

Part 200 Plan Sheet Layout

Section 201 Introduction

There are various methods to lay out a project plan sheet, and there is no single method that will work for every project. Depending on the method chosen and the specific project details, resulting plan sheets will vary. In many ways, project plan sheet layout is an art form, but there are guiding rules. As the CAD Technician gathers experience, they will become more proficient in laying out sheets for a project.

The mainline alignment is the paramount alignment for the project. Generally, there is only one state highway on a project but with intersections and interchanges, multiple state highways may appear in the project plans. The project title will help determine the project's mainline alignment, as the section name of the project will have a beginning point and an ending point along the mainline alignment.

The sheet numbers for the mainline alignment are in the “C” series. The plan sheets progress from lower number stations to higher number stationing along the length of the mainline alignment. The alignment shall be oriented on the plan sheets so that stationing increases from left to right, regardless of direction of North for the plan sheet.

Some projects will use milepoints as the project stationing. When milepoints are used for stationing, the project plan sheet layout still follows the directions above. The lowest milepoint is located at the beginning of the plan sheet layout. The milepoints will increase from left to right on each individual plan sheet.

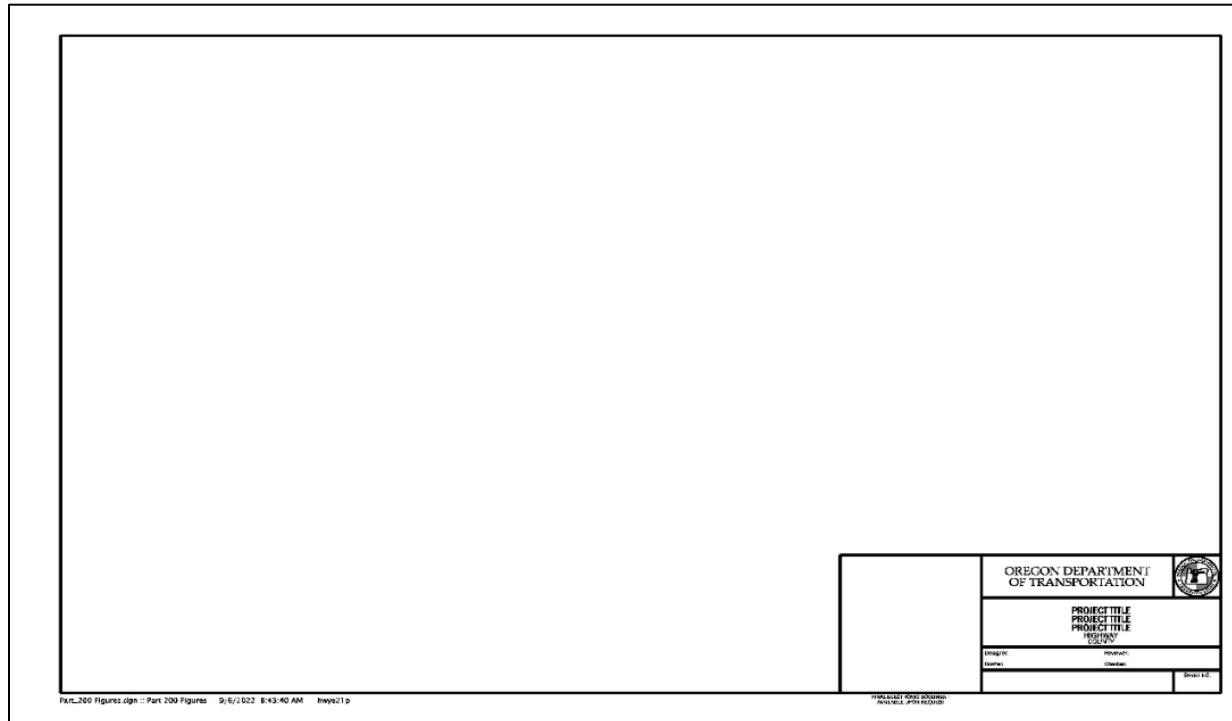
Section 202 Plan Sheet Styles

There are three styles of roadway plan sheets for use on projects:

