

Technical Specifications For:

Track and Field Replacement
Rancho Buena Vista High School

Vista Unified School District

ASDG Job Number: 23-015

Client:

Vista Unified School District
1234 Arcadia Ave.
Vista, CA
92084

Architect:

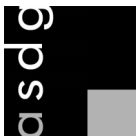
AlphaStudio Design Group
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Carlsbad, CA
92009
760-431-2444

Landscape Architect:

DA Hogan
1450 114th Ave. SE, Suite 225
Bellevue, WA
98004
206-285-0400

Civil:

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27127 Calle Arroyo Suite 1904
San Juan Capistrano, CA
92121
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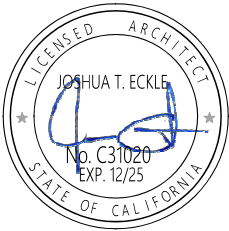


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Architect:
Joshua T. Eckle



Civil Engineer:
William J. Suiter



Landscape Architect:
Robert S. Harding

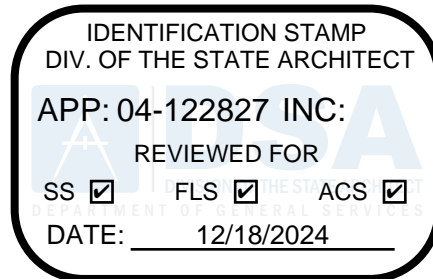


TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

01 1000	SUMMARY
01 2000	PRICE AND PAYMENT PROCEDURES
01 2100	ALLOWANCES
01 2300	ALTERNATES
01 2500	SUBSTITUTION PROCEDURES
01 3000	ADMINISTRATIVE REQUIREMENTS
01 3216	CONSTRUCTION PROGRESS SCHEDULE
01 3553	SECURITY PROCEDURES
01 4000	QUALITY REQUIREMENTS
01 5000	TEMPORARY FACILITIES AND CONTROLS
01 5100	TEMPORARY UTILITIES
01 5213	FIELD OFFICES AND SHEDS
01 5500	VEHICULAR ACCESS AND PARKING
01 6000	PRODUCT REQUIREMENTS
01 7000	EXECUTION AND CLOSEOUT REQUIREMENTS
01 7419	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 7800	CLOSEOUT SUBMITTALS
01 7900	DEMONSTRATION AND TRAINING

DIVISION 02 - EXISTING CONDITIONS

02 4100	DEMOLITION
---------	------------

DIVISION 03 - CONCRETE

03 1000	CONCRETE FORMING AND ACCESSORIES
03 2000	CONCRETE REINFORCING
03 3000	CAST-IN-PLACE CONCRETE

DIVISION 04 - MASONRY

04 0511	MORTAR AND MASONRY GROUT
04 2731	ENGINEERED UNIT MASONRY

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 1400	FLUID-APPLIED WATERPROOFING
07 1900	WATER REPELLENTS
07 9200	JOINT SEALANTS

DIVISION 09 - FINISHES

09 9000	PAINTS AND COATINGS – EXTERIOR
---------	--------------------------------

DIVISION 11 - EQUIPMENT

11 6824	EXTERIOR ATHLETIC EQUIPMENT
---------	-----------------------------

DIVISION 31 - EARTHWORK

31 1000	SITE CLEARING
---------	---------------

31 2200	GRADING
31 2216	FIELD & TRACK SUBGRADE ESTABLISHMENT
31 2316	EXCAVATION
31 2316.13	TRENCHING
31 2323	FILL

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 1123	AGGREGATE BASE COURSES
32 1216	ASPHALT PAVING
32 1216.36	TRACK ASPHALT PAVING
32 1313	CONCRETE PAVING
32 1823	SYNTHETIC TURF SURFACING
32 1823.10	RUBBERIZED TRACK SURFACING
32 1823.20	FIELD IMPORTED SANDS
32 1823.30	SOIL PREPARATION
32 3113	VUSD CHAIN LINK FENCING AND GATES
32 8400	WASHWATER AND LANDSCAPE IRRIGATION
32 9300	PLANTING

DIVISION 33 - UTILITIES

33 4211	STORMWATER GRAVITY PIPING
33 4616.13	FIELD SUBSURFACE DRAINAGE
33 4623.16	FIELD PERMEABLE AGGREGATE

**SECTION 01 1000
SUMMARY**

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: Rancho Buena Vista HS Track and Field Replacement
- B. Owner's Name: Vista Unified School District.
- C. Architect's Name: AlphaStudio Design Group.
- D. The Project consists of the removal and replacement of the existing synthetic track and artificial turf field at Rancho Buena Vista High School. Ancillary site work is included along with site ADA upgrades and new paving.
- E. The Project shall comply with Title 24, Parts 1-6, and 9.
- F. A copy of Title 24, Parts 1-5 must be kept on site at all times during construction.

1.02 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is indicated on drawings.

1.03 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Contractor to cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.04 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: as negotiated with Owner.
 - 1. The Contractor shall have an approved logistics plan prior to beginning construction activities.
- B. Arrange use of site and premises to allow:
 - 1. Owner occupancy.
- C. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Existing building spaces may not be used for storage.
- E. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the building is unoccupied.
 - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
 - 3. Prevent accidental disruption of utility services to other facilities.
 - 4. In the event that any or all life safety systems are shutdown, the Contractor shall provide Life and Safety watch for the entirety of the shutdown.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 1000 - 1	Summary
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**SECTION 01 2000
PRICE AND PAYMENT PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

1.02 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Substitute forms containing equivalent information may be considered in lieu of AIA G703. Contractor shall submit proposed form to Architect for review within 10 days after issuance of the notice to proceed for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in PDF format, electronically within 10 days after the notice to proceed.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization and bonds and insurance.
- F. Revise schedule to list **approved** Change Orders, with each Application For Payment.
- G. Provide line items for Owner's allowance and/or contingency where applicable.
- H. Contractor and subcontractors to provide schedule of values for all lump sum items at or prior to the pre-construction meeting and when submitting payment application.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. The contractor shall submit to the Architect, Inspector, and Owner a pencil draft of the payment application for review and comment a minimum of five business days prior to issuance.
- C. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- D. Substitute forms containing equivalent information may be considered in lieu of AIA G702 and G703. Contractor shall submit proposed form to Architect for review within 10 days after issuance of the notice to proceed for approval.
- E. Forms filled out by hand will not be accepted.
- F. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place under this Application.
 - 6. Approved Change Orders
 - 7. Approved Allowance Usage Requests (AUR's)
 - 8. Total Completed and Stored onsite to Date of Application.
 - 9. Percentage of Completion.
 - 10. Balance to Finish.
 - 11. Retainage.
- G. Execute certification by signature of authorized officer.
- H. Submit Application for Payment in electronic PDF format.

Rancho Buena Vista HS Track and Field Replacement	01 2000 - 1	Price and Payment Procedures
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- I. Include the following with the application (in electronic format where applicable):
 - 1. Construction progress schedule, revised and current as specified in Section 01 3000.
 - 2. Partial release of liens from major subcontractors and vendors.
 - 3. Project record documents for review by Inspector and Architect.

1.04 MODIFICATION PROCEDURES

- A. When direction provided by the Architect or Owner appears to modify the contract scope, time, or price the following procedure shall be followed:
 - 1. The contractor shall notify the Architect in writing within three business days of receiving direction that a potential change to the above may occur.
 - 2. The contractor shall provide to the Architect within ten business days of receiving direction, a Change Order Request (COR) detailing what the modifications to the contract scope, price, or time are as well as including all relevant substantiation of costs and supporting documentation. Change Order Requests shall be on the Contractor's own form and numbered sequentially.
 - 3. If the contractor does not comply with Items 1 and 2 above, the contractor voids their ability to claim a contract modification of time and/or price.
 - 4. Within ten business days of receiving the Contractor's COR, the Architect shall respond in writing to the request.
 - 5. Once accepted, the COR shall be included in a Change Order for the Owner's approval. The Contractor can invoice for the COR once approved by the Owner.
- B. Substantiation of Costs: Provide full information required for evaluation.
 - 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time with updated project schedule.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
 - a. Time and Material work must be authorized by the Owner or the Architect prior to commencement of work.
 - b. Time and Material verification must be reviewed and verified by the Inspector at the conclusion of each day or portion thereof.
- C. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
 - 1. Change Orders shall be invoiced once the Owner has approved and the fully executed Change Order has been provided to the Contractor.
- D. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- E. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- F. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

Rancho Buena Vista HS Track and Field Replacement	01 2000 - 2	Price and Payment Procedures
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- B. Application for Final Payment will not be considered until the following have been accomplished:
1. All closeout procedures specified in Section 01 7000.
 2. Provide completed record drawings including all supplemental instructions, request for information, and other relevant project information. These items shall be included as a permanent part of the record drawings.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 2000 - 3	Price and Payment Procedures
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**SECTION 01 2100
ALLOWANCES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Contingency allowance.

1.02 CONTINGENCY ALLOWANCE

- A. At closeout of Contract, funds remaining in Allowance will be credited to Owner by deductive Change Order.
- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in usage request authorizing expenditure of funds from this Contingency Allowance.
- C. The Contractor will prepare detailed breakdown of all costs associated with the work defined for the Allowance. These amounts will be based on final detailed payment receipts and back-up or estimates as required by Architect, and will include all direct costs of work performed under the defined work scope and will be charged against the Allowance through the Allowance Usage Request (AUR).
- D. Types of allowance scheduled herein for the Work include lump sum cash allowances. Include all allowances in Contract sum, and identify all allowances in Schedule of Values as separate line items.
- E. The Allowance is used only as directed by the Owner.
- F. The Allowance is used exclusively for the Owner's purposes and for the defined scope of work.
- G. The Contractor shall include in the base bid contract amount all cost of coordination, supervision, bond costs, insurance and all indirect project costs associated with performing the work of the Allowance.
- H. Changes that exceed the amount of each allowance will be processed as a Change Order per Contract Documents.
- I. All backup information provided for allowance usage shall include, but not be limited to:
 - 1. Material and/or equipment rental receipts
 - 2. Invoices
 - 3. Delivery tickets
 - 4. Contractor and sub contractor daily reports

1.03 ALLOWANCES SCHEDULE

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 2100 - 1	Allowances
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**SECTION 01 2300
ALTERNATES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Description of Alternates.

1.02 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.03 SCHEDULE OF ALTERNATES

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 2300 - 1	Alternates
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**SECTION 01 2500
SUBSTITUTION PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

- A. Section 01 2300 - Alternates, for product alternatives affecting this section.
- B. Section 01 3000 - Administrative Requirements: Submittal procedures, coordination.
- C. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.03 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
 - a. Substitution requests offering advantages solely to the Contractor shall be considered on a case by case basis.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
 - 6. Contractor and sub contractors shall submit written requests for substitution or an 'equal' material, process, or article, together with substantiating data, no later than 35 days after award of the contract or at the pre-construction meeting, whichever is earlier.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. No specific form is required. Contractor's Substitution Request documentation must include the following:
 - a. Project Information:
 - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
 - 2) Owner's, Architect's, and Contractor's names.
 - b. Substitution Request Information:
 - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.

Rancho Buena Vista HS Track and Field Replacement	01 2500 - 1	Substitution Procedures
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- 2) Indication of whether the substitution is for cause or convenience.
 - 3) Issue date.
 - 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - 5) Description of Substitution.
 - 6) Reason why the specified item cannot be provided.
 - 7) Differences between proposed substitution and specified item.
 - 8) Description of how proposed substitution affects other parts of work.
- c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
- 1) Physical characteristics.
 - 2) In-service performance.
 - 3) Expected durability.
 - 4) Visual effect.
 - 5) Sustainable design features.
 - 6) Warranties.
 - 7) Other salient features and requirements.
 - 8) Include, as appropriate or requested, the following types of documentation:
 - (a) Product Data:
 - (b) Samples.
 - (c) Certificates, test, reports or similar qualification data.
 - (d) Drawings, when required to show impact on adjacent construction elements.
- d. Impact of Substitution:
- 1) Savings to Owner for accepting substitution.
 - 2) Change to Contract Time due to accepting substitution.
- D. Limit each request to a single proposed substitution item.
1. Submit an electronic document, combining the request form with supporting data into single document.
- E. Substitutions affecting DSA regulated items shall be considered an Addendum or Construction Change Document and shall be approved prior to fabrication or procurement of substituted product.
1. All addenda shall be signed by the Architect of Record and approved by DSA.
 2. All Construction Change Documents (CCD's) shall be signed by the Architect of Record, Structural Engineer (where applicable), and delegated professional engineer (where applicable). CCD's shall be reviewed and approved by DSA prior to fabrication, procurement, and installation of substituted product.

3.02 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Architect will consider requests for substitutions only within 15 days after date of Agreement.
- B. Submit request for Substitution for Cause immediately upon discovery of need for substitution, but not later than 14 business days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 business days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 3. Bear the costs engendered by proposed substitution of:
 - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.

Rancho Buena Vista HS Track and Field Replacement	01 2500 - 2	Substitution Procedures
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- b. Other construction by Owner.
 - c. Other unanticipated project considerations.
- D. Substitutions will not be considered under one or more of the following circumstances:
- 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 - 2. Without a separate written request.

3.03 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.
 - 1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.04 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.05 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 2500 - 3	Substitution Procedures
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**SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Submittals for review, information, and project closeout.
- G. Number of copies of submittals.
- H. Requests for Interpretation (RFI) procedures.
- I. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 6000 - Product Requirements: General product requirements.
- B. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- C. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Conform to requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Construction and Progress Schedule
 - 2. Digital Photo Documentation of the Project Site and Adjacent Areas
 - 3. Corner Records of all Survey Monuments Tie-Out in or Near the Work Area (if Surveying is to be Provided by the Contractor)
 - 4. Specifications and Certifications for Each Material or Item to be Used on the Project
 - 5. Traffic Control Plans
 - 6. Illness and Injury Prevention Program Plan
 - 7. Schedule of Values for all Lump Sum Bid Items
 - 8. Staff Names with a list of staff assignments, including superintendent and other personnel in attendance at project site. (Identify individuals and their duties and responsibilities; list addressess and telephone numbers, including home and office telephone numdbers)
 - 9. All Permits and Contractor Licenses
 - 10. Confined Space Entry Program and Shoring Plan, (if Required)
 - 11. Sewer Spill Prevention Plan, (if Required)
 - 12. Cut Sheet/Shop Drawings, Manufacturers Brochures, Technical Bulletins and Reports, Specifications, Diagrams for all Products to be Used on the Project
 - 13. Plans, Schematics, Drawings and Engineering Calculations as Required per the Contract Documents and/or Permitting
 - 14. SWPPP (if Required)
 - 15. Data, including, but not limited to, catalog sheets, manufacturers brochures, technical bulletins, specifications, diagrams, product samples, and other information necessary to describe a system, product or item. This information is required for irrigation systems, lighting systems, and may also be required for any product, manufactured item, or system.
 - 16. Requests for Information
 - 17. Requests for Substitution
 - 18. Appications for payment and change order requests

Rancho Buena Vista HS Track and Field Replacement	01 3000 - 1	Administrative Requirements
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19. Correction Punch List and Final Correction Punch List for Substantial Completion
20. Closeout Documents (Warranties, O&M Manuals, Etc.)

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
 1. Owner.
 2. Architect.
 3. Contractor.
 4. Inspector.
 5. Bond Program Manager.
 6. School Site Representative.
- C. Agenda:
 1. Designation of Contractor's personnel for the project.
 2. 24 hour emergency contact information for Contractor and Owner.
 3. List of all sub contractors regardless of percentage of work.
 4. Construction CPM Schedule
 5. Copy of Public Notification/Door Hangers
 6. Digital photo documentation of project site and adjacent area. This item can be processed as a formal project submittal.
 7. Traffic control plan
 8. Illness and injury prevention plan
 9. Confined space entry program (if required)
 10. Shoring plan (if required)
 11. Sewer spill prevention plan (if required)
 12. SWPPP
 13. Schedule of values for all lump sum bid items. This item can be processed as a formal submittal.
 14. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 15. Example pay application showing conformance to Owner requirements.

3.02 PROGRESS MEETINGS

- A. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required:
 1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's superintendent.
 5. Major subcontractors.
 6. Inspector.
- C. Agenda:
 1. Review minutes of previous meetings.
 2. Review of work progress.
 - a. Contractor shall provide a three week look ahead schedule projecting upcoming work activities.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of RFIs log and status of responses.

Rancho Buena Vista HS Track and Field Replacement	01 3000 - 2	Administrative Requirements
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7. Review of off-site fabrication and delivery schedules.
8. Corrective measures to regain projected schedules.
9. Coordination of projected progress.
10. Maintenance of quality and work standards.
11. Effect of proposed changes on progress schedule and coordination.
12. Other business relating to work.

3.03 CONSTRUCTION PROGRESS SCHEDULE (CPM SCHEDULE) - SEE SECTION 01 3216

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

3.04 REQUESTS FOR INTERPRETATION(RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Do not forward requests which solely require internal coordination between subcontractors.
- C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Include in each request Contractor's signature attesting to good faith effort to determine from the Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 3. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.

