

ADDENDUM NO. 1
to the
LA MIRADA HIGH SCHOOL NEW FOOTBALL STADIUM PROJECT
for the
NORWALK-LA MIRADA UNIFIED SCHOOL DISTRICT
BID NO. 202122-4 (Formal, DSA #03-120551/03-120869)

This addendum forms a part of the contract and modifies the original bid documents. It is intended that all work affected by the following modifications shall conform to related provisions and general conditions of the contract, of the original bid package. **Modify the following items wherever appearing in any portion of the bid package.** Acknowledge receipt of Addendum No. 1 in the space provided on this form as well as on the bid form. Failure to do so may subject bidder to disqualification.

Project Modifications/Changes/Additions/Deletions are hereby made:

Document(s):

- **NLMUSD'S Addendum No. 1 consists of this document along with seven (7) attachment files as summarized herewith:** and foremost, the attachment file (along with this doc) can be found at: www.crplanwell.com

Attachment Files:

- ADDM 1_1F_Special Conditions_Exhibit B_CEQA IS MND MMRP; ADDM 1_1G_Special Conditions_Exhibit C_Logistics Plan; ADDM 1_1H_Special Conditions_Exhibit D_Revised Designation of Subcontractors; ADDM 1_1J_Additional Special Conditions; ADDM 1_2G_DSA 03-120551_Narrative; ADDM 1_2H_DSA 03-120551_Drawings; ADDM 1_2J_SA 03-120551_Specifications

ALL OTHER PROVISIONS of the Contract Documents shall remain unchanged. This Addendum is hereby made a part of the Contract Documents to the same extent as those provisions contained in the original documents and all itemized listings thereof.

NOTE: The failure or omission of any bidder to receive or examine any contract document, form, instrument, addendum, plans or other document, or to visit the site and acquaint himself with the conditions there existing shall by no means relieve any bidder from any obligation with respect to his bid or to the contract.

PLEASE SIGN AND RETURN ONE COPY OF THIS ADDENDUM WITH YOUR BID FORM.

Company Name

Signature

Title

**Table 7.0-1
MITIGATION MONITORING AND REPORTING PROGRAM**

IMPACT	MITIGATION MEASURE	RESPONSIBLE/ MONITORING PARTY	MONITORING ACTION	1. ENFORCEMENT AGENCY 2. MONITORING AGENCY 3. MONITORING PHASE
Project Design Feature				
BIOLOGICAL RESOURCES				
Threshold 4.4 (a): Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	Project Design Feature BIO-1: If project construction occurs between March 1 and August 31, a qualified avian biologist shall conduct a preconstruction nesting bird survey no earlier than one week prior to construction. If the nests are still occupied, a buffer of 200 feet shall be maintained around any active nest, and the avian biologist shall visit the site once a week, until the avian biologist can determine that the young have fledged or the nest has become inactive.	NLMUSD	Field Verification	NLMUSD NLMUSD During Construction
Mitigation Measures				
CULTURAL RESOURCES				
Threshold 4.5 (b): Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	MM CUL-1: A Worker Environmental Awareness Program (WEAP) Training shall be prepared and customized for the La Mirada High School location and current project that describes the types of local Native American resources that are commonly found subsurface in Southern California. It shall include a brief description of the local tribe, the Tongva/Gabrielino, including information from local tribal groups on their concerns for discoveries. Also included shall be descriptions and illustrations of common paleontological resources that may be encountered in the soil on the project site. Related local, state and federal regulations and laws shall be noted, as well as procedures to follow if cultural and/or paleontological resources are uncovered. This presentation shall be designed for the layman. Figures of common artifacts and fossils and a review of the project site shall be included. Materials shall be provided to the District, including copies of the PowerPoint presentation on either a CD or a “thumb-drive” and hard copies of the presentation, so that its staff and project contractor supervisors themselves can give this training to construction crew.	NLMUSD	Field Verification	NLMUSD NLMUSD During Construction

IMPACT	MITIGATION MEASURE	RESPONSIBLE/ MONITORING PARTY	MONITORING ACTION	1. ENFORCEMENT AGENCY 2. MONITORING AGENCY 3. MONITORING PHASE
Threshold 4.5 (b): Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	MM CUL-2: If historical or unique archaeological resources are discovered during construction activities, the contractor shall halt construction activities in a 30-foot radius and notify the Norwalk-La Mirada Unified School District. A Secretary of the Interior qualified archaeologist shall be notified and afforded the necessary time to recover, analyze, and curate the find(s). The qualified archaeologist shall recommend the extent of archaeological monitoring necessary to ensure the protection of any other resources that may be in the area and afforded the necessary time and funds to recover, analyze, and curate the find(s). Construction activities may continue on other parts of the project site while evaluation and treatment of historical or unique archaeological resources takes place.	NLMUSD	Field Verification	NLMUSD NLMUSD During Construction
Threshold 4.5 (b): Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	MM CUL-3: If a local Native American tribal organization(s) request that a tribal monitor and/or a qualified archaeologist monitor construction at the project location, then the project proponent shall retain and schedule any required monitors during all subsurface excavations into native soil. At the discretion of the monitoring archaeologist, excavation or other ground-disturbing activities must be halted when an archaeological artifact or feature is observed. Tribal monitors may request the archaeological monitor to halt ground-disturbing activities if they observe potential cultural finds. Native American monitors will be required to complete and submit daily monitoring logs while at the project site to the project proponent's lead archaeologist.	NLMUSD	Field Verification	NLMUSD NLMUSD During Construction
Threshold 4.5 (c): Disturb any human remains, including those interred outside of dedicated cemeteries?	MM CUL-4: If human remains are encountered during excavations associated with this project, all work shall stop within a 30-foot radius of the discovery and the Los Angeles County Coroner will be notified (§ 5097.98 of the Public Resources Code). The Coroner will determine whether the remains are recent human origin or older Native American ancestry. If the coroner, with the aid of the supervising archaeologist, determines that the remains are prehistoric, they will contact the NAHC. The NAHC will be responsible for designating the Most Likely Descendant (MLD). The MLDS (either an individual or sometimes a committee) will be responsible for the ultimate disposition of the remains, as required by § 7050.5 of the California Health and Safety Code. The MLD will make recommendations within 24 hours of their notification by the NAHC. These recommendations may include scientific removal and nondestructive analysis of human remains and items associated with Native American burials (§ 7050.5 of the Health and Safety Code).	NLMUSD	Field Verification	NLMUSD NLMUSD During Construction

IMPACT	MITIGATION MEASURE	RESPONSIBLE/ MONITORING PARTY	MONITORING ACTION	1. ENFORCEMENT AGENCY 2. MONITORING AGENCY 3. MONITORING PHASE
GEOLOGY AND SOILS				
Threshold 4.7 (d): Be located on expansive soil, as defined in Table 18-1 B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	MM GEO-1: <i>Expansive Soils:</i> The existing soil on the project site has an expansion index of “medium”. Grading activities may mix onsite soils with imported fill and the expansion potential may change; therefore, the potential expansion index of onsite soils shall be tested and verified after grading of areas where slabs, foundations and pavements would be placed directly onsite or on native subgrade soils. If the expansion index of mixed soil is found to be above 20, onsite soil used for support of slabs, foundations, walkways, and pavements shall be mixed with 5 percent cement to reduce the expansion potential. Any proposed import fill shall have an expansion index less than 20 and shall be evaluated and approved by an engineering geologist prior to import to the site (Converse Consultants, 2019, p. 15).	NLMUSD	Field Verification	NLMUSD NLMUSD During Construction
Threshold 4.7 (f): Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	MM GEO-2: A Worker Environmental Awareness Program (WEAP) Training shall be prepared and customized for the La Mirada High School location and current project that describes and illustrates the common paleontological resources that may be encountered in the soil on the project site. This WEAP training program shall be developed in conjunction with MM CUL-3 concerning the types of local Native American resources that are commonly found subsurface in Southern California, and shall be administered jointly. Related local, state and federal regulations and laws shall be noted, as well as procedures to follow if cultural and/or paleontological resources are uncovered. This presentation shall be designed for the layman. Materials shall be provided to the District so that its staff and project contractor supervisors can themselves give this training, including copies of the PowerPoint presentation on either a CD or a “thumb-drive” and hard copies of the presentation.	NLMUSD	Field Verification	NLMUSD NLMUSD During Construction
Threshold 4.7 (f): Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	MM GEO-3: If paleontological resources are uncovered during construction activities, the contractor shall halt construction activities in the immediate area and notify the Norwalk-La Mirada Unified School District. The on-call paleontologist shall be notified and afforded the necessary time and funds to recover, analyze, and curate the find(s). Subsequently, the monitor shall remain onsite for the duration of the ground disturbance to ensure the protection of any other resources that may be in the area.	NLMUSD	Field Verification	NLMUSD NLMUSD During Construction

IMPACT	MITIGATION MEASURE	RESPONSIBLE/ MONITORING PARTY	MONITORING ACTION	1. ENFORCEMENT AGENCY 2. MONITORING AGENCY 3. MONITORING PHASE
4.9 HAZARDS AND HAZARDOUS MATERIALS				
Threshold 4.9 (a): Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials	<p>MM HAZ 1 Due to the age of the existing buildings and the potential presence of asbestos-containing materials (ACMs), testing shall be conducted prior to demolition and a Hazardous Material Abatement Plan shall be prepared.</p> <p>Prior to the commencement of demolition, the project proponent shall retain a qualified environmental consultant to conduct a comprehensive survey of the existing buildings to confirm the presence or absence of ACMs and LBP. A comprehensive lead-based paint survey of painted surfaces at the project site shall occur prior to any renovation or demolition activities to confirm the presence or absence of LBP to prevent potential exposure to workers and/or building occupants. If the existing buildings are found to contain any ACMs or LBP, a detailed Hazardous Material Abatement Plan shall be prepared, approved, and implemented. The Hazardous Material Abatement Plan shall include a site-specific scope of work and specifications for the proper disposal of hazardous materials. The Hazardous Material Abatement Plan shall be prepared and implemented in accordance with the Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) and all other federal and state standards and regulations including the DTSC, California Department of Education (CDE), and Office of Public School Construction (OPSC).</p> <p>The Hazardous Material Abatement Plan shall require that all ACMs and LBP be removed and properly disposed of in accordance with the provisions of the Hazardous Material Abatement Plan.</p> <p>The Hazardous Material Abatement Plan shall be implemented prior to demolition activities to ensure that any hazardous materials are properly identified, removed, and disposed of offsite at a landfill that can accept asbestos and any other hazardous materials removed from the site.</p> <p>A qualified environmental consultant shall be present on the project site during demolition activities and shall monitor compliance with the Hazardous Material Abatement Plan.</p>	NLMUSD	Field Verification	<p>NLMUSD</p> <p>NLMUSD</p> <p>Prior to the commencement of demolition</p>

IMPACT	MITIGATION MEASURE	RESPONSIBLE/ MONITORING PARTY	MONITORING ACTION	1. ENFORCEMENT AGENCY 2. MONITORING AGENCY 3. MONITORING PHASE
Threshold 4.9 (f): Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	MM TRANS-1: The General Contractor shall submit a detailed Construction Management Plan to be reviewed and approved by the Norwalk-La Mirada Unified School District. The Construction Management Plan shall specify that the Construction Manager will schedule truck traffic and employee shifts to avoid creating trips during the peak traffic periods, as is feasible for construction operations. All measures including identified truck routes and designated employee parking areas shall be included in the Construction Management Plan. The Plan shall include but is not limited to the following provisions: a) Identification of permitted hours for construction related deliveries and removal of heavy equipment and material; b) Identification of where construction workers would park their personal vehicles during project construction with a requirement that at no time shall construction worker vehicles block any driveways. If complaints are received by the project applicant regarding issues with construction worker vehicle parking, the project applicant shall identify alternative parking options for construction workers so as not to interfere with adjacent commercial and residential parking availability; c) Identification of how emergency access to and around the project site will be maintained during project construction; d) Identification of haul routes for delivery or removal of heavy and/or oversized equipment or material loads. Where feasible, delivery or removal of oversized equipment or material loads shall be conducted during off-peak hour traffic periods; e) Maintain pedestrian connections around the project site and safe crossing locations shall be considered for all pedestrian detours; and f) Maintain the security of the project site by erecting temporary fencing during the construction phase of the project.	NLMUSD	Field Verification	NLMUSD NLMUSD During Construction
TRANSPORTATION				
Threshold 4.17 (a): Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	Refer to MM TRANS-1 above.	NLMUSD	Field Verification	NLMUSD

IMPACT	MITIGATION MEASURE	RESPONSIBLE/ MONITORING PARTY	MONITORING ACTION	1. ENFORCEMENT AGENCY 2. MONITORING AGENCY 3. MONITORING PHASE
Threshold 4.17 (d): Result in inadequate emergency access?	Refer to MM TRANS-1 above	NLMUSD	Field Verification	NLMUSD
4.21 MANDATORY FINDINGS OF SIGNIFICANCE				
Threshold 4.21 (a): The potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	Refer to PDF BIO-1 and MM CUL-1 through MM CUL-3 above.	--	--	--
Threshold 4.21(c): Environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly	Refer to all of the mitigation measures listed above in this table.	--	--	--

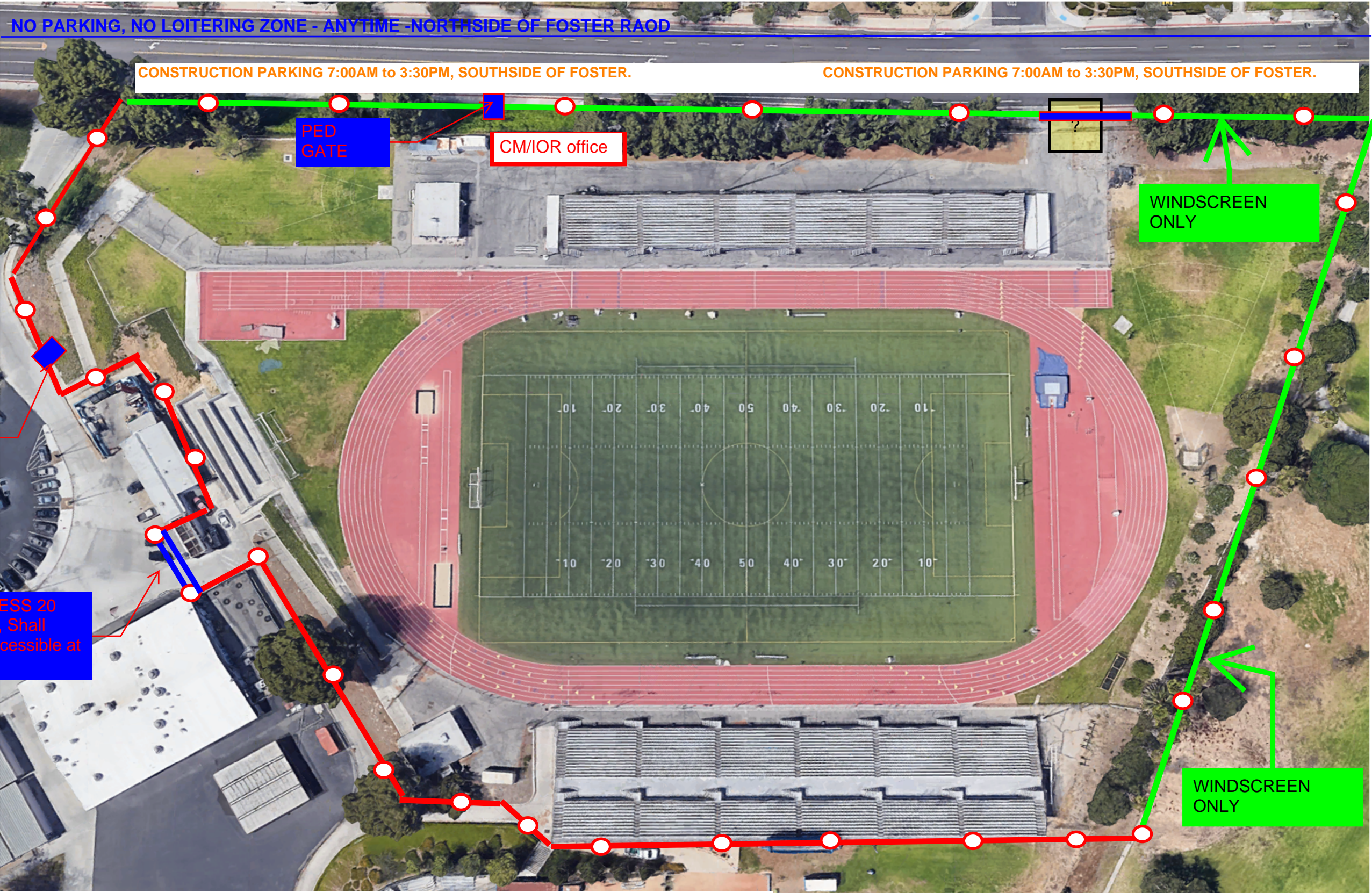
LA MIRADA HIGH SCHOOL _NEW FOOTBALL STADIUM PROJECT- LOGISTIC PLAN

Contractor Shall:

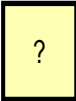
1. Provide and Install and Maintain a Construction Temp Fence including a 20 foot wide vehicle gate and two Pedestrian gates. The location for the two Pedestrian gates will be assigned by the CM.
2. Keep the existing Domestic Waterline active at all-times and with no disruptions for Irrigation of baseball and other fields down stream. All existing sprinklers systems outside construction fence and on FOSTER Road shall remain active.
3. Foster Road- Construction employee parking shall be kept clean from trash at all times. NO SMOKING or Loud Noise is permitted at anytime. Parking hours are 7am to 3:30pm.
4. All aluminum school and team signs mounted approx. 150 on Fences to be removed without damage and stored until the end of the project. General Contractor shall reinstall/mount all aluminum sign at the locations designated by the CM
5. All other construction temporary facility items required are listed in specification 01500 shall be provided.

LA MIRADA HIGH SCHOOL
_NEW FOOTBALL
STADIUM PROJECT-
LOGISTIC PLAN

0.000A



TEMPORARY FENCING (8' HIGH W/PRIVACY SCREEN) - CONTRACTOR SHALL INCLUDE DRIVEN POSTS AND LOCATE ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION. INCLUDE 1 HIGH GRAVEL/SAND BAG MONOFILAMENT)AT PERIMETER.



CONSTRUCTION ENTRANCE / EXIT
CONTRACTOR TO PROVIDE FLAG MEN AT ENTRANCE DURING CONSTRUCTION WHEN VEHICULAR TRAFFIC IS UTILIZING ACCESS ROUTE REGARDLESS OF THE TIME OF DAY.

REVISED DESIGNATION OF SUBCONTRACTORS FORM

Please refer to Addendum No. 1 for details on specific subcontractor designation and experience requirements for certain specialty subcontractors.

Description/Portion of Work	Name of Subcontractor	Location & Place of Business	License Type and Number	DIR Registration Number	E-Mail & Telephone*
Grading					
Site Concrete					
Synthetic Turf Cool-Down System					
Synthetic Sports Turf Aggregate Base					

ADDITIONAL SPECIAL CONDITIONS AND/OR INFORMATION PROVIDED:

1. DESIGNATION OF SUBCONTRACTORS/ SPECIALTY SUBCONTRACTORS

Specialty Subcontractors. In addition to meeting the subcontractor designation requirements set forth in the Subletting and Subcontracting Fair Practices Act (Public Contract Code section 4100 et seq.), all bidders must designate a subcontractor for the following scopes/ portions of work noted in the following Specifications Sections (“Specialty Subcontractor(s)”) **regardless of the dollar amount of the contract or cost of the work, or regardless of the tier of the subcontractor:**

Section 31 22 00	Grading
Section 32 13 13	Site Concrete Work
Section 32 84 10	Synthetic Turf Cool-Down System
Section 32 95 00	Synthetic Sports Turf Aggregate Base

Designation of Specialty Subcontractors. Bidders are to use the Revised Designation of Subcontractors Form included with this Addendum (**Refer to Exhibit “D” Revised Designation of Subcontractors Form**) to designate all subcontractors in accordance with Public Contract Code section 4100 et seq. and to designate all Specialty Subcontractors at the time of bid. If the bidder intends to self-perform any Specialty Subcontractor work noted above, the bidder shall note “self-perform” in the area for the “Name of Subcontractor” in the attached Revised Designation of Subcontractors Form. Leaving this information blank or failure to comply with these requirements shall render the bidder’s bid non-responsive. Bidder is only required to note “self-perform” in the attached Revised Designation of Subcontractors Form as it relates to the four Specialty Subcontract work noted above and does not apply to other portions or scope of work.

Specific Experience Requirements of Specialty Subcontractor and its Foreman. Any Specialty Subcontractor **and** its foreman who will be performing work set forth in the Specification Sections above must have successfully performed and completed two (2) similar projects during the last five (5) years in California. A “similar project” is a synthetic turf athletic field consisting of at least 57,600 square feet of synthetic field surface area. Documents and other evidence confirming the Specialty Subcontractor and its foreman meet these requirements (as determined by the Architect in his or her discretion) must be provided a minimum of two weeks prior to any work noted in the Specifications Section above being performed on the Project. No work can commence for any work noted in the Specifications Section above without submittal of the required documentation and approval by the architect. Bidder/prime contractor shall be solely responsible for all delays related to the bidder/ prime contractor’s failure to provide the requisite information confirming compliance with all experience requirements. Any Specialty Subcontractor and its foreman failing to meet the experience requirements set forth above shall be substituted pursuant to Public Contract Code section 4107. These requirements also apply to the bidder/prime contractor if the bidder/prime contractor noted in the Designation of Subcontractors Form that it intended to self-perform any of the Specialty Subcontractor work. In addition to demanding substitution of a Specialty Subcontractor that does not meet the experience requirements set forth above, the District may assess penalties and take any other action set forth in Public Contract Code sections 4110 and 4111.

Specific Experience Requirements of Prime Contractor and its Field Superintendent. The bidder/ prime contractor **and** the field superintendent assigned to this Project must have successfully performed and completed two (2) projects during the last seven (7) years in California that required the construction and installation of a synthetic turf athletic field consisting of at least 57,600 square feet of synthetic field surface. Prior to commencing work on any work related to the synthetic field for this Project, the prime contractor must submit documents and other evidence confirming the prime contractor and its field

superintendent meet these experience requirements as determined by the Architect in his or her discretion. Failure to provide the requisite information confirming compliance with all experience requirements shall be deemed a material breach of the contract for the Project and subject the prime contractor to termination of its contract with the District for cause. Any delays in providing the requisite information confirming compliance with these experience requirements shall be the sole responsibility of the prime contractor. If the prime contractor intends to self-perform any of the Specialty Subcontractor work noted above, the applicable Specialty Subcontractor requirements must also be met by the prime contractor.

2. GARLAND PRE-APPROVED ROOFING INSTALLER

Referencing Spec. 07 41 13 Standing Seam Metal Roof Panels, and Spec. 07 55 00 Kee 2 Ply Membrane Roofing System, and Spec 07 62 00 Flashings and Sheet Metal Work, roofing bidders are to contact Peter Cochran with Garland Roofing at pcochran@garlandind.com or 949.295.0447 and request a Garland approval letter, currently dated, for the specific project submitted with their bid to the GC. Post bid approvals will NOT be accepted. Bidders are still required to submit questions through the pre-bid RFI process.

3. The Contractor shall be responsible for completely fencing off the areas under construction and all excavations with chain link, green-screened fencing. The screening shall be added not only onto new temporary fencing, but also onto the existing fencing surrounding the construction site. Fencing and screening must be maintained in safe and aesthetically good condition at all times. The fencing is required even during the summer, due to the presence of the students and staff at school site for the summer school.
4. All gates shall remain locked at all times.
5. The Contractor shall maintain proper safety signage around the construction area. The school must be fully functional prior to the beginning of school year. Work performed at all common areas must be performed while school is out of session.
6. The Contractor is responsible for providing Construction parking for his workers and Subcontractors. Parking shall be limited to only offsite or delineated areas during school sessions.
7. The Contractor's work hours shall be in accordance with local city ordinances.
8. The Contractor is responsible for coordinating the work of the local utility companies required to bring new services (including but not limited to: gas meter, water, reclaimed water, sewer, electrical service, and telephone) to the school campus.
9. The Contractor is advised that school staff and students will occupy other buildings and continue to work on campus throughout all construction activities. Therefore, it is understood that services to all other buildings are to remain fully functional and operational during construction to ensure the productivity and safety of school staff. These services include but are not limited to: fire alarm, public address system, telephone, internet, security, power, gas, water, and lighting. Contractor shall make reasonable efforts to identify all interconnected utilities prior to demolition. In addition, contractor shall develop a plan to maintain existing services (provide temporary services when the existing services cannot be maintained) to the campus subject to review and approval of the district representative/ construction manager. Disconnect and tie-ins to these services shall only occur after written notification and acceptance by the District has been achieved.

10. The Contractor is responsible for the ignition of all gas equipment within the project scope. The Contractor shall incorporate on the Baseline schedule and track on the three week look ahead, any anticipated gas shutdown. The Contractor shall provide 14-day notice to the District of any anticipated ignition of gas equipment for the entire Campus.
11. The Contractor is responsible for storing and securing of OFCI items upon delivery to the construction Site.
12. **WEEKEND WORK HOURS AND NORMAL WORK HOURS**
 - a. Contractor will be allowed to perform work on weekends with written permission from the District and local government agencies per the General Conditions.
 - b. Working Hours: Monday through Saturday 8am to 4pm, Sunday 9am to 5pm

13. **MITIGATED NEGATIVE DECLARATION REPORT**

The Mitigated Negative Declaration Report includes Table 7.0-1 Mitigation Monitoring and Reporting Program (MMRP). **Refer to Exhibit “B” CEQA IS MND MMRP.** Contractor is required to implement all measures as noted in Tale 7.0-1 of the MMRP, specifically:

- a. BIO-1: Contractor is required to comply with the requirements as stated in the Biological Resources, Threshold 4.4 (a), PDF-BIO-1.
- b. MM CUL-1: Contractor is notified that there will be a Worker Environmental Awareness Program (WEAP) Training material giving to General Contractor for themselves and to train their construction crew including subcontractors. General Contractor to provide training completion log to district for documentation.
- c. MM-CUL-2: Contractor is notified that work may be halted or may continue other parts of the project should cultural resources be discovered during construction.
- d. MM-CUL-3: Contractor is notified that there will be Native American monitoring and is required to coordinate construction activities to comply with measure.
- e. MM-CUL-4: Contractor is notified that work may be halted should human remains be encountered during construction.
- f. General Contractor is required to comply with the requirements as shown in MM-GEO-1; MM-GEO2; MM GEO-3;
- g. General Contractor is required to comply with the requirements as shown in MM-HAZ 1; MM-TRANS-1;

14. **LOGISTICS PLAN**

Refer to **Exhibit “C” Logistics Plan** for the Draft Site Logistics Plan for reference only. The General Contractor will be required to submit the Site Logistics Plan to determine final locations and detailed information.

15. **OWNER FURNISHED OWNER INSTALLED ITEMS**

Owner Furnished Owner Installed (OFOI) items include:

- a. SYNTHETIC TURF AND TRACK SURFACING (Specification 32 12 93 and 32 18 39)
The Owner will procure the track and field materials and installation under separate contract via California Multiple Awards Schedules (CMAS) agreement. The awarded General Contractor will be required to coordinate their work with the OFOI Track and Field Contractor for this scope as required.

Refer to scope clarification on next page between General Contractor (CFCI) and District’s Track and Field Contractor (OFOI):

SYNTHETIC GRASS/ TRACK SURFACING	GC (CFCI)	DISTRICT'S TRACK AND FIELD CONTRACTOR (OFOI)
Provide, grade and compact aggregate base under synthetic turf and track surfaces, per Specification section (32 95 00)	X	
Demolition and preparation of subgrade, per Specification section (32 95 00)	X	
Provide and install fabric within base, per Specification section (32 95 00)	X	
Provide and install flat ADS ADVANEDGE drains, radius track drains and perimeter collector piping and connection to storm drain POC as shown per Specification section (32 95 00)	X	
Storm drain points of connection, per Sheet (C501)	X	
Provide and install all concrete curbs and synthetic and wood nailers as required for the turf installation per Specification section (32 95 00)	X	
Provide and install asphaltic concrete paving under track system per Specification section (32 18 39.3.1.D)	X	
Provide and install track surfacing per Specification section (32 18 39)		X
Provide and install Synthetic Grass Surfacing system <i>including Supplemental Pad</i> , per Specification Section (32 12 93)		X
Provide and install irrigation and electrical/low-voltage systems installed within the turf and track installation. Coordinate the work with Astroturf.	X	
Provide and install all underground utilities	X	
Provide and install in-ground communication boxes (Comboxes) and associated conduit within the turf areas, per Sheets (TF2.31, TF2.2, E3.02, & E6.02)	X	
Coordinate their work with Astroturf's scope as required.	X	

ATHLETIC EQUIPMENT	GC	DISTRICT'S OFOI TRACK AND FIELD CONTRACTOR
Provide and install all sports equipment related to the track and field identified on Specification section (32 14 80) <ul style="list-style-type: none"> • soccer goal post (2 sets of Kwik Goal 2B3906), including netting, wheels and anchors • football goal posts • corner flags • long jump sandpits • triple jump sandpits • takeoff boards • pole vault boxes • pole vault standard and landing pads • discus throw ring • shot put throw ring • shot put toe board • discus safety cage and extension net • steeplechase barriers • steeplechase water pit cover • rocker hurdles • miscellaneous materials 	X	
Provide and install flagpole specified in Section (10 75 16)	X	
Install scoreboard specified in Section (11 68 43)	X	
Install audio system specified in Section (27 41 16)	X	

16. **OWNER FURNISHED CONTRACTOR INSTALLED ITEMS**

Owner Furnished Contractor Installed (OFCI) items include:

- a. EXTERIOR ATHLETIC LIGHTING materials, as indicated in the Contract Documents, will be awarded under separate contract via National Joint Powers Alliance (NJPA) agreement. The awarded Contractor will coordinate with the NJPA agreement Supplier as required for the complete installation of the system and base bid scope of work. Contractor is to provide electrical work to the Light locations. MUSCO field lighting sheets and specification are provided in set for reference only.
- b. RUBBER FLOORING BASE materials only, as indicated in the Contract Documents, will be awarded under separate contract via National IPA (NIPA) agreement. The awarded Contractor will coordinate with the NIPA agreement material supplier for the ordering, inventory, and unloading for the complete installation of the system and base bid scope of work.
- c. ROOFING materials only, as indicated in the Contract Documents, will be awarded under separate contract via California Multiple Awards Schedules (CMAS) agreement. The awarded Contractor will coordinate with the CMAS agreement material supplier for the ordering, inventory, and unloading for the complete installation of the system and base bid scope of work. Once the roofing system shop drawings are approved, the General Contractor is required to at least a 6-week notification to the District if additional roofing materials are needed. Any schedule impacts caused by the lack of timely notification will be attributed to the contractor.
- d. DAKTRONICS equipment only, including sounds system, Assistive Listening System (ALS), speakers, scoreboards. Contractor to request cut sheets of equipment and coordinate with Daktronics for the installation of equipment.
- e. SECURITY CAMERAS equipment only, as indicated in the Contract Documents, will be awarded under separate contract. The awarded Contractor will coordinate with the equipment supplier for the ordering, inventory, and unloading for the complete installation of the system and base bid scope. The Contractor will furnish and install all other devices, necessary parts, wiring and conduits. The District will initialize cameras onto District's existing video recording system (ONSSI, version 5.6) and be responsible for the Software Licensing.
- f. WIRELESS ACCESS POINT (WAP) equipment only, as indicated in the Contract Documents, will be awarded under separate contract. The awarded Contractor will coordinate with the equipment supplier for the ordering, inventory, and unloading for the complete installation of the system and base bid scope. The Contractor will furnish and install all other devices, necessary parts, wiring and conduits.
- g. REFRIGERATOR AND ICE MACHINE equipment only, as indicated in the Contract Documents, will be awarded under separate contract. The awarded Contractor will coordinate with the equipment supplier for the ordering, inventory, and unloading for the complete installation of the system and base bid scope. The Contractor will furnish and install all other devices, necessary parts, wiring and conduits.
- h. LIQUID SOAP DISPENSERS equipment only, as indicated in the Contract Documents, will be awarded under separate contract. The awarded Contractor will coordinate with the equipment

supplier for the ordering, inventory, and unloading for the complete installation of the system and base bid scope. The Contractor will furnish and install all other devices, necessary parts, wiring and conduits.

ADDENDUM #1- DSA Backcheck Submittal - NARRATIVE OF CHANGES

DSA A#: 03-120551

PROJECT: La Mirada High School, New Football Stadium
13520 Adelfa Dr, La Mirada, CA 90638

OWNER: Norwalk La Mirada Unified School District (NLMUSD)
12820 Pioneer Boulevard, Norwalk, CA 90650
Bomee Yoon Facilities Coordinator, Facilities Planning & Construction
Email: byoon@nlmusd.k12.ca.us

ARCHITECT: NAC Architecture
837 North Spring Street, Third Floor
Los Angeles, CA 90012
323.475.8075
AOR: Helena Jubany
Email: [hjuby@nacarchitecture.com](mailto:hjubany@nacarchitecture.com)
Project Manager: Leticia Ochoa
Email: lochoa@nacarchitecture.com
Contact: Reyna Ramirez, Project Architect
Email: rramirez@nacarchitecture.com

DATE: February 9, 2022

NAC PROJECT #: 161-19015
Changes included in this addendum are itemized below:

ARCHITECTURAL - GENERAL

SHEET REVISIONS

- G0.01
- NLMUSD Notes have been updated to show specific procurement scope.
- G1.01
- Existing DSA #03-118224 added to (E) Bldg. 600 "O".
- G1.02
- Existing portable building to be demolished in previous phase of work. Graphic has been removed from drawing.
 - Extent of paving adjusted west of track.
 - New fire hydrant relocated.
 - Gate G29 added to scope of work.
 - "Cylinder dogging" added to exit device door hardware.

