

**PUBLIC WORKS STANDARDS, INC. – GREENBOOK COMMITTEE  
MEETING AGENDA -  
MAY 17, 2022**

**Presiding:**

1. **Called to Order:**
2. **Self-Introduction:**
3. **Establish a Quorum:** (minimum 13 voting members, including 1 public utility member and 1 contractor)
4. **Distribute Agenda-** via TEAMS invite
5. **Approval of Minutes: April 21, 2022**
6. **Correspondence –**
  - Change No. 322 UM assigned to Portland Limestone Cement revision to 210-1.2.5
  - City of Long Beach Standard Plan 140 - Microtrenching
7. **Old Business:**
8. **New Business:**
  - a) APWA Co-Chairman’s Report: ..... Lance Grindle
  - b) Secretary’s Report: ..... Bill Mahoney
  - c) Vice Chair Communication Report: ..... Charles Chen
  - d) Vice Chair Editorial Report: ..... Charles Chen

**Greenbook Subcommittees:**

- e) Surface Materials and Methods Subcommittee Report: ..... Vinh Tran
- f) Underground Materials and Methods Subcommittee Report:..... Gean Na
- g) Standard Plans Subcommittee Report: ..... Temo Galvez / Alex Salazar
- h) General Provisions Subcommittee Report ..... Dan Peterson
- i) Editorial Standards Subcommittee Report ..... Charles Chen
- j) Greenbook Retention Subcommittee Report..... Edward Arrington
- k) Landscaping and Irrigation Subcommittee Report ..... David Gallaher

l) Street Lighting and Traffic Systems Subcommittee Report ..... Phil Phan / Irene Chia

m) Other New Business:

**9. General Discussion:**

**10. Next meeting: June 16, 2022**

**11. Adjourn:**

Proposed Revision To: <input checked="" type="checkbox"/> <b>Standard Specifications For Public Works Construction</b> <input type="checkbox"/> <b>Standard Plans For Public Works Construction</b>	<b>Change No.</b> <b>322 SM</b> <small>(ASSIGNED BY GREENBOOK COMMITTEE)</small>
Public Works Standards, Inc. c/o Associated General Contractors of California Los Angeles District Office 1906 West Garvey Avenue, Suite No. 100 West Covina, California 91760	<b>Date Proposal Received</b> <b>04/19/22</b> <small>(ASSIGNED BY GREENBOOK COMMITTEE)</small>
<b>Subsection or Standard Plan to be revised: 210-1.2.5</b> <b>On page(s): 58, 61, &amp; 64 (2021 Ed.)</b>	
<b>Warning:</b> Public Contract Code §3400 prohibits any local agency specification that limits bidding, directly or indirectly, to any one specific concern or product. If this revision describes a proprietary or patented product, it must identify other products which equally perform the functions of the proprietary or patented product.	
<b>Revision:</b> Add language to allow the use of blended cements under ASTM C595	
<b>Reason For Revision:</b> Blended cement including Portland Limestone Cement (PLC) under ASTM C595 “Standard Specification for Blended Hydraulic Cement,” can enhance sustainability, lower greenhouse gas emissions, and reduce the energy consumption associated with cement, while maintaining equivalent quality and performance of the concrete produced.  The California cement industry is committed to achieving carbon neutrality by 2045, consistent with the reality that urgent and aggressive emissions reductions are necessary to avoid the worst impacts of global climate change. Achieving this goal requires unlocking a diverse and flexible set of emissions reductions options. These options begin with the adoption and use of blended cement.  PLC substitution for OPC is the most significant improvement available to concrete sustainability with current technology. When OPCs with up to 5% limestone are replaced with PLCs containing 10% to 15% limestone, the resulting impact per million tons of cement produced equates to between 189,000 to 283,000 tons reduction of CO2 emissions. With approximately 10,000,000 tons of cement produced annually in California, the CO2 savings potential is enormous.  Caltrans has adopted blended cements as standard materials in their Revised Standard Specifications with the October 15 <sup>th</sup> , 2021 update. As cement producers transition to PLC and concrete producers transition to making concrete with blended cement, it will be important to have the cement specifications of the Greenbook and Caltrans aligned to ensure the continued availability of approved materials.	
Submitted By: <u>Concrete Ad-Hoc / Nathan Forrest</u> Phone No: <u>520-235-0480</u> Agency: _____ Address: _____	
<b>Instructions:</b> Use a separate form for each revision. Attach plain paper if more space is needed. For minor changes, copy present wording striking out words to be deleted and <u>underlining</u> new text. For major changes, rewrite or add paragraph or sections. All proposed revisions must include the reason(s) for the revision.	
<b>Subcommittee Action:</b> On _____ (Date) <input type="checkbox"/> Recommended For ___ Supplement/Edition <input type="checkbox"/> Rejected <input type="checkbox"/> As Modified	<b>Editorial Standards Subcommittee Review:</b> On _____ (Date) <input type="checkbox"/> Reviewed For Surf/Und/Spec/Plans Subcommittee <input type="checkbox"/> NO Modifications <input type="checkbox"/> As Modified
<b>Greenbook Committee Action:</b> On _____ (Date) <input type="checkbox"/> Approved For _____ Supplement/Edition <input type="checkbox"/> As Modified <input type="checkbox"/> Rejected	