Rancho Buena Vista HS Track and Field Replacement	01 3000 - 3	Administrative Requirements
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1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Owner's, Architect's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 2. Note dates of when each request is made, and when a response is received.
 3. Highlight items requiring priority or expedited response.
 4. Highlight items for which a timely response has not been received to date.
 5. Identify and include improper or frivolous RFIs.
- G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
 2. RFIs that require additional input from Architect's consultants may require additional review time.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner and Architect.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.05 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
1. Submit at the same time as the preliminary schedule specified in Section - 01 3216 - Construction Progress Schedule.
 2. Coordinate with Contractor's construction schedule and schedule of values.
 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work

Rancho Buena Vista HS Track and Field Replacement	01 3000 - 4	Administrative Requirements
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covered, and role and name of subcontractor.

5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.06 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.07 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Design data.
 2. Certificates.
 3. Test reports.
 4. Inspection reports.
 5. Manufacturer's instructions.
 6. Manufacturer's field reports.
 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.08 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in conformance to requirements of Section 01 7800 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.09 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 1. After review, produce duplicates.
 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.10 SUBMITTAL PROCEDURES

- A. General Requirements:
 1. Use a separate transmittal for each item.

Rancho Buena Vista HS Track and Field Replacement	01 3000 - 5	Administrative Requirements
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2. Transmit using approved form.
 - a. Use Contractor's form, subject to prior approval by Architect.
 3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
 6. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Send submittals in electronic format via email to Architect.
 7. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
 - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days minimum.
 8. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 9. Provide space for Contractor and Architect review stamps.
 10. When revised for resubmission, identify all changes made since previous submission.
 11. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
 12. Submittals not requested will not be recognized or processed.
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related work.
 2. Do not reproduce the Contract Documents to create shop drawings.
 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.11 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
 1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:

Rancho Buena Vista HS Track and Field Replacement	01 3000 - 6	Administrative Requirements
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1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "No Exceptions Taken", or language with same legal meaning.
 - b. "Make Corrections Noted, Resubmittal Not Required", or language with same legal meaning.
 - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - 2) Non-responsive resubmittals may be rejected.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
1. Items for which no action was taken:
 - a. "Received" - to notify the Contractor that the submittal has been received for record only.
 2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 3000 - 7	Administrative Requirements
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**SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type, Critical Path Method, CPM, cost loaded schedule

1.02 REFERENCE STANDARDS

- A. AGC (CPSM) - Construction Planning and Scheduling Manual 2004.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM 2015.

1.03 SUBMITTALS

- A. Within 10 days after date established in Notice to Proceed, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
- D. Within 10 days after joint review, submit complete schedule identifying start and completion dates.
 - 1. Submit a minimum of two printed copies large enough to display the entire schedule for the complete construction period on a single page.
- E. Submit updated schedule with each Application for Payment or monthly.
- F. Submit in PDF format.

1.04 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.05 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules to define critical portions of the entire schedule.
- E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- F. Provide separate schedule of submittal dates for shop drawings, product data, and samples, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

Rancho Buena Vista HS Track and Field Replacement	01 3216 - 1	Construction Progress Schedule
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- G. Coordinate content with schedule of values specified in Section 01 2000 - Price and Payment Procedures.
- H. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.04 NETWORK ANALYSIS

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15 day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 - 11. Monetary value of activity, keyed to Schedule of Values.
 - 12. Percentage of activity completed.
 - 13. Responsibility.
- D. Required Reports: List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest.
 - 2. By amount of float, then in order of early start.

3.05 REVIEW AND EVALUATION OF SCHEDULE

- A. Evaluate project status to determine work behind schedule and work ahead of schedule.
- B. After review, revise as necessary as result of review, and resubmit within 10 days.

3.06 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.

3.07 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.

Rancho Buena Vista HS Track and Field Replacement	01 3216 - 2	Construction Progress Schedule
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- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 3216 - 3	Construction Progress Schedule
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**SECTION 01 3553
SECURITY PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Security measures including entry control, personnel identification, miscellaneous restrictions, and entry and exit control, personnel identification, protective devices, and miscellaneous restrictions.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: use of premises and occupancy.
- B. Section 01 5000 - Temporary Facilities and Controls: Temporary lighting.

1.03 SECURITY PROGRAM

- A. Protect Work , existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
- B. Initiate program at project mobilization.
- C. Maintain program throughout construction period until Owner acceptance precludes the need for Contractor security.

1.04 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into Project site .
- B. Allow entrance only to authorized persons with proper identification.
- C. Maintain log of workers and visitors, make available to Owner on request.

1.05 PERSONNEL IDENTIFICATION

- A. Provide identification badge to each person authorized to enter premises.
- B. Badge To Include: Personal photograph, name and employer.
- C. Maintain a list of accredited persons, submit copy to Owner on request.
- D. Require return of badges at expiration of their employment on the Work.

1.06 RESTRICTIONS

- A. Do no work on Sundays unless previously authorized by Owner, in the event the work is ordered by the Owner and there is written direction specifically authorizing Sunday work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 3553 - 1	Security Procedures
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**SECTION 01 4000
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. Testing and inspection agencies and services.
- D. Control of installation.
- E. Mock-ups.
- F. Tolerances.
- G. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.

1.03 DEFINITIONS

- A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.
 - 1. Contractor to submit to Owner, Inspector, and Architect detailed quality control plan prior to initiation of construction activities onsite.

1.04 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. The Project Inspector and testing lab shall be employed by the Owner and approved by the Architect of Record, Structural Engineer of Record (where applicable), delegated professional engineer (where applicable), and DSA.

PART 3 EXECUTION

2.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

2.02 MOCK-UPS

- A. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.
- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

Rancho Buena Vista HS Track and Field Replacement	01 4000 - 1	Quality Requirements
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2.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

2.04 TESTING AND INSPECTION

- A. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests/inspections specified.
- B. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- C. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- E. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

2.05 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 4000 - 2	Quality Requirements
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**SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Field offices.

1.02 RELATED REQUIREMENTS

- A. Section 01 5100 - Temporary Utilities.
- B. Section 01 5213 - Field Offices and Sheds.
- C. Section 01 5500 - Vehicular Access and Parking.

1.03 TEMPORARY UTILITIES - SEE SECTION 01 5100

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

1.04 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Temporary telephone service in common-use facilities for use by all construction personnel.
 - 2. Install one telephone line for each field office.
 - 3. Provide a list of important telephone numbers including police and fire departments, contractor's main office, architect's office, owner's office, and primary sub contractors main office.
 - 4. Provide superintendent with cellular telephone or portable two-way radio when away from field office.

1.05 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
 - 1. Provide temporary toilets, wash facilities, and drinking water for use by construction personnel. Comply with authority having jurisdiction regarding type, quantity and maintenance of fixtures and facilities.
- B. Maintain daily in clean and sanitary condition.

1.06 BARRIERS

- A. Provide barriers with sound proofing to prevent unauthorized entry to construction areas as well as mitigate noise pollution into the active school site and public right away. Barrier should be constructed to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

Rancho Buena Vista HS Track and Field Replacement	01 5000 - 1	Temporary Facilities and Controls
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- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.07 FENCING

- A. Provide 6 foot (1.8 m) high fence with steel pipe posts and galvanized steel base for supporting posts. Posts to be a minimum 2-3/8" OD line posts, 2-7/8" OD corner and pull posts, and 1-5/8" OD top and bottom rails.
- B. Fencing to be located around construction site and equipped with vehicular and pedestrian gates with locks.
- C. Provide screen on all temporary construction fence panles to limit the visibility of the construction site from the public.
- D. Minimum 2 inch, 9 gauge galvanized steel, chain link fencing fabric.

1.08 INTERIOR ENCLOSURES

- A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1.09 SECURITY - SEE SECTION 01 3553

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.10 VEHICULAR ACCESS AND PARKING - SEE SECTION 01 5500

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and Maintain access to all fire lanes and fire hydrants, free of obstruction, during all construction activities.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.11 WASTE REMOVAL

- A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
- B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- C. Provide containers with lids. Remove trash from site periodically.
- D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.12 PROJECT IDENTIFICATION

- A. Provide project identification sign of design and construction indicated on drawings.
- B. Erect on site at location indicated.
- C. No other signs are allowed without Owner permission except those required by law.

1.13 FIELD OFFICES - SEE SECTION 01 5213

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 8 persons.

Rancho Buena Vista HS Track and Field Replacement	01 5000 - 2	Temporary Facilities and Controls
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- C. Provide separate field office for Inspector of Record.
- D. Provide separate field office for Bond Program Manager.
- E. Locate offices a minimum distance of 30 feet (10 m) from existing and new structures.

1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 5000 - 3	Temporary Facilities and Controls
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**SECTION 01 5100
TEMPORARY UTILITIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary Utilities: Provision of electricity and water.

1.02 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls:

1.03 TEMPORARY ELECTRICITY

- A. Cost: By Contractor.
- B. Provide power service required from utility source.
- C. Provide temporary electric feeder from existing building electrical service at location as directed.

1.04 TEMPORARY WATER SERVICE

- A. Cost of Water Used: By Contractor.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Temporary water service for fire protection shall be installed prior to combustibles arriving onsite.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 5100 - 1	Temporary Utilities
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**SECTION 01 5213
FIELD OFFICES AND SHEDS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary field offices for use of Contractor.
- B. Maintenance and removal.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: use of premises and responsibility for providing field offices.
- B. Section 01 5000 - Temporary Facilities and Controls:
- C. Section 01 5500: Parking and access to field offices.

PART 2 PRODUCTS

2.01 CONSTRUCTION

- A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
- B. Construction: Structurally sound, secure, weather tight enclosures for office. Maintain during progress of Work; remove when no longer needed.
- C. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy requirements.
- D. Exterior Materials: Weather resistant, finished in one color.
- E. Interior Materials in Offices: Sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
- F. Lighting for Offices: 50 fc (538 lx) at desk top height, exterior lighting at entrance doors.
- G. Fire Extinguishers: Appropriate type fire extinguisher at each office.

2.02 ENVIRONMENTAL CONTROL

- A. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions.

2.03 CONTRACTOR OFFICE AND FACILITIES

- A. Size: For Contractor's needs and to provide space for project meetings.
- B. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.
- C. Other Furnishings: Contractor's option.
- D. Equipment: Six adjustable band protective helmets for visitors, one 10 inch (250 mm) outdoor weather thermometer and six high visibility construction vests for visitors.

2.04 DISTRICT CONSTRUCTION MANAGER/INSPECTOR OFFICE

- A. The Contractor shall provide the following furnishings for a 40' site office trailer: 4 desks, 4 chairs, 2 drawing layout tables, interior hand wash sink 2 (30" by 84") folding tables or conference table that accommodate seating for 12 people, 4 filing cabinets (4 drawer legal size), 16 stackable meeting chairs, 1 refrigerator minimum 5 ft3, 1 microwave minimum (2x2) mid-size, 2 (6 ft high x 3 ft wide x 1 ft deep) bookcases, 5 gallon size hot/cold water cooler with 4ea 5gal bottle per month water service, 12 cup coffee maker, Install articulated flat screen monitor at conference table, windows with mesh security screens and bars, door entrance complete with a suitable lock, minimum ten (10) 120 volt, ac duplex electrical receptacles, Internet service, Office printer/scanner with a stapling feature, and capable of printing 11"x17", 2 each VIP restrooms with locks serviced minimum once a week, and weekly janitorial cleaning services for IOR/ District CM field office. All items should be included for the duration of the project.

Rancho Buena Vista HS Track and Field Replacement	01 5213 - 1	Field Offices and Sheds
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PART 3 EXECUTION

3.01 PREPARATION

- A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.02 INSTALLATION

- A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.

3.03 MAINTENANCE AND CLEANING

- A. Weekly janitorial services for offices; periodic cleaning and maintenance for offices.
- B. Maintain approach walks free of mud, water, and snow.

3.04 REMOVAL

- A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 5213 - 2	Field Offices and Sheds
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**SECTION 01 5500
VEHICULAR ACCESS AND PARKING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Parking.
- B. Existing pavements and parking areas.
- C. Flag persons.
- D. Maintenance.
- E. Removal, repair.
- F. Mud from site vehicles.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: For access to site, work sequence, and occupancy.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Temporary Construction: Contractor's option.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

3.02 PARKING

- A. Use of designated areas of existing parking facilities by construction personnel is permitted.
- B. Arrange for temporary parking areas to accommodate use of construction personnel.
- C. When site space is not adequate, provide additional off-site parking.
- D. Locate as approved by Owner and identified in Contractor's approved logistics plan.

3.03 FLAG PERSONS

- A. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.04 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

3.05 REMOVAL, REPAIR

- A. Repair existing facilities damaged by use, to original condition.
- B. Repair damage caused by installation.

3.06 MUD FROM SITE VEHICLES

- A. Provide means of removing mud from vehicle wheels before entering streets. Identify system on Contractor's logistics plan.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 5500 - 1	Vehicular Access and Parking
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**SECTION 01 6000
PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Lists of products to be removed from existing building.
- B. Section 01 2500 - Substitution Procedures: Substitutions made during and after the Bidding/Negotiation Phase.

1.03 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.
- C. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is not prohibited, unless noted otherwise.
 - 1. If reuse of other existing materials or equipment is desired, submit substitution request.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Where all other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 6116.
 - 2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
 - 3. Have a published GreenScreen Chemical Hazard Analysis.

2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

Rancho Buena Vista HS Track and Field Replacement	01 6000 - 1	Product Requirements
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- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- C. A request for substitution constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.

3.02 OWNER-SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 - 1. Arrange and pay for product delivery to site.
 - 2. On delivery, inspect products jointly with Contractor.
 - 3. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 4. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
 - 1. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - 2. Handle, store, install and finish products.
 - 3. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

Rancho Buena Vista HS Track and Field Replacement	01 6000 - 2	Product Requirements
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3.04 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 6000 - 3	Product Requirements
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**SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- I. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.
- C. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.
- D. Section 01 7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- E. Section 07 8400 - Firestopping.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
 - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
 - 3. Submit surveys and survey logs for the project record.
 - 4. Final property survey
 - a. Submit two hardcopies, one CAD file, and one PDF showing the work performed and record survey data.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.04 QUALIFICATIONS

- A. For demolition work, employ a firm specializing in the type of work required.
 - 1. Minimum of 5 years of documented experience.
- B. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction

Rancho Buena Vista HS Track and Field Replacement	01 7000 - 1	Execution and Closeout Requirements
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activities,

- C. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.05 PROJECT CONDITIONS

- A. Use of explosives is not permitted, unless approved prior by Owner and Architect.
- B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- E. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- F. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 1. Minimize amount of bare soil exposed at one time.
 - 2. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- G. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
- H. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
 - 1. Coordinate scheduling of loud and heavy construction work with the Owner to minimize disturbance during standardized testing and other blocks of time in which the site will conduct such activities. Site bell and testing schedule will be provided to Contractor for scheduling purposes.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

Rancho Buena Vista HS Track and Field Replacement	01 7000 - 2	Execution and Closeout Requirements
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PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction. Existing Survey control points damaged by the contractor shall be restored by the Contractor at no additional cost to the District.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

Rancho Buena Vista HS Track and Field Replacement	01 7000 - 3	Execution and Closeout Requirements
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3.04 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 .
 - 2. Provide sound retardant partitions between areas of alteration work and areas occupied by Owner during construction.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated **and** as required to accomplish new work.
 - 1. Remove items indicated on drawings.
 - 2. Relocate items indicated on drawings.
 - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
 - 5. The contractor is responsible to perform all demolition work necessary to allow execution of all requirements of the new construction.
 - a. Elements not specifically noted for demolition shall be removed by the contractor in order to facilitate all requirements of the new construction.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.

Rancho Buena Vista HS Track and Field Replacement	01 7000 - 4	Execution and Closeout Requirements
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- b. Provide temporary connections as required to maintain existing systems in service.
- c. Provide Owner with 72 hour minimum notification before existing systems taken off line.
- 4. Verify that abandoned services serve only abandoned facilities.
- 5. Remove abandoned pipe, ducts, conduits, and equipment , including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
 - 1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
 - 2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
 - 3. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
 - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- J. Clean new and existing systems and equipment as necessary.
- K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- L. Do not begin new construction in alterations areas before demolition is complete.
- M. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

Rancho Buena Vista HS Track and Field Replacement	01 7000 - 5	Execution and Closeout Requirements
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- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- J. Patching:
 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 2. Match color, texture, and appearance.
 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

Rancho Buena Vista HS Track and Field Replacement	01 7000 - 6	Execution and Closeout Requirements
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- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 7900 - Demonstration and Training.
- B. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.11 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING

- A. Final interior cleaning prior to architect's Punch walk and for Owner occupancy shall consist of full and thorough cleaning using appropriate non-marring cleaners for all areas of the building, all accessible equipment and all visible building components. All protective coverings and coatings shall be removed along with adhesive residues. All concrete and tile floors shall be mopped and left free of water or cleaner residue. Glass and painted surfaces shall be cleaned free of fingerprints, smudges and non-code-required labels and stickers. Machine scrub ceramic flooring. Clean all thresholds. Clean all millwork. Clean horizontal surfaces. Dust and wipe down walls. Clean all mirrors, restrooms, storage rooms, concession, custodial, ticket room, and lobby. Clean all furniture. Clean all fixtures. Visible air shaft louvers, grilles and registers dusted.
- B. Provide adequate manpower to complete work in multiple buildings concurrently as required. Review cleaning and maintenance instructions for installed material prior to cleaning.
- C. Furnish all labor, material and equipment to complete all final cleaning of the work as described in the contract documents.
- D. Sweep paved areas broom clean and Powerwash all exterior concrete sidewalks, curbs, asphalt, parking lots. Remove stains, spills and other foreign deposits.
- E. Fire cabinets cleaned inside and out.
- F. Complete/detailed vacuum and spot removal of all wall-coverings throughout the building.
- G. Clean all closets including janitor closets, mop sinks, plumbing fixtures and floor sinks.
- H. Wax all VCT and sheet vinyl. Use proper products per specification and manufacturer requirements.
- I. All ceramic tiles wiped clean using special cleaning materials for best reflection.
- J. All toilet partitions and accessories wiped clean.
- K. All stainless steel kitchen cabinets, countertops and appliances wiped clean.
- L. Clean and polish transparent materials, including mirrors and glass in doors and windows including frames.
- M. Restore reflection surfaces to their original reflection condition.

