PART VI

CONTRACT AGREEMENT

THIS AGREEMENT, made on the _____ day of _____, 20___, by and between **Lexington-Fayette Urban County Government**, acting herein called "OWNER" and KENTUCKY SERVICE COMPANY, INC., doing business as *(an individual) (a partnership) (a corporation) located in the City of LEXINGTON, County of FAYETTE, and State of KENTUCKY, hereinafter called "CONTRACTOR."

WITNESSETH: That the CONTRACTOR and the OWNER in consideration of One Hundred Eighty Seven Thousand Seven Hundred Seventy Seven & 66/100's Dollars and SIXTY SIX Cents ($187,777.66) quoted in the proposal by the CONTRACTOR, dated March 12, 2019, hereby agree to commence and complete the construction described as follows:

1. SCOPE OF WORK

The CONTRACTOR shall furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Proposal, the General Conditions, and the Special Conditions of the Contract, the Specifications and Contract Documents therefore as prepared by the Division of Parks and Recreation for the Pump Installation for Pools and Fountains project.

2. TIME OF COMPLETION

The time period estimated and authorized by the OWNER for the proper execution of the Work by the Contract, in full, is hereby fixed as ninety (90) calendar days for fountain installations. The time shall begin ten (10) days after the CONTRACTOR is given the Notice to Proceed with the Work. Work on pre-season installations shall begin immediately after the CONTRACTOR is given the Notice to Proceed with the Work. The time period estimated and authorized by the OWNER for the proper execution of the Work by the Contract, in full, for pre-season pool pump installations is hereby fixed as per timeframe listed in Form of Proposal. Work on post-season pool pump installations shall begin immediately after the CONTRACTOR is given the Notice to Proceed with the Work. The time period estimated and authorized by the OWNER for the proper execution of the Work by the Contract, in full, for post-season pool pump installations is hereby fixed as thirty (30) calendar days.

3. ISSUANCE OF WORK ORDERS

Notice to begin Work will be given in whole or for part of the Work as determined by the OWNER pending the availability of funds. The order of construction will be as determined by the Engineer after consultation with the CONTRACTOR and the OWNER.

4. THE CONTRACT SUM

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the Contract, as quoted in the proposal, subject to any additions and deductions, as provided therein.

5. PROGRESS PAYMENTS

The OWNER shall make payments on account of the Contract, as provided in accordance with the General Conditions, as estimated by the Engineer, less the aggregate of previous payments.

6. ACCEPTANCE AND FINAL PAYMENT

Final payment shall be due within ninety (90) days after completion of the Work, provided the Work be then fully completed and the Contract fully accepted.

Before issuance of final certificate, the CONTRACTOR shall submit evidence satisfactory to the Engineer that all payrolls, material bills, and other indebtedness connected with the Work has been paid.

If, after the Work has been substantially completed, full completion thereof is materially delayed through no fault of the CONTRACTOR, and the ENGINEER so certifies, the OWNER shall upon certificate of the ENGINEER, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

7. THE CONTRACT DOCUMENTS

The Advertisement for Bids, Information for Bidders, the General Conditions, Performance and Payment Bonds, Contract Agreement, Special Conditions, Technical Specifications, any and all Addenda, and Proposal, and Plan Drawings form the Contract, and they are fully a part of the Contract as if hereto attached or herein repeated.

8. EXTRA WORK

The OWNER, without invalidating the Contract, may order extra work or make changes by altering, adding to or deducting from the Work, the Contract Sum being adjusted accordingly. All such Work shall be executed and paid for in accordance with the General Conditions, which is a part of this Contract.

9. **THE FOLLOWING IS AN ENUMERATION OF THE SPECIFICATIONS AND DRAWINGS (CONTRACT DOCUMENTS):**

SPECIFICATIONS

SECTION NO.	TITLE	PAGES
I	Advertisement for Bids	AB 1 thru 5
II	Information for Bidders	IB 1 thru 9
III	Form of Proposal	P 1 thru 36
IV	General Conditions	GC 1 thru 50
V	Special Conditions	SC 1 thru 5
VI	Contract Agreement	CA 1 thru 5
VII	Performance and Payment Bonds	PB 1 thru 7
VIII	Addenda	AD 1 thru 1
IX	Technical Specifications	TS 1 thru 43

PLAN DRAWINGS –

M-1 Castlewood
M-2 Shillito
M-3 Southland
M-3A Southland
M-4 Tates Creek
M-6 Woodland
M-7 Thoroughbred Park
M-8 Schedules

IN WITNESSETH WHEREOF, the parties hereto have executed this Contract as of the date and year above written.

(Seal)

ATTEST:

Mark J Miller Deputy
Clerk of the Urban County Council

Debbie Dean
(Witness)

(Seal)

Barbara J Bruce
~~(Secretary)~~* Notary
444646

(Witness)

Lexington-Fayette Urban County Government.
Lexington, Kentucky
(Owner)

BY: Jim Gray
MAYOR

JIM GRAY, MAYOR
(Title)

Kentucky Service Co Inc
(Contractor)

BY: [signature]

President
(Title)

2328 Maggard 40511
(Address and Zip Code)

IMPORTANT: *Strike out any non-applicable terms.

Secretary of the Owner should attest. If the CONTRACTOR is corporation, Secretary should attest. Give proper title of each person-executing Contract.

SENTRY INSURANCE A MUTUAL COMPANY
STEVENS POINT, WISCONSIN
(A PARTICIPATING MUTUAL COMPANY)
A MEMBER OF THE SENTRY FAMILY OF INSURANCE COMPANIES

CERTIFICATE OF INSURANCE ACCOUNT NUMBER 24-32034

This certificate is issued as a matter of information only and confers no rights upon the certificate holder. This certificate does not amend, extend or alter the coverage afforded by the policies below.

Name and Address of Certificate Holder	Name and Address of the Insured
LEXINGTON FAYETTE URBAN COUNTY GOVERNMENT 200 E MAIN ST LEXINGTON, KY 40507	KENTUCKY SERVICE INC 2328 MAGGARD DR LEXINGTON, KY 40511

This certificate is issued on 04-09-2014 and is effective until 01-01-2015. It certifies that policies of insurance listed below have been issued to the insured named above. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions, and conditions of such policies. Limits shown may have been reduced by paid claims.

Coverage Provided	Policy Number	Coverage Limits		
Workers' Compensation and Employer's	24-32034-05	Statutory		
		Each Accident	$	500,000
		Each Disease/Employee	$	500,000
		Each Disease/Policy	$	500,000
General Liability	24-32034-06	General Aggregate	$	3,000,000
		Products Aggregate	$	2,000,000
Bodily Injury and Property Damage Combined	OCCURRENCE	Pers/Adv Injury	$	1,000,000
		Each Occurrence	$	1,000,000
		Premises Damage	$	500,000
		Medical Expense	$	15,000
Automobile Liability	24-32034-06	Each Accident	$	1,000,000
Includes: Bodily Injury and Property -Specifically Described Autos -Hired Autos -Non Owned Autos				
Excess/Umbrella	24-32034-06	Each Occurrence	$	4,000,000
		General Aggregate	$	4,000,000
		Products Aggregate	$	4,000,000

80-C1035 (SFA)

KEN 24-32034 33-131603 LDI COI 269628-1 02 11
04-09-2014
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ADDITIONAL INSURED STATUS IS SUBJECT TO THE TERMS AND CONDITIONS OF ENDORSEMENT CG 70 21 (04/2013).

Should any of the above described policies be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

PART VII

PERFORMANCE AND PAYMENT BONDS

1. PERFORMANCE BOND

2. PAYMENT BOND

PART VII

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that

_____

(Name of CONTRACTOR)

_____

(Address of CONTRACTOR)

a_____, hereinafter
(Corporation, Partnership, or Individual)

called Principal, and _____
(Name of Surety)

_____

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT
200 East Main Street, Third Floor
Lexington, Kentucky 40507

hereinafter called "OWNER" in the penal sum of: _____
Dollars, ($_____), for the payment of whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal by written agreement is entering into a Contract with OWNER for _____**(project name)**_____ in accordance with drawings and specifications prepared by: _____**(the Engineer)**_____ which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the OWNER.

Whenever, Principal shall be, and declared by OWNER to be in default under the Contract, the OWNER having performed OWNER'S obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

(1) Complete the Contract in accordance with its terms and conditions or

(2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or if the OWNER elects, upon determination by the OWNER and Surety jointly of the lowest responsible bidder, arrange for a Contract between such bidder and OWNER, and make available as Work progresses (even though there may be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract Price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract Price", as used in this paragraph shall mean the total amount payable by OWNER to Principal under the Contract and any amendments thereto, less the amount properly paid by OWNER to Principal.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the OWNER named herein or the heirs, executors, administrators or successors of OWNER.

IN WITNESS WHEREOF, this instrument is executed in _____ each one of which shall be
(number)
deemed an original, this the _____ day of _____, 20_____.

ATTEST:

_____
Principal

_____
(Principal) Secretary

BY: _____(s)

_____
(Address)

_____

_____
Witness as to Principal

_____
(Address)

_____

_____
Surety

ATTEST:

BY: _____
Attorney-in-Fact

_____
(Surety) Secretary

_____
(Address)

_____

(SEAL)

_____
Witness as to Surety

_____
(Address)

_____

TITLE: _____
Surety

_____

_____

BY: _____

TITLE: _____

NOTE: The number of executed counterparts of the bond shall coincide with the number of executed counterparts of the Contract.

PART VII

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENT: that

_____

(Name of Contractor)

_____

(Address of Contractor)

a _____, hereinafter

(Corporation, Partnership or Individual)

called Principal, and _____

(Name of Surety)

_____

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto:

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT
200 East Main Street, Third Floor
Lexington, Kentucky 40507

Obligee, hereinafter called OWNER, for the use and benefit of claimants as hereinafter defined, in the amount of _____ Dollars ($_____) the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal by written agreement is entering into a Contract with OWNER for **(project name)** in accordance with drawings and specifications prepared by: **(the Engineer)** which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions.

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the OWNER that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The OWNER shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

   (a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: The Principal, the OWNER, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the Work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the Work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, OWNER, or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

   (b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

   (c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against aid improvement, whether or not claim for the amount of such lien be presented under and against this bond.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of
(number)

which shall be deemed an original, this the _____ day of _____, 20_____.

ATTEST:

_____
(Principal)

_____
(Principal) Secretary

(SEAL)

BY: _____(s)

_____
(Address)

_____

_____
(Witness to Principal)

_____
(Address)

_____

_____
(Surety)

ATTEST:

BY: _____
(Attorney-in-Fact)

_____
(Surety) Secretary

(SEAL)

_____
Witness as to Surety

_____
(Address)

_____

_____
(Address)

_____

_____

NOTE: The number of executed counterparts of the bond shall coincide with the number of executed counterparts of the Contract.

END OF SECTION

Sentry Insurance – Surety Bond Department
1800 North Point Drive
P.O. Box 8022
Stevens Point, WI 54481
Phone: 800.624.8369

SENTRY® INSURANCE

Sentry Insurance a Mutual Company
SURETY BOND FOR THE PERFORMANCE OF A CONTRACT

Bond Number: 67-32053-02

Date Bond Executed: April 25, 2014
(must be same or later than date of contract)

Surety
Name: Sentry Insurance a Mutual Company
Address: 1800 North Point Dr.
Stevens Point, WI 54481
Incorporated: State of Wisconsin
Telephone: 1-800-624-8369

Principal
Principal's Name: Kentucky Service Co.
Primary Address: 2328 Maggard Dr
Lexington, KY 40511
State of Incorporation: Kentucky
Type of Organization: Corporation

PENAL SUM OF BOND

PERCENT OF BID PRICE	AMOUNT NOT TO EXCEED				CONTRACT DATE	CONTRACT NO.
	Million(s)	Thousand(s)	Hundred(s)	Cents		
100%	00	187	777	66	5/8/2014	Bid # 16-2014 - Pumps for Pools and Fountains

OBLIGATION:

We, the Principal and Surety(ies), are firmly bound to the Lexington-Fayette Urban County Government (hereinafter called the Obligee) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, where the Sureties are corporations active as co-sureties, we, the Sureties, bind ourselves in such sum "jointly" and "severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of Surety. If no limit of liability is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The Principal has entered into the contract identified above.

THEREFORE:

The above obligation is void if the Principal –

(a) (1)Performs and fulfills all the undertakings, covenants, terms, conditions, and agreements of the contract during the original term of the contract and any extensions thereof that are granted by the Obligee, with or without notice to the Surety(ies), and during the life of any guaranty required under the contract, and (2) performs and fulfills all the undertakings, covenants, terms conditions, and agreements of any and all duly authorized modifications of the contract that hereafter are made. Notice of those modifications to the Surety(ies) are waived.

(b) Pays to the Obligee the full amount of the taxes imposed by the Obligee, if the said contract is subject to the Miller Act, (40, U.S.C. 270a-270(e), which are collected, deducted, or withheld from wages paid by the Principal in carrying out the construction contract with respect to which this bond is furnished.

WITNESS:

The Principal and Surety(ies) executed this bond and affixed their seals on the above date.

SURETY
x Dorene R Bialas
Dorene R. Bialas, Attorney-in-Fact
(Printed Name and Title)

NA
Authorized Countersignature (Where Required)

SENTRY INSURANCE A MUTUAL COMPANY INCORPORATED 1913 WISCONSIN

PRINCIPAL
x C D Moore President
Craig D Moore President
(Printed Name and Title)

POWER OF ATTORNEY

No. 67-32053-02

SENTRY®
INSURANCE
A MUTUAL COMPANY

Know all men by these presents, that Sentry Insurance a Mutual Company, a corporation duly organized under the laws of the State of Wisconsin, and having its principal place of business in the City of Stevens Point, State of Wisconsin, does hereby make, constitute and appoint JOHN T. BAUMAN, BEVERLY R. BEIGEL, DORENE R. BIALAS, RITA M. GINDER, CHERYL M. JISKO, ANDY M. KURSZEWSKI, JENNIFER M. MURPHY, TRICIA L. SCHILLING, MICHELLE M. THAUER, AND LYNDA L. WACHOWIAK, as its true and lawful Attorneys-in-Fact, for it, and in its name, place and stead, with full power and authority to sign, execute, acknowledge and deliver for and on its behalf as Surety, any and all bonds with an effective date on or after January 13, 2014.

Signed:

Peter G. McPartland, Chairman of the Board,
President and Chief Executive Officer
SENTRY INSURANCE A MUTUAL COMPANY

Attest:

Kenneth J. Erler, Secretary
SENTRY INSURANCE A MUTUAL COMPANY

STATE OF WISCONSIN)
) ss:
COUNTY OF PORTAGE)

I, Shelley M. McEachen, Notary Public, do hereby certify that Peter G. McPartland, Chairman of the Board, President and Chief Executive Officer, and Kenneth J. Erler, Secretary, of Sentry Insurance a Mutual Company, personally known to me to be the same persons whose names are subscribed to the foregoing instrument as such Chairman of the Board, President and Chief Executive Officer and the Secretary, appeared before me this day in person and acknowledged that they signed, sealed and delivered said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and official seal this 13th day of January, 2014.

Shelley M. McEachen
My Commission expires 10/17/17.

AUTHORIZATION

I, Kenneth J. Erler, Secretary of Sentry Insurance a Mutual Company, hereby certify that Sentry Insurance a Mutual Company is duly licensed to transact fidelity and surety business in all states of the United States of America, that the foregoing Power of Attorney is a correct and true copy of the original Power of Attorney, and that said Power of Attorney has not been revoked. I further certify that the following is a true and exact copy of a resolution passed by the Board of Directors of Sentry Insurance a Mutual Company at a meeting held by said Board, a quorum being present and voting on May 7, 1970, which resolution is still in effect:

RESOLVED: That the President, the Vice President or the Treasurer of this Corporation shall have authority to appoint in writing such attorneys-in-fact as the business of the Corporation may require, and to authorize such attorneys-in-fact, and each of them to execute on behalf of the Corporation, any bonds, recognizances, stipulations, contracts of indemnity and other undertakings of like character, or to exercise any lesser number of said powers as hereinbefore set forth, and BE IT FURTHER RESOLVED: That said appointments shall be attested by the Secretary or an Assistant Secretary of this Corporation under its seal. The signature of the Secretary or any Assistant Secretary to certified copies of such powers of attorney may be original or facsimile, and when the corporate seal is affixed thereto, any third party may rely on said certified copies of powers of attorney as the act and deed of this Corporation. The President, Vice President, or Treasurer may revoke any appointment made pursuant hereto, and revoke any and all authority conferred by any such appointment.

Given under my hand and official seal this 25th day of April, 2014.

Attest:

Kenneth J. Erler, Secretary
Sentry Insurance a Mutual Company

PART VIII

ADDENDA

All addenda issued during the bidding of the Project will be reproduced in the signed Contract Documents, on the pages following this heading sheet.

Addendum Number	Title	Date
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

PART IX

TECHNICAL SPECIFICATIONS

SECTION 01039 - COORDINATION AND MEETINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.

