ADDENDUM #1- Issued 9/10/14

CITY OF TORRANCE
3031 Torrance Blvd.
Torrance, CA 90503

B2014-44

Bid for Benstead Plunge Swimming Pool and Mechanical Renovation

ADDENDUM # 1

THE FOLLOWING CHANGES ARE HEREBY INCORPORATED INTO AND MADE A MANDATORY PART OF SUBJECT BID:

The bid opening remains Wednesday, September 17th, 2014 by 3:00 PM in the City Clerk's office.

CORRECTION: In the bid proposal documents (pg. 10) and the project manual (pg. 35)-References, "bidder must have completed nine (9) full size soccer or football fields with the last three (3) years" is incorrect. Refer to Notice Inviting Bids on pg. 4 and 5 of the project manual for bidder's experience.

CORRECTION AND ATTACHED: Two (2) sections of the specifications were inadvertently omitted. Specification Sections 13155 Swimming Pool Plaster and 13156 Swimming Pool Equipment.

ATTACHED: The proposed Stark filtration system is considered equal to the specified Eko3 filtration system. The Contractor shall be responsible to obtain approval from the Health and Building Department for the Stark Filtration System prior to installation. All fees associated with the approval process or the cost for plan revisions shall be the Contractors responsibility.

CLARIFICATION: Per plan the Contractor shall replace and regrout any tile damaged during demolition. After demolition of the pool plaster, a review of the existing tile will be required to check for any damage or delamination. The Contractor shall be responsible to replace all tile damaged or tile delamination from the pool substrate.

Below are questions raised during the bidding period. Responses are in bold.

1. Plan sheet MR-1, detail 2, under equipment list for the pool filters lists to provide a signet flow sensor and flow meter. These items are not shown on the plans. Is there one sensor and meter for each filter or one sensor and one meter for all 4 filters?
   Response: Provide one Signet flow monitor with one Signet flow sensor.

2. Will the pool bulkhead be removed by city forces or should the bidding contractor include removal and re-installation? If to be done by contractor, could you provide an approximate weight of the bulkhead?
   Response: The City will remove and reinstall the bulkhead.

3. The Bidder's Proposal page 2 and 3 has various spec divisions which are not applicable to this project, such as division 8, and 14. Should we list the total for such divisions as $0.00 ?
   Response: Yes or you may put "N/A" for not applicable.

Please return this addendum with your bid proposal.
I hereby acknowledge receipt of this addendum.