- Updated gate heights to gates G11, G15-G20

CIVIL

SHEET REVISIONS

C3.01

- Updated keynotes # 17 & 24

C3.02

- Updated keynote #22 are of trench drain removal

C3.04

- Updated keynote #5 related to demolition of subdrain system

C4.01

- Added reference points to field control points

C4.02

- Updated location of new fire hydrant

C4.03

- Added coordinates for field control points, scoreboard & flagpole

C5.01

- Updated location of fire water & fire hydrant

C5.02

- Continuation of the update noted for C5.01

TRACK & FIELD

SHEET REVISIONS

Sheet TF 1.11

- Existing and new walks at main entry ramp clarified.
- Electrical equipment relocated around north corner of Visitor's Field House.
- Gates and fencing between track and Home Bleachers changed to new.
- Detail reference for high jump revised.
- Extent of new fencing at fire truck turn-around clarified.
- Fire Hydrant at fire truck turn-around added.
- Redundant gate west side of Home Field House deleted.
- Leader for gate 12 repointed.
- Gate 19 label by Building "U" corrected.
- Note "This approval for clouded areas only...." added.

Sheet TF 1.12

- Discuss cage and safety net revised.
- Note mandating cover water seal at steeplechase pit added.
- Steeplechase hurdle detail revised.
- New fence at west end of Home Bleacher clarified.
- Existing fence at east property line clarified "Retain in place as-is".
- Synthetic turf header details 2A & 2B added.
- Fence Footings/header wall connection added to fence detail.



- Discus cage repositioned and east safety net extended.
- Gate 20 redefined.
- Synthetic turf header details 2A & 2B revised to accommodate shock pad.
- Sub-grade compaction requirement for synthetic Turf in header details referenced to Geotechnical report.
- Chain link fencing pole footing detail and reinforcing requirements added.
- Note "This approval for clouded areas only...." added.

Sheet TF 2.1:

- Track grading requirements and accessible surface offsets in plane added to details 1 and 2.
- Detail 1 revised to show new fencing and fence header walls at outside of outer lane in lieu of existing to remain.
- Sub-grade compaction requirement for synthetic Turf in header details referenced to Geotechnical report.
- Synthetic turf header in detail 2 revised to accommodate shock pad.
- Note "This approval for clouded areas only...." added.

Sheet TF 2.2

- Soccer goal detail 5 added and goal locations shown on plan.
- Placement of Power/Communication Box immediately adjacent to field perimeter curb added to detail 2.
- Nailer anchor revised to Hilti Quick-bolt 2 in detail 2.
- Collector pipe trench in detail 2: trench dimensions and drain rock fill added.
- Synthetic turf slope and infill depth clarified in detail 1.
- Sub-grade compaction requirement for synthetic Turf in header details referenced to Geotechnical report.
- Requirement or compaction of permeable base in detail 1 clarified.
- Requirement to remove felt wrap from flat drain added to detail 1.
- Requirement and acceptable options to achieve depth of permeable base cover over the flat drain added to detail 1.
- Structural detail reference added for goal post footing detail 4.
- Shock pad added to details 1, 2, & 3.
- Felt wrap called to be removed from flat drain in detail 2.
- Additional requirements for sub-graded compaction based on requirements of geotechnical report added to detail 1.
- Note "Playground equipment is not part of a DSA review...." added.
- Note "This approval for clouded areas only...." added.

Sheet TF 2.31

- Pump pad illustrated for clarity in Pump Area Blow-up upper right-hand corner of sheet.
- Control wire splice boxes and conduit added for control wire between existing campus controller, new pump, and future baseball field project.
- 2'-1/2" low pressure main line added from system connection near pump pad to baseball field for



future landscaping.

- Blow-up enlargement added for layout of cool-down valves at edge of shot-put area west of Visitor Field-House,
- Sensor and control wire specification added to equipment legend for reference.
- Cool-down head locations in field adjusted for optimum coverage.
- Specification for irrigation controller changed to provide additional stations for future use.
- Note "This approval for clouded areas only...." added.

Sheet TF 2.32

- Sensor and control wire specification added to equipment legend for reference.
- Specification for irrigation controller changed to provide additional stations for future use.
- Added to detail 2: Omit valve, concrete supports, and gravel for detail use for control wire splice box.
- Shock pad added to detail 2.
- Note "This approval for clouded areas only...." added.

Sheet TF 2.33

- Detail 5 omitted.
- "Flow Guard" added to detail 3.
- Note "This approval for clouded areas only...." added.

Sheet TF 2.31

- Safety pads and additional lane markings added to detail 5.
- Discus cage net extension added to detail 4.
- Thrower's circle concrete pad detail reference added to detail 9.
- Subgrade compaction per requirements of Geotechnical Engineer added to details 2, 3, and 7.
- Structural design footing reference added for discus cage and extension netting, detail 4.
- Note added to detail 4 "Note: Exempt from Structural Review per DSA IR A-22".
- Note "This approval for clouded areas only...." added.

Sheet TF 2.32

- Soccer goal specification revised.
- End Zones/ Center Field Graphics revised.
- Sideline Coaches' Box graphic corrected.
- Note "This approval for clouded areas only...." added.

ARCHITECTURAL

SHEET REVISIONS

A1.01

- Added gate 29 and 6ft high fence Southeast of home side bleachers.
- Note at Visitor's Fieldhouse updated.



- Note updated to read "GC. TO REPAIR & REROUTE IRRIGATION SYSTEM AFFECTED BY NEW CONSTRUCTION AND REPAIR PLANTING TO MATCH EXISTING OR IF DAMAGED"
 - Added reference to Civil for new fire hydrant location
- A1.02
- Asphalt (previously shown to be repaired) updated to new asphalt.
 - Note added to clarify to GC to provide bird deterrents on visor portion of light fixture and install using adhesive or strapping. GC shall not install deterrents on heat sink portion of the fixture.
 - Note added to center of field for clarity.
 - Rolling gate, note added to reference gate schedule.
 - Updated new fire hydrant location.
 - Added keynote #5 -adding bird deterrents to sports lighting.
- A3.00
- Updated metal roofing details to add gypsum board sheathing at standing seam roof detail.
- A3.10
- Added dimensions to gates, added dimensions to FS
- A3.11
- Equipment pad moved to north side of Fieldhouse.
 - Added dimensions to FS
- A3.12
- Added detail number for standing seam roof to the roof legend
- A3.20
- Added adult changing facility (V-105) door to door schedule
- A3.21
- Added adult changing facility (V-105) to room finish schedule
- A5.01
- Added gate footing information, see updated detail 13/-
- A5.02
- Added detail 6/discus cage pole embedment detail & updated detail 3/- & added detail 7/- for pipe penetrations in CMU walls.
- A5.03
- Updated detail 4/- with a 4" header
- A5.04
- Added paint reference notes to details 3 & 4/-
- A5.06
- Added section reference to detail 11/-
- A5.09
- Modified details 3, 5, 7, 8, 10, 11, 12 & 13
- A5.10
- Added reference to receiver quantity & updated signage at detail 8/-
- A9.01
- Updated references to plywood sheathing at details 1, 4, 5, 6, 8 & 9/-
 - Added additional information to details 3 & 10/- overflow scupper details
- A9.02
- Updated references to plywood sheathing at details 1 & 2/-
 - Updated signage detail with additional information as noted.



STRUCTURAL

SHEET REVISIONS

S1.03

- Added details 15 for the retaining wall. See calculations.

S1.12

- Added details 9 & 10 for anchorage of the cooler and convection oven and the ice maker. See calculations.

MECHANICAL

SHEET REVISIONS

M0.01

- Added anchorage and bracing notes

M7.02

- Revised location of "HVAC" equipment to avoid conflicts with field conditions.

PLUMBING

SHEET REVISIONS

P0.01

- Revised "Plumbing Fixture Schedule" to revise faucet to comply with the District's request.
- Faucet SK-6 has been revised to sensor model via model number change in fixture schedule. See cutsheet.

P7.01

- Revised "Building "V" Floor Plan – Plumbing" to indicate the following:
 - o Referenced Sink "S-1" due to the revised faucet associated with this sink. Refer to the submitted catalog information. Installation indicated "code compliant".

P7.02

- Revised "Building "W" Floor Plan – Plumbing" to indicate the following:
 - o Referenced Sink "S-1" due to the revised faucet associated with this sink. Refer to the submitted catalog information. Installation indicated "code compliant".
 - o Relocate the exterior HVAC equipment from the west side of the building to the north side of the building to avoid any possible future damage from the adjacent "shot put" area. No equipment was changed, only location and plumbing connections. Installation indicated "code compliant".

ELECTRICAL

SHEET REVISIONS

E1.01

- Updated Single Line Diagram to include spare conduit to comply with the District's requests.

E1.02

- Updated Single Line Diagram to indicate the Emergency Lighting Circuit in a separate conduit from the Normal Lighting Circuit.



- E3.02
 - Revised the "In-Grade Field Communication Box Details" to indicate revised device mounting within the box to comply with the District's request.
- E4.01
 - Revised the "Fire Alarm Equipment Schedule" to include missing information on the Notifier "Digital Audio Amplifier".
 - Revised the "Fire Alarm Equipment Schedule" to include update information on the "Remote Power Supply" for Visual Devices. The original device, the "FCPS", has been discontinued by Notifier and replaced with a new device.
- E4.02
 - Updated the Fire Alarm Battery Calculations for the new "PSE-10" power supplies in lieu of the discontinued "FCPS" power supplies.
- E4.03
 - Updated the "Fire Alarm Riser Diagram" to replace reference to the discontinued "FCPS" power supply and change the reference to the new "PSE-10" power supply for Visual Devices. Updated FA annunciator conduit connection.
- E6.01
 - Updated "Overall Site Plan – Electrical" to include spare conduit to comply with the District's requests. Updated FA annunciator conduit connection.
- E6.02
 - Added additional underground pullboxes at each pole Musco pole location to separate the Emergency Power Circuits from the Normal Power Circuits as required by the C.E.C.
- E7.01
 - Updated "Fieldhouse (Home) Floor Plan – Power" to indicate the revised Fire Alarm Power Supply call-out.
- E7.02
 - Updated "Fieldhouse (Home) Floor Plan – Fire Alarm" to indicate the revised Fire Alarm Power Supply call-out.
- E7.03
 - Updated "Fieldhouse (Visitor) Floor Plan – Power" to indicate the revised Fire Alarm Power Supply call-out.
 - Updated "Fieldhouse (Visitor) Floor Plan – Power" to indicate the revised/relocated power connections to the relocated "HVAC" Equipment.
- E7.04
 - Updated "Fieldhouse (Visitor) Floor Plan – Fire Alarm" to indicate the revised Fire Alarm Power Supply call-out.

SCOREBOARD (PC A# 04-120097)

SHEET REVISIONS - UPDATED PC DRAWINGS

- PC-1 SCOREBOARD PC COVER SHEET
- PC-2 DSA 103 SPECIAL INSPECTION FORM
- PC-3 DSA 103 SPECIAL INSPECTION FORM (CONT)
- PC-4 MOUNTING DETAILS W/O VIDEO DISPLAY
- PC-6 SOUND CABINET ATTACHMENT DETAILS
- PC-7 2-COLUMN STRUCTURE W/PIER FOUNDATIONS



SPECIFICATIONS:

Updated cover page with updated consultant stamps

07 41 13 STANDING-SEAM METAL ROOF PANELS

- Changed manuf. From Taylor Metals to Garland

08 71 00 DOOR HARDWARE

- 2.07, a Updated hardware series to AD-300-MS

09 65 10 RESILIENT WALL BASE

- Added OFCI note

26 56 68 ATHLETIC FILED LIGHTING

- Added OFCI note

32 14 80 ATHLETIC EQUIPMENT

- Includes District's final soccer goal selection
- 2.3, A.3 Added wheel kits and ground anchors
- 2.3, A.4 Updated model number
- 2.3, A.5 Updated quantity updates

32 16 13 CONCRETE CURBS & FLATWORK

- Added note to include curbs & nailers.

32 18 39 SYNTHETIC TRACK SURFACING

- Updated section related to submittal requirements.

32 84 10 SYNTHETIC TURF COOL-DOWN SYSTEM

- Updated Synthetic turf Cool-down system
- Updates in red

32 95 00 SYNTHETIC SPORTS TURF BASE

- Updated Synthetic Sports turf Aggregate Base
- 1.2, C.1 a, b &c. Updated warranty requirements
- Additional updates noted in red

NEW SECTIONS

07 22 00 ROOF DECK & INSULATION

07 55 00 KEE 2-PLY MEMBRANE ROOFING SYSTEM

- Updated due to District CMAS contract

07 62 00 FLASHINGS & SHEET METALWORK

- Complimentary section to 07 41 13

10 75 16 FLAGPOLE

11 68 43 FOOTBALL SCOREBOARD

27 41 16 AUDIO SYSTEM



End narrative



SECTION 00 01 10

TABLE OF CONTENTS

00 00 01	COVER PAGE	GBS
PROCUREMENT & CONTRACTING REQUIREMENTS		
00 70 00	CONDITIONS OF THE CONTRACT	TBI
00 31 32	GEOTECHNICAL DATA	GBS
00 01 00	TABLE OF CONTENTS	GBS
DIVISION 01 - GENERAL REQUIREMENTS		
01 10 00	SUMMARY OF WORK	TBI
01 13 00	DELEGATED DESIGN REQUIREMENTS	TBI
01 17 00	OWNER-FURNISHED PRODUCTS	GBS
01 21 00	ALLOWANCES	TBI
01 22 00	UNIT PRICES	TBI
01 23 00	ALTERNATES	TBI
01 25 00	CONTRACT MODIFICATION PROCEDURES	TBI
01 25 10	CONTRACTOR'S REQUEST FOR INTERPRETATION	TBI
01 29 00	PAYMENT PROCEDURES	TBI
01 31 00	PROJECT MANAGEMENT & COORDINATION	TBI
01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION	TBI
01 33 00	SUBMITTAL PROCEDURES	GBS
01 40 00	QUALITY REQUIREMENTS	TBI
01 41 00	REGULATORY REQUIREMENTS	TBI
01 42 00	DEFINITIONS & REFERENCES	TBI
01 45 23	TESTING AND INSPECTION	NLMUSD
01 50 00	TEMPORARY FACILITIES & CONTROLS	NLMUSD
01 60 00	PRODUCT REQUIREMENTS	TBI
01 70 00	EXECUTION & CLOSEOUT REQUIREMENTS	TBI
01 71 23	FIELD ENGINEERING	TBI
01 73 19	CUTTING & PATCHING	TBI
01 74 18	WATER POLLUTION CONTROL	
01 74 16	STORMWATER POLLUTION PREVENTION PLAN	B&J
01 74 19	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL	GBS
01 74 23	CLEANING	TBI
01 77 00	CLOSEOUT PROCEDURES	TBI
01 78 00	CLOSEOUT SUBMITTALS	TBI
01 79 00	DEMONSTRATION & TRAINING	TBI
DIVISION 02 – EXISTING CONDITIONS		
02 41 00	DEMOLITION	GBS
DIVISION 03 - CONCRETE		
03 30 00	CAST-IN-PLACE CONCRETE	B&J
DIVISION 04 – MASONRY		
04 22 00	CONCRETE UNIT MASONRY	B&J
DIVISION 05 - METALS		

05 12 00	STRUCTURAL STEEL FRAMING	B&J
05 30 00	METAL ROOF DECKING	B&J
05 41 00	STRUCTURAL METAL STUD FRAMING	B&J
05 50 00	METAL FABRICATIONS	GBS

DIVISION 06 - WOOD & PLASTICS

06 10 00	ROUGH CARPENTRY	B&J
06 41 00	PLASTIC LAMINATE CASEWORK	GBS

DIVISION 07 - THERMAL & MOISTURE PROTECTION

07 21 00	THERMAL BUILDING INSULATION	GBS
07 22 00	ROOF DECK AND INSULATION	NLMUSD
07 26 00	VAPOR BARRIERS	NLMUSD
07 41 13	STANDING SEAM METAL ROOF PANELS	NLMUSD
07 55 00	KEE 2 PLY MEMBRANE ROOFING SYSTEM	NLMUSD
07 62 00	FLASHINGS & SHEET METALWORK	NLMUSD
07 84 00	PENETRATION JOINTS AND PERIMETER FIRE BARRIERS	GBS
07 92 00	JOINT SEALERS	GBS

DIVISION 08 - DOORS & WINDOWS

08 11 13	STEEL DOORS & FRAMES	GBS
08 31 16	ACCESS DOORS & PANELS	GBS
08 56 19	SLIDING SERVICE WINDOWS	GBS
08 56 53	TRANSACTION WINDOW	GBS
08 71 00	DOOR HARDWARE	ALL

DIVISION 09 - FINISHES

09 22 16	NON-STRUCTURAL METAL FRAMING	GBS
09 22 26	CEILING & SOFFIT SUSPENSION SYSTEMS	GBS
09 29 00	GYPSUM BOARD	GBS
09 30 00	TILING	GBS
09 65 10	RESILIENT WALL BASE	GBS
09 65 13	STATIC DISSIPATIVE RESILIENT TILE FLOORING	GBS
09 90 00	PAINTING	GBS
09 90 00A	PAINT SCHEDULE	GBS
09 96 23	GRAFFITI-RESISTANT COATING	GBS

DIVISION 10 - SPECIALTIES

10 11 00	VISUAL DISPLAY UNITS	GBS
10 14 00	SIGNAGE	GBS
10 21 13	TOILET COMPARTMENTS & SCREENS	GBS
10 28 00	TOILET ROOM ACCESSORIES	GBS
10 44 00	FIRE EXTINGUISHERS AND CABINETS	GBS
10 75 16	FLAGPOLE	GBS

DIVISION 11 - EQUIPMENT

11 68 43	FOOTBALL SCOREBOARD	DAKTRONICS
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DIVISION 12 - FURNISHINGS

12 36 16	STAINLESS-STEEL COUNTERTOPS	GBS
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DIVISION 13– SPECIAL CONSTRUCTION

13 34 16 PERMANENT GRANDSTANDS AND PRESS BOX

SBC

DIVISION 14 – CONVEYING SYSTEMS

NOT USED

DIVISIONS 15 – 20

NOT APPLICABLE

DIVISION 21 - FIRE SUPPRESSION

21 13 13 FIRE SUPPRESSION SPRINKLER SYSTEMS

DIVISION 22 – PLUMBING

22 05 00	BASIC MATERIALS & METHODS	T&R
22 05 53	IDENTIFICATION	T&R
22 07 00	INSULATION	T&R
22 08 00	EQUIPMENT AND SYSTEMS TESTS	T&R
22 11 00	DOMESTIC AND INDUSTRIAL WATER SYSTEMS	T&R
22 13 00	DRAINAGE SYSTEM	T&R
22 40 00	PLUMBING FIXTURES	T&R

DIVISION 23 – HVAC

23 00 00	GENERAL PROVISIONS	T&R
23 05 48	VIBRATION ISOLATION & SEISMIC RESTRAINTS	T&R
23 09 23	ENVIRONMENTAL CONTROLS AND ENERGY MANAGEMENT SYSTEMS	T&R
23 31 00	AIR TRANSMISSION AND DISTRIBUTION SYSTEM	T&R
23 80 00	AIR CONDITIONING AND AIR HANDLING EQUIPMENT	T&R
23 90 00	BUILDING MANAGEMENT SYSTEM	T&R

DIVISIONS 24 – 25

NOT USED

DIVISION 26 – ELECTRICAL

26 05 00	COMMON WORK RESULTS FOR ELECTRICAL	T&R
26 05 13	BASIC ELECTRICAL MATERIALS AND METHODS	T&R
26 05 19	LOW-VOLTAGE CONDUCTORS (600 VOLT AC)	T&R
26 05 26	GROUNDING AND BONDING	T&R
26 05 33	RACEWAYS, BOXES, FITTINGS AND SUPPORTS	T&R
26 22 00	LOW VOLTAGE TRANSFORMERS	T&R
26 24 13	SWITCHBOARDS	T&R
26 24 16	PANELBOARDS AND SIGNAL TERMINAL CABINETS	T&R
26 50 10	LIGHTING	T&R
26 52 00	EMERGENCY POWER SYSTEMS	T&R
26 56 29	SITE LIGHTING	T&R
26 56 68	ATHLETIC FIELD LIGHTING	T&R

DIVISION 27 – COMMUNICATIONS

27 10 14	STRUCTURED CABLING SYSTEM	T&R
27 41 16	AUDIO SYSTEM	DAKTRONICS
27 51 00	INTEGRATED COMMUNICATIONS SYSTEMS	T&R

27 51 30 PUBLIC ADDRESS SYSTEMS (ATHLETIC FIELDS)

T&R

DIVISIONS 28 - ELECTRONIC SAFETY AND SECURITY

28 16 00 INTRUSION DETECTION SYSTEM

T&R

28 31 00 FIRE DETECTION AND ALARM SYSTEM

T&R

DIVISION 31 – EARTHWORK

31 10 00 SITE CLEARING

B&J

31 20 00 EARTHWORK

B&J

31 22 00 GRADING

B&J

31 23 16 TRENCHING

B&J

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 01 17 ASPHALT PAVEMENT REPAIR

B&J

32 12 16 ASPHALT PAVING

B&J

32 12 36 SEAL BITUMINOUS SURFACING

B&J

32 12 93 SYNTHETIC TURF

NLMUSD

32 13 13 SITE CONCRETE WORK

B&J

32 14 80 ATHLETIC EQUIPMENT

CR

32 16 13 CONCRETE CURBS AND FLATWORK

B&J

32 17 23 PAVEMENT MARKINGS

B&J

32 18 39 SYNTHETIC TRACK SURFACING

NLMUSD

32 31 19 CHAIN LINK FENCES AND GATES

GBS

32 84 10 SYNTHETIC TURF COOL-DOWN SYSTEM

CR

32 95 00 SYNTHETIC SPORTS TURF BASE

CR

DIVISION 33 – UTILITIES

33 11 00 WATER DISTRIBUTION

B&J

33 30 00 SITE SANITARY SEWER UTILITIES

B&J

33 40 00 STORM DRAINAGE UTILITIES

B&J

ACRONYMS CONSULTANTS

ARCHITECT:	NAC ARCHITECTURE	NAC
CIVIL ENGINEER:	BRANDOW & JOHNSTON	B&J
DOOR HARDWARE:	ALLEGION	ALL
ELECTRICAL ENGINEER:	TURPIN & RATTAN	T&R
LANDSCAPE ARCHITECT:	CARTER ROMANEK	CR
MECHANICAL ENGINEER:	TURPIN & RATTAN	T&R
PLUMBING ENGINEER:	TURPIN & RATTAN	T&R
GRANDSTANDS:	SOUTHERN BLEAHER COMPANY	SBC
SPECIFICATIONS:	GARY BARNETT SPECIFICATIONS	GBS
STRUCTURAL ENGINEER:	BRANDOW & JOHNSTON	B&J

END OF TABLE OF CONTENTS

SECTION 07 22 00

ROOF DECK AND INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Install 2 ply modified title 24 roofing system and all of its compenents as required by this specification and manufacturer's installation requirements

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General Supplementary Conditions and Division 1 Specification Sections apply to this section.
- B. Related work specified elsewhere:
 - 1. Division 7 Section "Modified Bitumen Roofing."
 - 2. Division 7 Section "Flashing and Sheet Metal."

1.3 REFERENCES

ASTM A-167-94a	Specification for Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet and Strip
ASTM A-653	Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process
ASTM B-29	Pig Lead
ASTM B-32	Solder Metal
ASTM C-165-95	Test Method for Measuring Compressive Properties of Thermal Insulation
ASTM C-209-92	Test Method for Cellulosic Fiber Insulating Board
ASTM C-36	Specification for Gypsum Wallboard
ASTM D-5	Test Method for Penetration of Bituminous Materials
ASTM D-36	Test Method for Softening Point of Bitumen (Ring and Ball Apparatus)
ASTM D-312	Specification for Asphalt Used in Roofing
ASTM D-412-92	Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension
ASTM D-1621-94	Test Method for Compressive Properties of Rigid Cellular Plastics
ASTM D-1622	Test Method for Apparent Density of Rigid Cellular Plastics
ASTM D-2126-94	Test Method for Response off Rigid Cellular Plastics to Thermal Humid Aging
ASTM D-5147	Sampling and Testing Modified Bituminous Sheet Material
FM	Factory Mutual System, Norwood, Massachusetts
NRCA	National Roofing Contractors Association, Chicago, IL
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
UL	Underwriter's Laboratories, Inc., Northbrook, Illinois
WH	Warnock Hersey International, Inc., Middletown, Wisconsin

1.4 SUBMITTALS

- A. Submit under provisions of contract documents.
- B. Product Data: Provide manufacturer's specification data sheets for each product in accordance with contract documents

- C. Provide approval letters from insulation manufacturer for use of their insulation within this particular roofing system type.
- D. Shop Drawings
 - 1. As necessary, submit manufacturer's shop drawings indicating complete installation details of tapered insulation system, including identification of each insulation block, sequence of installation, layout, drain locations, roof slopes, thicknesses, crickets and saddles.
 - 2. Shop drawing shall include outline of roof, location of drains, complete board layout of tapered insulation components, thickness and the average "R" value for the completed insulation system.
- E. CERTIFICATION
 - 1. Submit roof manufacturer's certification that insulation and fasteners furnished are acceptable to roof manufacturer meeting FM Requirements.
 - 2. Submit roof manufacturer's certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
 - 3. Manufacturer's Certificate: Certify that roof system furnished is approved by Factory Mutual, Underwriters Laboratories, Warnock Hersey or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes. Manufacturer's Certificate: Certify that the roof system is adhered properly to meet or exceed the requirements of ASCE 7.
- F. Any material submitted as equal to the specified material must be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.
- G. Submit under provisions of Section 01300.
- H. Product Data: Provide manufacturer's technical product data for each type of roofing product specified. Include data substantiating those materials comply with specified requirements.
- I. Manufacturer's Installation Instructions: Submit installation instructions and recommendations indicating special precautions required for installing the membrane. Manufacturer's Certificate: Submit a certified copy of the roofing manufacturer's ISO 9001 compliance certificate.
- K. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147.
- L. Submit a copy of an unexecuted manufacturer's warranty for review.
- M. Submit a sample of roofing aggregate for review.
- N. Design Loads: Submit copy of manufacturer's site-specific wind design load calculations according to ASCE 7-10

1.5 QUALITY ASSURANCE

- A. Fire Classification, ASTM E-108
- B. Submit certification that the roof system furnished is approved by Factory Mutual, Underwriters Laboratories or Warnock Hersey for external Fire E-108 Class 1A.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.
- B. Store all insulation materials in a manner to protect them from the wind, sun and moisture damage prior to and during installation. Any insulation that has been exposed to any moisture shall be removed from the project site.
- C. Keep materials enclosed in a watertight, ventilated enclosure (i.e. tarpaulins).
- D. Store materials off the ground. Any warped, broken or wet insulation boards shall be removed from the site.

]
PART 2 - PRODUCTS

2.1 APPROVED EQUIVALENT

- A. Contractor must submit any product did not specify a minimum ten days before the bid date for product to be considered for approval. The owner's representative will notify contractor in writing of decision to accept or reject request.

2.2 INSULATION MATERIALS

- A. Provide thicknesses of insulation as indicated to match existing elevations provide combination of types and thicknesses to provide a complete system.

1. SUBSTRATE ROOF BOARD

- a. Densdeck prime or equal, .5"
 - 1. Board Size: 4' x 8' or 4' x 4'
 - 2. Thickness: Minimum .5 in.
- b. Insulation board shall meet the following requirements
 - 1. UL, WH, FM listed under Roofing Systems.

2.3 RELATED MATERIALS

- A. Fiber Cant and Tapered Edge Strips: Performed rigid insulation units of sizes/shapes indicated, matching insulation board or of perlite or organic fiberboard, as per the approved manufacturer.
- B. Fasteners
 - 1. Corrosion resistant screw fastener as recommended by roof membrane manufacturer.
 - 2. Factory Mutual Tested and Approved with 3 in. coated disc; length required to penetrate metal deck per code requirements

PART 3 – EXECUTION

3.1 INSPECTION OF SURFACES

- A. Roofing contractor shall be responsible for preparing an adequate substrate to receive insulation.
 - 1. Verify that work penetrating roof deck has been completed.
 - 2. Verify that wood nailers as required are properly and securely installed.
 - 3. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness.
 - 4. Do not proceed until defects are corrected.
 - 5. Do not apply insulation until substrate is completely dry.
 - 6. Broom clean substrate immediately prior to application.
 - 7. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.
 - 8. Verify that temporary roof has been completed.

3.2 INSTALLATION

A. Attachment with fasteners

- 1. Insulation shall be mechanically fastened to the deck with fasteners per ASCE 7 wind uplift requirement calculation.

3.3 CLEANING

- A. Remove debris and cartons from roof deck. Leave insulation clean and dry, ready to receive roofing membrane.

END OF SECTION

1

SECTION 07 41 13
STANDING-SEAM METAL ROOF PANELS
(OWNER FURNISHED CONTRACTOR INSTALLED (OFCI))

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Standing seam metal roofing system.
- B. Standing seam metal roofing accessories.
- C. Metal roofing accessories.
- D. Required underlayment

1.2 RELATED SECTIONS

- A. Shop Drawings

1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Provide all labor, equipment, and miscellaneous materials to install District furnished CMAS materials for indicated roofing sections/buildings over the properly prepared substrate.
- C. responsible to provide all materials required to install the specified roofing system which are not provided by the school District. District provided materials are listed in the back of this specification. Contractor is responsible to install system as specified by manufacturer's installation requirements and details. Additionally, contractor shall purchase shop drawings from Garland as required by the manufacturer's warranty.
- D. Contractor shall coordinate with Garland a cut list of specified roof panels and accessories necessary to complete the project base on site measurements in coordination with Garland's technical team.
- E. Contractor is required to break District supplied flat stock as necessary for field or shop fabricated conditions.
- F. Contractor responsible to unload all materials from delivery trucks as materials will be staged at the Site. Contractor is responsible to unload those materials at the site and load to roof. Materials accepted to site by contractor shall then be contractor's 100% responsibility.

1.4 REFERENCES

- A. ASTM D 1056 - Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
- B. ASTM D 3575 - Standard Test Methods for Flexible Cellular Materials made from Olefin Polymers.
- C. ASTM E 283 - Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

- D. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- E. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- F. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
- G. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
- H. ASTM E 2140 - Standard Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head.
- I. AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure.
- J. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- K. FM 4470 Approval Standard for Class 1 Panel Roofs.
- L. FM 4471 - Class 1 Panel Roof; Factory Mutual Research Corporation.
- M. UL 263 - Fire Tests of Building Constructions and Materials.
- N. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies.
- O. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings.
- P. UL 1897 - Uplift Test for Roof Covering Systems.
- Q. SMACNA - Architectural Sheet Metal Manual.
- R. National Coil Coating Association (NCCA)
- S. NRCA - The NRCA Roofing and Waterproofing Manual.

1.5 DESIGN / PERFORMANCE REQUIREMENTS

- A. Standing Seam Roofing System: R-Mer Loc
 - 1. Thermal Expansion and Contraction:
 - a. Completed metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.
 - b. Design temperature differential shall be not less than 200 degrees F.
 - c. Interface between panel and clip shall provide for unlimited thermal movement in each direction along the longitudinal direction.
 - d. Location of metal roofing rigid connector shall be at roof ridge unless otherwise approved by the Architect. Metal ridge connector may require design as per job conditions by specified manufacturer.
 - e. ASTM E 1592: Shall be determined using pleated airbag method in accordance with ASTM E 1592, testing of sheet metal roof panels. Allowable safe working loads shall be determined by dividing the ultimate test load by the safety factor specified above.
 - f. Underwriters' Laboratories, Inc., (UL), wind uplift resistance classification: Roof assembly shall be classified as Class 1-90, as defined by UL 580
 - 2. Underwriters' Laboratories, Inc., (UL):
 - a. Underwriters' Laboratories, Inc., (UL) fire resistance P ratings for roof assemblies: If applicable, panel system shall be approved for use in an appropriate Construction Assembly, as defined by UL 263.
 - b. Underwriters' Laboratories, Inc., (UL) Class A fire rating per UL 790.
 - 3. ASTM E 1680: Static pressure air infiltration (roof panels):
 - a. Pressure Leakage Rate
 - 1) 1.57 PSF 0.0054 cfm/sq.ft.
 - 2) 6.24 PSF 0.0054 cfm/sq.ft.
 - 3) 20.0 PSF 0.0027 cfm/sq.ft.
 - 4. ASTM E 1646: Static pressure water infiltration (roof panels):
 - a. Pressure Result:

- 1) 5 Gal/Hr per S.F. and Static No Leakage
- 2) Pressure of 20.0 Psf. for 15 minutes
5. Capacities for gauge, span or loading other than those tested may be determined by interpolation of test results within the range of test data. Extrapolation for conditions outside test range is not acceptable.
6. Submit third party validation of environmental claims, prepared UL Environment, for all metal roof panels containing recycled content and/or bio based content.

1.6 SUBMITTALS

- A. Product Data: Submit product data, test reports, and certifications in accordance with quality assurance and performance requirements specified herein.
- B. Design Loads: Submit manufacturer's minimum design load calculations according to ASCE 7, Method 2 for Components and Cladding. In no case shall the design loads be taken to be less than those specified herein.
- C. Shop Drawings: Approve District supplied manufacturer shop drawings specifically for this project; Provide comments if needed regarding metal products, details, and accessories, fastening details and connections and interface with other products. Make comments as necessary prior to starting the project.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. Closeout Submittals:
 1. Provide manufacturer's maintenance instructions that include recommendations for periodic checking and maintenance of installed roof system.
 2. Provide executed copy of manufacturer's warranty.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have in place a documented, standardized quality control program such as ISO-9001 approval.
- B. Installer Qualifications: Certified and approved installer of the sheet metal roofing manufacturer.

