Specification for Citywide Trails Stabilized Decomposed Granite Pavement

- **1. General.** Decomposed Granite Pavement as indicated herein this section shall consist of a thoroughly pre-blended mixture (before placement) of Decomposed Granite Materials (fines) and Binder ("stabilizer"), that is, when reacted with water and compacted in place, creates a Stabilized Decomposed Granite Pavement surface.
- **A. Material Data.** Submit all available product data and manufacturing sources for each type of material and product listed herein this Article to the Engineer. All product data shall also include source, Manufacturer's and Distributor's name, address, and telephone numbers. Submit the following:
 - 1. Decomposed Granite Material.
 - 2. Stabilizer Binder.
 - 3. Soil Sterilizer
 - 4. PCC Header (applicable only to Circulation Element trails)
- **B. Samples.** Submit three (3) physical samples of each surfacing material and/or system herein to the Engineer. Submit samples of Decomposed Granite Material for approval to ensure color will be compatible with the Project. Each sample shall be clearly labeled in reseal able 1-gallon bags, and in a sufficiently large quantity (one (1) pound minimum per bag) that clearly illustrate the functional characteristics and full range of color and texture of the material.
- **C. Sieve Analysis.** Submit sieve analysis of each type of Decomposed Granite material to ensure it meets the proper grading requirements. Sieve analysis and coloring of the Decomposed Granite Material shall be approved, in writing, by the Engineer/Park Planner, before any material is delivered to the Project Site.
- **D. Material test Reports.** Submit certified copies of the field tests performed (testing the comprehensive strengths) of the Decomposed Granite Material.
- **E. Quality Assurance and Control.** Installer-provide evidence to indicate successful experience in providing decomposed granite or crushed 3/8" or 1/4" minus aggregate paving containing Stabilizer binder additive.
- **F. Source Limitations.** Obtain each type of Decomposed Granite Material from the same manufacturer's Plant.
- **G. Single-Source Limitations.** Obtain each color, type, and/or variety of the Decomposed Granite Material from a single source with resources to provide products and materials of consistent quality in appearance and physical properties without delaying the Work.
- **H. Field Constructed Mock-Ups.** Accepted Mock-Ups are a prerequisite to commencing Work under this section. Prior to the installation of any Work as Indicated herein this section, the Contractor shall erect Field-Constructed Mock-Ups for each type of Decomposed Granite Pavement to verify selections made under the Submittals Article and the to demonstrate

aesthetic effects as well as qualities of materials and execution.

Build Field Constructed Mock-Ups to comply with the following requirements, using materials and some base construction including special features for surface finish, compaction within lifts, color(s), and contiguous work, as indicated for the final unit of work.

Locate Field-Constructed Mock-Ups in a location and of the size indicated or, if not indicated, as directed by the Engineer.

Notify the Engineer, in writing, at least on (1) week in advance of the dates and times when Field-Constructed Mock-Ups will be erected.

Demonstrate quality and range of aesthetic effects and workmanship in the Field Constructed Mock-Ups that will be produced in the final unit of Work. Obtain the Engineer's acceptance of the Field-Constructed Mock-Ups, in writing, before the start of Work.

Each Field-Constructed Mock-Up in this section shall measure six (6') feet wide and eight (8') feet long, and at the equal thickness of the Decomposed Granite Pavement as indicated in the Contract Drawings and as provided herein, to compare the aesthetics of material colors, textures, and finishes.

Mobility Element Trails - Include an 8" depth, x 6" wide Cast-in-Place Concrete Header as part of the Mock-Up when construction of trails is part of roadway improvements.

Retain and maintain all Field-Constructed Mock-Ups during construction in an undisturbed condition. The Accepted Field-Constructed Mock-Ups shall be the standard for judging the completed work under this section.

When the Engineer determines that a Field-Constructed Mock-Up does not meet requirements, retain it for reference and create another Field-Constructed Mock-Up until the Field-Constructed Mock-Up is accepted by the Engineer.

When directed by the Engineer, the Contractor shall demolish and remove Field- Constructed Mock-Up samples from the Project Site.