## SECTION 201 - CONCRETE, MORTAR, AND RELATED MATERIALS

### 201-1 PORTLAND CEMENT CONCRETE.

#### 201-1.1 Requirements.

**201-1.1.1 General.** Concrete shall consist of cement, concrete aggregates, water, and when specified or approved for use, chemical admixtures, and/or SCMs, fibers, color, and/or reclaimed concrete material. Concrete shall be specified by class, alternate class, special exposure, or compressive strength.

Concrete specified by compressive strength shall be designed by the Contractor in accordance with 201-1.1.4.

Chemical admixtures shall be used in accordance with 201-1.2.4 and at the manufacturer's specified dosage rate. Additional cement or SCMs may be used to obtain high early strength in concrete, except that the total amount of cement shall not exceed 700 pounds per cubic yard ( $415 \text{ kg/m}^3$ ) unless otherwise approved by the Engineer.

Colored concrete shall conform to 303-7.

Fiber reinforcement shall conform to 201-2.3 and be added at the rate specified in the Special Provisions.

Reclaimed concrete material conforming to 201-1.2.6 may be incorporated into concrete mixtures when so specified in the Special Provisions or approved by the Engineer.

When concrete is specified by class, alternate class, or special exposure, a mix design shall be submitted to the Engineer for approval in accordance with 3-8.4. The mix design shall specify the proportions of aggregate, water, and when applicable, SCMs, chemical admixtures, and reclaimed concrete material. The mix design shall also include the gradation and source of aggregate, the type and source of cement and SCMs, the brand and designation of chemical admixtures, and slump requirement. If fiber reinforcement is to be added, the fiber type, fiber manufacturer, and rate of addition shall be included with the mix design. If so specified in the Special Provisions, the color manufacturer, amount of color, and the type of construction for which the concrete is to be used shall also be included with the mix design.

**201-1.1.2 Concrete Specified by Class and Alternate Class.** When the specified by class, concrete will be designated by a number, one or two letters, and a number. The first number is the weight of Portland Cement or Blended Cement conforming to 201-1.2.1 in pounds per cubic yard ( $\text{kg/m}^3$ ), the first letter is the combined aggregate gradation conforming to 201-1.3.2 and the second letter (W) designates the required use of a water reducing admixture conforming to 201-1.2.4. The last number is the minimum compressive strength at 28 Days in pounds per square inch (MPa). A water reducing admixture conforming to 201-1.2.4 may be used in any concrete specified by class and is required in all 4000 psi (28 MPa) compressive strength concrete specified by class.

When specified by alternate class, concrete will be designated by a number, three letters, and a number. The first number is the weight of cementitious material in pounds per cubic yard ( $\text{kg/m}^3$ ) which consists of 85 percent Portland Cement or Blended Cement conforming to 201-1.2.1 and 15 percent SCMs by weight. The first letter is the combined aggregate gradation, conforming to 201-1.3.2, the second letter (F) designates the required use of SCMs conforming to 201-1.2.5, the third letter (W) designates the required use of a water reducing admixture conforming to 201-1.2.4. The last number is the minimum compressive strength at 28 Days in pounds per square inch (MPa).