1.8 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-roofing conference approximately two weeks before scheduled commencement of roofing system installation and associated work.
- B. Require attendance of installers of deck or substrate construction to receive roofing, installers of rooftop units and other work in and around roofing which must precede or follow roofing work including mechanical work, Architect, Owner, roofing system manufacturer's representative.
- C. Objectives include:
 1. Review foreseeable methods and procedures related to roofing work, including set up and mobilization areas for stored material and work area.
 2. Tour representative areas of roofing substrates, inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work.
 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
 4. Review roofing system requirements, Drawings, Specifications and other Contract Documents.
 5. Review and finalize schedule related to roofing work and verify availability of

materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

6. Review required inspection, testing, certifying procedures.
7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
8. Record conference including decisions and agreements reached. Furnish a copy of records to each party attending.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Contractor responsible to receive materials from Garland, unload delivery trucks and sign for proper quantities and ensure there are no damaged or missing materials upon delivery. Contractor is responsible to safely protect and stage materials on site. Any thefts or damages to materials will be the responsibility of the contractor.
- C. Contractor responsible to secure any District supplied materials in contractor supplied enclosed containers which must be locked at night.
- D. Stack pre-finished materials to prevent twisting, bending, abrasion and denting and elevate one end to facilitate moisture run-off.
- E. Unload metal panels using a boom or crane, supporting the panels in at least two locations during lifting, and never lift more than three panels at a time
- F. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
 1. Store materials above ground, on skids.
 2. Protect material with waterproof covering and allow sufficient ventilation to prevent condensation buildup or moisture entrapment on the materials.

1.10 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.11 WARRANTY

- A. Warranty:
 1. 30 year limited watertight warranty for roofs over a 3:12 slope.
 2. Provide installers 5 year warranty covering roofing system installation and watertightness.

1.12 MANUFACTURER'S INSPECTIONS

- A. When the Project is in progress, the roofing system manufacturer will provide the following:
 1. Report progress and quality of the work as observed.
 2. Provide job site inspections three days per week for a minimum of one hour each day. Provide photographic reports for each inspection day directly to the owner.
 3. Report to the Owner in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
 4. Confirm after completion that manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

PART 2 PRODUCTS

2.1 PRODUCTS – GENERAL

- A. A list of District supplied materials are indicated at the end of this specification section.

2.2 MANUFACTURERS

- A. The CMAS materials and project design is based upon roofing systems engineered and manufactured by The Garland Company. Contact local reps: Peter Cochran 949-295-0447.

2.3 STANDING SEAM METAL ROOFING

- A. R-Mer Loc: Panel with 1-3/4 inch high standing seam with 3/8-inch high clearance between panel and substrate.
1. Width of Panel:
 - a. 16 inches.
 2. Seam Height: 1-3/4 inch.
 3. Slope: Open Purlins, Slopes down to 3:12.
 4. Slope: Solid Substrate, no framing components, Slopes down to 1-1/2 :12.
 5. Panel Clips: Minimum 18 gauge, galvanized steel or stainless steel. Two-piece clips are unacceptable.
 6. Passes:
 - a. ASTM E 1592
 - b. ASTM E 1680
 - c. ASTM E 1646
 - d. Class A Fire Rating, UL-790.
 - e. UL (Class 90) 580.
 7. Panel material:
 - a. Galvanized steel 22 gauge, G90, smooth as per ASTM A 653.
 8. Flashing and flat stock material: Fabricate in profiles indicated on Drawings of same material, thickness, and finish as roof system, unless indicated otherwise.
 9. Coated Finish:
 - a. Exposed surfaces for coated panels:
 - 1) Two coat coil applied, baked-on full-strength (70% resin) fluorocarbon coating system (polyvinylidene fluoride, PVF2), applied by manufacturer's approved applicator.
 - b. Unexposed surfaces for coated panels shall be baked-on polyester coating with .20 to .30 dry film thickness (TDF).
 10. Accessory Components:
 - a. Gable anchor clips shall be minimum 18 gauge, galvanized steel or stainless steel.
 - b. Fasteners:
 - 1) Concealed fasteners: Corrosion resistant steel fasteners (zinc plated or equal) designed to meet structural loading requirements. Provide #14 as minimum fastener size.
 - 2) Exposed fasteners: Series 410 stainless steel fasteners or one-eighth (1/8) inch diameter stainless steel waterproof rivets. All exposed fasteners shall be factory painted to match the color of the standing seam panels.
 - c. Closures: Factory precut closed cell foam meeting ASTM D 1056 or ASTM D 3575, with metal trim matching panels when used at hip, ridge, jamb, and rake.
 - d. Provide all miscellaneous accessories for complete installation.

2.4 STANDING SEAM METAL ROOFING ACCESSORIES

- A. Underlayment:
 - 1. R-Mer Seal: 45 mil minimum high temp self adhesive membrane, installed in accordance with manufacturer's recommendations.
- B. Sealant:
 - 1. Concealed Applications: Non-Curing Butyl Sealant - Schnee-Morehead, Inc. SM5430 Acryl-R, or equal.
 - 2. Exposed Applications: UV Resistant Tripolymer Sealant.

2.5 METAL ROOFING ACCESSORIES

- A. R-Mer SS Sheet Stock: High gloss, factory painted aluminum
 - 1. Material and Thickness:
 - a. 22 gauge steel
 - 2. Color: To be selected by Architect, provide samples

2.6 COLOR OPTIONS

- 1. Standard collection as specified by the contract documents. Color: To be selected by Architect, provide samples

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive metal roofing. Notify the Architect in writing of any defective conditions encountered. Starting of work shall constitute acceptance of such conditions.
- B. Structural Deck Substrate:
 - 1. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped.
 - 2. Verify deck is dry and joints are solidly supported and fastened.
 - 3. Verify wood nailers are installed and correctly located. Do not use pressure-treated wood containing salt-based preservatives or materials corrosive to steel.
- C. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.

3.2 INSTALLATION

- A. Install in conformance with the NRCA Roofing and Waterproofing Manual and Manufacturers installation requirements.
- B. Form panel shape as indicated on Drawings, accurate in size, square, and free from distortion or defects.
- C. Install underlayment and eave protection sheet underlayment as recommended by the Manufacturer.
- D. Where not otherwise indicated conform to SMACNA details including flashings and trim.
- E. Install sealants where indicated to clean dry surfaces only without skips or voids.
- F. Install metal edge treatment in accordance with the manufacturer's instructions and the approved shop drawings.

- G. Install metal roofing accessories in accordance with the manufacturer's instructions and the approved shop drawings.

3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.4 OWNER SUPPLIED MATERIALS

- A. Contractor must provide all labor to install owner supplied materials as part of their bid. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor. Contractor responsible for any equipment required to load materials from truck onto roof of each site, including but not limited to required cranes and safety requirements.
- B. List of Owner supplied materials and quantities.
- C. Contractor is responsible to purchase all materials necessary to install project that are not listed below, which include all fasteners, clips, and manufacturer required accessories. Contract Garland for a complete list of contractor supplied materials and pricing to be included in contractor's bid.

<u>Product</u>	<u>Size of each</u>	
R-Mer-Lock 22ga	16" panel	
R-Mer Seal underlayment	200 sq. ft. roll	
R-Mer Flat Stock, 22 ga	4'x10' sheet	
Al-Sil Sealant	10.3 oz./Tube	
Butyl Sealant tape	Case 12	
Tuff-Stuff MS True White	10.3 oz./Tube	

END OF SECTION

SECTION 07 5500

KEE 2 PLY MEMBRANE ROOFING SYSTEM (OWNER FURNISHED CONTRACTOR INSTALLED (OFCI))

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. Provide all labor, equipment, and miscellaneous materials to install specified insulation components and the owner supplied CMAS purchased roofing system over the properly prepared substrate.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General Supplementary Conditions and Division 1 Specification Sections apply to this section.
- B. Related work specified elsewhere:
 - 1. Division 7 Section "Roof and Deck Insulation."
 - 2. Division 7 Section "Flashing & Sheet Metal."

1.3 REFERENCES

ASTM D-41	Specification for Asphalt Primer Used in Roofing, Damp proofing and Waterproofing
ASTM D-312	Specification for Asphalt Used in Roofing
ASTM D-451	Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products
ASTM D-1079	Terminology Relating to Roofing, Waterproofing and Bituminous Materials
ASTM D-1227	Specification for Emulsified Asphalt Used as a Protective Coating for Roofing
ASTM D-1863	Specification for Mineral Aggregate Used as a Protective Coating for Roofing
ASTM D-2178	Specification for Asphalt Glass Felt Used as a Protective Coating for Roofing
ASTM D-2822	Specification for Asphalt Roof Cement
ASTM D-2824	Specification for Aluminum-Pigmented Asphalt Roof Coating
ASTM D-4601	Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing
ASTM D-5147	1991 Test Method for Sampling and Testing Modified Bituminous Sheet Materials
ASTM D-6162	Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements
ASTM D-6163	Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements
ASTM E-108	Test Methods for Fire Test of Roof Coverings
FM	Factory Mutual
NRCA	National Roofing Contractors Association
UL	Underwriters Laboratories

1.4 SUBMITTALS

- A. Submit certification
 - 1. Submit roof manufacturer's certification that insulation fasteners furnished are acceptable to roof manufacturer meeting FM Requirements.
 - 2. Submit roof manufacturer's certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
 - 3. Manufacturer's Certificate: Certify that roof system furnished is approved by Factory Mutual, Underwriters Laboratories, Warnock Hersey or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.
- B. Submit certification that the roof system furnished meets local or nationally recognized building codes for fire Class A and/or wind resistance.
- C. Product Data for each type of product specified including manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required. Include data substantiating those materials comply with specified requirements.
- D. For all modified bituminous sheet roofing, include independent test data according to ASTM designation D-5147-91 "Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material", substantiating those materials comply with specified requirements.
- E. Any material submitted as an equal to specified material must also submit a list of five jobs where the proposed material has been used in a similar roofing system as that which is specified and within seventy-five-mile radius from the location of the specified job. In addition, the five jobs must be at least four years old and be available for the Owner or Owner's Representative to inspect.
- F. Show evidence that the products and materials are manufactured in the United States and that materials provided conform to all requirements specified herein and are chemically and physically compatible with each other and are suitable for inclusion within the total roof system specified herein.
- G. Show evidence that the Installer specializes in modified bituminous roof application with a minimum 5 year experience and who is certified by the roofing system manufacturer as qualified to install manufacturer's roofing materials.
- H. Provide a sample of each product.
- I. Unexecuted Manufacturer's warranty.
- J. Certified copy of ISO 9001 compliance.
- K. Any deficiencies in performance, warranty terms or improper submittal procedure will constitute grounds for immediate rejection of alternate.
- L. Shop Drawings
 - 1. Submit shop drawings indicating complete installation details of insulation system, sequence of installation, layout, drain locations, roof slopes, thicknesses, crickets and saddles.
 - 2. Shop drawing shall include: Outline of roof, location of drains, complete board layout of tapered insulation components, thickness and the average "R" value for the completed insulation system.
- N. Any material submitted as equal to the specified material must be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.
- O. Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7-10, Method 2 for Components and Cladding

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Roofing system manufacturer shall have a minimum of 20 years experience in manufacturing bitumen roofing products in the United States and be ISO 9001 certified.
- B. Installer Qualifications: Installer (Roofer) shall be specializing in modified bituminous roof application with minimum 5 years experience and who is certified by the roofing system manufacturer as qualified to install manufacturer's roofing materials.
- C. It is the intent of this specification to provide a roof system with an external fire rating. The descriptions given below are general descriptions. The insulation, recovery board, and other components shall be required by the membrane manufacturer to provide a Class A fire resistance rating.
- D. Installer's Field Supervision: Require Installer to maintain a full-time Supervisor/Foreman on job site during all phases of bituminous sheet roofing work and at any time roofing work is in progress, proper supervision of workmen shall be maintained. A copy of the specification shall always be in the possession of the Supervisor/Foreman and on the roof.
- E. It shall be the Contractor's responsibility to respond immediately to correction of roof leakage during construction. If the contractor does not respond within 24 hours, the Owner has the right to hire a qualified contractor and back charge the original contractor.
- F. Disqualification of Bidders: A bidder can be disqualified by the Architect or Owner for any of the following reasons, but not limited to:
 - 1. The failure to attend the Pre-Bid conference at the time and place so described under Bidding Dates.
 - 2. Incorrect use of the "Proposal" as provided by the Architect/Owner. Any changes in said format shall be accepted by the Architect/Owner only when requested and approved in writing prior to the bid opening. Changes in the Proposal after the opening of the bids will not be accepted.
 - 3. Lack of proficiency as shown by past work or incomplete work under other contracts which, in the judgment of the Owner might hinder or prevent the prompt completion of additional work if so awarded or any involvement in any legal actions which relate to past or present performance. This includes, but is not limited to lawsuits, court appointed actions, and/or ongoing litigation.
- G. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.
- H. Pre-application Roofing Conference: Approximately 2 weeks before scheduled commencement of modified bitumen roof system installation and associated work meet at project site with installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in the around roofing must precede or follow roofing work (including mechanical work if any), Architect/Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) Owner's insurers, test agencies and governing authorities.

Objectives to include:

 - 1. Review foreseeable methods and procedures related to roofing work.
 - 2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.
 - 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
 - 4. Review roofing system requirements (drawings, specifications, and other contract documents).
 - 5. Review required submittals both completed and yet to be completed.
 - 6. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

7. Review required inspection, testing, certifying and material usage accounting procedures.
8. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not mandatory requirement).
9. Record (contractor) discussion of conference including decisions and agreements (or disagreements) reached and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
10. Review notification procedures for weather or non-working days.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver owner supplied products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged. Contact manufacturer immediately for shortages or damaged materials. Contractor to sign for a complete and undamaged shipment.
- B. Store and handle roofing sheets in a dry, well-ventilated, weather-tight place to ensure no possibility of significant moisture exposure. Store rolls of felt and other sheet materials on pallets or another raised surface. Stand all roll materials on end. Cover roll goods with a canvas tarpaulin or other breathable material (not polyethylene).
- C. Do not leave unused materials on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.
- D. It is the responsibility of the contractor to secure all material and equipment on the job site. If any material or equipment is stored on the roof, the contractor must make sure that the integrity of the deck is not compromised at any time. Damage to the deck caused by the contractor will be the sole responsibility of the contractor and will be repaired or replaced at his expense.
- E. Owner supplied missing or damaged materials are contractor's sole responsibility.

1.7 MANUFACTURER'S INSPECTION

- A. When the project is in progress, an actual full-time employee of the Roofing System Manufacturer will provide the following:
 1. Keep the Owner informed as to the progress and quality of the work as observed.
 2. Provide job site inspections a minimum of 3 (three) days per week.
 3. Report to the Owner in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
 4. Confirm after completion of the project and based on manufacturer's observation and tests that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.8 PROJECT CONDITIONS

- A. Weather Condition Limitations: Do not apply roofing membrane during inclement weather or when a 30% chance of precipitation is expected. Owner reserves the right due to weather or other conditions without clarification to override the contractor's decision and suspend work.
- B. Do not apply roofing insulation or membrane to damp deck surface.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- D. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.

1.9 SEQUENCING AND SCHEDULING

- A. Sequence installation of modified bituminous sheet roofing with related units of work specified in other sections to ensure that roof assemblies including roof accessories, flashing, trim and joint sealers are protected against damage from effects of weather, corrosion and adjacent construction activity.
- B. All work must be fully completed on each day. Phased construction will not be accepted.

1.10 WARRANTY

- A. Upon completion of installation, and acceptance by the Owner, the manufacturer will supply to the Owner the appropriate Thirty-Year Warranty. This shall consist of a minimum 30 year no dollar limit warranty. This warranty shall also include all labor and materials for the roof system.
- B. Contractor will submit a minimum of a five-year warranty to the membrane manufacturer with a copy directly to Owner.
- C. Membrane manufacturer will provide an annual inspection for the life of the warranty at no additional cost to the owner.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Roof system owner supplied products and installation requirements based on The Garland Company, manufacturer. Contact Peter Cochran 949.295.0447

2.2 DESCRIPTION

- A. Modified bituminous roofing work including but not limited to:
 - 1. One ply of HPR torch base bonded to the prepared Densdeck Prime.
 - 2. One ply KEE FB bonded to the substrate with supplied low-rise foam adhesive.
 - 3. The KEE Membrane will be an:
 - a. 60 mil KEE FB Stone as manufactured by The Garland Company.
 - 4. Kee Lock Adhesive foam – low rise foam adhesive for the installation of kee cap sheet membrane and all vertical flashing membrane.

2.4 SHEET MATERIALS

- A. HPR Torch-Base sheet
ASTM D-6163
- B. KEE Stone FB Cap Sheet Membranes and non-FB flashing membrane
Thickness (nominal) ASTMD751/ .060

2.5 RELATED MATERIALS

- A. Roof Insulation: Reference Section 07220 - Roof and Deck Insulation for requirements.
- B. Roof Insulation Fasteners: Reference Section 07220 - Roof and Deck Insulation for requirements.
- C. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless-steel nails shall be used with aluminum;

and stainless-steel nails shall be used with stainless steel. Fasteners shall be self-clinching type of penetrating type as recommended by the manufacturer of the deck material. Nails and fasteners shall be flush-driven through flat metal discs of not less than 1-inch diameter. Metal discs may be omitted when one-piece composite nails or fasteners with heads not less than 1-inch diameter are used.

- D. Metal Discs: Flat discs or caps of zinc-coated sheet metal not lighter than 28 gauge and not less than 1-inch in diameter. Discs shall be formed to prevent dishing. Bell or cup shaped caps are not acceptable.
- E. Materials not listed shall be obtained from manufacturer representative.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Remove existing roof down to the deck as per requirements and dispose of debris. No more roofing shall be removed then can be re-roofed in any given day.
- B. Examine substrate surfaces to receive modified bitumen sheet roofing system and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Roof System Manufacturer.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.
- B. Insurance/Code Compliance: Where required, install, and test the roofing system to comply with governing regulation and specified insurance requirements.
- C. Protect other work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore other work damaged by installation of the modified bituminous roofing system work.
- D. Coordinate installing roofing system components so that insulation and roofing plies are not exposed to precipitation or left exposed overnight
- H. Apply roofing materials as specified herein unless recommended otherwise by manufacturer's instructions. Keep roofing materials dry before and during application. Do not permit phased construction. Complete application of roofing plies modified sheet and flashing in a continuous operation. Begin and apply only as much roofing in one day as can be completed that same day.
- I. Cut-Offs: At end of each day's roofing installation, protect exposed edge of incomplete work, including ply sheets and insulation.
- J. Provide walk pads at roof entrance and around all serviceable units as contractor purchased from roofing system manufacturer.

3.3 BASE PLY INSTALLATION

- A. Base Ply: Install (1) one ply of HPR Torch base shingled uniformly to achieve one ply throughout over the prepared substrate.
- B. Lap ply sheet ends 4inches. Stagger end laps twelve inches minimum.
- C. Extend ply two inches beyond top edges of cants at wall and projection bases.
- D. Install base flashing ply to all perimeter and projection details.

3.4 KEE MEMBRANE APPLICATION:

- A. Fully adhere KEE FB with KEE foam adhesive according to manufacturer requirements.

- B. Provide prefabricated pipe boots and corner flashings.
- C. Provide walk pads approved by membrane manufacturer at roof entrance and around all serviceable units.

3.5 FLASHING MEMBRANE INSTALLATION (GENERAL)

- A. All curb, wall and parapet flashings shall be sealed with an application of KEE mastic and mesh daily. No condition should exist that will permit moisture entering behind, around or under the roof or flashing membrane.
- B. The modified membrane will be used as the flashing membrane.
- C. KEE flashing membrane adhered according to detail drawings.
- D. The entire sheet of flashing membrane must be solidly adhered to the substrate.
- E. Counter flashing, cap flashings, expansion joints, and similar work to be coordinated with modified bitumen roofing work are specified in other sections.
- F. Roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices to be coordinated with the roofing system work are in other sections. Caulk the upper edge of the band with an elastomeric sealant.
- G. Metal Edge and Coping Cap as supplied by roofing manufacturer and as specified.

3.6 CURB - FLASHING

- A. Minimum curb height is eight (8) inches.
- B. Turn up field sheets min. 3" and term bar system.
- C. Install KEE bare 50 mil over flashing out 6" onto horizontal roof surface.
- D. Install metal term bar and Metal Counterflashing according to detail.

3.7 ROOF DRAIN

- A. Run roof system plies over drain. Cut out plies inside drain bowl.
- B. Install base flashing ply (forty (40) inch square minimum).
- C. Install KEE membrane (forty-eight (48) inch square minimum) in adhesive.
- D. Install clamping ring and assure that all plies are under the clamping ring.
- E. Remove drain plug and install strainer.

3.8 CLEANING

- A. Remove drippage of bitumen adhesive from all walls, windows, floors, ladders, and finished surfaces.
- B. In areas where finished surfaces are soiled by asphalt or any other sources of soiling caused by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their instructions.

3.9 FINAL INSPECTION

- A. At completion of roofing installation and associated work, meet with Installer, installer of associated work, Owner, full time employee of the roof system manufacturer, and other representatives directly concerned with performance of roofing system.
- B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs, and other equipment. List all items requiring correction or completion and furnish copy of list to each party attending.
- C. If core cuts verify the presence of damp or wet materials, the Roofing Contractor shall be required to replace the damaged areas at his own expense.
- D. Repair or replace (as required) deteriorated or defective work found at time above inspection to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

- E. The Contractor is to notify the Owner upon completion of corrections.
- F. Following the final inspection, acceptance will be made in writing by the material manufacturer.

END OF SECTION

SECTION 07 6200

FLASHINGS AND SHEET METAL WORK (OWNER FURNISHED CONTRACTOR INSTALLED (OFCI))

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. Provide all labor, equipment, and materials fabricate and install the following.
 - 1. Edge strip and flashing.
 - 2. Fascia, scuppers, and trim.
 - 3. Counterflashings over bituminous base flashing, at walls, brick pony walls, and all conditions requiring either horizontal or vertical termination.
 - 4. Counterflashings for roof accessories.
 - 5. Counterflashings at roof mounted equipment and vent stacks.
 - 6. Base flashing coverings.
 - 7. Coping cap at parapets.
 - 8. Expansion joint and area divider covers.
 - 9. Panelized wall covering systems
 - 10. Fascia and edge metal.
 - 11. Counterflashings at walls and penetrations.

1.2 RELATED SECTIONS

- A. Drawing and general provisions of the Contract, including General Supplementary Conditions and Division 1 Specification Sections, Apply to this Section.
- B. RELATED SECTIONS
 - 1. Section 07 55 00 - Modified Bitumen Roofing, Kee 2 ply roofing

1.3 REFERENCES

ASTM A-446	Specification for steel sheet
ASTM B-209	Specification for aluminum sheet
ASTM B-221	Specification for aluminum extruded shape
FS QQ-L-201	Specification for Lead Sheet
ASTM A792	Steel Sheet, Aluminum-Zinc Alloy-Coated, by the Hot-Dip Process
ASTM B32	Solder Metal
ASTM B209	Aluminum and Alloy Sheet and Plate
ASTM B486	Paste Solder
ASTM D226	Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D486	Asphalt Roof Cement, Asbestos-free
FS O-F-506	Flux, Soldering, Paste and Liquid
WH	Warnock Hersey International, Inc. Middleton, WI.
FM	Loss Prevention Data Sheet
NRCA	National Roofing Contractors Association - Roofing Manual
SMACNA	Architectural Sheet Metal Manual

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300 - Submittals.
- B. Product Data: Provide manufacturer's specification data sheets for each product in accordance with Section 01300.
- C. Provide approval letters from metal manufacturer for use of their metal within this

- particular roofing system type.
- D. Shop Drawings
1. For manufactured and shop fabricated gravel stops, fascia, scuppers, and all other sheet metal fabrications.
 2. Shop drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashing, termination's, and installation details.
 3. Indicate type, gauge and finish of metal.
- E. Certification
1. Submit roof manufacturer's certification that metal fasteners furnished are acceptable to roof manufacturer.
 2. Submit roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
- F. Manufacturer's Product Data
1. Metal material characteristics and installation recommendations.
 2. Submit color chart prior to material ordering and/or fabrication so that equivalent colors to those specified can be approved.

1.5 QUALITY CONTROL

- A. Reference Standards
1. Comply with details and recommendations of SMACNA Manual for workmanship, methods of joining, anchorage, provisions for expansion, etc.
 2. Factory Mutual Loss Prevention Data Sheet 1-49 windstorm resistance 1-90.
- B. Manufacturer's Warranty
1. Pre-finished metal material shall require a written 20-year non-prorated warranty covering fade, chalking and film integrity. The material shall not show a color change greater than 5 NBS color units per ASTM D-2244 or chalking excess of 8 units per ASTM D-659. If either occurs material shall be replaced per warranty, at no cost to the Owner.
- C. Contractor's Warranty
1. The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of two years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop and make good any damage to other work or equipment caused by such leaks or the repairs thereof.

1.6 QUALIFICATIONS

- A. Fabricator and Installer: Company specializing in sheet metal flashing work with 5 years experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels

- intact and legible.
- B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials which may cause discoloration or staining.

PART 2 - PRODUCTS

2.1 APPROVED EQUIVALENT

- A. Contractor must submit any product did not specify a minimum five days before the bid date

2.2 MATERIALS

- A. Metal system is to be comprised of minimum Galvalume steel, coated on both sides with an epoxy primer and on the weathering surface with a polyvinylidene fluoride or siliconized polyester baked organic coated finish.
 - 1. Materials
 - a. Aluminum-Zinc alloy Coated Steel
Aluminum-zinc alloy (galvalume) coated steel, ASTM A792, coating designation AZ-50, in thickness of .0217 nom. /22 gauge or 0.157 nom. / 30 gauge for accessory components; 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
 - 1. Minimum gauge of steel or thickness of Aluminum to be 24 ga. as specified in accordance with Architectural Sheet Metal Manual, Sheet Metal and Air Conditioning Contractor's National Association, Inc. recommendations.
 - b. Steel Finishes: fluorocarbon finish. Epoxy primer baked both sides, .2-.25 mils thickness as approved by finish coat manufacturer. Weathering finish as referred by National Coil Coaters Association (NCCA).
 - c. Colors shall be selected by the owner.

2.3 RELATED MATERIALS

- A. Metal Primer: Zinc chromate type.
- B. Sealant: Specified in Section 07900 or on drawings.
- D. Fasteners:
 - 1. Corrosion resistant screw fastener as recommended by metal manufacturer. Finish exposed fasteners same as flashing metal.
 - 2. Fastening shall conform to Factory Mutual 1-90 requirements or as stated on section details, whichever is more stringent.
- E. Termination Bars:
 - 1. Shall be aluminum unless otherwise recommended by membrane manufacturers.
 - 2. Material shall be .125" x 1" (minimum) aluminum conforming to ASTM B-221, mill finish. Bar shall have caulk cup as required.

PART 3 – EXECUTION

3.1 PROTECTION

- A. Protect contact areas of dissimilar metals with heavy asphalt or other approved coating, specifically made to stop electrolytic action.

3.2 GENERAL

- A. Furnish and install manufactured fascia and coping cap systems in strict accordance with manufacturer's printed instructions.
Provide factory-fabricated accessories including, but not limited to, fascia extenders, miters, scuppers, joint covers, etc. Refer to Source limitation provision in Part 1.
- B. Fastening of metal to walls and wood blocking shall comply with SMACNA Architectural Sheet Metal Manual, Factory Mutual I-90 wind uplift specifications and/or manufacturer's recommendations whichever is of the highest standard.
- C. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.
- D. Metal fascia and copings shall be secured to wood nailers at the bottom edge with a continuous cleat. Cleats shall be at least one gauge heavier than the metal it secures.

3.3 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets are in place, and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed, and secure.
- C. Beginning of installation means acceptance of existing conditions.
- D. Field measure site conditions prior to fabricating work.

3.4 MANUFACTURED SHEET METAL SYSTEMS

- A. Installing Contractor shall be responsible for determining if the sheet metal systems are in general conformance with roof manufacturer's recommendations.
- B. Furnish and install manufactured sheet metal systems in strict accordance with manufacturer's printed instructions.

3.6 COPING CAP DETAIL

1. Position base flashing of the Built-Up and/or Modified Roofing membrane over the wall edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
2. Coping to be installed over self adhering waterproof membrane in any area that roofing can not extend up and over parapet wall.
3. Install continuous cleat and fasten at six (6) inches o.c. to outside wall.
4. Install new metal coping cap hooked to continuous cleat.
5. Fasten inside cap twenty-four (24) inches o.c. with #14 fasteners with neoprene washers through slotted holes which allow for expansion and contraction.

3.7 SHOP FABRICATED SHEET METAL

- A. Installing Contractor shall be responsible for determining if the sheet metal systems are in general conformance with roof manufacturer's recommendations.
- B. Metal work shall be manufacturer fabricated to configurations and forms in accordance with recognized sheet metal practices.
- C. Hem exposed edges.
- D. Angle bottom edges of exposed vertical surfaces to form drip.
- E. All corners for sheet metal shall be lapped with adjoining pieces fastened and set in sealant.
- F. Joints for gravel stop fascia system, cap flashing, and surface-mount counterflashing shall be formed with a 1/4" opening between sections. The opening shall be covered by a cover plate or backed by an internal drainage plate formed to the profile of fascia piece.

The cover plate shall be embedded in mastic, fastened through the opening between the sections and loose locked to the drip edges.

- G. Install sheet metal to comply with Architectural Sheet Metal manual, Sheet Metal and Air Conditioning Contractor's National Associations, Inc.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:
 - a. Swinging doors.
2. Electronic access control system components, including:
 - a. Electronic access control devices.
3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
4. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
3. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
4. Division 13 Section "Radiation Protection" for requirements for lead-lining for door hardware at openings indicated to receive radiation protection.
5. Division 26 sections for connections to electrical power system and for low-voltage wiring.
6. Division 28 sections for coordination with other components of electronic access control system.

1.02 REFERENCES

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies

4. UL 305 - Panic Hardware
- B. DHI - Door and Hardware Institute
 1. Sequence and Format for the Hardware Schedule
 2. Recommended Locations for Builders Hardware
 3. Key Systems and Nomenclature
- C. ANSI - American National Standards Institute
 1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

B. Action Submittals:

1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated, and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
 - a. Door Index; include door number, heading number, and Architects hardware set number.
 - b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
 - c. Quantity, type, style, function, size, and finish of each hardware item.

- d. Name and manufacturer of each item.
- e. Fastenings and other pertinent information.
- f. Location of each hardware set cross-referenced to indications on Drawings.
- g. Explanation of all abbreviations, symbols, and codes contained in schedule.
- h. Mounting locations for hardware.
- i. Door and frame sizes and materials.
- j. Name and phone number for local manufacturer's representative for each product.
- k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components).
Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.

- 1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.

5. Key Schedule:

- a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
- b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
- c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
- d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
- e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
 - 1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
- f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

- 6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

- 1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
- 2. Product data for electrified door hardware:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
- 3. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:

- 1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.

- c. Factory order acknowledgement numbers (for warranty and service)
- d. Name, address, and phone number of local representative for each manufacturer.
- e. Parts list for each product.
- f. Final approved hardware schedule, edited to reflect conditions as-installed.
- g. Final keying schedule
- h. Copies of floor plans with keying nomenclature
- i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
- j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.04 QUALITY ASSURANCE

- A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
 - 4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
 - a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
- B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - 1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC).
 - 2. Can provide installation and technical data to Architect and other related subcontractors.
 - 3. Can inspect and verify components are in working order upon completion of installation.
 - 4. Capable of producing wiring diagrams.
 - 5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.
- C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
- D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
- F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.

G. Keying Conference

1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - d. Requirements for access control.
 - e. Address for delivery of keys.

H. Pre-installation Conference

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.

I. Coordination Conferences:

1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1. Deliver each article of hardware in manufacturer's original packaging.

C. Project Conditions:

1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:

1. Promptly replace products damaged during shipping.
2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

- F. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.07 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.
 - a. Closers:
 - 1) Mechanical: [LCN 4000 series, 30 years]
 - 2) Electrified: 2 years.
 - b. Automatic Operators: [LCN, 2 years]
 - c. Exit Devices:
 - 1) Mechanical: 3 years.
 - 2) Electrified: 1 year.
 - d. Locksets:
 - 1) Mechanical: [Schlage, 3 years]
 - 2) Electrified: 1 year.
 - e. Continuous Hinges: Lifetime warranty.
 - f. Key Blanks: Lifetime
 - 2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.08 MAINTENANCE

- A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The Owner requires use of certain products for their unique characteristics and project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
 - 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.
- B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

- A. Fasteners
 - 1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
 - 2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 - 3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
 - 4. Install hardware with fasteners provided by hardware manufacturer.
- B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.
 - 1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
 - 2. Use materials which match materials of adjacent modified areas.
 - 3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.
- C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
 - 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Ives 5BB series.
2. Acceptable Manufacturers and Products: Hager BB series, McKinney TA/T4A series, Stanley FBB Series.

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
4. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component.
10. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Aluminum Geared

1. Manufacturers:
 - a. Scheduled Manufacturer: Ives.
 - b. Acceptable Substitute: Markar, Stanley.
2. Requirements:
 - a. Provide aluminum geared continuous hinges conforming to ANSI A156.25, Grade 2.

- b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum, with .25 inch diameter Teflon coated stainless steel hinge pin.
- c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
- d. Hinges shall be capable of supporting door weights up to 450 pounds, and shall be successfully tested for 1,500,000 cycles.
- e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by a testing agency acceptable to the authority having jurisdiction.
- f. Provide aluminum geared continuous hinges with electrified option where specified. Provide with sufficient number and gage of concealed wires to accommodate electric function of specified hardware.

Install hinges with fasteners supplied by manufacturer. Hole pattern shall be symmetrically patterned.

2.05 FLUSH BOLTS

A. Manufacturers:

- 1. Scheduled Manufacturer: Ives.
- 2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:

- 1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.06 MORTISE LOCKS

A. Manufacturers and Products:

- 1. Scheduled Manufacturer and Product: Schlage L9000 series. No substitutes will be accepted.

B. Requirements:

- 1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3 hour fire doors.
- 2. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
- 3. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
- 4. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
- 5. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
- 6. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
- 7. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.

- a. Lever Design: Schlage 06A.

