Drainage Update

Manual, Handbooks, and Standards

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New & Revised Drainage Manuals & Handbooks

- New -

- Bridge Hydraulics Handbook

- Revised -

- Drainage Manual
- Hydrology Handbook
- Storm Drain Handbook
- Optional Pipe Handbook
- Drainage Connection Permits Handbook
- Exfiltration Systems Handbook

Bridge Hydraulics Handbook

- Provides guidelines and a reference for the hydraulic design of bridges, including:

  - Policy
  - Riverine Analysis
  - Tidal Analysis
  - Controlled Canals
  - Bridge Scour
  - Deck Drainage
  - Bridge Hydraulics Report Format &Documentation
  - June release / posted on the website!

Drainage Manual

- Chapter 1: Section 1.7 –
  - Revisions shown by revision date in header only
  - Vertical bars for revisions removed

- Chapter 3: Section 3.11 –
  - New Section Titled – “Additional Design Considerations”
    - The placement of drainage lines MSE Walls and other structures.

Drainage Manual

- Chapter 4 – “Cross Drain Hydraulics”
  - Section 4.3 – Divided section into two subsections
    - Section 4.3.1: “Permanent Facilities” –
      - Changed ADT to AADT
      - Removed the Temporary Detour Rows from the frequency table. (See Temporary Facilities)

Drainage Manual

- Section 4.3.2: “Temporary Facilities” –
  - Based the Temporary Facility’s design on the detour’s length of time utilized.

DURATION OF TRAVERSING WORK	FREQUENCY
≤ 13 Months	2 years
13-40 Months	5 years
40-85 Months	10 years
> 85 Months	Use the Permanent Facilities Table in 4.3.1

In lieu of the above table the DSF may be determined using the equation:

$DSF = 1 / [1 – (1 – R)^{1/N}]$

where:

DSF = Design Storm Frequency,

N = Duration of Facility Usage in Years,

R = Risk of Occurrence of 100 year storm with a 75 year life span.

Drainage Manual

- Chapter 4 (Continued) –
  - Sections 4.6.1, 4.6.2, & 4.6.3 –
    - Moved the bridge clearance requirements to the PPM, Volume 1, Section 2.10.
    - Referenced the PPM in Section 4.6 for the clearances.
  - Section 4.7.2 – “Tidal Flow”
    - Added an alternative method to estimate runoff flows.
    - Alternative Method – A steady discharge equal to the peak flow from a 10-year storm.

Drainage Manual

- Chapter 4 (Continued) –
  - Section 4.9.2.2 – Replaced the scour estimate conditions with a table using modified HEC-18 criteria.

Hydraulic Design Flood Frequency	Scour Design Flood Frequency	Scour Design Check Flood Frequency
Q_{10}	Q_{25}	Q_{50}
Q_{25}	Q_{50}	Q_{100}
Q_{50}	Q_{100}	Q_{500}

- "Long term scour" for structures required to meet the extreme event vessel collision load.

Drainage Manual

- Chapter 4 (Continued) –
  - Section 4.9.4.2 –
    - Added restrictions for scupper discharge location.
    - “Scuppers should not be directly discharging onto railroads, roadway travel lanes, or shared use paths, or sidewalks.”
  - Section 4.10.4.1 –
    - Added reasons to 18” pipe maybe required.
    - Added the ** note to the Median Drain Culvert
      - 18” pipe minimum when debris control not provided

Drainage Manual

- Chapter 4 (Continued) –
  - Section 4.11.2.3 – Deleted old reference to a BHR backwater requirement for interstate bridges that was previously referenced in Section 4.4.

- Chapter 5 – “Storm Water Management”
  - Section 5.3.1.3 – Added reference to Rule 14-86 FAC.
  - Section 5.3.4.2 – Revised the pond “Freeboard” design description.

Drainage Manual

- Chapter 6 – “Optional Culvert Materials”
  - Section 6.2.1 – Added Polypropylene (50-year) to the materials list.
  - Section 6.5 – Removed aluminum pipes and added F949 PVC pipes to materials to be considered for vertical drains.

Drainage Manual

- Chapter 6 (Continued) –
  - Table 6-1 – “Culvert Material Applications and Design Service Life”
    - Added a Vertical Drain column.
    - Added rows for Polypropylene and Fiberglass pipe.
    - Changed ADT to AADT in Note #2.
    - Added Note 10 – Resilient connections required for all vertical pipes.

