## *Submittal Review Response*

| | |
|---|---|
| **Project Name:** | ***Hilo WWTP Rehabilitation and Replacement Project Phase 1*** |
| **Submittal No.:** | ***02581-001.0*** |
| **Date:** | ***8/20/2025*** |

| | | | |
|---|---|---|---|
| **Client:** | County of Hawai‘i | **Carollo Project No.:** | 203975 |
| **Contractor:** | Nan, Inc. | | |
| **Submittal Name:** | Precast Electrical Structure Mix Design | | |
| **Reviewed By:** | Felicia Fan | | |

| **SUBMITTAL REVIEW** | | |
|---|---|---|
| Review is for general compliance with contract documents. No responsibility is assumed by Carollo for correctness of quantities, dimensions, and details. No deviation or variation is approved unless specifically addressed in these review comments. Refer to Section 01330 for additional requirements. The Contractor shall assume full responsibility for coordination with all other trades and deviations from contract requirements. | | |
| Approved | ☒ | No Exceptions |
| | ☐ | Make Corrections Noted - See Comments |
| | ☐ | Make Corrections Noted - Confirm |
| Not Approved | ☐ | Correct and Resubmit |
| | ☐ | Rejected - See Remarks |
| Receipt Acknowledged | ☐ | Filed for Record |
| | ☐ | With Comments - Resubmit |

**Review Comments:**

1. No comments.

☐ High Priority

# CONTRACTOR SUBMITTAL TRANSMITTAL FORM REV. A

| | | | |
|---|---|---|---|
| **Owner:** | County of Hawaii | | |
| **Contractor:** | Nan, Inc. | **Project No.:** | WW-4705R |
| **Project Name:** | Hilo WWTP Phase 1 | **Submittal Number:** | 02581-001.0 |
| **Submittal Title:** | Precast Electrical Structure Mix Design | ☐ For Information Only | |
| **TO:** | County | | |
| **From:** | Nan Inc. | | |

| **Specification No. and Subject of Submittal / Equipment Supplier** | | | |
|---|---|---|---|
| **Spec:** | 02581 | **Paragraph:** | 1.04 C B. 1 |
| **Authored By:** | Mass Electric | **Date Submitted:** | 6/12/2025 |

**Submittal Certification**

**Check Either (A) or (B):**

☑ (A) We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings with no exceptions.

☐ (B) We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings except for the deviations listed.

Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

**General Contractor's Reviewer's Signature:**

**Printed Name and Title:**

In the event, Contractor believes the Submittal response does or will cause a change to the requirements of the Contract, Contractor shall immediately give written notice stating that Contractor considers the response to be a Change Order.

**Firm:** **Signature:** **Date Returned:**

**PM/CM Office Use**

Date Received GC to PM/CM:

Date Received PM/CM to Reviewer:

Date Received Reviewer to PM/CM:

Date Sent PM/CM to GC:

Nan, Inc

PROJECT: HILO WWTP REHABILITATION AND REPLACEMENT PROJECT - PHASE 1

JOB NO. WW-4705R

THIS SUBMITTAL HAS BEEN CHECKED BY THIS CONTRACTOR. IT IS CERTIFIED CORRECT, COMPLETE, AND IN COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. ALL AFFECTED CONTRACTORS AND SUPPLIERS ARE AWARE OF, AND WILL INTEGRATE THIS SUBMITTAL (UPON APPROVAL) INTO THEIR OWN WORK.

DATE RECEIVED 6/12/2025
SPECIFICATION SECTION # 02581
SPECIFICATION Precase Electrical handholes
PARAGRAPH 1.04 C b 1
DRAWING N/A
SUBCONTRACTOR Mass Electric
SUPPLIER Island Ready-Mix
MANUFACTURER Jensen Precast

CERTIFIED BY CQCM or Designee :_____

Per pre-bid Question 133, Type IL is acceptable in lieu of Type II and Type V cement.

## SECTION 02581

## PRECAST ELECTRICAL HANDHOLES AND ELECTRICAL MANHOLES

### PART 1 GENERAL

### 1.01 SUMMARY

A. Design, fabricate, and install precast electrical handholes and precast electrical manholes of the size and type indicated on the Drawings and specified.
   1. Construction of cast-in-place concrete electrical structures, including handholes and manholes, are specified in other sections.

B. Section includes:
   1. Precast portland cement concrete handholes, manholes, and accessories.

C. Alternates:
   1. Contractor may propose to construct cast-in-place structures in lieu of the precast structures specified.
      a. Obtain Engineer's acceptance of this alternative before submitting, providing, or installing.
      b. Submit full information on design and detailing of proposed alternatives including design details and drawings of the same types required by this Section for precast structures.

### 1.02 REFERENCES

A. American Association of State Highway Transportation Officials (AASHTO):
   1. Standard Specifications for Highway Bridges.

B. American Concrete Institute (ACI):
   1. 318 - Building Code Requirements for Structural Concrete and Commentary.

C. ASTM International (ASTM):
   1. A48 - Standard Specification for Gray Iron Castings.
   2. C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
   3. C858 - Standard Specification for Underground Precast Concrete Utility Structures.
   4. C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.
   5. C1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
   6. C1037 - Standard Practice for Inspection of Underground Precast Concrete Utility Structures.

D. National Fire Protection Association (NFPA):
   1. National Electrical Code (NEC).

E. National Precast Concrete Association (NPCA).

F. Society of Cable Telecommunications Engineers (SCTE):
   1. 77 - Specification for Underground Enclosure Integrity.

G. Underwriters Laboratories (UL).

## 1.03 DEFINITIONS

A. Handhole: An enclosure for use in underground systems that has been sized and detailed to allow personnel to reach into, but not enter, the enclosure to install, operate, or maintain equipment or wiring or both. (Reference: NEC, Article 100.)
   1. As used in this Section, "handhole" will refer to a precast electrical handhole.

B. Manhole: An enclosure for use in underground systems that has been sized and detailed to allow personnel to enter the enclosure to install, operate, or maintain equipment or wiring or both.
   1. As used in this Section, "manhole" will refer to a precast electrical manhole.

C. Portland Cement Concrete: A composite material consisting of a Portland cement binder, water, admixtures, and a combination of fine and coarse mineral aggregates.

D. Precast Concrete: A concrete fabrication designed by a qualified engineer and subsequently fabricated at a qualified fabrication site, which is usually located some distance from the site where the fabrication will be installed.

## 1.04 SUBMITTALS

A. Product data: Manufacturer's catalog data, details, and warranties for the following items.
   1. Portland cement concrete handholes and manholes:
      a. Materials of construction.
      b. Joint details and joint-sealing materials.
      c. Data for hatches or covers and rings.
      d. Preformed channels and accessories for cable racking.
      e. Drain and sump details, including removable covers.
      f. Pulling iron details.

B. Shop drawings:
   1. Portland cement concrete handholes and manholes:
      a. Shop drawings for each structure shall bear the seal and signature of a professional engineer licensed in the state where the structures will be installed.
      b. Dimensioned and "to-scale" plans, sections, and details for each structure including:
         1) Layout plan for that structure.
         2) Sizes, locations, and vertical positions of duct bank windows and knockout panels.
         3) Locations and details for access openings, pulling irons, embedded cable supports and racks, and sumps.

4) Details of structural reinforcement showing bar size and spacing; true position of reinforcement in structural members with clear concrete cover at both inside and outside faces; location, bar size, and spacing of added reinforcement around openings; and other details relevant to design and fabrication of the structure.
5) Details of joints between adjacent precast sections, including provisions for overlap and for placement of sealants.