B. Preconstruction meeting.

C. Progress meetings.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.

1.3 PRECONSTRUCTION MEETING

A. Engineer will schedule a meeting after Notice of Award.

B. Attendance Required: Owner, Engineer, Contractor and major Sub-contractors.

1.4 PROGRESS MEETINGS

A. Schedule of progress meetings will be at the discretion of the owner.

B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Engineer, others, as appropriate to agenda topics for each meeting.

D. Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems which impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.

10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

PART 2 – PRODUCTS

2.1 Not Used

PART 3 – EXECUTION

3.1 Not Used

END OF SECTION

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Product Data.

D. Shop Drawings.

E. Manufacturer's Instructions.

F. Invoices

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Manufacturers' field services and reports.

B. Section 01700 - Contract Closeout: Contract warranties, manufacturers' certificates, and closeout submittals.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

D. Apply Contractor's stamp, signed, certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to Engineer. Coordinate submission of related items.

F. For each submittal for review, allow 15 days excluding delivery time to and from the contractor.

G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor and Engineer review stamps.

I. When revised for resubmission, identify all changes made since previous submission.

J. Submittals not requested will not be recognized or processed.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within 15 days after date of Owner-Contractor Agreement.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Schedule will be developed with coordination of the owner. Generally pumps will be replaced at the end of Swimming Season. Water may remain in pools for a limited time period so that new pumps can be operated and tested under load. Pumps installed after pool water is drained will be tested at the following Spring pool start up. VFD installation for the Thoroughbred Park Fountains will be under a different schedule.

1.5 PRODUCT DATA

A. Product Data For Review:

1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
2. After review, provide copies and distribute in accordance with *SUBMITTAL PROCEDURES* article above and for record documents purposes described in Section 01700 - *CONTRACT CLOSEOUT.*

B. Product Data For Information:

1. Submitted for the Architect/Engineer's knowledge as contract administrator for the Owner.

C. Product Data for Project Close-out:

1. Submitted for the Owner's benefit during and after project completion.

D. Submit the number of copies which the Contractor requires, plus four copies which will be retained by the Engineer and owner.

E. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

F. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

G. The contractor may submit one copy of submittals to the Engineer via electronic format and make owner copies after engineering review.

1.6 SHOP DRAWINGS

A. Shop Drawings:

1. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Submit the number of opaque reproductions which Contractor requires, plus four copies which will be retained by Engineer.

D. Submittals may be made in the form of printable PDF files and transmitted via E-Mail

1.7 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer for delivery to owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

C. Refer to Section 01400 - Quality Control, Manufacturers' Field Services article.

1.8 INVOICES AND SCHEDULE OF VALUES

A. Contractor shall use invoice forms provided by the Commonwealth of Kentucky.

B. Contractor shall, at the pre construction meeting, submit invoice "0". Invoice 0 shall be the "Schedule of Values" and shall be the basis for subsequent invoices.

C. One week prior to each monthly progress meeting contractor shall submit an invoice for that months work. Invoice shall be submitted to the engineer.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality assurance - control of installation.

B. Tolerances

C. References and standards.

D. Inspecting and testing laboratory services.

E. Manufacturers' field services.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals: Submission of manufacturers' instructions and certificates.

B. Section 01600 - Material and Equipment: Requirements for material and product quality.

C. Section 01650 - Starting of Systems.

1.3 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.4 TOLERANCES

A. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.5 REFERENCES AND STANDARDS

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.6 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 – PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

SECTION 01510 - TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, and sanitary facilities.

1.2 RELATED SECTIONS

A. Section 01700 - Contract Closeout: Final cleaning.

1.3 TEMPORARY ELECTRICITY

A. By Owner, connect to Owner's existing power service. Do not disrupt Owner's need for continuous service. Owner will pay cost of energy used. Exercise measures to conserve energy.

1.4 TELEPHONE SERVICE

A. Provide Project Superintendent with a Cellular Phone.

1.5 TEMPORARY SANITARY FACILITIES

A. Existing designated facilities may be used during construction operations. Maintain daily in clean and sanitary condition.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01600 - MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Transportation and handling.

C. Storage and protection.

D. Product options.

E. Substitutions.

1.2 PRODUCTS

A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

1.3 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

D. Local office will not be responsible for signing of delivered materials, or be responsible for stored items.

1.4 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive Products in weather tight, climate controlled, enclosures in an environment favorable to Product.

D. For exterior storage of fabricated Products, place on sloped supports above ground.

E. Provide insured off-site storage and protection when site does not permit on-site storage or protection.

F. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.

G. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submitting must be of equivalent quality to listed equipment.

C. Products named in bid form, see General Conditions.

1.6 SUBSTITUTIONS

A. See general conditions for substitutions of equipment listed at time of bid.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01650 - STARTING OF SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Starting systems.

B. Demonstration and instructions.

C. Testing, adjusting, and balancing.

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Manufacturers field reports.

B. Section 01700 - Contract Closeout: System operation and maintenance data and extra materials.

1.3 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Engineer seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative and Contractors' personnel in accordance with manufacturers' instructions.

G. Submit a written report stating each heat pump, pump, water treatment system, or other system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Products to Owner's personnel one weeks prior to date of final inspection.

B. Instruct in the various pump rooms and instructed by a qualified manufacturers' representative who is knowledgeable about the Project.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment to LFUCG personnel two weeks prior to final inspection.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

F. One 3 hour training session is required at each facility where pump or VFD is installed.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Adjusting.

D. Project record documents.

E. Operation and maintenance data.

F. Spare parts and maintenance Products.

G. Warranties and bonds.

H. Maintenance service.

1.2 RELATED SECTIONS

A. Section 01500 - Construction Facilities and Temporary Controls: Progress cleaning.

B. Section 01650 - Starting of Systems: System start-up, testing, adjusting, and balancing.

1.3 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Owner will occupy all portions of the building during construction.

1.4 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

C. Replace filters of operating equipment.

D. Clean debris from roofs, gutters, downspouts, and drainage systems.

E. Remove waste and surplus materials, rubbish, and construction facilities from the site.

F. Cleaning shall be by a professional office cleaning facility.

1.5 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings: Legibly mark each item to record actual construction including:

1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
2. Field changes of dimension and detail.
3. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.7 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

B. Deliver to Project site

1.8 WARRANTIES AND BONDS

A. Provide notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Submit prior to final Application for Payment.

D. Warranty effective date shall be on the day after equipment is operated and passes testing under load.

1.9 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in specification sections for year from date of Substantial Completion

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

E. Building is covered by existing maintenance contract. Replacement of filters and other routine maintenance shall be by the contracted maintenance provider.

PART 2 - PRODUCTS

2.1 Not Used.

END OF SECTION

SECTION 01730 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Format and content of manuals.

B. Instruction of Owner's personnel.

C. Schedule of submittals.

1.2 RELATED SECTIONS

A. Section 01300 – Submittals

B. Section 01400 - Quality Control

C. Section 01600 - Material and Equipment: Systems demonstration.

D. Section 01700 - Contract Closeout

1.3 QUALITY ASSURANCE

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.4 FORMAT

A. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

    a. Significant design criteria.
    b. List of equipment.
    c. Parts list for each component.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
    f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

    a. Shop drawings and product data.
    b. Air balance reports.
    c. Certificates.
    d. Photocopies of warranties and bonds.

1.5 CONTENTS, EACH VOLUME

A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, Sub-consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

E. Warranties: Bind in copy of each.

1.6 MANUAL FOR MATERIALS AND FINISHES

A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.

B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

C. Additional Requirements: As specified in individual Product specification sections.

D. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.7 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

B. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

C. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

D. Provide servicing and lubrication schedule, and list of lubricants required.

E. Include manufacturer's printed operation and maintenance instructions.

F. Include sequence of operation by controls manufacturer.

G. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

H. Provide control diagrams by controls manufacturer as installed.

I. Provide Contractor's coordination drawings, with color-coded piping diagrams as installed.

J. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

K. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

L. Include test and balancing report.

M. Additional Requirements: As specified in individual Product specification sections.

N. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.8 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons.

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.9 SUBMITTALS

A. Submit one copy of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit three sets of revised final volumes in final form within 10 days after final inspection.

D. Submit electronic copy of revised final volumes in final form within 10 days after final inspection.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

A. Not Used.

END OF SECTION

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following basic mechanical materials and methods to complement other Division 15 Sections.
   1. Equipment nameplate data requirements.
   2. Labeling and identifying mechanical systems and equipment.
   3. Field-fabricated metal and wood equipment supports.
   4. Installation requirements common to equipment specification sections.
   5. Mechanical demolition.
   6. Cutting and patching.
   7. Touchup painting and finishing.
   8. Demolition.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
   1. ABS: Acrylonitrile-butadiene-styrene plastic.
   2. CPVC: Chlorinated polyvinyl chloride plastic.
   3. NP: Nylon plastic.
   4. PE: Polyethylene plastic.
   5. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:
   1. CR: Chlorosulfonated polyethylene synthetic rubber.
   2. EPDM: Ethylene propylene diene terpolymer rubber.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate mechanical equipment installation with other building components.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.

E. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

F. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors."

G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.

1.6 PERMITS, CODES, INSPECTIONS AND APPROVALS

A. Permits

1. All permits necessary for the complete heating, air conditioning, ventilating, sprinkler, boilers and plumbing systems shall be obtained by the Contractor from the authorities governing such work. The cost of all permits shall be borne by the Contractor.

B. Mechanical Work

1. Heating and ventilating and air conditioning work shall be performed in accordance with the rules and regulations of the Kentucky Building Code, National Fire Protection Association, the latest standards recognized by the American Society of Heating and Air Conditioning Engineers and IMC-International Mechanical Code as adopted by the Commonwealth of Ky. Installation of boilers and piping shall comply with the Commonwealth of Ky. Boiler and Pressure Vessel and Pressure Piping Law and Rules and Regulations and an Inspection Certificate provided to the Owner per this Code. All HVAC work shall be performed by a Licensed Kentucky Master HVAC Contractor.
2. Where the scope of mechanical work includes electrical work, all provisions included in the electrical sections of the work shall apply.

C. Inspection Requirements

1. The inspection work shall be scheduled for rough as well as the finished work. The rough inspection shall be divided into as many inspections as may become necessary to cover all roughing-in. A punch list inspection shall be scheduled with the Architect or his representative present.
2. The Architect shall be notified twenty-four (24) hours in advance when any tests or inspections are to be made and before any work is insulated or concealed. Failing to do so, the Contractor shall uncover and retest lines as directed by the Architect. The Contractor shall notify the Architect when he is ready for final inspection.

1.7 MECHANICAL DRAWINGS AND SPECIFICATIONS

A. The drawings and specifications are intended to cover all work enumerated under the respective headings. The drawings are diagrammatic only as far as final location of pipes, relative size, is concerned. Any item of work not clearly included, specified and/or shown, any errors or conflict between plans (Mechanical, Architectural, Structural or Electrical), specifications, codes and field conditions, shall be clarified by a written request to the Architect by the Bidder before bidding; otherwise the bidder shall, at his own expense, supply the proper labor and materials to make good any damages or defects in his work caused by such error, omission or conflict.

B. Piping schematics, risers and details shown on the drawings are for the equipment specified hereinafter. All revisions, modifications or changes in piping, accessories, etc. due to using equipment of a different manufacturer than specified hereinafter, shall be the responsibility of the Bidder and shall be made at no additional cost to the Owner. All modifications or changes shall be submitted to the Architect in writing and meet with his approval before the equipment is released for shipment.

C. This Contractor shall be responsible for all revisions, modifications or changes necessary in the structural or architectural or electrical systems to accommodate the equipment to be furnished under this Section of the Specifications. This shall be made at no additional cost to the Owner.

D. The contractor in all areas where his work and/or expense is involved shall verify scale of Drawings and/or details. This may involve all contract drawings: Architectural, Structural, Mechanical, Electrical, etc. due to the advent of computers, copiers, and faxes, which change drawing scales so easily, this is very important. If drawings are scaled to determine quantities of materials, labor, etc., no allowances will be due the contractor due to inaccurate scales shown on any of the contract drawings or reproductions thereof.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Refer to individual specification sections for listings of acceptable manufacturers.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to provide maximum possible headroom, if mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

E. Install equipment giving right of way to piping installed at required slope.

F. Install flexible connectors on equipment side of shutoff valves, horizontally and parallel to equipment shafts if possible.

3.2 PAINTING AND FINISHING

A. Limited painting is refered to in other specification sections.

3.3 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1, "Structural Welding Code--Steel."

3.4 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.5 DEMOLITION

A. Disconnect, demolish, and remove Work specified in Division 15 Sections.

B. If pipe, ductwork, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.

D. Work Abandoned in Place: Cut and remove underground pipe a minimum of 2 inches beyond face of adjacent construction. Cap and patch surface to match existing finish.

E. Removal: Remove indicated equipment from Project site.

F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

3.6 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.7 PROTECTION

A. All work, equipment and material shall be protected at all times. All equipment and accessories shall be tightly covered and protected against dirt, water or other injury during period of construction.

B. It shall be the responsibility of the Contractor to install and maintain equipment which is clean and free of rust, dirt, scale, etc. Where roughed-in only, the Contractor shall provide temporary airtight covers at all conduit, duct and equipment openings.

3.8 ELIMINATION OF NOISE AND VIBRATION (CONSTRUCTION EQUIPMENT)

A. During construction of this project, if any system or piece of equipment produces noise or vibration which is, in the opinion of the Architect, objectionable to the Owner, the Contractor shall, at his own expense, make changes in equipment and do all work necessary to eliminate the objectionable noise or vibration.

END OF SECTION

SECTION 15175

SWIMMING POOL PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   a. Pool water piping.
   b. Unions and flanges.
   c. Valves.
   d. Pipe hangers and supports.
   e. Pumps.

B. Related Sections:
   a. Hangers and Supports for Plumbing Piping and Equipment: Execution requirements for pipe hangers and supports for placement by this section.
   b. Wiring Connections: Execution requirements for electric connections to equipment specified by this section.

C. Regulation:
   a. All pool work shall meet requirements of 902 KAR 10:120. Kentucky public swimming pool and bathing facilities.

1.2 REFERENCES

A. ASTM International:
   a. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
   b. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
   c. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
   d. ASTM D2464 - Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
   e. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
   f. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
   g. ASTM D2846/D2846M - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems.
   h. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
   i. ASTM F437 - Standard Specification for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.

j. ASTM F438 - Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.
k. ASTM F439 - Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
l. ASTM F441/F441M - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
m. ASTM F493 - Standard Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
n. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
o. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

B. Manufacturers Standardization Society of the Valve and Fittings Industry:
a. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
b. MSS SP 67 - Butterfly Valves.
c. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
d. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
e. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

1.3 SUBMITTALS

A. Section 01330 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate detailed assembly of components of each system or sub-system.

C. Product Data:
a. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
b. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
c. Hangers and Supports: Submit manufacturers catalog information including load capacity.
d. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.
e. Heat Exchanger: Submit capacity, dimensions, size of trappings, and performance data.
f. Filters: Submit manufacturers catalog information, capacity, component sizes, rough-in requirements, dimensions of tanks, tank lining methods, anchors, attachments, lifting points, and drains.

D. Manufacturer's Installation Instructions: Submit details, components assembly, and start-up procedures.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 01700 - Execution Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of controlling devices and under-floor and buried piping.

C. Operation and Maintenance Data: Submit replacement part numbers and availability, and service depot location and telephone number.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience, and with service facilities within 100 miles of Project.

B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Product storage and handling requirements.

B. Accept equipment on site in shipping containers with labeling in place. Inspect for damage.

C. Protect equipment from damage and elements by maintaining shipping packaging in place until installation. Maintain temporary inlet and outlet caps in place until installation.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 WARRANTY

A. Section 01700 - Execution Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer warranty for pumps, and two year warranty for Variable Frequency Drives.

PART 2 PRODUCTS

2.1 POOL WATER PIPING

A. PVC Pipe: ASTM D1785, Schedule 80, polyvinyl chloride (PVC) material.
   a. Fittings: ASTM D2467, Schedule 80, PVC or ASTM D2464 PVC, threaded.
   b. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 UNIONS AND FLANGES

A. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.

2.3 HARDWARE

A. All hardware used in pool equipment rooms shall be stainless steel.

2.4 BUTTERFLY VALVES

A. Manufacturers:
   a. Crane Valve, North America.
   b. Hammond Valve.
   c. Milwaukee Valve Company.
   d. NIBCO, Inc.
   e. Stockham Valves & Fittings.
   f. Spears.

B. 2-1/2 inches and Larger: MSS SP 67, Class 150.
   a. Body: Cast or ductile iron, wafer, or lug ends, stainless steel stem, extended neck.
   b. Disc: Stainless steel.
   c. Seat: Resilient replaceable EPDM, Buna N, or neoprene Viton.
   d. Handle and Operator: 10 position lever handle

2.5 PIPE HANGERS AND SUPPORTS

A. Manufacturers:
   a. Carpenter & Paterson Inc.
   b. Creative Systems Inc.
   c. Flex-Weld, Inc.
   d. Glope Pipe Hanger Products Inc.
   e. Michigan Hanger Co.
   f. Superior Valve Co.

