



Design Scene Part 2 – Plan Conventions

Chapter 3 Details and ADA

4/4/2023

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Chapter 3 Details and ADA

ADA Design Guidance, Checklists and Examples

Refer to the ADA Design Guidance website: <http://www.dot.state.mn.us/ada/design.html>

ADA Pay Item Guidance

The following were 2018 ADA Pay Item changes:

2521 Concrete Walk (ADA) will no longer be including the aggregate base. Designers must compute the aggregate base by CV under all new concrete curb ramps for all projects.

2531 Curb and Gutter (ADA) will follow the same recommendation as 2521 Concrete Walk.

These changes were necessary to clear up the confusion of when aggregate was incidental. Plan (P) quantities should not be used for these items due to varying field conditions. Minor grading is still incidental with the above pay items.

Use traditional pay items for 4" concrete walk, 6" and 8" driveway pavements. Compute 4" minimum aggregate base CV for all new concrete areas. Calculate grading quantities (common excavation, embankment) for all new sidewalk (no existing walk), or when the existing sidewalk width, alignment or profile change. Do not pay for grading when the sidewalk is replaced in kind.

2104 Remove & Replace Bituminous Pavement and 2232 Mill & Patch Bituminous Pavement are both now paid for as SQ FT instead of LIN FT.

2575 Site Restoration is paid for by EACH for Curb ramp only jobs, otherwise it is paid for by SQ FT for all jobs that are replacing sidewalk and driveways beyond the curb ramps.

The following are other ADA pay items:

2104.503 REMOVE CURB AND GUTTER by LIN FT; Add note: Sawcuts are incidental.

2104.518 REMOVE CONCRETE WALK by SQ FT; Add note: Sawcuts are incidental.

2104.618 REMOVE AND REPLACE BITUMINOUS PAVEMENT by SQ FT; use when bituminous is in poor condition.

2232.603 MILL AND PATCH BITUMINOUS PAVEMENT by LIN FT; use when bituminous is in good condition.

2521.618 CONCRETE WALK by SQ FT; use for curb ramp only projects and for use by local agencies.

2531.603 CONCRETE CURB & GUTTER by LIN FT

2531.603 CONCRETE CURB DESIGN V by LIN FT

2531.618 TRUNCATED DOMES by SQ FT

2575.602 SITE RESTORATION by EACH; use for curb ramp only projects.

2575.618 SITE RESTORATION by SQ FT; use for curb ramp, sidewalk, and driveway projects.

New 2021 ADA Pay Items

2521.602 DRILL & GROUT REINFORCEMENT BAR (EPOXY COATED) by EACH

- For Sidewalks – Longitudinal ties, Transverse ties and at Driveways
- At Quadrants – Back of curb, separate landing pours and end of curb tie-ins

2521.618 CONCRETE CURB RAMP WALK by SQ FT; to be used on all projects with curb ramp and sidewalk work.

For more information see Pay Item Guidance at: <http://www.dot.state.mn.us/ada/design.html>

Approach Panel Standards - Implementation Guidelines

A typical bridge will require six standard approach panel sheets, the first two sheets will vary depending on the approach barrier configuration (see below), and the other four sheets will be typical for all approach panel configurations. A description of each of the standard approach panel sheets follows:

Geometry & Reinforcing Details

Depending on the approach barrier configuration, use one of the following ALTERNATE A or B to select the first two sheets of approach panel standards (check with the bridge designer if necessary):

ALTERNATE A - Use the following 2 sheets for bridges where the concrete barrier off the end of the bridge is mounted on a wingwall (typical of past bridge designs);

5-297.222 Geometry; contains the approach panel layout information. This is project/bridge specific information showing the skew, stationing and elevation of key panel points. The type of joint at the end of the panel is indicated on this sheet. This sheet along with sheet 5-297.223 should be used when the concrete barrier is mounted on a wingwall.

5-297.223 Reinforcing Details; shows the details for the steel reinforcing bars, including plan views and cross section views indicating the size and spacing of the reinforcement in the panel. The new standards now include a bar mark (e.g. AP1302E) for each reinforcing bar. A blank Bill of Reinforcement is provided for the contractor/fabricator to complete, to be submitted along shop drawings for each panel.

