CITY OF ORLANDO

STANDARD ENGINEERING DETAILS

Part 1 – Paving & Drainage

Index to Sheets

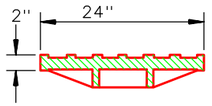
ENGINEERING BUREAU • PUBLIC WORKS DEPARTMENT

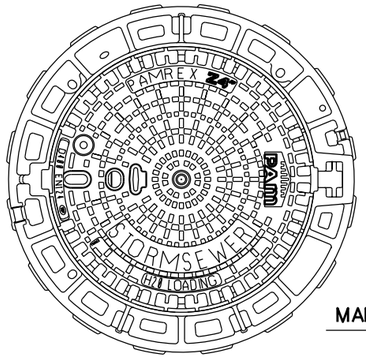
CITY HALL • P.O. BOX 4990 • 400 SOUTH ORANGE AVENUE • ORLANDO, FLORIDA 32802-4990

PHONE 407-246-3267 • FAX 407-246-2892

NOTES (TOPS, FRAMES, AND COVER)

1. All steel bars shall have 1 1/4 " minimum cover unless otherwise shown and shall be hooked where indicated.
2. Manhole top Type 7 slabs shall be of Class II concrete. Concrete as specified in ASTM C-478 may be used for precast units; see General Note No. 2.
3. Manhole top Type 7 slabs may be of cast-in-place or precast construction. The optional key is for precast tops and in lieu of dowels. Frame and slab openings are to be omitted when top is used over a junction box. Frames can be adjusted with from one to six courses of brick.
4. Manhole top Type 8 may be of cast-in-place or precast concrete construction. For concrete construction, the concrete and steel reinforcement shall be the same as the supporting wall unit. An eccentric cone may be used.
5. Manhole tops shall be secured to structures by optional construction joints as shown on Sheet 3 of 6.





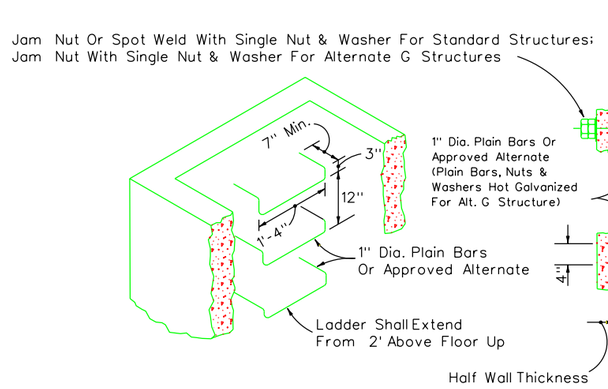
MANHOLE COVERS
N.T.S.

MANHOLE FRAME & COVER FOR USE IN PRIVATE PROPERTY:

MANHOLE FRAME & COVER FOR USE IN DEDICATED PUBLIC R.O.W.: NOT FOR USE IN ASPHALT PAVEMENT AREA

SPECIFICATIONS

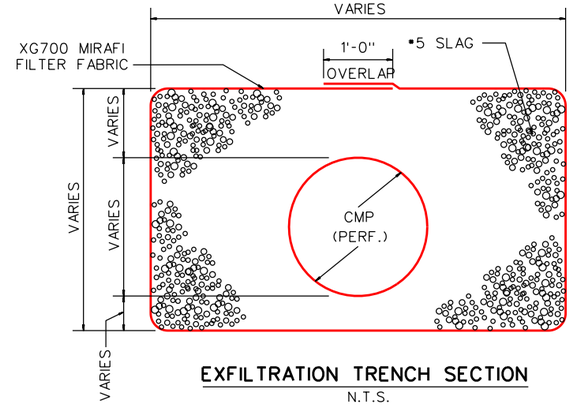
1. PAMREX or similar approved Manhole Cover and Frame
2. Covers and Frames shall be manufactured from Ductile Iron in accordance with ISO 1083
3. Covers to be hinged and incorporate a 90° blocking system to prevent accidental closure.
4. Covers shall be one-man operable using standard tools and shall be capable of withstanding an average load of 120,000 lbs.
5. Frames shall be circular and shall incorporate a seating gasket; Frame depth shall not exceed 4".
6. The Flange shall incorporate bedding slots and bolt holes.
7. All components shall be black coated.
8. Manhole cover and frame for use in asphalt paved roadways shall be US Foundry 420JT or 120JT.



PICTORIAL VIEW

OPTIONAL BAR TYPES

LADDER BARS FOR STRUCTURES OVER 10' IN DEPTH



EXFILTRATION TRENCH SECTION
N.T.S.

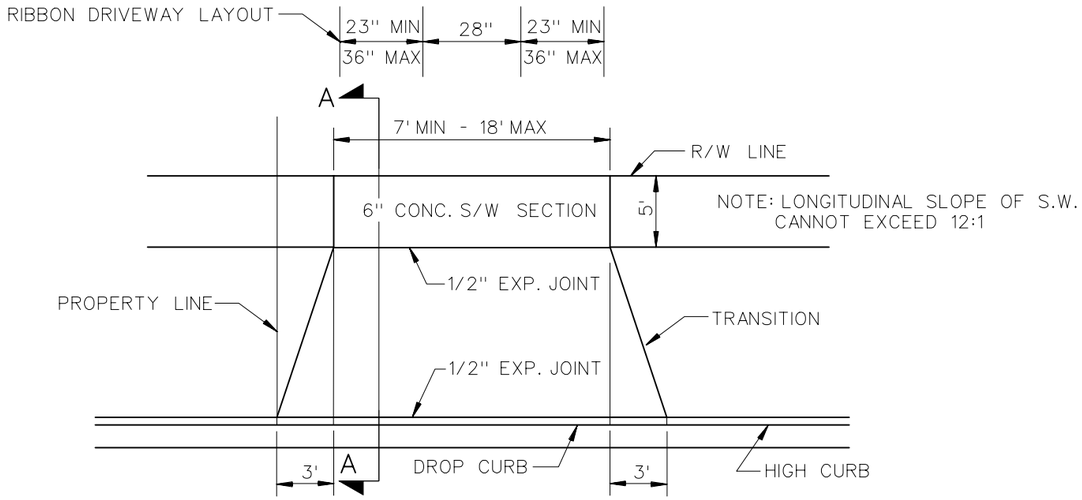
FILENAME: DRAINAGE.DGN	CATEGORY: DRAIN
DATE: 2/25/2009	SCALE: N.T.S.
DRAWN BY: GAP/EL	APPROVED BY: RMH

ENGINEERING STANDARDS MANUAL

DEPARTMENT OF PUBLIC WORKS
PROJECT / CONSTRUCTION MANAGEMENT BUREAU
CITY OF ORLANDO, FLORIDA

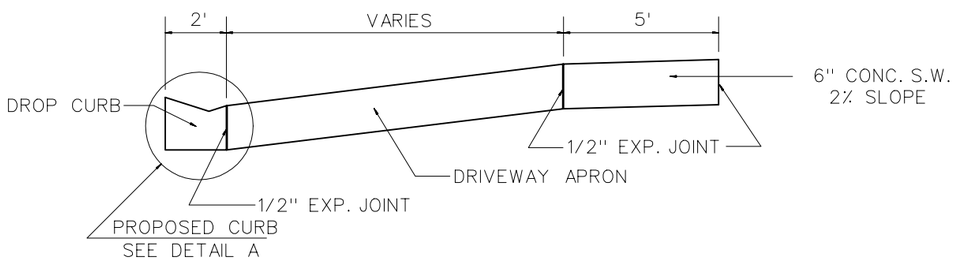
TITLE: SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS

SHEET 1



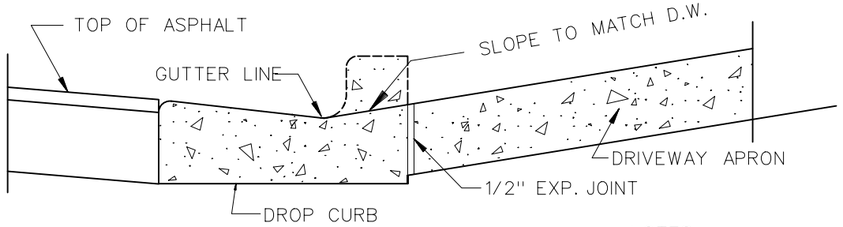
RESIDENTIAL DRIVEWAY APRON

N.T.S.



SECTION A-A

N.T.S.

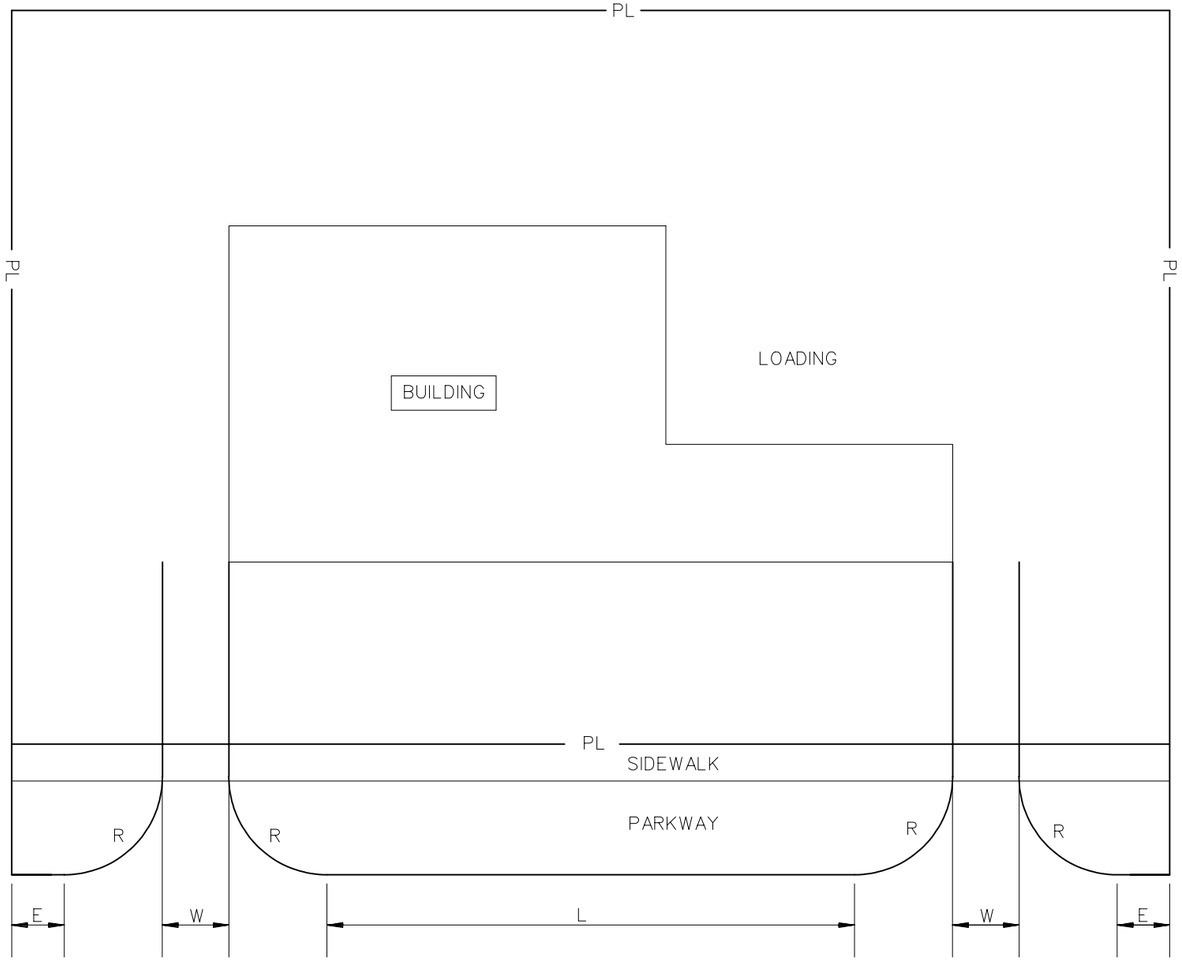


DETAIL A

N.T.S.

NOTES:

1. 3000 PSI CLASS 1 CONCRETE REQUIRED
2. EXISTING HIGH CURB SHALL BE REMOVED AND REPLACED WITH DROP CURB
3. 6" S.W. SECTION SHALL BE INSTALLED THROUGH DRIVEWAY



COMMERCIAL DRIVEWAY APRON

N.T.S.