B. Conform to ASME B31.9 and MSS SP89.

C. Hangers for Pipe Sizes 1/2 to 1-1/2 inch; Stainless Steel, adjustable swivel, split ring.

D. Hangers for Cold Pipe Sizes 2 inches and Larger: Stainless Steel, adjustable, clevis.

E. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

2.6 CLOSE COUPLED PUMPS

A. Manufacturers:
   a. Marlow.
   b. Paco.
   c. Aurora.
   d. Gorman Rupp.

B. Pumps shall be approved by the National Sanitation Foundation for use in Swimming Pools or shall have an epoxy coating on all wetted parts equal to the NSF requirement. All pumps in swimming pools must meet requirements of 902 KAR 10:120. Kentucky public swimming and bathing facilities.

C. Type: Horizontal shaft, single stage, single or double suction, direct connected, radial or horizontally split casing, for 125 psi maximum working pressure.

D. Casing: Cast iron, Bronze, or Stainless steel, with suction and discharge gage ports, renewable bronze casing wearing rings, seal flush connections, drain plug, flanged suction and discharge.

E. Impellers: Bronze or Stainless steel, fully enclosed, keyed to motor shaft extension.

F. Shaft: Stainless steel.

G. Seals: Carbon rotating against stationary ceramic seat, 225 degrees F maximum continuous operating temperature.

H. Pump motors will be OPD, Open Drip Proof and shall have minimum efficiency as listed on the schedule.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Verify excavations, equipment supports and pipe hanger inserts.

3.2 INSTALLATION - HANGERS AND SUPPORTS

A. Inserts:
   a. Provide inserts for placement in concrete forms.
   b. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   c. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
   d. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above or recessed into and grouted flush with slab.

B. Pipe Hangers and Supports:
   a. Install in accordance with ASME B31.9, ASTM F708 and MSS SP 89.
   b. Support horizontal piping as schedule.
   c. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   d. Place hangers within 12 inches of each horizontal elbow.
   e. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   f. Support vertical piping at every [other] floor. Support riser piping independently of connected horizontal piping.
   g. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

3.3 INSTALLATION - ABOVE GROUND PIPING SYSTEMS

A. Install piping to conserve building space, not interfere with use of space and other work.

B. Route piping in orderly manner, and maintain gradient.

C. Group whenever practical at common elevations.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Provide access to valves and fittings.

E. Pipe relief valve outlet and backwash to nearest floor drain.

F. Install unions downstream of valves and at equipment or apparatus connections.

G. Install piping in accordance with ASME B31.9.

H. Slope piping and arrange systems to drain at low points.

I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.

J. Prepare unfinished pipe, fittings, supports, and accessories, ready for finish painting.

K. Install valves with stems upright or horizontal, not inverted.

3.4 INSTALLATION - PUMPS

A. Install pumps on concrete housekeeping pad minimum 3-1/2 inches high and 6 inches wider than equipment base on each side. Refer to Section 03300.

B. Provide air cock and drain connection on horizontal pump casings.

C. Provide line sized valve and reuse existing strainer on suction.

D. Decrease from line size, with long radius reducing elbows or reducers. Support piping adjacent to pump independently of pump casings. Install supports under elbows on pump suction and discharge line sizes 4 inches and larger.

3.5 FIELD QUALITY CONTROL

A. Field inspecting, testing, adjusting, and balancing.

B. Test swimming pool piping systems in accordance with ASME B31.9.

END OF SECTION

SECTION 15911 - VARIABLE SPEED MOTOR DRIVES

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Variable Speed Motor Drives

1. Adjustable Frequency Drive

1.2 REFERENCES

A. ANSI - American National Standards Institute
B. NEMA - National Electrical Manufacturers Association
C. UL - Underwriters Laboratories. Inc.
D. ETL - Electrical Testing Laboratories
E. NEC - National Electrical Code
F. ISO - International Standards Organization
G. IEC - International Electrotechnical Commission

1.3 SUBMITTALS

A. Submittals shall include the following:
1. System summary sheet
2. Sequence of operation
3. Shop drawing indicating dimensions, required clearances and location and size of each field connection
4. Power and control wiring diagrams
5. System profile analysis including variable speed pump curves and system curve. The analysis shall also include pump, motor and AFD efficiencies, job specific load profile, staging points, horsepower and kilowatt/hour consumption.

B. Submittals must be specific to this project. Generic submittals will not be accepted.

1.4 QUALITY ASSURANCE

A. Existing pumps, TB-1 and TB-2 at Thoroughbred Park and will have Variable Frequency Drives added so that operation of pumps at night can be at a lower flow rate than operation of pumps during the day.

B. The manufacturer shall be fully certified by the International Standards Organization per ISO 9001. Proof of this certification shall be furnished at time of submittal.

C. Pumps are existing. Information for 1.3.A.5 will compare motors and drive only Similar to those manufactured by AEGIS SGR.

D. Contractor shall verify existing pump motors will properly operate with Variable Frequency Drives. Contractor shall warranty existing motors and motor installation

for one year. Contractor shall include replacement motors in his price if the VFD drive installed is not compatible with existing motors.

E. Install VFD Motor Protection Ground Rings on each existing motor.

F. Manufacturer shall be listed by Underwriter's Laboratories as a manufacturer of packaged pumping systems.

G. Bidders shall comply with all sections of this specification relating to packaged pumping systems. Any deviations from this specification shall be bid as a voluntary alternate clearly defined in writing. If no exceptions are noted, the supplier or contractor shall be bound by these specifications.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
1. ABB
2. Frenic
3. Hitachi
4. Vector
5. TECO
6. Worldwide Electric Corporation.
7. Graham
8. Allen Bradley

2.2 MANUFACTURED UNITS

A. The control system shall include as, a minimum, the programmable logic controller, adjustable frequency drive(s) and remote sensor/transmitters as indicated on the plans. Provide additional items as specified or as required to properly execute the sequence of operation.

B. The variable speed pump adjustable frequency drive(s) and AFD bypass circuitry shall be mounted in a, NEMA 1 enclosure. Unit shall be pre-wired at the factory to permit a single point incoming power connection. Contractor shall make internal wiring changes to the units to supply power to motors from VFD Drives.

C. The control cabinet shall be designed and fabricated in compliance with construction code 508 of Underwriters Laboratories, Inc. The entire cabinet shall be listed by and bear the ETL label.

D. A door interlocked disconnect switch shall be provided for each adjustable frequency drive.

2.3 COMPONENTS

A. Adjustable Frequency Drive

1. The adjustable frequency drive(s) shall be pulse width modulation (PWM) type, microprocessor controlled design.
2. The AFD, including all factory installed options, be tested to UL Standard 508. The AFD shall also meet C-UL and be CE marked and built to ISO 9001 standards.

3. The VFD shall be housed in a NEMA 1 enclosure. AFDs with plastic enclosures shall not be acceptable.

4. The VFD shall employ an advanced sine wave approximation and voltage vector control to allow operation at rated motor shaft output speed with no de-rating. This voltage vector control shall minimize harmonics to the motor to increase motor efficiency and life. Power factor shall be near unity regardless of speed or load and shall not drop below 95%.

5. The VFD shall have balanced DC link reactors to minimize power line harmonics. VFDs without a DC link reactor shall provide a 3% impedance line reactor.

6. Automatic motor adaptation (AMA) algorithm shall be utilized. This feature shall allow for automatically optimized drive performance and efficiency leading to additional energy savings.

7. Input and output power circuit switching can be done without interlocks or damage to the VFD.

8. The following customer modifiable adjustments shall be provided:
   a. Accel time
   b. Decel time
   c. Minimum frequency
   d. Maximum frequency

9. The AFD shall be capable of displaying the following information in plain English via a 40 character alphanumeric display:
   a. Frequency
   b. Voltage
   c. Current
   d. Kilowatts
   e. Fault identification
   f. Percent torque
   g. Percent power
   h. RPM
   i. Power Factor

10. All AFDs shall be warranted for a period of 12 months after installation and acceptance by owner. This warranty shall cover parts and labor.

11. Motors (New or existing) shall be fitted with shaft grounding rings for bearing protection.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.

B. Power wiring, as required, shall be the responsibility of the electrical contractor or contractor selected by the Control Contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.

C. Control wiring for remote mounted switches and sensor / transmitters shall be the responsibility of the controls contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.

3.2 DEMONSTRATION

A. The system manufacturer or factory trained representative shall provide start-up of the packaged pumping system. This start-up shall include verification of proper installation, system initiation, adjustment and fine tuning. Start-up shall not be considered complete until the sequence of operation, including all alarms, has been sufficiently demonstrated to the owner or owner's designated representative. This jobsite visit shall occur only after all hook-ups, tie-ins, and terminations have been completed and signed-off on the manufacturer's start-up request form.

B. The system manufacturer or factory trained representative shall provide on-site training for owner's personnel. This training shall fully cover maintenance and operation of all system components.

END OF SECTION 15911

SECTION 16000 - GENERAL PROVISIONS AND REQUIREMENTS

PART 1 - PERMITS, CODES, INSPECTIONS, APPROVALS, ETC.

1.1 The Contractor shall obtain all permits necessary and shall bear all costs involved.

1.2 All electrical work shall be performed in accordance with the requirements of the latest revision of the National Electrical Code (NFPA 70), National Electrical Safety Code, and Ky. Building Code. Similarly, all electrical equipment, where applicable, shall conform to all other NFPA Pamphlets, NEMA, ANSI, IPCBA and U.L. requirements. Whenever and wherever the design or State and local regulations require higher standards than the current National Electrical Code, then these shall be followed. Division 1 of the Architectural specifications shall apply to all electrical work.

1.3 The Engineer shall be notified twenty-four (24) hours in advance when any tests are to be made and before any work is concealed. The Contractor shall notify the Engineer when he is ready for final inspection.

1.4 The fronts of all electrical panels shall be removed for final punch list inspection.

1.5 All electrical items on this project shall bear the Underwriters Laboratories (UL) label and/or FM (Factory Mutual).

1.6 Provide electrical inspection by a licensed and recognized Electrical inspector acceptable to the State Fire Marshal's Office. Notify Electrical Inspector in writing, immediately upon start of work with a copy of notice to Architect. Schedule inspection for rough as well as finished work. Approval from Electrical Inspector will not be allowed as reason for deviation from Contract Documents. All costs incidental to Electrical Inspection shall be borne by Contractor. Prior to final acceptance of work and release of final payment, deliver to Architect the certificate of final inspection.

PART 2 - CLEANING AND PAINTING

2.1 The Contractor shall remove all temporary stickers, tags, etc. from all items installed under this Contract and shall thoroughly clean all equipment or materials installed under this Contract. Scratched and damaged paint and/or other finishes shall be touched up and/or repainted as required. All equipment shall be cleaned and made ready for painting by others.

2.2 Upon completion of the work, the Contractor shall thoroughly clean and lubricate all equipment.

2.3 Surplus material, rubbish and equipment resulting from the electrical work shall be removed from the building and premises by the Contractor upon completion of the work in accordance with the Architectural specifications.

2.4 All permanent nameplates on equipment shall be kept clean and exposed for easy reading. If field conditions warrant (in the opinion of the Architect) the Contractor shall vacuum clean all equipment and installed materials.

PART 3 - SLEEVES, ESCUTCHEONS AND INSERTS

3.1 Sleeves shall be installed through masonry and concrete walls and floors for the passage of electrical raceways, cables, etc. Sleeves shall be placed and sized to permit installation and removal of the assembly. All electrical raceways larger than 1" shall be sleeved. Sleeves are not required where raceway bends into wall.

3.2 All raceways installed through firewalls must be sleeved and firestopped.

3.3 Cast iron sleeves shall be installed through all walls where conduit enters the building below grade. All other sleeves shall be standard weight steel. Sleeves shall be flush with each face of the wall. Sleeves for conduit through outside walls shall be packed with oakum for weatherproofing.

3.4 All sleeves through floors shall extend 3/4" above finished floors. All sleeves shall be 1/2" larger than the outside diameter of the duct or conduit. All sleeves shall be equal to Schedule 20 pipe or heavier.

3.5 Escutcheon shall be installed around all openings in exposed finished area. This includes all raceways whether they are sleeved or not. Escutcheon shall be equal to Benton & Caldwell, No. 40 or equal.

3.6 Inserts shall be installed as required, with location coordinated with other Contractors.

PART 4 - CIRCUIT NUMBERS AND CIRCUITRY

4.1 Circuit numbers, and breaker numbers shall be coordinated on panel identification card as shown on the Drawings.

4.2 The exact routing of circuits as shown on the drawings from receptacle to receptacle, light to light, etc. is schematic only. If the Contractor desires to change the routing of any circuits, he may do so within the scope of good engineering practice, and with the permission of the Architect/Engineer. All outlets shall be on the same circuit number as shown on the Drawings. Any change in routing shall be shown on the "Record" Drawings. Contractor shall not run more than (3) circuits (one circuit per phase) in any conduit even if conductors are derated (1 neutral per run of conduit).

PART 5 - SPARE CIRCUITS

5.1 All spare breakers or switches shown in the Panelboard Schedule shall have conduits stubbed above ceiling and/or down below slab as described hereinafter.

A. Recessed Panels - All spare conduit shall be stubbed above ceiling. If area has no ceiling, spare conduit shall ell out 2" below slab above.

B. Surface Panels - Spare circuits shall have knockouts only in top of tub available for spare circuits.

5.2 Number of conduit required for spare circuits shall be figured at three (3) 115 volt circuits per 3/4" conduit. Cap all spare conduits.

PART 6 - PROTECTION

6.1 All work, equipment and material shall be protected at all times. All conduit openings shall be closed with caps or plugs during construction. All equipment and accessories shall be tightly covered and protected against dirt, water or other injury during period of construction.

6.2 The Contractor shall cover all installed receptacles, switches, etc. with a plastic or equal cover prior to the painting of the areas. No device plate shall be installed prior to the finish painting. Any receptacle, switch, device plate, etc. with paint on it shall be removed and replaced by this Contractor. It shall be the Contractor's responsibility to coordinate with the Painting Contractor with regard to the scheduling of the installation of switches, outlets, device plates, etc.

PART 7 - TESTING AND ADJUSTING

7.1 When the work included is complete, the Contractor shall start up and adjust all parts of his system. All equipment items of the various systems shall be adjusted for proper operation within the framework of design intent, and the operating characteristics as published by the equipment manufacturer.

7.2 No equipment shall be operated for any purpose until properly lubricated and brought into service condition.

7.3 The Contractor shall provide all equipment, materials and labor required to make the necessary tests.

7.4 The Architect/Engineer reserves the right to require the services of an authorized representative of the manufacturer in the event the Contractor is unable to so adjust any piece of equipment. The Contractor shall arrange for such services and bear all incurred costs thereof. After completion of adjustments, the Contractor shall advise the Architect/Engineer that the work is ready for the final acceptance test.

7.5 Upon completion of the installation, the Contractor, at his expense, shall conduct complete performance tests in the presence of the Architect/Engineer and Owner to fully demonstrate the capacity and all other characteristics of the systems. The test shall be run for a length of time sufficient to demonstrate the ability of each system to perform as required by design drawings and specifications.

7.6 The Electrical Contractor shall perform the following tests:

A. All branch circuits of No. 8 wire and larger and main feeders shall be megged for ground and insulation resistance before connecting to equipment. (Megger to be 500 volts).

B. All motors larger than 1/2 HP shall be megged before conductors are connected thereto and again after they have gained running temperature.

C. A record of all megging shall be delivered to the Engineer before final acceptance. Architect/Engineer shall be notified in advance so that he may witness the test.

7.7 Refer to respective equipment sections for special tests such as Fire Alarm Systems, Sound Systems, etc.

PART 8 - CONNECTIONS TO EQUIPMENT FURNISHED BY OTHERS

8.1 The Architectural, Structural, Electrical, Plumbing, Heating, Ventilating and Air Conditioning Drawings and Specifications are complementary to one another.

A. The Contractor shall rough-in for and furnish all labor and materials necessary to make final connections to all equipment furnished by the Owner or any other Contractor or Sub-Contractor which requires electrical connections. This includes all wiring, raceways, etc. for connection of all HVAC controls and interlocks.

8.2 The Contractor making the required connections shall be responsible for any damages caused by erroneously connected equipment.

PART 9 - MOTORS AND APPARATUS BY OTHER TRADES

9.1 The Contractor shall obtain from the other trades all necessary information regarding motors, controls, and wiring connections of apparatus furnished by these trades.

9.2 The Contractor shall carefully examine the Architectural, Structural, Plumbing, Heating, Ventilating and Air Conditioning Drawings and Specifications to determine the extent, type and locations of all wiring required and shall obtain from the respective Contractors the wiring diagrams and other necessary information to properly install his part of the work.

9.3 Motor sizes shown on the Drawings are nominal sizes with some variation anticipated in the final installations. Under this section of the specifications, the Contractor is to coordinate the work with all other trades by obtaining all final data from each supplier and install wiring, circuit and motor protection and equipment in accordance with the actual equipment nameplate data regardless of sizes, etc. shown on the drawings. Undersized wiring, conduit, disconnects, etc. connected to equipment shall be the responsibility of the Contractor. Coordinate with the Engineer on any differences found between drawings and actual load data.