**201-1.1.3 Concrete Specified by Special Exposure.** Concrete specified by special exposure, shall be designated by a number, followed by 3 letters and a number. The first number is the minimum weight of cementitious material in pounds per cubic yard ( $\text{kg/m}^3$ ) as specified in Table 201-1.1.3. The first letter is the combined aggregate gradation conforming to 201-1.3.2. The second and third letters (LE, ME, or SE) designate the level of exposure (Low Exposure, Moderate Exposure or Severe Exposure). The last number is the minimum compressive strength at 28 Days in pounds per square inch (MPa).

Concrete specified by special exposure shall contain Class F fly ash conforming to 201-1.2.5 and a water-reducing admixture conforming to 201-1.2.4, and shall conform to the water-cementitious material ratio specified in Table 201-1.1.3.

Concrete specified by special exposure shall be proportioned in accordance with Table 201-1.1.3. Admixtures containing calcium chloride are prohibited for use in concrete exposed to sulfates. The level of exposure shall be as specified in the Special Provisions or shown on the Plans. A mix of a higher level of exposure may be substituted for a mix of a lower level of exposure.

Additional special exposure requirements shall be as specified in the Special Provisions or shown on the Plans. When specified, concrete exposed to other conditions, including freeze-thaw, contact with water, or corrosion protection, shall conform to the durability requirements of ACI 318.

**TABLE 201-1.1.3**

Special Exposure Mixes	Maximum Water - Cementitious Ratio <sup>2</sup>	Special Exposure U.S. Standard Measure (Metric Units)	Cementitious Material Requirement <sup>3</sup>
LOW EXPOSURE (LE) - Water-soluble Sulfate ( $\text{SO}_4$ ) in soil samples, % by mass, $0.10 \leq \text{SO}_4 < 0.20$  Dissolved Sulfate ( $\text{SO}_4$ ) in water samples, ppm, $150 \leq \text{SO}_4 < 1,500$	0.50	650-BLE-4000P <sup>1</sup> (385-BLE-28P <sup>1</sup> ) 650-CLE-4000P <sup>1</sup> (385-CLE-28P <sup>1</sup> ) 740-DLE-4000P <sup>1</sup> (440-DLE-28P <sup>1</sup> )	80% Type II or V Portland cement with 20% Class F fly ash or 80% Moderate or High Sulfate <u>resistant Blended cement with</u> <u>20% Class F fly ash</u>
MODERATE EXPOSURE (ME) - Water-soluble Sulfate ( $\text{SO}_4$ ) in soil samples, % by mass, $0.20 \leq \text{SO}_4 < 2.00$  Dissolved Sulfate ( $\text{SO}_4$ ) in water samples, ppm, $1,500 \leq \text{SO}_4 < 10,000$	0.45	658-BME-4500P <sup>1</sup> (390-BME-31P <sup>1</sup> ) 658-CME-4500P <sup>1</sup> (390-CME-31P <sup>1</sup> ) 815-DME-4500P <sup>1</sup> (480-DME-31P <sup>1</sup> )	80% Type V Portland cement with 20% Class F fly ash or 80% High Sulfate resistant Blended <u>cement with 20% Class F fly ash</u>
SEVERE EXPOSURE (SE) - Water-soluble Sulfate ( $\text{SO}_4$ ) in soil samples, % by mass, $\text{SO}_4 > 2.00$  Dissolved Sulfate ( $\text{SO}_4$ ) in water samples, ppm, $\text{SO}_4 > 10,000$	0.40	750-BSE-5000P <sup>1</sup> (450-BSE-35P <sup>1</sup> ) 750-CSE-5000P <sup>1</sup> (450-CSE-35P <sup>1</sup> ) 875-DSE-5000P <sup>1</sup> (520-DSE-35P <sup>1</sup> )	80% Type V Portland cement with 20% Class F fly ash or 80% High Sulfate resistant Blended <u>cement with 20% Class F fly ash</u>

- Concrete mixes followed by a "P" have been designed to accommodate placement by a concrete pump using a 4-inch line.
- Maximum slump is determined by placement conditions so long as water-cementitious ratio is not exceeded.
- Portland cement and Blended cement shall conform to 201-1.2.1. Class F Fly Ash shall conform to 201-1.2.5.3.