W-ONE WAY DRIVE 16' MIN 20' MAX*
TWO WAY DRIVE 24' MIN 30' MAX*
*OR AS REQUIRED FOR MULTI-LANE DRIVEWAYS

E-2' MIN

L-42' MIN

R-BASED ON DESIGN VEHICLE REQUIREMENTS
25' MINIMUM RADIUS

SHEET 2

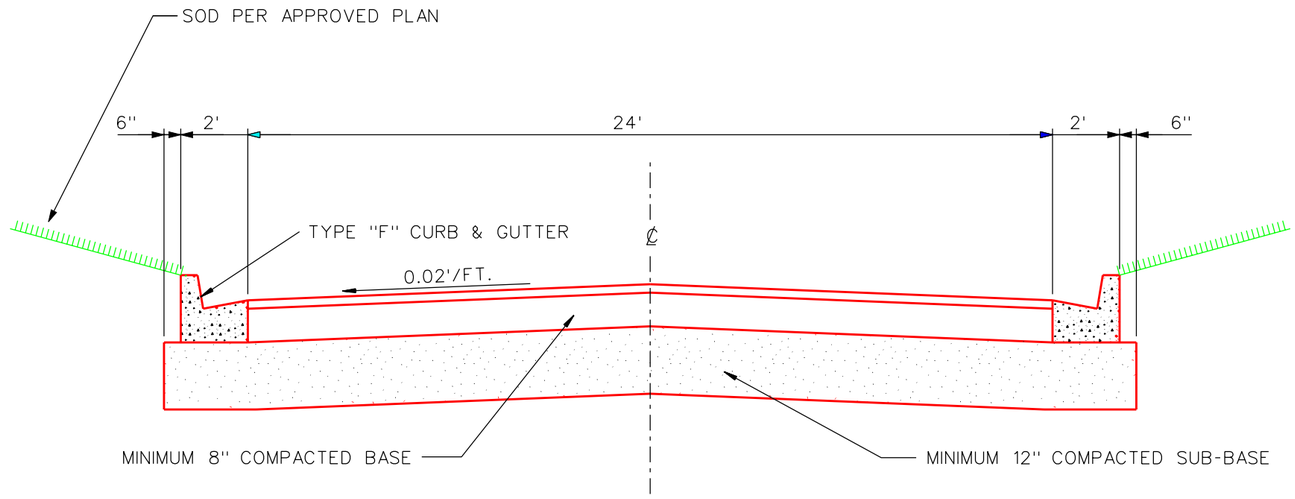
DEPARTMENT OF PUBLIC WORKS
PROJECT / CONSTRUCTION MANAGEMENT BUREAU

CITY OF ORLANDO, FLORIDA

TITLE: DRIVEWAYS: RESIDENTIAL & COMMERCIAL APPROACHES

ENGINEERING STANDARDS MANUAL

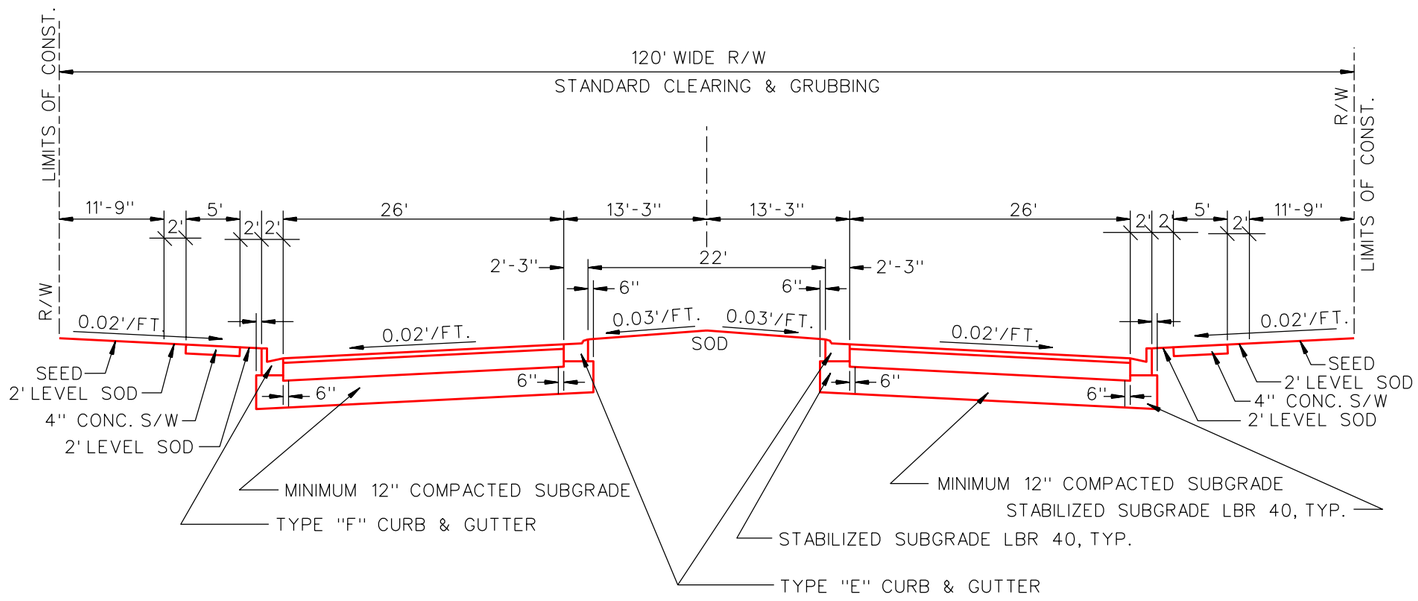
FILENAME: APRONS.DGN	CATEGORY: DRIVEWAYS
DATE: 2/18/03	SCALE: N.T.S.
DRAWN BY: EL	APPROVED BY: RMH



FINAL LAYER THICKNESSES TO BE DETERMINED BY THE ENGINEERS PAVEMENT DESIGN CALCULATIONS.

TYPICAL ROADWAY SECTION

N.T.S.



FINAL LAYER THICKNESSES TO BE DETERMINED BY THE ENGINEERS PAVEMENT DESIGN CALCULATIONS.

TYPICAL DIVIDED ROADWAY SECTION

N.T.S.

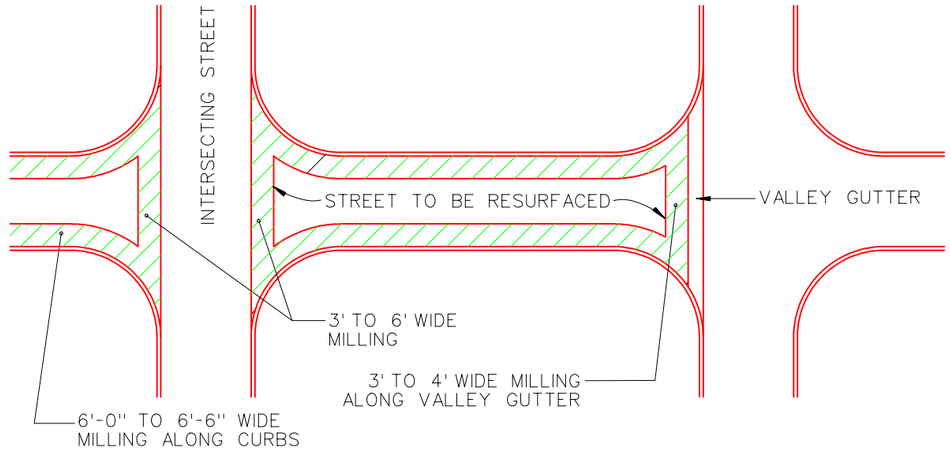
FILENAME: ROADWAY.DGN	CATEGORY: ROADWAY
DATE: 6/3/2009	SCALE: N.T.S.
DRAWN BY: EL/DG	APPROVED BY: RMH

ENGINEERING STANDARDS MANUAL

DEPARTMENT OF PUBLIC WORKS
PROJECT / CONSTRUCTION MANAGEMENT BUREAU
CITY OF ORLANDO, FLORIDA

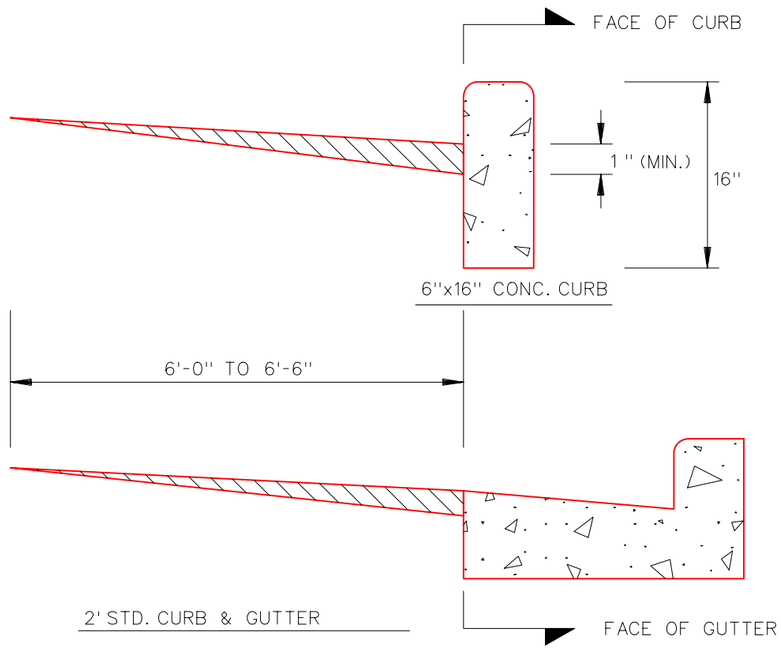
TITLE: TYPICAL ROADWAY SECTIONS

SHEET 3



MILLING AT INTERSECTIONS

N.T.S.