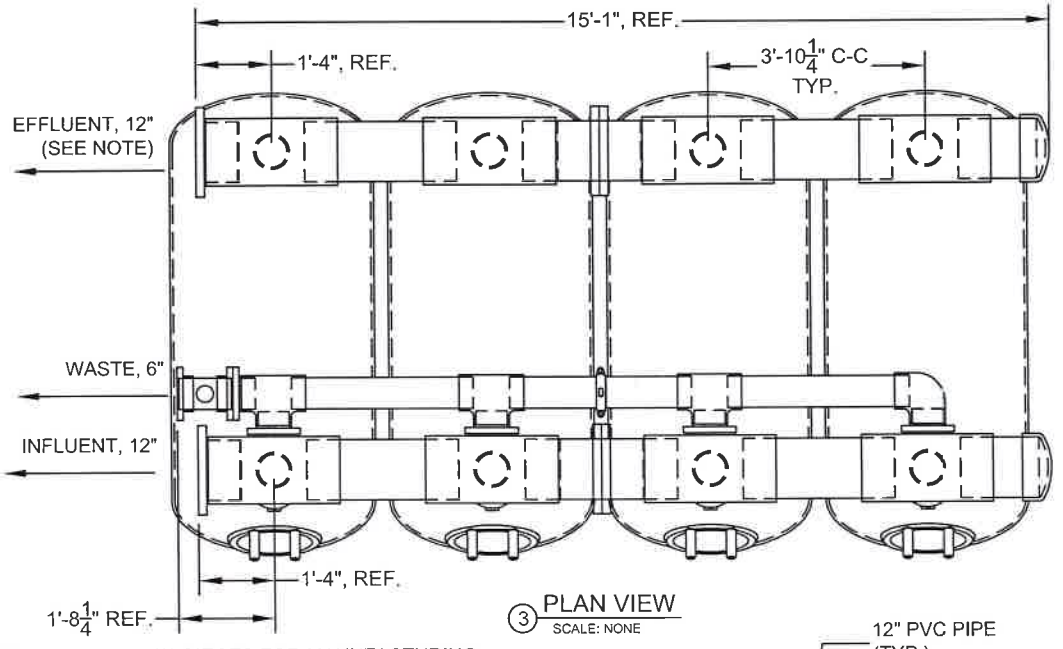
_____
Name of Company

_____
Address

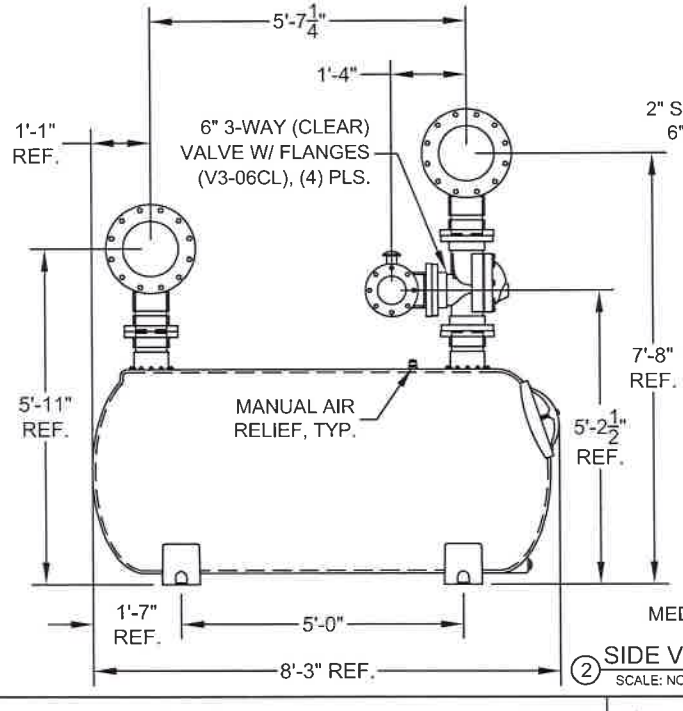
_____
City State Zip Code

NOTES:
1. TOTAL FILTRATION AREA: 108 SQ. FT.
2. STANDARD SYSTEM INCLUDES SEMI-AUTOMATIC CONTROLLER (CM200, NOT SHOWN) AND FACE-PIPING KIT NUMBER FP-SS4-1206FC (SHOWN, INCLUDES FLANGE GASKETS AND ISOPLAST HARDWARE).
3. AUTOMATIC CONTROLLER (CA100) AND SEMI-AUTOMATIC CONTROLLER (CS400) ARE AVAILABLE AS UPGRADES.
4. DIMENSIONS ARE APPROXIMATE. DO NOT PRESET ANCHORS.
5. ALL PIPING SHOULD BE SUPPORTED WITH ADEQUATE BRACING AND HANGERS (BY OTHERS) TO PREVENT DAMAGE FROM WEIGHT AND VIBRATIONS.