Handbook Updates

- Overland flow limitations
  - To meet NRCS limitations, the maximum limit of overland flow is now 100’ rather than 300’ previously used by FDOT.
- Changed in following HBs:
  - Hydrology
  - Drainage Connection Permit
  - Exfiltration HB

Hydrology Handbook

- Chapter 2 – “Hydrology”
  - Section 2.2.3 – The Regression Equations for natural conditions throughout the state updated.
  - Regression Equations for West-Central Florida have been added.
- Appendix B – “Design Aids”
  - Tables – The Regression Equations Tables have been revised to reflect the updated and new regression equations from Chapter 2.
  - Figures –
    - Figure F-4 – Revised to reflect the four new regions created by the new state regressions equations from Chapter 2.
    - Figure F-5 – Added to show the four regions utilized for the West-Central Florida area regression equations.

Storm Drain Handbook

- Chapter 4 – “Pipe System Placement”
  - Section 4.1.1 – New Section and three figures to give guidance for pipe systems near retaining walls.

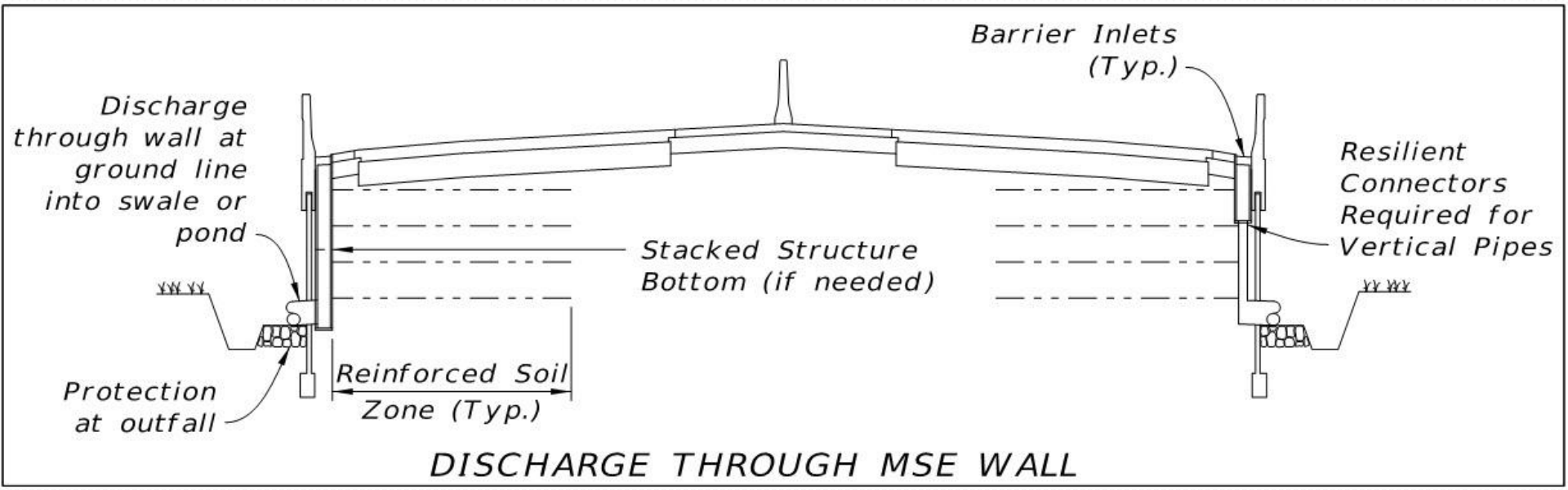


Figure 4-1

Storm Drain Handbook

- Chapter 4 – “Pipe System Placement”
  - Section 4.1.1 – New Section and three figures to give guidance for pipe systems near retaining walls.

