-molded bituminous material, and shall be placed in conformance with these specifications and the standard drawings. Alternate material must be approved by the City.
- b) Isolation joints shall extend from the surface of the finished slab to subgrade. They shall be accurately held in place during placing and finishing of the concrete so that they remain straight, vertical, and flush with the top of the concrete.
- c) Isolation joints shall be placed adjacent concrete parking lots, foundations, structures, at locations shown on the standard drawings, and at such other locations as may be deemed necessary by the City.

8. The permit holder shall maintain all gutters, and other drainage facilities of the city, free and unobstructed for the full depth of the adjacent curb and for at least two feet from the face of the curb at any gutter.

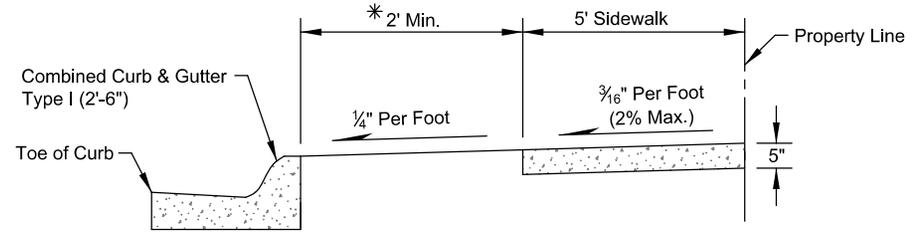
9. The permit holder shall be required to take measures to protect the storm sewer system from excessive contamination from permitted activities.

10. Restoration of Landscaped Areas:

Any disturbance or damage to landscaped areas of public right-of-way, and/or the adjacent impacted area on private property, caused by the activities of a permit holder or any agent, affiliate, employee, or subcontractor, while occupying, constructing, repairing or maintaining sidewalks and/or driveways on public right-of-way or private property shall be returned or restored to its functional equivalence before the damage pursuant to the reasonable requirements and specifications of the City. If the permit holder fails to make the repairs required by the City, the City may make those repairs and charge the actual repair costs to the permit holder.

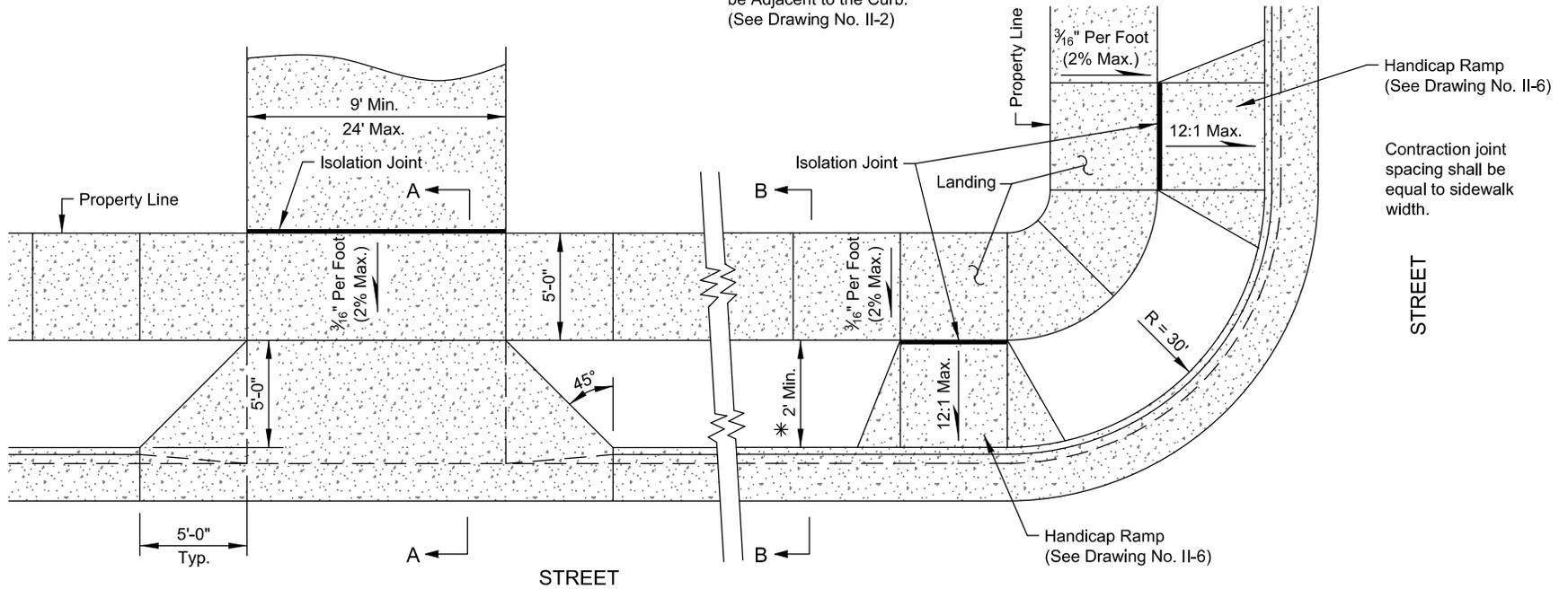


SECTION A-A



SECTION B-B

* When this Distance is 2' or Less the Walk will be Adjacent to the Curb. (See Drawing No. II-2)

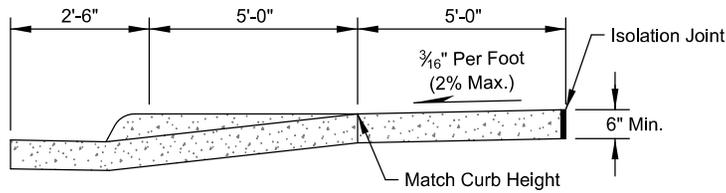


NOTE: When sidewalk is less than 5' from curb the sidewalk shall flare out with driveway flares.

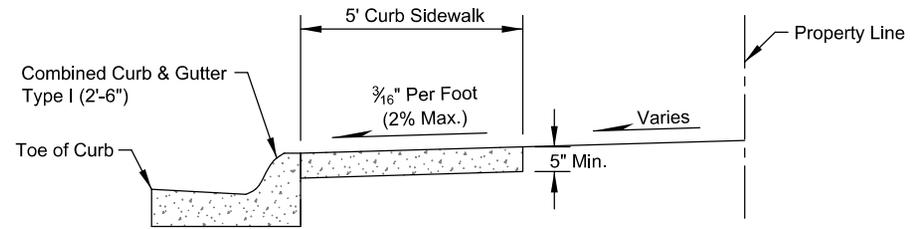
Isolation Joints:
 1/2" Pre-Molded Bituminous Material (for depths under 6")
 3/4" Pre-Molded Bituminous Material (for depths of 6" or more)

NOTE: For driveways placed where there is existing curb & gutter the curb & gutter shall be removed to the toe of the curb, a toe form is required on asphalt streets. The approach, the flares, and the curb & gutter shall be poured at the same time (monolithic). Place temporary surfacing in asphalt patch area, until street department can place permanent patch.

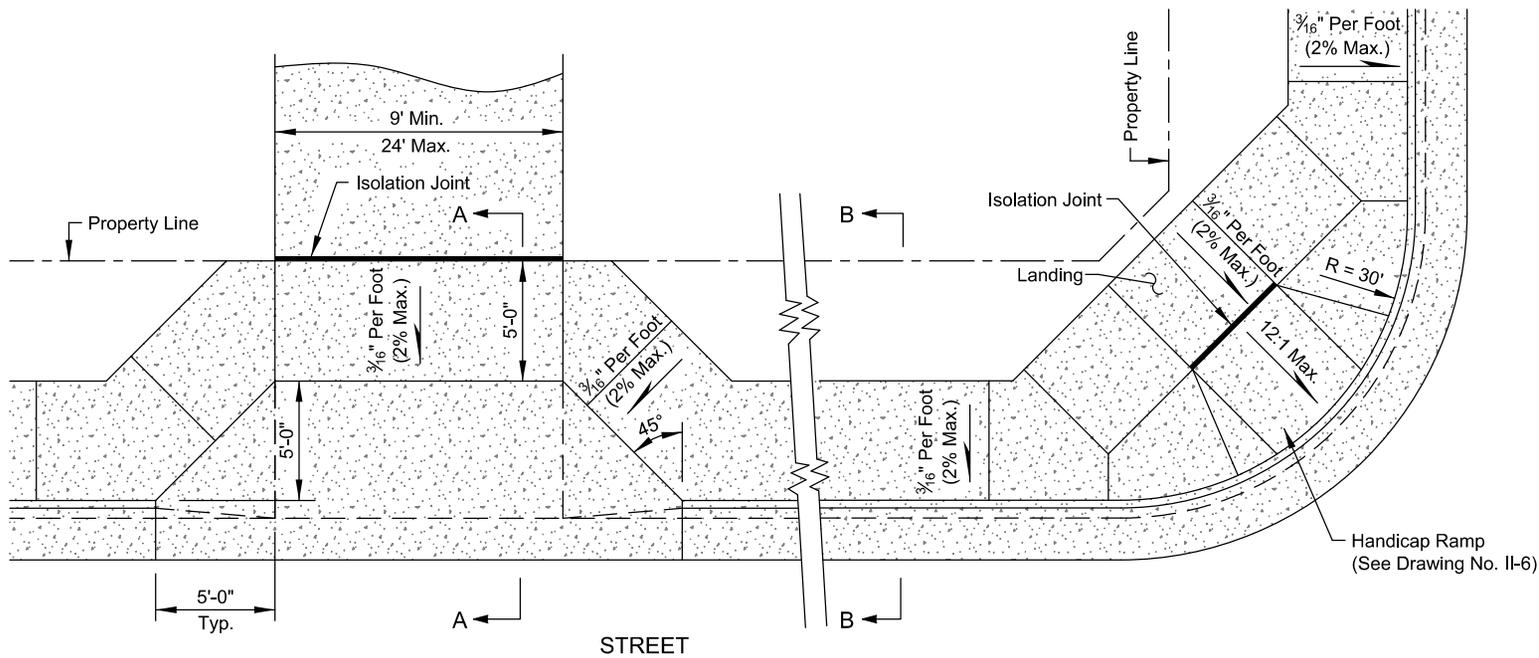
CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
RESIDENTIAL DRIVEWAYS AND SETBACK SIDEWALK WITH CURB & GUTTER TYPE I	
Revisions:	Date: JUNE 2017
	Dr. No.: II-1



SECTION A-A



SECTION B-B



Contraction joint spacing shall be equal to sidewalk width.

STREET

STREET

Isolation Joints:
 1/2" Pre-Molded Bituminous Material
 (for depths under 6")
 3/4" Pre-Molded Bituminous Material
 (for depths of 6" or more)

NOTE: For driveways placed where there is existing curb & gutter the curb & gutter shall be removed to the toe of the curb, a toe form is required on asphalt streets. The approach, the flares, and the curb & gutter shall be poured at the same time (monolithic). Place temporary surfacing in asphalt patch area, until street department can place permanent patch.

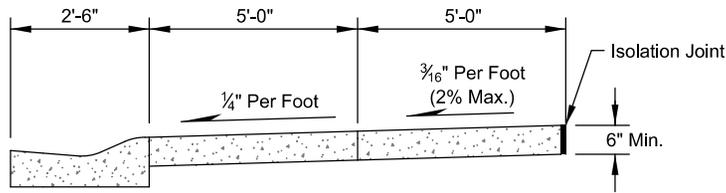
CITY OF GARDEN CITY, KANSAS
 PUBLIC WORKS DEPARTMENT

RESIDENTIAL DRIVEWAYS AND CURB
 SIDEWALK WITH CURB & GUTTER TYPE I

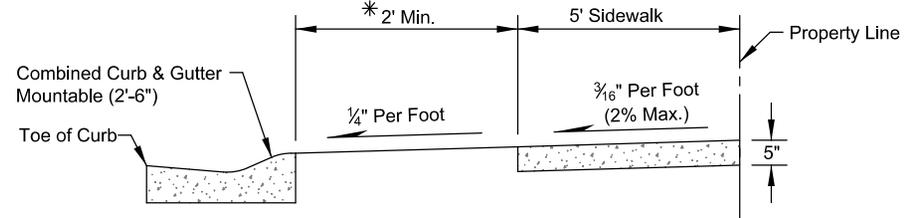
Revisions:

Date: JUNE 2017

Dr. No.: 11-2

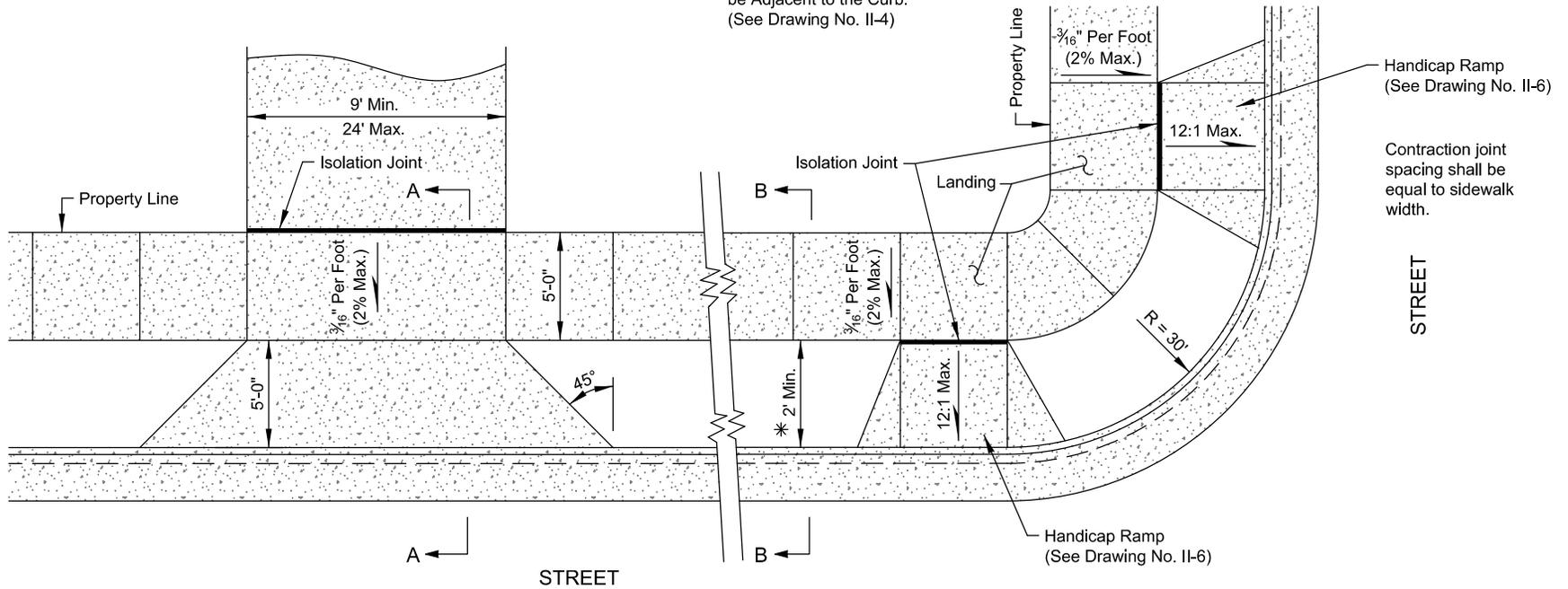


SECTION A-A



SECTION B-B

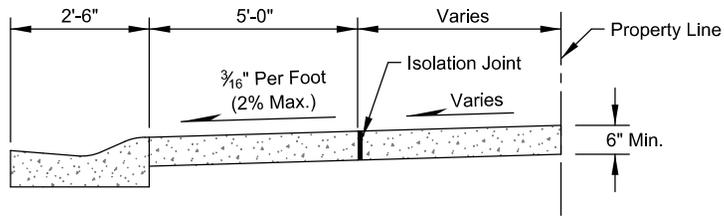
* When this Distance is 2' or Less the Walk will be Adjacent to the Curb. (See Drawing No. II-4)



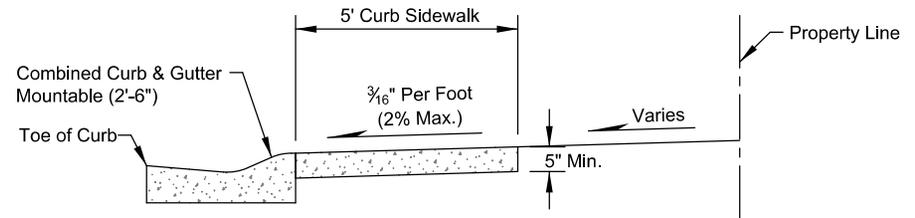
NOTE: When sidewalk is less than 5' from curb the sidewalk shall flare out with driveway flares.

Isolation Joints:
 1/2" Pre-Molded Bituminous Material
 (for depths under 6")
 3/4" Pre-Molded Bituminous Material
 (for depths of 6" or more)

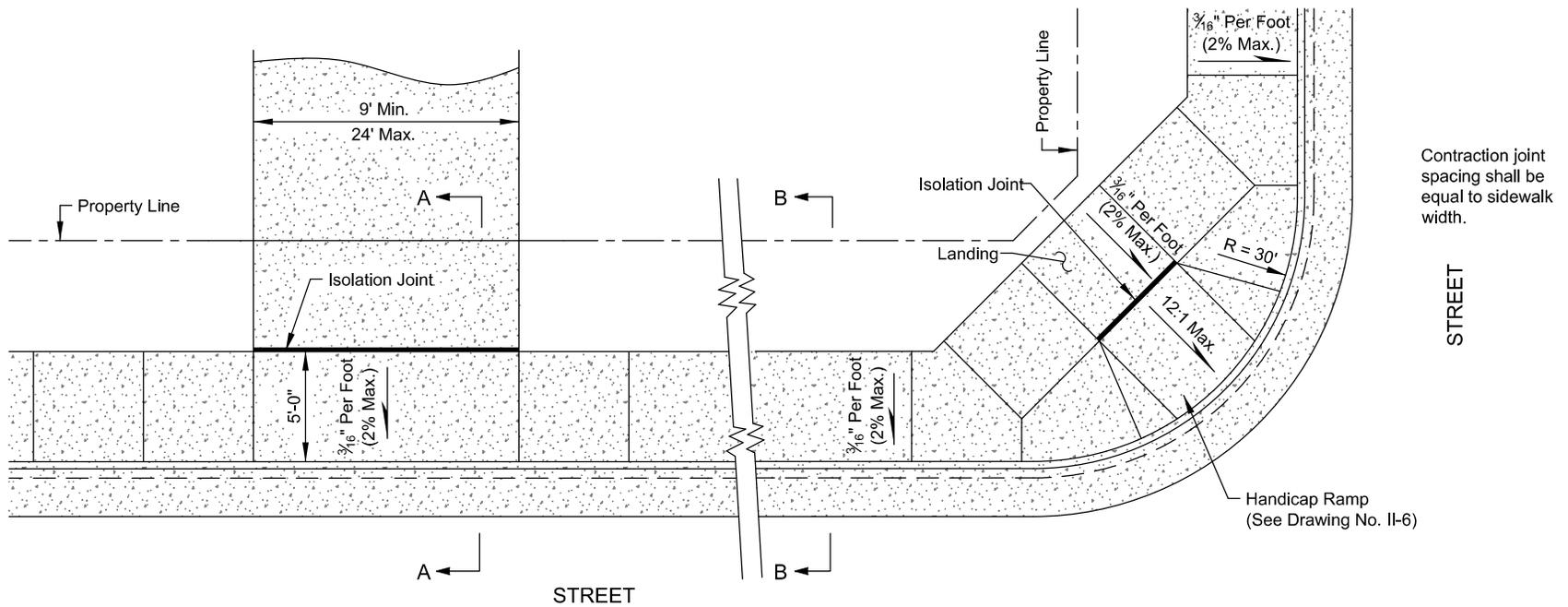
CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
RESIDENTIAL DRIVEWAYS AND SETBACK SIDEWALK WITH MOUNTABLE CURB & GUTTER	
Revisions:	Date: JUNE 2017
	Dr. No.: II-3



SECTION A-A



SECTION B-B



Contraction joint spacing shall be equal to sidewalk width.

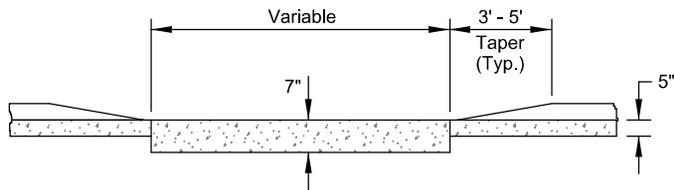
STREET

STREET

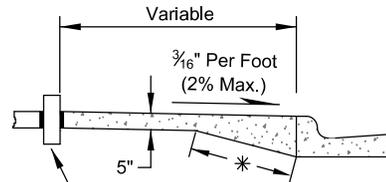
Isolation Joints:
 1/2" Pre-Molded Bituminous Material
 (for depths under 6")

 3/4" Pre-Molded Bituminous Material
 (for depths of 6" or more)

CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
RESIDENTIAL DRIVEWAYS AND CURB SIDEWALK WITH MOUNTABLE CURB & GUTTER	
Revisions:	Date: JUNE 2017
	Dr. No.: 11-4



SECTION A-A
Sidewalk Through Driveway



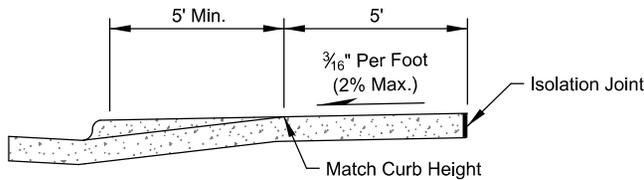
SECTION C-C

Isolation Joints:
1/2" Pre-Molded Bituminous Material
(for depths under 6")

3/4" Pre-Molded Bituminous Material
(for depths of 6" or more)

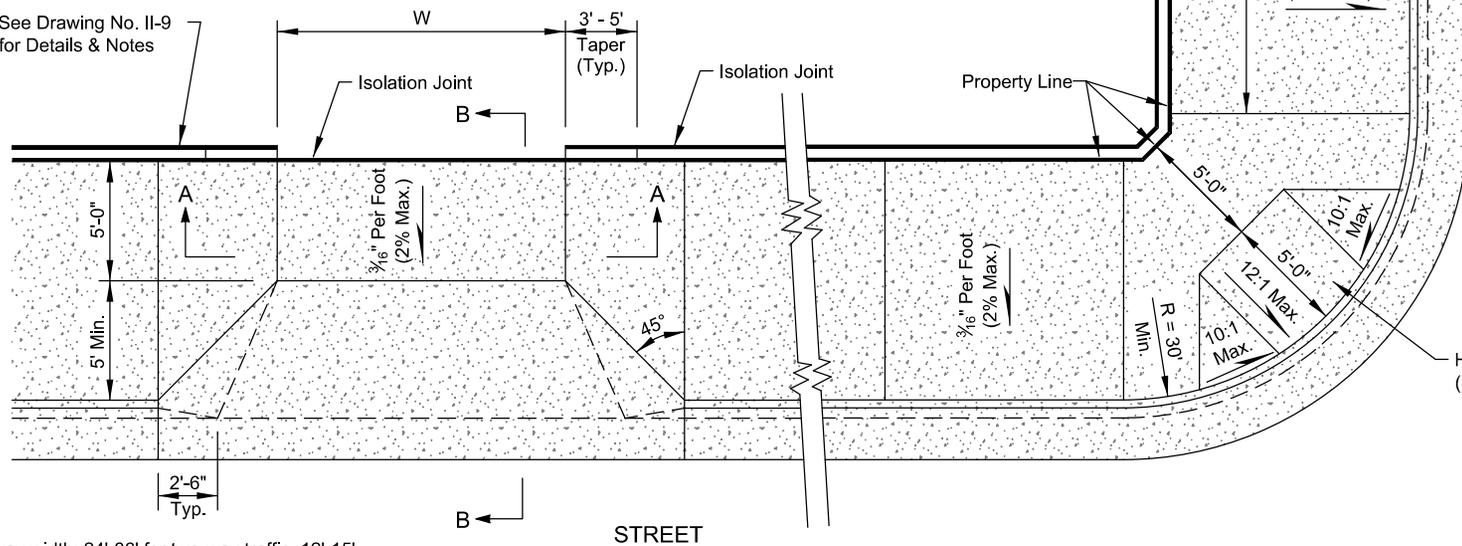
* Consult Public Works Department

Contraction joint spacing to be equal to sidewalk width (not to exceed 10' x 10')



SECTION B-B

See Drawing No. II-9 for Details & Notes



Contraction joint spacing shall be equal to sidewalk width.

Handicap Ramp (See Drawing No. II-6)

STREET

STREET

Driveway width: 24'-36' for two-way traffic, 12'-15' for one way traffic.

Driveway grade may be flattened, to lessen the "bump" in the approach, with approval from the Public Works Department.

Driveway maybe depressed 0.10' to accommodate drainage.

Approach shall be monolithic pour.

Minimum sidewalk width is 5' at property line. Fully paved parking is permissible.

Sidewalk & driveway construction shall be handicap accessible. Ramps, or other means, shall be provided as necessary at driveway crossings.

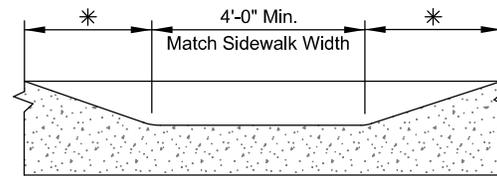
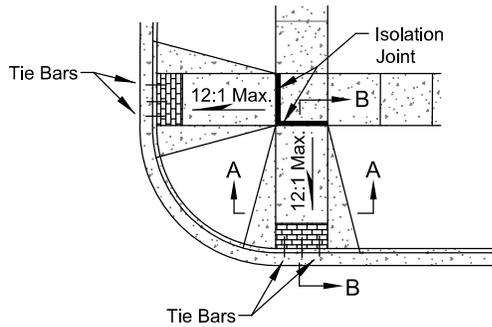
CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

**MAJOR COMMERCIAL DRIVEWAYS &
COMMERCIAL AREA SIDEWALK**

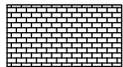
Revisions:

Date: JUNE 2017

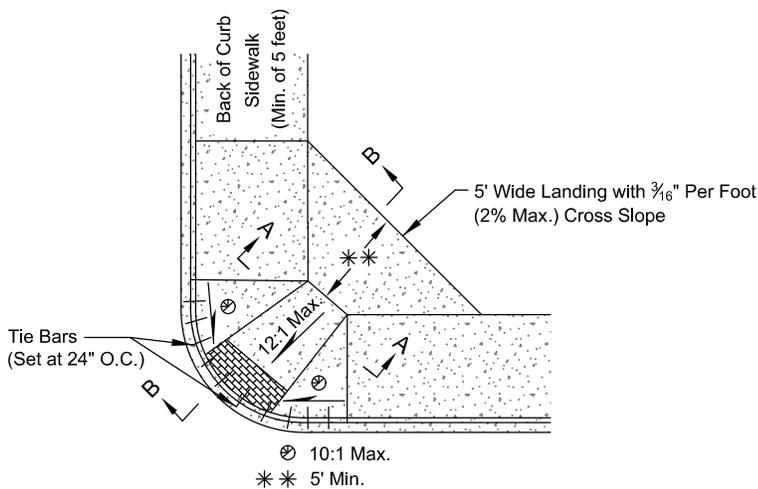
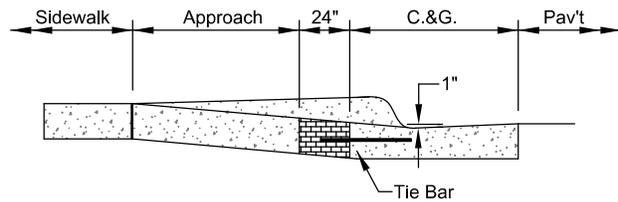
Dr. No.: II-5



* Variable - Consult Public Works Department for Dimensions.