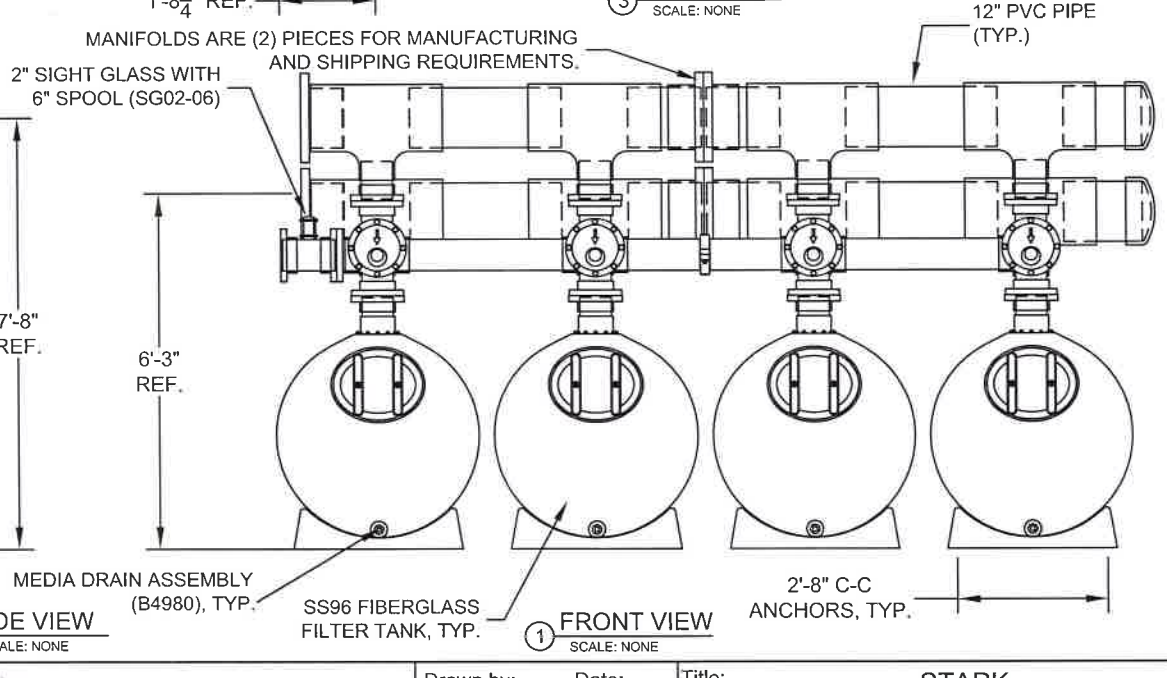
**A BUTTERFLY VALVE (MANUAL FOR SEMI AUTO CONTROLLER OR MOTORIZED FOR AUTOMATIC CONTROLLER) TO BE INSTALLED DOWNSTREAM OF EFFLUENT MANIFOLD TO ENSURE AMPLE BACK PRESSURE DURING BACKWASH. SAID VALVE AND REQUIRED HARDWARE ARE INCLUDED WITH FACE PIPE KIT. 110V POWER AND SPDT RELAY WITH 10-30 VAC/DC/ 120V COIL REQUIRED TO OPERATE VALVE TO BE PROVIDED BY OTHERS



3 PLAN VIEW
SCALE: NONE



2 SIDE VIEW
SCALE: NONE



1 FRONT VIEW
SCALE: NONE

PARAGON AQUATICS

Drawn by:	Date:	Title: STARK
RV	4/23/12	4-TANK SS96 FILTER SYSTEM - 12" FLANGED CONNECTIONS
Approved by:	Date:	Drawing Number: / Rev Ltr: / Sheet:
SF	4/23/12	SS4-96-12FC / - / 1 of 1

SECTION 13155

SWIMMING POOL PLASTER

PART 1 GENERAL

1.01 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.

1.02 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: Swimming pool plaster shall conform with requirements of Chapter 31B of California Building Code, latest edition. In addition, meet requirements of applicable portions of most current edition of the "Technical Manual," National Plasterers Council, Mission Viejo, California.

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's Representative 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: 1.00 to 2.0 PPM
d. pH Factor: 7.2 to 7.6

1.03 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in conformance with the requirements of Section 01330.

B. Submit proof of qualifications as specified in Article 1.02.A and 1.02.C.1 of this Section.

1.04 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's Representative.

1.05 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

2.01 CEMENT / AGGREGATE

A. "Pebble-Fina" quartz cement plaster by Pebble Technology, Inc., "Luna Quartz ®", quartz-cement plaster by Wet Edge Technologies or "Krystal Krete" quartz-cement plaster by C.L. Industries, Inc

2.02 COLOR

A. All swimming pool plaster shall be white in color. "Pebble-Fina" shall be "Classico", "Luna Quartz" shall be "Polar White" and "Krystal Krete" shall be "Krystal Blue"

2.03 WATER

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

2.04 GUTTER WATERPROOFING

A. Xypex, Aquafin-2K/M, or approved equal. Mix and apply per manufacturer's recommendations for specific application. Color shall be Gray.

