

# MISCELLANEOUS DESIGN AIDS

This section is intended to give designers additional information concerning commonly used rules of thumb, procedures and typical things to consider in the development of plans, quantities and estimates. In most cases, these rules of thumb are merely suggested "starting points". Adjustments will be needed based on good engineering judgment and experience to meet the specific needs of the project.

This section is divided into two parts. Part one contains general guidelines pertaining to plan development, arranged as typically encountered in the set of plans. Part two contains information relating to pay item quantity calculations and estimates, arranged by headings in the same order as presented in the Louisiana Standard Specifications for Roads and Bridges.

## Rules Associated With Plan Preparation

### General

- If a project is delayed such that the plan-in-hand is more than three years old, a second plan-in-hand may need to be held, if the District feels it's warranted.
- Estimates are to be updated to ensure that they are no more than 6 months old.
- A note should be attached when sending a revision to the Chief Engineer for approval stating a brief description of the revision.
- If the designer thinks a revision to the plans would affect utility relocation plans, a copy should be sent to the HQ Utility Relocation Administrator and the District Utility Specialist for coordination with utility companies.
- For paving projects where the embankment was previously constructed, current design standards will be used, as far as practicable. However, design exceptions should be considered for criteria such as side slopes, etc., when additional right-of-way would be required to meet the criteria in the current standards.

### Title Sheet

- The federal project number is shown on the Title Sheet and Summary of Estimated Quantities Sheets only.

## Typical Sections

- Concrete pavement is typically not placed in direct contact with any form of calcium sulfate material. Contact the Pavement and Geotechnical Section for guidance if necessary.
- Rumble strips are to be included on shoulders on all rural highways. Rumble strips are typically ground into the shoulders when shoulders are not needed for maintenance of traffic during construction. Otherwise, buttons may be placed on the shoulders after they are no longer needed for traffic maintenance.
- A grading line for sidewalks is not shown on the typical sections.
- Blended calcium sulfate cannot be placed within 10 ft of metal drainage structures.
- Blended calcium sulfate is not allowed for permanent surfacing.
- In areas where calcium sulfate material has been used in the base or subbase:
  - The base or subbase cannot be stabilized with portland cement.
  - The base or subbase can be stabilized with slag cement or left in place if placing stone or recycled portland cement concrete on top.
- The need for undercutting should be discussed during the plan-in-hand and then addressed in the plans.
- A note should be placed on plans when a project is in a dust sensitive area, stating such.
- The subgrade layer is considered as below the pavement structure. Therefore, the grading line is at the top of any required subgrade layer.

## Summary Sheets

- Include a list of items for plan-in-hand (quantities are not required).
- Road Design should inform the Materials Lab and Real Estate Section of underground storage tank sites for investigation. Attention should be directed toward looking for signs of UST's at site visits, plan-in-hand, etc.

## Plan-Profile Sheets

- When driveway construction must extend past the required right-of-way, use the following as a guide for obtaining access to the property:
  - Right-of-entry agreements are the preferred method for obtaining access to adjacent property to properly connect driveways.
    - The Real Estate Section will secure the needed right-of-entry agreements upon request.

- Once the limits of construction are finalized (typically at 100% preliminary plans), the Real Estate Section should be notified of the need for right-of-entry agreements.
- Construction servitude may be required when rights-of-entry cannot be obtained or when construction of the driveway connection will have significant impacts to adjacent property (such as removal of trees and other landscaping, large cut or fill slopes or other significant changes to the topography).
  - There is no specific condition where construction servitude would be required. The decision is made on a case-by-case basis. If there is a question, contact the Real Estate Section to get input on how best to proceed.
- Construction notes are to be shown in a conspicuous location on the plan, with bold lettering, making reference to the pay item name when appropriate.
- When calling for removal of asphalt pavement that is to be salvaged and used for rap elsewhere in the District, notes on the plans should state where the contractor is to haul rap designated to be returned to DOTD.
- Prior to removing asphalt pavement at the beginning or end of the construction limits, a saw cut should be made to ensure a uniform edge. A note is placed in these areas stating this requirement.
- Scenic rivers will not be realigned under any circumstances.
- When an existing drive is paved, extend the limits of the new drive to the right-of-way line, unless the designer determines that such lengths are excessive.
- All abandoned water wells and similar holes within DOTD R/W are to be plugged in accordance with Section 202.06 of the Louisiana Standard Specifications for Roads and Bridges.

