

Design Standards Letter

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Section/Plan No.: P203.00, P203.02, P203.35, P203.61, P203.62, P203.63, P203.64, P203.65, P502.04, P502.10, P504.00, P602.00, P604.05, P604.70, P606.00, P606.30, P606.40, P607.10, P607.20, P608.00, P608.20, P608.10, P609.00, P609.15, P609.40, P609.60, P609.70, P612.10, P613.00, P614.10, P614.30, P615.00, P725.31, P726.30, P731.00, P731.10, P732.00, P732.10, P806.02

Subject: Metric Standard Plans

Body

Attached are copies of the Missouri Standard Plans which have been converted to metric units. This distribution includes 40 standard plans of a total of approximately 130. The remainder are in progress by this division and the bridge division. They should be completed and distributed to the districts later this year.

The drawings have a "M" prefix and the letter suffix has been deleted. Therefore, when the first revisions are made they will have a "M" prefix and an "LETTER" suffix added to them as has been done before.

Example: issued M203.00

1st rev. M203.00A

2nd rev. M203.00B

The distribution date is 2-1-95.

The title block was changed to allow for an engineer's seal to be added to the plans.

Hard conversion was used where possible. Anything formed or built in the field was hard converted (typically 1"=25 mm; 1'=0.3 m). Manufactured or precast items were soft converted.

The note sizes on all the drawings have been standardized. A note "ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE NOTED" has been included on all drawings.

**The AASHTO Metric Green Book was followed. Metric slope convention was used:
i.e. rise/run (V:H) 1:6**

Plan view lane tapers remain the same: i.e. 5:1, 30:1.

ASTM and AASHTO metric specifications have been followed. Metric reinforcing steel was used, so steel quantities have changed. Gage thickness is in dual units. Metric wire fabric was used. All pipe sizes were hard converted (1' = 25 mm). Lumber was described nominal- a 2 x 4 was converted to 50 x 100.

These metric standard plans can be kept with the English standards. We will provide a binder at a later date.

M203.00 Excavation & Embankment

Hard converted.

M203.02 Undergrading

Hard converted.

M203.35 Mailbox Turnouts

Hard Converted. Edge of pavement changed to edge of traveled way to correct for New Pavement Design.

M203.61 Driveway Type I

General comments: Hard converted. To correct for New Pavement Design, edge of pavement was changed to edge of traveled way.

Driveway typical section: Cross-slope was hard converted from 3.12% to 3%. Recommended width note was moved to general notes.

Plan view: The 375 mm (15") pipe note was removed since it is in general notes. The "L" distance to pipe was put in profile view.

Profile view: Pipe size and location note was added to the general notes. To correct for New Pavement Design (NPD), edge of pavement note was removed. Low point was changed to Break Point.

M203.62 Driveway Type II

General comments: Hard converted. to correct for New Pavement Design, edge of pavement was changed to edge of traveled way.

Driveway typical section: Cross-slope was hard converted from 3.12% to 3%. Recommended width note was moved to general notes.

Plan view: Crown section (without pipe) was moved and shown with fill section since they are the same. The "L" distance to pipe was put in profile view. Recommended width note was moved to general notes.

Profile view: Pipe size and location note was added to the general notes. To correct for NPD, edge of pavement note was removed. Low point was changed to Break Point.

M203.63 Driveway Type III

General comments: Hard converted. To correct for New Pavement Design, edge of pavement was changed to edge of traveled way.

Driveway typical section: Cross-slope was hard converted from 3.12% to 3%. Recommended width note was moved to general notes. Plan view: Crown section (without pipe) was moved and shown with fill section since they are the same. The "L" distance to pipe was put in profile view. Recommended width note was moved to general notes.

Profile view: Pipe size and location note was added to the general notes. To correct for NPD, edge of pavement note was removed. Low point was changed to Break Point.

M203.64 Driveway Type IV

General comments: Hard converted. To correct for New Pavement Design, edge of pavement was changed to edge of traveled way.

Driveway typical section: Cross-slope was hard converted from 3.12% to 3%. Recommended width note was moved to general notes. Plan view: Crown section (without pipe) was moved and shown with fill section since they are the same. The "L" distance to pipe was put in profile view. Recommended width note was moved to general notes.

Profile view: Pipe size and location note was added to the general notes. To correct for NPD, edge of pavement note was removed. Low point was changed to Break Point.

M203.65 Driveway Type V

General comments: Hard converted. To correct for New Pavement Design, edge of pavement was changed to edge of traveled way.

M502.05 Concrete Pavement & Base Appurtenances

Sheet 1 of 2

Hard converted. Premolded expansion joint changed to Preformed fiber expansion joint.

Sheet 2 of 2

Hard converted. Tie bar sizes converted to metric sizes.

M502.10 Dowel Supporting Units

Hard converted. To correct for NPD, edge of pavement was changed to edge of pavement structure.

M504.00 Concrete Approach Pavement

Sheet 1 of 2 - Hard converted.