PART 3 EXECUTION

3.01 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.

3.02 INSTALLATION OF GUTTER WATERPROOFING

A. Provide two (2) coats of the specified gutter 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.

3.03 INSTALLATION OF POOL PLASTER

A. Outdoor Pool:

1. Completion of other work: **DO NOT** commence plastering of swimming pool until the following conditions have been met:
   a. The Health Department and/or other governing agencies have approved the pool(s) and/or spas) for plaster.
   b. All concrete pool deck construction is complete and the pool decks have been

thoroughly cleaned.

c. All landscaping in areas adjacent to the pool is complete and the landscape irrigation system is operable.
d. All painting in the pool area is complete.
e. All welding and grinding in locations adjacent to the pool area are complete.
f. The backwash sewer connection is complete.
g. Pool area perimeter fencing installation is complete.
h. All trash and debris have been removed from areas adjacent to the pool, particularly those areas that are normally upwind from the pool.
i. All dust raising construction and/or activities in areas adjacent to the pool are complete or mitigated.
j. The circulation pump(s) is/are operational.
k. The mechanical system has been flushed sufficiently to remove all dirt and debris from the piping system.
l. All necessary chemicals (Chorine, pH adjuster, Sodium Bicarbonate and Calcium Chloride or any other required chemicals) are on site and ready for use.
m. Obtain written approval from the Owner's Representative 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's Representative and the Architect.

D. **POOL PLASTER AUTHORIZATION FORM**:

1. The pool at **Benstead Plunge** is hereby approved for the installation of the pool plaster. Pursuant to the requirements of specification section 13155, paragraph 3.03.

_____ _____
Owner Date

_____ _____
Architect / Project Manager Date

E. 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.

F. 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-cement plaster is to be applied by a licensed applicator as approved by the manufacturer, and in accordance with manufacturer's training.

3.04 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.

3.05 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).

3.06 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.

3.07 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

SECTION 13156

SWIMMING POOL EQUIPMENT

PART 1 GENERAL

1.01 WORK INCLUDED

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

1.02 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. All equipment supplied or work performed shall comply with regulations governing public swimming pools and spas as contained within Chapter 31 of California Building Code, latest edition.

1.03 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in conformance with the requirements of Section 01330.

B. Required submittals include:

1. Swimming Pool Mechanical Equipment as specified in Article 2.01 of this Section.

C. Submit proof of qualifications as specified in Article 1.02.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. 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.

1.04 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

2.01 CIRCULATION PUMP STRAINER

A. 'Mer-Made' FRP Series F.O basket strainer, with two (2) stainless steel strainer baskets, acrylic lid, and stainless steel eyebolts. Pressure tested to 50 P.S.I. 10" x 8" standard strainer. One (1) required. Field verify all dimensions prior to ordering to verify space required.

2.02 SWIMMING POOL HEATER(S)

A. 'Raypak' #2004 cold run MVB, 1,999,000 BTU input, 2" natural gas connection, 2½" water influent/effluent connections with isolations valves and 14" ø flue to atmosphere. Two (2) total (1,050 lbs. each). Raypak or approved equal.

2.03 SWIMMING POOL FILTRATION SYSTEM (Eko^{3}or approved equal) ADDITIVE ALTERNATE #1

A. The filter system specified herein shall be the standard cataloged product of a company regularly engaged in the manufacture of water treatment equipment. The purpose of this specification is to establish the minimum design, performance, quality, and service standards for the proposed equipment. Equipment provider shall have a minimum of five year's experience in the manufacture of such specified Commercial/Industrial grade water treatment equipment. The equipment shall consist of filter vessel(s), internal distribution and collection system, immediate face piping, operating valves, backwash sightglass, air relief systems, gauges, hydraulic pressure supply system, electronic operational control systems, system operating setup/startup and fifteen (15) year warranty.