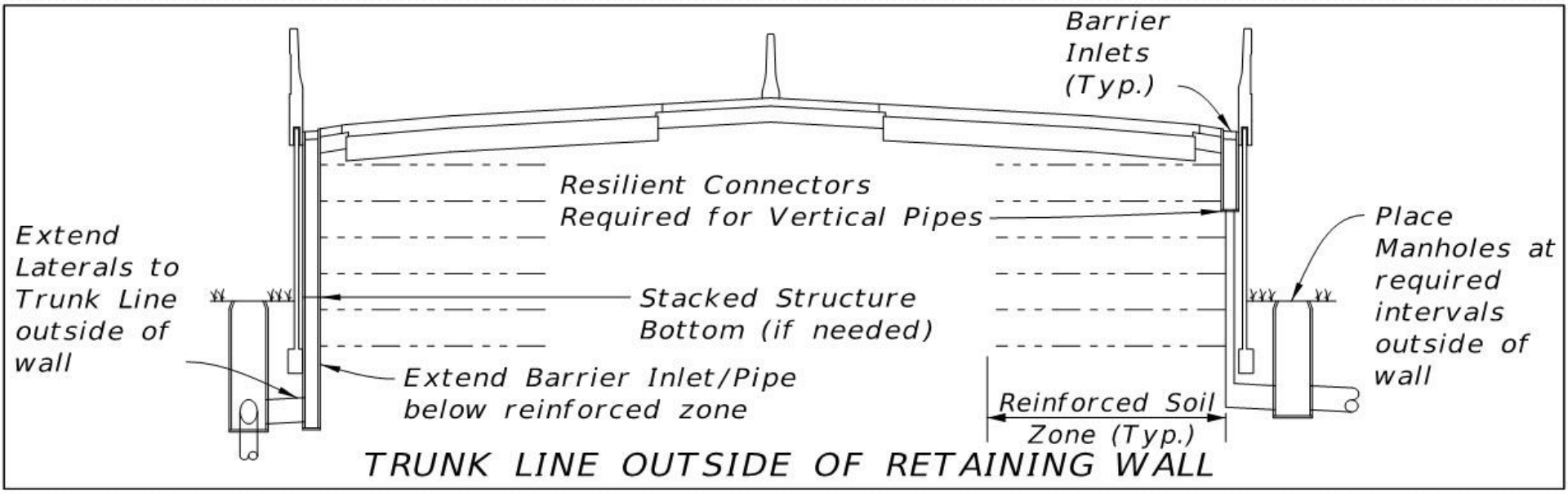


Figure 4-2

Storm Drain Handbook

- Chapter 4 – “Pipe System Placement”
  - Section 4.1.1 – New Section and three figures to give guidance for pipe systems near retaining walls.

