### General Standard Details

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<td>Metal Access Gate Details</td>
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NOTES

1. CENTER LINE PIPE ALLOWABLE RANGE: ± 30° FROM PERPENDICULAR, AND

2. NO PART OF PIPE SHALL PASS THROUGH ANY CORNER OF STRUCTURE AS DEFINED BY PROJECTION OF INTERIOR WALLS.

3. BENCH SIMILAR TO TYPE A MANHOLE SHALL BE BUILT INTO INLET WHERE DRAINS 24" AND LARGER RUN THROUGH INLET. SEE DETAIL D-3.00.
NOTES

1. Increase the size of each of the first three normal main vertical reinforcing steel bars on each side of the wall opening. New bar size shall be increased by at least 1/6 of the total area of the main reinforcing steel that has been cut.

2. When pipe size is over 3'-0", sufficient horizontal bars shall be added over and below opening to transfer load to adjacent full sections of wall.

3. In no case shall concrete cover be less than 2".

ELEVATION
Scale: None

DEPARTMENT OF PUBLIC WORKS
GENERAL DETAILS
REBAR ADJUSTMENT
AT OPENINGS IN CONCRETE WALLS

PLATE G-1A
NOTES

1. CR-6 OR CR-1 SHALL BE USED FOR THE TOP 10 FEET OF BACKFILL BELOW THE ROAD SUB-BASE. WHERE STRUCTURE IS LESS THAN 10 FEET IN DEPTH, THIS MATERIAL SHALL BE USED FOR THE FULL DEPTH OF STRUCTURE. WITH APPROVAL OF THE ENGINEER, RECYCLED CONCRETE MEETING CR-1 OR CR-6 GRADATIONS (RC-1 OR RC-6) MAY BE SUBSTITUTED.

2. EXCAVATION BELOW 10 FEET SHALL BE BACKFILLED WITH SUITABLE NATIVE MATERIAL OR COMMON BORROW AND SHALL BE FULLY COMPACTED TO SPECIFICATION.

3. THIS DETAIL SHALL APPLY TO ALL STORM DRAIN, WATER SUPPLY AND SANITARY SEWER STRUCTURES CONSTRUCTED WITHIN PUBLIC OR PRIVATE ROAD RIGHT-OF-WAY.

4. REFER TO SECTIONS 305.03.05 & 06 (PRECAST DRAINAGE STRUCTURES), 303.03.02 (PIPE CULVERT BEDDING), 1004.03.02(d) (VAULTS AROUND VALVES 16", 20", 24" & 30"), 1008.03.01 (SANITARY SEWER MANHOLES) AND 901.06 (RECYCLED CONCRETE FOR AGGREGATE).
NOTES

1. SEE STANDARD DETAIL PLATE G-4 FOR MANHOLE STEP SPECIFICATIONS, SPACING.

2. GRADE RING TO BE PLACED FLUSH WITH EDGES OF MANHOLE RISER OPENING.

3. REINFORCEMENT SHALL BE CONTINUOUS AROUND ENTIRE RING. MINIMUM CIRCUMFERENTIAL REINFORCEMENT PER A.S.T.M. C-478.

4. GRADE ADJUSTMENT RINGS SHALL BE MORTARED IN PLACE.

5. GRADE ADJUSTMENT RINGS SHALL BE ONE-PIECE EXCEPT AS NOTED: 2" THICK RINGS (24" & 30" INNER DIAMETER) AND 3" THICK RINGS (30" INNER DIAMETER ONLY) SHALL BE CONSTRUCTED AS TWO SEMICIRCULAR SEGMENTS.

6. USE 4500 psi CONCRETE (MIX #6) FOR ADJUSTMENT RINGS.
NOTES

1. Adjustable Riser Ring shall be used ONLY on paving overlay Contracts not involving utilities. Manhole adjustment otherwise required.

2. Adjustable Riser Ring shall be warranted free of defects in materials and workmanship for a period of 10 years. Defective units will be replaced in kind.

3. Adjustable Riser Rings will be certified to support HS–20 loads.

4. Paving overlay shall be flush with top of upper ring around entire circumference.

5. Use with portland cement concrete only with permission of Engineer.
NOTES

1. SEE STANDARD DETAIL PLATE C-4 FOR MANHOLE STEP SPECIFICATIONS, SPACING.

2. GRADE RING TO BE PLACED FLUSH WITH EDGES OF MANHOLE RISER OPENING.

3. ONE RUBBER GRADE ADJUSTMENT RING MAY BE USED WITH ONE PRECAST CONCRETE GRADE ADJUSTMENT RING (STD. DETAIL C-3).

4. RUBBER GRADE ADJUSTMENT RINGS SHALL BE SEALED TO THE CONCRETE (OR BRICK) STRUCTURE AND TO THE FRAME USING URETHANE-BASED SEALANT CONFORMING TO ASTM C 920-87, TYPE S, GRADE NS, CLASS 25, USE NT, M AND A (GNR TECHNOLOGIES CHEMEX CX-22 OR APPROVED EQUAL).