### **Drainage Related Items and Sheets**

- End treatments or drop inlets should be provided for pipes entering a storm sewer system. Consider increasing the pipe size 6" when end treatments are used to account for losses.

### **Intersection Geometrics**

- Special attention should be paid to pavement edge slopes at major intersections to ensure smooth edge profiles.

### **Pavement Striping**

- 4" pavement edge lines shall be placed on all roadways.
- All permanent pavement markings will be thermoplastic.

## Joint Layouts

- Type EJ modified joints (4") associated with concrete paving (CP-01) need to extend through the barrier rail and coping on all projects with reinforced earth retaining walls. A note should be added to the plans, on both the coping and barrier rail sheets.

## Rules Associated With Pay Items

### Clearing and Grubbing

- For average clearing and grubbing, estimates typically ranges from \$1000/acre for large projects to \$2000/acre for smaller projects. This does not apply to areas with isolated trees only.
- Typically includes an area approximately 15' beyond the limits of construction or to the r/w, whichever is less.

### Removal of \_\_\_\_\_

- A Removal of Structures and Obstructions item is commonly included on all projects as a catch-all for removal of things such as existing pipes, etc.
- For major items easily tabulated, such as bridges and box culverts, specific pay items are included for each.
- When existing asphalt concrete pavement is on stabilized base, removal will be measured separately.
- The cost of removal of asphalt concrete and untreated base will also be measured separately.
- Any asphalt overlay on top of concrete pavement should be noted for removal by milling and the cost of the concrete pavement will be measured for removal separately.
- The measurement for removal of contaminated water from a tank will be by the gallon.

### Excavation and Embankment

- The lump sum item may be used for earthwork when the total does not exceed 10,000 cubic yards. If multiple sites are involved, the 10,000 cu. yd. limit applies to each site. When lump sum is used, a separate item is required for undercut, if applicable.
- No adjustment is made in earthwork quantities for removal of existing pavement and base course.

- No adjustment is made in earthwork quantities for placement of sidewalks. The grading line is shown as the finished surface of the walk.
- No adjustments are made for additional earthwork required at turnouts, driveways, or crossovers.
- Adjustments are to be made for areas of undercutting. Where required, undercutting should be added to both the general excavation quantity and the embankment quantity, since the contractor will be required to remove the unsuitable material and replace it with embankment meeting the specifications.

### **Temporary Erosion Control**

- Quantities of erosion control covering for ditch lining are based on a depth of 1' of protection.

### **Base Course, Lime Treatment and Subgrade Layer**

- If Lime and Lime Treatment will be required to treat embankment on the project, typical estimates range from 50% to 75% of the area of pavement and/or base course.

### **Traffic Maintenance Surfacing**

- The preferred pay item is measured using vehicular measurement.
- Traffic Maintenance Surfacing is classified as either Mainline or Non-Mainline and will be included on all projects where traffic will be maintained within the project limits during construction, for either through or local traffic. The quantity will be a topic of discussion at the plan-in-hand meeting.

### **Culverts and Storm Drains**

- Removal of existing drainage structures will generally not be measured for pay (except for major structures such as box culverts), but will be included in the Removal of Structures and Obstructions item. A listing of the structures to be removed is typically included for informational purposes.
- Yard drains less than or equal to  $\frac{1}{2}$  the diameter of the trunk line can be stubbed directly into the trunk using conduit fittings, thus eliminating the need for manholes at many locations.
- Cross drains should be of such length that as a minimum the portion protruding from the embankment is at or beyond the clear zone (see Figures 6.12-1 and 6.12-2 in the [Hydraulics Manual](#)).
- Safety end treatments will be required on the ends of all existing pipes located within the clear zone and designated to remain, or those that cannot be extended.

