SECTION 13 11 00– SWIMMING POOL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The scope of the work included under this Section of the Specifications shall include swimming pool(s) as illustrated on the Drawings and specified herein. The General and Supplementary Conditions of the Specifications shall form a part and be included under this Section of the Specifications. The Swimming Pool Subcontractor shall provide all supervision, labor, material, equipment, machinery, plant and any and all other items necessary to complete the work. ALL OF THE WORK IN SECTIONS 13 11 00 - 13 11 08 IS TO BE THE RESPONSIBILITY OF ONE EXPERIENCED SWIMMING POOL SUBCONTRACTOR PRIMARILY ENGAGED IN THE CONSTRUCTION OF COMMERCIAL PUBLIC-USE SWIMMING POOLS. A SWIMMING POOL SUBCONTRACTOR SHALL BE CONSIDERED PRIMARILY ENGAGED AS REQUIRED HEREIN IF THE SUBCONTRACTOR DERIVED 50% OF ITS ANNUAL REVENUE FROM PUBLIC-USE SWIMMING POOL CONSTRUCTION FOR EACH OF THE LAST FIVE YEARS. THE SUBCONTRACTOR MUST HAVE ALSO, IN THE LAST FIVE YEARS CONSTRUCTED AT LEAST FIVE (5) COMMERCIALLY DESIGNED MUNICIPAL or COMMERCIAL AND PUBLIC-USE SWIMMING POOLS, IN THE BALTIMORE - WASHINGTON DC METROPOLITIAN AREA (as designated by the United States Office of Management and Budget), EACH OF WHICH SHALL HAVE INCORPORATED A MINIMUM SIZE OF 6,000 SQUARE FEET OF WATER SURFACE AREA WITH A STAINLESS STEEL PERIMETER OVERFLOW GUTTER AND SELF-MODULATING BALANCE TANK AND WET PLAY FEATURES. The Swimming Pool Subcontractor shall furnish and install the swimming pool structures, finishes, cantilever forming, swimming pool mechanical and electrical systems, and all accessories necessary for a complete, functional swimming pool system, as herein described. Work shall include start-up, winterizing and summerizing preparation (for first Winter and first Summer), instruction of Owner’s personnel, as-built drawings and warranties as required.

1.2 CODES, RULES, PERMITS, FEES

A. The swimming pools shall be constructed in strict accordance with the applicable provisions set forth by authorities having jurisdiction over swimming pool construction and operation in the State of Maryland and Montgomery County, Maryland.

B. The Swimming Pool Subcontractor shall give all necessary notices, obtain all permits, and pay all government sales taxes, fees, and other costs in connection with their work; file all necessary plans, prepare all documents and obtain all necessary approvals of governmental departments having jurisdiction; obtain all required certificates of inspection for their work and deliver same to the Designated Representative before request for acceptance and final payment for the work.

C. The Swimming Pool Subcontractor shall include in the work any labor, materials, services, apparatus, or drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.

D. The Contractor shall submit all required documents and materials to all Governmental Departments having jurisdiction for any deferred approval items or substituted materials or products to obtain final approval to installation.

1.3 DESCRIPTION OF WORK

A. Furnish and perform supervision, coordination, all layout, formwork, excavation, hand trim, disposing off-site of all unused material or debris to complete the swimming pool excavation to the dimensions shown on the plans.

B. Furnish and install complete swimming pool structures, including reinforcing steel and cast-in-place or pneumatically placed concrete walls and floors.

C. Furnish and install swimming pool finishes, including ceramic tile and marble plaster or other waterproof finishes.

D. Furnish and install complete swimming pool mechanical system(s), including, but not limited to, circulation systems, filtration systems, pool water heating systems, water chemistry control and disinfection systems, domestic water fill line systems, booster pump and special effects systems, and all pumps, piping, valves, and connections between system(s) and swimming pool(s).

E. Furnish and install complete swimming pool electrical system(s) from P.O.C. in Mechanical Room, including, but not limited to, water level control systems, recreational water features, water slides, special effects systems, control circuitry, motor starters, time clocks, bonding, and all conduits, conductors, contactors, and switches between the system(s) and swimming pool(s).

F. Furnish and install stainless steel pool gutter, deck equipment and required anchors and inserts for the specified equipment as required by code, shown on the Drawings and specified herein.

G. After the initial filling of the swimming pool system(s), should any repairs, continuing work, or other Subcontractor responsibility require drainage or partial drainage of the swimming pool systems, the Swimming Pool Subcontractor shall be responsible for any subsequent refilling and shall complete the project with the swimming pool system(s) full of water, water in chemical balance, complete in every way, and in full operation.

H. Furnish and install of waterslides and water play features.

I. Coordinate and provide the first seasonal cycle of winterization and subsequent summerization of the pools. To be coordinated with owner's representative who will provide qualified staff to work alongside the contractor's personnel for the initial winterization and summerizing.

1.4 ASSIGNED RESPONSIBILITIES AND RELATED WORK

A. It is the intent of this section of the Specifications to clarify Work responsibilities of the trades directly and indirectly involved in construction of the pool systems. All labor, equipment, materials and supplies furnished by the Swimming Pool Subcontractor and other Subcontractors per the contractual agreement with the General Contractor and Owner and shall be as directed by the Owner through their Designated Representative.

B. THE SWIMMING POOL SUBCONTRACTOR SHALL NOT SUBCONTRACT ANY PORTION OF THE SWIMMING POOL CONSTRUCTION OR SWIMMING POOL EQUIPMENT INSTALLATION TO ANYONE OTHER THAN A SUBCONTRACTOR THAT SATISFIES THE REQUIREMENTS OF SECTION 13 11 00

C. References to “swimming pool systems” shall include the swimming pools, equipment, and accessories.

D. The Owner will provide one complete water filling of the swimming pool(s), but will not assume any responsibility for the swimming pool system(s) until they have been proved fully operational, complete in every way and accepted by the Designated Representative.

E. Pool Contractor to coordinate with General Contractor to schedule preconstruction meeting (which may be virtual) with Architect, City, General Contractor prior to any swimming pool construction.

1.5 RESPONSIBILITIES OF THE CONTRACTOR

A. The Contractor shall grade the swimming pool site(s), establish benchmarks, cut and fill as necessary to provide as level an area as possible at swimming pool deck elevation before swimming pool layout.

B. The Contractor shall be responsible for horizontal dimensions and grade elevations accurately from established lines and benchmarks (as indicated on the Drawings) and be responsible for those grades.

C. The Contractor shall provide adequate temporary light, electric power, heat and ventilation per Federal and State OSHA requirements to construct the swimming pool system(s).

D. The Contractor shall not permit any heavy equipment activity over any area or within five (5) feet of any area under which swimming pool piping is buried. There shall be no exceptions to this requirement.

E. The Contractor shall keep the swimming pool excavation(s) and swimming pool structure(s) free of construction residue and waste materials of their workmen or Subcontractors, removing said material from the swimming pools as required.

F. The Contractor shall protect the swimming pool(s) from damage caused by their construction equipment and /or workmen and Subcontractors.

G. The Contractor shall provide a representative at time of swimming pool start-up to coordinate all trades related to swimming pool system(s).

1.6 RESPONSIBILITIES OF THE MECHANICAL SUBCONTRACTOR

A. The Mechanical Subcontractor shall be licensed in the State of Maryland and the City of Rockville and provide written notifications to Swimming Pool Subcontractor and contractor when necessary to excavate and backfill within the swimming pool construction site.

B. The Mechanical Subcontractor shall not utilize any swimming pool piping trench for installation of any sanitary sewer, storm sewer, domestic water, hot water, chilled water or natural gas line.

C. The Mechanical Subcontractor shall furnish and install all sanitary sewer piping, including vent stacks (if necessary), for backwash pits, floor drains and floor sinks as required by code, shown on Drawings, and herein specified.

D. The Mechanical Subcontractor shall furnish and install all storm sewer piping and site drainage systems as required by code, shown on the Drawings, and herein specified.

E. The Mechanical Subcontractor shall provide a minimum 75 psi water supply for swimming pool construction work within fifty (50) feet of the swimming pool construction site(s).

F. The Mechanical Subcontractor shall furnish and install reduced pressure backflow protected domestic water lines to P.O.C. within swimming pool Mechanical Room as required by code, shown on the Drawings, and herein specified.

G. The Mechanical Subcontractor shall furnish and install natural gas piping, pressure regulation and valving to P.O.C. within swimming pool Mechanical Room as required by code, shown on the drawings, and herein specified.

H. The Mechanical Subcontractor shall furnish and install all ductwork, louvers, heater flues, and all HVAC equipment within swimming pool Mechanical Room as required by code, shown on the Drawings, and herein specified.

I. The Mechanical Subcontractor shall provide a representative at time of swimming pool start-up to coordinate work related to swimming pool system(s).

1.7 RESPONSIBILITIES OF THE ELECTRICAL SUBCONTRACTOR

A. The Electrical Subcontractor shall be licensed in the State of Maryland and the City of Rockville and shall furnish and install electrical service to swimming pool Mechanical Room sized to accommodate all necessary swimming pool equipment as shown on the Drawings and herein specified.

B. The Electrical Subcontractor shall furnish any temporary power needed by the Swimming Pool Subcontractor within fifty (50) feet of the swimming pool construction site(s).

C. The Electrical Subcontractor shall furnish and install all conduits, conductors, starters/disconnects, panels, circuits, switches and equipment as required for lighting, ventilation and HVAC equipment within swimming pool Mechanical Room as required by code, shown on the Drawings, and herein specified.

D. The Electrical Subcontractor shall furnish and install all conduits, conductors, panels, circuits, switches and equipment for area lighting as required by code, shown on the Drawings, and herein specified.

E. All equipment, material and installation shall be as required under Division 16 of the Specifications and shall conform to NEC Article 680 (latest revision), State and Local Codes,

and as may be required by all authorities having jurisdiction over swimming pool construction within the State of Maryland.

F. Electrical sub contractor shall conduct electrical bond test of the swimming pool and all items connected to it, per NEC Article 680. Documentation of satisfactory bond test to be provided to Owner.

G. The Electrical Subcontractor shall provide a representative at time of swimming pool start-up to coordinate work related to swimming pool system(s).

1.8 INTENT

A. It is the intention of these specifications and Drawings to call for finished work, tested and ready for operation. Wherever the work "provide" is used, it shall mean "furnish and install complete and ready for use."

B. Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the work, the same as if herein specified or shown.

1.9 SCHEDULE OF VALUES

A. Provide a Schedule of Values for all work specified in each of the technical specifications listed in the table below, regardless of whether the work is performed by the swimming pool contractor or others. Values listed shall be fully burdened, with contractor general conditions, overhead, profit and bonds included. Payments for swimming pool work completed shall not be approved until Schedule of Values has been submitted to and approved by Architect.

SWIMMING POOL SCHEDULE OF VALUES			
No.	**Section #**	**Description**	**Value**
1.	13 11 01	Swimming Pool Excavation	
2.	13 11 02	Swimming Pool Concrete	
3.	13 11 03	Swimming Pool Shotcrete	
4.	13 11 04	Swimming Pool Ceramic Tile	
5.	13 11 05	Swimming Pool Plaster	
6.	13 11 06	Swimming Pool Equipment	
7.	13 11 07	Swimming Pool Mechanical	
8.	13 11 08	Swimming Pool Electrical	
9.	13 11 65	Swimming Pool Water Slide (large slides)	
10.		Swimming Pool Play Equipment	
Total			

Add Alt.No.	**Section #**	**Description**	**Value**
1.		Add 2nd Floating Lily Pad Course to Rec Pool	
2.		Add small semi -commercial waterslide to Wellness Pool	

3.		Add new plaster 'white' coat to the Fitness Pool. Coordinate the timing of work with Owner's Representative.	
4.		Add sports lighting and public address system around Fitness Pool	
5.		Add thermal pool cover and reels for Wellness Pool	
6.		Add water heater for Wellness Pool. The work will be design/build by Contractor.	
7.		Add pool area furnishings. Quantity and unit prices to be reviewed and finalized by Owner.	

1.01 SUBMITTAL PROCEDURES

B. General: Electronic copies of CAD Drawings of the Contract Drawings can be provided by Architect for Subcontractor's use in preparing submittals after CAD release is signed by Contractor's Representative.

C. Coordination: Coordinate preparation and processing submittals with performance construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
   a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

D. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for schedules performance of related construction activities.

E. Processing Time: Allow enough time for submittal review, including time for re-submittals as follows. Time for review shall commence on Architect's receipt of submittal.

1. Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contract when a submittal being processed must be delayed for coordination.
2. Concurrent Review: Where concurrent review of submittals by Architect's consultants, Owner, or other parties is required, allow fourteen (14) days for initial review of each submittal.
3. Direct Transmittal to Consultant: Where the Contract Documents indicate that submittals may be transmitted directly to Architect's consultants, provide duplicate copy of transmittal to Architect. Submittal will be returned to Architect before being returned to Subcontractor.
4. If intermediate submittal is necessary, process it in same manner as initial submittal.
5. Allow fifteen (15) days for processing each submittal.
6. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

F. Identification: Place a title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on title block.

2. Provide a space on title block to record Subcontractor's review and approval markings and action taken by Architect.

3. Include the following information on title block for processing and recording action taken: (See Attached Sample)
   a. Project name.
   b. Date.
   c. Name and address of Subcontractor.
   d. Name of Subcontractor.
   e. Name of Supplier.
   f. Name of Manufacturer.
   g. Unique identifier, including revision number.
   h. Number and title of appropriate Specification Section.
   i. Drawing number and detail references, as appropriate.
   j. Other necessary identification.

SUBMITTAL FOR:	SUBMITTAL TO:	SUBCONTRACTOR:

Item Number: _____
Section Number: _____
Section Description: _____
Subcontractor: _____
Supplier: _____
Manufacturer: _____
Product Code: _____
Quantity: _____

Subcontractor Certification:

It is hereby certified that the equipment or material designated in this submittal is proposed to be incorporated in the above-named project and is in compliance with the contract drawings and / or specifications and is submitted for approval.

Certified by: _____
Date: _____
Job Superintendent: _____
Revisions: _____

Contractor's Submittal Stamp:

Architect's Review Stamp and Comments

G. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract documents on submittal.

H. On all catalogue or cut sheets identify which model or type is being submitted.

I. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Product data and shop drawings shall be packaged within a three-ring binder and colored samples shall be packaged on a heavy cardboard. Transmit each submittal using a transmittal form.

1. On an attached separate sheet, prepared on Subcontractor's letterhead, record relevant information, request for data, revisions other than those requested by Architect on previous submittals and deviations from requirements of the Contract documents, including minor variations and limitations. Include the same label information as the related submittal.
2. Include Subcontractor's certification stating that information submitted complies with requires of the Contract Documents.
3. Transmittal Form: Provide locations on form for the following information:
   a. Project name.
   b. Date.
   c. Destination (To:).
   d. Source (From:).
   e. Names of Subcontractor, manufacturer, and supplier.
   f. Category and type of submittal.
   g. Submittal purpose and description.
   h. Remarks.

J. Distribution: Furnish copies of final submittals to manufacturers, Subcontractors, suppliers, fabricators, installers, authorities having jurisdiction and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

1.10 SUBSTITUTIONS

A. To obtain approval to use unspecified products, bidders shall submit requests for substitution at least fifteen (15) days prior to bid date. Requests shall only be considered if they clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability. All unspecified products and equipment will be considered on an “or equal” basis at the discretion of the Designated Representative(s) with final approval by Owner. Requests for substitution received after the specified deadline will not be considered. Where a conflict exists between the requirements of the General Conditions / Special Conditions / Division 1 concerning substitutions and the requirements of this Article, this Article (Section 13 11 00, Article 1.10) shall govern.

B. Where the Swimming Pool Subcontractor proposes to use an item of equipment other than that specified or detailed on the Drawings which requires any redesign of the structure, partitions, foundations, piping, wiring, or any other part of the architectural, mechanical, or electrical layout, all such redesign and all new drawings (stamped by Maryland Licensed Engineer) and

detailing required shall be prepared by the Swimming Pool Subcontractor, at their own expense, submitted for review and approval by the Designated Representative prior to bid.

C. Where such approved deviation requires a different quantity and arrangement of piping, supports and anchors, wiring, conduit, and equipment from that specified or indicated on the Drawings, the Swimming Pool Subcontractor shall furnish and install any such piping, structural supports, controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.

1.11 SURVEYS AND MEASUREMENTS

A. The Swimming Pool Subcontractor shall base all measurements, both horizontal and vertical, from benchmarks established by the Contractor. All work shall agree with these established lines and levels. The mechanical Drawings do not give exact details as to elevations of piping, exact locations, etc. and do not show all offsets, control lines, pilot lines and other installation details. Verify all measurements at site and check the correctness of same as related to the work.

1.12 DRAWINGS

A. Drawings are diagrammatic and indicate the general arrangement of the systems and work included in the Subcontractor. Drawings are not to be scaled. The architectural drawings and details shall be examined for exact dimensions. Where they are not definitely shown, this information shall be obtained from the Designated Representative.

1.13 SWIMMING POOL SUBSUBCONTRACTOR

A. The swimming pool construction work as herein described and specified in Division 13 of the Project Manual shall be the complete responsibility of a qualified and specifically licensed (C-53 license classification within the State of Maryland) Swimming Pool Subcontractor with extensive experience in commercial public use swimming pool installations.

B. The Contractor shall require the Swimming Pool Subcontractor to furnish to the Contractor performance and payment bonds in the amount of 100% of the Swimming Pool Subcontractor's bid written by a surety Company properly registered in the State of Maryland and listed by the U.S. Treasury. The expense of the bond(s) is to be borne by the Subcontractor. The Contractor shall clearly specify the amount and requirements of the bond(s) in the Contractor's written or published request for subbids. The Contractor's written or published request for subbids shall also specify that the bond(s) expense is to be borne by the Subcontractor.

C. Subcontractor certifies that it meets the qualifications and experience requirements established in Swimming Pool General Requirements, Section 13 11 00, as follows:

1. Subcontractor has derived 50% of its annual revenue from public-use swimming pool construction for each of the last five (5) years.
2. Subcontractor has, in the last five (5) years, constructed at least five (5) commercially designed municipal and public-use swimming pools in the metropolitan DC area, each of which have incorporated a minimum size of 6,000 square feet of water surface area with a concrete and stainless steel perimeter overflow gutter and self-modulating balance tank.

3. The following list of projects meet the requirements of section (b) above and the contact as reference by the Contractor, the Awarding Authority of their agent or designee.

a. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

b. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

c. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

d. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

e. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

D. Swimming Pool Deck Subcontractor other than the swimming pool Subcontractor certifies that it meets the qualifications and experience requirements established in Swimming Pool General Requirements, Section 13 11 00, as follows:

1. Subcontract has, in the last five (5) years, constructed at least five (5) commercially designed stainless-steel perimeter gutters, each of which have incorporated a minimum size of 6,000 square feet of water surface area of the swimming pool.
2. The following list of projects meet the requirements of section (b) above and the contact as reference by the Contractor, the Awarding Authority of their agent or designee.

SWIMMING POOL DECK SUBCONTRACTOR

a. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

b. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

c. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

d. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

e. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

1.14 OPERATING INSTRUCTIONS

A. The Swimming Pool Subcontractor shall determine from actual samples of pool water supplied by the Owner, the proper water management program necessary for maximum operating efficiency and comfort. The Swimming Pool Subcontractor shall provide the services of experienced personnel familiar with this type of pool system operation, in conformance with Section 13 11 05 of the Specifications.

1.15 MAINTENANCE MANUALS

A. The Swimming Pool Subcontractor shall provide two (2) laminated, bound sets for delivery to the Designated Representative of instructions for operating and maintaining all systems and equipment included in this Contract. Manufacturer's advertising literature or catalog pictures will not be acceptable for operating and maintenance instructions. A digital submission of the same is also required. Laminated pool data charts and operating instructions are required to be posted in the mechanical room for all swimming pool systems.

B. Bound in ring binders shall be all parts lists, periodic maintenance instructions and troubleshooting guidelines for all pool equipment, including but not limited to filters, pumps, controllers, water chemistry control equipment, etc.

1.16 SECURE FROM THE OWNER

A. A complete Owner-furnished filling of the swimming pools.

B. The Owner's assistance, as specified herein, from the time of start-up until final written acceptance of the swimming pool system(s).

C. Chemicals as required for swimming pool operation after Swimming Pool Subcontractor completes initial water chemistry balance and water treatment during the maintenance period described in Section 13 11 05 of the Specifications.

