



Design Scene Part 2 – Plan Conventions

Chapter 2 Quantities and Tabulations

5/31/2023

Contents

Design Scene Part 2 – Plan Conventions.....	1
Chapter 2 Quantities and Tabulations	3
Alternate Bid	3
As Built	6
Bridge and Box Culvert Replacement	6
City/County Funds.....	10
Concrete Median Barrier Design Type AA	10
Culvert Treatments	10
Estimated Quantities Format.....	11
Fog Seal	11
Funding	11
Mill Pavement Surface – Automated Machine Guidance Milling Using Relative Surface or Robotic Total Stations	13
Haul Salvaged Material	14
Incidental and Lump Sum Items	15
Lump Sum Items	15
Lump Sum in Multiple Column SEQ's or Tied Plans	15
Mobilization Item.....	16
Plan Quantities (P)	16
Prorata Items	18
Safety Shape for Pavement Edge.....	20
Standard Abbreviations for Pay Items	20
Tabulation Development	21
Weed Spraying.....	21
Work Zone Item Changes.....	21

Chapter 2 Quantities and Tabulations

Alternate Bid

Alternate Bid plans MnDOT has made a decision to develop alternate bid pavement plans for rehabilitation projects that fall within a certain threshold.

These alternate bid pavement plans will allow certain rehabilitation projects to be bid by both bituminous and concrete contractors.

A committee was formed to formulate the following guidelines for alternate bid projects.

General Themes

As the committee discussed the sections of the plan two thoughts became prominent. The first was that as much of the plan as possible should be common to both alternates. Having as much of the plan as possible common to both alternates should keep the plan size reduced to nearly the same size as a single alternate rehabilitation project.

The second thought was that all information relating to alternates should be clearly and consistently labeled to provide a contractor as much clarity as possible in distinguishing between alternates. The committee selected to label alternates using numbers rather than letters for statewide consistency. The alternate number should be followed by a description of the alternate. An example would be “**Alternate 1 – Reclamation and Bituminous Surfacing, Alternate 2 – Concrete Overlay**”. This labeling should be used consistently throughout the plan wherever alternate paving information is shown.

Recommendations for Plan Format

Title Sheet

The title on the title sheet should clearly state that the plan is an alternate pavement plan, e.g.: CONSTRUCTION PLAN FOR Grading, Alternate Bituminous or Concrete Surfacing, etc.

Statement of Estimated Quantities

Pay for the bituminous quantities by the ton and pay for concrete with two items, Sq Yd for Place Concrete Material and cubic yard for the structural concrete. This is consistent with the September 1, 2011 letter from the Office of Materials and Road Research.

The alternate bid quantities should be part of the main SEQ and not in separate SEQs. The alternate bid quantities should be at the end of the SEQ. The alternates should be slightly separated from the other items in the SEQ and clearly labeled as discussed under General Themes section of this report. Only those items directly related to the alternate pavement design should be listed in the alternate sections of the SEQ. In some cases, there may be items such as striping listed in the alternate sections because those items change with the pavement selected.

In the case where the milling depth or the reclaim depth may vary between alternates, the removal quantities that the alternates have in common should be shown in the common section of the estimated quantities. For the alternate that requires the removal of extra material, only the quantity of extra material should be shown in the alternate quantity.

General Layout and Construction Plan Sheets

For most rural plans, a General Layout should be sufficient to convey the anticipated construction. Plan details can be added later in the plan to show information that may be required for culvert replacement, superelevation transitions, etc.

Construction Plans sheets may be needed if a rural project involves inslope grading over the length of the project due to crown or superelevation correction. In these cases, erosion control, turf establishment, culvert adjustments, etc. may need to be shown on a more detailed Construction Plan type sheet. As much information as possible should be shown on one sheet to minimize the size of the plan set.

For urban projects, Construction Plan sheets may be necessary to show locations of storm sewer facilities, ADA improvements, etc.

Profiles

Profiles are generally not needed unless there are intentional corrections to the profile to correct sight distance or bridge clearance.

Typical Sections

Use common typical sections where possible for existing typical and perhaps the milling and/or reclaiming.

Clearly label typical sections for alternates with the convention listed under the General Themes section of this report.

Each alternate should have its own typical section(s). Do not split a typical section between alternates (show the bituminous alternate left of centerline and the concrete alternate right of centerline).

As per the September 1, 2011 letter from the Office of Materials and Road Research, the pavement widths should be the same if possible. Pavement widths may not be 26 feet, however, due to the width of the underlying pavements upon which the new surface will be constructed.

Tabulated Quantities and Construction Notes

Most tabulated quantities and construction notes should be common to both alternatives. Tabulated quantities and construction notes that pertain to only one alternate should be clearly labeled as described in the General Themes section of this report.

Traffic Control

Alternate bid plans requiring reclaiming will typically require a detour for both alternates. The same detour should be used.

Alternate bid plans requiring milling may only require a detour for the concrete paving since the bituminous overlay could typically be done under traffic. In the case of milling type projects, several options could be considered by the District:

Require the bituminous contractor use the same detour as the concrete contractor. This would keep consistency between the options and would allow the bituminous contractor the same unobstructed work site as the concrete contractor. If bridge or culvert replacement is part of a project, this may be the natural course of action. Depending upon the length of detour and business impacts, this option may not be desirable from the public's perspective.