ALTERNATE B - Use the following 2 sheets for bridges where the concrete barrier off the end of the bridge is mounted on the approach panel (This is a new construction detail and is expected to be used very often in the future).

5-297.224 Geometry; contains the approach panel layout information. This is project/bridge specific information showing the skew, stationing and elevation of key panel points. The type of joint at the end of the panel is also indicated on this sheet. This sheet along with sheet 5-297.225 should be used on bridges where the concrete barrier is mounted on the approach panel. To accommodate guardrail connection and crash test requirements the concrete barrier must extend 7'-0" minimum onto the approach panel. For wingwalls that are parallel to the roadway centerline the barrier must extend 5'-7'-0" minimum onto the approach panel or to the end of the wingwall, whichever is longer. Barrier reinforcement and payment will be included in the bridge plan.

5-297.225 Reinforcing Details; shows the details for the steel reinforcing bars, including plan views and cross section views indicating the size and spacing of the reinforcement in the panel. The new standards now include a bar mark (e.g. AP1302E) for each reinforcing bar. A blank Bill of Reinforcement is provided for the contractor/fabricator to complete, to be submitted along shop drawings for each panel.

Other Approach Panel Standard Sheets

5-297.227 Miscellaneous Details; includes the details and reinforcement for the sill at the end of the approach panel and the curb transition details. Blank *Bill of Reinforcement* tables are provided for the contractor/fabricator to complete, to be submitted along with shop drawings for each panel.

5-297.228 Joint Layout; indicates the joint locations and types for all of the longitudinal and transverse joints on the approach panel and is intended to be customized by the grading/roadway designer to include the unique features (skew, length, etc.) of each approach panel. The Concrete Engineering Unit at the Maplewood Lab can be contacted for assistance with joint layouts.

5-297.229 Joint Details; provides the sawing, sealing, and other requirements for the joints indicated on sheet 5-297.228 and details regarding sidewalk (if present) cover plates.

5-297.231 Drainage Details; the location of pipe drains and catch basins are included on this sheet. In the future a sheet with details for a drainage flume (in lieu of a catch basin) will be added.

Road Designer Responsibilities:

Select the first two standard sheets (Either Alternate A or Alternate B). The choice depends on the location of the concrete barrier and whether it is attached to the approach panel or to the bridge abutment wingwall. The Bridge Preliminary Plan will indicate which detail should be used. The Bridge Office will provide assistance on the selection if needed.

Include either 5-297.222 & 5-297.223 (Alternate A) or 5-297.224 & 5-297.225 (Alternate Option B). Choose the correct panel plan view based on the skew of approach panel. Cross out the unneeded view. The approach panel plan view should be modified/mirrored to show the actual skew orientation, wingwall and curb transition configuration, and traffic direction arrows. Fill in the proposed skew angle (where needed).

Fill in all data for proposed stations and elevations. Contact the Bridge Office for stations and elevations at the end of the bridge.

Fill in the proposed expansion joint type (E8H, or None). Contact the Bridge Office for the appropriate type, which will generally be E8H for trunk highway bridges and "None" for low volume local roads. Details of the E8H expansion joint are shown on sheet 5-297.227 and 5-297.229.

Note that the Contractor is directed to provide shop drawings for the reinforcing layout and a completed *Bill of Reinforcement* table. The Contractor is to send this information to the Project Engineer at least 3 weeks prior to rebar fabrication. The Bridge Office Construction Unit will provide help on reviewing the shop drawings if necessary.

Work with the Concrete Engineering Unit to determine the location and type of all joints on the approach panel and complete standard sheet 5-297.228. Sheet 5-297.229 should also be included as it provides additional joint details.

Complete standard sheet 5-297.227 by verifying the proposed curb transition lengths and details. Also, in the lower left corner of the sheet, based on the type of joint at the end of the approach panel, cross out the details that do not apply. Note that one end of the panel rests on a concrete sill and is NOT to be tied or doweled to the concrete approach panel in order to allow the approach panel to slide to accommodate the temperature movement of the bridge. The sill is placed under the lanes, shoulders and curbs. When approach panels abut concrete pavement, the concrete pavement (not the approach panel) is rigidly tied to the sill.