C. Design data:
1. Portland cement concrete handholes and manholes:
a. Structural calculations:
1) Submit complete structural calculations for each structure.
2) Provide calculations bearing the seal and signature of a professional engineer licensed in the state where the structures will be installed.
b. Manufacturer's statement of materials used for fabrication and construction, in accordance with ASTM C858, for record. Include the following:
1) Concrete mix design: For each concrete mix design to be used for the structures, include data describing:
a) Source and type of cement.
b) Sources, grading, and specific gravities of aggregates.
c) Aggregate reactivity data.
d) Concrete mix proportions and design strength.
e) Type, name, and dosage of mixtures included in the concrete mix.
2) Reinforcing steel: Mill certificates.

D. Test reports:
1. Portland cement concrete handholes and manholes:
a. Fabricator's tests for compressive strength of concrete used in structures, made in accordance with recommendations of ASTM C858.

E. Certificates:
1. Portland cement concrete handholes and manholes:
a. Manufacturer's current plant certification under NPCA for the structures to be supplied.
1) Certification shall be current and in-effect at the time structures are manufactured.
b. Manufacturer's certification that handholes and manholes are in accordance with the requirements of ASTM C858.

F. Manufacturer's instructions:
1. Instructions for handling and setting structures in place.
2. Portland cement concrete handholes and manholes:
a. Instructions for operation and maintenance of hatches.

G. Manufacturer's field reports:
1. Portland cement concrete handholes and manholes:
a. Manufacturer's inspection reports in accordance with ASTM C1037.

H. Closeout documents:
    1. Project record documents:
        a. Portland cement concrete handholes and manholes:
            1) Final, revised plans and details of as-constructed precast handholes and manholes if requested for record by the Engineer.
    2. Warranties:
        a. Manufacturer's standard warranty for:
            1) Portland concrete handholes and manholes and accessories.

## 1.05 QUALITY ASSURANCE

A. Qualifications:
    1. Designer:
        a. Portland cement concrete handholes and manholes:
            1) Professional engineer qualified in the design of concrete structures and holding a current license in the state where the structures will be installed.
    2. Manufacturer:
        a. Portland cement concrete handholes and manholes:
            1) Holding current NPCA plant certification for the products produced.
            2) Demonstrating at least 5 years of experience in the design, production, and installation of products of the type required for this Work.
            3) Capable of providing structural designs prepared by a professional engineer licensed in the state where the structures will be installed.
            4) Providing inspection during fabrication and handling in accordance with the requirements of ASTM C1037.
    3. Installer:
        a. Capable of providing equipment of adequate capacity and mobility to handle and set units with proper bearing on the subgrade and without damage to the unit.

## 1.06 DELIVERY, STORAGE, AND HANDLING

A. Packing, shipping, handling, and unloading:
    1. Package and brace structures to avoid damage during shipping and handling.
    2. Furnish crane or forklift for unloading and setting of portland cement concrete handholes and manholes.

B. Acceptance at site:
    1. Structures delivered to the site with cracks, damage, and damaged or missing accessories shall be removed from the site and replaced at no additional cost to the Owner.

C. Storage and protection:
    1. Store handholes and manholes and their appurtenances in areas protected from damage due to weather and site operations.

## 1.07 PROJECT SITE CONDITIONS

A. Operating environment: As specified in Section 01850 - Design Criteria

## 1.08 SEQUENCING

A. Coordinate installation of precast electrical handholes and manholes with duct banks specified in Section 16133 - Duct Banks.

## 1.09 WARRANTY

A. As specified in Section 01783 - Warranties and Bonds.

## 1.10 SYSTEM START-UP

A. As specified in Section 16050 - Common Work Results for Electrical.

# PART 2 PRODUCTS

## 2.01 MANUFACTURED UNITS - PORTLAND CEMENT CONCRETE HANDHOLES AND MANHOLES

A. General:
   1. Provide Portland cement concrete handholes and manholes configured and designed as indicated on the Drawings and specified.
   2. In accordance with ASTM C858 unless otherwise noted.
      a. Concrete: Provide units with minimum specified compressive strength (f'c) of 4,500 pounds per square inch and using Type V cement.

B. Manufacturers: One of the following, or equal:
   1. Oldcastle Precast.
   2. Jensen Precast.
   3. Hawaii Precast.
   4. Utility Vault Co.

C. Components:
   1. Floor:
      a. Construct floors as a monolith.
      b. Where sump or low-point drain is included, slope floor to that point.
   2. Roof, walls, and base:
      a. Designed and rated to support vehicle and pedestrian loads at the spans indicated.
      b. See the Electrical Handhole and Manhole Schedule indicated on the Drawings for required load rating by structure location.
   3. Access covers:
      a. Handholes: Aluminum plate hinged floor access door (hatch) as specified in Section 08320 - Floor Access Doors.
         1) Load rating:
            a) "Heavy Duty" for covers at locations designated for "Roadway" loads.
            b) "Medium Duty" or stronger for covers at locations designated for "Sidewalk" loads.
         2) Minimum access door size not less than 36 inches square, unless otherwise indicated on the Drawings.

3) Provide bearing surface with pre-installed continuous elastomeric gasket to minimize water infiltration at lid.
4) Provide skid-resistant lid with cast-in or machined-in grid pattern and the word "ELECTRICAL (TAG NO)" in block letters at least 1.5 inches high. Refer to Electrical Handhole and Manhole Schedule on the Drawings for Tag Number.
5) Provide 2-inch drain pipe from drain channel discharge to drain structure in the bottom of the manhole or handhole.

b. Manholes: Cast iron frame and cover:
1) Manhole rings and covers: As specified in Section 05500 - Metal Fabrications.
2) Provide skid-resistant lid with cast-in or machined-in grid pattern and the word "ELECTRICAL (TAG NO)" in block letters at least 1.5 inches high. Refer to Electrical Handhole and Manhole Schedule on the Drawings for Tag number.

D. Accessories:
1. Provide accessories as indicated on the Drawings and specified.
2. Materials at duct bank penetrations:
a. Joint filler as specified in Section 03150 - Concrete Accessories.
b. Backer rod and sealant as specified in Section 07900 - Joint Sealants.
3. Pulling irons:
a. Provide non-corroding cable pulling irons located for use with each current duct bank location and additional irons for use with duct banks that may be installed through future knockout panels.
b. Pulling irons may not be located on the floor.
c. Where pulling irons are installed on the wall, any pockets surrounding the irons shall have bottom surfaces sloped to drain.
d. Secure pulling eyes to structure reinforcement.
4. Cable racks and racking hardware:
a. Materials: Stainless steel as specified in Section 16070 - Hangers and Supports, unless noted otherwise on drawings.
b. Embedded slots: Maximum depth of 1.5 inches.
5. Sumps and drains:
a. As shown on the Drawings.
6. Exterior dampproofing:
a. As specified in Section 07110 - Dampproofing.
b. Field applied to wall and roof surfaces exposed to soil.

E. Fabrication:
1. Embeds:
a. Install embedded items with provisions for drainage to remove dripping or standing water, and to minimize corrosion.
1) Pulling irons may not be placed on the floor or in pockets that will collect water.
2) Detail bottom of cable rack channels to provide a downward sloping "sill" at the bottom of each vertical channel, so that the channel slot drains toward the floor.
b. Concrete cover:
1) Provide minimum 0.75-inch clear concrete cover between embeds and surrounding reinforcement.

2) Provide minimum 1.25-inch clear concrete cover between embed and exterior face of wall.

F. Tests and inspections:
1. Test and inspect structures in accordance with ASTM C858 and ASTM C1037.

## 2.02 DESIGN AND PERFORMANCE CRITERIA

A. General requirements for handholes and manholes:
1. As specified in Section 16050 - Common Work Results for Electrical for general requirements for electrical work.
2. Provide structures of the sizes and shapes indicated on the Drawings, with layouts, dimensions, and details as indicated on the Drawings and as specified.
3. Conform to the requirements of:
a. NEC.
b. Project regulatory requirements as specified in Section 01410 - Regulatory Requirements.