Require the bituminous contractor to work under traffic. This could require the traffic control to be considered as part of the alternate bid portion of the estimated quantities since it would be drastically different for the two alternatives. This option could be more desirable from a road user and business perspective. However, the bituminous contractor is not allowed the same unobstructed work site as the concrete contractor and heavy traffic volumes may reduce production rates or require night work.

Design the same detour plan for both options, but allow contractors to work under traffic if they desire. Contractors choosing to work under traffic could not submit the proposal under value engineering. A more formalized way to deal with this option, however, would be to set up an A+B contract where the B portion is determined by the number of days that the contractor would use the detour. This would allow the contractors the greatest flexibility, but would not necessarily be the best way to address user costs and business impacts.

The decision on Traffic Control for mill and overlay type projects will need to be addressed on a case by case basis considering other work types in the project that may require a detour, traffic volumes that may hinder productivity, business impacts, and available and reasonable detour routes.

Cross-sections

With many rehabilitation projects, cross-sections will not be needed as part of the plan set.

Some rehabilitation projects may require minor inslope work. The inslope work may not be readily visible on cross-sections drawn for the plan. In these cases, the cross-sections may be omitted from the plan, even though they may need to be developed to calculate quantities.

Other Issues

Other issues affecting project delivery were also discussed.

The designer should request a life cycle cost from the pavement engineer at the time of plan turn in. This will allow the pavement engineer sufficient time to develop the life cycle cost adjustment factor for the bidding process.

A standard specification for pavement smoothness has been developed for alternate pavement projects. This specification should be incorporated into the special provisions.

Alternate bid projects should not be combined with single alternate projects. These combinations could skew the bid of the alternate pavement to the pavement type selected for the other portion of the project.

Alternate bid projects should not be combined with other alternate bid projects. If a District desires to combine two alternate bid projects, the District should work with the pavement engineer to see if common typical sections and life cycle costs can be used over the length of both projects.

Districts may use A+B bidding in conjunction with alternate pavements. A+B contracts may be desirable when a significant difference in working days between alternates is anticipated.

Use 2301.504 Concrete Pavement ___” by the SQ YD pay item when 2360 pay items are SQ YD. Use 2301.504 Place Concrete Pavement ___” by the SQ YD and 2301.507 Structural Concrete by CU YD pay items when 2360 pay items are Tons.

As Built

See Design Scene Part 1 – Pay Item Guidance

Bridge and Box Culvert Replacement

The following guidance relates to the SEQ notations needed for asset tracking and finance for Bridge Replacements, New Bridges and Box Culverts (with or without Bridge Numbers). The Bridge numbers (new and existing) should also be identified in the appropriate sections of the plan such as the general layout, construction plans and profiles.

Bridge/Box Culvert Replaced with Bridge

An existing bridge or box culvert (with a bridge number) that is replaced with a new bridge has a separate bridge plan. The bridge plan is not included in the grading plan. It is a separate plan that is included in the bid package.

The existing and new bridge numbers are identified on the grading plan title sheet index map (for example: Remove Br No XXXXX, Proposed Br No XXXXX) and the new bridge number is included in the project description. The bridge pay items and quantities are in the separate bridge plan and are also a separate funding group.

Bridge/Box Culvert Replaced with Box Culvert 10’ and Over

When an existing bridge/box culvert (with a bridge number) is replaced with a box culvert 10’ and over (with a bridge number), the new box culvert plan sheets are incorporated into the grading plan.

The existing and new bridge/box culvert numbers are identified on the grading plan title sheet index map (for example: Remove Br No XXXXX, Proposed Br No XXXXX) and the new bridge number is included in the project description. The pay items and quantities for each box culvert and end sections are included in the grading plan quantities. Notes on the SEQ that cross reference the replacements are needed to track assets and funding. When the project includes multiple box culverts of the same size with different bridge numbers, the notes need to identify the quantities for each bridge number.

Example of Single Bridge/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(2)	2412.502	12X11 PRECAST CONCRETE BOX CULVERT END SECT	EACH	2
(2)	2412.503	12X11 PRECAST CONCRETE BOX CULVERT	LIN FT	150
(1)	2442.501	REMOVE EXISTING BRIDGE	LUMP SUM	1
	(1) Bridge No. 1234 consists of 25'x25' concrete beam structure.			
	(2) Box Culvert No. 23X10, Replaces Bridge No. 1234.			

Example of Single Box Culvert/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(1)	2104.502	REMOVE CONCRETE BOX CULVERT END SECTION	EACH	2
(1)	2104.503	REMOVE CONCRETE BOX CULVERT	LIN FT	130
(2)	2412.502	12X11 PRECAST CONCRETE BOX CULVERT END SECT	EACH	2
(2)	2412.503	12X11 PRECAST CONCRETE BOX CULVERT	LIN FT	150
	(1) Bridge No 1234, 12x10 Box Culvert.			
	(2) Box Culvert No 23X10, Replaces Bridge No. 1234.			