MILLING ALONG CURBS

N.T.S.

SHEET 4

DEPARTMENT OF PUBLIC WORKS
PROJECT / CONSTRUCTION MANAGEMENT BUREAU

CITY OF ORLANDO, FLORIDA

TITLE: **PAVEMENT AND MILLING STREET RESTORATION**

ENGINEERING STANDARDS MANUAL

FILENAME: PAVEMENT.DGN	CATEGORY: GENERAL
DATE: 2/19/03	SCALE: N.T.S.
DRAWN BY: EL	APPROVED BY: RMH

CURB RAMP - GENERAL NOTES & DETAILS

1. Public sidewalk curb ramps shall be constructed in the public right of way at locations that will provide continuous unobstructed pedestrian circulation paths to pedestrian areas, elements and facilities in the public right of way and to accessible pedestrian routes on adjacent sites. Curbed facilities with sidewalks and those without sidewalks are to have curb ramps constructed at all street intersections and at turnouts that have curbed returns. Partial curb returns shall extend to the limit prescribed by FDOT Index No. 515 to accommodate curb ramps. Ramps constructed at locations without sidewalks shall have a 5' x 5' landing constructed at the top of each ramp.

2. The location of curb ramps shall be as shown in the plans, but shall conform to these standard details. All ramps, landings and curbs shall be constructed with minimum 3000 psi, Class A concrete and shall have minimum thickness of 6 inches. All concrete for pedestrian areas shall have a medium broom finish and standard color, unless specifically required by the plans.

3. Curb ramp running slopes at unrestrained sites shall not be steeper than 1 : 12 and cross slope shall not be steeper than 2%. Transition slopes shall not be steeper than 1 : 12.

   When altering existing pedestrian facilities where existing site development precludes the accommodation of a ramp slope of 1 : 12, a running slope between 1 : 12 and 1 : 10 is permitted for a rise of 6" maximum and a running slope of between 1 : 10 and 1 : 8 is permitted for a rise of 3" maximum. Where compliance with the requirements for cross slope cannot be fully met, the minimum feasible cross slope shall be provided.

4. If a curb ramp is located where pedestrians must walk across the ramp, then the walk shall have transitions with a maximum longitudinal slope of 1 : 12. and a 2% cross-slope. Ramps with curb returns may be used to provide guidance, avoid an obstacle, or when R/W limitations prohibit flares. Improvements for directional guidance are required whenever necessary to guide or re-direct the pedestrian towards the receiving ramp.

5. All curb ramps shall have detectable warning surfaces that extend the full width of the ramp and 24" from the back of curb in the direction of travel. Detectable warning surfaces shall be constructed by texturing a truncated dome pattern in conformance with U.S. Department of Justice A.D.A. Standards For Accessible Design, A.D.A. Accessibility Guidelines, Section 4.29.2, (detail shown above left). Transition slopes are not to have detectable warnings. Dome pattern shall be in-line with direction of travel. Use Armor Tile cast-in place detectable warning tiles, or approved equal.

6. The color requirement for detectable warnings is to provide a dark-on-light visual contrast between the detectable warning surface and the adjacent walking surface. Where adjacent walking surfaces are dark colored and/or constructed with materials other than standard Class I Portland Cement Concrete in accordance with the Standard Specifications, the Contractor must provide a detectable warning surface color that provides the necessary contrast, with the adjacent concrete. The standard color is dark red brick colored detectable warning tile with standard concrete unless otherwise noted.

7. Where a curb ramp is constructed within existing curb, curb and gutter or sidewalk, the existing concrete shall be removed to the nearest joint beyond the transition slope so that no remaining section of concrete is less than 5' long. The existing sidewalk shall be removed to the nearest joint beyond the transition slope, if the ramp must extend into the sidewalk.

8. Expansion joints shall be placed at all perimeter edges abutting concrete, but no joints shall be made in the ramp itself.

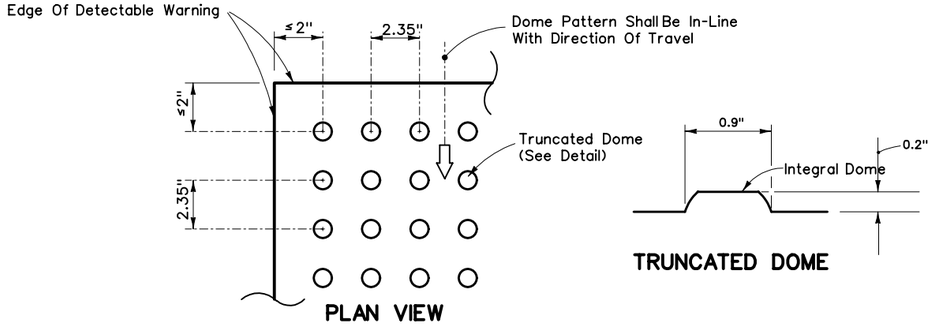
9. Public sidewalk curb ramps are to be paid for as follows:
   Ramps, landings, curb transitions, flares, ramp and sidewalk curbs are to be paid for under the contract unit price for Concrete Curb Ramps, 6" Thick. Reconstructed curbs beyond the ramp are to be paid for under the contract unit price for concrete curb.

   When a separate pay item for the removal and disposal of existing curb, curb and gutter, and/or sidewalk is not provided in the Bid Form, the cost of removal and disposal shall be included under demolition, clearing/grubbing, or in the contract unit price for new curb, curb and gutter or sidewalk, respectively.

10. If curbs are not present on both sides of the walkway, then the concrete is not considered a curb ramp and is therefore may be paid for as 6" concrete sidewalk or driveway.

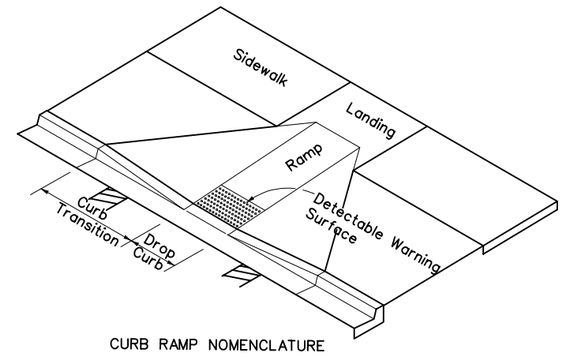
11. Drop and transition curb may be formed at the time of curb construction or may be monolithic with the ramp, but is included with the pay item for the ramp.

