PROJECT MANUAL

Marinwood Community Services District

Marinwood Replaster

San Rafael, California

Prepared by
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775 Miller Creek Road
San Rafael California 94903
Project Number 097.2502

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SECTION 13 11 00 SWIMMING POOL CONTRACTOR GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 REFERENCE

A. Requirements in Addenda, Alternates and Conditions collectively apply to this work.

1.2 SUMMARY

A. Principal Work Items Are:
   a. Swimming Pool Contractor Qualifications
   2. Swimming Pool Deck Contractor Qualifications
   3. Swimming Pool Contractor Responsibilities

B. Related Work Specified Elsewhere:
   1. Section 13 11 05 – Swimming Pool Required Testing and Inspections
   2. Section 13 11 09 – Start Up
   3. Section 13 11 10 – Swimming Pool Recirculation Equipment
   4. Section 13 11 20 – Swimming Pool Cast-In-Place Concrete
   5. Section 13 11 21 – Swimming Pool Deck Coating
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1.3 SWIMMING POOL CONTRACTOR'S SUBSTITUTION PROPOSAL

A. It is the intent of the contract documents to encourage competition. The base proposal must be based on providing the construction methods and equipment as specified and detailed. Substitutions or deviations from the basis of design equipment will not be allowed prior to the bid date.

B. Contractor shall submit their bid to the Owner based on materials, equipment and methods as specified in this section and sections listed in 131100-1.02.B.

C. At the discretion of the Owner and Engineer, proposed substitutions may be considered after the Award of Contract. All proposed substitutions of specified construction methods and equipment shall include a complete submittal as required by these specifications and drawings of appropriate scale incorporating and highlighting all required changes. The Contractor shall provide a list of at least ten (10) satisfactory installations comparable to this project that have been manufactured and installed under the manufacturer's current legal name. Submit a list of such projects with the name, address and current telephone number of the Owner's Operator and Architect of Record to the Architect.

D. Any accepted system substitution must have written approval by the Engineer.

E. Any changes or modifications to the contract documents that are not authorized by the Owner, Architect or Engineer, shall be the sole responsibility of the Contractor.

1.4 SUBMITTALS

A. Refer to Division 1 for submittal requirements.

B. Include complete product data indexed, tabbed, and referenced to specifications with 8 ½" x 11" cover sheet covering:

C. Provide submittals for all equipment included in sections listed in 1.02.B.

1.5 SWIMMING POOL CONTRACTOR QUALIFICATIONS

A. It is the intent of the Owner to award this Contract based on the specific experience and financial means required to complete the specified work on the swimming pool system. The successful bidder must be regularly engaged in the construction of commercial pools. Each bidding Contractor shall demonstrate their specific experience and competency by complying with the following requirements.
   1. The Swimming Pool Contractor must provide a written statement from an approved bonding company certifying that the Contractor can qualify for 100% Performance and Labor - Material Bonds on this Project.
   2. The Swimming Pool Contractor shall provide evidence of having a Contractor's License C53 (California) in the state of the project location.
   3. The Swimming Pool Contractor shall show evidence of having adequate experience in plastering commercial pools. In order to be considered for this Project, the Swimming Pool Contractor must have completed within the last five years at least five (5) replaster projects on public use 25-Yard size pools with a shotcrete structure with tile and plaster finish. All these pools shall have been in operation for at least one year. Submit a list of such projects with the name, address, and current telephone number of the Owner and Architect for reference.

1.6 SWIMMING POOL CONTRACTOR RESPONSIBILITIES

A. It is the intent of this section to place the entire responsibility for the renovation of each of the pools under one vested Contractor. Under this section the Pool Contractor will provide, but is not limited, to the following:
   1. Providing labor, material, management and coordination of own personnel and specialty subcontractors experienced in commercial pool building to produce a functioning Swimming Pool ready for public use upon completion of the Work. Remove equipment from premises when no longer required.
   2. Provide all equipment and services required for erection and delivery onto the premises of any equipment or apparatus furnished. Remove equipment from premises when no longer required.
   3. Provide Cementitious Waterproofing for pool main drain sumps,. Reference Section 131125 – Cementitious Waterproofing.

4. Provide all necessary piping and valving as shown on the drawings and specified herein.
5. Flush all piping lines and remove any resultant debris and/or sediment.
6. Install new Autofill, including deck demolition and replacement per the contract documents
7. Install new deck coating per 13 11 21 Swimming Pool Deck Coating
8. Furnish and install specialty trim tile per Specification 131145 – Swimming Pool Trim Tile, including the tolerance requirements for the concrete substrate.
9. Furnish and install a plaster finish in the pool per Specification Section 131140 – Swimming Pool Plaster.
10. Re-install exisitng underwater lights and pull cords through conduits to their appropriate junction box. Secure underwater light to light niche with stainless steel set screw.
11. Provide Swimming Pool Start-Up as stated in Section 131109 – Swimming Pool Start-Up including minimum consecutive 14-day trouble-free operation. Start, test, calibrate and adjust all mechanical equipment, electrical equipment, recirculation, chemical, and other supplied systems including deck, loose, maintenance, and safety equipment. Instruct the Owner's representative in the systems operation and maintenance as described.
12. Provide initial pool water fill and initial chemical balancing based upon the Ryznar Stability Index and Langelier Saturation Index.
13. Obtain final acceptance by jurisdictional health department(s).
14. Provide Swimming Pool sealants and caulking. Reference Section 131130 – Swimming Pool Sealants and Caulking.

PART 2 - Unused

PART 3 - Execution

3.1 TOLERANCES FOR CONSTRUCTION OF THE POOL SHELL

A. The completed structures shall be constructed level and to the dimensions, elevation, depths and thickness as shown on the plans.

B. The elevation tolerance of the pool shell and coping shall be plus or minus 1/8 inch.

3.2 AS-BUILT DOCUMENTS

A. Refer to Division 1 for As-Built Documentation requirements.

B. Swimming Pool Contractor shall provide As-built engineering construction drawings that depict actual as-built conditions of the completed construction as a permanent record of each project feature.

3.3 CLOSE OUT SUBMITTALS

A. Refer to Division 1 for Close Out Submittal requirements.

3.4 CONCLUSION

A. It is the intention of these specifications to provide a complete installation. All accessory construction and apparatus necessary in the operation or testing of the performance of the work shall be included. The omission of specific reference to any part of the work necessary for such complete installation shall not be interpreted as relieving the Contractor from furnishing and installing such parts. Any such omission or clarification shall be brought to the attention of the Architect/Engineer prior to bidding as provided in this section.

END OF SECTION 13 11 00

SECTION 131109 - SWIMMING POOL START UP

PART 1 - GENERAL

1.1 SUMMARY

A. Principal work items are:

1. Principal work items related to both the swimming pool and the wading pool are:
2. Operation and Maintenance Manuals and Closeout Submittals
3. Pool Fill and Chemical Balance
4. Installation & Operation Certification
5. Owner System Training
6. Project Turnover

B. Related work specified elsewhere:

1. Section 131110 – Swimming Pool Recirculation Equipment
2. Section 131111 – Swimming Pool Piping
3. Section 131115 – Swimming Pool Deck Equipment
4. Section 131140 – Swimming Pool Plaster

1.2 COORDINATION AND CLARIFICATION

A. Coordinate with other contractors or subcontractors all work relating to this section.

B. The Contractor must establish with other contractors or subcontractors, having related work in this section, that all work necessary to complete the pool(s) as shown on the drawings and in the specifications is included in the base bid and alternates to the Owner.

C. If in doubt regarding the responsibility for work covered in this section and/or discovery of errors or omissions in the bidding documents, the Contractor shall notify the Architect through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.3 OPERATION AND MAINTENANCE MANUALS AND CLOSE-OUT SUBMITTALS

A. Three weeks prior to filling of pool, submit to the Engineer Start-up Chemical Dosing procedure with listed chemicals and quantities.

B. Detailed operation and maintenance information shall be supplied for all equipment requiring maintenance or other attention. The equipment supplier and/or Contractor shall prepare an operation and maintenance manual for all equipment. Parts lists and operating and maintenance instructions shall be provided.

C. The operation and maintenance manuals shall be in addition to any instructions or

parts lists packed with or attached to the equipment when delivered, or which may be required by the Contractor.

D. All material shall be marked with project identification. Non-applicable information shall be marked out or deleted.

E. Shipment of equipment will not be considered complete until all required manuals and data have been received.

1.4 RECORD DRAWINGS

A. Provide a complete set of record drawings of the entire pool system(s) including all sub-systems. All record drawings shall be prepared in accordance with the requirements of Division 1 for As-Built Documentation and shall be a complete, stand-alone set. The Contractor shall be permitted to obtain original documents and copy them for this purpose only. Provide the record set on compact disk (AutoCAD Release 2022 or compatible software).

1.5 POOL FILL WATER QUALITY

A. The Owner shall bear the cost of water required for the final filling. bear the cost of the water required for one (1) complete filling of eachpool. Removal of iron or copper (if in excess of .3 ppm) maybe required for the final fill to avoid staining of the pool finish. Any subsequent fillings or partial fillings (more than 25%) of the pool shall be by the Contractor, at their own expense.

B. The Contractor shall provide the necessary plant equipment so that the temperature of fill water will be within plus or minus 10 degrees of the ambient air and/or the pool structure at the time of filling. Extreme caution is urged if the temperature variance is greater than 10 degrees F.