5. SEE PHYSICAL PROPERTIES TABLE FOR REQUIREMENTS FOR PRECAST RUBBER GRADE ADJUSTMENT RINGS.

6. CLEAN AND WIREBRUSH SURFACES CONTACTING RUBBER RING. APPLY SEALANT BEAD (NOTE 4) GENEROUSLY 1/2 INCH INSIDE OUTER EDGE OF CONTACT AREA & ALSO AS NECESSARY TO FILL IRREGULARITIES.

7. FOR EXISTING BRICK/BLOCK MANHOLES: REMOVE ALL LOOSE OR BROKEN BRICKS OR WEDGES USED IN ORIGINAL INSTALLATION. RE-MORTAR TOP SURFACE USING POLYMER MODIFIED NON-SHRINK PATCHING MATERIAL (OCTACRETE OR APPROVED EQUAL) TO PROVIDE SMOOTH, LEVEL TOP SURFACE. INSTALL SEALANT PER NOTE 6 AFTER PATCHING MATERIAL HAS CURED.

SECTION A-A

<table>
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<tr>
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<tr>
<td>(≥ 1 MPa)</td>
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<tr>
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</tr>
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<td>Compressive Deformation</td>
</tr>
<tr>
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<td>Freeze/Thaw When Exposed to De-Icing Chem. Cycles</td>
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<td>Compressive Strength retained</td>
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<tr>
<td>Tensile Str. Retained</td>
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<td>Elongation Retained</td>
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</table>
1. LADDER STEPS SHALL BE USED IN ALL MANHOLES, INLETS, JUNCTION BOXES, VALVE VAULTS, ETC., WHERE DEPTH MEASURED FROM STREET SURFACE TO INVERT (OR TOP OF BOTTOM SLAB) IS GREATER THAN 3 FEET, OR WHERE DIRECTED BY THE ENGINEER.

2. STEP SPACING (MEASURED VERTICALLY): 10 INCHES (MIN.) TO 14 INCHES (MAX.) APART, SPACED UNIFORMLY. 12 INCH STEP SPACING IS PREFERRED.
   MINIMUM 16 INCHES, MAXIMUM 32 INCHES BETWEEN FIRST STEP AND TOP OF MANHOLE OR GRATE FRAME. DO NOT INSTALL A STEP IN THE MANHOLE PRECAST ADJUSTMENT RING OR BRICK ADJUSTMENT AREA UNDER A MANHOLE OR GRATE FRAME.
   24 INCHES SPACING FROM LAST STEP TO BENCH OR BOTTOM OF STRUCTURE, AS APPLICABLE. BENCH MUST BE UNDER FULL WIDTH OF BOTTOM STEP IN ORDER TO BE CONSIDERED AS STRUCTURE BOTTOM.

   TREAD WIDTH: 10 INCHES MINIMUM
   EMBEDMENT DEPTH IN WALL: 3 INCHES MINIMUM
   END OF TREAD DESIGNED TO PREVENT FOOT FROM SLIDING OFF RUNG TO PROJECT 4 INCHES MINIMUM CLEAR FROM WALL, MEASURED AT EMBEDMENT.
   TESTING PER A.S.T.M. C 478 SECTION 13.6, LATEST EDITION.
   MATERIAL: POLYPROPYLENE-COATED DEFORMED STEEL OR APPROVED EQUAL. EXPOSED SURFACE TO BE FREE OF SHARP EDGES, SPLINTERS, BURRS OR OTHER HAZARDS.
   DETAIL DRAWINGS AND CERTIFIED LOAD TEST RESULTS TO BE SUBMITTED FOR APPROVAL.

4. WHERE BRICK CONSTRUCTION IS EMPLOYED, ADJUST MORTAR JOINTS TO ACCOMMODATE LADDER STEPS.

5. COPOLYMER POLYPROPYLENE ENCAPSULATED 1/2" DIAMETER STEEL REINFORCING BAR SHALL CONFORM TO ASTM A-615 GRADE 60.

6. COPOLYMER POLYPROPYLENE SHALL BE CERTIFIED BY THE MANUFACTURER TO CONFORM TO ASTM D 4101 AND HAVE A MINIMUM EXPOSED SECTION THICKNESS OF 1/8 INCH.