12. Two ramp design may be required at certain large radius, signalized, offset or angled intersections. Flare and curb transitions may be replaced with ramp curbs if site conditions warrant.



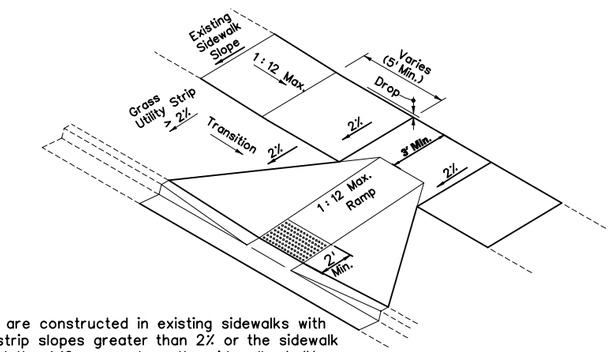
All sidewalk curb ramps shall have detectable warning surfaces that extend the full width of the ramp and in the direction of travel 24 inches (610 mm) from the back of curb.

CURB RAMP DETECTABLE WARNING SURFACE



CURB RAMP NOMENCLATURE

PICTORIAL VIEW



Where curb ramps are constructed in existing sidewalks with sidewalk or utility strip slopes greater than 2% or the sidewalk is too high to meet the 1:12 ramp slope the sidewalk shall be reconstructed as necessary to reduce the slopes to 2% at the flare point and match the ramp slope.

SIDEWALK / UTILITY STRIP TRANSITION

FILENAME: CURBRAMP1.DGN	CATEGORY: CURB RAMPS
DATE: 1/30/2003	SCALE: N.T.S.
DRAWN BY: DDR	APPROVED BY: CCC

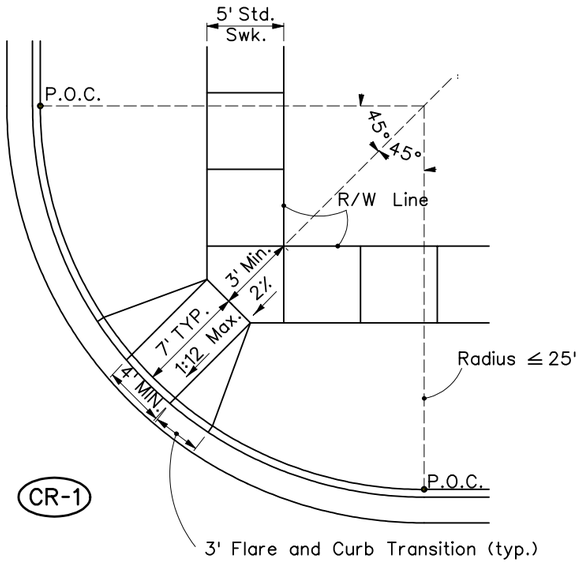
ENGINEERING STANDARDS MANUAL

DEPARTMENT OF PUBLIC WORKS
PROJECT / CONSTRUCTION MANAGEMENT BUREAU
CITY OF ORLANDO, FLORIDA

TITLE: CURB RAMP NOTES & DETAILS

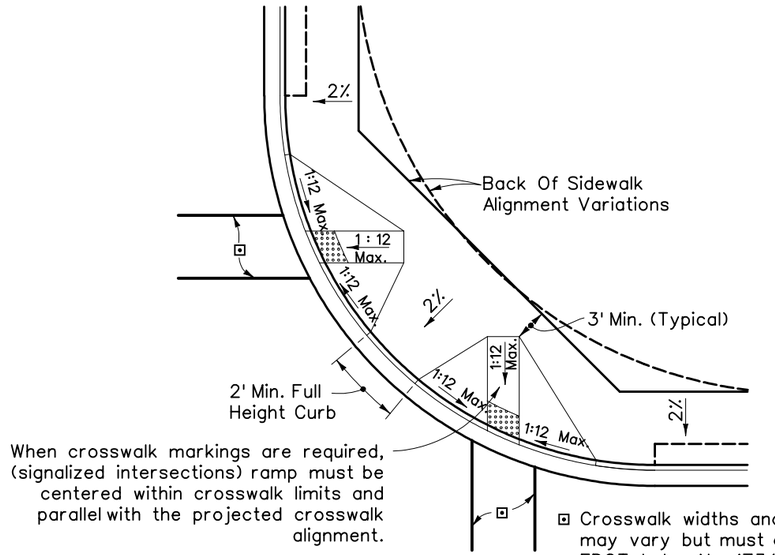
SHEET 5

Note: If necessary due to existing grade differences or less than 10' distance from back of curb to R/W corner, ramp length may be less than 7', as long as slope doesn't exceed 1:12 and approaching walks ramp down to R/W corner at 1:12 maximum slope. A sidewalk curb or retaining wall may be necessary along the R/W line approaching the corner, if lowering the grade of the R/W corner is not an option.



CR-1

RADIAL CURB RAMP
FOR USE IN RESIDENTIAL
OR SMALL RADIUS LOCATIONS



CR-2

TWO RAMP CONFIGURATION FOR USE IN LARGE RADIUS,
SIGNALIZED, OFFSET OR ANGLED INTERSECTION LOCATIONS

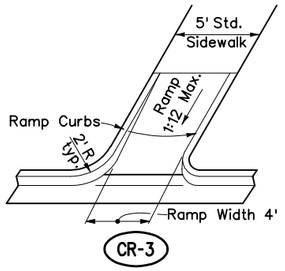
SHEET 5A

DEPARTMENT OF PUBLIC WORKS
PROJECT / CONSTRUCTION MANAGEMENT BUREAU
CITY OF ORLANDO, FLORIDA

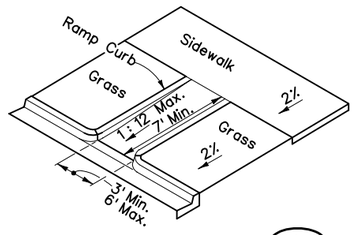
TITLE: CURB RAMP DETAILS

ENGINEERING STANDARDS MANUAL

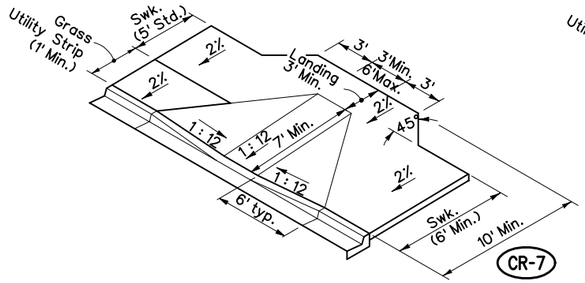
FILENAME: CURBRAMP2.DGN	CATEGORY: GENERAL
DATE: 2/3/03	SCALE: N.T.S.
DRAWN BY: DDR	APPROVED BY: CCC