I. Substitutions. Any pavement to be considered equal to the Decomposed Granite Pavement indicated herein this section shall be reviewed by the Engineer. Decomposed Granite Pavement with equal use characteristics produced by other Manufactures and/or Distributors may be considered, providing deviations in dimensional size, color, composition, operation, and/or other characteristics do not change the design concept, aesthetic appearance, or intended performance, as solely judged by the Engineer. The burden of proof on product equality is on the Contractor.

Obtain approval for all pavement options and/or substitutions, in writing, by the Engineer, prior to the Bid Date. No substitutions of Products indicated herein this section shall be allowed after the Bid Date.

2. Products

A. **Decomposed Granite Material.** Clean, hard, durable particles or fragments of minus select crushed granite, river rock, or basalt. Material fines shall be evenly mixed throughout the aggregate. When produced from gravel, fifty percent (50%) by weight of the material retained on a No.4 sieve shall have (1) fractured surface.

The portion retained on the No. 4 sieve shall have a maximum percentage of wear of 50 at 500 revolutions as determined by AASHTO T96-77. The portion passing a No. 4 sieve shall have a maximum liquid limit of 25 and a maximum plasticity index of 7 as determined by AASHTO T89-81 and AASHTO 90-81 respectively.

The Decomposed Granite Material shall be free from clay lumps, or any other deleterious material.

Grading Requirements:

Percentage of Weight Passing a Square Mesh Sieve AASHTO T11-82 and T27-82

Sieve Size	Percentage Passing	Sieve Size	Percent Passing
3/8"	100%	No. 30	40-50%
No.4	95-100%	No. 50	25-35%
No.8	75-80%	No. 100	20-25%
No. 16	55-65%	No. 200	5-15%

- B. **Stabilizer Binder:** A non-toxic, colorless, odorless, non-staining, concentrated organic powder that binds decomposed granite or crushed 3/8" or minus aggregate together, creating a natural-appearing, firm surface.
 - Material: "Versilock", Stabilizer Solutions, Inc., 205 South 28th St. Phoenix, AZ85034, (800) -336-2468, or approved equal.
 - Supplier: KRC Rock, 315 E Carmel St. San Marcos, CA 92069, 800-427-0572.
 - Application Rate: Per Manufacturer's written recommendations. Minimum application rate of 13 lbs/ton.
- C. **Concrete Header.** Concrete shall be class 520-C-2500P and conform to Section 201-1 Portland Cement Concrete.
- D. **Soil Sterilant.** Apply selective pre-emergence herbicide in accordance with the City of Carlsbad latest edition of the Integrative Pest Management Plan.

3. Execution

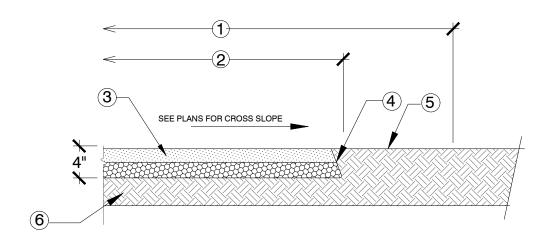
A. **Blending Stabilizer** - Blend 12-151bs of Stabilizer per ton of decomposed granite or crushed 3/8" or ¼" minus aggregate screenings. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed granite or crushed aggregate screenings. Blending shall be

performed at the batch plant that will supply both the aggregate and the stabilizer.

- B. Placement of Decomposed Granite Screenings or crushed 3/8" or %" minus aggregate screenings: Place aggregate in lifts and depths shown on standard drawings. Upon thorough moisture penetration, compact aggregate screenings to 95% relative compaction with a double drum roller (2-4 ton) or single drum roller (1000 lbs.) or vibratory plate tamp. Do not begin compaction for 6 hours after placement and moisture penetration. However, compaction must be completed within 48 hours of placement and moisture penetration.
- C. **Repairs and Protection** Remove and replace stabilized decomposed granite crushed 3/8" or ¼" minus aggregate paving that is damaged, defective or does not meet requirements of this section. Repairs can be made by the following steps:
 - 1. Rototill damaged area to the depth of the stabilized aggregate and square up side walls.
 - 2. If area is dry, moisten damaged portion lightly.
 - 3. Pre-blend the dry required amount of stabilizer powder with the proper amount of aggregate in a concrete mixer. (12 lbs. per ton)
 - 4. Add water to the pre-blended aggregate and stabilizer. Thoroughly moisten mix to 25 to 35 gallons per ton of pre-blended material to approximately 10% moisture content.
 - 5. Apply moistened pre-blended aggregate to rutted or excavated area to finish grade.
 - 6. Compact with a vibrating plate compactor or 1000 lb. drum roller. Keep traffic off areas for 12 to 48 hours after repair has been completed.
- D. **Maintenance** Remove debris, such as grass clippings, leaves or other materials by mechanically blowing or hand raking the surface as needed.