Rancho Buena Vista HS Track and Field Replacement	01 7000 - 7	Execution and Closeout Requirements
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- N. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances.
- O. Clean plumbing fixtures to a sanitary condition.
- P. All shades, storefront, rolling shutters and coiling doors wiped down inside and out.
- Q. General roof clean-up.
- R. Clean tops, sides and bottoms (if accessible) of equipment.
- S. Remove labels that are not permanent. Do not remove permanent labels (UL, WH, etc.)
- T. Wipe clean any exposed duct, pipe and conduit.
- U. Exterior cleaning shall include washing all windows, exposed metal and stone surfaces, removing any stains from exterior plaster, wash down of roof equipment wells and cleaning roof mounted equipment and all rain gutters shall be cleared of any obstructions.
- V. One (1) pre-punch clean prior to Architect's punch walk and one (1) final clean prior to Owner occupancy.
- W. Clean all windows and mullions interior and exterior. Remove drywall texture where required.
- X. Clean all restrooms complete including all plumbing fixtures, electrical fixtures, toilet partitions and accessories. Remove any and all temporary protection and labels not required to remain. Clean and shine hardware. Clean all mirrors. Clean all floor and wall tile.
- Y. Sweep and mop all floors.
- Z. Vacuum all carpeted areas and wipe base. Spot clean carpet as needed.
- AA. Clean all casework and cabinetry inside and out.
- BB. Clean all doors, jambs and hardware. Remove drywall texture where required.
- CC. Clean all exit signs
- DD. Clean all plumbing fixtures, lighting fixtures and any other wall or ceiling mounted fixtures/devices.
- EE. Clean interior of wheelchair lift.
- FF. Remove temporary floor protection.
- GG. Dust walls and wall coverings.
- HH. Clean all vinyl tack panel. This includes heavy cleaning to remove stains.
- II. Clean all countertops.
- JJ. Clean all interior and exterior light fixtures.
- KK. Clean exposed piping as required.
- LL. Provide additional touch up cleaning as required prior to owner occupancy. Contractor shall include final touch-up of stained plaster at Building exteriors due to weather, soil staining, or any other staining seen on Buildings.
- MM. Clean all other permanent items shown in the plans.
- NN. Power wash all exterior hard surfaces around buildings that contain work on the project.
- OO. Multiple move-ons as required for the phased schedule to achieve final cleaning scope of work.

3.13 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
- B. Notify Architect when work is considered complete and ready for Architect's Punch List.
- C. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete (including all Punch List items) in accordance with Contract Documents and ready for Architect's Substantial Completion review.

Rancho Buena Vista HS Track and Field Replacement	01 7000 - 8	Execution and Closeout Requirements
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- D. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- E. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.14 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 7000 - 9	Execution and Closeout Requirements
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**SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports. The Contractor shall submit copies of fully signed hazardous material disposal manifests to the District.
- E. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

Rancho Buena Vista HS Track and Field Replacement	01 7419 - 1	Construction Waste Management and Disposal
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- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Contractor to submit for review a Waste Management Plan. The waste management plan shall be an outline of the items required for the Waste Disposal Reports as indicated below. The waste management plan shall be submitte for review prior to the start of construction.
- C. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
 - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 - 2. Submit Report on a form acceptable to Owner.
 - 3. Report shall contain contact information for the waste management company that can proviable verifiable documentation of the percentages of construction and demolition waste diverted from the landfill.
 - 4. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 5. Incinerator Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project delivered to incinerators.
 - c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 6. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards (cubic meters), date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
 - 7. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.
 - b. Amount, in tons or cubic yards (cubic meters).
 - c. Include weight tickets as evidence of quantity.
 - 8. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

Rancho Buena Vista HS Track and Field Replacement	01 7419 - 2	Construction Waste Management and Disposal
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PART 3 EXECUTION

2.01 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

2.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Prebid meeting.
 - 2. Preconstruction meeting.
 - 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. Provide containers as required.
 - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 7419 - 3	Construction Waste Management and Disposal
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**SECTION 01 7800
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect prior to submission of final Application of Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - a. Approved Change Order shall be made a permanent part of the record drawings.
 - b. Allowance Usage Requests shall be made a permanent part of the record drawings.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
 - 7. Requests for Information (RFI)
 - a. RFI's shall be made a permanent part of the record drawings.
 - 8. Architect's Supplementary Instructions (ASI)
 - a. ASI's shall be made a permanent part of the record drawings.

Rancho Buena Vista HS Track and Field Replacement	01 7800 - 1	Closeout Submittals
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- 9. Approved Construction Change Directives (CCD)
 - a. Approved CCD's shall be made a permanent part of the record drawings.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
 - 1. Record drawings shall be reviewed by Architect, Inspector, and Owner at the time of Application for Payment. If Record drawings are deemed incomplete, delays in payment may occur.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

Rancho Buena Vista HS Track and Field Replacement	01 7800 - 2	Closeout Submittals
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- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Photocopies of warranties and bonds.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.

Rancho Buena Vista HS Track and Field Replacement	01 7800 - 3	Closeout Submittals
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- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch (216 by 279 mm) three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 7800 - 4	Closeout Submittals
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**SECTION 01 7900
DEMONSTRATION AND TRAINING**

PART 1 GENERAL

1.01 SUMMARY

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Plumbing equipment.
 - 4. Electrical systems and equipment.
 - 5. Conveying systems.
 - 6. Landscape irrigation.
 - 7. Items specified in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
 - 2. Finishes, including flooring, wall finishes, ceiling finishes.
 - 3. Fixtures and fittings.
 - 4. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

- A. Section 01 7800 - Closeout Submittals: Operation and maintenance manuals.
- B. Section 01 9113 - General Commissioning Requirements: Additional requirements applicable to demonstration and training.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit not less than two weeks prior to start of training.
 - 2. Revise and resubmit until acceptable.
 - 3. Provide an overall schedule showing all training sessions.
 - 4. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such as slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
 - 1. Format: Per Owner's Request
 - 2. Label each disc and container with session identification and date.

Rancho Buena Vista HS Track and Field Replacement	01 7900 - 1	Demonstration and Training
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1.04 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
- D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.

3.02 TRAINING - GENERAL

- A. Conduct training on-site unless otherwise indicated.
- B. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- C. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
 - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 - 3. Typical uses of the O&M manuals.
- D. Product- and System-Specific Training:
 - 1. Review the applicable O&M manuals.
 - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 - 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 - 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 - 6. Discuss common troubleshooting problems and solutions.
 - 7. Discuss any peculiarities of equipment installation or operation.
 - 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 - 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 - 10. Review spare parts and tools required to be furnished by Contractor.
 - 11. Review spare parts suppliers and sources and procurement procedures.
- E. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	01 7900 - 2	Demonstration and Training
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**SECTION 02 4100
DEMOLITION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition of built site elements.
- B. Selective demolition of building elements for alteration purposes.
- C. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- D. Section 31 2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2022, with Errata (2021).

PART 3 EXECUTION

2.01 SCOPE

- A. Remove items indicated on demolition plans as required to be removed.

2.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 3. Provide, erect, and maintain temporary barriers and security devices.
 - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
- B. Do not begin removal until receipt of notification to proceed from Owner.

2.03 EXISTING UTILITIES

- A. Protect existing utilities to remain from damage.
- B. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- C. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- D. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- E. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

Rancho Buena Vista HS Track and Field Replacement	02 4100 - 1	Demolition
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2.04 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Protect existing work to remain.
 - 1. Repair adjacent construction and finishes damaged during removal work.

2.05 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	02 4100 - 2	Demolition
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**SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Form accessories.
- C. Form stripping.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ACI 117 - Specification for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 301 - Specifications for Concrete Construction 2020.
- C. ACI 347R - Guide to Formwork for Concrete 2014 (Reapproved 2021).

1.04 QUALITY ASSURANCE

- A. Perform work of this section in accordance with Highways standards of the State of California.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.
- C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

2.02 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor.
- B. Forms shall be of suitable material and type, size, shape, quality, and strength to ensure construction as designed.
- C. Forms shall be true to line and grade, mortar tight, and sufficiently rigid to resist deflection during the placement of concrete.
- D. All dirt, chips, sawdust, nails, and other foreign matter shall be completely removed from forms prior to the placement of concrete.
- E. The surface of the forms shall be smooth and free from irregularities, dents, sags, and holes that would deface the finished surface.
- F. Before concrete is placed in forms, all inside surfaces shall be treated with an approved releasing agent. The releasing agent shall leave no objectionable film on the surface of the forms which would transfer to the finished concrete.
- G. Forms for all surfaces that will not be completely hidden below the permanent surface of the adjacent grade shall be made of surface lumber or of a material which provides a surface equal to surfaced lumber or plywood.
- H. Any lumber that becomes badly checked or warped, prior to placing concrete, shall not be used.

Rancho Buena Vista HS Track and Field Replacement	03 1000 - 1	Concrete Forming and Accessories
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PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.04 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Locate and set in place items that will be cast directly into concrete.
- B. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

3.06 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.

3.07 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

3.08 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	03 1000 - 2	Concrete Forming and Accessories
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**SECTION 03 2000
CONCRETE REINFORCING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories.
- B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Concrete Construction 2020.
- B. ACI 318 - Building Code Requirements for Structural Concrete 2019 (Reapproved 2022).
- C. ACI SP-66 - ACI Detailing Manual 2004.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- E. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement 2022a.
- F. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement 2019, with Editorial Revision (2020).
- G. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.
- H. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars 2018, with Amendment (2020).
- I. CRSI (DA4) - Manual of Standard Practice 2018, with Errata (2019).
- J. CRSI (P1) - Placing Reinforcing Bars, 10th Edition 2019.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.
- B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars Grade 60 (for bar reinforcement that is to be welded).
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch (1.29 mm).
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

Rancho Buena Vista HS Track and Field Replacement	03 2000 - 1	Concrete Reinforcing
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2.02 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is permitted only with the specific approval of Structural Engineer and Architect. Perform welding in accordance with AWS D1.4/D1.4M.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Reinforcing bars shall be placed in accordance with the size and spacing shown on the plans. Reinforcing bars shall be firmly and securely held in position in accordance with the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute.
- B. Before placing in the form, all reinforcing steel shall be cleaned thoroughly of mortar, oil, dirt, loose mill scale, loose or thick rust, and coatings of any character that would destroy or reduce the bond. No concrete shall be deposited until the placing of the reinforcing steel has been inspected and approved.
- C. Do not displace or damage vapor barrier.
- D. Maintain concrete cover around reinforcing as follows:
 - 1. Walls (exposed to weather or backfill): #6 through #18 bars 2 inch, #5 bar and smaller 1-1/2 inch.
 - 2. Footings and concrete formed against earth: 3 inch.

3.02 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section 01 4000, will inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	03 2000 - 2	Concrete Reinforcing
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**SECTION 03 3000
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete foundations and footings.
- B. Concrete curing.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 2000 - Concrete Reinforcing.
- C. Section 03 3511 - Concrete Floor Finishes: Densifiers, hardeners, applied coatings, and polishing.
- D. Section 07 9200 - Joint Sealants: Products and installation for sealants for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

- A. Title 24, Part 2, C.C.R., 2022 California Building Code (2021 I.B.C. w/ California Amendments); Chapter 19A.
- B. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide 2022.
- C. ACI 301 - Specifications for Concrete Construction 2020.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- F. ACI 305R - Guide to Hot Weather Concreting 2020.
- G. ACI 306R - Guide to Cold Weather Concreting 2016.
- H. ACI 308R - Guide to External Curing of Concrete 2016.
- I. ACI 318 - Building Code Requirements for Structural Concrete 2019 (Reapproved 2022).
- J. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.
- K. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2023.
- L. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- M. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2023.
- N. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- O. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).
- P. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.
- Q. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019, with Editorial Revision (2022).
- R. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2023, with Editorial Revision.
- S. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2020.
- T. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.

Rancho Buena Vista HS Track and Field Replacement	03 3000 - 1	Cast-in-Place Concrete
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- U. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs 2017 (Reapproved 2023).

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Quality Control Submittals: Submit the following information related to quality assurance requirements specified:
 - 1. Design data: Submit proposed mix designs and test data before concrete operations begin. Identify for each mix submitted the method by which proportions have been selected.
 - a. For mix designs based on field experience, include individual strength test results, standard deviation, and required average compressive strength $f'(cr)$ calculations. Provide 30 test results from the previous 12 months from the date of the concrete pour.
 - b. Indicate quantity of each ingredient per cubic yard of concrete.
 - c. Indicate type and quantity of admixtures proposed or required.
 - 2. Certifications: Submit affidavits from an independent testing agency certifying that all materials furnished under this section conform to specifications.
 - 3. Delivery tickets: Submit copies of delivery tickets complying with ASTM C 94 for each load of concrete delivered to site.
 - a. Include on the tickets the additional information specified in the ASTM document.
 - 4. Hot weather concreting: Submit description of planned protective measures.
- D. Waiver of Continuous Batch Plant Inspection
 - 1. Continuous batch plant inspection may be waived by the registered design professional, subject to approval by the enforcement agency under either of the following conditions:
 - a. The concrete plant complies fully with the requirements of ASTM C94, Sections 9 and 10, and has a current certificate from the National Ready Mixed Concrete Association or another agency acceptable to the enforcement agency. The certification shall indicate that the plant has automatic batching and recording capabilities.
 - b. For single-story light-framed construction (without basement or retaining walls higher than 6 feet in height measured from bottom of footing to top of wall) and isolated foundations supporting equipment only, where deep foundation elements are not used.
 - 2. When continuous batch plant inspection is waived, the following requirements shall apply and shall be described in the construction documents:
 - a. An approved agency shall check the first batch at the start of the day to verify materials and proportions conform to the approved mix design.
 - b. A licensed weighmaster shall positively identify quantity of materials and certify each load by a batch ticket.
 - c. Batch tickets, including material quantities and weights shall accompany the load, shall be transmitted to the inspector of record by the truck driver with load identified thereon. The load shall not be placed without a batch ticket identifying the mix. The inspector of record shall keep a daily record of placements, identifying each truck, its load, and time of receipt at the jobsite, and approximate location of deposit in the structure and shall maintain a copy of the daily record as required by the enforcement agency.
 - 3. Batch Plant Inspection Not Required
 - a. Batch plant inspection is not required for any of the following conditions, provided they are identified on the approved construction documents and the licensed weighmaster and batch ticket requirements of Section 1705A.3.3.1 are implemented:
 - 1) Site flatwork
 - 2) Unenclosed site structures, including but not limited to lunch or car shelters, bleachers, solar structures, flag or light poles, or retaining walls.

Rancho Buena Vista HS Track and Field Replacement	03 3000 - 2	Cast-in-Place Concrete
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- 3) Controlled low-strength material backfill.
- 4) Single-story relocatable buildings less than 2,160 square feet.
- E. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
- F. Construction Joint Layout: Submit drawing showing proposed location and type of each joint.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Acquire cement from same source and aggregate from same source for entire project.
- C. Follow recommendations of ACI 305R when concreting during hot weather.
 - 1. Well in advance of proposed concreting operations, advise the architect of planned protective measures including but not limited to cooling of materials before or during mixing, placement during evening to dawn hours, fogging during finishing and curing, shading, and windbreaks.
- D. Follow recommendations of ACI 306R when concreting during cold weather.
- E. If any of the test cylinders do not reach the required specified design strength, comply with ACI 318 Section 26.12.4 for core drilling and testing.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT

- A. Comply with requirements of Section 03 2000.

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type II Portland type. Provide ____ manufactured by ____ .
 - 1. Acquire all cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C 33.
 - 1. Acquire all aggregates for entire project from same source.
- C. Water: ASTM C1602; Clean and not detrimental to concrete.

2.04 ADMIXTURES

- A. Admixtures may be used with prior approval by the Architect and Structural Engineer of Record. Use of admixtures shall require the approval of DSA prior to use.
- B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- C. Air Entrainment Admixture: ASTM C260/C260M.
- D. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS

- A. Chemical Hardener: Fluosilicate solution designed for densification of cured concrete slabs.
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
- C. Liquid Curing Compound: ASTM C 309, Type 1, clear or translucent.
 - 1. Non-yellowing formulation where subject to ultraviolet light.
 - 2. Where compounds are proposed for use on surfaces to which finishes, coatings, or coverings subsequently will be applied, compound shall possess demonstrated compatibility with finish, coating, or covering, and use shall be subject to approval of the architect.