CR-3



CR-6



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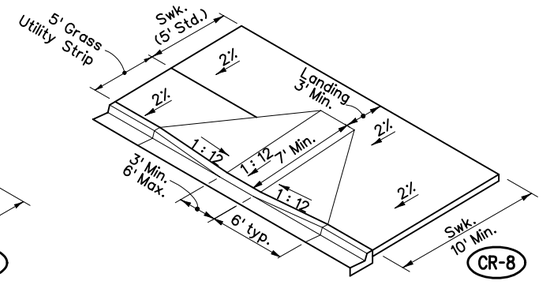
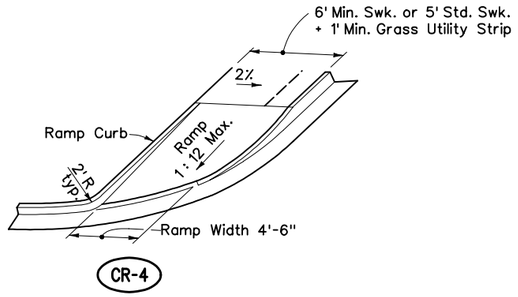
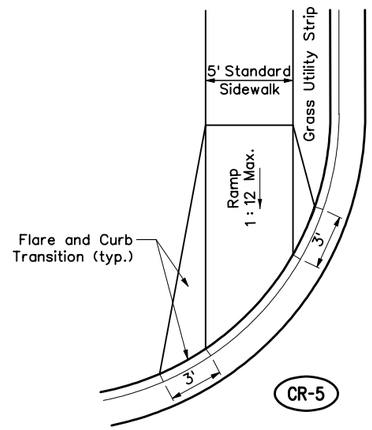


CR-8



CR-4

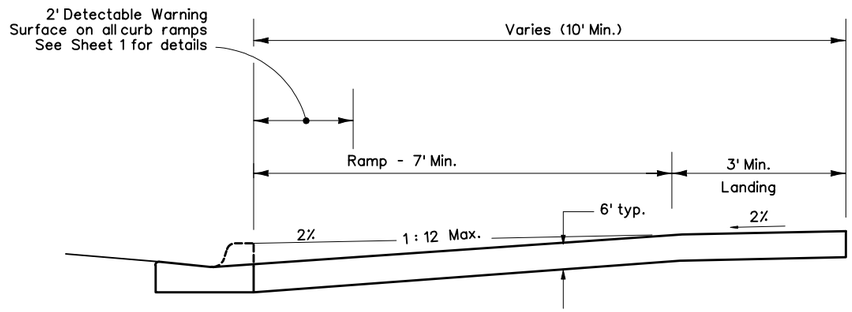


CR-5

TRAVERSE CURB RAMP OPTIONS FOR USE IN LOCATIONS WHERE ADEQUATE R/W OR EASEMENTS EXIST

STRAIGHT CURB RAMPS FOR LINEAR PEDESTRIAN TRAFFIC

Note: These straight ramps should only be used if future sidewalks and crosswalks will not be needed perpendicular to travel on the proposed walkway.



SECTION THROUGH RAMP WITH LANDING AT NORMAL SIDEWALK ELEVATION

(Typical CR-1 to CR-8)

FILENAME: CURBRAMP3.DGN	CATEGORY: GENERAL
DATE: 2/3/2003	SCALE: N.T.S.
DRAWN BY: DDR	APPROVED BY: CCC

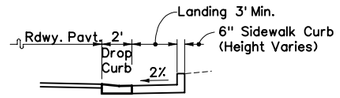
ENGINEERING STANDARDS MANUAL

DEPARTMENT OF PUBLIC WORKS
PROJECT / CONSTRUCTION
MANAGEMENT BUREAU

CITY OF
ORLANDO, FLORIDA

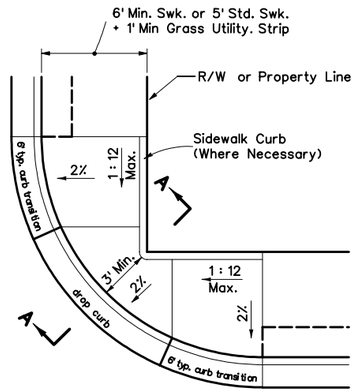
TITLE: CURB RAMP DETAILS

SHEET 5B

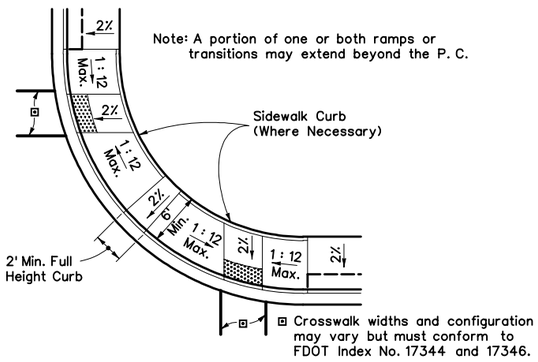


SECTION AA

CR-9

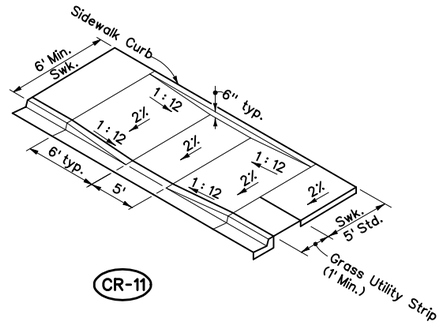


CORNER CURB RAMP FOR USE IN LOCATIONS LIMITED BY R/W CORNER OR OBSTRUCTION

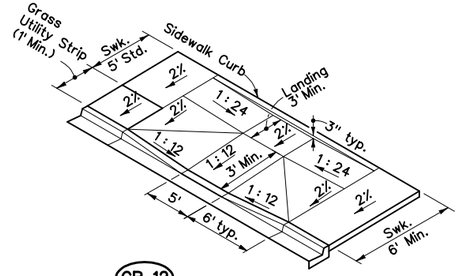


CR-10

TWO RAMP CONFIGURATION FOR USE IN LOCATIONS WHERE R/W LIMITATIONS PRECLUDE THE USE OF CR-2



CR-11



CR-12

TRAVERSE CURB RAMP OPTIONS FOR USE IN LOCATIONS WITH R/W LIMITATIONS

SHEET
5C

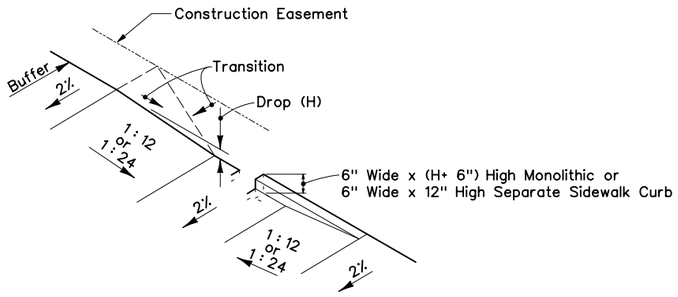
DEPARTMENT OF PUBLIC WORKS
PROJECT / CONSTRUCTION
MANAGEMENT BUREAU

CITY OF
ORLANDO, FLORIDA

TITLE:
CURB RAMP DETAILS

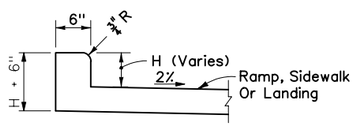
ENGINEERING STANDARDS MANUAL

FILENAME:	CATEGORY:
CURBRAMP4.DGN	GENERAL
DATE: 2/3/2003	SCALE: N.T.S.
DRAWN BY: DDR	APPROVED BY: CCC

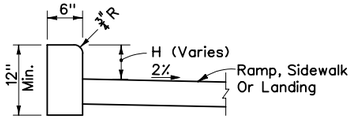


Construct sidewalk curb when inadequate R/W and easement buffer exist, when unable to lower the abutting grade, or when called for in the plans.