B. Portland cement concrete handholes and manholes:
1. Load resistance of boxes and covers.
2. Design requirements: Loads on structures:
a. In accordance with ASTM C857, except as modified in this Section.
b. Loads at the ground surface:
1) See "Electrical Handhole and Manhole Schedule" indicated on the Drawings for minimum surface loading requirements at each structure. Loads are designated as "sidewalk," or "roadway".
2) The vehicle and pedestrian loadings in the following paragraphs need not be additive; however, structures designated for "roadway" loading shall also support "sidewalk" loads.
3) "Sidewalk": Load from regular pedestrian traffic with considerations for occasional non-deliberate vehicular traffic:
a) Designation "A-0.3" in ASTM C857 Table 1 (300-psf uniform load).
4) "Roadway": Load from heavy, frequently repeated vehicle traffic:
a) Designation "A-16" in ASTM C857 Table 1 (AASHTO HS20-44).
c. Lateral earth pressure loads:
1) Determine in accordance with the following requirements. Include effects of groundwater and seismic accelerations on lateral earth pressures.
a) Equivalent lateral pressure: 60 pounds per square foot per foot of depth (lateral triangular distribution).
b) Surface surcharge load:
(1) Backfill-induced live load surcharge of 250 pounds per square foot (lateral uniform rectangular distribution).
(2) In accordance with ASTM C857 Vehicle Load Designation "A-16" for "Roadway" or "A-0.3" for "Sidewalk" where such surcharge exceeds backfill loads described in the preceding paragraph.

c) Groundwater effects:
(1) Include transient hydrostatic pressure, effects from groundwater and soils saturated by flooding to site finished grade elevation.
(2) Use equivalent lateral pressure of 122 pounds per square foot per foot of depth (triangular distribution) for soil below the design groundwater elevation.
(3) Groundwater effects do not need to be combined with seismic loads.
d) Seismic design:
(1) As specified in Section 01850 - Design Criteria.
(2) On opposite sides of the structure that are perpendicular to the direction of acceleration, include equivalent lateral pressure (rectangular uniform pressure distribution) of 29H in pounds per square foot, where "H" is the depth of structure from the ground surface.
(3) Apply seismic effects as additive force on side where the soil mass is being accelerated toward the structure, and as subtractive force on the opposite side where the soil mass is being accelerated away from the structure.

d. Groundwater and flood loads - buoyancy effects:
1) Design for site groundwater elevation taken at the level of finished grade around the structure.
2) Buoyancy: For groundwater and flood conditions, provide factor of safety against flotation of at least 1.20.
a) If the weight of soil overlying footing projections on the structure is considered to resist flotation, use a buoyant unit weight of soil equal to not more than 40 pounds per cubic foot.
b) Concrete fill may be provided in the bottom section of precast Portland cement concrete structures to add weight. Submit proposed details.

e. Net allowable soil-bearing pressure at base:
1) Maximum 3500 pounds per square foot pressure on prepared subgrade soils.

f. Lifting and handling loads:
1) Make provision in the design for the effects of loads or stresses that may be imposed on structures during fabrication, transportation, or erection.

g. Load combinations:
1) Design structures to sustain the specified loads individually or in combination.

3. Design requirements: Structural analysis, design, and detailing:
a. General:
1) Analyze and design structures including the effects of 2-way action ("plate action") and of load transfer around current and future openings.
2) Where structures include panels designed for future removal ("knockout panels"), design structures for loads and stresses with any combination of any or all such panels in place or removed.

b. Precast Portland cement concrete handholes and manholes:
    1) Design structures in accordance with the requirements of ACI 318 and this Section.
    2) Provide reinforcement at areas subject to tensile stress when loaded with the specified loads and combinations thereof.
    3) Provide temperature and shrinkage reinforcement to equal or exceed ACI 318 requirements in concrete sections.
    4) Provide minimum clear concrete cover over reinforcement at both interior and exterior faces of members in accordance with the following:
        a) Handholes: 2 inches.
        b) Manholes: 2 inches.
    5) Reinforcement details:
        a) Walls: For structures with wall thickness of 8 inches or less, locate a single mat of reinforcement at the center of the wall.
        b) Slabs: For structures with slab thickness of 7 inches or less, locate a single mat of reinforcement at the center of the slab.
        c) Structures with wall or slab thicknesses exceeding these limits shall have a reinforcement at each face of the member.
    6) Joints:
        a) Provide structures with watertight joints between sections and detailed to minimize water infiltration at duct bank and conduit penetrations.
        b) Provide structures with non-skid, shiplap or tongue and groove joints between sections.

4. Design requirements: Materials:
    a. Polymer concrete handholes:
    b. Portland cement concrete handholes and manholes:
        1) In accordance with ASTM C858.

## 2.03 MATERIALS

A. Cast-in-place concrete for fill at base sections of Portland cement concrete manholes with ballast to resist buoyancy shall be "Class A" concrete as specified in Section 03300 - Cast-in-Place Concrete.

# PART 3 EXECUTION

## 3.01 GENERAL

A. Furnish and install precast electrical handholes and manholes as indicated on the Drawings and specified.

B. Install additional handholes and manholes required so installation procedures will conform to cable manufacturer's pulling tension requirements.
    1. Include proposed locations and details of such additional handholes and manholes with the submittals under this Section.

## 3.02 PREPARATION

A. Design:
   1. Prepare detailed and scalable layouts for each manhole structure showing locations of conduit or duct bank penetrations, clearances, locations, and sizes of access openings and major accessories.

B. Protection:
   1. Where handhole and manhole structures are installed adjacent to existing site structures or utilities, provide excavation support or other protection as required to maintain those facilities in service and to prevent damage to both existing and new facilities.

C. Site preparation:
   1. Excavate and prepare exposed subgrade as indicated on the Drawings and as specified.
   2. Install and compact foundation layer as indicated on the Drawings and specified.
   3. Level foundation materials so that structures will be set plumb, and duct banks will be at proper grade and alignment.
      a. Install with uniform bearing on foundation materials.
      b. Wedging or blocking of base sections for leveling over the foundation materials will not be permitted.

## 3.03 INSTALLATION

A. General:
   1. Protect handholes and manholes from displacement, flooding, or flotation.

B. Portland cement concrete handholes and manholes:
   1. Install structures in accordance with ASTM C891 and the provisions of this Section.
      a. In the event of conflicts, the more restrictive provisions shall apply.
   2. Clean and prime joints between adjacent precast sections.
      a. Install sealing compound between sections and provide watertight joints.
   3. Set covers and hatches at elevations indicated on the Drawings.
      a. Securely attach frames to top of precast structures and grade adjustment rings.
   4. Penetrations:
      a. Holes for duct banks and other penetrations may not be cut into precast handholes and manholes unless they are located at designated locations shown on the shop drawings or at knockout panels cast into the structure during manufacturing.
      b. Carefully remove concrete from knockout panel areas with saws.
         1) Ensure that break-back does not extend beyond the designated limits of the knockout panel.
      c. Coat any reinforcement cut or exposed during removal of knockout panel sections with minimum 2 coats of high solids epoxy as specified in Section 09960 - High-Performance Coatings.
         1) Apply epoxy coating applied over and at least 1-inch past the perimeter of the reinforcement.