Example of Multiple Bridges/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(4)	2412.502	12X11 PRECAST CONCRETE BOX CULVERT END SECT	EACH	6
(4)	2412.503	12X11 PRECAST CONCRETE BOX CULVERT	LIN FT	350
(1)	2442.501	REMOVE EXISTING BRIDGE A	LUMP SUM	1
(2)	2442.501	REMOVE EXISTING BRIDGE B	LUMP SUM	1
(3)	2442.501	REMOVE EXISTING BRIDGE C	LUMP SUM	1
	(1) Bridge No. 1234 consists of 25'x25' concrete beam structure.			
	(2) Bridge No 5678 consists of 20' timber structure.			
	(3) Bridge No 9123 consists of 35' x 35' concrete beam structure.			
	(4) Box Culvert no 23X10 = 100' with 2 end sections, Replaces Bridge No. 1234.			
	Box Culvert No 23X11 = 150' with 2 end sections, Replaces Bridge No. 5678.			
	Box Culvert No 23X12 = 100' with 2 end sections, Replaces Bridge No. 9123.			

Bridge/Box Culvert Replaced with Box Culvert under 10'

An existing bridge/box culvert (with a bridge number) that is replaced with a box culvert less than 10', will not have a bridge number and the box culvert plan sheets are incorporated into the grading plan.

The existing bridge/box culvert that is being replaced is identified on the grading plan title sheet index map (for example: Remove Br. No. XXXXX) and included in the project description. The pay items and quantities for each box culvert and end sections are included in the grading plan quantities. Notes on the SEQ that cross reference the replacements are needed to track assets and funding. When the project includes multiple box culverts of the same size replacing existing structures (with bridge numbers), the notes need to identify the quantities for each existing bridge number.

Example of Single Bridge/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(2)	2412.502	8X8 PRECAST CONCRETE BOX CULVERT END SECT	EACH	2
(2)	2412.503	8X8 PRECAST CONCRETE BOX CULVERT	LIN FT	150
(1)	2442.501	REMOVE EXISTING BRIDGE	LUMP SUM	1
	(1) Bridge No. 1234 consists of 25'x25' concrete beam structure.			
	(2) Replaces Bridge No. 1234.			

Example of Single Box Culvert/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(1)	2104.502	REMOVE CONCRETE BOX CULVERT END SECTION	EACH	2
(1)	2104.503	REMOVE CONCRETE BOX CULVERT	LIN FT	130
(2)	2412.502	8X8 PRECAST CONCRETE BOX CULVERT END SECT	EACH	2
(2)	2412.503	8X8 PRECAST CONCRETE BOX CULVERT	LIN FT	150
(1) Remove 6'x8' box culvert and end sections.				
(2) Replaces 6'x8' box culvert with end sections.				

Example of Multiple Bridges/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(4)	2412.502	12X11 PRECAST CONCRETE BOX CULVERT END SECT	EACH	6
(4)	2412.503	12X11 PRECAST CONCRETE BOX CULVERT	LIN FT	350
(1)	2442.501	REMOVE EXISTING BRIDGE A	LUMP SUM	1
(2)	2442.501	REMOVE EXISTING BRIDGE B	LUMP SUM	1
(3)	2442.501	REMOVE EXISTING BRIDGE C	LUMP SUM	1
(1) Bridge No. 1234 consists of 25'x25' concrete beam structure.				
(2) Bridge No 5678 consists of 20' timber structure.				
(3) Bridge No 9123 consists of 35' x 35' concrete beam structure.				
(4) Box Culvert at Station 101+00 = 100' with 2 end sections, Replaces Bridge No. 1234.				
Box Culvert at Station 105+70 = 150' with 2 end sections, Replaces Bridge No. 5678.				
Box Culvert at Station 120+35 = 100' with 2 end sections, Replaces Bridge No. 9123.				

Bridge/Box Culvert Replaced with Pipe

An existing bridge/box culvert (with a bridge number) that is replaced with a pipe will not have a new bridge number and the plan sheets are included in the grading plan.

The existing bridge/box culvert number being replaced is identified on the grading plan title sheet index map (for example: Remove Br. No. XXXXX) and included in the project description. The pay items and quantities for the replacement pipe(s) and end sections are included in the grading plan. Notes on the SEQ that cross reference the replacements are needed to track assets and funding. When the project includes multiple pipes of the same size replacing existing structures (with bridge numbers), the notes need to identify the quantities for each existing bridge number.

Example of Single Bridge/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(1)	2442.501	REMOVE EXISTING BRIDGE	LUMP SUM	1
(2)	2501.502	72" RC SAFETY APRON & GRATE DES 3132	EACH	2
(2)	2501.503	72" RC PIPE CULVERT CLASS IV	LIN FT	150
(1) Bridge No. 1234 consists of 25'x25' concrete beam structure.				
(2) Replaces Bridge No. 1234.				

Example of Single Box Culvert/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(1)	2104.502	REMOVE CONCRETE BOX CULVERT END SECTION	EACH	2
(1)	2104.503	REMOVE CONCRETE BOX CULVERT	LIN FT	130
(2)	2501.502	72" RC SAFETY APRON & GRATE DES 3132	EACH	2
(2)	2501.503	72" RC PIPE CULVERT CLASS IV	LIN FT	150
		(1) Remove 6'x8' box culvert and end sections.		
		(2) Replaces 6'x8' box culvert.		