PART 10 - ELIMINATION OF NOISE AND VIBRATION

10.1 During the construction of this project, if any system or piece of equipment produces noise or vibration which, in the opinion of the Architect is objectionable to the Owner, the Contractor shall, at his own expense, make changes in equipment and do all work necessary to eliminate the objectionable noise or vibration.

PART 11 - GROUNDING OF SYSTEM

11.1 All metallic conduit, supports, cabinets and equipment shall be grounded in accordance with the latest issue of the National Electrical Code and as shown on the Drawings.

11.2 The size of the grounding conductor for service equipment shall not be less than that given in Article 250-94 and 250-95 of the National Electrical Code or as shown on the Drawings.

11.3 Ground bus and non-current carrying metallic parts of all equipment and conduit shall be securely grounded by connection to common ground bus insofar as possible or as shown. Jumper all noise or vibration isolators to insure ground potential.

11.4 The above ground bus shall be sized as per code with all connections made with pressure connectors.

11.5 No ground wires smaller than No. 12 solid copper shall be used; all wires larger than No. 8 shall be bare copper, stranded cable. All flexible conduit shall have a green insulated jumper bonded at each end.

11.6 The main ground electrode shall be sized per NEC and be a copper conductor laid in bottom of footer trench. This electrode shall be no less than 100' long and shall be thermal welded to building steel at each column it passes with both ends tied back to ground terminal in main gear. Ground resistance shall not exceed 5 ohm.

11.7 The main water pipe shall be bonded to the service equipment enclosure, the grounded conductor at the service and the grounding electrode conductor in footer trench.

11.8 All connections to main ground conductors shall be thermal welded.

11.9 All raceways with ground lug bushings shall be grounded to their respective boxes with an approved jumper wire.

11.10 All EMT runs to receptacles, light fixtures, power outlets or any equipment shall have a code size insulated green ground wire connected to respective receptacle, light fixture outlet or equipment. All PVC (if allowed) shall have code sized ground wire.

PART 12 - SHOP DRAWINGS

12.1 Submit Shop Drawings in bound sets on all items furnished under this Contract in sufficient number to satisfy the Architect's requirements. Shop Drawings should be submitted within 30 days after the work order to proceed. All shop drawings submitted for review shall bear an "approved stamp" and signed by the Contractor. All shop drawings not bearing the Contractor's "approved" stamp will be returned without comment.

PART 13 - MANUFACTURER'S SUBMITTALS

13.1 Any manufacturer wishing to be listed by addendum as equal-to-bid must submit catalog cuts, brochures, samples, etc., and a letter requesting to be listed, (12) twelve working days prior to the bid date.

13.2 All submittals must include complete information on the item(s) in question, as well as on all related components and accessories. All information shall be clearly marked/highlighted to indicate the specific items to be provided.

13.3 Complete, un-marked manufacturer product-line catalogs are not acceptable.

13.4 Inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of the drawings and specifications.

13.5 Final acceptance will be subject to Engineers shop drawing review.

13.6 Refer to separate specification sections for additional, specific submittal requirements.

PART 14 - CUTTING AND PATCHING

14.1 Any cutting and patching in the building required to install the equipment, etc. shown on Drawings shall be accomplished by the Contractor. He shall meet all requirements of the Architectural Section and at his expense.

14.2 The Contractor shall be responsible for all openings and chases he may require in floors, walls or ceilings of any type construction (whether under construction or existing). All work necessary as a result of failure on the part of the Contractor to provide the required openings and chases and to set sleeves and inserts shall be performed at his own expense. When shown, these openings and/or chases will be formed or provided for in the work of the General Contractor. However, the Contractor shall be responsible for cooperation with the General Contractor in locating and sizing such openings. Openings required and not shown on Drawings shall be brought to the attention of the General Contractor promptly and the Architect/Engineer for approval.

PART 15 -ACCESS DOOR

15.1 The Contractor shall refer to the Architectural Drawings to ascertain which rooms have removable ceilings. Where removable ceilings are specified, access to equipment may be obtained by removing the ceiling pieces. Where non-removable ceilings are specified, the Contractor shall furnish all required access doors for servicing disconnect switches, etc.

15.2 Access doors shall be equal to L.M. Walsh Company "Way-Loctor". No. 3 shall be used for concrete block or tile walls having no plaster finish and No. 2 shall be used for plastered walls and ceilings for acoustical tile ceilings. All doors shall be prime coated and key operated and keys shall be the same for plumbing and heating work. Doors by Miami or Milcor or equal quality will be acceptable.

15.3 Installation of doors will be done by the General Contractor. However, the Contractor shall be responsible for the correct location of them for servicing equipment. These access doors shall be sized large enough to service the equipment with a minimum size of 20" X 20".

PART 16 - COORDINATION OF WALL OUTLETS

16.1 The Contractor shall plan his work in such a manner that wall outlets that are adjacent to each other or within a given area, shall be installed at the same height, and with a symmetrical appearance.

PART 17 - FOUNDATIONS AND ANCHOR BOLTS

17.1 The Contractor shall be responsible for the location of all concrete pads required for all equipment installed under this Contract. All pads required will be poured at the expense of the Contractor.

17.2 The Contractor shall furnish anchor bolts for all equipment installed on concrete slabs and/or bases. Bolts shall be placed in exact positions prior to pouring concrete. Sizes of bolts shall be determined by the manufacturer's recommendations for the equipment served.

PART 18 - OPERATING AND MAINTENANCE INSTRUCTIONS

18.1 Deliver to the Architect three (3) copies of shop drawings and all Operating and Maintenance Instructions for all equipment furnished and installed under this Contract, including parts lists for all new major equipment items. Each set shall be provided in a plastic or hard back binder with table of contents and divider for each section.

18.2 Provide an electronic copy of shop drawings and all Operating and Maintenance Instructions for all equipment furnished and installed under this Contract, including parts lists for all new major equipment items.

PART 19 - FIRESTOPPING

19.1 All openings required for conduit in walls, floors, ceilings, partitions, etc., where such construction is required for fire protection, shall be firestopped to preserve the fire rating of the construction. All materials used shall be approved for use as fire stop equal to 3M Fire Barrier. (Caulk CP-25, putty 303 and 7904 Barriers), or equal by Hilti (Caulk FS601, putty CB 120 Foam, FS611A barrier material, FS635 Cable Tray.

19.2 All openings required for conduit in walls, floors, ceilings, partitions, etc., where such construction is not fire rated, shall be patched with mortar, caulking, etc.

PART 20 - SUSPENDED CEILINGS

20.1 The Contractor shall insure that framing members of suspended ceiling systems used to support fixtures shall be securely fastened to each other and shall be securely attached to the building structure at necessary intervals (NEC).

20.2 If the above items are not covered, the Contractor shall immediately alert the Architect. Fixtures shall not be installed until all questions concerning the above are answered.

PART 21 - ELECTRICAL DRAWINGS AND SPECIFICATIONS

21.1 The drawings and specifications are intended to cover all work enumerated under the respective headings. The drawings are diagrammatic only as far as final location of raceways, equipment, etc. is concerned. Any item of work not clearly included, specified and/or shown, any errors or conflict between plans (Mechanical, Electrical, Architectural or Structural) specifications, codes and field conditions, shall be clarified by a written request to the Architect by the Bidder before bidding; otherwise, the bidder shall, at his own expense, supply the proper labor and materials to make good any damages or defects in his work caused by such error, omission or conflict.

21.2 Schematics, risers and details shown on the drawings are for the equipment specified. All revisions, modifications or changes in circuitry, accessories, etc. due to using equipment of a different manufacturer than specified hereinafter, shall be the responsibility of the Bidder and shall be made at no additional cost to the Owner. All modifications or changes shall be submitted to the Architect in writing and meet his approval before the equipment is released for shipment.

21.3 The Contractor shall be responsible for all revisions, modifications or changes necessary in the Structural, Architectural or Mechanical/Electrical systems to accommodate the equipment to be furnished under this section of the specifications. This shall be made at no additional cost to the Owner.

PART 22 - APPLICATION FOR PAYMENT

22.1 Line items and description of electrical work shall be as follows:

Item No.	Description of Work
1	Bond & Permits
2	Mobilization
3	Distribution Equipment Breakers
4	Outlet boxes, conduits, fittings
5	Conduit & Boxes
6	Wiring

PART 23 - INSPECTION

23.1 At the completion of the job, the Owner shall furnish the electrical inspection. Contractor shall coordinate with the Owner's representative for any rough-in and final inspections.

END OF SECTION

SECTION 01039 - COORDINATION AND MEETINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.

B. Preconstruction meeting.

C. Progress meetings.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.

1.3 PRECONSTRUCTION MEETING

A. Engineer will schedule a meeting after Notice of Award.

B. Attendance Required: Owner, Engineer, Contractor and major Sub-contractors.

1.4 PROGRESS MEETINGS

A. Schedule of progress meetings will be at the discretion of the owner.

B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Engineer, others, as appropriate to agenda topics for each meeting.

D. Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems which impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.

11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

PART 2 – PRODUCTS

2.1 Not Used

PART 3 – EXECUTION

3.1 Not Used

END OF SECTION

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Product Data.

D. Shop Drawings.

E. Manufacturer's Instructions.

F. Invoices

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Manufacturers' field services and reports.

B. Section 01700 - Contract Closeout: Contract warranties, manufacturers' certificates, and closeout submittals.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

D. Apply Contractor's stamp, signed, certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to Engineer. Coordinate submission of related items.

F. For each submittal for review, allow 15 days excluding delivery time to and from the contractor.

G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor and Engineer review stamps.

I. When revised for resubmission, identify all changes made since previous submission.

J. Submittals not requested will not be recognized or processed.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within 15 days after date of Owner-Contractor Agreement.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Schedule will be developed with coordination of the owner. Generally pumps will be replaced at the end of Swimming Season. Water may remain in pools for a limited time period so that new pumps can be operated and tested under load. Pumps installed after pool water is drained will be tested at the following Spring pool start up. VFD installation for the Thoroughbred Park Fountains will be under a different schedule.

1.5 PRODUCT DATA

A. Product Data For Review:

1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
2. After review, provide copies and distribute in accordance with *SUBMITTAL PROCEDURES* article above and for record documents purposes described in Section 01700 - *CONTRACT CLOSEOUT.*

B. Product Data For Information:

1. Submitted for the Architect/Engineer's knowledge as contract administrator for the Owner.

C. Product Data for Project Close-out:

1. Submitted for the Owner's benefit during and after project completion.

D. Submit the number of copies which the Contractor requires, plus four copies which will be retained by the Engineer and owner.

E. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

F. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

G. The contractor may submit one copy of submittals to the Engineer via electronic format and make owner copies after engineering review.

1.6 SHOP DRAWINGS

A. Shop Drawings:

1. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Submit the number of opaque reproductions which Contractor requires, plus four copies which will be retained by Engineer.

D. Submittals may be made in the form of printable PDF files and transmitted via E-Mail

1.7 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer for delivery to owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

C. Refer to Section 01400 - Quality Control, Manufacturers' Field Services article.

1.8 INVOICES AND SCHEDULE OF VALUES

A. Contractor shall use invoice forms provided by the Commonwealth of Kentucky.

B. Contractor shall, at the pre construction meeting, submit invoice "0". Invoice 0 shall be the "Schedule of Values" and shall be the basis for subsequent invoices.

C. One week prior to each monthly progress meeting contractor shall submit an invoice for that months work. Invoice shall be submitted to the engineer.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality assurance - control of installation.

B. Tolerances

C. References and standards.

D. Inspecting and testing laboratory services.

E. Manufacturers' field services.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals: Submission of manufacturers' instructions and certificates.

B. Section 01600 - Material and Equipment: Requirements for material and product quality.

C. Section 01650 - Starting of Systems.

1.3 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.4 TOLERANCES

A. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.5 REFERENCES AND STANDARDS

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.6 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 – PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

SECTION 01510 - TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, and sanitary facilities.

1.2 RELATED SECTIONS

A. Section 01700 - Contract Closeout: Final cleaning.

1.3 TEMPORARY ELECTRICITY

A. By Owner, connect to Owner's existing power service. Do not disrupt Owner's need for continuous service. Owner will pay cost of energy used. Exercise measures to conserve energy.

1.4 TELEPHONE SERVICE

A. Provide Project Superintendent with a Cellular Phone.

1.5 TEMPORARY SANITARY FACILITIES

A. Existing designated facilities may be used during construction operations. Maintain daily in clean and sanitary condition.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01600 - MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Transportation and handling.

C. Storage and protection.

D. Product options.

E. Substitutions.

1.2 PRODUCTS

A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

1.3 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

D. Local office will not be responsible for signing of delivered materials, or be responsible for stored items.

1.4 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive Products in weather tight, climate controlled, enclosures in an environment favorable to Product.

D. For exterior storage of fabricated Products, place on sloped supports above ground.

E. Provide insured off-site storage and protection when site does not permit on-site storage or protection.

F. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.

G. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submitting must be of equivalent quality to listed equipment.

C. Products named in bid form, see General Conditions.

1.6 SUBSTITUTIONS

A. See general conditions for substitutions of equipment listed at time of bid.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01650 - STARTING OF SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Starting systems.

B. Demonstration and instructions.

C. Testing, adjusting, and balancing.

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Manufacturers field reports.

B. Section 01700 - Contract Closeout: System operation and maintenance data and extra materials.

1.3 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Engineer seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative and Contractors' personnel in accordance with manufacturers' instructions.

G. Submit a written report stating each heat pump, pump, water treatment system, or other system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Products to Owner's personnel one weeks prior to date of final inspection.

B. Instruct in the various pump rooms and instructed by a qualified manufacturers' representative who is knowledgeable about the Project.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment to LFUCG personnel two weeks prior to final inspection.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

F. One 3 hour training session is required at each facility where pump or VFD is installed.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Adjusting.

D. Project record documents.

E. Operation and maintenance data.

F. Spare parts and maintenance Products.

G. Warranties and bonds.

H. Maintenance service.

1.2 RELATED SECTIONS

A. Section 01500 - Construction Facilities and Temporary Controls: Progress cleaning.

B. Section 01650 - Starting of Systems: System start-up, testing, adjusting, and balancing.

1.3 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Owner will occupy all portions of the building during construction.

1.4 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

C. Replace filters of operating equipment.

D. Clean debris from roofs, gutters, downspouts, and drainage systems.

E. Remove waste and surplus materials, rubbish, and construction facilities from the site.

F. Cleaning shall be by a professional office cleaning facility.

1.5 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings: Legibly mark each item to record actual construction including:

1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
2. Field changes of dimension and detail.
3. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.7 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

B. Deliver to Project site

1.8 WARRANTIES AND BONDS

A. Provide notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Submit prior to final Application for Payment.

D. Warranty effective date shall be on the day after equipment is operated and passes testing under load.

1.9 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in specification sections for year from date of Substantial Completion

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

E. Building is covered by existing maintenance contract. Replacement of filters and other routine maintenance shall be by the contracted maintenance provider.

PART 2 - PRODUCTS

2.1 Not Used.

END OF SECTION

SECTION 01730 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Format and content of manuals.

B. Instruction of Owner's personnel.

C. Schedule of submittals.

1.2 RELATED SECTIONS

A. Section 01300 – Submittals

B. Section 01400 - Quality Control

C. Section 01600 - Material and Equipment: Systems demonstration.

D. Section 01700 - Contract Closeout

1.3 QUALITY ASSURANCE

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.4 FORMAT

A. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

   a. Shop drawings and product data.
   b. Air balance reports.
   c. Certificates.
   d. Photocopies of warranties and bonds.

1.5 CONTENTS, EACH VOLUME

A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, Sub-consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

E. Warranties: Bind in copy of each.

1.6 MANUAL FOR MATERIALS AND FINISHES

A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.

B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

C. Additional Requirements: As specified in individual Product specification sections.

D. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.7 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

B. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

C. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

D. Provide servicing and lubrication schedule, and list of lubricants required.

E. Include manufacturer's printed operation and maintenance instructions.

F. Include sequence of operation by controls manufacturer.

G. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

H. Provide control diagrams by controls manufacturer as installed.

I. Provide Contractor's coordination drawings, with color-coded piping diagrams as installed.

J. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

K. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

L. Include test and balancing report.

M. Additional Requirements: As specified in individual Product specification sections.

N. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.8 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons.

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.9 SUBMITTALS

A. Submit one copy of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit three sets of revised final volumes in final form within 10 days after final inspection.

D. Submit electronic copy of revised final volumes in final form within 10 days after final inspection.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

A. Not Used.

END OF SECTION

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following basic mechanical materials and methods to complement other Division 15 Sections.
   1. Equipment nameplate data requirements.
   2. Labeling and identifying mechanical systems and equipment.
   3. Field-fabricated metal and wood equipment supports.
   4. Installation requirements common to equipment specification sections.
   5. Mechanical demolition.
   6. Cutting and patching.
   7. Touchup painting and finishing.
   8. Demolition.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
   1. ABS: Acrylonitrile-butadiene-styrene plastic.
   2. CPVC: Chlorinated polyvinyl chloride plastic.
   3. NP: Nylon plastic.
   4. PE: Polyethylene plastic.
   5. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:
   1. CR: Chlorosulfonated polyethylene synthetic rubber.