7. INSTALLATION SHALL CONFORM TO MANUFACTURER'S RECOMMENDATIONS.

8. TOP STEP SHALL PROJECT A MINIMUM OF 2 INCHES INTO THE ACCESS OPENING.

9. SEE STANDARD DETAIL G-4A FOR DRAWINGS AND DIMENSIONS OF LADDER STEPS FOR USE IN VARIOUS APPLICATIONS.
TYPE A STEP
FOR DRIVING INTO RECEP-TACLES CAST INTO WALL.

TYPE B STEP
FOR DRIVING INTO RECEP-TACLES CAST INTO WALL.

TYPE C STEP
FOR BRICK OR BLOCK INSTALLATIONS

TYPE D STEP
PRESS-FITTED INTO PRE-FORMED CONCRETE HOLES.

SEE DETAIL PLATE G-4 FOR PLACEMENT DIAGRAM AND NOTES.
NOTES:

1. UTILITY TRENCHES AND INSTALLATIONS OF GAS, ELECTRIC, COMMUNICATION AND CATV ARE TO BE MADE BY OTHERS.

2. STANDARD SHOWN IS BASED ON MINIMUM 10'-0" SPACING BETWEEN CURB AND PROPERTY LINE.

3. THIS STANDARD IS MANDATORY FOR FIVE OR MORE DWELLING UNITS.

4. "A" = 2'-6" FROM EDGE OF PAVED SHOULDER ON OPEN SECTION ROADS.
   = 2'-6" FROM FACE OF EXISTING OR PROPOSED CONCRETE CURB.
   = 3'-0" FROM FACE OF EXISTING OR PROPOSED BITUMINOUS CURB.
   = 4'-0" OR MORE FROM FACE OF CURB WHERE PARKING IS PERPENDICULAR.

5. ABOVE-GRADE UTILITIES ARE EXPECTED TO BE INSTALLED OUTSIDE THE HIGHWAY IN PRIVATE EASEMENTS OBTAINED FOR THAT PURPOSE. EXCEPTIONS WILL BE CONSIDERED ON A CASE-BY-CASE BASIS. TRAFFIC SAFETY (SIGHT DISTANCE AT INTERSECTIONS), PUBLIC CONVENIENCE AND COMMUNITY AESTHETICS ARE TO BE CONSIDERED.

6. MINIMUM COVER FOR PHASE TO PHASE DIRECT BURY SUPPLY CABLE: 24" (0-600V), 30" (601V-50kV) OR 42" (>50kV) PER NEC 35202.

7. MAINTAIN 12" MINIMUM CLEARANCE BETWEEN DIRECT BURY CABLES AND OTHER PARALLEL & CROSSING UTILITIES (NEC 353). MINIMUM CLEARANCE MAY BE REDUCED WHERE UTILITIES ARE INSTALLED IN ACCORDANCE WITH NEC 3540.
1. TREES WITHIN BALTIMORE COUNTY R/W REQUIRE DEPARTMENT OF PUBLIC WORKS APPROVAL. AN APPROVED LANDSCAPE PLAN IS RECOMMENDED FOR DEVELOPMENT PROJECTS.

2. TREE LOCATION: 8’ MINIMUM (ALONG CURB) FROM SANITARY HOUSE CONNECTION; 8’ MINIMUM (ALONG CURB) FROM WATERS SERVICE; 8’ MINIMUM FROM STORM DRAIN INLET OR PIPE.

3. APPROVED TREE ROOT BARRIER SHALL BE PRESENT AT ALL TREE LOCATIONS. IF NOT PLACED WHEN TREE IS PLANTED, IT SHALL BE PLACED WITH SUBSEQUENT SIDEWALK/UTILITY INSTALLATION. PROVIDE ROOT BARRIER ALONG NEAR EDGE OF SIDEWALK TO POINT 5’ ON EITHER SIDE OF TREE. USE 10 MIL PLASTIC SHEETING TO 12” DEPTH OR AN EQUIVALENT APPROVED BARRIER.