Previously, concrete lugs were provided under the concrete approach panel. They have since been removed from under the approach panel and are now located under the first concrete pavement panel beyond the sill (away from the bridge). This is an important change since many new bridge designs include "integral"

abutments, where all of the bridge thermal movement takes place at the E-8H joint. Moving the lugs to the first concrete pavement panel allows the bridge thermal movement to take place and limits the amount of pavement “growth” due to incompressible entering the pavement joints.

Include standard 5-297.231 which provides general drainage details. Identify the location and type of proposed drainage. The Road Designer has the prerogative to select an appropriate drainage system, but should provide either a catch basin or a flume at each corner of the bridge in order to reduce the possibility of erosion around the wingwalls, which has been a very significant and all too common problem when this detail is neglected.

Guidance is being developed regarding the use of approach panels adjacent to mechanically stabilized earth retaining walls and will be issued in the future.

Specific questions regarding the Approach Panel Standard Sheets can be directed to the Bridge Standards Engineer.

Concrete Median Islands

Concrete median islands placed on overlay projects that are 4 ft. or less in width and have only a 1 ½ in. wearing course holding it in place should be pinned in place. A dowel 1 in. x ___ in. long reinforcement bar spaced at about 4 ft. - 5 ft. shall be used to pin median in place. The dowel bar will be incidental. The length of the dowel will vary according to thickness of concrete median. Bar should begin in 1 ½ in below the top of concrete median to an embedment of approximately 6 in. - 8 in.

Curbs

Curbs on high-speed roadways should be discouraged. But if they are deemed necessary, use a B4 design. On ramps a D4 should be used. For loops, use a D4 on the outside and a B4 on the inside.

Design Standards – Design Detail Drawings

These details are provided for use in plan preparation, but are not issued or supported as a MnDOT Standard. The design engineer of record is responsible for taking full ownership and responsibility for the use of detail as is, or as modified. They are located at <https://standardplans.dot.state.mn.us/> under Main Menu – Design Details pulldown.

Design Standards – Standard Plan Modification

Use these guidelines when incorporating modified Standard Plans into your roadway plan sets.

If a Standard Plan sheet contains details not associated with your project, it is optional for designers to cross out the undesired details. If any changes are made to a Standard Plan sheet, however, including crossing out details as mentioned above, the following must be done to the plan sheet:

1. Clearly cross-out the *STANDARD PLAN [NUMBER]* and the *Signature/Approval Date* box in the sheet border.
2. Add “MODIFIED” text just above the Standard Sheet No. to indicate the standard plan has been modified.
3. Add an “I HEREBY CERTIFY...” signature block to the left of the title block for engineer’s signature.
4. Identify the changes made to the details:

- A. Label the changes using italicized text.
- B. Footnote the changes with an asterisk. Place the following footnote above the signature block in italics: * DENOTES MODIFICATION FROM STANDARD PLAN
- C. Use the MicroStation custom line style **StdsPlnMod** to place a double line (thick/thin) box around the text to highlight/identify the modifications. You may need to adjust the scale of the line style.

MnDOT Internal Only: When accessing Standard Plan CADD files from ProjectWise, only those file versions marked APPROVED are suitable to be included as a Standard Plan. Those versions marked Historical or Working are not to be included as a Standard Plan.

Example of Modified Standard Plan sheet:

Modified

POSTED SPEED LIMIT	MINIMUM REQUIRED DEFLECTION DISTANCE (A) BEHIND ANCHORED PORTABLE CONCRETE BARRIER			
	41'	1'-3'	3'-8'	FIXED OBJECTS
30 MPH	0.5'	0.5'	0.5'	0.5'
35-50 MPH	0.5'	0.5'	1.0'	1.5' (2.0') (3.0')
55 MPH	0.5'	1.0'	2.0'	2.0' (4.0') (6.0')

