

Chapter 15

Lateral Ditch/Outfalls, Retention/Detention and Mitigation Areas

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Chapter 15

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15.1 General

Drainage systems that convey stormwater from the roadway may be made up of many components such as inlets, manholes, pipes, ditches, and retention/detention areas. Usually, these systems require additional right of way and/or easements.

Mitigation areas, although not usually a component of the highway drainage system, may have drainage components in them.

If space permits, drainage components adjacent to the roadway may be shown on the roadway plan-profile sheets. Drainage components not adjacent to the roadway may require separate plan view sheets. In either case, profile views and/or cross sections may also be needed to provide enough detail to construct the components.

Plans for drainage components can generally be grouped into three categories:

1. Lateral ditch/outfalls
2. Retention/detention areas
3. Mitigation areas

15.2 Lateral Ditch/Outfall

Lateral ditch plans and profiles shall be prepared on a standard plan-profile format using a horizontal scale of 1" = 100'. However, if storm drain construction is proposed for a portion of the ditch, a scale of 1" = 40' or 1" = 50' may be used.

15.2.1 Plan Portion

Data presentation in the plan portion shall be oriented so that the lateral ditch/outfall centerline is parallel to the long side of the sheet. Information shall be shown in a manner similar to that described in **Chapter 10, Roadway Plan and Roadway Plan-Profile**.

Right of way (or easement) alignment data and topography shall be shown in the plan portion. An alignment tie between the lateral ditch/outfall and the project shall also be shown. The north arrow and scale shall be placed at the proper location on the sheet (refer to **Chapter 10** of this volume).

15.2.2 Profile Portion

The profile portion shall be prepared in the same manner as the profile portion of the roadway plan-profile sheets (**Chapter 10**). Existing ground line profiles, high water elevations, underground utilities, benchmark information and elevation datum shall be shown as described for roadway plan-profiles.

Where the lateral ditch/outfall survey baseline does not follow the flow line of the existing ditch or channel, the existing ditch or channel profile shall be shown with a broken line and identified.

If storm drain construction is proposed along a lateral ditch/outfall, the proposed structures shall be plotted on the drainage structures sheets, or in the lateral ditch/outfall profile. Structures shown in the profile will include flow line, structure numbers, pipe or culvert sizes, and utilities (if applicable).

The normal water elevation of the receiving system shall be indicated and labeled.

15.2.3 Typical Section

A typical section showing the width of proposed clearing and grubbing, right of way, ditch bottom width and side slopes shall be shown on the lateral ditch plan and profile sheet. This section does not need to be to scale, but shall be dimensionally proportionate. If the width of clearing and grubbing is variable for a lateral ditch/outfall, the various widths and their respective station limits shall be noted below the typical section.

15.2.4 Ditch Cross Sections

Lateral ditch cross section sheets are included in the plans. These sheets show the right of way required, the extent of clearing and grubbing required and the amount of earthwork.

Lateral ditch cross sections shall be prepared in a manner similar to that of roadway cross sections (**Chapter 18** of this volume). The scale, generally, should be 1" = 10', vertical and horizontal. Regardless of the horizontal scale used, the vertical scale shall always be 1" = 10'.

Often it is possible to place two or more columns of ditch cross sections on one sheet. They shall be plotted with the stationing progressing from the bottom of the sheet to the top, and the columns shall be placed from left to right.

Usually, soil surveys are made along the lateral ditch only when a large amount of material is expected to be excavated.

Guidance given in **Roadway Cross Sections (Chapter 18)** shall be applicable equally to lateral ditch cross sections.

15.3 Retention or Detention Areas

15.3.1 Pond Detail Sheet

The retention or detention pond, including the outlet structure, is usually the end point of the drainage system for a particular project. The retention/detention pond detail sheet shall show the pond in plan view, with station and offset ties to the project centerline of construction. The plan view shall also include the following:

1. Locations of pond sections.
2. Side slopes and base dimensions.
3. Bottom and top elevations.
4. Location of maintenance berm.
5. Fence and gate locations.
6. Right of way.
7. Pond drainage structures with structure numbers.
8. Soil boring locations, and
9. Any other necessary data pertaining to the pond.

The pond sections shall show the bottom width and elevation, side slopes, normal water depth, if applicable, as well as soil borings. A minimum of two (2) sections, taken in directions perpendicular to each other, shall be shown.

15.3.2 Typical Section

A typical section is required when the pond sections do not represent the *typical* design features of the pond. Following is a list of appropriate information to be shown on the typical section:

1. Limits of clearing and grubbing
2. Typical side slopes
3. Bottom and top elevations
4. Details of maintenance berm
5. Fence location
6. Right of way
7. Water level information
8. Vegetation requirements

The typical section does not need to be to scale, but shall be dimensionally proportionate. It should be shown on the pond detail sheet, if room allows, or on a separate sheet when necessary.

15.3.3 Pond Cross Sections

Pond cross sections shall be prepared in a manner similar to that for roadway cross sections (**Chapter 18** of this volume). As with lateral ditches, the standard scale is 1" = 10' vertical. The standard horizontal scale is also 1" = 10', although another scale may be used if necessary.

If material is to be excavated from the pond the data from the soil survey sheet shall be shown on the cross sections.

Guidance given in **Roadway Cross Sections (Chapter 18)** shall be applicable to pond cross sections.

15.4 Mitigation Areas

If construction details for mitigation areas are included in the plans, follow the requirements for retention/detention areas.