4. TREE SHALL BE PLACED 5’ (ALONG CURB) MINIMUM FROM JOINT IN CURB & GUTTER.

5. ENCASE SANITARY HOUSE CONNECTION (SEE STD. DETAIL PLATE C-8) IF H.C. MUST BE NEARER THAN SPECIFIED IN NOTE 2.

6. TREES APPROVED FOR USE SHALL:
   * BE 40’ TO 60’ IN HEIGHT AT MATURITY TO BE CONSIDERED A SUBSTANTIAL STREET TREE, BUT NOT SO LARGE THAT THEY OVERWHELM AVAILABLE SPACE.
   * HAVE PROVEN ABILITY TO WITHSTAND DRY URBAN CONDITIONS.
   * HAVE NON-AGGRESSIVE ROOT GROWTH, TO PROTECT CURBS, SIDEWALKS & SEWER HOUSE CONNECTIONS.
   * HAVE UPRIGHT, ASCENDING & COMPACT LIMB STRUCTURE. AT MATURITY, TREES MUST ALLOW FOR ACCEPTABLE SIGHT DISTANCE, MUST RESIST WIND & ICE BREAKAGE & MUST NOT CROWD THE VEHICLE - PEDESTRIAN ZONE.
   * NOT HAVE EXCESSIVE LITTER NOR BE EXCESSIVELY DIFFICULT TO CLEAN UP.

7. A LIST OF RECOMMENDED TREES FOLLOWS. OTHER TREES MAY BE USED BASED UPON NOTE 6 & WITH THE ENGINEER’S APPROVAL. SUBSTITUTIONS ONLY WITH ENGINEER’S APPROVAL.

   RED MAPLE (Acer rubrum) “Red Sunset”
   SUGAR MAPLE (Acer saccharum) “Legacy”
   HACKBERRY (Celtis occidentalis) “Hackberry”
   PRAIRIE PRIDE Magnolias
   KATSURATREE (Cercidiphyllum japonicum) “Autumn Blaze”
   WHITE ASH (Fraxinus americana) “Autumn Appliance”, “Autumn Blaze”
   GREEN ASH (Fraxinus pennsylvania) “Newport”, “Pattmore”, “Summit”, “Morshalls Seedless”, “Prairie Spar”
   GINKGO (Ginkgo biloba) “Magyar Upright”
   HONEYLOCUST (Gleditsia triacanthos inermis) “Skyline”

   LONDON PLANTETREE (Platanus x acerifolia) “Bloodgood”
   CHERRY (Prunus sargentii) “Sargent”
   PEAR (Pyrus calleryana) “Chanticleer”
   PIN OAK (Quercus palustris)
   NORTHERN RED OAK (Quercus rubra)
   SCHOLARTREE (Sophora japonica) “Princeton Upright”
   JAPANESE PAGODATREE (Sophora japonica) “Regent”
   LINDEN (Tilia americana) “Boulevard”, “Fastigiata”, “Redmond”
   Tilia cordata “Greenspire”“brand littleleaf”
   Tilia tomentosa “Green Mountain”“brand silver”
   Tilia x euchlora “Crimson King”
   ZELKOVA (Zelkova serrata) “Green Vase”, “Village Green”

Information about this list may be obtained from the County Landscape Architect.

DEPARTMENT OF PUBLIC WORKS
GENERAL DETAILS
PUBLIC ROAD UTILITY & STREET TREE LOCATIONS

NOTE A: MIN. COVER FOR PHASE TO PHASE DIRECT BURY SUPPLY CABLE: 24” (0-600V), 30” (601V-50kV) & 42” (>50kV). SEE NESC 35202.

NOTE B: MAINTAIN 12’ MINIMUM CLEARANCE BETWEEN DIRECT BURY CABLES AND OTHER PARALLEL & CROSSING UTILITIES (NESC 353). MINIMUM CLEARANCE MAY BE REDUCED WHERE UTILITIES ARE INSTALLED IN ACCORDANCE WITH THE PROVISIONS OF NESC 3540.

DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING/CONSTRUCTION
1-2-07

PLATE G-5A

ISSUED: OCTOBER 28, 1996
REVISED: AUGUST 1997
REVISED: SEPTEMBER 2006

DATE
## NOTES:

1. WHEN BOTTOM OF TRENCH IS IN ROCK, UNDERCUT 6" BELOW BOTTOM OF BARREL AND REPLACE WITH TAMPED SUITABLE MATERIAL.

2. WHERE TRENCH BRACING IS UTILIZED, ADDITIVES ARE PROVIDED FOR INCREASED TRENCH WIDTH & FINISHED PAVING PURSUANT TO THE SPECIFICATIONS.