NOTES:
 BARRIER SECTIONS SHALL NOT BE PERMANENTLY INCORPORATED INTO CONSTRUCTION OR MAINTENANCE PROJECTS.
 A DROP-OFF IS CONSIDERED A SLOPE STEEPER THAN 1(1/2):1(H).
 FIXED OBJECTS ARE HAZARDS THAT ARE FIRM, UNYIELDING, AND GREATER THAN 4 INCHES IN HEIGHT.
 ALL BARRIERS ARE DESIGN 8337 AND SHALL HAVE CONNECTION PINS. SEE STANDARD PLATE 8337.
 ① RETAINER BOLT AND NUT REQUIRED. SEE STANDARD PLATE 8337 FOR DETAILS.
 ② 3 STAKES REQUIRED PER BARRIER SECTION, PLACED ON TRAFFIC SIDE OF BARRIER.
 ③ REFER TO MHOT BRIDGE STANDARD DETAIL B920 FOR ANCHORING BARRIER ONTO BRIDGE.
 ④ BARRIER NOT REQUIRED FOR DROP-OFF PROTECTION.
 ⑤ DEFLECTION DISTANCE FOR TIE-DOWN STRAP ANCHOR SYSTEM.
 ⑥ IF THE FIXED OBJECT IS 3'-5' BEYOND IMPACT CURB AND THE POSTED SPEED IS 35 MPH, TEMPORARY BARRIER IS OPTIONAL.
 ⑦ SEE SPEC. 2533.
 ⑧ TIE-DOWN STRAP ANCHOR IS NOT TO BE USED ON BRIDGE DECKS.

MODIFIED

*** DENOTES MODIFICATION FROM STANDARD PLAN**

TEMPORARY PORTABLE PRECAST CONCRETE BARRIER ANCHORING

1 OF 2 SHEETS

Moment Slab

Based on discussions with the concrete and bridge offices, it has been determined that moment slabs should be designed with concrete mix 3B52.

Moment slabs should be paid for with the following two pay items:

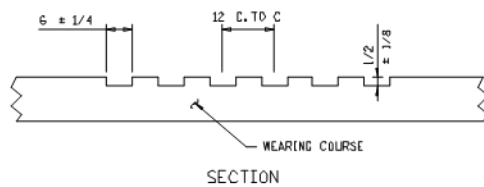
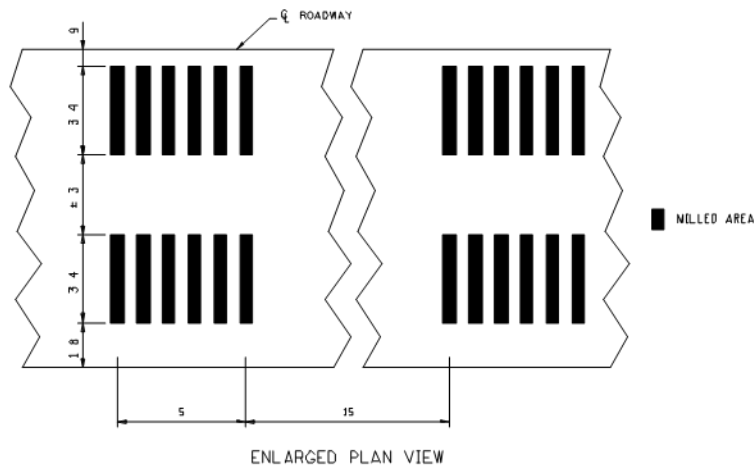
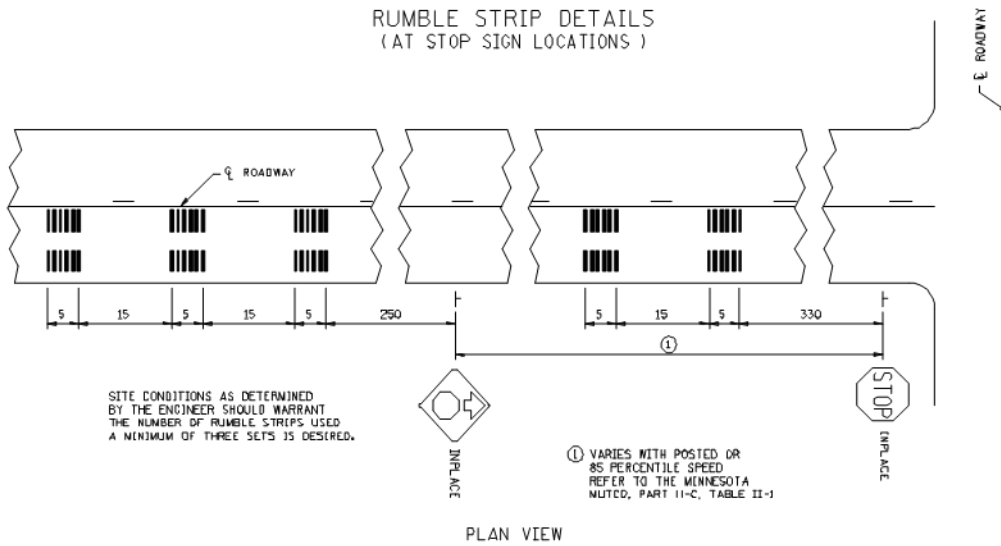
2411.507 STRUCTURAL CONCRETE (3B52) by CU YD