2.07 ELECTRONIC ACCESS CONTROL LOCKSETS – WIRELESS MORTISE-TYPE

- a. Manufacturer: “AD-300-MS” series, as manufactured by Schlage, an Allegion Company. No substitutes will be accepted.
- b. Requirements: Wireless electronic locksets to comply with the following requirements.
- 1) Type: Mortise, field-reversible handing.
 - 2) Backset: 2-3/4-inch (70 mm), nominal.
 - 3) Latchbolt: 3-piece, beveled, stainless steel with 3/4-inch (19 mm) throw and anti-friction latch.
 - 4) Chassis: Shall accommodate ANSI standard mortise lock prep for 1-3/4-inch (44 mm) doors standard, or 1-3/8-inch (35 mm) to 2-3/4-inch (70 mm) thick doors in 1/8-inch (3 mm) increments.
 - 5) Applicable Standards:
 - a) Listed, UL 294 - The Standard of Safety for Access Control System Units.
 - b) Compliant with A156.25 and A156.13 Series 1000, Grade 1 Operational and Security.
 - c) Lockset to meet or exceed ANSI Standard A156.25 and A156.13 Series 1000, Grade 1 strength and operational requirements.
 - d) Certified to UL10C, FCC Part15, Florida Building Code Standards TAS 201 large missile impact, TAS 202 and TAS 203.
 - e) Compliant with ASTM E330 for door assemblies.
 - f) Compliant with ICC / ANSI A117.1, NFPA 101, NFPA 80, and Industry Canada RSS-210.
 - 6) Lockset Functions: Provide locks with following functions, as scheduled, that are field configurable without taking the lock off the door:
 - a) Office 50.
 - 7) Emergency Override: Lockset shall have the ability to utilize emergency mechanical key override with the following manufacturer's key systems in the lever:
 - a) Small Format Interchangeable core up to 7 pin by Falcon.
 - 8) Levers:
 - a) Vandal Resistance: Exterior (secure side) lever designed with ability to rotate freely while door remains securely locked, preventing damage to internal lock components from vandalism by excessive force.
 - b) Levers shall operate independently of each other.
 - c) Style: Rhodes (06).
 - d) Tactile Warning (Knurling): Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous by the authority having jurisdiction.
 - 9) Power Supply:
 - a) Lockset powered by four AA batteries with options for eight AA batteries or a 12V or 24V DC power supply.
 - b) Lockset shall have ability to communicate battery status and battery voltage level by means of a handheld programming device at door and remotely by Partner integrated software.
 - 10) Features: Locksets shall incorporate the following features.
 - a) Ability to communicate unit's communication status.

- b) Visual tri-colored LED indicators that indicate activation, additional PIN code credential required, operational systems status, system error conditions and low power conditions.
- c) Visual bi-colored LED indicator on interior that is capable of indicating secured/unsecured status of device to occupants on interior. Optional Audible feedback that can be enabled or disabled.
- e) Tamper-Resistant Screws: Tamper torx screws on inside escutcheon for increased security.

11) Adaptability:

- a) Open Architecture: Locksets manufactured with open architecture characteristics capable of handling new and existing access control software and credential reading technology.
- b) Field changeable Reader Modules: Lockset to have the ability to change credential reader technologies without being removed from door.

12) Switches: Provide locksets with the following switches, standard:

- a) Door Position Switch
- b) Interior Cover Tamper Guard
- c) Mechanical Key Override
- d) Request to Exit
- e) Request to Enter
- f) Unlock/Lock Status (Clutch Position).

13) Credential Reader:

- a) Credential Reader Configuration: Provide credential reader modules in the following configurations, as indicated in door hardware sets.
 - i. Proximity, Smartcard and Multi-Technology.
- b) Credential reader capabilities, which can be configured at lockset with handheld programming device and remotely by Partner software to include, but may not be limited to (Verify):
 - i. 13.56 MHz Smart card credentials:
 - (a) Secure section (Multi-Technology and Smartcard): Schlage, XceedID ISO-X, MIFARE, ISO-X Lite, my-d, DESFire 8-EV1.
 - (b) 13.56 MHz Serial number only (Multi-Technology and Smartcard): MIFARE, DESfire, iClass, Inside Pictotag, ST Micro, TI Tagit.
 - ii. 125 kHz Proximity card credentials: Schlage, XceedID, HID, GE/CASI ProxLite and AWID.
 - iii. Multi-Technology readers that read both 13.56 MHz Smart Cards and 125 kHz Prox cards.
 - iv. Dual credential reading capabilities credential card or fob and PIN.

14) Operation:

- a) Lockset System Interface (Verify):
 - i. Wiegand or Clock & Data via PIM400-TD2 (Panel Interface Module).
 - ii. Directly via RS485.
- b) Lockset to have real-time bidirectional communication between access control system and lock.
- a. Remote Commanding Capability By Partner Integrated Access Control Network Software: Battery-powered lockset shall have "Wake on Radio" feature causing activation of remote, wireless access control locksets, enabling activated locksets to be configured, locked or unlocked from a centralized location within 10 seconds or less without user interface at the device.
 - c) Local Commanding: Locksets shall have the ability to be configured, locked or unlocked locally by handheld programming device, in real-time.

- d) When Utilized with Access Control Network Software With Remote Commanding Capability: Lockset shall have ability to be remotely locked down or unlocked in real-time via configurable heartbeat without user interface at the device. Real-time response of battery powered device capable of being configured at door by handheld programming device and remotely by Partner integrated software.
- e) Upon Loss of Power to Lockset: Lockset shall have ability to manage access control offline in one of three methods below that can be configured in the field at lockset by handheld programming device and remotely by Partner integrated software:
 - i. Fail locked (secured)
 - ii. Fail unlocked (unsecured)
 - iii. Fail As-Is
- f) Upon Loss of Communication Between Lockset and Network: Lockset shall have ability to manage access control offline in one of four methods below that can be configured in the field at lockset by handheld programming device and remotely by Partner integrated software:
 - i. Fail locked (secured)
 - ii. Fail unlocked (unsecured)
 - iii. Fail As-Is
 - iv. Fail to Degraded/cache mode utilizing cache memory with following selectable options:
 - (a) Grant access up to the last 1,000 unique previously accepted User IDs.
 - (b) Grant access up to the last 1,000 unique previously accepted facility/site codes
 - (c) Remove from cache previously stored User IDs or facility/site codes that have not been presented to lock within the last 5 days.
- g) Lockset shall have ability to be configured at door by handheld programming device and remotely by Partner integrated software the length of time device is unlocked upon access grant.
- h) Lockset shall have the ability to communicate identifying information such as firmware versions, hardware versions, serial numbers, and manufacturing dates by handheld programming device and remotely by Partner integrated software.
- i) Wireless Transmission:
 - i. Modulation: 900 MHz spread spectrum, direct sequence, 10 channels.
 - ii. Encryption: AES-128 bit Key minimum.

2.08 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer: Falcon.

B. Requirements:

1. Provide interchangeable cylinders/cores to match Owner's existing Falcon key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide the following keyway: Verify.

C. Construction Keying:

1. Replaceable Construction Cores.
 - a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - 1) 3 construction control keys
 - 2) 12 construction change (day) keys.
 - b. Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2.09 KEYING

- A. Provide cylinders/cores keyed into Owner's existing Falcon factory registered keying system.
- B. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- C. Requirements:
 1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - a. Master Keying system as directed by the Owner.
 2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 3. Provide keys with the following features:
 - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - b. Patent Protection: Keys and blanks protected by one or more utility patent(s)
 4. Identification:
 - a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Do not provide blind code marks with actual key cuts.
 - b. Identification stamping provisions must be approved by the Architect and Owner.
 - c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
 5. Quantity: Furnish in the following quantities.
 - a. Change (Day) Keys: 3 per cylinder/core.
 - b. Permanent Control Keys: 3.
 - c. Master Keys: 6.

2.10 DOOR CLOSERS

- A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4040XP series. No substitutes will be accepted.

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2 inch (38 mm) diameter with 5/8 inch (16 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.11 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:

1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

2.12 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer: Zero International.
2. Acceptable Manufacturers: National Guard, Reese.

B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Size of thresholds:
 - a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
 - b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.13 FINISHES

A. Finish: BHMA 626/652 (US26D); except:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Continuous Hinges: BHMA 630 (US32D)
3. Continuous Hinges: BHMA 628 (US28)
4. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
5. Protection Plates: BHMA 630 (US32D)
6. Overhead Stops and Holders: BHMA 630 (US32D)
7. Door Closers: Powder Coat to Match
8. Wall Stops: BHMA 630 (US32D)
9. Latch Protectors: BHMA 630 (US32D)
10. Weatherstripping: Clear Anodized Aluminum
11. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
- C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Where on-site modification of doors and frames is required:
 - 1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
 - 2. Field modify and prepare existing door and frame for new hardware being installed.
 - 3. When modifications are exposed to view, use concealed fasteners, when possible.
 - 4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
 - a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
 - b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
 - c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- H. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying section.
 - 2. Furnish permanent cores to Owner for installation.
- I. Wiring: Coordinate with Division 26, ELECTRICAL sections for:
 - 1. Conduit, junction boxes and wire pulls.
 - 2. Connections to and from power supplies to electrified hardware.

3. Connections to fire/smoke alarm system and smoke evacuation system.
 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 5. Testing and labeling wires with Architect's opening number.
- J. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- M. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- N. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- O. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- P. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- Q. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- R. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 FIELD QUALITY CONTROL

- A. Engage qualified manufacturer trained representative to perform inspections and to prepare inspection reports.
1. Representative will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.05 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

C. Door closing speeds shall be as follows: CBC Section 11B-404.2.8.

1. Closer shall be adjusted so that the required time to move a door from an open position of 90 degrees to a position of 12 degrees from the latch is 5 seconds minimum.
2. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is 1.5 seconds minimum.

D. The force for pushing or pulling open a door shall be as follows: CBC Section 11B-404.2.9.

1. Interior hinged doors, sliding or folding doors, and exterior hinged doors: 5 lbs. (22.2N) maximum.
2. Required fire doors: the minimum opening force allowable by the DSA Authority, not to exceed 15 lbs. (67N) maximum.
3. The force required to activate any operable parts, such as retracting latch bolts or disengaging other devices shall be 5 lbs. (22.2N) maximum to comply with CBC Section 11B-309.4.

3.06 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.









3.07 DOOR HARDWARE SCHEDULE

- A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.
- B. Hardware Sets: Starting on next page.

Hardware Group No. 1

For use on Door #(s):

PB-101 PB-102 PB-103 U-101

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		628	IVE
1	EA	ELEC OFFICE LOCK	AD-300-MS-50-MT-SPA-LDFA7 12/24 VDC		626	SCE
1	EA	SFIC CORE	C607		626	FAL
1	EA	SFIC CONST. CORE	C607CCA		622	FAL
1	EA	SURFACE CLOSER	4040XP EDA SRI		689	LCN
1	EA	FLOOR STOP	FS444		US26D	IVE
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER

TIE TO EXISTING ACCESS CONTROL SYSTEM.









KEY TO EXISTING FALCON SFIC.

VERIFY THRESHOLD CONDITION

Hardware Group No. 1A

For use on Door #(s):

V-101 W-101

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		628	IVE
1	EA	ELEC OFFICE LOCK	AD-300-MS-50-MT-SPA-LDFA7 12/24 VDC		626	SCE
1	EA	SFIC CORE	C607		626	FAL
1	EA	SFIC CONST. CORE	C607CCA		622	FAL
1	EA	OH STOP & HOLDER	100H		630	GLY
1	EA	SURFACE CLOSER	4040XP EDA SRI		689	LCN
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER

TIE TO EXISTING ACCESS CONTROL SYSTEM.

KEY TO EXISTING FALCON SFIC.

VERIFY THRESHOLD CONDITION

Hardware Group No. 2









For use on Door #(s):

V-103

V-104

W-103

W-104

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	CONT. HINGE	112HD		628	IVE
1	EA	ELEC OFFICE LOCK	AD-300-MS-50-MT-SPA-LDFA7 12/24 VDC		626	SCE
1	EA	SFIC CORE	C607		626	FAL
1	EA	SFIC CONST. CORE	C607CCA		622	FAL
1	EA	SURFACE CLOSER	4040XP RW/PA SRI		689	LCN
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER

TIE TO EXISTING ACCESS CONTROL SYSTEM.









KEY TO EXISTING FALCON SFIC.

VERIFY THRESHOLD CONDITION

Hardware Group No. 3

For use on Door #(s):

X-101

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		628	IVE
1	EA	PANIC HARDWARE	PA-AX-98-L-17		626	VON
1	EA	SFIC RIM HOUSING	80-129		626	SCH
1	EA	SFIC CORE	C607		626	FAL
1	EA	SFIC CONST. CORE	C607CCA		622	FAL
1	EA	SURFACE CLOSER	4040XP EDA SRI		689	LCN
1	EA	FLOOR STOP	FS444		US26D	IVE
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER

KEY TO EXISTING FALCON SFIC.






VERIFY THRESHOLD CONDITION

Hardware Group No. 4

For use on Door #(s):

PB-102A

PB-102B






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		628	IVE
1	EA	OFFICE/ENTRY LOCK	L9050BD 17A 09-544		626	SCH
1	EA	SFIC CORE	C607		626	FAL
1	EA	SFIC CONST. CORE	C607CCA		622	FAL
1	EA	FLOOR STOP	FS439		682	IVE

KEY TO EXISTING FALCON SFIC.

Hardware Group No. 4A

For use on Door #(s):








V-101A W-101A

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		628	IVE
1	EA	OFFICE/ENTRY LOCK	L9050BD 17A 09-544		626	SCH
1	EA	SFIC CORE	C607		626	FAL
1	EA	SFIC CONST. CORE	C607CCA		622	FAL
1	EA	OH STOP & HOLDER	90H		630	GLY
KEY TO EXISTING FALCON SFIC.						

Hardware Group No. 4B

For use on Door #(s):










V-105

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		628	IVE
1	EA	CORRIDOR LOCK	L9456BD 17A 09-544		626	SCH
1	EA	SFIC CORE	C607		626	FAL
1	EA	SFIC CONST. CORE	C607CCA		622	FAL
1	EA	SURFACE CLOSER	4040XP EDA SRI		689	LCN
1	EA	FLOOR STOP	FS444		US26D	IVE
1	EA	THRESHOLD	655A-223		A	ZER
KEY TO EXISTING FALCON SFIC.						

Hardware Group No. 5

For use on Door #(s):

V-102 W-102

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD		628	IVE
2	EA	MANUAL FLUSH BOLT	FB458		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	OFFICE/ENTRY LOCK	L9050BD 17A 09-544		626	SCH
1	EA	SFIC CORE	C607		626	FAL
1	EA	SURFACE CLOSER	4040XP EDA SRI		689	LCN
2	EA	FLOOR STOP	FS444		US26D	IVE
2	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER
KEY TO EXISTING FALCON SFIC.						
VERIFY THRESHOLD CONDITION						

Hardware Group No. 6








For use on Door #(s):

V-102B

V-102A

W-102A

W-102B

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD		628	IVE
2	EA	MANUAL FLUSH BOLT	FB458		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	OFFICE/ENTRY LOCK	L9050BD 17A 09-544		626	SCH
1	EA	SFIC CORE	C607		626	FAL
1	EA	SFIC CONST. CORE	C607CCA		622	FAL
2	EA	FLOOR STOP	FS439		682	IVE
KEY TO EXISTING FALCON SFIC.						

END OF SECTION

RESILIENT WALL BASE
(OWNER FURNISHED CONTRACTOR INSTALLED (OFCI))

1

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Rubber bases.
 - 2. Adhesive.
- B. Related requirements: Other Sections of Division 09 for resilient flooring.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Scheduling and sequencing:
- B. Pre-installation meeting:

1.3 SUBMITTALS

- A. Samples: 12-inch long Samples of each type and color of base.
- B. Data: Proof of compliance with specified requirements.

1.4 HANDLING

- A. Store materials indoors at a temperature above 60-degree F for at least 24 hours before use.

1.5 JOB CONDITIONS

- A. Illuminate work areas during installation to provide the same or greater level of illumination required to properly perform the work and as will occur in the room or space after the building is in operation.
- B. Maintain temperature in spaces to receive resilient bases between 70-degree and 90-degree F for not less than 24 hours before and 48 hours after its installation.
- C. Maintain minimum temperature of 60-degree F after bases have been installed, except as specified above.

1.6 MAINTENANCE

- A. Furnish 100 feet of each type and color of base for future maintenance.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Rubber bases:
 - 1. One-eight-inch thick, by height indicated on the Drawings, ASTM F 1861, Type TS (thermoset vulcanized rubber), Group 1 (homogeneous).
 - 2. By Burke Flooring Products, Roppe Rubber Corp., Johnsonite, Flexco Co. or Mercer Products Co., Inc., of the color(s) selected by the Architect.
 - 3. Top set base where no flooring and resilient flooring occur; straight (carpet) base at all other locations; do not use preformed corners.
 - 4. In rolls minimum 100-foot long. Walls 20-foot or less in one piece; do not use short pieces.
 - 5. Base shall be from same batch and run number for each color.
- B. Adhesive: Type and brand recommended by base manufacturer for the conditions of use.

PART 3 - EXECUTION

3.1 EXAMINATION/PREPARATION

- A. Examine walls for excessive moisture content and unevenness which would prevent the proper execution of the work of this Section. Fill cracks and sand down bumps.
- B. Remove dirt, oil, grease, or other foreign matter from surfaces to receive bases.
- C. Correct detrimental conditions before proceeding with installation.
- D. Do not install bases until they are same temperature as space where they are to be installed. Move bases and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

3.2 ADHESIVE

- A. Mix and apply adhesive in compliance with its manufacturer's instructions.
- B. Provide safety precautions during mixing and application as recommended by the adhesive manufacturer.
- C. Apply adhesive uniformly over backing surfaces, but only on areas which can be covered by bases within the recommended working time of the adhesive.
- D. Tape adjacent surfaces to prevent migration and misapplication of adhesive.
- E. Remove adhesive which dries or films over. Do not soil walls, bases, and other adjacent surfaces with adhesive. Promptly remove spillage from adjacent surfaces without damaging those surfaces.

3.3 BASE

- A. At masonry surfaces, fill voids along top edges of base with base manufacturer's recommended adhesive filler material.
- B. Match edges at seams or double cut adjoining lengths. Install with hairline, flush butt joints.
- C. Locate end of runs not less than 36 inches from a corner, except where impossible due to length of wall.
- D. Do not use pieces less than 6-foot long, except where impossible due to length of wall.
- E. Do not use preformed corner pieces [, except for vented base].
 - 1. Form inside corners on job from straight pieces of maximum lengths possible by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce snug fit to substrate.
 - 2. Form outside corners on job from straight pieces of maximum lengths possible by shaving back of base at point where bending will occur. Remove a strip perpendicular to length of base and only deep enough to produce a snug fit without bends whitening or removal of more than half the thickness of base.
 - 3. Form without producing discoloration (whitening) at bends.
- F. Scribe base accurately to abutting materials.

3.4 FIELD QUALITY CONTROL

- A. After adhesive sets, clean bases with a neutral cleaner recommended by the base manufacturer.
- B. Verify that there are no open joints and that base is completely adhered for its full length. Re-install in fresh adhesive where applicable.
- C. Protect completed installations from damage until final acceptance.

END OF SECTION

SECTION 10 7516

FLAGPOLES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Ground set aluminum flagpoles.
- B. Related Requirements:
 - 1. Division 01 - General Requirements.
 - 2. Section 03 3000 - Cast-In-Place Concrete.

1.02 STRUCTURAL PERFORMANCE

- A. Provide flagpole assemblies, including anchorages and supports, capable of withstanding the effects of wind loads, determined according to NAAMM FP 1001, "Guide Specifications for Design of Metal Flagpoles" or to CBC wind loads, whichever is more stringent.
 - 1. Base flagpole design on polyester flags of maximum standard size suitable for use with flagpole or size indicated, whichever is more stringent.

1.03 SUBMITTALS

- A. Shop Drawings: Include elevations and details showing general arrangement, jointing, fittings and accessories, grounding, anchoring and supporting systems, and manufacturer's specifications.
- B. Product Data: Submit manufacturer's product literature.
- C. Installation Instructions: Submit manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

- A. Qualifications of Manufacturer: Flagpole shall be the product of a manufacturer who has been regularly engaged in manufacture of flagpoles for at least five years.
- B. Source Limitations: Furnish flagpole as a complete unit, including fittings, accessories, bases, and anchorage devices, from a single manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Spiral wrap with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following manufacturers:
 - 1. Southern California Flagpole.
 - 2. American Flagpole, Division of Kearney-National Inc. Co.
 - 3. Concord Industries, Inc
 - 4. Approved equal.

2.02 FLAGPOLES

- A. Flagpoles shall be cone-tapered fabricated from seamless extruded aluminum tubing complying with ASTM B241, Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube, alloy 6063 T6, with a minimum wall thickness of 3/16 inch.
- B. Exposed Flagpole Height: 50-foot.
- C. Construct flagpoles in one piece unless more than one piece is necessary due to structural performance. When more than one piece is required, provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.

2.03 FITTINGS

- A. External Halyard with Locking Cleat and Halyard Cover: Manually operated external cleat with key. Halyard to run through stainless steel ball bearing sheaves.
- B. Finial Ball: Manufacturer's standard flush seam ball, 0.063 inch thick. Diameter of ball shall be approximately same as pole butt diameter, or as indicated in the drawings.
 - 1. Spun aluminum finish to match flagpole.
- C. Flag Snap Hooks and Halyard: Provide four chromium plated bronze or stainless steel snap hooks per halyard, including neoprene or vinyl covers. Provide a 5/16 inch diameter nylon rope.
- D. Flash Collar: Manufacturer's standard collar to seal flagpole base and anchorage system from weather. Spun aluminum finish to match flagpole.
- E. Furnish foundation, foundation sleeves and required attachments and accessories for a complete flagpole installation.
- F. Provide an American Flag and one California State Flag, 3ft x 5ft.

2.04 METAL FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Aluminum: Fine, directional, medium satin polish, in accordance with AA-M32 and clear anodized in accordance with AA-M32-C22-A41.

2.05 CONCRETE

- A. Twenty eight day compressive strength of 3,000 psi minimum. Refer to Section 32 1313 - Site Concrete Work.

PART 3 - EXECUTION

3.01 ERECTION

- A. Install in accordance with Shop Drawings and manufacturer's written recommendations.

3.02 TOLERANCES

- A. Flagpole shall be true and plumb after installation with cleat located in prevailing wind direction. Maximum variation from true vertical shall be within one inch of true vertical, measured at top of pole, in three directions.

3.03 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.04 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

FOOTBALL SCOREBOARD
(OWNER FURNISHED CONTRACTOR INSTALLED (OFICI))

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Single-sided LED football scoreboard

1.02 REFERENCES

- A. Standard for Electric Signs, UL 48
- B. Standard for CSA C22.2 #207
- C. Federal Communications Commission Regulation Part 15
- D. National Electric Code

1.03 SUBMITTALS

- A. Product data: Submit manufacturer's product illustrations, data and literature that fully describe the scoreboards and accessories proposed for installation.
- B. Shop drawings: Submit mechanical and electrical drawings.
- C. Maintenance data: Submit manufacturer's installation, operation, and maintenance manuals.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Product delivered on site
- B. Scoreboard and equipment to be housed in a clean, dry environment

1.05 PROJECT CONDITIONS

- A. Environmental limitations: Do not install scoreboard equipment until mounting structure is secure and concrete has ample time to cure.
- B. Field measurements: Verify position and elevation of structure and its layout for scoreboard equipment. Verify dimensions by field measurements.
- C. Verify mounting structure is capable of supporting the scoreboard's weight and windload in addition to the auxiliary equipment.
- D. Installation may proceed within acceptable weather conditions.

1.06 QUALITY ASSURANCE

- A. For outdoor use
- B. Source Limitations: Obtain each type of scoring or related equipment through one source from a single manufacturer.
- C. ETL listed to UL 48
- D. NEC compliant
- E. FCC compliant
- F. ETLC listed to CSA 22.2 #207

1.07 WARRANTY

- A. Provide 5 years of no cost parts exchange including standard shipping on electronics parts and radios due to manufacturing defects
- B. Provide toll-free service coordination
- C. Provide technical online and phone support during Daktronics business hours

PART 2 PRODUCTS**2.01 MANUFACTURER**

- A. Daktronics, Inc., 201 Daktronics Drive, P.O. Box 5128, Brookings, SD 57006-5128

SECTION 11 68 43

FOOTBALL SCOREBOARD

B. Approved equal.

2.02 PRODUCT

- A. Daktronics FB-2021 single-sided football scoreboard displays period time to 99:59, HOME and GUEST scores to 99, and DOWN/TO GO/BALL ON/QTR (quarter) information. T.O.L. (time outs left) to nine are optional. Arrows indicate possession. During the last minute of the period, the clock displays time to 1/10 of a second.

2.03 SCOREBOARD

- A. General information
1. Dimensions: 8'-0" (2.44 m) high, 25'-0" (7.62 m) wide, 0'-8" (203 mm) deep
 2. Base weight: 820 lb (372 kg) with vinyl captions – options may increase weight
 3. Base power requirement: 290 W (white digits), 620 W (white digits) with vinyl captions – options may increase wattage
 4. Color: provide over 150 colors to choose from
- B. Construction
1. Alcoa aluminum alloy 5052 for excellent corrosion resistance
 2. Scoreboard back, face, and perimeter: 0.063" (1.60 mm) thick
 3. Scoreboard top and bottom: 0.125" (3.18 mm) thick
 4. Side panels (Non-backlit) 3'-0" high x 8'-6" wide each side
- C. Digits & Indicators
1. LED color
Game information digits White, team information digits White
 2. Clock digits: 30" (762 mm) high
 3. HOME, GUEST, DOWN, TO GO, BALL ON, and QTR digits: 24" (610 mm) high
 4. Seven bar segments per digit
 5. PanaView® LED digit technology
 6. All digits and indicators are sealed front and back with weather-tight silicone gel
- D. Captions
1. Vinyl applied directly to scoreboard face
 2. HOME and GUEST captions: 15" (381 mm) high
 3. DOWN, TO GO, BALL ON, and QTR captions: 12" (305 mm) high
 4. Color: standard white or others available upon request
- E. Accessory Equipment
- Custom team name caption in place of HOME.
1. Soccer captions on changeable panels
 2. LED Colon
 3. Horn
 4. Individual digit protective screens
 5. Back of scoreboard to be painted the same color as the front.

2.04 SCORING CONSOLE

- A. Console is an All Sport® 5000 controller
- B. Scores multiple sports using changeable keyboard inserts
- C. Controls multiple scoreboards and displays, including other All Sport 5000 controlled displays currently owned by customer
- D. Recalls clock, score, and period information if power is lost
- E. Console capable of automatically calculating and displaying DOWN & TO GO for each play
- F. Runs Time of Day and Segment Timer modes

SECTION 11 68 43

FOOTBALL SCOREBOARD

G. Console includes:

1. Rugged aluminum enclosure to house electronics
2. Sealed membrane water-resistant keyboard
3. 32-character LCD to verify entries and recall information currently displayed
4. Power cord that plugs into a standard grounded outlet; 6 watts max
5. Control cable to connect to the control receptacle junction box (wired system only)
6. Hand-held switch for main clock start/stop and horn
7. Soft-sided carrying case

H. Accessory Equipment

1. 2.4 GHz spread spectrum radio system with frequency hopping technology and 64 non-interfering channels; system includes a transmitter installed inside the console and a receiver installed inside the scoreboard(s)
2. Hard carrying case
3. Battery pack

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that mounting structure is ready to receive scoreboard. Verify that placement of conduit and junction boxes are as specified and indicated in plans and shop drawings. Verify concrete has cured adequately according to specifications.

3.02 INSTALLATION

- A. All power and control cables to scoreboards and displays will be routed in conduit. Power to the scoreboards/displays as well as raceways shown on electrical plans by the Electrical Contractor. Scoreboard control wiring including conduit will be the responsibility of the contractor assigned the scoreboard equipment.
- B. Install scoreboards and exterior displays to beams in location detailed and in accordance with manufacturer's instructions. Verify unit is plumb and level.

3.03 INSTALLATION—CONTROL CENTER

- A. Provide boxes, cover plates and jacks in locations per plans.
- B. Test connect control unit to all jacks and check for proper operation of control unit, scoreboard and all features. Leave control unit in carrying case and other loose accessories with owner's designated representative.
- C. Verify earth ground does not exceed 15 ohms.

END OF SECTION

ATHLETIC FIELD LIGHTING
(OWNER FURNISHED CONTRACTOR INSTALLED (OFICI))

1

PART 1 - GENERAL

1.1 SUMMARY - LIGHTING SYSTEM WITH LED LIGHT SOURCE

- A. Work covered by this section of the specifications shall conform to the contract documents, engineering plans as well as state and local codes.
- B. The purpose of these specifications is to define the lighting system performance and design standards for La Mirada High School Football using an LED Lighting source. The manufacturer / contractor shall supply lighting equipment to meet or exceed the standards set forth in these specifications.
- C. The sports lighting will be for the following venues:
 - 1. Football
 - 2. Soccer
 - 3. Track and Field
 - 4. Bleachers and surrounding spaces
- D. The primary goals of this sports lighting project are:
 - 1. Guaranteed Light Levels: Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators; therefore, light levels shall be guaranteed to not drop below specified target values for a period of 25 years.
 - 2. Environmental Light Control: It is the primary goal of this project to minimize spill light and glare.
 - 3. Cost of Ownership: In order to reduce the operating budget, the preferred lighting system shall be energy efficient and cost effective to operate. All maintenance costs shall be eliminated for the duration of the warranty.
 - 4. Control and Monitoring: To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system. Fields should be proactively monitored to detect luminaire outages over a 25-year life cycle. All communication and monitoring costs for 25-year period shall be included in the bid.

1.2 RELATED SECTIONS

- A. Division 01: GENERAL CONDITIONS
- B. Division 03: CONCRETE
- C. Division 26: Electrical
- D. Division 31: EARTHWORK

1.3 REFERENCES

- A. California Building Code (CBC)
- B. California Electric Code (CEC)
- C. National Electrical Contractors Association (NECA)
- D. California Administrative Code Title 24
- E. American National Standards Institute (ANSI)
- F. Illuminating Engineers Society (IES)
- G. Institute of Electrical and Electronics Engineers (IEEE)
- H. National Electric Manufacturer's Association (NEMA)
- I. City, State and other local codes and requirements as applicable

1.4 SUBMITTALS

- A. Refer to Division 01 for procedures for shop drawings and submittals.
- B. Product Data: Submit manufacturer's product data and installation instructions on each type of exterior lighting fixture and component as per the requirements of Basic Electrical Requirements Section. Data shall be sufficient to show conformance to specified requirements and shall include the following:
 - 1. Luminaires, including LED light engines and drivers, and all mounting hardware.
 - 2. Poles, brackets, anchor bolts, yokes, mounting devices & all required accessories.
 - 3. Data for each type of LED light engine and LED driver
- C. Shop Drawings:
 - 1. Luminaires: Submit light fixture shop drawings in booklet form with separate sheet for each fixture, assembled in "fixture type" alphabetical or numerical order, with proposed fixture and accessories clearly indicated on each sheet. Include dimensions, accessories and installation and construction details. Photometric data, including zonal lumen data, average and minimum ratio.
 - 2. Poles: Include dimensions, wind load determined in accordance with AASHTO LTS-1, pole deflection, pole class and other applicable information. Include information for anchor bolts, hand holes, pole shaft, base plate, finish, etc.
 - 3. Mounting Accessories: Submit complete details for all mounting accessories, including stainless steel straps for tree mounting of fixtures.
- D. Wiring Diagrams: Submit control wiring diagrams for exterior lighting indicating all control devices, photocells, time switches, contactors, etc. as indicated, described or required.
- E. Samples: Submit samples as requested. Samples will be required for all substitutions, to allow proper evaluation of the proposed substitute.
- F. Should the Contractor desire to propose substitutions, the Contractor shall provide all tests, data, samples, calculations, etc. that may be required by the Owner's Representative, as necessary to evaluate such substitutions, all at no cost to the Owner. Submittal for proposed substitutes shall

include a complete computer generated “point by point” foot-candle calculation with horizontal and vertical foot-candle levels indicated for all surfaces of the illuminated area, etc.

1.5 CODES, REGULATIONS AND STANDARDS

- A. The materials herein shall be new and furnished in accordance with specifications of the Institute of Electrical and Electronics Engineers, National Electric Manufacturer's Association, National Fire Protection Association and the California Electrical Code.

1.6 LIGHTING PERFORMANCE CRITERIA

- A. Illumination Levels and Design Factors: Playing surfaces shall be lit to an average target illumination level and uniformity as specified in the chart below. Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number of grid points specified below. Appropriate light loss factors shall be applied and submitted for the basis of design. Average illumination level shall be measured in accordance with the IESNA LM-5-04 (IESNA Guide for Photometric Measurements of Area and Sports Lighting Installations). Illumination levels shall not to drop below desired target values in accordance to IES RP-6-15, Page 2, Maintained Average Illuminance and shall be guaranteed for the full warranty period.

- a. Refer to Paragraph 3.5 for ‘post-installation’ testing and reporting requirements.

Area of Lighting	Average Target Illumination Levels	Maximum to Minimum Uniformity Ratio	Grid Points	Grid Spacing
Football	50 footcandles	2.0:1	72	30' x30'
Soccer	50 footcandles	2.0:1	96	30' x 30'
Track	19 footcandles	N/A	52	30' x 30'
Egress	4 footcandles	10.0:1	474	10' x 10'

Bleacher Lighting - Home				
Bleacher - Field	7 footcandles	N/A	217	10' x 10'
Egress	6 footcandles	N/A	217	10' x 10'
ADA East Ramp	1.5 footcandles	N/A	27	5' x 5'
ADA Egress East Ramp	5 footcandles	N/A	27	5' x 5'
ADA West	3.5 footcandles	N/A	14	5' x 5'
ADA Egress West	6 footcandles	N/A	14	5' x 5'

Bleacher Lighting - Visitor				
Bleacher - Field	7.5 footcandles	N/A	128	10' x 10'
Egress	6 footcandles	N/A	128	10' x 10'
ADA West Ramp	4 footcandles	N/A	30	5' x 5'
ADA Egress West Ramp	7 footcandles	N/A	30	5' x 5'
ADA East Ramp	4 footcandles	N/A	30	5' x 5'
ADA Egress East Ramp	7 footcandles	N/A	30	5' x 5'

- B. Color: The lighting system shall have a minimum color temperature of 5700K and a CRI of 75.
- C. Mounting Heights: To ensure proper aiming angles for reduced glare and to provide better playability, minimum mounting heights shall be as described below. Higher mounting heights may be required based on photometric report and ability to ensure the top of the field angle is a minimum of 10 degrees below horizontal.