1. Full Plan Sheets
2. Plan and Profile Sheets
3. Full Profile Sheets

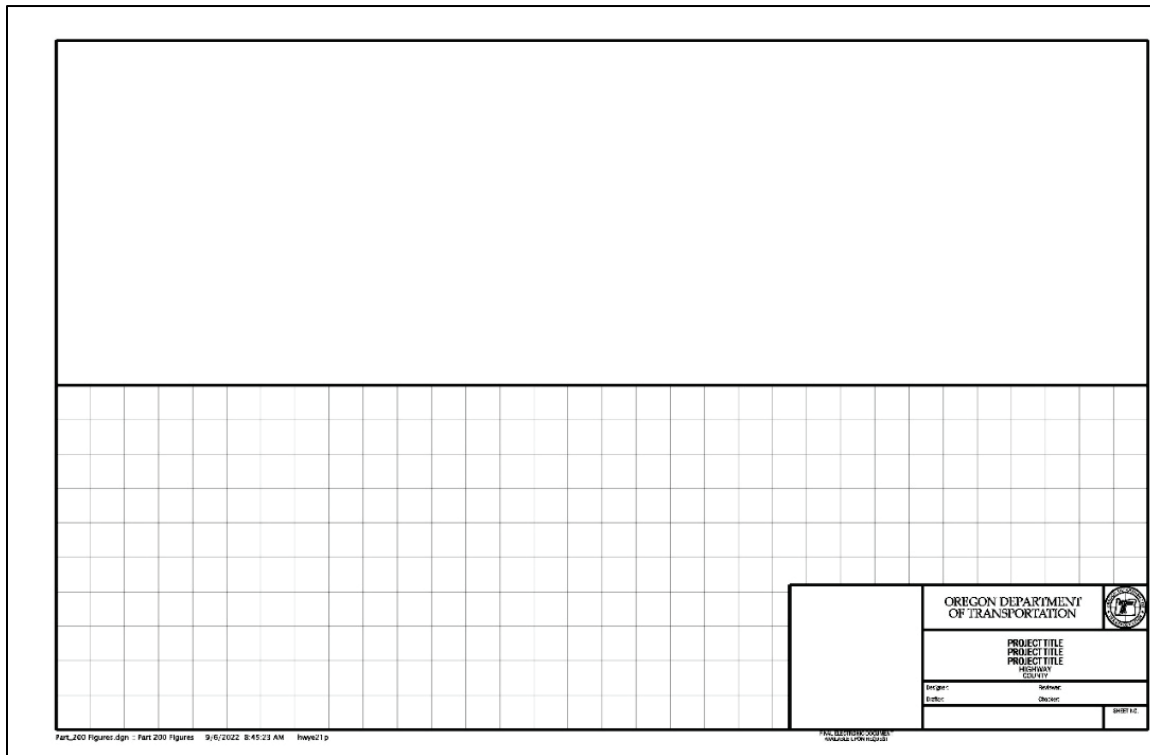
The first style of plan sheet is the Full Plan Sheet. There are no profile gridlines on this style of Full Plan Sheet. A full sheet is used for Typical Sections, Details, Notes, or Plan View. Full Plan Sheets are used when either no profiles are shown in the plans or full profile sheets are used. See Figure 202-1 for an example of the Full Plan Sheet.

Figure 202-1 Full Plan Sheet



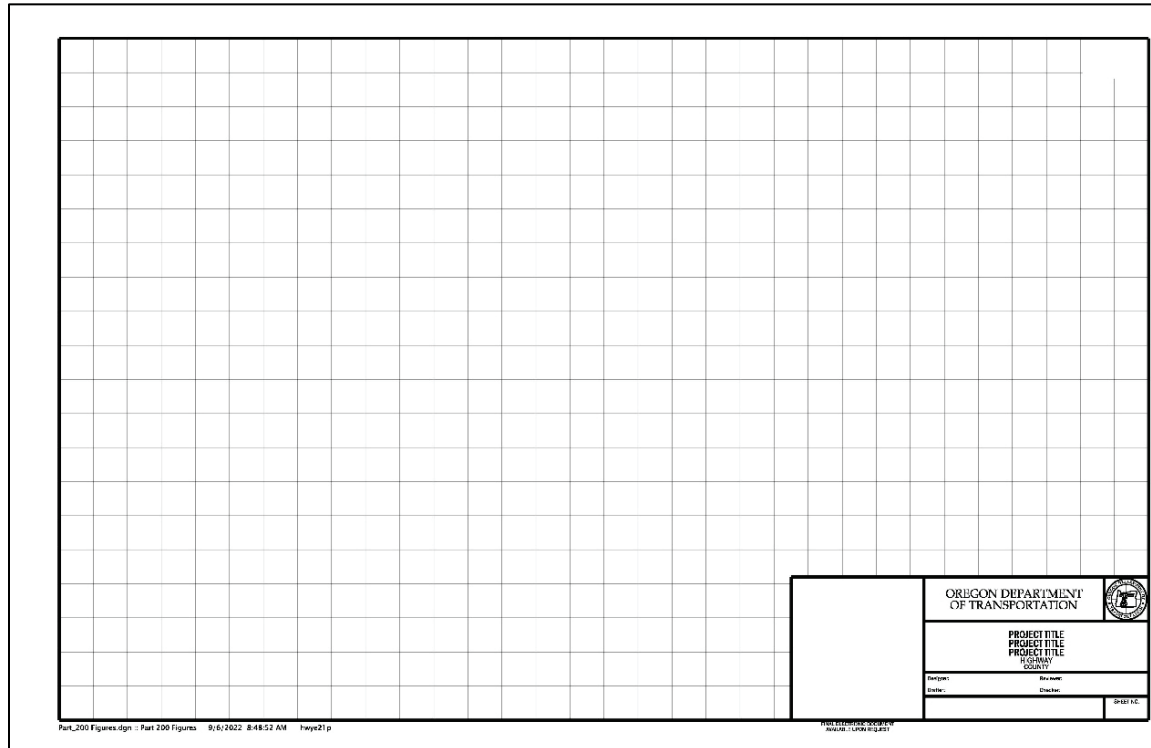
The second style of plan sheet is a Plan and Profile Sheet. The top half of the plan sheet is the plan view area. The bottom half of the sheet includes a profile grid. Use of the Plan and Profile Sheet style is limited by the horizontal curvature of the alignment that can be shown on the plan view portion of the sheet and by the vertical difference that can be shown on the profile portion of the sheet. See Figure 202-2 for an example of a Plan and Profile Sheet.