Example of Multiple Bridges/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(1)	2442.501	REMOVE EXISTING BRIDGE A	LUMP SUM	1
(2)	2442.501	REMOVE EXISTING BRIDGE B	LUMP SUM	1
(3)	2442.501	REMOVE EXISTING BRIDGE C	LUMP SUM	1
(4)	2501.502	72" RC SAFETY APRON & GRATE DES 3132	EACH	6
(4)	2501.503	72" RC PIPE CULVERT CLASS IV	LIN FT	350
		(1) Bridge No. 1234 consists of 25'x25' concrete beam structure.		
		(2) Bridge No 5678 consists of 20' timber structure.		
		(3) Bridge No 9123 consists of 35' x 35' concrete beam structure.		
		(4) Culvert at Station 101+00 = 100' with 2 end sections, Replaces Bridge No. 1234.		
		Culvert at Station 105+70 = 150' with 2 end sections, Replaces Bridge No. 5678.		
		Culvert at Station 120+35 = 100' with 2 end sections, Replaces Bridge No. 9123.		

New Bridge/Box Culvert

New Bridge

A new bridge has a separate bridge plan. The bridge plan is not incorporated into the grading plan. It is a separate plan that is included in the bid package.

The new bridge number is identified on the Grading plan title sheet index map and included in the project description. The bridge pay items and quantities are in the separate bridge plan and are also a separate funding group.

New Box Culvert 10' and Over

A new box culvert 10' or over (with a bridge number) will be incorporated into the grading plan. The new box culvert bridge numbers are identified on the grading plan title sheet index map (for example: Proposed Box Culvert No XXXXX) and included in the project description. The pay items and quantities for each box culvert and end sections are included in the grading plan quantities. Notes on the SEQ that cross reference the replacements are needed to track assets and funding. When the project includes multiple box culverts of the same size with different bridge numbers, the notes need to identify the quantities for each bridge number.

Example of Single Bridge/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(1)	2412.502	12X11 PRECAST CONCRETE BOX CULVERT END SECT	EACH	2
(1)	2412.503	12X11 PRECAST CONCRETE BOX CULVERT	LIN FT	150
	(1)	Box Culvert No 23X10.		

Example of Multiple Bridges/Box Culvert				
NOTES	ITEM	DESCRIPTION	UNIT	QUANTITY
(1)	2412.502	12X11 PRECAST CONCRETE BOX CULVERT END SECT	EACH	6
(1)	2412.503	12X11 PRECAST CONCRETE BOX CULVERT	LIN FT	350
	(1)	Box Culvert no 23X10 = 100' with 2 end sections		
		Box Culvert No 23X11 = 150' with 2 end sections		
		Box Culvert No 23X12 = 100' with 2 end sections		

New Box Culvert under 10'

A new box culvert less than 10' will not have a bridge number and will be incorporated into the grading plan. The box culverts are not identified on the grading plan title sheet or included in the project description. The pay items and quantities for box culverts and end sections without bridge numbers are incorporated into the grading plan SEQ.

Items such as grading, pavement, guardrail, riprap, erosion control, and turf are not required or recommended for inclusion in the box culvert cost groups (unless it is shown in the items on separate Bridge SEQ's/Plans) to aid in more efficient contract management in the field.

City/County Funds

When a plan has city/county cost participation, include the name of the agency that is participating. Place the name with the funding information either in the SEQ column heading or in a lettered funding note.

If there is a State/Fed Aid SP or SAP associated with a project, the plan will require either one or two signatures from the State/Fed Aid office on the title sheet. For appropriate signature blocks contact the District State Aid office. If the plan requires CO State Aid to sign the title sheet, obtain the signature or make arrangements with CO State Aid.

Concrete Median Barrier Design Type AA

See Design Scene Part 1 – Pay Item Guidance

Culvert Treatments

The Culvert Treatment Details should indicate how the excavation and backfill is being paid for. These pay items should be tabulated separately in the earthwork and drainage tabs.

Estimated Quantities Format

The quantities on the estimate sheet should be rounded to the nearest whole number if possible. Only in cases of extremely small quantities should decimals be used and then only to the tenth place.

When decimals are needed (as in the case of pro-rata quantities), a zero should be placed before the decimal number (e.g. 0.5 instead of .5).

Commas should not be used. A space may be used for large numbers (e.g. 12 345 or 12345 instead of 12,345).

Do NOT use zeros or dashes in the estimated quantities table or any tabs. These should be left blank.

The statement of estimated quantity (SEQ) table should begin with the Tab column followed by the Sheet number column. Next will be the Item number column followed by the item description column. After this will be the units column. Be sure to follow the standard abbreviations as shown later in this chapter.

There will only be one total column. It will not have a final estimate column. The Total Estimate Column should always follow the Unit column on the estimated quantities table. If there is more than one SP or one funding source the Total Estimate Column should come first then the prime SP followed by the next major SP and ending with the state aid/city/county SP . If there is only one SP then only the total column should be shown not a total and SP column. The following is an example of how the headings in the estimate column should be shown...

Tab	Sheet No	Item No	Item Description	Units	Total Estimated Quantity	SP Prime No Quantity	SP Secondary No Quantity	State Aid SP No Quantity
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If there is only one SP then the following headings are recommended...

