

# Appendix J

## Supplemental Quantity Summaries Information

Appendix J contains supplemental information associated with Chapter 13: Quantity Summaries, which include the following:

- Quantity Rounding Criteria
- Basis of Plan Quantities

### J.1 QUANTITY ROUNDING CRITERIA

The following table provides a summary of rounding criteria for various frames. Chapter 13 provides additional information on Quantities Summaries.

Item	Measured Unit	Rounding Criteria
<b>MISCELLANEOUS ITEMS FRAME</b>		
Miscellaneous Items	cubic yard, cy square yard, sy linear foot, lnft hour, hr lump sum each, ea	1
<b>FINISH GRADE CONTROL FRAME</b>		
Finish Grade Control	course-foot, crft	Up to nearest 50 foot
<b>CLEARING &amp; GRUBBING FRAME</b>		
Clearing and Grubbing	acre or lump sum	0.1 1
<b>REMOVE TREES FRAME</b>		
Remove Trees	each, ea	1
<b>REMOVE STRUCTURE FRAME</b>		
Remove Structure	lump sum or each, ea	1
<b>BITUMINOUS PAVEMENT REMOVAL FRAME</b>		
Remove Bituminous Pavement	square yard, sy	1

Item	Measured Unit	Rounding Criteria
<b>GRADING FRAME</b>		
Unclassified Excavation Excavation Street Excavation Unclassified Borrow Excavation Excess Excavation Embankment + Embankment in Place	cubic yard, cy	1
<b>ADDITIONAL GRADING FRAME</b>		
Unclassified Excavation Excavation Street Excavation Embankment + Embankment in Place Additional Unclassified Excavation Additional Embankment in Place	cubic yard, cy	1 nearest 5 if not incl. in earthwork run, (min. 5)
<b>SPECIAL BORROW FRAME</b>		
Special Borrow – Excavation Special Borrow Neat Line	cubic yard, cy	1
<b>SUBEXCAVATION FRAME</b>		
Unclassified Excavation Street Excavation Embankment in Place Special Borrow Neat Line	cubic yard, cy	1
<b>DIGOUT FRAME</b>		
Digout Excavation Special Borrow Neat Line	cubic yard, cy	1
Geotextile	square yard, sy	1
<b>MUCK EXCAVATION FRAME</b>		
Muck Excavation Special Borrow Neat Line	cubic yard, cy	1
<b>EMBANKMENT FOUNDATION TREATMENT FRAME</b>		
Special Borrow Neat Line	cubic yard, cy	1
Geotextile	square yard, sy	1
<b>DRILL PRESPLIT HOLES FRAME</b>		
Drill Presplit Holes	linear foot, lnft	1
<b>SCALING FRAME</b>		
Hours	hour, hr	1
Cubic Yards (for information only)	cubic yard, cy	1
<b>DETOUR FRAME</b>		
Detour - Construct, Maintain & Remove Detour - Construct & Maintain	lump sum or each, ea	1
Detour - Maintain & Remove Detour - Maintain	lump sum	1
<b>EQUIPMENT FRAME</b>		
Motor Grader Dozer Miscellaneous Equipment	hour, hr	1