5. Install duct banks and conduit penetrations in accordance with the penetration details indicated on the Drawings.
    a. Place joint fillers, caulks, and sealants before coating exterior concrete surface with bituminous dampproofing.
6. Fill holes that were provided for handling or other temporary purposes with non-shrink cement grout using procedures as specified in Section 03300 - Cast-in-Place Concrete unless otherwise detailed by the manufacturer.
7. After structures are set and before backfilling, coat exterior below-grade surfaces (around the sidewalls, over the top slab, and around any vertical risers to grade) with 2 heavy coats of bituminous dampproofing as specified in Section 07110 - Dampproofing.
    a. Apply dampproofing in accordance with the coating manufacturer's instructions and at a rate of 40 to 60 square feet per gallon per coat.
    b. Mask over at least 1 inch back from joint caulks or sealants and prevent dampproofing from coming in contact with those materials.
8. Backfill handholes and manholes as indicated on the Drawings and as specified in Section 02300 - Earthwork.

C. Site tolerances:
1. Set electrical handholes and manholes plumb and true at locations indicated on the Drawings.
2. Tolerances on placing:
    a. Horizontal location: Plus or minus 1 inch.
    b. Vertical elevation: Plus or minus 1/2 inch.
    c. Plumb: Plus or minus 1/8 inch over 10 feet.

## 3.04 REPAIR/RESTORATION

A. Repair cracks or blemishes in concrete as described in Section 03300 - Cast-in-Place Concrete or by methods acceptable to the Engineer. Submit proposed repairs for acceptance before commencing work.

## 3.05 ADJUSTING

A. After final grading is complete, adjust access covers to grade.

## 3.06 CLEANING

A. Before installation of cables in any duct banks and handholes or manholes, remove concrete spoil, forms, debris, silt, dust, and other foreign material.

B. Pressure wash interior of structures if required to provide clean interior surfaces.
1. Block drains and provide pumps to remove washwater from structures.
2. Do not permit washwater to drain into subgrade soils.

## 3.07 SCHEDULES

A. See Drawings for Electrical Handhole and Electrical Manhole Schedule.

END OF SECTION

mass. electric construction company

**Submittal No.:** MEC-NAN-02581-DD03502

# SUBMITTAL

**Contractor:** Mass Electric Construction Co. **DATE:** 6/11/2025

**Company:** Nan Inc.

**Project Reference:** Hilo Wastewater Treament Plant (WWTP) Rehabilitation and Replacement Project Phase 1

MEC Job No. 106330 **HI DEM No:** WW-4705R

**Sent To:** **Nan Inc.**
Attn: Mark McCarthy
161 Silva Street
Hilo, HI 96720
Phone: (808) 232-5041

**Transmittal Type:**
- [X] Product Data
- [ ] Test Report
- [ ] Method of Procedure
- [ ] Certificates
- [ ] Design Drawings/Calcs
- [ ] Other

**Transmittal For:**
- [X] Approval
- [ ] Information Only
- [ ] Final Record

**Submittal Description:**

| Line | # Copies | Description | Spec Reference |
|---|---|---|---|
| 1 | 1 | Precast Electrical Structure Mix Design - Standard | 02581 1.04 C. b. 1. |
| | | | |
| | | | |
| | | | |
| | | | |

**Comments:**

Per pre-bid Question 133, Type IL is acceptable in lieu of Type II and Type V cement.

**Mass Electric Construction Co.**

Darrin Lee - Project Manager — 6/11/2025 (Date)

**DISPOSITION:**
- [ ] PROCEED
- [ ] REVISE AND RESUBMIT - Work may proceed subject to incorporation of changes indicated
- [ ] DO NOT PROCEED - Change as noted and resubmit
- [ ] DATA ACCEPTED AS INFORMATION ONLY

**Comments:**

**Nan Inc.** _____

Authorized Representative — Date

Island Ready-Mix Concrete, Inc.
91-047 Hanua Street • Kapolei, Hawaii 96707 • Phone 808-682-1305 • Fax 808-682-4478

Submittal # M24-292 Version 1
11/19/2024

Customer ID: 1754
Customer Name: JENSEN PRECAST
Customer Contact: JAIME KATSUTANI
Subject: Concrete Mix Design Submittal

Project Name: VARIOUS PROJECTS
Project Contact: JENSEN PRECAST

The following mix designs for use on the above project are being submitted for your approval.
Please return one copy of the design. APPROVED _____ DISAPPROVED _____

NOTE: Island Ready Mix Concrete reserves the right to adjust the proportions of materials in the mix designs as required to produce concrete meeting the job specifications and strength class specified when evaluated per ASTM C-94 Alternate 2 or ACI 318.

Remarks: The mixes may be modified to maintain yield, slump, setting time and strength. Prior to unloading, a maximum of two (2) gallons of water per cubic yard, may be added provided that the specification limits for slump, w/c and time are not exceeded as allowed by ASTM C94.

| Mix Code | Mix Description | Spec Workability |
|---|---|---|
| CP422955 | 6500 PSI 3/4" & 3/8" HRWR 8.5 SK | 23"-29" |

To avoid confusion, order by PRODUCT CODE, MIX DESCRIPTION and SLUMP. Concrete ordered without the approval will be the contractor's responsibility.
Return copy of the Mix Design-Cover Letter marked approved or not approved with your comments.

Sincerely,

Noel Camama
Concrete Technician

Island Ready-Mix Concrete, Inc.
91-047 Hanua Street * Kapolei, Hawaii 96707 * Phone 682-1305 * Fax 682-4478

# Concrete Mix Design Submittal

Date : 11/19/2024 **No. M24-292** **Version 1**

Mix Code : **CP422955** Description : **6500 PSI 3/4" & 3/8" HRWR 8.5 SK**

| | | | Design | Tolerance |
|---|---|---|---|---|
| Customer | JENSEN PRECAST | Air Content | 1.7 | ±1.5% |
| Contact | JAIME KATSUTANI | Slump | 23"-29" | |
| Project Name | VARIOUS PROJECTS | Design Strength | 6500 | psi |
| Project Contact | JENSEN PRECAST | Unit Weight | 154.7 | lb/ft3 |
| Usage/Placement | | W/C Ratio | 0.32 | |

| Material Type | Description | Source Supplier | Specific Gravity | Blend % | Design Quantity | Volume (ft3) |
|---|---|---|---|---|---|---|
| Coarse Aggregate | HC&D PEA GRAVEL - A4208 | HC&D HAWAII-KAPAA | 2.76 | 15.1 | 470 lb | 2.730 |
| Fine Aggregate | HC&D CONC SAND- A6031 | HC&D HAWAII-KAPAA | 2.67 | 37.6 | 1172 lb | 7.030 |
| Coarse Aggregate | HC&D #3 FINE 3/4" - A4211 | HC&D HAWAII-KAPAA | 2.76 | 35.2 | 1098 lb | 6.380 |
| Fine Aggregate | ORCA STRATUM - A6041 | BRITISH COLUMBIA-VANCOUVER | 2.79 | 12.2 | 380 lb | 2.180 |
| Cement | TYPE IL CEMENT - H105 | HAWAIIAN CEMENT -HAWAIIAN CE | 3.14 | 100.0 | 799 lb | 4.080 |
| Admixture | MASTERPOZZ 322N | Master Builders Solutions-MBCC | - | | 0-56 lq o | - |
| Admixture | MasterGlenium 7920 | Master Builders Solutions-MBCC | - | | 0-64 lq o | - |
| Admixture | VMA 362 | Master Builders Solutions-MBCC | - | | 0-64 lq o | - |
| Water | CHILL WATER | BOARD OF WATER SUPPLY-BOARI | 1.00 | | 31.0 gal | 4.140 |
| Water | WATER | BOARD OF WATER SUPPLY-BOARI | 1.00 | | 0.0 gal | 0.000 |
| Admixture | CarbonCure | CarbonCure Technologies, Inc.-Carbo | - | | 0-32 lq o | - |
| | | | **Air Content** | | **1.70 %** | **0.460** |
| | | | **Yield** | | **4178 lb** | **27.000** |