Requests for substitutions for the specified components and materials will not be considered unless equal to the specified system in every respect and must be submitted to the specifying agent not less than twenty (20) calendar days prior to bid date. Requests for substitutions must include, but not be limited to:

- List containing contact name and telephone number of ten like systems, each of which shall utilize all specified features and employ fiberglass filament wound vessels, and electronic filter control devices.
- Complete documentation and that proves proposed unit includes all of the specified

features.

- Manufacturer's sales literature.
- Engineering drawings, structural and seismic calculations prepared by a licensed Civil Engineer.
- Certification listings.
- Installation/operation/maintenance manuals.
- Name and address of the site-local, factory-authorized startup and service representative with affidavit of last date of certification.

Failure to provide this or any other information necessary to confirm that all specified features are provided will be cause for rejection of substitution request. Prior to ten (10) days before bid date, all prospective bidders will be notified in writing of any proposed substitutions.

A. Filter Area And Flow Rate:

1. The filter system shall be model Eko-42-225-4 high-rate permanent media filter vessels with a total effective filter area of 90 square feet. When operating at 16 gallons per minute, per square foot of filter area, the filter system will have a capacity of filtering 1,440 gallons per minute. Eko[3]or approved equal.

B. Filter Vessel:

1. Vessel :

a. The filter vessel will be 42" inside diameter, will have 22.5 square feet of filter area and shall be designed for a maximum working pressure of 100 psi with a 4-to-1 safety factor for minimum burst. The design shall be capable of withstanding, without leaks or structural failure, a repetitive pressure test consisting of 250,000 cycles of 0 to 100 psi. This is required to ensure long service life, reduce potential liability and guarantee safe operation.

b. Materials used in the construction of the vessel shall be in accordance with Article RM-1 of ASME Boiler and Pressure Vessel Code, Section X and ASME RTP-1, most current versions. The vessel shell shall be fabricated throughout of a continuous and woven premium grade glass fiber roving with a laminate matrix of un-pigmented polyester resin and hardener. High stress areas shall be reinforced with Kevlar® and/or carbon fiber. Resin-rich layers shall be resistant to UV, weathering, stress cracking and de-laminating, and shall have a field history of performance. The minimum laminate properties shall be as follows:

Tensile Strength (ASTM D-638)	-	42,000 psi
Tensile Modulus	-	2.2×10^6 psi
Flexural Strength (ASTM D-790)	-	50,000 psi
Flexural Modulus	-	1.6×10^6 psi
Heat Distortion Temp. (ASTM D-638)	-	180° F @ 264 psi
Barcol Hardness (ASTM D-2533)	-	45 (Mod #934)

Structural Adhesive Bond Strength - 1,500 psi

c. Attachments, if any, to the vessel shall be made with a structural adhesive compatible with the laminate used to fabricate the vessel.

d. The vessel shall incorporate two (2), six-inch (6") grooved pipe ports located in the top of the vessel side shell to serve as influent and effluent plumbing connections. One (1), three-inch (3") port shall be located in the lower front portion of the vessel to serve as a winterizing and media dump port connection. One (1), three-inch (3") port shall be located in the upper-most portion of the side shell to serve as a connection for a manual air relief valve. Bulkhead through-port connections will not be considered for this application in order to preclude fitting failure and structural weaknesses inherent with vessels using bulkhead fittings.

e. A 12" x 16" viewing window/access manway shall be fitted at the front end of the vessel to provide operation and periodic media examination, and ease of access for media loading. Manways or manholes located in the side shell of the vessel will not be permitted. Manways or manholes with metal reinforcement will not be allowed, due to inherent weaknesses.

f. Following fabrication, the entire vessel shall be cured to ensure uniformity of strength.

g. Each filter vessel shall be subjected to an in-shop hydro pressure test of 100 psi for a period of four (4) hours. Verification of this test and results shall be submitted to the owners at time of delivery.

h. Vessel shall be supported by two (2) foam-filled, molded polyethylene saddles, which shall allow the vessel to withstand load forces specified for seismic zone 4 without damage. Certified engineering drawings are required to confirm this capability. Saddles shall be attached to vessel with a permanent adhesive. Vessel to saddle attachment with tank through-bolts is not acceptable. A positioning template, and four (4) 3/4" x 7" anchor bolt sets with leveling shims shall be provided with each vessel to ensure proper installation.

i. Coated and/or non-coated metal vessels and/or fiberglass vessels with metal reinforcement or fiberglass vessels employing inner tanks (bladders) will not be considered for this application. Historical problems, related to corrosion of metal tanks, an inability to bond inner and outer fiberglass tanks (bladders), and the extreme difficulty associated with the repair of tank bladders, will not allow their use.

