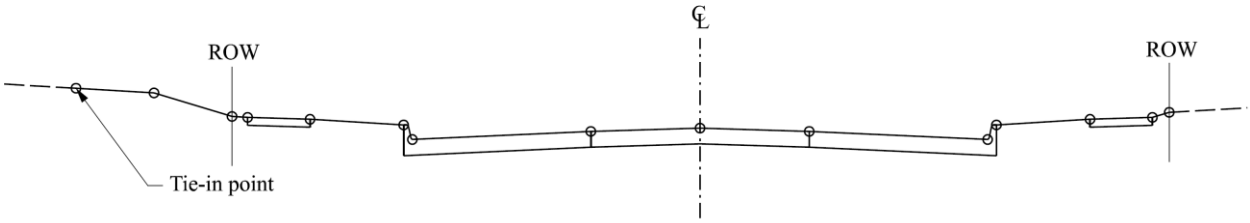
Detailed Plans for Construction of Public Improvements

A. Public Improvement Plan Sheet Requirements

Detailed reproducible plans, certified by a licensed professional engineer in the State of Iowa, should be filed with the jurisdiction for all work involved in public improvement contracts and/or agreements.

When providing computer aided design (CAD) files, ensure they contain all break lines used to develop a 3D file showing coordinates (x,y,z) needed to accurately represent the paper design plans. Break lines should be shown according to the cross-section below. In addition, break lines within the 3D file should indicate all locations within the project limits where there is a change of slope.

The 3D file should be available to potential bidders at the same time that the paper plans are available to the bidders and filed with the jurisdiction. A disclaimer statement should also be included that indicates the paper copy on file with the agency is the official copy and the contractors are responsible for constructing the project to those plans.



Detailed plans should comply with the following general requirements.

1. **Plan Organization:** Plan sheets should be arranged consistently from one plan set to another. In general, the sheets should be arranged according to Table 1D-1.01, which is consistent with Iowa DOT plans, where possible.

   Different plan sheet arrangements may be used to better identify such elements as utility conflicts, temporary pavement markings in conjunction with staging, or others that will provide greater clarity to the contractor. Verify with jurisdiction how to designate plan sheets.

Table 1D-1.01 - Plan Organization

Page Number	SUDAS Description	Iowa DOT Description (Iowa DOT Design Section 1F-1)
A	Title Sheets	Title Sheets
B	Typical Cross-sections and Details (including as-built typical cross-sections)	Typical Cross-sections and Details (including as-built typical cross-sections)
C	Quantities and General Information	Quantities and General Information
CD	*Not typically used*	Drainage Structure Quantities Tabulation
CS	*Not typically used*	Geotechnical Quantities Tabulation
D	Mainline Plan and Profile Sheets	Mainline Plan and Profile Sheets
E	Side Road Plan and Profile Sheets; Open Channel Profile Sheets	Side Road Plan and Profile Sheets
ED	*Not typically used*	Drainage Channel and Dike Plan and Profile Sheets
F	*Not typically used*	Detour Pavement, Temporary Pavement Sheets
G	Survey Sheets (reference ties and bench marks)	Survey Sheets (reference ties and bench marks)
H	Right-of-way Sheets	Right-of-way Sheets
J	Traffic Control and Staging Sheets	Traffic Control and Staging Sheets
K	Landscaping Sheets	Interchange Sheets
L	Geometric, Staking, and Jointing Sheets	Geometric, Staking, and Jointing Sheets
M	Buried Pipe Sheets	Storm Sewer Sheets
MSA	*Use M instead of MSA*	Sanitary Sewer Sheets
MWM	*Use M instead of MWM*	Water Main Sheets
MIT	Wetland Sheets	Wetland Sheets
N	Traffic Signal Sheets	Traffic Signal Sheets
P	Lighting Layout Sheets	Lighting Layout Sheets
Q	Soil Sheets	Soil Sheets
QR	*Not typically used*	Soil Borrow Sheets
R	Erosion and Sediment Control (SWPPP)	Sediment Control Quantities Tabulations
RR	*Not typically used*	Erosion Control Plan Sheets
RU	*Not typically used*	Erosion Control Detail Sheets
S	Sidewalk Sheets	Sidewalk Sheets
SPS	*Not typically used*	Bridge Plan Soils Sheets
T	Earthwork Quantity Sheets	Earthwork Quantity Sheets
U	Design Detail Sheets, Modified Standards, and Detail Sheets	Design Detail Sheets, Modified Standards, and Detail Sheets
V	*Not typically used*	Bridge and Culvert Situation Plans
W	Mainline Cross-sections	Mainline Cross-sections
X	Side Road Cross-sections	Side Road Cross-sections
Y	*Not typically used*	Ramp Cross-sections
Z	*Not typically used*	Detour Cross-sections