Rancho Buena Vista HS Track and Field Replacement	03 3000 - 3	Cast-in-Place Concrete
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2.06 BONDING AND JOINTING PRODUCTS

- A. Slab Isolation Joint Filler: 1/2 inch (13 mm) thick, height equal to slab thickness, with removable top section that will form 1/2 inch (13 mm) deep sealant pocket after removal.
- B. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, 1/4 inch thick (6 mm thick) and 4 inches deep (200 mm deep); tongue and groove profile.

2.07 CURING MATERIALS

- A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

2.08 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Proportioning Normal Weight Concrete: Comply with the 2022 California Building Code, Chapter 19A, Section 1905A.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- D. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - a. The contractor may elect to replace a portion of the portland cement with fly ash up to a maximum of 15 percent by weight of cement plus fly ash (per Section 1903A.6).
- E. Admixtures:
 - 1. Air-entraining admixture: Add at rate to achieve specified air content.
 - a. Do not use in slabs-on-grade scheduled to receive topping, unless manufacturer of topping recommends use over air-entrained concrete.
 - 2. Water-reducing admixture: Add as required for placement and workability.
 - 3. Water-reducing and retarding admixture: Add as required in concrete mixes to be placed at ambient temperatures above 90 degrees F.
 - 4. Do not use admixtures not specified or approved.
- F. Design mixes to meet or exceed each requirement specified. Where more than one criterion is specified, the most stringent shall apply. For example, a minimum cement content or maximum water-cement ratio might result in strengths greater than the minimum specified; likewise, a greater cement content or lower water-cement ratio may be required in order to achieve the required strength.

2.09 CONTROL OF MIX IN THE FIELD

- A. Slump: A tolerance of up to 1 inch above that specified will be permitted for 1 batch in 5 consecutive batches tested. Concrete of lower slump than that specified may be used, provided proper placing and consolidation is obtained.
 - 1. If slump upon arrival at the site is lower than 1 inch below the value specified, one addition of water in accordance with ASTM C 94 will be permitted to bring slump within tolerance, provided that:
 - a. A positive means is available to measure the amount of water added at the site.
 - b. The specified (or approved) maximum water-cement ratio is not exceeded.
 - c. Not more than 45 minutes have elapsed since batching.
- B. Total Air Content: A tolerance of plus or minus 1-1/2 percent of that specified will be allowed for field measurements.
 - 1. Do not use batches that exceed tolerances.

2.10 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.

Rancho Buena Vista HS Track and Field Replacement	03 3000 - 4	Cast-in-Place Concrete
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1. At ambient temperatures of 85 to 90 degrees F, reduce mixing and delivery time to 75 minutes.
2. At ambient temperatures above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

- A. Verify that forms are clean and free of rust before applying release agent.
- B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- D. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches (150 mm). Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.03 VAPOR RETARDER INSTALLATION

- A. General: Place vapor retarder sheet over prepared base material, aligning longer dimension parallel to direction of pour and lapped 6 inches. Seal joints with appropriate tape. Cover with sand to depth shown on drawings.

3.04 JOINT CONSTRUCTION

- A. Expansion Joints: Construct expansion joints where indicated. Install expansion joint filler to full depth of concrete. Recess edge of filler to depth indicated to receive joint sealant (and backer rod where necessary) specified in Division 7.
- B. Control Joints: Construct contraction joints in slabs poured on grade to form panels of sizes indicated on drawings, but not more than 14 feet apart in either direction.
 1. Saw cuts: Form control joints by means of saw cuts one-third the depth of the slab, performed as soon as possible after slab finishing without dislodging aggregate.

3.05 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set anchorage devices and other items required for other work connected to or supported by cast-in-place concrete, using templates, setting drawings, and instructions from suppliers of items to be embedded.
 1. Edge Forms and Screeds: Set edge forms and intermediate screeds as necessary to achieve final elevations indicated for finished slab surfaces.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Preparation: Provide materials necessary to ensure adequate protection of concrete during inclement weather before beginning installation of concrete.
- D. Inspection: Before beginning concrete placement, inspect formwork, reinforcing steel, and items to be embedded, verifying that all such work has been completed.
 1. Wood forms: Moisten immediately before placing concrete in locations where form coatings are not used.
- E. Placement - General: Comply with requirements of ACI 304 and as follows:
 1. Schedule continuous placement of concrete to prevent the formation of cold joints.
 2. Provide construction joints if concrete for a particular element or component cannot be placed in a continuous operation.

Rancho Buena Vista HS Track and Field Replacement	03 3000 - 5	Cast-in-Place Concrete
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3. Deposit concrete as close as possible to its final location, to avoid segregation.
- F. Placement in Forms: Limit horizontal layers to depths which can be properly consolidated, but in no event greater than 24 inches.
1. Consolidate concrete by means of mechanical vibrators, inserted vertically in freshly placed concrete in a systematic pattern at close intervals. Penetrate previously placed concrete to ensure that separate concrete layers are knitted together.
 2. Vibrate concrete sufficiently to achieve consistent consolidation without segregation of coarse aggregates.
 3. Do not use vibrators to move concrete laterally.
- G. Hot Weather Placement: Comply with recommendations of ACI 305R when ambient temperature before, during, or after concrete placement is expected to exceed 90 degrees F or when combinations of high air temperature, low relative humidity, and wind speed are such that the rate of evaporation from freshly poured concrete would otherwise exceed 0.2 pounds per square foot per hour.
1. Do not add water to approved concrete mixes under hot weather conditions.
 2. Provide mixing water at lowest feasible temperature, and provide adequate protection of poured concrete to reduce rate of evaporation.
 3. Use fog nozzle to cool formwork and reinforcing steel immediately prior to placing concrete.
- H. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

3.07 SLAB JOINTING

3.08 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. Maximum Variation of Surface Flatness:
1. Exposed Concrete Floors: 1/4 inch (6 mm) in 10 feet (3 m).
 2. Under Seamless Resilient Flooring or Epoxy Flooring: 1/4 inch (6 mm) in 10 feet (3 m).
 3. Under Carpeting: 1/4 inch (6 mm) in 10 feet (3 m).
- B. Correct the slab surface if tolerances are less than specified.

3.09 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
1. Remove honeycombed areas and other defective concrete down to sound concrete, cutting perpendicular to surface or slightly undercutting. Dampen patch location and area immediately surrounding it prior to applying bonding compound or patching mortar.
 2. Before bonding compound has dried, apply patching mixture matching original concrete in materials and mix except for omission of coarse aggregate, and using a blend of white and normal portland cement as necessary to achieve color match. Consolidate thoroughly and strike off slightly higher than surrounding surface.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. CONCRETE SLABS: Finish to requirements of ACI 302.1R, and as follows:
1. Do not directly apply water to slab surface or dust with cement.
 2. Use hand or powered equipment only as recommended in ACI 302.1R.
 3. Screeding: Strikeoff to required grade and within surface tolerances indicated. Verify conformance to surface tolerances. Correct deficiencies while concrete is still plastic.
 4. Bull Floating: Immediately following screeding, bull float or darby before bleed water appears to eliminate ridges, fill in voids, and embed coarse aggregate. Recheck and correct surface tolerances.

5. Do not perform subsequent finishing until excess moisture or bleed water has disappeared and concrete will support either foot pressure with less than 1/4-inch indentation or weight of power floats without damaging flatness.
6. Final floating: Float to embed coarse aggregate, to eliminate ridges, to compact concrete, to consolidate mortar at surface, and to achieve uniform, sandy texture. Recheck and correct surface tolerances.
7. Troweling: Trowel immediately following final floating. Apply first troweling with power trowel except in confined areas, and apply subsequent trowelings with hand trowels. Wait between trowelings to allow concrete to harden. Do not overtravel. Begin final troweling when surface produces a ringing sound as trowel is moved over it. Consolidate concrete surface by final troweling operation. Completed surface shall be free of trowel marks, uniform in texture and appearance, and within surface tolerance specified.
 - a. Grind smooth surface defects which would telegraph through final floor covering system.
 - b. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and terrazzo with full bed setting system.
 - c. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, thin set quarry tile, and thin set ceramic tile.
8. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; use steel-reinforced plastic trowel blades instead of steel blades to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.
 - a. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
 - b. Chemical Hardener: See Section 03 3511.
9. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 2% maximum.
10. Slab Surface Tolerances:
 - a. Achieve flat, level planes except where grades are indicated. Slope uniformly to drains.
 - b. Floated finishes: Depressions between high spots shall not exceed 5/16 inch under a 10-foot straightedge.
 - c. Troweled finishes: Achieve level surface plane so that depressions between high spots do not exceed the following dimension, using a 10-foot straightedge:
 - 1) 1/8 inch.
11. Repair of Slab Surfaces: Test slab surfaces for smoothness and to verify surface plane to tolerance specified. Repair defects as follows:
 - a. High areas: Correct by grinding after concrete has cured for not less than 14 days.
 - b. Low areas: Immediately after completion of surface finishing operations, cut out low areas and replace with fresh concrete. Finish repaired areas to blend with adjacent concrete. Proprietary patching compounds may be used when approved by the architect.
 - c. Craze or cracked areas: Cut out defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts. Dampen exposed concrete and apply bonding compound. Mix, place, compact, and finish patching concrete to match adjacent concrete.
 - d. Isolated cracks and holes: Groove top of cracks and cut out holes not over 1 inch in diameter. Dampen cleaned concrete surfaces and apply bonding compound; place dry pack or proprietary repair compound acceptable to architect while bonding compound is still active:
 - 1) Dry-pack mix: One part portland cement to 2-1/2 parts fine aggregate and enough water as required for handling and placing.

- 2) Install patching mixture and consolidate thoroughly, striking off level with and matching surrounding surface. Do not allow patched areas to dry out prematurely.

3.10 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Surfaces Not in Contact with Forms:
 1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
 2. Final Curing: Begin after initial curing but before surface is dry.
 - a. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.11 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Composite Sampling, and Making and Curing of Specimens: ASTM C 172 and ASTM C 31.
 1. Take samples at point of discharge.
 2. For pumped concrete, perform sampling and testing at the frequencies specified herein at point of delivery to pump, and perform additional sampling and testing at the same frequency at discharge from line. Results obtained at discharge from line shall be used for acceptance of concrete.
- D. Slump: ASTM C 143. One test per strength test and additional tests if concrete consistency changes.
 1. Modify sampling to comply with ASTM C 94.
- E. Air Content of Normal Weight Concrete: ASTM C 173 or ASTM C 231. One test per strength test performed on air-entrained concrete.
- F. Concrete Temperature:
 1. Test hourly when air temperature is 90 degrees F or above.
 2. Test each time a set of strength test specimens is made.
- G. Compressive Strength Tests: ASTM C 39 and Section 1903A, 2022 C.B.C. and ACI 318-14, Chapter 5.
 1. Compression test specimens: Mold and cure one set of 4 standard cylinders for each compressive strength test required.
 2. Testing for acceptance of potential strength of as-delivered concrete:
 - a. Obtain samples on a statistically sound, random basis.
 - b. Minimum frequency:
 - 1) One set per 50 cubic yards or fraction thereof for each day's pour of each concrete class.
 - 2) One set per 2000 square feet of slab or wall area or fraction thereof for each day's pour of each concrete class.
 - 3) When the above testing frequency would provide fewer than 5 strength tests for a given class of concrete during the project, conduct testing from not less than 5 randomly selected batches, or from each batch if fewer than 5.
 - c. Test one specimen per set at 7 days for information unless an earlier age is required.
 - d. Test 2 specimens per set for acceptance of strength potential; test at 28 days unless other age is specified. The test result shall be the average of the two specimens. If one specimen shows evidence of improper sampling, molding, or testing, the test result shall be the result of the remaining specimen; if both show such evidence,

- discard the test result and inform the architect.
- e. Retain one specimen from each set for later testing, if required.
- f. Strength potential of as-delivered concrete will be considered acceptable if the following criteria is met:
 - 1) Minimum of all sets of 3 consecutive strength test results equals or exceeds specified compressive strength $f'(c)$.
- g. Evaluate construction and curing procedures and implement corrective action when strength results for field-cured specimens are less than 85 percent of test values for companion laboratory-cured specimens.
- 3. Removal of forms or supports: Mold additional specimens and field-cure with concrete represented; test to determine strength of concrete at proposed time of form or support removal.
- H. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.12 CONCRETE SURFACE REPAIRS:

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.
- B. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush?coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.
- C. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike?off slightly higher than surrounding surface.
- D. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.
- E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
- G. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
- H. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- I. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.
- J. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same

Rancho Buena Vista HS Track and Field Replacement	03 3000 - 9	Cast-in-Place Concrete
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manner as adjacent concrete

3.13 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
 - 1. Test reports shall contain the following data:
 - a. Project name, number, and other identification.
 - b. Name of concrete testing agency.
 - c. Date and time of sampling.
 - d. Concrete type and class.
 - e. Location of concrete batch in the completed work.
 - f. All information required by respective ASTM test methods.
- B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Nondestructive testing devices such as impact hammer or sonoscope may be used at architect's option for assistance in determining probable concrete strength at various locations or for selecting areas to be cored, but such tests shall not be the sole basis for acceptance or rejection.
- E. The testing agency shall make additional tests of in-place concrete as directed by the architect when test results indicate that specified strength and other concrete characteristics have not been attained.
 - 1. Testing agency may conduct tests of cored cylinders complying with ASTM C 42 and 2605(g), or tests as directed.
 - 2. Cost of additional testing shall be borne by the contractor when unacceptable concrete has been verified.

3.14 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	03 3000 - 10	Cast-in-Place Concrete
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**SECTION 04 0511
MASONRY MORTARING AND GROUTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Mortar for masonry.
- B. Grout for masonry.

1.02 RELATED REQUIREMENTS

- A. Section 04 2900 - Unit Masonry: Installation of mortar and grout.

1.03 REFERENCE STANDARDS

- A. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2023.
- B. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.
- C. ASTM C476 - Standard Specification for Grout for Masonry 2023.
- D. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry 2023.
- E. ASTM C1019 - Standard Test Method for Sampling and Testing Grout for Masonry 2020.
- F. Title 24, Part 2, C.C.R., 2022 California Building Code (2021 I.B.C. w/ California Amendments); Chapter 21A.
- G. TMS 402/602 Building Code Requirements and Specifications for Masonry Structures, 2016 (Formerly ACI 530)

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.
- C. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Submit packaged dry mortar manufacturer's installation instructions.

1.05 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.07 FIELD CONDITIONS

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

1.08 MORTAR AND GROUT APPLICATIONS

- A. Use only factory premixed packaged dry materials for mortar and grout, with addition of water only at project site.
- B. Mortar Mix Designs: Conforming to CBC 2103A.2.
 - 1. Masonry below grade and in contact with earth: Type S.
 - 2. Exterior, Non-loadbearing Masonry: Type S.

1.09 MATERIALS

- A. Water: Clean and potable.

Rancho Buena Vista HS Track and Field Replacement	04 0511 - 1	Masonry Mortaring and Grouting
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1.10 MORTAR MIXING

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.
- D. If water is lost by evaporation, re-temper only within two hours of mixing.

1.11 GROUT MIXING

- A. Mix grout in accordance with ASTM C94/C94M.
- B. Grout at 28 days F'G: 2,000 psi.
- C. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for coarse grout.
- D. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

PART 3 EXECUTION

2.01 PREPARATION

- A. Plug clean-out holes for grouted masonry with brick masonry units. Brace masonry to resist wet grout pressure.

2.02 INSTALLATION

- A. Install mortar and grout to requirements of section(s) in which masonry is specified.

2.03 GROUTING

- A. All cells shall be solid grouted.
- B. All grout shall be consolidated with a mechanical vibrator at the time of placement and then reconsolidated before plasticity is lost.
- C. When grouting is stopped for one hour or longer, horizontal construction joints shall be formed by stopping the grout pour 1-1/2" below top of the uppermost unit.
- D. Pours over 4'-0", provide cleanouts in bottom course at vertical reinforcement.
- E. No conduits are to be placed in CMU wall without Architect and Structural Engineer's previous approval.
- F. Low-Lift Grouting:
 - 1. Low-lit grouting shall conform to CBC section 2104A.1.3.1.2.2.
 - 2. Limit height of masonry to 48 inches (1,219.2 mm) above each pour.
 - 3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
 - 4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.
- G. High-Lift Grouting:
 - 1. High-lift grouting shall conform to CBC section 2104A.1.3.1.2.3 and DSA IR 21-2.
 - 2. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
 - 3. Place grout for spanning elements in single, continuous pour.
 - 4. Admixture Requirements
 - a. Admixtures shall conform to DSA IR 21-2
 - b. The grout shall contain an admixture of the type that reduces early water loss to the masonry units and produces expansive action in the plastic grout sufficient to offset initial shrinkage and promote bonding of the grout to all interior surfaces of the masonry units.
 - c. Admixtures shall meet the requirements of CBC section 2103A.15 or 2144.3 and have an evaluation report meeting the requirements of DSA IR A-5.
 - d. Admixture Types:

- 1) Sika Grout Aid
- 2) Orco R-Grout Aid (GA213)
- 3) Substitutions: Any proposed substitutions for admixtures intended for the high lift grout method shall require the approval of the Architect, Structural Engineer, and DSA prior to installation.