2. EPDM: Ethylene propylene diene terpolymer rubber.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate mechanical equipment installation with other building components.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.

E. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

F. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors."

G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.

1.6 PERMITS, CODES, INSPECTIONS AND APPROVALS

A. Permits

1. All permits necessary for the complete heating, air conditioning, ventilating, sprinkler, boilers and plumbing systems shall be obtained by the Contractor from the authorities governing such work. The cost of all permits shall be borne by the Contractor.

B. Mechanical Work

1. Heating and ventilating and air conditioning work shall be performed in accordance with the rules and regulations of the Kentucky Building Code, National Fire Protection Association, the latest standards recognized by the American Society of Heating and Air Conditioning Engineers and IMC-International Mechanical Code as adopted by the Commonwealth of Ky. Installation of boilers and piping shall comply with the Commonwealth of Ky. Boiler and Pressure Vessel and Pressure Piping Law and Rules and Regulations and an Inspection Certificate provided to the Owner per this Code. All HVAC work shall be performed by a Licensed Kentucky Master HVAC Contractor.
2. Where the scope of mechanical work includes electrical work, all provisions included in the electrical sections of the work shall apply.

C. Inspection Requirements

1. The inspection work shall be scheduled for rough as well as the finished work. The rough inspection shall be divided into as many inspections as may become necessary to cover all roughing-in. A punch list inspection shall be scheduled with the Architect or his representative present.
2. The Architect shall be notified twenty-four (24) hours in advance when any tests or inspections are to be made and before any work is insulated or concealed. Failing to do so, the Contractor shall uncover and retest lines as directed by the Architect. The Contractor shall notify the Architect when he is ready for final inspection.

1.7 MECHANICAL DRAWINGS AND SPECIFICATIONS

A. The drawings and specifications are intended to cover all work enumerated under the respective headings. The drawings are diagrammatic only as far as final location of pipes, relative size, is concerned. Any item of work not clearly included, specified and/or shown, any errors or conflict between plans (Mechanical, Architectural, Structural or Electrical), specifications, codes and field conditions, shall be clarified by a written request to the Architect by the Bidder before bidding; otherwise the bidder shall, at his own expense, supply the proper labor and materials to make good any damages or defects in his work caused by such error, omission or conflict.

B. Piping schematics, risers and details shown on the drawings are for the equipment specified hereinafter. All revisions, modifications or changes in piping, accessories, etc. due to using equipment of a different manufacturer than specified hereinafter, shall be the responsibility of the Bidder and shall be made at no additional cost to the Owner. All modifications or changes shall be submitted to the Architect in writing and meet with his approval before the equipment is released for shipment.

C. This Contractor shall be responsible for all revisions, modifications or changes necessary in the structural or architectural or electrical systems to accommodate the equipment to be furnished under this Section of the Specifications. This shall be made at no additional cost to the Owner.

D. The contractor in all areas where his work and/or expense is involved shall verify scale of Drawings and/or details. This may involve all contract drawings: Architectural, Structural, Mechanical, Electrical, etc. due to the advent of computers, copiers, and faxes, which change drawing scales so easily, this is very important. If drawings are scaled to determine quantities of materials, labor, etc., no allowances will be due the contractor due to inaccurate scales shown on any of the contract drawings or reproductions thereof.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Refer to individual specification sections for listings of acceptable manufacturers.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to provide maximum possible headroom, if mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

E. Install equipment giving right of way to piping installed at required slope.

F. Install flexible connectors on equipment side of shutoff valves, horizontally and parallel to equipment shafts if possible.

3.2 PAINTING AND FINISHING

A. Limited painting is refered to in other specification sections.

3.3 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1, "Structural Welding Code--Steel."

3.4 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.5 DEMOLITION

A. Disconnect, demolish, and remove Work specified in Division 15 Sections.

B. If pipe, ductwork, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.

D. Work Abandoned in Place: Cut and remove underground pipe a minimum of 2 inches beyond face of adjacent construction. Cap and patch surface to match existing finish.

E. Removal: Remove indicated equipment from Project site.

F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

3.6 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.7 PROTECTION

A. All work, equipment and material shall be protected at all times. All equipment and accessories shall be tightly covered and protected against dirt, water or other injury during period of construction.

B. It shall be the responsibility of the Contractor to install and maintain equipment which is clean and free of rust, dirt, scale, etc. Where roughed-in only, the Contractor shall provide temporary airtight covers at all conduit, duct and equipment openings.

3.8 ELIMINATION OF NOISE AND VIBRATION (CONSTRUCTION EQUIPMENT)

A. During construction of this project, if any system or piece of equipment produces noise or vibration which is, in the opinion of the Architect, objectionable to the Owner, the Contractor shall, at his own expense, make changes in equipment and do all work necessary to eliminate the objectionable noise or vibration.

END OF SECTION

SECTION 15175

SWIMMING POOL PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   a. Pool water piping.
   b. Unions and flanges.
   c. Valves.
   d. Pipe hangers and supports.
   e. Pumps.

B. Related Sections:
   a. Hangers and Supports for Plumbing Piping and Equipment: Execution requirements for pipe hangers and supports for placement by this section.
   b. Wiring Connections: Execution requirements for electric connections to equipment specified by this section.

C. Regulation:
   a. All pool work shall meet requirements of 902 KAR 10:120. Kentucky public swimming pool and bathing facilities.

1.2 REFERENCES

A. ASTM International:
   a. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
   b. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
   c. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
   d. ASTM D2464 - Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
   e. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
   f. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
   g. ASTM D2846/D2846M - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems.
   h. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
   i. ASTM F437 - Standard Specification for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.

j. ASTM F438 - Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.
k. ASTM F439 - Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
l. ASTM F441/F441M - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
m. ASTM F493 - Standard Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
n. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
o. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

B. Manufacturers Standardization Society of the Valve and Fittings Industry:
a. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
b. MSS SP 67 - Butterfly Valves.
c. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
d. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
e. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

1.3 SUBMITTALS

A. Section 01330 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate detailed assembly of components of each system or sub-system.

C. Product Data:
a. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
b. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
c. Hangers and Supports: Submit manufacturers catalog information including load capacity.
d. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.
e. Heat Exchanger: Submit capacity, dimensions, size of trappings, and performance data.
f. Filters: Submit manufacturers catalog information, capacity, component sizes, rough-in requirements, dimensions of tanks, tank lining methods, anchors, attachments, lifting points, and drains.

D. Manufacturer's Installation Instructions: Submit details, components assembly, and start-up procedures.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 01700 - Execution Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of controlling devices and under-floor and buried piping.

C. Operation and Maintenance Data: Submit replacement part numbers and availability, and service depot location and telephone number.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience, and with service facilities within 100 miles of Project.

B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Product storage and handling requirements.

B. Accept equipment on site in shipping containers with labeling in place. Inspect for damage.

C. Protect equipment from damage and elements by maintaining shipping packaging in place until installation. Maintain temporary inlet and outlet caps in place until installation.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 WARRANTY

A. Section 01700 - Execution Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer warranty for pumps, and two year warranty for Variable Frequency Drives.

PART 2 PRODUCTS

2.1 POOL WATER PIPING

A. PVC Pipe: ASTM D1785, Schedule 80, polyvinyl chloride (PVC) material.
   a. Fittings: ASTM D2467, Schedule 80, PVC or ASTM D2464 PVC, threaded.
   b. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 UNIONS AND FLANGES

A. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.

2.3 HARDWARE

A. All hardware used in pool equipment rooms shall be stainless steel.

2.4 BUTTERFLY VALVES

A. Manufacturers:
   a. Crane Valve, North America.
   b. Hammond Valve.
   c. Milwaukee Valve Company.
   d. NIBCO, Inc.
   e. Stockham Valves & Fittings.
   f. Spears.

B. 2-1/2 inches and Larger: MSS SP 67, Class 150.
   a. Body: Cast or ductile iron, wafer, or lug ends, stainless steel stem, extended neck.
   b. Disc: Stainless steel.
   c. Seat: Resilient replaceable EPDM, Buna N, or neoprene Viton.
   d. Handle and Operator: 10 position lever handle

2.5 PIPE HANGERS AND SUPPORTS

A. Manufacturers:
   a. Carpenter & Paterson Inc.
   b. Creative Systems Inc.
   c. Flex-Weld, Inc.
   d. Glope Pipe Hanger Products Inc.
   e. Michigan Hanger Co.
   f. Superior Valve Co.

B. Conform to ASME B31.9 and MSS SP89.

C. Hangers for Pipe Sizes 1/2 to 1-1/2 inch; Stainless Steel, adjustable swivel, split ring.

D. Hangers for Cold Pipe Sizes 2 inches and Larger: Stainless Steel, adjustable, clevis.

E. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

2.6 CLOSE COUPLED PUMPS

A. Manufacturers:
   a. Marlow.
   b. Paco.
   c. Aurora.
   d. Gorman Rupp.

B. Pumps shall be approved by the National Sanitation Foundation for use in Swimming Pools or shall have an epoxy coating on all wetted parts equal to the NSF requirement. All pumps in swimming pools must meet requirements of 902 KAR 10:120. Kentucky public swimming and bathing facilities.

C. Type: Horizontal shaft, single stage, single or double suction, direct connected, radial or horizontally split casing, for 125 psi maximum working pressure.

D. Casing: Cast iron, Bronze, or Stainless steel, with suction and discharge gage ports, renewable bronze casing wearing rings, seal flush connections, drain plug, flanged suction and discharge.

E. Impellers: Bronze or Stainless steel, fully enclosed, keyed to motor shaft extension.

F. Shaft: Stainless steel.

G. Seals: Carbon rotating against stationary ceramic seat, 225 degrees F maximum continuous operating temperature.

H. Pump motors will be OPD, Open Drip Proof and shall have minimum efficiency as listed on the schedule.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Verify excavations, equipment supports and pipe hanger inserts.

3.2 INSTALLATION - HANGERS AND SUPPORTS

A. Inserts:

a. Provide inserts for placement in concrete forms.
b. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
c. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
d. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above or recessed into and grouted flush with slab.

B. Pipe Hangers and Supports:
a. Install in accordance with ASME B31.9, ASTM F708 and MSS SP 89.
b. Support horizontal piping as schedule.
c. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
d. Place hangers within 12 inches of each horizontal elbow.
e. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
f. Support vertical piping at every [other] floor. Support riser piping independently of connected horizontal piping.
g. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

3.3 INSTALLATION - ABOVE GROUND PIPING SYSTEMS

A. Install piping to conserve building space, not interfere with use of space and other work.

B. Route piping in orderly manner, and maintain gradient.

C. Group whenever practical at common elevations.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Provide access to valves and fittings.

E. Pipe relief valve outlet and backwash to nearest floor drain.

F. Install unions downstream of valves and at equipment or apparatus connections.

G. Install piping in accordance with ASME B31.9.

H. Slope piping and arrange systems to drain at low points.

I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.

J. Prepare unfinished pipe, fittings, supports, and accessories, ready for finish painting.

K. Install valves with stems upright or horizontal, not inverted.

3.4 INSTALLATION - PUMPS

A. Install pumps on concrete housekeeping pad minimum 3-1/2 inches high and 6 inches wider than equipment base on each side. Refer to Section 03300.

B. Provide air cock and drain connection on horizontal pump casings.

C. Provide line sized valve and reuse existing strainer on suction.

D. Decrease from line size, with long radius reducing elbows or reducers. Support piping adjacent to pump independently of pump casings. Install supports under elbows on pump suction and discharge line sizes 4 inches and larger.

3.5 FIELD QUALITY CONTROL

A. Field inspecting, testing, adjusting, and balancing.

B. Test swimming pool piping systems in accordance with ASME B31.9.

END OF SECTION

SECTION 15911 - VARIABLE SPEED MOTOR DRIVES

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Variable Speed Motor Drives

1. Adjustable Frequency Drive

1.2 REFERENCES

A. ANSI - American National Standards Institute
B. NEMA - National Electrical Manufacturers Association
C. UL - Underwriters Laboratories. Inc.
D. ETL - Electrical Testing Laboratories
E. NEC - National Electrical Code
F. ISO - International Standards Organization
G. IEC - International Electrotechnical Commission

1.3 SUBMITTALS

A. Submittals shall include the following:
   1. System summary sheet
   2. Sequence of operation
   3. Shop drawing indicating dimensions, required clearances and location and size of each field connection
   4. Power and control wiring diagrams
   5. System profile analysis including variable speed pump curves and system curve. The analysis shall also include pump, motor and AFD efficiencies, job specific load profile, staging points, horsepower and kilowatt/hour consumption.

B. Submittals must be specific to this project. Generic submittals will not be accepted.

1.4 QUALITY ASSURANCE

A. Existing pumps, TB-1 and TB-2 at Thoroughbred Park and will have Variable Frequency Drives added so that operation of pumps at night can be at a lower flow rate than operation of pumps during the day.

B. The manufacturer shall be fully certified by the International Standards Organization per ISO 9001. Proof of this certification shall be furnished at time of submittal.

C. Pumps are existing. Information for 1.3.A.5 will compare motors and drive only Similar to those manufactured by AEGIS SGR.

D. Contractor shall verify existing pump motors will properly operate with Variable Frequency Drives. Contractor shall warranty existing motors and motor installation for one year.

Contractor shall include replacement motors in his price if the VFD drive installed is not compatible with existing motors.

E. Install VFD Motor Protection Ground Rings on each existing motor.

F. Manufacturer shall be listed by Underwriter's Laboratories as a manufacturer of packaged pumping systems.

G. Bidders shall comply with all sections of this specification relating to packaged pumping systems. Any deviations from this specification shall be bid as a voluntary alternate clearly defined in writing. If no exceptions are noted, the supplier or contractor shall be bound by these specifications.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
1. ABB
2. Frenic
3. Hitachi
4. Vector
5. TECO
6. Worldwide Electric Corporation.
7. Graham
8. Allen Bradley

2.2 MANUFACTURED UNITS

A. The control system shall include as, a minimum, the programmable logic controller, adjustable frequency drive(s) and remote sensor/transmitters as indicated on the plans. Provide additional items as specified or as required to properly execute the sequence of operation.

B. The variable speed pump adjustable frequency drive(s) and AFD bypass circuitry shall be mounted in a, NEMA 1 enclosure. Unit shall be pre-wired at the factory to permit a single point incoming power connection. Contractor shall make internal wiring changes to the units to supply power to motors from VFD Drives.

C. The control cabinet shall be designed and fabricated in compliance with construction code 508 of Underwriters Laboratories, Inc. The entire cabinet shall be listed by and bear the ETL label.

D. A door interlocked disconnect switch shall be provided for each adjustable frequency drive.

2.3 COMPONENTS

A. Adjustable Frequency Drive

1. The adjustable frequency drive(s) shall be pulse width modulation (PWM) type, microprocessor controlled design.

2. The AFD, including all factory installed options, be tested to UL Standard 508. The AFD shall also meet C-UL and be CE marked and built to ISO 9001 standards.

3. The VFD shall be housed in a NEMA 1 enclosure. AFDs with plastic enclosures shall not be acceptable.

4. The VFD shall employ an advanced sine wave approximation and voltage vector control to allow operation at rated motor shaft output speed with no de-rating. This voltage vector control shall minimize harmonics to the motor to increase motor efficiency and life. Power factor shall be near unity regardless of speed or load and shall not drop below 95%.

5. The VFD shall have balanced DC link reactors to minimize power line harmonics. VFDs without a DC link reactor shall provide a 3% impedance line reactor.

6. Automatic motor adaptation (AMA) algorithm shall be utilized. This feature shall allow for automatically optimized drive performance and efficiency leading to additional energy savings.

7. Input and output power circuit switching can be done without interlocks or damage to the VFD.

8. The following customer modifiable adjustments shall be provided:
   a. Accel time
   b. Decel time
   c. Minimum frequency
   d. Maximum frequency

9. The AFD shall be capable of displaying the following information in plain English via a 40 character alphanumeric display:
   a. Frequency
   b. Voltage
   c. Current
   d. Kilowatts
   e. Fault identification
   f. Percent torque
   g. Percent power
   h. RPM
   i. Power Factor

10. All AFDs shall be warranted for a period of 12 months after installation and acceptance by owner. This warranty shall cover parts and labor.

11. Motors (New or existing) shall be fitted with shaft grounding rings for bearing protection.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.

B. Power wiring, as required, shall be the responsibility of the electrical contractor or contractor selected by the Control Contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.

C. Control wiring for remote mounted switches and sensor / transmitters shall be the responsibility of the controls contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.

3.2 DEMONSTRATION

A. The system manufacturer or factory trained representative shall provide start-up of the packaged pumping system. This start-up shall include verification of proper installation, system initiation, adjustment and fine tuning. Start-up shall not be considered complete until the sequence of operation, including all alarms, has been sufficiently demonstrated to the owner or owner's designated representative. This jobsite visit shall occur only after all hook-ups, tie-ins, and terminations have been completed and signed-off on the manufacturer's start-up request form.

B. The system manufacturer or factory trained representative shall provide on-site training for owner's personnel. This training shall fully cover maintenance and operation of all system components.