1.17 WARRANTY

A. The Swimming Pool Subcontractor shall warrant all swimming pool structures, finishes and systems against defects in material and workmanship for a period of two years after the date of acceptance by the Owner. Any repair or replacement required due to defective material or workmanship will be promptly corrected by the Swimming Pool Subcontractor.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 13 11 00

SECTION 13 11 01 – SWIMMING POOL EXCAVATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Finish and fine grading to bring the surface of the ground to the required grades and elevations as indicated on the Drawings.

B. Subgrade improvements and placing of compacted fills.

C. Excavation and backfill for all swimming pool, pool deck, surge chamber and backwash retention tank structural requirements, including footings, foundations, slabs and walls.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Conform with requirements of the General Conditions, and more specifically the following:

1. Comply with International Building Code, latest edition.
2. Comply with applicable construction safety orders, latest edition, Federal and State OSHA.
3. Comply with applicable trench safety provisions, latest edition, Federal and State OSHA.

B. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

C. Project/Site Conditions:

1. Be familiar with site and subsurface conditions.
2. Excavation is unclassified and includes excavation to sub-grade elevations indicated or necessary, regardless of character of materials and obstructions encountered.
3. Provisions for mitigation of wet soils due to seepage or rain shall be made during excavation and throughout construction. If wet soils are encountered within the swimming pool excavations, de-watering shall be provided and the Geotechnical Engineer shall make recommendations for moist soil mitigation.
4. Where slope instability is encountered, all excavations within those areas shall be 1:1 or flatter. Forming of vertical walls may be necessary, and all soil conditions shall be field verified by the Geotechnical Engineer.

5. Contractor shall review the Geotechnical Investigation Report as furnished by the Owner to determine the suitability of the soils.
6. Refer to General Conditions, Articles 3.17 and 3.18.

D. Adverse Weather Conditions:

1. During the periods when site soil moisture content is substantially in excess of moisture content required for optimum compaction, do not perform fill compaction.
2. When unfavorable weather conditions necessitate interrupting filling and grading operations, prepare areas by compaction of surface and grading to avoid collection of water. Provide adequate temporary drainage to prevent erosion.

1.3 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in conformance with requirements of Section 01 33 00. Requests for substitution shall conform to requirements of Article 1.10.A of Section 13 11 00.

B. Required submittals include:

1. Offsite fill material, if applicable.

C. Submit proof of qualifications as specified in Article 1.02.B of this Section.

1.4 EXCAVATING & TRENCHING, GENERAL REQUIREMENTS

A. Refer to Section 01 50 00, Temporary Facilities and Controls.

B. All trenches, holes, etc. are to be completely protected using solid barricades, steel plates, and plywood both during construction and during off hours, including night time.

C. Flashing warning light barricades are required on sidewalks, roads, and any other critical areas that require night time protection.

D. Roads, paths and sidewalks shall not be blocked at any time or in any way. Trenching across roads, paths or sidewalks involves special instructions and review of the construction procedure by the Owner at least three (3) days prior to the Work actually being started.

E. Construction equipment, including all trucks, cars, etc. shall not be parked or driven on roads, paths or sidewalks. Items not allowed on roads, paths or sidewalks include hoses, power cords, ropes, construction materials, dirt and debris, etc.

F. All roads, paths and sidewalks must remain clear and the Contractor shall maintain temporary safe and effective pedestrian access at all times.

G. Drawings show existing major underground utilities using the best information available. The Contractor shall also fully check public works reference drawings prior to excavation. Call local Dig Alert to locate utilities to ensure safety.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials to be used as fill or backfill shall be examined, tested, and approved by the Geotechnical Engineer. Based on the SPT borings, in general, the on-site soils natural granular soils which are free from organic and root fragments can be re-used as site fill. Materials suitable for various construction purposes can be identified by the Geotechnical Engineer or their designated representative during grading operations.

B. Moisture conditioning (that is, wetting or drying) of the soils shall be anticipated to achieve proper compaction. The moisture contents of the soils shall be controlled properly to avoid extensive construction delays. If imported fill material is required, those materials shall have Unified Soil Classifications of SM or more granular.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify drawing dimensions and elevations with actual field conditions. Inspect related Work and adjacent surfaces and report discrepancies and conditions which prevent proper execution of the Work to the Owner's Representative.

3.2 SUBGRADE IMPROVEMENTS

A. It should be noted that relatively soft/loose soils were noted at each of the six boring locations. Once the foundation subgrade has been exposed it shall be observed and tested by the Geotechnical Engineer or the Geotechnical Engineer's representative by performing Dynamic Cone Penetration (DCP) tests to locate foundation subgrade areas requiring local undercut and replacement.

B. Soft or loose pockets of soil encountered in the footing excavations shall be removed and replaced with suitable soils meeting the recommendations outlined in Section 2.1 Fill Selection, Placement and Compaction. Alternatively, the footings may be established at a lower elevation, or the unsuitable materials could be replaced with lean (2000 psi) concrete.

C. All structural fill shall be placed in relatively horizontal 8 (maximum) loose lifts and shall be compacted to a minimum of 95 percent of the Standard Proctor (ASTM D-698) maximum dry density. Field moisture contents shall be maintained within 2 percentage points of the optimum moisture content to provide adequate compaction.

D. New fills shall be properly benched into existing slopes. A sufficient number of in-place density tests shall be performed by an experienced Engineering Technician on a full-time basis to verify that the proper degree of compaction is being obtained. All excavations shall be properly benched and/or shored per OSHA and MOSH requirements.

3.3 GROUND SUPPORTED SLABS

A. Floor slabs shall be supported on approved, firm subsoils, or on new compacted fill. The slab subgrade shall be prepared in accordance with the procedures outlined in Sections 3.2 of this section. In particular, the slab subgrade shall be proofrolled to verify stability or delineate any soft or loose areas requiring undercutting and/or stabilization. The Geotechnical Engineer or their designated representative shall be on-site to confirm the suitability of subgrade materials.

B. It is recommended that the slab be directly supported on a minimum 4-inch layer of clean granular materials such as washed sand, clean sand, and gravel, or screened, crushed stone. A suitable moisture/vapor barrier (that is, polyethylene sheeting) shall also be provided. These procedures will provide a moisture break that will help to prevent capillary rise and dampness of the floor slabs, and also help to cure the slab concrete. It is also recommended that construction joints on the slab surface and isolation joints between the slab and structural walls be provided (such that the slab would be ground-supported).

C. On most projects, there is a significant time lag between initial grading and a point when the contractor is ready to pour the slabs-on-grade. Environmental conditions and construction traffic often disturb the subgrade soils, particularly those predominately clayey soils encountered on-site. Provisions shall be made in the construction specifications for the restoration of the subgrade soil to a stable condition before the placement of the concrete for the floor slabs.

D. Dimensions: Excavate to proper dimensions as shown, cut square and smooth with firm level bottoms. Prepared excavations shall be approved by Geotechnical Engineer. Excavations shall be free of loose or disturbed materials.

E. Excess Water Control: Keep all excavations free from standing water by pumping, draining or providing proper protection against water intrusion. If soil becomes soft, soggy or saturated, perform additional excavation to firm soil not affected by water.

F. Form Removal: Make all excavations of sufficient size to permit installation and removal of forms and all other required work.

G. Alternate Forming: Sides of structures may be formed by neat excavations where banks will stand without caving. If banks cave, provide forming as required and widen excavation to permit forming, bracing and inspection. Provide forming in conformance with Section 13 11 02 and all recognized safety standards. Form all grade beams.

3.4 BACKFILLING

A. Method: After concrete has been placed, forms removed and concrete work approved, backfill the excavations with earth to indicated or required grades. Carry on backfilling simultaneously on each side of walls or grade beams. Remove all rubbish and wood from the excavations before placing backfill.

B. Concrete Protection: Prior to placing any backfill, adequately cure all concrete and provide any bracing required to ensure the stability of the structure. Protect waterproofing and dampproofing against damage in a manner acceptable to the Owner’s Representative. Remove bracing as backfill operations progress.

C. Material: Use the material from the excavations for backfilling, subject to approval by Soils Testing Agency. The earth shall be free from debris, large clods or stones.

D. Lifts: Place backfill in eight (8) inch loose layers, bring to optimum moisture content and compact to a minimum 95% of the standard proctor maximum dry density, sloping down and away from the structures being backfilled.

E. Moisture: Rigidly control the amount of water used to ensure optimum moisture conditions for the type of fill material used. Excessive amounts of water causing saturation of earth will not be permitted. Compaction by flooding or jetting is prohibited.

3.5 GRADING

A. Slopes: Grade to finish grades indicated on Drawings, with uniform slopes between all points.

B. Subgrades: Blade to required grade and roll or tamp subgrades for exterior slabs, decks and paving.

3.6 CLEAN-UP

A. Disposal: Haul away rubbish, debris, and rocks from site promptly and dispose of legally. Burning rubbish on site is prohibited.

B. Dust and Noise Abatement: During entire period of construction keep area and material being loaded sprinkled to reduce dust in air and annoyance to premises and surrounding property.

END OF SECTION 13 11 01

SECTION 13 11 02 – SWIMMING POOL CONCRETE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Forming for cast-in-place concrete and shotcrete associated with swimming pools and pool decks.
B. Reinforcement for cast-in-place concrete and shotcrete associated with swimming pools and pool decks.
C. Cast-in-place concrete for swimming pool structures. Do not use waterproofing admixture of any kind.
D. Cast-in-place concrete for swimming pool decks with Xypex C-500 crystalline waterproofing admixture. Waterproofing admixture for swimming pool decks only.
E. Provide labor, materials and equipment as required to install sealant for all pool deck expansion joints, or any other caulking, as indicated on the aquatic Drawings and herein specified.

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. Standards:

1. In addition to complying with the International Building Code, latest edition, ACI-318-19, comply with all pertinent recommendations contained in “Guide to Formwork for Concrete" Publication ACI 347R-14 of the American Concrete Institute.
2. In addition to complying with the International Building Code, latest edition, comply with all pertinent recommendations contained in “Guide to Presenting Reinforcing Steel Design Details,” Publication ACI 315R-18 of the American Concrete Institute.
3. In addition to complying with all local codes and regulations, comply with all pertinent recommendations contained in American Society for Testing and materials (ASTM); ASTM C 920 “Standard Specification for Elastometric Joint Sealants.”

C. Tolerances: Construct all swimming pool concrete straight, true, plumb and square within a tolerance horizontally of one in 200 and vertically of one in 2000.

1.3 SUBMITTAL AND SUBSTITUTIONS

A. Provide submittals in conformance with the requirements of Section 01 33 00. Requests for substitution shall conform to requirements of Article 1.10.A of Section 13 11 00.
B. Samples and Certificates, Concrete Reinforcement:

1. Provide all data and access required for testing as described in Section 01 45 00 of the Specifications.
2. All material shall bear mill tags with heat number identification. Mill analysis and report shall be made available upon request.
3. Rebar samples shall be taken from bundles as delivered from the mill with the bundles identified as to heat number and the accompanying mill certificate. One tensile test and one bend test shall be made from a sample from each 10 tons or fraction thereof of each size of reinforcing steel.
4. Design mix from batch plant demonstrating previous use history and associated strengths at 28 days.
5. The Contractor shall submit a mix design stamped and signed by a licensed engineer for approval by the Owner's Representative prior to any placement of concrete.
6. The Contractor shall submit a separate mix design stamped and signed by a licensed engineer for the swimming pool decks which contains the specified Xypex C-500 crystalline waterproofing admixture for approval by the Owner's Representative prior to any placement of concrete.

C. Submit proof of qualifications as specified in Article 1.2.A of this Section.
D. Submit reinforcing shop drawings for pool walls, gutters, floors, dike walls and balance tank, etc. as shown on the construction drawing.

1.4 PRODUCT HANDLING

A. Delivery: Deliver materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.
B. Storage: Store materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project Site.
C. Protection: Use all means necessary to protect the swimming pool concrete before, during, and after installation and to protect the installed Work specified in other Sections.
D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner.

PART 2 - PRODUCTS

2.1 CONCRETE FORMWORK

A. Form Materials:

1. Form Lumber: All form lumber in contact with exposed concrete shall be new except as allowed for reuse of forms in Part 3 of this Section, and all form lumber shall be one of the following, a combination thereof, or an equal approved in advance by the Owner's Representative.

a. "Plyform," Class I or II, bearing the label of the Douglas Fir Plywood Association; "Inner-Seal" Form as manufactured by Louisiana-Pacific, or approved equal.
b. Douglas Fir-Larch, number two grade, seasoned, surfaced four sides.

2. Form Release Agent: Colorless, non-staining, free from oils; chemically reactive agent that shall not impair bonding of paint or other coatings intended for use.

B. Ties and Spreaders:

1. Type: All form ties shall be a type which do not leave an open hole through the concrete and which permits neat and solid patching at every hole.
2. Design: When forms are removed, all metal reinforcement shall be not less than two (2) inches from the finished concrete surface.
3. Wire Ties and Wood Spreaders: Do not use wire ties or wood spreaders.

C. Alternate Forming Systems: Alternate forming systems may be used subject to the advance approval of the Owner's Representative.

2.2 CONCRETE REINFORCEMENT

A. Bars: Bars for reinforcement shall conform to "Specifications for Deformed Carbon-Steel Bars for Concrete Reinforcement," ASTM A-615, Grade 60.
B. Wire Fabric: Wire fabric shall conform to "Specifications for Carbon Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete," ASTM A1064.
C. Tie Wire: Tie wire for reinforcement shall conform to "Specifications for Carbon Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete," ASTM A1064 black annealed 16-gauge tie wire.

2.3 CAST-IN-PLACE CONCRETE

A. Concrete:

1. All concrete, unless otherwise specifically permitted by the Owner's Representative, shall be transit-mixed in accordance with ASTM C94. Concrete for water retaining structures that do not receive a waterproofing finish such as ceramic tile or swimming pool plaster shall receive a topical waterproofing finish.
2. The control of concrete production shall be under the supervision of a recognized testing agency, selected by the Owner in accordance with Section 01 25 00 of the Specifications.
3. Quality: All concrete shall have the following minimum compressive strengths at twenty-eight (28) days and shall be proportioned within the following limits

a. 4,000 psi minimum compressive strength for cast-in-place concrete swimming pool structures.
b. 4,000 psi minimum compressive strength for cast-in-place swimming pool decks with Xypex C-500 waterproofing admixture.
c. 1" maximum size aggregate.
d. 6.0 minimum sacks of cement per cubic yard.*
e. Maximum water to cement ratio of 0.40 minimum to 0.45 maximum.
f. 4" maximum slump.

g. Xypex Admix C-500 2% - 2.5% by weight of cement content. Contact Xypex Technical Services to confirm dosage. (To be used for swimming pool decks only.) * For estimate only: to be determined by mix design.

4. Cement: All cement shall be Portland Cement conforming to ASTM C-150, Type II or V and shall be the product of one manufacturer.
5. Aggregates:

   a. Shall conform to "Standard Specifications for Concrete Aggregates," ASTM C33, except as modified herein.
   b. Coarse Aggregate: Clean sound washed gravel or crushed rock. Crushing may constitute not more than 30% of the total coarse aggregate volume. Not more than 5% flat, thin, elongated or laminated material nor more than 1% deleterious material shall be present. 1" aggregate graded from 1/4" to 1", fineness modulus 6.90 to 7.40. 1-1/2" graded from ½" to 1-1/2", fineness modulus 7.80 to 8.20.
   c. Fine Aggregate: Washed natural sand of hard, strong particles and shall contain not more than 1% of deleterious material, fineness modulus 2.65 to 3.05.
   d. Aggregate must be certified, non-expansive from a "known" good source.

6. Water: ASTM C1602 Clean, fresh, free from acid, alkali, organic matter or other impurities liable to be detrimental to the concrete (potable).
7. Admixtures: Admixtures shall be used upon approval of the Owner's Representative.

   a. Air-entraining admixture: Conform to ASTM C260.
   b. Water-reducing admixture: Conform to ASTM C494.
   c. Waterproofing admixture for swimming pool decks only: Xypex Admix C-500, No substitutions permitted. Conform to ASTM C494.

8. Xypex Admix C-500 Dosage: To be used for swimming pool decks only.

   a. General: Xypex Admix must be added to concrete mix at time of batching. It is important to obtain a homogeneous mixture of Xypex Admix with the concrete. Do not add dry Admix powder directly to wet mixed concrete as this could cause clumping and thorough dispersion may not occur.
   b. Dosage Rate: Under normal conditions, the crystalline waterproofing powder shall be added to the concrete mix at the following rates:
      1.) Xypex Admix C-500 2% – 2.5% by weight of cement content
   c. Weather Conditions: For mixing, transporting and placing concrete under conditions of high temperature or low temperature, follow concrete practices such as those referred to in ACI 305R (Hot Weather Concreting) and ACI 306R (Cold Weather Concreting) or other applicable standards.
   d. Concrete Batching & Mixing Procedures: Procedures for the addition of Xypex admixture will vary according to type of batch plant operation and equipment. Prior to the placement of any concrete, the concrete batch plant and the contractor shall be responsible to consult with the local Xypex representative concerning additional procedures for the addition, mixing and to confirm dosage.
      Note: For enhanced chemical protection or for meeting specific project requirements or where the concrete mix design contains higher than 25% type F fly ash content or includes a portland cement/slag cement/type C fly ash blend, consult with manufacturer or its authorized representative to determine appropriate dosage rates.

B. Construction Joints: Use keyform for slab pour joints. Either preformed galvanized or PVC construction joint forms of a standard manufacturer may be used. Install per manufacturer's recommendations and tool edges of slabs.
C. Waterstops: PVC bulb-type for use between concrete pours / lifts, conforming with ASTM D 570, D 624, and D 638. Provide in configuration(s) as recommended by manufacturer for specific application. Greenstreak, W.R. Meadows, or approved equal.
D. Curing Materials:

1. Liquid Membrane (covered slab): Chlorinated rubber membrane forming, curing-sealing compound conforming to ASTM C309.
2. Liquid Membrane (exposed slab): Clear methyl and butyl methacrylate non-staining, membrane forming, curing-sealing compound conforming to ASTM C309.

E. Cement Grout and Drypack:

1. Cement Grout: Mix 1 part by volume of Portland Cement, 1/2 part by volume of water and fine aggregate enough to make mixture flow under its' own weight.
2. Drypack: Mix 1 part by volume of Portland Cement, 1/2 part by volume of water and fine aggregate enough to make a stiff mix that will mold into a ball. Mix no more than can be used in 30 minutes.

2.4 JOINT SEALANT MATERIALS

A. Caulking: Multipart, non-sag gun grade polyurethane based sealant meeting the requirements of ASTM C920-02, Type S or M, Sika Corp., Pecora, Sonneborn Building Products, Tremco or approved equal. Self leveling caulking materials are not allowed.
B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
C. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
D. Sealant Backer Rod: Provide compressible polyethylene or polyurethane backer rod as recommended by the sealant manufacturer.
E. Bond Breaker Tape: Provide polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant.
F. Sand: Cover the surface of the caulking with #30 silica sand.

2.5 OTHER MATERIALS

A. All other materials, not specifically described but required for proper completion of the work of this Section, shall be as selected by the Contractor subject to the advance review by the Owner’s Representative.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all Work of this Section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation may properly commence.
2. Verify that all Work may be constructed in accordance with all applicable codes and regulations, the referenced standards, the original design, and in accordance with site specific Geotechnical Report.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Failure to notify the Owner's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive work.

3.2 CONCRETE FORMWORK

A. Construction of Forms:

1. General: Construct all required forms to be substantial, sufficiently tight to prevent leakage of concrete paste, and able to withstand excessive deflection when filled with wet concrete.
2. Layout:

    a. Form for all required cast-in-place concrete to the shapes, sizes, lines and dimensions indicated on the Drawings.
    b. Exercise particular care in the layout of forms to avoid necessity for cutting concrete after placement.
    c. Make proper provisions for all openings, offsets, recesses, anchorages, blocking and other features of the Work as shown or required.
    d. Perform all forming required for Work of other trades and do all cutting and repairing of forms required to permit such installation.
    e. Carefully examine the Drawings and Specifications and consult with other trades as required relative to providing for pipe and conduit penetrations, reglets, chases and other items in the forms.

3. Imbedded Items: Set all required steel frames, angles, bolts, inserts and other such items required to be anchored in the concrete prior to concrete being placed.
4. Bracings:

    a. Properly brace and tie the forms together so as to maintain position and shape and to ensure safety to workmen.
    b. Construct all bracing, supporting members and centering of ample size and strength to safely carry, without excessive deflection, all dead and live loads to which they may be subjected.
    c. Properly space the forms apart and securely tie them together, using metal spreader ties that give positive tying and accurate spreading.