C. The Contractor shall provide the necessary chemicals and to adjust and balance the water chemistry in the pools to the following levels:

1.6 START-UP CHEMICALS

A. The Contractor shall maintain the chemical balance of the pool water (including the cost of all chemicals required) until the project, pool and mechanical system(s) are fully operational and accepted by the Architect and the Owner.

B. The Contractor may utilize the chemical storage and delivery systems during initial chemical balancing where appropriate.

C. The Contractor shall confirm all chemicals necessary for initial pool balance are on site 3 days prior to the start of plaster application.

D. Provide the Owner with sufficient quantities of the necessary chemicals to maintain the pool operation for minimum of thirty (30) days from substantial completion or the Owner begins using the pool.

E. Chemicals to be provided to the Owner shall include those required by the chemical feed systems installed.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION

3.1 EXISTING CONDITIONS, INSPECTION AND PREPARATION

A. Carefully examine all of the contract documents for requirements that affect the work of this section. Prior to starting any work, notify the General Contractor of defects requiring correction. Do not start work until conditions are satisfactory.

B. Verify that all work by others, related to this section, has been completed. This includes all earthwork, concrete work, and mechanical, electrical and plumbing connections.

C. Protect all materials and work completed by others from damage while completing the work in this section.

3.2 START UP

A. Upon plastering of pool, refer to Specification 131140 for pool plaster curing process requirements.

B. Provide final cleaning of the swimming pool of all loose debris and sediment. Contractor may not utilize cleaning equipment to be provided to the Owner.

C. Provide Swimming Pool and related equipment Start-Up. Start, test, calibrate and adjust all mechanical equipment, electrical equipment, recirculation, chemical, and other supplied systems.

D. Provide proof of minimum consecutive 14-day trouble-free operation. Lack of chemicals or other non-critical items shall not require a re-start of the trouble-free period but may result in a pause of the trouble-free period.

E. Provide final cleaning of the swimming pool of all loose debris and sediment. Contractor may not utilize cleaning equipment to be provided to the Owner.

F. Provide certification that the entirety of pool systems are operational and function correctly through all phases of operation.

3.3 PROJECT TURNOVER

A. Prior to leaving the job, the Swimming Pool Contractor shall obtain written certification from the designated Owner's representative acknowledging that the instruction period has been completed and all necessary operating information provided.

B. Written reports of each of these visits outlining the pool's operation, competence and performance of the pool's operation personnel, and other pertinent comments shall be

submitted to the Owner and Architect/Engineer within one (1) week after each visit.

END OF SECTION 131109

SECTION 131110 – SWIMMING POOL RECIRCULATION SYSTEMS

PART 1 - GENERAL

1.1 COORDINATION AND CLARIFICATION

A. Coordinate with other contractors or subcontractors all work relating to this section.

B. The Contractor must establish with other contractors or subcontractors, having related work in this section, that all work necessary to complete the pool(s) as shown on the drawings and in the specifications is included in the base bid and alternates to the Owner.

C. If in doubt regarding the responsibility for work covered in this section and/or discovery of errors or omissions in the bidding documents, the Contractor shall notify the Architect through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.2 SUBMITTALS

A. All submittals shall be made in accordance with the requirements of Division 1 - General Requirements and in strict compliance with the following procedures and guidelines.

1.3 CONTRACTOR'S ALTERNATE PROPOSAL OR SUBSTITUTIONS

A. Contractor shall submit their bid to the owner based on materials, equipment and methods as specified in this section. Approval of any substitution of material is not guaranteed.

B. Any proposed substitutions shall include a mechanical drawing incorporating all required changes in layout, piping and valves. The cost of such changes shall be included in the price of the substitute. Contractor to confirm voltage prior to ordering pump. All motors shall be capable of continuously running without overloading at any point on the characteristic curve of the pump without overload or harm. Contractor shall confirm by 1/4 inch scale shop drawing that the pumps and filters to be provided will fit in the available space and can be removed for servicing.

1.4 WARRANTIES

A. The Contractor warrants to the Owner and Architect that materials and equipment provided under the contract will be of good quality and new unless otherwise required or permitted by the contract documents, that the work will be free from defects not inherent

in the quality required or permitted, and that the work will conform with the requirements of the contract documents. Work not conforming to these requirements, including substitutions not properly approved and authorized will be considered defective. The Contractor's warranty will exclude remedies for damage or defect caused by abuse, improper or insufficient maintenance, improper operations, modifications not executed by the Contractor or improper wear and tear under normal use. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. All warranties shall be for a period of one year from the date of substantial completion or the owner begins using the pool unless otherwise specified.

B. The Contractor shall agree to repair or replace any defective or non-complying work at no cost to the Owner upon written notification from the Owner within the warranty period. Pro-rated warranties are not acceptable.

PART 2 - PRODUCTS

2.1 RECIRCULATION FITTINGS

A. Competition Pool Main Suction Outlets (Main Drains)

1.1 Suction outlet fitting assemblies shall be constructed of UV stabilized PVC material. New grates shall be certified to NSF/ANSI/CAN50 and ANSI/APSP/ICC-16 2017. The grate shall fit closely and flush with top surface of frame and secured to frame with vandal proof stainless steel fasteners. The frame shall be installed atop the existing sump. All exposed edges of main outlets shall be rounded and smooth, free of burrs and sharp edges.

a. Suction outlet fitting assemblies shall be model WAV18WR 18-inch by 18-inch frame and grate manufactured by Aquastar. Maximum approved flow rate for floor installation of 600 GPM with 6" suction, V.I.F. or approved equal. Quantity two (2).

B. Wading Pool Main Suction Outlets (Main Drains)

1.2 Suction outlet fitting assemblies shall be constructed of UV stabilized PVC material. New grates shall be certified to NSF/ANSI/CAN50 and ANSI/APSP/ICC-16 2017. The grate shall fit closely and flush with top surface of frame and secured to frame with vandal proof stainless steel fasteners. The frame shall be installed atop the existing sump. All exposed edges of main outlets shall be rounded and smooth, free of burrs and sharp edges.

a. Suction outlet fitting assemblies shall be model 10AVR 10-inch round frame and grate manufactured by Aquastar. Maximum approved flow rate for floor

installation of 96 GPM with 3” suction, V.I.F. or approved equal. Quantity two (2).

B. Wall inlet fitting assemblies shall be Sta-Rite 08429 1.5” eyeball inlet with ¾” opening or approved equal from Hayward or Swimtime.

C. Static water line inlet fitting for the automatic water level controller shall be provided consisting of a cycolac body, grate and construction shield. The body shall have a 1-1/2 inch solvent weld connection and provided with an integral molded "knock-out" membrane to facilitate line pressure testing. The static water line inlet fitting shall be an Aquastar 6HPHA 6” round outlet cover or approved equal.

2.2 FILL AND MAKE-UP WATER SYSTEM

A. Swimming Pool Autofill

1.1 Autofill to be a float valve assembly with ¾” minimum water supply and 1 ½” equalizer line. Unit to be provided with a high-impact plastic lid with color to match surrounding decking.

a. Basis of Design is MP Industries MP-1953-J AUTO-LEV.

2.3 INSERTS

A. Recessed steps shall be a single molding of white ABS with an integral slip resistant tread surface. The step shall be 17.5 in. wide by 7in. deep at the out edges of the lip. Color to be white. Step by S.R. Smith 62-209-4001 or approved equal.

PART 3 - EXECUTION

3.1 EXISTING CONDITIONS, INSPECTION AND PREPARATION

A. Carefully examine all of the contract documents for requirements that affect the work of this section. Prior to starting any work, notify the General Contractor of defects requiring correction. Do not start work until conditions are satisfactory.

B. Verify that all work by others, related to this section, has been completed. This includes all earthwork, concrete work, and mechanical, electrical and plumbing connections.

C. Protect all materials and work completed by others from damage while completing the work in this section.

3.2 FIELD MEASUREMENTS

A. Verify benchmark and pool location prior to layout.

B. If field measurements differ from the construction drawing dimensions, notification shall be given to the Architect prior to proceeding with work.

3.3 EQUIPMENT AND SYSTEMS INSTALLATION

A. The Contractor shall assemble and install all equipment, special parts and accessories as shown on pool drawings, specifications and shop drawings of the equipment suppliers.

B. The Contractor shall install all equipment and systems in accordance with manufacturer's directions. Equipment shall all be assembled and in place for final observation.

C. All items necessary to complete this section are shown on the plans or described in the specifications including items that may be purchased by the Owner. Items are detailed and specified as a guide for dimensional purposes. The Contractor must make provisions accordingly and submit shop drawings and submittals based on that data.

END OF SECTION 131110

SECTION 131120 - SWIMMING POOL CAST-IN-PLACE POOL CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work in this section. Principal items include:

1. The work under this section shall include all labor, materials, and equipment required to complete the concrete work for the following: swimming pool autofill installation and adjacent decking.
2. Materials and/or methods specified in this section as "C.B.C.", "C.B.C. Standards", or similar wording refer to the California Building Code, 2025 Edition.
3. Except as otherwise specified herein, the work of this section shall be in accordance with Chapter 19 "Concrete" of the California Building Code, 2025 Edition.

1.2 SUBMITTALS

A. Product Data: Provide product data for each type of product indicated. Include any technical data and installation requirements.

B. Concrete Mix Design: Provide a mix design for each strength and type of concrete. Furnish a complete list of materials including type, brand, source, and amount of cement, pozzolan, and admixtures. Obtain approval before concrete placement. Any concrete work placed prior to approval of the concrete mix design is not acceptable, is rejected and shall be removed at no cost to the owner.

1. Provide alternate design mixtures when characteristics of materials, project conditions, weather, test results or other circumstances warrant adjustments.
2. Indicate amounts of mixing water to be withheld for later addition at project site in the submittal.