During the first year a minor amount of loose aggregate will appear on the surface (1/16" to %"). If this material exceeds a %" depth, redistribute the material over the entire surface. Water thoroughly to the depth of 1". Compact with power roller of no less than 1000 lbs.

If cracking occurs, simply sweep fines into the cracks, water thoroughly and hand tamp with an 8"-10" hand tamp plate.

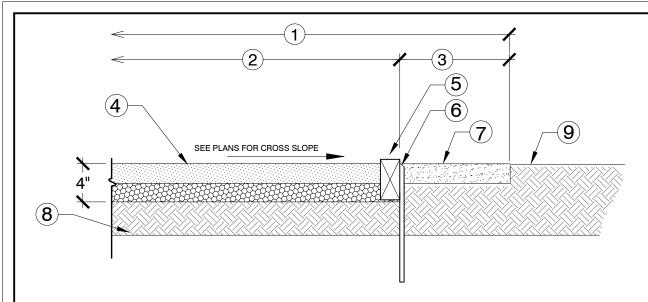


- 1 DEDICATED TRAIL EASEMENT (MAY VARY SEE PLANS)
- 2 TYPICAL WIDTH OF TYPE 1 NATURE TRAIL IS MINIMUM 2', OPTIMUM 4'. TRAIL WIDTH MAY VARY DEPENDING UPON LOCATION WITHIN OPEN SPACE.
- 3 LOCALLY OCCURRING MATERIAL: NATIVE SOIL, SAND OR CRUSHED ROCK; INSTALL IN TWO 2" LIFTS. COMPACT BETWEEN LIFTS IN ACCORDANCE WITH SPECIFICATIONS
- (4) DG TRAIL SHOVEL EDGE
- (5) FINISHED GRADE OF TRAIL SHALL MATCH EXISTING GRADES AT TRAIL EDGE
- (6) 90% COMPACTED NATIVE SOIL

- 1. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE FOR THE TRAIL WITH THE 2% MINIMUM CROSS SLOPE IN THE DIRECTION OF THE ESTABLISHED WATERSHED.
- 2. HORIZONTAL CLEARANCE TO BE NO MORE THAN 12" ON BOTH SIDES OF TREAD EDGE.
- 3. REFER TO CITY OF CARLSBAD TRAIL MASTER PLAN FOR MORE INFORMATION

CITY OF CARLSBAD

TYPE 1 - NATURE TRAIL

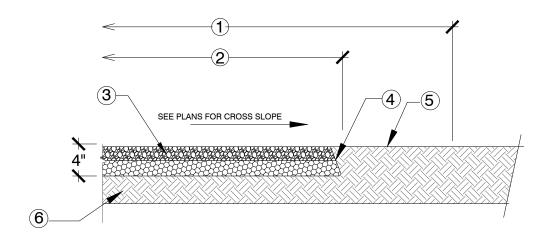


- 1 DEDICATED TRAIL EASEMENT (MAY VARY SEE PLANS)
- 2 TRAIL WIDTH TO BE MINIMUM 6', OPTIMUM 8'. TRAIL WIDTH MAY VARY DEPENDING UPON LOCATION WITHIN OPEN SPACE OR LANDSCAPED AREAS.
- 3 24" WIDE MULCH MAINTENANCE ZONE ON BOTH SIDES. NO IRRIGATION HEADS SHALL BE PLACED IN THIS ZONE. LOW GROUNDCOVERS 6" OR LESS MAY BE ALLOWED.
- 4 DECOMPOSED GRANITE WITH STABILIZER. COLOR SHALL BE BUFF OR TAN. SUBMIT SAMPLE TO OWNER FOR APPROVAL. INSTALL IN TWO-2" LIFTS. COMPACT BETWEEN LIFTS IN ACCORDANCE WITH SPECIFICATIONS.
- (5) 2" x 4" PRESSURE TREATED LUMBER FLUSH WITH TRAIL GRADE.
- 6 2" x 12", PRESSURE TREATED DOUGLAS FIR STAKE WITH 1" CHAMFER CUT. INSTALL 8' O.C. AND WHERE TWO BOARDS MEET
- 7 2" DEEP x 18" WIDE MULCH AREA OR OPEN SPACE, FLUSH WITH HEADER BOARD. 1/4" TOLERANCE
- (8) 90% COMPACTED NATIVE SOIL
- (9) FINISHED GRADE

- CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE FOR THE TRAIL. MIN. 2% CROSS SLOPE IN DIRECTION OF WATER SHED OR CROWNED FROM CENTERLINE OF TRAIL.
- 2. SPLICES AT JOINTS TO BE 1x4 REDWOOD
- NAILS TO BE GALVANIZED COMMON NAILS -NAIL AS REQUIRED FOR SOLID INSTALLATION.
- ON TURNS AND CURVES, BENDER BOARDS TO MATCH EDGING WIDTH (4" DEPTH) IN PLACE OF 2 X 4 SHALL BE USED.
- 5. A 24" WIDE MULCHED MAINTENANCE AREA ON BOTH SIDES OF TRAIL SHALL BE PROVIDED (OMIT IN NATIVE OPEN SPACE AREAS AND WHEN TRAIL IS NEXT TO LAWN AREAS).
- 6. MATERIALS AND METHODS FOR TRAIL CONSTRUCTION SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR CITYWIDE STABILIZED DECOMPOSED GRANITE PAVEMENT.
- 7. ALL DECOMPOSED GRANITE MATERIALS SHALL CONTAIN A STABILIZING ADDITIVE IN ACCORDANCE WITH THE SPECIFICATIONS.
- 8. TRAILS THAT ARE CONSTRUCTED ABUTTING, WALLS, DITCHES, CURBS, OR OTHER STRUCTURES, WILL NOT REQUIRE WOOD EDGING AT EDGE (S) THAT ARE ADJACENT TO SUCH STRUCTURES.

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TYPE 2 - RECREATIONAL TRAIL

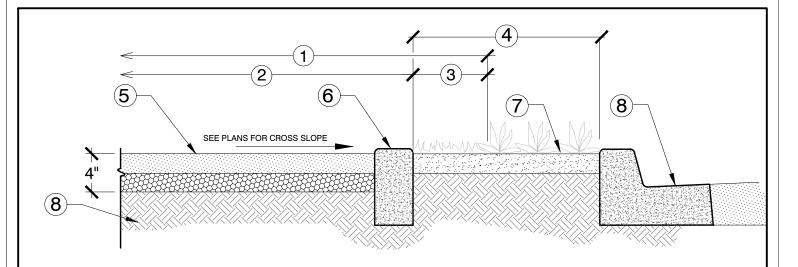


- 1 DEDICATED TRAIL EASEMENT (MAY VARY SEE PLANS)
- 2 WIDTH OF TYPE 3 TRAIL VARIES DEPENDING ON UTILITY AGENCY'S REQUIREMENTS.
- 3 CLASS 2 ROAD BASE INSTALLED IN TWO 2" LIFTS. COMPACT BETWEEN LIFTS IN ACCORDANCE WITH SPECIFICATIONS
- (4) SHOVEL EDGE
- (5) FINISHED GRADE OF TRAIL SHALL MATCH EXISTING GRADES AT TRAIL EDGE
- (6) 90% COMPACTED NATIVE SOIL

- IF UTILITY EASEMENT OR MAINTENANCE
 ACCESS ROAD ADOPTED FOR TYPE 3 TRAIL,
 FOLLOW OWNER'S SPECIFICATIONS FOR TRAIL
 CONSTRUCTION.
- 2. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE FOR THE TRAIL. MIN. 2% CROSS SLOPE IN DIRECTION OF WATER SHED OR CROWNED FROM CENTERLINE OF TRAIL.
- HORIZONTAL CLEARANCE TO BE NO MORE THAN 24" ON BOTH SIDES OF TREAD EDGE.
- 4. REFER TO CITY OF CARLSBAD TRAIL MASTER PLAN FOR MORE INFORMATION
- 5. THIS IS A GUIDELINE, CITY OF CARLSBAD TYPICALLY DO NOT DEVELOP THIS TYPE OF TRAIL, BUT MAY IMPROVE EXISTING UTILITY ROADBED WITH UTILITY AGENCY'S APPROVAL.