Item	Measured Unit	Rounding Criteria
<b>OBLITERATE ROADWAY FRAME</b>		
Obliterate Roadway	stations, sta. (100 ft)	1
Unclassified Excavation (for information only) Embankment + (for information only)	cubic yard, cy	1
<b>BRIDGE END BACKFILL FRAME</b>		
Bridge End Backfill	cubic yard, cy	1
Geotextile	square yard, sy	1
<b>PULVERIZATION FRAME</b>		
Pavement Pulverization	square yard, sy	1
<b>SURFACING &amp; ADDITIONAL SURFACING FRAMES</b>		
Distance *	linear foot, lnft	0.01
Hydrated Lime Mineral Filler - CIR Plant Mix Surfacing Microsurfacing Aggregate	ton	1
Cover Blotter Material Cold Recycled Plant Mix Aggregate Treatment Cement Treated Pulverized Base Portland Cement Concrete Pavement	square yard, sy	1
Crushed Aggregate Course Special Borrow Neat Line Crushed Top Surfacing Shoulder Gravel Traffic Gravel	cubic yard, cy or ton	1
Non-frost Susceptible Backfill Cement Treated Base	cubic yard, cy	1
Asphalt Cement Seal Curing Seal Recycling Agent CIR-EE Microsurfacing Emulsion	ton	0.1
Tack Fog Seal	gallon, gal	1
<b>RUMBLE STRIPS FRAME</b>		
Rumble Strips	mile, mi	0.1
Fog Seal (for information only)	gallon, gal	1
<b>CRACK SEALING FRAME</b>		
Crack Sealing	pound, lb	1
Crack Sealing (for information only)	linear foot, lnft	1
<b>COLD MILLING FRAME</b>		
Cold Milling	square yard, sy	1
<b>CRACK &amp; SEAT FRAME</b>		
Crack and Seat	square yard, sy	1
* Where existing stationing is utilized, the dimensions may only be available to the nearest 0.1'.		

Item	Measured Unit	Rounding Criteria
<b>RAIL FRAME</b>		
Hand Rail Pedestrian Rail	linear foot, lnft	0.1
<b>WATER LINE FRAME</b>		
Adjust Water Main / Service Line Water Service Valve Connection Pipe Plug Fire Hydrant	each, ea	1
Pipe – PVC Pressure Water Steel Casing Special Installation of Pipe	foot, ft	1
Ductile Iron Fittings	pound, lb	1
Controlled Low Strength Material	cubic yard, cy	1
<b>CULVERT FRAME (Option, No Option, Approach and Recap)</b>		
Length of Pipe	foot, ft	2 6 for RCB
Relay Pipe Culvert	foot, ft	2
Clean Culvert Pipe	foot, ft	1
Height of Cover Remove Pipe Culvert	foot, ft	0.1
Foundation Material Bedding / Granular Bedding Material Special Backfill Fill and Abandon Pipe	cubic yard, cy	1
Concrete Class General	cubic yard, cy	0.1
Plug Ends and Abandon Pipe	each, ea	1
Geotextile	square yard, sy	1
<b>STOCKPASS FRAME</b>		
Length of Pipe	foot, ft	2
Plant Mix Surfacing	ton	1
Crushed Aggregate Course Foundation Material Granular Bedding Material Special Backfill	cubic yard, cy	1
Concrete Class General	cubic yard, cy	0.1
Geotextile	square yard, sy	1
Height of Cover	foot, ft	0.1
<b>UNDERDRAIN FRAME</b>		
Length of Pipe	foot, ft	2
Geotextile	square yard, sy	1
Trench Excavation (not a pay item)	cubic yard, cy	5
Filter Material	cubic yard, cy	0.1

Item	Measured Unit	Rounding Criteria
<b>STORM DRAIN FRAME</b>		
Pipe Lengths Slotted Drain	foot, ft	0.1
Manhole Manhole and Inlet (Combo - Drop / Curb) Inlet (Drop / Curb) Remove Inlet / Manhole Reset Inlet / Manhole	each, ea	1
Granular Bedding Material Fill and Abandon Pipe	cubic yard, cy	1
Trench Excavation (not a pay item)	cubic yard, cy	5
<b>EMBANKMENT PROTECTORS FRAME</b>		
Embankment Protector – 18 inches	foot, ft	2
Concrete Curb	foot, ft	0.1
Bank Protection	cubic yard, cy	0.1
<b>MEDIAN INLETS FRAME</b>		
Median Inlet Adjust Median Inlet	each, ea	1
<b>GUARDRAIL FRAME</b>		
New Metal Guardrail Intersecting Roadway Terminal Section	foot, ft	12.5
Box Beam Guardrail	foot, ft	18
Remove Guardrail Cable Guardrail	foot, ft	0.1
Bridge Approach Section Box Beam Bridge Approach Section Optional Terminal Section Optional Box Beam Terminal Section Box Beam Departure Terminal Section One-Way Departure Terminal Section Cable Guardrail Terminal Section Guardrail End Section Widening	each, ea	1
<b>TEMPORARY GUARDRAIL FRAME</b>		
Temporary Metal Guardrail	foot, ft	12.5
Temporary Concrete Barrier Rail	each, ea (10-foot increment)	1
Temporary Optional Terminal Section Temporary Bridge Approach Section Temporary Impact Attenuator	each, ea	1