C. Steel Reinforcement Shop Drawings: Provide placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, materials, and grades; bar schedules; stirrup spacing; bent bar diagrams; bar arrangements, splices and laps; mechanical connections; tie spacing; hoop spacing; and supports for concrete reinforcement.

D. Formwork Shop Drawings: Provide formwork shop drawings prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.

E. Material Test Reports: Provide reports from a qualified testing agency, indicating

compliance with requirements for the following:

1. Aggregates - Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

F. Material Certificates: Provide certificates for each of the following, signed by the manufacturers:

1. Cementitious materials
2. Admixtures
3. Form materials and form-release agents
4. Steel reinforcement and accessories
5. Curing compounds
6. Bonding agents
7. Repair materials
8. Provide field quality control test and inspection reports.
9. Provide minutes of pre-installation conference.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on project personnel qualified as ACI Certified Flatwork Technician and Finisher and a supervisor who is an ACI Certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and complies with ASTM C94 / C94M requirements for production facilities and equipment.

C. Testing Agency Qualifications: An independent agency qualified according to ASTM C1077 and ASTM E329 for testing indicated and as documented according to ASTM E548.

1. Personnel conducting field tests shall be qualified as an ICC Certified Reinforced Concrete Technician according to the International Code Council or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI Certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI Certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

E. ACI Publications: Comply with the following unless modified by requirements in the contract documents:

1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, forms and form removal limitations, shoring and reshoring procedures, steel reinforcement installation, concrete repair procedures, and concrete protection.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Keep waterstops covered during storage to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Products are subject to compliance with requirements. Products that may be incorporated in the work include, but are not limited to, the products specified.
2. Available Manufacturers: Manufacturers are subject to compliance with requirements. Manufacturers offering products that may be incorporated in the work include, but are not limited to, the manufactures specified.

2.2 CONCRETE MATERIALS

A. Cementitious Materials: Use the same type, brand, and source throughout the project. The following cementitious materials are recommended:

1. Portland Cement: ASTM C150, Standard Specification for Portland Cement.

2. Fly Ash: ASTM C618, Class C or F.

B. Normal Weight Aggregate: ASTM C33, Class 5S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1 in (25 mm) nominal size.
2. Fine Aggregate: Fine aggregate to be free of materials with deleterious reactivity to alkali in cement.
3. Water: ASTM C94 / C94M, Clean and potable.

2.3 ADMIXTURES

A. Air-Entraining Admixture: ASTM C260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494 / C494M, Type A.
2. Retarding Admixture: ASTM C494 / C494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C494 / C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494 / C494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494 / C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017 / C1017M, Type II.

2.4 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
2. Limit use of fly ash to not exceed, in combination, 15% of portland cement by weight.

B. Limit water-soluble, chloride-ion content in hardened concrete to 0.15% by weight of cement.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, and concrete with a water-cementitious materials ratio below 0.45.

2.5 CONCRETE MIXES

A. All concrete: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4,000 psi (20.7 MPa) at 28 days
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Minimum Cement Content: 500 lb/yd3
4. Slump Limit:

    a. 3 in +/- 1 in (75 mm +/- 25 mm) or 8 in (200 mm) for concrete with verified slump of 2 to 4 in (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, +/- 1 in (25 mm).

5. Use Type I/II Cement.
6. Cement to aggregate, in dry weight, shall not be less than one to five.

B. Ready-Mix Concrete

1. Comply with ASTM C94 / C94M.
2. Before using trucks for batching, mixing, and transporting concrete, thoroughly clean the trucks and equipment of materials capable of contaminating concrete.
3. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 is required.
4. When air temperature is between 85 °F and 90 °F, reduce mixing and delivery time from 90 minutes to 75 minutes, and when air temperature is above 90 °F, reduce mixing and delivery time to 60 minutes.
5. Do not add water to ready-mix concrete at project site except when slump is below specified limits and total water does not exceed the design water-cement ratio; inject added water into mixer and mix thoroughly before discharging.

C. Truck mixers without batch tickets will be rejected.

D. Retain certificates at project site. Submit to the owner/architect for review upon request.

2.6 FORM-FACING MATERIALS

A. Forming Materials: Forming materials shall be new. Materials may be reused during the progress of the work provided they are completely cleaned and reconditioned, recoated for each reuse, capable of producing formwork of the required quality and are structurally sound.

B. Smooth-Formed Finished Concrete: Form-facing panels shall be used to provide continuous, true, and smooth concrete surfaces. Furnish panels in the largest practicable sizes to minimize the number of joints.

1. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

    a. Medium-density overlay, Class 1 or better, mill-release agent treated and edge sealed.

C. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 in x 3/4 in (19 mm x 19 mm) minimum

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect the concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 in (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 in (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive damp proofing or waterproofing.

2.7 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615 / A615M, Grade 60 (Grade 420) deformed.

B. Plain-Steel Wire: ASTM A82, as drawn.

2.8 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports, from steel wire, plastic, or precast concrete, according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

B. Mechanical Splices (Optional): Tapered, threaded couplers, pre-assembled to reinforcing with mounting plate for attachment to form work and a pressed in metal disc thread protector which can be easily removed. The mechanical connection shall meet

building code requirements of developing in tension or compression. The mechanical connection shall be the positive locking, taper threaded type coupler manufactured from high quality steel. The bar ends must be taper threaded using the manufacturer's requirements.

1. Lenton Form Saver; Erico Corp.

2.9 RELATED MATERIALS

A. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before placing new concrete against existing shotcrete/concrete , remove unsound or loose materials and contaminants that may inhibit concrete bonding. Chip or scarify areas to be repaired to extent necessary to provide sound substrate. Cut edges square and 1 in (13 mm) deep at perimeter of work, tapering remaining shoulder at 1:1 slope into cavity to eliminate square shoulders. Dampen surfaces before placing concrete.

1. Abrasive blast or hydroblast existing surfaces that do not require chipping to remove paint, oil, grease, or other contaminants and to provide roughened surface for proper concrete bonding.

B. Earth: Compact and trim to line and grade before placing concrete. Do not place concrete on frozen surfaces. Dampen surfaces before concrete placement. Expansive soils shall be maintained in a moist condition during construction.

C. Rock: Clean rock surfaces of loose materials, mud, and other foreign matter that might weaken concrete bonding.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 STEEL REINFORCEMENT

A. General: Fabrication and placement of reinforcing for concrete construction shall be in

accordance with the requirements of Title 24, Part 2, California Building Code, and as shown.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.4 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Before test sampling and placing concrete, water withheld from the concrete mixture at the plant may be added at project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 in (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or dobies to form a uniform and open-

textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average low temperature is expected to fall below 40 °F (4.4 °C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 °F (32 °C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.5 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

3.6 FINISHING SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings. **Finish shall be confirmed with pool deck coating manufacturer**.

1. Apply a trowel finish to surfaces exposed to view or to be covered with ceramic tile, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E1155 / ASTM E1155M, for a randomly trafficked floor surface:

a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with

minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.

3.7 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the work.

1. All patches shall be watertight.
2. Contractor shall not use permanent markings on any concrete finishes or finish facing formwork.

3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/ft2 x h (1 kg/m2 x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12 in (300 mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 in (300 mm), and sealed by waterproof tape or

adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by methods recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of tile used on project.

3.9 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland Cement to two and one-half parts fine aggregate passing a No.16 (1.18 mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 in (13 mm) in any dimension in solid concrete, but not less than 1 in (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by owner/architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls,

popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 in (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Repair defective areas, except random cracks and single holes 1 in (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4 in (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
5. Repair random cracks and single holes 1 in (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to engineer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to engineer's approval.

END OF SECTION 131120

SECTION 13 11 21 SWIMMING POOL DECK COATING

PART 1 - GENERAL

1.1 REFERENCE

A. Requirements in Addenda, Alternates and Conditions collectively apply to this work.

1.2 SUMMARY

A. Principal Work Items Are:
   a. Furnish and install EP Enduro-Kote Cement deck coating system on swimming pool deck surfaces, extents shown on construction documents.
   2. Surface preparation of pool deck substrate.
   3. Application of waterproof cementitious topping coat.
   4. Application of sealer or protective coating over finished surface.

B. Related Work Specified Elsewhere:
   1. Section 13 11 00 – Swimming Pool Contractor General Requirements
   2. Section 13 11 20 – Swimming Pool Cast-In-Place Concrete
   3. Section 13 11 25 – Swimming Pool Cementitious Waterproofing
   4. Section 13 11 30 – Swimming Pool Sealants and Caulking

1.3 SUBSTITUTIONS

A. It is the intent of the contract documents to encourage competition. The base proposal must be based on providing the construction methods and materials as specified and detailed. Substitutions or deviations from the basis of design product will not be allowed prior to the bid date.

B. Contractor shall submit their bid to the Owner based on materials, equipment and methods as specified in this section and sections listed in 131100-1.02.B.

C. At the discretion of the Owner and Engineer, proposed substitutions may be considered after the Award of Contract. All proposed substitutions shall include a complete submittal with product data, test data, and documented performance history comparable to the specified product. The Contractor shall provide a list of at least five (5) satisfactory installations comparable to this project installed under the manufacturer’s current legal name, with the name, address and current telephone number of the Owner and Architect of Record for each.

D. Any accepted substitution must have written approval by the Engineer.

E. Any changes or modifications to the contract documents that are not authorized by the Owner, Architect, or Engineer shall be the sole responsibility of the Contractor.