5. Wetting: Keep forms sufficiently wetted to prevent joints from opening up before concrete is placed.

B. Plywood Forms:

1. Design: Nail the plywood panels directly to studs and apply in a manner to minimize the number of joints.
2. Joints: Make all panel joints tight butt joints with all edges true and square.

C. Footing Forms:

1. Wood Forms: All footing forms shall be wood unless otherwise specifically approved by the Owner's Representative, or as specified in paragraph 3.2(C)(2).
2. Earth Forms:

   a. Side walls for footings may be of earth provided the soil will stand without caving and the sides of the bank are made with a neat cut to the minimum dimensions indicated on the Drawings.
   b. For excavation and backfill of earth forms, conform with applicable provisions of Section 13 11 01.

D. Reuse of Forms:

1. Reuse of forms shall be subject to advance approval of the Owner's Representative.
2. Except as specifically approved in advance by the Owner's Representative, reuse of forms shall in no way delay or change the schedule for placement of concrete from the schedule obtainable if all forms were new.
3. Except as specifically approved in advance by the Owner's Representative, reuse of forms shall in no way impart less structural stability to the forms nor less acceptable appearance to finished concrete.

E. Removal of Forms:

1. General:

   a. In general, side forms of footings may be removed seven (7) days after placement of concrete, but time may be extended if deemed necessary by the Owner's Representative.
   b. Forms for footings, foundations, grade beams, slabs, walls, and other formed concrete may be removed fourteen (14) days after placement of concrete.

2. Removal:

   a. Use all means necessary to protect workers, passersby, the installed Work of other trades and the complete safety of the structure.
   b. Cut nails and tie wires or form ties off flush, and leave all surfaces smooth and clean.
   c. Remove metal spreader ties on exposed concrete by removing or snapping off inside the wall surface and pointing up and rubbing the resulting pockets to match the surrounding areas.

d. Flush all holes resulting from the use of spreader ties and sleeve nuts using water, and then solidly pack throughout the wall thickness with cement grout applied under pressure by means of a grouting gun; grout shall be one part Portland Cement to 2-1/2 parts sand; apply grout immediately after removing forms.

3.3 CONCRETE REINFORCEMENT

A. Bending:

1. General:

a. Fabricate all reinforcement in strict accordance with the Drawings.
b. Do not use bars with kinks or bends not shown on the Drawings.
c. Do not bend or straighten steel in a manner that will injure the material. (When opposite end is already encased in concrete.)

2. Design:

a. Bend all bars cold.
b. Make bends for stirrups and ties around a pin having a diameter of not less than four (4) times the minimum thickness of the bar (#3 - #5) per ACI.
c. Make bends for other bars, including hooks, around a pin having a diameter of not less than six (6) times the minimum thickness of the bar.

B. Placing:

1. General: Before the start of concrete placement, accurately place all concrete reinforcement, positively securing and supporting by concrete blocks, metal chairs or spacers, or by metal hangers.
2. Clearance:

a. Preserve clear space between bars of not less than one and one-half (1-1/2) times the nominal diameter of the round bars.
b. In no case let the clear space be less than one and one-half (1-1/2) inches nor less than one and one-third (1-1/3) times the maximum size of the aggregate.
c. Provide the following minimum concrete covering of reinforcement:
   1) Concrete deposited against earth: three (3) inches minimum.
   2) Concrete below grade deposited against forms: two (2) inches minimum.
   3) Concrete elsewhere: As indicated on Drawings or otherwise approved by the Owner’s Representative.

3. Splicing:

a. a. Horizontal Bars:
   1) Place bars in horizontal members with minimum lap at splices sufficient to develop the strength of the bars.
   2) Bars may be wired together at laps except at points of support of the member, at which points preserve clear space described above.
   3) Whenever possible, stagger the splices of adjacent bars.
   4) Splice forty (40) bar diameters minimum.

5) Provide non-contact lap slices for shotcrete.

b. Wire Fabric: Make all splices in wire fabric at least one and one-half (1-1/2) meshes wide.
c. Other Splices: Make only those other splices that are indicated on the Drawings or specifically approved by the Owner's Representative.

4. Dowels: Place all required steel dowels and securely anchor them into position before concrete is placed.
5. Obstructions: In the event conduits, piping, inserts, sleeves and other items interfere with placing reinforcement as indicated on the Drawings or otherwise required, immediately consult with the Owner's Representative and obtain approval of a new procedure prior to placing concrete.

C. Cleaning Reinforcement: Steel reinforcement, at the time concrete is placed around it, shall be free from rust scale, loose mill scale, oil, paint and all other coatings which will destroy or reduce the bond between steel and concrete. Bend down all tie wire away from the top of the pool deck. Maintain a 2" clear from top of concrete to the tie wire.

3.4 SHOTCRETE REINFORCEMENT

A. Shotcrete reinforcement shall be in accordance with the requirements of ACI 318-19, along with the provisions of ACI 506R and ACI 506.2. For parallel nonprestressed reinforcement in shotcrete members, the clear spacing between bars shall be at least the greater of 6 bar diameters and 2-1/2 in. Where two curtains of reinforcement are provided, the clear spacing between bars in the curtain nearer the nozzle shall be at least 12 bar diameters; the clear spacing between bars in the remaining curtain shall be at least the greater of 6 bar diameters and 2-1/2 in. Adequate encasement of bars larger than No. 5 shall be demonstrated by a preconstruction test shotcrete mockup panel.
B. Subject to the approval of the building official, it shall be permitted to use a clear spacing that does not meet the clear spacing provisions listed above provided that shotcrete mockup panels are used to demonstrate the proper reinforcement encasement in accordance with the following:

1. The shotcrete mockup panels shall be representative of the most complex reinforcement configurations to be encountered.
2. The licensed design professional shall specify the shotcrete mockup panel quantity, frequency of shooting per nozzleman and member type, and panel thickness to verify reinforcement encasement.
3. Information on shotcrete mockup panels is provided in ACI 506R.

C. Non-contact lap splices for reinforcement in shotcrete shall have clear spacing in accordance with the following:

1. For No. 6 and smaller bars, the clear spacing between bars shall be at least greater of 6 bar diameters and 2-1/2" in.
2. For No. 7 and larger bars, the clear spacing shall be established using a shotcrete mockup panel to demonstrate that the reinforcement is properly encased.
3. Subject to the approval of the building official, contact lap splices for reinforcement in shotcrete shall be oriented with the plane of the spliced bars perpendicular to the surface

of the shotcrete and approved by the licensed design professional based on a shotcrete mockup panel to demonstrate that the reinforcement is properly encased.

3.5 CAST-IN-PLACE CONCRETE

A. Conveying and Placing Concrete:

1. Before placing concrete, mixing and conveying equipment shall be well cleaned, and the forms and space to be occupied by concrete shall be thoroughly cleaned and wetted. Ground water shall be removed until the completion of the work.
2. No concrete shall be placed in any unit of work until all formwork has been completely constructed, all reinforcement has been secured in place, all items to be built into concrete are in place, and form ties at construction joints tightened.
3. Concrete shall be conveyed from mixer to place of final deposit in such a way to prevent the separation or loss of ingredients. It shall be placed as nearly as practicable in its' final position to avoid rehandling or flowing. Concrete shall not be dropped freely where reinforcing bars will cause segregation, nor shall it be dropped freely more than six (6) feet. Use tremies, spouts and dump boxes in deep sections. Vibrators are not acceptable for facilitating concrete transport.
4. Concrete shall be tamped and spaded to insure proper compaction into all parts of forms and around reinforcement. A mechanical vibrator shall be used to thoroughly compact the concrete. Vibration must be by direct action in the concrete and not against forms or reinforcement.
5. Mixing and transport time as indicated in ASTM C94 is required. If air temperatures are between 85° and 90° F the delivery time is to be reduced to 75 minutes. When air temperatures is in excess of 90° F the delivery time should be reduced to 60 minutes.
6. Truck mixes without batch certificates will be rejected.

B. Construction Joints / Expansion Joints: Construction joints and expansion joints shall be provided at locations and in the manner shown on the Drawings. With exception of existing concrete / new shotcrete joints, use PVC bulb-type waterstops appropriate for design condition between all concrete pours / lifts to avoid cold joints. Waterstops shall be placed in such a way to protect reinforcing steel from rust and oxidation. All expansion joints must be the full depth of the concrete section in which they are located.

C. Slab Finishes: Concrete slabs shall be compacted and screeded uniformly to grades shown. Push large aggregates below the surface with a screen tamper, screed and bull float. As soon as the surface becomes workable, it shall be wood floated, then finished as indicated on the Drawings to a uniform smooth, true surface in a neat and workmanlike manner. Carefully coordinate slab finish requirements with other trades (ceramic tile, pool plaster) to insure concrete finish is appropriate substrate for final finish material.

1. Contractor shall provide three mock-up deck samples, minimum 3'x 3', with a wedge anchor installed in one sample. These (3) samples shall be constructed; one with a light broom finish, one (1) with a medium broom finish and one (1) with a heavy broom finish for determination and selection of an appropriate deck finish. Each sample shall be edged on all four sides to demonstrate a 3/4" radius edge. Anchor installation shall demonstrate acceptable interface between anchor and the top of deck. Deck samples shall remain on job site through final inspection for reference.
2. Pool Floor Slab: Heavy Wire Broom Finish.

D. Protection and Curing:

1. Concrete shall be protected from injurious action of the elements and defacement of any nature during construction.
2. All forms must be kept wet to prevent drying out of the concrete.
3. All concrete surfaces including footings must be kept wet for at least seven (7) days after concrete is placed.
4. Apply the appropriate curing materials, as specified in 2.03 of this Section, immediately after finishing slabs. Application shall be as specified by the manufacturer.

E. Form Removal:

1. Take care in removing forms so that surfaces are not marred or gouged and that corners are true, sharp and unbroken.
2. No steel spreaders, ties or other metal shall project from or be visible on any concrete surfaces.

F. Defective Work:

1. Should the strength of any concrete for any portion of the work indicated by tests of molded cylinders and core tests fall below minimum 28 days strength specified or indicated, concrete will be deemed defective work and shall be replaced.
2. Concrete work that is not formed as indicated, is not true to intended alignment, not plumb or level where so intended, not true to intended grades or elevations, not true to specified or selected finish, contains sawdust shavings, wood, or embedded debris, which exhibits cracks or contains fine or coarse sulfide particles, or expansive aggregates detrimental to performance or appearance of the concrete shall be deemed defective.
3. Promptly perform work required to replace and properly clean (by sandblasting if necessary) any defective concrete panels (control joint or expansion joint to control joint or expansion joint), at Contractor's expense, including all expense of additional inspection, tests, or supervision made necessary as a result of defective concrete.
4. Contractor must verify slopes of concrete pool deck match Contract Documents using a 2’ long level. Test locations random and determined by Owner’s Representative or Architect. Test observation by the Owner’s Representative or the Architect is required.
5. Contractor must perform a flood test of cured concrete pool deck to verify concrete is draining per the Contract Documents and there are no low areas of standing water. Test observation by the Owner’s Representative or the Architect is required.

3.6 EXPANSION JOINTS

A. Temperatures: Do not install sealants when air temperature is less than 40°F.
B. Tooling: Tool exposed joints to a slightly concave surface using slicking materials recommended by the manufacturer. The tooling procedure shall press sealant against the sides of the joint. No materials shall be left “feathered” out or smeared on the abutting materials. Completed joints shall have a uniform professional appearance.
C. Joint Construction: Sealant joint width, thickness and cross-sectional profile to be constructed in strict accordance with the sealant manufacturer’s recommendations.
D. Sand: At the appropriate time cover the sealant with sand to provide a sanded finish.

3.7 CLEAN-UP

A. Upon completion of the Work of this Section, immediately remove all swimming pool concrete materials, debris and rubbish occasioned by this Work to the approval of the Owner's Representative.

END OF SECTION 13 11 02

SECTION 13 11 03 – SWIMMING POOL SHOTCRETE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials and equipment as required to install structural wet mix shotcrete for swimming pool structures as indicated on the Drawings and herein specified.

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. Standards: Except as otherwise indicated, provide shotcrete per American Concrete Institute Standard ACI 506. In addition, conform to recommendations contained in "Shotcrete," Brochure G84 as published by the Gunite Contractors Association of Sylmar, California and the International Building Code (latest edition).

C. Mix Design: The Contractor shall submit a mix design stamped and signed by a licensed engineer for approval by the Owner's Representative prior to any placement of shotcrete. Mix design shall indicate source of aggregate and brands of cement and admixtures used. All mix designs shall take character of locally available aggregate into consideration and make adjustments as necessary to conform with specified design criteria.

D. Testing and Inspection: A test panel shall be shot, cured, cored or sawn, examined and tested (representing the most congested and difficult project scenario) prior to commencement of the project in accordance with ASTM C1140. All project conditions and personnel shall be represented in the test panel. Additionally, one test panel shall be provided for each 50 yards (or portion thereof) of shotcrete placed for each day or each nozzleman, whichever is greater. The size of the strength test panel shall be per the direction of the Special Shotcrete Inspector. At least three (3) cores shall be taken from each test panel. (At least three (3) cores shall be taken from the completed work for each day of shotcrete operation.) Testing shall be performed by the Owner's designated Testing Lab and comply with Section 1908A.10ACI 318. Contractor shall contract ICC licensed third party shotcrete inspector for continuous inspection of all shotcrete work. Contractor shall submit third party inspector's qualifications and license for review and approval by Architect and Owner. Contractor shall be responsible for all testing and inspection costs.

E. Tolerances: Construct all swimming pool shotcrete straight, true, plumb and square within a tolerance horizontally of one in 200 and a tolerance vertically of one in 2000.

1.3 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in conformance with the requirements of Section 01 33 00 and ACI 506.2. Requests for substitution shall conform with requirements of Article 1.10.A of Section 13 11 00.

B. Materials List: Within thirty (30) days after issuance of Notice to Proceed, and before shotcrete materials are delivered to the project site, submit to the Owner a complete list of materials proposed to be used in this portion of the Work, showing manufacturer's name and catalog number of all items such as admixtures and curing membranes, and the name and address of the supplier of cement and aggregate to be used.

C. Submit proof of qualifications as specified in Article 1.2.A of this Section.

1.4 PRODUCT HANDLING

A. Protection: Use all means necessary to protect shotcrete materials before, during and after installation and to protect the installed Work specified in other Sections.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cement: Cement shall be Type 1 Portland Cement conforming to ASTM C150. Cement type shall be the same for all shotcrete work.

B. Aggregate: ASTM C33, washed hard dense durable clean sharp sand from approved pit, free of organic matter and opaline, feldspar, or silicous magnesium substances and containing not more than 3% by weight of deleterious substances. Maximum size aggregate for shotcrete is ¾" per ACI 318-19. When tested for organic impurities by ASTM C40 method, fine aggregate color not darker than reference standard color. When tested for soundness by ASTM C88 method, grading No. 2 of ASTM C1436, loss after 5 cycles not over 10% of fine aggregate.

C. Water: Potable, clean, fresh, free from acid, alkali, organic matter or other impurities liable to be detrimental to the shotcrete.

D. Admixtures: Admixtures shall conform to ASTM C1141 and only be used upon approval of the Owner's Representative.

PART 3 - EXECUTION

3.1 EXECUTION

A. Inspection:

1. Prior to all Work of this Section carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation may properly commence.
2. Verify that items to be imbedded in shotcrete are in place and that shotcrete may be placed to the lines and elevations shown on the Drawings, with all required clearance from reinforcement.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Failure to notify the Owner's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive the Work.

3.2 PREPARATION

A. General:

1. Thoroughly clean all areas where shotcrete is to be placed to insure proper bonding of shotcrete.
2. Where shotcrete is to be placed against smooth surfaces (i.e., cast-in-place concrete), sandblast surfaces to receive shotcrete to provide clean aggregate surface, thereby insuring proper bond between materials.

B. Ground Wires: Adequate ground wires, to be used as screeds, shall be installed to establish the thickness and surface planes of the shotcrete work. Ground wires shall be placed so that they are tight and true to line and grade and in such a manner that they can be easily tightened.

3.3 PROPORTIONING AND MIXING

A. Accurately control proportion of water to Portland cement to produce thorough and uniform hydration of the shotcrete that, when shot, forms a homogeneous mass containing neither sags nor dry sand formation. Proportion by mass per ASTM C94 or by volume per ASTM C685.

B. Shotcrete shall have a minimum compressive strength of 4,000 PSI at 28 days. Shotcrete material shall have a water/cement ratio of 0.40-0.45 per ACI 506R, Chapter 6, Proportioning and Preconstruction Testing; Section 6.3.3, Wet Mix Process.

C. Discontinue shotcrete work if the time between the addition of mixing water to cement and aggregate, or cement to aggregates, and placement of shotcrete exceeds ninety (90) minutes when the ambient temperature is below 85 degrees Fahrenheit, or exceeds sixty (60) minutes

when the ambient temperature is above 85 degrees Fahrenheit. Batch, mix and deliver wet-mixture shotcrete per ASTM C94 or C685.

D. Hot Weather Shotcreting – Unless otherwise specified, do not place shotcrete when shotcrete temperature is above 95°F, unless prequalification testing shows that the required quality of materials can be achieved at high temperatures. The temperature of reinforcement and receiving surfaces shall be below 90°F prior to shotcrete placement. If temperature mitigation measures are taken, it is at the Contractor's expense.

E. Cold Weather Shotcreting – Unless otherwise specified, shooting may proceed when ambient temperature is 40°F and rising. Stop shooting when ambient temperature is 40°F and falling, unless measures are taken to protect the shotcrete. Shotcrete material temperature, when shot, shall not be less than 50°F. Do not place against frozen surfaces. If temperature mitigation measures are taken, it is at the Contractor's expense.

3.4 SHOTCRETE PLACING, FINISHING, AND CURING

A. Operations: Utilize a standard type of air compressor, capable of providing a minimum of 250 cubic feet of air per minute per nozzle.

B. Placing: Except when shooting reinforcing, hold the nozzle perpendicular to and 2-1/2 to 3 feet from surface. At reinforcing bars, hold the nozzle so as to direct shotcrete behind the bars, and shoot each side of each bars separately. A nozzleman's helper equipped with an air jet shall precede the nozzle and blow out rebound or sand lodged behind bars, on forms, or placed shotcrete. Placing shotcrete horizontal members from the top is not allowed unless approved methods are employed to eliminate all rebound. Material shall emerge from the nozzle in a uniform flow. If flow becomes intermittent for any reason, direct the nozzle away from the surface until the flow is again steady and constant. Do not reuse rebound or loose sand for any purpose.

C. Puddled Shotcrete: Use of "puddled shotcrete" in which the air pressure is reduced and the water content is increased to facilitate placing in difficult locations is not allowed. Do not place shotcrete where nozzle stream cannot impinge directly on the involved surface. Where difficult shooting conditions occur, obtain proper results by maintaining correct air pressure and water ratio and reduce supply of material.

D. Construction Joints: Form joints with sloping beveled edges. Clean and dampen the hardened joint surfaces before placing additional shotcrete. Square edged construction joints are not allowed. The film of laitance which forms on the surface of the shotcrete shall be removed within approximately two hours after application by brushing with a stiff broom. If this film is not removed within two hours, it shall be removed by thorough wire brushing or sand blasting. Construction joints over eight hours old shall be thoroughly cleaned with air and water prior to receiving shotcrete.

E. Finishing: Rod exposed surfaces to true planes and lines on reaching the thickness and plane established by forms and ground wires. Tamp and wood float surfaces level and provide a rough raked finish. Carefully coordinate finish requirements with other trades (ceramic tile, pool plaster) to ensure shotcrete finish is appropriate substrate for final finish material.

F. Curing: Keep shotcrete continuously damp for not less than seven (7) days after placing. Use sealed curing sheeting or other approved curing method where water curing is not feasible. Do not use curing compound of any kind.

3.5 DEFECTIVE WORK

A. Cut out, remove and replace, or repair to the satisfaction of the Owner's Representative, shotcrete not meeting minimum strength, not true, plumb or level, not to required elevations, containing cracks detrimental to performance or appearance, containing shavings, debris or with honeycombs or voids.

B. Promptly perform Work required to repair, patch, replace, render properly cleaned surfaces (by sandblasting if necessary) or otherwise make good any defective shotcrete at Contractor's expense, including all expense of additional inspection, tests, or supervision made necessary as a result of defective shotcrete.

3.6 CLEAN-UP

A. Upon completion of the Work of this Section, immediately remove all swimming pool shotcrete materials, debris and rubbish occasioned by this work to the approval of the Owner's Representative.