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TYPE 3 - UTILITY ROAD TRAIL

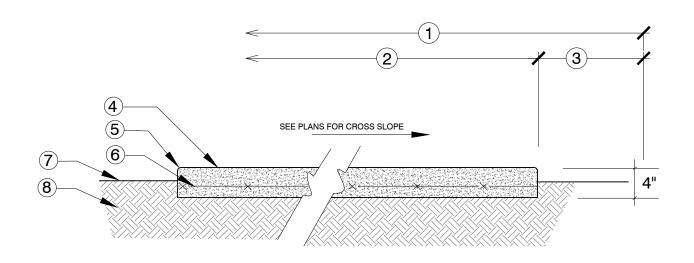


- 1 DEDICATED TRAIL EASEMENT BETWEEN 10' 14' WIDE (MAY VARY SEE PLANS)
- 2 TRAIL WIDTH BETWEEN 8'-12' WIDE. TRAIL WIDTH MAY VARY DEPENDING UPON LOCATION WITHIN OPEN SPACE OR LANDSCAPED AREAS.
- 3 24" WIDE MULCH MAINTENANCE ZONE ON BOTH SIDES. FLUSH WITH MOW CURB, 1/4" TOLERANCE; NO IRRIGATION HEADS SHALL BE PLACED IN THIS ZONE. LOW GROUNDCOVERS 6" OR LESS MAY BE ALLOWED.
- (4) MINIMUM 5' WIDE LANDSCAPE BUFFER FROM THE ROAD
- 5 DECOMPOSED GRANITE WITH STABILIZER. COLOR SHALL BE BUFF OR TAN. SUBMIT SAMPLE TO OWNER FOR APPROVAL. INSTALL IN TWO- 2" LIFTS. COMPACT BETWEEN LIFTS IN ACCORDANCE WITH SPECIFICATIONS.
- 6 6" WIDE x 8" DEEP CONCRETE CURB, COLOR TO MATCH DECOMPOSED GRANITE
- (7) FINISHED GRADE
- (8) ROAD CURB
- (9) 90% COMPACTED NATIVE SOIL

- CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE FOR THE TRAIL. MIN. 2% CROSS SLOPE IN DIRECTION OF WATER SHED OR CROWNED FROM CENTERLINE OF TRAIL.
- A 24" WIDE MULCHED MAINTENANCE AREA ON BOTH SIDES OF TRAIL SHALL BE PROVIDED (OMIT IN NATIVE OPEN SPACE AREAS AND WHEN TRAIL IS NEXT TO LAWN AREAS).
- 3. ALL DECOMPOSED GRANITE MATERIALS SHALL CONTAIN A STABILIZING ADDITIVE.
- 4. MATERIALS AND METHODS FOR TRAIL CONSTRUCTION SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR CITYWIDE STABILIZED DECOMPOSED GRANITE PAVEMENT.