# of Poles	Pole Designation	Pole Height
1	F5	110'
5	F1-F4, F6	100'

1.6 ENVIRONMENTAL LIGHT CONTROL

- A. Light Control Luminaires: All luminaires shall utilize spill light and glare control devices including, but not limited to, internal shields, louvers and external shields. No symmetrical beam patterns are accepted.
- B. Spill Light and Glare Control: To minimize impact on adjacent properties, spill light and candela values must not exceed the following levels taken at 3 feet above grade.

Foster Road Spill	Average	Maximum
Specified Spill Line Horizontal Footcandles	.1 fc	.1 fc
Specified Spill Line Max Vertical Footcandles	.1 fc	.2 fc
Specified Spill Line Max Candela	<2000 Cd	<7000 Cd

- C. Spill Scans: Spill scans must be submitted indicating the amount of horizontal and vertical footcandles along the specified lines. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both horizontal and aimed towards the most intense bank of lights. Illumination level shall be measured in accordance with the IESNA LM-5-04 after 1 hour warm up.
- D. The first page of a photometric report for all luminaire types proposed showing horizontal and vertical axial candle power shall be provided to demonstrate the capability of achieving the specified performance. Reports shall be certified by a qualified testing laboratory with a minimum of five years of experience or by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products. A summary of the horizontal and vertical aiming angles for each luminaire shall be included with the photometric report.

1.7 COST OF OWNERSHIP

- A. Manufacturer shall submit a 25-year Cost of Ownership summary that includes energy consumption, anticipated maintenance costs, and control costs. All costs associated with faulty luminaire replacement - equipment rentals, removal and installation labor, and shipping - are to be included in the maintenance costs.

1.8 SUBSTITUTIONS

- A. Approved Product: Musco's Light-Structure System™ with TLC for LED™ is the approved product. All substitutions must provide a complete submittal package for approval as outlined in Submittal Information at the end of this section at least 10 days prior to bid. Special manufacturing to meet the standards of this specification may be required. An addendum will be issued prior to bid listing any other approved lighting manufacturers and designs.
- B. Design Approval: The owner / engineer will review pre-bid submittals, per this section, from all the manufacturers to ensure compliance to the specification 10 days prior to bid. If the design meets the design requirements of the specifications, a letter and/or addendum will be issued to the manufacturer indicating approval for the specific design submitted.
- C. All listed manufacturers not pre-approved shall submit the information at the end of this section at least 10 days prior to bid. An addendum will be issued prior to bid; listing approved lighting manufacturers and the design method to be used.
- D. Bidders are required to bid only products that have been approved by this specification or addendum by the owner or owner's representative. Bids received that do not utilize an approved system/design, will be rejected.
- E. REQUIRED SUBMITTAL INFORMATION FOR ALL MANUFACTURERS (NOT PRE-APPROVED)
10 DAYS PRIOR TO BID

1. All items listed below are mandatory, shall comply with the specification and be submitted according to pre-bid submittal requirements. Complete the Yes/No column to indicate compliance (Y) or noncompliance (N) for each item. Submit checklist below with submittal.

Yes/ No	Tab	Item	Description
	A	Letter/ Checklist	Listing of all information being submitted must be included on the table of contents. List the name of the manufacturer's local representative and his/her phone number. Signed submittal checklist to be included.
	B	Equipment Layout	Drawing(s) showing field layouts with pole locations
	C	On Field Lighting Design	Lighting design drawing(s) showing: <ul style="list-style-type: none"> a. Field Name, date, file number, prepared by b. Outline of field(s) being lighted, as well as pole locations referenced to the center of the field (x & y), Illuminance levels at grid spacing specified c. Pole height, number of fixtures per pole, horizontal and vertical aiming angles, as well as luminaire information including wattage, lumens and optics d. Height of light test meter above field surface. e. Summary table showing the number and spacing of grid points; average, minimum and maximum illuminance levels in foot candles (fc); uniformity including maximum to minimum ratio, coefficient of variance (CV), coefficient of utilization (CU) uniformity gradient; number of luminaires, total kilowatts, average tilt factor; light loss factor.
	D	Off Field Lighting Design	Lighting design drawing showing initial spill light levels along the boundary line (defined on bid drawings) in footcandles. Lighting design showing glare along the boundary line in candela. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both horizontal and aimed towards the most intense bank of lights.
	E	Photometric Report	Provide first page of photometric report for all luminaire types being proposed showing candela tabulations as defined by IESNA Publication LM-35-02. Photometric data shall be certified by laboratory with current National Voluntary Laboratory Accreditation Program or an independent testing facility with over 5 years experience.
	F	Performance Guarantee	Provide performance guarantee including a written commitment to undertake all corrections required to meet the performance requirements noted in these specifications at no expense to the owner. Light levels must be guaranteed to not fall below target levels for warranty period.
	G	Structural Calculations	Pole structural calculations and foundation design showing foundation shape, depth backfill requirements, rebar and anchor bolts (if required). Pole base reaction forces shall be shown on the foundation drawing along with soil bearing pressures. Design must be stamped by a structural engineer in the state of California, if required by owner.
	H	Control & Monitoring System	Manufacturer of the control and monitoring system shall provide written definition and schematics for automated control system. They will also provide ten (10) references of customers currently using proposed system in the state of California.
	I	Electrical Distribution Plans	Manufacturer bidding an alternate product must include a revised electrical distribution plan including changes to service entrance, panels and wire sizing, signed by a licensed Electrical Engineer in the state of California.

	J	Warranty	Provide written warranty information including all terms and conditions. Provide ten (10) references of customers currently under specified warranty in the state of California.
	K	Project References	Manufacturer to provide a list of five (5) projects where the technology proposed for this project has been installed in the state of California. Reference list will include project name, project city, installation date, and if requested, contact name and contact phone number.
	L	Product Information	Complete bill of material and current brochures/cut sheets for all product being provided.
	M	Delivery	Manufacturer shall supply an expected delivery timeframe from receipt of approved submittals and complete order information.
	N	Non-Compliance	Manufacturer shall list all items that do not comply with the specifications. If in full compliance, tab may be omitted.
	O	Cost of Ownership	Document cost of ownership as defined in the specification. Identify energy costs for operating the luminaires. Maintenance cost for the system must be included. All costs should be based on 25 Years
	P	Environmental Light Control Design	Environmental glare impact scans must be submitted showing the maximum candela from the field edge on a map of the surrounding area until 500 candela or less is achieved.

2. The information supplied herein shall be used for the purpose of complying with the specifications for La Mirada High School Football. By signing below I agree that all requirements of the specifications have been met and that the manufacturer will be responsible for any future costs incurred to bring their equipment into compliance for all items not meeting specifications and not listed in the Non-Compliance section.

Manufacturer: _____ Signature: _____

Contact Name: _____ Date: ____/____/____

Contractor: _____ Signature: _____

PART 2 - PRODUCTS

2.1 SPORTS LIGHTING SYSTEM CONSTRUCTION

- A. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, drivers and other enclosures shall be factory assembled, aimed, wired and tested.
- B. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed carbon steel shall be hot dip galvanized per ASTM A123. All exposed aluminum shall be powder coated with high performance polyester or anodized. All exterior reflective inserts shall be anodized, coated, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All exposed hardware and fasteners shall be stainless steel of 18-8 grade or better, passivated and coated with aluminum-based thermosetting epoxy resin for protection against corrosion and stress corrosion cracking. Structural fasteners may be carbon steel and galvanized meeting ASTM A153 and ISO/EN 1461 (for hot dipped galvanizing), or ASTM

B695 (for mechanical galvanizing). All wiring shall be enclosed within the cross-arms, pole, or electrical components enclosure.

1. System Description: Lighting system shall consist of the following:
 - a. Galvanized steel poles and cross-arm assembly.
 - b. Non-approved pole technologies:
 - 1) Square static cast concrete poles will not be accepted.
 - 2) Direct bury steel poles which utilize the extended portion of the steel shaft for their foundation will not be accepted due to potential for internal and external corrosive reaction to the soils and long-term performance concerns.
 - c. Lighting systems shall use concrete foundations. See Section 2.4 for details.
 - 1) For a foundation using a pre-stressed concrete base embedded in concrete backfill the concrete shall be air-entrained and have a minimum compressive design strength at 28 days of 3,000 PSI. 3,000 PSI concrete specified for early pole erection, actual required minimum allowable concrete strength is 1,000 PSI. All piers and concrete backfill must bear on and against firm undisturbed soil.
 - 2) For anchor bolt foundations or foundations using a pre-stressed concrete base in a suspended pier or re-inforced pier design pole erection may occur after 7 days. Or after a concrete sample from the same batch achieves a certain strength.
 - d. Manufacturer will supply all drivers and supporting electrical equipment
 - 1) Remote drivers and supporting electrical equipment shall be mounted approximately 10 feet above grade in aluminum enclosures. The enclosures shall be touch-safe and include drivers and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Disconnect per circuit for each pole structure will be located in the enclosure. Integral drivers are not allowed. If allowed, integral drivers mounted at the top of the pole will require a pole mounted enclosure approximately 10 feet above grade. The enclosure shall include a disconnect per circuit, individual luminaire fusing, and surge protection. The pole shall include steps, cables, and platforms for luminaire maintenance, if owner responsible for removal of faulty luminaires.
 - 2) Manufacturer shall provide surge protection at the pole equal to or greater than 40 kA for each line to ground (Common Mode) as recommended by IEEE C62.41.2_2002.
 - e. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation.
 - f. All luminaires, visors, and cross-arm assemblies shall withstand 150 mph winds and maintain luminaire aiming alignment.
 - g. Control cabinet to provide remote on-off control, monitoring features of the lighting system. See Section 2.3 for further details.
 - h. Manufacturer shall provide lightning grounding as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A.
 - 1) Integrated grounding via concrete encased electrode grounding system.

- 2) If grounding is not integrated into the structure, the manufacturer shall supply grounding electrodes, copper down conductors, and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780. The grounding electrode shall be minimum size of 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting height.
- i. Enhanced corrosion protection package: Due to the potentially corrosive environment for this project, manufacturers must provide documentation that their products meet the following enhanced requirements in addition to the standard durability protection specified above:
 - 1) Exposed carbon steel horizontal surfaces on the crossarm assembly shall be galvanized to no less than a five (5) mil average thickness.
 - 2) Exposed die cast aluminum components shall be Type II anodized per MIL-STD-8625 and coated with high performance polyester.
 - 3) Exposed extruded aluminum components shall be Type II anodized per MIL-STD-8625 and coated with high performance polyester.
 - j. Safety: All system components shall be UL listed for the appropriate application.

2.2 ELECTRICAL

A. Electric Power Requirements for the Sports Lighting Equipment:

1. Electric power: 480- Volt, 3-Phase
 - a. Maximum total voltage-drop: Voltage-drop to the disconnect switch located on the poles shall not exceed three (3) percent of the rated voltage.
 - b. Energy Consumption: The kW consumption for the lighting system shall be 75.96 kW.
2. UL Listing - There shall be provided a UL listing for all electrical components from its connection to the feeder conductors, to its completion at the lamp socket including all connections. This listing shall be based upon UL testing and evaluation of the compatibility of the enclosures and the components for use in combination in this application in addition to the individual components being UL listed or recognized.
3. UL Test Report - Bidder shall supply in advance of bid a copy of the complete Underwriters Laboratory report covering the entire luminaire assembly being bid for the owner's review and retention. Partial UL files will not be accepted per the requirements of UL. In addition, bidder must supply proof of most recent Underwriters Laboratory inspection process.
4. Codes - Sports Lighting Structure shall meet California Electrical code.

2.3 CONTROLS

- A. Instant On/Off Capabilities: System shall provide for instant on/off of luminaires.
- B. Lighting contactor cabinet(s) constructed of NEMA Type 4 aluminum, designed for easy installation with contactors, labeled to match field diagrams and electrical design. Manual off-on-auto selector switches shall be provided.

- C. Dimming: System shall provide for 3-stage dimming (high-medium-low). Dimming will be set via scheduling options (Website, app, phone, fax, email).
- D. Remote Lighting Control System: System shall allow owner and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP/IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

The owner may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields to only having permission to execute "early off" commands by phone. Scheduling tool shall be capable of setting curfew limits.

Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

- E. Remote Monitoring System: System shall monitor lighting performance and notify manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The controller shall determine switch position (manual or auto) and contactor status (open or closed).

- 1. The Musco Control & Monitoring Cabinet shall be furnished with factory installed Digital Cellular Antenna for connection to remote monitoring and remote controls.

- F. Management Tools: Manufacturer shall provide a web-based database and dashboard tool of actual field usage and provide reports by facility and user group. Dashboard shall also show current status of luminaire outages, control operation and service. Mobile application will be provided suitable for IOS, Android and Blackberry devices.

Hours of Usage: Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the owner.

- 1. Cumulative hours: shall be tracked to show the total hours used by the facility.
 - 2. Report hours saved by using early off and push buttons by users.

- G. Communication Costs: Manufacturer shall include communication costs for operating the controls and monitoring system for a period of 25 years.
- H. Communication with luminaire drivers: Control system shall interface with drivers in electrical components enclosures by means of powerline communication.

2.3 STRUCTURAL PARAMETERS

- A. Wind Loads: Wind loads shall be based on the 2019 California Building Code. Wind loads to be calculated using ASCE 7-10, a design wind speed of 110 mph, exposure category C and wind importance factor of 1.0.
- B. Pole Structural Design: The stress analysis and safety factor of the poles shall conform to 2009 AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (LTS-5).
- C. Foundation Design: The foundation design shall be based on soil parameters as outlined in the geotechnical report. If no geotechnical report is available, the foundation design shall be based on soils that meet or exceed those of a Class 5 material as defined by 2016 CBC Table 1806.2.
- D. Foundation Drawings: Project specific foundation drawings stamped by a registered engineer in the state where the project is located are required. The foundation drawings must list the moment, shear

(horizontal) force, and axial (vertical) force at ground level for each pole. These drawings must be submitted at time of bid to allow for accurate pricing.

PART 3 - EXECUTION

3.1 ATHLETIC FIELD LIGHTING -- INSTALLATION GENERAL

- A. Athletic field lighting shall be installed complete including fixtures, poles, lamps, controls, etc. All equipment shall be cleaned of dirt and grease.

3.2 SOIL QUALITY CONTROL

- A. It shall be the Contractor's responsibility to notify the Owner if soil conditions exist other than those on which the foundation design is based, or if the soil cannot be readily excavated. Contractor may issue a change order request / estimate for the Owner's approval / payment for additional costs associated with:
 - 1. Providing engineered foundation embedment design by a registered engineer in the State of California for soils other than specified soil conditions;
 - 2. Additional materials required to achieve alternate foundation;
 - 3. Excavation and removal of materials other than normal soils, such as rock, caliche, etc.

3.3 DELIVERY TIMING

- A. Delivery Timing Equipment On-Site: The equipment must be on-site 6-14 weeks from receipt of approved submittals and receipt of complete order information.

3.4 WARRANTY AND GUARANTEE

- A. 25-Year Warranty: Each manufacturer shall supply a signed warranty covering the entire system for 25 years from the date of shipment. Warranty shall guarantee specified light levels. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty does not cover weather conditions events such as lightning or hail damage, improper installation, vandalism or abuse, unauthorized repairs or alterations, or product made by other manufacturers.
- B. Maintenance: Manufacturer shall monitor the performance of the lighting system, including on/off status, hours of usage and luminaire outage for 25 years from the date of equipment shipment. Parts and labor shall be covered such that individual luminaire outages will be repaired when the usage of any field is materially impacted. Owner agrees to check fuses in the event of a luminaire outage.

3.5 FIELD QUALITY CONTROL

- A. Illumination Measurements: Upon substantial completion of the project and in the presence of the Contractor, Project Engineer, Owner's Representative, and Manufacturer's Representative, illumination measurements shall be taken and verified. The illumination measurements shall be conducted in accordance with IESNA LM-5-04.
 - 1. Manufacturer's Representative shall generate a report of the results of these measurements and shall submit it to the Owner's Representative for review and record.
- B. Field Light Level Accountability

2. Light levels shall be guaranteed not to fall below the target maintained light levels for the entire warranty period of 25 years. These levels will be specifically stated as “guaranteed” on the illumination summary provided by the manufacturer.
 3. The contractor/manufacturer shall be responsible for an additional inspection one year from the date of commissioning of the lighting system and will utilize the owner’s light meter in the presence of the owner.
 4. The contractor/manufacturer will be held responsible for any and all changes needed to bring these fields back to compliance for light levels and uniformities. Contractor/Manufacturer will be held responsible for any damage to the fields during these repairs.
- C. Correcting Non-Conformance: If, in the opinion of the Owner or his appointed Representative, the actual performance levels including foot-candles and uniformity ratios are not in conformance with the requirements of the performance specifications and submitted information, the Manufacturer shall be required to make adjustments to meet specifications and satisfy Owner.
- D. Commissioning of the Control Systems:
1. The installing contractor, in the presence of the Contractor, Project Engineer, Owner's Representative, and Manufacturer's Representative, shall “commission” the lighting control system upon completion of installation. The commissioning process shall confirm that the control system is functioning properly (all zones turn on, dimming works, etc.). All controls shall be tested locally (manually at the control panel) and remotely via the remote monitoring and control system (Control-Link).
 2. The Manufacturer’s Representative shall coordinate and conduct Control-Link training for the District maintenance and facilities departments. The training shall be conducted via, teleconference training. Training session(s) shall take place at a time and date acceptable to the District. An agenda of the training sessions(s) shall be distributed to the attendees prior to the session(s) to allow them to familiarize themselves with the system.

3.06 FIELD TECHNICIAN ON-SITE VISIT

- A. Manufacturer shall provide an on-site visit by a factory technician after completion of the installation. The factory technician shall make any necessary adjustments to the aiming in order to ensure that specified maximum foot-candle levels are not exceeded. This service shall be included at no additional cost to the owner or installing contractor.

END OF SECTION

SECTION 27 41 16

AUDIO SYSTEM

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes all professional services, transportation services, supervision, coordination, etc., necessary to complete the installation of a high quality Audio System as specified. "Audio System" references the system and "Audio System Installer" references the installer. The Audio System Installer is responsible for sizing the sound cabinet, amplifiers, patch panels, transformers, etc. to ensure a complete and properly operating system in accordance with the performance criteria set forth in this specification. All installed equipment must be new and in unused condition. It is the intent of the specifications to indicate the quality, configuration, and performance of the Audio System. The Audio System installation includes the following:
 - 1. Point Source Sound System
 - 2. Audio Control System
 - 3. Cables, connectors, plates and wiring
 - 4. All necessary design, fabrication, processing and amplification equipment, and installation for a complete sound system as described
- B. The section also includes:
 - 1. Scope of work
 - 2. Verification of dimensions and conditions at the job site
 - 3. Preparation of submittal information
 - 4. Installation in accordance with the contract documents, manufacturers recommendations, and all applicable code requirements
 - 5. Instruction of operating personnel: provision of manuals
 - 6. Maintenance services and warranty

1.02 REFERENCES

- A. Audio System Design and Installation, G.H. Philip Giddings, 1990
- B. Digital Audio Engineering - Serial Transmission Format for Two-Channel Linearly Represented Digital Audio Data, Recommended Practice (AES-3), ANSI S4.40, 1992
- C. Handbook for Sound Engineers (Third Edition) Glen M. Ballou, 2002
- D. Loudspeaker Components Used in Professional Audio and Sound Reinforcement, ANSI S4.26, 1984 (R1992)
- E. Sound System Engineering (Third Edition), Don Davis and Eugene Patronis, Jr., 2006
- F. Standard for Safety for Audio, Video, and Similar Electronic Apparatus – Safety Requirements: IEC 60065, UL 60065, EN 60065, and CAN/CSA C22.2 #60065
- G. Information Technology Equipment-Radio Disturbance Characteristics: EN 55022:2010 / AC:2011, Class A / CISPR 22 (ed.5); am1
- H. Electromagnetic Compatibility: EN 61000-3-2:2006 +A1:2009 +A2:2009 / IEC 61000-3-2 (ed.3); am1, am2
- I. Electromagnetic Compatibility: EN 61000-3-3:2008 / IEC 61000-3-3 (ed.2)
- J. Information Technology Equipment – Immunity Characteristics: EN 55024:2010 / CISPR 24 (ed.1); am1, am2; 47 CFR, Part 15:2010, §15.107 and §15.109, Class A; ICES-003, Issue 4:2004
- K. National Electric Code

1.03 SYSTEM DESCRIPTION

- A. The following is intended to provide an overview of the design concepts and is not an exhaustive description of the Audio System.

- B. The Audio System consists of a main speaker cluster that may be integrated with a display structure. It is composed of horn-loaded, three-way, full-range tri-amplified design with built-in signal processing.
- C. The Audio System includes speaker amplification and signal processing components that are 100% self-contained within the speaker cabinet. All electronic components are to be properly housed and shielded from the elements to ensure long life. Fiber optic cable utilized to interconnect the control rack at the audio mix location to the main cluster. Design the system to ensure that all processing and amplification equipment meets project and manufacturer's recommendations for allowed headroom. The services of the Audio System Installer include all necessary acoustical, electrical, mechanical, and structural engineering to incorporate a complete sound system.
- D. The Audio System has remote diagnostics capabilities including – temperature monitoring, amplifier status, and speaker coil impedance.
- E. The audio system will incorporate an analog back-up system. In the event of a failure in the digital audio system, the operator will be able to engage a single switch to bypass all digital equipment to deliver analog audio to the power amplifiers.
- F. Scope of work includes the following: fiber optic cable between the press box (designated by owner) and the control enclosure supplied by the Audio System Installer, and AC power feeds to the main speaker cluster and control equipment. A licensed electrician must perform all high voltage electrical work.
- G. All structural components provided by the Audio System Installer must be certified by a structural engineer. Documentation of engineering reviews and structural certification of the speaker cabinet structures must be provided. Structural steel accommodations for incorporating the speaker cabinet into a complete display structure will be the responsibility of the Audio System Installer. The internal structure of the cabinet is constructed to minimize structural vibrations induced by the speaker components. Access doors on the back of the cabinet allow for easy access to internal components. The mesh on the front of the cabinet is bolted into place.
- H. Provide the front of the main speaker cabinet that consists of an extruded aluminum grille frame covered with signage grade, vinyl mesh material. The vinyl material must be acoustically transparent and provide the capability of creating a speaker grille covering with custom printed graphics. The specified graphic art is printed using a large format, photographic quality, color printing process.
- I. Provide external surfaces of the cabinets that are skinned with powder-coated black aluminum. Provide exterior paint which is automotive grade, resistant to fading, peeling or chipping.
- J. Loudspeaker
 - 1. Safe, secure and permanent manner in their operating position.
 - 2. The aiming direction of the mid/high loudspeakers must be adjustable by 0-30 degrees horizontally.
 - 3. Rigging, mounting and support systems for loudspeakers reviewed and certified by a registered professional engineer.
 - 4. Structural support members to have an appropriate safety factor (determined by a structural engineer). All fasteners to be graded and certified for use in the intended applications.
 - 5. All loudspeakers rigidly supported inside of the sound cabinet. Wire rope and/or chain suspension of loudspeaker components inside the sound cabinet is unacceptable.
- K. The Audio System is to achieve the following performance standards: continuous output level of 122 dBA at 1 meter with sufficient headroom to allow for peaks. The frequency response of the sound system to be at least 45 Hz to 13 kHz, -10 dB at 1 meter.
- L. The Audio System utilizes digital signal processing for all applications. All digital signal processing is contained within each amplifier. Each amplifier's digital signal processor will provide the following signal processing capability: gain control, minimum four band filtering or equalization, delay, crossover, and limiting.

1.04 SUBMITTALS

- A. Submit the following documents with bid proposal. Failure to provide a complete set of submittals will result in disqualification. Provide shop drawings and submittal data containing sufficient information to describe the work to be performed. Prepare drawings at an appropriate scale. Submit shop drawing information at one time. Provide the following information, but not necessarily limited to:
 - 1. System description
 - 2. Complete system equipment list, with individual specification sheets for each piece of equipment
 - 3. Functional system block diagram showing all major equipment and signal flow
 - 4. Basic speaker cabinet design drawings consisting of the cabinets' overall dimensions, cabinet integration with a display structure and estimated weight of entire system with all equipment installed
 - 5. Speaker cluster drawings showing all speakers in their installed position and estimated electrical draw of the entire system
 - 6. Proof of performance illustrations as generated by an acoustical CAD modeling program (EASE or equivalent). Illustrations to include direct field sound pressure level performance throughout the stadium at 125 Hz, 250 Hz, 500 Hz, 1,000 Hz, 2,000 Hz and 4,000 Hz.

1.05 DELIVERY, STORAGE AND HANDLING

- A. The Audio System Installer will be responsible for transporting all related audio equipment to the job site. Upon installation, audio equipment becomes the responsibility of the owner.
- B. The Audio System Installer will be responsible for audio equipment once it is received at the job site. In addition, Audio System Installer will be responsible for unloading the shipment truck, providing safe storage of audio equipment, installation of audio equipment and all necessary welding of structure.
- C. All transportation expenses of equipment to the job site will be the responsibility of the Audio System Installer.

1.06 PROJECT CONDITIONS

- A. Audio System Installer desiring to submit a proposal are responsible for acquiring, from the owner, any plans or documentation pertaining to the audio system installation and are encouraged to perform a pre-bid site survey.
- B. Confirm conditions on the jobsite pertinent to this work. Give notice to the owner in writing of discrepancies, conflict, or omissions promptly upon discovery.

1.07 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of audio equipment through one source from a single manufacturer.
- B. ETL listed and conform to IEC 60065, UL 60065 and EN 60065
- C. Certified to CSA C22.2 #60065
- D. Carries the ETL US, ETL Canada, ETL EU, and CE marks
- E. Manufacturer's qualifications: A minimum of five (5) years' experience with the specified types of products and installation.
- F. Installer's qualification: Business familiar in the installation of systems similar in complexity to those essential for this project; and fulfillment of the following:
 - 1. The primary business of contractor shall be in the installation of sound and video systems.
 - 2. At least (5) five years' experience with systems of the specified types and products included.
 - 3. Experience with comparable scale sound reinforcement projects within the last three (3) years.
 - 4. Retain a fully staffed and equipped service facility with fulltime field technicians.

5. Be a franchised dealer and approved service facility for all amplifiers, digital and analog signal processing equipment and loudspeaker products specified or proposed; if not, supply detailed description of how warranty service on these items will be obtained, and if any manufacturer's warranties will become void.
6. Installer to be factory educated in the installation and maintenance of any digital signal processed based control systems.
7. At the request of the owner, the Installer must demonstrate that he has:
 - Sufficient plant and equipment to complete the work within the agreed timetable
 - Sufficient staff with commensurate technical experience
 - Appropriate financial status to meet the obligations of the work
 - Capability to provide performance bonding

1.08 WARRANTY

- A. Provide a complete system parts warranty for a minimum period of one year after completion and acceptance of audio system.
- B. This warranty will not void specific warranties issued by manufacturers for greater periods of time. Nor will it void any rights guaranteed to the owner by law.
- C. The Audio System Installer must provide the owner an opportunity to purchase a preventive maintenance inspection agreement or full service agreement. The minimum term of any maintenance or service agreement consists of one year.
- D. Warranty replacement and service of equipment will not apply to any owner-furnished equipment.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. To establish the minimum functional, aesthetic and quality standards, products and product series of the manufacturers listed below are required.
- B. Substitutions: Products of other manufacturers are acceptable provided they meet the performance and reliability standards of the recommended equipment. Any substitution to this list must be submitted and approved in writing 10 days prior to the bid date.

2.02 GENERAL

- A. Regardless of the length or completeness of the descriptions below, each device shall meet published manufacturers' specifications.
- B. Equipment and materials must be new and conform to applicable UL or ANSI provision.
- C. Product quantity is as required. If a quantity is given, Audio System Installer shall provide at least the given amount.

2.03 AUDIO CONTROL SYSTEM

- A. Equipment Rack
 1. Top is (10U) angled rackmount rails + 6" in rear for cables
 2. (6U) vertical rackmount space below
 3. Locking covers
 4. Acceptable products:
 - SKB 10x6 Roto Rack Console
- B. Audio Mixer
 1. Eight mic/line inputs
 2. Two 1/4" stereo inputs
 3. Three band EQ per channel
 4. Frequency response, mic/line input to any output: 20 Hz to 20 kHz +/- 0.5 dB
 5. One insert per channel

6. Gain control per channel: +5 to +60 dB
 7. Two aux outputs (pre or post-fader selectable)
 8. 2-track inputs and outputs: Unbalanced RCA connector
 9. Acceptable products:
 - Soundcraft EPM8
 - Allen and Heath WZ3-8:2
- C. Rackmount Surge Suppressor
1. 9 outlets
 2. Resettable circuit breaker
 3. Max surge current: 50 kA
 4. Joule rating: 1800 joules
 5. Acceptable product:
 - Middle Atlantic PD-915R
- D. Audio Signal Switch
1. Style: 2 Position
 2. Operator action: maintained
 3. 1 RU standard rack space, black
 4. Laser etched text
 5. Acceptable products:
 - Daktronics Signal Switch
- E. Wireless Microphone Receiver
1. 1/2 RU unit
 2. 24 bit digital audio
 3. XLR balanced mic/line outputs
 4. RF Sensitivity: -97 dBm at 10^{-5} BER
 5. Audio Frequency Response: 20 Hz to 20 kHz, +/- 1 dB
 6. Audio Dynamic Range: > 120 dB (A)
 7. Total Harmonic Distortion: < 0.1%
 8. Acceptable products:
 - Shure QLXD4
 - AKG DSR700 V2
- F. Wireless Handheld Transmitter
1. Microphone element: Cardioid, Dynamic Vocal Microphone
 2. Working Range: 100 m (328')
 3. Battery life: 9+ hours
 4. RF Output: Selectable 1 mW or 10 mW
 5. Acceptable products:
 - Shure QLXD2/58
 - AKG DHT700 V2
- G. Professional CD/Media Player
1. MP3, WAV, AAC, and WMA file playback
 2. Support for SD/SDHC cards and USB memory devices
 3. Wireless playback via Bluetooth™ devices
 4. AM/FM radio tuner
 5. Balanced XLR and Unbalanced RCA outputs
 6. Acceptable products:
 - TASCAM CD-400U

- Denon DN-300Z

H. Laptop Interface

1. 1/8" (3.5 mm) male input
2. Balanced XLR male output
3. Adjustable output volume control
4. Acceptable products:
 - LTIBLOX Laptop Interface
 - Whirlwind podDI

I. USB Audio Interface

1. 24-bit, 96 kHz quality audio
2. Two balanced XLR outputs (left and right)
3. 3.5mm TRS headphone output
4. Ground lift and mono-sum switches
5. Acceptable product:
 - Radial® Engineering USB-Pro™

J. Self-powered Monitor Speaker

1. Three inputs: one 1/4" phone, one RCA, one XLR
2. Tone control (High/Low)
3. Acceptable product:
 - Yamaha MSP3

WIRED MIC CONFIGURATIONS ARE AS FOLLOWS:

- SSR-AM – DD3638250 Push-to-Talk Announcer Interface + Handheld Vocal Microphone + Dynamic Headphones

K. Push-to-Talk Announcer Interface

1. Balanced XLR input, balanced XLR output, and 1/4" headphone jack
2. Momentary and continuous audio output modes
3. Acceptable products:
 - Daktronics Announcer's Interface
 - Studio Technologies, Inc. Model 210 Announcer's Console

L. Handheld Vocal Microphone

1. Dynamic microphone with unidirectional (cardioid) polar pattern
2. Frequency response: 50 Hz to 15 kHz
3. Acceptable product:
 - Shure SM58
 - AKG D5

M. Dynamic Headphones

1. Neodymium magnet
2. Gold 1/4" and 1/8" plug
3. Acceptable product:
 - Sony MDR7506

N. Single-Muff Headset

1. Neodymium magnet
2. Cardioid condenser microphone

3. Acceptable product:
 - Beyerdynamic DT 287

WIRELESS CONFIGURATION AS FOLLOWS:

- Additional Wireless Microphone Receiver + Wireless Bodypack Transmitter + Referee Headset + In-Ear Monitor System + ADA Hearing Assist
- Any wireless system above may have the High Gain Antenna Kit

O. Additional Wireless Microphone Receiver

1. 1/2 RU unit
2. 24 bit digital audio
3. XLR balanced mic/line outputs
4. RF Sensitivity: -97 dBm at 10^{-5} BER
5. Audio Frequency Response: 20 Hz to 20 kHz, +/- 1 dB
6. Audio Dynamic Range: > 120 dB (A)
7. Total Harmonic Distortion: < 0.1%
8. Acceptable products:
 - Shure QLXD4
 - AKG DSR700 V2

P. Wireless Bodypack Transmitter

1. Connector: 4-pin male mini connector (TA4M) for microphone or mute switch
2. Working Range: 100 m (328')
3. Battery life: 9+ hours
4. RF output: Selectable 1 mW or 10 mW
5. Acceptable products:
 - Shure QLXD1
 - AKG DPT700 V2

Q. Referee Headset

1. Electret condenser microphone element
2. Unidirectional cardioid polar pattern
3. Acceptable product:
 - Shure SM35

R. In-Ear Monitor System

1. Audio frequency response: 35 Hz to 15 kHz
2. Operating range: 300 ft
3. Total harmonic distortion: 0.8% typical
4. Signal-to-noise ratio: 90 dB typical
5. RF output power: 100 mW typical
6. Acceptable products:
 - Shure PSM-900
 - Sennheiser EN300 IGMG2

S. ADA Hearing Assist

1. Signal-to noise ratio: SQ enabled: 70 dB; SQ disabled 50 dB
2. 57 channels
3. Frequency response: 50 Hz to 15 kHz +/- 3dB
4. Acceptable products:
 - Listen LS-54-216
 - Telex SMP400

- T. High Gain Antenna Kit
 - 1. Cardioid directional antenna
 - 2. 6 dB gain
 - 3. Acceptable product:
 - Shure PA805 @ 2

2.04 CABLE AND CONTROL WIRING

- A. All cables must be installed in conduit or closed raceway areas. Use plenum cable as necessary. Exposed cable is not acceptable. Cable specifications are as follows:
 - 1. Multi-mode fiber optic cable from audio control to sound cabinet
 - 2. Microphone level cables: No. 22 shielded jacketed - Belden 9451 with black jacket

PART 3 EXECUTION

3.01 GENERAL

- A. Coordinate work with other trades to prevent delays in the construction schedule.
- B. Verify dimensions and location of equipment to be mounted.