SIDEWALK CURB OR BUFFER TRANSITION

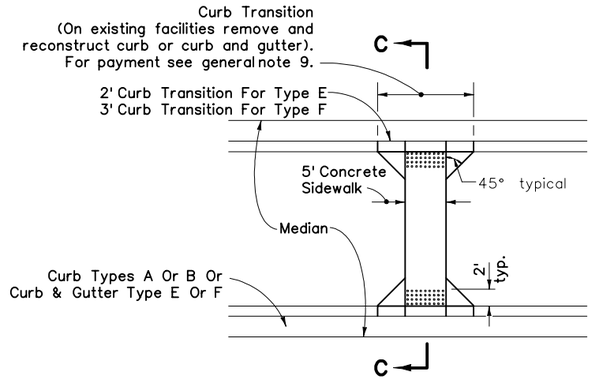


MONOLITHIC CAST CURB



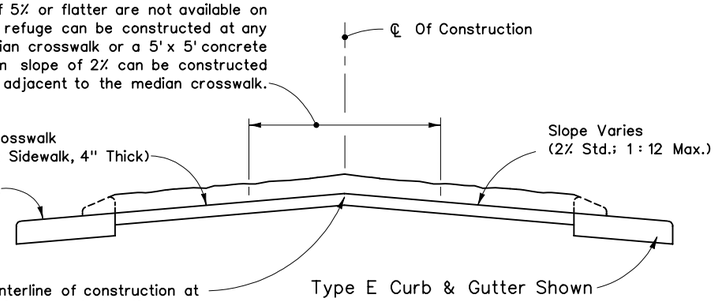
SEPARATELY CAST CURB

RAMP AND SIDEWALK CURB OPTIONS



PLAN

A 5' x 5' landing/refuge with maximum slope of 2% must be provided when slopes of 5% or flatter are not available on the median crosswalk. The refuge can be constructed at any location within the median crosswalk or a 5' x 5' concrete landing with maximum slope of 2% can be constructed adjacent to the median crosswalk.



Slopes shall intersect at the centerline of construction at the 2% rate when the edge of pavement elevations are equal. The slopes may intersect off the centerline for variable edge of pavement elevations or to accommodate other construction in the median; however, slopes shall not be steeper than 1 : 12.