Figure 202-2 Plan and Profile Sheet



The third style of sheet is the Full Profile Sheet that is made up of a full sheet of grid lines. See Figure 202-3 for an example of a Full Profile Sheet.

Figure 202-3 Full Profile Sheet



Both the the "Full Plan Sheet" and the "Plan and Profile Sheet" can contain a limited number of construction notes. When construction notes are included on either style of plan sheet, the notes placed along the right side only and the area for the length of the alignment is reduced.

If the construction notes do not fit in a single column in the area on the right side of the "Full Plan Sheet" or the "Plan and Profile Sheet", all of the notes are placed on a separate note sheet that would immediately follow the "Full Plan Sheet" or the "Plan and Profile Sheet" respectively. When creating a separate notes sheet, start notes in the upper left corner of the sheet.

When the construction notes need to be moved to a note sheet, it is not required to adjust the plan sheet layout for all of the sheets.

See Figure 202-4: Full Plan Sheet with Note Area and Figure 202-5: Plan and Profile Sheet with Note Area.

Figure 202-4: Full Plan Sheet with Note Area

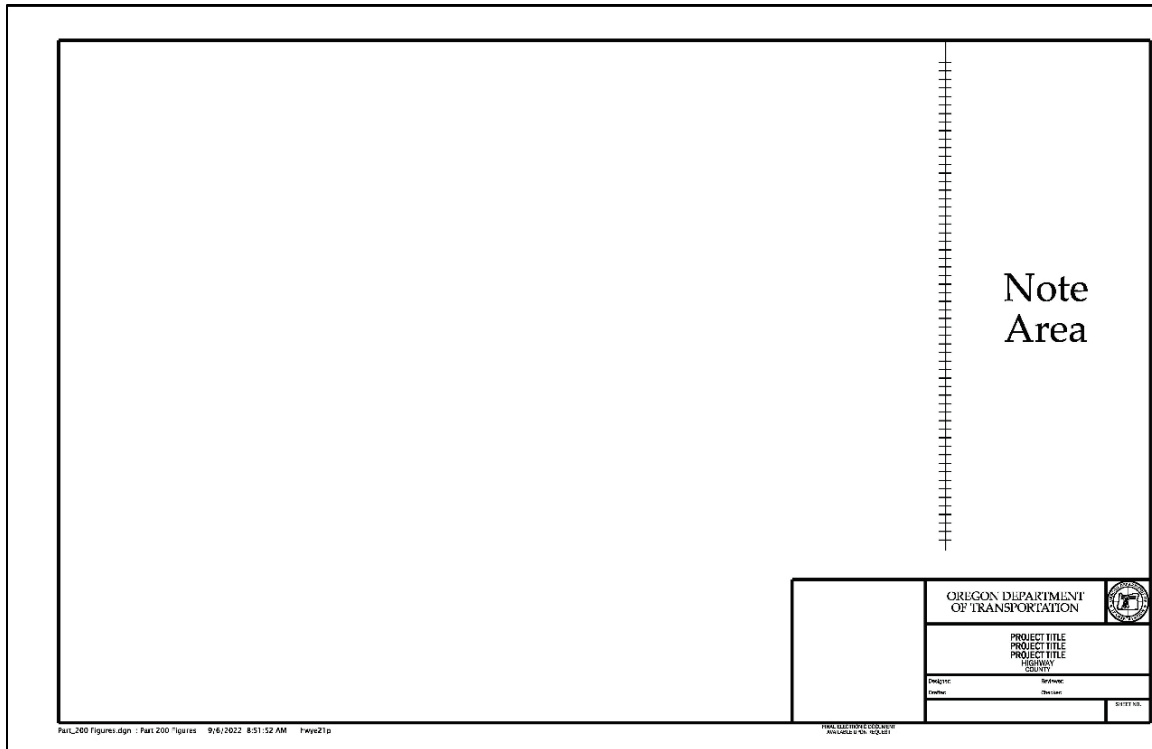
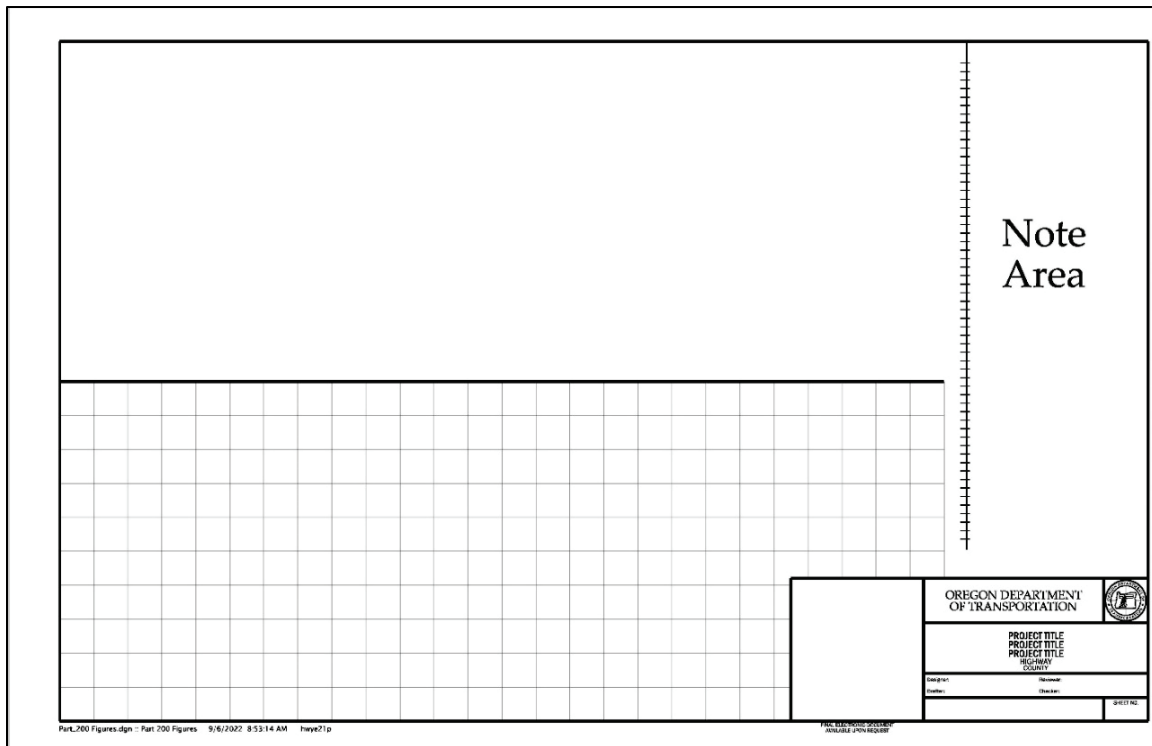


Figure 202-5: Plan and Profile Sheet with Note Area



When deciding on a plan sheet layout, the style of each sheet along the alignment must be taken into consideration. All of these plan sheet styles can be used for a single project along any alignment.