All of the above mentioned sheets will not necessarily occur in every plan, but those that do should remain in the same relative order and use the letter designation listed above.

2. **Plan Sheet Material:** Plans filed with the jurisdiction should be on media designated by the jurisdiction.

3. **Plan Sheet Size:** Check with the jurisdiction for appropriate plan sheet sizes.

4. **Title Sheet:** The following information should be shown when applicable.

   a. Project name and vicinity map showing general location.

   b. Jurisdiction's name.

   c. Small scale vicinity map showing project location.

   d. Index (a complete sheet index is to be shown).

   e. File number/project number/contract number (to be provided by the jurisdiction).

   f. Engineer's firm name and address.

   g. Signature line for jurisdiction authority.

   Sample:

   REVIEWED:

   _____

   Jurisdiction Authority Title Date

   h. Sheet number and total number of sheets.

   i. All official plans should be certified according to the requirements set forth by the Iowa Engineering and Land Surveying Examining Board.

   j. Note that projects should be constructed according to the SUDAS Standard Specifications and any applicable supplemental specifications provided by the jurisdiction.

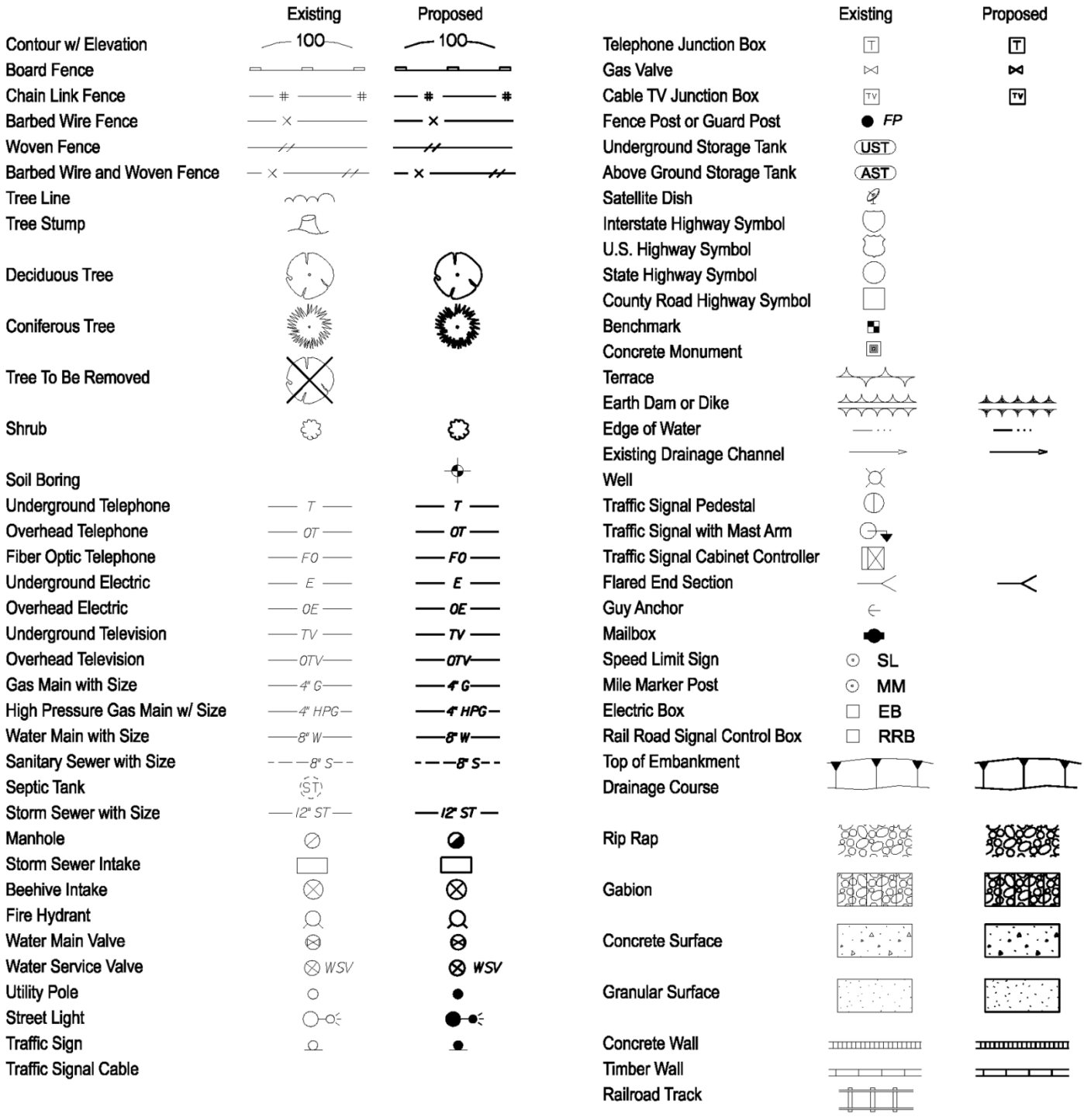
   k. Listing of standards (if applicable).

   l. Owner/developer (if applicable).

   m. Legend (see Figure 1D-1.01 for sample legend).

      The jurisdictional engineer may require different legends depending on the designated design software package. The project engineer should ensure that the completed design plan complies with the jurisdiction's requirements for symbols and the design information to be placed on specific layers within the software program.