END OF SECTION 13 11 03

SECTION 13 11 04 – SWIMMING POOL CERAMIC TILE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Swimming pool ceramic tile detailed on the Drawings, including, but not limited to, the following:

1. Lane Line / Target Tile / 5'-0" Depth Tile.
2. Trim Tile. (At Underwater Steps, Benches, and Beach Entry)
3. Depth Marker Tile. (On top of rim flow bond beam and waterline)
4. Zero Depth Entry Transition Strip (between plaster and diamond brite)
5. Underwater Tile Markings

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. Standards: In addition to complying with all pertinent codes and regulations:

1. Manufacture of all tile shall be in accordance with ANSI A-137.1-1976.
2. Install ceramic tile in accordance with the recommendations contained in the 2023 "Handbook for Ceramic Tile Installation" of the Tile Council of America, Inc.

C. Tolerances: Install all swimming pool ceramic tile straight, true, plumb and square within a tolerance horizontally of one in 200 and a tolerance vertically of one in 500. Waterline and gutter bullnose tile shall be level to 1/8" (+/- 1/16") around entire perimeter of swimming pools.

1.3 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in conformance with the requirements of Section 01 33 00. Requests for substitution shall conform to requirements of Article 1.10.A of Section 13 11 00.

B. Samples: Submit samples of each color and pattern in the specified groups. Character samples can be representative for review prior to screening of actual tile.

C. Master Grade Certificate: Prior to opening ceramic tile containers, submit a Master Grade Certificate, signed by the manufacturer of the tile used and issued when the shipment is made, stating the grade, kind of tile, identification marks for the tile containers, and the name and location of the Project.

D. Specifications: Submit manufacturer's recommended installation specifications for the Work.

E. Submit proof of qualifications as specified in Article 1.2.A of this Section.

1.4 PRODUCT HANDLING

A. Delivery: Deliver all materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.

B. Storage: Store all materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project site.

C. Protection: Use all means necessary to protect swimming pool ceramic tile before, during and after installation and to protect the installed Work specified in other Sections.

D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner.

PART 2 - PRODUCTS

2.1 TILE (All tile to have minimum coefficient of friction of 0.42 per ANSI standard A137.1)

A. Lane Line / Target Tile / 5'-0" Depth Tile:

1. Material: Group 3 quality, frost proof unglazed ceramic mosaic tile with absorption rate of less than 1% as manufactured by Dal-Tile or approved equal.
2. Size: 1 x 1 inches.
3. Color: Dal-Tile #D-621, 'Nautical Blue', in 25YD direction. Dal-Tile# D-311, 'Black' at 5'-0" depth tile. To be approved by Owner prior to ordering.

B. Trim Tile (on underwater steps, benches and beach entry)

1. Material: Group 3 quality, frost proof unglazed ceramic tile with absorption rate of less than 1% as manufactured by Dal-Tile or approved equal.
2. Size: 1 x 1 inches with S-812 quarter round.
3. Color: Dal-Tile #D-621. 'Nautical Blue'. To be approved by Owner prior to ordering.

C. Depth / Caution Marker Tile (on top of bond beam and waterline at rim flow pool/spa):

1. Material: All depth/caution marker tile shall be unglazed ceramic mosaic tile with absorption rate of less than 1% as manufactured by Inlays or approved equal.
2. Size: 6 x 6 inches.
3. Depth Markers: Inlays FT and IN Series. To be approved by Owner prior to ordering.

4. Caution Markers: Inlays MG and TMG Series. To be approved by Owner prior to ordering.

D. Zero Depth Entry:

1. Material: All zero-depth entry transition strip tile shall be Diamond Brite or approved equal. To be approved by Owner prior to ordering.
2. Zero Depth Entry Edge Tile:
   a. Material: Group 3 quality, frost proof unglazed ceramic mosaic tile with absorption rate of less than 1% as manufactured by Dal-Tile or approved equal.
   b. Size: 1 x 1 inch tile to form 4" tile band.
   c. Color: Dal-Tile #D-617, 'Artic White'

E. Underwater Tile Markings (at swimming pool floor):

1. Material: Group 3 quality, frost proof unglazed ceramic mosaic tile with absorption rate of less than 1% as manufactured by Dal-Tile or approved equal.
2. Size: 1 x 1 inch tile to form 6" x 6" floor markers.
3. Color: Dal-Tile #D-621, 'Nautical Blue'.

2.2 MORTAR

A. Laticrete 3701 fortified mortar #LCR-37-1017.

B. Site mortar mix shall comply with ASTM C270 standards.

1. Sand for Mortar: Comply with requirements of fine aggregate for concrete.
2. Cement: Type 1 portland cement, conforming to ASTM C150.
3. Hydrated Lime: Conforming to ASTM C206 or 207, Type S.
4. Water: From a potable source.

C. Water: From a potable source.

D. Mortar shall meet ASTM C627.

2.3 THIN SET MORTAR

A. Laticrete 254 Platinum. Laticrete, Custom or equal.

B. Water from a potable source.

C. Mortar shall meet ASTM C627.

2.4 GROUT

A. All tile grout shall be waterproof grout complying with the recommendations of referenced standards. Grout color shall be grey for dark backgrounds, white for light backgrounds (verify colors with Architect).

2.5 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation of ceramic tile as indicated on the Drawings, shall be new, first quality of their respective kinds, and subject to the approval of the Owner's Representative.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all Work of this Section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation may properly commence.
2. Verify that ceramic tile can be installed in accordance with the original design and all referenced standards.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Failure to notify the Owner's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive its Work.

3.2 INSTALLATION

A. Method:

1. Install all ceramic tile in strict accordance with installation method P601-90 of the 2023 Handbook for Ceramic Tile Installation of the Tile Council of America, Inc.
2. Be certain to install all ceramic tile perfectly level, flush, plumb, and to the finish grades and elevations indicated on the Drawings.

B. Interface:

1. Carefully establish and follow the required horizontal and vertical elevations to insure proper and adequate space for the work and materials of other trades.
2. Coordinate and cooperate as required with other trades to insure proper and adequate interface of ceramic tile Work with the Work of other trades.

3.3 GROUTING

A. Follow grout manufacturer's recommendations as to grouting procedures and precautions.

B. Remove all grout haze, observing grout manufacturer's recommendations as to use of acid and chemical cleaners.

3.4 EXTRA STOCK

A. Provide two (2) unopened boxes of extra tile for 2.1A, 2.1B, 2.1C and 2.1E for Owners use at a future time.

3.5 CLEAN-UP

A. Upon completion of the swimming pool ceramic tile installation, thoroughly clean and polish the exposed surfaces of tile work. Completely clean work area of debris and rubbish occasioned by this Work and dispose of to the approval of the Owner’s Representative.

END OF SECTION 13 11 04

SECTION 13 11 05 – SWIMMING POOL PLASTER

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Swimming pool plaster and waterproofing of swimming pool structures as indicated on the Drawings and herein specified.

B. Start-up and operation instructions to Owner's operations and maintenance personnel and properly balance swimming pool water chemistry until the Owner takes occupancy.

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in application and installation of commercial pool plaster for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. Standards: Swimming pool plaster shall conform with requirements of International Building Code, latest edition. In addition, meet requirements of applicable portions of most current edition of the "Technical Manual," National Plasterers Council, Wauconda, Illinois.

C. Start-up:

1. Furnish a swimming pool water chemistry consultant, with a minimum of five (5) years experience, possessing either AFO (Aquatic Facility Operator) or CPO (Certified Pool Operator) certification(s), to supervise and properly balance swimming pool water chemistry.
2. Demonstrate to the Owner that all systems are fully operational and that calcium hardness, total alkalinity, chlorine residual and pH levels are within specified limits.
3. Standards: Furnish labor and chemicals as required to condition the water properly to the following specifications:
   a. Calcium Hardness: 200-400 parts per million (PPM)
   b. Total Alkalinity: 80-100 PPM
   c. Chlorine Residual: 1.5 to 10.0 PPM
   d. pH Factor: 7.2 to 7.8

1.3 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in conformance with the requirements of Section 01 33 00. Requests for substitution shall conform with requirements of Article 1.10.A of Section 13 11 00.

B. Submit proof of qualifications as specified in Article 1.2.A and 1.2.C.1 of this Section.

1.4 PRODUCT HANDLING

A. Delivery: Deliver materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.

B. Storage: Store materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project Site.

C. Protection: Use all means necessary to protect the swimming pool plaster before, during, and after installation and to protect the installed Work specified in other Sections.

D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner.

1.5 ENVIRONMENTAL CONDITIONS

A. No plastering shall be done under unsuitable conditions of weather or temperature. No plastering shall be done when prevailing temperature is 40 degrees Fahrenheit or less.

B. Do not install plaster during rain and, if rain commences after plastering has begun, immediately protect the plaster from rain by all means necessary until the plaster has set.

C. Do not install plaster during wind greater than 10 mph and, if wind commences after plastering has begun, immediately protect the plaster from wind by all means necessary until the plaster has set.

PART 2 - PRODUCTS

2.1 CEMENT / AGGREGATE

A. All Interior Pool Surfaces, unless otherwise noted: Luna Quartz® tiny pebble finish by Wet Edge Technologies. Altima® quartz finish by Wet Edge Technologies. Pebble-Fina® pool finish by Pebble Technologies or approved equal.

B. Sun Shelf: Diamond Brite Diamond Quartz finish with select aggregates and polymer modified Portland Cement and BondKote by SGM, Inc., no known equal. Color to be white. www.sgm.com _800) 641-9247

2.2 COLOR

A. All swimming pool plaster shall be white in color. Wet Edge Technologies shall be Luna Quartz® “Polar White”. Wet Edge Technologies shall be Altima® “White”. Pebble Technology shall be Pebble-Fina® “Classico”. Contractor to obtain written approval on selected pebble color from the local Health Department prior to installation. Submit cut sheet, color sample and written approval for review by Architect and Owner.”

B. Sun Shelf: Color shall be White Diamond Brite Diamond Quartz Finish.

2.3 WATER

A. Water for swimming pool plaster shall be clean and free from injurious amounts of acid, alkali, and organics.

2.4 PUMP PIT, BACKWASH PIT & SURGE CHAMBER WATERPROOFING

A. Xypex, Miracote Miraflex Membrane C Hycrete Waterproofing System concrete additive or approved equal. Mix and apply per manufacturer’s recommendations for specific application. Color shall be Gray.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to Work of this Section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation can properly commence.
2. Verify that swimming pool plaster can be installed in accordance with the original design and all referenced standards, including proprietary application techniques and application training/certifications.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Failure to notify the Owner's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive the Work.

3.2 INSTALLATION OF PUMP PIT, BACKWASH PIT & SURGE CHAMBER WATERPROOFING

A. Provide two (2) coats of the specified gutter and surge chamber waterproofing prior to plastering the swimming pool. Prepare surfaces to receive waterproofing and cure in conformance with manufacturer's recommendations. Provide steel trowel application method to ensure uniform smooth, dense surface finish.

3.3 INSTALLATION OF POOL PLASTER

A. Indoor Pools or Spas:

1. Completion of Other Work: DO NOT commence plastering of swimming pool(s) or spa(s) until the following conditions have been met:
   a. The Health Department has approved the pool(s) and/or spa(s) for plaster.
   b. All work above the pool(s) and/or spa(s) is complete.
   c. All painting in the pool area is complete.
   d. All welding and grinding in locations adjacent to the pool area are complete.
   e. The backwash sewer connection is complete.
   f. All concrete pool deck construction is complete and the pool decks have been thoroughly cleaned.
   g. The circulation pump(s) is/are operation.
   h. The mechanical system has been flushed sufficiently to remove all dirt and debris from the piping system.
   i. All necessary chemicals (Chlorine, Acid, Sodium Bicarbonate and Calcium Chloride) are on site and ready to use.
   j. Obtain written approval from the Owner and the Architect.

B. Contractor accepts all liability from damage done to the pool plaster if the pool(s) or spa(s) is (are) plaster before the completion of the above listed items or without the written approval of the Owner and the Architect.

C. POOL PLASTER AUTHORIZATION FORM:

1. The pool(s) and or spa(s) at Rockville Outdoor Recreation Pool is/are hereby approved for the installation of the pool plaster. Pursuant to the requirements of specification section 13 11 05, paragraph 3.3.

_____ _____

Owner Date

_____ _____

Architect / Project Manager Date

D. Preparation:

1. Do not apply plaster over dirt, rust, scale, grease, moisture, scuffed surfaces or conditions otherwise detrimental to the formation of a durable plaster finish.
2. Consult with manufacturer on application to specific surfaces being treated. Follow manufacturer's recommendation for curing of cast-in-place concrete or shotcrete surfaces prior to application of plaster.
3. Protect ceramic tile, decking, deck equipment, gratings, fittings and other items by suitable covering or masking.
4. Mask or remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures and similar items in place not to receive pool plaster. Following completion of plaster for each space or area remove masking. Re-install all removed items utilizing workers skilled in the trades involved.

E. Application:

1. Finish shall be applied to a uniform thickness of 3/8” to ½” over the entire surface. The walls shall be scratch-coated followed by a finish coat. Material applied to the floor after the walls have been applied shall be accelerated to assure uniform setting time throughout the pool surface.
2. Float the plaster to a uniform plane and trowel to a smooth, dense, impervious surface using extreme care to avoid stains.
3. Take special care in finishing around pool fittings, making sure to mask off or plug openings so as not to fill such openings with excess plaster. Be certain to completely enclose pool fittings with plaster to insure a leak-proof seal around pipes, fittings, lights, anchors, etc.
4. Accurately interface with the finish planes of items installed by other trades.
5. Quartz and pebble plaster finish is to be applied by a licensed applicator as approved by the manufacturer, and in accordance with manufacturer’s training.

3.4 CURING

A. Preparation: Anticipate the need for required equipment and have all such equipment immediately available for use upon completion of pool plastering.

B. Pool Filling:

1. After the plaster has sufficiently dried and before drying has proceeded to a damaging point, cure the plaster by gradually filling the pool with water, preventing all damage to finished plaster surfaces.
2. Flow the water continuously until the pool is filled.
3. When the weather is hot and/or water pressure is low, keep the pool walls damp while the pool is filling.
4. Coordinate with Contractor to ensure that the pool is continuously monitored while filling to prevent overfill.

3.5 EQUIPMENT ACTIVATION

A. All water chemistry and filtration mechanical equipment shall be operational upon filling of pool after plaster. Chemicals and other related support items as supplied by Contractor, shall be in supply at start-up.

B. For the first fourteen (14) calendar days after completion of the pool plaster, brush all plastered surfaces at least twice a day and coordinate with General Contractor to ensure that the plaster is carefully maintained after the initial fourteen day period. In addition, coordinate with the Contractor to ensure that pool filtration equipment is continuously running during the initial fourteen day period.

C. Start-up and provide qualified personnel to operate pool equipment for a period not less than fourteen (14) days after the pool is placed in operation, or until the Owner takes occupancy of the facility or letter of substantial completion. During this time, Contractor shall instruct and supervise the Owner's personnel in the various operating and maintenance techniques involved. Contractor shall be responsible for supply of chemicals during this not less than fourteen (14) day period and at time of turnover to Owner, chemical storage tanks shall be full. (Owner's personnel shall be fully trained and capable of assuming swimming pool maintenance tasks, training may begin before Owner takes occupancy).

3.6 CLEAN-UP

A. Upon completion of swimming pool plaster, remove all materials, equipment and debris occasioned by this Work and leave the job site in a clean and presentable condition. Perform all such clean-up to the approval of the Owner’s Representative.

3.7 WARRANTY

A. All applicators must provide a minimum of five (5) year warranty for application and workmanship additional to the manufacturer’s warranty for product.

END OF SECTION 13 11 05

SECTION 13 11 06 – SWIMMING POOL EQUIPMENT

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Swimming pool equipment items required for this Work as indicated on the Drawings and specified herein.

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in commercial pool work for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. All equipment supplied or work performed shall comply with regulations governing public swimming pools and spas as contained within International Building Code, latest edition, Maryland Department of Health and Montgomery County Health and Human Services regulations for swimming pool operation and construction, International Swimming Pool and Spa Code, Swimming Pool Code, latest edition.

1.3 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in conformance with the requirements of Section 01 33 00. Requests for substitution shall conform with requirements of Article 1.10.A of Section 13 11 00.

B. Required submittals include:

1. Swimming Pool Safety and Maintenance as specified in Article 2.1-2.2 of this Section.
2. Swimming Pool Fittings as specified in Article 2.3 of this Section.
3. Wet Play Equipment as specified in Article 2.4-2.7
4. Swimming Pool Deck and Mechanical Equipment as specified in Article 2.8-2.30 of this Section.
5. Winterization Plan/Instructions and Summerization Plan/Instructions for all pools and equipment.

C. Submit proof of qualifications as specified in Article 1.2.A of this Section.

D. The equipment shown on the plans represent the first listed items in the technical specifications. The Contractor shall be responsible for all required field coordination and installation of any approved equal product to provide a fully working and warranted system. The Contractor shall submit detailed shop drawings for any products used other than the first listed specified items. Allow fifteen (15) days for initial review per swimming pool specification section 13 11 00. Contractor provided shop drawings shall include details and quality equal to the original plans and construction documents. The Contractor shall provide any and all required engineering including but not limited to structural and anchorage requirements for any proposed equipment other than the first listed specified equipment. The Contractor is responsible to provide a factory certified representative(s) to start-up and provide on-site training for all swimming pool mechanical equipment provided. Allow fifteen (15) days for initial review.

1.4 PRODUCT HANDLING

A. Protection: Use all means necessary to protect swimming pool equipment items before, during and after installation and to protect the installed work specified in other Sections.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative.

PART 2 - PRODUCTS

2.1 SAFETY EQUIPMENT

A. Pool Safety Signs: As required by the Department of Health. Size, layout, materials, and text to be approved by Owner. Submittal required. Placement at the pool site shall be in conformance with Health Department requirements. Two (2) sets minimum.

2.2 MAINTENANCE EQUIPMENT

A. Commercial Pool Vacuum: Provide pool vacuum cart with a 155-square foot single-cartridge filter, lid-mounted handle, separate lid-mounted bracket for electrical cord, and two rubber-tired ball bearing wheels with grease fittings. Cart and filter shall be fabricated from schedule 304 stainless steel with welds treated and passified. Provide Whisperflo pump with a 1 1/2 hp, 115/230 volt, maximum 20 amp draw @ 120 volts, single phase motor and integral trap. Pump shall be UL and NSF listed, have 2" suction and 1 1/2" discharge fittings, and have a brass priming valve with hose bib. Entire pump assembly shall be anchored to vacuum cart with two stainless steel bolts. Provide a 100 foot 10 AWG 3/C SJ electrical cord with ground fault interrupter (GFI) plus. Cord shall be wired to a double pole, 30-amp switch which shall be mounted on pump motor. Lincoln Aquatics Model # 27015, one (1) required.

2.3 FITTINGS

A. Main Drain Frame & Grate (18" x 36"): 'Daldorado' DalmaxSG-183634, Super Sump with VGB Compliant Grates, or approved equal, eight (8) required. Provide two (2) Hayward #SP-1056 1-1/2" collector tubes and two (2) #SP-1055 Hayward 1-1/2" hydrostatic relief valve, one

per main drain sump. Contractor shall provide to the Owner a Certificate of Compliance, signed by a licensed design professional, for main drain sump(s) and frame(s) and grate(s), as required by the Virginia Graeme Baker Act.

B. Floor Return Inlet 1-1/2" Adjustable: StaRite #08417-0000, United Industries, or approved equal. Twenty two (22) required. Contractor shall field verify prior to ordering. Ten (10) additional spare covers to be provided.

2.4 WET PLAY EQUIPMENT

	Product	Qty.
1.	Foam Jet #WMO-104 'Crystal Fountains' or approved equal.	7
2.	Split Spurt #0010-7482 'Waterplay or approved equal.	3
3.	Hopper #0011-0839 'Waterplay or approved equal.	1
4.	Bamboo Down Jet 'Splashtacular' or approved equal. No themeing required.	1
5.	Funbrella #0010-0485 'Waterplay' or approved equal.	1
6.	Water Trough Garden 'Splashtacular' or approved equal.	1
7.	Spiral Tunnel #0010-0377 'Waterplay' or approved equal.	1
8.	'Splashtacular' Custom Activity Structure #225st or approved equal.	1

2.5 AQUA ZIP

A. Aqua Zip'N Pool Adventure Rope Swim with 304SS frame, high tenacity polyester rope and recessed SS anchors, one (1) required. To be provided with one (1) Aqua Zip safety crash pad at pool edge and 4'-0" high removeable UV resistant safety padding at vertical support poles, and one (1) additional safety crash pad. Two (2) safety crash pads total.

