

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
MISCELLANEOUS ITEMS FRAME		
Miscellaneous Items	cubic yard, cy square yard, sy linear foot, lft hour, hr lump sum each, ea	1
CLEARING & GRUBBING FRAME		
Clearing and Grubbing	acre or lump sum	0.1 1
REMOVE TREES FRAME		
Remove Trees	each, ea	1
REMOVE STRUCTURE FRAME		
Remove Structure	lump sum or each, ea	1
BITUMINOUS PAVEMENT REMOVAL FRAME		
Remove Bituminous Pavement	square yard, sy	1

GRADING FRAME		
Unclassified Excavation Excavation Street Excavation Unclassified Borrow Excavation Excess Excavation Embankment + Embankment in Place	cubic yard, cy	1
ADDITIONAL GRADING FRAME		
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)
SPECIAL BORROW FRAME		
Special Borrow – Excavation Special Borrow Neat Line	cubic yard, cy	1
SUBEXCAVATION FRAME		
Unclassified Excavation Street Excavation Embankment in Place Special Borrow Neat Line	cubic yard, cy	1
DIGOUT FRAME		
Digout Excavation Special Borrow Neat Line	cubic yard, cy	1
Geotextile	square yard, sy	1
MUCK EXCAVATION FRAME		
Muck Excavation Special Borrow Neat Line	cubic yard, cy	1
EMBANKMENT FOUNDATION TREATMENT FRAME		
Special Borrow Neat Line	cubic yard, cy	1
Geotextile	square yard, sy	1
DRILL PRESPLIT HOLES FRAME		
Drill Presplit Holes	linear foot, lnft	1
SCALING FRAME		
Hours	hour, hr	1
Cubic Yards (for information only)	cubic yard, cy	1
DETOUR FRAME		
Detour - Construct, Maintain & Remove Detour - Construct & Maintain	lump sum or each, ea	1
Detour - Maintain & Remove Detour - Maintain	lump sum	1
EQUIPMENT FRAME		
Motor Grader Dozer Miscellaneous Equipment	hour, hr	1

OBLITERATE ROADWAY FRAME		
Obliterate Roadway	stations, sta. (100 ft)	1
Unclassified Excavation (for information only) Embankment + (for information only)	cubic yard, cy	1
BRIDGE END BACKFILL FRAME		
Bridge End Backfill	cubic yard, cy	1
Geotextile	square yard, sy	1
PULVERIZATION FRAME		
Pavement Pulverization	square yard, sy	1
SURFACING & ADDITIONAL SURFACING FRAMES		
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
RUMBLE STRIPS FRAME		
Rumble Strips	mile, mi	0.1
Fog Seal (for information only)	gallon, gal	1
CRACK SEALING FRAME		
Crack Sealing	pound, lb	1
Crack Sealing (for information only)	linear foot, lnft	1
COLD MILLING FRAME		
Cold Milling	square yard, sy	1
CRACK & SEAT FRAME		
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
RAIL FRAME		
Hand Rail Pedestrian Rail	linear foot, Inft	1
WATER LINE FRAME		
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	linear foot, Inft	1
Ductile Iron Fittings	pound, lb	1
Controlled Low Strength Material	cubic yard, cy	1
CULVERT FRAME (Option, No Option, Approach and Recap)		
Length of Pipe	linear foot, Inft	2 6 for RCB
Relay Pipe Culvert	linear foot, Inft	2
Clean Culvert Pipe	linear foot, Inft	1
Height of Cover	foot, ft	0.1
Remove Pipe Culvert	linear foot, Inft	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
STOCKPASS FRAME		
Length of Pipe	linear foot, Inft	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
UNDERDRAIN FRAME		
Length of Pipe	linear foot, Inft	2
Geotextile	square yard, sy	1
Trench Excavation (not a pay item)	cubic yard, cy	5
Filter Material	cubic yard, cy	0.1

STORM DRAIN FRAME		
Pipe Lengths Slotted Drain	linear foot, lnft	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
EMBANKMENT PROTECTORS FRAME		
Embankment Protector – 18 inches	linear foot, lnft	2
Concrete Curb	linear foot, lnft	1
Bank Protection	cubic yard, cy	0.1
MEDIAN INLETS FRAME		
Median Inlet Adjust Median Inlet	each, ea	1
GUARDRAIL FRAME		
New Metal Guardrail Intersecting Roadway Terminal Section	linear foot, lnft	12.5
Box Beam Guardrail	linear foot, lnft	18
Remove Guardrail Cable Guardrail	foot, ft	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
TEMPORARY GUARDRAIL FRAME		
Temporary Metal Guardrail	linear foot, lnft	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

CONCRETE BARRIER RAIL FRAME		
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
Cast-in-Place Barrier Rail	linear foot, lnft	1
FENCING FRAME		
Fence Types Remove / Reset Fence	linear foot, lnft	1
Panels Deadman New Wood or Metal Posts	each, ea	1
Gates	linear foot, lnft	2
SIDEWALK FRAME		
Concrete Sidewalk Detectable Warning Devices Remove Sidewalk	square yard, sy	0.1
CURB FRAME		
Concrete Curb and Gutter Remove Curb and Gutter Concrete Curb	linear foot, lnft	1
Concrete Valley Gutter	square yard, sy	0.1
MEDIAN CONCRETE CURB FRAME		
Concrete	square yard, sy	0.1
Median Curb Remove Median Curb	linear foot, lnft	1
TOPSOIL & SEEDING / REVEGETATION FRAMES		
Salvaging and Placing	cubic yard, cy	1
Seed Fertilizer Mulch / Mulch-Compost / Compost Revegetation	acre	0.1
Revegetation	lump sum	1
PERMANENT EROSION CONTROL FRAME		
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

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

MEDIAN CROSSOVER FRAME		
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
PAVEMENT MARKING FRAME		
Remove Pavement Markings	linear foot, lnft	1
Striping - Paint / Epoxy Words and Symbols – Paint / Epoxy Curb Markings – Paint / Epoxy	gallon, gal	1
Thermoplastic Treatment	lump sum	1
Temporary Striping	linear foot, lnft	1
Final Sweep and Broom	course mile, crmi	0.1
MANHOLES IN PLACE FRAME		
Adjust Manhole	each, ea	1
WATER VALVE BOXES FRAME		
Adjust Water Valve Box Reset Water Vale Box	each, ea	1
EDGE DRAIN FRAME		
Edge Drain	linear foot, lnft	1
Side Drain	each, ea	1
MAILBOX FRAME		
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 BINDER - 3/8" AGG.	= 6.2% OF PL.MIX BIT.SURF.
ASPHALT BINDER - 1/2" AGG.	= 5.8% OF PL.MIX BIT.SURF. (3), (4)
ASPHALT BINDER - 3/4" AGG.	= 5.4% OF PL.MIX BIT.SURF. (3)
HYDRATED LIME	= 1.4% OF PL.MIX BIT.SURF.
ASPHALT BINDER	= 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 asphalt binder rates from Surfacing Design. If commercial mix (< 5,000 tons) 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.