Tab	Sheet No	Item No	Item Description	Units	Total Estimated Quantity
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The sheet no column (if used) should reference the sheet that the tab is on and/or any special details other than standard plan sheets. We do not reference standard plan sheets.

Fog Seal

See Design Scene Part 1 – Pay Item Guidance

Funding

The funding sources (e.g. state, federal, city, county, state aid, etc.) need to be determined early in the process. If there are multiple funding sources then the Statement of Estimated Quantities (SEQ) and the

tabulations need to show the funding splits. ALL TABS need to show the funding splits, even traffic and drainage tabs.

Quantities on the estimated quantities sheets must be split into as many columns as there are separate funding groups; the factors that determine funding groups are funding source, project number, and percentage of participation. Specific funding information should be included at the top of each group column.

MnDOT participation should be indicated by showing the percentage of MnDOT participation for each group. When there is more than one State Project Number, each separate state funding source is a separate group and the appropriate State Project Number should be indicated.

The Federal Project Number, State Project Number, and State Aid Project Number must be shown on the construction plan title sheet. These will be located on the bottom right corner of the title sheet. At a minimum the Prime SP number needs to be in the bottom right corner of every sheet. The State Aid number(s) needs to be on the bottom right corner of EVERY plan sheet as well. The other SP numbers may also be on every sheet but do not have to be (other than the title sheet).

Local participation should be indicated by showing the percentage of local participation, and if applicable, the State Aid Project Number. Lump sum agreements should be identified with an alpha note at the top of the column. The notes on the SEQ sheet will need to include

A typical note for a...

Schedule "I" agreement reads...100% CITY FUNDS S.A.P. XXX-XXX-XXX. SEE AGREEMENT NUMBER XXXXXXXX with the CITY OF CROCKER.

Lump Sum or Lump Sum based on bids agreement reads...SEE LUMP SUM AGREEMENT NUMBER XXXXXXXX with SWANSON COUNTY.

Lump sum agreement sub-note should be added to the column when the items for a lump sum agreement are included in that column.

When 100% local funds apply to more than 5 items, then you need a column for those items.

When 100% local funds apply to 5 items or less and it is not a lump sum agreement, then sub-note those items with an alpha character note which will read....100% CITY FUNDS SEE AGREEMENT NUMBER XXXXXXXX with the CITY OF CROCKER.

For example....

ITEM	DESCRIPTION	UNITS	TOTAL ESTIMATED QUANTITY	ESTIMATED QUANTITY SP 1111-11 (A)	ESTIMATED QUANTITY SAP 111-112-121 (B)	100% CITY OF CROCKER FUNDS (C)
2021.501	MOBILIZATION	LUMP SUM	1	0.5	0.3	0.2
2104.502	REMOVE CONCRETE APRON	EACH	10	5	3	2
2105.504	GEOTEXTILE FABRIC TYPE 3	SQ YD	200	100	50	50

- (A) SEE LUMP SUM AGREEMENT NUMBER 1234567 WITH THE CITY OF CROCKER or
- (A) SEE AGREEMENT NUMBER 1234567 WITH SWANSON COUNTY (64% FEDERAL, 16% STATE, 20% COUNTY FUNDS)
- (B) SEE AGREEMENT NO 1234568 WITH THE CITY OF CROCKER (100% STATE AID FUNDS) or
- (B) SEE AGREEMENT NO 1234568 WITH SWANSON COUNTY (80% STATE AID, 20% COUNTY FUNDS)
- (C) SEE AGREEMENT NO 1234569 WITH THE CITY OF CROCKER (100% CITY FUNDS)

The funding percentages must total 100% for each column.

If there are federal funds and/or unique funds the SEQ needs to show the funding splits. (e.g. 80% Federal/20% State Funds). When there is more than one Federal Project Number, each separate federal aid funding source is shown as a separate group and the appropriate Federal Project Number should be indicated.

If the funding designations (80% Federal/20% State Funds) do not fit in the SEQ column headings then they should be shown as a note. The note should be a lettered note (e.g. A, B, C, etc.) not a numbered note. It should be set apart from the numbered notes so that it stands out and is noticed.

Do NOT use numbered notes for any funding items. Even the “100% State Funds” note should be a lettered note.

If federal funds are applied to the local share, the local federal funds must be identified in the STIP, and the local share needs a federal State Aid project number.

For further information regarding cost participation information required in the construction plan, see the “Metro Sample Plan,” MnDOT Policy for Cost Participation for Cooperative Construction Projects and Maintenance Responsibilities between MnDOT and Local Units of Government, or contact MnDOT’s Design Service Engineer, the Funding Program Coordinator in the MnDOT Office of Transportation System Management, or MnDOT’s Cooperative Agreements Engineer.

Mill Pavement Surface – Automated Machine Guidance Milling Using Relative Surface or Robotic Total Stations

Statement of Estimated Quantities (SEQ)

Add estimated quantity of milling to SEQ as calculated using the milled surface model (see example presented in Table 2232-1).