2411.508 REINFORCEMENT BARS (EPOXY COATED) by POUND

Rumble Strip Detail (At Stop Sign Locations)

The detail shown below shall be considered an unapproved standard detail to be used at stop sign locations (all units are in inches). However, the usage shall be a District/Division Traffic Engineers recommendation as to when and where to be used.

This should be paid for as 2232.602 MILLED RUMBLE STRIPS by the EACH. The quantity is based per pair of rumbles. For the example shown below would be a quantity of 5 EACH.



REFERENCE DATE
10-21-99

Rumble Strip/Stripe

Technical Memorandum No. 17-08-T-02 Rumble Strips and Stripes on Rural Trunk Highways was issued on August 21, 2017. As a result there are now typical details on the traffic pavement marking website (MnDOT A to Z under “Pavement Markings” ...”Pavement marking typical detail sheets”).

These are general details for rumbles. If the typical is modified the designer will need to follow the modification guidelines as stated in the Design Scene Chapter 16 – PAVEMENT MARKING TYPICALS article.

Safety Shape for Pavement Edge

Construction of a safety edge at the edge of the paved surface significantly reduces the potential of “tire scrubbing” and minimizing the consequences of drifting off the pavement surface.

The safety edge construction is done by shaping the edge of the pavement material with a 30-degree slope during the paving process (measured from the pavement/shoulder cross slope plane).

Payment for the safety edge will be included in the roadway bituminous or concrete quantities. Add a note to the tabulation indicating that the quantity includes the safety edge shape.

Safety edge guidance may be found in the [Facility Design Guide](#) in Section 4A.14 and in the [Traffic Engineering Manual](#) in section 11-8.02.

Standard Plan 5-297.219

There is an error on standard plan sheet 5-297-219 dated February 16, 2016. Until this is corrected the designer will need to cross out the last sentence on note 2...DR4 JOINTS SHALL BE SEALED...as this does not apply.

This is a modification and will require the engineer certification on the sheet.

Standard Plate 3006

Include Standard Plate 3006 when the project includes: (2501) RC Pipe, (2501) RC Dissipator Ring, (2502) RC Pipe, (2503) RC Pipe Sewer, or (2506) RC Pipe.

Surcharge

When including Standard Plan sheets 5-297.233 and/or 5-297.234 check with the bridge office to determine if a surcharge is required. If a surcharge is required, the sheets can be included as is. If it is not required, cross off note (2) on sheet 1 of 2 which states:

PLACE ABUTMENT APPROACH SURCHARGE MATERIAL PRIOR TO ABUTMENT CONSTRUCTION. AFTER COMPLETION OF SURCHARGE WAITING PERIOD, REMOVE SURCHARGE AND EXISTING MATERIAL OR SELCT GRADING MATERIAL TO THE LIMITS SHOWN IN “ROUGH GRADING SECTION” ABOVE, PRIOR TO ABUTMENT CONSTRUCTION. SEE BRIDGE PLANS AND SPECIAL PROVSIONS FOR ABUTMENT APPROACH SURCHARGE REQUIREMENT AND PAYMENTS.

Also cross off (2) in the Rough Grading Section drawing.

This is a modification and will require the engineer certification on the sheet.