Item	Measured Unit	Rounding Criteria
<b>CONCRETE BARRIER RAIL FRAME</b>		
Remove Concrete Barrier Rail Concrete Barrier Rail Tall Concrete Barrier Rail One-Way Depart. Conc. Barrier Sect. Concrete Barrier Rail Transition Reset Concrete Barrier Rail	each, ea (10-foot increment)	1
Impact Attenuator Remove Impact Attenuator	each, ea	1
<b>FENCING FRAME</b>		
Fence Types Remove / Reset Fence	foot, ft	1
Panels Deadman New Wood or Metal Posts	each, ea	1
Gates	foot, ft	2
<b>SIDEWALK FRAME</b>		
Concrete Sidewalk Detectable Warning Devices Remove Sidewalk	square yard, sy	0.1
<b>CURB FRAME</b>		
Concrete Curb and Gutter Remove Curb and Gutter Concrete Curb	foot, ft	0.1
Concrete Valley Gutter	square yard, sy	0.1
<b>MEDIAN CONCRETE CURB FRAME</b>		
Concrete	square yard, sy	0.1
Median Curb Remove Median Curb	foot, ft	0.1
<b>TOPSOIL &amp; SEEDING / REVEGETATION FRAMES</b>		
Salvaging and Placing	cubic yard, cy	1
Seed Fertilizer Condition Seedbed Mulch / Mulch-Compost / Compost Revegetation	acre	0.1
Revegetation	lump sum	1
<b>PERMANENT EROSION CONTROL FRAME</b>		
Random Riprap	cubic yard, cy	0.1
Wetland Soil - Salvage and Place Streambed Material Crushed Aggregate Course	cubic yard, cy	1
Geotextile Turf Reinforcement Mat Erosion Control Blanket Coir Erosion Control Net	square yard, sy	1

Item	Measured Unit	Rounding Criteria
<b>LANDSCAPING FRAME</b>		
Landscaping	lump sum	1
<b>WETLAND SITE FRAME</b>		
Wetland Site	lump sum	1
<b>CATTLE GUARD FRAME</b>		
Cattle Guard Reset Cattle Guard Remove Cattle Guard	each, ea	1
<b>RANDOM RIPRAP &amp; RIPRAP REVEGETATION FRAMES</b>		
Random Riprap	cubic yard, cy	0.1
Geotextile	square yard, sy	1
Riprap Revegetation	square yard, sy	1
<b>CONCRETE DRAINAGE CHUTES FRAME</b>		
Concrete Class General	cubic yard, cy	0.1
<b>CONCRETE DITCH FRAME</b>		
Concrete Ditch	foot, ft	0.1
Special Backfill	cubic yard, cy	1
Drain Aggregate Bank Protection	cubic yard, cy	0.1
Geomembrane	square yard, sy	1
<b>GABIONS FRAME</b>		
Gabion Structure Gabion Mattress	cubic yard, cy	1
<b>RETAINING WALL FRAME</b>		
Retaining Wall	linear foot, lnft or sq yard, sy	0.1
Design, Const. MSE Walls Soil Nail Retaining Wall Design, Const. Gravity Ret. Wall	square yard, sy	1
<b>IRRIGATION STRUCTURES FRAME</b>		
Concrete Class General Random Riprap	cubic yard, cy	0.1
Geotextile	square yard, sy	1
Irrigation Canal Gate Slidegate Gate Valve Trash Guard Canal Check Structure Remove Irrigation Structure	each, ea	1
<b>TRAFFIC CONTROL FRAME</b>		
Traffic Control Ramp Crossover Traffic Control Crossover	each, ea	1
Traffic Control Two-Way Traffic	mile, mi	0.1