2.6 SPLASHTACTULAR ACTIVITY STRUCTURE

A. PLAY FEATURE SCOPE – (225st) See plans for layout and additional information.
   1. Platform(s) and other items
      a. (Qty 3) Square 6' x 6' Platform (108 Sq Ft) at 5', 4' and 3' Elevation
      b. (Qty 6) Cantilever 20" x 6' Platforms (72 Sq Ft) at 6', 4' and 3' Elevation.

B. PLAY FEATURE SPECIFICATIONS
   1. Design Influence
      a. Components and assemblies to meet ASTM and CPSC codes
   2. Steel and Fasteners
      a. All steel supports and components to be made from a minimum of 304L stainless steel.
      b. All fasteners and hardware to be made from 304L and 316 stainless steel.

c. Anchor system to use two-part high strength epoxy such as Hilti RE500 or equal and stainless steel structural anchor bolts.
d. Structural connections and feature connections placed in user-accessible areas must use flangeless connections.
e. All fabricated steel components to be made in the United States of America.

3. Platforms and Decking
   a. Platforms and decking components to be made from self-supporting fiberglass with coring added for rigidity and longevity. To have non-skid texture on all walking surfaces.
   b. Choice of 180 colors to be offered for gel-coat on platforms.
   c. Fiberglass components to use 20 mil minimum gel-coat and laminate thickness of ¼".
   d. All bridging material to be made from PVC lumber with non-skid surface on all walking surfaces.
   e. All fabricated platforms and decking components to be made in the United States of America.
4. Waterslides
   a. All slides to be made from fiberglass using a smooth gel-coat finish on the riding surface.
   b. Choice of 180 colors to be offered for gel-coat on waterslides.
   c. Fiberglass components to use 20 mil minimum gel-coat and laminate thickness of ¼".
   d. Exterior of fiberglass to have industrial automotive grade UV protective clear coating applied.
   e. All slides to be fed with water enhancing the user experience and controller the rider.
   f. All fabricated waterslide components to be made in the United States of America.
   g. Activity Structure to be provided with one (1) open flume double slide, and one (1) closed tube slide with fiberglass runout.
5. Coatings and Graphics
   a. Exposed stainless steel to be coated with 'super durable' powder coat.
   b. Choice of 180 colors to be offered for powder coat.
   c. All skirting panels to use UV laminated graphic-wraps with 150 dpi printed artwork.
6. Plumbing
   a. Manifold to be made from stainless steel and anchored to pool floor or play equipment.
   b. Manifold to be powder coated.
   c. All features to be individually fed off of manifold and individually valved.
7. Accessibility
   a. None see-thru skirting panels or no-climb netting to be fastened under platforms and slides under 84" tall.
   b. Exposed under-side of platforms to be skirted with PVC mesh material.
   c. Manifold to be hidden by skirting panels or under-deck mesh.
   d. Custom 48" wide ADA transfer platform per plans with transfer rails and 19" maximum height platform.
   e. All steps to be 6" rise and 14" run and a minimum clearance width of 48".
   f. All stairs to have a continuous handrail with a height of 34" to 38" inches.
   g. All elevated platforms and stairs to have 42" guardrail height.

C. INSTALLATION

1. Full Installation to be provided by fully experienced and capable team. To include all labor, materials and equipment to complete the installation of the equipment, as well as cleaning and waxing in accordance of good workmanship.

D. WARRANTY
1. All materials, components and coatings to be warranted to be free from defects in workmanship or materials and free from defects arising from process of manufacture for a period of 1 year.

2.7 SWIMMING POOL LILY PATH

A. Water Walk
1. General: The specifications for products in this section have been developed utilizing designs and data provided by PLAYTIME. All materials and components of the Water Walk system shall be designed, manufactured, and/or supplied by PLAYTIME, (303) 962-7625.
2. Materials:
   a. Water Walk Floatables
      1) Provide seven (7) floatables consistent with the following theme and sizes:
      2) Seven (7) “Lily Pad” Floatables: 42” L x 8” H
   b. All shall be constructed as shown on the drawings and anchored to the pool bottom to provide a floating walkway across the pool as shown in the plans. The pads are to be constructed as follows:
      1) High gloss vibrant colors, as approved by Owner.
      2) Coated foam impact attenuating protection on all surfaces
      3) One stainless steel U-bolt inset to a stainless steel plate inside each floatable element located in the center of each pad for connection to PLAYTIME Anchor Kit
      4) SS Anchor Kit connecting Floatable embed Cup Anchor. Anchor Kit shall include: One (1) 5/16” stainless steel shackle, a 5/16” eye-to-jaw swivel, 9/32” stainless steel chain (cut to length with a protective, flexible tubing. – (One per Floatable)
      5) Embed Cup Anchor w/ Custom Cap: Flush mounted to pool floor – (One per Floatable), see 2.8C of this section.
      6) Embed 7 additional cup anchors for future float walk and provide cap for each as listed in #2.b.6 above
      7) Provide two additional cup anchors at swimming pool for zip course. Enclosure ropes as specified on the Drawings.
   c. Overhead Netting
      1) Provide overhead Netform System by InCord that spans the pool over the Water Walk suspended from the posts shown in the plans. Ropes should be fed through the holes in the column at the desired height and secured to the posts using stainless steel turnbuckles on each end to allow for height adjustment. The rope shall be 3/4” diameter and come with a steel core and have integral Schedule 40 stainless steel spreader bars to reduce sag. High density polypropylene knot connections shall be provided. All connection hardware shall be stainless steel and have strength consistent with rope.
   d. Safety Padding
      1) Provide a minimum 2” thick safety padding according to the manufacturer’s recommendations at the entry and exit to the Water Walk. Recommended 8’

L (along pool edge) x 4' Deep (back from pool edge) x 1' Turndown - Refer to the drawings for the required extent of the padding or requirement of custom spacers to fit with gutter systems or other custom edge dimensions. Safety Padding shall be supplied by PLAYTIME, or approved equal.

2) Provide 4'-0" high removeable UV resistant safety padding at vertical support poles.

3) Provide Owner with two (2) additional safety pads for attic stock.

e. Cargo Net Support Posts

1) Structural calculations to support the Water Walk loads shall be supplied by PLAYTIME, or approved equal. Provide (2) 'T' frame support posts for the overhead netting system, one (1) at the Water Walk entry and one (1) at the Water Walk exit as shown on the drawings. All Water Walk posts shall be made as schedule 40, galvanized steel post with choice of powder-coating color (1 color per 4 posts). The pre-engineered posts shall have a diameter of 8" and a height of 10'-0" – 11' 0" (above pool deck). Structural calculations to support the Water Walk shall be provided by the manufacturer.

2) Additive Alternate: See Section 01 10 00, 1.4.A.2; 2nd Lily Path Crossing to include all additional items above needed to install the second lily path crossing as indicated as plans.

2.8 ADDITIVE ALTERNATE: SWIMMING POOL SLIDE (See Section 01 10 00, 1.4.A.2)

A. Spectrum single flume model #1810371 360 tri-deck 8 ft high (or approved equal), closed flume and powder coated construction with engineered footings. Contractor to submit shop drawings for review. Shop drawings and structural calcs to be prepared by Maryland registered structural engineered. Base bid to include all piping, connections and anchorage. Additive alternate to furnish and install the slide.

B. Provide 4'-0" high removeable UV resistant safety padding at vertical support poles.

2.9 DECK EQUIPMENT

A. Stanchion Sockets and covers: 1.90" I.D. Bronze. KDI-Paragon 38201TC, no known equal. Sixteen (16) required. Coordinate remaining 8 anchor locations around swimming pool slide and zipline with Owner for line queuing / separation. Provide two (2) spare cover and key sets.

B. Stanchion Posts: 1.90" O.D. x .145 wall. KDI-Paragon #38106 8' post, six (6) required, and #38105 4'-6" post, four (4) required and #38301 hook and collar, no known equal. Ten (10) posts total. Coordinate location of 4'-6" posts and anchors with Owner.

C. Commercial Cup Anchor: Spectrum #58316 or equal. Eleven (11) required. To be provided with custom fabricated Spectrum cup anchor threaded cap. Provide two (2) spare cup anchor eyebolts.

D. Racing Lanes, 25 M: Kiefer TSP Racing Lanes 4" disc. #33.0025, no known equal. Verify color with Owner's Representative prior to ordering. 25-meter lanes. Seven (7) required. Provide vinyl covered stainless steel lane line extensions, as required, two (2) per lane line.

E. Racing Lane Reel with Cover: KDI-Paragon #75101SS with cover #75133, no known equal. One (1) required.

F. Moveable Lifeguard Chair: 1.90" O.D. x .065 wall. KDI-Paragon 20302, no known equal. Three (3) required.

G. Deck Level Lifeguard Station: Paragon 1-step lookout chair, model #20350. Four (4) required.

H. Adjustable Figure 4 Grab Rails: KDI-Paragon #30302, 1.90" O.D. x .104" wall, no known equal. Nine (9) sets required.

I. Recessed Steps, Set of 3: Paddock custom recessed gutter steps. Nine (9) sets of three required.

J. Handrail: Spectrum Custom length three bend handrails, 90", 66", 39", 42", 72, 1.90" O.D. x .109" wall, or approved equal. See plans, thirteen (13) required.

K. Anchor Sockets for Grab Rails and Handrails: KDI-Paragon 28102, no known equal. Sixty-two (62) required.

L. Stainless steel Escutcheon Plates for Grab Rails and Handrails: Spectrum Model #35214, no known equal. Sixty-two (62) required.

M. Accessible Lift: Pentair "Aqua Tram 360" 500 lb. max lifting capacity. Furnish complete with anchors, cover, extra battery pack and transporter cart. No known equal. Two (2) required.

N. Backstroke Pennants: 'Champion' 12" x 18" vinyl coated polyester pennants #53-006 Blue and White, Lincoln Equipment, Knorr Systems or equal. Two (2) total.

O. Basketball Hoop: SR Smith #S-BASK-ERS-ER Commercial Basketball hoop, square tube w/ 30'' setback and rock-solid anchor custom height of 48" above water level. Spectrum or equal. One (1) required.

P. Basketball Safety Net: Justfornets.com, model JFN #18 6'-0" x 11'-0". Contractor to field verify and coordinate with Owner.

Q. Lifelines with bouys and rope to separate aqua zip area from swimming pool, beach entry areas from main activity pool, and lily path area from activity pool. Contractor to field verify length of rope required.

Location	Length	Quantity
Activity Pool	35 feet	3
	28 feet, 9 inches	1
Swimming Pool	82 feet	1
	21 feet, 6 inches	3
	42 feet, 6 inches	1

R. Pool Cover System (Wellness Pool):

1. A pool cover system as described below shall be provided and shall include all the specified features, without exception. Submittal data must include complete documentation relating to all the specified features and include manufacturer's sales

literature, specification sheets, and installation/operation/maintenance manuals. Upon written request by the specifying agent, the following samples must be provided: samples of tubing used for storage reel winding tubes and end frames; a sample winding tube bearing; a sample castor wheel assembly; and a cover sample measuring at least 8" x 11", including weighted side edge, reinforced end edge, and grommet.

2. Cover Material:
   a. Material shall be woven, 10 by 10 count per inch, high-density polyethylene, ultraviolet stabilized film fabric, laminated to both sides of 1/8" thick, closed cell, medium density, white, polyethylene foam. The woven polyethylene film fabric shall be coated on both sides with an ultraviolet stabilized, chemically resistant polyethylene coating. The combination of film, foam and woven components shall be non-toxic, non-absorbent, non-permeable and buoyant. Color shall be blue on upper surface and black on under surface. In addition to the above, cover must meet the following requirements:

Thickness	1/8 inch minus or plus 10%
Foam Density	2 lbs. per cubic foot
Weight	5 oz. per square foot
*Tensile Strength	318 lbs. (ASTM 1682264)
*Tear Strength	60 lbs. (ASTM D2261-71)
*Bursting Strength: (Mullen Tester)	425 psi (ASTM 751-73)
Service Temperature	-40°F to +160°F
K Factor	.25 BTU/sq. ft.-Hr – degrees F/inch (ASTM D2326)
Reinforced Edge Tear Strength	1225 lbs. pull strength, corner to corner
Open Seam Tear Strength	70 lbs.

3. Cover Design Criteria:
   a. Cover panels shall totally cover the surface of the pool without gaps or overlaps with reinforced cutouts to accommodate rounded corners, step areas, rails, etc. Cover panels shall be of the following quantities and sizes:

Qty.	Size
3	14 feet, 7 inch x 82 feet
1	Custom width to be provided with stair fold outs.

   b. Along end and side edges of each panel, a weighted material shall be sewn in and shall be continuous, non-corrosive and conform to the flat shape of the cover. End edges shall be reinforced with a double layer of polyethylene-coated film fabric and designed in such a manner as to prevent panels from dividing when the covers are being pulled across the water. On all corners, weighted edge shall wrap corners and be itself encapsulated by the two layers of end reinforcement. The entire corner construction shall be reinforced with an 1/8" thick load dispersion plate and non-corrosive grommet.
   c. Both ends of each cover panel shall be equipped with no less than three (3) non-corrosive grommets and quick-release loops for easy connection to the storage reel or to the next cover panel. All sewing shall be ultra-violet stabilized and chemically resistant 100% polyester thread. Main body seams shall be welded, glued or heat sealed. Complete mechanical attachment with lock-stitched thread shall be required. Warning labels consistent with the recommendations of the Federal Consumer Protection Agency shall be permanently affixed to each end of each cover panel and to the sides of perimeter panels.

4. Storage Reels:

a. The following quantity, type, and size of storage reels shall be provided:

Qty.	Winding Tubes Per Reel	Length of Winding Tubes
1	3	17 Foot
1	1	17 Foot

b. Storage reel frame, winding tubes, castors, brake shafts, cranks and fasteners shall be made of type 304 stainless steel. Each reel shall have six wheels, each of which shall be 6 inches in diameter, be rated at 1150 pounds load capacity and be made of solid polyurethane. Wheels shall be lubricateable through grease fittings on stainless steel axle shafts and have stainless steel swivel yoke assemblies. The reel shall have two frame mounted, screw-type brakes with pads that lock directly to the pool deck and have a total of 18 square inches of total braking surface. Castor brakes or other types of foot-operated or lever-operated brakes will not be considered equal. Each winding tube shall be 4 1/2 inches in diameter; have a wall thickness of .120 inches; and shall consist of continuous length of tubing without joints or welds. Reels with tubes fabricated from two or more pieces of tubing joined together will not be acceptable. End frames shall be fabricated from 1 1/2-inch square Schedule 304 stainless steel box beam tubing with .120" wall thickness. To facilitate field repair, 3/8" stainless steel bolts, nuts and washers shall be used to connect major reel frame parts, wheels, brakes, bearings and winding tubes. Reels that use welding to connect these components will not be considered equal. Winding tube bearings shall be heavy duty, self-aligning, pillow block ball bearings with set screws to secure tube shafts and prevent their lateral movement. All bearings shall be lubricateable through grease fittings. Plastic surface bearings will not be acceptable.

c. Each storage reel shall be provided with a protective cover constructed of vinyl-laminated polyester cloth, 1000 denier, totaling 13 ounces per square yard.

5. Measuring and Training:
   a. A representative of the manufacturer shall visit pool site to confirm measurements prior to fabrication of cover, and once cover is delivered, train operating personnel and supervise initial installation of cover.

6. Warranty:
   a. Cover panels shall be provided with manufacturer's three- year full replacement warranty covering defects in material and workmanship. Storage reel shall be provided with manufacturer's 10-year warranty covering defects in material and workmanship

2.10 CIRCULATION PUMP STRAINERS

A. ‘Mer-Made’ FO Series FRP reducing basket strainer: one (1) 10” x 8” standard, (1) 6” x 5” standard each with acrylic lids and two (2) stainless steel strainers each. (150 lbs.)

2.11 ACTIVITY POOL CIRCULATION PUMP

A. Paco #60123, 6” x 8” x 9.5” type LC end suction centrifugal pump, 1750 RPM 460V, 3PH; 30 HP rated at 1250 GPM @ 60 ft. TDH; 80% efficient; premium efficiency TEFC motor; epoxy coat all wet surfaces. Paco, Aurora, or approved equal. (425 lbs.) Provide with Acudrive

#AD300X-2303-N4X variable speed drive 30 HP 208V with manual bypass and fused disconnect. Coordinate mounting location to maintain desired clearances. Two (2) strainer baskets per pump to be provided.

2.12 ACTIVITY POOL PLAY STRUCTURE BOOSTER PUMP

A. Jandy #JCP15-3AT-S JCP Series; 15 HP; 208V 3PH rated at 708 GPM @ 60 ft. TDH; with integral strainer. One (1) total (249 lbs.) Provide with Acudrive #AD150X-2303-N4X variable speed drive 15 HP 208V with manual bypass and fused disconnect. Coordinate mounting location to maintain desired clearances. Two (2) strainer baskets per pump to be provided.

2.13 ACTIVITY POOL WET PLAY BOOSTER PUMP AND MANIFOLDS

A. Jandy #JCP05-3AT-S JCP Series; 5 HP; 208V 3PH rated at 268 GPM @ 60 ft. TDH; with integral strainer. Two (2) total (72 lbs.) Provide with Acudrive #AD050X-2303-N4X variable speed drive 5 HP 208V with manual bypass and fused disconnect. Two (2) total. Provide booster pump with 4" manifold wet play features as shown per plumbing plan. Manifold to be provided with individual isolation ball valves per feed line, pressure gauge and drain down ports for winterization. All feed lines to be routed away from existing footings as necessary. Two (2) total. Two (2) strainer baskets per pump to be provided.

2.14 ACTIVITY POOL FILTERS

A. 'Paddock' #6730-V-3C vertical 3 cell stainless steel filter with manual filter control hi rate permanent media filter with 99.6 sq. ft of filter area rated at 1494 GPM at 15 GPM/sq. ft. Complete with 10" face piping, 8" backwash (with independent tank backwash). Filters to be ASME code compliant and labeled as required by Health Code. Provide all utilities, piping, valving etc. (7400 each tank) Paddock, no known equal. Provide Signet MK-515 flowsensor with digital readout. One (1) system total.

2.15 ACTIVITY POOL ULTRAVIOLET SYSTEM

A. 'Evoqua' wafer UV model #WF-225-8-N, validated at 1540 GPM 8" flanged connection in-line UV with two (2) lamps at 1500 watts, 208V 1PH. Control Unit" 208V 1PH, 23" x 31" x 12" deep. (121 lbs.) Provide piping bypass, valving, ETS EZ valve strainer and installation and piping per manufacturers recommendations. One (1) system total.

2.16 SWIMMING / WELLNESS POOL CIRCULATION PUMP

A. Paco #40129, 4" x 5" x 12" type LC end suction centrifugal pump, 1,750 RPM 208V, 3PH; 15 HP rated at 400 GPM @ 60 ft. TDH; 74% efficient; premium efficiency TEFC motor; epoxy coat all wet surfaces. Paco, Aurora, or approved equal. (425 lbs.) Provide with Acudrive #AD150X-2303-N4X variable speed drive 15 HP 208V with manual bypass and fused disconnect. Coordinate mounting location to maintain desired clearances.

2.17 SWIMMING / WELLNESS POOL FILTERS

A. 'Paddock' #6726-V-2C vertical 2 cell stainless steel filter with manual filter control hi rate permanent media filter with 31.8 sq. ft of filter area rated at 477 GPM at 15 GPM/sq. ft. Complete with 6" face piping, 4" backwash (with independent tank backwash). Filters to be ASME code compliant and labeled as required by Health Code. Provide all utilities, piping, valving etc. (7,400 each tank) Paddock, no known equal. Provide Signet MK-515 flowsensor with digital readout. One (1) system total.

2.18 SLIDE BALANCE TANK CIRCULATION PUMP

A. 'Jandy' #SHPH-2.0-3PH SH series; 2HP 208V 3PH, rated at 125 GPM at 60 ft. TDH with integral strainer. One (1) total. Provide with Danfoss variable speed drive 2HP 208V with by pass and fused disconnect. Variable speed drive shall be provided with user lockout. VFD to be programed with normal circulation flow rate of 80 GPM. Backwash and night time flow rates shall be set to non-operational hours only. 230V 3PH. One (1) total. (58 lbs) Two (2) strainer baskets per pump to be provided.

2.19 SLIDE BALANCE TANK FILTER

A. 'Pentair' Triton #TR-140C-3 hi rate permanent media filters with 7.06 sq. ft of filter area rated at 105 GPM at 15 GPM/sq. ft. Complete with 3" manifold, 3" flanges and valved together, 3" backwash, seismic anchorage. Provide all utilities, piping, valving, etc. One (1) tank total. (1007 lbs.)