END OF SECTION 15911

SECTION 16000 - GENERAL PROVISIONS AND REQUIREMENTS

PART 1 - PERMITS, CODES, INSPECTIONS, APPROVALS, ETC.

1.1 The Contractor shall obtain all permits necessary and shall bear all costs involved.

1.2 All electrical work shall be performed in accordance with the requirements of the latest revision of the National Electrical Code (NFPA 70), National Electrical Safety Code, and Ky. Building Code. Similarly, all electrical equipment, where applicable, shall conform to all other NFPA Pamphlets, NEMA, ANSI, IPCBA and U.L. requirements. Whenever and wherever the design or State and local regulations require higher standards than the current National Electrical Code, then these shall be followed. Division 1 of the Architectural specifications shall apply to all electrical work.

1.3 The Engineer shall be notified twenty-four (24) hours in advance when any tests are to be made and before any work is concealed. The Contractor shall notify the Engineer when he is ready for final inspection.

1.4 The fronts of all electrical panels shall be removed for final punch list inspection.

1.5 All electrical items on this project shall bear the Underwriters Laboratories (UL) label and/or FM (Factory Mutual).

1.6 Provide electrical inspection by a licensed and recognized Electrical inspector acceptable to the State Fire Marshal's Office. Notify Electrical Inspector in writing, immediately upon start of work with a copy of notice to Architect. Schedule inspection for rough as well as finished work. Approval from Electrical Inspector will not be allowed as reason for deviation from Contract Documents. All costs incidental to Electrical Inspection shall be borne by Contractor. Prior to final acceptance of work and release of final payment, deliver to Architect the certificate of final inspection.

PART 2 - CLEANING AND PAINTING

2.1 The Contractor shall remove all temporary stickers, tags, etc. from all items installed under this Contract and shall thoroughly clean all equipment or materials installed under this Contract. Scratched and damaged paint and/or other finishes shall be touched up and/or repainted as required. All equipment shall be cleaned and made ready for painting by others.

2.2 Upon completion of the work, the Contractor shall thoroughly clean and lubricate all equipment.

2.3 Surplus material, rubbish and equipment resulting from the electrical work shall be removed from the building and premises by the Contractor upon completion of the work in accordance with the Architectural specifications.

2.4 All permanent nameplates on equipment shall be kept clean and exposed for easy reading. If field conditions warrant (in the opinion of the Architect) the Contractor shall vacuum clean all equipment and installed materials.

PART 3 - SLEEVES, ESCUTCHEONS AND INSERTS

3.1 Sleeves shall be installed through masonry and concrete walls and floors for the passage of electrical raceways, cables, etc. Sleeves shall be placed and sized to permit installation and removal of the assembly. All electrical raceways larger than 1" shall be sleeved. Sleeves are not required where raceway bends into wall.

3.2 All raceways installed through firewalls must be sleeved and firestopped.

3.3 Cast iron sleeves shall be installed through all walls where conduit enters the building below grade. All other sleeves shall be standard weight steel. Sleeves shall be flush with each face of the wall. Sleeves for conduit through outside walls shall be packed with oakum for weatherproofing.

3.4 All sleeves through floors shall extend 3/4" above finished floors. All sleeves shall be 1/2" larger than the outside diameter of the duct or conduit. All sleeves shall be equal to Schedule 20 pipe or heavier.

3.5 Escutcheon shall be installed around all openings in exposed finished area. This includes all raceways whether they are sleeved or not. Escutcheon shall be equal to Benton & Caldwell, No. 40 or equal.

3.6 Inserts shall be installed as required, with location coordinated with other Contractors.

PART 4 - CIRCUIT NUMBERS AND CIRCUITRY

4.1 Circuit numbers, and breaker numbers shall be coordinated on panel identification card as shown on the Drawings.

4.2 The exact routing of circuits as shown on the drawings from receptacle to receptacle, light to light, etc. is schematic only. If the Contractor desires to change the routing of any circuits, he may do so within the scope of good engineering practice, and with the permission of the Architect/Engineer. All outlets shall be on the same circuit number as shown on the Drawings. Any change in routing shall be shown on the "Record" Drawings. Contractor shall not run more than (3) circuits (one circuit per phase) in any conduit even if conductors are derated (1 neutral per run of conduit).

PART 5 - SPARE CIRCUITS

5.1 All spare breakers or switches shown in the Panelboard Schedule shall have conduits stubbed above ceiling and/or down below slab as described hereinafter.

A. Recessed Panels - All spare conduit shall be stubbed above ceiling. If area has no ceiling, spare conduit shall ell out 2" below slab above.

B. Surface Panels - Spare circuits shall have knockouts only in top of tub available for spare circuits.

5.2 Number of conduit required for spare circuits shall be figured at three (3) 115 volt circuits per 3/4" conduit. Cap all spare conduits.

PART 6 - PROTECTION

6.1 All work, equipment and material shall be protected at all times. All conduit openings shall be closed with caps or plugs during construction. All equipment and accessories shall be tightly covered and protected against dirt, water or other injury during period of construction.

6.2 The Contractor shall cover all installed receptacles, switches, etc. with a plastic or equal cover prior to the painting of the areas. No device plate shall be installed prior to the finish painting. Any receptacle, switch, device plate, etc. with paint on it shall be removed and replaced by this Contractor. It shall be the Contractor's responsibility to coordinate with the Painting Contractor with regard to the scheduling of the installation of switches, outlets, device plates, etc.

PART 7 - TESTING AND ADJUSTING

7.1 When the work included is complete, the Contractor shall start up and adjust all parts of his system. All equipment items of the various systems shall be adjusted for proper operation within the framework of design intent, and the operating characteristics as published by the equipment manufacturer.

7.2 No equipment shall be operated for any purpose until properly lubricated and brought into service condition.

7.3 The Contractor shall provide all equipment, materials and labor required to make the necessary tests.

7.4 The Architect/Engineer reserves the right to require the services of an authorized representative of the manufacturer in the event the Contractor is unable to so adjust any piece of equipment. The Contractor shall arrange for such services and bear all incurred costs thereof. After completion of adjustments, the Contractor shall advise the Architect/Engineer that the work is ready for the final acceptance test.

7.5 Upon completion of the installation, the Contractor, at his expense, shall conduct complete performance tests in the presence of the Architect/Engineer and Owner to fully demonstrate the capacity and all other characteristics of the systems. The test shall be run for a length of time sufficient to demonstrate the ability of each system to perform as required by design drawings and specifications.

7.6 The Electrical Contractor shall perform the following tests:

A. All branch circuits of No. 8 wire and larger and main feeders shall be megged for ground and insulation resistance before connecting to equipment. (Megger to be 500 volts).

B. All motors larger than 1/2 HP shall be megged before conductors are connected thereto and again after they have gained running temperature.

C. A record of all megging shall be delivered to the Engineer before final acceptance. Architect/Engineer shall be notified in advance so that he may witness the test.

7.7 Refer to respective equipment sections for special tests such as Fire Alarm Systems, Sound Systems, etc.

PART 8 - CONNECTIONS TO EQUIPMENT FURNISHED BY OTHERS

8.1 The Architectural, Structural, Electrical, Plumbing, Heating, Ventilating and Air Conditioning Drawings and Specifications are complementary to one another.

A. The Contractor shall rough-in for and furnish all labor and materials necessary to make final connections to all equipment furnished by the Owner or any other Contractor or Sub-Contractor which requires electrical connections. This includes all wiring, raceways, etc. for connection of all HVAC controls and interlocks.

8.2 The Contractor making the required connections shall be responsible for any damages caused by erroneously connected equipment.

PART 9 - MOTORS AND APPARATUS BY OTHER TRADES

9.1 The Contractor shall obtain from the other trades all necessary information regarding motors, controls, and wiring connections of apparatus furnished by these trades.

9.2 The Contractor shall carefully examine the Architectural, Structural, Plumbing, Heating, Ventilating and Air Conditioning Drawings and Specifications to determine the extent, type and locations of all wiring required and shall obtain from the respective Contractors the wiring diagrams and other necessary information to properly install his part of the work.

9.3 Motor sizes shown on the Drawings are nominal sizes with some variation anticipated in the final installations. Under this section of the specifications, the Contractor is to coordinate the work with all other trades by obtaining all final data from each supplier and install wiring, circuit and motor protection and equipment in accordance with the actual equipment nameplate data regardless of sizes, etc. shown on the drawings. Undersized wiring, conduit, disconnects, etc. connected to equipment shall be the responsibility of the Contractor. Coordinate with the Engineer on any differences found between drawings and actual load data.

PART 10 - ELIMINATION OF NOISE AND VIBRATION

10.1 During the construction of this project, if any system or piece of equipment produces noise or vibration which, in the opinion of the Architect is objectionable to the Owner, the Contractor shall, at his own expense, make changes in equipment and do all work necessary to eliminate the objectionable noise or vibration.

PART 11 - GROUNDING OF SYSTEM

11.1 All metallic conduit, supports, cabinets and equipment shall be grounded in accordance with the latest issue of the National Electrical Code and as shown on the Drawings.

11.2 The size of the grounding conductor for service equipment shall not be less than that given in Article 250-94 and 250-95 of the National Electrical Code or as shown on the Drawings.

11.3 Ground bus and non-current carrying metallic parts of all equipment and conduit shall be securely grounded by connection to common ground bus insofar as possible or as shown. Jumper all noise or vibration isolators to insure ground potential.

11.4 The above ground bus shall be sized as per code with all connections made with pressure connectors.

11.5 No ground wires smaller than No. 12 solid copper shall be used; all wires larger than No. 8 shall be bare copper, stranded cable. All flexible conduit shall have a green insulated jumper bonded at each end.

11.6 The main ground electrode shall be sized per NEC and be a copper conductor laid in bottom of footer trench. This electrode shall be no less than 100' long and shall be thermal welded to building steel at each column it passes with both ends tied back to ground terminal in main gear. Ground resistance shall not exceed 5 ohm.

11.7 The main water pipe shall be bonded to the service equipment enclosure, the grounded conductor at the service and the grounding electrode conductor in footer trench.

11.8 All connections to main ground conductors shall be thermal welded.

11.9 All raceways with ground lug bushings shall be grounded to their respective boxes with an approved jumper wire.

11.10 All EMT runs to receptacles, light fixtures, power outlets or any equipment shall have a code size insulated green ground wire connected to respective receptacle, light fixture outlet or equipment. All PVC (if allowed) shall have code sized ground wire.

PART 12 - SHOP DRAWINGS

12.1 Submit Shop Drawings in bound sets on all items furnished under this Contract in sufficient number to satisfy the Architect's requirements. Shop Drawings should be submitted within 30 days after the work order to proceed. All shop drawings submitted for review shall bear an "approved stamp" and signed by the Contractor. All shop drawings not bearing the Contractor's "approved" stamp will be returned without comment.

PART 13 - MANUFACTURER'S SUBMITTALS

13.1 Any manufacturer wishing to be listed by addendum as equal-to-bid must submit catalog cuts, brochures, samples, etc., and a letter requesting to be listed, (12) twelve working days prior to the bid date.

13.2 All submittals must include complete information on the item(s) in question, as well as on all related components and accessories. All information shall be clearly marked/highlighted to indicate the specific items to be provided.

13.3 Complete, un-marked manufacturer product-line catalogs are not acceptable.

13.4 Inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of the drawings and specifications.

13.5 Final acceptance will be subject to Engineers shop drawing review.

13.6 Refer to separate specification sections for additional, specific submittal requirements.

PART 14 - CUTTING AND PATCHING

14.1 Any cutting and patching in the building required to install the equipment, etc. shown on Drawings shall be accomplished by the Contractor. He shall meet all requirements of the Architectural Section and at his expense.

14.2 The Contractor shall be responsible for all openings and chases he may require in floors, walls or ceilings of any type construction (whether under construction or existing). All work necessary as a result of failure on the part of the Contractor to provide the required openings and chases and to set sleeves and inserts shall be performed at his own expense. When shown, these openings and/or chases will be formed or provided for in the work of the General Contractor. However, the Contractor shall be responsible for cooperation with the General Contractor in locating and sizing such openings. Openings required and not shown on Drawings shall be brought to the attention of the General Contractor promptly and the Architect/Engineer for approval.

PART 15 -ACCESS DOOR

15.1 The Contractor shall refer to the Architectural Drawings to ascertain which rooms have removable ceilings. Where removable ceilings are specified, access to equipment may be obtained by removing the ceiling pieces. Where non-removable ceilings are specified, the Contractor shall furnish all required access doors for servicing disconnect switches, etc.

15.2 Access doors shall be equal to L.M. Walsh Company "Way-Loctor". No. 3 shall be used for concrete block or tile walls having no plaster finish and No. 2 shall be used for plastered walls and ceilings for acoustical tile ceilings. All doors shall be prime coated and key operated and keys shall be the same for plumbing and heating work. Doors by Miami or Milcor or equal quality will be acceptable.

15.3 Installation of doors will be done by the General Contractor. However, the Contractor shall be responsible for the correct location of them for servicing equipment. These access doors shall be sized large enough to service the equipment with a minimum size of 20" X 20".

PART 16 - COORDINATION OF WALL OUTLETS

16.1 The Contractor shall plan his work in such a manner that wall outlets that are adjacent to each other or within a given area, shall be installed at the same height, and with a symmetrical appearance.

PART 17 - FOUNDATIONS AND ANCHOR BOLTS

17.1 The Contractor shall be responsible for the location of all concrete pads required for all equipment installed under this Contract. All pads required will be poured at the expense of the Contractor.

17.2 The Contractor shall furnish anchor bolts for all equipment installed on concrete slabs and/or bases. Bolts shall be placed in exact positions prior to pouring concrete. Sizes of bolts shall be determined by the manufacturer's recommendations for the equipment served.

PART 18 - OPERATING AND MAINTENANCE INSTRUCTIONS

18.1 Deliver to the Architect three (3) copies of shop drawings and all Operating and Maintenance Instructions for all equipment furnished and installed under this Contract, including parts lists for all new major equipment items. Each set shall be provided in a plastic or hard back binder with table of contents and divider for each section.

18.2 Provide an electronic copy of shop drawings and all Operating and Maintenance Instructions for all equipment furnished and installed under this Contract, including parts lists for all new major equipment items.

PART 19 - FIRESTOPPING

19.1 All openings required for conduit in walls, floors, ceilings, partitions, etc., where such construction is required for fire protection, shall be firestopped to preserve the fire rating of the construction. All materials used shall be approved for use as fire stop equal to 3M Fire Barrier. (Caulk CP-25, putty 303 and 7904 Barriers), or equal by Hilti (Caulk FS601, putty CB 120 Foam, FS611A barrier material, FS635 Cable Tray.

19.2 All openings required for conduit in walls, floors, ceilings, partitions, etc., where such construction is not fire rated, shall be patched with mortar, caulking, etc.

PART 20 - SUSPENDED CEILINGS

20.1 The Contractor shall insure that framing members of suspended ceiling systems used to support fixtures shall be securely fastened to each other and shall be securely attached to the building structure at necessary intervals (NEC).

20.2 If the above items are not covered, the Contractor shall immediately alert the Architect. Fixtures shall not be installed until all questions concerning the above are answered.

PART 21 - ELECTRICAL DRAWINGS AND SPECIFICATIONS

21.1 The drawings and specifications are intended to cover all work enumerated under the respective headings. The drawings are diagrammatic only as far as final location of raceways,

equipment, etc. is concerned. Any item of work not clearly included, specified and/or shown, any errors or conflict between plans (Mechanical, Electrical, Architectural or Structural) specifications, codes and field conditions, shall be clarified by a written request to the Architect by the Bidder before bidding; otherwise, the bidder shall, at his own expense, supply the proper labor and materials to make good any damages or defects in his work caused by such error, omission or conflict.

21.2 Schematics, risers and details shown on the drawings are for the equipment specified. All revisions, modifications or changes in circuitry, accessories, etc. due to using equipment of a different manufacturer than specified hereinafter, shall be the responsibility of the Bidder and shall be made at no additional cost to the Owner. All modifications or changes shall be submitted to the Architect in writing and meet his approval before the equipment is released for shipment.

21.3 The Contractor shall be responsible for all revisions, modifications or changes necessary in the Structural, Architectural or Mechanical/Electrical systems to accommodate the equipment to be furnished under this section of the specifications. This shall be made at no additional cost to the Owner.

PART 22 - APPLICATION FOR PAYMENT

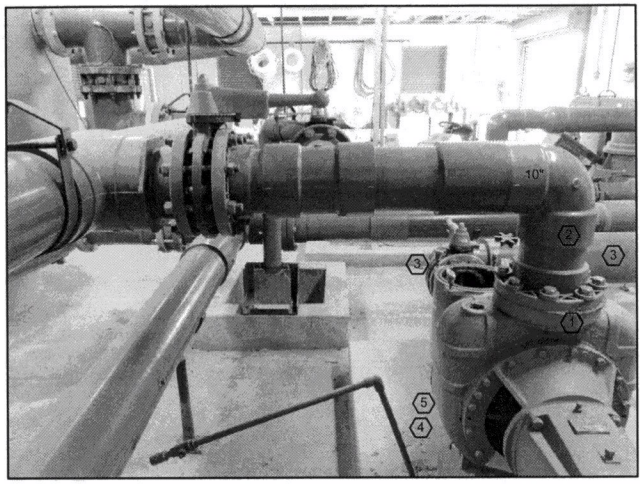
22.1 Line items and description of electrical work shall be as follows:

Item No.	Description of Work
1	Bond & Permits
2	Mobilization
3	Distribution Equipment Breakers
4	Outlet boxes, conduits, fittings
5	Conduit & Boxes
6	Wiring

PART 23 - INSPECTION

23.1 At the completion of the job, the Owner shall furnish the electrical inspection. Contractor shall coordinate with the Owner's representative for any rough-in and final inspections.