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TYPE 4 - ROADSIDE TRAIL

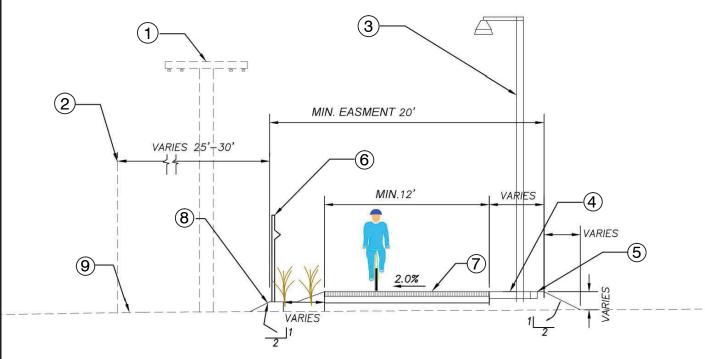


- 1 TRAIL EASEMENT AS SHOWN ON IMPROVEMENT AND GRADING PLANS
- 2 MINIMUM FIVE (5') WIDE CONCRETE SIDEWALK. SIDEWALK WIDTH MAY VARY DEPENDING UPON IMPROVEMENT PLANS.
- (3) PLANTED PARKWAY; STREET TREES PREFERRED FOR SHADE
- (4) CONCRETE FINISH TO MATCH EXISTING
- (5) 1" RADIUS ALL EDGES TYPICAL
- (6) 4x4 W.W.M. 1" MIN. COVER
- 7 FINISH GRADE; 2" ABOVE FINISH SURFACE OF PLANTING AREAS
- (8) COMPACTED SUBGRADE AND SUBBASE PER GEOTECHNICAL REPORT

- 1. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE FOR SIDEWALK. MIN. 2% CROSS SLOPE IN DIRECTION OF WATER SHED OR CROWNED FROM CENTERLINE OF TRAIL.
- MATERIALS AND METHODS FOR SIDEWALK CONSTRUCTION SHALL BE IN ACCORDANCE WITH LATEST GREENBOOK STANDARD SPECIFICATION.
- 3. SEE SAN DIEGO REGIONAL STANDARD DETAIL G-7 FOR REFERENCE

CITY OF CARLSBAD

TYPE 5 - SIDEWALK CONNECTOR

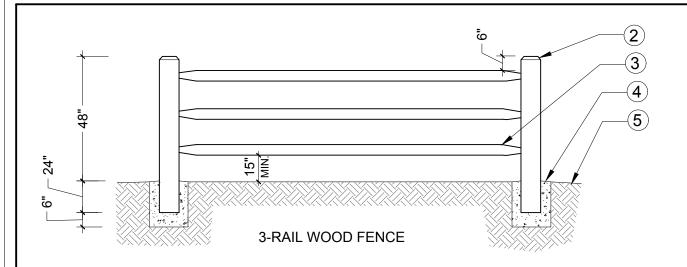


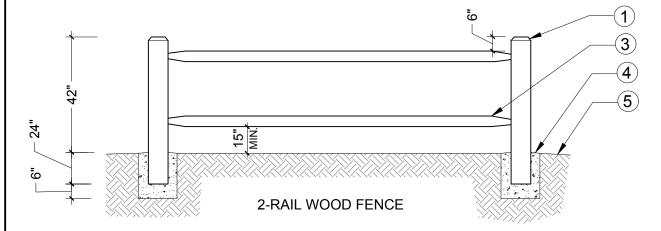
- 1 EXISTING OVERHEAD UTILITY
- 25' FOUL ZONE LIMIT
- (3) LIGHT POLE
- 4 DECOMPOSED GRANITE PATH
- (5) CONCRETE HEADER
- 6 FENCE
- (7) PAVED SURFACE (ASPHALT OR CONCRETE)
- (8) PROPOSED GRADE
- (9) EXISTING GRADE

- 1. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE FOR SIDEWALK. MIN. 2% CROSS SLOPE IN DIRECTION OF WATER SHED OR CROWNED FROM CENTERLINE OF TRAIL.
- MATERIALS AND METHODS FOR PAVED TRAIL CONSTRUCTION SHALL BE IN ACCORDANCE WITH LATEST GREENBOOK STANDARD SPECIFICATION.
- 3. COMPACTED SUBBASE AND SUBGRADE PER GEOTECHNICAL REPORT