3. GRADED AGGREGATE BASE SHALL BE PLACED UNIFORMLY AT THE SPECIFIED DEPTH OVER THE FULL WIDTH OF THE TRENCH.

### Pipe Diameter vs. Trench Width vs. Finished Paving Width

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### Bracing Additives

- **Single Tier**: ADD 24"  ADD 24"
- **Double Tier**: ADD 48"  ADD 48"

*16' TO INVERT OF PIPE*
NOTE

1. MINIMUM TRENCH WIDTH SHALL BE OUTSIDE DIAMETER OF PIPE PLUS 4" (2" ON EITHER SIDE OF PIPE). MAXIMUM TRENCH PAYMENT WIDTH PER STANDARD DETAIL G-6.

2. PIPE SHALL NOT BE ALLOWED TO MOVE DURING PLACEMENT OF FLOWABLE FILL. SUITABLE ANCHORING OR WEIGHTING SHALL BE PROVIDED TO PREVENT SUCH MOVEMENT.

3. TRENCH SHALL BE PLATED OVER DURING 24 HOUR CURING PERIOD.

4. DIMENSION "A" SHALL BE SUFFICIENT TO MATCH THE THICKNESS OF ADJACENT EXISTING BOUND PAVING WITHIN BOTH BALTIMORE COUNTY AND MARYLAND S.H.A. RIGHT OF WAY. DIMENSION "A" WITHIN MARYLAND S.H.A. RIGHT OF WAY SHALL BE A MINIMUM OF 9 INCHES AND A MINIMUM OF 3" WITHIN BALTIMORE COUNTY RIGHT-OF-WAY.

5. TACK COAT EDGE OF EXISTING HOT MIX ASPHALT PAVING IMMEDIATELY PRIOR TO PLACING SURFACE COURSE OVER TRENCH.

6. FLOWABLE FILL SHALL BE FURNISHED AND PLACED AS SPECIFIED IN SECTION 313, "FLOWABLE BACKFILL FOR UTILITY CUTS", IN THE "STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS".
### Repaving Quantities

**Graded Aggregate Base**
- 145 Lb./Cu.Ft.

**Hot Mix Asphalt**
- 150 Lb./Cu.Ft.

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<th>12 Inch Graded Aggregate Base (Tons / Linear Foot)</th>
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<td>0.037</td>
<td>0.075</td>
</tr>
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<td>8&quot;</td>
<td>0.218</td>
<td>0.037</td>
<td>0.075</td>
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<td>0.075</td>
</tr>
<tr>
<td>12&quot;</td>
<td>0.218</td>
<td>0.037</td>
<td>0.075</td>
</tr>
<tr>
<td>15&quot; &amp; 16&quot;</td>
<td>0.218</td>
<td>0.037</td>
<td>0.075</td>
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<td>18&quot;</td>
<td>0.254</td>
<td>0.044</td>
<td>0.084</td>
</tr>
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<td>20&quot; &amp; 21&quot;</td>
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<td>0.044</td>
<td>0.084</td>
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<td>24&quot;</td>
<td>0.290</td>
<td>0.050</td>
<td>0.094</td>
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</tr>
<tr>
<td>33&quot;</td>
<td>0.399</td>
<td>0.069</td>
<td>0.122</td>
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<tr>
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<td>0.399</td>
<td>0.069</td>
<td>0.122</td>
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<td>0.653</td>
<td>0.112</td>
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<td>0.725</td>
<td>0.125</td>
<td>0.206</td>
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<td>0.798</td>
<td>0.137</td>
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<td>0.834</td>
<td>0.144</td>
<td>0.234</td>
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<td>0.870</td>
<td>0.150</td>
<td>0.243</td>
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<td>0.943</td>
<td>0.162</td>
<td>0.262</td>
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<tr>
<td>108&quot;</td>
<td>1.015</td>
<td>0.175</td>
<td>0.281</td>
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**Bracing Additives**

- Single Tier: Add 0.145
- Double Tier: Add 0.290

---

**Department of Public Works**
**General Details**
**Payment Quantities for Repaving Trenches**

**Plate G-7**
### Concrete Quantities - Cubic Ft. Per Linear Ft.

<table>
<thead>
<tr>
<th>Pipe Diameter (D)</th>
<th>Low Cradle</th>
<th>High Cradle</th>
<th>Encasement</th>
</tr>
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<tbody>
<tr>
<td>6&quot;</td>
<td>0.94</td>
<td>1.38</td>
<td>2.15</td>
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<td>8&quot;</td>
<td>1.09</td>
<td>1.67</td>
<td>2.57</td>
</tr>
<tr>
<td>12&quot;</td>
<td>1.40</td>
<td>2.25</td>
<td>3.43</td>
</tr>
<tr>
<td>16&quot;</td>
<td>1.73</td>
<td>2.87</td>
<td>4.35</td>
</tr>
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<td>20&quot;</td>
<td>2.09</td>
<td>3.51</td>
<td>5.32</td>
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<td>15.9</td>
</tr>
<tr>
<td>48&quot;</td>
<td>6.6</td>
<td>12.3</td>
<td>18.4</td>
</tr>
</tbody>
</table>