**201-1.1.6.2 Materials.** Materials shall consist of:

- a) Type II or Type V Portland cement conforming to 201-1.2.1, a, Type II, unless otherwise specified in the Special Provisions;
- b) coarse concrete aggregate conforming to 200-1.4, No. 4, unless otherwise specified in the Special Provisions;
- c) water conforming to 201-1.2.3;
- d) hydration stabilizing (Type B or D), air-entraining, and/or specific performance chemical admixtures conforming to 201-1.2.4;
- e) fly ash conforming to 201-1.2.5.3, the content shall be less than 25 percent;
- f) sand for Portland cement concrete conforming to 200-1.5.3; and
- g) reclaimed concrete material conforming to 201-1.2.6.

**201-1.1.6.3 Mix Design.** A mix design shall be submitted in accordance with 3-8.4. The minimum cementitious material content shall be 540 pounds per cubic yard (320 kg/m<sup>3</sup>). The fly ash content shall not be greater than 25 percent of the total weight of cementitious materials.

The mix design shall show the mix identification number and the applicable proportions, weights, and quantities of Portland cement, aggregate, water, and when specified or approved, fly ash, chemical admixtures, sand, and reclaimed concrete material. The mix design submittal shall also include the size and source of concrete aggregates, the type and source of Portland cement and fly ash, the brand and designation of chemical admixtures, the percent voids, and the intended type of construction.

## **201-1.2 Materials.**

**201-1.2.1 Cement.** Cement shall be:

**a) Portland Cement.** Portland cement shall be:

- 1) Type II or Type V Portland cement conforming to ASTM C150 and the optional requirements of ASTM C150, Table 2 for maximum equivalent alkalis (Na<sub>2</sub>O + 0.658K<sub>2</sub>O) of 0.60 percent.
- 2) Type III Portland cement conforming to ASTM C150 and the optional requirements of ASTM C150, Table 2 for maximum equivalent alkalis (Na<sub>2</sub>O + 0.658K<sub>2</sub>O) of 0.60 percent may be used when approved by the Engineer.

**a) Blended Cement.** ~~Blended cements shall be Type IP (MS) Portland pozzolan conform to ASTM C595, unless otherwise specified. Blended cements shall be Moderate Sulfate Resistant (MS) or High Sulfate Resistant (HS.) Type IP (MS) cement shall meet the optional mortar expansion requirements of ASTM C595, Table 2 and contain no more than 25 percent pozzolan. The alkali content in the cement portion of Blended cements must not exceed 0.60 percent by mass of alkalies as Na<sub>2</sub>O + 0.658 K<sub>2</sub>O when determined under AASHTO T 105. Maximum limits on pozzolan content do not apply.~~