END OF SECTION

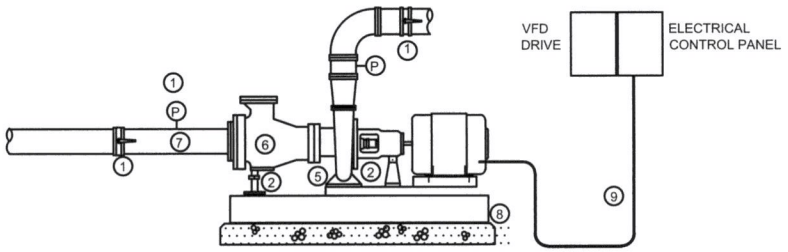


CW-1 POOL PUMP

CW-1 POOL PUMP

SHEET NOTES:

1. REPLACE EXISTING PUMP CW-1.
2. ADAPT TO EXISTING DISCHARGE CONFIGURATION.
3. ADAPT TO EXISTING SUCTION CONFIGURATION.
4. RECONFIGURE UNDERFLOOR POWER WIRING.
5. RECONFIGURE EQUIPMENT GROUND.



NOTE:

1. REUSE EXISTING BUTTERFLY VALVES AND PRESSURE GAGES. SUCTION VALVE IS 6", REPLACE IF NEW PUMP SUCTION IS LARGER THAN 6"
2. STANCHION SUPPORT ON SUCTION END AND AT PUMP AS REQD
3. REUSE EXISTING HOUSEKEEPING PAD. RECONFIGURE AS NECESSARY.
4. NOT USED.
5. PROVIDE PUMP DRAIN IF NOT PROVIDED BY PUMP MANUFACTURER.
6. EXISTING STRAINER, REUSE.
7. NOT USED
8. GROUT PUMP BASE AS REQD
9. INSTALL VARIABLE FREQUENCY DRIVE.

PIPING FOR SELF PRIMING END SUCTION PUMP

NTS 15510-D2

CASTLEWOOD POOL, INSTALL REPLACEMENT SELF PRIMING PUMP

NO.	REVISION	DATE	BY
1.			
2.			
3.			
4.			

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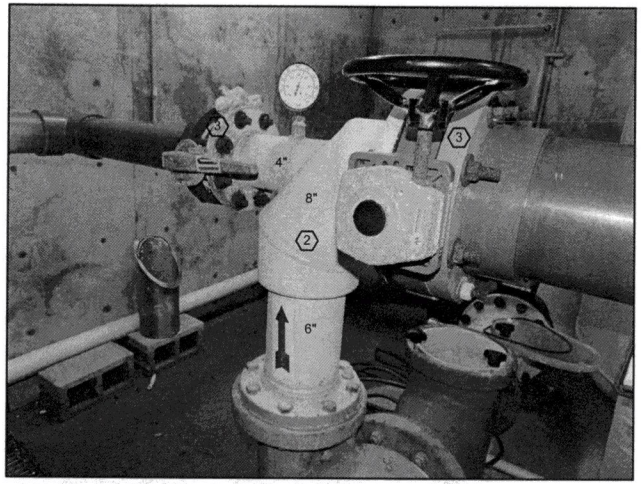
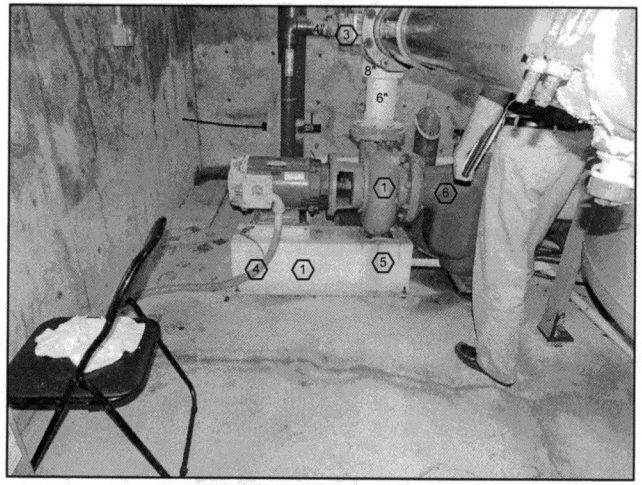
PHONE (859) 255-4437

LEXINGTON FAYETTE URBAN COUNTY GOVERNMENT

DRAWN BY: MG	PROJECT NO: 1950	DEPARTMENT OF PARKS & RECREATION	DRAWING NO. M-1
CHECKED BY: TBW	DATE: MAY 8, 2013	POOL AND FOUNTAIN ENERGY IMPROVEMENT	SHEET 1 OF 8



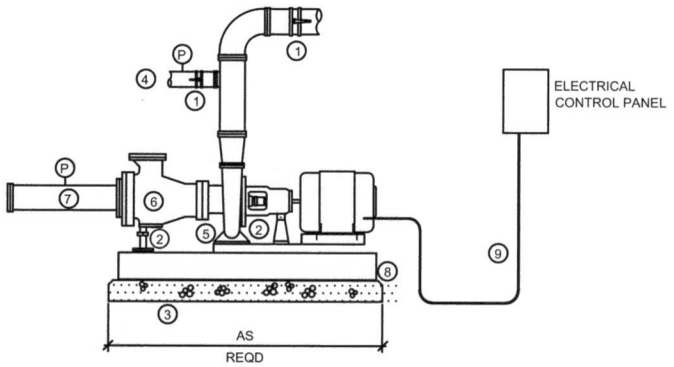
SH-1 MAIN POOL PUMP



SH-1 MAIN POOL PUMP

SHEET NOTES:

1. REPLACE EXISTING PUMP SH-1 AND PUMP BASE.
2. REPLACE EXISTING METAL DISCHARGE ASSEMBLY WITH SCHEDULE 80 PVC COMPONENTS.
3. REPLACE BUTTERFLY VALVE.
4. RECONFIGURE POWER WIRING.
5. RECONFIGURE EQUIPMENT GROUND.
6. EXISTING STRAINER, ADAPT TO REPLACEMENT PUMP.



NOTE:

1. REPLACE 4" AND 8" BUTTERFLY VALVES. RELOCATE EXISTING GAUGES.
2. STANCHION SUPPORT ON SUCTION END AS REQD
3. HOUSEKEEPING PAD MINIMUM THICKNESS 4"; CHAMFER EDGES
4. 4", RECONNECT TO BACKWASH.
5. PROVIDE PUMP DRAIN IF NOT INCLUDED WITH PUMP.
6. EXISTING STRAINER, REUSE.
7. RECONNECT SUCTION.
8. GROUT PUMP BASE AS REQD
9. REPLACE ELECTRICAL WATER TIGHT CONDUIT, CONDUCTORS, AND FITTINGS.

PIPING FOR END SUCTION PUMP

NTS

15510-D2

SHILLITO POOL,REPLACE PUMP AND PUMP BASE

NO.	REVISION	DATE	BY
1.			
2.			
3.			
4.			

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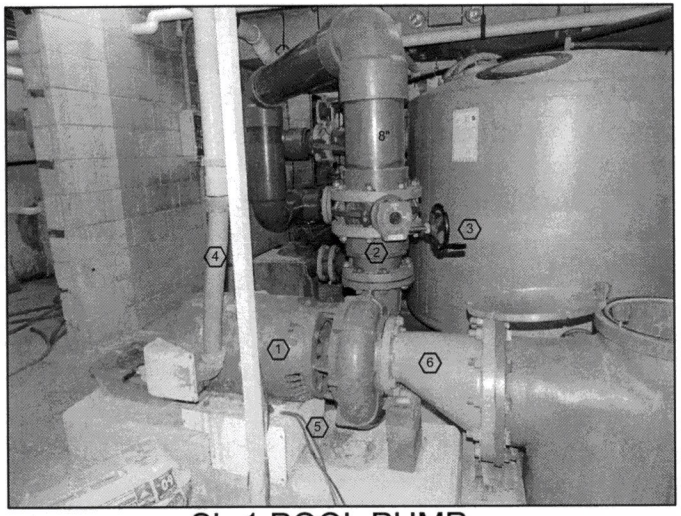
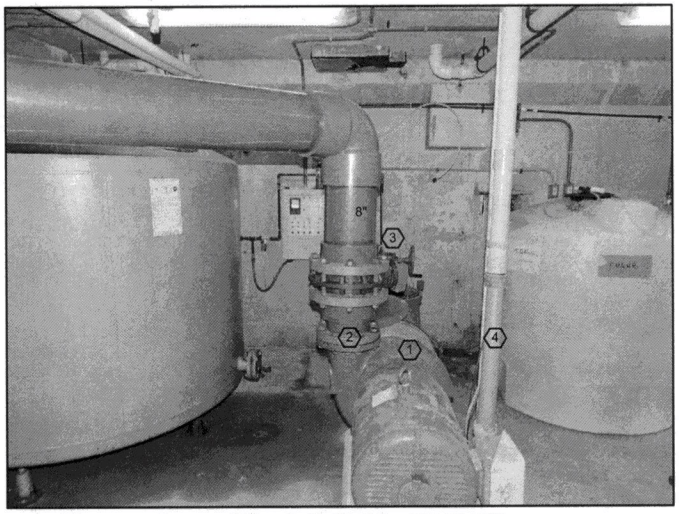
LEXINGTON FAYETTE URBAN COUNTY GOVERNMENT

DRAWN BY: MG	PROJECT NO: 1950	DEPARTMENT OF PARKS & RECREATION	DRAWING NO. M-2
CHECKED BY: TBW	DATE: MAY 8, 2013	POOL AND FOUNTAIN ENERGY IMPROVEMENT	SHEET 2 OF 8



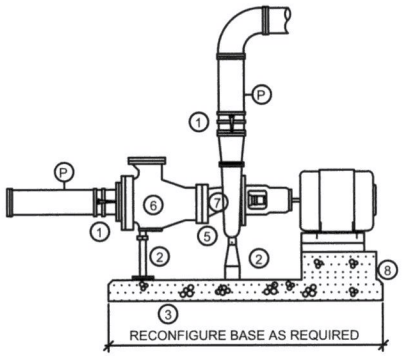
SL-1 POOL PUMP



SL-1 POOL PUMP

SHEET NOTES:

1. REPLACE EXISTING PUMP SH-1 AND PUMP BASE.
2. ADAPT EXISTING DISCHARGE PIPE TO NEW PUMP.
3. REUSE BUTTERFLY VALVE.
4. RECONFIGURE POWER WIRING.
5. RECONFIGURE EQUIPMENT GROUND.
6. EXISTING 12 BY 6 EXCENTRIC REDUCER.



NOTE:

1 PROVIDE NEW 4" PRESSURE GAUGES.
2 STANCHION SUPPORT ON SUCTION END AND AT PUMP AS REQD
3 NOT USED.
4 NOT USED.
5 PROVIDE PUMP DRAIN PAN IF NOT PART OF PUMP ASSEMBLY.
6 EXISTING STRAINER, REUSE.
7 RECONNECT SUCTION, REUSE EXCENTRIC REDUCER, OR REPLACE AS REQUIRED.
8 GROUT PUMP BASE AS REQD

PIPING FOR END SUCTION PUMP

NTS

15510-D2

SOUTHLAND POOLREPLACE PUMPAND FIT BASE TO NEW PUMP

NO.	REVISION	DATE	BY
1.			
2.			
3.			
4.			

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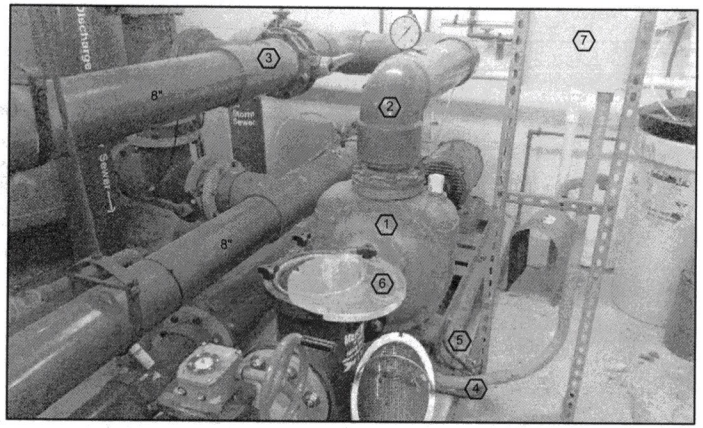
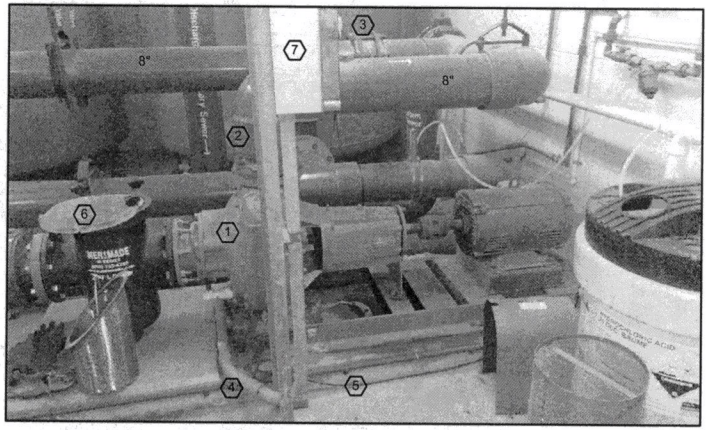
LEXINGTON FAYETTE URBAN COUNTY GOVERNMENT

DRAWN BY: MG	PROJECT NO: 1950	DEPARTMENT OF PARKS & RECREATION	DRAWING NO. M-3
CHECKED BY: TBW	DATE: MAY 8, 2013	POOL AND FOUNTAIN ENERGY IMPROVEMENT	SHEET 3 OF 8



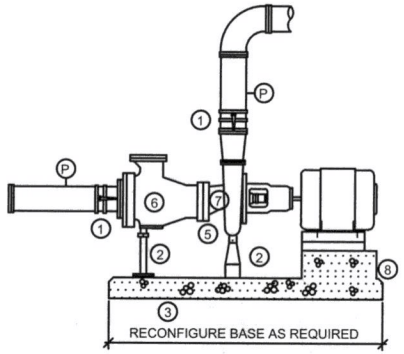
SL-BP POOL PUMP



SL-BP POOL PUMP

SHEET NOTES:

1. REPLACE EXISTING PUMP SH-BP AND FIR FRAME TO EXISTING PUMP BASE.
2. ADAPT EXISTING DISCHARGE PIPE TO NEW PUMP.
3. REUSE BUTTERFLY VALVE.
4. RECONFIGURE POWER WIRING.
5. RECONFIGURE EQUIPMENT GROUND.
6. EXISTING STRAINER, ADAPT TO REPLACEMENT PUMP.
7. RESET OVERLOAD DEVICE FOR NEW MOTOR.



NOTE:

1 PROVIDE NEW 4" PRESSURE GAUGES.
2 STRUCTURAL BASE FOR EXISTING UNIT, CONFIRURE NEW PUMP TO EXISTING BASE.
3 REPAIR HOUSEKEEPING PAD TO FIT NEW PUMP AND BASE.
4 NOT USED.
5 PROVIDE PUMP DRAIN PAN IF NOT PART OF PUMP ASSEMBLY.
6 EXISTING STRAINER, REUSE.
7 RECONNECT SUCTION, REUSE EXCENTRIC REDUCER, OR REPLACE AS REQUIRED.
8 GROUT PUMP BASE AS REQD

PIPING FOR SELF PRIMING PUMP

NTS

15510-D2

SOUTHLAND BABY POOL PUMP REPLACEMENT

NO.	REVISION	DATE	BY
1.			
2.			
3.			
4.			