1.4 SUBMITTALS

A. Refer to Division 1 for submittal requirements.

B. Include complete product data indexed, tabbed, and referenced to specifications with 8½" x 11" cover sheet covering:
   1. Manufacturer's product data sheets for EP Enduro-Kote Cementitious Mix (EKC) and Enduro-Kote Emulsion (EKL).
   2. Manufacturer's application guidelines and mixing instructions.
   3. Material Safety Data Sheets (MSDS/SDS) for all product components.
   4. Test data demonstrating compliance with specified performance requirements.
   5. Manufacturer's warranty documentation.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: The applicator shall be experienced in the installation of cementitious waterproof deck coatings and shall have successfully completed a minimum of five (5) comparable commercial pool deck coating projects within the last five (5) years.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the project site in manufacturer's original, unopened containers with labels intact. Store all components in a dry, protected location away from direct sunlight.

B. Do not allow any Enduro Products components to freeze. Store ENDURO-KOTE Emulsion (EKL) above 32°F at all times.

C. Store ENDURO-KOTE Cementitious Mix (EKC) in dry conditions. Protect bags from moisture prior to use.

1.7 PROJECT CONDITIONS

A. Do not apply EP Enduro-Kote Cement prior to or during moist or inclement weather. Normal application shall be limited to an ambient and substrate temperature range of 50°F to 95°F.

B. Concrete substrate shall be completely dry prior to application to promote optimum adhesion. Consult Enduro Products for recommended methods for checking moisture content of the concrete substrate.

1.8 WARRANTY

A. Enduro Products warrants EP Enduro-Kote Cement to be free of defects in materials. No warranty is made as to appearance or color. Enduro Products' sole obligation shall be, at its option, to replace or to refund the purchase price of the quantity of EP Enduro-Kote Cement proven to be defective.

B. Contractor Warranty: The Contractor shall provide a three (3) year warranty against defects in workmanship from the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: EP Enduro-Kote Cement, as manufactured by Enduro Products, Inc.
   1. Corporate Office: 1133 N. Patt Street, Anaheim, California 92801
   2. Phone: (714) 526-5898 | Toll Free: (877) 809-0781
   3. Website: www.endurokote.com | Email: info@endurokote.com

B. Substitutions: As approved by the Engineer in accordance with Section 13 11 21 Article 1.03.

2.2 MATERIALS

A. EP Enduro-Kote Cement: A two-component premixed uniform blend of portland cements and graded washed silica aggregates with a liquid polymer modifier, suitable for interior or exterior waterproof applications on pool decks and related surfaces. System components are:
   1. ENDURO-KOTE Cementitious Mix (EKC): Pre-blended portland cement and graded washed silica aggregate powder, available in 46-lb. bags.
   2. ENDURO-KOTE Emulsion (EKL): Liquid polymer modifier, available in 1-gallon containers and 5-gallon pails.

B. Sealer: Latex or water-based concrete sealer (surface or penetrating type) as recommended by the deck coating manufacturer, suitable for use over cured EP Enduro-Kote Cement on pool deck surfaces.

2.3 PERFORMANCE REQUIREMENTS

A. EP Enduro-Kote Cement shall meet or exceed the following minimum performance criteria when tested in accordance with the referenced ASTM standards:
   1. Compressive Strength (ASTM C109): Minimum 5,325 psi.
   2. Abrasion Resistance (ASTM D 1242, Method A): Shall not exceed the maximum allowable loss in thickness.
   3. Water Absorption (ASTM D 570): Maximum 8.7 percent by weight.
   4. Accelerated Aging – 6 Cycles (ASTM D 756, Procedures D & E): Shall pass bond strength test; minimum average bond strength of 83 psi after aging (ASTM C 297).
   5. Accelerated Aging – 25 Cycles (ASTM D 756, Procedures D, E & F): Shall pass bond strength test; minimum average bond strength of 82 psi after aging (ASTM C 297).
   6. Freeze-Thaw Resistance (ASTM C 67): No breakage, weight loss, cracking, crazing, or delamination; minimum average bond strength of 104 psi after freeze-thaw cycling (ASTM C 297).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that the concrete substrate is of sound structural grade, properly cured, and free of standing water, efflorescence, or other conditions that would adversely affect bonding. Notify the Architect in writing of any conditions that do not comply with these requirements. Do not begin application until all unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. All substrates to receive EP Enduro-Kote Cement shall be of sound structural grade, clean, and free of dust, oil, grease, sealers, curing compounds, laitance, release agents, or other surface contaminants.

B. For best results, apply mechanical abrasion by bead blast or mechanical grinding of the concrete surface. Remove any loose dust or dirt by vacuum cleaning. The cleaning and preparation method selected shall be appropriate to both the substrate and its condition.

C. Concrete shall be completely dry prior to application to promote optimum adhesion. Consult Enduro Products for recommended methods for checking moisture content of the concrete substrate prior to application.

D. When EP Enduro-Kote Cement is to be applied on surfaces other than concrete (i.e., wood, metal, terrazzo, gypsum underlayments, etc.), consult Enduro Products for recommended preparation procedures specific to the substrate type.

E. Plastic drains are to be protected or avoided. Do not allow coating materials to permanently bond to plastic drain components.

3.3 MIXING

A. Mix EP Enduro-Kote Cement by combining components at a ratio of approximately 1 gallon of ENDURO-KOTE Emulsion (EKL) for each 46-lb. bag of ENDURO-KOTE Cementitious Mix (EKC).

B. Add the EKL polymer to the mixing container first, then add the EKC powder. Use a mortar mixing paddle with a low-speed drill (400–500 rpm) and mix thoroughly until the cementitious mix reaches a smooth, homogeneous texture.

C. Do not add EKL polymer after the EP Enduro-Kote Cement has begun to set. Pot life per batch is approximately 15 to 20 minutes, depending on ambient temperature. Mix only as much material as can be applied within the pot life.

3.4 APPLICATION

A. Apply EP Enduro-Kote Cement with a trowel or straight edge to the prepared surface and trowel to the desired texture. EP Enduro-Kote Cement may also be applied to create a knock-down splatter texture. Should a broom finish be desired, finish the surface immediately after placement.

B. Do not add or spray polymer onto the surface for finishing purposes; this may cause the surface to spall.

C. Rough spots or trowel marks may be sanded off using medium to fine grit sandpaper after the EP Enduro-Kote Cement has set. Sanding shall be accomplished no later than 24 hours after application.

D. Refer to the application guidelines for EP Enduro-Kote XL, EP Enduro-Flexkote, and EP Enduro-Lastic Traffic Coating Systems for specific coverage rates and application procedures when EP Enduro-Kote Cement is used as a wearing surface within one of those systems.

3.5 CURING AND SEALING

A. Allow an adequate curing time prior to applying a sealer. Apply a latex or water-based concrete sealer (surface or penetrating type) over the cured EP Enduro-Kote Cement surface. When EP Enduro-Kote Cement is used as a wearing surface, application of a sealer or protective coating is required.

3.6 CLEANING

A. Remove uncured material from tools, equipment, and adjacent surfaces with soap and water immediately after use. Cured material can only be removed mechanically. Clean all tools and equipment with soap and water after each use.

B. Remove all debris and packaging from the project site upon completion of work. Leave surfaces clean and free of coating residue in areas not intended to receive the deck coating.

3.7 CLOSE OUT SUBMITTALS

A. Refer to Division 1 for Close Out Submittal requirements.

B. Provide manufacturer’s warranty documentation and copies of all product data sheets used during construction.

3.8 CONCLUSION

A. It is the intention of these specifications to provide a complete installation. All accessory construction and apparatus necessary in the operation or testing of the performance of

the work shall be included. The omission of specific reference to any part of the work necessary for such complete installation shall not be interpreted as relieving the Contractor from furnishing and installing such parts. Any such omission or clarification shall be brought to the attention of the Architect/Engineer prior to bidding as provided in this section.

END OF SECTION 13 11 21

SECTION 131125 - SWIMMING POOL CEMENTITIOUS WATERPROOFING

PART 1 - GENERAL

1.1 Description

A. Work in this section. Principal Items include:

1. Application of polymer modified cement waterproofing.
2. Waterproofing main drain sumps.

B. Related Sections:

1. Section 131121 – Swimming Pool Cast-In-Place Deck Concrete

1.2 Submittals

A. Comply with requirements of Shop Drawings, Product Data and Samples Section.

B. Product Data: Manufacturer's specifications, data, and installation instructions.

C. Submit list of project references as documented in this specification under Quality Assurance Article. Include contact name and phone number of the person charged with oversight of each project.

D. Quality Control Submittals:

1. Provide protection plan of surrounding areas and non-work surfaces.

1.3 Quality Assurance:

A. Qualifications:

1. Manufacturer Qualifications: .

a. :Company shall be ISO 9001:2015 Certified.
b. Company with minimum 15 years of experience in manufacturing of specified products and systems.

2. Applicator Qualifications: Company with minimum of 5 years’ experience in application of specified products and systems on projects of similar size and scope, and is acceptable to product manufacturer.

a. Minimum of 5 years’ experience in application of specified products and systems on projects of similar size and scope, and is acceptable to product

manufacturer.

b. Successful completion of a minimum of 5 projects of similar size and complexity to specified Work.

1.4 Product Delivery and Storage

A. Comply with manufacturer’s ordering instructions and lead-time requirements to avoid construction delays.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Transport and store in unopened containers and keep in clean, dry condition protected from rain, dew and humidity. If dry onsite storage of bags is unavailable or if project is located in a very wet, humid climate, purchase product in manufacturer's packaged metal pails.