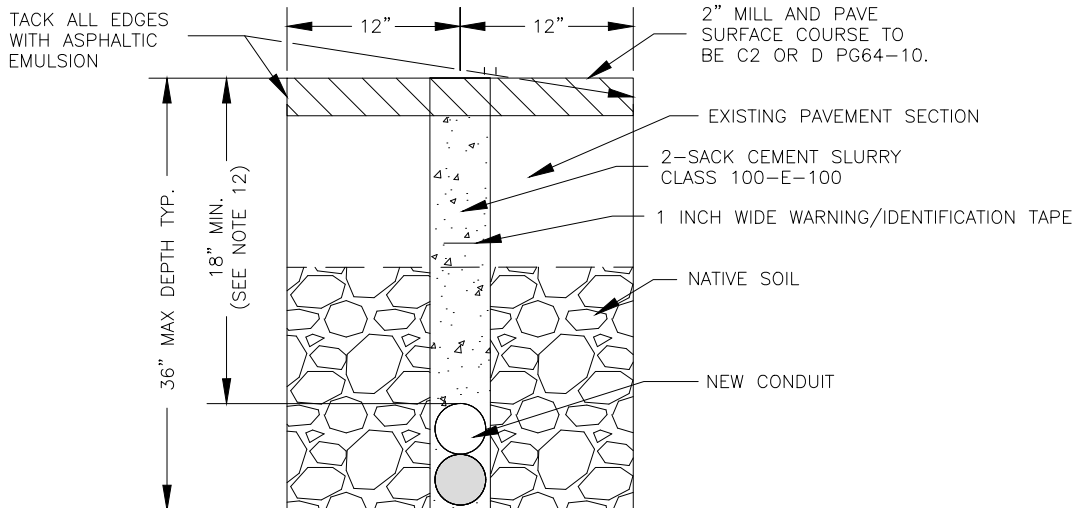
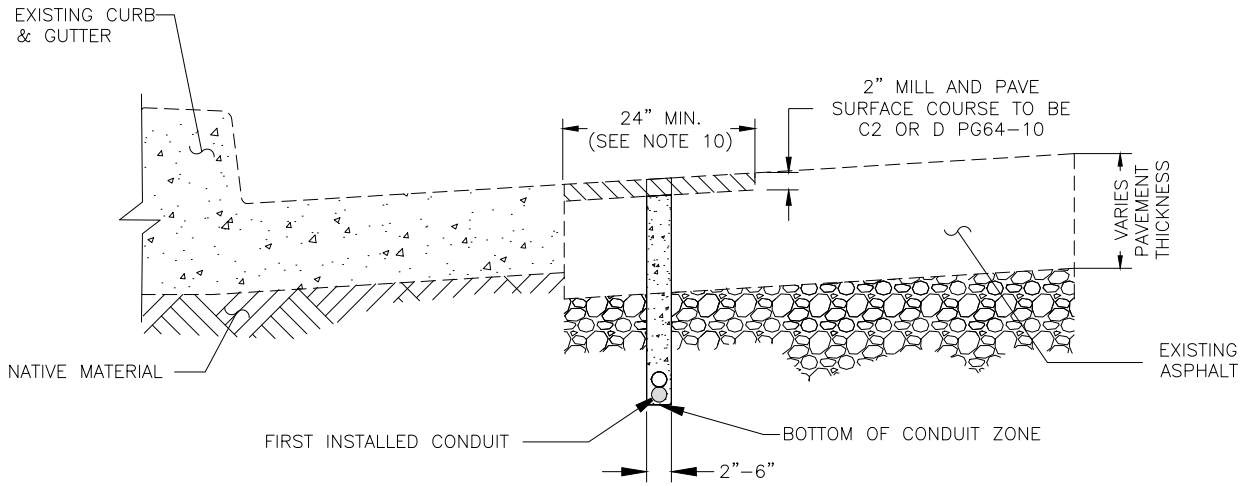
**b) Rapid Hardening Hydraulic Cement.** Rapid hardening hydraulic cement shall conform to ASTM C1600.

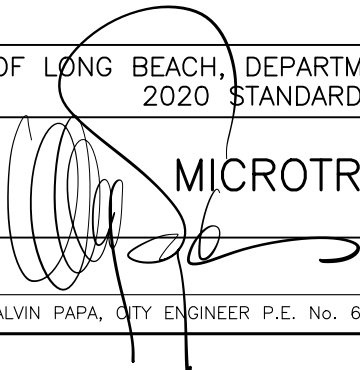
**c) Expansive Hydraulic Cement.** Expansive hydraulic cement shall conform to ASTM C845. Expansive hydraulic cement shall be used when specified and may be used when approved by the Engineer.

The Contractor shall furnish a Certificate of Compliance.

Cement shall be stored to protect against contamination and moisture. Should any cement show evidence of contamination or be otherwise unsuitable, the Engineer may reject it and require that it be removed from the site.

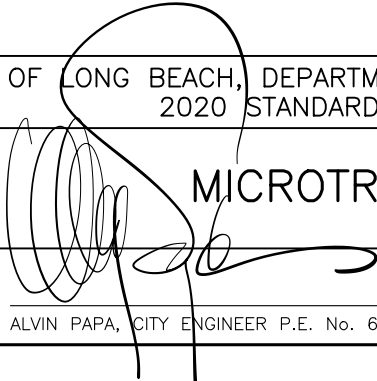
Cement used in concrete for any individual structure shall be of the same brand and type unless otherwise approved by the Engineer.