3.02 INSTALLATION

- A. Mount equipment and enclosures square and plumb. Permanently installed equipment to be held firmly and safely in place. Loudspeaker mounting systems and sound cabinet mounting systems to be approved by a structural engineer. All mounting brackets must be approved by a structural engineer.
- B. Furnish and install an RF wireless assistive listening system for use by the hearing-impaired. The assistive listening system (ALS) shall be capable of broadcasting on 57 channels and be frequency agile. The RF receiver shall be capable of receiving on 57 wide and narrow band channels. The device shall tune to a single channel and user shall not be able to change the channel. The receiver shall have a signal-to-noise ratio of 70 DB or greater and shall have an audio frequency response of 50 HZ – 15 khz (± 3 DB). The device shall employ a unique DSP SQTM noise reduction technology. The unit shall have a programmable squelch circuit. The unit shall incorporate a multi-functional display that indicates battery status, inventory number and channel. The device shall have the option of being lanyard or belt clip worn and the lanyard shall have the option of an integrated DSP driven neck loop that automatically senses and sends optimized audio signals directly to hearing aids and cochlear implants equipped with telecoils. The neck loop shall have a field strength of 400 ma/m (± 3 db) and frequency response of 100HZ to 5KHZ (± 3 DB ref 1KHZ). The device shall have a USB connector used for inventory control, set up, charging and firmware upgrades. The device shall incorporate automatic battery charging circuitry and use a non-proprietary lithium ion battery. The device shall have additional charging contacts to allow multiple charging options. The ALS system shall have 70DB SNR or greater, end-to-end. Listen technologies corporation products are specified.
- C. Furnish and install the following:
Furnish And Install The Following:
 Listen Technologies Lt-800-216-01 Stationary RF Transmitter (216 Mhz) (Qty: 1 Ea.)
 Listen Technologies La-122 Universal Antenna Kit (72 Mhz And 216 Mhz) (Qty: 1 Ea.)
 Listen Technologies La-326 Universal Rack Mounting Kit (Qty: 1 Ea.)
 Listen Technologies Lr-4200-216 Intelligent DSP RF Receiver (216 Mhz) (Qty: 4 Ea.)
 Listen Technologies La-401 Universal Ear Speaker (Qty: 4 Ea.)
 Listen Technologies La-430 Intelligent Earphone/Neck Loop Lanyard (Qty: 2 Ea.)
 Listen Technologies La-423 4-Port USB Charger (Qty: 1 Ea.)
 Listen Technologies Lpt-A107-B Dual RCA To Dual RCA Cable 6.6 Ft. (2 M) (Qty: 1 Ea.)
 Listen Technologies La-304 Assistive Listening Notification Signage Kit. (Qty: 1 Ea.)

3.03 FIELD QUALITY CONTROL

- A. Upon completion of installation and initial test adjustments, the audio system installer will conduct a performance evaluation in the presence of the owner or the owner's representative (owner's option). The audio system installer will notify the owner or the installer's representative of the testing schedule.

END OF SECTION

SECTION 32 12 93

SYNTHETIC TURF (OWNER-FURNISHED, OWNER-INSTALLED (OFOI))

PART I – 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.
- B. Related Sections:
 - 1. Division 01: General Requirements
 - 2. Section 31 20 00: Earthwork.
 - 3. Section 21 22 00: Grading.
 - 4. Section 31 23 16: Trenching.
 - 5. Section 32 95 00: Synthetic Turf Aggregate Base.
 - 6. Section 32 16 13: Concrete Curbs and Flatwork.
 - 7. Section 32 84 10: Synthetic Turf Cool-Down System.
 - 8. Section 33 11 00: Water Distribution.
 - 9. Section 33 40 00: Storm Drainage Utilities.

1.2 SUMMARY

- A. The work under this section shall consist of furnishing all labor, materials, and equipment necessary to install, in place, all synthetic turf, pad and other materials as indicated on the plans and as specified herein. The installation of all new materials shall be performed in strict accordance with these specifications, the turf provider's instructions and in accordance with all details and shop drawings.
- B. CMAS Procurement: The Owner has purchased synthetic turf and all associated lines graphic markings under direct under separate contract, not part of the General Contract and not part of the General Contract Bid. This section is for clarification and in coordination with the general contractor's scope of work and project schedules.

1.3 SUBMITTALS

- A. Substitutions: Products other than Rootzone 3D3 Blend 60 are acceptable if in compliance with all requirements of these specifications. Submit alternate products with the bid proposal and provide the following:
 - 1. Provide all specifications, product data, certification and required information for proposed alternate. It is the responsibility of the bidder to prove that the product substitution is equal to or greater than the product specified.
 - 2. Provide a sample copy of insured warranty and insurance policy information
 - 3. Provide a sample (8.5" x 11") of the product substitution
 - 4. Provide a sample (8.5" x 11") of the proposed pad
- B. Product Data: For each type of product and pad indicated.
 - 1. Submit catalog cuts, material safety data sheets (MSDS), brochures,

- specifications, preparation and installation instructions and recommendations for both the turf and the pad.
2. All supplied and installed materials and products will meet or exceed the minimum specifications designated in this section. Sufficient data must be submitted to indicate compliance with the Contract Documents.
 3. Submit instructions for installation.
- C. Test Results: The following test results, certified by a licensed independent testing laboratory, shall be submitted as outlined below:
1. With the bid – Mandatory and minimum specifications as shown in Part 2. Bids not meeting the minimum specifications will be rejected.
 2. Upon completion of the installation of the infill (including anti-static applications)— Installer Supervisor must measure and record infill depth using a three-prong depth tester for Turf and Tracks with analog or digital readout. At ten separate field locations, three data points should be recorded by measuring the infill depth in a triangular pattern approximately 12" – 18" apart. At each of the ten testing locations, the three data points should be averaged. Any location that does not measure 1.46" in depth or more must be corrected.
 3. At completion of project – Dynamic Cushioning Test according to ASTM F-355-95, Procedure A and Standard F-1936-98 only if the finished product is to be used for American Football.
- D. Shop Drawings: Show fabrication and installation details for synthetic turf including, but not limited to:
1. Proposed locations of all seams in fabric surfacing. Show installation methods and construction.
 2. Field lining and marking - Submit a complete scale and dimensional drawing of inlaid or tufted-in field lines and marking boundaries. Include graphics for end zones and center logo artwork for approval as well.
 3. All submittals shall be provided within 14 days after Notice to Proceed.
- E. The Turf Manufacturer shall provide the following samples of the artificial turf selected for this project
1. An 8.5" x 11" minimum sample of the exact synthetic turf and infill system that is specified for this project.
 2. An 8.5" x 11" minimum sample of the exact pad that is specified for this project.
 3. Infill mix in accordance with product specifications
- F. Turf Manufacturer Certificates: Certified list of fifty (50) existing installations of a synthetic turf and infill system installed over a pad within the last three years, including Owner Representative and telephone number, attesting compliance with quality assurance information. All must be located within the continental United States.
- G. With the bid - Proof that the Turf Manufacturer is a member, in good standing, of the Synthetic Turf Council.
- H. With the bid – Sample Warranty: Provide a sample pre-paid third party insured warranty with the bid. Policy must be in force at the time of the bid.
1. The Contractor shall provide a warranty to the Owner that covers defects in materials and installation workmanship of the turf for a period of eight (8) years from the date of substantial completion. The turf provider must verify that their

representative has inspected the installation and that the work conforms to the turf provider's requirements and any written directives. The warranty shall include general wear and damage caused from UV degradation. Other items that must be addressed include the following:

- a. Acceptable uses for the field
- b. Fading
- c. Color match within specifications
- d. Excessive fiber wear
- e. Wrinkling and panel movement
- f. Shock absorbency (Gmax)
- g. Seam integrity
- h. Drainage (through the turf only)

2. Exclusions shall include the following:

- a. Vandalism
- b. Acts of God

- I. With the bid – Turf Manufacturer must attest that their submitted products infringe on no known patents.
- J. Maintenance and Operations Data: At the completion and acceptance of the project submit 3 complete sets, in manual form, of all the turf provider's recommended procedures and materials for, but not limited to general maintenance, line/marking installation, small repair procedures, cleaning, etc.
- K. Project Record Documents: Record actual locations of seams, drains, and other pertinent information in accordance with the General Requirements

1.4 QUALITY ASSURANCE

A. Turf Manufacturer Qualifications

1. Shall be experienced in the installation of synthetic infill grass (including in-house factory extruded RootZone® fiber) for a minimum of five (5) years.
2. Shall have a minimum of 500 full sized tall fiber infilled type field installations. Field size to be a minimum of 65,000 square feet to qualify. This list is to be provided with the bid.
3. Manufacturer must have completed a minimum of 20 prefabricated fields. Prefabrication refers to factory installed in the playing field; center hashmarks, numbers, arrows, and end zone letters. Those items must be factory installed, no field installation allowed of those items to meet this qualification.
4. Shall provide third party certification confirming compliance with referenced standards.
5. Turf Manufacture must formulate and produce its own fiber master batch.

B. Installer Qualifications:

1. Installation team shall be an established, insured installation firm experienced as a premium turf installer with suitable equipment and supervisory personnel, with a minimum of five years' experience with 15 foot wide tufted materials.
2. Installation team shall be trained and certified, in writing, by the turf manufacturer, as competent in the installation of the specified material, including seaming and proper installation of the infill mixture.
3. Site superintendent shall have at least 10 installations that are similar to this type of

tall fiber synthetic turf system.

4. Site superintendent shall have at least 35 installations that are of the AstroTurf product which utilizes Nylon RootZone.

- C. All components and their installation method shall be designed and manufactured for use on outdoor athletic fields. The materials as hereinafter specified, should be able to withstand full climatic exposure, be resistant to insect infestation, rot, fungus and mildew; to ultra-violet light and heat degradation, and shall have the basic characteristic of flow-through drainage allowing free movement of surface run-off through the turf and directly into prepared granular base and into the field drainage system.

The synthetic turf and components shall be of national reputation. The turf fabric shall be installed by factory-authorized and certified technicians.

1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit synthetic turf work to be performed according to Contractor or Turf Provider's written instructions and warranty requirements.
- B. Field Measurements: Indicate measurements on Shop Drawings.

- 1.6 WARRANTY – Special warranty for American Football: Turf must maintain an ASTM F 355 Gmax of less than 165 for the life of the warranty. This is for the entire warranty period of eight (8) years.

- 1.7 MAINTENANCE SERVICE – Turf Installation Contractor shall train maintenance staff and/or contracted maintenance staff in the use of the recommended maintenance equipment and provide maintenance guidelines to the facility maintenance staff.

PART TWO – PRODUCTS

2.1 ACCEPTABLE TURF MANUFACTURERS

- A. Pre-Approved turf manufacturer:
 1. AstroTurf Corporation – AstroTurf® Rootzone 3D3 Blend 60 Trionic
2680 Abutment Road, SE
Dalton, GA 30721
P: 706.277.8873
 2. Alternate provider is acceptable and must meet and/or be equivalent to all listed requirements, qualifications, and specifications.

2.2 SHOCK PAD

- A. Brock Power Base YSR, or approved equal, Resilient Molded Expanded Polypropylene Shock Pad Base System
 1. A white impact energy absorbing sub-base drainage system designed specifically for use with synthetic turf is required. The specified material must have physical, drainage and performance properties that meet the following requirements:
 - a. Product format: Interlocking panels
 - b. Size: approximately 73.5 x 49.0 inches (1867 x 1245 mm) overall dimensions
 - c. Area: Net coverage per panel 24.15 ft² (2.24 m²)

- d. Thickness: 1.00" (25.4mm) ± .08"
- e. Panel Weight: approximately 5.2 lbs / panel
- f. Product must be Cradle to Cradle™ Certified by the Cradle to Cradle Products Innovation Institute.
- g. As part of a Buy American requirement, shock pad must be of a raw material 100% sourced in the USA and the pad produced in a factory within the continental United States.
- h. Material must be covered by a pre-approved and binding 25-year limited product and performance warranty issue by a company in the United States of America. Warranty must include guarantee for surface system Gmax <120 g according to ASTM F1936-10 for warranty period of artificial turf.
- i. Warranty must also include guarantee that surface system must provide average HIC <700 from a 1.3m drop height upon initial testing of installed field. (ASTM F3146-18, Procedure A) and surface system must provide average HIC <1000 from a 1.3m drop height during warranty period of artificial turf. (ASTM F3146-18, Procedure A)

2.3 TURF MATERIALS

- A. Synthetic Turf System: A synthetic turf system tufting 10,800 denier monofilament fibers made from a singularly extruded combination of stabilized polyethylene and nylon polymers with proper compatibilizers. Fibers shall be tufted into a suitable primary backing and coated with a secondary metered polyurethane adhesive coating. Pile height shall be nominal 2.0". Fibers shall be tufted to a primary backing and a mechanically applied adhesive secondary backing.
 - 1. The tufted fiber's face weight shall not weigh less than 60 ounces per square yard. The tufted rows of fiber are to be spaced no more than 1/2" apart. ASTM tests proving the fiber meets these qualifications must be provided with the bid. Turf systems that do not meet this specification will be disqualified.
 - 2. The carpet's primary backing shall have a minimum weight of 7.0 oz per square yard. The carpet shall then be coated with a secondary backing of polyurethane synthetic coating material with a minimum application rate of 20 ounces per square yard and then perforated for adequate drainage. Carpets that are not perforated for adequate drainage shall not be acceptable.
 - 3. The carpet shall be delivered in 15' wide rolls. The rolls shall be of sufficient length to go from sideline to sideline. Head seams, other than at sidelines, will not be acceptable.
- B. The infilled pile surface shall provide good traction in all types of weather with the use of conventional sneaker type shoes, composition molded sole athletic shoes, and screw- in style football cleats.
- C. The pile surface shall be suitable for both temporary and permanent line markings using acrylic paint, as per the turf provider's recommendations.
- D. All adhesives used in bonding the seams shall be resistant to moisture, freeze/thaw, bacteria and fungus attacks, and resistant to ultraviolet radiation. The adhesive shall be made especially for the adhesion of synthetic turf seams and inlaid field markings and graphics.
- E. The seam specific adhesive system shall have been utilized on at least 25 full installations. Provide this information with the bid. It shall consist of a factory-made adhesive bed applied to a non-woven fabric seaming tape. The adhesive bed shall be a metered amount suitable for the application. It shall be heat and pressure activated. A special heat application

machine and pressure application using weighted rollers is mandatory.

- F. Supply field groomer and sweeper or single maintenance apparatus that performs both basic maintenance functions.
- G. Perimeter edge details required for the system shall be as detailed and recommended by the turf provider, and as approved by the turf provider.

2.4 TURF FABRIC SURFACE

- A. The pile surface shall resemble freshly mown natural grass in appearance, texture and color.
- B. The pile surface shall be nominally uniform in length.
- C. The pile fiber angle shall be 90 degrees \pm 15 degrees, measured from the horizontal after installation of the infill material.
- D. The entire system shall be resistant to weather, insects, rot, mildew and fungus growth and will be non-allergic and non-toxic.
- E. The synthetic turf system shall have a nominal fiber length of 2.0".
- F. Each roll shall be minimum 15' wide
- G. The entire system shall be constructed for porous standards as specified. Synthetic turf system shall be perforated at 4 – 6" on center. Systems that are not perforated for maximum drainage shall not be acceptable.
- H. All markings shall be tufted in-place, inlaid or glued. It is recommended that the maximum amount of markings be factory-prefabricated into the turf system prior to shipment to site. At a minimum all football markings (with the exception of hash marks) shall be factory prefabricated.

2.5 PRODUCT SPECIFICATIONS – TURF

- A. Face yarns shall be a proven athletic quality, outdoor stabilized monofilament made from a singularly extruded combination of stabilized polyethylene and nylon polymers with proper compatibilizers.
- B. The fabric shall possess the following minimum physical characteristics. ASTM testing shall be provided with the bid and any products not meeting the minimum physical characteristics will be rejected:

Average Pile Yarn Face	ASTM D 5848	60 oz/square yard
Weight Average Total Weight	ASTM D 5848	86.5 oz/square yard
Secondary Backing Weight	ASTM D 5848	20 oz/square yard
Primary Backing	ASTM D 5848	7.0 oz/square yard
Average Tuft Length	ASTM D 5823	2.0"
Tufting Gauge	ASTM D 5793	1/2" maximum
Tuft Bind	ASTM D 1335	> 8 lbs
Yarn Denier (monofilament fiber)	ASTM D 1577	10,800/6
Fiber Thickness (primary/secondary)	ASTM D 3218	330 microns
Surface Flammability	ASTM D 2859	8 of 8 PASS
Permeability	ASTM F 1551	>30
Melt Point	ASTM D 789	248 degrees Fahrenheit
Gmax System (American Football)	ASTM F 355	<125 at installation

< 165 over life of
warranty

2.6 INFILL MATERIAL

- A. Infill composition shall consist of a ballast layer of silica sand topped by ambient SBR rubberperformance infill ratio by weight of 65% rubber 35% sand
- B. Silica sand infill:
 - 1. Must be clean, sub-angular silica sand
 - 2. Must be a 20-40 sieve size.
- C. SBR Rubber Infill:
 - 1. Must be ambient SBR Rubber
 - 2. Must be 10-20 sieve size
- D. Immediately after infill layers are installed, infill depth must be measured per testing protocol detailed in Section 1.3 C. 2 above to ensure that infill layer is at least 1.46" deep.

2.7 LINES AND MARKINGS

- A. All markings shall be installed in accordance with prior approved project shop drawings
- B. Inlays shall conform to the turf manufacturers specifications, directions and recommendations for best results.
- C. Striping layouts shall be accurately measured by the contractor before installation on field markings
- D. Install inlays only when the field is dry. Adhere all inlays securely into place

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to installation of the synthetic turf, examine substrates and conditions, with Installer present, for compliance with requirements for visual installation tolerances. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Certification of prior work: The synthetic turf manufacturer and / or certified installation contractor shall perform a visual inspection of the field base onto which the synthetic turf system is to be installed and to examine the finished surface for required compaction, and grade tolerances (through string line testing). After any discrepancies between the required materials, application and tolerance requirements noted have been corrected, the synthetic turf installer should submit a written certification of VISUAL acceptance of the base for installation of the synthetic turf system. Any tests other than VISUAL tests (string line, water hose, etc...) shall be the responsibility of the General Contractor, Architect, Engineer, or Sports Field Consultant.
- C. Installation of all materials shall be performed in full compliance with approved project shop drawings. Only factory trained and certified technicians skilled in the installation of athletic caliber synthetic turf systems, working under the direct supervision of the turf manufacturer's project managers, shall undertake the placement of the turf system. The designated supervisory personnel on the project must be certified, in writing by the turf provider as

competent in the installation of these materials, including proper seaming and proper installation of the infill mixture. The turf provider shall certify the installation and warranty compliance.

3.2 PREPARATION

- A. Inspect delivered field surface fabric and components immediately prior to installation. Any damaged or defective items shall be rejected. Installed synthetic turf system shall be inspected for, but not limited to, the following:
 - 1. Uniformity of product and color
 - 2. Surface wrinkles
 - 3. Field markings
 - 4. Field Edge installation
 - 5. Pile height of each roll shall be measured. Any material(s) that does not meet minimum height and thickness specifications shall be rejected. Pile height shall be measured in its finished positions.
- B. Environmental Conditions: Weather conditions are important for the successful installation of the systems. No work under this section will proceed when:
 - 1. Ambient temperatures are below 45 degrees F.
 - 2. Material temperatures are below 45 degrees F.
 - 3. Surfaces are wet or damp
 - 4. Rain is imminent or falling.
 - 5. Conditions exist or are imminent, which will be unsuitable to installation requirements of the systems specified herein. Humidity levels will be inside the limits recommended by the adhesive manufacturer to obtain optimal bonding characteristics of the surfaces.

3.3 SHOCK PAD

- A. Per manufacturer's recommendation - obtain written installation instructions and procedures from the manufacturer.

3.4 INSTALLATION OF THE SYNTHETIC TURF

- A. The carpet rolls are to be installed directly over the base
- B. The full width rolls shall be laid out across the field. When all of the rolls of the playing surface have been installed, the sideline areas will be installed at right angles to the playing field. All seam widths are to be held to a minimum and shall be traverse to the field direction. Seams shall be flat, tight, and permanent with no separation or fraying. All seams shall remain as required for the duration of the warranty period.
- C. The perimeter of the field shall be firmly secured to the edge anchors for the life of the warranty and in accordance to project details.
- D. Resilient Infill
 - 1. The sand ballast infill material shall be spot inspected and tested for conformance to sieve specifications.
 - 2. Sand ballast Infill must be placed in such a way as to minimize fiber entrapment.
 - 3. The rubber infill must be uniformly applied so as to ensure uniform, predictable surface.
 - 4. After infill layers are installed, infill depth must be measured to ensure that infill

depth is at least 1.46" deep.

3.5 Field Lining and Markings

- A. All markings shall be installed in accordance with prior approved project Shop Drawings.
- B. Inlays shall conform to the turf manufacturer's specifications, directions and recommendations for the best results.
- C. Striping layouts shall be accurately measured by the Contractor before installation of inlaid field markings
- D. Install inlays only when the surface is completely dry. Adhere all inlays securely into place. Never loose-lay and sew an inlay into place.

3.6 FIELD QUALITY CONTROL – Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

- A. Testing Services: Testing and inspecting of completed applications of synthetic turf system shall take place in suggestive states, in areas of extent and using methods that are industry standard. Do not proceed with application of next stages until test results for previously completed applications show compliance.
- B. Remove and replace items where test results indicate that it does not comply with specified requirements.

3.7 FINAL ACCEPTANCE

- A. Upon final acceptance, the Manufacturer shall submit to the Owner three (3) copies of Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance of the synthetic turf system, including painting and striping.
- B. The Manufacturer shall ensure that the turf can be plowed with Manufacturer approved snow removal equipment as detailed in the provided Maintenance Manuals.
- C. The finished playing surface shall appear as mowed grass with no irregularities and shall afford excellent traction for conventional athletic shoes of all types. The finished surface shall resist abrasion and cutting from normal use.

3.8 CLEANING

- A. Contractor shall provide the labor, supplies and equipment as necessary for final cleaning of surfaces and installed items. All usable remnants of new material shall become the property of the Owner. The Contractor shall keep the area clean throughout the project and clear of debris. Surfaces, recesses, enclosures, etc... shall be cleaned, as necessary, to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

END OF SECTION

SECTION 32 14 80

ATHLETIC EQUIPMENT

(CONTRACTOR-FURNISHED, CONTRACTOR-INSTALLED (CFCI))

PART 1 - GENERAL

1.1 SUMMARY:

A. Principal work of this Section:

1. Supply all work and materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of Athletic equipment, complete, as shown on the Drawings and/or as specified herein.
2. The principal items of work included in this section are:
 - a. Football Goal Posts
 - b. Soccer Goal Nets and Corner Flags, wheels and anchors, two sets of Kwik Goal 2B3906.
 - c. Long Jump / Triple Jump Sandpits
 - d. Takeoff Boards
 - e. Pole Vault Boxes
 - f. Pole Vault Standard & Landing Pads
 - g. Discus and Shot Put Thrower's Ring Circles
 - h. Shot Put Toe Board
 - i. Discus Cage and Safety Net Extension
 - j. Steeplechase Barriers Fixed and Portable
 - k. Steeplechase Water Pit Cover
 - l. Rocker Hurdles
 - m. Athletic Sand Fill for Sandpits

B. Related Work Specified elsewhere:

1. Excavation, Backfilling & Compaction for Pavement & structures – refer to soils report.
2. Timing Equipment- Division 26 – Electrical.
3. Section 32 18 39 Synthetic Track Surfacing

1.2 QUALITY ASSURANCE AND REQUIREMENTS

- A. The work of this Section shall be coordinated with all underground utilities and trades responsible for their installation and with all related work in other sections.
- B. Applicable Codes & Ordinances: Comply with the requirements of the following standards as applicable:
 1. National Federation of High School Associations (NFHS) Rules and Regulations.
 2. California Building Code – 2008 Edition.
 3. State of California Building Codes & ordinances.
 4. Consumer Product Safety Commission.

5. American Society for Testing and Materials.
 6. Underwriter's Laboratories.
- D. Protection: Erect and maintain barricades, warning signs and lights, and provide guards as necessary or required to protect all persons on the site.
 - E. All work to be performed shall be done with professional quality and to the satisfaction of the District's Representative; all materials shall be new and of the brand and quality specified in the Specifications and/or Drawings; and all workmanship shall be of the best, and not simply ordinary, quality and shall be performed by skilled workmen.
 - F. Manufacturer's Directions: Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturers used in this Contract furnish directions covering points not shown in the drawings and specifications.
 - G. The Contractor shall not willfully install the work as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in equipment usage or area dimensions exist that might not have been considered in the design. Such obstructions or differences shall be brought to the attention of the District's Representative. In the event this notification is not performed, the Contractor shall assume full responsibility for any revision necessary.
 - H. Contractor Qualifications: As specified in Section 32 18 39 – Synthetic Track Surfacing

1.3 SUBMITTALS

- A. Procedures: In accordance with Division 1.
- B. Submit manufacturer's product literature for approval prior to placing orders and/or fabrication:
 1. Manufacturer's specifications, installation instructions and details for manufactured items. Indicate methods of assembly, dimensions, weight and material, holes, lugs, inserts, finishes and other pertinent data.
 2. Provide color chart where applicable.
- C. Owner's manuals: Prior to Final Acceptance, submit owner's manuals including manufacturer's product literature for each item specified.
 1. Include the following:
 - a. Operating instructions, where relevant.
 - b. Equipment specifications.
 - c. List of components and accessories.
 - d. Manufacturer's installation instructions and details.
 - e. Spare parts list.
 - f. Maintenance recommendations.
 - g. Manufacturer's warranties (see paragraph 1.05 below).
- D. Do not fabricate prior to review and acceptance of samples by District Representative.
- E. Submit manufacturer's letters that installation has been inspected and approved - see Paragraph 1.06 below.

1.4 SITE OBSERVATION SCHEDULE:

- A. The Contractor shall be responsible for notifying the District in advance for required observation meetings and inspections.
 - 1. Provide a minimum of 48 hour notice to the District requesting meeting unless otherwise noted.
- B. Before any work commences, a conference shall be held with the Landscape Architect, District Representative and Contractor regarding general requirements of this work.
 - 1. Provide a minimum 7 day notice to the District requesting conference.
- C. Inspections required:
 - 1. Initial Conference: Before any work commences, a conference shall be held with the District's Representative, Manufacturer's Representative, and Contractor regarding installation requirements. Provide 7-day minimum advance notice.
 - 2. Layout. The District's Representative reserves the right to make minor adjustments to location from position(s) shown on the Drawings prior to installation at no extra cost.
 - 3. After holes are excavated for footings, and subgrade prepared, but prior to pouring concrete. Inspection is required by Soils Engineer. Provide 7-day minimum advance notice.
 - 4. After placement of steel for footings, but prior to pouring concrete. Inspection is required by Structural Engineer.
 - 5. Final Inspection by Manufacturer=s representatives. Provide 7-day minimum advance notice.
- C. Other Items specified in this Section: Observations required:
 - 1. Layout. The District reserves the right to make minor adjustments from positions on the Drawings prior to installation at no extra cost.
 - 2. After delivery to job site, but prior to installation.

1.5 WARRANTIES

- A. Provide manufacturer=s written warranties for each item specified to the District, including proof of date of purchase and/or installation, make and model number, and personnel to contact in event of a warranty claim.
- B. Provide operating & maintenance manuals in accordance with Section 01730 including spare parts list in detail.

1.6 INSPECTION BY MANUFACTURER=S REPRESENTATIVE

- A. Contact the equipment manufacturer to arrange an inspection of the final installation by the manufacturer's authorized representative. The District Representative shall also be invited to attend the inspection.
- B. Contractor shall repair and/or replace any items found defective. Arrange for re-inspection if so required by the District and/or manufacturer.

- C. Submit manufacturer's letters stating that installation has been inspected and found in compliance with specified requirements, and including the following:

1. Date of Inspection
2. Name, address & telephone number of Inspector
3. Name, address & telephone number of Contractor

PART 2 – PRODUCTS

2.1 GENERAL

- A. All equipment shall comply with the current edition of the National Federation of High School Associations (NFHS) Rules and Regulations.

2.2 FOOTBALL GOAL POSTS

- A. Prefabricated Schedule 40 aluminum football goal posts with adjustable uprights & powder coated finish. 20'-0" uprights, 23'-4" clear between uprights, with 8'-0" gooseneck, color: white.
1. Goal posts shall be removable for storage. Provide with manufacturers ground-sleeves, min. 8" diameter Sch. 40 steel tube.
 2. Provide with upright wind flags.
 3. Manufactured by SportsEdge, Sportsfield Specialties, or equal.
- B. Provide aluminum access frames for adapting ground sleeves and footings to artificial turf installations.

2.3 SOCCER GOALS AND CORNER FLAGS

- A. Soccer Goals Shall be Aluminum Frame with tire rollers, saddle anchor bags, and semi-permanent ground anchors.
1. Netting shall be 3 mm white net.
 2. Powder Coat White finish.
 3. Provide with wheel kits and ground anchors. Install with cast in place concrete footings as detailed by the manufacturer.
 4. Model 2B3906 as manufactured by Kwikgoal.
 5. Provide 2 full sets of two goals, 4 goals total.
- B. Corner Flags shall be removable, installed in permanent ground sleeves\.
1. Manufactured by SportsEdge, Sportsfield Specialties, or equal.

2.4 LONG JUMP / TRIPLE JUMP SANDPITS

- A. Modular Prefabricated aluminum sandpit forms with ledge for covers and integral sandcatcher system, size as shown on the drawings.
1. Provide sandcatcher system as manufactured by Sportsfield Specialties, or equal.
 2. Provide rubber coated sand catcher covers as supplied by the sandpit form manufacturer, quantity as required to cover all sandcatcher areas.

3. Provide modular extruded aluminum plank sandpit covers sufficient to completely cover the sandpits.

- a. Provide 7mm synthetic track surfacing on all sandpit covers.

B. Sand pit forms, sandcatcher covers, and sandpit covers shall be of a single source manufacturer.

C. Provide athletic sand and drainage course backfill in compliance with NHFS rules.

2.5 TAKEOFF BOARDS

A. Prefabricated adjustable aluminum take-off board system consisting of an aluminum tray assembly and replaceable foul and take-off boards.

1. Provide takeoff boards with 13mm synthetic track surfacing system, field applied to match new synthetic track surfacing.

3. Provide blanking lid for installation when takeoff board is not in use.
Takeoff systems, foul boards, takeoff boards & blanking lids shall be of a single source manufacturer.

2.6 POLE VAULT BOXES

A. Cast aluminum alloy pole vault boxes with white powder coat finish.

1. Gill Athletics # 505, or equal.

B. Provide aluminum vault box lid compatible with the vault box model.

1. Provide vault box lids with 13mm synthetic track surfacing system, field applied to match new synthetic track surfacing.
2. Vault box lid shall be flush with runway material.
3. Gill Athletics # 50201, or equal.

2.7 POLE VAULT STANDARD AND LANDING PADS

A. S1 Pole Vault Value Pack by Gill Athletics, or equal.

1. #65417 Pole Vault Pit Color to be selected.
2. #6541702 S1 Cover.
3. #61517 Base Pads Color to match pit.
4. #77100 S4 Standards.
5. #523 Crossbar.

B. Pole Vault Box Safety Collar.

1. Gill #719 Safety Max, Color Yellow.

C. Pole Vault Safety Pads

1. Gill #716 4' x 8' Safety Pads, Color Yellow

2.8 DISCUS/SHOT PUT THROW RING

A. TRDAA - Discus Throw Ring
TRSPHAA Shot Put Throw Ring

by Sportsfield Specialties:

1. Rolled 2" x 2" x 1/4" (0.25") Aluminum Angle
2. Inside Diameter: 98-1/2" (Discus) 84" (Shot Put)
3. 3/4" (0.75") Recessed Concrete Finishing Screed Line
4. Two (2) Piece Bolt Together Construction
5. Provided with assembly hardware

2.9 SHOT PUT TOE BOARD

- A. High School Shot Put Toe Board for recessed concrete pad installation.
 1. Sportsfield Specialties SPTBCARHS

2.10 DISCUS SAFETY CAGE AND EXTENSION NET

- A. High School Discus Cage with Hinged Net Stabilize Arms and Backup Net System

1. Sportsfield Specialties DCHSTEAL (TFDCHS-EXT) Tall High School Discus Cage W/ DCHSBNS Backup Net System Included.
2. Includes Main Net, 21' Upright Poles with Ground Sleeves and Stabilization Arms and 20' high netting.
3. Include Optional DCHSBNS Backup Net System Included.

- C. Discus Cage Net Extension

1. Sportsfield Specialties DCNE20 Tall Discus Cage Extension, 20' net height with 21' poles.
 - a. Length of net as required to fit plan.
 - b. Number of poles as required by manufacturer.
2. Includes Ground Sleeves for Poles

2.11 STEEPLECHASE BARRIERS

- A. Fixed Barrier

1. Gill #740144 Water Jump Barrier, Surface Mount
2. Include with 740145212 Water Seal Barrier

- B. Portable Barriers

1. Gill #740150 Portable Steeple Chase Barrier with Drop-Down Wheels, Set of 4

2.12 STEEPLECHASE WATER PIT COVER

- A. Gill #730146 Custom Fit Aluminum Cover

1. Include Track Surfacing installed by Track Surfacing Contractor.

2.13 ROCKER HURDLES

- A. 41" wide adjustable hurdle meeting NFHS pullover requirements.

1. Adjustable for 5 heights 30", 33", 36", 39", and 42".
2. High strength heavy gage anodized aluminum with Lexan gateboard
3. Gill #411 S1 hurdle.

2.14 MISCELLANEOUS MATERIALS

- A. Concrete for footings: As specified on the drawings.
 - 1. Minimum 2,500 psi compressive strength at 28 days.
 - 2. Rebar for footings: As specified on the drawings.
 - 3. Sand (for jump pits): Washed silica sand, 0mm to 2mm grain, not more than 5% less than 0.20 mm.