2. Distribution and Collection System

a. Internal components shall be hydraulically balanced to prevent migration and channeling of the filter media during the filter cycle and must uniformly fluidize the filter media in the backwash cycle without breakthrough at any one location. Internal component design shall accommodate, during "OFF" cycle, that the filter system shall remain full of water.

b. The influent distribution system shall be fabricated of no less than 12 ABS distribution lenses - each having two-inch (2") IPS connections, PVC pipe, and

fittings. The distribution system design shall accommodate a Reynolds Number not to exceed 2000. The collection system shall consist of PVC fittings, six-inch (6") Schedule 80 PVC pipe and molded polypropylene reverse "V" slotted laterals. The laterals shall be designed to retain filter media with minimum head loss. A minimum of 22 molded laterals shall be utilized in the filter vessel with flow velocity not exceeding 6 feet per second at designed filter flow rate. Non-molded laterals will not be considered acceptable for this application. Collection system hydraulic design calculations will be required.

3. Air Relief System

   a. An automatic air bleed system shall be provided. An anti-plug protective shield screen shall be a part of the assembly. A manually operated external air relief shall also be provided for the vessel.

4. Winterizing/Drain and Media Dump Port

   a. At the lowest point of the front of the vessel a three-inch (3") port shall be provided. The port shall allow the evacuation of all water from the vessel for the purpose of winterizing or service. No media shall be allowed to leave the vessel during the draining process. The port shall also facilitate the removal of the filter media from the vessel.

C. Backwash Valving And Piping: Each filter vessel within the system shall be cleaned individually using filtered water provided by adjacent filter vessels. Reverse flow backwash with raw source water will not be allowed. Maximum allowable backwash flow rate will be 450 gallons per minute.

1. Backwash Valve:

   a. One (1), two-way, three-port, six-inch (6") backwash valve shall be supplied with each vessel. The valve body shall be injection-molded of ABS plastic all external components will incorporate UV inhibitors. Valves using metal bodies and covers, coated or non-coated, will not be approved. Grooved-type fittings shall be provided at each of the valve ports for connection to the filter vessel and manifold piping. Couplers shall be provided at each of the valve ports for connection to the filter vessel and manifold piping. The couplers shall be injection-molded of Isoplast 101LGF40NAT plastic and shall contain UV inhibitor. Each valve shall be fitted with a hydraulic diaphragm designed to operate a sliding flow direction piston. Valve internal shaft, nuts, washers and bolts shall be 316 stainless steel. All stainless steel components shall be passivated and rinsed after forming and machining.

   b. The backwash valve shall be designed to allow for continuous circulation pump operation during the backwash of the filter system that will prevent the loss of circulation pump prime and damage to boiler, chemical feed systems and piping that can result by repetitive on/off cycling of circulation pump. Valves requiring external linkage for synchronization of their operation will not be allowed.

2. Rate of Flow Valve:

a. A tamperproof, gate-type valve shall be supplied for use on the effluent manifold. The valve shall be made of PVC, will be field-adjustable, ensuring the proper system flow rate. The rate of flow valve shall be manually set using a removable tool. Standard butterfly and/or gate-type valves will not be allowed.

3. Backwash Sightglass Valve:

a. A tamperproof, gate-type valve shall be supplied for use on the waste manifold. The valve shall be made of PVC, will be field-adjustable, ensuring the proper system backwash flow rate. The backwash rate shall be manually set using a removable tool. Standard butterfly and/or gate-type valves and separate sightglass will not be allowed.