Section 203 Laying Out Plan Sheets

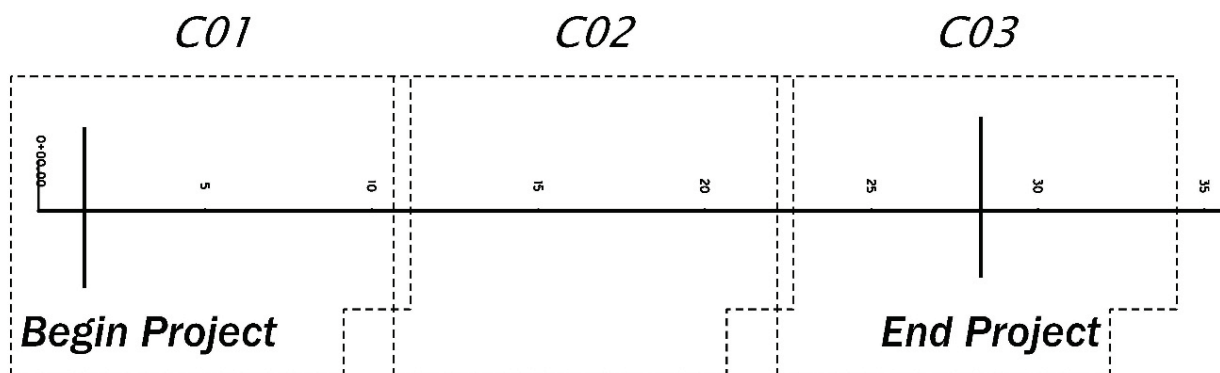
The first step in the process for laying out a project is to determine if profiles will be used on the project. If there are profiles, determine the elevation difference along the alignment at plan sheet intervals. There are nine (9) horizontal grid lines on a plan and profile sheet. The profile grid lines generally show 5 foot increments for a plan view scale of 1 inch = 50 feet, or 10 foot increments for a plan view scale of 1 inch = 100 feet. This gives the maximum vertical difference that can be shown on a plan and profile sheet.

Determine a rough number of notes needed for each sheet. Guardrail and drainage can require longer construction notes that will require more space. Discussion with the roadway designer about the number of notes per sheet is an important part of the sheet layout process. Seven (7) to ten (10) notes per sheet is a guideline to help determine if a full note sheet will be needed and thus the plan view can be lengthened.

Mark the beginning and the end of the project limits, and begin placing sheet outlines or clip shapes along the alignment in the base file. These shapes can be found using the MicroStation CONNECT ribbon search. Use the "Clip Shape Full Sheet" when no construction notes will be placed on the plan sheet, or "Clip Shape w Notes" for a shape that allows the area for construction notes on the plan sheet.

Adjust the placement of the outlines so that there is a pleasing and balanced look to the plans. The overlap amount between sheets is generally 1 inch, regardless of the scale. If the end of the project is just a few stations onto the last sheet, consider adjusting the outlines so that a more reasonable length of alignment in plan view is on the last sheet and a smaller length of alignment in plan view is on the first sheet. Adjust the sheets so that the overlap does not occur at an intersection. This is more of an art than a hard rule, but the overall aesthetics of the layout should be considered while at this beginning point. See Figure 203-1 for an example layout of a simple, single alignment, 3-sheet project.

Figure 203-1 Single Alignment, 3 Sheet Example



For some projects, additional alignments will be shown crossing the main alignment. These secondary alignments might continue off of the main alignment sheet. When the alignment leaves the area of the mainline sheet, match lines will need to be added to the plan set.

Match lines do not contain overlapping alignment. The match line is a clean break in the alignment from one sheet to the next. If the secondary alignment continues on more than one sheet, overlapping is used for the remaining sheets, the same as for the mainline alignment.