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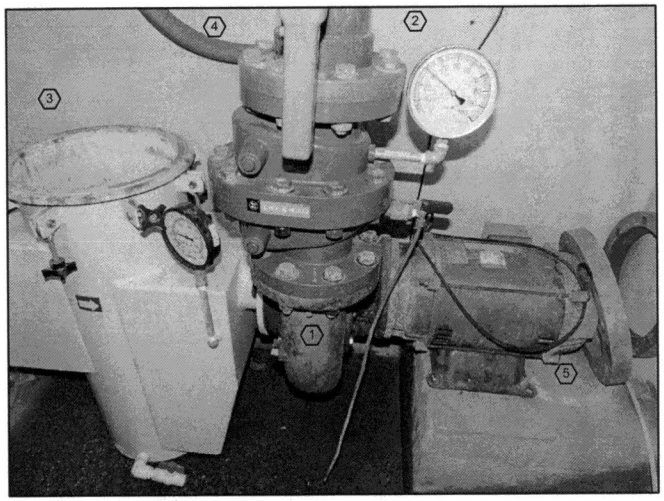
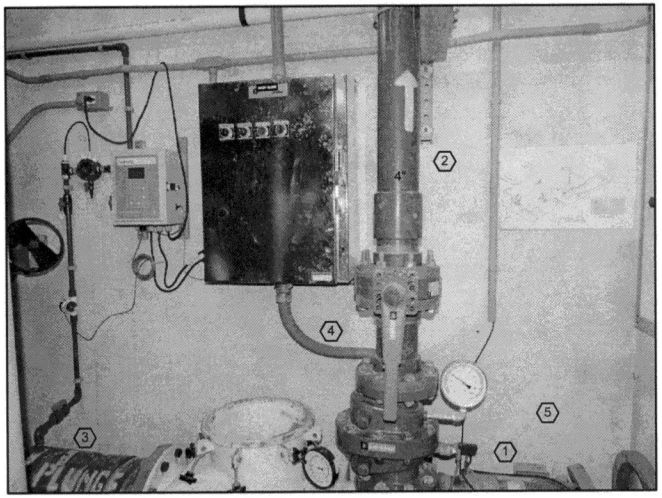
LEXINGTON FAYETTE URBAN COUNTY GOVERNMENT

DRAWN BY: MG	PROJECT NO: 1950	DEPARTMENT OF PARKS & RECREATION	DRAWING NO. M-3A
CHECKED BY: TBW	DATE: MAY 8, 2013	POOL AND FOUNTAIN ENERGY IMPROVEMENT	SHEET 4 OF 8



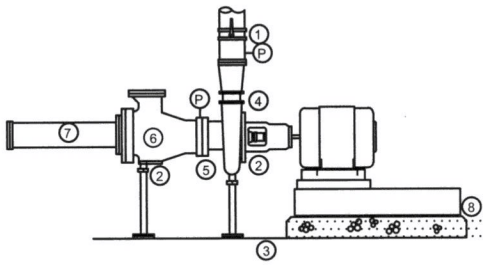
TC-1PLUNGE POOL



TC-1PLUNGE POOL

SHEET NOTES:

1. REPLACE EXISTING PUMP SH-1 AND PUMP BASE.
2. REUSE/RECONFIGURE EXISTING CHECK VALVE,BUTTERFLY VALVE AND DISCHARGE PIPE TO FIT NEW PUMP.
3. REUSE EXISTING BUTTERFLY SUCTION VALVE.
4. RECONFIGURE POWER WIRING.
5. RECONFIGURE EQUIPMENT GROUND.
6. CONFIRM REPLACEMENT PUMP WILL MEET SIZE/SPACE REQUIREMENTS.
7. VERIFY PUMP/STRAINER CONNECTION SIZES.



NOTE:

1 REUSE EXISTING BUTTERFLY VALVES.
REUSE EXISTING GAUGES, RECONFIGURE AS NECESSARY.

2 STANCHION SUPPORT ON SUCTION END AND AT PUMP AS REQD

3 REUSE/RECONFIGURE EXISTING HOUSEKEEPING PAD AS REQUIRED.

4 EXISTING CHECK VALVE, REINSTALL.

5 PROVIDE PUMP DRAIN IF NOT PART OF PUMP ASSEMBLY.

6 EXISTING STRAINER, REUSE.

7 RECONNECT SUCTION.

8 GROUT PUMP BASE AS REQD

PIPING FOR END SUCTION PUMP

NTS 15510-D2

TATES CREEK POOL, REPLACE PLUNGE POOL PUMP

NO.	REVISION	DATE	BY
1.			
2.			
3.			
4.			

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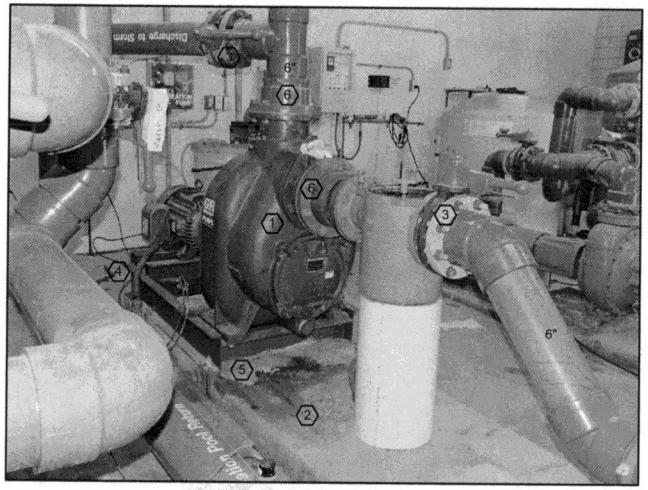
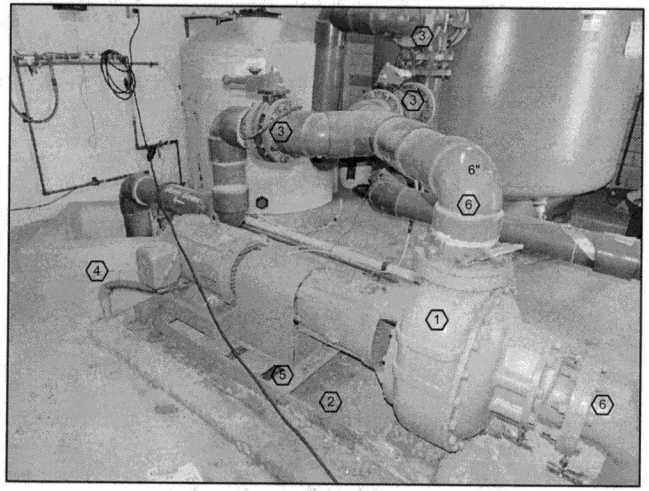
LEXINGTON FAYETTE URBAN COUNTY GOVERNMENT

DRAWN BY: MG	PROJECT NO: 1950	DEPARTMENT OF PARKS & RECREATION	DRAWING NO. M-4
CHECKED BY: TBW	DATE: MAY 8, 2013	POOL AND FOUNTAIN ENERGY IMPROVEMENT	SHEET 5 OF 8



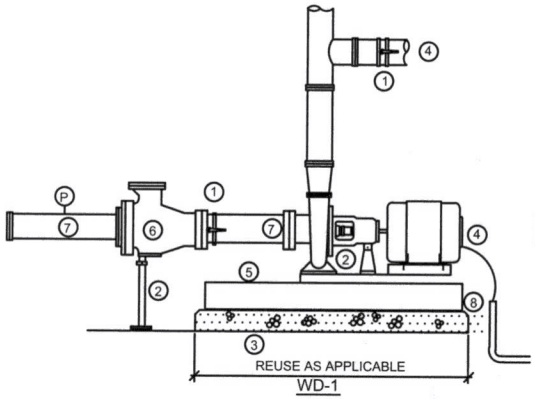
WD-1 "0" DEPTH POOL PUMP



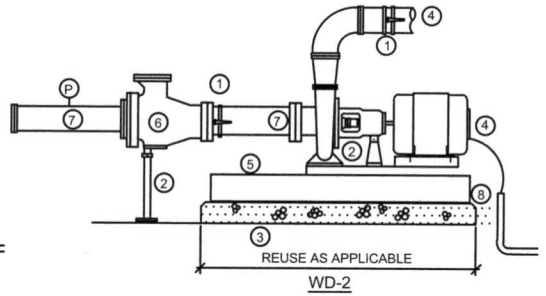
WD-2 DIVING WELL POOL PUMP

SHEET NOTES:

1. REPLACE EXISTING PUMP WD-1 AND WD-2.
2. PLACE PUMP ON EXISTING BASE, RECONFIGURE AS NECESSARY.
3. REUSE ALL EXISTING VALVING.
4. RECONFIGURE POWER WIRING.
5. RECONFIGURE EQUIPMENT GROUND.
6. RECONFIGURE EXISTING SUCTION AND DISCHARGE ASSEMBLY TO FIN NEW PUMPS.



WD-1



WD-2

NOTE:

1 REUSE EXISTING BUTTERFLY VALVES.
2 STANCHION SUPPORT ON SUCTION END AS REQD
3 HOUSEKEEPING PAD MINIMUM THICKNESS 4"; CHAMFER EDGES REUSE EXISTING IF APPLICABLE.
4 4", RECONNECT TO BACKWASH.
5 RECONFIGURE DISCHARGE PIPING AS REQUIRED.
6 EXISTING STRAINER, REUSE.
7 RECONNECT SUCTION.
8 GROUT PUMP BASE AS REQD

PIPING FOR END SUCTION PUMP

NTS

15510-D2

WOODLAND POOL, REPLACE TWO PUMPS

NO.	REVISION	DATE	BY
1.			
2.			
3.			
4.			

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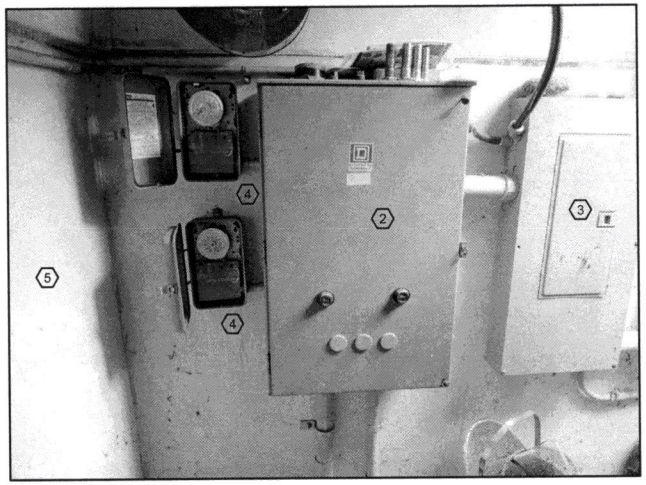
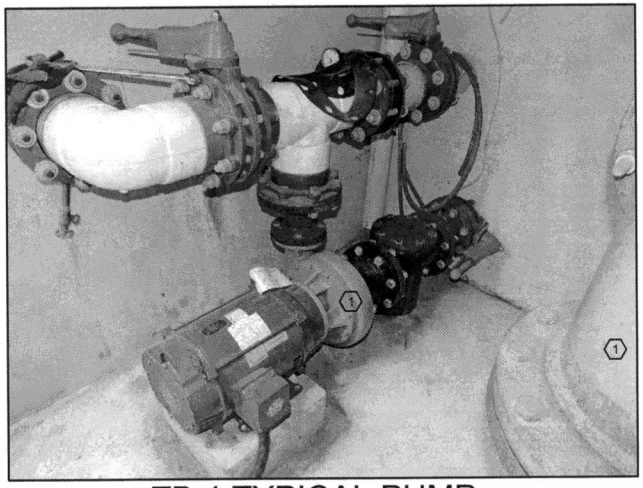
LEXINGTON FAYETTE URBAN COUNTY GOVERNMENT

DRAWN BY: MG	PROJECT NO: 1950	DEPARTMENT OF PARKS & RECREATION	DRAWING NO. M-6
CHECKED BY: TBW	DATE: MAY 8, 2013	POOL AND FOUNTAIN ENERGY IMPROVEMENT	SHEET 6 OF 8



TB-1 AND TB-2 CONTROL PANNEL



TB-1 TYPICAL PUMP

SHEET NOTES:

1. EXISTING PUMPS, TB-1 AND TB-2 WILL REMAIN IN PLACE AS CURRENTLY INSTALLED.
2. EXISTING PUMP CONTROL PANEL WILL STAY AS IS OR BE REPLACED WITH THE SAME FUNCTIONS IN VARIABLE FREQUENCY PUMP CONTROLLERS.
3. EXISTING POWER PANEL TO REMAIN IN PLACE.
4. EXISTING TIMERS MAY BE REUSED FOR NIGHTTIME LOWER PUMP FLOW SELECTION IF APPLICABLE.
5. INSTALL NEW VFD PUMP CONTROLLERS ON THIS WALL.
6. VFD DRIVES WILL BE MATCHED TO EXISTING MOTORS. CONTRACTOR WILL WARRANTY DRIVES AND EXISTING MOTORS FOR A ONE YEAR PERIOD. SHOULD CONTRACTOR HAVE RESERVATIONS IN INSTALLATION OF DRIVES ON EXISTING MOTORS HE IS TO INCLUDE INSTALLATION OF NEW MOTORS IN HIS PROPOSAL.

THOROUGHBRED PARK, INSTALL VARIABLE FREQUENCY DRIVE

NO.	REVISION	DATE	BY
1.			
2.			
3.			
4.			

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LEXINGTON FAYETTE URBAN COUNTY GOVERNMENT

DRAWN BY: MG	PROJECT NO: 1950	DEPARTMENT OF PARKS & RECREATION	DRAWING NO. M-7
CHECKED BY: TBW	DATE: MAY 8, 2013	POOL AND FOUNTAIN ENERGY IMPROVEMENT	SHEET 7 OF 8

PUMP AND MOTOR SCHEDULE

1750 ?

PUMP NUMBER	UNIT LOCATION	MANUFACTURER	MODEL NUMBER	NSF?	GPM	TOTAL HEAD	HP	MINIMUM PUMP EFFICENCY	MINIMUM MOTOR EFFICENCY	VOLTAGE/ PHASE	RPM	NOTES:
CW–1	CASTLEWOOD MAIN POOL	GORMAN RUPP	86B-B-1 SELF PRIMING	NO	803	80	25	75.8	93.6	208/3	1520	1, 3, 5
SH–1	SHILLITO MAIN POOL	MARLOW	530 SC SERIES	YES	1100	80	30	83.8	94.4	208/3	1750	1, 3
SL–1	SOUTHLAND MAIN POOL	MARLOW	530 SC SERIES	YES	892	80	20	84.4	93.1	208/3	1750	1, 3
SL–1	SOUTHLAND BABY POOL	MARLOW	EL-6E1 SELF PRIMING	YES	1066	72	30	72.7	93.1	208/3	1750	1, 3
TC–1	TATES CREEK PLUNGE POOL	MARLOW	530 SC SERIES	YES	176	80	7.5	71.4	92.3	208/3	1750	1, 3
WD–1	WOODLAND 0 DEPTH	MARLOW	EL 4E1 SELF PRIMING	YES	687	80	25	67.4	93.6	208/3	1750	1, 3
WD–2	WOODLAND DIVING WELL	MARLOW	EL 4P1 SELF PRIMING	YES	532	84	20	68.6	93.1	208/3	1750	1, 3
TB–1	THOROUGHBRED PARK	EXISTING	N/A	NO	N/A	N/A	30	N/A	94.4	208/3	1465	2, 4
TB–2	THOROUGHBRED PARK	EXISTING	N/A	NO	N/A	N/A	15	N/A	93.0	208/3	1465	2, 4

1. EFFICENCY SHOWN IS TO BE TAKEN FROM THE PUMP PERFORMANCE CHART AT THE CONDITIONS SHOWN. SELECTED PUMPS MUST OPERATE WITHIN 1% OF VALUE SHOWN.
2. PROVIDE VARIABLE FREQUENCY DRIVE AND ELECTRONIC TIMER (WITH BATTERY BACK UP FOR TIMER).
3. MOTOR EFFICIENCY IS BASED ON BALDOR TEFC MOTORS OPERATING AT 1750 RPM AND 3/4 OF LOAD.
4. INSTALL MOTOR BEARING GROUNDING RINGS ON EACH PUMP.
5. PUMPS WITHOUT NSF RATINGS SHALL HAVE ALL INTERNAL PARTS COATED WITH AN EPOXY COATING SIMILAR TO RHE COATING REQUIRED FOR NSF.

ELECTRICAL NOTES:

1 EXISTING CONDUCTORS CAN BE REUSED WHEN OF THE CORRECT SIZE AND OF LENGTH TO REACH THE NEW MOTORS.

2 REUSE EXISTING RIGID CONDUIT. INSTALL AT LEAST 12" OF WATERTIGHT FLEXIBLE CONDUIT BETWEEN END OF CONDUIT AND MOTOR FITTING.

3 EACH PUMP SHALL BE GROUNDED TO BUILDING STEEL OR TO EXISTING GROUNDING POINT. CONTRACTOR SHALL PROVIDE A MEGGAR TEST FOR EACH GROUND AND DEMONSTRATE GROUND MEETS REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE. EXISTING STRAINER, REUSE.

4 ALL WORK WILL BE INSPECTED BY AN ELECTRICAL INSPECTOR HIRED BY THE CONTRACTOR.

MECHANICAL NOTE:

1 ALL WORK SHALL BE INSPECTED BY THE LFCUG BUILDING INSPECTION MECHANICAL DIVISION. OF LENGTH TO REACH THE NEW MOTORS.

2 ALL REPLACEMENT BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL.

SCHEDULES AND NOTES

NO.	REVISION	DATE	BY
1.			
2.			
3.			
4.			

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LEXINGTON FAYETTE URBAN COUNTY GOVERNMENT

DRAWN BY: MG	PROJECT NO: 1950	DEPARTMENT OF PARKS & RECREATION	DRAWING NO. M-8
CHECKED BY: TBW	DATE: MAY 8, 2013	POOL AND FOUNTAIN ENERGY IMPROVEMENT	SHEET 8 OF 8