4. Piping:

a. To minimize floor space requirements and provide unhindered access to filter controls, backwash valves, media dump port, and vessel access openings, all piping shall be located on top of the horizontal filter vessel. All 6" manifolds shall be fabricated from Schedule 80 PVC pipe and fittings. All manifolds 8" and larger shall be fabricated Schedule 80 piping with pulled fittings, in manifold sections not exceed two tank lengths. Influent and effluent manifolds shall be 12" IPS and the waste manifold shall be 6" IPS. All piping shall be factory-assembled and pressure tested.

D. Operational Control

1. Automatic Control Device:

a. An Automatic Control System (ACS) shall be provided, which will allow for the automatic and manual manipulation of the filter backwash operation.

2. Functions And Features

a. The ACS shall perform the following functions and features:

3. Automatic Filter Backwash:

a. Initiate - at filter system via field-adjustable differential set point
b. Ability for the optional initiation of backwash via and external device, i.e., time of day/day of week set point time clock or System6 chemical controller
c. Initiate - manually activated automatic backwash cycle
d. Initiate - backwash by manual manipulation of multiport valve
e. Initiate on/off - Pressure Accumulation System "HydroForce" pump actuation

4. Multiport Valve:

   a. Distribute water for the hydraulic actuation of filter system valves
   b. 24 VAC, continuous drive motor
   c. Constructed of non-corrosive ABS and stainless steel, metallic multiport valves will not be approved - multiple solenoid valves will not be approved

5. Housing and Mounting:

   a. The ACS shall be housed in a non-metallic NEMA 4X rated enclosure. The enclosure and connections shall be designed to eliminate any possibility of corrosion or damage to the internal components of the control.

6. Multiport Valve:

   a. The multiport valve wetted components shall be injection-molded ABS with stainless steel shaft and springs. The unit shall distribute water for the hydraulic actuation of the filter system valves. Porting shall be 3/8" IPS minimum, employing 1/2" IPS tubing, and shall not retard the opening or closing of the backwash valves beyond 10 seconds. The multiport valve will be equipped with an indicating dial for valve operating sequence and home position. The multiport valve 24 VAC stager drive motor shall be installed in an independent enclosure of the NEMA 4X type.
   b. System serial number, model number, operating pressure, media information and basic operating instructions shall be permanently affixed to the multiport valve enclosure. The label shall be treated to resist the mechanical room environment. The enclosure shall be directly attached to the filter system.

7. Transformer :

   a. A line voltage to 24 VAC transformer shall be provided. The transformer shall be mounted in an independent enclosure of the NEMA 4X type. The transformer and enclosure shall be of the wall-mount type and shall be posted near the electronic mechanical room control device.

E. Gauges:

1. Two (2), four-inch (4") pressure gauges shall be provided. The gauges shall indicate influent and effluent pressures of the filter. The gauges shall be mounted with the filter system multiport valve enclosure, within a common gauge-mounting bracket.

F. Hardware:

1. All fasteners (nuts, bolts, washers) employed in the system shall be cadmium-plated steel.

G. Service Access:

1. Access to manway, backwash valves, and filter control console shall be from the front of the filter system and shall not require disassembly of any piping or climbing over or around vessel, manifolds or valves to perform operation, service or routine maintenance.

H. Filter Media

1. Filter media depth shall be as indicated on the drawings; measurements will be taken at the site and will be from top of the collection laterals to the top of the media. The media shall be of a single grade, consisting of uniformly graded, angular shaped, crushed silica sand which shall be free of limestone or clay.

2. Filter system manufacturer shall provide a filter media analysis for the media being utilized. Media supplier shall supply two (2) pounds of filter media from installation site. Consulting engineer, prior to its installation, must approve filter media analysis.

3. #20 Sand

a. Filter media shall be Grade #20, effective size .45 millimeter with a uniformity coefficient of 1.5 maximum.

MEDIA ANALYSIS

Sieve No. US Series	MM Opening	Percent Retained On Sieve (By Weight)
20	0.833 (0.333 in)	2
30	0.589 (0.023 in)	58
40	0.417 (0.016 in)	36
50	0.295 (0.012 in)	4

4. Alternate Filter Media

a. #30 Sand

1) Filter media shall be Grade #30, effective size .27 millimeter with a uniformity coefficient of 1.6 maximum.