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TYPE 6 - MULTI-USE TRAIL



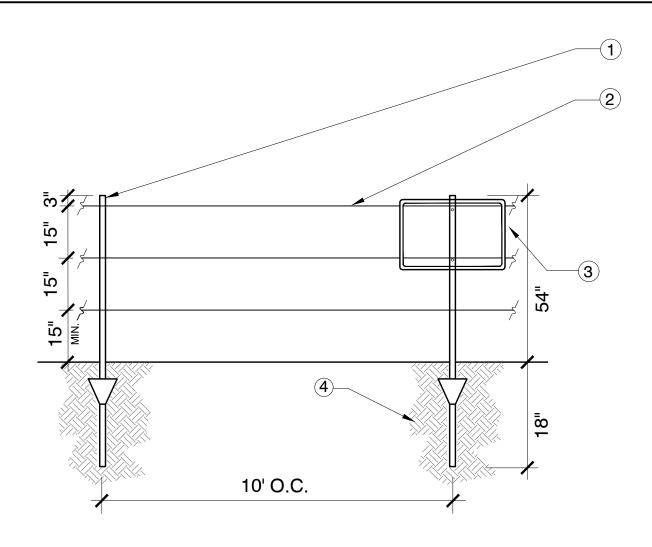


- 1 4 " DIAMETER ROUND POST WITH BEVELED TOP
- (2) 6" DIAMETER ROUND POST WITH BEVELED TOP
- (3) 3" DIA. ROUND PRESSURE TREATED WOOD RAIL
- (4) 12" DIAMETER CONCRETE FOOTING
- (5) FINISH GRADE

- . CONTRACTOR SHALL CALL DIG ALERT AND HAVE ALL UTILITIES MARKED PRIOR TO FENCE CONSTRUCTION OPERATIONS 2 DAYS BEFORE DIGGING. CALL DIG ALERT 1-800-422-4133
- PRIOR TO EXCAVATION OF ANY POST FOOTERS, CONTRACTOR SHALL STAKE FENCING LOCATIONS AND OBTAIN OWNER APPROVAL.
- 3. POSTS SHALL BE CENTERED IN CONCRETE FOOTING.
- 4. CROWN ALL CONCRETE FOOTINGS TO SLOPE @ 2% AWAY FROM POSTS.
- 5. BOTTOM RAIL SHALL BE MINIMUM 16" CLEAR FROM FINISH GRADE

CITY OF CARLSBAD

WOOD POST'N'RAIL FENCE

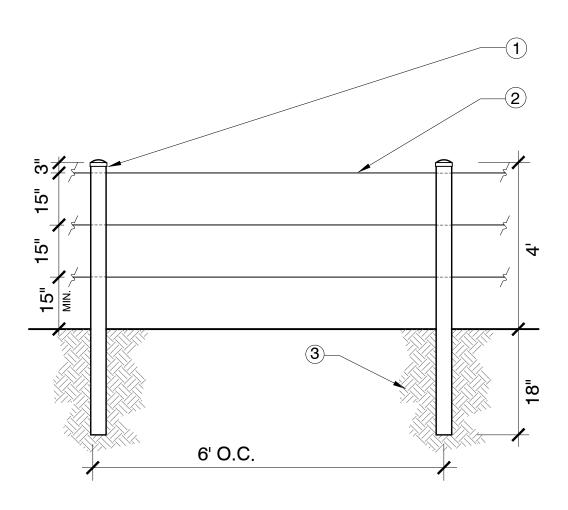


- 6' LONG METAL T-POSTS (TYP) W/ TOP 12" PAINTED FLUORESCENT YELLOW
- 2 THREE STRAND 9 GAUGE WIRE PULLED TAUGHT
- 3 ENVIRONMENTAL SIGNS (RIGHT). INSTALL SIGNS AT LOCATIONS SHOWN ON PLANS.
- (4) COMPACTED NATIVE SOIL

- PLACE POSTS AT 10' O.C. AND AT ALL VERTICES/CHANGES IN DIRECTION.
- ATTACH WIRE SECURELY TO EACH POST WITH 18 GAUGE GALV. WIRE OR APPROVED T-POST CLIP.
- 3. INSTALL 2' DEEP BY 12" DIAMETER CONCRETE FOOTER ON EVERY 10TH POST AND AT CORNERS WHERE FENCE MAKES A 90 DEGREE TURN OR OTHER SHARP TURN.