MASTERPOZZOLITH 322N: 0.0 To 7.0 lq oz Per 100 lb of Cementitious
MASTERGLENIUM 7920: 0.0 To 8.0 lq oz Per 100 lb of Cementitious
MASTERMATRIX VMA 362: 0.0 To 8.0 lq oz Per 100 lb of Cementitious
CARBON DIOXIDE: 0.0 To 4.0 lq oz Per 100 lb of Cementitious

| Sieve Size | Coarse A4208 %Passing | Coarse A4211 %Passing | Combined Coarse %Passing | Fine A6031 %Passing | Fine A6041 %Passing | Combined Fine %Passing | Combined %Passing |
|---|---|---|---|---|---|---|---|
| **1-1/2"** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **1"** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **3/4"** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **1/2"** | 100.0 | 61.0 | 72.7 | 100.0 | 100.0 | 100.0 | 86.4 |
| **3/8"** | 98.0 | 27.0 | 48.3 | 100.0 | 100.0 | 100.0 | 74.3 |
| **No. 4** | 24.0 | 3.0 | 9.3 | 100.0 | 98.6 | 99.7 | 54.8 |
| **No. 8** | 5.0 | 1.0 | 2.2 | 94.0 | 96.7 | 94.6 | 48.7 |
| **No. 16** | 3.0 | | 0.9 | 57.0 | 94.5 | 65.9 | 33.6 |
| **No. 30** | | | 0.0 | 32.0 | 88.0 | 45.3 | 22.8 |
| **No. 50** | | | 0.0 | 16.0 | 60.3 | 26.5 | 13.3 |
| **No. 100** | | | 0.0 | 7.0 | 20.5 | 10.2 | 5.1 |
| **No. 200** | | | 0.0 | 2.8 | 5.0 | 3.3 | 1.7 |

Aggregate gradation in conformance with ASTM C33.

*Slump/Spread : 23"-29"

DOT 4-151
(HWY-LQ r7/96)

# MIX DESIGN FOR PORTLAND CEMENT CONCRETE

(Approval of mix design by Q.A. Engineer required prior to usage in concrete work)

TO: QUALITY ASSURANCE ENGINEER
HIGHWAY DIVISION – HDOT

DATE: 11/19/2024

FROM: JENSEN PRECAST

PROJECT NO. _____ PROJECT: VARIOUS PROJECTS

Class: 6500 PSI 3/4" & 3/8" HRWR concrete will be supplied by ISLAND READY_MIX CONCRETE, INC.
Name of Supplier

Prod. Code: CP422955

DESIGN WEIGHTS PER CUBIC YARD

| Material | A4208 | A6031 | A4211 | A6041 | H105 | CH2O | Total |
|---|---|---|---|---|---|---|---|
| Source | HC&D | HC&D | HC&D | ORCA | HWNCMT | BOW | |
| SSD Weight Lbs. | 470 | 1172 | 1098 | 380 | 799 | 259 | 4178 |
| Specific Gravity | 2.76 | 2.67 | 2.76 | 2.79 | 3.14 | 1.00 | |
| Absolute Volume, cu.ft. | 2.73 | 7.03 | 6.38 | 2.18 | 4.08 | 4.14 | 27.00 |
| Moisture % | 2.70 | 4.70 | 3.00 | 4.20 | | | |
| Absorption % | 3.20 | 4.60 | 2.20 | 1.60 | | | |
| Correction % | -0.50 | 0.10 | 0.80 | 2.60 | | | |
| Correction Lbs. | -2.35 | 1.17 | 8.78 | 9.88 | | -17.48 | |
| Batch Wt. Lbs. | 468 | 1173 | 1107 | 390 | 799 | 241 | 4178 |

Admixture(s) & Dosage:
MASTERPOZZOLITH 322N @ 0.0 to 7.0 lq oz per 100 lb of Cementitious, MASTERGLENIUM 7920 @ 0.0 to 8.0 lq oz per 100 lb of Cementitious, MASTERMATRIX VMA 362 @ 0.0 to 8.0 lq oz per 100 lb of Cementitious, CARBON DIOXIDE @ 0.0 to 4.0 lq oz per 100 lb of Cementitious

Design Data:

Slump (in) 23"-29" Air (%) 1.7±1.5% Unit Weight(pcf) 154.7 W/C Ratio(lb/lb) 0.32

Remarks: Aggregate gradation in conformance with ASTM C33.

*Slump/Spread : 23"-29"

By: Noel Camama
Supplier's Representative

By: JAIME KATSUTANI
Prime Contractor

HAWAIIAN CEMENT
A subsidiary of Knife River Corporation

Hawaiian Cement - Cement Division
99-1300 Halawa Valley Street
Aiea, Hawaii 96701
Phone: (808) 673-4200 Fax: (808) 441-7692
www.hawaiiancement.com

## PORTLAND LIMESTONE CEMENT CONFORMING TO ASTM C595/C595M-21 TYPE IL (8.22) SCG Bangkok Thailand

| Physical properties | Unit | Specification | Test Results | Test Method |
|---|---|---|---|---|
| Air content of mortar | % | 12 Max | 7.9 | ASTM C 185 |
| Autoclave expansion | % | 0.80 Max | 0.03 | ASTM C151/C151M |
| Blaine | cm2/g | 3800-4800 | 4540 | ASTM C 204 |
| Mass density | g/cm3 | A | 3.14 | ASTM C 188 |
| Heat of Hydration | J/g(cal/g) | ** | 301 | ASTM C1702 |
| Mortar Bar Expansion | % | < 0.020 | 0.004 | ASTM C1038 |
| Sulfate Resistance | % | 0.10 Max *** | 0.07 | ASTM C1012 |
| | | | | |
| | | | | |
| **Compressive Strength** | | | | |
| 3 days | PSI/MPa | 1890 (13.0) | 5170 (35.6) | ASTM C 109/C109M |
| 7 days | | 2900 (20.0) | 5810 (40.0) | |
| 28 days | | 3620 (25.0) | 7090 (48.9) | |
| **Time of setting (Vicat)** | | | | |
| Initial set | Minutes | 45 Min | 130 | ASTM C 191 |
| Final set | | 420 Max | 195 | |
| **Retained content on** | | | | |
| .+Sieve 45µm | % | 10.0 Max | 1.3 | ASTM C 430 |
| **Chemical properties** | | | | |
| MgO | % | A | 1.54 | ASTM C114 |
| SO3 | % | 3.0 Max* | 2.8 | |
| Loss on ignition (LOI) | % | 10 Max | 4.6 | |
| Insoluble Residue | % | A | Mill Cert-0.24 | |
| Limestone in cement | % | 5.0-15.0 | 8.22 | |
| CaCO2 in Limestone | % | 70 or > | 98.40 | |
| SiO2 | % | A | 19.6 | |
| AI203 | % | A | 3.7 | |
| Fe203 | % | A | 2.9 | |
| CaO | % | A | 65.7 | |
| K2O | % | A | 0.47 | |
| Na2O | % | A | 0.23 | |
| R2O (Total alkalies) | % | A | 0.54 | |
| Chloride content | % | A | 0.07 | |

***Remark:***

*This cement meets ASTM C595 and AASHTO M240 Specification for Type IL Portland Limestone Cement.*

*A = Not applicable.*
** = Default table maximum may be exceeded if C1038/C1038M limit is met.*
*** = Meets 3d Moderate Heat – MH*
****=Meets 180d Moderate Sulfate – MS*

*January 22, 2024*

**Daniel K. Paaaina III**
Chemist

**Master Builders Solutions Admixtures US, LLC**

**January 10, 2024**

**Island Ready-Mix Concrete**
**91-047 Hanua Street**
**Kapolei, HI 96707**

**Attention:** Scott Ballard
**Project:** Various
**Project location:** Oahu

Certificate of Conformance
MasterPozzolith® 322
Master Builders Solutions Admixture

I, Richard Hubbard, Sr. Technical Marketing Specialist for Master Builders Solutions, Cleveland, Ohio, certify:
That MasterPozzolith 322 admixture is a Master Builders Solutions Water-Reducing Admixture for concrete; and
That MasterPozzolith 322 and Pozzolith 322N admixture are the same product having identical composition, differing only in designation; and
That no calcium chloride or chloride based ingredient is used in the manufacture of MasterPozzolith 322 admixture; and
That MasterPozzolith 322 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00024 percent (2.4 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and
That MasterPozzolith 322 admixture meets the requirements for a Type A, Water Reducing, Type B, Retarding, and Type D, Water Reducing and Retarding Admixture specified in ASTM C494/C494M and AASHTO M194, the Standard Specification for Chemical Admixtures for Concrete, as well as the requirements for Type A, Type B and Type D admixtures as specified in Corps of Engineers' CRD-C 87.