PART 3 – EXECUTION

3.1 SITE REVIEW

- A. Examine site for conditions that will adversely affect execution, permanence, and quality of work.
 - 1. Verify that grading has been completed and the work of this section can properly proceed.
 - 2. Exercise extreme care in excavating and working near existing structures, utilities, underground piping and conduits. Contractor is responsible for damages which are caused by his operations or neglect. Check existing utility drawings for locations.
 - 3. All scaled dimensions are approximate. The Contractor shall check and verify all size dimensions prior to proceeding with work under this Section.
 - 4. Notify the District's Representative in writing, describing unacceptable conditions.
 - 5. Do not proceed with work until unacceptable site conditions are corrected.

3.2 SUBGRADE PREPARATION

- A. Subgrade below bottoms of footings and slabs shall be prepared as specified in the soils report.

3.3 INSTALLATION

- A. Install all items in accordance with manufacturer's printed instructions and as detailed.
- B. Repair damaged surfaces to acceptance of the District Representative. Remove all temporary labels and tags. Clean items to remove dirt and stains.

END OF SECTION

SECTION 32 16 13

CONCRETE CURBS AND FLATWORK AT TRACK

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish all labor, materials, equipment, facilities, transportation, and services to complete all concrete and related work as shown on the Drawings and/or specified herein.

- B. Scope of work

The general extent of the concrete work is shown on the Drawings and may include, but is not necessarily limited to the following:

1. Concrete curbs
2. Expansion and Score Joints
3. Reinforcement

1.2 SUBMITTALS

- A. Submit "cut-sheets," mill certificates, or certificates of compliance for all products proposed for use on the project.

1.3 QUALITY ASSURANCE

- A. Concrete

1. All formwork, joint patterns, base material, reinforcement and other miscellaneous items shall be reviewed and accepted by the District Representative prior to pouring concrete
2. The District Representative shall at all times have access to any off-site batch plant or quarry supplying materials for subject project and trucks en route to the project site. The District Representative may at any time request slump tests and secure samples for further testing.
3. Concrete Testing Service: The District may retain a testing lab to perform material evaluation tests; the District will pay for all costs associated with on or off site testing.
4. Codes and Standards: Comply with the provisions of the following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - a. Uniform Building Code, current edition
 - b. ACI 318 "Building Code Requirements for Reinforced Concrete"
 - c. ACI 614 "Recommended Practice for Measuring, Mixing, and Placing Concrete"
 - d. Concrete Reinforcing Steel Institute, "Manual for Standard Practice"
 - e. ACI 302 "Standard for Concrete Finishing"
 - f. ACI 305 "Hot Weather Concrete"
 - g. ACI 306 "Cold Weather Concrete"

1.4 DELIVERY AND STORAGE

- A. Deliver concrete reinforcement to job site properly tagged and ready to set. Store above ground surface on platforms, skids, or other supports. Coordinate delivery and storage of all other materials as appropriate.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement shall be Type II cement conforming to ASTM C-150.
- B. Water used for mixing shall be potable.
- C. It shall be the contractor's responsibility to design the concrete mixes to provide the minimum requirements listed below. Minimum ultimate compression strength of concrete at 28 days is as follows:
 - 1. Compressive strength: 2500 PSI
 - 2. Slump Range: 2" to 4"
 - 3. Air Content: 3% to 5%
 - 4. Aggregate Size: 1" maximum

2.2 OTHER MATERIALS

- A. New form lumber shall be required for all track and field concrete form work, the practice of utilizing used lumber is prohibited even within the scope of this project. Formwork materials shall be surfaced lumber, plywood, metal, metal-framed plywood faced or other acceptable materials, to provide continuous, straight, smooth, exposed surfaces. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection. Plywood for forming shall be ACX or better.
- B. Score Joints: One half-inch (1/2") radius tooled joint to a depth of one inch.
- C. Reinforcing bars: Comply with ASTM A-615. Grade 60 #4 rebar.
- D. Provide supports for reinforcement to position the bars at mid depth of the concrete. Plastic and/or steel chairs, and dobies are acceptable.
- E. Provide and install all concrete curbs and nailers required for the installation of synthetic track and turf.

PART 3 - EXECUTION

- A. Subgrade Preparation
The Subgrade should be uniform in composition and compacted. Base course or cushion sand may needed or used to bring the elevation of the subgrade up to the desired level before the placement of concrete. All organic material should be removed from the subgrade before base course or cushion sand is placed.
- B. Forms and Screeds
New form lumber shall be required for all track and field concrete form work, the practice of utilizing used lumber is prohibited even within the scope of this project. Set forms to the required grades and lines, rigidly braced and secured. A form should be placed as deep as the pavement edge. Install a sufficient quantity of forms to allow continuous progress of work.
- C. Weather Conditions
Place concrete only when the air temperature is above 35 degrees F and conform to the standards set forth in ACI-306. Retardant may be required when the temperature exceeds 85 degrees F and conform to the standards set forth in ACI-305.
- D. Placement
Concrete shall be a minimum of 4" thickness. Rebar shall be accurately Placed at mid-depth, supported adequately by chairs, terminating 2" away from edges and joints. Rebar should be

lapped 18" and tied securely tied so that there is no displacement. Rebar shall be clean and free of rust as not to interfere with bonding of the concrete.

- E. **Finishing**
Concrete shall be spread, consolidated, screeded, bull-floated, edged, and Finished in accordance with ACI Standard 302. The final finish texture should be in accordance with the synthetic surface installer's recommendations, but must have at least a medium broom finish.
- F. **Tolerance**
The concrete surface should be finished so that the tolerance should not vary more than 1/4" inch in 10' when measured with a 10' straightedge in all directions vertically and horizontally. Finish surfaces shall drain properly with no areas of standing water. The top of all curb work shall not vary more than 1/8" laterally. There also shall be no elevation variance greater than 1/8" between any 2 locations over the entire project.
- G. **Curing**
Immediately after brooming, the concrete be kept continuously moist for 7 days by covering with burlap or polyethylene film. Curing compounds shall never be used. Curing time should be in accordance with the synthetic surface installers recommendations, but in no case less than 28 days.
- H. **Final tolerance verification**
Immediately upon completion of all concrete curbs and before any base or paving construction takes place, a final tolerance verification shall be performed. This shall consist of site survey conducted by the owners Land Survey Engineers consisting of elevation shots every 10' at the trackside edge of both inside and outside curb. Additional planarity verification shall consist of string line, digital hand level and 10 ft strait edge checks at random over entire area. Contractor shall immediately remediate any areas found not to meet specification. The track specialty contractor must accept in writing that the concrete curbs all meet the requirements for the track surface installation. The District Representative (AFCI) has the final word on all matters relating to compliance with the plans and specifications as well as remediation techniques acceptable under the unique circumstances.

PART 4 – CLEANUP

- A. Remove excess material, concrete spills, and all other excess materials from all project areas prior to Final Acceptance.

END OF SECTION

SECTION 32 18 39

SYNTHETIC TRACK SURFACING (OWNER-FURNISHED, OWNER-INSTALLED (OFOI))

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Synthetic running track surfaces.
- B. Lane and Line markings.
- C. The contract work to be performed under this section consists of furnishing all required labor, materials, equipment, implements, parts and supplies necessary for the track surfacing in accordance with these specifications and as indicated on the Drawings.
- D. CMAS Procurement: The Owner has purchased synthetic track surfacing and all associated line striping direct under separate contract not a part of the General Contract and not to be included in the General Contract bid. This section is for clarification and in coordination with the general contractor's scope of work and project schedules.
- E. Perimeter edge details and asphalt concrete base required for the track system shall be as recommended by the Track Surfacing manufacturer and as approved by the District. Supply and installation of the edge curbing and asphalt concrete base will be under the scope of work of the General Contractor included in the General Contract based on project plans and are not part of the synthetic track surfacing manufacturer / installer's scope.
- F. Asphalt paving under track system to be provided by General Contractor.

1.2 RELATED REQUIREMENTS

- A. Division 01: General Requirements.
- B. Section 31 20 00: Earthwork.
- C. Section 31 22 00: Grading.
- D. Section 32 12 16: Asphalt Paving.
- E. Section 32 16 13: Concrete Curbs and Flatwork.

1.3 REFERENCE STANDARDS

- A. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- B. IAAF/NCAA - Performance Specification for Synthetic-Surfaced Athletics Tracks (Outdoor); current edition.
- C. DIN 18035 6 - Sporting Grounds Part 6-Synthetic Surfaces; 2008.
- D. NCAA (TF) - Men's and Women's Track and Field and Cross Country Rules; current edition.
- E. NFHS (Guide) - Court and Field Diagram Guide; current edition.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Conduct a pre-installation meeting one week prior to start of work of this section; require attendance by all affected installers.
- B. The synthetic surfacing contractor shall coordinate the work specified with the District Representative, Construction Manager, General Contractor, and related subcontractors, so as to perform the work during a period and in a manner acceptable to the District.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's product data including standard specifications, installation guidelines and maintenance instructions.
 - 1. Submit documentation that synthetic running track surfacing material is free of toxic or hazardous substances that exceed the limits set forth by the U.S. Environmental Protection Agency.
 - 2. Submit Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS) for all individual components of the products to be installed.
- C. Shop Drawings: Show location and color of lane lines, start lines, finish lines, and related markings for District to review a minimum of 4 weeks prior to application.
 - 1. Prepare a set of computerized calculations and diagrams to verify the accurate distance around the track for each lane and each race.
 - a. Conform calculations to NFHS (Guide), National Federation for State High School Associations.
 - b. Include all standard high school races included in the striping and as indicated in this Section.
 - 2. Consult with the District and Architect prior to the start of calculations for determination of the finish line, events to be run, location of lane numbers and additional paint markings.
 - 3. Provide a scaled drawing to the District prior to construction as a submittal for approval.
 - a. Provide the approved scaled drawing to the District as part of the closeout documents.
- D. Samples: Three, 12 inch by 12 inch (305 mm by 305 mm) samples of the full-depth system in the color(s) indicated on the contract documents.
- E. Certifications:
 - 1. Submit documentation that the synthetic track surfacing contractor is a member of the American Sports Builders Association (ASBA).
 - 2. Submit installer's certification that the installer has reviewed the asphalt or concrete base drawings and specifications and accepts the asphalt or concrete base will be suitable if constructed as shown and specified.
 - 3. Submit installer's certification that asphalt substrate is acceptable as installed.
 - 4. Submit certification from registered engineer or land surveyor that synthetic running track surface layout and dimensions are as shown on the drawings.
 - 5. A current IAAF Certificate proving the product to be installed meets the current IAAF Performance Standards for Synthetic Surfaced Athletics Tracks (Outdoor).

6. A letter signed by an authorized representative surfacing installer that the track and field surfacing has no measurable traces of heavy metals, leachable mercury, and any other hazardous materials identified by the EPA.
 7. ISO 9001 and ISO 14001 Certificates as outlined in Part 1.6 Quality Assurance.
- F. Test Reports: Reports of field quality control testing.
 - G. Manufacturer's Instructions: Submit copies of manufacturer's written installation and maintenance instructions and other recommendations
 - H. Manufacturer's Qualification Statement certifying the requirements as outlined in 1.6 Quality Assurance.
 - I. Installer's Qualification Statement.
 1. The track surfacing installer shall be authorized by ATP (Manufacturer) and possess a minimum of ten (10) years of experience of installing the specified system.
 2. A list of completed facilities, including the installing supervisor, of the exact synthetic track surfacing system.
 - J. Maintenance Data: Operations and Maintenance Manual.
 - K. Warranty: Submit manufacturer warranty and ensure that forms have been completed in District's name and registered with manufacturer.
 - L. Project Record Documents: Record actual locations of installed synthetic running track surfaces.
 1. Upon completion of all line Markings, the SSC shall submit to the District a certification of accuracy submitted by a Registered Engineer or Surveyor. Confirm in the document that the track markings and layout meets the NFHS requirements and the requirements of these bid documents.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company that has produced surfacing materials for not less than ten (10) years with not less than five (5) similar projects that have been in successful use for more than five years in the California Market.
 1. Single Source Responsibility: Provide products and installation by the same manufacturer. No substitutions allowed.
 2. The Manufacturer must offer a minimum of four (4) IAAF approved track systems.
 3. All polyurethanes used must be manufactured by APT, and ISO 9001 and ISO 14001 Certified Company. Manufacturer's ISO 9001 and ISO 14001 certificate shall be provided with the bid.
- B. Installer Qualifications: Minimum ten (10) years' experience in successful installation of surfacing systems of type specified herein.
 1. Submit manufacturer's certification that installer is qualified to install the products specified.
 2. Submit installer's certification that installer is a member of American Sports Builders Association (ASBA).
 3. Submit installer's certification that installer employs at least one ASBA "Certified Track Builder" (CTB) on installation team for project.

4. Submit not less than ten similar projects that have been installed in the California Market within the last two years.
 - a. Installed using the exact, IAAF certified, synthetic track surfacing, as specified herein with the contractor bidding this project.

C. Contractor must have a current California contractor's license and DIR number at time of bid.

1.7 DELIVERY STORAGE AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store in weathertight location and protect from damage during delivery, storage and handling.

1.8 SITE CONDITIONS

- A. Ambient Conditions: Do not install during rainfall, when rain is imminent, when freezing temperatures are forecasted or exist, or when gusting winds are occurring within 24 hours minimum.
 1. Work is to progress only when the installing Contractor can guarantee successful cure of the materials.
- B. During surface installation and striping, all irrigation systems shall be shut-off or controlled so that no water falls on the track or event area surfaces. All on-site personnel, vehicles and equipment are prohibited from contact with the surfacing during the curing process.
- C. Mixing: Only mix and apply surfacing when meeting manufacturer's strict recommendations and guidelines.
- D. During set-up, installation and striping, the General Contractor and/or District shall be responsible to have the entire track and other pertinent areas closed and secured of all activities 24 hours per day until completion of the project.

1.9 WARRANTY

- A. See Section 01 77 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five (5) year period after date of Substantial Completion.
- C. Provide manufacturer's standard five (5) year warranty for synthetic running track surface system.
 1. The warranty shall cover defects in materials and workmanship not deemed as ordinary wear on a running track.
 2. All material shall be guaranteed to the extent that the surfacing:
 - a. Has been manufactured and applied in accordance with these and the manufacturer's specifications.
 - b. Will hold fast and/or adhere to the asphalt, concrete, edging, filler and patches or overlay materials.
 - c. Will perform as specified in these specifications and the specifications of the product manufacturer in the current standard product information literature and specification sheets.
 - d. Is Ultra-Violet resistant and will not de-laminate, bubble, blister, fade, crack or wear excessively during the guarantee period.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Synthetic Running Track Surfacing:

1. Manufacturer: Advanced Polymer Technology (APT), Harmony, PA. Telephone: (742) 452-1330. Website: Sportsbyapt.com.
2. CMAS Product System: Rekortan® G-10. Two-layer, 10 mm, impermeable full-pour system. The base layer consists of a self-leveling PU made from environmentally friendly, renewable resources. The top layer is a 4 mm flood and chip topcoat of polyurethane and embedded EPDM rubber. The minimum depth of the system shall be 10 mm with the depth of the top-wearing layer a minimum of 4 mm.
 - a. Qualipur Polyurethane Primer (as required).
 - b. SBR Spray Rubber
 - c. Tw0-Component Qualipur Renewable Polyurethane.
 - d. Two-Component Qualipur Polyurethane.
 - e. Melos EPDM Broadcast Rubber.
3. Polyurethanes shall be ISO 9001 approved.
4. Rubber (Black SBR Spray Rubber): The rubber in the base layer shall be specifically graded Styrene Butadiene Rubber (SBR). SBR is to be dried to no less than 2.5% moisture content and sealed in bags.
5. Colored Rubber (EPDM Broadcast): Must be Melos rubber. Black rubber is not allowed in the wearing course layer. Color as selected by Architect.
6. Full-Pour Polyurethane: The two (2) layers of Qualipur shall be made of a two-component Qualipur polyurethane with no solvents or fillers added. The specified products are Qualipur 5062 (A&B) in the base force reduction layer and Qualipur 5050 (A&B) for the top layer.
7. Colors: Colors to be selected by Architect for manufacturer's full range.

2.2 ACCESSORIES

- A. All required accessories as provided by manufacturer for a complete and proper installation.
- B. Track and Event Line Marking Paint: Compatible polyurethane paint formulated for exterior service environments in striping applications in color as specified for line markings as approved by the manufacturer of the surfacing system.
 1. The experienced track-striping specialist shall be as approved by the manufacturer and the track system installer.
 2. Thickness: 12 mils (0.3 mm) dry film thickness (DFT).
 3. Formulate paint to be compatible with synthetic track surface materials. Comply with VOC requirements in Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
 4. Colors shall be as prescribed or approved by the appropriate governing body; NFHS (Guide), NCAA (TF), IAAF/NCAA.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. The General Contractor shall verify that all asphalt paving meets all dimensional accuracy, quality, strength and compaction.
2. The General Contractor shall verify that all perimeter elements such as concrete curbs and flatwork meet all required tolerances.
3. Notify Owner's Representative, Inspector and Architect of any deficiencies. Coordinate and implement all necessary corrective work prior to the track surfacing installer's examination.
4. Substrate tolerances:
 - a. Planarity: Not to exceed 1/8 inch (3 mm) in 10 feet (3.048 m), non-cumulative.
 - b. Levelness: Not to exceed 0.1 percent in running direction.
 - c. Concrete Curbs: Ensure top elevations of continuous concrete curbs are at constant elevation.

B. Upon completion of paving, it is the responsibility of the General Contractor and paving subcontractor to water flood the surface with the use of a water truck.

C. Flood Test: Flood substrate immediately after substrate is capable of supporting foot traffic. Allow to dry for 30 minutes.

1. If any areas of ponded water ("birdbaths") are visible at the end of the 30-minute drying time, correct areas of substrate that allow water to pond.
2. Obtain manufacturer's written approval of method of correction prior to proceeding with corrective work.
3. Cold tar patching, skim-coat patching and sand-mix patching are not acceptable methods of correction.
4. Site Contractor and/or District (Not installer) to protect the base from activities and traffic that may damage the base or leave dirt, oil or other foreign material on the base prior to application of the synthetic track surface.

D. The entire asphalt surface shall be clean and free from all dirt, oil, grease or any other deleterious matter or residue. It is the responsibility of the General Contractor to ensure that the surface is thoroughly clean in all areas of the new asphalt paving as necessary to ensure adhesion of the track surfacing.

E. Minimum curing time, prior to the beginning of the synthetic track surfacing, is fourteen (14) days.

F. Track Surfacing Installer: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Do not proceed until unsatisfactory conditions have been corrected.
2. Beginning installation stipulates that track installer "accepts" the existing (installed) conditions. Adhesion to the existing surface is the surfacing contractor's responsibility.

3.2 PREPARATION

A. Protection: Protect surfaces adjacent to track surfacing operations from polyurethane liquids.

- B. Surface Preparation: Surfacing contractor to verify substrate is fully cured and free from dirt, excess surface oils and chemicals that would impair track surface installation. Pressure-washing is an acceptable method of cleaning the substrate.
 - 1. Asphalt: Cure asphalt for no less than fourteen (14) days. Test cured asphalt and provide documentation that volatiles and latent asphalt content are within limits defined by manufacturer. See Section 32 12 16.50 - Asphalt Paving at Synthetic Running Track Surfacing.
 - 2. Any oil spills (hydraulic, diesel, motor oil, etc.) must be completely removed, either by chipping out or removing and replacing with new, keyed in asphalt. The minimum depth of any asphalt replacement shall be one inch. The curing time for the asphalt base is 28 days. It shall be the responsibility of the surfacing contractor to determine if the asphalt substrate has cured sufficiently prior to the application of polyurethane surfacing system.
- C. Asphalt paving installer to ensure that asphalt compaction tests indicate compaction of 95 percent or greater. Check asphalt with 10 foot (3.048 m) straightedge in all directions. Asphalt paving installer to repair areas not in conformance or replace with new materials, recompact, and recheck surfaces.

3.3 INSTALLATION

A. General:

- 1. Comply with manufacturer's recommendations. Install track surface as specified to achieve track surface performance and physical dimensions within tolerances.
- 2. Priming: If necessary, prime entire surface area with compatible Qualipur polyurethane primer. Mask and protect adjacent surfaces and improvements, as required. After primer has become tack-free, but no longer than 24 hours, apply base layer. The consumption rate is 0.29 lbs/sy (0.16 kgs/sm).
 - a. Make substrate surface repairs and minor planarity corrections with repair compound.
- 3. Base Layer: Mix Qualipur 5052 (A&B), add 20% spray rubber to mixture, blend until thoroughly mixed, and apply using a notched trowel or squeegee. Do not overwork material; this can cause excessive trapped air. The consumption rate of the Qualipur 5052 is 7.62 lbs/sy (4.14 kgs/sm). The consumption rate of the spray rubber is 1.88 lbs/sy (1.02 kgs/sm). Before base resin layer sets, blow onto the surface a fine layer of black SBR rubber, to create a texture. The texture helps support traffic on the surface, helps keep the exposed resin from contamination and helps adhesion of the top layer. Approximate consumption of the rubber is 0.50-0.67
- 4. Top Layer: After the base has cured, but no longer than 24 hours, mix the Qualipur 5050 (A&B) coating and apply using a notched trowel or squeegee to achieve an even wet coat. The consumption rate of the Qualipur 5050 is 5.51 lbs/sy (2.99 kgs/sm). Broadcast to excess with 1-4 mm colored EPDM granules using a flat shovel or machine spreader ensuring all of the coating is covered. The consumption rate for the EPDM granules is 7.72 lbs/sy (4.19 kgs/sm).
- 5. Allow top layer to cure, and reclaim all excess rubber by means of a mechanical sweeper.

3.4 TRACK AND EVENT LINE MARKING

- A. Track and Event Line Markings, General: Comply with the requirements of the referenced NFHS (Guide) standards.
- B. Provide NFHS (Guide) standard markings for the following track and field events:
 - 1. 100 m; white lines.

2. 200 m; white lines 1 turn stagger.
 3. 400 m; white lines 2 turn stagger.
 4. 800 m; (one turn stagger in green line) green waterfall line where runners break.
 5. 1500 m; waterfall line white and dashed black line 3 meters behind start line for start.
 6. 1600 m; Waterfall line (white) and dashed black line 3 meters behind start line for start.
 7. 3200 m; Waterfall line (white) and dashed black line 3 meters behind start line for start.
 8. 1 mile; Black waterfall line and dashed black line 3 meters behind start line for start.
 9. 2 mile; Black waterfall line and dashed black line 3 meters behind start line for start.
 10. Waterfall line at 200 meters for medley relays – white.
 11. Provide alleys on outside lane staggered start for large field 1600 m and 3200 m starts – white line from inside of lane 5 to outside edge of lanes on track.
 12. 100 m hurdles; white start line, yellow marks for hurdle locations.
 13. 110 m hurdles; white start line, blue marks for hurdle locations.
 14. 300 m hurdles (men and women); white start lines, one turn stagger, green marks for hurdle locations.
 15. 400 m hurdles (men and women); black marks for hurdle locations.
 16. 4 by 100 m relay; white start line, 2 turn stagger, yellow diamonds for exchange zones.
 17. 4 by 400 m relay; white start lines, 3 turn stagger distances, blue diamonds for exchange zones, white line where runners break out of lanes.
 18. 4 by 800 m relay.
 19. 4 by 1500 m relay.
 20. Other events defined by District.
- C. Paint school name on visitor grandstand straightaway. Coordinate exact location with Architect in Shop Drawings.
1. Letter Size: 32 inches.
 2. Color: White.

3.5 TRACK CURB MARKERS

- A. Track curb markers shall be installed by the General Contractor and curb installer as referenced in Section 32 16 13.50 - Concrete Curbs and Flatwork at Track and as specified herein.
- B. Surveyor to provide markers placed centered in the inside track curb at the tracks' radius points.
1. Marker Designations:
 - a. Beginning of Curve (BC)
 - b. Midpoint of Curve (MC)
 - c. End of Curve (EC)
 - d. There shall be six total markers. Mark each BC, MC or EC (as appropriate).

- C. Concrete curb contractor shall install markers during setting of concrete curb. Embed marker into concrete such that top of marker is flush with the top of curb elevation.

3.6 TOLERANCES

- A. Percent Granules: Variation of plus or minus 2 percent.
- B. Surface Thickness, variation: Variation of minus 0.0 inch (0.0 mm) to plus 1/8 inch (3.0 mm).
- C. Color Deviation: 5 Delta E (Hunter) units maximum allowed.
- D. Slopes:
 - 1. Track Oval:
 - a. Running Direction: 1.0 percent, maximum.
 - 2. High Jump ("D" area): 1.0 percent maximum, downwards to the cross bar.
 - 3. Run Ups: Same as track oval unless located in the High Jump ("D") area.
- E. Striping:
 - 1. Calculations shall be made to the nearest 1/100th of a foot.
 - 2. Angles shall be set by using a total station GPS survey equipment or theodolite capable of reading direct to 20 seconds.
 - 3. Measurement shall also be made with a steel tape in engineering scale.

3.7 FIELD QUALITY CONTROL

- A. See Section 01 45 23 – Testing and Inspection for additional information and Section 01 7300 Execution.
- B. Striping Layout:
 - 1. Employ registered surveyor to document compliance of in-place work with the contract documents and the referenced standards.
 - 2. Submit reports.

3.8 CLEANING AND PROTECTION

- A. Leave surfacing in clean condition and free of surface defects. Reapply and touch up paint striping once during the warranty period.
- B. Protect installed surfacing from damage during the balance of construction activity.

END OF SECTION

SECTION 32 84 10

SYNTHETIC TURF COOL-DOWN SYSTEM

PART 1 - GENERAL

1.1 SCOPE:

A. Principal work of this Section:

1. Supply all work and materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of Landscape Irrigation System, complete, as shown on the Drawings and/or as specified herein.
2. Work noted as "N.I.C.", "existing", or "by others" is not a part of this Section.
3. Definitions, guarantees, submittals, cleanup, as-builts and all other applicable requirements of Division 1 apply to the work of this section.
4. The principal items of work included in this section, but not exclusively, are:
 - a. Complete synthetic turf field cooling spray system including trenching and backfilling for all pipes and valves, all mains, laterals, and risers, fittings, high pressure cast iron fittings and joint restraints, gear driven heads, quick couplers, pressure booster pump, special function manual control timing device, separate automatic irrigation timer/controller, low voltage electric wiring, and all necessary specialties and accessories.
 - b. Connection to a back flow protected main line provided by civil site utility plan.
 - c. Providing all sleeves beneath walkways, roads, and driveways where required whether shown on the drawings or not.
 - d. Clearing, testing, and adjusting of the system.
 - e. Guarantees.

1.2 REQUIREMENTS

- A. The work of this Section shall be coordinated with all underground utilities and trades responsible for their installation and with all related work in other sections.

1.3 QUALITY ASSURANCE

- A. Permits & Fees: Obtain and pay for all permits and inspections required by outside agencies.
- B. Ordinances and Regulations: Local, municipal, and state laws, and rules and regulations governing or relating to any portion of this work are hereby incorporated into and made part of these specifications, and their provisions shall be carried out by the Contractor. Anything contained in the specifications shall not be construed to conflict with any of these rules and regulations or requirements of the same. However, when the specifications and drawings call for or describe materials, workmanship, or construction

of a better quality, higher standard, or larger size than is required by these rules and regulations, the provisions of the specifications and drawings shall take precedence.

- C. Underwriters Laboratories: Electrical wiring, controls, motors, and devices shall be U.L. listed, and so labeled.
- D. Installer Qualifications (for solvent and rubber gasket joints): Each person shall be trained by the manufacturer's representative in techniques for making correct joints prior to performing work on the site.
- E. Manufacturer's Directions: Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturers used in this Contract furnish directions covering points not shown in the drawings and specifications.
- G. Work called for on the drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the specifications.

1.4 SUBMITTALS

- A. Provide the following submittals for review and approval: Provide a minimum of four copies unless otherwise directed.
 - 1. Materials Lists (see paragraph 1.5 below)
 - 2. Record Drawings (see paragraph 1.6 below)
 - 3. Controller Charts (see paragraph 1.8 below)
 - 4. Operating & Maintenance Manuals (see paragraph 1.9)
 - 5. Check List (see paragraph 1.10 below)
 - 6. Guarantee (see paragraph 1.11 below)
 - 7. Maintenance Tools (see paragraph 2.16 below)
- B. Submittal shall include a detailed list of proposed ductile iron fittings and compatible joint restraint fittings. Include manufacturer's standard joint restraint selection guide and installation instructions as part of submittal.
 - 1. Provide calculations indicating restrained length requirements for cool-down system piping. Provide for each type of fitting to be used, using calculator template supplied by manufacturer. Provide for the following applications:
 - a. Horizontal Bend.
 - b. Vertical Offset.
 - c. Tee.
 - d. Reducer.
 - e. Dead End.
 - 2. Calculations are not required for piping less than 3 inches in size. Use safety factor of 2 in calculations.

1.5 MATERIALS LISTS

- A. Prior to installation of any work, prepare a detailed list of each material proposed for use in the project and submit to Architect for approval. Prepare typewritten material list using the following format. Double space between each item.

ITEM NO.	DESCRIPTION	MANUFACTURER	MODEL NO.
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1.	Pressure	Pac. Western	Class 315 PVC supply lines
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- 2. Gear Head Hunter I-90
- 3. Etc. Etc. Etc.

- B. If equipment is as specified, no manufacturer descriptive catalogs are necessary in submittal.

1.6 RECORD DRAWINGS (AS BUILTS)

- A. Maintain up to date complete "as-built" record set of drawings which shall show every change from the original drawings and exact as-built locations, sizes, and kinds of equipment.
 - 1. Maintain information daily. Keep drawings at the site at all times and available for review by the Architect and or District's Representative.
 - 2. Record all required information on a set of prints of the Drawings. Do not use these prints for any other purpose.
 - 3. Record all changes which are made from the Contract Drawings, including changes in the pressure and non-pressure lines.
- B. These drawings shall also serve as work progress sheets and shall be the basis for measurement and payment for work completed.
- C. Record dimensioned locations and depths for each of the following:
- D. Locate all dimensions from two permanent points (buildings, monuments, sidewalks, curbs or pavements).
- E. When record drawings have been approved by the Architect, transfer all information to a clean set of base drawings using permanent ink.
 - 1. Make dimensions accurately at the same scale used on original drawings, or larger. If photo reduction is required to facilitate controller chart housing, notes or dimensions must be a minimum 1/4 inch in size.
- F. Reproducible prints will be furnished by the Architect at cost for printing and handling.
- G. Use appropriate white-out fluid for removing original lines and dimensions where changes are made. Completed reproducible shall be equal in quality and legibility to the original drawings.
- H. Submit "as-built" drawing to the Landscape Architect for approval prior to making controller charts.

1.7 SUBSTITUTIONS

- A. Substitutions of any product, material, or equipment without the prior written approval of the Landscape Architect and or District's Representative will not be permitted.
- B. Refer to Division 1 requirements for substitution approval procedure.

1.8 CONTROLLER CHARTS

- A. Do not prepare charts until record drawings have been approved by the Landscape Architect and or District's Representative.
- B. Provide one controller chart.
 - 1. Chart may be a reproduction of the Record Drawing, if the scale permits fitting the controller door. If photo reduction prints are required, keep reduction to maximum size possible to retain full legibility.
 - 2. Chart shall be blackline print of the actual as built system.
- C. Identify the area of coverage of each valve-in-head gear head using a distinctly different pastel color, drawn over the entire area of coverage.
- D. Following approval of charts by Landscape Architect and or District's Representative the chart shall be hermetically sealed between two layers of 20 mil thick plastic sheet.
- E. The chart must be completed and approved prior to final review of irrigation system.

1.9 OPERATING AND MAINTENANCE MANUALS

- A. Provide individually bound manuals detailing operation and maintenance requirements for the irrigation system.
- B. Provide four copies of each manual.
- C. Provide the following in each manual:
 - 1. Index sheet, stating Irrigation Contractor's name, address, telephone number and name of person to contact.
 - 2. Duration of the guarantee period.
 - 3. Equipment list providing the following for each item:
 - a. Manufacturer's name
 - b. Make and model number
 - c. Name and address of local manufacturer's representative
 - d. Spare parts list in detail
 - e. Detailed operating and maintenance instructions for major equipment.

1.10 CHECK LIST

- A. Provide a signed and dated checklist and deliver to the Architect and or District's Representative prior to final review of the work.
- B. Use the following format:
 - 1. Plumbing permits: if none required, so note.
 - 2. Material approvals: approved by and date.
 - 3. Pressure line tests: by whom and date.
 - 4. Record drawings: received by and date.
 - 5. Controller charts: received by and date.
 - 6. Maintenance Equipment furnished: received by and date.
 - 7. Operation and maintenance manuals: received by and date.
 - 8. System and equipment operation instructions received by and date.
 - 9. Manufacturer's warranties if required: received by and date.
 - 10. Written guarantee: received by and date.

1.11 GUARANTEE

- A. Guarantee the irrigation system to provide service as designed and installed for a period of one year from date of acceptance by Landscape Architect and or District's Representative.
- B. Correct all problems which develop in the system due to faulty materials or workmanship during the guarantee period.
- C. Repair or replace such work as directed by the Landscape Architect and or District's Representative.
- D. Make repairs and replacements promptly when notified.
- E. The District reserves the right to make temporary repairs during the guarantee period as necessary to keep systems in operating condition without voiding the Contractor's guarantee, nor relieving the Contractor of his responsibilities.
- F. All repairs and replacements shall match original installation in every way.
- G. Provide a written guarantee for each segment of the project, using the following format to be retyped on the Contractor's letterhead:

"GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM

We hereby guarantee that the sprinkler irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the drawings and specifications, ordinary wear and tear and unusual abuse or neglect excepted. We agree to repair or replace any defects in material or workmanship which may develop during the period of one year from the date of acceptance and also to repair or replace any damage resulting from the repairing or replacing of such defects at no cost to the Owner. We shall make such repairs or replacements within a reasonable time, as determined by the Owner, after receipt of written notice. In the event of our failure to make such repairs or replacements within a reasonable time after receipt of written notice from the Owner, we authorize the Owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

PROJECT: _____

CONTRACTOR: _____ PHONE NO: _____

ADDRESS: _____ BY: _____

_____ TITLE: _____

DATE OF ACCEPTANCE: _____ BY: _____ "

1.12 PRODUCT HANDLING

- A. Storage:
 - 1. Store materials at a location as directed by the District's Representative.
 - 2. Store materials in an orderly manner. Avoid interference with other construction

activities.