2.20 SLIDE BOOSTER PUMP STRAINERS

A. Mer-Made' F.O. Series FRP basket strainer: one (1) 8" x 5" standard and one (1) 10" x 6" standard. Each provided with acrylic lid and two (2) stainless steel strainers each.

2.21 SLIDE 'A' BOOSTER PUMP

A. ''Paco' #50123, 6" x 5" type 'LC' end suction centrifugal pump, 1,187 RPM, 208V, 3PH, 15HP, rated at 1,000GPM @ 45 ft. TDH; 80.24% efficient; premium efficiency TEFC motor; epoxy coat all wet surfaces. 'Paco', 'Aurora', or approved equal. (600 lbs.) Interconnect with circulation pump so it can only operate when circulation pump is on.

2.22 SLIDE 'B' BOOSTER PUMP

A. Paco #4012A, 4" x 5" x 12" type LC end suction centrifugal pump, 1187 RPM 208V, 3PH; 7.5 HP rated at 500 GPM @ 45 ft. TDH; 80.76% efficient; premium efficiency TEFC motor; epoxy coat all wet surfaces. Paco, Aurora, or approved equal. (600 lbs.) Interconnect with circulation pump so it can only operate when circulation pump is on.

2.23 WATER CHEMISTRY CONTROLLERS

A. Activity Pool: CAT 4000 complete system control package.

B. Swimming Pool: CAT 4000 complete system control package.

C. Slide Balance Tank: CAT 4000 complete system control package.

2.24 CHLORINE STORAGE / FEED SYSTEM

A. Provide 'Chem-Tainer' 150 gallon #TC3448C; dual storage/containment tank with lid; Operating weight = 1250 lbs. Complies with Fed Reg. #40CFR-264-193 Six (6) total. Feed pumps shall be as listed below, all feed pumps shall be provided with FRP shelf brackets and hard piped to point of injection.
   1. Activity Pool: 'Blue and White' A1N20X-7T 91 GPD @ 100 PSI, two (2) total.
   2. Swimming Pool: 'Blue and White' A1N10X-7T 52 GPD @ 100 PSI, two (2) total.
   3. Fitness Pool Metering Pumps: (Existing) to be relocated to new storage room and plumbed to existing injection point.

2.25 CARBON DIOXIDE /FEED SYSTEM

A. CO2 flow control units with flow adjustments from 0-200 SCFH with pressure regulator and gauges for up to 850 PSI nominal cylinder pressure and 40 PSI output to CO2 feed unit fed from storage tanks. Three (3) feed systems furnished by gas service provider. Contractor shall connect to each pool system per manufacturer's requirements. Provide within mechanical room hard wired 'Analox' #API KIT CO2 detector with audible and visual alarms, UL 1971 standard listed, one (1) total.

2.26 CARBON DIOXIDE STORAGE SYSTEM

A. Two (2) 750 lb. storage tanks with remote fill ports (operating weight = 680 liquid lbs. each) tanks to be furnished by gas service provider.

2.27 ELECTRICAL

A. Provide all electrical wiring, conduit, panel(s), starter/disconnect interconnect(s), etc. as required for proper equipment installation per manufacturer's recommendations and shop drawings. Coordinate all work with other trades as required. Refer to electrical plans for additional information.

2.28 EYEWASH/SHOWER

A. Provide Haws model #8300-8309 CRP, corrosion resistant combination eyewash shower. See MEP sheets for water supply piping. Two (2) required.

2.29 BACKWASH PIT

A. Existing backwash pit with P-trap outlet to storm.

2.30 AUTO FILL SYSTEM

A. Aquatic Controller Technologies ELS-810 fill system to include 2” bronze body solenoid control valve, bronze trim flanged globe pattern, 24V solenoid wiring shall be wired to water level controller. Provide 6” air gap at fill point. Three (3) total. Connected to source down stream of reduced pressure backflow preventor (by others).

2.31 POOL OPERATOR WORKSTATION

A. ‘Total Lab Solutions’ epoxy countertop with drop-in sink and two (2) end cabinets. Furnish with wall mounted five (5) faucets ‘Broen Boss’ or approved equal. See MEP plans for water supply piping.

2.32 SLIDE BALANCE TANK TABLET CHLORINE FEEDER / STORAGE

A. ‘PPG’ Accu-Tab Powerbase chlorination unit model 1030 with 67.2 lbs./day output. 30 lb. storage. Complete with piping, valving, venturi injection and ¾ HP booster pump. NSF 50 certified. One (1) total.

2.33 SWIMMING POOL HEATER: ADD ALTERNATE

A. ‘Lochinvar’ #CPN1442, 1,440,000 BTU input, 2” gas connection, 2 ½" flanged water influent/effluent connections and 12” intake and exhaust with category IV double wall venting with drain tees. One (1) total (1,042 lbs.) As part of the add. Alternate the contractor shall provide engineered shop drawings for the permitting and installation of the new heater and modification of the existing gas and venting system which shall include:
   1. Lochinvar stacking support rack system, 4” reinforced concrete equipment pad and anchors. Rack to be positioned over existing pool heater. Contactor may reposition heaters as necessary.
   2. All new necessary plumbing fittings, valves, temperature sensors, thermometers, pipe hangers, etc for the connection of the new pool heater to the swimming pool circulation plumbing.
   3. The modifications required to tie in the new heater exhaust venting to the existing roof vent system.
   4. The modifications required to tie in the new heater intake venting to the existing roof intake system or propose alternate intake system.
   5. The modifications required to the existing gas supply plumbing and regulator system within the mechanical room to provide the necessary gas volume to each heater. The gas line modifications will not be required to allow both heaters to be used simultaneously.
   6. Conduit, feeder lines, disconnects and interlock connections to the chemical controller and electrical panel per the manufacturer's installation requirements.
   7. Pipe hangers and support systems for related pool plumbing and all utilities.

8. All modifications required by the manufacturer for a fully functioning heating system with start-up and training per the manufacturer's guidelines.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to installing the items of this Section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation may properly commence.
2. Verify that the swimming pool equipment items may be installed in strict accordance with original design, pertinent codes and regulations, and the manufacturers' recommendations.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies are fully resolved.
3. Failure to notify the Owner's Representative and give written notice of discrepancies shall constitute acceptance by the Installer of existing conditions as fit and proper to receive its Work.

3.2 INSTALLATION

A. Supply and install items of swimming pool equipment in strict accordance with applicable codes and regulations, the original design, and the manufacturer's published recommendations, anchoring firmly and securely for long life under hard use.

B. Coordinate with other trades to insure all imbedded items are set plumb and flush. Railing ends must have anchor sockets and escutcheon plates. Be certain that deck equipment and railings are properly bonded prior to imbedding.

C. All equipment shall be braced and/or anchored to resist a horizontal force acting in any direction using the criteria shown on the Drawings.

3.3 INSTRUCTION

A. The Contractor shall provide a factory certified representative(s) to start-up and certify proper installation, operation and full warranty status of all swimming pool mechanical equipment. The Contractor shall provide not less than two 8-hour days of on-site training for facility staff in the operation and maintenance of the swimming pool mechanical equipment and systems. The two 8-hour days shall be separated by a minimum of seven calendar days and be completed within the 14-day start-up period.

B. The contractor shall provide a factory certified representative(s) to perform instruction training for the first year's winterization of the pools. This will occur in the fall, after the first summer's operation of the pools and on a schedule approved by the Owner. The contractor shall provide no less than four (4) 8-hour days of on-site work with the facility staff. The four days may be separated based on the Owners' needs to winterize the different pools at different times.

C. The contractor shall provide a factory certified representative(s) to perform instruction and training for the second year's summerization of the pools. This will occur in the subsequent spring after the first summer's operation of the pools and on a schedule approved by the owner. The contractor shall provide no less than four (4) 8-hour days of on-site work with the facility staff. The four days may be separated based on the Owners' needs to summerize the different pools at different times

3.4 EQUIPMENT ACTIVATION

A. All water chemistry and filtration mechanical equipment shall be operational upon filling of pool after plaster. Chemicals and other related support items as supplied by Contractor, shall be in supply at start-up.

B. For the first fourteen (14) calendar days after completion of the pool plaster, brush all plastered surfaces at least twice a day and coordinate with General Contractor to ensure that the plaster is carefully maintained after the initial fourteen-day period. In addition, coordinate with the Contractor to ensure that pool filtration equipment is continuously running during the initial fourteen-day period.

C. Start-up and provide qualified personnel to operate pool equipment for a period not less than fourteen (14) days after the pool is placed in operation, or until the Owner takes occupancy of the facility or letter of substantial completion. During this time, Contractor shall instruct and supervise the Owner's personnel in the various operating and maintenance techniques involved. Contractor shall be responsible for supply of chemicals during this not less than fourteen (14) day period and at time of turnover to Owner, chemical storage tanks shall be full. (Owner's personnel shall be fully trained and capable of assuming swimming pool maintenance tasks, training may begin before Owner takes occupancy).

3.5 CLEAN-UP

A. Upon completion of swimming pool equipment, remove all debris, materials and equipment occasioned by this Work to the approval of the Owner's Representative.

END OF SECTION 13 11 06

SECTION 13 11 07 – SWIMMING POOL MECHANICAL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Swimming pool mechanical piping as indicated on the Drawings for circulation and filtration systems, pool water heating systems, chemical control systems, booster pump systems and appurtenances.

B. Domestic water system from points of connection within swimming pool mechanical equipment room to make-up water system.

C. Filter backwash piping to point of connection with backwash retention pit as required.

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. Standards:

1. All equipment supplied or work performed shall comply with International Building Code, latest edition.
2. Work shall be performed in accordance with the applicable editions of all National, State and local codes, laws, regulations and ordinances, including the following:
   a. American National Standards Institute (ANSI).
   b. American Society for Testing Materials (ASTM).
   c. American Waterworks Association (AWWA).
   d. American Welding Society (AWS).

3. Do not construe anything in the Drawings or Specifications to permit Work not conforming to these requirements.

1.3 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in conformance with the requirements of Section 01 33 00. Requests for substitutions shall conform with requirements of Article 1.10.A of Section 13 11 00.

B. Required submittals include:

1. Pipe and Fittings as specified in Article 2.2 of this Section.
2. Valves as specified in Article 2.3 of this Section.
3. Pressure / Vacuum Gauges as specified in Article 2.4 of this Section.
4. Pipe Hangers and Supports as specified in Article 2.5 of this Section.
5. Sleeves and Waterstops as specified in Article 2.6 of this Section.

C. Submit proof of qualifications as specified in Article 1.2.A of this Section.

1.4 PRODUCT HANDLING

A. Delivery: Deliver all materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.

B. Storage: Store all materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project site.

C. Protection: Use all means necessary to protect swimming pool mechanical items before, during and after installation and to protect the installed Work specified in other Sections.

D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and at no additional cost to the Owner.

1.5 JOB CONDITIONS

A. Cooperate with entities performing Work specified in other Sections to so that no conflict of new construction or occupied space may occur. Should any installation Work be done without such craft coordination, that Work so installed shall be removed and re-installed.

PART 2 - PRODUCTS

2.1 PRODUCT QUALITY

A. Materials and equipment shall be new, of the best quality for the purpose intended, and shall be clearly marked with the manufacturer's name and nameplate data or stamp and rating. As far as practicable, materials and equipment shall be of one manufacturer.

2.2 PIPE AND FITTINGS

A. PVC Schedule 40: Type 1, normal impact, NSF approved for solvent welding applications, ASTM Specification D-1785, color shall be white. Dura, Lasco, or approved equal.

B. PVC Schedule 80: Type 1, normal impact, NSF approved for solvent welding applications, ASTM Specification D-1785, color shall be gray. Dura, Lasco, or approved equal.

C. CPVC Schedule 80 Influent/Effluent Heater Piping: Type 1, normal impact, NSF approved for solvent welding applications, ASTM Specification D-1785, color shall be gray. Dura, or Lasco.

D. PVC DR25: Conforming to ATSM D-1784, use with epoxy coated bell and spigot-type fittings or epoxy coated mechanical joint by flange adapters with epoxy coated cast iron fittings as specified in Article 2.02 (F), below. Johns-Manville "Big Blue", Diamond Plastics, or approved equal.

E. Copper Tubing: ASTM Specification B-88, hard drawn, with ANSI Standard B16.22 wrot copper fittings.

F. Steel: ASTM Specification A-120, Schedule 40 black or galvanized pipe with ASTM A-47 150 lb. banded malleable iron threaded fittings.

G. Cast Iron: ASTM Specification B16.1, cast iron flanged fittings, provide epoxy coating as required for use with chlorinated water.

2.3 VALVES

A. Ball Valves:

1. For pool system: True-Union design, PTFE seat material with FPM or FKM Double O-ring stem seals, locking handle, NSF certified. PVC schedule 80 body for below grade installation. PVC Schedule 80 body for above grade installation. Furnish ball valves on all pip diameters 2 ½" or less with a rating of at least 200psi at 73° F, Asahi, or approved equal.
2. For copper pipe system: 3-piece full-port Bronze body valve with Teflon seat, 'Apollo', 'Nibco' or approved equal.

B. Butterfly Valves:

1. Epoxy coated cast or ductile iron body, 316 stainless steel disc and stem, viton seat material, furnish hand wheel/gear operators on all valves 8" and larger. DeZurick, Keystone, Ipex or equal.
2. PVC body, PVC disc and EPDM construction suitable for chlorinated water applications. Stem shall be of 316 stainless steel and non-wetted. Valves shall be self-gasketed design with a convex sealing arrangement. Valves 1-1/2" – 10" shall be rated to 150 psi and 12" valves shall be rated to 100 psi at 70°F. Asahi Pool-Pro, no known equal.

C. Check Valves: Wafer-type, epoxy coated cast or ductile iron body, 316 stainless steel plates and shaft, viton seat material. Centerline, Metraflex, or approved equal.

D. Surge Chamber Float Valve: EPD #2-0020-019 Float Control Valve, 8" line size, one (1) required, and one (1) 10" line size as manufactured by Environmental Products Division of Doughboy Recreational, Rancho Cucamonga, CA, Neptune Benson, or Mer-Made.

E. Surge Chamber Isolation Valve: Butterfly valve, tapped lug style, bronze body, stainless steel stem, bronze disc, phenolic back-up ring, EPT seat material. Provide stainless steel shaft extension, shaft housing and tool operator located 2'-0" above floor level with deck access grate and waterproof gear operator as required. Asahi, Keystone, Spears, Ipex or approved equal.

F. RP Backflow Preventer: Febco #835-B for 2" and smaller; #825 for 2-1/2" and larger. Febco, Watts, or approved equal. Must comply with pertinent requirements of the City of Rockville and Washington-Suburban Sanitary Commission.

G. Make-up Water Control: Cla-Val make-up water control valve with ductile iron body/cover, bronze trim, globe pattern, Buna-N rubber seals. Pilot system materials to consist of bronze/brass with stainless steel wetted parts and Buna-N rubber seals.

H. System to include: 100-01 Hytrol valve, CF1-C1KX float control, X46A flow clean strainers, and copper tubing with brass fittings. Float linkage and float rod shall be PVC and brass. Base plate shall be 316 stainless steel. The plastic float shall be provided with 8’ PVC rod and stops and a brass counter weight. Provide model #124-01AKX available KSI (714) 754-044.

2.4 PRESSURE / VACUUM GAUGES

A. Furnish and install pressure and vacuum gauges on the discharge and suction sides of all pumps. 2” or 2 1/2" diameter dial, liquid filled, bottom connection, chrome ring, shut-off cock and snubber. Ranges shall be selected to indicate between mid-point and two-thirds of maximum range under design conditions. Marsh, Trerice, or approved equal.

2.5 PIPE HANGERS AND SUPPORTS

A. General:

1. The requirements of this Section relates to various requirements of the Agreement, General and Supplementary Conditions, Specifications, Drawings, and modifying documents which are part of the Construction Contract. Responsibility for coordination of all such applicable requirements will be that of the Contractor.

B. Description:

1. This section provides guidelines and limitations for the support of all mechanical, electrical, plumbing or architectural items from the building structure, and for the seismic bracing of such items.
2. Design and install all support and bracing systems as required for the swimming pool systems. Provide for attachment to portions of the building structure capable of bearing the loads imposed. Design these systems to not overstress the building structure.

C. Quality Assurance:

1. Design and install all support systems to comply with the requirements of the International Building Code.
2. Pipe hanger system is to be designed by a professional engineer licensed in the State of Maryland.
3. For the support bracing of mechanical, electrical and plumbing system, refer to “Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems” by Sheet Metal and Air conditioning Contractors National Association, Inc., (SMACNA) for guidelines.

D. Submittals:

1. Submit shop drawings for all substructures and attachment methods.
2. Submit proposed alternative methods of attachment for review and approval by the Architects, prior to deviating from the requirements given below.
3. For all pipe hangers and support systems, submit structural calculations and details which include all resultant forces applied to the building structure and are prepared and signed by the Contractor's licensed Maryland professional engineer. Calculations will be reviewed for compliance with design criteria, not for arithmetic.

E. Materials:

1. Use Kin-Line, Grinnel, or approved equal.
2. Support all pipelines individually with hangers, each branch having at least one hanger. Lateral brace as noted and required.
3. Support piping near floor with steel stanchions welded to end plates secured to pipe and floor or use of pre-engineered galvanized Unistrut system.
4. Support vertical piping at each floor level. Install coupling in piping at each support. Coupling shall rest on and transmit load to support. Isolate copper from steel supports with vinyl electrician's tape around pipe and coupling.
5. Use Stoneman "Trisolator," Unistrut, or approved equal, isolators at each hanger and other support points on bare copper tubing system.
6. For PVC pipe, space hangers four (4) feet apart for pipe sizes 1" and under, five (5) feet apart for pipe sizes 1-1/4" to 2", and six (6) feet apart for pipe sizes over 2". Space hangers for horizontal pipes at a maximum of six (6) feet for copper 2" and smaller and for steel 1-1/4" and smaller; ten (10) feet for copper 2-1/2" and larger and for steel 1-1/2" and larger.
7. Size hanger rods, screws, bolts, nuts, etc., according to manufacturer's sizing charts.
8. Trapeze hangers may be used for parallel lines.
9. Use galvanized plated hangers, attachments, rods, nuts, bolts, and other accessories in pool mechanical room, high humidity areas, or where exposed to weather. Hot dip galvanize all items which are not factory furnished. Plating for hinged movements must be done at the factory.
10. Lateral Bracing: To prevent swaying of the piping systems, provide angle iron bracing and anchor into wall or overhead framing. Piping shall be braced or anchored in such a way as to resist a horizontal force of 50% of its operating weight in any direction.
11. Do not use wire or other makeshift devices for hangers.
12. Furnish all substructures and fasteners required to comply with the limitations given below. Use material as specified in the various sections and as appropriate to their use.

F. Guidelines & Limitations:

1. Each Contractor will coordinate the load requirements from all subcontractors so that no combination of loads overstresses the building structure or exceed the limitations given below.
2. Concrete Structure:
   a. Support all loads hung from concrete structure with cast-in-place inserts, unless drilled-in anchors are specifically approved in writing prior to placing the concrete.
   b. Concrete anchors must not penetrate into reinforcing bars. Where the anchors boring indicates the presence of reinforcing bar, patch hole with an epoxy type grout and relocate anchor 12 diameters away.

c. Individual expansion anchors cannot support any loads greater than 300 pounds or manufacturer's specified load capacity without approval.

3. Steel Structure:
   a. Hang no more than 20 pounds per metal deck rib in any span.
   b. At beams, hang all beam loads greater than 40 pounds concentric to beam, not off the flanges.
   c. Attached no loads to the beams or girders greater than the following without specific approval from the architect;
      1) Roof beams and girders: 300 pound point load or 600 pound total load for a single span.

G. Pipe Bracing and Supports:

1. Design and install pipe supports to not ground out vibration and sound isolation systems.
2. All items of mechanical and electrical equipment 60" or more in height are to be supported and braced whether such bracing is shown or not.

2.6 SLEEVES AND WATERSTOPS

A. Provide sleeves where work of this Section passes through fire rated partitions, floors and ceilings, concrete slabs or exterior of structure. Caulk clearance space using sealant appropriate for application in conformance with manufacturer's recommendations and Title 24 of Maryland Code of Regulations. 3m, Dow Corning, or approved equal. In lieu of sleeves and caulking, "Link Seal" products may be used.

B. Provide prefabricated waterstops as indicated on the Drawings at all pipe penetrations through structures containing stored water (i.e., swimming pools, balance/surge tanks, etc.) to insure leak-proof seals.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to Work of this Section, carefully inspect the installed Work of other trades and verify that such work is complete to the point where this installation may properly commence.
2. Verify that items of this Section may be installed in accordance with the original design and referenced standards.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3. Failure to notify the Owner's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive his work.