SECTION C-C

MEDIAN CROSSWALKS

FILENAME: CURBRAMP5.DGN	CATEGORY: GENERAL
DATE: 2/3/2003	SCALE: N.T.S.
DRAWN BY: DDR	APPROVED BY: CCC

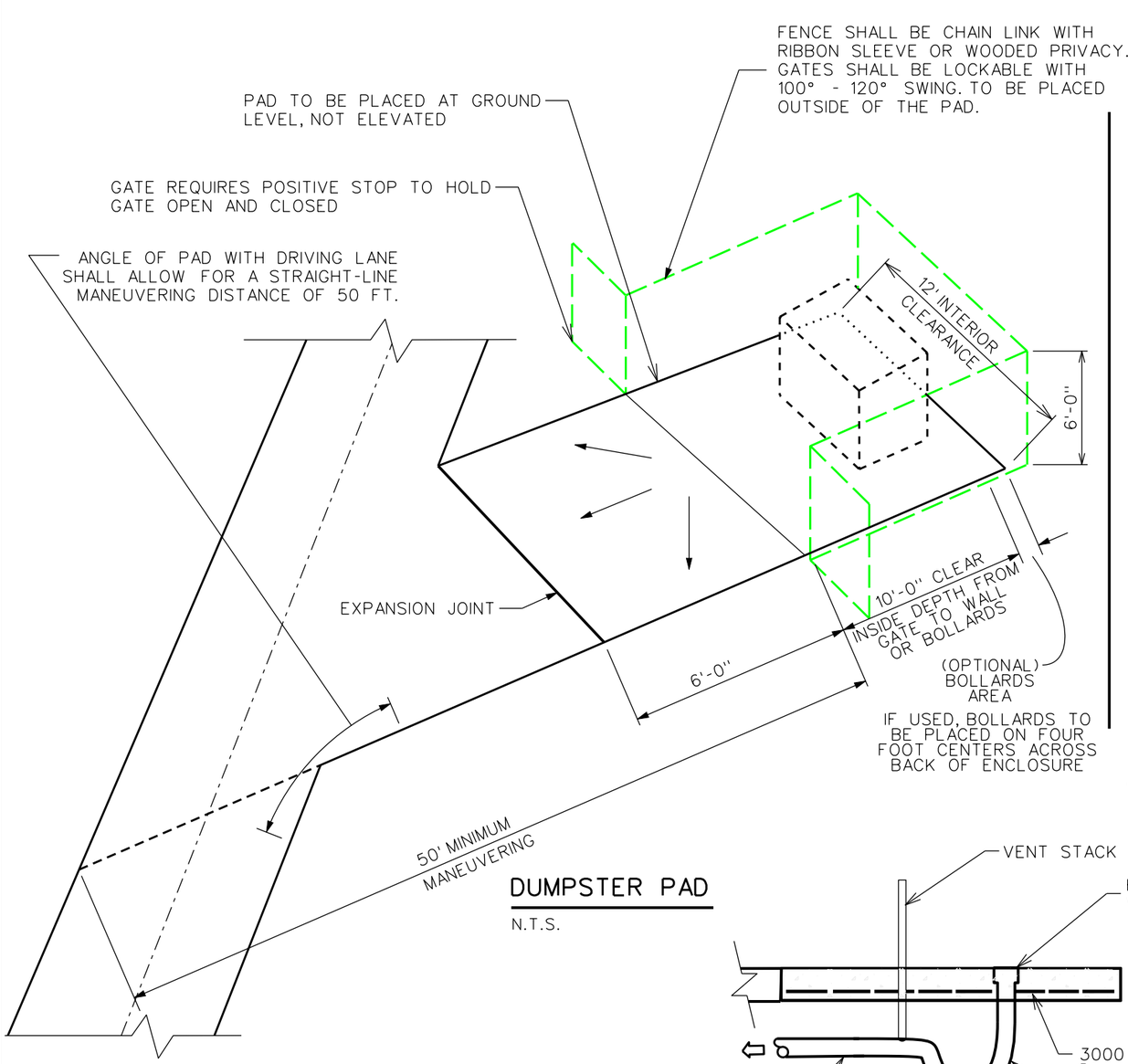
ENGINEERING STANDARDS MANUAL

DEPARTMENT OF PUBLIC WORKS
PROJECT / CONSTRUCTION
MANAGEMENT BUREAU

CITY OF
ORLANDO, FLORIDA

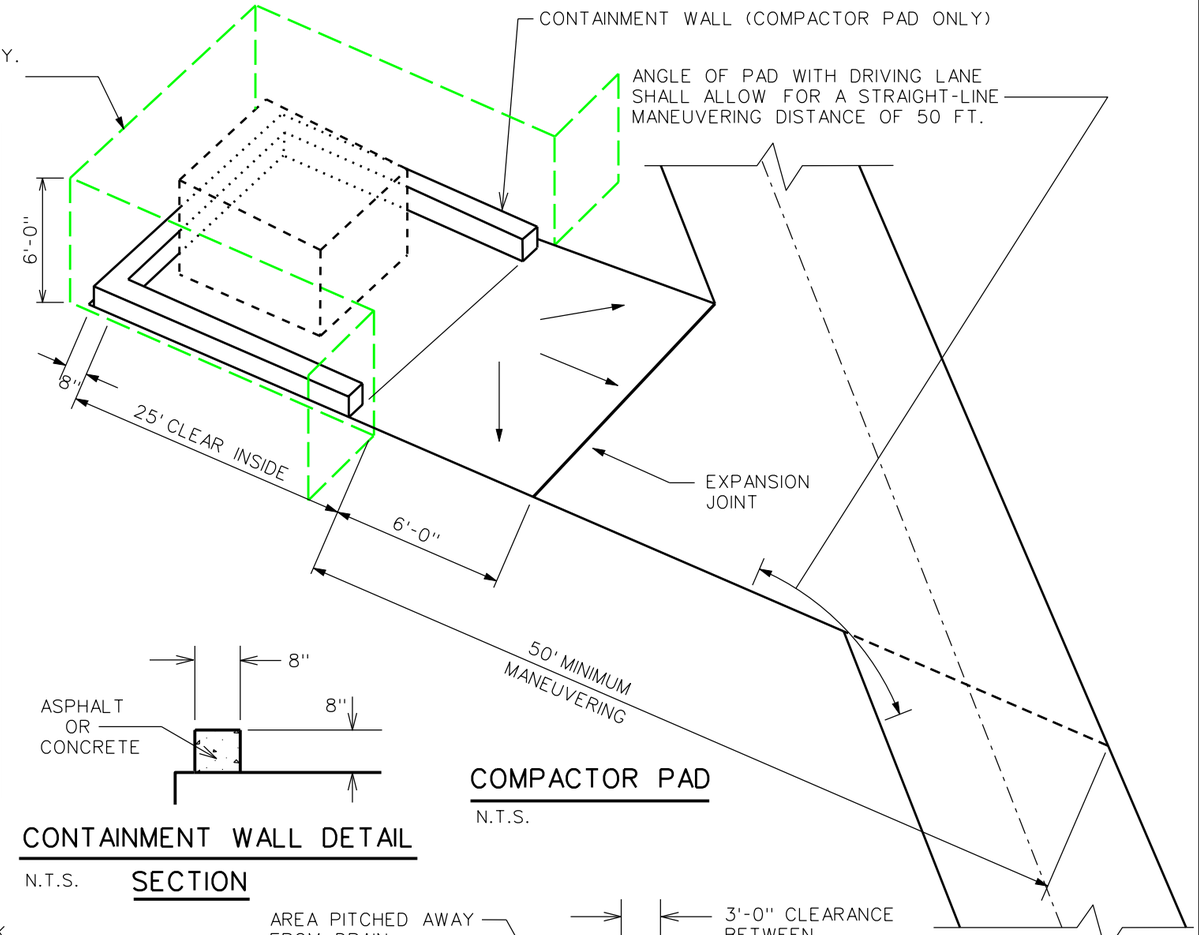
TITLE: CURB RAMP DETAILS

SHEET 5D



DUMPSTER PAD

N.T.S.

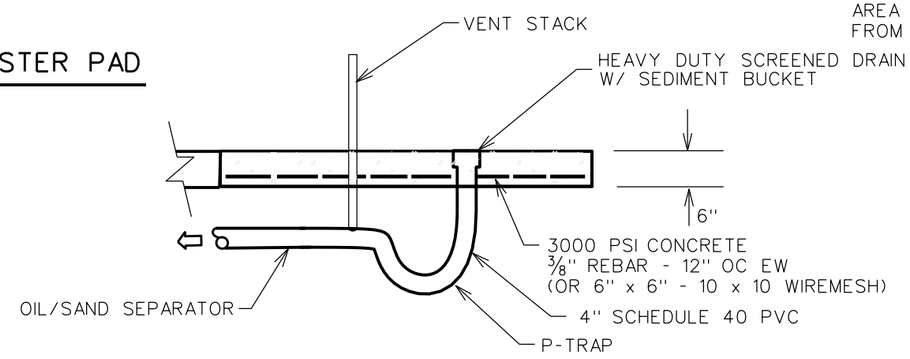


CONTAINMENT WALL DETAIL SECTION

N.T.S.

COMPACTOR PAD

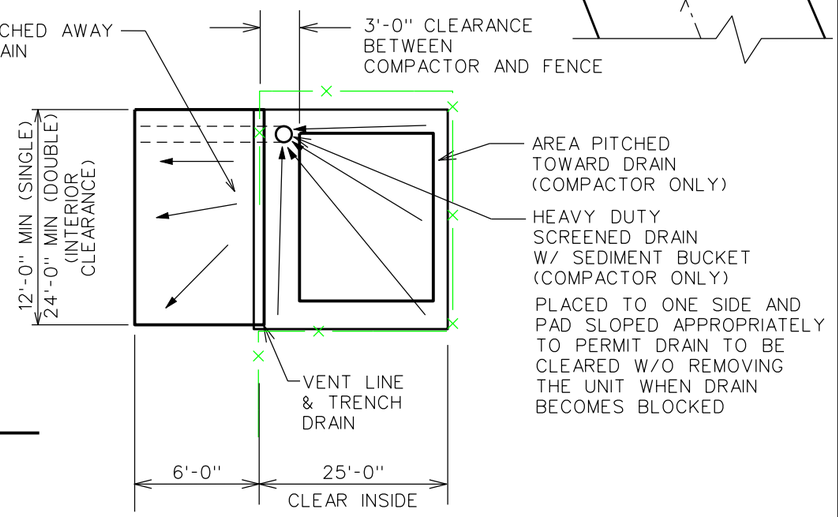
N.T.S.



PAD SECTION W/ SANITARY SEWER CONNECTION

N.T.S.

NOTE: SANITARY SEWER CONNECTION NOT ALLOWED FOR DUMPSTER APPLICATION



COMPACTOR PAD PLAN

N.T.S.

SHEET 6

DEPARTMENT OF PUBLIC WORKS
PROJECT / CONSTRUCTION MANAGEMENT BUREAU
CITY OF ORLANDO, FLORIDA

TITLE: **DUMPSTER AND COMPACTOR PAD DETAILS**

ENGINEERING STANDARDS MANUAL

FILENAME: DUMPSTER.DGN	CATEGORY: GENERAL
DATE: 12/19/2008	SCALE: NONE
DRAWN BY: EL/WAS/DSG	APPROVED BY: RMH