Figure 203-2 Layout with Match Line

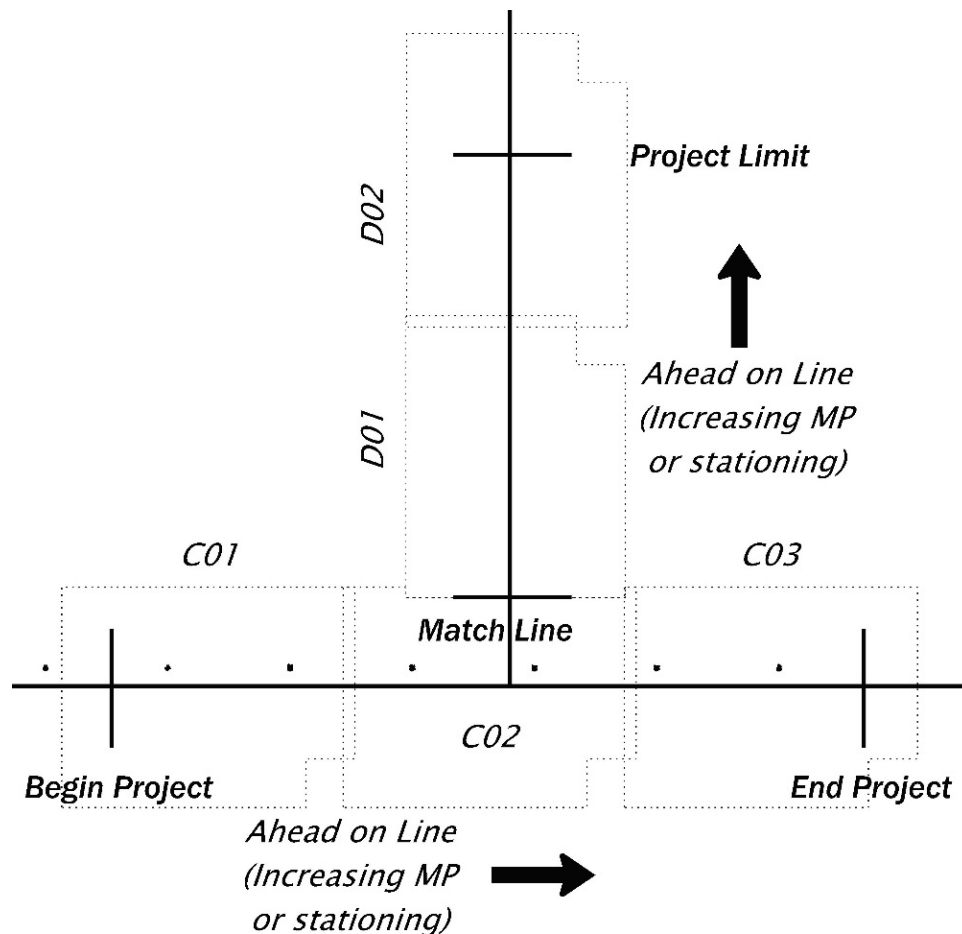


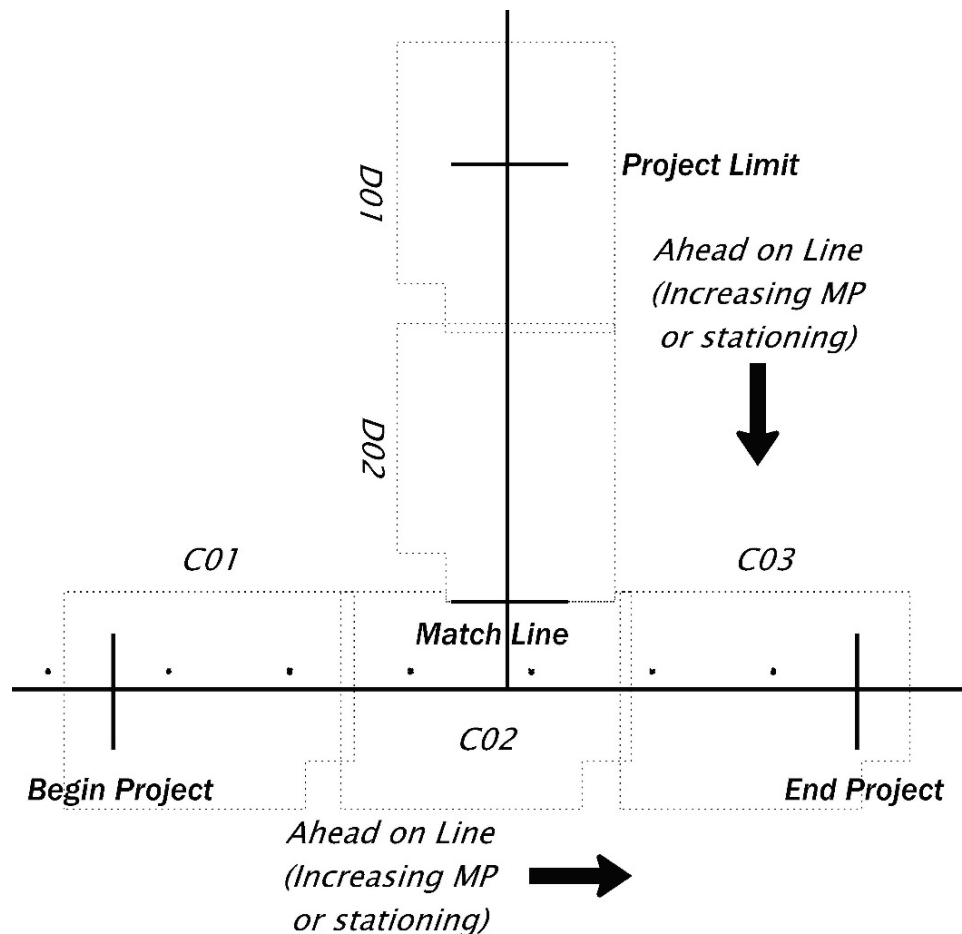
Figure 203-2 shows a mainline alignment that spans 3 sheets with a secondary alignment that is 2 sheets in length. The mainline sheets are the primary focus of the project and are shown consecutively in the “C” series of sheets. When the secondary alignment stationing increases away from the main alignment, begin the sheet layout at the match line and progress along its alignment away from the mainline consecutively. The stationing still follows the rule of increasing stations left to right on the sheet.