## **Fence and Gates**

- Where existing barbed wire or combination mesh and barbed wire fence must be replaced due to additional right-of-way required, the fence is usually replaced with new fence of the same type. However, the property owner will typically be compensated for special types of fence (rebuilt fence, chain link, wood, etc.), so no pay item is included.
- Where fence exists within required construction servitude, the fence must be temporarily relocated behind the servitude and then replaced at the right-of-way line after construction is complete. Therefore, new fence should be called for at such locations.
- New fence quantities are adjusted for the length of gates required. If rebuilt fence is required, no adjustments are made for gate lengths in the rebuilt fence.

## **Temporary Signs, Barricades and Pavement Markings**

- The cost of temporary signs and barricades, when required, usually ranges from 4% to 5% of the total project cost, depending on the particular phasing required for the project.
- Temporary pavement markings required to maintain traffic on temporary pavement widening, new pavement and existing pavement will require pay items and will be measured for pay. The cost of temporary pavement markings within the limits of detours will be included in the cost of the detour when there is no pay item for temporary pavement markings included in the plans.
- Quantities are typically included for both short-term and long-term markings, where temporary markings are required. Assume that both short-term and long-term markings will be needed for each traffic movement phase or for each lift of asphalt on which traffic will be maintained.
- Type I removable tape should be used for temporary striping on all new concrete pavement or existing concrete pavement to remain.

## **Water, Seeding and Fertilizer**

- Quantities for water, seeding and fertilizer are generally based on the area from right-of-way to right-of-way, excluding pavement areas.
- Both seeding and temporary seeding are required for most projects. The quantity for temporary seeding will be the same as that required for permanent seeding.
- Seeding is typically estimated as 30 pounds/acre.
- Fertilizer is typically estimated as 1000 pounds/acre.

### **Vegetative Mulch, Asphalt Mulch, and Erosion Control Systems**

- Vegetative mulch or asphalt mulch should be considered for use on seeded slopes up to 5 feet in height.
- Consideration should be given to including erosion control covering on slopes exceeding 5 feet in height or where overland flow is appreciable.

### **Pavement Patching and Widening**

- The cost of saw-cutting, removal of existing pavement, base course and excavation will not be measured for pay.

### **Temporary Detour Roads**

- Temporary Detour Roads will be measured by the square yard. The limits of the measurement will be where the centerline of the detour road crosses the edge of the existing roadway on both ends.

### **Bedding Material**

- Bedding Material is usually calculated for a depth of 6 inches. Thicker bedding can be provided if requested by the District.

### **Mobilization**

- Mobilization is typically estimated as 8% to 9% of the total project cost.

### **Pavement Striping**

- Painted traffic striping is no longer used for permanent markings on state highway construction projects.
- The designer should estimate and include striping quantities for no passing zones.

### **Traffic Signs and Devices**

- Object markers should be included at all cross drain sites and at guardrail.

### **Construction Layout**

- Construction layout will be included on all construction projects.
- Construction layout is typically estimated as 1%-2% of the project cost.

### **Mailboxes**

- In plan development, all mailboxes and mailbox supports within the project limits will be included for replacement with new boxes and supports. The project engineer may elect to re-use some during construction.

- When mailboxes are placed adjacent to aggregate shoulders, include a quantity of asphalt for mailbox pads per standard plan.

### **Right-of-Way Monuments and Witness Posts**

- Right-of-way monuments will be required on all construction projects requiring additional right-of-way.
- No monuments will be placed in clearing and grubbing projects. Instead, they will be placed in the following construction project.
- Witness posts will be required only on rural projects requiring additional right-of-way.

### **Temporary Precast Barrier**

- The percentage of new vs. DOTD furnished temporary barrier will be as per District recommendations.
- The number of times temporary barrier will be moved on a project should be calculated and included as a pay item.