Richard Hubbard
Sr. Technical Specialist

**Master Builders Solutions Admixtures US, LLC**
23700 Chagrin Blvd.
Cleveland, OH 44122
216-839-7500
www.master-builders-solutions.com

**Master Builders Solutions Admixtures US, LLC**

**January 10, 2024**

**Island Ready-Mix Concrete**
**91-047 Hanua Street**
**Kapolei, HI 96707**

**Attention:** Scott Ballard
**Project:** Various
**Project location:** Oahu

Certificate of Conformance
MasterGlenium® 7920
Master Builders Solutions Admixture for Concrete

To Whom It May Concern:
I, Richard Hubbard, Sr. Technical Marketing Specialist forMaster Builders Solutions, Cleveland, Ohio, certify:
That MasterGlenium 7920 admixture is a high-range water-reducing admixture manufactured by Master Builders Solutions; and
That no calcium chloride or chloride based ingredient is used in the manufacture of MasterGlenium 7920 admixture; and
That MasterGlenium 7920 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00021 percent (2.1 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and
That MasterGlenium 7920 admixture meets the requirements for a Type A, Water-Reducing and Type F, Water-Reducing, High Range Admixture specified in ASTM C494/C494M and AASHTO M194, the Standard Specification for Chemical Admixtures for Concrete, as well as the requirements for Type A and Type F admixtures as specified in Corps of Engineers' CRD-C 87.

Richard Hubbard
Sr. Technical Specialist

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**January 10, 2024**

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**Kapolei, HI 96707**

**Attention:** Scott Ballard
**Project:** Various
**Project location:** Oahu

Certificate of Conformance
MasterMatrix® VMA 362
Master Builders Solutions Viscosity Modifying Admixture for Concrete

I, Richard Hubbard, Sr. Technical Marketing Specialist for Master Builders Solutions, Cleveland, Ohio, certify:
That MasterMatrix VMA 362 admixture is a ready-to-use high performance admixture formulated to control the rheological properties of shotcrete, ready-mixed concrete and grout; and
That MasterMatrix VMA 362 admixture and Rheomac VMA362 admixture are the same product having identical composition, differing only in designation; and
That no calcium chloride or chloride based ingredient is used in the manufacture of MasterMatrix VMA 362 admixture; and
That MasterMatrix VMA 362 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00016 percent (1.6 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and
That MasterMatrix VMA 362 admixture meets the requirements for a Type S, Specific Performance Admixture as specified in Table 1 of ASTM C494/C494M and AASHTO M194, the Standard Specification for Chemical Admixtures for Concrete.

Richard Hubbard
Sr. Technical Specialist

# CarbonCure™ Concrete Additive
## ASTM C 494 Type S

## Product Description

CarbonCure Technologies offers a technology to implement carbon dioxide ($CO_2$) utilization in the ready mix concrete industry. Waste $CO_2$ can be put to a beneficial use as a feedstock in the production of concrete. The retrofit CarbonCure™ Ready Mix Technology adds $CO_2$ to concrete during mixing. The $CO_2$ reacts with the cement and is mineralized to produce nanoscale calcium carbonate. The carbonate formation can impart positive impacts on the concrete. The $CO_2$ addition (hereafter, CarbonCure) can improve hydration and increase compressive strength without affecting the fresh concrete properties.

## Uses

CarbonCure is used to produce concrete mixes with a reduced carbon footprint. CarbonCure is suitable for normal weight and light weight concrete in ready mix applications. Concrete shall be designed in accordance with *Standard Recommended Practice for Selecting Proportions for Concrete, ACI 211*.

## Benefits

The addition of CarbonCure to concrete mixes can realize benefits including:

- Improved performance; reduced variability
- Ability to improve both-early and late-age compressive strengths
- Optimized mix designs
- Concrete produced with a reduced carbon footprint

## Guidelines for Use

**Dosage Rates**: CarbonCure has a recommended dosage rate of 0.8 – 4.0 fl oz/cwt (50 – 250 g/100 kg) of cement (as distinct from total cementitious) for most applications. Dosages outside this range may be used if local testing shows acceptable performance. Pretesting is required to determine the appropriate dosage rate for desired performance. The optimum dosage rate may be influenced by other concrete mixture components, cement types, ambient temperature, mineral additives, quality and gradations of aggregates, slump of concrete, mixing equipment, job conditions, and desired performance characteristics

**Mixing:** The optimum performance of the CarbonCure is generally obtained with a delayed dosage following the start of mixing.

## Packaging and handling

$CO_2$ is available in bulk and delivered by tanker truck to an on-site pressurized storage tank for dispensing by means of the $CO_2$ metering equipment.

$CO_2$ must have a certified purity of 99% or above for use in this application – certification of $CO_2$ purity compliance shall be made available upon request. $CO_2$ safety and handling information can be found in Carbon Dioxide safety data sheet CAS No: 124-38-9.

## Dispensing Equipment

CarbonCure is dispensed from a storage tank of liquid $CO_2$ in communication with the dispensing control system. The tank and $CO_2$ are sourced from a local industrial gas supplier. The tank capacity is determined according to the usage and gas supplier recommendation. The dispensing control system is connected to the batching system and the $CO_2$ addition is fully integrated into the batch sequencing of materials that are added to the mix.



CarbonCure Technologies Inc. | 42 Payzant Avenue Dartmouth, NS B3B 1Z6
+1 (902) 442-4020 | info@carboncure.com | carboncure.com

## Performance Characteristics

### Fresh properties

An optimal dose of CarbonCure does not impact concrete workability or air content. Producer data for production on a single mix design is presented for slump (**Figure 1**) and air content (**Figure 1**). The CarbonCure production data is presented against control limits for the mix when made without $CO_2$. The average metric and variability of the fresh properties of the concrete made with CarbonCure was comparable to and consistent with the reference production.