Item	Measured Unit	Rounding Criteria
<b>MEDIAN CROSSOVER FRAME</b>		
Crossover – Const., Maintain & Remove Crossover – Const., Maintain & Close Crossover – Const. & Maintain Crossover – Maintain Crossover – Maintain & Close Crossover – Maintain & Remove Ramp Crossover Remove Crossover Crossover Reclamation	each, ea	1
<b>PAVEMENT MARKING FRAME</b>		
Remove Pavement Markings	foot, ft	1
Striping - Paint / Epoxy Words and Symbols – Paint / Epoxy Curb Markings – Paint / Epoxy	gallon, gal	1
Thermoplastic Treatment	lump sum	1
Temporary Striping	mile, mi	0.1
Final Sweep and Broom	course mile, crmi	0.1
<b>MANHOLES IN PLACE FRAME</b>		
Adjust Manhole	each, ea	1
<b>WATER VALVE BOXES FRAME</b>		
Adjust Water Valve Box Reset Water Vale Box	each, ea	1
<b>EDGE DRAIN FRAME</b>		
Edge Drain	linear foot, lnft	1
Side Drain	each, ea	1
<b>MAILBOX FRAME</b>		
Mailbox	each, ea	1

## J.2 BASIS OF PLAN QUANTITIES

The following table provides a summary of basis of plan quantities. The quantities are for estimating purposes only.

COMP. AGGREGATE WEIGHT	= 3700 LBS. PER CUBIC YARD (1)
COMP. WEIGHT OF PL. MIX BIT. SURF.	= 3855 LBS. PER CUBIC YARD (2)
ASPHALT CEMENT - GRADE S - 3/8" AGG.	= 6.2% OF PL.MIX BIT.SURF.
ASPHALT CEMENT - GRADE S - 1/2" AGG.	= 5.8% OF PL.MIX BIT.SURF. (3), (4)
ASPHALT CEMENT - GRADE S - 3/4" AGG.	= 5.4% OF PL.MIX BIT.SURF. (3)
HYDRATED LIME	= 1.4% OF PL.MIX BIT.SURF.
ASPHALT CEMENT	= 3.0% OF RECYCLED PL.MIX (50% RAP) (5)
BITUMINOUS MATERIAL	= 8.5 LBS. PER GAL.
EMULSIFIED ASPHALT - TACK (All other surfaces)	= 0.05 GAL. PER SQ.YARD (UNDILUTED)
EMULSIFIED ASPHALT - TACK (concrete surfaces)	= 0.10 GAL. PER SQ.YARD (UNDILUTED)
EMULSIFIED ASPHALT - FOG SEAL (seal and cover)	= 0.075 GAL. PER SQ.YARD (UNDILUTED)
EMULSIFIED ASPHALT - FOG SEAL (rumble strips)	= 0.10 GAL. PER SQ.YARD (UNDILUTED)
SEAL	= 0.42 GAL. PER SQ.YARD
COVER	= 25 LBS. PER SQ.YARD
CURING SEAL	= 0.2 GAL. PER SQ.YARD
COMP. WEIGHT OF CTB	= 3620 LBS. PER CUBIC YARD
BLOTTER	= 15 LBS. PER SQ.YARD
PORTLAND CEMENT	= 5.0% PULV. CTB - DRY WT. (6)

- (1) 3,750 lbs per cu. yd. – Billings District, except Lewistown area and Eastern Part of District.  
3,625 lbs per cu. yd. – Lewistown area and Eastern part of Billings District.
- (2) 4,167 lbs per cu. yd. – Billings District
- (3) Obtain project specific A/C rates from Surfacing Design. If commercial mix is specified or project specific rates are not available, use the rate shown.
- (4) 1/2" is the max PMS AGG. size for use in Missoula District.
- (5) Applicable to projects with recycled asphalt pavement (RAP)
- (6) Indicate Portland Cement rate only if measured for payment. Obtain project specific rate from Surfacing Design unit.