1. \( CF/F = (W \times (0.333 + OD/4)) - 0.154 \times (OD)^2 \)
2. \( CF/F = (W \times (0.333 + (0.750 \times OD))) - 0.632 \times (OD)^2 \)
3. \( CF/F = (W \times (0.833 + OD)) - 0.785 \times (OD)^2 - 0.25 \times W \)

\( W = \) Cradle Payment Width (Trench Width)
\( W = O.D. + 2E \)

\( E = 9" \) for 6" to 24" Pipes
\( E = 12" \) for 27" to 36" Pipes
\( E = 15" \) for 42" to 72" Pipes

**NOTES:**

1. Quantities are for estimating only.
2. Quantities based on Ductile Iron Pipe.
3. Formulas shown may be used for pipe other than D.I.P and/or for sizes not shown.
TABLE A: STAIRWAYS

<table>
<thead>
<tr>
<th>Slope</th>
<th>Riser</th>
<th>Step Tread</th>
</tr>
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<tbody>
<tr>
<td>1.57:1</td>
<td>7&quot;</td>
<td>11&quot; Min.</td>
</tr>
<tr>
<td>2:1</td>
<td>6&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>4:1</td>
<td>4&quot;</td>
<td>16&quot;</td>
</tr>
</tbody>
</table>

Bars A to be equally spaced. For number of bars, see Table B.

* 1" Minimum per BOCA

TABLE B: NUMBER OF BARS

<table>
<thead>
<tr>
<th>NO. OF STEPS:</th>
<th>* N=1–5</th>
<th>N=6</th>
<th>N=7</th>
<th>N=8</th>
<th>N=9</th>
<th>N=10</th>
<th>N=11</th>
<th>N=12</th>
<th>N=13–25</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIDTH W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W=3</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>W=4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>11</td>
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<tr>
<td>W=5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

N indicates the number of steps exclusive of "Landing". For other widths, the approximate spacing of Bars A, in inches, will be equal to 80 / N with a minimum spacing of 6".

NOTES:

1. Concrete is Mix No. 2. Chamfers shall be 3/4" x 3/4".
2. Stair width W shall be in compliance with BOCA, latest edition, for means of egress stairway. Least dimension of landings shall not be less than req'd. width W of stairway, except 4' maximum for straight run between landings.
3. Reinforcing Steel per ASTM A-615.
   All reinforcement shall be No. 4 Bars, except Nosing Bars. Nosing Bars shall be No. 3 or No. 4 bars and shall be placed in all steps regardless of stair length. Bars A, B, and C shall be used in installations of six (6) or more steps.
4. Exposed surfaces shall receive an ordinary Surface Finish. Unless otherwise noted, all treads shall be finished with a lightly broomed finish.
5. For railing details, see "Ornamental Railing for Concrete Stairs", Plate G-12, or "Pipe Railing for Concrete Stairs", Plate G-10.
6. The stairs shall be paid for based upon the unit price bid per cubic yard for "Mix No. 2 Concrete for Steps and Miscellaneous Structures", complete in place.
7. Step treads and Landings shall be graded to drain, but in no case should grading exceed two (2) percent in any direction following curing and any settlement.
8. Tolerances: 3/16" Max. variation in depth of adjacent treads or in height of adjacent riser. 3/8" max. variation between largest & smallest riser or largest & smallest tread in any flight of stairs. At sloping public way serving as landing with established grade, bottom riser's height may vary 3 inches or less in 3 feet of stair width.

DEPARTMENT OF PUBLIC WORKS
GENERAL DETAILS

CONCRETE STAIRS

ISSUED: OCTOBER, 1977
REVISED: FEBRUARY, 1991
REVISED: AUGUST, 1997

PLATE G-9
NOTES

1. Unless otherwise noted, painted railing shall be furnished.

2. Railings and posts to be painted shall conform to A.S.T.M. Designation A-36. See painting notes.

3. Railings and posts to be galvanized shall conform to A.S.T.M. Designation A-441. Galvanized railings shall be hot-dip galvanized after fabrication.

4. Handrails are required for stairs with three (3) or more risers. Stairs having a step width of 40 inches or less shall have handrail on one side only, unless otherwise noted. Step widths greater than 5' require an intermediate handrail.