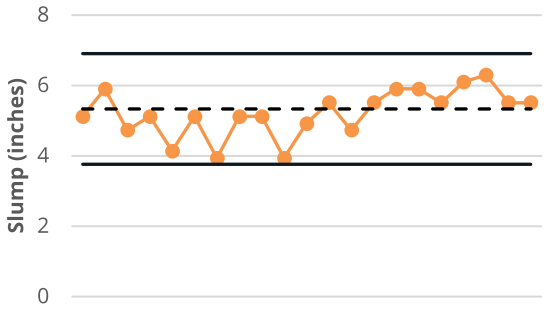


**Figure 1: Slump comparison**

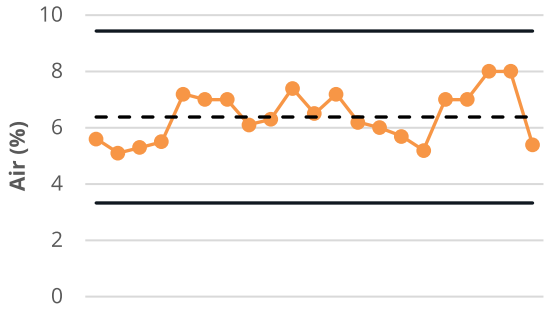


**Figure 1: Air comparison**

### Compressive Strength

An optimal dose of CarbonCure can improve the compressive strength of the concrete at both early and late ages. Industrial strength data of concrete produced with two different CarbonCure dosages is presented in **Figure 2.**

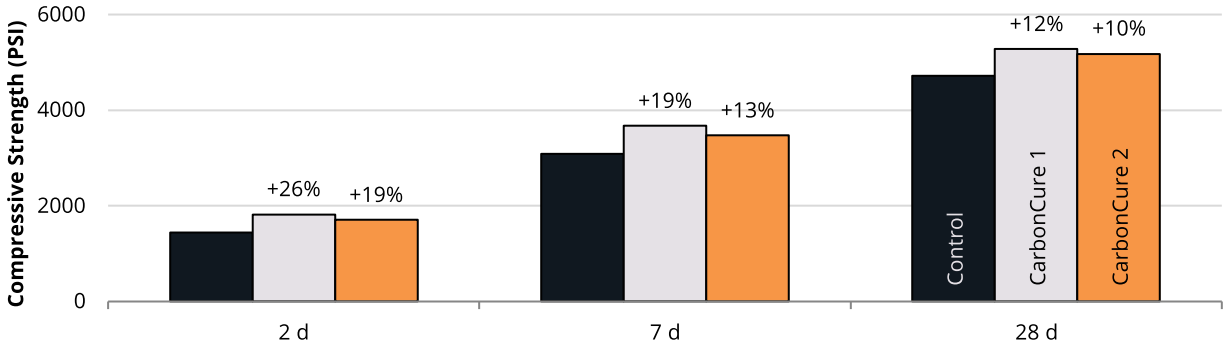


**Figure 2: Compressive strength field data**

### Compatibility

CarbonCure is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, accelerators, retarders, extended set control admixtures, air-entrainers, corrosion inhibitors, and shrinkage reducers.



CarbonCure Technologies Inc. | 42 Payzant Avenue Dartmouth, NS B3B 1Z6
+1 (902) 442-4020 | info@carboncure.com | carboncure.com

## Comment on Concrete pH

The reaction of atmospheric carbon dioxide with hydrated cement paste over time is acknowledged to consume calcium hydroxide and thereby reduce pore solution pH. Testing of the pore solution of concrete produced with CarbonCure was conducted at 28 days (**Figure 3**). The extracted pore solution was not affected by the $CO_2$ addition. The action of $CO_2$ in the earliest stages of hydration neither prevents nor impairs the later development of pore solution alkalinity.

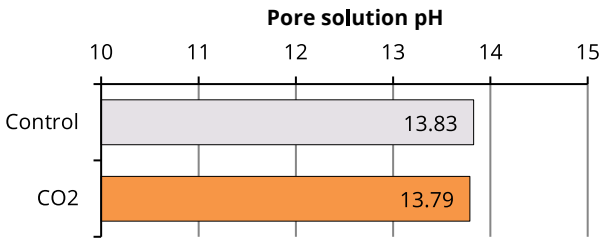


**Figure 3: Pore solution pH measurement**

## Related Documents

See MSDS for carbon dioxide as provided by the industrial gas supply partner.

## NOTE

Continuous testing by the concrete producer is strongly recommended. Since all cements and other concrete-making materials differ from source to source, and can vary over time, ongoing testing by the concrete producer is recommended for optimum $CO_2$ system performance, especially when changes are made to the materials or batch sequencing. Accurate concrete performance assessments require adequate quality control practices. The $CO_2$ injection system performance is supported through following all recommended maintenance practices, procedures and schedules.





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+1 (902) 442-4020 | info@carboncure.com | carboncure.com

Island Ready-Mix Concrete, Inc.
P.O. Box 2230 • Pearl City, Hawaii 96782-9230 • Phone 682-1305 • Fax 682-4478

April 18, 2023

Notification: **Carbon Dioxide ($CO_2$)**

Dear Customer,

Island Ready-Mix is proud to announce that we have taken our commitment to sustainability to the next level. Beginning June 1, 2021, we have started to increase our use of recycled $CO_2$ in every yard of concrete that leaves our production facility!

**What is $CO_2$?**
For any that don't know, $CO_2$ comes from natural sources such as decomposition, ocean release and respiration, manmade sources such as deforestation, burning fossil fuels like coal, oil, natural gas, and cement production to name a few.

**What is the process?**
Island Ready-Mix has installed a system that injects recycled $CO_2$ into our concrete during mixing. This process, known as $CO_2$ mineralization, improves concrete strength and reduces the impact of $CO_2$ on the environment. This process is currently being used all over the world.

**How does this affect you?**
As an Island Ready-Mix customer, you will not notice any changes other than a slight increase in compressive strength. You should feel great knowing that every yard of concrete you purchase from Island Ready-Mix is helping sustain the environment. Your impact can be seen every time you walk down a sidewalk, drive out of your garage onto your concrete driveway, cross a bridge, enter a warehouse or see a concrete structure!

We here at Island Ready-Mix would like to thank you for helping reduce the impact of $CO_2$ emissions! Please check out our website https://www.islandreadymix.com/ and be sure to click on the CarbonCure link for additional information.

Your Island Ready-Mix Team

Island Ready-Mix Concrete, Inc.
91-047 Hanua Street • Kapolei, Hawaii 96707 • Phone 682-1305 • Fax 682-4478

October/17/2023

Subject: Short Supply Kapaa Quarry Concrete Sand

To: Whom it may concern,

If for any reason, our standard concrete sand from the Kapaa Quarry is unavailable, we will be substituting Orca C-33 Concrete Sand from British Columbia, Canada. Once it becomes available again, we will switch back to our standard mix designs utilizing Kapaa Quarry Concrete Sand.

When necessary, the substitution of Orca C33 Concrete sand will continue to meet the same fine aggregate requirements as the Kapaa Concrete Sand mix designs. Aggregate proportion will be adjusted, to maintain 27 $Ft^3$ for designs that are approved and currently being used, as well as new mix designs being submitted for your project(s). There will be no change in quality of our concrete mix designs. We have previously provided Orca C-33 Concrete Sand and our testing indicates no adverse effects to strength, placement and finishing.

We have included this letter and attached material evaluation for the Orca C-33 Concrete Sand for your reference. If you require a written submittal showing the substitution, please submit your request via email to: qc@islandrm.com and your request will be handled ASAP.

If you have any questions or require additional information, please contact our Sales (x3) or our Technical Services (x4) department at (808)682-1305.

Thank you for your cooperation and understanding.

Sincerely,

R. Scott Ballard

Manager Technical Services

February 15, 2023

# ORCA WASHED CONCRETE SAND

Orca concrete aggregates are produced at the Orca Quarry, Port McNeill, B.C., in a modern and efficient washing and processing plant opened in March 2007 and distributed via ocean-going ships or barges.

The California Department of Transportation has established that aggregates from this source are innocuous with respect to Alkali Silica Reactivity and has approved them for use in reduced mineral admixture concrete.

Caltrans # 22-CAN-3

Caltrans Innocuous List  Caltrans Aggregate Prequalification

Independent laboratory concrete trial mixes using Orca washed concrete sand and Orca 1" x #4 gravel produced results designated "Low Shrinkage" in accordance with test method ASTM C157 (Modified).