24" Min. from Back of Curb Line & Width of Ramp shall be Colored & Stamped (Truncated Domes) Concrete.



SIDEWALK RAMP REQUIREMENTS

1. Where possible, ramp & gutter should be monolithic pour. Tie bars not required on monolithic pour.
2. The maximum ramp slope is 1" per foot. any deviation must be approved by the Public Works Department.
3. The normal gutter flowline profile shall be maintained through the ramp area.
4. Consult the Public Works Department for specific applications and for approval of alternate ramp types.
5. The concrete depth will be a minimum of 6" in residential areas. A minimum of 8" is to be used on collector and arterial streets.
6. Use 3/4" isolation jt. for 6" or thicker, use 1/2" isolation jt. for under 6" thick.

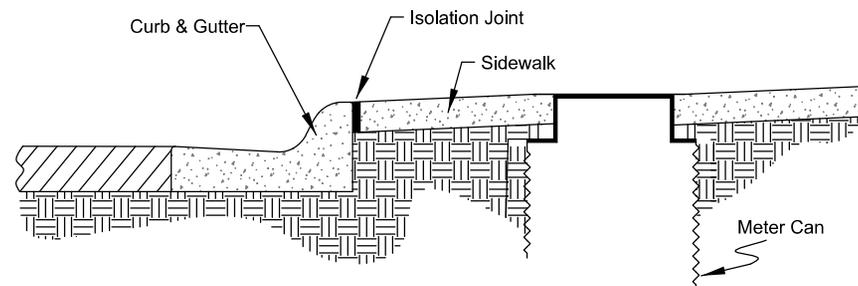
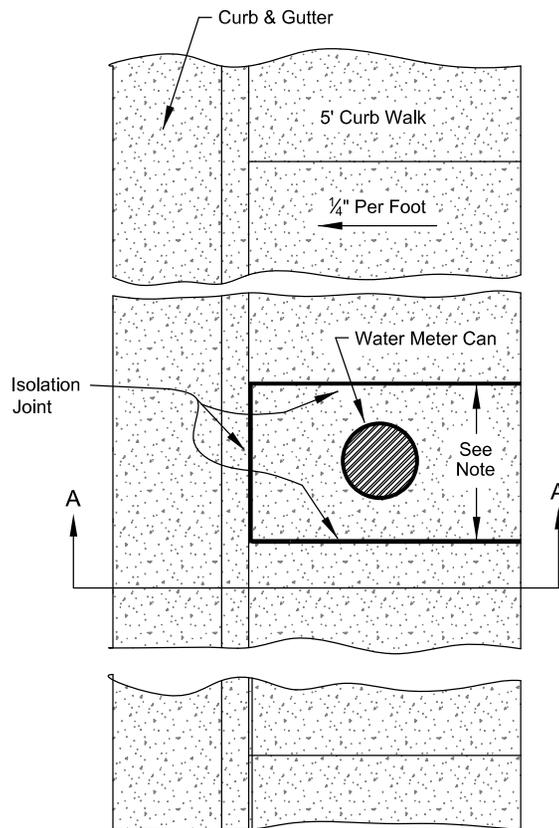
CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

SIDEWALK HANDICAP RAMPS

Revisions:

Date: JUNE 2017

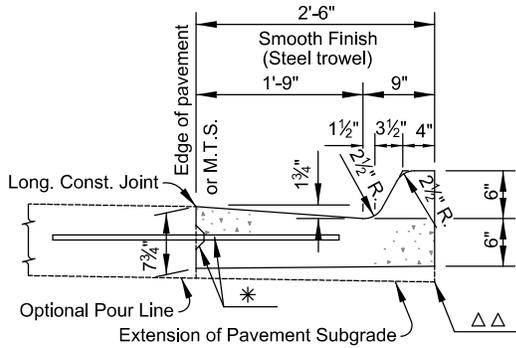
Dr. No.: 11-6



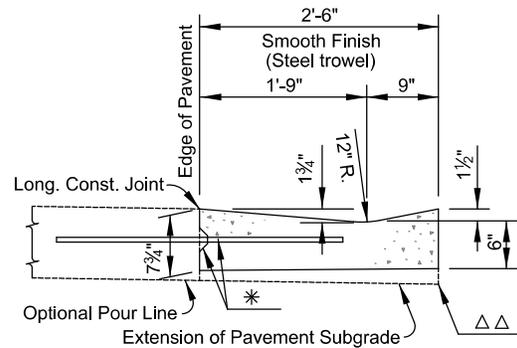
SECTION A-A

NOTE: The top of the meter can lid should be set flush with the concrete. Maintain a min. of six (6) inches from the edge of the water can to the expansion joint.

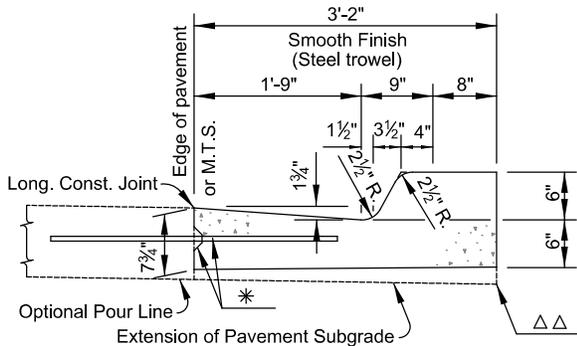
CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
WATER METER PLACEMENT WITHIN SIDEWALK	
Revisions:	Date: JUNE 2017
	Dr. No.: 11-7



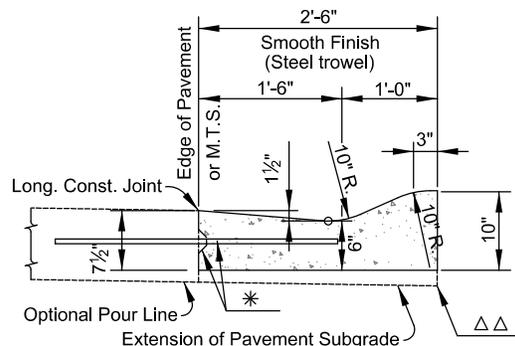
COMBINED CURB & GUTTER - TYPE I (2'-6" WIDTH)



COMBINED CURB & GUTTER - TYPE II (2'-6" WIDTH)



COMBINED CURB & GUTTER - TYPE I SPECIAL (3'-2" WIDTH)



MOUNTABLE CURB & GUTTER (2'-6" WIDTH)

* Longitudinal construction joint and #4 x 3'-0" bars @ 2'-6" ctrs., where concrete pavement is constructed.

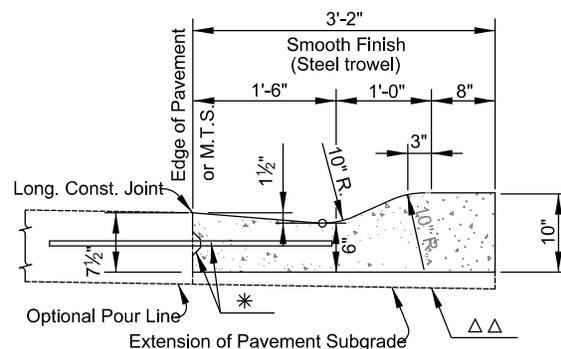
△△ Contractor has the option of thickening the curb & gutter as shown.

NOTES:

Contraction joints on 6' centers.

Isolation joints at the ends of curb returns.

When tying Combined Curb & Gutter Type I to Mountable Curb & Gutter the gutter flowline shall be transitioned in a distance long enough to not pond water in the gutter flowline.



MOUNTABLE CURB & GUTTER SPECIAL (3'-2" WIDTH)

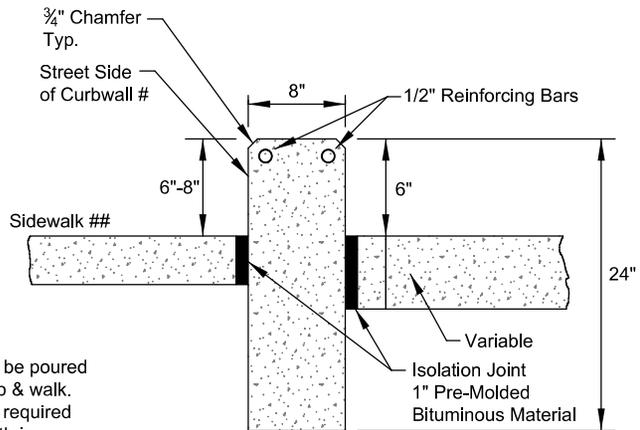
CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

STANDARD CURB DETAILS

Revisions:

Date: JUNE 2017

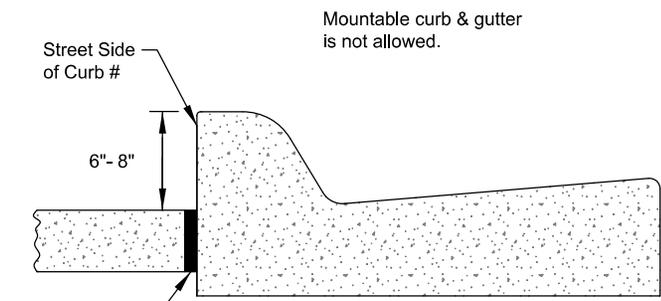
Dr. No.: 11-8



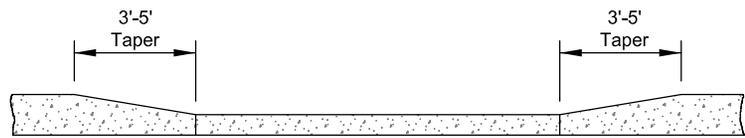
NOTE: Curb wall to be poured separately from slab & walk. Street side-bit. joint required if entire parking width is Concrete. Parking lot side-bit. joint required if parking lot is concrete.

CURBWALL OPTION

Street side of curbwall/curb & gutter may be located at the property line, or offset to allow bumper overhang not to overlap the sidewalk.
Location of sidewalk shall be per approved site plan.



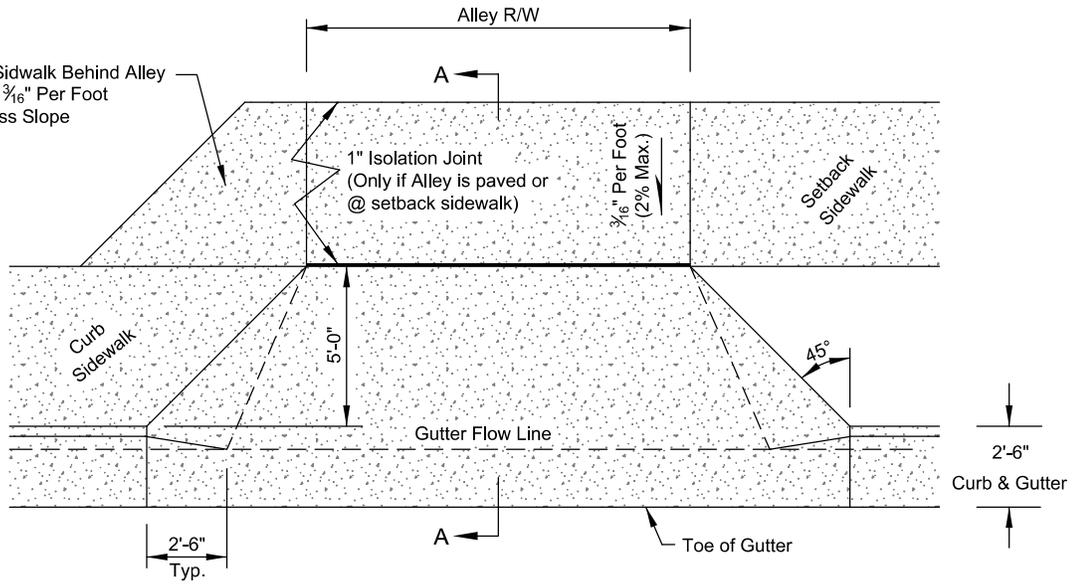
CURB & GUTTER OPTION



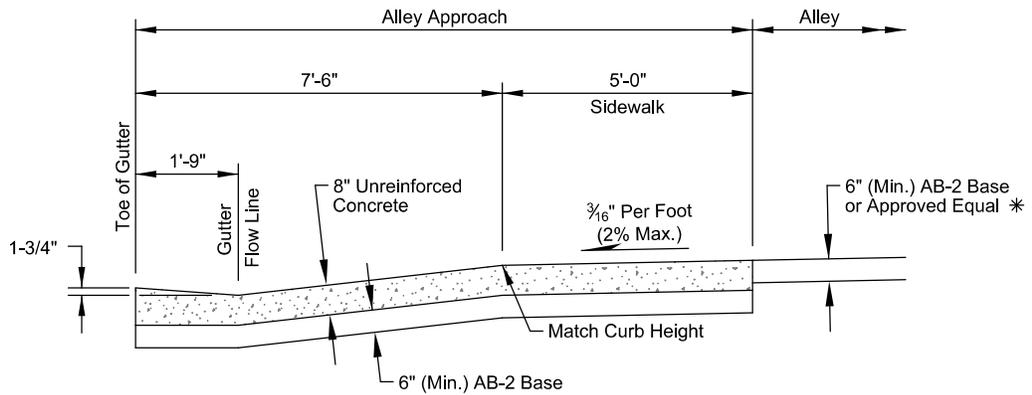
SECTION @ DRIVEWAY OPENING

CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
CURBWALL DETAILS	
Revisions:	Date: JUNE 2017
	Dr. No.: 11-9

Flare 5' Wide Sidewalk Behind Alley Approach with $\frac{3}{16}$ " Per Foot (2% Max.) Cross Slope



TYPICAL SECTION



SECTION A-A THROUGH ALLEY

NOTES:

1. Concrete alleys shall have 1" isolation joints at each end. Contraction joints on 12' ctrs.
2. The work will conform to the general specifications of the City of Garden City.
3. The curb & gutter in front of the approach will be removed to the "toe" & repoured monolithic with the approach.

* Optional Surfacing

1. Residential/Light Commercial Areas: 7" (Min.) Concrete Pavement over 6" (Min.) AB-2 Base
2. Heavy Commercial/Industrial Areas: 8" (Min.) Concrete Pavement over 6" (Min.) AB-2 Base

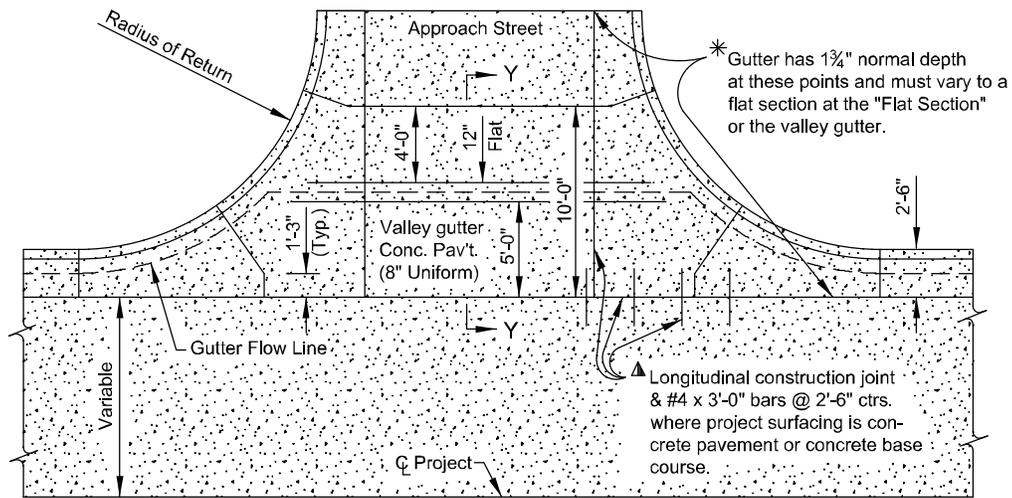
CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

ALLEY APPROACH

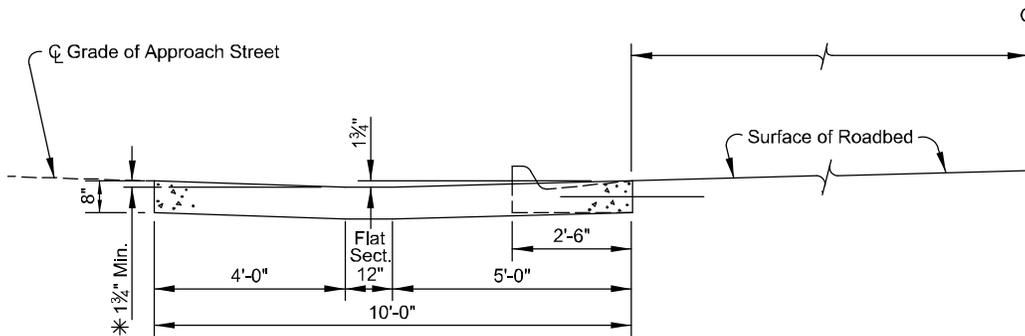
Revisions:

Date: AUGUST 2017

Dr. No.: II-10



PLAN



SECTION Y-Y

* Use 1½" when constructed with mountable curb & gutter

▲ Where the valley gutter does not abut concrete pavement or concrete base course, omit tie bars and longitudinal construction joint.

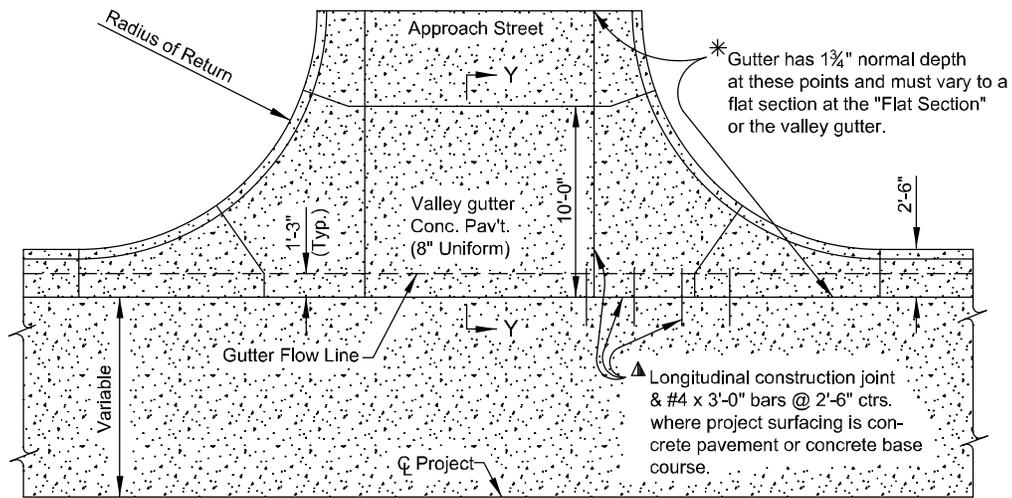
CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

VALLEY GUTTER
TYPE I

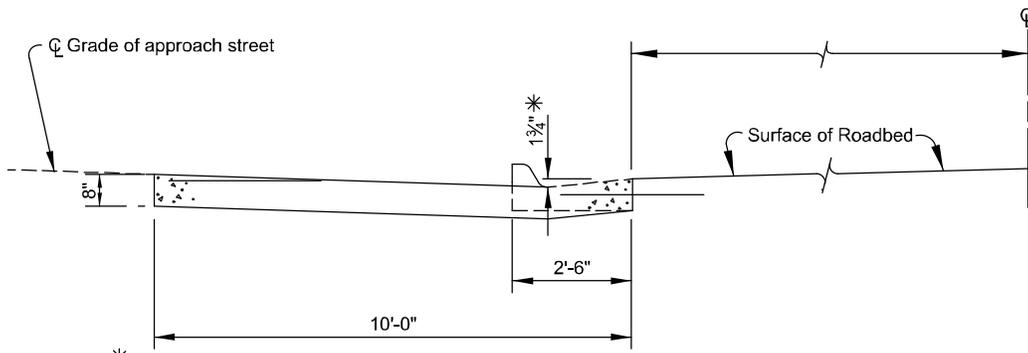
Revisions:

Date: JUNE 2017

Dr. No.: II-11



PLAN



SECTION Y-Y

* Use 1½" when constructed with mountable curb & gutter

▲ Where the valley gutter does not abut concrete pavement or concrete base course, omit tie bars and longitudinal construction joint.

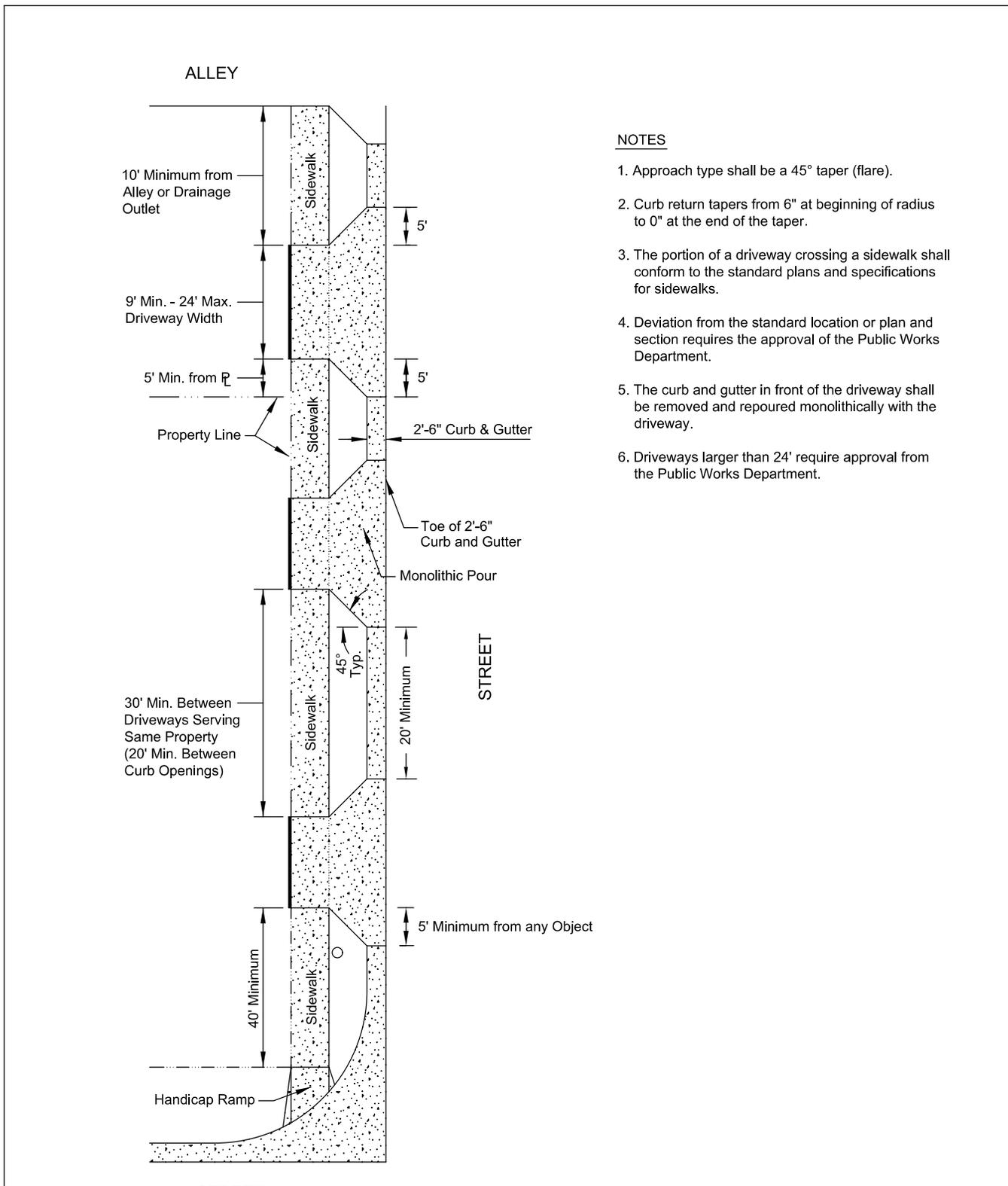
CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

VALLEY GUTTER
TYPE II

Revisions:

Date: JUNE 2017

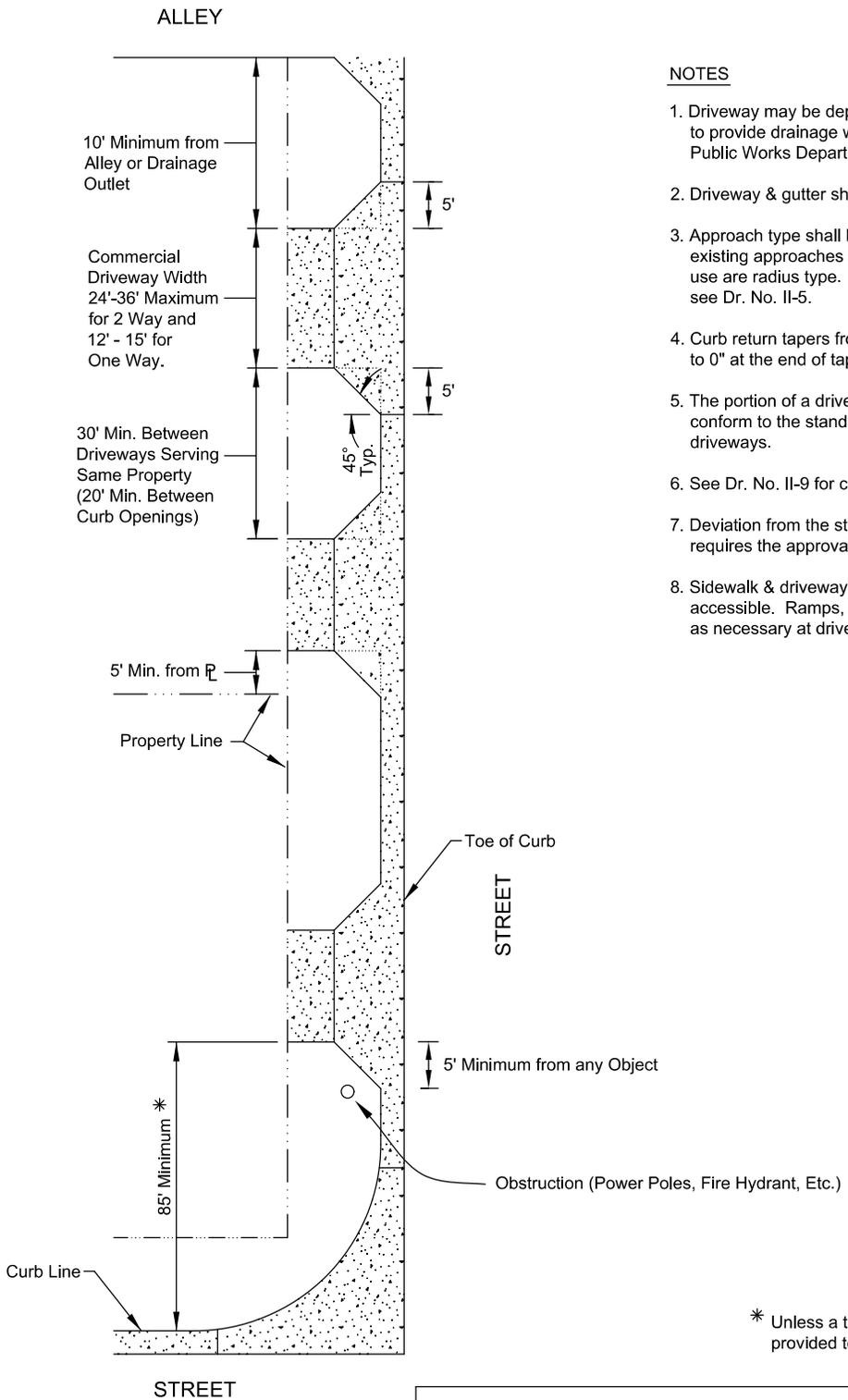
Dr. No.: II-12



NOTES

1. Approach type shall be a 45° taper (flare).
2. Curb return tapers from 6" at beginning of radius to 0" at the end of the taper.
3. The portion of a driveway crossing a sidewalk shall conform to the standard plans and specifications for sidewalks.
4. Deviation from the standard location or plan and section requires the approval of the Public Works Department.
5. The curb and gutter in front of the driveway shall be removed and repoured monolithically with the driveway.
6. Driveways larger than 24' require approval from the Public Works Department.

CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
RESIDENTIAL DRIVEWAY LOCATION	
Revisions:	Date: JUNE 2017
	Dr. No.: II-13



NOTES

1. Driveway may be depressed 0.10' where necessary to provide drainage with the approval of the Public Works Department.
2. Driveway & gutter shall be monolithic pour.
3. Approach type shall be 45° taper unless other existing approaches on the block on major streets, use are radius type. Major commercial driveway, see Dr. No. II-5.
4. Curb return tapers from 6" at the beginning of taper to 0" at the end of taper.
5. The portion of a driveway crossing a sidewalk shall conform to the standard plans & specifications for driveways.
6. See Dr. No. II-9 for curbwall details & notes.
7. Deviation from the standard location or plan & section requires the approval of the Public Works Department.
8. Sidewalk & driveway construction shall be handicap accessible. Ramps, or other means, shall be provided as necessary at driveway crossings.

* Unless a traffic impact study is completed and provided to the city for review and approval.

CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

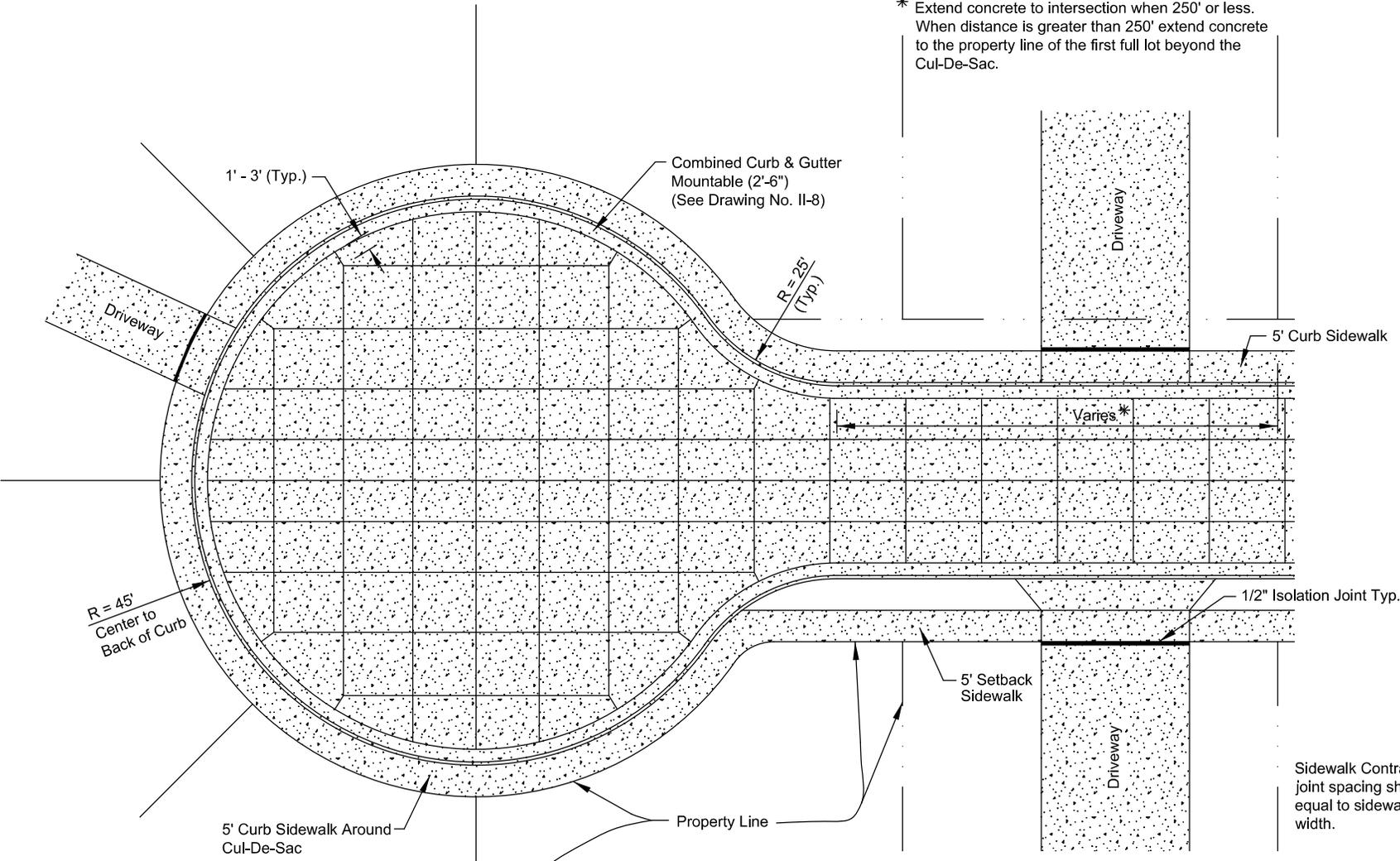
COMMERCIAL DRIVEWAY LOCATION

Revisions:

Date: JUNE 2017

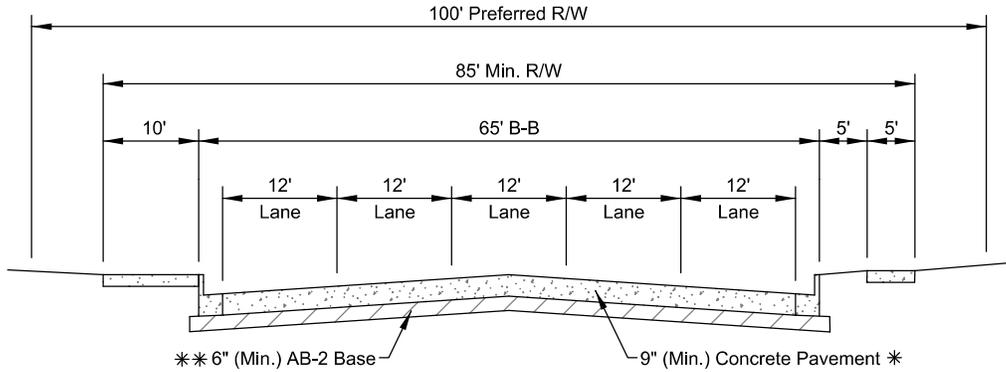
Dr. No.: II-14

* Extend concrete to intersection when 250' or less.
 When distance is greater than 250' extend concrete to the property line of the first full lot beyond the Cul-De-Sac.

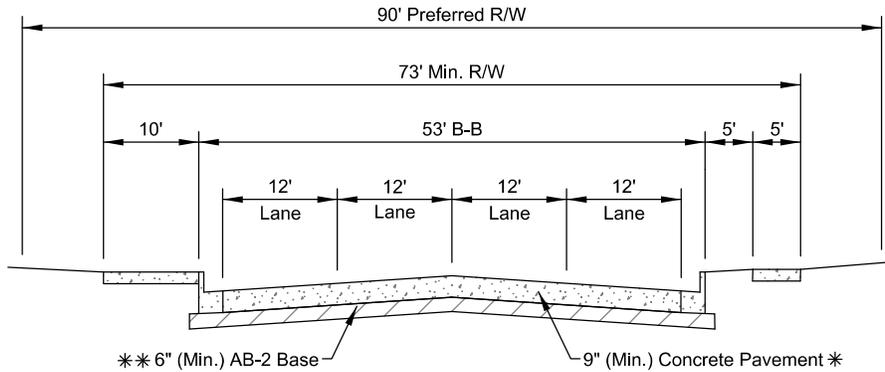


NOTE: Joint spacing not to exceed 12' x 12'.

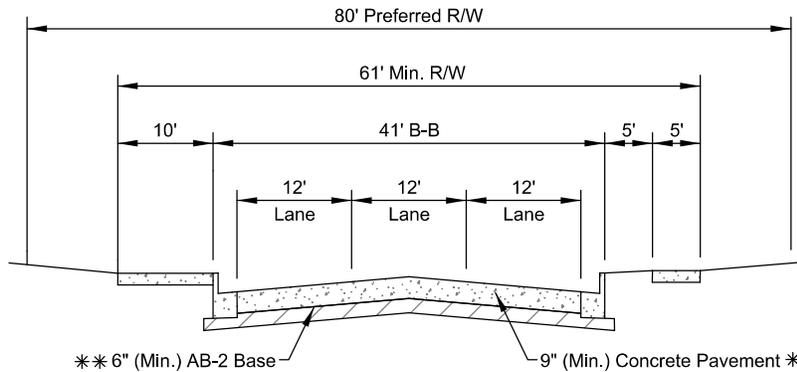
CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
RESIDENTIAL CUL-DE-SAC SIDEWALKS WITH MOUNTABLE CURB & GUTTER	
Revisions:	Date: JUNE 2017
	Dr. No.: II-15



5-LANE ARTERIAL



4-LANE ARTERIAL



3-LANE ARTERIAL

NOTE: 6" AB-2 Base extends 12" past back of curb. Subgrade and AB-2 Base shall be compacted to 95% Standard Proctor. Testing shall be the responsibility of the Contractor.

* A Pavement Design Recommendation prepared by a Geotechnical Engineer Licensed in the State of Kansas will be required to be submitted to the City for review and approval. The City will not accept a pavement recommendation thinner than 9" thick.

** Refer to the most current version of the KDOT Specifications for AB-2 Base. The AB-3 Base gradation using local aggregates is acceptable.

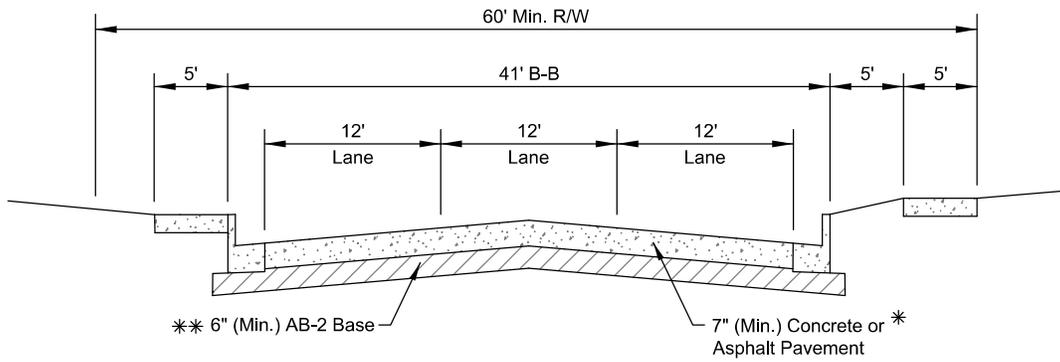
CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

STREET DESIGN STANDARDS
TYPICAL SECTIONS

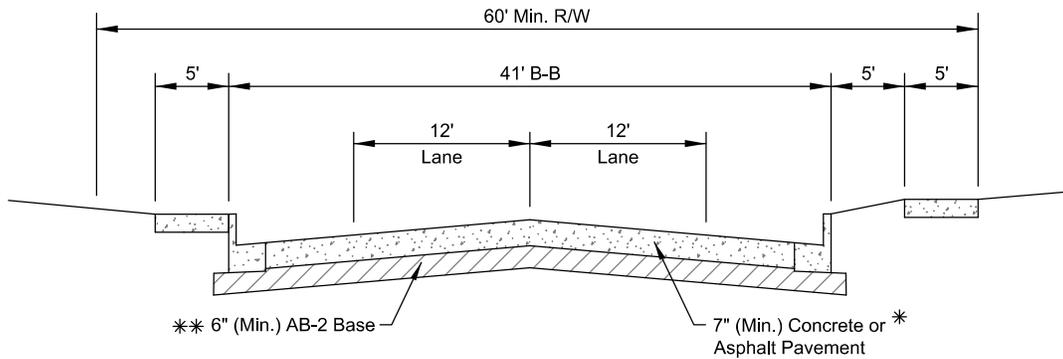
Revisions:

Date: JUNE 2017

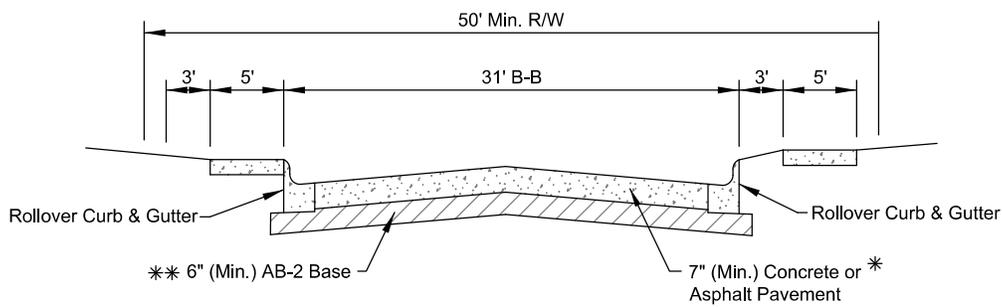
Dr. No.: II-16



3-LANE COLLECTOR



2-LANE COLLECTOR



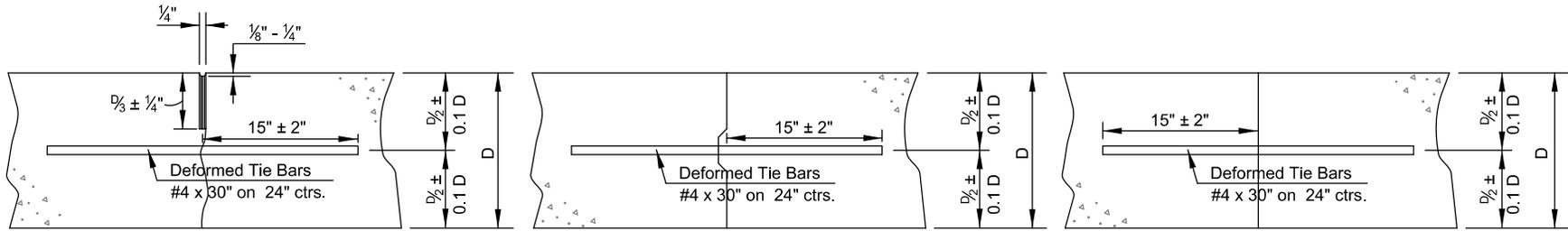
LOCAL RESIDENTIAL STREET

NOTE: 6" AB-2 Base extends 12" past back of curb. Subgrade and AB-2 Base shall be compacted to 95% Standard Proctor. Testing shall be the responsibility of the Contractor.

* A Pavement Design Recommendation prepared by a Geotechnical Engineer Licensed in the State of Kansas will be required to be submitted to the City for review and approval. The City will not accept a pavement recommendation thinner than 7" thick.

** Refer to the most current version of the KDOT Specifications for AB-2 Base. The AB-3 Base gradation using local aggregates is acceptable.

CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
STREET DESIGN STANDARDS TYPICAL SECTIONS	
Revisions:	Date: JUNE 2017
	Dr. No.: II-17



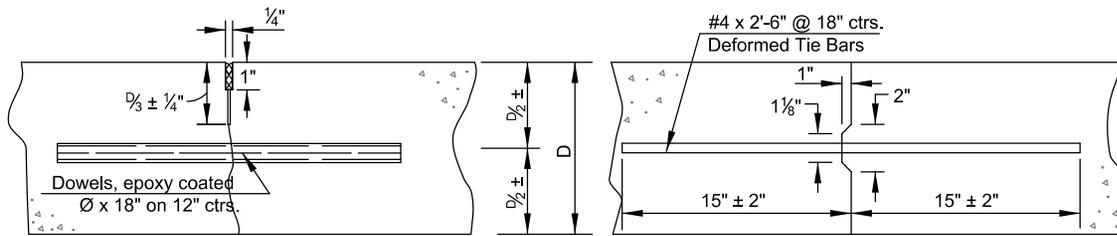
TIED NON-KEYED

TIED KEYED CONSTRUCTION

TIED BUTT CONSTRUCTION

Note: For longitudinal construction joints the contractor has the option of using either the keyed or butt type. Place deformed tie bars mid-depth.

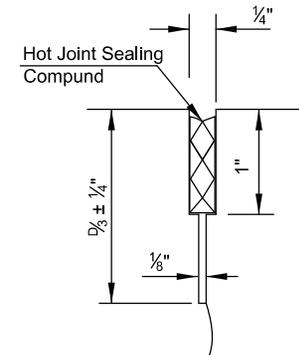
LONGITUDINAL JOINTS



CONTRACTION

CONSTRUCTION

TRANSVERSE JOINTS



DETAIL OF SEALED JOINT SAWCUT

NOTE: Construct contraction joints at plan locations or at the Engineer's direction. When necessary to interrupt continuous placement for a substantial length of time or at the end of a day's paving, the Contractor has the option of ending placement at a contraction joint or with a construction joint. Construct either joint type by placing a header at the end of the pour or by paving past the joint location. After the concrete has hardened, saw joint and drill holes for tie bars or dowels.

Make an initial 1/8" saw cut (1/3 ± 1/4" depth); the second 1/4" saw cut is a separate operation done after concrete has gained sufficient strength to avoid spalling as determined by the Engineer.

DOWEL SIZE	
D (in.)	Diameter
6 < D < 9	1"
9 ≤ D < 11	1 1/4"
D ≥ 11	1 1/2"

PAVEMENT DEPTH = D

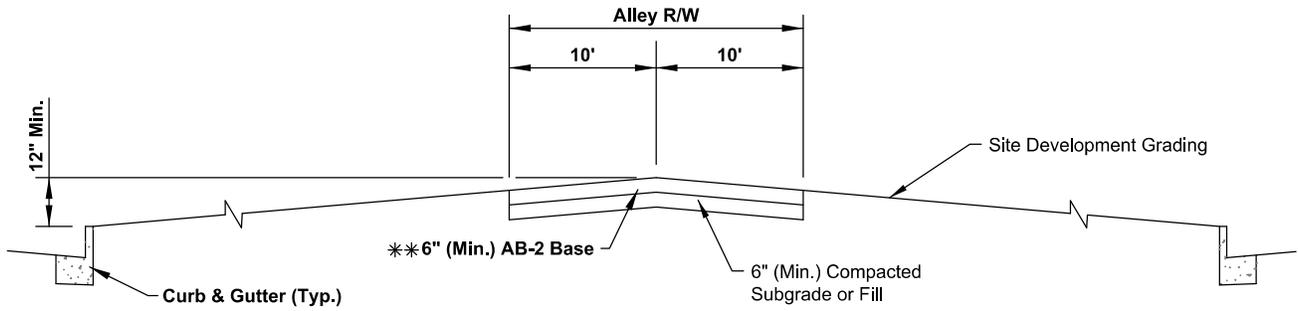
CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

CONCRETE JOINT DETAILS

Revisions:

Date: JUNE 2017

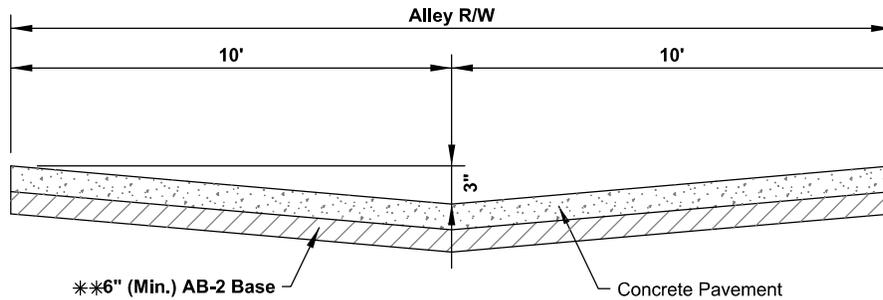
Dr. No.: II-18



Alley Grade
AB-2 Base Typical Section Mid-Block

NOTES:

1. Typical site development grading shall have the alley a minimum of 12" above the curb and be graded so the drainage flows away from the alley towards the curb & gutter.
2. The alley shall be paved with concrete pavement when the typical site development grading cannot be obtained and portions of the site development grading drains toward the alley. Site development grading shall be approved by the Public Works Department
3. The alley shall be paved with concrete pavement when used for industrial, commercial, and residential access with a minimum width of 20' unless approved otherwise by the Public Works Department.



Alley Pavement Section

1. Residential/Light Commercial Areas:
7" (Min.) Concrete Pavement
over 6" (Min.) AB-2 Base
2. Heavy Commercial/Industrial Areas:
8" (Min.) Concrete Pavement
over 6" (Min.) AB-2 Base

NOTE: Subgrade and AB-2 Base shall be compacted to 95% Standard Proctor. Testing shall be the responsibility of the Contractor.

** Refer to the most current version of the KDOT Specifications for AB-2 Base. The AB-3 Base gradation using local aggregates is acceptable.

CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
STREET DESIGN STANDARDS TYPICAL SECTIONS	
Revisions:	Date: MARCH 2018
	Dr. No.: II-19

SECTION III

PLACEMENT of UTILITIES In PUBLIC RIGHTS-of-WAY

CITY OF GARDEN CITY
Standards for Placement of
Utilities in
Public Rights-of -Way

1. UNDERGROUND FACILITIES.

In those areas and portions of the city where either the transmission and distribution facilities of the public utility providing telecommunications or video service, or those of the city providing electric service are underground, or may hereafter be placed underground, pursuant to Chapter 90 of the Code of Ordinances, then the service provider shall likewise construct, operate and maintain all of its transmission, amplification and distribution facilities underground.

2. ALLEYS

The typical placement of underground utilities in alleys is shown on Drawing No. III-1. Underground service drops shall cross alleys within 10° of perpendicular. Service drops crossing alleys shall be installed in conduit, to allow minimal disruption of other utilities and alley surfacing during future replacement and/or repairs.

3. OVERHEAD UTILITY INSTALLATIONS

The minimum vertical clearance and separation of overhead utilities crossing or running parallel with streets and alleys is shown on Drawing No. III-2. Service drops crossing streets and alleys shall be subject to the same minimum vertical clearance.

4. EASEMENTS

The desired placement of underground utilities in public utility easements is the same as for alley locations as shown on Drawing No. III-1. However, public utility easements vary in width and location. Public utility easements are found along side lot lines, rear lot lines and front lot lines.

Prior to commencement of construction in areas with public utility easements and no alleys, a utility coordination meeting will be arranged by the Director of Community Development and/or the Director of Public Utilities, so that a coordinated plan for all utilities may be developed. Such plan will be permanently documented and distributed to all utilities.

5. PERMITS

Work requiring any excavation, demolition, patch, stockpile, or other improvement within the public rights-of-way, shall be in accordance with Section I, Standards for Excavations in Public Rights-of-Way. An excavation permit shall be obtained from the City Inspection Department.