D. Do not stack bags more than two pallets high.

E. Do not allow MasterEmaco® A660 modifying admixture (formerly Acryl 60) to freeze.

1.5 Job Conditions

A. Do not apply in rain or when rain is expected within 24 hours. Do not apply above 90 degrees F (32 degrees C) or below 40 degrees F (4 degrees C) or when temperatures are expected to fall below 40 degrees F (4 degrees C) within 24 hours. For hot and cold temperature applications, store materials and water at 50 degrees F (10 degrees C) to 70 degrees F (21 degrees C) before use.

1.6 Warranty

A. Defects in material, workmanship, and installation of the pool cementitious finish against cracking and delamination for a period of three (3) years.

PART 2 - PRODUCTS

2.1 Materials

A. Waterproof Coating: Sika Thoroseal 581 (Formerly MasterSeal 581) cement based, aggregate type, heavy duty, waterproof coating for concrete or masonry, as manufactured by Master Builders Solutions, or approved equal. Color shall be grey.

1. Bonding and Modifying Mixture: Sika Thoroseal Acryl 60 liquid compound of acrylic polymers and modifiers, as manufactured by Sika Corporation, or approved equal.

B. Water: Clean, fresh, from domestic potable source.

2.2 Proportions and Mixing

A. Materials are specified on a volume basis and shall be measured in approved containers that will ensure that the specified proportions will be controlled and accurately maintained during progress of the work. Measuring materials with shovels (“shovel count”) is NOT permitted.

B. Mixing: Perform mixing in approved mechanical mixers of the type in which quantity of water can be controlled accurately and uniformly. Mix to manufacturer’s recommendations for swimming pool applications. Discard material which has begun to set before it is used; re-tempering is not allowed. Do not use any caked or lumpy materials. Completely empty mixer and mixing boxes after each batch is mixed and keep free of old material.

PART 3 - EXECUTION

3.1 Preparation of Surfaces

A. Surface Conditions Requirements:

1. Existing surfaces to be coated must be smooth and clean. Sandblast existing concrete (old) surface to remove projections, loose particles, foreign matter or construction debris, and make sufficiently rough to provide a strong mechanical bond to 1/16 in amplitude.
2. New concrete to be rough float finish 1/16 in amplitude chip, sandblast, or grind off all defective materials and foreign matter.

B. Surface Repair Requirements:

1. Repair all cracks with “Waterplug” concrete patch, or approved equal.
2. All areas of loose plaster discovered shall be completely removed down to rough concrete.

C. Preparation:

1. Application of waterproofing constitutes acceptance of substrate. Contractor shall be responsible for properly preparing substrate. Any defects from resulting from substrate issues shall be covered under contractor’s warranty.
2. Prior to coating, thoroughly wash entire surface with 2,000 psi high-pressure water.
3. Wet cementitious base surfaces with fine fog water spray to produce a uniformly moist condition.
4. Check gutter grates and accessories for correct alignment before coating is started.
5. Do not apply coating to base surfaces containing frost.

6. Install temporary coverings as required to protect adjoining surfaces from staining or damage by waterproofing operations.

3.2 Application of Waterproofing

A. General: Apply waterproof coating to the manufacturer's minimum thickness at any location. Apply finish coating by manufacturer's approved brushes (do not use a paint brush).

B. Workmanship:

1. Apply waterproof coating in two coats with second coat applied the next day or before material has become too dry or glazed for good bond.
2. Dampen surface immediately ahead of application.
3. Brush on two coats of waterproof coating, each with a minimum thickness as recommended by the manufacturer.
4. Float final brushed on coat with damp sponge 15 minutes after application to provide a smoother finish without waves, cracks, ridges, pits, projections, or other imperfections.
5. Form coating carefully around curves and angles.

C. Curing:

1. Cure waterproof coating with fine water mist spray applied to finish coat three or four times at 8-hour intervals or as drying conditions require to prevent premature drying. Do not fill with water for at least 8 days.

D. Patching and Cleaning up:

1. Upon completion, cut out and patch loose, cracked, damaged, or defective waterproof coating; patches matching existing coating in texture, color, and finish, flush with adjoining coating. Remove waterproof coating droppings or spattering from all surfaces. Leave surfaces in clean unblemished condition ready for pool filling. Remove protective coverings from adjoining surfaces. Remove rubbish and debris from site.

END OF SECTION 131125

SECTION 131130 - SWIMMING POOL SEALANTS AND CAULKING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work in this section. Principal Items include:

1. Labor, materials, and equipment to complete sealants and caulking as indicated and specified.

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. American Society for Testing Materials (ASTM):

a. C920-11 Elastomeric Joint Sealants

1.3 SUBMITTALS

A. All submittals shall be made in accordance with the requirements of Division 1 - General Requirements and in strict compliance with the following procedures and guidelines.

B. Certificates of Conformance or Compliance: Submit certificates from the manufacturers attesting that materials meet the specified requirements.

C. Manufacturers' Descriptive Data: Submit complete descriptive literature for each type of material. Clearly mark data to indicate which type the Contractor intends to provide. Data shall state conformance to specified requirements. Data for sealant and caulking shall include application instructions, shelf life, mixing instructions for multi-component sealants, and recommended cleaning solvents.

1.4 SAMPLE JOINTS

A. Before Sealant and Caulking Work starts, provide a sample of each type of finished joint where directed. The sample shall show the workmanship, bond, and color of sealant or caulking. The workmanship, bond, and color of work throughout the project shall match that of the approved sample joints.

1.5 ENVIRONMENTAL CONDITIONS

A. The ambient temperature shall be within the limits of 40 °F and 100 °F when the

sealant and caulking are applied, unless noted otherwise herein.

1.6 DELIVERY AND STORAGE

A. Materials shall be delivered to the job site in the manufacturer's original shipping containers with brand names, date of manufacture, color, and material designation clearly marked thereon.

B. Containers of elastomeric sealant shall be labeled as to type, class, grade, and use.

C. Carefully handle and store materials to prevent inclusion of foreign materials or subjection to sustained temperatures exceeding 100 °F or less than 40 °F.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Products shall conform to the reference documents listed for each use. Color of sealant shall match adjacent surface color unless specified otherwise. For ASTM C920 sealants, use a sealant that has been tested on the types of substrate to which it shall be applied.

2.2 POOL DECK EXPANSION JOINT FILLER

A. “Deck-O-Foam” expansion joint filler, non-staining closed-cell polyethylene.

B. #16 silica sand.

2.3 POOL DECK EXPANSION JOINT SEALANT

A. “Deck-O-Seal” gun grade 2-part joint sealant 2-part polysulfide 2-component chemically cured polysulfide rubber, color as selected by Owner’s representative.

1. Approved equal:

a. Sika Corporation “Sikaflex 2C SL” 2-component chemically cured urethane sealant, color as selected by Owner’s representative.

1) Immediately after use and before sealant has cured clean equipment with xylene.
2) The cured sealant may be removed by cutting with a sharp-edged tool and thin films by abrading.
3) Protect joint from dirt and traffic overnight. Time for initial cure will vary with humidity and temperature.

PART 3 - EXECUTION

3.1 GENERAL SURFACE PREPARATION

A. Surfaces shall be clean, dry to the touch, and free from frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. Where adequate grooves have not been provided, clean out grooves to a depth of 1/2 in and grind to a minimum width of 1/4 in without damage to the adjoining Work.

3.2 SEALANT PREPARATION

A. Do not modify the sealant by addition of liquids, solvents, or powders. Mix multi-component elastomeric sealants in accordance with manufacturer's printed instructions

3.3 GENERAL APPLICATION

A. Backstops: Where joint cavities are constructed deeper than indicated, tightly pack the back or bottom with backstop material to provide a joint of the depth indicated. Install backstops dry and free of tears or holes.

B. Primer: Just prior to application of sealant, clean out loose particles from joints. Apply primer in accordance with sealant manufacturer's directions. Do not apply primer to exposed finish surfaces.

C. Bond Breaker: Provide bond breakers as recommended by the sealant manufacturer for each type of joint and sealant used.

D. Sealant: Use a sealant that is compatible with the material to and against which it is applied. Do not use a sealant that has exceeded its shelf life or has become too jelled to be discharged in a continuous flow from the gun. Apply sealant in accordance with the manufacturer's printed instructions. Force sealant into joints with sufficient pressure to fill the joints solidly. Sealant shall be uniformly smooth and free of wrinkles.

1. Interior Sealant: Provide sealant at all exposed joints and at all joints indicated to receive sealant.
2. Exterior Sealant: Provide sealant at all joints around the perimeter of openings and at all exposed joints and at all joints indicated to receive sealant.
3. Floor Joint Sealant: Provide sealant in all control joints and in other floor joints indicated or specified.

3.4 POOL DECK EXPANSION JOINT SEALANT

A. Joint Preparation

1. The number of joints and joint width should be designed for a maximum of ±25%

movement. The depth of the sealant should be 1/2 the width of the joint with a maximum depth of 1/2” (12.7 mm) and a minimum of 1/4” (6.35 mm).

2. In joints of 1/4 in to 1/2 in (6.4 mm to 12.7 mm), the sealant depth at midpoint should be 1/4 in (6.4 mm). In joints of 1/2 in to 1 in (12.7 mm to 25.4 mm), the depth at midpoint should be 1.4 in to 1/2 in (6.4 mm to 12.7 mm).
3. Control the sealant depth in deep joints with closed-cell backer rod or soft backer-rod. Where the joint depth does not permit the use of backer rod, a bond breaker (polyethylene strip) must be used to prevent three-point bonding.
4. To maintain the recommended sealant depth, install backer rod by compressing and rolling it into the joint channel without stretching it lengthwise. Backer rod should be about 1/8 in larger in diameter than the width of the joint to allow for compression. Backer rod becomes an integral part of the joint. The sealant does not adhere to it, and no separation bond breaker is required. Do not prime or puncture the backer rod.