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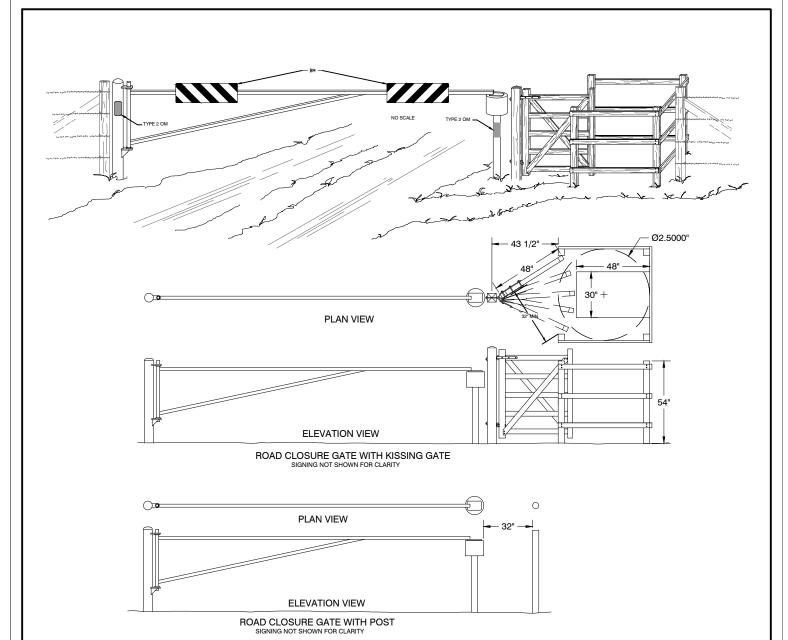
THREE-STRAND WIRE FENCE



- 1 2 \frac{3}{8}" NET POST, GALVANIZED & POWDER COATED BLACK, DQ SCHEDULE 20 PIPE; DRILL (4) \frac{1}{4}" PASS THROUGH HOLES ON EACH POST; 1 \frac{5}{8}" BLACK GALVANIZED, POWDER COATED BRACE AT THE END OF EACH POST
- 2 GALVANIZED & POWDER COATED WIRE, 7-STRAND; STAINLESS STEEL EYE BOLT AT ENDS;
- (3) COMPACTED NATIVE SOIL

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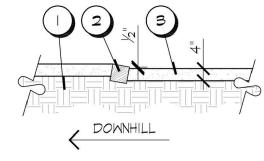
POST AND CABLE FENCE



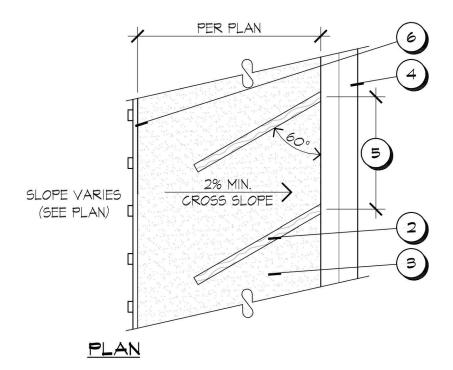
- 1 INSIDE DIMENSIONS ARE MINIMUM CLEAR DISTANCES REQUIRED TO MEET ACCESSIBILITY STANDARDS.
- 2 ROAD CLOSURE GATE MAY VARY FROM REGION TO REGION.
- 3 THESE DRAWINGS ARE TYPICAL DRAWINGS AND MAY REQUIRE MINOR MODIFICATION FOR INSTALLATION.
- 4 ALL TRAFFIC CONTROL DEVICES SHALL MEET EM 7100-15, FIGURE 3C-14 AND SECTION 3A.8.5 GATE AND CATTLEGUARD SIGNING.
- 5. TIMBER KISSING GATE ADOPTED FROM THE SCOTTISH NATIONAL HERITAGE TIMBER GATE.

CITY OF CARLSBAD

CHICANE WITH WHEELCHAIR ACCESSIBILITY



SECTION



- 1 90% COMPACTED SUBGRADE TREAT TOP OF SUBGRADE & FINISHED D.G. SURFACE W/ APPROVED PRE-EMERGENT GRANULAR HERBICIDE, INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
- 2 TIMBER DIVERTERS, 6x6 PRESSURE TREATED DOUGLAS FIR
- 3 4" DEPTH NATIVE SOIL OR DECOMPOSED GRANITE

- (4) TRAIL DITCH
- 5 TIMBER TIE SPACING:
 LONG SLOPE DISTANCE
 5-10% 50' O.C.
 10-15% 25' O.C.
 >15'% 20' O.C.
- (6) TRAIL EDGE WHERE APPLICABLE

CITY OF CARLSBAD

TRAIL WATERBAR