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REVISION OF SECTIONS 105 AND 608

DETECTABLE WARNINGS

Sections 105 and 608 of the Standard Specifications are hereby revised for this project as follows:

Subsection 105.03 shall include the following:

When corrective work is required for curb ramps, the Contractor shall submit a method statement in writing outlining the work to be performed. Corrective work for curb ramps shall not be performed until written approval has been received from the Engineer. All corrective work for curb ramps shall be at the Contractor’s expense.

Subsection 608.01 shall include the following:

This work includes the installation of detectable warnings on concrete curb ramps as shown on the plans.

Subsection 608.02 shall include the following:

Detectable warnings on curb ramps shall be truncated domes of the dimensions shown on the plans or on Standard Plan M-608-1 Curb Ramps.

The final surface shall meet the requirements given in R305 of the PROWAG.

The domes and their underlying surface shall contrast visually with adjacent gutter, street or highway, or pedestrian access route surface, either light-on-dark or dark-on light, per R305.1.3 of the PROWAG. The contrasting colors shall not be black and white. Unless specified otherwise in the Contract, the color of the domes and their underlying surface shall be yellow conforming to Federal Color Standard 33538. Material for the truncated domes shall be one of the following:

1. Embeddable Concrete or Masonry Pavers. The Contractor may use pavers upon written approval by the Engineer and with a signed maintenance agreement. Domes shall be prefabricated by the manufacturer as a pattern on concrete or masonry pavers. Pavers shall meet the requirements of ASTM C 902 or ASTM C 936. The paver contrast shall be achieved by adding pigment during the fabrication of the paver. Prior to the start of work, the Contractor shall submit appropriate documentation from the manufacturer verifying that the required contrast has been met, along with a sample plate to the Engineer for approval.

Bedding and joint sand for pavers shall be free of deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Limestone screenings or stone dust shall not be used. Sand for bedding material shall conform to ASTM C 33. Sand that is to be placed between joints shall conform to ASTM C 144.

1. Embeddable Surface Plates. The domes shall be prefabricated by the manufacturer as a pattern on embeddable surface plates. Plates shall be one of the plates allowed for use as detectable warnings listed on CDOT’s Approved Products List. Prior to the start of work, the Contractor shall submit appropriate documentation from the manufacturer verifying that the required contrast has been met, along with a sample plate to the Engineer for approval.
2. Detectable Warnings Fabricated On Site. Material for on-site fabrication of detectable warnings shall be a liquid-applied epoxy composed of resins, reactive monomers, pigments, glass beads, and fillers. The material shall be low-VOC compliant. The installed product shall have the following properties:

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REVISION OF SECTIONS 105 AND 608

DETECTABLE WARNINGS

**DETECTABLE WARNINGS FABRICATED ON SITE**

|  |  |  |
| --- | --- | --- |
| Property | Test | Requirement |
| Hardness | ASTM D 2240, Shore A | 80 minimum after 24 hours |
| Tensile Strength | ASTM D 638 | 125 psi minimum at break |
| Adhesion | ASTM C 482 | Concrete: 200 psi  Asphalt: Cohesive failure of substrate |
| Skid Resistance |  | Shall remain Firm, Stable , and Slip-Resistant regardless of weather conditions |

The color shall be integral to the material and shall be uniform throughout the domes and the underlying surface.

Subsection 608.03 shall include the following:

(g) *Detectable Warnings for curbs ramps.*

1. Pavers. Pre-fabricated pavers for detectable warnings shall be brought to the site in steel banded, plastic banded or plastic wrapped cubes capable of being transported by a fork lift or clamp lift. Pavers shall be carefully removed and stacked in a manner which results in the least amount of damage. All pavers that are damaged during transport or delivery will be rejected and shall be replaced at the Contractor’s expense. Minor cracks or chipping due to transport and handling that do not interfere with the structural integrity of the paver or the overall pattern of truncated domes will not be deemed as grounds for rejection.

The Contractor shall spread the bedding sand evenly in the area shown on the plans and shall screed the sand to an appropriate embedment depth as shown on the plans or as directed by the Engineer. Sufficient sand shall be placed to stay ahead of laid pavers.

Pavers shall be placed in a running bond pattern. Pavers shall be installed such that the base of the truncated dome is at the same elevation as the adjoining surface, allowing for a smooth transition between the curb ramp and the detectable warning.

When cut pavers are required to fill gaps between the pavers and the edge of concrete, the Contractor shall bevel portions of the truncated domes at a 45-degree angle to create a smooth transition between the partial dome and the curb ramp surface. Unless otherwise directed by the Engineer, pavers shall be cut and installed in such a manner that the domes on the cut sections will not significantly impact the overall pattern of the truncated domes.

The Contractor shall use a plate vibrator to embed the pavers into the sand. The size and type of plate vibrator shall be in accordance with manufacturer’s recommendations, or as directed by the Engineer. All pavers that are damaged during embedment shall be replaced at the Contractor’s expense.

Joint spacing between paver units shall be in accordance with the manufacturer’s recommendations, or as approved by the Engineer. Joints shall be filled completely with joint sand. Excess sand shall be removed by sweeping.

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REVISION OF SECTIONS 105 AND 608

DETECTABLE WARNINGS

1. Plates. Prior to installation of the plates, concrete conforming to subsection 608.02 shall be installed and consolidated as a base for the plates. The concrete shall be placed to a thickness that will allow the base surface of the plates to be at the same elevation as the adjacent concrete. The plates shall be embedded into the plastic concrete in accordance with the manufacturer’s specifications.
2. Detectable Warnings Fabricated On Site. The detectable warnings shall be installed by a trained installer approved by the manufacturer. The detectable warnings shall be installed in accordance with the manufacturer’s specifications. The general installation procedure shall be as follows:
3. Prepare the surface to receive the detectable warnings.
4. Apply the liquid material to the surface.
5. Apply the template for the truncated domes.
6. Apply the liquid material to the template.
7. Remove the template.

If the manufacturer of the detectable warnings fabricated on site provides a standard warranty, the Contractor shall obtain that warranty and submit it to the Engineer.

Subsection 608.05 shall include the following:

Detectable warnings on curb ramps, including sand, pavers, plates, liquid epoxy, and all other work and materials necessary for fabrication, transport, and installation will not be measured and paid for separately, but shall be included in the work.

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**INSTRUCTIONS TO DESIGNERS** (delete instructions from final draft)**:**

Use on projects having curb ramp construction. Use in conjunction with Standard Plan M-608-1, 10 sheets, dated May 3, 2019.