B. Surface Preparation

1. Remove any old joint sealing material by mechanical means. If joint surfaces have absorbed oils, sufficient concrete must be removed to ensure a clean surface.
2. Joint surfaces must be structurally sound, dry, clean, and free of all loose aggregate, laitance, oil, grease, asphalt, paint, wax, mastic compounds, waterproofing compounds, or form release materials.

C. Priming

1. Prime Joint surfaces with manufacturer’s recommended primer for the substrate before sealing. If the surfaces are other than shotcrete or concrete, test first to determine adhesion. Seek technical assistance from manufacturer.
2. Apply primer in a thin uniform film. Avoid buildup of film.
3. Allow approximate 30 minutes drying time before applying sealant.
4. Reapply primer if not sealed the same day.
5. To minimize contamination of adjacent surfaces, apply masking tape and remove before sealant has begun to thicken and set.
6. Coverage rate of primers is approximately 35 ft2 per pint.

D. Mixing

1. Two two-component systems must be thoroughly mixed before use. The oversize Part-A container allows for the addition and mixing of Part-B and the color pigment.
2. 1-1/3 gallon (5.67 L) unit: (1) Transfer Part-B to Part-A container using a spatula or knife. It is imperative that the entire contents of Part-B be combined with Part-A. (2) With a slow speed drill and a slotted mixing paddle, thoroughly mix for 3 minutes. The paddle blade must be kept below the sealants surface to avoid whipping in air. (3) Transfer the contents of the pigment can into the mixed Part-A and Part-B. Use a spatula or knife, removing the entire con tents to ensure consistent color. (4) Continue mixing with a slow speed drill and slotted paddle until color is uniform. During the process, the sides and bottom of the base can and the paddle itself several times.

3. 3 gallon (11.37 L) unit: Use 2 Part-B and 2 pigment container for each Part-A container. Mix as instructed under 1-1/2 gallon (5.69 L) unit.
4. Pot life of the sealant is dependent upon temperature.

E. Application

1. All caulking and sealing be should be performed when temperatures are above 40 °F (+4 °C) any moisture or frost on surfaces shall adversely affect adhesion.
2. Ideally, the temperature at the times of application should be the median of temperature extremes when the joint width opening is at its midpoint.
3. Fill joints from the bottom; avoid bridging of the joint that might form air voids.
4. For large joints, the self-leveling grade may be poured directly form the can.
5. For smaller joints and for all slope-grade applications, fill the joint by flowing the sealant from a bulk-loading gun.
6. Light tooling of the sealant is recommended to smooth out ripples. On sloped surfaces, tool from lowest point to highest.

F. Clean Up

1. Immediately after use and before sealant has cured clean equipment with xylene.

G. Curing

1. The cured sealant may be removed by cutting with a sharp-edged tool and thin films by abrading.
2. Protect joint from dirt and traffic overnight. Time for initial cure will vary with humidity and temperature.

3.5 BACKER ROD

A. Installation

1. Closed-cell backer rod must be compressed in the joint at the time of installation. For joint widths up to 3/4 in (19.1 mm), the diameter of the rod should be 1/8 in (3.18 mm) larger than the width of the joint. For 3/4 in (19.1 mm) wide joints use 1 (25.4 mm) diameter rod.
2. Closed-cell backer rod may be easily installed with a blunt probe or a plain-faced roller to force the rod to the desired depth. A template or roller gauge may be used to control the depth at which the rod is placed. Do not puncture, fold, or crease backer-rod. Follow sealant manufacturer’s suggestions for joint sealant width and depth ratio.
3. Backer rod may be omitted if a backer rod is integrated into expansion joint filler. Backer rod is required if sand is used as expansion joint filler.

3.6 PROTECTION

A. Protection: Protect all areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled.

B. Cleaning: Immediately scrape off fresh sealant that has been smeared on masonry and rub clean with a solvent as recommended by the sealant manufacturer. Upon completion of application, remove all remaining smears and stains resulting there from and leave the Work in a clean and neat condition.

END OF SECTION 131130

SECTION 131140 - SWIMMING POOL PLASTER

PART 1 - GENERAL

1.1 REFERENCE

A. Requirements in Addenda, Alternates and Conditions collectively apply to this work.

1.2 DESCRIPTION

A. Principal Work Items Are:

1. Swimming pool plaster finish.
2. Swimming pool start-up and maintenance.

B. Related Work Specified Elsewhere:

1. Section 131100 – Swimming Pool Contractor General Requirements
2. Section 131109 – Swimming Pool Start Up
3. Section 131120 – Swimming Pool Cast-In-Place Concrete
4. Section 131125 – Swimming Pool Cementitious Waterproofing
5. Section 131130 – Sealants and Caulking
6. Section 131145 – Swimming Pool Trim Tile

1.3 SUBMITTALS

A. All submittals shall be made in accordance with the requirements of Division 1 - General Requirements and in strict compliance with the following procedures and guidelines.

B. Procedure: The Contractor shall submit to the Engineer at least four weeks prior to the start of plaster installation the procedure for initial fill and chemical dosing for initial water chemistry balancing.

C. Samples: Provide 4 in minimum sample at the site showing color and texture for pool plaster. Finished plasterwork shall match the approved sample panel.

D. Certificates: Submit certificates attesting that the materials furnished meet the requirements specified herein.

E. Test Report: Submit results of domestic water analysis.

1.4 PRODUCT DELIVERY AND STORAGE

A. Deliver manufactured materials to site in manufacturers' original unbroken packages or

containers bearing manufacturers' name and brand labels. Keep cementitious materials dry until ready to be used and stored off the ground, under cover, and away from damp surfaces.

1.5 JOB CONDITIONS

A. Apply plaster in exterior swimming pool only when ambient temperature is above 40 °F and below 90 °F, and protect applied plaster from rapid drying by sun or wind until curing is completed or pool is filled with water.

B. Do not install plaster during rain. Do not begin plastering is there is a chance of rain within 24hrs of the plastering. If it begins to rain during the plastering process, see section 1.06 “Protecting plaster in unanticipated circumstances”.

C. Do not install plaster if the wind conditions are greater than 10 MPH. Do not begin plastering is there is a chance of 10MPH or greater wind within 24hrs of the plastering. If the wind raises above 10MPH during the plastering process, see section 1.06 “Protecting plaster in unanticipated circumstances”.

D. Make every effort to apply plaster as late in the construction schedule as possible to avoid staining or damage to the finish.

E. Protect interior plaster applications from construction debris. Stains or damage occurring as a result of inadequate care may result in the rejection of the installation and require complete removal and re-installation at the contractor’s expense.

1.6 PROTECTING THE PLASTER DURING UNANTICIPATED WEATHER EVENTS

A. If the weather becomes a threat to the plaster during the plastering process before the plaster has cured, the following steps shall be followed

1. Plaster already placed shall be protected until cured.
2. Plastering shall continue until the plaster abuts tilework. Plastering should then stop until the weather turns favorable. All plasterwork shall be protected until cured.

    a. There shall be no cold joints in the plaster

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement: ASTM C150, Type I White Portland cement. Manufacturer, Federal Cement.

B. Hydrated Lime: ASTM C206, Type S.

C. Aggregate: Georgia Marble Pool Aggregate, Riverside Premium Pool Aggregate, or approved equal. Mix per manufacturer’s recommendations for specific application. If an onsite mix is used, aggregate must be white marble dust uniformly graded within the following limits, all passing the No. 30 sieve:

D. Color: Swimming Pool plaster shall be white in color.

E. Water: Clean, fresh, from domestic potable source, free from injurious amounts of acid, alkali, and organics.

2.2 PROPORTIONS AND MIXING

A. Materials are specified on a volume basis and shall be measured in approved containers that will insure that the specified proportions will be controlled and accurately maintained during the progress of the work. Measuring materials with shovels ("shovel count") is not permitted.

B. White Marble Pool Plaster Finish Coat: Mix finish in proportion of one part by volume of White Portland cement to not more than two parts by volume of sand (specified white marble dust).

C. Mixing: Perform mixing in approved mechanical mixers of the type in which quantity of water can be controlled accurately and uniformly. While mixer is in continuous operation, charge approximately 90% of estimated quantity of water, half of sand, all cement, and the other one-half of the sand into mixer in that sequence and mix thoroughly with remainder of water until mixture is uniform in color and consistency. Avoid excess mixing to prevent hasty solution of cement resulting in accelerated set. Discard plaster which has begun to set before it is used; re-tempering is not allowed. Do not use any caked or lumpy materials. Completely empty mixer and mixing boxes after each batch is mixed and keep free of old plaster.

PART 3 - EXECUTION

3.1 PREPARATION OF SURFACES

A. Removal of existing plaster and tile

1. All surfaces to receive new plaster shall be stripped of all existing finishes, including plaster and tile, by use of hydroblasting, a chipping gun or by picking down to the bare concrete. Expose a clean rough surface to receive new plaster.

B. Clean base surfaces of projections, dust, loose particles, grease, bond breakers, and foreign matter; make sufficiently rough to provide a strong mechanical bond.

1. Do not apply plaster directly to the surfaces of masonry or concrete that is coated with any membrane-forming curing compound or similar agent until compound or agent is completely removed by sandblasting.
2. Thoroughly wash entire surface with 6,000 psi high-pressure water immediately

prior to plastering.