B. Protection:

1. Protect all materials to prevent intrusion of dirt and moisture. Do not store PVC material in direct sunlight.
2. Protect the installed work and materials of other trades.

PART 2 - PRODUCTS

2.1 GENERAL PIPING

- A. Lines 2-1/2 inch and larger downstream of backflow preventer: class 315 PVC solvent weld type, or (as a Contractor option) rubber gasket type, unless otherwise noted on the drawings.
- B. Lines 2 inches and smaller downstream of backflow preventer: schedule 40 PVC.
- C. Cool-Down System Piping: PVC plastic pipe with ductile iron fittings.
- a. Pressure Main Line Piping & Fittings 2 inches and larger: SDR 17 gasketed PVC, 250 psi pressure rated, with ductile iron fittings. Provide joint restraints at all tees, bends, offsets, reducers and end caps. Provide additional joint restraints in accordance with chart on drawings and manufacturers standard calculator.
 - b. Pressure Main Line Piping & Fittings 1-1/2 inch and smaller: schedule 40 PVC solvent weld type.
 - c. Non-pressure lateral line: Schedule 40.
 - d. Swing joints under synthetic turf: Prefabricated ductile iron assemblies, refer to paragraph 2.19 below.

2.2 PLASTIC PIPE:

- A. Identification Markings: Identify all pipe with the following indelible markings:
1. Manufacturer's name
 2. Nominal pipe size
 3. Schedule or class
 4. Pressure rating p.s.i.
 5. NSF seal of approval
 6. Date of extrusion
- B. Pipe (solvent weld type): manufactured from virgin poly-vinyl chloride in accordance with ASTM D-1784 or ASTM D-2241, cell classification 12454B; hydrostatic design stress rating not less than 2000 p.s.i.
- C. Rubber Gasket PVC Pipe, Couplings and Fittings **other than cool-down system**:
1. Pipe: ASTM D-1784, Type 1, Grade 1, 2000 pound design stress, class 315.
 2. Couplers and Fittings: Sch 80 injection threaded outlets shall be required, with stainless steel bands and support gussets. All tees and ells supported with an angle brace as a part of fitting. Similar in all respects to those manufactured by Flo-Seal.
- D. Fittings (solvent weld type): Schedule 80 injection molded PVC. Comply with ASTM D-1784, cell classification 13454B.

1. Threads (where required): Injection molded type.
 2. Tees and Ells: side gated.
- A. Threaded Nipples: Standard weight, Schedule 80 PVC with molded threads.
 - B. Fittings (2" through 4") slip type may be used, but must be similar in all respects to those manufactured by Cal Am Manufacturing Company and installed in accordance with their recommendations.

2.3 JOINT CEMENT AND PRIMER

- A. Non-pressure plastic pipe and fittings (lateral lines) shall be cemented using a 100% active solvent, blue in color.
- B. Pressure plastic pipe and fittings (main line) shall be coated with a primer and then with a 100% active solvent.
- D. Both primer and solvent shall be similar in all respects to that manufactured by Christy's, or approved equal.

2.4 DUCTILE IRON FITTINGS

- A. Fittings for high pressure cool-down system piping:
 1. Ductile iron, Grade 65-45-12 in accordance with ASTM A-536. Fittings shall be compatible with IPS plastic pipe & shall have slanted, deep bell, push-on joints with gaskets complying with ASTM F-477. Fittings shall have lugs to accommodate joint restraints and other fittings. Bell section shall allow 5-degree freedom of pipe deflection within the bell end. Gasket design shall be rib-enforced "U-Cup" configuration to seal and assist in restraining pipe at all pressures.
 2. Fittings shall be SB Series as manufactured by Leemco, Inc., Colton, CA, "Harco Deep Bell" as manufactured by The Harrington Corporation, Lynchburg, VA, or equal.
- B. Joint restraints:
 1. All changes of directions and reductions shall be mechanically restrained with ductile iron joint restraints. Additional adjacent joints shall also be restrained as per standard chart manufacturer's recommendations. Gate valves shall be treated as a dead end and shall be mechanically restrained for serviceability. Concrete thrust blocks shall not be allowed under synthetic turf.
 2. Joint restraints shall be as recommended by the manufacturer supplying the ductile iron fittings. Models, sizes and quantities of joint restraints shall be as specified by the manufacturer's standard joint restraint selection guide.
 3. Restraints shall be as manufactured by Leemco, Inc., Colton, CA, as manufactured by The Harrington Corporation, Lynchburg, VA, or equal.

2.5 ELECTRICAL WIRING AND SERVICE

- A. High Voltage:

1. All connections between electrical services and equipment shall be in rigid galvanized electrical conduit, with conduit and wiring size as required.

B. Low Voltage:

1. Connections between controller and remote control valves shall be made with direct burial AWG-UF, 600 volt wire, insulation thickness 3/64 inch, utilizing low density, high molecular weight polyethylene insulation.
2. Splices, where permitted, shall be waterproofed using **3M DBR-6 Connectors**, and housed in a plastic box.
3. Wire sizing shall be according to Manufacturer's recommendations, in no case less than #14, unless a shielded cable is used in which case #18 wire may be used.
4. Ground (common) wire shall be white in color. All others shall be a different color.

2.6 BACKFLOW PREVENTER

- A. **See civil site utility plan.**

2.7 COACHE'S SWITCH TIMER

- A. Type: Special purpose mechanically adjusted timing device capable of on-demand start, timed operation of each valve-in-head head, Green Product Sales Top Entry Controller Assembly ICA6 Series or approved equal. Assembly shall be as specified on the Drawings and shall be capable of operating the number of stations.

B. Features:

1. Individual manual start button for each station including a station active run light.
2. The controller shall be mounted within a stainless steel, vandal resistant enclosure and pedestal. Metal conduit shall run from the 117 volt supply to the controller housing. All power within the housing shall be properly phased. A pre-wired terminal strip shall be provided clearly indicating the proper points of connection of all appropriate wiring.
3. Fuse and chassis ground all controller components.
4. Provide heavy duty exterior grade padlock and (4) keys for each stainless steel cabinet.

2.8 AUTOMATIC CONTROLLER ASSEMBLY

- A. Type: Assembly Including all of the following:

1. **Rain Master Eagle-i Controller, iCentral communications enabled with antenna and 1 year i-Central service.**
2. **16"W x 38"H x 15.5"D Top Entry Strong Box stainless steel enclosure.**
3. **Hand-held wireless remote radio receiver and antenna.**
4. **Flow sensing including compatible Rain Master/Irritrol 1-1/2" flow sensor.**

2.9 GATE VALVES

- A. 3" and larger: 125 psi, iron body, bronze mounted, bolted bonnet, non-rising stem, double disc, parallel seat, hub end for PVC, nut operated. AWWA specifications, Walworth 719F or Kennedy 573X, or equal.

2.10 QUICK COUPLING VALVES

- A. Two piece type brass body, 150 pound class, with 1 inch female threads opening at base, permitting operation with a special connecting device (coupler).
1. Coupler Threads: Lug type.
 2. Hinge Cover: Provide with rubber-like vinyl cover.

2.11 REMOTE CONTROL VALVES

- A. Glass filled nylon constructed, Automatic Control Valves:
1. General Application and Description: Superior 850 Irrigation Remote Control Valve, Body constructed of durable glass-filled nylon for long life and heavy-duty performance at 200 psi (13.80 bar) pressure. Stainless steel studs molded into the body. Bonnet can be attached and removed more easily without damaging threads. One-piece solenoid design with captured plunger and spring for easy servicing. Prevents loss of parts during field service. External bleed protects the solenoid ports from debris when system is flushed. Internal bleed operates the valve without allowing water into the valve box; allows pressure regulator to be adjusted without turning on the valve at the controller first. Low flow operating capability. Install in Carson 1419.

2.12 FIELD COOL-DOWN HEAD ASSEMBLY

- A. Hunter STK-1 Kit including
1. ST Rotor Head as specified on the plan
 2. ST Vault with polymer concrete cover.
 3. VA 2" 7 pivot swing joint.
 4. ST Adapter Elbow Fitting and ST Rotor Adapter Fitting'
 5. STG 900 Rubber Cover Kit.

2.13 BOOSTER PUMP ASSEMBLY

SYSTEM DESIGN PARAMETERS

IBCR20-15-2-3/VFD-F System Model Number	105 GPM System Design Flow Rate	130 PSI System Design Pressure	3 INCH System Piping Size
42 PSI Minimum Suction Pressure	480 VAC System Electrical Voltage	3 PHASE 60 Hz System Electrical Phase and Frequency	
CR20-5 Pump Model Number	105 GPM Pump Capacity (GPM)	220 FEET Pump Total Head (Feet)	
15 HP Pump Horsepower	3500 RPM Pump RPM		

BOOSTER PUMP ASSEMBLY

- A. A simplex water pressure booster system as designed and fabricated by Barrett

Engineered Pumps (619) 232-7867. The system shall be a completely prefabricated system with pump, piping, electrical and structural elements. The entire booster pump assembly shall be UL Listed and Approved.

B. Pump shall be:

1. (CR Series) Vertical Multi-Stage Centrifugal. Pump construction shall be cast iron stainless fitted with cast iron casing, stainless steel impellers and bowls. Pump shall be equipped with tungsten carbide mechanical seal. Pump shall be directly coupled to a C-face electric motor.
2. Electric motor shall be of the squirrel cage induction type suitable for full voltage starting. Motor shall be ODP to aid in cooling. Electric motor shall be rated for continuous service. The motor shall have horsepower ratings such that the motor will carry the maximum possible load to be developed under the designed pumping conditions and not overload the motor beyond the nameplate rating of the motor. Motor shall have a 1.15 service factor. The motor shall conform to the latest NEMA Standards for motor design and construction.
3. Pump Control Panel shall have a NEMA3R plain front non-metallic enclosure with padlock latches. This Includes power and control re-settable thermal circuit breakers, heavy duty magnetic starter with adjustable overload protection, Hand-Off-Auto switch to select mode of operation, and heavy duty numbered terminal strips for power and control wiring lead terminations.
4. If 24V control started, a Metal oxide varistor protected pump start relay shall be incorporated in panel to start pump with signal from an irrigation controller.

- C. All system piping shall be Schedule 10S 304 stainless steel. All major fittings shall be 304 stainless steel with flanges to allow for system disassembly or major component removal. All instrumentation fittings shall be 304SS. System shall incorporate an integral full pipe size bypass line with isolation valve to allow for pump removal and repair without disrupting water supply to system.
- D. Isolation valves shall be all stainless quarter turn ball valves with hard chrome ball on lines 2" and less. Isolation valves shall be lug style butterfly valves with Buna-N elastomeric seats, ductile iron nickel coated disc, and stainless steel stem with handle and 10 position galvanized memory plate on lines 2½" and greater.
- E. Gauges shall be 2½" diameter face, glycerin filled with stainless casing and brass internals.
- F. Flow switch shall be a 316 stainless steel and solid state thermal sensor designed to measure change in flow velocity and in temperature. The flow switch shall include an integrated bar graph with 10 LED lights and shall be capable of providing indication of flow (green), closed (orange), and open (red) conditions.
- G. Pump system shall be mounted on a structural aluminum skid with mounting flanges on front and back to allow for mounting of skid to concrete pad. Skid equipped with pipe support on suction and discharge piping. All nuts and bolts and washers shall be stainless steel on skid and piping. Skid shall include mounting hardware for integral aluminum enclosure.
- H. The system enclosure shall be vandal and weather resistant, marine grade aluminum alloy 5052-H32 construction with rectangular punch-outs for viewing and heat dissipation. The

enclosure shall be low profile hinged top design with padlock provision. The cover shall be secured to the concrete pad with stainless steel hardware. The enclosure shall measure 35D" x 50W" x 40H" and concrete pad dimensions shall be 47" x 62". The enclosure shall be as manufactured by V.I.T. Products, Inc.

- I. Pump Assembly shall include the following option(s):
 - ❑ (VFD-F) a Fuji Variable Frequency Drive system to receive feedback signal from system mounted stainless steel pressure transducer, and in conjunction with internal software driven PID control loop maintain customer adjustable constant system discharge pressure by varying the speed of the pump in response to varying system load.
- J. The services of a factory representative or trained service professional shall be made available on the job site to check installation and perform the startup and instruct the operating personnel. A startup report containing voltage and amperage readings, suction and discharge pressure readings, estimated flow conditions, and general operating characteristics shall be submitted to the Owner.
- K. One electronic set of operating and maintenance manual shall be provided to the owner after startup and shall include parts manuals for major components, performance curve for pump, general sequence of operation, and electrical schematic for control panel.
- L. The warranty period shall be a non-prorated period of 36 months from date of purchase.

2.14 THRUST BLOCKS

- A. Thrust Blocks: 3000 psi concrete at 28 days.

2.15 OPERATING AND MAINTENANCE TOOLS

- A. Deliver the following items to the District when work is completed and prior to final acceptance of work:
 - 1. Six wrenches for disassembly and adjustment of sprinkler head.
 - 2. Two keys coach's timer enclosure.
 - 3. Three couplers and matching hose swivels with globe valves.
 - 4. Six keys for opening valve boxes.

PART 3 - EXECUTION

3.1 UTILITY SERVICES

- A. Contractor shall connect to water service at location shown on the drawing and make any minor changes in location necessary due to actual site conditions as a part of this contract.

3.2 REMOVALS, SALVAGE AND MODIFICATIONS

- A. Prior to starting work, confer with District's Representatives to discover potential problem areas and locations of points of joining between the removal work and existing system to remain in service. Also identify locations of shut-off valves for all emergencies. Immediately reconnect existing service beyond the site irrigation system, should removal

or modifications affect the service.

- B. No shut-downs shall be made without prior approval of the District. Requests for shut-downs shall include date, time and the period of time for shut-down. Requests shall be made a minimum of three (3) working days prior to the requested shut-down.
- C. Replace or repair, to the satisfaction of the District's Representative, all existing paving or landscaping disturbed during the course of this work. New paving and landscaping shall be of the same type, strength, texture, and finish and be equal in every way to the material removed. Repair work shall be done at no additional cost to the District. All existing irrigation systems serving adjacent planted areas shall remain operational throughout all capping and abandoning of existing irrigation mainlines.
- D. All sprinkler heads, valves, and equipment within the limits of work shall be salvaged and signed over to the District. Piping shall not be abandoned in place. Piping removed shall be legally disposed of off the site.
- E. All connections made from the new work to the existing system shall be recorded on the Record Drawings. All other utility lines, site drainage lines, etc. found and which are to be saved shall also be recorded.

3.3 SITE REVIEW

- A. Before any work commences, a conference shall be held with the Landscape Architect and or District's Representative and Contractor regarding general requirements of this work.
- B. Contractor's Responsibility:
 - 1. Notify the Landscape Architect and or District's Representative for the following reviews, with 48 hour minimum notice except as noted:
 - a. Main line installation and testing
 - b. System layout
 - c. Controller location
 - d. Control wire installation
 - e. Coverage tests prior to planting
 - f. Final inspection - minimum 7 day notice required.
 - 1. Provide up-to-date as built drawings at each review.
- C. Examine site for conditions that will adversely affect execution, permanence, and quality of work.
 - 1. Verify that grading has been completed and the work of this section can properly proceed.
 - 2. Exercise extreme care in excavating and working near existing structures, utilities, underground piping and conduits, and over waterproofing membrane. Contractor is responsible for damages which are caused by his operations or neglect. Check existing utility drawings for locations.
 - 3. Determine locations of points of connections to all piping installed by others, and determine that pressure supply is available for work of this Section.

- D. Notify the Landscape Architect and or District's Representative in writing, describing unacceptable conditions. Do not proceed with work until unacceptable site conditions are corrected or existing utilities are located.

3.4 EXISTING IRRIGATION MAINLINES

- A. The scope of work includes cutting and capping of existing irrigation lines. At the commencement of the project the Contractor shall set up a meeting with the Landscape Architect and the University's Representative to discuss the exact locations for cutting and capping existing lines.
- B. The Contractor shall ensure that all adjacent landscaped areas receive irrigation water throughout the entire construction period. The Contractor shall install temporary irrigation lines as required to ensure there is no interruption in water delivery to adjacent planted areas.

3.5 LAYOUT

- A. All piping or equipment shown diagrammatically on the drawing under paved shall be located under unpaved areas whenever possible.
- B. Lay out each sprinkler head and make any minor adjustments required due to differences between actual site conditions and the Drawings. Minor adjustments shall be maintained within the original design intent.
- C. Lay out each system using staking method as approved by Landscape Architect and or District's Representative. Maintain and protect approved staking layout.

3.6 TRENCHING

- A. Excavate trenches to required depths. Follow approved layout for each system.
- B. Trench bottom shall be flat to insure piping is supported continuously on an even grade.
- C. Where lines occur under paved areas, consider dimension to be below the subgrade.
- D. Provide minimum coverage as follows:
 - 1. Lines 3 inch and smaller: 18 inches.
 - 2. Main Lines 4 inches and larger: 24 inches
 - 3. All Lines under synthetic turf: 30 inches.
 - 4. Control Wires: 18 inches.

3.7 LINE CLEARANCES

- A. Provide not less than 4 inches clearance (horizontal and vertical) between each line and not less than 6 inches clearance between lines of other trades, unless otherwise noted.
- B. Do not install parallel lines directly over any other line.

3.8 BACKFILLING

- A. Buried pipe in trenches shall be center loaded only until all required tests are performed.
- B. Initial Backfill: Clean, fine granular material as approved by the Landscape Architect and or District's Representative. No foreign matter or stones larger than 1/2 inch will be permitted.
- C. Compact trench backfill to a dry density equal to adjacent undisturbed soil. Restore to adjacent grade, free of dips, depressions, humps or other irregularities.
 - 1. Where acceptable soils exist, the Landscape Architect and or District's Representative may authorize flooding in lieu of tamping.
 - 2. Compaction by truck or other vehicle is not permitted.

3.9 INSTALLATION

- A. All plastic pipe and fittings shall be installed in complete accord with manufacturer instructions.
- B. Routing of sprinkler lines as indicated on the Drawings is diagrammatic. Install lines and assemblies to conform to details on the plan.
- C. Installation of Piping:
 - 1. Provide concrete thrust blocks at each change in direction and at all terminal points for all rubber gasket piping and/or all piping larger than 3 inches. Block in accordance with pipe manufacturer's instructions and as detailed on the drawings.
 - a. Thrust blocks are not permitted for cool-down system lines. Install cool-down system mains with restrained ductile iron fittings per chart on drawings and per manufacturer's instructions.
 - b. Provide joint restraints at all tees, bends, offsets, reducers and end caps. Provide additional joint restraints in accordance with chart on drawings and manufacturers standard calculator.
 - 2. Plastic Pipe with Threaded Fittings: Assemble using teflon tape applied to male threads only.
 - 3. All PVC pipe and fitting shall be thoroughly cleaned of dirt, dust and moisture prior to installation. Installation and solvent welding methods shall be as recommended by the pipe & fitting manufacturer.
 - 4. Tape all open ends of pipe to prevent entry of any foreign matter into the system.
 - 5. On PVC to metal connections, the Contractor shall work the metal connections first. Use teflon tape on all threaded PVC to metal joints.
- D. Install all specified assemblies in accordance with the Drawings. In absence of detail drawings or specifications pertaining to specific items required to complete the work, perform such work in accordance with best standard practice, as approved by the Landscape Architect.
- E. All major equipment shall be verified for exact location with the District's Representative before installation.

1. Quick Coupling Valves: Unless otherwise indicated, locate valves within 12 inches of a walkway.
- F. Sprinkler Heads: All sprinklers shall be installed flush with finish grade unless otherwise noted.
1. Spacing of heads shall not exceed the maximum shown on the drawings.
- 3.10 EXISTING PAVEMENTS
- A. Piping under existing pavements may be installed by jacking, boring, or by hydraulic driving, except as otherwise specified or directed.
 - B. Secure District's permission prior to cutting or breaking existing pavements.
 - C. Make completely clean cuts using power saws, at approved locations only.
 - D. Replace and restore all surfaces to original condition, including grade and landscaping. Restoration work shall match the original work in every respect, including type, strength, texture and finish.
- 3.11 NEW PAVED AREAS
- A. Coordinate installation of piping and wires under paved areas with General Contractor.
 - B. The installing contractor may (but is not required to) install sleeves for future installation of water lines and wires.
 - C. If the only piping installed is over 20 feet long, pressure testing is required for that section at the time of installation. Upon completion of piping installation, the entire system must be tested.
 - D. If wires under paved areas cannot be continuous, all splices must be enclosed in an approved box.
- 3.12 LOW VOLTAGE WIRING
- A. Place wiring in the same trench and along the same routing as the main lines unless otherwise approved.
 1. Install wiring prior to main line whenever possible.
 2. When more than one wire is placed in a trench, tape wires together at maximum intervals of 12 feet.
 - B. Provide a 12 inch expansion loop at each connection and at each change in direction.
 - C. Use a continuous wire between controller and remote control valves.
 1. Except as otherwise approved, do not splice wire at any point.
 2. All approved splices shall be enclosed in an acceptable box.
 - D. Each controller shall be provided with separate ground (common) wire, white in color.

3.13 SYSTEM FLUSHING

- A. After all sprinkler pipes and risers are in place and connected, and prior to installation of sprinkler heads, thoroughly flush all lines with a full head of water.
- B. Do not install sprinkler heads until lines have been flushed to the satisfaction of the Landscape Architect and or District's Representative.

3.14 SYSTEM ADJUSTMENT

- A. Cool-down Heads: Adjust for alignment and coverage.

3.15 PRESSURE TESTS

- A. Provide all equipment necessary to test systems, including force pump.
- B. Perform all hydrostatic tests in presence of the District's Representative.
- C. Test all main lines under hydrostatic pressure of 150 p.s.i. for a period of 2 hours, unless otherwise required and approved. Pressure drop over test period shall be zero p.s.i.
- D. Do not backfill over any line more than is necessary for testing, until it has been inspected, tested and approved.
- E. Do not install remote control valves, quick couplers or any other valve assembly until testing is completed and approved.

3.16 OPERATING INSTRUCTIONS

- A. Train the District's maintenance personnel in proper operation of all major equipment. Arrange for training by manufacturer's representatives for controller operation.
- B. Provide this training at the District's convenience.
- C. Submit written evidence that training has been successfully completed.

3.17 CLEANUP

- A. Upon completion of the work, restore ground to required elevations and remove excess materials, debris, and equipment from the site to the satisfaction of the District's Representative.

END OF SECTION

SYNTHETIC SPORTS TURF BASE

SECTION 32 95 00

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Synthetic turf drain bed, perforated pipe sub-drains, and synthetic turf system edge anchorage.

1.2 QUALITY ASSURANCE

- A. Contractor qualifications:
 - 1. Installers of the synthetic turf base system shall:
 - a. Possess a Class A California Engineering Contractor's License.
 - b. Have prior direct experience in preparing a drainage base for synthetic turf sports fields and must have installed a minimum of 10 such base systems in California during the past 3 years.
- B. Changes & Substitutions:
 - 1. The contractor shall strictly adhere to the procedures outlined under this Section. Any variance from these requirements will only be accepted by the College upon acceptance in writing by the synthetic turf contractor onsite representative, verifying that the changes do not in any way affect the synthetic turf warranty.
- C. Synthetic Turf Warranty Requirements:
 - 1. Completed Work of this section shall comply with the following:
 - a. Compaction of sub-grade: minimum 90% ASTM 1557-Modified Proctor density.
 - b. Planarity of sub-grade: tolerance of one quarter inch (1/4") in ten feet (10').
 - c. Compaction of crushed aggregate permeable base: Shall be compacted to a minimum of 90%, and no more than 92%, ASTM 1557- Modified Proctor density.
 - d. Surface tolerance of crushed aggregate permeable base: not to exceed 1/4 inch over 10 feet and 1/2" from design grade.
- D. Coordination:
 - 1. Coordinate locations of connections to storm drainage system with piping installed by others.
 - 2. Coordinate work with installation of underground piping beneath synthetic turf and with installation of field appurtenances such as cool-down heads, electrical outlets in synthetic turf and other items required by Contract Documents.

1.3 FIELD QUALITY CONTROL & ACCEPTANCE OF WORK

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing. Contractor shall provide project schedule and timeline to recognize, allow for and coordinate with the geotechnical engineer's specified testing operations.
 - 1. Tests shall include compaction and Proof Roll testing of sub-grade, finish grade and each lift of synthetic turf base, measured at a minimum of 12 locations randomly spaced across the surface of each field.
 - 2. The Independent Testing Agency shall also test the crushed aggregate permeable base material prior to delivery to the job site to verify that material meets the specified gradation & permeability requirements. A minimum of one (1) test for every 3,000 tons of material

3. In-situ drainage testing shall be provided for every 15,000 SF of Synthetic Turf surface.
4. Installed drainage properties to comply with the following
 - 1) Testing Methods:
 - a. Test Method ASTM D 3385-09 "Standard Test Method for Infiltration Rate of Soils Using Double Ring Infiltrometer or BSI 7044 "Artificial Sports Surfaces – Test Method 4-EN 12616 , Test shall be conducted and exceed 28" per hour.
 - b. If access to a water source with a hose is available the ASTM F 2898, "Standard Test Method for Permeability of Synthetic Turf Sports Field Base Stone and Surface System by Non-confined Area Flood test Method." -Test shall also be conducted in same location as double ring test. Test shall exceed 5-6" per hour.
 - 2) Double ring and non-confined shall be conducted so that double ring test location is within wetted area of non-confined test location.
 - a. Final approval of infiltration requirements are to be through field testing only.
 - b. Methods not specifically listed above shall be submitted for approval.
5. Testing agency will test compaction of soils & base materials in place according to ASTM D 1557, ASTM D 6938, as applicable.
6. Contractor's surveyor will verify proper elevation of nailer board around entire perimeter of field, and submit to the Engineer for approval. Contractor's surveyor shall be a licensed California surveyor and shall be an independent sub consultant of the General Contractor

- B. Owner provided independent testing agency results verifying compliance with compaction & permeability requirements shall be supplied and approved by owner's representative prior to the commencement of synthetic turf installation.

1.4 SUBMITTALS

- A. Contractor Qualifications.
- B. Product Data: Submittals required:
1. Aggregate base material including sieve size analysis & source.
 2. Impermeable Fabric Membrane.
 3. Perforated Pipe Sub-drainage pipe & fittings.
- C. Samples: Submittals required:
1. Impermeable Fabric Membrane.

PART 2 - PRODUCTS

2.1 IMPERMEABLE FABRIC MEMBRANE

- A. Impermeable fabric membrane.
1. Hercushield 2400, or approved equal
In-Line Plastics, LC.
8615 Golden Spike Lane
Houston, Texas 77086
Phone: (800) 364-7686 or (281) 272-1660

2.2 PERFORATED PIPE SUBDRAINS

- A. Initial piping, rectangular section:
1. Basis of Design: 1" x 12" ADS AdvanEDGE rectangular perforated pipe, or equal.
 - a. Complying with ASTM D7001.
 - b. Pipe and fittings made of polyethylene with minimum cell classification of ASTM D3350 class 424420C.
 - c. Nominal pipe size 1" x 12".
 - d. Outside dimensions approximately 1 1/2" x 13".

- e. Water Inlet Area approximately 15 sq.in per lineal foot of pipe.
- f. Supply with integral external geotextile wrap provided by pipe manufacturer.
- 2. Fittings compatible with pipe, as recommended by pipe manufacturer.

B. Collector piping, round section:

- 1. As specified in Storm Utility Drainage Piping.
- 2. Collector pipe trench fill: ASTM Angular ASHTO #57 crushed rock, washed.

2.3 CRUSHED AGGREGATE STRUCTURAL BASE

- A. Material to be open graded, fractured friction course that provides adequate mechanical stability and compaction for athletic field applications.
- B. Installed drainage properties to exceed 14" per hour of vertical water passage.
- C. Material to be clean washed with minimal fines as described in gradation table below.
- D. Material to be 100% fractured with at least one mechanical fracture per particle greater than 1/4" sieve size.
- E. Comply with the gradation criteria for the California Department of Transportation 3/4" Permeable Class II (Section 68):

Mesh Size	% Passing
1"	100
3/4"	90-100
3/8"	40-100
#4	25-40
#8	18-33
#30	5-15
#50	0-7
#200	0-3

- 1. Acceptable local sources:
 - a. Vulcan Materials Company, Western Division, Carroll Canyon: "Turf Perm 40% 3/4"CR, 20% 1/2"CR, 20% 3/8"CR, 20% FS-30"
 - b. FST Sand & Gravel, Corona, California tel.(951) 277-8440 "Class II Permeable Base"
 - c. Other sources complying with specified requirements.
- 2. Soft limestones and shale materials are not acceptable.
- 3. Questionable materials shall be tested at the Contractor's expense using a sulfate soundness test (ASTM C-88) and LA Abrasion Test (ASTM C-131).

Test Method	Criteria
Sulfate Soundness (ASTM C-88)	Not to exceed 12% Loss
LA Abrasion (ASTM C-131)	Not to exceed 40

2.4 PERIMETER CURBING AND TURF FABRIC ATTACHMENT

- A. Freeform trench-dug concrete curb wall.
 - 1. Curb finish where exposed.
 - 2. Concrete as specified in Division 3, requirements for footings.
- B. Fabric nailer board.
 - 1. Recycled plastic polymer landscape board, 2 x 4 nominal.
 - 2. Nailer board anchors: Simpson Carbon Steel Strong-Bolt 2, zinc coated, 3/8" diameter, nominal embedment depth 1-7/8", 24" on center spacing
- C. Fence footings where required.

PART 3 - EXECUTION

3.1 PREPARATORY WORK

- A. Examination of Site:
 - 1. Examine site for conditions that will adversely affect execution, permanence, and quality of work.
 - 2. Verify that underground utility & irrigation piping below sub-grade of synthetic turf base has been completed and the work of this section can properly proceed.
 - 3. The Contractor shall be responsible to close and cover, in a manner acceptable to the Owner, any existing basins, which the Owner determines to be detrimental to the function of the new artificial turf field.

3.2 EXCAVATION & SUB-GRADE PREPARATION

- A. Sub-grade of base material shall be sloped of at a minimum grade of 0.5% towards perforated pipe subdrains as shown on the drawings.
- B. Trench sub-grade locally as required to achieve design slopes on sub-drain collector pipes.
 - 1. Minimum collector pipe trench width to be pipe diameter plus 12 inches.
- C. Compaction:
 - 1. After sub-grade has been properly graded, contoured and sloped as required, compact soil materials to not less than the following percentages of maximum dry unit weight according to Modified Proctor procedure, ASTM D 1557:
 - a. Under synthetic turf, scarify and recompact top 18 inches of existing subgrade to 90 percent.
 - b. Comply with the requirements for Engineered Fills defined in the Converse Consultants Geotechnical Study Report dated 10/24/2019.
- D. Tolerances:
 - 1. Compacted sub-grade shall conform to required elevations within a tolerance of one inch (1") in ten feet (10').

3.3 IMPERMEABLE FABRIC MEMBRANE

- A. The prepared soil subsurface is to be isolated from the installed field and drainage system above it with an impermeable fabric membrane placed across the entire surface of the field. This ensures no mixing of the soil sub surface with the aggregate drainage system, and keeps water from infiltrating into existing soils with high clay content.
- B. The membrane is to be additionally draped and formed into the collector pipe drainage trenches to ensure non-penetration of surrounding soil.
- C. Place membrane on subgrades free of mud, frost, snow, or ice.

3.4 PERFORATED PIPE SUBDRAINS

- A. Install prefabricated one inch by twelve inch (1" x 12") rectangular initial collector pipe sub-drains in a "V" design over impermeable fabric membrane with lines approximately twenty feet (20') on center as shown on the drawings.
 - 1. Minimum slope of rectangular pipe shall be as indicated on the drawings.
 - 2. Use connectors as recommended by the manufacturer.
- B. Install round section collector pipe as shown on the drawings.
 - 1. Methods and testing in accordance with Section 334100.

2. Connect 1" x 12" lines using appropriate connectors, as recommended by manufacturer.
 3. Minimum slope of pipe shall be as indicated on the drawings.
- C. Connect to storm drainage utility system at locations and elevations as shown on the civil drawings.
- D. Protect installed piping from damage during construction activities, especially vehicular traffic & compaction processes.
1. Piping with torn or otherwise damaged geotextile sleeves shall be rejected.
- 3.5 PERIMETER CURBING AND TURF FABRIC ANCHORAGE
- A. A continuous perimeter concrete header, either exposed or concealed as shown on plans, is required around the entire perimeter of all synthetic turf areas.
- B. Install free form concrete headers in accordance with the requirements of Division 3 and as detailed.
- C. Attach 2 x 4 recycled polymer composite nailer boards to concrete headers using glue and 3/8 inch diameter anchor bolts at 24 inches on center maximum spacing.
1. Polymer composite 2x4 nailer boards will serve as the attachment surface for the synthetic turf fabric.
 2. Nailer boards shall be continuous around entire perimeter of all synthetic turf areas.
 3. Top of 2x4 nailer boards shall be 1-1/2 inches from the top of exposed headers.
- 3.6 INSTALLATION OF BASE
- A. Place structural base materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
1. Minimum nominal compacted thickness of base layer: 4 inches.
- B. Place materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact structural base materials to the following percentages of maximum dry unit weight according to ASTM D 1557:
1. 92 minimum-95% maximum.
 2. Over compaction of the stone base will not be tolerated.
- D. The finished grade of the aggregate base shall not vary more than a quarter of an inch (1/4") in ten feet (10') and 1/2" from design grade. A laser grader must be used to meet these requirements.
- 3.7 FIELD BOXES
- A. Install field boxes as required for all field appurtenances such as irrigation cool-down heads, quick coupler valves, electric outlets, etc. as specified elsewhere and as detailed.
- B. Backfill around field boxes with structural base material and compact backfill using methods approved by the Geotechnical Engineer.
1. Required compaction percentages around field boxes shall match requirements for structural base.
- 3.8 FIELD QUALITY CONTROL
- A. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent work only after test results for previously completed work comply with requirements.

- B. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace materials to depth required; recompact and retest until specified compaction is obtained.

3.9 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 329500