6. RESTORATION OF LANDSCAPING

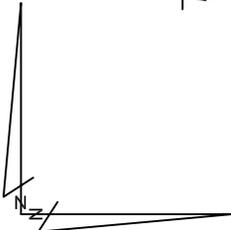
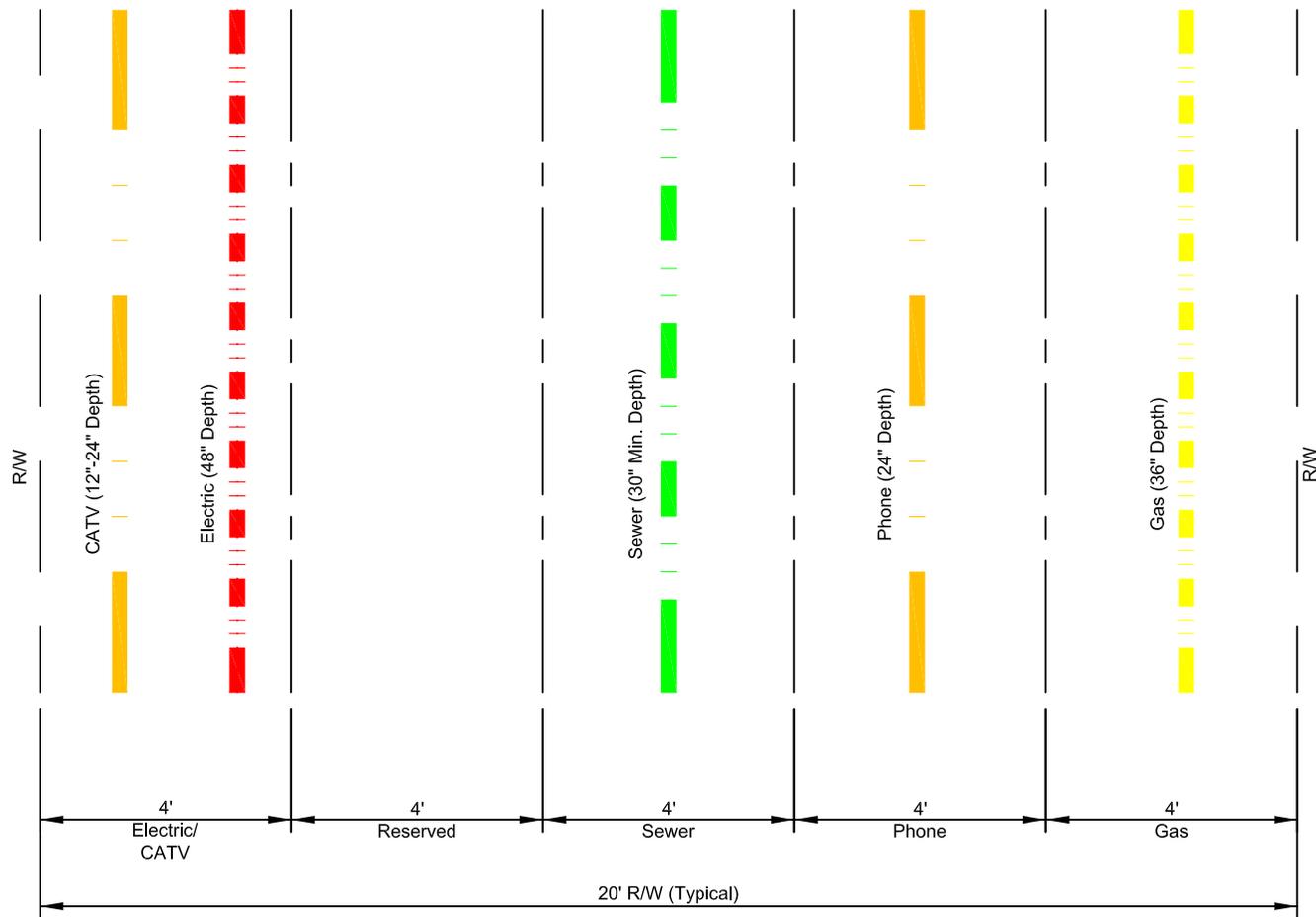
Any disturbance or damage to landscaped areas of public right-of-way, and/or the adjacent impacted area on private property, caused by the activities of a utility or any agent, affiliate, employee, or subcontractor, while occupying, constructing, repairing or maintaining sidewalks and/or driveways on public right-of-way or private property shall be returned or restored to its functional equivalence before the damage pursuant to the reasonable requirements and specifications of the City. If the utility fails to make the repairs required by the City, the City may make those repairs and charge the actual repair costs to the utility.

7. TEMPORARY TRAFFIC CONTROL (Barricades, Warning Signs, and Lights)

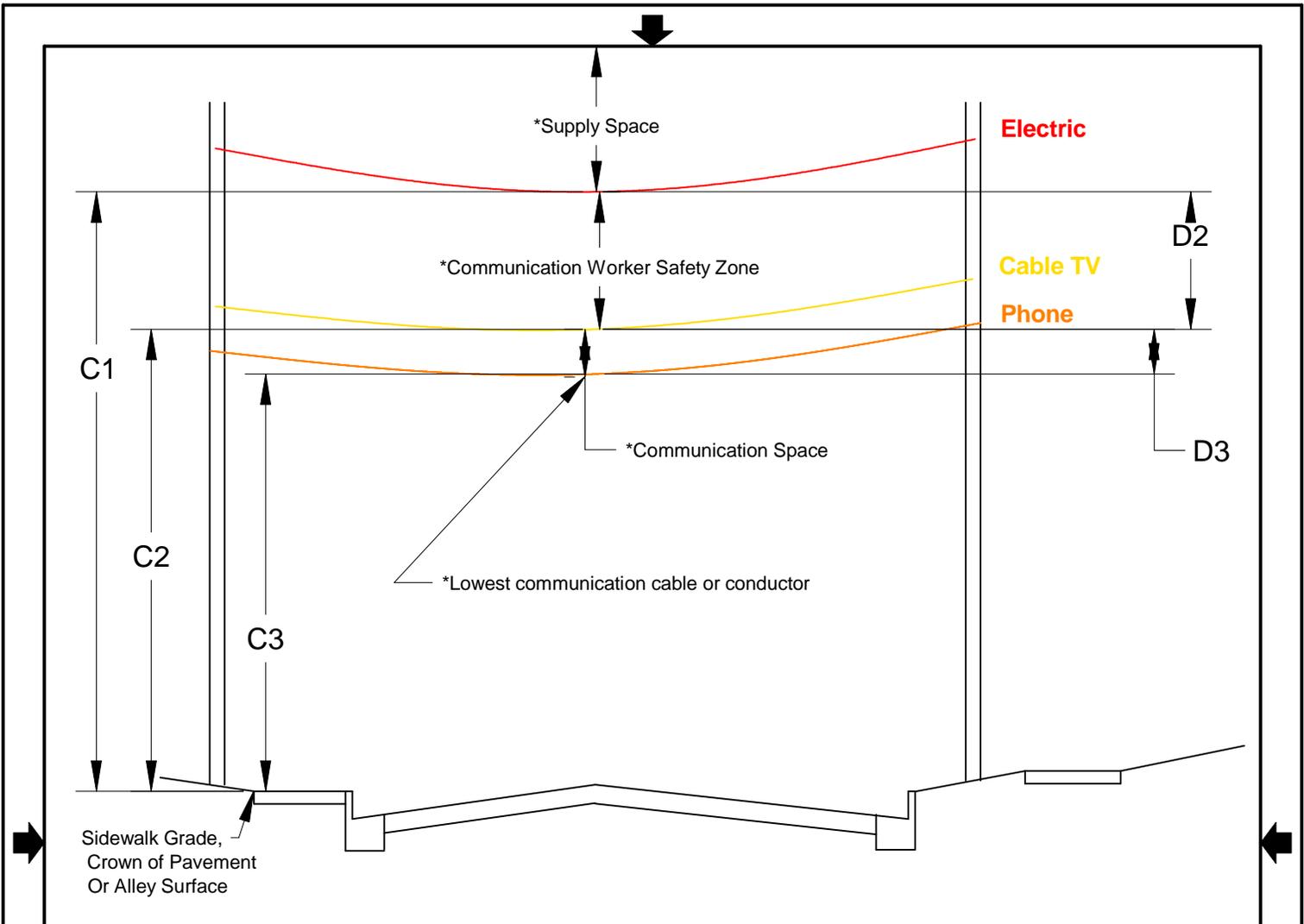
Temporary traffic control is the responsibility of the permit holder/contractor. The permit holder/contractor shall submit a plan to the Public Works Department for review. The temporary traffic control shall conform to Part 6, Temporary Traffic Control, of the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).

8. STATE HIGHWAYS

If the work is on a state highway, a KDOT permit is required. Permits are obtained at the KDOT District 6 office at 121 N. Campus Drive. The City must sign the KDOT permit.



CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
UTILITY LAYOUT – ALLEYS	
Revisions:	Date: JUNE 2017
	Dr. No.: III-1



TYPICAL OVERHEAD UTILITY CROSSING

	Overhead Clearances and Separations			
	Min. Clearance Above Surface		Min. Separation Between Utilites	
	Single Use	Joint Use		
C1	18'-6"	21'-10"		
			D2	40"
C2	17'-0"	18'-0"		
			D3	12"
C3	17'-0"	17'-0"		

*Reference: National Electric Safety Code 2017

NOTES:

- Overhead clearances and separations are the same for installations running parallel with the right-of-way.
- Overhead clearances at signalized intersections shall be a minimum of 22' to lowest line.
- Lateral placement of Utility Poles in right-of-way shall be approved by the City Engineer.

CITY OF GARDEN CITY
PUBLIC WORKS DEPARTMENT

OVERHEAD UTILITY STANDARDS

Revisions:	Date: JUNE 2017
	Dr. No.: III-2

SECTION IV

IMPROVEMENTS ON PRIVATE PROPERTY

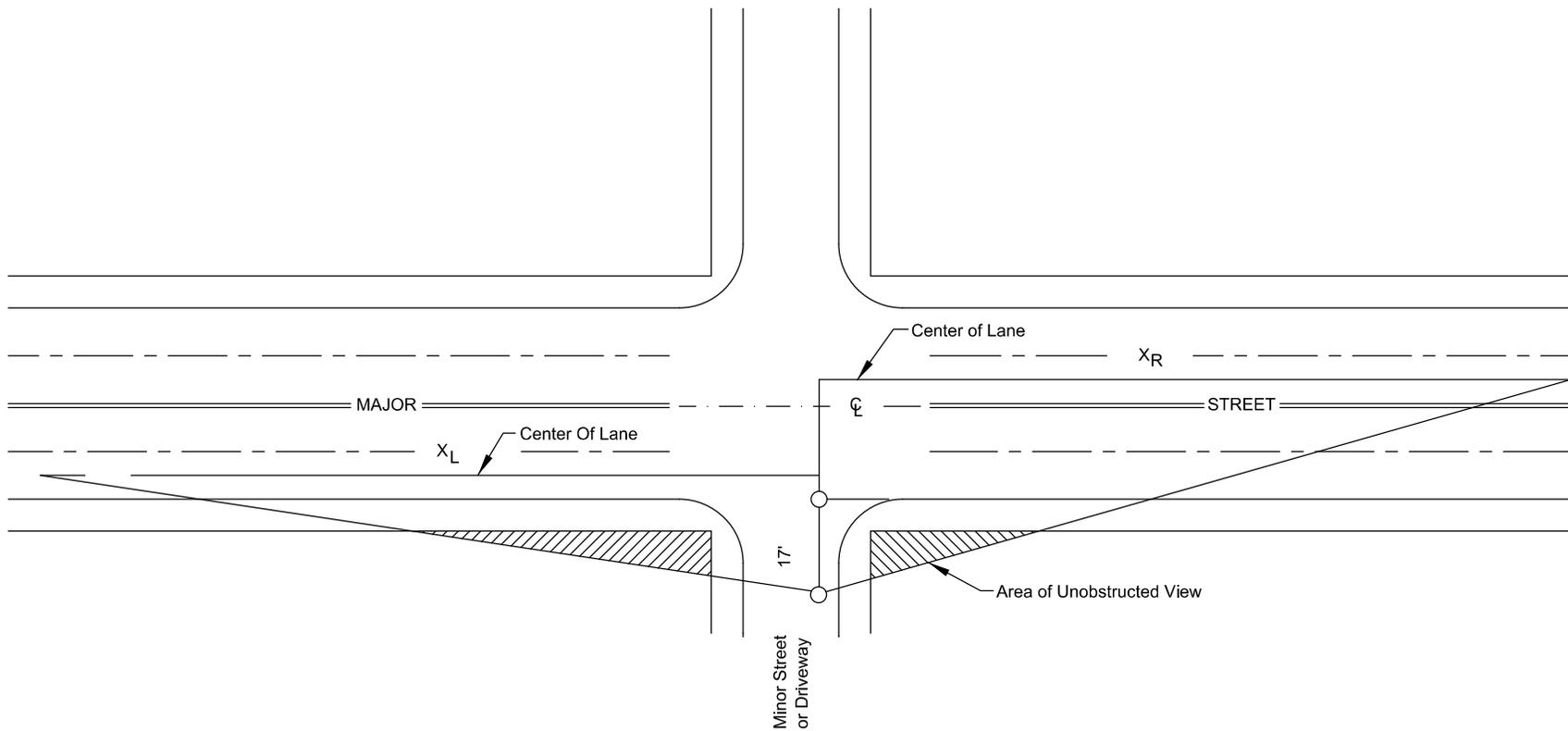
GRADING AND DRAINAGE

The following excerpt is from the Subdivision Regulations of Garden City, Kansas, as adopted by Ordinance No. 2300 (July 1, 2005):

Section 70-2: 9.040 F

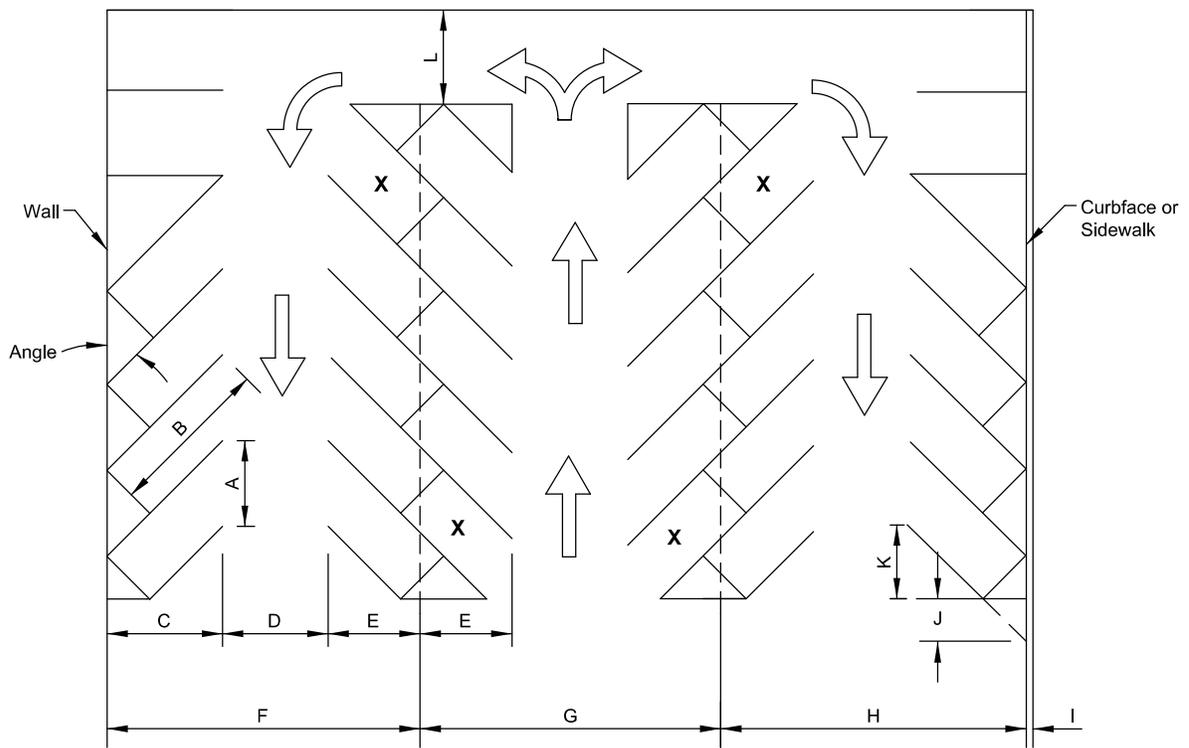
Lot Drainage: Lots shall be laid out so as to provide positive drainage away from all buildings and alleys, and individual lot drainage shall be in conformance with the approved subdivision drainage plan.

City's interpretation: Unless otherwise specifically approved by the City, the lots shall be graded such that the drainage flows from a highpoint at the alley, or rear lot line, towards the street. The alley grade is to be a minimum of 12" higher than the highest curb in the block.



Posted Speed	Distance (ft)		
	X_L	X_R	
		2 Lanes	4 Lanes
30	270	190	140
35	340	230	165
40	430	280	210

CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
SIGHT TRIANGLE @ STOP CONTROLLED INTERSECTION OR DRIVEWAY	
Revisions:	Date: JUNE 2017
	Dr. No.: IV-1



X - Stall not accessible in certain areas.
 May be designated for motorcycles
 or compact cars depending on size.

See Dr. No. IV-3 for handicap parking requirements.
 Parallel parking stalls are 26' x 8.0'.
 Angled and perpendicular parking stalls are 9' wide.
 Pavement markings shall be white.

PARKING LOT PLAN

ITEM	DIM.	ANGLE		
		45°	60°	90°
Stall Width	A	12.7	10.4	9.0
Stall Length of Line	B	29.0	25.2	20.0
Stall Depth @ Wall	C	20.5	21.8	20.0
Aisle Width Between Rows	D	12.0	16.0	26.0
Stall Depth @ Interlock/Curb	E	17.3	19.6	20.0
Wall to Interlock Module	F	49.8	57.4	66.0
Interlock to Interlock Module	G	46.6	55.1	66.0
Interlock to Curb Module	H	49.8	57.4	66.0
Bumper Overhang	I	2.0	2.3	2.5
Offset	J	6.4	2.6	0.0
Setback	K	14.1	10.0	0.0
Cross Aisle, One-Way	L	14.0	14.0	14.0
Cross Aisle, Two-Way	L	24.0	24.0	24.0

NOTE TO DESIGNER:

Due to the size of some vehicles (suv/pick-up), consideration should be given to wider & deeper stalls and wider aisles. Larger spaces could be grouped along one side of an aisle.

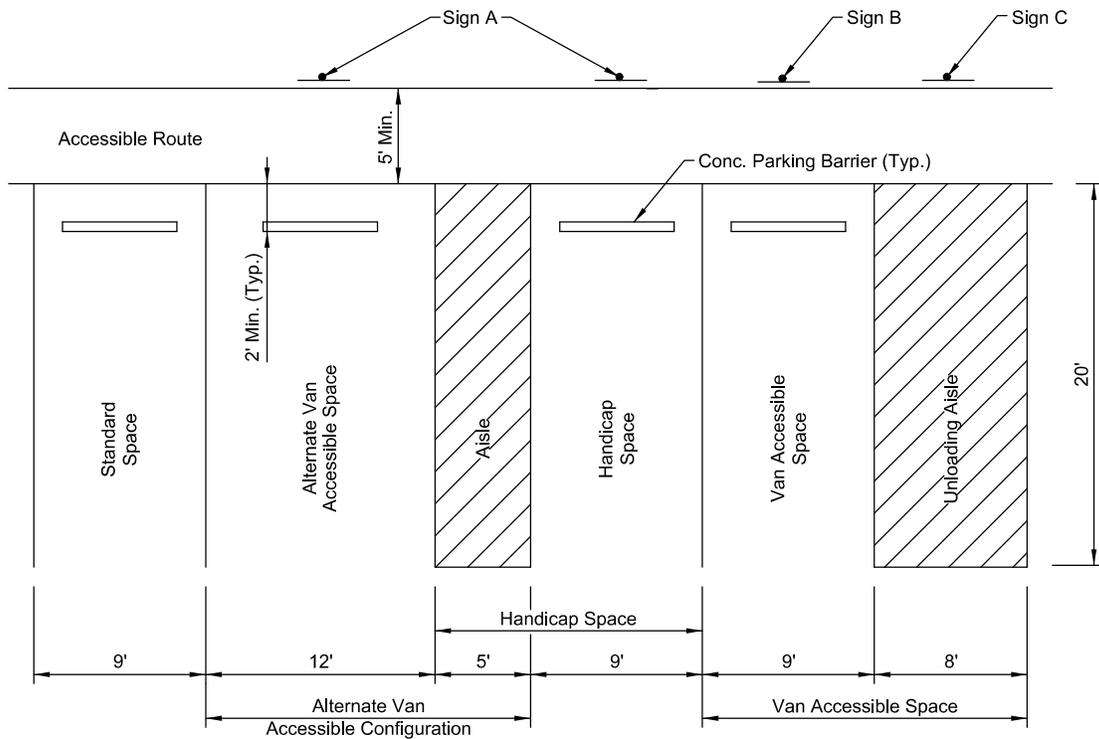
CITY OF GARDEN CITY, KANSAS
 PUBLIC WORKS DEPARTMENT

PARKING LOT LAYOUT

Revisions:

Date: JUNE 2017

Dr. No.: IV-2



HANDICAP PARKING SPACES

Ramps must not extend into aisles.
 Accessible route is 5' min. unobstructed width.

HC parking signage is required.
 -Signs are white on blue.
 -Signs shall be 12" x 18" min.
 -Mounted on post or wall at 5' to 6' height to bottom of sign, measured from pavement.

HC symbol on pavement is NOT required.

HANDICAP PARKING REQUIREMENTS:

Total Spaces	HC Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2% of Total
1001+	20 + 1/100 over 1000

1 per 8 HC Spaces shall be van accessible.

All spaces may be universal type.



Sign A



Sign B



Sign C

Refer to the U.S. Department of Justice Civil Rights Division Disability Rights Section ADA Design Guide for additional information. The most stringent guideline shall be followed.

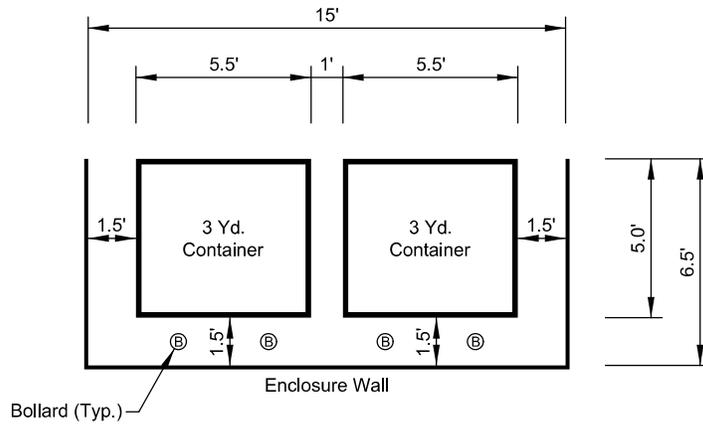
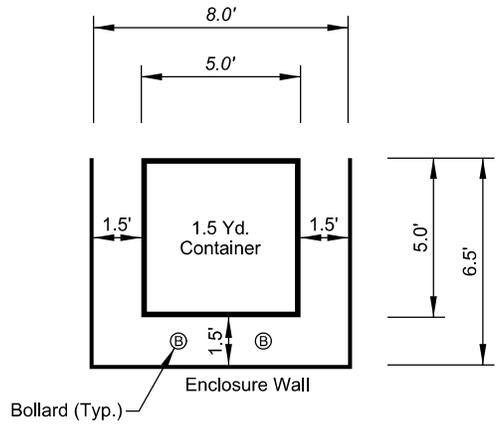
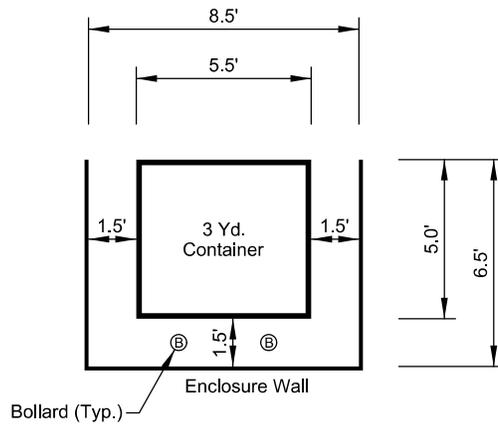
CITY OF GARDEN CITY, KANSAS
 PUBLIC WORKS DEPARTMENT

HANDICAP PARKING

Revisions:

Date: JUNE 2017

Dr. No.: IV-3



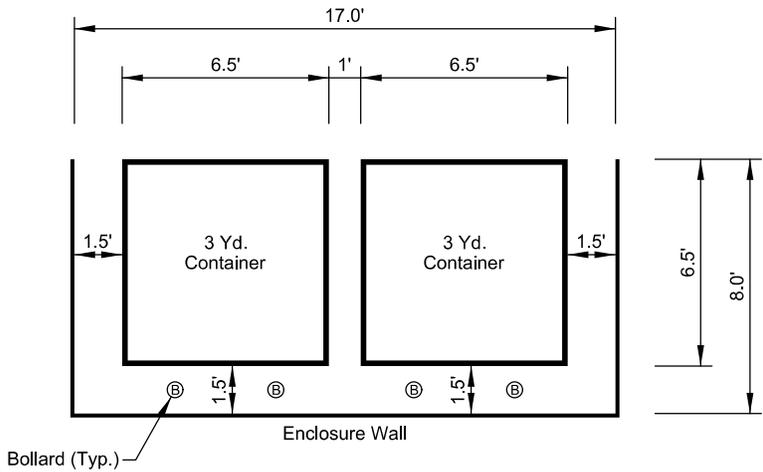
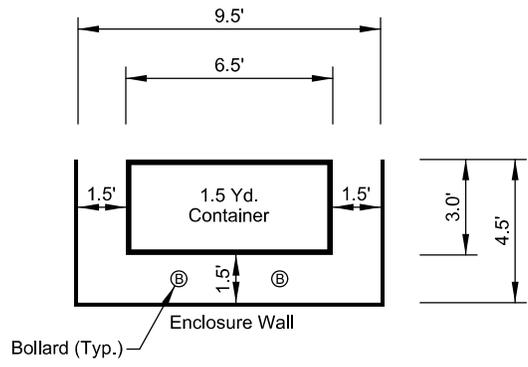
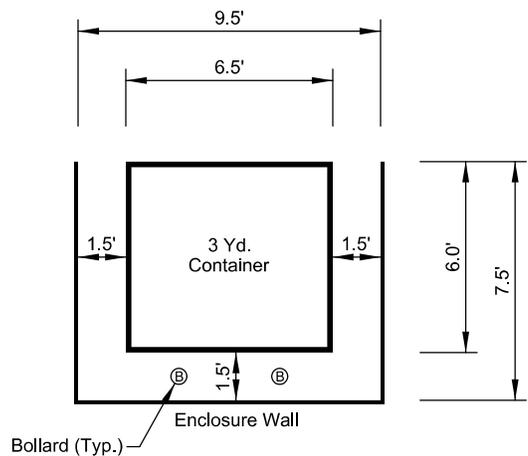
CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

SOLID WASTE ENCLOSURE DETAILS
SIDELoader CONTAINERS

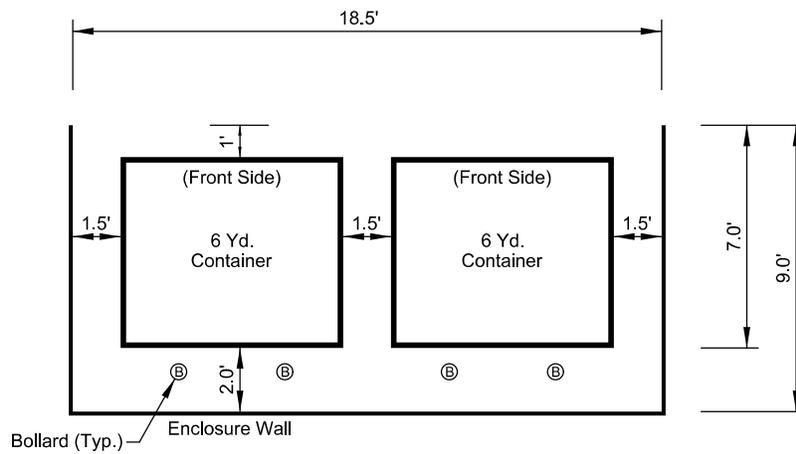
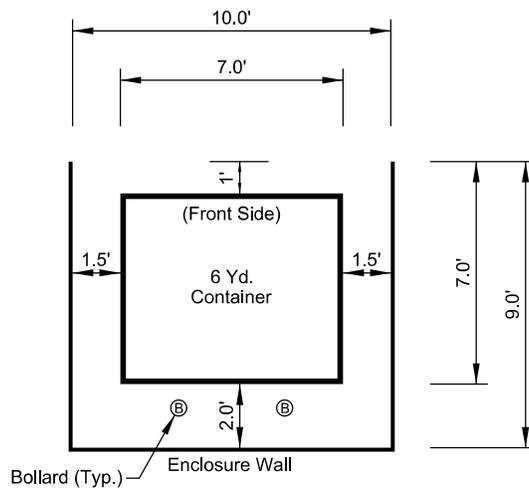
Revisions:

Date: AUGUST 2017

Dr. No.: IV-4



CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
SOLID WASTE ENCLOSURE DETAILS REARLOADER CONTAINERS	
Revisions:	Date: AUGUST 2017
	Dr. No.: IV-5



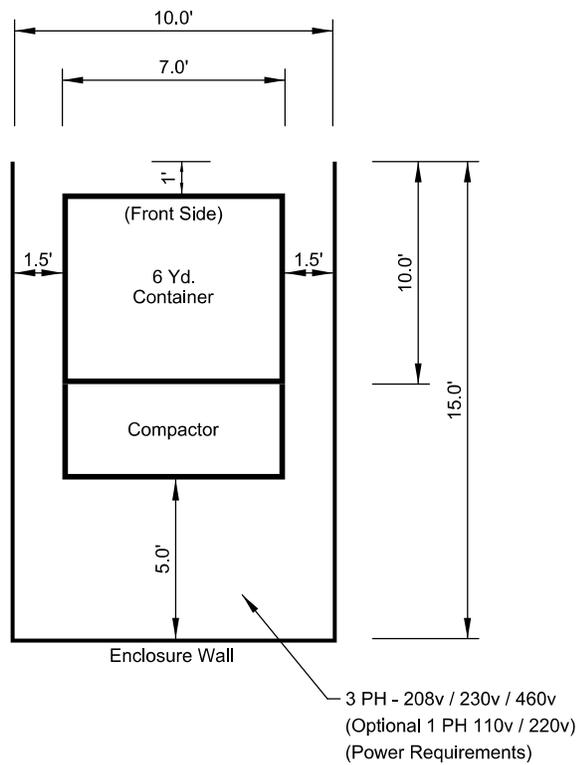
CITY OF GARDEN CITY, KANSAS
PUBLIC WORKS DEPARTMENT

SOLID WASTE ENCLOSURE DETAILS
FRONTLOADER CONTAINERS

Revisions:

Date: AUGUST 2017

Dr. No.: IV-6



CITY OF GARDEN CITY, KANSAS PUBLIC WORKS DEPARTMENT	
SOLID WASTE ENCLOSURE DETAILS FRONTLOADER CONTAINER WITH COMPACTOR	
Revisions:	Date: AUGUST 2017
	Dr. No.: IV-7

SECTION V

PERMITS AND INSPECTIONS

PERMITS

A. STATE HIGHWAYS

If the work is on a state highway, a KDOT permit is required. Permits are obtained at the KDOT District 6 office at 121 N. Campus Drive. The City must sign the KDOT permit.