2.04 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field tests, in accordance with provisions of Section 01 4000 - Quality Requirements.
- B. Test and evaluate mortar in accordance with ASTM C780 procedures.
 1. Test with same frequency as specified for masonry units.
- C. Test and evaluate grout in accordance with ASTM C1019 procedures.
 1. Test with same frequency as specified for masonry units.

Rancho Buena Vista HS Track and Field Replacement	04 0511 - 3	Masonry Mortaring and Grouting
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**SECTION 04 2900
ENGINEERED UNIT MASONRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete Block.
- B. Mortar and Grout.
- C. Reinforcement and Anchorage.
- D. Accessories.

1.02 REFERENCE STANDARDS

- A. TMS 402/ ACI 530/ ASCE 5 - Building Code Requirements for Masonry Structures and Related Commentaries; 2016.
- B. TMS 602/ ACI 530.1/ ASCE 6 - Specification for Masonry Structures; American Concrete Institute International; 2016.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.
- F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2022.
- G. ASTM C91/C91M - Standard Specification for Masonry Cement 2023.
- H. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2023.
- I. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units 2023.
- J. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- K. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.
- L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.
- M. ASTM C476 - Standard Specification for Grout for Masonry 2023.
- N. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry 2023.
- O. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2016.
- P. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars 2018, with Amendment (2020).
- Q. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2022, with Errata.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar and grout.
- C. Shop Drawings: Indicate bar sizes, spacings, reinforcement quantities, bending and cutting schedules, reinforcement supporting and spacing devices, and accessories.
- D. Samples: Submit four samples of decorative block units to illustrate color, texture, and extremes of color range.

Rancho Buena Vista HS Track and Field Replacement	04 2900 - 1	Engineered Unit Masonry
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1.04 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/ ACI 530/ ASCE 5, except where exceeded by requirements of the contract documents.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.06 FIELD CONDITIONS

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/ ACI 530/ ASCE 5 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depth of 8 inches (200 mm) unless otherwise specified on drawings.
 - 2. Load-Bearing Units: ASTM C90, medium weight.
 - a. Hollow block, as indicated.
 - b. Precision Cut Face: Architect to select from manufacturer's full range of standard colors. Locate precision cut faced block as indicated on architectural drawings.
 - c. Split Cut Face: Architect to select from manufacturer's full range of standard colors. Locate split cut faced block as indicated on architectural drawings.

2.02 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M Type N.
- B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
 - 1. Grout Aggregate: ASTM C404.
- C. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
- D. Water: Clean and potable.

2.03 REINFORCEMENT AND ANCHORAGE

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa) yield strength.
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.

2.04 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.

2.05 MORTAR MIXES

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 - 1. Engineered Masonry; Type S.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

2.06 MORTAR MIXING

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.

Rancho Buena Vista HS Track and Field Replacement	04 2900 - 2	Engineered Unit Masonry
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- C. Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.
- D. Do not use anti-freeze compounds to lower the freezing point of mortar.
- E. If water is lost by evaporation, re-temper only within two hours of mixing.

2.07 GROUT MIXES

- A. Engineered Masonry: 2,000 psi (13 MPa) strength at 28 days; 8-10 inches (200-250 mm) slump; provide premixed type in accordance with ASTM C 94/C 94M.

2.08 GROUT MIXING

- A. Mix grout in accordance with ASTM C94/C94M.
- B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.
- C. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Clean reinforcement of loose rust.

3.03 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 1. Bond: Running.
 2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
 3. Mortar Joints: Concave.

3.04 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar as work progresses.
- E. Interlock intersections and external corners, except for units laid in stack bond.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

3.05 REINFORCEMENT AND ANCHORAGE

- A. Reinforcement Bars: Secure at locations indicated and to avoid displacement during grouting. Minimum spacing between bars or to masonry surfaces shall be one bar diameter.
 1. Comply with AWS D1.4 for welded splices.

Rancho Buena Vista HS Track and Field Replacement	04 2900 - 3	Engineered Unit Masonry
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- B. Reinforced Hollow Unit Masonry: Keep vertical cores to be grouted clear of mortar, including bed area of first course.

3.06 GROUTING

- A. Low lift grouted construction shall conform to C.B.C. Section 2104A.1.3.1.2.2 with units laid at 4-5 feet maximum before grouting. High lift grouted construction shall conform to C.B.C. Section 2104A.1.3.1.2.3 and DSA IR 21-2.

3.07 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal reinforcement through expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joint in accordance with Section 07 9005 for sealant performance.

3.08 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

3.09 TOLERANCES

- A. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).
- B. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft (3 mm/m).
- C. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

3.10 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.
- C. Mortar Tests: Test each type of mortar in accordance with recommended procedures in ASTM C780, testing with same frequency as masonry samples.

3.11 CLEANING

- A. Remove excess mortar and mortar smears as work progresses.
- B. Use non-metallic tools in cleaning operations.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	04 2900 - 4	Engineered Unit Masonry
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**SECTION 07 1400
FLUID-APPLIED WATERPROOFING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fluid-Applied Waterproofing:

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete substrate.
- B. Section 04 2000 - Unit Masonry: Masonry joints prepared to receive flashings.

1.03 REFERENCE STANDARDS

- A. ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course 2018 (Reapproved 2022).
- B. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016 (Reapproved 2021).
- C. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness 2015 (Reapproved 2021).
- D. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers 2022.
- E. NRCA (WM) - The NRCA Waterproofing Manual 2021.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for membrane and surface conditioner.
- C. Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and acceptable installation temperatures.
- E. Samples:
 - 1. Submit (2), 2 inch by 4 inch sample of fully cured waterproofing.
 - 2. Submit maintenance manual.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than _____ years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.06 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F (5 degrees C) for 24 hours before and during application and until cured.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no cost to Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Polyurethane Waterproofing:
 - 1. Pacific Polymers: Elasto-Deck BT: www.pacpoly.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

Rancho Buena Vista HS Track and Field Replacement	07 1400 - 1	Fluid-Applied Waterproofing
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2.02 WATERPROOFING APPLICATIONS

- A. Polyurethane Waterproofing:
 - 1. Location: As indicated on drawings.
 - a. Horizontal surfaces: Type: I
 - b. Vertical Surfaces: Type: II
 - 2. Cover with drainage panel.

2.03 FLUID APPLIED WATERPROOFING MATERIALS

- A. Polyurethane Waterproofing: Cold-applied, high solids content polyurethane waterproofing complying with ASTM C836/C836M.
 - 1. Cured Thickness: 60 mils, 0.060 inch (1.52 mm), minimum.
 - 2. Suitable for installation over concrete substrates.
 - 3. Tensile Strength: 400 psi (2.758 MPa), minimum, measured in accordance with ASTM D412.
 - 4. Ultimate Elongation: 180 percent, minimum, measured in accordance with ASTM D412.
 - 5. Durometer Hardness, Type A: 30, minimum, in accordance with ASTM D2240.
 - 6. Adhesion: 150 psi (1.03 MPa), minimum, measured in accordance with ASTM D4541.

2.04 ACCESSORIES

- A. Sealant for Joints and Cracks in Substrate: Type compatible with waterproofing material and as recommended by waterproofing manufacturer.
- B. Drainage Panel: 1/4 inch (6 mm) thick formed plastic, hollowed sandwich.
 - 1. Product: PercoDrain 10 manufactured by USDS.
- C. Cant Strips: As indicated on drawings..

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of waterproofing system.
- C. Verify that substrate surfaces are smooth, free of honeycomb or pitting, and not detrimental to full contact bond of waterproofing materials.
- D. Verify items that penetrate surfaces to receive waterproofing are securely installed.
- E. Concrete surfaces shall be trowel finished followed by a light brooming, left free of loose particles, ridges, projections, voids and droppings that can interfere with the application of the coatings.
- F. Concrete surfaces shall be water cured in lieu of curing compounds for a minimum of 28 days. If curing compounds are used, pre-approve with manufacturer.
- G. Verify that concrete surfaces do not exceed 15% moisture content.
- H. Prior to installation, provide letter from manufacturer indicating that they have physically reviewed the substrate and it is acceptable to receive waterproofing materials.

3.02 PREPARATION

- A. Protect adjacent surfaces from damage not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to waterproofing manufacturer.
- D. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.
- E. Seal moving cracks with sealant and non-rigid filler, using procedures recommended by sealant and waterproofing manufacturers.

Rancho Buena Vista HS Track and Field Replacement	07 1400 - 2	Fluid-Applied Waterproofing
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- F. Install cant strips at inside corners and locations where vertical surfaces meet horizontal surfaces.
- G. Prime metal surfaces with Elasto-Poxy Primer VOC.
- H. Cracks and Control Joints: Except for non-moving shrinkage cracks, all other cracks and joints shall be sealed with sealant and fabric reinforced (Tie-TEX).

3.03 INSTALLATION

- A. Install waterproofing to specified minimum thickness in accordance with manufacturers instructions and NRCA (WM) applicable requirements.
- B. All cracks 1/16" and over must be V-Grooved and filled with Permathane SM7120 PU polyurethane sealant.
- C. At intersections of membrane and vertical walls, columns, pipes and other penetrations, caulk a 3/8"-1/2" fillet bead at the meeting angle using Permathane SM7120 PU polyurethane sealant. Allow for a minimum overnight cure of the sealant before applying Elasto-Deck B.T.
- D. Apply by, roller, trowel, brush or squeegee (consult Mfg. for Spray applications) the first coat of Elasto-Deck B.T. at a rate of 42.6 square feet per gallon.
- E. After an overnight cure, apply a second coat of Elasto-Deck B.T. at the same 42.6 square feet per gallon to achieve a total dry film thickness of 60 mils.

3.04 INSTALLATION - DRAINAGE PANEL AND PROTECTION BOARD

- A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward, and scribe and cut boards around projections, penetrations, and interruptions.

3.05 PROTECTION

- A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	07 1400 - 3	Fluid-Applied Waterproofing
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**SECTION 07 1900
WATER REPELLENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water repellents applied to exterior masonry surfaces.

1.02 RELATED REQUIREMENTS

- A. California Air Resources Board, Volatile Organic Compound (VOC) Limitation: Provide water repellent materials, including primers and accessory materials, that have a VOC content of 100 g/l or less, consistent with Southern California Air Quality Management District (SCAQMD) Rule 1113 for architectural waterproofing sealers and waterproofing concrete/masonry sealers.

1.03 REFERENCE STANDARDS

- A. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units 2023.
- B. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete 2021.
- C. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings 2005 (Reapproved 2018).
- D. ASTM D5095 - Standard Test Method for Determination of the Nonvolatile Content in Silanes, Siloxanes and Silane-Siloxane Blends Used in Masonry Water Repellent Treatments 1991 (Reapproved 2022).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description.
- C. Manufacturer's Field Reports: Report whether manufacturer's "best practices" are being followed; if not, state corrective recommendations. Email report to Architect the same day as inspection occurs; mail report on manufacturer's letterhead to Architect within 2 days after inspection.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years experience.

1.06 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and applicator agree to repair or replace materials that fail to maintain water repellency specified within specified warranty period.
 - 1. Warranty Period: Five years from date of Project Completion.

1.07 MOCK-UP

- A. Prepare a representative surface 36 by 36 inch (1 by 1 m) in size using specified materials and preparation and application methods on surfaces identical to those to be coated; approved mock-up constitutes standard for workmanship.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.08 FIELD CONDITIONS

- A. Protect liquid materials from freezing.
- B. Do not apply water repellent when ambient temperature is lower than 50 degrees F (10 degrees C) or higher than 100 degrees F (38 degrees C).

Rancho Buena Vista HS Track and Field Replacement	07 1900 - 1	Water Repellents
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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Silane, Siloxane, Silane-Siloxane Blend, and Siliconate Water Repellents:
 - 1. Chemical Products Industries, Inc.: CP-500W.
 - 2. Prosoco, Inc.: Blok-Guard & Graffiti Control II.
 - 3. Rainguard International, Inc.: Micro-Seal.
 - 4. Tnemec Company, Inc.: Series 635 Dur A Pell 10.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Anti-Graffiti Coating
 - 1. Prosoco, Inc.: Blok-Guard & Graffiti Control II.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Water Repellent: Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.
 - 1. Applications: Vertical surfaces.
 - 2. VOC Content: Less than 100 g/L, when tested in accordance with ASTM D3960 or ASTM D5095.
 - 3. Moisture Absorption When Applied to Masonry: 5 percent, maximum, when tested in accordance with ASTM C140/C140M using masonry sample completely coated with water repellent.
 - 4. Water-Vapor Transmission: Maximum 10 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens in accordance with ASTM E 96/E 96M.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify joint sealants are installed and cured.
- C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.
- D. Test pH level according to water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protection of Adjacent Work:
 - 1. Protect adjacent landscaping, property, and vehicles from drips and overspray.
 - 2. Protect adjacent surfaces not intended to receive water repellent.
- B. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.
- C. Do not start work until masonry mortar substrate is cured a minimum of 60 days.
- D. Remove loose particles and foreign matter.
- E. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.
- F. Allow surfaces to dry completely to degree recommended by water repellent manufacturer before starting coating work.

3.03 APPLICATION

- A. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.
- B. Apply two coats, minimum.

Rancho Buena Vista HS Track and Field Replacement	07 1900 - 2	Water Repellents
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- C. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.
- D. Provide manufacturer's field service representative to inspect preparation and application work during entire application period to ensure that manufacturer's "best practices" for preparation and application are being followed.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	07 1900 - 3	Water Repellents
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**SECTION 07 9200
JOINT SEALANTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.02 REFERENCE STANDARDS

- A. ASTM C834 - Standard Specification for Latex Sealants 2017 (Reapproved 2023).
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016 (Reapproved 2023).
- D. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness 2015 (Reapproved 2021).
- E. SCAQMD 1168 - Adhesive and Sealant Applications 1989, with Amendment (2022).

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
- C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.

Rancho Buena Vista HS Track and Field Replacement	07 9200 - 1	Joint Sealants
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3. Do not seal the following types of joints.
 - a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - c. Joints where installation of sealant is specified in another section.
 - d. Joints between suspended panel ceilings/grid and walls.
- B. Exterior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.
- C. Interior Joints: Use nonsag Acrylic emulsion latex sealant, unless otherwise indicated.
 1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.

2.02 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in South Coast Air Quality Management District (SCAQMD); Rule 1168.

2.03 NONSAG JOINT SEALANTS

- A. Type 1 - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
 1. Movement Capability: Plus and minus 25 percent, minimum.
- B. Type 2 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
 1. Color: Standard colors matching finished surfaces, Type OP (opaque).

2.04 SELF-LEVELING SEALANTS

- A. Semi-Rigid Self-Leveling Polyurea Joint Filler: Two-component, 100 percent solids; Intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
 1. Hardness: 75, Shore A, minimum, when tested in accordance with ASTM D2240 after 7 days.
 2. Color: Concrete gray.

2.05 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- D. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 FIELD QUALITY CONTROL

- A. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	07 9200 - 3	Joint Sealants
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**SECTION 09 9000
PAINTS AND COATINGS - EXTERIOR**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior paints and coatings.
- B. Surface preparation.
- C. Field application of paints and other coatings.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide Provide data on all finishing products, including VOC content..
- C. Samples: Submit two samples, 8-1/2" x 11" inch (____x____ mm) in size, illustrating selected colors and textures for each color and system selected. Submit on cardstock..
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces..

1.03 QUALITY ASSURANCE

- A. Applicator Qualifications: Applicator specializing in performing the work of this section must have minimum three years experience.

1.04 PROTECTION AND SAFEGUARD

- A. The contractor shall provide continuous dust, over-spray and fumes control to protect adjacent areas. Any use of noisy or hazardous equipment shall be coordinated with the District Representative.
- B. Any accidental spillage, etc.; on any surface shall be immediately cleaned and the damaged surfaces restored to their original condition.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, product name, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in an adequately protected well ventilated area, and as required by manufacturer's instructions.
- D. Storage containers: Subject to District Representative approval as to the type, and placement at the site.
 - 1. All painting materials (including rags, tarpaulins, mixers, empty containers, and filled or partially filled containers) shall be kept in designated storage areas. All material mixing and handling shall be performed in designated area.

1.06 CLEANING OF PREMISES

- A. Whenever painting and finishing work is being performed; all walks, steps, floors, plants, unpainted surfaces and adjacent areas shall be carefully protected from damage by the preparation and painting work. Contractors to provide clean drop cloths and used wherever necessary. All supply materials, paints, containers, etc.; shall be orderly and carefully arranged and protected.
- B. During the process of the work, the contractor shall carefully clean up after his crew and shall leave the area in which his employees are working free from debris.
- C. Upon completion of the painting contract, remove all materials and equipment, unusable scraps, waste and debris, leaving the areas in a clean, orderly and acceptable condition.

Rancho Buena Vista HS Track and Field Replacement	09 9000 - 1	Paints and Coatings - Exterior
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School district trash containers shall not be used for waste of any kind.

- D. Collect waste material, which may constitute a fire hazard, place in closed metal containers, and removed daily from site.

1.07 SPECIAL REQUIREMENTS

- A. The contractor shall inspect the facilities to be painted carefully to check and verify all dimensions, sizes, etc.; including conditions at the site and shall assume full responsibility for all errors and unexpected conditions, which arise through lack of verification.