5. Railing shall be all welded, with all joints ground smooth and free of burrs.

6. Railing posts shall be set in 8” deep metal sleeves which shall be filled with hot poured lead or hot poured sulfur or an equivalent epoxy compound.

7. This handrail is to be used only for pedestrian protection. Use Traffic Barrier W-Beam where vehicular protection is required.

8. The railing shall be paid for at the Unit Price bid per Linear Foot, measured horizontally, for "Standard Pipe Railing" complete in place; or its cost shall be included in the Cubic Yard price bid for "Mix # Concrete for Steps & Miscellaneous Structures", complete in place.

PAINTING NOTES

STEP 1: Primer pretreatment conforming to Federal Specification MIL-P-15328 B (Formula 117 for metals)

STEP 2: One coat of SSPC Paint 25 Shop Coat

STEP 3: One coat of SSPC Paint 25 tinted – first field coat.

STEP 4: One coat of Gray Alkyd – second field coat.

STEP 5: A finish coat of black equipment enamel.
NOTES:

1. UNLESS OTHERWISE NOTED, PAINTED RAILING SHALL BE FURNISHED.

2. RAILING AND POSTS TO BE PAINTED SHALL CONFORM TO A.S.T.M. DESIGNATION A-36. SEE PAINTING NOTES, STD. PLATE G-10.

3. RAILING AND POSTS TO BE GALVANIZED SHALL CONFORM TO A.S.T.M. DESIGNATION A-441. GALVANIZED RAILINGS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.

4. RAILING SHALL BE ALL WELDED, WITH ALL JOINTS GROUND SMOOTH AND FREE OF BURRS.

5. RAILING POSTS SHALL BE SET IN 8" DEEP METAL SLEEVES WHICH SHALL BE FILLED WITH HOT Poured LEAD OR HOT Poured SULFUR OR AN EQUIVALENT EPOXY COMPOUND.

6. THIS HANDRAIL IS TO BE USED ONLY FOR PEDESTRIAN PROTECTION. USE TRAFFIC BARRIER W-BEAM WHERE VEHICULAR PROTECTION IS REQUIRED.

7. THE RAILING SHALL BE PAID FOR AT THE UNIT PRICE BID PER LINEAR FOOT. MEASURED HORIZONTALLY, FOR "STANDARD PIPE RAILING" COMPLETE IN PLACE; OR ITS COST SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR OTHER ITEMS, COMPLETE IN PLACE.

8. CONSTRUCTION ON PRIVATE PROPERTY SHALL CONFORM TO LATEST EDITION, BOCA NATIONAL BUILDING CODES.

9. WITHIN EACH 20 LINEAR FEET OF RAILING, PROVIDE FOR 1/4" EXPANSION.
NOTES


2. Unless otherwise noted, painted railing shall be furnished.

3. Railings and posts to be painted shall conform to A.S.T.M. Designation A-36. See painting notes.

4. Railing and posts to be galvanized shall conform to A.S.T.M. Designation A-441. Galvanized railings shall be hot-dip galvanized after fabrication.

5. Handrails are required for stairs with three (3) or more risers. Stairs having a step width of 30 in. or less shall have handrail on one side only, unless otherwise noted. Step widths greater than 5' require an intermediate handrail.

6. Railing shall be all welded, with all joints ground smooth and free of burrs.

7. Railing posts shall be set in 6" deep metal sleeves which shall be filled with hot poured lead or hot poured sulfur or an equivalent epoxy compound.

8. This handrail is to be used only for pedestrian protection. Use Traffic Barrier W-Beam where vehicular protection is required.

9. The railing shall be paid for at the Unit Price bid per Linear Foot, measured horizontally, for "Standard Ornamental Railing for Concrete Stairs", complete in place; or its cost shall be included in the price bid per Cubic Yard for "Mix #___ Concrete for Steps and Miscellaneous Structures", complete in place.

PAINTING NOTES

STEP 1: Primer pretreatment conforming to Federal Specification MIL-P-15328 B (Formula 117 for metals)

STEP 2: One coat of SSPC Paint 25 Shop Coat

STEP 3: One coat of SSPC Paint 25 tinted — first field coat.

STEP 4: One coat of Gray Alkyd — second field coat.

STEP 5: A finish coat of black equipment enamel.