B. EXCAVATIONS

Excavation Permits are obtained at the City Building Inspection Department located in the City Administrative Center.

C. SIDEWALKS & DRIVEWAYS

A Curb Cut/Sidewalk Permit is required to construct or replace a sidewalk or a driveway. The cost of the work need not be specified at the time the permit is purchased. The permit is obtained from the City Building Inspection Department located in the City Administration Center

D. PARKING LOTS

Parking lot construction is covered under a Building Permit. The cost of the work must be specified at the time the permit is purchased. The permit is obtained from the City Building Inspection Department located in the City Administration Center.

E. TEMPORARY TRAFFIC CONTROL (Barricades, Warning Signs, and Lights)

Temporary traffic control is the responsibility of the permit holder/contractor. The permit holder/contractor shall submit a plan to the Public Works Department for review. The temporary traffic control shall conform to Part 6, Temporary Traffic Control, of the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).

INSPECTIONS

The City conducts inspections of all sidewalk and driveway construction. The Kansas Department of Transportation also inspects and approves construction covered under separate KDOT permits. Contractors are responsible for notifying KDOT of the need for inspections.

The following lists are not to be considered all-inclusive. Inspection is by cursory means only. A more detailed inspection may be conducted at the discretion of the City.

A. CURB AND GUTTER

1. The flowline of the gutter should be free of dirt and debris.
2. The curb and gutter should not be broken, cracked, or damaged.
3. The area behind the curb should be back-filled and properly graded to the street.

B. SIDEWALKS

1. Isolation joints and contraction joints should be properly placed.
2. The sidewalk should be properly graded, both longitudinally and transversely.
3. The thickness and width of the sidewalk shall conform to the standard plan and section.
4. The placement of sidewalks shall conform to current City policy.
5. Compaction beneath sidewalks shall be as specified.

6. The sidewalk should not be broken, damaged, or misaligned.
7. The Contractor is responsible for compaction around and on utility meters or service lines.
8. Sidewalk (handicap) ramps to be constructed as specified, when required.

C. DRIVEWAYS

1. Compaction beneath driveways shall be as specified.
2. The removal and replacement of curb and gutter shall be as specified.
3. Isolation joints should be properly placed.
4. The placement, thickness, and width of driveways shall conform to standards.
5. The driveway should not be broken, damaged, or misaligned.
6. The driveway should be properly graded.
7. The portion of the driveway through the sidewalk should conform to the standard plans and specifications for sidewalks.

D. GENERAL SITE IMPROVEMENTS

1. The improvements should match those shown on the plot plan.
2. Check compaction beneath concrete porch landings and air conditioning pads.
3. Check for proper backfill and compaction adjacent to the structure foundation, driveway, and walks.
4. The grade of the yard will be checked to insure proper drainage.
5. Parking lots: required number of spaces, spaces painted, with handicap spaces marked/signed.

E. CONCRETE FORM INSPECTIONS

1. The Public Works Department will conduct a form inspection. The Contractor shall contact the Public Works Department 24-hours in advance to schedule an inspection.

F. EXCAVATIONS

The City makes excavation inspections in accordance with the Excavation Standards (Section I). 24-hour advance notification is required.

1. Backfill inspections are made prior to backfilling the excavation. Inspection during actual backfilling operations may be made.
2. Prepaving inspections are made to determine if sufficient pavement has been removed and or properly removed.
3. Paving observations are to be requested. However contractors are not required to wait for an inspection to commence paving.

APPENDIX A

STANDARD SPECIFICATIONS

City of Garden City, 2017 Standard Specifications

Section AP-1, 1-4	Asphalt Paving
Section Str-4, 1-4	Concrete Pavement
Section Str-5, 1-3	Patching
Section Str-6, 1-2	Concrete Mixtures
Section W-1, 1-18	Watermains
Section W-2, 1-2	Boring and Casing
Section W-3, 1-2	Directional Drilling
Section SS-1, 1-12	Sanitary Sewer Construction
Section SS-2, 1-7	Submersible Lift Station

STANDARD SPECIFICATIONS
ASPHALT PAVING
SECTION AP-1

1. SCOPE:

The work covered by this section of the specifications consist of furnishing all labor, equipment, appliances and materials and in performing all operations in connection with the construction of a bituminous mix meeting the requirements of **Hot Mix Asphalt (HMA) – Commercial Grade Class A (Section 611)** mixed in a central plant, and spread and compacted on a prepared subgrade in accordance with these specifications and in close conformity with the lines, grades, thickness and typical cross sections as shown on the plans or established by the Engineer.

2. MATERIALS:

The materials for the plant mix bituminous mat shall meet the requirements for Hot Mix Asphalt (HMA) – Commercial Grade Class A, Section 611 and Divisions 1100 and 1200.

The Contractor shall submit from an independent testing lab a Design Job Mix Marshall (50 blow) Properties that fit the requirements of the specific job as specified. All tests shall be furnished to the Engineer 2 weeks before work starts for approval.

3. EQUIPMENT:

All equipment necessary for accomplishing the work required under this section of the specifications shall be as specified in the latest edition of the Standard Specifications of the Kansas Department of Transportation.

4. CONSTRUCTION REQUIREMENTS:

PREPARATION OF ASPHALT CEMENT: Asphalt cement shall be heated within a temperature range of 275° F. to 325° F. at the time of mixing. All material reheated more than 75° F. above the maximum shown shall be considered overheated and shall be rejected until the material can be resampled and tested. The acceptance or rejection will be made on the same requirements as established for the original material. Asphalt cement received from the refinery at temperature in excess of 325° F. but not exceeding 375° F. may be used.

PREPARATION OF MINERAL AGGREGATE: Each aggregate ingredient shall be heated and dried at such temperatures that the temperature as recorded in the hot fines bin after screening shall not exceed 325° F. If the aggregates contain sufficient moisture to cause

foaming in the mixture or their temperature is in excess of 325° F., they shall be removed from the bins and returned to their respective stockpiles.

The aggregate or aggregates immediately after heating shall be screened into at least three (3) sizes and conveyed into separate bins ready for batching and mixing with bituminous material. When the aggregates furnished are of such size and grading that separating into three bins is impractical, the number of required separations may be reduced to two (2) with the approval of the Engineer. The efficiency of the screening operation shall be sufficient to produce, at plant operating capacity, gradations in each of the sizes of heated and dried aggregates which are uniform and result in the production of a mixture complying with the limits specified herein.

PREPARATION OF SUBGRADE: When the bituminous mixture is placed on a prepared subgrade and whether or not a prime cost is designated on the plans, the prepared base or road surface shall be prepared to meet the following requirements:

- a) The subgrade shall be free of all sod, weeds, brush, debris, or other undesirable material. All subgrade soil shall be uniformly compacted; soft, yielding material shall be removed and replaced with approved material. The subgrade shall be dampened prior to placing the concrete, but care shall be exercise to prevent puddling or muddy conditions.

- b) All fill material shall be approved material, placed in successive layers not exceeding 8 inches in depth for the full width of the subgrade, and compacted to 95% Standard Proctor.

PLACING OF THE MIXTURE: The bituminous mixture shall be spread and finished reasonably true to crown and grade by the automatically controlled self-propelled bituminous paver. Bituminous mixtures may be spread and finished by hand methods only where machine methods are impractical as determined by the Engineer.

The paver shall be operated at a speed which will give the best results for the type of paver being used and which coordinates satisfactory with the rate of delivery of the mixture to the paver so as to provide a uniform rate of placement without intermittent operation of the paver.

All mixed material shall be delivered to the paver in time to permit completion of spreading, finishing and compaction of the mixture during daylight hours. Night time work on projects not open to traffic may be permitted when ample lighting and other satisfactory means are provided.

Bituminous materials spreaders shall be equipped with electronic sensing devices for grade controls. The device shall be capable of utilizing the stringline, long ski sled, joint matches, and automatic transverse grade control methods for controlling grades. The long ski sled shall have a minimum length of 25 feet.

Bituminous mixtures except on leveling courses shall be spread in a placement thickness so that after rolling the nominal thickness of the completed mat will not exceed two (2) inches for the surface or top lift and intermediate lifts.

The maximum thickness for lifts may be increased slightly when such increase is more adaptable to total pavement thickness and when in the opinion of the Engineer it is not detrimental to placement and rolling conditions.

If the total plan thickness is less than two and one half (2½) inches the material may be placed in one lift, unless otherwise designated on the plans.

MACHINE SPREADING: The Engineer will determine a Reference Grade Line necessary to erect the Reference String Line. On the initial pass the asphaltic mixture shall be spread to a grade line constant to the Reference String Line. The string will be taut and free from sags at the time it is in use as a guide for the paver. On the second or subsequent laydowns the asphaltic mixture shall conform to a Mobile String Line. If the existing surface is of acceptable centerline grade as determined by the Engineer from the profile survey, the Engineer may permit the rise of the Mobile String Line for all lifts.

COMPACTION OF MIXTURES: After spreading and strike-off and as soon as the mix conditions permit the rolling to be performed without excessive shoving or tearing, the mixture shall be thoroughly and uniformly compacted.

Rollers shall be of the steel wheel and/or pneumatic tire and shall be in good condition, capable of reversing without backlash and shall be operated at speeds slow enough to avoid displacement of the bituminous mixture. The use of equipment which results in excessive crushing of the aggregate will not be permitted. The selection of the type of roller to be used on the breakdown rolling may be varied to suit mix characteristics. The final rolling of the top or surface course shall be accomplished with a steel roller unless otherwise designated.

Any mixture that becomes loose, broken, mixed with foreign material, or which is in any way defective in finish or density, or which does not comply in all other respects with the requirements of the specifications shall be removed, replaced with suitable material, and finished in accordance with these specifications.

CONTACT SURFACES: Contact surfaces of curbing, gutters, manholes, and similar structures shall be tacked with a thin uniform coating SS-1H. The bituminous mixture shall be placed

uniformly high near the contact surfaces so that after compaction it will be one-fourth ($\frac{1}{4}$) inch above the edge of such structures.

JOINTS: Joints between old and new pavements or between successive days work shall be made so as to insure thorough and continuous bond between the old and new mixtures. Transverse construction joints in previously laid material may be constructed by cutting the material back its full depth so as to expose a fresh surface. Where a wooden header is used at a construction joint the cutting may be omitted provided the joint conforms to the specified thickness and cross section.

Before placing the fresh mixture against a cut joint or against old pavement the contact surface shall be sprayed or painted with a thin uniform coat of asphalt material. Where a finishing machine is used, the longitudinal joint shall be made by overlapping the screed on the previously laid material for a width of at least one (1) inch and depositing a sufficient amount of mixture so that the joint formed will be smooth and tight.

TACK COAT: A tack coat of SS-1H applied at a minimum of 0.05 gallon per yard will be placed between lifts

SURFACE TOLERANCES: The surface shall be tested using a sixteen (16) foot straight-edge at selected locations. The variation of the surface from the testing edge of the straightedge between any two (2) contacts with the surface shall at no point exceed $\frac{1}{4}$ inch. All humps or depressions exceeding this tolerance shall be corrected by removing defective work and replacing it with new material as directed. The material required to correct surface tolerances will be at the expense of the contractor.

WEATHER LIMITATIONS: Hot asphalt pavement shall be placed only when the air temperature is 50° F. or above and when the weather is not foggy or rainy and when the surface is free from moisture.

STANDARD SPECIFICATIONS
CONCRETE PAVEMENT
SECTION Str-4

1. SCOPE

The work covered by this section of the specifications consist of furnishing all labor, equipment, appliances and materials and in performing all operations in connection with the construction of concrete pavement mixed in a central plant, and spread and compacted on a prepared subgrade in accordance with these specifications and in close conformity with the lines, grades, thickness and typical cross sections as shown on the plans.

2. CONCRETE MIX DESIGN

Contractor shall comply with Section Str-6, Concrete Mixtures, of these specifications.

1. CONCRETE PAVEMENT

Unless otherwise noted, concrete pavement shall be air entrained (AE), have a 3 inch maximum slump and shall reach a 4,000 psi twenty-eight (28) day compressive strength. Testing shall be the responsibility of the Contractor.

Construction joints shall be tied with 24" No. 4 deformed bars on 24" centers. Concrete pavement shall be tied to the curb & gutter using 18" deformed No. 4 bars on 24" centers. Construction joints shall also be keyed.

When Non-Reinforced Dowel Jointed (NRDJ) Pavement is specified, dowel baskets shall be of the size and spacing identified on the drawings.

Construction joints and saw cuts shall be sealed with cold applied chemically cured joint sealant or hot pour sealant material. Joints may be sealed upon completion of all pavement, under traffic, rather than on a phased basis.

Concrete pavement may be opened to traffic on a phased basis, or completion of major intersections, as directed by the Engineer, when concrete has reached a minimum compressive strength of 3,500 psi.

2. PLACING

At the Contractor's option, the slip form or fixed form paving method may be used.

a. Slip Form Paving.

The contractor may use standard manufacture, slip form paving equipment capable of spreading, consolidating, screeding and float finishing freshly placed concrete in one pass. Such equipment shall be capable of producing a homogeneous pavement to the specified cross-section, profile and density, and shall be automatically controlled in regard to line and grade.

Moisten dry subgrade to minimize absorption of water from the fresh concrete. Subgrade shall not be muddy, soft, frozen, or covered with standing water when concrete is placed.

Use a standard manufacture longitudinal finisher capable of producing a smooth surface to the specified cross-section. The longitudinal finisher may operate either mechanically or manually. Adjust and operate the longitudinal finisher (in conjunction with the finishing screed) so that a small roll of mortar is carried ahead of the float.

b. Fixed Form Paving.

(1) Forms. Use straight, metal forms having adequate strength to support the equipment. Each section shall be a minimum of 10 feet in length. Use forms with a depth equal to the prescribed edge thickness of the concrete, a base width at least equal to the depth of the forms and without a horizontal joint. Flexible or curved forms must be approved by the Engineer. The Engineer may approve the use of wood forms in areas requiring hand finishing. Secure the forms in place to withstand the impact and vibration of the consolidating and finishing equipment without visible spring or settlement. Extend flange braces outward on the base a minimum of $\frac{2}{3}$ the height of the form. Remove forms with battered top surfaces or bent, twisted or broken forms. Do not use repaired forms until they have been inspected and approved by the Engineer. Do not vary the top face of the form from a true plane more than $\frac{1}{8}$ inch in 10 feet, and do not vary the vertical face of the form by more than $\frac{1}{4}$ inch. The forms shall contain provisions for locking the ends of abutting form sections together tightly, and for secure setting.

(2) Base Support. Provide a foundation under the forms that is compact and true to the specified grade so that the whole length of the form will be set firmly in contact with the grade.

(3) Form Setting. Set forms sufficiently in advance of the point where concrete is being placed so that line and grade may be checked. After the forms have been correctly set, thoroughly tamp the grade mechanically at both the inside and

outside edges of the base of the forms. Tightly lock form sections, free from play or movement in any direction. Do not deviate the form from true line by more than ¼ inch at any point. No excessive settlement or springing of forms under the finishing machine is permitted. Clean and oil forms before the placing of concrete.

(4) **Grade and Alignment.** Check the alignment and grade elevations of the forms immediately before placing the concrete and make any necessary corrections. When any form has been disturbed or any grade has become unstable, reset and recheck the form.

(5) **Placing & Finishing.** Use an approved roller or razor finishing screed capable of finishing the pavement to the required grade, section and density. Operate the finishing screed so that a small roll of mortar is carried ahead of the screed.

(6) **Removing Forms.** Unless otherwise provided, do not remove forms from freshly placed concrete until it has set for a minimum of 12 hours, except auxiliary forms used temporarily in widened areas. Remove forms carefully to avoid damage to the pavement.

3. TEXTURING

a. **Burlap Drag.** Use a drag consisting of a seamless strip of damp burlap, artificial turf or cotton fabric. Use a drag that produces a uniform, gritty texture when pulled longitudinally along the full width of the pavement. Use only drags that are clean and free of encrusted mortar.

b. **Grooving Equipment.** Use standard manufacture transverse or longitudinal grooving equipment capable of covering the width of the pavement in a single pass. Use grooving equipment with a metal comb that is capable of producing a uniform pattern of grooves approximately 3/16 inch wide, spaced at ¾ inch centers and ⅛ to ¼ inch deep. Small or irregular areas may be grooved by hand methods.

a. Before final finishing is completed and before the concrete has taken its initial set, the edges of the slab shall be carefully finished with an edger.

b. **Float Finish:** After the surface stiffens enough to support the operation, float with hand floats or powered disc floater. Check the concrete surface to insure level and smoothness, cutting down high spots and filling in low areas.

- c. Broom Finish: Immediately after the concrete has received a float finish, produce a coarse transverse scored texture by drawing a concrete broom across the surface. Striations shall be perpendicular to the direction of traffic.
- d. With jointer or saw, cut control joints to $\frac{1}{4}$ of the depth of the slab. Consult the City Engineer for joint spacing requirements. Where control joints meet, they shall not form tees or angles of less than 70° . Where tees or reentrant corners are unavoidable, a 4-foot length of #4 rebar shall be embedded in the top half of the slab as a crack stop.

4. CURING AND PROTECTION

- a. Protection from Mechanical Injury: During the curing period, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage caused by construction equipment or materials, application of curing procedures, pedestrian traffic, rain or running water. Concrete injured by any of the above actions shall be removed and replaced at the expense of the Permit holder.
- b. Cold Weather Placement: When placing concrete after the first frost or when the mean daily temperatures are below 40° F, the following requirements apply. Use a specified accelerator in the concrete. Maintain concrete temperature at a minimum of 55° F for not less than the time required for the duration of barricade placement. Do not place concrete without approval of the City Engineer on days when the temperature at 9:00 a.m. is below 30° F. Do not place concrete until the outside air temperature is 35° F and rising and stop pouring when the temperature reaches 40° F and is falling. When concrete has been placed and the temperature may drop below 35° F, spread insulated curing blankets over the concrete to prevent freezing of the concrete. These blankets should be left on at least 2 days to assure proper curing, if the temperatures remain below 40° F. Concrete injured by frost action shall be removed and replaced at the expense of the Permit holder.
- c. Hot Weather Placement: When air temperature is expected to exceed 95° F, the Permit holder shall use hot weather placement procedures in placing, finishing, protecting, and curing the concrete. The temperature of the concrete at the time of placement shall not exceed 90° F. Provide protection to prevent rapid drying. Start finishing and curing as soon as possible. Water reducing retarding admixture may be used.
- d. Use white pigmented, wax-resin based curing compound, ASTM C309, Type II, Class B, if required by the City Engineer.

STANDARD SPECIFICATIONS
PATCHING
SECTION Str-5

1. CONCRETE MIX DESIGN

Concrete for patching shall meet the requirements of Section Str-6, Concrete Mixtures, of these specifications. Testing shall be the responsibility of the Contractor.

2. CURB & GUTTER

Concrete for curb and gutter and concrete pavement shall meet the requirements of Section Str-6, Concrete Mixtures, of these specifications.

3. CONCRETE PATCHING

The thickness of the patch surface shall be at least as thick as the adjacent concrete or asphalt surfacing, but not less than 7 inches thick.

- a. Extra precaution of time will be required if the temperature, after placement of the concrete, falls below sixty (60) degrees F. Hot weather precautions should be observed in the temperature of the concrete before placement reaches ninety (90) degrees F.
- b. Concrete patches shall be opened to traffic when concrete has reached a minimum compressive strength of 3,500 psi.
- c. Where colored concrete pavement is required, it shall meet the concrete mix design specified above with pigment added.
- d. The Contractor shall be responsible for any asphalt backfill between the repaired and existing surfaces. Cold-mix asphalt shall not be used.
- e. Excavation, base manipulation and compaction are subsidiary items.

4. REINFORCEMENT

Tie bars and dowels are required on concrete surfaced streets. Minimum of ½ inch tie bars shall be placed at 24-inch centers on patch edges perpendicular to the direction of traffic. Dowels may be required if patch covers more than one panel. Use ¾" smooth steel bars with dowel cap on one end.

5. PLACING

Moisten dry subgrade to minimize absorption of water from the fresh concrete. Subgrade shall not be muddy, soft, frozen, or covered with standing water when concrete is placed.

- a. Before final finishing is completed and before the concrete has taken its initial set, the edges of the slab shall be carefully finished with an edger.
- b. Float Finish: After the surface stiffens enough to support the operation, float with hand floats or powered disc floater. Check the concrete surface to insure level and smoothness, cutting down high spots and filling in low areas.
- c. Broom Finish: Immediately after the concrete has received a float finish, produce a coarse transverse scored texture by drawing a concrete broom across the surface. Striations shall be perpendicular to the direction of traffic.
- d. With jointer or saw, cut control joints to ¼ of the depth of the slab. Consult the City Engineer for joint spacing requirements. Where control joints meet, they shall not form tees or angles of less than 70°. Where tees or reentrant corners are unavoidable, a 4-foot length of #4 rebar shall be embedded in the top half of the slab as a crack stop.

6. CURING AND PROTECTION

- a. Protection from Mechanical Injury: During the curing period, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage caused by construction equipment or materials, application of curing procedures, pedestrian traffic, rain or running water. Concrete injured by any of the above actions shall be removed and replaced at the expense of the Permit holder.
- b. Cold Weather Placement: When placing concrete after the first frost or when the mean daily temperatures are below 40° F, the following requirements apply. Use a specified accelerator in the concrete. Maintain concrete temperature at a

minimum of 55° F for not less than the time required for the duration of barricade placement. Do not place concrete without approval of the City Engineer on days when the temperature at 9:00 a.m. is below 30° F. Do not place concrete until the outside air temperature is 35° F and rising and stop pouring when the temperature reaches 40° F and is falling. When concrete has been placed and the temperature may drop below 35° F, spread insulated curing blankets over the concrete to prevent freezing of the concrete. These blankets should be left on at least 2 days to assure proper curing, if the temperatures remain below 40° F. Concrete injured by frost action shall be removed and replaced at the expense of the Permit holder.

- c. Hot Weather Placement: When air temperature is expected to exceed 95° F, the Permit holder shall use hot weather placement procedures in placing, finishing, protecting, and curing the concrete. The temperature of the concrete at the time of placement shall not exceed 90° F. Provide protection to prevent rapid drying. Start finishing and curing as soon as possible. Water reducing retarding admixture may be used.
- d. Use white pigmented, wax-resin based curing compound, ASTM C309, Type II, Class B, if required by the City Engineer.

STANDARD SPECIFICATIONS
CONCRETE MIXTURES
SECTION Str-6

1. SCOPE

This section of the specifications covers the materials and mixtures of concrete pavement mixed in a central plant, for use in curb and gutter, concrete pavement and concrete patching.

2. CONCRETE MIX DESIGN

Contractors shall submit concrete mix design(s) to the Engineer for approval prior to beginning work.

- a. Mix concrete in accordance with ASTM C94.
- b. All aggregate shall meet requirements of the most current version of the Kansas Department of Transportation Spec Book.
- c. Only Type C or E Accelerating Admixtures may be used, Chloride Accelerators are not allowed.
- d. High-Early Strength Concrete – to be used when opening of traffic in 8 to 12 hours is desired. Use Type III cement or non-corrosive non-chloride additive to obtain the desired strength.
- e. All concrete mixtures shall be air entrained accomplished by addition of an approved air entraining agent. Air content shall be determined on each day of production as early and as frequently as necessary until the air content is consistently acceptable. The intended content of finished concrete is 6.0% and the “target” air content in front of the paver shall be determined to account for air loss during consolidation of concrete during slip form paving.
- f. Fly ash may be used as a partial replacement for Portland cement and blended hydraulic cement, when indicated in the Contact Documents. Fly ash shall meet requirements of the most current version of the Kansas Department of Transportation Spec Book.
 - i. Fly ash shall not exceed 20% of cement replacement.

