

DESIGN QUALITY INDEX RATING DESCRIPTIONS

1. TRAFFIC CONTROL

Definition – Effective coordination of traffic control device selection and layout with site geometrics, established construction staging, traffic volumes, and specific construction activities. (Note: changes made solely due to contractor preference should not be reflected in this rating).

- 4 - No modifications necessary to ensure well delineated traffic flow and safety from hazards for both motorists and workers.
- 3 - Minor modifications needed (e.g., several devices overlooked). All adjustments could be made in the field.
- 2 - Moderate redesign efforts necessary in the field to provide adequate safety (e.g., improper placement of lane closures, missed phases or construction activities).
- 1 - Major redesign efforts performed in the field. Obvious lack of designer consideration to construction activities and site geometrics (e.g., need to add a detour, temporary bypass, etc.).

2. CONSISTENCY BETWEEN PLANS AND SPECIAL PROVISIONS

Definition – The degree to which contract plans and special provisions convey the same intent. Discrepancies between the two can lead to contract disputes and/or incorrect work performed.

- 4 - No discrepancies between plans and special provisions.
- 3 - Only minor discrepancies with no substantial impact on cost, schedule, or quality of work. All problems handled in the field.
- 2 - Moderate discrepancies or ambiguities requiring negotiation at the project level.
- 1 - Major discrepancies resulting in disputes escalating beyond the project level. High potential for claims or undesired work performed.

3. CONTRACT TIME

Definition – Accurate estimate of time necessary to complete the work using conventional construction methods. Includes assessment of seasonal constraints and foreseen accelerated schedules to accommodate necessary completion dates. Time extensions due to plan changes should not be reflected.

- 4 - Contract completed close to estimated contract time without additional effort or decreased attention to project by contractor.
- 3 - Minor overrun (1 – 5%) or underrun (1 – 5%) and/or minor addition (1 – 5%) to contractor's work force to complete the work.
- 2 - Moderate overrun (5-10%) or underrun (5 – 10%), and/or minor addition (5 – 10%) to contractor's work force to complete the work.
- 1 - Large overrun (>10%) or underrun (>10%) to complete work. Extensive additions to work force by contractor.

4. GENERAL CONSTRUCTABILITY

Definition – Division of a project by time, area, and activity to provide orderly and logical prosecution of the work and accommodate functionality of the facility during work prosecution.

- 4 - No modifications required to efficiently perform the work and/or maintain the intended level of use.
- 3 - Minor modifications required for contractor to proceed. (e.g., reordering the sequence of operations). No added project costs or time delays directly resulting from staging plans. All issues could be handled in the field.
- 2 - Moderate modifications required for the contractor to proceed or the facility to operate as intended (e.g., addition of more activities in the sequence of operations). Minor involvement of Mn/DOT traffic personnel needed.
- 1 - Substantial changes required (e.g., sequencing that was impossible to follow and/or plans not considering physical site constraints or conventional construction methods). Mn/DOT traffic personnel needed to redesign traffic control layouts and/or sequencing.

5. DRAINAGE

Definition – Three major considerations: (1) safety of the traveling public; (2) sound engineering practices to economically protect and drain the highway; and (3) the protection of private property from flooding, water soaking, and other damage. Includes slope of pavements, culverts and storm sewers, inlets and manholes, etc.

- 4 - Adequate drainage design. No design modifications necessary and no water collection problems.
- 3 - Minor drainage problems requiring minimal redesign. Any water collection problems could be remedied with minor field effort.
- 2 - Moderate potential or actual drainage problems requiring a significant amount of design modifications and/or rework. Involvement needed by design office personnel to resolve issues.
- 1 - Major drainage problems. Extensive field and design office effort to avoid and/or correct poor drainage design. Obvious lack of consideration to general drainage guidelines.

6. ALIGNMENT CONTROL

Definition – Proper layout of roadway considering adequate sight distance, roadway profile, horizontal curve placement, horizontal and vertical clearances, efficient use of cut and fill and existing layout of site. Selecting pavement widths and cross sections with consideration of equipment capabilities and constraints. Rating intended for projects where new alignment varies from existing alignment.

- 4 - No modifications necessary. Provided safe roadway while facilitating efficient construction operations. Roadway matches existing site conditions.
- 3 - Minor modifications to alignment to match existing conditions or accommodate equipment constraints (e.g., needed to adjust superelevation transition area or needed time to change PCC paver configuration).
- 2 - Moderate redesign effort necessary to match existing site conditions. Design promoted inefficient use of conventional construction equipment (e.g., needed to adjust curve radius to match existing roadway or contractor needed to mobilize different equipment to pave some areas).

- 1 - Unacceptable roadway layout. Major redesign and resulting project delay necessary. (e.g., inadequate sight distance, incorrect placement of horizontal or vertical curves).

7. EARTHWORK/SOILS

Definition – Proper placement of grade line to facilitate balanced earthwork quantities (although other factors such as drainage will control on some projects). Accurate estimates of earthwork quantities, shrinkage factors and subsurface conditions.