Figure 1D-1.01: Sample Legend



5. **Title Block:** Place the following information on the right edge or bottom of the sheet.

    a. The name of the project

    b. Project engineer

    c. Sheet title

    d. Date

    e. Space that denotes revisions

    f. Page numbers

    g. Names or initials of persons designing, detailing, and checking plans

6. **Plan Scale:** Scale to be approved by the jurisdictional engineer. A bar scale is required on each drawing.

B. General Information to be Shown on the Construction Plans

1. Beginning (B.O.P.) and ending (E.O.P.) of project.

2. Street names.

3. Right-of-way widths and legal descriptions as required.

4. Legend and abbreviations as part of title sheet requirements.

5. Adequate witnesses and horizontal and vertical controls so surveyor can lay out project plans. Show all controls at actual locations on the plans. Benchmarks and ties.

6. Lot numbers, subdivision names, and project numbers, as applicable.

7. Lot dimensions (along right-of-way or easements).

8. North arrow up or to the right, when applicable.

9. Existing and proposed utilities, including type, size, and location.

10. Proposed improvement locations, dimensions, and stations.

11. Station Bar (reference all improvements to same stationing). Stationing from left to right or bottom to top.

12. Existing trees, fences, walks, drainage structures, open channels, pavements, buildings, and other obstacles or improvements that could reasonably affect the work area.

13. Survey line or reference line shown on plan view with stations increasing from west to east or south to north, when practical.