3. CITY MIX DESIGNATIONS

Concrete Mix Designations					
<i>Location</i>	<i>Mix Designation</i>	<i>W/C ratio</i>	<i>Max. Slump</i>	<i>Air</i>	<i>Notes</i>
Sidewalk	CM-520-4000 CM-520-F-4000	0.42	3.5"	6% ±1%	
Curb & Gutter	CM-611-4000 CM-6-F-4000	0.42	3.5"	6% ±1%	
Pavement	CM-611-4000 CM-611-F-4000	0.42	3"	6% ±1%	10% extra rock
Patching	CM-752-5000	0.42	3"	6% ±1%	no flyash
Flowable Fill	Flowable Fill	--	--	--	1 Sax Mix
CM = City Mix; 520 = lbs of Cement; F = Flyash allowed; 4000 = 28 day compressive strength (psi)					

STANDARD SPECIFICATIONS

WATERMAINS

SECTION W-1

1.01 DESCRIPTION

This section covers construction of Watermains, including fittings, and other appurtenances normally used for water supply and distribution systems. This work consists of furnishing and installing pipe, fittings, valves, fire hydrants, construction of thrust blocks, testing, cleaning and disinfection of mains and other related work.

1.02 MATERIALS

A. PIPE

Pipe used in water main construction shall be as called out in the Special Provisions and shall be in accordance with the following specifications. Any other pipe acceptable for use on the projects shall be outlined in the Special Provisions.

POLYVINYL CHLORIDE (PVC) PRESSURE PIPE - PVC pipe for the watermains shall meet the requirements of ANSI/AWWA Specification C900, DR-18, or C905, DR-21, "Polyvinyl Chloride Pressure Pipe", made to ductile iron O.D.'s for "Push-On" joints. Pipe joints shall be bell and spigot with an elastomeric gasket or joint with double insertion lines. Pipe class shall be as specified in the Special Provisions.

POLYETHYLENE (PE) PRESSURE PIPE - PE pipe for the watermains shall meet the requirements of ANSI/AWWA Specification C906, DR 11, "Polyethylene Pressure Pipe".

DUCTILE IRON PIPE - Ductile iron pipe shall conform to the provisions of ANSI/AWWA Specifications C151, Class 51. Pipe joints shall be "Push-On" joints conforming to ANSI/AWWA Specifications C111. The interior of the pipe shall have a cement mortar lining conforming to the requirements of AWWA Specification C104. The outside surface of pipe designed for underground service shall receive a bituminous coating approximately one (1) mil thick.

TRACER WIRE - A 10 ga. tracer wire shall be installed along the centerline of the pipe and taped to the pipe on all watermains. The wire shall terminate at top of valve box and at test stations for fire hydrants. Test stations for fire hydrants shall be galvanized or polypropylene material "condulet" style with removable solid cover having two leads extending from the face, the test shall be attached to a 1-inch conduit (36" length minimum). Tracer Wire is subsidiary to water main construction.

PIPE RESTRAINT – Pipe restraints shall be from Romac Industries, Inc. For 12” and smaller diameter, use Grip Ring Pipe Restraint 4” to 12”, and for larger than 12” diameter use RomaGrip MJ Restraining Gland for ANSI/AWWA C905 14” to 24”.

SPECIAL PIPE - Pipe used to encase watermains shall be steel pipe as specified in *Specification W-2, Boring & Casing*. Pipe and fittings used in directional drilling installations shall be as specified in *Specification W-3, Directional Drilling*.

B. FITTINGS

Fittings used for water mains shall be ductile iron, Class 250 conforming to ANSI/AWWA Specifications C110/A21.10, Gray-Iron and Ductile Irons Fittings for water and Other Liquids. Joints for Ductile Iron and PVC Pipe shall be mechanical joint short body fittings conforming to ANSI/AWWA Specifications C111/A21.11 or compact body fittings conforming to ANSI/AWWA C153/A21.53. The interior of the fitting shall have a cement mortar lining conforming to ANSI/AWWA Specifications C104/A21.4. The outside surface of the fitting shall receive a bituminous coating approximately one (1) mil thick. Special fittings shall be in accordance with the plans and Special Provisions.

C. VALVES

RESILIENT WEDGE GATE VALVES: All valves on waterlines with adequate cover as specified in Section 1.04E shall be Resilient Wedge Gate valves. These valves shall be Mueller 2” – 12” 2360 Series Resilient Wedge Gate valves and 14” – 48” 2361 Series Resilient Wedge Gate valves or approved equal and have an iron body, with nonrising stainless steel (type 304) stems with design, construction, and pressure rating conforming to ANSI/AWWA Specification C509, standard for Resilient Seated Gate Valves with modification specified herein.

Waterway shall be smooth and shall have no depressions or cavities in seat area where foreign material can lodge and prevent closure or sealing.

Stem seals shall be double "O" ring seals designed so that the seal above the stem collar can be replaced with the valve under pressure in full open position.

Resilient Seated Gate Valves for underground installation shall have two-inch square wrench nut for key operation. All valves shall open counterclockwise.

Resilient Seated Gate Valves shall be set and jointed to the pipe in the manner specified for pipe laying and jointing. Valves shall be set with operating nut vertical. Valve, boxes shall be centered and plumb over the operating nut and shall be set so that no shock or stress will be transmitted to the valve.

The Resilient Seated Gate Valves' interior parts and surfaces shall be coated in accordance with ANSI/AWWA C550. All bolts shall be stainless steel.

BUTTERFLY VALVES: Butterfly valves shall be used only when adequate cover cannot be achieved on a waterline and only after approval of the City Engineer. Butterfly valves for use in the water distribution system shall be Class 150 rubber seated, tight closing butterfly valves conforming to ANSI/AWWA Specification C504. Butterfly valves shall be furnished with mechanical joint ends and lubricated screw type operators designed for underground service.

Rubber valve seats shall be replaceable without disassembling the valve or removing the valve from the main, and shall not be interrupted by the shafting. Rubber seats may be retained on the disc edge by stainless steel clamping in lieu of bonding to the valve body. Shaft packing shall be of the self-adjusting permanent type.

Operators for underground service shall be permanently lubricated screw-type operators, totally enclosed and of watertight construction. Overload protection shall be incorporated into the operator allowing the application of 450 foot-pounds input torque at full-open and full-closed positions without damage to the operator or valve. A 2" square wrench nut and valve box shall be provided for operating the valve. Valves shall open counterclockwise unless indicated otherwise in the Special Provisions. All bolts shall be stainless steel.

Certification of performance, leakage and hydrostatic tests in accordance with ANSI/AWWA Specification C504 shall be furnished when required by the Engineer. Valves shall be the product of a manufacturer having a minimum of five years' experience in the manufacture of water works and distribution valves.

D. TAPPING SLEEVES & VALVES

Tapping sleeves shall be fabricated from 304 stainless steel or its equivalent, CF8 cast stainless steel. They shall have a pass through bolt design and provide a 360° seal around the pipe. Sleeves shall be manufactured to meet the following minimum specifications. Tapping Sleeves shall be JCM 432, Rockwell 663 or approved equal.

BODY CONSTRUCTION: To provide the proper strength, support and safety factor for the valve, drilling machine operation and load forces, the outlet half (load bearing half) shall be 12 ga Stainless Steel and the back half (conforming half) shall be 14 ga Stainless Steel

<i>Dimensions</i>	
<i>Outlet Size</i>	<i>Length</i>
2"- 6"	15"
8"	21"
10"	27"
12"	30"

OUTLET CONSTRUCTION: For proper strength, support and rigidity for the valve, drilling machine operation and load forces, the outlet construction shall be Schedule 10 Stainless Steel pipe sized to accept full size cutters. Flanges shall be CF8 cast stainless steel or equivalent 304 stainless steel with a high-pressure hydro mechanical lip flange gasket set in a cavity. Flange outlets shall be indexed to accept tapping valves.

BOLTING SYSTEM: The lugs shall have a pass-through bolt design, to avoid alignment problems and allow tightening from either side of the pipe. Bolts shall not be integrally welded to the sleeve.

Lugs shall be triangular design with a maximum of 3" bolt center spacing. Outlet sizes 10" and 12" and pipe sizes larger than 12" shall have internal strengthening of lugs by means gussets.

Bolts, nuts & washers shall be 304 Stainless Steel, the bolts shall be track head type and furnished with permanently lubricated heavy - hex nuts and stainless washers.

GASKET: The full circumferential gasket shall be molded of synthetic rubber compounded for use with water, salt solutions, mild acids, bases and sewage. The gasket shall have a gridded surface, be a full 1/4" thick with 304 stainless steel bridge plates molded flush into the gasket and have a raised hydro mechanical outlet seal to seal against line surges and water hammer.

PRESSURE RATING: The sleeves shall be rated at 150 psi hydrostatic with a test pressure of 200 psi on pipe with a full circumferential break.

E. VALVE BOXES

Valve boxes shall consist of a Cast Iron Valve Box Cover, Clay & Bailey No. 2194 or equal, and a length of 6" PVC SDR-35 Pipe to grade level, sufficient to seat over the valve and extend to the Cast Iron Cover. The cast iron cover shall be stamped with the word "WATER".

Valve boxes shall be centered and plumb over the operating nut of the valve. Tops of valve boxes shall be set flush with the ground or street surface unless otherwise directed by the Engineer.

F. FIRE HYDRANT ASSEMBLIES

Fire hydrants shall conform to ANSI/AWWA C502, as modified herein. Hydrants shall be of the "Compression" or "Toggle Joint" type with safety flange and safety stem coupling above the ground line so that they can be repaired without shutting off the water. Hydrants shall be of the dry top design with two or more "O" rings sealing the water from the operating mechanism. The portion of the hydrant above the ground line shall be painted red in

accordance with the Owner's standards. Hydrants shall be furnished for 5' cover unless specified otherwise in the Special Provisions. Hydrant assemblies shall include an auxiliary gate valve, as specified above.

Standard 3-way hydrant assemblies shall be furnished a 6" shoe, with 5-1/4" main valve opening, one 5" integral Storz Pumper connection, or one standard 4-1/2" pumper connection with 5" Storz adapter, and two 2-1/2" hose connections.

Standard 2-way hydrant assemblies shall be furnished a 6" shoe, with 5-1/4" main valve opening, two 5" integral Storz Pumper connections, or two standard 4-1/2" pumper connection with 5" Storz adapters.

Hydrants shall open by turning left. Operating Nuts shall be 1- 3/8" Pentagon, measured from point to opposite flat and tapering to 1-5/16" at the end and not less than 1-1/8" long.

All hydrants shall stand plumb with the pumper connection facing the street. Hydrant shall be set with the ground line at the location indicated by the plans. Auxiliary valve box shall be at sidewalk/pavement grade or no higher than the hydrant traffic flange.

Drainage shall be provided at the base of the hydrant by placing clean gravel under and around the base of the hydrant. Sufficient gravel shall be used to provide a minimum of one foot on all sides from the base of the hydrant to the point at least 6" above the drain opening. Hydrant shall be braced against unexcavated earth at the end of the trench with concrete backing as detailed on the plans. Hydrant installation shall be as shown on the Standard Drawing.

Hydrants shall be Mueller Super Centurion (3way-A-423- SC250; 2way- A-425- SC200), Clow Medallion (3-way; 2-Pumper), or American AVK Nostalgic (Series 2780 – 3 way; Series 2736 – 2 way).

Hydrants coating above ground shall be Fusion bonded epoxy inside and out. Below ground shall be Bitumen-Fusion bonded epoxy. Epoxy color shall be manufactures standard red. Epoxy shall meet or exceeds AWWA C550 (latest).

G. AIR RELIEF VALVES, BLOW-OFFS, FLUSHING HYDRANTS

These shall be of the same material as the main installation and shall meet pressure and flow requirements equal to or exceeding the main installation or as required by the manufacturer. The open end of the relief pipe from a manual or automatic combined air/vacuum relief valve shall be extended to at least 1 foot above grade and provided with a screened, downward-facing elbow. Termination of the open end of the relief pipe at the top of a pit shall not be allowed.

H. PIPE RESTRAINT

All fittings shall be mechanically restrained. For 12" and smaller diameter, thrust blocks are not required. For larger than 12" diameter, thrust blocks are required in addition to mechanical restraint. When thrust blocks are installed, wrap the fitting with vizqueen or other suitable impermeable material. Thrust blocks shall be a 6 sack concrete mix with a 3500 psi compressive strength at 28 days. All installation shall be in accordance with these specifications and as detailed on Standard Drawing. Pipe restraint and thrust blocks shall be considered subsidiary to other items of work.

I. SERVICE ASSEMBLY

Where services are provided, the following shall be furnished based on the meter size required.

1" Service Assembly:

Service Saddle: Brass Service Saddle for C900 PVC Pipe, AWWA/CC Tapered Thread Ford S90 Style

Corporation Stops: AWWA/CC Taper Thread Inlet by Grip Joint Outlet for Copper or Plastic Tubing (CTS) copper tubing size.
Ford F 1000-4-G

Service Tubing: NDOT 3408 SDR9 200PSI CTS and shall be NSF certified.

Curb Stops: Grip Joint for Copper or Plastic Tubing (CTS) Inlet by Meter Swivel Nut with locking wing and grip nut.
Ford B41-44W-G

Angle Meter Coupling: Meter Swivel Nut by Male Iron Pipe Thread.
Ford L38-44

Meter and Meter Radio: Supplied by Water Department.

Check Valve: Angle Cartridge Style Dual Check Valve (In Line Accessible) with meter swivel nut inlet by grip joint outlet for CTS.
Ford HHCA34-444-G

Angle Meter Coupling: Meter Swivel Nut by Grip Joint.
Ford L38-44-G

Coupling: Male Adapter (straight coupling) Male IP Thread x CTS Grip Joint
FordC84-44-G

Meter Box and Lid: Supplied by the Water Department.

2" Meter Service Assembly:

Service Saddle: Brass Service Saddle for C900 PVC Pipe, Iron Pipe Thread Ford S91 Style

Corporation Stops: Iron Pipe Thread Inlet by Grip Joint Outlet for Copper or Plastic Tubing (CTS) copper tubing size. Ford FB1100-7-G

Service Tubing: NDOT 3408 SDR9 200 PSI CTS and shall be NSF certified.

Curb Stops: Grip Joint for Copper or Plastic Tubing (CTS) Inlet by Meter Flange with locking wing. Ford BF43-777W-G

Meter and Meter Radio: Supplied by Water Department.

Coppersettters: For commercial property that cannot be shut off during regular business hours.

Ball Valve Inlet and ASSE approved Angle Dual Check Valve Outlet with by-pass, bypass check valve and locking wing.

Ford VBHH77-12BHC-44-77-W-G

Check Valve: Angle Dual Check Valve (In-Line Accessible) Ford HHFA31-777

Meter Flange: Meter Coupling for Flanged Meters. 2" Meter Flange x 2" CTS Grip Joint Ford CF34-77-G

Coupling: Male Adapter (straight coupling) Male IP Thread x Grip Joint Ford C84-77-G

Meter Box and Lid: Supplied by the Water Department.

1.03 TRENCH EXCAVATION AND BACKFILL

Trench excavation and backfill shall include all excavation, backfilling, disposal of surplus and unsuitable material, and all other work incidental to the construction of trenches, including any excavation which may be required for valves, fittings hydrants, pipe restraint, thrust blocks or other structures forming a part of the pipeline.

Work performed under this section shall be in conformance with City of Garden City standards for excavation in Public Right-of-way.

1.04 INSTALLATION

A. GENERAL

The pipe shall be installed with a minimum of 4.0 feet of cover from final grade and pipe shall be installed in accordance with ANSI/AWWA C600 or C605 and the manufacturer's recommendations for installing the type of pipe used unless modified or changed in the Special Provisions. The Contractor shall provide all tools and equipment including any special tools designed for installing each particular type of pipe used. Bedding under the pipe is required if the installation is in rock. Vertical separation between watermains and sanitary sewer forcemains shall be 24" with the forcemain always below the watermain.

B. DEWATERING OF TRENCH

Where water is encountered in the trench, it shall be removed during pipe laying operations and the trench so maintained until the ends of the pipe are sealed and provisions are made to prevent floating of the pipe.

C. RESPONSIBILITY FOR MATERIAL

The Contractor shall be responsible for all material furnished by him and shall replace at his own expense all such material found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all materials and labor required for the placement of installed material discovered damaged or defective prior to the final acceptance of the work, or during the guarantee period.

The Contractor shall be responsible for the safe and proper storage of material furnished by him or to him and accepted by him, and intended for the work, until it has been incorporated in the completed project. The interior of all pipe and other accessories shall be kept free from dirt and foreign matter at all times.

Precautions shall be taken to protect pipe interiors, fittings, and valves against contamination. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material. 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 of 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.

D. HANDLING OF PIPE:

All pipe furnished by the Contractor shall be delivered and distributed at the site by the Contractor. Pipe, fittings, specials, valves and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench.

Pipe shall be so handled that the coating and lining will not be damaged. If, however, any part of the coating or lining is damaged, the repair shall be made by the Contractor, at his expense, in a manner satisfactory to the Engineer.

E. LAYING OF PIPE

Before installation, the pipe and pipe coating shall be inspected for defects. Any damage to pipe coatings shall be repaired with the same materials used for the original coating before laying the pipe.

All pipe shall be laid and maintained to the required lines and grades with fittings and valves at the required locations.

Wherever obstructions not shown on the plans are encountered during the progress of the work and interfere to such an extent that an alteration in the plan is required, the Engineer shall have the authority to change the plans and order a deviation from the line and grade or arrange with the owners of the structures for the removal, relocation and reconstruction of the obstructions.

Proper implements, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. All pipe, fittings and valves shall be carefully lowered into the trench piece by piece by suitable tools or equipment, in such a manner as to prevent damage to pipe materials and protective coatings and linings. Under no circumstances shall materials be dropped or dumped into the trench.

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a water-tight plug or other means approved by the Engineer.

Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflections at the joints. If the pipe is shown curved on the plans and no special fittings are shown, the curves can be made by deflection of the joints with standard lengths of pipe.

Where field conditions require deflection or curves not anticipated by the plans, the Engineer will determine the methods to be used. No additional payment will be made for laying pipe on curves as shown on the plans, nor for field changes involving standard lengths of pipe deflected at the joints.

Maximum deflections at pipe joints shall not exceed the applicable specifications of AWWA or recommendations of the manufacturer. When rubber gasketed pipe is laid on a curve,

the pipe shall be jointed in a straight alignment and then deflected to the curved alignment. Trenches shall be made wider on curves for this purpose.

Pipe restraint shall be applied at all tees, Plugs, caps and at bends deflecting 11-1/4° or more, or movement shall be prevented by attaching suitable tie rods or straps as approved by the Engineer. Poured concrete blocking shall be placed between solid ground and the fitting; the area of bearing on the pipe and on the ground shall be as shown on Standard Drawings. The blocking shall be so placed that the pipe and fitting joints will be accessible for repair.

The cutting of pipe for inserting valves or fittings or shall be done in a neat and workmanlike manner without damage to the pipe or coating and so as to leave a smooth end at right angles to the axis of the pipe. Torch cutting of pipe shall not be allowed.

1.05 PIPE JOINTING

A. RUBBER GASKET "PUSH-ON" JOINTS

Jointing of pipe with a rubber gasket "push-on" joint shall be as recommended by the manufacturer. The rubber gasket and gasket seat inside the bell shall be wiped clean with a cloth. A thin film of lubricant, furnished with the pipe, shall be applied to the inside surface of the gasket. The plain end of the adjoining pipe shall be wiped clean and inserted into the bell a sufficient distance to make contact with the gasket. The plain end shall then be forced "home" by the use of a crow bar, fork tool, or jack assembly.

B. MECHANICAL JOINTS

The inside of the bell and the outside of the spigot of the mechanical joint fittings shall be brushed thoroughly with a wire brush to remove all loose rust or other foreign material and the cleaned surfaces shall be brushed with soapy water just prior to slipping the gasket over the spigot end and into the bell.

The spigot end of the pipe or fitting shall be accurately centered in the bell before jointing is begun. After the gasket is in place the gland shall be brought up toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. Bolts shall be partially tightened alternately around the socket maintaining approximately equal tension until the final tension is reached. The normal range of bolt torques to be applied to the bolts in the joints shall be as follows:

Bolt Size (inch)	Range of Torque (ft. lb.)
5/8	40 - 60
3/4	60 - 90
1	70 - 100
1-1/4	90 - 120

Torque loads may be applied with torque measuring or indicating wrenches, or they may be applied using regular socket wrenches, and checked by torque wrenches.

If effective sealing is not attained at the maximum torque indicated above, the joint shall be disassembled and reassembled after thorough cleaning. Overstressing of bolts to compensate for poor installation practice will not be permitted.

C. CONNECTIONS TO EXISTING MAINS

All connections to watermains in use shall be made by the Contractor unless otherwise provided in the Plans or Special Provisions. The Contractor shall furnish the fittings and all other materials required. The Contractor shall make all necessary excavations, to assure gradual transition between the new and existing water main, and all backfilling.

The Water Superintendent and the Contractor shall coordinate the interruptions of service and notification of customers affected.

1.06 TESTING

A. PRESSURE TEST

After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 150% the working pressure at the point of testing or 150 psi, whichever is greater. A passing pressure test shall be defined as the maintaining pressure within five (5) psi of the specified test pressure for 2 hours after the air in the pipeline has been expelled and the pipe has been filled with water.

Any damaged or defective pipe, fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the Engineer.

B. LEAKAGE TEST

A leakage test shall be conducted concurrently with the pressure test. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or section thereof, to maintain pressure within five (5) psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. If the leakage test is performed independent from the pressure test, the test duration shall be 2 hours.

No pipe installation, or segment thereof, will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{148,000}$$

Where: L = allowable leakage, gal/hour
S = length of pipe being tested, feet
D = nominal diameter of pipe, inches
P = average test pressure during test, psi

The formula is based upon an allowable leakage of 10.5 gpd/mi/in of nominal pipe diameter.

When testing against closed metal seated valves, an additional leakage per closed valve of 0.0078 gal/hour/inch of nominal valve size is allowed.

Any damaged or defective pipe, fittings, valves, or hydrants that are discovered following the leakage test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the Engineer.

1.07 DISINFECTING WATER MAINS

A. DISINFECTION

Disinfection methods shall be in accordance with AWWA C651. When the disinfecting of water mains is not to be done by the Contractor, the Contractor shall coordinate such work with the Engineer.

B. PRELIMINARY FLUSHING

The main shall be flushed prior to disinfection, except when the tablet method is used. No site for flushing should be chosen unless it has been determined that drainage is adequate at that site. The flushing velocity shall not be less than 2.5 ft/sec. With 40 psi residual pressure, a 2-1/2" hydrant outlet nozzle will discharge approximately 1,000 gpm and a 4-1/2" hydrant nozzle will discharge approximately 2,500 gpm.

C. FORM OF CHLORINE FOR DISINFECTION

The most common forms of chlorine used in the disinfecting solutions are calcium hypochlorite granules or tablets and sodium hypochlorite solutions. The hypochlorite solutions shall be applied to the water main with a gasoline or electrically-powered chemical feed pump designed for feeding chlorine solutions. For small applications the solutions may be fed with a hand pump, for example, a hydraulic test pump. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

- (a) **CALCIUM HYPOCHLORITE.** Calcium hypochlorite contains 65 percent (65%) available chlorine by weight. A chlorine-water solution is prepared by dissolving the granules in water in the proportion requisite for the desired concentration.
- (b) **SODIUM HYPOCHLORITE.** Sodium hypochlorite is supplied in strengths from 5.25 to 16 percent available chlorine in liquid form. The chlorine-water solution is prepared by adding hypochlorite to water.

D. METHODS OF CHLORINE APPLICATION:

During the application of any form of chlorine, prevent the treatment dosage from flowing back into the line supplying the water.

- (a) CONTINUOUS FEED METHOD. This method is suitable for general application.
- (1) Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly-laid pipeline. The water shall receive a dose of chlorine at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 25 mg/l available chlorine for 24 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24-hour period, the treated water shall contain no less than 10 mg/l chlorine throughout the length of the main. After flushing the lines will be ready for use for potable water supply purposes.

Amounts of either a 10 percent sodium hypochlorite solution or 65 percent high test hypochlorite powder required per 500 feet of water line for a 25 mg/l chlorine content

<u>Pipe Size</u>	<u>Ounces 10% Solution</u>	<u>Ounces 65% Compound</u>
4"	13.1	1.7
6"	26.2	3.8
8"	43.8	6.7
12"	96.3	15.1

- (b) SLUG METHOD. This method is suitable for use with mains of large diameter for which, because of the volumes of water involved, the continuous feed method is not practical.
- (1) Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly-laid pipeline. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the concentration in the water entering the pipeline is maintained at no less than 300 mg/l. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or "slug" of chlorinated water that will, as it passed along the line, expose all interior surfaces to a concentration of at least 300 mg/l for at least at least three (3) hours. The application shall be checked at a tap near the upstream end of the line by chlorine residual measurements.
- (2) As the chlorinated water flows past tees and crosses, related valves and hydrants shall be operated so as to disinfect appurtenances.

(c) TABLET METHOD. Tablet disinfection is best suited to short extensions (up to 3,500 feet) and smaller diameter mains (up to 12 inches). Because the preliminary flushing step must be eliminated, this method shall be used only when scrupulous cleanliness has been exercised. Tablet disinfection shall not be used if trench water or foreign material has entered the main during construction.

(1) PLACEMENT OF TABLETS. Tablets are placed in each section of pipe and also in hydrants, hydrant branches, and other appurtenances. They shall be attached by an adhesive, except for the tablets placed in hydrants and in the joints between the pipe sections. All the tablets within the main must be at the top of the main. If the tablets are fastened before the pipe section is placed in the trench, their position should be marked on the section to assure that there will be no rotation. In placing tablets in joints, they are crushed and placed on the inside annular space, or, if the type of assembly does not permit, they are rubbed like chalk on the butt ends of the sections to coat them with calcium hypochlorite.