3.2 ABBREVIATIONS AND SYMBOLS

A. Abbreviations and symbols on the Drawings are those most commonly used. Obtain clarification from the Owner's Representative on any questionable items before bid.

3.3 GENERAL PIPING REQUIREMENTS

A. Size any section of pipe for which size is not indicated or any intermediate section erroneously shown undersized the same size as the largest pipe connecting to it. Sizes listed are nominal.

B. Cut pipe accurately to job measurements and install without springing or forcing, true to line and grade, generally square with building and/or structures and adequately supported to prevent undue stress on pipe, fittings and accessories.

C. Make changes of direction with manufactured fittings. Street ells, bushings, reducing flanges, close nipples or bending of pipe is not allowed.

D. Use great care to install piping in accordance with best practice. Plastic pipe shall be "snaked" in trenches to allow for thermal expansion.

E. All above grade, below grade and buried or imbedded PVC shall be installed using solvent weld fittings. Also, each and every fitting and pipe end shall be prepared with solvent primer. Fittings shall be joined individually and with enough time between assembly of adjacent joints to allow them to seal solidly. After joining, an even ring of primer must be visible around the entire fitting. If any fittings are installed without visible primer, the fitting shall be removed and discarded and piping recut, rechamfered and joint made up again using a new fitting. All procedures, methods and techniques used to make up solvent weld joints shall be in strict accordance with manufacturer's recommendations.

F. Arrange pipe and hangers to allow for expansion, contraction and structural settlement. No pipe shall contact structure except penetrations as shown on the Drawings.

G. Provide dielectric connections between copper and dissimilar metals. In copper systems, threaded piping including connections to equipment shall be brass pipe and fittings. Install dielectric connections in vertical sections of piping only.

H. Run pipe full size through shut-off valves, balancing valves, etc. Change pipe size within three (3) pipe diameters of final connection to control valves, fixtures and other equipment.

I. Provide unions or flanges at connections to equipment, on service side of valves and elsewhere as required to facilitate ease of maintenance.

J. Locate equipment shut-off valves as close to equipment as possible maintaining easy valve access.

K. Make all connections between domestic water systems and equipment or face piping with approved backflow prevention devices as required.

L. All PVC pipe exposed to direct sunlight shall be painted with two coats of Exterior Acrylic Semi-Gloss Paint, Sherwin Williams or equal. Color to be selected by the Architect. Prior to painting the PVC pipes, the exterior of all PVC pipes shall be wiped with Methyl Ethyl Ketone, or an approved equal, to remove the glaze from the pipes.

M. The Main Drain pipe must run either level or uphill from the main drain sump, through the surge pit (if applicable) and then to the circulation pump.

3.4 TRENCH EXCAVATION AND BACKFILL

A. Excavation:

1. Excavate and backfill trenches as required for the Work of this Section. Conform to requirements of Section 13 11 01.
2. The Contractor shall perform all excavation of every description and of whatever materials encountered, to the depths indicated on the Drawings or as necessary. The Contractor shall dispose of the excavated materials not required or suitable for backfill as directed, and shall perform such grading as may be necessary to prevent surface water from flowing into the trenches. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters, which may accumulate in the excavated areas.

B. Trenching:

1. Excavate trenches to lines and grades as indicated on the Drawings and with banks as nearly vertical as practicable.
2. Bottoms of trenches shall be accurately graded to provide uniform bearing on undisturbed soil for the entire length of each section of pipe.
3. The width of the trench at and below the top of the pipe shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed 8” on either side of the pipe. The width of trench above the top of pipe may be wider if necessary.
4. Over-depth excavations shall be filled with tamped sand to required grades.
5. Excavations of five (5) feet or more in depth shall be shored or supported in conformance with rules, and regulations of State and Federal Governments. Shoring shall be constructed, maintained and removed in a manner to prevent caving of the excavation walls or other load on the pipe.

C. Backfilling:

1. Material for backfilling of pipes shall be approved granular material less than two (2) inches in diameter obtained from the excavation. No material of a perishable, spongy or otherwise unsuitable nature shall be used as backfill.
2. Backfilling of pipe trenches shall commence immediately after installation and testing to preclude damage to the installed pipe. Backfill around pipe shall be carefully placed so as not to displace or damage the pipe, and shall be carried up symmetrically on each side of the pipe to one foot above the top of the pipe. The material shall be carefully compacted or consolidated before additional backfill is placed.

3. Backfill above an elevation of one foot above the top of pipe in conformance with requirements of Section 131101. Material for balance of backfill shall be approved granular material less than six (6) inches in diameter taken from the excavation.
4. Unless otherwise indicated on the Drawings, all pipe shall have a minimum of eighteen (18) inches of cover.

3.5 GENERAL EQUIPMENT REQUIREMENTS

A. Position equipment to result in good appearance and easy access to all components for maintenance and repairs.

B. Install piping, flues, breeching and ducts so that they do not interfere with equipment access.

C. Install level, secure and out of moisture. Provide shims, anchors, support straps, angles, grouted bases, or other items as required to accomplish proper installation.

D. All screws, nuts, bolts and washers shall be galvanized, cadmium plated or stainless steel. After fabrication, hot-dip galvanize unfinished ferrous items for outdoor, below grade or other use subject to moisture.

E. Extend 1/2” Schedule 40 black steel pipe lubrication tubes from all hard-to-reach locations to front of equipment or to access points. Terminate with proper type of lubrication fitting.

3.6 VALVES AND STRAINERS

A. If no shut-off is indicated, provide ball valves at inlet connections and balance valves at outlet connections to fixtures and equipment. Provide proper valve trim for service intended.

B. Use no solder end valves unless noted otherwise; provide adapters in copper tubing systems.

C. Locate valves with stems above horizontal plane of pipe. In general, locate valves within six (6) feet of floor, out from under equipment, in accessible locations with adequate clearance around hand wheels or levers for easy operation.

D. Provide all valves, cocks and strainers, full pipe size unless indicated otherwise.

E. Provide hand wheel operators on all valves 8” and larger, under 6” lever operators may be used.

F. Provide tool operated valve with stainless steel shaft extension and 'on deck' tool operation for surge chamber butterfly isolation valve.

3.7 IDENTIFICATION OF PIPING

A. Identify each valve by laminated, block lettered/numbered tag with hole and brass chain mounted on valve stem or handle. Tag to be a minimum of 2” in size. Valves and plumbing lines shall be labeled clearly with the source or destination descriptions.

B. Install an identification chart in a plastic or other weatherproof framed enclosure, which schematically illustrates the proper operation of all piping systems and indicates number and location of all valves and control devices within the system.

C. The direction of flow for the recirculation equipment shall be labeled clearly with directional symbols such as arrows on all piping in the equipment area. Where the recirculation equipment for more than one pool is located on site, the equipment shall be marked as to which pool the system serves. Color coding must comply with local health department requirements.

3.8 TESTS

A. Perform tests in presence of Owner's Representative with no pressure loss or noticeable leaks.

B. Do not include valves and equipment in tests. Include connection to previously tested sections if systems are tested in sections.

C. Perform tests as follows:

System	Test Pressure	Test Medium	Duration
Skimmer Lines and Lawson Main Drain sump lines	20psig	Water*	4 hours
Pool Piping	50 psig	Water*	4 hours
Pool Main Drains	30 psig	Water*	4 hours
Domestic Water	150 psig	Water*	4 hours

***Never test PVC pipe or fittings with air or other gases, always use water.**

3.9 PIPE MATERIAL APPLICATION

A. PVC Schedule 40: Below grade swimming pool piping and domestic water piping up to 12" line size; use standard solvent weld fittings.

B. PVC Schedule 80: Above grade swimming pool piping up to 12" line size; use solvent weld Schedule 80.

C. Type L Hard Copper: Above grade domestic water piping.

D. CPVC Schedule 80; Pool Heater Piping.

E. Schedule 40 Steel: Natural gas piping.

3.10 CUTTING AND DRILLING

A. Cutting or drilling necessary for installation of Work of this Section shall be done only with approval of Owner's Representative.

3.11 CLOSING-IN OF UNINSPECTED WORK

A. Do not cover or enclose Work before testing and inspection. Re-open Work prematurely closed and restore all Work damaged.

3.12 QUIETNESS

A. Quietness is a requirement. Eliminate noise, other than that caused by specified equipment operating at optimum conditions, as directed by Owner's Representative.

3.13 FLUSHING OF LINES

A. Flush or blow out pipes free from foreign substances before installing valves, stops or making final connections. Clean piping systems of dirt and dust prior to initial start-up.

B. Just prior to plastering the pool, under the observations of the IOR, the pool mechanical system shall be flushed using the pool circulation pump. Circulate water through the mechanical system until the effluent water from the pool return heads runs clean.

3.14 CLEAN-UP

A. After all Work has been tested and approved, the Swimming Pool Subcontractor shall thoroughly clean all parts of the equipment installations, including all pool pipe and fittings in the pool mechanical room. Exposed parts shall be cleaned of cement, plaster and other materials and all grease and oil spots removed with solvent.

B. The Swimming Pool Subcontractor shall remove debris from the Project site. Cartons, boxes, packing crates and excess materials not used, occasioned by this work shall be disposed of to the satisfaction of the Owner's Representative.

C. If the above requirements of clean up are not performed to the satisfaction of the Owner's Representative, the Owner reserves the right to order the work done, the cost of which shall be borne by the Swimming Pool Subcontractor.

END OF SECTION 13 11 07

SECTION 13 11 08 – SWIMMING POOL ELECTRICAL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials and equipment as required to install the swimming pool electrical system including but not limited to:

1. A complete and operable system of service equipment, switchboards, panelboards, conduits, switches, time clocks and wiring for power and lighting, motor control centers.
2. Junction and/or pull boxes, conduits, disconnects, starters, contactors, wiring and connection of all motors and mechanical equipment, including connection and wiring of line voltage controls associated with the mechanical systems.
3. Complete grounding system as required and shown on the Drawings.
4. Complete equipotential bonding system as required and shown on the Drawings.
5. Adjusting and preliminary operation of the completed electrical system as described in Article 3.6, A of this Section.
6. Cleaning of all completed Work and installation adjustment of all trim and decorative items.

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. Ordinances and Codes: Materials and construction shall conform with all applicable code requirements, including:

1. National Electrical Code, latest edition; Electrical Safety Orders of the State of Maryland; Department of Industrial Relations; regulations of the State Fire Marshal; rules and regulations of the Board of Underwriters of the Pacific, UL 50, 50E and NEMA 250 rating. Montgomery County Manuals on Swimming Pool Construction and Operation, State of Maryland COMAR 10.17.01 and International Swimming Pool and Spa Code (latest edition).
2. City of Rockville and International Building Code, latest edition.

C. Verification of Conditions:

1. The locations shown on the Drawings are diagrammatic only and the exact finish location of equipment and materials cannot be indicated. Therefore, locations of all Work and equipment shall be verified to avoid interferences, preserve head room and keep openings and passageways clear. Changes shall be made in locations of equipment and materials which may be necessary to accomplish these purposes.

D. Preliminary Operations and Testing:

1. Motor driven equipment shall be tested for correct rotation and completion of all connections.

1.3 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in conformance with the requirements of Section 01 33 00. Requests for substitutions shall conform with requirements of Article 1.10.A of Section 13 11 00.

B. Required submittals include:

1. Conduit and Fittings as specified in Article 2.2 of this Section.
2. Panelboards as specified in Article 2.8 of this Section.
3. Circuit Breakers as specified in Article 2.9 of this Section.
4. Motor Starters as specified in Article 2.12 and 2.13 of this Section.
5. Fuses as specified in Article 2.15 of this Section.
6. Time Clocks as specified in Article 2.16 of this Section.
7. Ground Fault Circuit Interrupters as specified in Article 2.17 of this Section.
8. NEMA Type 4x corrosion resistant UL 50, 50E & NEMA 250 rating for enclosures, cabinets and boxes as specified in Article 2.11 & 2.18 of this Section.

C. Submit proof of qualifications as specified in Article 1.02.A of this Section.

1.4 PRODUCT HANDLING

A. Delivery: Deliver all materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.

B. Storage: Store all materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project site.

C. Protection: Use all means necessary to protect swimming pool electrical materials before, during, and after installation and to protect the installed Work specified in other Sections.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Materials shall be new, in unbroken packages and bear the U.L. label of approval.

B. Equipment of one type shall be by same manufacturer. One type of equipment for classifications such as:

1. Switchboards, panels, buss duct, disconnect switches and allied items.
2. Conduit.
3. Wire.
4. Conduit fittings.
5. Fixtures of the same general type.
6. Wiring devices.

2.2 CONDUIT AND FITTINGS

A. Conduit within or under buildings or where exposed outdoors shall be rigid metal threaded, hot dipped galvanized, or U.L. approved plastic except where noted otherwise on the Drawings. Metallic conduit shall be of the same metal between outlets or terminals.

B. Use flexible metallic conduit only for short connections of motors and where specifically called for on Drawings. Maximum length shall be 40". Use only liquid tight flexible metal conduit. Install an unbroken #12 AWG insulated copper grounding conductor in each liquid tight flexible conduit with permanent connection at motor junction box and service panel ground.

C. Protect, before installation, metallic conduit runs in all slabs laid on grade or in contact with the earth or exposed in damp locations, with two (2) heavy coats of asphaltum rust-resisting compound.

D. Encase conduits 2-1/2" or larger run underground, outside, or under buildings, in concrete envelopes a minimum of 3" thick, except as indicated otherwise on Drawings or stubouts. Conduits 2 and smaller laid 18" below finish surface in soil.

E. Low voltage runs underground outside buildings, 1-1/4" or smaller, may be G.I. or sherardized steel conduit, with machine applied wrapping equal to double wrap or Scotch-Wrap #50 tape, half lapped and quadrupled at joints in lieu of concrete encasement.

F. Service conduits through foundations or concrete members shall run through metal sleeves with adequate clearances for full movement of the conduit. Do not run conduits through footings.

G. Secure conduits run exposed on surfaces with one hole heavy-duty straps or fasten with matching fittings to inserts or trapezes, parallel to building walls and ceilings.

H. Cap all conduit or duct stub-outs with standard factory caps; except cap threaded steel conduit with B.I. water pipe caps in outdoor locations.

I. Use conduit fittings as manufactured by Crouse-Hinds Company, Appleton Electric Co., or approved equal.

J. Employ U.L. liquid tight fittings for use with liquid tight flexible metal conduit.

K. Use unions as manufactured by Appleton, O-Z/Gedney, or approved equal. The use of running threads will not be permitted.

L. Exposed conduit and fittings in chemical rooms shall be nonmetallic rigid polyvinyl chloride, corrosion resistant rated suitable for installation in corrosive environments and in accordance with the latest NEC requirements.

2.3 EQUIPOTENTIAL BONDING/GROUNDING

A. Bond together and ground to a common ground at a single point all metallic conduit, piping systems, pool reinforcing steel, metal parts of ladders, lifeguard stands, handrails and their supports and the like. The solid copper bonding conductor shall not be smaller than #8 copper.

2.4 WIRING CONNECTIONS

A. Make connections without strain on conductors, allowing the conductors to take a natural position after connections or taps are made. Include all strand of wire in making the connection.

B. Make connections for wiring by one of the following means:

1. Make all taps or connections to conductors with compression type connectors except those smaller than #8 B&S gauge may have soldered connections. Solderless connections for #10 AWG or smaller may be used and shall be "Scotchlok", Buchanan, or approved equal. For #8 AWG or larger, they shall be T&B "LockTite", Burndy "Versitaps", or approved equal.
2. All cable or conductor terminal lugs shall be Burndy "Quicklug", Ilsco, or approved equal. Two piece stamped lugs and solder lugs will not be approved.
3. Paint taped splices in damp or outdoor locations with two (2) coats of insulating paint.
4. Tag all branch circuit wires with circuit number at the panelboard and at each point of use with linen or plastic tags.

2.5 CONDUCTORS

A. Copper RHW or THW. Do not make splices between boxes.

2.6 COLOR CODING

A. Neutrals (identified conductors shall be white).

B. Phase conductors shall be red for phase B; blue for phase C.

C. Green shall be used for mechanical equipment and receptacle grounds only.

2.7 MOTOR WIRING

A. Make final connections to motors with the required AWG (Minimum #12), Flamenol machine tool wire, 19 strand. Control wiring for equipment shall be Flamenol machine tool wire, 19 strand of required AWG. Provide corrosion resistant junction boxes at each item of equipment to change from standard building wiring to machine tool wire.

B. Phase motors as proper in direction of rotation.

2.8 PANELBOARDS

A. Panelboards shall be flush or surface mounting as indicated with circuit breakers as shown on panel schedule, hinged lockable doors, index card holders and proper bussing.

B. Where indicated on the drawings, panelboards shall be furnished with subfeed breakers and/or lugs, split bussing, contractors, time switches, relays, etc., as required.

C. All panelboards shall be keyed alike.

D. All panelboard enclosures shall be corrosion resistant rated in accordance with the latest NEC requirements.

E. Furnish corrosion resistant panelboard enclosures and terminal cabinets with Yale 46515 flush locks and LL806 keys except where indicated otherwise herein. Fasten the trim to panel boards and terminal cabinet by means of concealed, bolted or screwed fasteners accessible only when the door is open.

F. Panelboards 208/120 volt, three phase, 4 wire, S/N or 120/240 volt, single phase, 3 wire, S/N.

Panelboard types as manufactured by:	
Westinghouse	Type B10B
General Electric	Type NLAB
Square D	Type NQOB

G. Panelboards for 480/277 volt, three panes, 4 wire, S/N.

Panelboard types as manufactured by:	
Westinghouse	Type Pow-R-Line 2
General Electric	Type AE
Square D	Type NEHB
Sylvania	Type NH1B
I.T.E.	Type Approved Equal

H. Panelboard for bussing sizes thru 400 amp shall be 20" wide surface mounted type. Recess mounted type shall have a 20" wide (maximum) recess metal enclosure with trim plate cover extending 1" on all sides of enclosure. Depth shall be 5-3/4" nominal. Height of panel as required for devices.

I. Provide 6" additional gutter space in all panels where double lugs are required, or where cable size exceeds bus size. Minimum bottom gutter space shall be 6" high. 12" additional gutter space may be required for aluminum feeders where used.

J. Panelboards shown on the drawings with relays, time clocks or other control devices shall have a separate metal barriered compartment mounted above panel with separate hinged locking door to match panelboard. Provide mounting sub-base in cabinet for control devices and wiring terminal strips.

K. Panelboard shall have a circuit index card holder removable type, with clear plastic cover. Index card shall have numbers imprinted to match circuit breaker numbers.

2.9 CIRCUIT BREAKERS

A. Breakers shall have a minimum short circuit interrupting rating of 10,000A symmetrical for panelboard voltage thru 240 volt and 14000A for panelboards thru 600 volts or as specified on the drawings. In no case shall the interrupting rating be less than the bus withstand rating unless noted otherwise on the drawings.

B. Circuit breakers as manufactured by the following companies only are acceptable:

1. General Electric Company
2. Square D Company
3. Westinghouse Company
4. I.T.E. Company

C. Circuit breakers shall be arranged in the panels so that the breakers of the proper trip settings and numbers correspond to the numbering in the panel schedules on the drawings. Circuit numbers of breakers shall be black-on-white micarta tabs or other previously approved method. Circuit number tabs which can readily be changed from front of panel will not be accepted. Circuit number tabs shall not be attached to or be a part of the breaker.

D. Where two or three pole breakers occur in the panels, they shall be common trip units. Single pole breakers with tie-bar between handles will not be accepted.

E. All circuit breakers shall be padlockable in the "off" position. Locking facilities shall be riveted or mechanically attached to the circuit breaker (submit sample for approval). Other means of attachment shall not be accepted without prior written approval of Architect.

F. Where branch circuit breakers supply the power to motors and signal systems, the breakers shall be furnished with lockout clips, mounted in the "on" position. The breakers shall be able to trip automatically with lockout clips in place.

G. Panelboard circuit breakers shall be bolt-on type.

2.10 BUSSING

A. Bussing shall be rectangular cross section copper, or full-length silver or tin-plated aluminum.

B. Bussing shall be braces to withstand symmetrical short circuit ratings as follows or as noted on drawings. In no case shall bus short circuit bracing be less than specified circuit breakers.