14. Quantity estimate - separate sanitary sewer, storm sewer, other utilities, and paving quantities shown if they are detailed on same plan. Include estimate reference information listing any special requirements for each bid item.

15. Easements, both temporary and permanent.

16. Cross-sections - for subdivisions, existing and proposed finished contours may also be used.

17. Special details and special notes when required.

18. Plan view and profile. Profile should line up with plan stations whenever possible.

19. Plans for development work should contain a general note to construct the project according to the SUDAS Specifications and any supplemental specifications of the jurisdiction.

20. Make reference to soils report.

21. Traffic control signs and markings will follow the latest edition of the MUTCD. When it is required by the jurisdiction to maintain traffic during construction, show stage construction and special requirements on the plans. If required, show signing, street closures, and/or detours on traffic control sheet.

22. Permanent signing.

23. SWPPP and temporary and permanent erosion control measures proposed.

24. Other information deemed necessary by the engineer certifying the plans.

C. Detailed Sanitary and Storm Sewer Plans

1. Stationing, location, and type of all manholes, intakes, or other structures.

    a. Show structure designation on the plans.

    b. Show location on the plans and reference survey line or centerline.

    c. Comply with the SUDAS Specifications for the type of structure required.

2. Details should be shown for all structures that are not standard in the SUDAS Specifications.

3. Plan and profiles of all sewer lines and existing and proposed ground line above sewer.

4. Size, length, and grade of sewers in profile.

5. Type of pipe materials and strengths, if different from SUDAS Specifications, or if specific materials are required.

6. Invert elevations at all intakes, manholes, and other structures in profile.

7. Location, size, and type of all sewer stubs, wyes, or tees. Reference stub locations to lot corners. When risers are to be installed, show riser location and size.

8. Estimates should include all length of pipe stubbed out from structures.

9. Rim elevations of manholes, intakes, and other structures.

10. Ensure all castings comply with the jurisdictional requirements on sewers to be maintained by the jurisdiction.

11. Manholes should be identified with a numbering system on plan and profile. Structure sizes and casting sizes to be included by schedule or note on the plans.

12. Class of pipe bedding.

13. Existing utilities or other underground features that could reasonably affect the construction and maintenance of the sewer.

14. Storm sewer design calculations need to be submitted showing drainage area, flow patterns, and flows for design storms. (Hydraulic grade line data).

15. Show storm sewer outlet protection dimensions and locations where apron guards are required.

D. Detailed Open Channel and Drainageway Plans

1. Stationing and flow line elevation at beginning and end of open channel construction.

2. Plan and profile of drainage open channel.

3. Size, type, length, and grade of open channel and alignment.

4. Typical sections showing open channel dimensions, backslopes, and invert and slope treatment.

5. Invert elevations at all structures.

6. All special structures detailed on plans.

7. Criteria for hydraulic design data and elevations.

8. Cross-sections and contour map showing existing ground and finished grade.

9. Permanent and temporary erosion controls.

E. Detailed Paving Plans

1. Minimum 100 feet station intervals and profile elevations at a minimum of 50 feet intervals on tangents and 25 feet intervals at curves. Show station of the centerline of all intersecting streets.

2. Show street profiles and existing ground elevations in the profile view and the curb line in the plan view. The profile should show top of curb tangent grades, vertical curve data, and grade break data. Label any cross slope transitions and special shaping areas.

3. Pavement width (back-to-back).

4. All radii at returns (may be specified in general note if all radii are same).

5. Expansion joint locations, if applicable, on plan view.

6. Horizontal curve data should include centerline PC, PT, PI, delta angle, arc length, degree of curve, tangent length, and radius.

7. Typical cross-section showing baseline, referenced profile, subgrade treatment, pavement thickness, jointing, sidewalk, parking slope, foreslopes, backslopes, cross slopes, any break in ground line or grade, right-of-way line, and dimension of the location of the roadway with the right-of-way line.