1.08 EXTRA MATERIALS

- A. Supply 1-gallon of each color, store where directed.
- B. Label each container with color in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 EXTERIOR PAINT

- A. Contractor shall provide Paint meeting the following specifications exactly.

2.02 PAINTS AND COATINGS – GENERAL

- A. Material to be factory mixed and factory tinted, except field catalyzed coatings. Field tinting of materials will not be permitted.
- B. Paint accessory and sundry materials such as: putty, spackle, thinners, reducers, and caulking shall be of the highest quality and fully compatible with substrate and subsequent finishes.

2.03 PAINT SYSTEMS- EXTERIOR

- A. CONCRETE - PLASTER - STUCCO
 - 1. Finish: Eggshell
 - a. Coating Type: 100% Acrylic
 - b. Finishing Schedule:
 - 1) 1st coat Vista # 4600 Uniprime II or 4000 Uniprime
 - 2) 2nd coat Vista #8300 Carefree Eggshell
 - 3) 3rd coat Vista #8300 Carefree Eggshell
- B. MASONRY - BLOCK - BRICK
 - 1. Finish: Eggshell
 - a. Coating Type: 100% Acrylic
 - b. Finishing Schedule: 1st coat Vista#040 Block Kote
 - 1) 1st coat Vista#040 Block Kote
 - 2) 2nd coat Vista#8300 Carefree Eggshell
 - 3) 3rd coat Vista#8300 Carefree Eggshell
- C. WOOD: Rough Sawn Facia
 - 1. Finish: Flat
 - a. Coating Type: 100% Acrylic
 - b. Finish Schedule:
 - 1) 1st coat Vista#4200 Terminator II
 - 2) 2nd coat Vista #3000 Acribond
 - 3) 3rd coat Vista #3000 Acribond
- D. WOOD: a. Sidings
 - 1. Finish: Eggshell
 - a. Coating Type: 100% Acrylic
 - b. Finish Schedule: 1st coat Vista#4200 Terminator II
 - 1) 2nd coat Vista #8300 Carefree
 - 2) 3rd coat Vista #8300 Carefree
 - 2. b. Smooth Doors
 - a. Finish: Gloss
 - b. Coating Type: 100% Acrylic

- c. Finish Schedule:
 - 1) 1st coat Vista#4000 Uniprime
 - 2) 2nd coat Vista #9900 Gloss Protec Alkyd Emulsion
 - 3) 3rd coat Vista #9900 Gloss Protec Alkyd Emulsion
- E. METAL: Ferrous - Iron - Steel Doors
 - 1. Finish: Gloss
 - a. Coating Type: 100% Acrylic
 - b. Finishing Schedule:
 - 1) 1st coat Vista#9600 Protec Metal Prime
 - 2) 2nd coat Vista#9900 Gloss Protec Alkyd Emulsion
 - 3) 3rd coat Vista #9900 Gloss Protec Alkyd Emulsion
- F. METAL: Non Ferrous - Galvanized - Aluminum
 - 1. Finish: Gloss
 - a. Coating Type: 100% Acrylic
 - b. Finishing Schedule:
 - 1) Krud Kutter Metal Etch and Clean
 - 2) 1st coat Vista 4800 Metal Pro
 - 3) 2nd coat Vista #9900 Gloss Protec Alkyd Emulsion
 - 4) 3rd coat Vista #9900 Gloss Protec Alkyd Emulsion

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Paint thinner and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.
- B. Patching Material: Exterior spackle paste.
- C. Caulking Material: Latex painter's caulk (No silicone).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive paint as recommended by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Prepare surfaces that may potentially affect proper application.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishers unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit masonry: 12 percent.
 - 3. Exterior wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fitting prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces, which affect work of this section. Remove or repair existing coating that exhibit surface defects.
- C. Marks: Seal marks with shellac, those bleeding through surface finish.
- D. Impervious Surfaces: Any surface displaying sign of mold, fungus, mildew or any other rot to be cleansed free of the offending agent by bleaching and the application of the appropriate fungicide, and mildewcide. Rinse with clean water and allow surface to dry.
- E. Concrete and Unit Masonry Surfaces: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign mater. Remove oil and grease with a solution or tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering or corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- F. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

Rancho Buena Vista HS Track and Field Replacement	09 9000 - 3	Paints and Coatings - Exterior
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- G. Aluminum Surfaces: Remove surface contamination by approved method. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- H. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Wash surface with acid etching and apply coat of etching primer.
- I. Ferrous Metals: Wash with solvent. Acid etch with phosphoric acid.
- J. Wood Doors: Prime wood door top and bottom edge surfaces.
- K. Metal Doors: Prime metal door top and bottom edge surfaces.
- L. Unless specifically excluded, all surfaces are to be sanded until smooth and cleaned thoroughly. All glossy surfaces are to be de-glossed either by sanding or by the use of a previously district approved de-glossing agent. Use of any de-glossing agent to be used in strict accordance with manufacturer's instructions.
- M. All holes, cracks, joints, abutments, nail heads, pits, depressions, voids, and imperfections to be filled until surface is flush after drying. Fillers to be of the highest quality and appropriate for the conditions to ensure permanency to the surface and compatible to the systems to follow. "Float off" and "texture" the repair material to match adjacent areas. Prime areas first with appropriate primers and then again after being allowed to cure.
- N. All surfaces and substrates to be inspected and deemed as substantial. When surfaces do not have integrity the proper remedial actions are to be taken before any further actions are taken.
- O. All surface are to be tested to tested to insure that any remaining paint is substantial and will not lift, peel separate, bubble, alligator, etc.; and are compatible with subsequent coatings. If the existing paint fails any of these tests then existing paint is to be removed and the surfaces inspected and approved by the district prior to any further coating being applied.
- P. Upon completion of each step of the panting process (i.e., after each washing, prepping, filling, priming and painting) the work is to be inspected and approved by the district prior to the next step being taken. Re- work surfaces not approved until they are acceptable and approved by the district representative.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- C. Apply primers, undercoats, and finishes free from sags, runs, skips, and other defects. Primers and undercoats will not be allowed to be of the same color as the finish coats.
- D. Allow each coat to thoroughly dry before application of succeeding coats in accordance with manufacturer's recommendations and have each coat inspected and approved by the district representative before applying succeeding coats.
- E. Backrolling of all woodsiding to be performed. Stucco to be backrolled when deemed necessary by the district representative. The intent is to insure uniform coverage and sheen.
- F. All exposed surfaces to be primed immediately and not allowed to be left unprotected.
- G. Paint all soffits and overhangs body colors, not trim or accent color.

3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Remove unfinished louvers, grilles, and covers and access panels on mechanical and electrical components and paint separately.
- B. Finish equipment, piping, conduit, and exposed ductwork in utility areas in colors according to the color schedule.
- C. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, etc., and fittings removed prior to finishing.

3.05 SCHEDULE – SURFACES TO BE FINISHED

- A. Do not paint or finish the following items:
 1. Items fully factory-finished unless specifically noted.

Rancho Buena Vista HS Track and Field Replacement	09 9000 - 4	Paints and Coatings - Exterior
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2. Fire rating labels, equipment serial number and capacity labels.
 3. Stainless steel items.
- B. Painting relocatable classrooms
1. Water blast all exterior surfaces to clean surfaces, to remove peeling and flaking paint.
 2. Hand scrape all exterior areas after surfaces have dried from water blasting.
 3. Sand all areas with either #50 grit or #80 grit sandpaper to smooth or level the surface.
 4. Caulk all wood to wood, and metal to wood joints with at least 25-year rated latex caulking.
 5. Caulk all metal to metal joints with polyurethane caulking.
 6. Fill any remaining holes, voids, depressions or low spots with the appropriate filler, then smooth.
 7. Back-roll both the primer coating and at least one finish coat.
 8. All wood or metal ramps to have non-skid (non-slip) material applied to the walking surface of ramp. Color and type of material to be approved by the District.
 9. Factory finished HVAC units are not to be painted. Air ducts requiring paint will be protected so that the interior of the units will not get any paint or over-spray in them.
 10. All metal roof flashings that have been factory finished are not to be painted.
 11. All electrical panels, conduits and other electrical fastening devices to be painted when in or near a painted field.
 12. All five (5) sides of exterior doors to be painted. Both exterior and interior of the corresponding jam to be painted.
 13. Exterior rough sawn cedar when used as trim will be coated with two coats of Acrylic Stain unless the trim has been previously primed and painted.
 14. All four (4) side on all relocatable classrooms to be repainted. Partitions between each relocatable to be painted on six (6) sides with the body color.

3.06 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	09 9000 - 5	Paints and Coatings - Exterior
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SECTION 11 68 24
EXTERIOR ATHLETIC EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Include all labor, material, equipment, transportation, and services to install various items as shown on the drawings and herein specified.
 2. Furnish and install football goal posts including pad
 3. Furnish and install two (2) soccer goals
 4. Furnish and install two (2) pair of soccer goal anchors
 5. Furnish and install twelve (12) football pylons
 6. Furnish and assemble four (4) soccer corner flag assemblies
 7. Furnish and assemble two (2) lacrosse goals
 8. Furnish and assemble two (2) field hockey goals
 9. Furnish and install six (6) long jump take-off board assemblies.
 10. Furnish and install two (2) long jump sand catcher assemblies including jump pit covers
 11. Furnish and install two (2) shot put toe board assembly, including throw form system
 12. Furnish and install Pole Vault Box
 13. Furnish and assemble Combox / Handholes for new and/or existing electrical and low voltage conductors.
 14. Furnish and install ball control netting
- B. Related Sections:
1. 03 30 53 Miscellaneous Cast-In-Place Concrete

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Submit for approval: Manufacturer's product information, installation instructions and maintenance recommendations for all components.

PART 2 MATERIALS

2.01 FOOTBALL GOAL POSTS

- A. Anchoring System: Either a ground sleeve or anchor plate system may be utilized, providing a complete assembly for all components including, but limited to:
1. Ground Sleeve: The ground sleeve shall be constructed of 8 inch outside diameter Schedule 40 galvanized steel pipe. The ground sleeve shall be a minimum of 5 feet long.
 2. Anchor Plate: The anchor plate shall consist of four (4) "J" hook anchor bolts with anchor plate welded to main standard.
 3. Access Frame: Access frame kit shall be furnished including solid and split covers for each goal post assembly.
- B. Main Standard (Gooseneck): The main standard shall be constructed from 6 inch outside diameter Schedule 40 6061-T6 aluminum pipe. The pipe shall be curved to provide an 8 foot horizontal offset from the ground sleeve to the crossbar with a 5 foot radius bend.
- C. Crossbars: The crossbar shall be constructed from minimum 6 inch outside diameter Schedule 40 6061-T6 aluminum pipe. The crossbar shall extend 23'-4" in accordance with the NFSHSA requirements.
- D. Uprights: The upright shall be constructed from minimum 4 inch outside diameter Schedule 40 6061-T6 aluminum pipe. The uprights shall extend 30 feet above the crossbar.
- E. Provide one (1) set round post protector pads for 6" diameter posts. Pads to be 6" thick cylindrically high-density polyurethane foam with rear cut out for fitting onto post. A minimum

Rancho Buena Vista HS Track and Field Replacement	11 6824 - 1	Exterior Athletic Equipment
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nylon reinforced vinyl cover is to be provided to completely enclose foam pad with Velcro closure. Pads to be 6' high. Color shall be determined during submittal, with white vertical lettering including "RANCHO" and "LONGHORNS" on respective pad.

- F. Posts, crossbars and uprights to have two-coat catalyzed polyurethane finish. Color to be yellow or white.
- G. Manufacturer Reference: Football Goal Posts to be Aluminum Athletic Equipment #ASG-HS/8; Sportsfield Specialties Inc. #GP 830HSPL or GP 830HS, with anchors, ground sleeves and sleeve caps, and access frame kit GPAFIT; Gill Athletics FB 18130C18, with anchors or ground sleeve with Access Frame kit F304, or equal.

Aluminum Athletic Equipment
4 Portland Road
West Conshohocken, PA 19428
(800) 523-5471

Sportsfield Specialties, Inc.
P.O. Box 231
Delhi, NY 13753
1-888-408-8638

Gill Athletics
Gillathletics.com
1-800-637-3090

2.02 PORTABLE SOCCER GOALS

- A. General: Soccer goals to be in full compliance with National Federation of State High School Associates. Goals to provide an 8' x 24' front inside opening. Goals to be portable.
- B. Crossbar and Uprights: The crossbars and uprights shall consist of a single length of 4.5 inch OD 6063 T-5 aluminum D shaped tubing or 4-3/8 inch OD Rams Aluminum tubing.
- C. The goals shall be finished with a white polyester powder coat finish.
- D. Each goal shall have a swivel wheel kit.
- E. All hardware and fasteners shall be stainless steel.
- F. The goals shall include 4mm polyethylene twine nets. Nets shall be secured with removable clips
- G. Warranty: Goals to be warranted by manufacturer for a minimum period of 5 years.
- H. Manufacturer Reference: Kwik Goal 2B2001 Pro Premier European Match Goal with net, Contact (800) 531-4252, or approved equal

2.03 SOCCER GOAL ANCHOR

- A. Unit shall be pre-manufactured unit consisting of an access box, cover and tethering assembly suitable for securing the backbar/backstay of a soccer goal unit. Provide two per goal.
- B. Access box to be fabricated of .125" aluminum and 16 ga. stainless steel.
- C. Cover to be fabricated of .25" aluminum and 3/4" marine plywood.
- D. Tethering to be steel aircraft cable, minimum 1/4" dia. with terminated loops to secure with padlock.
- E. All connections to be welded or secured with stainless steel hardware.
- F. Manufacturer Reference: Soccer Goal Anchor shall be Aluminum Athletic Equipment, Sportsfield Specialties Model SG2S-Custom, or approved equal.
- G. Synthetic Turf Cover to identically match synthetic turf system used for field surfaces.

2.04 PYLON MARKERS

- A. Furnish at each corner of football field end zone and at the inbounds locations, a total of twelve (12) pylons required. The pylon markers furnished shall be weighted base, portable type which will topple over on impact. The pylons to be 4" x 4" x 18" high covered with red-orange vinyl.
- B. Football pylons to be Gilman WP12, Porter 296801, or approved equal.

Rancho Buena Vista HS Track and Field Replacement	11 6824 - 2	Exterior Athletic Equipment
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2.05 CORNER FLAG

- A. Furnish at each corner of soccer field, four (4) weighted soccer flags. The soccer flags shall be weighted base, portable type which will topple over on impact. The soccer flags shall be 70" high and shall meet NFHS requirements.
- B. Soccer pylons to be Gilman WSF, Gill 54603, or approved equal.

2.06 LACROSSE GOALS

- A. General: Portable lacrosse goals to be in full compliance with National Federation of State High School Association.
- B. The goal mouth shall consist of 1.90 inch OD heavy wall aluminum tubing. The goal base shall be constructed of a structurally reinforced steel flat bar.
- C. The goals shall include 4 mm white nets.
- D. Portable lacrosse goals shall be Aluminum Athletic Equipment Model LG-AS with LNP nets or approved equal. Aluminum Athletic Equipment, 4 Portland Road, West Conshohocken, PA 19428, (800) 523-5471, Gill Model 26630, or approved equal.
- E. Goal frame shall have stenciled in white paint on rear frame of goal: RANCHO BUENA VISTA HIGH SCHOOL. Size and style of lettering to be determined.

2.07 FIELD HOCKEY GOALS

- A. General: Portable Field Hockey goals to be in full compliance with National Federation of State High School Association.
- B. Product shall consist of:
 - 1. One Piece Side Frame Construction Fabricated of 2" x 2" x 0.090" Thick Wall Square Aluminum Tubing, TIG Welded
 - 2. Welded Aluminum Net Clips with Lifetime Guarantee
 - 3. Powder Coated White Finish with Enhanced Resistance to UV and Fade
 - 4. Replaceable 1/2" Black Polyethylene Bottom Boards Secured by Top and Bottom Aluminum Channels
 - 5. 7'H x 12'W x 4'D 2.5mm Twisted Black Polyethylene Net, 1.5" Square Mesh
 - 6. Stainless Steel Assembly Hardware
 - 7. Goal External Wheel Kit

2.08 TAKE OFF BOARDS

- A. Unit shall consist of an aluminum tray, 8" x 48" x 2" permanent recess installation in the track and a 2-3/4" thick dual surface board made up of a reversible top layer of 3/4" marine plywood fastened to 1-1/2" thick aluminum channel. The exposed aluminum channel shall be covered with 1/2" of beige EPDM rubber granules and polyurethane installed by the rubberized surfacing contractor.
- B. Manufacturer Reference: Take off board trays to be Sportsfield Specialties Model No. TFLT008SS, Gill Model No. 444-S, with supplemental board, or approved equal. Sportsfield Specialties, 408-728-0482.
- C. Furnish and install three (3) take off boards and trays for each runway as indicated in the plans.