C. Each panelboard shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

2.11 POOL MECHANICAL EQUIPMENT ENCLOSURES, TERMINAL CABINETS & MISC CABINETS

A. All pool mechanical equipment enclosures, terminal cabinets and miscellaneous cabinets in the pool mechanical room or chemical storage rooms shall be corrosion resistant rated in accordance with the latest NEC requirements. Enclosures and all cabinets shall be flush mounted (except where noted a surface) of the size indicated on the drawings, and complete with hinged lockable doors and the number of 2-way screw terminals required for termination of all conductors. Terminal cabinet locks to operated form same key used for panelboards. The trim to terminal cabinets shall be fastened by means of concealed bolted or screwed fasteners accessible behind door to terminal cabinets. Terminal cabinets shall have 5/8" plywood backing.

B. Provide engraved nameplate on each enclosure and cabinet indicating its designation and system (i.e., Swimming Pool - Panel 'SP').

2.12 MOTOR CONTROL INDIVIDUAL STARTERS

A. Manual Motor Starters:

1. Provide flush or surface mounting manual motor starters with number of poles and size of thermal overload heaters as required for the motor being controlled (equipped with overload heaters, one for each motor lead). Back boxes shall be supplied with all flush mounting starters whether they are toggle type requiring only a 4" square outlet box or the larger type requiring a special box and cover designed to accept the particular unit. All box types shall be corrosion resistant rated in accordance with the latest NEC requirements.
2. Unless otherwise noted on the drawings, all manual starters for single phase motors, smaller than 1 h.p., shall be the compact toggle type. Manual starters for all single phase motors, 1 to 5 h.p., and all three phase motors up to 5 h.p. shall be the heavy duty type.
3. Where manual motor starter is shown with pilot light, the pilot light shall be installed in a separate outlet box adjacent to the starter outlet, and engraved nameplate in indicate function of pilot light.
4. The following motor starters as manufactured by:

Manufacturer	**Single Phase 1HP and Below**	**Others**
Arrow Hart	Type RL	Type LL
General Electric	CR 101	Class CR 1062
I.T.E.	Class C10, C11 or C12	Class C20
Square D Company	Class 2510, Type A	Class 2510, Type B & C
Westinghouse	Type MS	Type A100
Allen Bradley	Approved Equal	Approved Equal.

B. Individual Magnetic Motor Starters:

1. Magnetic motor starters shall be A.C. line voltage, across-the-line units in a corrosion resistant rated enclosure in accordance with the latest NEC requirements.

2. All starters located outside of a building whether or not indicated shall be W.P. (weatherproof), and all starters noted W.P. shall be furnished in a corrosion resistant rated stainless steel enclosure in accordance with the latest NEC requirements.
3. Starter shall be horsepower rated for the motor controlled, and shall be equipped with properly sized overload elements. Every pole shall be with overload element.
4. Verify the exact motor current and voltage characteristics with the Contractor supplying the motor before installation of a starter.
5. Each starter shall be equipped with "Hand-Off-Auto" switch or stop-start pushbutton as required.
6. Coils shall be designed to operate on voltage indicated on control diagrams and have built-in-under the voltage release for coil circuit to drop motor starter off the line when the line voltage drops below normal operating voltage.
7. The coil control circuit shall be independently fused, sized to protect coil.
8. Starters to be equipped with running pilot light indication with a "Push-to-Test" feature.
9. Magnetic starters shall have a minimum of two auxiliary contacts. Additional auxiliary contacts shall be provided as required to comply with the requirements of the wiring diagrams on the electrical and mechanical drawings and the description of the function in the Mechanical Section of the Specifications.
10. Starters shall comply with NEMA standards, size and horsepower ratings as indicated on drawings.
11. The following types of magnetic motor starters as manufactured by:

Manufacture	**Type**
General Electric	Class CR 106
I.T.E.	Class A20
Square D Company	Class 8536
Westinghouse	Type A200 (Size 4 Max.) or Class II-200 (Sizes 5-8)

2.13 INDIVIDUAL COMBINATION MOTOR STARTERS

A. Combination starter shall incorporate fused disconnect switch and individual magnetic motor starter. Combination starters shall be mounted in a corrosion resistant rated enclosure in accordance with the latest NEC requirements.

B. Starters shall comply with NEMA standards, size and horsepower ratings as indicated on drawings General Electric, Square D, Westinghouse or I.T.E.

C. The disconnect handle used on combination starters shall control the disconnect device with the door opened or closed. The disconnect handle shall be clearly marked as to whether the disconnect device is "ON" or "OFF", and shall include a two-color handle grip, the black side visible in the "OFF" position indicating a safe condition, and the red side visible in the "ON" position indicating an unsafe or danger condition.

D. All starters used in combination starters shall be manufactured in accordance with the latest published NEMA standards, sizes, and horsepower ratings. These starters shall be furnished with three melting alloy type thermal overload relays.

E. Thermal units shall be of one-piece construction and interchangeable. The starter shall be inoperative if a thermal unit is removed.

2.14 MOTOR CONTROL CENTER, INTERLOCKS AND CONTROL DEVICES

A. Refer to mechanical and plumbing drawings and specifications and provide all control devices including timeswitches, relays and interconnection of starters as required.

B. Mount all relays and timeswitches in a separate compartment in motor control center unless otherwise indicated.

C. Whether shown on mechanical and plumbing drawings or control center schedules or not, where motors are controlled by external devices (i.e., thermostats, relays, float or pressure switches, etc.) or interlocked with other motors, each motor starter to be equipped with a "Hand-Off-Auto" selector switch in starter cover. Other starters equipped with a "Start' Stop" pushbutton station in starter cover. The Contractor shall be responsible to submit a complete and detailed set of shop drawings, electrical schematic design along with electrical component cut sheets from the MCC panel or the interlock control device manufacturer. RSD Total Control: Allan Pearson 949-380-7878, South Coast Controls: Anthony Ellis 714-998-5656 or approved equal.

2.15 FUSES

A. Fuses shall be dual element, current limiting type, U.L. Class RK5 unless otherwise indicated on the drawings. Provide one spare set of fuses of each size and type in each motor control center.

2.16 GROUND FAULT CIRCUIT INTERRUPTERS

A. Minimum rating shall be 20 amperes, 125V, 5 milliampere trip setting, Class A per UL943.

B. Manufacturer to be Crouse-Hinds, Leviton, or approved equal.

2.17 BOXES

A. Boxes shall be of the size required by ordinances or larger, must be corrosion resistant in accordance with the latest NEC requirements where concealed or exposed on ceilings or walls.

B. Outlets to be surface where wiring is exposed and flush in areas where conduit is concealed.

C. Provide surface outlets with proper corrosion resistant surface covers. Box and cover shall be deep enough to provide at least 1/4" clearance between back of device and back of box. Where box contains more than one device, use a corrosion resistant rated gang box with proper cover in accordance with the latest NEC requirements. Surface outlet boxes shall be of the threaded hub type wherever below 8'0".

D. If necessary for cable installation, additional pull boxes or junction boxes may be installed in accessible locations. Exposed pull boxes and junction boxes shall be corrosion resistant rated in accordance with the latest NEC requirements.

E. Where exposed to weather pull boxes larger than outlet boxes are required, galvanized code gauge sheet steel boxes may be used with covers attached by brass machine screws may be used. Boxes exposed to the weather shall be approved for the purpose, and conduit entrances

shall be on the bottom made by means of an interchangeable hub with gasket and adapter nut. Pull boxes not shown on Drawings may be added only after approval of size and location is obtained.

F. For outlets exposed to weather or where noted, cast outlet boxes shall be Crouse-Hinds, Appleton, or approved equal. Boxes shall have proper number and size hubs. Device plates, covers, adapters and boxes shall be as manufactured by Crouse-Hinds, Appleton, or approved equal.

G. Exposed junction boxes, outlet boxes and pull boxes for pool chemical rooms shall be non - metallic suitable for a corrosive environment and in accordance with the latest NEC requirements.

2.18 IDENTIFICATION MARKINGS

A. Plainly mark all motor and electrical appliance control equipment indicating the equipment controlled with laminated tags at least 2’ x 2’ in size.

B. Provide laminated plastic nameplates on panelboards on the outside of the door at the top indicating panel designation and feeder source.

C. Provide laminated plastic nameplates on distribution switchboards and motor control centers at the top center indicating panel designation and feeder source.

D. Identify each distribution switchboard and motor control center circuit breaker with a laminated plastic nameplate indicating its' use.

E. Type panelboard directories on the forms provided with the equipment, indicating the use of each branch circuit breaker.

F. Fasten all laminated plastic nameplates to surfaces with two (2) or more screws.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify conditions at the Project site before submitting bid. Be responsible for providing all necessary wiring for the new electrical systems. Wherever wiring is being disrupted due to remodeling or changes, reconnect existing and provide new wiring circuits to accomplish a fully operable system at no additional cost to the Owner.

3.2 COORDINATION

A. The Drawings are essentially diagrammatic and indicate the desired location, size, routes, connection points, etc., and are to be followed as closely as possible. Proper judgment must be exercised in executing the Work so as to provide the best possible installation in the available space and to overcome difficulties, limitations or interference wherever encountered. Be responsible for the correct placement of this Work, the proper location and connection in

relation to Work of other trades, for determining the exact location of all conduits, outlets and equipment, and for installing the conduits in such a manner as to conform to the structure, avoid obstruction, preserve headroom and keep openings and passageways clear. Particular attention is directed to the close coordination required on exposed Work. Locations shown on Architectural or Mechanical Drawings if different than those shown on Electrical Drawings should be communicated to the Owner's Representative in writing for clarification.

3.3 INSTALLATION

A. Trenching and Backfill: Conform with requirements of Section 13 11 01. Provide minimum cover as required by Code.

1. Conduit Installation:
2. Conduit and metallic raceway systems shall be mechanically and electrically continuous from sources of current to all outlets in a manner to provide a continuous grounding path. Close ends of conduit during construction to prevent entrance of dirt or moisture.
3. Securely fasten conduit to the building construction within three feet of each outlet and within every ten feet thereafter. Secure it to boxes, cabinets, pull boxes, terminals with two locknuts and ends equipped with bushings or a terminal fitting. Cut square with ends carefully reamed.
4. Make bends or elbows so that the conduit will not be injured or flattened.
5. Use insulated metallic bushings in all places where bushings are required.
6. Run exposed conduits level or plumb and parallel to the construction members of the building. No cutting across or diagonal runs will be permitted. Neatly surmount structural obstructions encountered on conduit runs by the use of fittings or pull boxes.
7. Identify feeder conduits by stamped metal tags secured to exposed section of conduit in main or sub-panels.
8. Make up all threaded conduit joints gas and watertight with conductive sealer except conduit above ground in dry indoor locations.
9. Rigidly support all boxes independently of the conduit system.

B. Connections to Equipment:

1. Fully connect, in an approved manner, all electrical outlets, apparatus, motors, equipment, fixtures, wiring devices and appliances whether they are installed under the Electrical Contract or not, which require electrical connections, to the corresponding electrical system outlet.
2. Where the Work of this Section requires connections to be made to equipment that is furnished and set-in-place under other Sections, obtain such roughing-in dimensions from the manufacturer or supplier of each item as required and assume full responsibility for the installation of the connections thereto.

3.4 ADJUSTMENT AND CLEAN-UP

A. Preliminary Operation: Should the Owner's Representative deem it necessary to operate the electrical installation or any part thereof prior to Substantial Completion of the Work, consent to such preliminary operation and supervise conduction of same. Subcontractor shall pay all costs occasioned by such operation. Preliminary operation shall not be construed as an acceptance of any Work installed under this Contract.

B. Clean-up: Upon completion of the Work of this Section, immediately remove all swimming pool electrical materials, debris and rubbish occasioned by this Work to the approval of the Owner's Representative.

END OF SECTION 13 11 08

SECTION 13 11 65 – FIBERGLASS WATERSLIDE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Design, manufacture and installation of the fiberglass waterslide indicated on the Drawings, specified herein, and as necessary for proper completion, including, but not necessarily limited to:
   1. Fiberglass flume components.
   2. Flume structural support systems.
   3. Foundations as required for flume structural support systems.

1.2 QUALITY ASSURANCE

A. Qualifications of Suppliers and Personnel:
   1. The waterslide flume supplier shall have at least five (5) years experience in the fabrication of fiberglass waterslides.
   2. The waterslide flume installer shall have at least five (5) years experience in the installation of fiberglass waterslides.
   3. All welding shall be performed by operators who are qualified as prescribed in "Qualification Procedure" of the American Welding Society, and welding shall be performed only under field welding or shop welding.

B. Codes and Standards: In addition to complying with all applicable codes and regulations, comply with pertinent recommendations contained in:
   1. Code of Maryland Regulations 09.12.60 Amusement Attractions and 09.12.63 Water Slides Erected Permanently or Temporarily in the State.
   2. ASTM standard F2376-22.
   3. Waterslide flumes shall conform to requirements of the "Suggested Health and Safety Guidelines for Recreational Water Slide Flumes," July 1981, as published by the U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Atlanta, GA.
   4. "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings," of the American Institute of Steel Construction.
   5. "Code for Welding in Building Construction," of the American Welding Society.
   6. "Specifications for Architecturally Exposed Structural Steel," of the American Institute of Steel Construction.
   7. "Manual of Standard Practice for Detailing Reinforced Concrete Structures," Publication ACI 315-74 of the American Concrete Institute.
   8. "Structural Concrete for Buildings," Publication ACI 301-72 of the American Concrete Institute.

C. Where provisions of pertinent codes and standards conflict with this Specification, the more stringent shall govern.

1.3 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in accordance with the requirements of Section 01 33 00.

B. Shop Drawings: Within thirty (30) calendar days of issuance of Notice to Proceed, and before any materials are delivered to the job site, submit the following shop drawings to the Owner's Representative for approval and Building Department review:
   1. Slide path design with X, Y and Z (elevation) coordinates.
   2. Flume component details, including interface at slide entry and exit.
   3. Flume structural support system details.
   4. Foundation plan and details as required for flume structural support.
   5. Structural calculations stamped and sealed by State of Maryland licensed Structural Engineer.

C. Show all shop erection details including cuts, copes, connections, holes, threaded fasteners, rivets and welds.

D. Show all welds, both shop and field, by the currently recommended symbols of the American Welding Society.

E. All shop drawings and calculations shall be certified and sealed by a Professional Engineer, registered and licensed as same in the State of Maryland.

F. The slide manufacturer shall certify to the Owner's Representative that the depth and configuration of the receiving pool is acceptable and compatible with all known safety standards for the manufacturer's designed product.

G. Proofs of Compliance: Submit proofs of compliance to the Owner's selected testing laboratory in accordance with Section 014400.

1.4 PRODUCT HANDLING

A. Delivery: Deliver all materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.

B. Storage: Store all materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project site.

C. Protection: Use all means necessary to protect fiberglass waterslide components and support systems before, during, and after installation and to protect the installed work of all other trades.

D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

1.5 GUARANTEE / WARRANTY

A. All work of this Section shall be warranted against all defects of material and/or application for a period of one (1) year from date of acceptance. Any failures that may occur within this warranty period, due to defective installation and/or materials, shall, upon written notification of such failure, be immediately repaired or replaced.

PART 2 - PRODUCTS

2.1 FIBERGLASS FLUME COMPONENTS (Acceptable manufacturers include Splashtactular, Whitewater West Industries, Columbus, Ohio, or ProSlide Technology, Ottawa, Ontario.)

A. Fiberglass Laminate Materials:
1. Gelcoat: Interior gelcoat shall be a high quality isopthalic polyester gel, .02" in thickness, with added ultraviolet inhibitors.
2. Spray Up Lamination:
   a. First Step- Resin #010W2209:
      1) Gelcoat- 18 to 24 mils wet.
      2) 3 oz. chop/square foot.
      3) 18 oz. woven roving.
      4) Allow to set.
   b. Second Step- Filled Resin #010W1817:
      1) 1-1/2 oz. chop/square foot, apply balsa or wood reinforcement.
      2) 1-1/2 oz. chop/square foot over entire area.
      3) Exterior gelcoat application to cover.
3. Structure: 3/16" to 1/4" body thickness, 1/4" to 3/8" flange thickness, minimum 32 oz. / square foot weight.

B. Joints, Connections and Seams:
1. Flume to flume joints shall be fastened with 3/8" stainless steel bolts, washers (2 per bolt) and self-locking nuts.
2. Flume to support system connections shall be made with stainless steel hardware.
3. Fiberglass seams shall be made up using waterproof caulking to be provided by fiberglass slide manufacturer.

C. Color: Manufacturer shall provide standard color samples to Owner's Representative for selection as a part of the shop drawings. Color shall be integral to the fiberglass and the same top and bottom (inside and out).

D. Ride Configuration: The preliminary slide layout has been developed utilizing a 32 inch enclosed aqua tube body flume. Slide A Length = 174.40 ft. and height = 24 ft. Slide B: Length = 80.43 ft. and slide height and platform height = 24 ft.

E. Required Components: All waterslide configurations shall be furnished with the following components:
1. Slide entry section / start piece.
2. Pool entry section / end piece / slide runout.
3. Factory pre-drilling of all sections.
4. Waterproof caulking as required for seams.
5. Stainless steel assembly hardware.

2.2 FLUME STRUCTURAL SUPPORT SYSTEM

A. Components: The flume structural support system shall consist of all elements necessary to safely and securely support the fiberglass waterslides from the slide entry to the receiving pool, including, but not limited to:

B. Concrete footings and foundations.
   1. Columns and support arms.
   2. Support yokes.
   3. Connecting hardware.

C. Design:
   1. Structural support system shall be designed to safely support the fiberglass slides given the following design criteria: Seismic, wind speed, and live loading per IBC, latest edition for the State of Maryland.
   2. All concrete footings/foundations shall have a minimum 28-day compressive strength of 4,000 psi.

D. Bolts and Nuts:
   1. High Strength Bolts:
      a. All high strength bolts shall meet the requirements of ASTM A-325.
      b. Use high strength friction bolts for all bolted connections unless otherwise indicated.
      c. Make bolt holes 1/16 inch larger than nominal bolt diameter.
   2. Machine Bolts and Anchor Bolts: All machine bolts and anchor bolts shall meet the requirements of ASTM A-307.

2.3 PAINT FOR STRUCTURAL SUPPORT SYSTEMS

A. Fabrications should arrive at site shop primed and ready to receive final paint coats per manufacturer's recommendations.

2.4 OTHER MATERIALS:

A. All other materials, not specifically described but required for a complete installation of fiberglass waterslides, shall be new, free from rust, first quality of their respective kinds, and subject to the approval of the Owner's Representative.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:
   1. Prior to installation of the work of this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.
   2. Verify that fiberglass slides and structural support systems may be fabricated and erected in strict accordance with the original design, the approved Shop Drawings and the referenced standards.

B. Discrepancies:
   1. In the event of discrepancy, immediately notify the Owner's Representative.

2. Do not proceed with fabrication or installation in areas of discrepancy until all such discrepancies are fully resolved.

3.2 FABRICATION

A. General: Fabricate all fiberglass slides and structural support systems in strict accordance with the approved Shop Drawings and the referenced standards.

B. Shop Cleaning and Priming:
1. Shop paint all structural steel one coat with the exception of the following:
   a. Steel to be encased in concrete.
   b. Surfaces to be field welded.
   c. Contact surfaces to be high strength bolted.
2. Thoroughly clean all steel to be encased in concrete.

3.3 GRADING, EXCAVATION AND BACKFILL

A. Conform with requirements of Section 131101 and in strict accordance with the approved Shop Drawings.

3.4 INSTALLATION OF FOOTINGS AND FOUNDATIONS

A. Conform with requirements of Section 131102 and install in strict accordance with the approved Shop Drawings.

3.5 WELDING

A. General:
1. For details of joints, comply with requirements for AWS joints accepted without qualification tests.
2. Use ASTM A-233, E-70 series electrodes.
3. Follow applicable sections of AWS specifications.

B. Types of Welds (unless otherwise noted):
1. Make all fillet welds 3/16 inch minimum.
2. Make all butt welds full penetration welds, using back-up or chip and back-weld.

3.6 ERECTION

A. General: Erect all fiberglass waterslides and structural support systems in strict accordance with the approved Shop Drawings and all pertinent regulations and standards.

B. Tolerance: Align all structural steel straight, plumb, and level with a tolerance of one in 500.

C. Touch-up: After erection is complete, touch-up all shop priming coats damaged during transportation and erection, and prime all field welds, using the priming paint specified for shop priming.

D. Fiberglass Joints: All flange to flange connections shall be made utilizing the waterproof caulking supplied by the fiberglass manufacturer and shall be joined in such a way as to provide for a safe and matless ride.

3.7 CLEAN-UP

A. Upon completion of the work of this Section, immediately remove all fiberglass, structural support system materials, debris and rubbish occasioned by this work to the approval of the Owner's Representative and at no additional cost to the Owner.

END OF SECTION 13 11 65