*Number of 5 g Calcium Hypochlorite Tablets
Required for a dose of 25 mg/l (3.25 g chlorine/tablet)*

<i>Length of Pipe Joint</i>						
<i>Pipe Size</i>	<i>13'</i>	<i>18'</i>	<i>20'</i>	<i>30'</i>	<i>40'</i>	
<i>4"</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	
<i>6"</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>2</i>	<i>2</i>	
<i>8"</i>	<i>1</i>	<i>2</i>	<i>2</i>	<i>3</i>	<i>4</i>	
<i>12"</i>	<i>3</i>	<i>4</i>	<i>4</i>	<i>6</i>	<i>7</i>	

(2) FILLING AND CONTACT. When installation has been completed, the main shall be slowly filled with water, at a velocity of less than one-foot/second. This water shall remain in the pipe for at least 24 hours. If the water temperature is below 41° F, the water shall remain in the pipes for 48 hours.

E. FINAL FLUSHING

After the applicable retention period and confirmation residual testing, with a residual of not less than 10 mg/l, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than one mg/l. Chlorine residual determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipeline.

F. DISINFECTION AFTER CUTTING INTO OR REPAIRING EXISTING MAINS

The procedures outlined in this section apply primarily when mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure present little danger of contamination and require no disinfection.

- (a) TRENCH "TREATMENT". When an old line is opened, either by accident or by design, the excavation will likely be wet and badly contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.
- (b) MAIN DISINFECTION
- (1) SWABBING WITH HYPOCHLORITE SOLUTION. The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) shall be swabbed with a five percent (5%) hypochlorite solution before they are installed.
 - (2) FLUSHING. Thorough flushing is the most practical means of removing contamination introduced during repairs. If valve and hydrant locations permit, flushing from both directions is recommended. Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated.
 - (3) SLUG METHOD. Where practicable, in addition to SWABBING WITH HYPOCHLORITE SOLUTION, a section of main in which the break is located shall be isolated all service connections shut off, and the section flushed and chlorinated as described in Section 4(b) above, except that the dose may be increased to as much as 500 mg/l, and the contact time reduced to as little as one-half hour. After chlorination, flushing shall be resumed and continued until discolored water is eliminated.
- (c) SAMPLING. Bacteriologic samples shall be taken after repairs to provide a record by which the effectiveness of the procedures used can be determined. If the direction of flow is unknown, samples shall be taken on each side of the main break.

1.08 SEPARATION OF WATERMANS AND SEWERLINES/POLLUTION SOURCES

A minimum distance of 25 feet shall be maintained between all potable water lines and all septic tanks, waste stabilization ponds or open sewage discharge locations.

Under no circumstances shall a water line extend through a septic tank tile absorption field, or feedlot. All water lines shall be located a minimum of 25 feet from the farthest known extent of any sewage absorption.

A minimum horizontal distance of 10 feet shall be maintained between parallel water and sewer lines. The laying of potable water lines and sanitary sewers shall be in separate trenches with undisturbed earth between them. If the 10 foot horizontal separation distance between a proposed waterline and sewerline cannot be maintained the engineer

shall contact KDHE and additional protection shall be determined on a case by case basis.

When a water pipe and a sanitary sewer cross and the sewer is 2 feet or more (clear space) below the water pipe, no special requirements or limitations are provided herein. At all other crossings, the sanitary sewer is to be constructed of one of the following materials (or approved equal) and pressure tested to assure water tightness pursuant to Chapter VI of the KDHE Minimum Standards of Design of Water Pollution Control Facilities:

- a. Utilize PVC pipe conforming to ASTM D3034 with minimum wall thickness of SDR26, ASTM F679, ASTM F789, or ASTM F794, with gasketed push-on joints in conformance with ASTM D3212. Joints in the sewer pipe shall be located as far as practical from the intersected water line.
- b. Utilize ductile iron pipe Class 150 designed in accordance with ANSI/AWWA C150/A21.50 and manufactured in accordance with ANSI/AWWA C151/A21.51, with gasketed push-on joints or mechanical joints. Joints in the sewer pipe shall be located as far as practical from the intersected water line.

Where a water main is laid across or through an area where there is an existing sanitary sewer, which is not constructed of one of the above specified materials and is 2 feet or less below the water pipe, the existing sewer shall be encased in concrete with a minimum of 6 inch thickness for a 10 foot distance on each side of the crossing or the crossed section of sewer requirements.

Under no condition will it be considered that encasement of the water main through an area of real or potential pollution would provide the protection needed to the water supply.

When pressure sewer lines (force mains) run parallel to water lines, the separation distance shall be as far as practical, maintaining a minimum horizontal separation distance of at least 10 ft. There shall be at least 2 ft. vertical separation at crossings with the water main always crossing above the sewer force main.

1.09 CERTIFICATION BY MANUFACTURER

When required by the Engineer, the Contractor shall furnish certification by the manufacturer of the pipe, fittings, valves, hydrants, and other appurtenances to be furnished on this project, certifying that the materials comply with the applicable specifications.

All pipe shall be clearly marked with type, class and/or thickness as applicable. Lettering shall be legible and permanent under normal conditions of handling and storage.

1.10 MEASUREMENT AND PAYMENT

A. GENERAL

The following items shall constitute pay items for the work covered under this section of the Specifications. Payment for these items shall be full compensation for providing all materials, tools, labor and equipment necessary to complete the item and all incidental work related thereto, whether specifically mentioned herein or not. Payment shall include all testing and disinfecting.

B. WATER MAIN

Measurement of water mains shall be on a linear foot basis, along the centerline of pipe through all valves, fittings, and appurtenances. Payment for water main will be made at the contract unit prices per lineal foot of the various sizes called for, which price shall include trench excavation, backfill, furnishing and installing pipe; furnishing and installing tracer wire; furnishing and placing bedding; cleaning, testing and disinfecting the water main and all other work necessary or incidental for completion of the item unless otherwise specified in the Special Provisions.

C. FITTINGS

Measurement of water main fittings will be on a per each basis, by numerical count of the various types and sizes listed in the Proposal. Payment for fittings will be made at the contract unit price for each fitting, which price shall include furnishing and installing the fittings as required, thrust blocking and any other work necessary or incidental for completion of the item.

D. VALVES

Measurement of water valves shall be on a per each basis, by numerical count of the sizes and types of valves listed in the Proposal. Payment for water valves will be made at the Contract Unit Price for each valve; which price shall include furnishing and installing the valve and valve box, all additional excavation, backfill, and special compaction required for the installation, and all other work necessary or incidental for completion of the item.

E. FIRE HYDRANT ASSEMBLIES

Measurement of fire hydrant assemblies shall be on a per each basis, by numerical count. Payment for this item will be made at the Contract Unit Price per each; which price shall include furnishing and installing the tee, pipe, fire hydrant and auxiliary gate valve and box, all additional excavation, backfill, and special compaction required for the installation, thrust and anchor blocking, drain gravel, and all other work necessary or incidental for completion of the item.

1.11 ACCEPTANCE OF WORK

For all projects involving the City's water facilities, work shall not be formally accepted by the City until the Contractor provides the City with two (2) copies of as-built drawings in accordance with Section 10 (k) of the City's General Conditions. Actual field dimensions between fittings, valves, hydrants, and other appurtenances shall be documented on these drawings, to the satisfaction of the City of Garden City Water Department. In addition, dimensional ties will also be noted to physical aboveground features, which will locate the buried work.

Superceded

SPECIFICATIONS BORING AND CASING SECTION W-2

2.01 SCOPE

The Contractor shall bore and encase pipe as shown on the plans or as directed by the Engineer. Borings are to be accomplished with an approved boring rig and with personnel experienced in this type of construction. Boring pits and operations shall be located to avoid conflicts with the public utilities, and other agencies.

2.02 INSTALLATION

As the boring progresses, it shall be concurrently supported with a welded continuous, permanent, new steel pipe casing conforming to ASTM-A-139 having a minimum diameter as shown on the plans.

Borings and encasement shall be constructed so they will drain and shall be bored in a single direction. The pipe shall be pulled or pushed into the casing on lubricated skids as shown in the details and approved by the Engineer. The entire void area between the casing and the water pipe shall be filled with blown sand or other approved backfill and the ends of the encasement pipe sealed with flexible boot type end seals.

2.03 MATERIALS

Steel casing pipe shall be Grade B under railroads and Grade A on all other uses. Steel casing pipe shall have a minimum wall thickness as shown in the following table.

Dia. of Casing – inches	Nominal Wall Thickness – inches	
	<u>Under Railroads</u>	<u>All Other Uses</u>
14 and Smaller	Schedule 40 all sizes	
16	0.281	0.188
18	0.312	0.250
20	0.344	0.250
22	0.375	0.250
24	0.406	0.281
26	0.438	0.281
28	0.459	0.312
30	0.469	0.312
32	0.500	0.312
34	0.500	0.312
36	0.500	0.344

2.04 CLEAN UP.

During the course of the work, and before final acceptance by the City, the entire area shall be cleaned of all debris resulting from construction and shall be left in a clean and sightly condition.

2.05 MEASUREMENT AND PAYMENT

Measurement and payment for boring and casing shall be per linear foot and shall include all work and materials necessary to complete the work as specified above. When encasement is laid in open trench it shall be paid as a separate item on a linear foot basis. The pay item does not include the pipe or conduits being installed in the encasement.

Superceded

SPECIFICATIONS DIRECTIONAL DRILLING SECTION W-3

3.01 SCOPE

Furnish all labor, materials and equipment required to install water or sewer main pipe using directional drilling method of installation. Work shall include and not be limited to proper installation, testing, restoration of underground utilities and environmental protection and restoration.

3.02 REQUIREMENTS

Products delivered under this specification shall be manufactured only from water distribution pipe and couplings conforming to ANSI/AWWA C900. The restrained joint pipe shall also meet all short term pressure test requirements ANSI/AWWA C900. Pipe, couplings, and all locking splines components used thereon shall be completely nonmetallic to eliminate corrosion problems.

3.03 MATERIALS

Restrained joint pipe to be used for watermains shall meet ANSI/AWWA C900/RJ standards for "Polyvinyl Chloride Pressure Pipe" and fittings with a dimension ratio DR18. Any other pipe shall have the written approval of the Engineer and meet all submittal review as an optional approved product.

The pipe shall be joined using separate PVC couplings with beveled edges, built in sealing gaskets and restraining grooves. Dimensions of the pipe thrust restraint grooves shall be in accordance with manufactures specifications. The restraining splines shall be square and made from Nylon 101. Splines shall be inserted into matting precisionmachined groves in the pipe and coupling to provide full 360° restraint with evenly distributed loading.

Couplings shall be designed for use at the rated pressure of the pipe with which they are utilized, and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F477. Joints shall be designed to meet the leakage test requirements of ASTM D3139, and the requirements of City of Garden City, Kansas, Standard Specifications Section W-1. Exposed splines shall be cut flush from coupling wait to reduce soil drag. Couplings shall be beveled on leading edges to minimize soil friction.

The Contractor shall adhere to the pipe manufacturer's most current calculations regarding tensile load limitations, deflection and radius of curvature for C900/RJ pipe used for trenchless application.

Drilling fluids shall not contain toxic materials, additives or substances which might impart taste or odors.

3.04 APPROVALS

Restrained joint pipe products shall be tested and approved by an independent thirdparty laboratory for continuous use at rated pressure. Copies of Agency approval reports or product listing shall be provided to the Engineer. Products intended for contact with potable water shall be evaluated, tested, and certified for conformance with NSF Standard 61 by an acceptable certifying organization.

3.05 CLEAN UP.

During the course of the work, and before final acceptance by the City, the entire area shall be cleaned of all debris resulting from construction and shall be left in a clean and sightly condition.

3.06 MEASUREMENT AND PAYMENT

Measurement and payment for directional drilling shall be per linear foot and shall include all work and materials necessary to complete the work as specified above.

STANDARD SPECIFICATIONS SANITARY SEWER CONSTRUCTION SECTION SS-1

1.01 SCOPE

This section of the specifications covers construction of wastewater collection systems consisting of sanitary sewer gravity and pressure mains, service fittings, and other appurtenances. This work shall consist of furnishing and installing pipe, service fittings, construction of manholes, testing, cleaning and other related work.

1.02 PIPE & FITTINGS

Pipe and fittings used in sanitary sewer construction shall be in accordance with the following specifications or as called out in the Special Provisions. Any other pipe acceptable for use on the projects shall be outlined in the Special Provisions.

POLYVINYL CHLORIDE (PVC) GRAVITY PIPE - All pipe and fittings shall conform to ASTM D3033, D3034, F679, F949, and F1336, DR-35. Joints shall be gasketed, bell and spigot, push-on type conforming to the requirements of ASTM D3212 or F477. Gaskets shall be part of a complete pipe section, and either factory installed or field installed as recommended by the manufacturer.

DUCTILE IRON PIPE (DIP) - Ductile iron pipe shall conform to the provisions of ANSI/AWWA Specifications C151, Class 51. Pipe joints shall be "Push-On" joints conforming to ANSI/AWWA Specifications C111. The interior of the pipe shall have a cement mortar lining conforming to the requirements of ANSI/AWWA Specification C104. The outside surface of pipe designed for underground service shall receive a bituminous coating approximately one (1) mil thick.

POLYVINYL CHLORIDE (PVC) PRESSURE PIPE - PVC pipe for the pressure sewer mains shall meet the requirements of ANSI/AWWA Specification C900, DR-18, or C905, DR-21, Polyvinyl Chloride Pressure Pipe, made to ductile iron O.D.'s for Push-On joints. Pipe class shall be as specified in the Special Provisions. Joints shall be gasketed, bell and spigot, push-on type. Gaskets shall be part of a complete pipe section, and either factory installed or field installed as recommended by the manufacturer.

POLYETHYLENE (PE) PRESSURE PIPE - PE pipe for the pressure sewer mains shall meet the requirements of ANSI/AWWA Specification C906, DR 11, Polyethylene Pressure Pipe.

VITRIFIED CLAY PIPE (VCP) - All pipe and fittings shall conform to ASTM Specification C700 for Clay Sewer Pipe.

SPECIAL PIPE - Pipe used to encase sanitary sewer mains shall be steel pipe as specified in *Section W-2, Boring & Casing*. Pipe and fittings used in directional boring installations shall be as specified in *Section W-3, Directional Drilling*.

1.03 MANHOLES

A. PRE-CAST MANHOLES. These manholes shall conform to the current ASTM Specifications C-478 except for the following modifications:

1. Cement used in the construction of pre-cast reinforced concrete manholes shall conform to the requirements of the Standard Specifications for Portland Cement ASTM Designations C-150. The compressive strength of the concrete shall be not less than 4,000 psi.
2. The minimum wall thickness for pre-cast concrete reinforced manholes shall be a minimum of 4" or 1/12 of the I.D. whichever is greater for manholes 16' or less in height; the minimum wall thickness for pre-cast concrete reinforced manholes shall be a minimum of 5" or 1/12 of the I.D. plus 1", whichever is greater, for manholes 16' or greater in height.
3. Joints between precast reinforced concrete sections shall be of such design that leakage and infiltration can satisfactorily be reduced to a minimum. The use of mastics or rubber gaskets (natural or synthetic) at joints between pre-cast manhole sections is required.
4. Pre-cast manhole bases are acceptable. The bottom sections of all precast reinforced concrete manholes shall extend into the manhole base a minimum depth of 4". The base shall have a minimum diameter of 12" greater than the outside diameter of the manholes. Steel reinforcement of the manhole base is required. If the base is cast-in-place, use materials per Section 1.04, Manhole Materials.
5. Any precast manhole section that has been damaged, in transit or on site, such that the integrity of the section has been adversely affected, in the opinion of the Engineer, shall not be used.

B. CAST-IN-PLACE MANHOLES. The use of cast-in-place manholes requires advance approval of the Engineer. Cast-in-place manholes shall have a minimum wall thickness of 8". Concrete shall be placed in the forms in 2-foot layers and consolidated in a manner, which will prevent segregation of aggregates.

Forms shall be made of metal, free from damage, and fabricated in sections permitting removal without damage to the concrete. The form used for the upper section of the manhole shall be tapered, resulting in a top diameter and height meeting the provisions of the standard drawings.

Backfilling will not be permitted until 12 hours removal of the forms.

C. DROP MANHOLES. Drop manholes shall be constructed at locations where two or more lines connect or intersect at elevations differing 2' or more. They shall be constructed in accordance with the standard drawings.

1.04 MANHOLE MATERIALS.

- A. CONCRETE. Cement used in the construction of cast-in-place concrete manholes, or installation of pre-cast manholes, shall conform to the requirements of the Standard Specifications for Portland Cement ASTM Designations C-150. The compressive strength of the concrete shall be not less than 4,000 psi.
- B. MORTAR. Mortar for jointing and plastering shall consist of one part Portland cement and two parts fine sand. The joints shall be completely filled and shall be smooth from surplus mortar on the inside of the manhole. Aggregate for mortar shall conform to ASTM Designation C-144.
- C. NON-SHRINK GROUT. Master Builders "Embco, Sonneborn "Ferrolith CDS" or approved equal.
- D. GASKETS.
1. MASTIC. Federal Specification SS-S-210; K.T Snyder "RamNek" or Kent Seal No. 2.
 2. RUBBER. Neoprene or other synthetic, 40 plus or minus 5 hardness when measured by ASTM D2240, Type A durometer.
 3. MASTIC SEALING. Koppers "Bitumastic SuperService Black", Tnemec "450 Heavy Tnemecol", or USS "Tarmastic 103".
- E. CASTINGS. Manhole rings and covers shall be made of good quality gray iron, free from cracks, holes, swells and cold shuts and, shall be as shown on the standard drawings. Manhole rings and covers shall weigh not less than 270 pounds rated for traffic loading and the covers shall not be perforated unless otherwise specified. Cleanout frames and covers shall be made of the above material and shall weigh not less than 90 pounds.
- F. FLOWABLE FILL. Flowable fill shall meet the specifications set forth in the *City of Garden City, Kansas, Standard Specifications Section Str-6.*

1.05 CONCRETE CRADLES & ENCASEMENT

Where unstable trench conditions are encountered which, in the opinion of the Engineer cannot be remedied by the addition of gravel or other select material, concrete cradle extending to the spring line of the pipe and 6" thick at the bottom shall be poured under the pipe and the full width of the trench. A 6" thick concrete encasement shall be poured around the pipe when the cover over the top of the pipe is 30" or less.

1.06 SERVICE CONNECTIONS & LINES

Service connections shall be made with manufactured wye branch fittings. Use of tapping tees or saddles is not allowed on new construction. The minimum size of service line shall be 4", Sch.

40 PVC, using a minimum slope of ¼” per foot. All wye branches shall have a proper socket on the outer end. Service lines shall be installed in accordance with the standard drawings.

1.07 TRENCH AND BACKFILL

Trench excavation and backfill shall include all excavation, backfilling, disposal of surplus and unsuitable material, and all other work incidental to the construction of trenches, including any excavation, which may be required for pipe installation and structures forming a part of the pipeline. Work performed under this section shall also be in conformance with the City of Garden City *General Improvements Handbook*. Water settlement (jetting) is not allowed.

The Contractor is responsible for conformance with current OSHA requirements and for the safety of his personnel and the public within or near excavations. All shoring, bracing, and blocking shall be furnished and installed as required to preserve and maintain exposed excavation faces, to protect existing structures and facilities, and to provide for the safety of workmen and the general public.

The Contractor shall, in accordance with the *Manual of Uniform Traffic Control Devices, latest edition*, or as otherwise directed by the Engineer, provide and maintain barricades, warning signs and lights and other safety devices required to protect the work, divert pedestrian and vehicular traffic and warn the general public of open excavations, unfilled trenches and other areas or conditions which might be hazardous.

All vegetation and other objectionable material shall be stripped from all areas of original ground or fill. Strippings shall not be used for backfilling structures, trenches or for fill of any kind. Unless otherwise directed, the contractor shall remove all unsuitable or surplus material, not required for fill or backfill, from the site.

Trenches shall be not less than 12” or more than 18” wider than the outside diameter of the pipe to be laid therein, unless otherwise required for proper bedding. Excess excavation below required level shall be backfilled with suitable material and compacted as directed by the Engineer. Bell holes shall be carefully excavated to insure pipe resting for its entire length upon the bottom of the trench. Trench bottoms shall be kept dry and stable during the trench preparation and until the pipe installation is completed to the extent that no damage from hydrostatic pressure, floatation, or other causes will result.

1.08 INSTALLATION

- A. **GENERAL:** The pipe shall be installed to the line grade and pipe shown on the drawings. The Contractor shall provide all tools and equipment including any special tools designed for installing each particular type of pipe used. Proper implements, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work.
- B. **DEWATERING OF TRENCH:** Where water is encountered in the trench, it shall be removed during pipe laying operations and the trench so maintained until the ends of the pipe are sealed and provisions are made to prevent floating of the pipe.

- C. RESPONSIBILITY FOR MATERIAL: The Contractor shall be responsible for all material furnished by him and shall replace at his own expense all such material found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include furnishing of all materials and labor required for the replacement of installed material discovered damaged or defective prior to the final acceptance of the work, or during the guarantee period. All rejected pipe shall be plainly marked by the Engineer and shall be replaced by the Contractor at his expense. After the pipe not rejected has been laid, all rejected pipe shall be accounted for.

Pipe furnished by the Contractor shall be delivered and distributed at the site by the Contractor. Pipe, fittings and accessories shall be loaded and unloaded so as to avoid shock or damage. Under no circumstances shall such materials be dropped. The Contractor shall be responsible for the safe and proper storage of materials intended for the work. The interior of all pipe and other accessories shall be kept free from dirt and foreign matter at all times. Precautions shall be taken to protect pipe and fittings against contamination.

- D. HANDLING OF PIPE: Pipe shall be so handled that coatings or linings will not be damaged. If, however, any part of the coating or lining is damaged, the repair shall be made by the Contractor, at his expense, in a manner satisfactory to the Engineer.

- E. LAYING OF PIPE: Pipe shall be laid and maintained to the required lines and grades with service fittings at the required locations. Pipe and fittings shall be carefully lowered into the trench piece by piece by suitable tools or equipment, in such a manner as to prevent damage to pipe materials and protective coatings and linings. Under no circumstances shall materials be dropped or dumped into the trench. All joints shall be made with the pipe in place in the trench. Ends of the pipe shall be clean and dry when the joints are made.

Pipe bedding shall conform to ASCE Manual No. 60/WPCF Manual FD-5 or to the standards required for the type of pipe being installed.

During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or other means approved by the Engineer.

1.09 STRUCTURE EXCAVATION.

The topsoil is to be excavated and stockpiled. The excavation shall be carried to a line 2' beyond the exterior lines of the concrete foundation. If suitable soil is not encountered and it is necessary to excavate below the elevation shown on the plans, a good pit run gravel shall be placed thereon to the required grades to provide for the placement of the concrete. The material shall be compacted to the satisfaction of the Engineer. Provisions shall be made to allow for installation of piping and other connections to the respective structures.

After completion of construction below original ground surface all forms, shoring, and bracing shall be removed and the excavation cleared of trash and debris. Material for backfilling shall

consist of approved material from the excavation or from borrow source, placed in lifts, and compacted to a 95% standard density or as otherwise directed by the Engineer. Water settlement (jetting) is not allowed.

All pipes under concrete floors/slabs shall be tested before the trenches are backfilled. After testing the pipelines, the trenches shall be backfilled with earth or sand and compacted to a density equal to that of the adjacent earth.

1.10 CLEAN UP.

During the course of the work, and before final acceptance by the City, the entire area shall be cleaned of all debris resulting from construction and shall be left in a clean and sightly condition.

1.11 SEPARATION FROM WATERMAINS.

A minimum horizontal distance of ten (10) feet shall be maintained between water and sewer lines. At points where sewers cross water mains, the sewer shall be constructed of cast or ductile iron, or encased in concrete for a distance of ten (10) feet in each direction of the crossing unless the water main is at least two (2) feet above the sewer.

When using PVC (SDR-35) pipe and with advance approval by the Engineer, the crossing may be constructed using a section of pipe centered on the pipe to be crossed, resulting in joints located the maximum distance from the pipe to be crossed.

1.12 CERTIFICATIONS & TESTING.

- A. **REPORTS.** Certified records of the tests made by the manufacturer or by a reliable commercial laboratory shall be submitted to the Engineer with each shipment of pipe.
- B. **VIDEO.** Prior to final acceptance, a video (CCTV) inspection shall be conducted by the City to check for alignment, deflection and other defects.
- C. **LEAKAGE.** Before acceptance, hydrostatic or air pressure tests shall be conducted, by the contractor in the presence of the Engineer. Testing method(s) to be used will properly consider groundwater elevation in relation to the sewer.

Infiltration-exfiltration rates exceeding 25 gallons per day per inch of pipe diameter per mile for any section of the system shall be considered excessive and the section of pipe has failed.

Infiltration-exfiltration tests must be conducted with a minimum of 4' of static water head above the invert of the sewer at the upstream manhole. Infiltration-exfiltration shall be less than 1.14 gallons per day per vertical foot of manhole height.

Low Pressure Air Test: Two procedures are included to find the rate of air leakage -- the constant-pressure method and the time-pressure drop method. This test may be used as a preliminary test to show the condition of a buried line prior to final backfill, paving, and other construction activities.

This test is per Uni-Bell PVC Pipe Association, UNI-B-6-98. The section of the line to be tested is plugged. Air, at low pressure, is introduced into the plugged line. The line passes the test if the rate of air loss, as measured by pressure drop, does not exceed a specified amount in a specified time.

APPARATUS.

Plugs--Mechanical or pneumatic type.

Air Compressor--A properly calibrated portable, oil-free air source with a singular control panel containing a main shut-off valve, pressure-regulating valve, 9 psig pressure-relief valve, input pressure gage, and a continuous monitoring pressure gage having a pressure range from 0 psi to at least 10 psi with minimum divisions of 0.10 psi and an accuracy of ± 0.04 psi.

Rotameter, standard CFM reading with an accuracy of $\pm 2\%$.

SAFETY PRECAUTIONS.

It is extremely important that the various plugs be properly installed and braced to prevent the sudden expulsion of a poorly installed or partially inflated plug. Observe the following minimum safety precautions:

1. No one shall be allowed in the manholes during testing.
2. Install and restrain all caps and plugs securely.
3. It is mandatory that all the caps and plugs be braced as an added safety factor.
4. Do not overpressurize the lines. Do not exceed 9.0 psig. A regulator or relief valve set no higher than 9 psi shall be included on all pressurizing equipment.

PROCEDURE.

Clean the section of sewer line to be tested by flushing or other means.

Isolate the section of sewer line to be tested by inflatable stoppers or other suitable test plugs.

Plug or cap the ends of all branches, laterals, tees, wyes, and stubs to be included in the test to prevent air leakage. All plugs and caps shall be securely braced to prevent blow-out. One of the plugs or caps should have an inlet tap, or other provision for connecting a hose to a portable air control source.

Connect the air hose to the inlet tap and portable air control source. The air equipment shall consist of necessary valves and pressure gages to control an oil-free air source and the rate at which air flows into the test section to enable monitoring of the air pressure within the test section.