2.09 LONG JUMP PIT WITH SAND CATCHER

- A. Unit shall be 26.2 ft. x 13.1 ft, including catcher constructed of modular aluminum components.
- B. Manufacturer's Reference: The pit and sand catcher shall Sportsfield Specialties Inc. Model #6020 Sand Pit with Trap Assembly, Gill Model No. F442 or approved equal, including runway insert, trays/grates and rubberized surfacing matching the adjacent track surfacing at trays suitable for a complete installation. Product is available from:

Rancho Buena Vista HS Track and Field Replacement	11 6824 - 3	Exterior Athletic Equipment
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Sportsfield Specialties, Inc.
P.O. Box 231
Delhi, NY 13753
1-888-408-8638

Gill Athletics
1-800-637-3090

- C. Unit shall be compatible with and be of the same manufacturer as the jump pit covers.

2.10 ALUMINUM JUMP PIT COVERS

- A. Units shall be 23.4 ft. x 9.84 ft., with modular aluminum cover panels including structure and support system.
- B. The jump pit covers shall be Sportsfield Specialties Inc., Model #6820 Cover Set, Gill Model No F442 with rubberized surfacing matching the adjacent track surfacing, or approved equal. Product is available from:

Sportsfield Specialties, Inc.
P.O. Box 231
Delhi, NY 13753
1-888-408-8638

Gill Athletics
1-800-637-3090

2.11 POLE VAULT BOX

- A. Pole vault box shall be stainless steel. Box shall meet IAAF Rule No. 17221 with width 23.62". Pole vault box shall be guaranteed for the products lifetime.
- B. Pole vault box cover shall be stainless steel to fit and match box. New rubberized surfacing shall be applied to the top surface of the cover.
- C. Manufacturer Reference: Vault boxes shall be Aluminum Athletic Equipment Model SSVB; Sportsfield Specialties Inc. TFPV002SS or equal. Vault box covers shall be Aluminum Athletic Equipment Model S SVC; Gill Athletics Model 504/50201; Sportsfield Specialties Inc. TFPVC002SS or equal.
- D. Furnish and install one vault box and one cover as indicated in the plans. Cover shall include a rubberized surfacing. In addition, a full pour removable rubberized surfacing plug shall be installed within the vault box. Surface to match rubberized runway surface.

2.12 COMBOX

- A. Combox shall be installed where shown. Boxes shall be aluminum with gasketed and bolted cover. The cover shall be recessed forming a deep pocket for the placement of synthetic surfacing materials. This provides a "zero" surface elevation change in the playing surface.
- B. Combox boxes shall be 18" x 30".
- C. There shall be two hand holes built into the cover
- D. Hand hole lids will have a toggle lock.
- E. Combox shall be Sportsfield Specialties, Combox CBTS1830/CBIT 1830 depending upon surfacing condition.
- F. Combox lids shall accommodate either rubberized track surfacing or synthetic turf depending upon specific location.

2.13 HANDHOLES

- A. Per electrical

Rancho Buena Vista HS Track and Field Replacement	11 6824 - 4	Exterior Athletic Equipment
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2.14 BALL CONTROL NETTING

- A. General: Provide 10 ft. ht. ball safety netting system including post sleeve, posts, netting associated attachments.
- B. Posts shall consist of minimum 2" diameter schedule 40 aluminum. Terminal posts shall be minimum 2" dia. schedule 80 aluminum, painted black.
- C. Netting shall consist of minimum #36 nylon 1-3/4" square mesh net. Color of netting to be black.
- D. Netting shall be configured for separate/removable panels / sections per layout plan.
- E. Manufacturer Reference: Sportsfield Specialties model PFBSS210 or approved equal.

PART 3 EXECUTION

3.01 FOOTBALL GOAL POST INSTALLATION

- A. Construct goal post footings as shown on the drawings complete with sleeve inserts or anchor plates as recommended by the manufacturer.
- B. Locate footings and sleeve inserts as shown to provide proper horizontal and transverse alignment of crossbar 10' directly above and parallel to inside edge of end zone.
- C. Provide temporary support when setting goal posts.
- D. The Contractor shall prime and repaint any areas of the goal posts damaged during delivery of installation.

3.02 PORTABLE SOCCER GOAL

- A. Assemble soccer goal per manufacturer's installation instructions.
- B. Install new goal nets per manufacturer's installation instructions.
- C. Secure to anchor system.

3.03 SOCCER GOAL ANCHOR

- A. Assemble soccer goal anchor per manufacturer's installation instructions.
- B. Secure to concrete foundation.
- C. Unit shall be pre-manufactured unit consisting of an access box, cover and clamping assembly suitable for securing the backbar of a soccer goal unit.

3.04 PORTABLE LACROSSE GOAL

- A. Assemble lacrosse goal per manufacturer's installation instructions.
- B. Install new goal nets per manufacturer's installation instructions.

3.05 PORTABLE FIELD HOCKEY GOAL

- A. Assemble field hockey goal per manufacturer's installation instructions.
- B. Install new goal nets and wheel kits per manufacturer's installation instructions.

3.06 TAKE OFF BOARD INSTALLATION

- A. Install two take off boards at each runway, (four total) as dimensioned and detailed on the drawings.
- B. Install take off boards and trays recessed so that the board is flush with surface of the concrete paving. Rubberized surface is to be applied to aluminum side of board. Rubberized to be cut with sharp edges producing 1/16" clearance between board and runway surfacing.
- C. All boards to be notched at each end at centerline of board to facilitate removal from tray.

Rancho Buena Vista HS Track and Field Replacement	11 6824 - 5	Exterior Athletic Equipment
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3.07 ALUMINUM JUMP PIT COVERS

- A. Install aluminum jump pit covers on two (2) jump pits per manufacturer's instructions and recommendations.

3.08 LONG JUMP PIT AND SAND CATCHER

- A. Install long jump pit and sand catcher units at two (2) jump pits per manufacturer's instructions and recommendations

3.09 POLE VAULT BOXES AND CONCRETE SLABS

- A. Install vault boxes in concrete in as shown on the detail drawings. Construct 4' x 5' x 12" concrete pads with specified aluminum vault box insert. Top of vault box insert to match level of rubberized surface. Top of concrete to slope away from vault box to match the surrounding grade as applicable.
- B. Measuring line at bottom of vault box shall be aligned with the centerline of the support slabs for the upright standards as shown on the detail drawings.
- C. Slabs: Install 36" x 6' x 12" concrete vault support slabs for upright standards as shown on the drawings. Align centerline of slab with measuring line of vault box as shown on the detail drawings. Edges of slab shall be flush with the surrounding finish grade.

3.10 COMBOX INSTALLATION

- A. Each conduit entering the box shall be neatly upswept and shall terminate not less than 5 inches or more than 10" below the lid.
- B. All boxes shall be set on a 6" free draining pea gravel base and be leveled to match grade. The lid shall be set flush with finish grade. Conduits into the boxes shall have bell ends installed and pull ropes installed.
- C. The combox shall be installed immediately inside the running track on the field side of the slot drain.
- D. The hand holes shall be installed outside the perimeter of the running track in the concrete paving or landscape areas as shown.

3.17 BALL SAFETY NETTING SYSTEM

- A. Assemble and install post sleeves, sleeves and hardware per manufacturer's installation instructions.
- B. Install new netting and retaining system per manufacturer's instructions. Rigging shall be configured to allow removal of specific sections at pole vault landing area while retaining remaining system.
- C. Provide assembly and storage instructions and demonstrate operation to owner's maintenance personnel.

END OF SECTION 11 68 24
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Rancho Buena Vista HS Track and Field Replacement	11 6824 - 6	Exterior Athletic Equipment
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**SECTION 31 1000
SITE CLEARING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Clearing and protection of vegetation.
- B. Removal of existing debris.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
- D. Section 31 2200 - Grading: Topsoil removal.
- E. Section 31 2200 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 PROJECT CONDITIONS

- A. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Fill Material: As described in geotechnical investigation

PART 3 EXECUTION

3.01 SITE CLEARING

- A. Comply with other requirements specified in Section 01 7000.
- B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Protect existing structures and other elements that are not to be removed.

3.03 VEGETATION

- A. Do not remove or damage vegetation beyond the limits indicated on drawings.
- B. Install substantial, highly visible fences at least 3 feet high (at least 1 m high) to prevent inadvertent damage to vegetation to remain:
 - 1. At vegetation removal limits.
 - 2. See Section 01 5000 for fence construction requirements.
- C. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
 - 1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
 - 2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches (450 mm).
 - 3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches (450 mm).

Rancho Buena Vista HS Track and Field Replacement	31 1000 - 1	Site Clearing
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- D. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.
- E. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.04 DEBRIS

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	31 1000 - 2	Site Clearing
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**SECTION 31 2200
GRADING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of topsoil.
- B. Rough grading the site for site structures.

1.02 RELATED REQUIREMENTS

- A. Section 31 1000 - Site Clearing.
- B. Section 31 2316 - Excavation.
- C. Section 31 2316.13 - Trenching: Trenching and backfilling for utilities.
- D. Section 31 2323 - Fill: Filling and compaction.

1.03 REFERENCES

- A. ASTM D 1556-90 -- Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 1990.
- B. ASTM D 1557-91 -- Test Methods for Laboratory Compaction Characteristics of Soils Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN m/m³)); 1991.
- C. ASTM D 2167-94 -- Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 1994.
- D. ASTM D 2487-93 -- Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System); 1993.
- E. ASTM D 2922-91 -- Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 1991.

1.04 SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with State of California, Public Works Department standards.

1.06 PROJECT CONDITIONS

- A. Protect above- and below-grade utilities that remain.
- B. Protect plants, lawns, and other features to remain as a portion of final landscaping.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from grading equipment and vehicular traffic.

1.07 SITE CONDITIONS

- A. The owner makes no representation as to the existing soil or sub-surface conditions or its suitability for the proposed/intended use. The Contractor shall take all necessary measures required to verify and substantiate the existing site conditions, and incorporate in his bid the required materials, methods and labor required to provide an acceptable finished product based on the provisions and requirements of this section.
- B. Site Utilities:
 - 1. Advise utility companies of excavation activities before starting excavations. Locate and identify underground utilities passing through work area before starting work.
 - 2. If underground utilities are encountered in locations other than indicated, immediately advise utility owners before proceeding. Amend project record documents to show actual locations.
 - 3. Protect existing utilities indicated to remain.
 - 4. Do not interrupt existing utilities without advance notice to and written approval from the owner.

Rancho Buena Vista HS Track and Field Replacement	31 2200 - 1	Grading
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5. Repair or replace any existing utilities that are damaged due to the work of this contract at no cost to the owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Where sufficient approved materials are not available from required excavations on site, obtain and pay for materials from approved sources off site without charge to the owner.
- B. For each soil material proposed for use as fill or backfill, whether obtained on or off site, testing laboratory shall classify soil material, develop Proctor curve, and perform any other tests required.
- C. Obtain approval of the architect / geotechnical engineer for each soil material.
- D. Backfill and Fill Materials: Materials classified as satisfactory.
- E. Satisfactory Fill Material (ASTM D 2487): Clean deposits free of roots, stumps, vegetation, deleterious matter, trash, debris, and unsuitable materials as approved in the field by the project geotechnical consultant and classified as follows:
 1. GW (well-graded gravel).
 2. GP (poorly graded gravel).
 3. GM (silty gravel).
 4. SW (well-graded sand).
 5. SM (silty sand).
- F. Unsatisfactory Fill Material (ASTM D 2487):
 1. GC (clayey gravel).
 2. SP (poorly graded sand).
 3. SC (clayey sand).
 4. CL (clean clay).
 5. ML (silt).
 6. OL (organic clay).
 7. OL (organic silt).
 8. CH (fat clay).
 9. MH (elastic silt).
 10. OH (organic clay).
 11. OH (organic silt).
 12. PT (peat).
- G. Subbase Materials: Well-graded, clean, sound, durable particles of crushed stone or crushed gravel, and screenings. Obtain the architect's / soil engineer's approval of source, quality, and gradation.

PART 3 EXECUTION

3.01 PROJECT GEOTECHNICAL INVESTIGATION

- A. Update Geotechnical Evaluation Vista High School Classroom Buildings, 1 Panther Way, Vista, California. Dated December 23, 2020, Project Number 107982041, by Nonyo and Moore, 5710 Ruffin Road, San Diego, CA 92123; 858-576-1000.
- B. Copies of this investigation should be reviewed by the Contractor, and are available upon request.
- C. The Geotechnical Evaluation shall be for informational purposes only and any information obtained from such report as to subsurface soil conditions or to elevations of underlying rock is approximate only, and is not guaranteed, and does not form a part of the Contract.
- D. All recommendations as provided in the Geotechnical Evaluation shall be adhered to and form the minimum requirements for the execution of the work.

3.02 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

Rancho Buena Vista HS Track and Field Replacement	31 2200 - 2	Grading
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- B. Verify the absence of standing or ponding water.

3.03 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Protection: Provide markers indicating limits of work and clear identification of items and areas requiring protection.
- D. Provide barricades, temporary fences, warning signs, and warning lights around open excavations as necessary to prevent injury to persons.
- E. The contractor is solely responsible for determining the potential for injury to persons and damage to property. Any indication of temporary fencing delineated on the drawings is a minimum requirement, and does not relieve the contractor of the responsibility of providing adequate protection of the work.
 - 1. Where such potential is present, take appropriate protective measures.
 - 2. Protect persons from injury and protect existing and new improvements from damage caused directly or indirectly by construction operations.
- F. Do not allow excavation subgrades and soil at foundations to be subjected to effects of rain or other sources of excessive moisture. Provide protective covering materials and divert site drainage and run off as necessary. Should prepared, compacted subgrades be damaged by rain or excessive moisture, remove soil materials to the depth required by the Soils Engineer and replace with acceptable materials and recompact in conformance with specified requirements.
- G. Locate, identify, and protect from damage above- and below-grade utilities to remain.
- H. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- I. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
- J. Protect plants, lawns, and other features to remain as a portion of final landscaping.

3.04 EROSION CONTROL

- A. To the maximum extent practicable, prevent erosion or displacement of soils and discharge of soil-bearing water runoff to adjacent properties and waterways.
- B. The Contractor shall implement and maintain such BMP's as re relevant to the work and as specifically required by the plans or special provisions.
- C. The Contractor shall be responsible throughout the duration of the contract for installing, constructing, inspecting, maintaining, removing and disposing of BMP's for wind erosion control, tracking control, erosion and sediment control, non-storm water control, and waste management and pollution control. Unless otherwise directed by the Owner, the Contractor shall be responsible for BMP implementation and maintenance throughout any temporary suspension of the work.

3.05 COMPLIANCE WITH STATE STORM WATER PERMIT FOR CONSTRUCTION

- A. Contractor shall be required to comply with all conditions of the State Water Resources Control Board (State Water Board) National Pollutant Discharge Elimination System General Permit for Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity (the "Permit") for all construction activity which results in the disturbance of in excess of five acres of total land area or which is part of a larger common area development or sale. It shall be the Contractor's responsibility to evaluate cost of compliance with the Storm Water Pollution Prevention Program (SWPPP) in bidding on this contract. Contractor shall comply with all requirements of the State Water Resources Control Board. Contractor shall include all costs of compliance with specified requirements in the contract amount.

Rancho Buena Vista HS Track and Field Replacement	31 2200 - 3	Grading
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- B. Contractor shall be responsible for implementing and complying with the provisions of the Permit and the SWPPP, including the standard provisions, monitoring and reporting requirements as required by Permit. Contractor shall provide copies of all reports and monitoring information to the Owner.
- C. Contractor shall comply with the lawful requirements of any applicable municipality, the County, drainage district, and other local agencies regarding discharges of storm water to separate storm drain system or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs.
- D. Failure to comply with the Permit is in violation of federal and state law. Contractor hereby agrees to indemnify and hold harmless the Owner, its officers, agents, and employees from and against any and all claims, demands, losses or liabilities of any kind or nature which Owner, its officers, agents, and employees may sustain or incur for noncompliance with Permit arising out of or in connection with the project, except for liability resulting from the negligence or wilful misconduct of Owner, its officers, agents or employees. Owner may seek damages from Contractor for delay in completing the contract in accordance with Article 6 of the General Conditions, caused by the Contractor's failure to comply with Permit.

3.06 PROTECTION OF TREES

- A. Provide temporary guards to protect trees and vegetation to remain. Place guards so as to prevent all forms of vehicular traffic or parking within drip lines.
 - 1. Do not allow excess foot traffic within drip lines.
 - 2. Do not stockpile construction materials, soil, or aggregates within drip lines.
 - 3. Water trees and other vegetation to remain within limits of the area of construction activities as required to maintain their health during course of construction operations.
- B. Engage a qualified arborist to remove branches or roots to the extent required by this specification or shown on the drawings.
- C. Excavate within drip line of trees only where indicated.
- D. Where underground utilities must pass within drip line, hand-dig tunnels to avoid cutting main lateral roots and taproots. Minor roots may be cut only when necessary.
 - 1. Where root system is damaged or cut back, prune branches to maintain root/branch balance.
- E. Immediately protect exposed roots until re-establishment in backfill. Cover with approved mulching material and keep continuously moist.
- F. Where cutting is required, cut branches and roots using properly sharpened tools and without breaking members.
- G. Promptly repair any damaged trees to prevent death or loss of vigor.
 - 1. Where the contractor's operations result in dead or severely damaged trees, remove trees and provide new trees of similar size, except provide 6 inch-caliper trees to replace existing trees over 6 inches caliper.
 - a. Species as selected by the architect.