In Figure 203-2, the “D” series of sheets have increasing stationing away from the mainline so the sheet numbering will increase away from the mainline.

When the secondary alignment stationing increases toward the main alignment, begin the sheet layout at the lowest station number and follow the secondary alignment to the match line.

In Figure 203-3, the “D” series of sheets have increasing stationing toward the mainline so the sheet numbering will increase toward the mainline.

Figure 203-3 Layout with Match Line

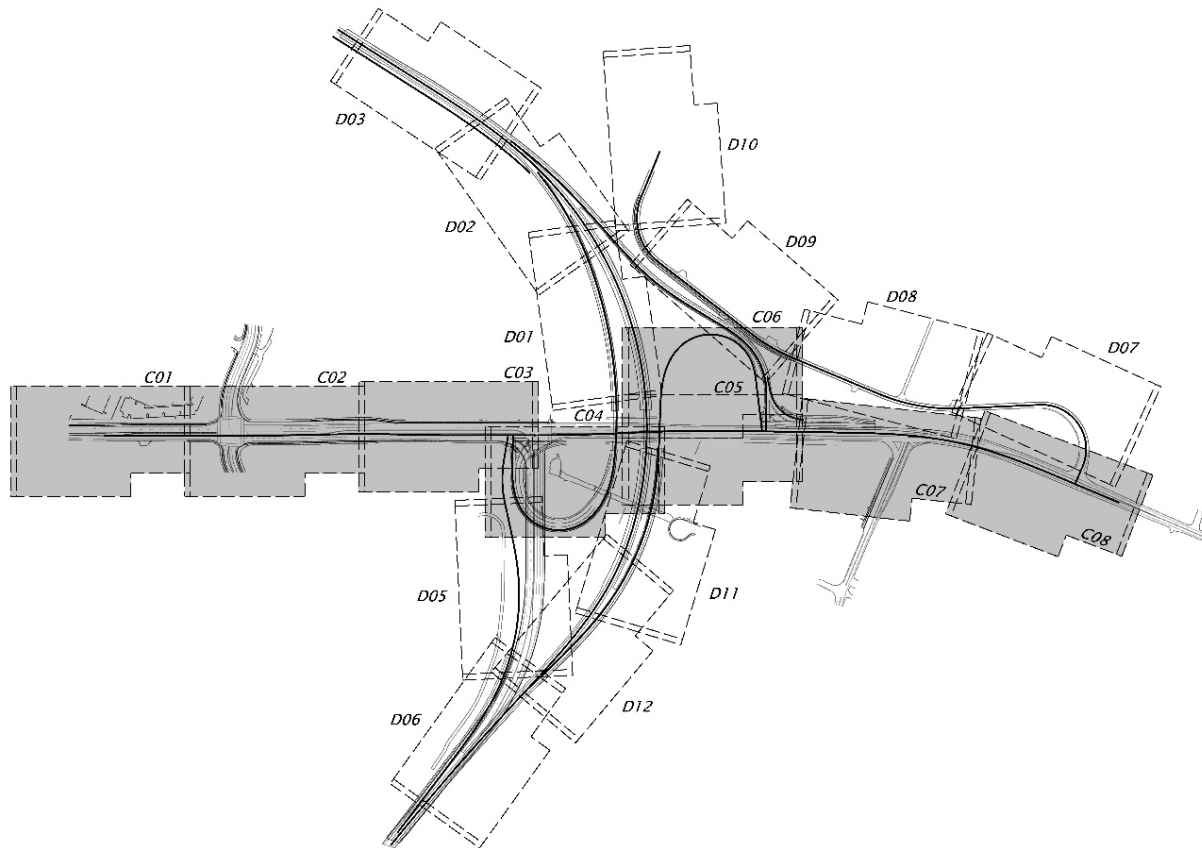


Adjustments might be required to make a more balanced layout. Some project limits will just not allow for a balanced layout but this should always be the goal. It is much easier to make adjustments early in the layout process than to correct sheet layout midway through the final design process.