Table 2232-1: Example of statement of estimated quantities for mill bituminous pavement (special)

SHEET NO.	ITEM NO.	DESCRIPTION	UNITS	TOTAL ESTIMATED QUANTITY (Note 1)
10	2232.504	MILL BITUMINOUS PAVEMENT (SPECIAL)	SQ YD	155512

Notes:

1. THE TOTAL ESTIMATED QUANTITY IS DETERMINED FROM THE MILLED SURFACE MODEL USING LONGITUDINAL NODE SPACINGS OF 50 LINEAR-FEET AND MILLING DEPTHS WITHIN PLUS OR MINUS 0.01 FEET.

Tabulations

Add estimated quantities for variable depth milling ranges to Tabulations as calculated using the milled surface model (see example presented in Table 2232-2).

These tabulations assist with the bidding process until 3D models can be incorporated directly into contracts. The cost of the milling operation is affected by milling depths, as deeper mill depths slow down the milling operation and increase drum teeth ware. Additionally, milling quantities aid in determination of staging, number of trucks and frequency, etc. Modify the example variable depth milling ranges, and/or add additional rows, to table as needed.

Table 2232-2: Mill bituminous pavement (special) tabulations

Milling Depth	Location	Sq. Yd (notes 2, 3)
Variable Depth Milling - 0" (Note 3)	Mainline	6384
Variable Depth Milling - 0" - 0.5"	Mainline	7155
Variable Depth Milling - 0.501" - 1"	Mainline	20662
Variable Depth Milling - 1.01" - 2"	Mainline	100490
Variable Depth Milling - 2.01" - 3"	Mainline	25644
Variable Depth Milling - 3.01" - 4"	Mainline	1445
Variable Depth Milling - 4.01" - 5"	Mainline	107
Variable Depth Milling - > 5"	Mainline	9
TOTAL		155512

Notes:

1. Mill bituminous pavement special will generate a volume of approximate 6,453 cu yd of milling.
2. Estimated quantities for the specified variable depth milling depth milling ranges are determined from the surface model using longitudinal node spacings of 50 linear-ft and milling depths within plus or minus 0.01 ft.
3. Accounts for areas of only overlay based on the milled surface model.

Pay items

See **Design Scene Part 1 Pay Item Guidance**, for *information* detailing when the AMG milling using relative surface or robotic total stations pay item is required on a given project.

2232.604 MILL BITUMINOUS PAVEMENT (SPECIAL) by SQUARE YARD

Haul Salvaged Material

See **Design Scene Part 1 – Pay Item Guidance**

Incidental and Lump Sum Items

An internal review of our existing process for the development of engineer's estimates for construction projects identified a number of risk areas and change needs. The following process changes will be made immediately. These adjustments to our process will result in reducing the risk of inadvertent disclosure of nonpublic data prior to project award per Minnesota Statute §13.72, subd. 1.

These new procedures will be applied to all projects that are included in the MnDOT letting process.

INCIDENTAL, FOR INFORMATION ONLY, and LUMP SUM quantities should not be shown in the plan or special provisions. The list of elements and application rates included in the incidental and lump sum items can be listed in the plan and special provisions but not the quantities.

FOR INFORMATION ONLY statement as associated with quantities will no longer be allowed in the plans.

This information will be supplied in the current tabulated or listed format via a stand alone document to the Cost Estimating Engineer and the Design Support Engineer only, at the time of project submittal. The Preliminary Estimate and Data Base file (*.mdb) will be located in the specific projects ProjectWise location (a right protected folder), with AD group name of "DxEstimates" and a Folder name of "Estimates Restricted" which restricts access for anyone except newly established AD group (Ex. Design Engineer, Lead Designer & District Cost Estimating Engineer).

Lump Sum Items

The term, "lump sum," when used as a unit of measurement for payment, means complete payment for that item of work as described by the contract. A description of the work to be paid for as a "lump sum" is included in the plans so that contractors bidding on the project will know exactly what work and materials are included in the pay item. These "lump sum" items usually include work items that are used on many projects. Either a bill of materials has been developed for them (such as standardized traffic control or traffic control interconnection systems) or they are routine work items that do not vary significantly from project to project (such as maintenance and restoration of haul roads). Clear definition in the plan of what is expected in each case contributes to better estimates, performance of the work, and a lower cost during construction. Provide quantities in the estimate for all items making up the lump sum price and provide enough detail in the plan so that quantities of items making up the lump sum item can be adequately determined by the bidders.

Lump Sum in Multiple Column SEQ's or Tied Plans

The total of a Lump Sum pay item should always equal 1.

If the funding is the same for all S.P.'s, place a quantity of 1 in the prime S.P. column and the total column. All other S.P. columns should be left blank.

Or if the item applies to a specific S.P. (other than the prime S.P.) place a 1 in that column and the total column.

Or if it is necessary to split the item between S.P. columns or tied plans, compute the quantity based on the amount of work for each S.P. The quantities should be shown to the tenths. Be sure the total column equals 1.

If the plan is tied, place the quantity for the lump sum in the appropriate plan or, if the lump sum item covers all plans, place the lump sum quantity into one of the plans only and leave the row blank in all others.

Examples can be found: [Multiple Funding Type examples](#)

Mobilization Item

See Design Scene Part 1 – Pay Item Guidance

Plan Quantities (P)

The (P) designation on individual contract items or specific portions of contract items in the Statement of Estimated Quantities means that Plan dimensions will be used to calculate the pay quantity for that contract item. The purpose of the use of (P) designated quantities is to avoid the expense of measuring dimensions in the field, if original Plan dimensions remain valid. The use of (P) designated quantities is limited to contract items with specified dimensions that can be controlled by field checks during or after construction.