8. Vertical curve data should include station and elevation of PI, PC, PT, K-value, low point, and length of curve. Elevations should be given on curves at 25 foot spacing.

9. Intersection details showing drainage and typical joint patterns, if applicable.

10. Location and type of standard sidewalk ramps.

11. Special subgrade or pavement treatment.

12. Location of existing pavement, including elevation and grades.

13. Pavement marking plan, if applicable.

F. Grading Plans/Erosion Control Plans

1. Survey control data.

2. Cross-sections and/or existing and proposed contours and spot elevations, as required.

3. Storm sewer/detention appurtenances.

4. Vicinity map showing haul routes with dates, if any, and borrow areas.

5. Total site area (disturbed area) with construction staging to minimize the area disturbed at any one time.

6. Stationing as it relates to paving plans, sewer, or drainageway plans.

7. Geometric dimensions.

8. Soils data and soil boring location(s) when applicable.

9. Erosion control information and location of any special erosion control measures such as silt fences, silt traps and basins, rip rap or gabions, vegetation and trees to remain, stockpile areas, terraces, contour furrows, temporary diversions, grading phases, etc. See Chapter 7 for a detailed listing of the required contents of Iowa DNR Stormwater Pollution Prevention Plan.

10. Topsoil stockpile and stabilization measures and vegetation areas to be preserved.

G. Water Main Plans

The plans for water mains and appurtenances should show all appropriate physical features adjacent to the proposed water mains along with horizontal and vertical controls and hydrant coverage. Other utilities such as sanitary and storm sewers, manholes, etc. should be shown on the plans with horizontal and vertical separation distances. Design details for other utilities that do not affect the water main should not be shown on water main plans.

1. Stationing, location, and type of all fittings, valves, and fire hydrants.

2. Details should be shown for all items that are not standard in the SUDAS Specifications.

3. Plan and profiles of all water lines and the existing and proposed ground line above the water main.

4. Size, length, and grade of water mains in profile.

5. Type of pipe materials and strengths if different from the SUDAS Specifications or if specific materials and fire hydrants are required.

6. Elevations at all structures in profile.

7. Location, size, and type of all water service stubs. Stub locations should be referenced to lot corners.

8. Estimates should include length of pipe stubbed out from valves.

9. Fire hydrants should be identified with numbering system on plan and profile.

10. Class of pipe bedding if different than the SUDAS Specifications.

11. Existing utilities or other underground features that could reasonably affect the construction and maintenance of the water main.

H. Railroad Crossings

If a railroad crossing is within the project limits, the project engineer should notify the railroad with a copy of the plans and specifications a minimum of 4 months prior to the project letting. If the project limits contain construction of railroad facilities that will be performed by the railroad's forces, the project engineer will state this in the contract documents. The contract documents will state the contractor's limits of responsibility and allow sufficient time in the schedule for the work to be accomplished by the railroad; and that the contractor must coordinate its activities with the railroad or any subcontractors the railroad mandates using during construction. The contractor must be made aware of any permit and insurance requirements imposed by the railroad.

The project engineer should notify the railroad of the following, immediately after awarding the contract:

1. Federal Railroad Administration (FRA) crossing number*

2. Jurisdiction project number

3. Contractor's name, mailing information, and phone number

4. Contractor's contact person

5. Anticipated start date

6. Number of working days

7. Number of days it is believed the contractor will impact the railroad.

8. Date of preconstruction meeting

* For help in identifying the FRA number, see Iowa DOT Modal Transportation Bureau, Rail Section's Highway/Railroad Crossing Identifiers webpage.

I. ADA Ramps

1. Ramp design must comply with PROWAG requirements or justification acceptable to the jurisdictional engineer.

2. Delineate all ramp components including ramps, turning spaces, transitions, passing spaces, detectable warning panels, and special shaping areas.

3. Show elevations at top and bottom of ramps, corners of turning spaces and transition areas, and all grade breaks.

4. Show table of slope and distance between all critical points.