Add air slowly to the test section until the pressure inside the pipe reaches 4.0 psig.

After the pressure of 4.0 psig is obtained, regulate the air supply so that the pressure is maintained between 3.5 to 4.0 psig for at least 2 min. The pressure will normally drop slightly until equilibrium is obtained; however, a minimum of 3.5 psig is required.

Determine the rate of air loss by either the constant pressure method or the time-pressure drop method.

Constant Pressure Method--Add air until the internal air pressure of the sewer line is raised to 4.0 psig and the test pipe section is stabilized. Release the pressure to 3.5 psig to run the constant pressure test. The air-flow rate in standard cubic feet per minute is read directly by a rotameter. Convert this air-flow rate to actual cubic feet per minute of air leaking from the test section by using the absolute pressure and temperature in the test section. The requirements for air loss under the constant pressure method shall be considered satisfied if the air loss does not exceed the specified leakage rate in cubic feet per minute per square foot of internal pipe surface area.

Time-Pressure Drop Method--Air is slowly introduced into the section of pipe to be tested, until the air pressure is raised to approximately 4.0 psi and the test pipe section is stabilized. Disconnect the air supply and decrease the pressure to 3.5 psi before starting the test. Determine the time required for the pressure to drop from 3.5 psi to 2.5 (or 3.0) psi, and compare this interval to the required time shown in Tables 1 or 2 to decide if the rate of air loss is within the allowable.

Upon completion of the test, open the bleeder valve and allow all air to escape. Plugs should not be removed until all air pressure in the test section has been reduced to atmospheric pressure.

TEST TIME CALCULATIONS.

Calculate all test times by the following formula:

$$T = 0.085 DK/Q$$

where:

T = shortest time allowed for the air pressure to drop 1.0 psig, seconds

K = 0.000419 DL but not less than 1.0

Q = leak rate in cubic feet/minute/square feet of internal surface = 0.0015 CFM/SF

D = nominal diameter of sewer pipe, inches

L = length of test section, feet

Table 1 contains the specified minimum times required for a 1.0 psig pressure drop from a starting pressure of 3.5 psig using a leakage rate of 0.0015 ft³/min/ft² of internal surface.

Table 2 contains the specified minimum times required for a 0.5 psig pressure drop from a starting pressure of 3.5 psig using a leakage rate of 0.0015 ft³/min/ft² of internal surface. This test method is used for testing of long sections or sections of larger diameter pipes.

The total leakage from any test section shall not exceed 625Q.

If the pressure drops 1.0 psig, or 0.5 psig, before the appropriate time shown in Table 1, or Table 2, has elapsed, the air loss rate shall be considered excessive and the section of pipe has failed the test.

If lateral or service lines are included in the test, their length may be ignored for computing required test time if the test time requirements are met. If the test section fails, time shall be recomputed to include all the lateral lengths using the following formula:

$$T = 0.085(D_1^2L_1 + D_2^2L_2 + \dots) / (D_1L_1 + D_2L_2 + \dots) (K/Q)$$

where:

- T = shortest time allowed for the air pressure to drop 1.0 psig, seconds,
- K = 0.000419 (D₁L₁ + D₂L₂ + ...), but not less than 1.0,
- Q = 0.0015 CFM/SF,
- D₁,D₂,etc. = nominal diameters pipe being tested, and
- L₁,L₂,etc. = respective lengths of the pipes being tested.

If the recomputed test time is short enough to allow the section tested to pass, then the test section meets the requirements of this test method.

**TABLE 1
LOW PRESSURE AIR TEST
PRESSURE DROP = 1.0 psi**

Minimum Specified Time Required for a 1.0 psig Pressure Drop for Size and Length of Pipe indicated for Q=0.0015

Pipe Diameter in.	Minimum Time, min:s	Length for Minimum Time, ft.	Time for Longer Length,s	Specification Time for Length (L) Shown, min:s								
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft	
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24	
10	9:25	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48	
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38	
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04	
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41	
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31	
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33	
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48	
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15	
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53	
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46	

TABLE 2
LOW PRESSURE AIR TEST
PRESSURE DROP = 0.5 psi

Minimum Specified Time Required for a 0.5 psig Pressure Drop for Size and Length of Pipe indicated for Q=0.0015

Pipe Diameter in.	Minimum Time, min:s	Length for Minimum Time, ft.	Time for Longer Length,s	Specification Time for Length (L) Shown, min:s							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	1:53	597	0.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	0.760 L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187 L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2.671 L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235 L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837 L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653 L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	64:54
30	14:10	80	10.683 L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926 L	21:33	32:19	43:56	53:12	64:38	75:24	86:10	96:57
36	17:00	66	15.384 L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23

Note – Consult with pipe and appurtenance manufacturer for maximum test pressure for pipe size greater than 30 in. in diameter.

Note – It is not necessary to hold the test for the entire period of time in Table 1 or Table 2 when it is evident that the rate of air loss is zero or less than the allowable, and authorized by the Engineer.

Manhole Vacuum Test: This test is used as an acceptance test for manholes. However, it may be a preliminary test to enable the Contractor to demonstrate the condition of the manholes prior to backfill.

PREPARATION OF THE MANHOLE

All lift holes shall be plugged. All pipes entering the manhole shall be temporarily plugged and securely braced to prevent them from being drawn into the manhole.

PROCEDURE

The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations. A vacuum of 10” of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9” of mercury.

The manhole shall pass if the time for the vacuum reading to drop form 10” of mercury to 9” of mercury meets or exceeds the values indicated in Table 3. If the manhole fails the initial test,

necessary repairs shall be made by an approved method. The manhole shall then be retested until a satisfactory test is obtained.

**TABLE 3
MANHOLE VACUUM TEST
Minimum Test Times**

Depth (ft.)	Diameter, in.								
	30	33	36	42	48	54	60	66	72
	Times								
8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	30	34	40	48	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

D. DEFLECTION TESTING. PVC gravity pipe sewer mains shall be tested for deflection. To insure accurate testing, the lines must be thoroughly cleaned. The maximum allowable deflection is 5.0%. Measurement will be made with a properly sized "go, no-go" mandrel or sewer ball, or other method approved by the engineer, not less than 30 calendar days following the installation. Deflections greater than 5.0% may require the pipe to be removed and reinstalled, or replaced if permanently damaged in any way.

1.13 MEASUREMENT AND PAYMENT

A. GENERAL: The following items shall constitute pay items for the work covered under this section of the Specifications. Payment for these items shall be full compensation for providing all materials, tools, labor and equipment necessary to complete the item and all incidental work related thereto, whether specifically mentioned herein or not. Payment shall include all testing and disinfecting.

B. SEWER MAIN: Measurement of sewer mains, and service laterals, shall be on a linear foot basis, along the centerline of pipe through all valves, fittings, and appurtenances. Payment for sewer mains will be made at the contract unit prices per lineal foot of the various sizes called for, which price shall include trench excavation, backfill, furnishing and installing pipe; furnishing and placing bedding; cleaning, and testing the water main and all other work necessary or incidental for completion of the item unless otherwise specified in the Special Provisions.

- C. FITTINGS: Measurement of sewer main fittings will be on a per each basis, by numerical count of the various types and sizes listed in the Proposal. Payment for fittings will be made at the contract unit price for each fitting, which price shall include furnishing and installing the fittings as required, and any other work necessary or incidental for completion of the item.
- D. MANHOLES. Measurement of manholes shall be on a per each basis, by numerical count of the sizes listed in the Proposal. A standard manhole shall be less than or equal to 8.0' in height. Extra manhole depth shall be measured on a vertical foot basis for each manhole over 8.01' in height. Payment for standard manholes and extra manhole depth, will be made at the Contract Unit Prices listed in the Proposal; which price shall include furnishing and installing the manholes, all additional excavation, backfill, and special compaction required for the installation, and all other work necessary or incidental for completion of the item.

STANDARD SPECIFICATIONS SUBMERSIBLE LIFT STATION SECTION SS-2

1.01 SCOPE

This section covers the furnishing and installation of an automatic pump station with duplex non-clog sewage pumps as indicated on the Drawings and herein specified. The station shall be complete with valves, duplex pumping units, piping, electrical equipment, controls and enclosures. Ventilation blower and all miscellaneous work, wiring and appurtenances required to provide a complete pump station, ready for operation.

The principal items of equipment for pump station shall include two vertical non-clog sewage pumps; valves; rails, internal piping; central control panel with circuit breakers; motor starters and automatic pumping level controls; all internal wiring and electrical service; plug valves; landings; standby generator.

The following pump station specifications are based on equipment manufactured by Myers and have been prepared to establish a standard of quality and equipment. Pre-approved equal by Engineer may be used.

1.02 SUBMITTALS AND SHOP DRAWINGS

Prior to fabrication, pump station manufacturer shall submit PDF copies of submittal data for review and approval.

Submittal shall include shop drawings, electrical ladder logic drawings and support data as follows: Catalog cuts sheets reflecting characteristics for major items of equipment, including materials of construction, major dimensions, motor data, pump characteristic curves showing the design duty point capacity (GPM), head (FT), and hydraulic brake horsepower (BHP). Electrical components used in the motor branch and liquid level control shall be fully described.

Shop drawings shall include a layout of mechanical equipment and anchor bolt locations for the station. Pipe penetrations and station access clearances shall be dimensioned relative to the station centerline. The electrical ladder logic drawings shall illustrate motor branch and liquid level control circuits to extent necessary to validate function and integration of circuits to form a complete working system.

1.03 WET WELL

The cover plate is to be a Halliday Model R1R72 with access door. The cover plate and access door shall meet the following specifications:

- a. Cover Leaf: ¼” aluminum diamond plate.
- b. Angle Frame: ¼” with anchor plates.
- c. Load Rating: 300 lbs. psf uniform live load with a maximum allowable deflection of 1/150 of the span.
- d. Locking System: non-corrosive locking bar used in conjunction with an owner supplied padlock.
- e. Cover equipped with the following Type 316 stainless steel features: heavy duty hinges, tamper proof attaching hardware, hold open arm with aluminum latch.
- f. Guarantee: Access covers shall carry a lifetime guarantee against defects in material and/or workmanship.

1.04 OPERATING CONDITIONS

The pumps must be designed to handle raw, unscreened, domestic sanitary sewage. All openings and passages shall be large enough to permit the passage of a sphere 3” in diameter and any additional material which will pass through a 4” house collection system.

The pump motors shall not be overloaded beyond their nameplate rating, at the design conditions, nor at any head in the operating range. The above rated total dynamic head does not include friction losses of the packaged pump system. It is the manufacturer’s responsibility to add these losses when calculating brake horsepower and total system efficiency. The losses must be included in the submittal package. Manufacturers using vendored components (valves, etc.) must submit head curves, which are published by the original manufacturer, for friction losses so as to assume correct application of pumps and motors.

1.05 NON-CLOG SEWAGE PUMPS

A. GENERAL

Furnish and install a complete non-clog sewage pumping system consisting of: Two (2) Myers model number submersible non-clog sewage pumps, as noted in the Supplemental Provisions, and SRA-400 lift-out check valve rail systems, shutoff valves, controls, access cover(s) and all other appurtenances to make a complete system.

B. COMPONENTS

Each lift-out system shall consist of a discharge and rail support elbow that bolts to bottom of wetwell, a combination check valve and seal flange that mounts to pump, top rail support guides, and guide/support brackets that mount to pump. All exposed nuts, bolts, and fasteners shall be 300 series stainless steel.

C. CHECK VALVE

The lift-out check valve shall be of the swing clapper type with rubber facing. A bronze seat bushing shall be mounted in the face of valve to provide a corrosion-proof seat. The clapper shall be mounted on a stainless steel shaft and shall be spring loaded to prevent slamming when closing

The open face of the valve shall be tapered and have a holding groove machined in the face to hold a sealing o-ring. The tapered seat shall allow pump to be nearly sealed at discharge elbow before sealing faces make full contact. A guide plate and adjustable guide bar shall fasten to the top of the pump to insure proper alignment and support of the pump. The check valve shall lift out with pump to allow for inspection, cleaning or maintenance of the valve outside the wetwell. No additional check valve shall be required in the discharge piping. Lift-out systems which do not incorporate a lift-out check valve as an integral part of the lift-out assembly shall not be considered equal.

D. ELBOW

Discharge elbow shall be 4" x 4" and shall be integrally cast into the base assembly.

E. GUIDE RAILS

Two rail pipes shall be used to guide the pump from the surface to the discharge base connection. The guide rails shall be 1-1/2" schedule 40, 304 stainless steel pipe. The weight of the pump shall bear solely on the discharge base and not on the guide rails. Rail systems which require the pump to be supported by legs which might interfere with the flow of solids into the pump suction will not be considered equal. The guide rails shall be firmly attached to the access hatch frame. Systems deeper than 18 feet shall use an intermediate guide for each 18 feet of wetwell depth.

F. LIFTING CHAIN

An adequate length of 304 stainless steel lifting chain shall be supplied for removing pump. The chain shall be of sufficient length and shall include an adequate number of lifting rings to provide ease of pump removal.

1.06 CONTROLS

The control logic shall provide for the automatic operation and alternation of the pumps based on a (4) float system – off, lead, lag, alarm.

A. ENCLOSURE

The pump controls shall be housed in a NEMA 4X stainless steel enclosure. The enclosure shall be post mounted type with exterior mounting tabs and sized to house all the required components and allow adequate space for testing and maintenance as necessary. The enclosure shall have back plate mounting studs, padlocking provisions, door latches and continuous hinge, all of stainless steel. The door gasket shall be a seamless foam-in-place type.

The panel shall have an aluminum hinged inner door with a latch to protect all live internal wiring from operator personnel. The inner door shall be able to be opened to a minimum of 150° to allow safe access to the components. Cutouts for breaker handles shall be provided to allow the operation of all circuit breakers through the inner door. All control switches and indicator pilot lights shall be mounted on the inner door.

The inner door shall be designed so that the mounting will not in any way penetrate the exterior of the control panel enclosure and deteriorate the NEMA rating. It shall also be designed to allow and provide fill access to the sides, top and bottom of the control panel for power and control conduit entrance. All conduit entrances shall be made in a NEC approved manner. The conduits to the wetwell shall have approved seal-off fittings installed and properly sealed to protect the control panel from adverse damage from the wetwell.

All components shall be securely mounted to the back plate with plated machine screws through machine thread tapped holes in the back plate. The screws shall be of adequate size for the device being secured.

B. POWER DISTRIBUTION

The panel power distribution shall include all components as indicated below and be completely wired with stranded conductors having a minimum of 90 degree insulation rating and an ampacity rating a minimum of 125% of the motor ampere rating. All power wiring shall be neatly routed and totally accessible. All conductor terminations shall be as recommended by the device manufacturer and be secure to provide adequate electrical.

C. CIRCUIT BREAKERS

Circuit breakers shall be provided for each motor and for the primary of the control transformer. Circuit breakers shall be of the thermal-magnetic type. Breakers will be operable through cutouts in the inner-door. Circuit breakers will be Square D – HDL series.

D. PROTECTION PHASE MONITOR

The panel shall contain a monitor voltage of each phase and not allow the pumps to operator when power is out of phase.

E. LIGHTNING/SURGE ARRESTOR

The panel shall contain a secondary surge arrestor. The arrestor shall be rated for 650 VAC phase-to-ground maximum. The arrestor will be Square D – SDSA3650 series.

F. MOTOR STARTERS

Motor starters shall be IEC rated, per Supplemental Provisions, and be provided with adjustable overload relays with Class 10 Trip. A normally open holding contact shall be provided. The starter shall be 3-pole poly phase type units as manufactured by Square D.

G. SELECTOR SWITCH

“Hand-Off Auto” selector switches shall be provided for each motor and mounted on the inner-door. In the “hand” position only the float switches will be bypassed. Switches will be of the heavy duty Toggle type and be manufactured by Gaynor.

H. PILOT LIGHTS

Pilot lights shall be of the 120vac neon type and be as manufactured by Chicago Miniature. All pilot lights shall be mounted on the inner-door and be supplied as follows:

- Pump Run (2) – Green
- Pump Failure (2) – Red
- Seal Fail (2) – Red
- High Level Light – Red

I. ELAPSED TIME METERS

A non-resettable elapsed time meter, reading in hours and tenths, shall be provided for each pump motor and mounted on the inner-door. Meters shall be manufactured by Redington 722 series.

J. DUPLEX CONVENIENCE OUTLET

A duplex convenience outlet with weather proof cover shall be installed through the right hand side of the NEMA 4x enclosure. A 15 Amp QOU115 circuit breaker will also be provided.

K. ALARM

The control panel shall be fitted with a red lexan alarm light. The globe shall be mounted on top of the enclosure. The bulb shall be 40-watt minimum high intensity. An alarm horn with manual reset shall be installed in the side of the control panel.

L. GENERAL

Terminal strips shall be provided for all wiring terminations. All components mounted on the inner-door shall be identified with engraved plastic labels. The control panel assembly shall be completely factory tested and shall be “UL” 508A listed and labeled.

Panel shall include a manual generator transfer switch.

Panel shall include an alarm light battery back-up system.

Stainless Steel junction box shall be located adjacent the wet well. The junction box shall contain terminal strips to correspond to the terminal strips in the control panel.

The control panel shall be as manufactured by CSI Controls – Ashland, Ohio.

M. PROTECTION AGAINST CORROSION

All structural steel surfaces shall be factory blasted with steel grit to remove rust, mill scale, weld slag, etc. All weld spatter and surface roughness shall be removed by grinding. Surface

preparation shall comply with SSPC-SP6 specifications. Immediately following cleaning, a single 6-mil dry film thickness of Versapox R epoxy resin or approved equal paint shall be factory applied. This coating shall be formulated for abrasion and corrosion resistance.

Stainless steel, aluminum and other corrosion resistant surfaces shall not be coated. Carbon steel surfaces not otherwise protected shall be coated with suitable non-hardening rust preventative compound. Auxiliary components, such as the electrical enclosure, ventilating blower and vacuum pumps, shall be furnished with the original manufacturer's coating.

Finish coating shall be accomplished prior to shipment of the station from the factory and shall comply fully with the intent of these Specifications. A touch-up kit shall be provided by the pump station manufacturer for repair of any mars or scratches occurring during shipping and installation. This kit shall contain detailed instructions for use and shall be the same material as the original coating.

1.07 INSTALLATION AND OPERATING INSTRUCTIONS

Installation of the pump chamber shall be done in accordance with the written instructions provided by the manufacturer.

Four copies of operation and maintenance manuals shall be furnished which will include parts lists of components and complete service procedures and troubleshooting guide.

1.08 GUARANTEE

The manufacturer of each station shall guarantee for one year from date of start-up, not to exceed eighteen months from date of shipment, that the structure and all equipment he provides will be free from defects in material and workmanship. Warranties and guarantees of the suppliers of various components in lieu of a single source responsibility by the manufacturer will not be accepted. The manufacturer shall assume prime responsibility for the guarantee of the station and all components.

In the event a component fails to perform as specified or is proven defective in service during the guarantee period, the manufacturer shall repair or replace at his discretion, such defective part. He shall further provide, without cost, such labor as may be required to replace, repair or modify major components such as the steel structure, main pumps, main pump motors and main piping manifold. After start-up service has been performed, the labor to replace accessory items, such as the blower, priming pumps, alternator, etc., shall be the responsibility of others.

The repair or replacement of those items normally consumed in service, such as seals, grease, light bulbs, etc., shall be considered as part of routine maintenance and upkeep.

It is not intended that the manufacturer assume responsibility for contingent liabilities or consequential damages of any nature resulting from defects in design, material, workmanship or delays in delivery, replacement or otherwise.

1.09 EXTERIOR ELECTRICAL

Exterior electrical work shall consist of furnishing and installing a new unistrut structure, furnishing and installing the electrical equipment and wiring for the operation of the new sewage pumping station in accordance with the Drawings and these Specifications. The electrical work is subsidiary to other Bid Items and shall conform to National Electric Code, local codes, and regulations.

The completed installation of the pump station will include the following principal items of work:

- a. Furnish and install a unistrut structure as indicated on the Drawings. The Contractor shall install the main disconnect switch and weatherhead with 24" of exposed wire above the weatherhead.
- b. Installing meter socket on pole.
- c. Connect electrical supply to meter pole weatherhead.
- d. Connect electrical supply to control center at pump station.
- e. Install alarm light, horn and level controls.

This statement of the principal items of work is not intended to restrict the work only to the items listed and itemized nor to relieve the Contractor of his responsibility to furnish, install and connect any and all items required for a complete and operable installation, at the pump station, regardless of whether or not specifically detailed and described. The Drawings show the general unit.

APPENDIX B

Miscellaneous Information

Department Phone Numbers

Ordinance

Summary and comparison between the 2006 General Surface Improvements Handbook and the 2017 General Improvements Handbook

APPENDIX B

DEPARTMENT PHONE NUMBERS

Public Works Department: (620) 276-1260

Neighborhood & Development Services Department: (620) 276-1170

Water Department: (620) 276-1291

Wastewater Department: (620) 276-1281

Electric Department : (620) 276-1290

Fire Chief/Department: (620) 276-1140 (for emergencies dial 911)

Police Chief/Department: (620) 276-1350 (for emergencies dial 911)

Kansas One Call: 811 or (800) 344-7233

(Published in the Garden City Telegram on September 12th, 2017)

ORDINANCE NO. 2770 - 2017

AN ORDINANCE PERTAINING TO THE USE OF DESIGNATED PUBLIC RIGHTS-OF-WAY; AMENDING SECTIONS 78-43 and 78-77 OF THE CODE OF ORDINANCES OF THE CITY OF GARDEN CITY, KANSAS; REPEALING SECTIONS 78-43 AND 78-77, ALL TO THE CODE OF ORDINANCES OF THE CITY OF GARDEN CITY, KANSAS.

BE IT ORDAINED by the Governing Body of the City of Garden City, Kansas:

SECTION 1. That Section 78-43 of the Code of Ordinances of the City of Garden City, Kansas, is hereby amended to read as follows:

Section 78-43. Plans, specifications adopted.

The standard plans and specifications for excavations and placement of utilities in public rights-of-way, as contained in the *GENERAL IMPROVEMENTS HANDBOOK, CITY OF GARDEN CITY, 2017*, prepared by the city engineer, are adopted by reference.

SECTION 2. That Section 78-77 of the Code of Ordinances of the City of Garden City, Kansas, is hereby amended to read as follows:

Section 78-77. Adoption of specifications.

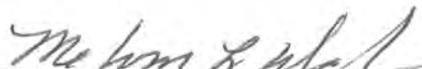
The standard plans and specifications for the construction, reconstruction and repair of sidewalks, as contained in the *GENERAL IMPROVEMENTS HANDBOOK, CITY OF GARDEN CITY, 2017*, prepared by the city engineer, are adopted by reference.

SECTION 3. That Sections 78-43 and 78-77 as previously existing and amended, be and the same are hereby repealed, to be replaced as specified in this ordinance.

SECTION 4. If any section, clause, sentence or phrase of this ordinance is found to be unconstitutional or is otherwise held invalid by any court of competent jurisdiction, it shall not affect the validity of any remaining parts of the ordinance.

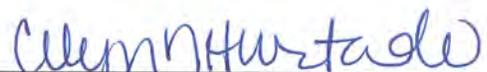
SECTION 5. That this ordinance shall take effect upon the date of its publication in the Garden City Telegram, the official City newspaper.

APPROVED AND PASSED by the Governing Body of the City of Garden City, Kansas, the 5th day of September, 2017.



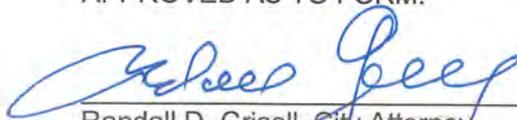
Melvin L. Dale, Mayor

ATTEST:



Celyn N. Hurtado, City Clerk

APPROVED AS TO FORM:



Randall D. Grisell, City Attorney



Summary

General Improvements Handbook (2017)

CITY COMMISSION

MELVIN L. DALE,
MAYOR

ROY CESSNA

JANET A. DOLL

DAN FANKHAUSER

J. CHRISTOPHER LAW

MATTHEW C. ALLEN

CITY MANAGER

MELINDA A. HITZ, CPA

FINANCE DIRECTOR

RANDALL D. GRISELL

CITY COUNSELOR

Below is the summary and comparison between the 2006 General Surface Improvements Handbook and the 2017 General Improvements Handbook.

	2006	2017
	Index (No Page numbers)	Numbered Index
Inspections requests	2 hrs. advance notice	24 hrs. advance notice
Review & approvals for deviation of standards	--	City review and approval required
Technical provisions:		
Regular Sidewalk Thickness	4" Thick	5" Thick
Driveway Sidewalk Thickness	5" Thick	6" Thick
Alley Approach Sidewalk Thickness	7" Thick	8" Thick
Slope	1/4" per foot	3/16" per foot (2% Maximum)
Concrete Joint Detail	#4 x 18" Bar	#4 x 30" Bar Hot joint sealing compound required for seal joints
Concrete Mix	C&G, Sidewalks (564 lbs.) 3,500 psi (6 sac)	Sidewalks (CM520-4000) – (520 lbs.) 4,000 psi (5.5 sac) C&G (CM611-4000) – (611 lbs.) 4,000 psi (6.5 sac) All aggregate required to meet most current KDOT specs.
Street Design Stds.	--	Pavement design by Geotechnical Engr. Reference to most current KDOT specs.

CITY ADMINISTRATIVE
CENTER
301 N. 8TH
P.O. Box 998
GARDEN CITY, KS
67846-0998
620.276.1160
FAX 620.276.1169
www.garden-city.org



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2006	
Underground utilities	<u>Preferred</u> installation in underground conduit
Parking Lot Spaces (Stall Dimensions)	18.5' x 9'
Valley Gutter Details	--
Residential Driveway Location	20' min. distance from corner
Commercial Driveway Location	20' min. distance from corner
Residential Cul-de-sac	--
ADA Parking Lot Detail	--
Solid Waste Enclosure Details	--
Appendix A	(Specs amended - see Section Str-6)
Appendix B	--

2017
<u>Required</u> installation in underground conduit
20' x 9' to match current zoning reg.
New detail sheets
40' min. distance from corner
85' min. distance from corner
Required to concrete the full length of cul-de-sac if 250' or less If cul-de-sac is longer than 250', then extend concrete to the property line of the first full lot beyond the cul-de-sac return.
Detail clarified for Alternate Van Accessible Configuration
New Details Added
<u>New Sections Added</u> Section AP-1, Asphalt Paving Spec Section Str-4, Concrete Pavement Section Str-5, Patching Section Str-6, Concrete Mixtures Section W-1, Watermains Section W-2, Boring and Casing Section W-3, Directional Drilling Section SS-1, Sanitary Sewer Const. Section SS-2, Submersible Lift Station
Department Contacts