Communication between the CAD technician and the designer is very important to achieving a logical project sheet layout.

Interchange projects are the most complex type of project to lay out. For this type of project, the starting point for the layout is centered on the interchange area. The area of the centering sheet is to include a majority of the interchange on a single sheet. The centering sheet might need to rotate such that it is more perpendicular to the mainline. This is acceptable practice for interchange style projects. Some interchanges may require a couple sheets to be rotated to best include all of the alignments.

Figure 203-4 Complex Interchange Layout

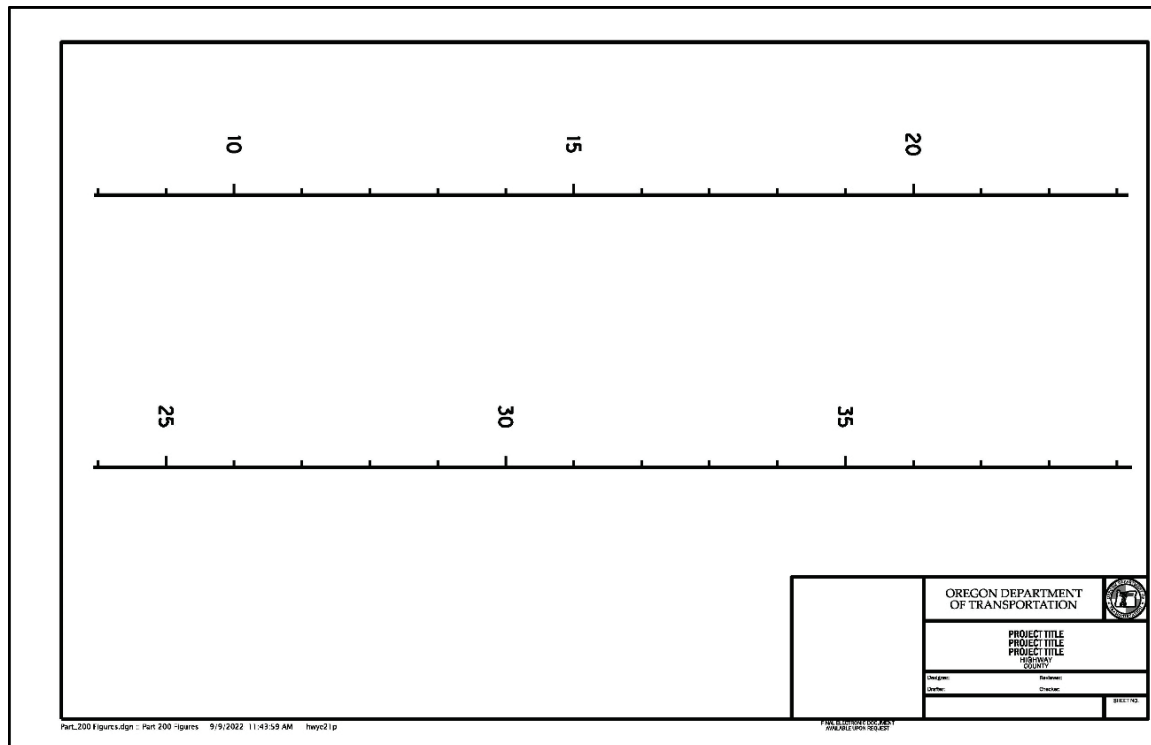


Section 204 Preservation Plans

Preservation projects are less complex and do not need to show a graphical curvilinear alignment or profiles. When items such as barrier systems or access approaches need to be shown on a preservation project, a straight line can be used. Often these will use milepoint stationing and will show very limited amounts of topography.

Notes can either be shown on the straight line plan sheet or on a separate notes sheet. Figure 204-1 shows the straight line on a full plan sheet. Notice that two alignment lengths can be shown on one plan sheet by stacking the alignments. Place the lower number alignment on the top so that the sheet is read from top to bottom ahead on stationing.

Figure 204-1 Straight Line Plan Sheet



When the project work can be shown with just typical sections and one or two tables for other items (like guardrail adjustment), the plan sheets can be reduced to 8 ½" x 11" portrait format. The plans are just a few pages long and are included in the special provisions.

The straight line format and the 8 ½" x 11" format are not often used but can be a method to accelerate a project to bid. These are limited to rural paving projects that do not have many other construction items shown. The Regional Roadway Manager can assist in determining if a project is eligible for either of these formats.