## GRADATION – PERCENTAGE PASSING

| Sieve Size | Orca Sand (Tested Values) | Specifications | |
|---|---|---|---|
| | | CALTRANS Per: 90-1.02C (4)(a)(c) 2022 | ASTM C33-03 |
| 9.5 mm (3/8") | 100 | 100 | 100 |
| 4.75 mm (#4) | 98 | 95 - 100 | 95 - 100 |
| 2.36 mm (#8) | 84 | 65 - 95 | 80 - 100 |
| 1.18 mm (#16) "A" | 70 | X = 68 58 - 78 X = ± 10 | 50 - 85 |
| 600 µm (#30) "B" | 52 | X = 46 37 - 55 X = ± 9 | 25 - 60 |
| 300 µm (#50) "C" | 24 | X = 24 18 - 30 X = ± 6 | 5 - 30 |
| 150 µm (#100) | 7 | 2 - 12 | 0 - 10 |
| 75 µm (#200) | 2 | 0 - 8 | 0 - 3 |
| A - B | 18 | 10 - 40 | |
| B - C | 28 | 10 - 40 | |
| Fineness Modulus | 2.65 - 2.85 | | 2.30 - 3.10 |

## TYPICAL PROPERTIES

| Testing | | Specifications | | | |
|---|---|---|---|---|---|
| Test Name | Orca Value | CTM | ASTM | Caltrans | ASTM |
| Specific Gravity, bulk SSD | 2.82 | 207 | | | |
| Absorption | 0.7 | | C128 | | |
| Dry Rodded Unit Weight, pcf | 120 | 212 | C29 | | |
| Sand Equivalent | 87 | 217 | D2419 | 75 Min. | |
| Durability | 81 | 229 | D3744 | 60 Min. | |
| Soundness | 0.6% | | C88 | | 10% Max |
| Soundness | 0 | 214 | | | 10% Max |
| Materials Finer Than No. 200 | 2.0% | | C117 | | 3% Max |
| Lightweight Pieces - Coal & Lignite | 0.0% | | C123 | | 0.5% Max |
| Clay Lumps | 0.0% | | C142 | | 3.0% Max |
| Organic Impurities | Pass | | C40 | | |
| Alkali Silica Reactivity | Innocuous | | C1567 | | 0.10% Max |
| Alkali Silica Reactivity | Innocuous | | C1293 | | 0.04% Max |
| Alkali Silica Reactivity | Innocuous | | C1260 | | 0.10% Max |

604-628-3353  6505 Island Highway – Port McNeill, BC V0N 2R0  orcasales@vmcmail.com

Orca Aggregates
A Subsidiary of Vulcan Materials Company

## SPECIAL NOTES

**1) <u>This material carries an Environmental Product Declaration</u>**

This declaration has been prepared in accordance with ISO 14025, ISO 21930, and ASTM International's EPD program operator rules.

Index List (https://www.astm.org/CERTIFICATION/EpdAndPCRs.html)

Specific EPD
(https://www.astm.org/CERTIFICATION/DOCS/344.EPD_Polaris_Materials_final.pdf)

**2) <u>This product is recognized by NSF International</u>**

This product complies with NSF/ANSI 61, 372 and all other applicable requirements

Certified to NSF/ANSI 61 & 372

**3)** All testing has been performed at accredited 3rd party laboratories in accordance with applicable ASTM and CalTrans methods.

Scott Dryden

President & CEO
Orca Sand & Gravel LP.

ATTACHMENT_"A"
CONCRETE MIX DESIGN SUBMITTAL

Cement & Concrete Industry of Hawaii
2153 N. King St. # 327 Honolulu, HI
Ph. 848-7100

To: Contractor

Subject: Concrete Testing Services/Personnel

The Cement and Concrete Products Industry of Hawaii and its Ready-mixed concrete producers uphold the ACI and ASTM standards related to concrete testing of concrete materials delivered to referenced project.

In compliance to these industry standards, please provide the following information of testing services to be used for the project:

ACI 301-10 Section 1.6.1.1. Name of Testing Services Company:
(Shall meet the requirements of ASTM C1077) Jensen Precast

ACI 301-10 Section 1.6.1.2 Full names of ACI Concrete Field Testing Technician Grade I assigned to the project (to be updated for changes):

Name: Brian Barit Certification No. 02216649 Expiration Date: 03/04/2028

Name: Ryan Kawakami Certification No. 02190126 Expiration Date: 09/23/2027

Name: _____ Certification No. _____ Expiration Date: _____

As a compliance check of concrete testing procedures and practices, please have the project's concrete testing service personnel review all testing procedure standards and acknowledge the following items of significance:

☑ACI 301 Sec 1.6.3.2.e - Owner's testing agency will conduct concrete strength tests during construction by making and curing test specimens in accordance with ASTM C31/C31M and testing them according to ASTM C39/C39M. Unless otherwise specified, concrete strengths for acceptance shall be the average of at least two 6 by 12 in. or at least three 4 by 8 in. cylinders tested at 28 days.

☑ACI 301 1.6.3.2e (ASTM C 31) – "Standard Practice for Making and Curing Concrete Test Specimens in the Field" refers to only "standard" cured cylinders when these specimens are tested for strength "acceptance" of concrete as specified.

If specimens are made and "field" cured, the resulting strength test data are to be used for the determination of whether the structure is capable of being put into service, for adequacy of curing and protection of concrete in the structure, or for form/shoring removal time requirements.

☑ACI 301-10 Sec. 1.6.2.2d (ASTM C31) on cylinder curing requirements for strength acceptance… "Immediately after molding and finishing, the specimens shall be stored for a period up **to 48hours in a temperature range from 60 to 80 °F** and in an environment preventing moisture loss from the specimens." Cylinders that are not initially cured under these conditions are not valid strength "acceptance" specimens.

☑Article 1.6.3.2.d dictates that the Contractor is responsible for providing "the testing agency adequate facilities for the **safe storage and proper curing** of concrete test specimens on the project site for initial curing as required by ASTM C 31." These requirements should be expressed to the contractor/owner so that proper storage (wood or insulated box) and curing will be provided. Various procedures are available during the initial curing period to maintain the specified moisture and temperature conditions, i.e. store in properly constructed wooden boxes or insulated curing boxes. [http://www.forneyonline.com/ http://www.humboldtmfg.com/ http://www.globalgilson.com/] Also, the transporting of these specimens to the lab requires special care and handling.

☑ACI 301-10 Sec. 1.6.3.1c ... "The Owner's testing agency will report test and inspection results of the Work to Owner, Architect/Engineer, Contractor, and Concrete Supplier **within 7 days** after tests and inspections are performed.

☑ASTM C39, "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens", is another source of serious concern among our member producers. This standard requires that each specimen **must be tested to complete failure**. Testing is not complete when the first "stall" or decrease in load is observed. Often times, it's noticed that concrete specimens are discarded with little or no visible failure; therefore, these specimens could not have been tested to "complete failure". Too often loading is terminated when the first sign of load decrease is noticed. This practice fails to complete a legitimate test, but intentionally avoids the related clean-up of a successful test. It is recommended that the person conducting compression test have a current ACI Concrete Strength Testing Technician certification.

☑ACI 301-10 Sec.1.6.6.1.b - No strength test result should fall below fc′ (specified concrete strength) by more than 500 psi, when fc′ is 5000 psi or less, or by more than 0.10fc′ when fc′ is more than 5000 psi. However, in the event that test results exceed these limits, then steps shall be taken to ensure that the load carrying capacity of the structure is not jeopardized. Strength testing technician should always note any deviations from test standards, i.e. visible defects in test specimen. It's an industry practice to retain all specimens that fail to meet the specified strength to aid in potential investigations.

Acknowledged by: Brian Barit Date: 11/19/2024

Concrete Testing Service Company: Jensen Precast