Items with the (P) designation must have quantities that are calculated using dimensions in the plan.

Some examples of items where a (P) designation might be appropriate include the following:

ITEM	DESCRIPTION	UNITS
2101.505	CLEARING	ACRE
2101.505	GRUBBING	ACRE
2104.503	REMOVE	LIN FT
2104.504	REMOVE	SQ YD
2104.518	REMOVE	SQ FT
2106.507	EXCAVATION – COMMON	CU YD
2106.507	EXCAVATION – SUBGRADE	CU YD
2106.507	EXCAVATION – ROCK	CU YD
2106.507	EXCAVATION – MUCK	CU YD
2211.507	AGGREGATE BASE (CV), CLASS _	CU YD
2221.507	SHOULDER BASE AGGREGATE (_V) CLASS _	CU YD
2232.504	MILL BITUMINOUS SURFACE (_ ”)	SQ YD
2301.504	CONCRETE PAVEMENT _ ”	SQ YD
2301.504	PLACE CONCRETE PAVEMENT _ ”	SQ YD
2301.508	SUPPLEMENTAL PAVEMENT REINFORCEMENT	POUND
2360.504	TYPE _# _ COURSE MIX (_) _ ” THICK	SQ YD
2360.504	TYPE _# _ COURSE MIX (_)	SQ YD
2401.507	STRUCTURAL CONCRETE (MIX NO.)	CU YD
2401.507	STRUCTURE EXCAVATION, CLASS _	CU YD
2401.508	REINFORCEMENT BARS	POUND
2401.508	REINFORCEMENT BARS (EPOXY COATED)	POUND
2401.508	STEEL FABRIC	POUND
2401.508	SPIRAL REINFORCEMENT	POUND

ITEM	DESCRIPTION	UNITS
2401.508	SPIRAL REINFORCEMENT, (EPOXY COATED)	POUND
2402.503	ORNAMENTAL METAL RAILING	LIN FT
2402.503	PIPE RAILING	LIN FT
2411.504	CONCRETE FOOTING	SQ YD
2411.507	STRUCTURAL CONCRETE (MIX NO.)	CU YD
2411.507	STRUCTURE EXCAVATION, CLASS _	CU YD
2411.507	GRANULAR BACKFILL (CV)	CU YD
2411.507	AGGREGATE BACKFILL (CV)	CU YD
2411.508	REINFORCEMENT BARS	POUND
2411.508	REINFORCEMENT BARS (EPOXY COATED)	POUND
2451.507	STRUCTURE EXCAVATION, CLASS _	CU YD
2451.507	GRANULAR BACKFILL (CV)	CU YD
2451.507	AGGREGATE BACKFILL (CV)	CU YD
2451.507	GRANULAR BEDDING (CV)	CU YD
2451.507	FINE AGGREGATE BEDDING (CV)	CU YD
2451.507	COARSE AGGREGATE BEDDING (CV)	CU YD
2451.507	CONDUITE AGGREGATE BEDDDING (CV)	CU YD
2451.507	COURSE FILTER AGGREGATE (CV)	CU YD
2451.507	FINE FILTER AGGREGATE (CV)	CU YD
2461.507	CONCRETE MIX NO. ____	CU YD
2501.507	CULVERT EXCAVATION, CLASS _	CU YD
2575.505	SEEDING	ACRE
2575.505	DISK ANCHORING	ACRE

Some examples of items where a (P) designation is **not** appropriate include the following:

2118.509	AGGREGATE SURFACING, CLASS ____	TON
2130.523	WATER	M GALLON
2131.506	CALCIUM CHLORIDE SOLUTION	GALLON
2131.509	CALCIUM CHLORIDE, TYPE ____	TON
2211.509	AGGREGATE BASE, CLASS ____	TON
2301.507	STRUCTURAL CONCRETE HIGH EARLY	CU YD
2301.507	STRUCTURAL CONCRETE	CU YD
2331.509	BITUMINOUS MATERIAL FOR MIXTURE	TON
2355.506	BITUMINOUS MATERIAL FOR FOG SEAL	GALLON
2360.509	TYPE SP __ WEARING COURSE MIXTURE __	TON
2360.509	TYPE SP __ NON-WEARING COURSE MIXTURE _	TON

If only a portion of the quantity for an item can be calculated using dimensions in the plan, then only that portion can have the (P) designation and can be shown as follows with a footnote:

2105.507 COMMON EXCAVATION (5) CU YD 1 289 582 (985 956.4) (P)

(5) This is a partial (P) quantity. The quantity is a (P) quantity except for the area between Sta. 842 to 851 which will be field measured.

Prorata Items

Prorating distributes the cost of items among the various funding groups and/or SP's so that they all share in the cost of these items. The prorata percentage for each funding split is computed to two decimal places on the estimated quantities sheet. It should be noted that ONLY the following items should be prorated:

MOBILIZATION	LUMP SUM
FIELD OFFICE	EACH
FIELD LABORATORY	EACH
TRAFFIC CONTROL	LUMP SUM

The prorata percentage assigned to each funding split (including bridge costs, if applicable) shown in the plans is determined by dividing the dollar value of work associated with that split by the total dollar value of the contract (including bridge costs), less the pro-rata items.