3. Wet cementitious base surfaces with a fine fog water spray to produce a uniformly moist condition. Ensure no visable water is present on the surface when the pool finish is applied. Check screeds, pool equipment, and accessories for correct alignment before plastering is started.
4. Do not apply plaster to base surfaces containing frost.
5. Install temporary coverings as required to protect adjoining surfaces from staining or damage by plastering operations.

C. External project considerations

1. The pool mechanical equipment shall be operational.
2. The health department and/or other governing agencies shall have approved the pools or spas for plaster.
3. All chemicals required to balance the pool are onsite and ready to be used.
4. All pool related piping have been flushed.
5. Provide initial cleaning of the surge tank and overflow perimeter skimming system (gutter) of all loose debris and sediment.
6. Decking work is complete.
7. The pool is protected from any cleaning or additional construction work to be completed that may introduce debris into the pool area.

D. The Contractor shall confirm all chemicals necessary for initial pool balance are on site 3 days prior to the start of plaster application.

3.2 APPLICATION OF PLASTER

A. General: Apply finish plaster to minimum 3/8 in thickness at any location. Apply finish plaster by hand or machine. If plastering machine is used, control fluidity of plaster to have a slump not exceeding 2-1/2 in when tested using a 2 in x 4 in x 6 in high slump cone. Do not add additional water to the mix subsequent to determining water content to meet this slump. Perform slump test according to following procedure:

1. Place cone on level, dry, non-absorptive base plate.
2. While holding cone firmly against base plate, fill cone with plaster taken directly from hose or nozzle of plastering machine, tamping with a metal rod during filling to release all air bubbles.
3. Screed off plaster level with top of cone. Remove cone by lifting it straight up with a slow and smooth motion.
4. Place cone in a vertical position adjacent to freed plaster sample using care not to disturb base plate.
5. Lay straightedge across top of cone being careful not to vibrate cone; measure slump in inches from bottom edge of straightedge to the top of slumped plaster sample.

B. Workmanship:

1. Apply finish plaster in no less than two coats by "double-back" method with second coat applied as soon as first coat is tamped and initially floated. Apply plaster with sufficient pressure to provide a good bond on bases.

2. Work plaster to screeds at intervals of from 5 ft to 8 ft, or closer as required on curved surfaces.
3. Finish plaster to tolerance of -0 to +1/8 inch in thickness on curved surfaces and to 1/8 in in 8 feet on straight surfaces.
4. Apply smooth trowel finish without waves, cracks, trowel marks, ridges, pits, crazing, discoloration, projections, or other imperfections. Form plaster carefully around curves and angles, well up to screeds.
5. Take special care to prevent sagging and consequent drooping of applications. Produce surfaces free of visible junction marks in finish coat where one day's work adjoins another.

C. Curing: Cure plaster with fine fog water spray applied to finish coat as frequently as required to prevent dry-out of plaster. Keep plaster damp until pool is filled. Prevent damage or staining of plaster.

D. Patching, Pointing, and Cleaning Up:

1. Upon completion, cut out and patch loose, cracked, damaged, or defective plaster; patches matching existing plaster in texture, color, and finish, flush with adjoining plaster.
2. Perform pointing and patching of surfaces and plasterwork abutting or adjoining any other finish work in a neat and workmanlike manner. If 10% or more of the pools plaster finish is found to be defective, the plaster shall be removed and replaced completely for the entire pool.
3. Remove plaster droppings, voids, holes or spattering from all surfaces. Leave plaster surfaces in clean, unblemished condition ready for pool filling. Remove protective coverings from adjoining surfaces. Remove rubbish and debris from the site.

3.3 START-UP SPECIFICATIONS

A. Contractor shall employ a qualified water testing agency to analyze the domestic water with which the pool will be filled within 2 weeks of the plaster date, and shall employ a swimming pool experienced, water chemistry consultant to determine types and quantities of chemicals required to ensure calcium-balanced water immediately upon the completion of water filling.

1. Have on hand quantities of the chemicals as determined above, plus 25% overage for follow-up treatment. These chemicals, typically including calcium chloride, bicarbonate of soda, and muriatic acid, are in addition to standard chlorine/chlorine products and alkalizer/pH control products required elsewhere.

B. Care shall be taken in filling the pool to assure that the water source is clean and potable and free of contaminants that could stain the fresh plaster. Flush all water lines that have not been in continuous operation before filling the pool.

C. The pool shall not be plastered until the filtration system and chlorination system are complete and ready for start-up.

1. Contractor shall notify the Owner in writing of start-up at least two weeks prior to

the plaster date.

2. The Owner is responsible for supplying chlorine/chlorine products and alkalizer/pH control products for maintenance of the pool by the automatic treatment systems.
3. Should these automatic treatment systems fail or if the Contractor fails to notify the Owner as required, the Contractor shall supply all chemicals required for manual treatment of the pool water.

D. Contractor shall maintain swimming pool for a minimum 14 consecutive days in conjunction with the mechanical system operational test.

1. This maintenance period shall be extended with the mechanical system operational test if required per specifications.
2. During this time, brush the entire pool plaster surface daily starting immediately after filling pool for a minimum of 5 days to remove plaster dust, periodically clean grates until no further accumulation of foreign material occurs, and add chemicals as required for acceptable water quality.
3. The pool shall be vacuumed to maintain a clean and new condition throughout the minimum 14-day period starting no sooner than 5 days after the date of plaster.
4. In no instance, shall the pool maintenance and cleaning responsibilities cease prior to gainful occupancy of the entire facility by the Owner.
5. After successful conclusion of the mechanical system operational testing, clean grates, vacuum pool, and leave the pool ready for use.

E. Clean-Up

1. Before the contractor leaves the site, the site shall be cleaned of all debris created due to the work. The site shall be left in a presentable condition, as determined by the owner or owners representative.

END OF SECTION 131140

SECTION 131145 - SWIMMING POOL TRIM TILE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work in this Section: Principal items include:

1. Ceramic tile for swimming pool.

2. Coping Stone for swimming pool.

1.2 QUALITY ASSURANCE

A. Reference Standards: Conform to the following standards unless otherwise required herein:

1. American Concrete Institute

   a. ACI 302 - Guide for Concrete and Floor Slab Construction

2. American National Standards Institute (ANSI):

   a. A108 - Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile Installed With Portland Cement Mortar.
   b. A137.1:2012 Standard Specifications for Ceramic Tile.

3. American Society for Testing and Materials (ASTM):

   a. C150 Portland Cement
   b. C171-16 Sheet Materials for Curing Concrete
   c. C206-14 Finishing Hydrated Lime

4. Tile Council of North America (TCNA): Latest Edition, Handbook for Ceramic Tile Installation.

B. Related Sections

1. 131100 – Swimming Pool Contractor General Requirements
2. 131109 - Swimming Pool Start Up
3. 131120 - Swimming Pool Cast-in-PlaceConcrete
4. 131125 - Swimming Pool Cementitious Waterproofing
5. 131130 – Swimming Pool Sealants and Caulking
6. 131140 - Swimming Pool Plaster

1.3 SUBMITTALS

A. All submittals shall be made in accordance with the requirements of Division 1 - General Requirements and in strict compliance with the following procedures and guidelines.

B. Product Data:

1. Submit the tile manufacturer's printed data identifying each field tile unit and each trimmer and shaped unit by model or type number.

2. Submit coping manufacturer's printed data including coping compressive strength and full dimensions.

C. Samples: Submit the following for selection and approval:

1. Each type, shape, and trimmer of tile in each required color.
2. Joint grout colors for each color of tile.

3. Coping sample
4. Grout colors for Coping

D. Master Grade Certificates: Submit for each lot of tile before installing

1.4 PRODUCT DELIVERY AND STORAGE

A. Deliver tile materials to site in unopened factory containers sealed with Grade Seals bearing printed name of manufacturer and the words "Standard Grade". Keep the Grade Seals intact and containers dry until tiles are used. Keep cementitious materials dry until used.

1.5 JOB CONDITIONS

A. Inspect and verify job conditions. Report all defects in base surfaces to Architect/Engineer for correction before proceeding.

B. Maintain a temperature range of 40 degrees Fahrenheit to 90 degrees Fahrenheit during installation of tile , coping and grout materials. Tile installation should cure for a minimum 14 days with average an temperature of 70 degrees, while maintaining the minimum 40 degrees and maximum 90 degrees Fahrenheit, prior to filling pool with water.

1.6 WARRANTIES

A. The Contractor warrants to the Owner that materials and equipment furnished under the contract will be of good quality and new unless otherwise required or permitted by the contract documents, that the work will be free from defects not inherent in the quality required or permitted and that the work will conform to the requirements of the contract documents. Work not conforming to these requirements including substitutions

not properly approved and authorized, may be considered defective.

B. The Contractor's warranty excludes remedy for damage or defect caused by abuse, improper or insufficient maintenance, improper operation, modifications not executed by the Contractor or improper wear and tear under normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

C. All warranties shall be for a period of five years, unless otherwise specified.

D. All setting materials shall be provided by the same manufacturer. All mixing materials and application procedures shall be done in accordance with manufacturer's recommendations and requirements. Documentation shall be provided to this effect by the contractor with verification from the manufacturer. This documentation shall be included in the operations and maintenance manual under warranties as documentation qualifying the project for a Lifetime Systems Warranty by Laticrete International, Inc. or approved equal.

E. The Contractor shall agree to repair or replace any work at no cost to the Owner upon written notification from the Owner within the warranty period. Pro-rated warranties are not acceptable.