4		CITY OF LONG BEACH, DEPARTMENT OF PUBLIC WORKS 2020 STANDARD PLANS  <b>MICROTRENCHING</b>	STANDARD PLAN NO.
3			140
2			
1			
NO.	DATE	APPROVED BY: 	DATE: <u>Aug 18, 2020</u>
REVISIONS		ALVIN PAPA, CITY ENGINEER P.E. No. 68360	SHEET <u>1</u> OF <u>2</u>

NOTES:

1. PAVEMENT SURFACE RESTORATION NEAR BOTTOM OF ACCESS RAMPS SHALL BE FLUSH WITH THE EDGE OF GUTTER (NO LIP).
2. THE LOCATION OF MICRO TRENCH IN RELATION TO THE CURB AND GUTTER SHALL NOT DEVIATE ALONG IT'S ALIGNMENT UNLESS APPROVED BY THE CITY.
3. WHERE THERE IS NO EXPOSED OR VISIBLE CONCRETE GUTTER, THE NEW CONDUIT SHALL BE INSTALLED A MINIMUM 3 FEET FROM ROADWAY EDGE OUTSIDE WHEEL PATH OF TRAVEL.
4. IF MICRO-TRENCHING CONFLICTS WITH SPANDREL, CROSS GUTTER, OR PCC STREET PAVEMENT, THE ENTIRE SECTION SHALL BE REPLACED JOINT TO JOINT PER CITY OF LONG BEACH STANDARD PLAN, OR AS OTHERWISE APPROVED BY CITY ENGINEER.
5. CUTS SHALL BE STRAIGHT. EXISTING A.C. PAVEMENT WILL NOT REQUIRE SAWCUTTING WHEN USING ROCKWHEEL FOR EXCAVATION PROVIDED THAT A SMOOTH SURFACE IS PRODUCED.
6. INSTALLED APPROVED MARKING TAPE 3 INCHES ABOVE CONDUIT.
7. CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED, HAVE A MAXIMUM SLUMP OF 4 INCHES. FLY ASH MEETING THE REQUIREMENTS OF 201-1.2.5.3 MAY BE ADDED (NOT AS A SUBSTITUTE) TO THE MINIMUM CEMENT REQUIREMENTS. SLURRY COMBINED GRADING SHALL MEET REQUIREMENTS OF 201-1.3.2(A) GRADING D.
8. DROP TEST PER ASTM D6024 SHALL BE PERFORMED ON SLURRY AND ACHIEVE A MAXIMUM INDENTATION DIAMETER OF 3 INCHES PRIOR TO PLACEMENT OF ASPHALT CONCRETE. SLURRY PLACED IN NARROW TRENCHES WHERE BALL DROP TEST CANNOT BE PERFORMED SHALL BE CURED A MINIMUM OF 48 HOURS PRIOR TO PLACEMENT OF ASPHALT CONCRETE. PERMANENT RESURFACING SHALL BE COMPLETED IN NO MORE THAN 7 DAYS AFTER PLACEMENT OF CEMENT SLURRY.
9. DURING PLACEMENT, CONCAVE SLURRY SURFACE WITH A SHOVEL TO 1/2 INCHES -1 INCH DEPTH.
10. 2-SACK CEMENT SLURRY SHALL BE PLACED TO FINISH GRADE AND ALLOWED TO FULLY CURE BEFORE PERFORMING 2 INCH MILL AND PAVE.
11. MILL AND PAVE SHALL BE 24" WIDE MINIMUM, ON CENTER OF MICROTRENCH; 18" IS ALLOWABLE WHEN APPROVED BY CITY ENGINEER; LIMIT OF RESTORATION SHALL BE UP AGAINST EXISTING EDGE OF GUTTER OR CURB.
12. TOP OF NEW CONDUIT TO TOP OF MILL AND PAVE SHALL BE 18" MINIMUM; 12" MINIMUM ALLOWED IF 2" MINIMUM CLEARANCE CAN BE ACHIEVED BETWEEN BOTTOM OF PAVEMENT SECTION AND TOP OF CONDUIT. "PAVEMENT SECTION" SHALL INCLUDE ASPHALT CONCRETE AND SUBBASE SECTIONS.

4		CITY OF LONG BEACH, DEPARTMENT OF PUBLIC WORKS 2020 STANDARD PLANS  <b>MICROTRENCHING</b>	STANDARD PLAN NO.
3			
2			140
1			
NO.	DATE	APPROVED BY: 	DATE: <u>Aug 18, 2020</u>
REVISIONS		ALVIN PAPA, CITY ENGINEER P.E. No. 68360	SHEET <u>2</u> OF <u>2</u>