The designer is to use estimated quantities and estimated prices to compute the prorata percentages. No other items should be shown to two decimal places. (There are a few rare exceptions to this such as signals with agreements.) Prorata percentages should be shown on the grading plan only, even when bridge costs are included in calculation.

Special circumstances may justify an exception to these procedures. These situations should be reviewed with the Municipal Agreements Unit and the Plan Review Unit, and the determination of how to handle such exception will be made on a case-by-case basis.

Prorata Items Involving Cooperative Construction

A sample computation of prorata items is shown below for reference.

Sample Computation
of PRORATA ITEMS
for Cooperative Construction
Agreements
Total Contract Cost (including
bridge cost) = \$220,500.00

Prorata Items

Mobilization	\$10,000.00
Field Office	\$ 3,000.00
Field Laboratory	\$ 2,500.00
Traffic Control	\$ 5,000.00
Total Cost of <u>Prorata</u> Items	<u>\$20,500.00</u>

Total Contract Cost Minus Total Cost of Prorata Items
 $\$220,500.00 - \$20,500.00 =$
 $\$200,000.00$

Cost of each Funding Group & Bridge

(Cost for each group does not include cost for prorata items)

Group 1:	100% State	\$101,000.00
Group 2:	60% State, 40% City	\$ 87,200.00
Group 3:	56% State, 44% City	\$ 1,000.00
Group 4:	100% City	\$ 800.00
Bridge:	100% State	\$10,000.00

Prorata percentage for each Funding Group

$$\text{Group 1: } \frac{(\$101,000.00 + \$10,000.00)}{\$200,000.00} = 0.555 \text{ (Use 0.55)}$$

$$\text{Group 2: } \frac{\$ 87,200.00}{\$200,000.00} = 0.436 \text{ (Use 0.44)}$$

$$\text{Group 3: } \frac{\$ 1,000.00}{\$200,000.00} = 0.005 \text{ (Use 0.01)}$$

$$\text{Group 4: } \frac{\$ 800.00}{\$200,000.00} = 0.004 \text{ (Use 0.00)}$$

Prorata items on Tied Plans

When the tied plan has the same funding for all the SP's:

Item No.	Description	Unit	PLAN A		PLAN B			
			TOTAL A	SP 1111-11	TOTAL B	SP 2222-22	SP 3333-33	
2021.501	MOBILIZATION	LUMP SUM	1	1				ACCEPTABLE
2021.501	MOBILIZATION	LUMP SUM	1					ACCEPTABLE
2021.501	MOBILIZATION	LUMP SUM						ACCEPTABLE - PREFERRED

When the tied plan has a different funding for at least one of the SP's:

Item No.	Description	Unit	PLAN A		PLAN B			
			TOTAL A	SP 1111-11	TOTAL B	SP 2222-22	SP 3333-33	
2021.501	MOBILIZATION	LUMP SUM	0.25	0.25	0.75	0.35	0.40	ACCEPTABLE

Safety Shape for Pavement Edge

The quantity for the safety edge is computed and included in the tabulations for bituminous and concrete pay items. Add a note to the tabulation informing that the bituminous 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 Abbreviations for Pay Items

The item descriptions in the estimated quantities table should exactly match the AASHTOWare list. The list shows both a short description and a long description. The designer can use either option for each pay item but an individual item should not be part long and part short description.

The UNITS must also follow the standard abbreviation as follows:

As Shown in Plan	Definition	As Shown in Plan	Definition	As Shown in Plan	Definition
LUMP SUM	Lump Sum	DAY	Day	YARD	Yard
EACH	Each	WEEK	Week	DOLLAR	Dollar
LIN FT	Linear Foot	UNIT DAY	Unit Day	MBM	Thousand Board Feet
SQ YD	Square Yard	STRUCTURE	Structure	M GALLON	Thousand Gallons
ACRE	Acre	ASSEMBLY	Assembly	TREE	Tree
GALLON	Gallon	SYSTEM	System or Signal System	SHRUB	Shrub
CU YD	Cubic Yard	SQ FT/DAY	Square Foot/Day	VINE	Vine
POUND	Pound Ton	SQ FT	Square Foot/Day	PLANT	Plant
HOOR	Hour	ROAD STA	Road Station		

Tabulation Development

When tabulations are under development it is good practice to leave an open line every 5 or 6 lines and space below the tabs. This practice allows additions to the tabs or notes to be made on the sheets after the plan is turned in for processing. A two inch minimum space from the bottom border line of the plan sheet to the lower line on the tabulation is desirable.

Specific notes should only appear in one location (either the SEQ or the tab, not both).

Tab letters should be placed in the top right corner of the tab box. It should be in capital letters and it is recommended that you do not use the letters "I", "O", or "Q".

Weed Spraying

See Design Scene Part 1 – Pay Item Guidance

Work Zone Item Changes

As a result of updates to the Temporary Traffic Management provisions two traffic control pay items have changed.

2563.610 FLAG PERSON by HOUR is now 2563.610 FLAGGER

2563.613 WORK ZONE SPEED LIMIT by UNIT DAY is now 2563.613 WORKERS PRESENT SPEED LIMIT