PART 2 - PRODUCTS

2.1 BASIC MATERIALS

A. Portland Cement: ASTM C150, Type II, low alkali

B. Hydrated Lime: ASTM C207, Type S.

C. Mortar sand: ASTM C144, at least 4% passing No. 100 sieve.

D. Joint sand: Same as mortar sand, except all passing the No. 30 sieve.

E. Water: From domestic potable source

F. Color pigments: Pure ground mineral oxides, non-fading, alkali and lime proof, factory weighed and packaged.

2.2 TILE MATERIALS

A. Manufacturer

1. Tile Products: Dal Tile, American Olean, Cepac, Agrob Buchtal or approved equal.

B. Standard Grade conforming to ANSI A137.1. Additional Tile Requirements include:

1. Provide trim units as indicated and specified, including special shapes as

detailed or required.

2. Tile patterns and colors shall be as indicated and specified, colors of approved shades.
3. Mesh mounted or perforated paper backed tile is not allowed where the mesh of paper remains as a permanent part of the installation. If dot mounting is used, a minimum of 67% of the depth of the tile shall be free from any dots to ensure proper grout curing.
4. All 1” x 1” tiles shall be face mounted as guaranteed suitable for pool use by the manufacturer.
5. Use factory-made half-size units where required for tile numbers, or make the half-size units by precision cutting on powered tile saw.
6. Ease all cut tile edges prior to installation.

C. Glazed Ceramic Tile – See Drawings for location, quantity, and size.

1. Water Line Tile
2. Waterline Depth Marking Tile

D. Unglazed Ceramic Mosaic Tile

1. “NO DIVING” Warning Tile
2. Depth Marking Tile
3. Stair Entry Tile
4. Stair Nosing Tile – Daltile Keystones 1”x1” Cap Wall Tile
5. Main Drain Trim Tile
6. Lane Marking tile
7. Wall TargetTile

E. Trim Units: Provide tile trim units where indicated or necessary for complete and finished installation. Provide bullnose units for external corners and angles. Internal corners shall be squared. External corners shall be mitered. Provide trim units of material and finish identical to adjoining tile, except slip-resistant surfacing is not required for curved or vertical trim units. Provide special type slip-resistant tread nosing units as indicated.

2.3 COPING MATERIALS

A. The coping shall have the shape as shown on the construction drawings. All concrete shall be 4,000 PSI minimum. Cast-In-Place Coping shall not be accepted.

2.4 SETTING BED MORTAR

A. Manufacturer: LATICRETE International Inc., 3701 Fortified Mortar Bed, thick bed mortar. Polymer fortified blend of carefully selected polymers, Portland cement and graded aggregates. Exceeds ASTM C270 Requirements. Mix and Apply in accordance with Manufacturer’s recommendations.

1. Tile and coping Setting Products: LATICRETE International Inc., Mapei

Corporation or approved equal.

2.5 BOND COAT

A. Manufacturer: LATICRETE International Inc., 254 Platinum one step, polymer-fortified thin-set mortar. Exceeds ANSI A118.4 Shear Bond Strength Requirements & ANSI A118.15 (ISO 13007 C2TES1). Mix and apply in accordance with Manufacturer's recommendations as a Bond Coat (placed under setting bed mortar screeds at 'horizontal surfaces').

2.6 THINSET

A. Manufacturer: LATICRETE International Inc., 254 Platinum one step, polymer-fortified thin-set mortar. Exceeds ANSI A118.4 Shear Bond Strength Requirements & ANSI A118.15 (ISO 13007 C2TES1). Mix and apply in accordance with Manufacturer's recommendations.

B. Manufacturer: LATICRETE International Inc., LATAPOXY 300 OR LATAPOXY BIOGREEN 300. Exceeds ANSI A118.3. Mix and apply in accordance with Manufacturer's recommendations

2.7 TILE JOINT GROUT

A. Manufacturer: LATICRETE International Inc., Spectra Lock Pro Premium Grout Exceeds ANSI A118.3 (ISO 13007-3 RG), patented high performance grout. Mix and Apply in accordance with Manufacturer's recommendations.

B. Plaster Finish: See Specification 131140.

2.8 COPING JOINT GROUT

A. Manufacturer: LATICRETE International Inc., Spectra Lock Pro Premium Grout Exceeds ANSI A118.3 (ISO 13007-3 RG), patented high performance grout. Mix and Apply in accordance with Manufacturer's recommendations.

2.9 MIXING AND APPLICATION PROCEDURES

A. All mixing and application procedures shall be done in accordance with the manufacturer's recommendations, requirements, and guidelines. A manufacturer's representative shall visit the site to verify field conditions, confirm materials and application requirements, and confirm that all materials and systems are installed per the manufacturer's recommendations, requirements, and guidelines. Documentation shall be provided to this effect for the Design Team's records.

PART 3 - EXECUTION

3.1 PREPARATION

A. The Swimming Pool and Wading Pool surface shall be structurally sound and free of any foreign substances and debris that could reduce or impair adhesion. Sound and remove all loose concrete to firm substrate. Clean substrates of dust, dirt, oil, grease, and deleterious substances. Conform to applicable Reference Standards and to recommendations of manufacturers of materials used. Thoroughly wash/rinse with clean potable water.

B. Surface defects or holes in the substrate shall be patched per manufacturer’s recommendations.

C. Substrates To Receive Mortar Setting Beds: Keep cementitious backing damp for at least 8 hours and scrub with a neat Portland cement slurry just prior to placing setting bed mortar.

D. Tile Wetting: Dampen tile according to above Reference Standards or tile manufacturer's instructions, as required.

E. Screeds: Accurately set temporary screeds to control the finish plane of mortar-bed set tile and remove as soon as setting bed is sufficiently hardened. Fill void spaces from screeds with same mortar.

3.2 TILE INSTALLATION

A. Arrange tile according to patterns detailed, set tile flush with well-fitted joints, finish in true planes, that are plumb and square, and with joints of uniform size. Provide approved trimmers as shown or required. Cut tile without marring. Carefully grind and joint tile edges and cuts. Set tiles to avoid puddles and ponding in large fields and arrange curved field joints at radiuses that minimize joints and tapered grout joints.

B. Mortar Bed Set Tile: Apply bond coat under dry pack screed mortars at horizontal surfaces (vertical renders / leveling mortars are mixed to a more plastic / plaster like consistency and typically do not require a bond coat). While bond coat remains wet and tacky, apply specified setting bed mortar, tamp, and screed to required planes. Spread no more mortar than can be covered with tile before initial set. Do not use re-tempered mortar. Trowel 1/32" to 1/16" thick bond coat over plastic setting bed mortar just before setting tile or apply bond coat to back of each tile placed. Set tile in position and beat firmly into the setting bed mortar. Bring tile faces to a true and proper plane. Complete all beating and leveling before mortar sets and in no case later than one hour after first placing. When ready, wet and remove paper and glue avoiding excess water. Adjust any out-of-line or out-of-level tile.

C. Ceramic Tile Joint Grouting:

1. For tile 3 inches below waterline and above: Grout tile joints full after washing out and saturating with clean water. Mix grout with water to a thick creamy

consistency and force into joints for entire joint depth, flush with surface. Clean off all excess and fill skips and gaps before grout sets. Use white grout throughout. Provide dampness for minimum 3-day curing and polish with clean dry cloths. Unless otherwise approved, install tile with uniform 3/32 inch joint width. A maximum 1/8" joint width may be utilized to meet specific installation requirements, if required.

2. For tile at least 3 inches below waterline: Grout tile joints full after washing out and saturating with clean water with plaster finish. See specification 131140.

D. Tile Expansion Joints: Install tile with uniform 1/8" joint width. Place expansion joint per applicable TCNA Method P601MB, P601TB, or P602 and conforming to Method EJ171. Provide shop drawings showing backer rod and joint dimensions. All expansion, control, construction, cold, and seismic joints in the pool structure should continue through the tile work, including such joints at vertical surfaces. Movement joints shall be placed at all changes in direction and elevation. Refer to the structural engineer for additional required movement joints. Joint size shall be a minimum of 1/8”. Joints through tile work directly over structural joints shall not be narrower than the structural joint. The Contractor shall use cement compatible coatings when using chalk lines for joint layout purposes.

3.3 CLEANING AND PROTECTION

A. Remove stains, cement, grout, and foreign matter after grouted joints are fully set as recommended by TCNA and manufacturers of proprietary materials. Do not use any acid for cleaning free of both sodium and potassium. Repair all defective joints until approved.

B. Protect installed tile work with non-staining Kraft paper, polyethylene sheeting, or other approved heavy covering during the construction period to prevent damage.

3.4 TESTING AND INSPECTION

A. Before filling of the pool, and its subsequent provisional acceptance at substantial completion, the tile installation shall be visually inspected and sounded in the presence of the Architects and/or the Owner’s representative to verify adhesion of the tile to its substrate as well as its overall compliance with the requirements of this Section. Any and all tile work found to be loose, improperly adhered, out of plane, misaligned or otherwise non-conforming shall be removed and replaced at no additional cost to the Owner.

3.5 POOL FILLING AND EMPTYING

A. Use a fill and drain rate of 2 feet per 24 hours to minimize thermal shock and structural movement. Maintain a temperature differential of 10 degrees Fahrenheit or less between the pool water and the substrate during fill and drain cycles.

3.6 REPLACEMENT TILE

A. Provide Owner with approximately 10% or 25 square feet (whichever is least) of each color and type tile used on the project for Owner's repair and replacement requirements.

END OF SECTION 131145