- 4 - Accurate estimate of earthwork quantities including amount and type. No need for additional borrow or waste. No unforeseen subsurface conditions.
- 3 - Minor variations from predicted earthwork quantities. Minor discrepancies from soil information in plans.
- 2 - Moderate variations from predicted earthwork quantities. Considerable changes to amount of waste or borrow. Design personnel involvement needed to remedy problem.
- 1 - Major earthwork problems resulting in considerable redesign and/or overruns/underruns on quantities. Extensive unforeseen subsurface conditions. Design personnel needed to completely rework quantities.

8. QUANTITIES

Definition - Accuracy of material estimates versus actual quantities needed to perform work. Identifies problems with large overruns and /or underruns. Includes all items except those related to earthwork and structures. Ratings should not reflect quantity deviations due to plan changes.

- 4 - Actual quantities very close to estimates in bid quantities.
- 3 - Minor deviation from bid quantities. No impact on bid price.
- 2 - Moderate deviation from bid quantities for very few items. Changes in bid prices necessary for at least one item due to excessive increase or decrease in quantities.
- 1 - Major deviation from bid quantities on several items. Significant overruns/underruns and price changes due to quantity miscalculation.

9. EROSION CONTROL PLAN

Definition – Efforts to recognize and minimize potential soil erosion problems during and after construction operations. An erosion control plan's objectives include limiting off-site effects to acceptable levels and complying with federal, state and local laws and regulations.

- 4 - Erosion control plan performed as intended facilitating easy installation and flexibility to adjust to field conditions.
- 3 - Minor modifications were necessary to accommodate field conditions (e.g., minor adjustments of device placement, or needed to make slight overruns of existing devices).
- 2 - Moderate modifications were necessary. The erosion control plan did not adequately reflect field conditions resulting in significant redesign and/or needed to purchase devices or material that were not included in the plan.
- 1 - Major modifications necessary. Erosion control measures totally ineffective as planned. No consideration to drainage patterns, soil types, or construction operations. Needed to purchase devices or materials that were not included in the plan.

10. UTILITY INFORMATION AND COORDINATION

Definition – The extent to which the utility involvement was correctly shown in the plan and explained in the special provisions. Utility adjustments were scheduled so as not to interfere with construction operations. (Note: non-performance by the utility should not be reflected in the rating).

- 4 - No modification necessary. All utilities were shown on plan and adjustments made without interference or delay to contractor's operations.
- 3 - Minor modifications in design or construction operations due to utility conflicts. No considerable schedule delay. All problems handled in the field without involving utility companies.
- 2 - Moderate modifications in design or construction operations due to utility conflicts (e.g., inadequate vertical clearance over utility requiring additional adjustment).
- 1 - Major delays, redesign, and/or change in construction operations. Obvious lack of coordination with local utilities and government to locate and adjust utilities.

11. RIGHT OF WAY

Definition – Completing issues such as real estate commitments and purchases, access, hazardous materials, easements and rights of entry in a timely manner so as to not interfere with prosecution of construction activities.

- 4 - No modifications necessary. No conflicts or delays due to right of way issues. Right of way and easements effectively accommodated construction methods and equipment. All commitments to landowners addressed.
- 3 - Minor modifications or extra effort needed due to right of way problems (e.g., tight R/W constraints in some areas making construction operations more difficult).
- 2 - Additional easements or right of entry necessary to accomplish the work. Moderate field engineering and/or minor delays in schedule necessary to accomplish the work.
- 1 - Major modifications requiring significant field redesign and/or purchase of additional R/W to perform the work (e.g., plan cross sections extend slope intercepts well beyond R/W). Major conflicts with landowners occurred.

12. SURVEYS (STAKEABILITY)

Definition – Data and reference points provided in the plans to ensure accurate and efficient survey operations during construction. Minimizes the amount of effort necessary in the field to calculate grades and alignment.

- 4 - Sufficient and accurate survey data provided in plan for layout.
- 3 - A few minor additions or changes to survey data necessary in the field.
- 2 - Several missed or inaccurate items in survey data resulting in redesign or recalculation of data (e.g., existing cross sections in plans do not reflect actual conditions found in the field).
- 1 - Major problems found with survey data. Many survey items omitted or large errors shown in the plan. Layouts impossible with normal survey techniques due to complete lack of survey control.

13. PERMITS & AGREEMENTS

Definition – Effective application and coordination of all permits and agreements necessary for construction operations.

- 4 - All permits and agreements were executed correctly, efficiently and in a timely manner. No modifications were necessary.
- 3 - Minor modifications needed to successfully execute permits or agreements.
- 2 - Moderate modifications needed, requiring involvement from office personnel to solve problem.
- 1 - Major changes needed or new permits/agreements written. High potential for claims (e.g., new railroad agreement written to replace crossing).

14. STRUCTURES

Definition – Designs of bridges, box culverts, and/or any small structures as part of a larger project. Addresses soundness of engineering design principles as well as the demonstrated understanding of conventional equipment and methods to build structures.

- 4 - No design modifications necessary. Plans were constructable and demonstrated knowledge of conventional construction methods and equipment.
- 3 - Minor design modifications necessary. Does not impact overall constructability of structure. Modifications could be handled in the field.
- 2 - Moderate design changes necessary to ensure constructability of structures (e.g., plans do not accommodate spatial needs of equipment). Involvement of Bridge Office is necessary to solve problem.
- 1 - Structure is not constructable without major design revisions. Possible impacts include extensive project delays and/or changes in planned construction operations.