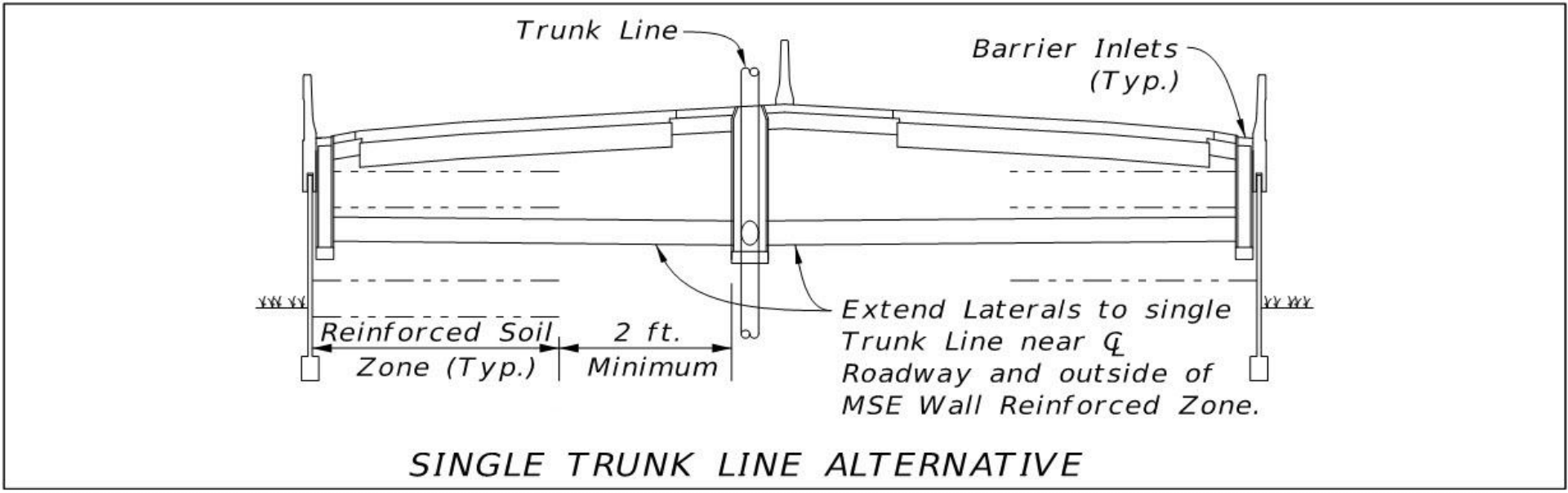


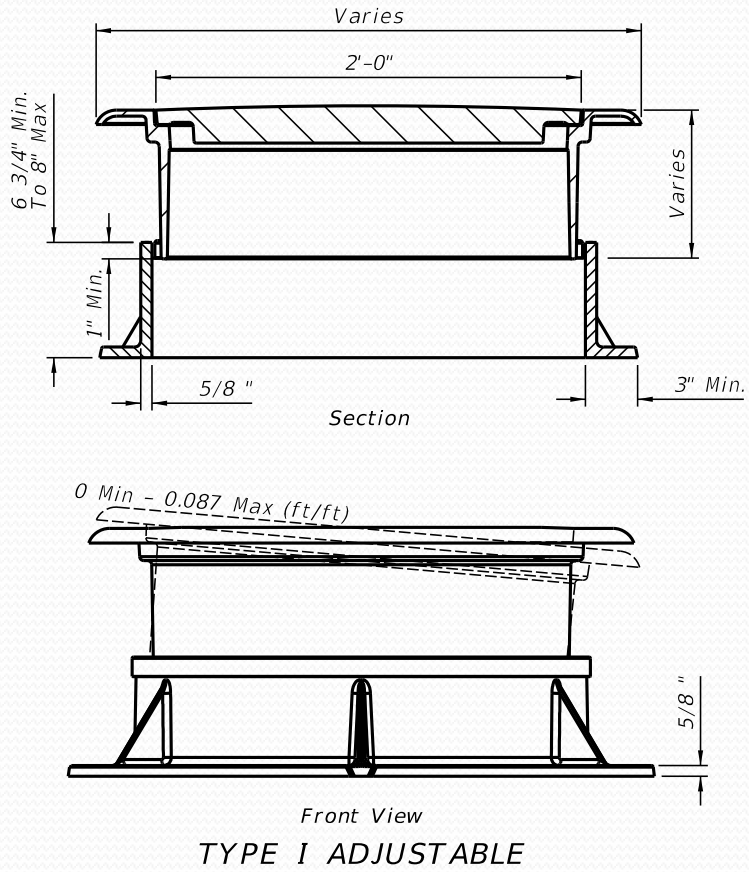
Figure 4-3

Optional Pipe Materials Handbook

- Chapter 2 – “Design Service Life”
  - Section 2.1 – Updated Table 6-1 to the latest Drainage Manual Version.

- Chapter 3 – “Durability”
  - Section 3.2 – Changed ADT to AADT for jack and bore installations.

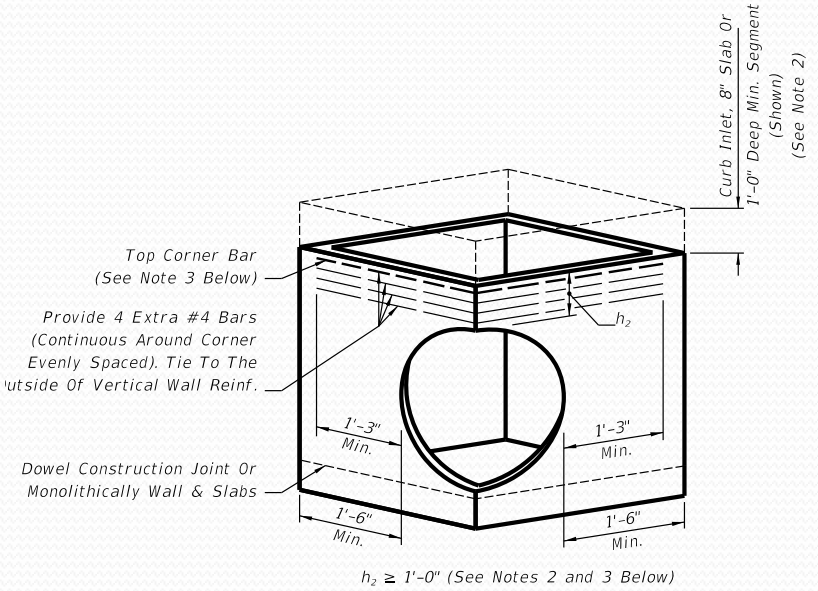
Design Standard Index Update



- Index 201: Adjustable MHs added to standards and specs
  - Designer must specify where adjustable MHs should be used in plan set.
  - Same pay item as traditional MH

Design Standard Index Update

- Index 201: Corner Openings
  - Corner opening will now require shop drawings and approval from EOR.



DESIGNER NOTE: Use only when round structures are not practical, engineer of record approval required.

PICTORIAL VIEW

NOTE: 1. Submit Shop Drawings for approval of corner opening by the Engineer.

On the horizon

- HDPE – Removal of Interim Restrictions
- LRFD Pipe Cover
  - Design Standard Index 205
  - CSLE (Culvert Service Life Estimator)

Questions?

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