RAIL SECTIONS

1-1/4" To 2" O.D. Steel Tubing OR Proprietary Handrail Moulding meeting BOCA 1022.2.5 - Shop Drawing Req'd. for Proprietary Items

1" x 1/2" x 1/8"

1/2" ■ Picket @ 0'-6" c/c
(Alternate Pickets Twisted)

3'-6" to 42' @ Landing
3'-4" to 39' @ Stairs

4" Maximum
Typical Post Spacing

Measurement for Unit Price Bid
per Linear Foot

RAIL ELEVATION

3'-4" to 39' @ Stairs

DEPARTMENT OF PUBLIC WORKS
GENERAL DETAILS

ORNAMENTAL RAILING FOR CONCRETE STAIRS

PLATE G-12
EXISTING GROUND

EXTEND BRICK OR FORMED CONCRETE TO TOP OF FRAME

LIMIT OF PAYMENT
STORM DRAIN MANHOLE
LIMIT OF PAYMENT
SANITARY MANHOLE

IMPROVED PROPERTY

EXTEND BRICK OR FORMED CONCRETE TO TOP OF FRAME

WATERTIGHT FRAME & COVER IN FLOODPLAIN

LIMIT OF PAYMENT
STORM DRAIN MANHOLE
LIMIT OF PAYMENT
SANITARY MANHOLE

1' MIN.

EXISTING GROUND

UNIMPROVED PROPERTY

TYPICAL MANHOLE
WHEN NOT IN ROADWAY
FRAME:

CLASS 35B CASTING
MODEL NO.
BE SPYD
XXX-XXX
MADE IN USA

FOUNDARY NAME
COUNTRY OF ORIGIN

MACHINED ON BEARING SURFACE

OPTIONAL FRAME STACKABILITY

NOTE: ALL DIMENSIONS ARE SHOWN IN ENGLISH AND [METRIC].

MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
FINISH: NOT PAINTED
FRAME WEIGHT: APPROXIMATELY 140 LBS MINIMUM
COVER: PER STANDARD DETAILS S-88 OR D-305B AS APPLICABLE.
ANCHOR BOLT HOLES: (4) 1" [25mm] ON 30 1/4" DIA. BOLT HOLE CIRCLE
ARE OPTIONAL

G-14
5'-6' I.D. MANHOLE BASE (TYP)

BENCH

SHAPED INVERT

SECTION A - A

4', 5', or 6' I.D. MANHOLE BASE (TYP)

BENCH

SHAPED INVERT

5'-6' I.D. MANHOLE BASE (TYP)

BRICK INVERT - SANITARY SEWER & STORM DRAINS

PRECAST OR CAST-IN-PLACE CONCRETE MANHOLE

DEPARTMENT OF PUBLIC WORKS
GENERAL DETAILS
INVERT PLANS
MANHOLES WITH LATERALS
PLATE G-15
MANHOLE LOCATION, SIZE AND DETAILS, CONCRETE & REINFORCING STEEL REQUIREMENTS, CENTERLINE RADIUS AND OTHER DETAILS SHALL BE IN ACCORDANCE WITH BEND STRUCTURE DETAILS D-4.01 AND D-4.02.

DEPARTMENT OF PUBLIC WORKS
GENERAL DETAILS
CONNECTION LOCATIONS
TO BEND STRUCTURES

PLATE G-16
1/4" PLATE (TYP.)

1 1/2"

6" X 8" WOOD

SECTION A - A

LATCH DETAIL - 1/4" THICK PLATE

SEE DETAIL G-17 FOR ACCESS GATE
NOTES

1. ALL CONCRETE TO BE MIX No. 2
2. ALL FOOTINGS TO BE POURED AGAINST UNDISTURBED EARTH.
3. STEEL PIPE SHALL MEET ASTM A-501; STEEL TUBING SHALL MEET ASTM A-500, GRADE B.
4. STEEL SHALL RECEIVE 1 COAT OF METAL PRIMER & 1 COAT OF METAL PAINT (GREEN, UNLESS OTHERWISE SPECIFIED).
5. OWNER SHALL SUPPLY LOCK & CHAIN FOR GATE.
6. BEFORE PLACING GATE ASSEMBLY, SURFACE OF 3" NOMINAL DIA. PIPE COLUMN SHALL BE COATED WITH GREASE.
7. POSTS SHALL BE FILLED WITH MIX #2 CONCRETE TO WITHIN 12" OF TOP OF POST.
8. DIRECTION OF GATE SWING TO BE AS SHOWN ON PLANS OR AS DIRECTED BY ENGINEER IN FIELD.

* THIS JOINT SHALL BE SMOOTH AND SQUARE TO ENSURE A PROPER BEARING SURFACE FOR THE FREE SWING OF THE GATE.