MEDIA ANALYSIS

Sieve No. US Series	MM Opening	Percent Retained On Sieve (By Weight)
30	0.589 (0.023 in)	2
40	0.417 (0.016 in)	36
50	0.295 (0.012 in)	46
70	0.208 (0.008 in)	11
100	0.147 (0.006 in)	5

I. "HydroForce®" System:

1. The HydroForce® system shall consist of a stainless steel centrifugal pump, hydro-pneumatic pressure sustaining tank, adjustable pressure switch, 50 feet of 3/8 inch Nylo Seal® tubing and all necessary tubing connectors.

2. Pump

   a. The pump housing shall be made of stainless steel and the impeller shall be molded of Lexan®. A mechanical seal shall be provided and shall be a precision-lapped, highly- polished, carbon-ceramic stainless steel shaft seal, ensuring drip-proof protection. The motor shall be a 1/2 HP, single phase, 60 cycle, 3450 RPM, suitable for service with filter control console. The motor shall be a NEMA 'C' face flange mounting with a drip-proof enclosure. The motor shall be equipped with sealed ball bearings. The pump shall be performance rated at 5 gallons per minute at 80 feet of head.

3. Tank

   a. Pressurized water shall be contained in a hydro-pneumatic steel tank that shall be lined with an epoxy coating. The tank will employ a flexing diaphragm, separating wet and dry chambers. The steel tank shall be designed for a maximum working pressure of 100 psi. Tank connection shall be 3/4" NPTM.

4. Pressure Switch

   a. A pressure switch shall be mounted directly to the pump motor and shall be rated for the operation of a 1-1/2 HP motor at 115 volt, single phase. The switch will allow for adjustment of cut-in and cut-out pressure.

5. Check Valve:

   a. A half-inch, spring-loaded check valve shall be supplied as part of the assembly. The check valve shall be installed on the pump suction and shall be designed to retain water pressure accumulated within the amplification system.

6. Tubing and Fittings:

   a. Fifty (50) feet of 1/2 inch Nylo Seal® tubing and all necessary tubing to pipe fittings shall be supplied for the connection of the HydroForce system to the filter system and the filter control.

7. Finish:

   a. The system shall be coated with an industrial-grade polyurethane high-gloss protective finish.

J. Packaging:

1. To protect and safeguard filter vessel, it shall be skidded and supplied with a plastic wrapping to facilitate shipment, handling, and/or storage on job site. The plastic wrap shall also act as a protective barrier during installation. All other components shall be packaged in a manner that will ensure damage-free transportation and facilitate storage at job site.

K. Instructions:

1. Printed and bound operating, installation and service manual with exploded parts list shall be supplied with the system described herein.

L. Certification:

1. Certified/stamped engineering calculations and drawings will be required for the structural strength of filter vessel and seismic loading. The filter supplied must be listed by the National Sanitation Foundation (NSF) ANSI 50 for a flow rate of up to 20 gallons per minute, per square foot of filter area. Proof of National Sanitation Foundation (NSF) listings will be required.

M. Startup, Training And Field Service:

1. Local factory representation for the products contained herein is mandatory. A site specific/site local factory-authorized and trained service specialist shall provide eight hours (8) of startup and training service. The startup shall include adjustments to the filter system and all of its controlling components, calibration and setup of the control system, and instructions to the owner/operator of the system's workings.

2. Prior to the completion of one (1) year's service, the site specific/site local factory-authorized service specialist shall visit the filter system installation site. With the owner/operator, the service specialist shall inspect all of the filter system components for signs of wear/malfunction at that time. Any and all worn or malfunctioning items shall be repaired or replaced at no expense to the owner. The service specialist will thoroughly instruct the owner/operator on annual service procedures for the filter system, all at no expense to the owner.

N. Warranty:

1. A 15-year limited warranty shall be provided covering all components of the filter system specified herein. The first (1st) year of the warranty period shall be unconditional. The second (2nd) year through the fifteenth (15th) year may be limited and prorated.

PART 3 EXECUTION

3.01 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.

3.02 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.

3.03 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 one 4-hour on-site training for facility staff in the operation and maintenance of the swimming pool mechanical equipment and systems.

3.04 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