Sheet 2 of 2 - Hard converted. Tie bars converted to metric sizes

M602.00 Right-of-Way & Drain Markers

Hard converted. Steel and concrete r/w markers were soft converted.

M604.05 Pipe Culvert Headwalls - Type S

Pipe sizes were hard converted. Dimensions on headwall soft converted, but many rounded to nearest 5 mm. Concrete quantities soft converted. Reinforcing steel converted to metric sizes.

Reinforcing steel lengths were soft converted. Grate and bearing plate was soft converted.

M604.70 Slotted Drain

Sheet 1 of 2. Soft converted. Angles and carriage bolts soft converted.

Sheet 2 of 2. Soft converted. Angles and carriage bolts soft converted. Some section views were relettered: D-D became B-B, F-F became C-C, G-G became D-D.

M606.00 Guard Rail

Sheet 1 of 6. Soft converted. We used 1905 mm for post spacing (AASHTO recommends this dimension) and 535 mm for 21".

Sheet 2 of 6. Soft converted. Gage thickness in dual units. Bolts soft converted.

Sheet 3 of 6. Soft converted. Steel shapes converted as per draft metric steel manual.

Sheet 4 of 6. Soft converted.

Sheet 5 of 6. Soft converted.

Sheet 6 of 6. Soft converted.

M606.30 Terminal Section

Soft converted (incl. bolts).

M606.40 Guard Cable

Soft converted.

M607.10 Chain Link Fence

Soft converted, some non critical values hard converted. The A, B, & C dimensions were separated from the size & mass/length table.

M607.20 Woven Wire Fence

Combination of hard and soft conversions.

M608.00 Paved Approaches

Hard converted. The L-joint was shown more clearly and a note was added referring to M502.05 for joint details Premolded bituminous joint changed to preformed fiber expansion joint. Notes were moved to general notes. Section views on Not Adjoining Curb & Gutter were relettered from G-G thru M-M.

M608.10 Concrete Sidewalk & Wheelchair Ramps

Hard converted. Premolded bituminous joint changed to preformed fiber expansion joint. 1220 mm MIN. was used for 4' MIN.

M608.20 Concrete Steps

Soft converted. SI reinforcing steel used. Concrete quantities soft converted.

M609.00 Concrete Curb - Curb & Gutter - Gutter

Hard converted. SI reinforcing steel used. Tie bars were hard converted. Some views were enlarged and rearranged.

M609.15 Paved Ditches

Hard converted. Metric wire fabric used.

M609.40 Drain Basin, Shoulder Paving & Fill Slope at Bridge Ends

Sheet 1 of 2

Hard converted bridge approach slab to 7.5 m (24.6') and bridge

approach pavement to 9.0 m (29.5'). Bridge anchor section not shown on downstream side. Detail B changed to "A". Section Q-Q changed to F-F. Drop inlet was soft converted.

Sheet 2 of 2

Hard converted. Sections A-A, C-C, & D-D were lined up with left justification. Section F-F changed to G-G.

M609.60 Rock Ditch Liner

Hard converted.

M609.70 Rock Lining for Culvert Outlets

Hard converted.

M612.10 Barricades and Flasher Signs

Hard converted. Manufactured items (wye, tee, spring, reflector) all soft converted.

M613.00 Pavement Repair

Hard converted.

M614.10 Curb Inlets, Grates & Bearing Plates

Soft converted (incl. bolts). Angles as per draft steel manual.

M614.30 Manhole Frames & Covers

Soft converted. Type 1A & 1B reference old pavement thicknesses: 203 mm (8"), 229 mm (9"), & 254 mm (10").

M615.00 Office for Engineer

Hard converted.

M725.31 Metal Curtain Wall and Metal Inlets

Soft converted. Pipe sizes hard converted.

M726.30 Culvert Installation Methods

Hard converted.

M731.00 Precast Manholes

Soft converted. Pipe sizes hard converted.

M731.10 Precast Drop Inlets

Sheet 1 of 4 - Soft converted. SI reinforcing steel used.

Sheet 2 of 4 - Soft converted. SI reinforcing steel used.

Sheet 3 of 4 - Soft converted. SI reinforcing steel used.

Preformed Bituminous Expansion joint changed to preformed fiber expansion joint.

Sheet 4 of 4 - Hard converted. Added Details for Median Relief - 18.0 m Median (NPD).

M732.00 Flared End Section

Sheet 1 of 2 - Soft converted.

Sheet 2 of 2 - Soft converted. Pipe sizes hard converted.

M732.10 Safety Slope End Sections

Sheet 1 of 2 - Hard converted. Some views were rearranged.

Driveway edge of shoulder changed to Driveway Shoulder Point.

General Notes: Type 1 straps changed to Type 1 connectors,

Type 2 Rods and Lugs changed to Type 2 connectors.

Sheet 2 of 2 - Hard converted. The 600 mm to 525 mm pipes are

**left out of Bar Grate Table since they are covered in the ** note.
M806.02 Staple Placement for Plastic Netting
Hard converted.**

tea/kd