3.07 DEWATERING

- A. Do not allow surface or ground water to flow into or accumulate in excavations.
- B. Do not allow water to flow in an uncontrolled fashion across the project site or to erode slopes or to undermine foundations. Do not allow water to be diverted onto adjacent properties. Arrange excavation operations so as to provide continual and effective drainage of excavations.
- C. Provide and maintain temporary diversion ditches, dikes, and grading as necessary; do not use trench excavations for this purpose. When required by surface or subsurface water conditions, provide sumps, wellpoints, French drains, pumps, and other control measures necessary to keep excavations free of water. When existence of ground water near or above final excavation level is indicated or suspected, provide control measures prior to excavating to lower water level and maintain water level continuously below working level.

Rancho Buena Vista HS Track and Field Replacement	31 2200 - 4	Grading
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- D. The plans shall identify the location, type, and size of dewatering devices and related equipment, as well as the size and types of materials composing the collection system, the size and type of equipment to be used to retain and, if required, treat accumulated water and the proposed disposal locations. If the proposed disposal location is a sanitary sewer, the Contractor shall submit to the Owner written evidence of permission from the owner of the system. If the proposed location is a storm drain system or receiving body of water, the Contractor shall submit written evidence of permission from the owner of the storm drain system and original signed permits from jurisdictional regulatory agencies or written evidence that such permits are not required.
- E. Payments for all costs involved for dewatering shall be paid for as a lump sum. If the schedule of values contains no line item for dewatering costs, all such work, permits, and submittals shall be included in the relevant items or work and there shall be no additional costs to the Owner.

3.08 GEOTECHNICAL RECOMMENDATIONS

- A. Site Preparation: Site preparation shall begin with the removal of vegetation and other deleterious debris from the project area. Clearing and grubbing should extend outside of the proposed excavation and fill areas when reasonable. The debris and unsuitable material generated during clearing and grubbing shall be removed from the project area and disposed of at a legal dumpsite away from the project area, unless directed otherwise by the District Representative.
- B. Compacted Fill:
 - 1. Prior to placement of compacted fill, the contractor shall request an evaluation of the exposed ground surface by the geotechnical engineer. It is the contractor's responsibility to notify the geotechnical engineer when project areas are ready for observation, and to provide reasonable time for that review.
 - 2. Compacted fill should be placed in horizontal lifts of approximately 8 inches in loose thickness. Prior to compaction, each lift shall be moisture conditioned to near optimum, mixed, and then compacted by mechanical methods to 95 percent of its Proctor density as evaluated by ASTM D 1557.
 - 3. Only existing on-site material that is classified as competent and suitable may be used for compacted fill, provided they meet all the requirements of this section and are moisture conditioned (i.e., dried if above optimum moisture levels) prior to use.

3.09 EXCAVATIONS

- A. General: Excavation includes the removal of any and all materials necessary to achieve the required subgrade elevations and includes any required over-excavation necessary to achieve the required sub-grade compaction, and the reuse or disposal of such materials.
- B. Unnecessary Excavation: The expense of excavation of materials outside of limits indicated or ordered in writing by the architect and the correction thereof to the satisfaction of the architect shall be borne by the contractor.
 - 1. Unnecessary excavation under footings: Either deepen footings to bear on actual subgrade elevation without changing top elevations or place concrete fill up to required elevation, as required by the architect.
 - 2. Unnecessary excavation other than under footings: Either place compacted fill or otherwise correct conditions, as required by the Soils Engineer.
- C. Approval of Bottom of Over-Excavation: Notify the Soils Engineer when required elevations have been reached as indicated on the Geotechnical Evaluation. Prepare and process the bottom of over-excavations as required to provide the required compaction indicated.
 - 1. When required by the Soils Engineer due to the presence of unsatisfactory materials or other factors, perform additional excavation and replace with approved compacted fill material or re-work existing soils in accordance with the Soils Engineer's instructions. Refer to the project soils report for the anticipated conditions and recommended mitigation necessary.
 - 2. Payment for unforeseen additional work will be made in accordance with provisions for changes in the work. No payment will be made for correction of removals / over-excavations improperly protected against damage from accumulation of water, or for

Rancho Buena Vista HS Track and Field Replacement	31 2200 - 5	Grading
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correction of otherwise defective subgrades including the presence of excessive moisture levels and unacceptable soils.

- D. Excavation for Structures:
 - 1. Excavate beyond footings and foundations so as to allow proper construction and inspection of concrete formwork and other materials. Excavate to the required elevation.
 - a. Tolerance: Plus or minus 0.10 foot.
- E. Excavation for Footings and Foundations:
 - 1. Delay excavation to final grade and final compaction until just before concrete will be placed.
 - 2. Remove any loose or sloughed material and adjust excavations to conform to required lines, grades, and tolerances and to form a suitable bearing surface. Do not disturb bottom of completed excavations.

3.10 STORAGE

- A. Stockpile materials to be used for filling and backfilling, including excavated materials classified as satisfactory soil materials, at locations indicated or as directed. Stockpile in a manner to freely drain surface water; cover if necessary to prevent wind-blown dust.
 - 1. Store soil materials without intermixing. Protect from contamination with other soils or debris.
 - 2. Do not stockpile materials inside of drip line of trees to remain.

3.11 FILLING AND BACKFILLING

- A. Preparation: Backfill excavations as soon as practicable. Complete the following operations before backfilling:
 - 1. Inspection and acceptance of below-grade construction.
 - 2. Inspection, testing, and approval of underground utilities.
 - 3. Surveying of underground utilities for record documents.
 - 4. Concrete formwork removal.
 - 5. Removal of loose material, muck, debris, and trash from excavation.
 - 6. Installation of temporary or permanent horizontal bracing for structures to receive backfill.
- B. Installation: Place approved soil materials in 6 to 8 inch maximum layers to required elevations. Compact to minimum 95% of the corresponding maximum density (ASTM D 1557).
 - 1. Do not place material on muddy or uncompacted surfaces.
- C. Installation: Place fill materials to required elevations in lifts of required depth. Provide fill materials beneath each area as indicated.
 - 1. Planted areas: Satisfactory soil materials, Part 2 - Products.
 - 2. Paved areas: Subbase material.
 - 3. Exterior steps/ramps: Subbase material.
 - 4. Building slabs: Capillary water barrier material.
 - 5. Piping/conduit: Subbase material where indicated; otherwise use satisfactory soil materials.

3.12 PAVEMENT SUBBASE / SUBGRADE PLACEMENT

- A. Place lifts such that compaction true to grade and level is accomplished with a minimum of surface disturbance and segregation or degradation of materials. Maintain moisture content within prescribed limits during placing and compacting.
- B. When the total thickness of subbase is less than the maximum lift thickness permitted, place material in a single lift. When the total thickness of subbase is greater than the maximum lift thickness permitted, place materials in two or more lifts of uniform thickness with no lift less than 3 inches or greater than 8 inches in thickness.
- C. Cut any over build to grade. Should top elevation be lower than allowable tolerances, scarify to a depth of 6 inches, add new material, and recompact to bring to grade within required tolerances.

Rancho Buena Vista HS Track and Field Replacement	31 2200 - 6	Grading
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3.13 BUILDING AREAS

- A. Place fill or backfill lifts such that compaction true to grade and level is accomplished with a minimum of surface disturbance and segregation or degradation of materials as specified in the project preliminary soils report. Maintain grade control and cross section by means of line and grade stakes. Maintain moisture content within prescribed limits during placing and compacting.
- B. When the total thickness of materials to be placed is less than the maximum lift thickness permitted, place material in a single lift. When the total thickness of materials to be placed is greater than the maximum lift thickness permitted, place materials in two or more lifts of uniform thickness with no lift less than 3 inches or greater than 8 inches in thickness.

3.14 COMPACTION

- A. Place materials used in backfilling and filling in layers not exceeding loose depths as follows:
 - 1. Heavy equipment compaction: 8 inches.
 - 2. Hand-operated tampers: 4 inches.
- B. Place material simultaneously on opposite sides of walls, small structures, utility lines, etc. to avoid displacement or overstressing.
- C. In-Place Density Requirements: Compact soil to not less than the values given below, expressed as a percentage of maximum density at optimum moisture content.
 - 1. Unpaved areas: Top 12 inches of bottom of over-excavation and subsequent lifts:
 - a. 90 percent.
 - 2. Paved areas: Top 12 inches of bottom of over-excavations and subsequent lifts, except the upper one foot from rough finish grade:
 - a. 95 percent.
 - b. 95 percent within upper one foot below base coarse.
 - 3. Exterior steps and ramps: Top 12 inches of bottom of over-excavation and subsequent lifts:
 - a. 95 percent.
 - 4. Building areas and structures: Top 12 inches of bottom of over-excavation and subsequent lifts:
 - a. 95 percent.
 - 5. Utility trenches: Compact backfill and fill materials to in-place density specified for applicable area of trench, but in no case less than 95 percent.
- D. Moisture Control: During compaction, control moisture of bottom of over-excavations and subsequent lifts to within tolerances from optimum moisture content as recommended by testing laboratory. Wet surface with water when additional moisture is required. Aerate soil to aid in drying or replace soil when excessive moisture is present.

3.15 ROUGH GRADING

- A. General: Smooth grade to a uniform surface that complies with compaction requirements and required lines, grades, and cross sections and is free from irregular surface changes.
- B. Provide smooth transition between existing adjacent grades and changed grades. Cut out soft spots, fill low spots, and cut down high spots to conform to required surfaces tolerances.
- C. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- D. Do not remove topsoil when wet.
- E. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- F. Do not remove wet subsoil , unless it is subsequently processed to obtain optimum moisture content.
- G. When excavating through roots, perform work by hand and cut roots with sharp axe.
- H. See Section 31 2323 for filling procedures.
- I. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

Rancho Buena Vista HS Track and Field Replacement	31 2200 - 7	Grading
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- J. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.
- K. Slope grades to direct water away from structures and to prevent ponding. Finish subgrade to required elevations within the following tolerance:
 - 1. Unpaved areas: Plus or minus 0.10 foot.
 - 2. Paved areas: Plus or minus 0.05 foot.
 - 3. Exterior steps and ramps: Plus or minus 0.05 foot.
 - 4. Inside building lines: 1/2 inch in 10 horizontal feet.

3.16 PROOFROLLING

- A. After completion of required compaction and immediately prior to proceeding with subsequent construction, proof roll in the presence of testing laboratory representative.
- B. Areas to Receive:
 - 1. Pavement.
 - 2. Building slabs on grade.

3.17 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) (30 mm) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch) (13 mm).

3.18 REPAIR AND RESTORATION

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
- B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.
- C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.19 FIELD QUALITY CONTROL

- A. Testing Laboratory Services: Provide timely notice to testing laboratory. Do not proceed with construction until testing of each bottom of over excavation and lift of fill or backfill has been performed and required inspections and approvals have been obtained.
- B. Maximum Density at Optimum Moisture Content: Determine in accordance with ASTM D 1557-91.
- C. In-Place Density Tests: ASTM D 1557-90 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2922 (nuclear method), as applicable.
- D. If testing service reports indicate that subgrade or fills are below specified density, scarify or remove and replace to the required depth, recompact, and retest at no cost to the owner.

3.20 FIELD QUALITY CONTROL

- A. See Section 31 2323 for compaction density testing.

3.21 MAINTENANCE

- A. Completed Areas: Protect from damage by pedestrian or vehicular traffic, freezing, erosion, and contamination with foreign materials.
 - 1. Repair and re-establish grades to specified tolerances in settled, eroded, or rutted areas.
- B. Damaged Areas: Where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction and whether due to subsequent construction operations or weather conditions, restore materials to required conditions: Scarify or remove and replace to the required depth, return to optimum moisture content, and compact materials to the required density before continuing construction.
- C. Correction: Should settling occur within the project correction period, remove finished surfacing, add additional approved material, compact material, and reconstruct surfacing.

Rancho Buena Vista HS Track and Field Replacement	31 2200 - 8	Grading
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Construct surfacing to match and blend in with adjacent surfacing as nearly as practicable.

3.22 CLEANING

- A. Spread any excess satisfactory topsoil in locations on site as directed by the architect and District. Properly dispose of unsatisfactory topsoil off site.
- B. Spread any excess satisfactory soil in location on site as directed by the architect and District.
- C. Remove any unsatisfactory soil, trash, debris, and other materials not required for use on the project and legally dispose of it off the owner's property.
- D. On-site burning is not permitted.
- E. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	31 2200 - 9	Grading
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**SECTION 31 22 16
FIELD AND TRACK SUBGRADE ESTABLISHMENT**

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, material and equipment for the earthwork and the subgrade establishment for the synthetic turf, rubberized track and field event surfaces. Work includes, but is not limited to the following:
 - 1. Layout and engineering;
 - 2. Surface water and erosion control;
 - 3. Management of the construction sequencing and scheduling relative to soil moisture content and the use of onsite material as fill;
 - 4. Excavation, filling, back filling and compacting;
 - 5. Subgrade scarification, drying, and re-compaction as required;
 - 6. Compaction, compaction testing, and establishment of subgrade;

1.02 EXISTING SITE CONDITIONS

- A. Refer to drawings for topographical and existing condition information and the geotechnical report for site soil conditions.
- B. Carefully maintain benchmarks, monuments and other reference points. If disturbed or destroyed, replace as directed. It is the responsibility of the Contractor to familiarize themselves with all records of existing utilities in area of site work.
- C. The Contractor shall contact the appropriate utility agencies for identification of underground utility location.

1.03 TEMPORARY EROSION AND SILTATION CONTROL

- A. All work shall conform to the erosion and sedimentation control requirements of the local jurisdiction including installation of siltation control such as filter fabric fences, check dams, sedimentation basins, etc. and approved SWPPP plan.

1.04 EXISTING UTILITIES

- A. The Contractor shall coordinate all existing utilities prior to proceeding with demolition and earthwork activity. Protect any active pipes encountered.

1.05 DUST CONTROL

- A. Protect persons and property from damage and discomfort caused by dust. Water as necessary to quell dust.

1.06 ROADWAY PROTECTION

- A. Provide wheel-cleaning stations to clean wheels and undercarriage of trucks before leaving site, as necessary to prevent dirt from being carried onto public streets. If streets are fouled, they must be cleaned immediately in conformance with the requirements of the local jurisdiction as applicable. This requirement applies to all vehicle movements for the entire period of construction.

1.07 TRAFFIC REGULATION

- A. Conduct operations in such a manner to avoid unnecessary interference to existing traffic. Minimize heavy vehicle traffic to and from site during peak traffic hours. Do not park vehicles in traffic lanes. Provide flagmen as required. Conform to traffic control requirements of the local

Vista HS Track and Field Replacement	31 2216 - 1	Field and Track Subgrade Establishment
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jurisdiction.

- B. Contractor shall be responsible for all traffic control and emergency call outs resulting from Contractor operations.
- C. Maintain fire lanes, roadways and alleys to existing buildings continuously, as required by the fire department having jurisdiction.
- D. Existing walkways and roadways leading past the construction shall remain clear and safe at all times. Provide barriers, flashing lights, walkways, guardrails and night lighting as required for safety and control.

1.08 RELATED WORK IN OTHER SECTIONS

- A. 02 10 00 Site Preparation

1.09 QUALIFICATIONS

- A. The Contractor or subcontractor responsible for field and track base establishment, field subsurface drainage, field washwater and irrigation systems, and field permeable aggregate placement and compaction shall be submitted to the Field Landscape Architect for approval. Specific prequalification requirements are included as follows:
 - 1. Contractor or sub-contractor shall be and has been actively and directly engaged in constructing similar natural or synthetic field projects for a period of five (5) or more years and shall provide proof of four (4) or more sports field base installations completed in the past two (2) years. as used in this section means a project similar in character to the work in which each respective firm or their employee will perform on this project. The "similar project" shall also be equal or greater in scale and complexity than the work for which each firm will be engaged to perform on this project. The "similar" project must be a natural or synthetic turf athletic field and/or a rubberized running track project, consisting of at least 75,000 sf of field surface area and a 400m, 8 lane running track. The Contractor's experience shall include completion of high school, college, or professional level competition fields. The playing field system shall include earthwork, washwater or irrigation systems, drainage and subsurface drainage systems, and base aggregate placement and compaction. Provide a listing of all construction contracts (whether completed or in progress) entered into or performed by the Contractor or subcontractor within the past five years for projects similar in scope, time and complexity to the work called for under this Contract; include the names of the contracts, and the names and contact information of the owners.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 FIELD LAYOUT AND ENGINEERING

- A. The General Contractor shall be responsible for the vertical and horizontal layout of all work and control points required to construct all work in accordance with the drawings and specifications.

3.02 SEQUENCING AND SCHEDULING

- A. All new cut and fill areas shall be seal rolled at the end of each day to minimize moisture penetration.

Vista HS Track and Field Replacement	31 2216 - 2	Field and Track Subgrade Establishment
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3.03 EXCAVATED MATERIALS

- A. Strip surface to be disturbed of existing grass, brush, and any other organic plant material and dispose of off-site.
- B. All excess soil materials excavated to establish the required subgrade elevations shall be removed and disposed of off-site.
- C. All items of concrete, debris, piping, etc., are to be disposed of off-site at Contractor's expense and pre-arranged location. The Contractor shall make efforts to have the concrete and asphalt concrete paving recycled.

3.04 SUBGRADE

- A. All synthetic turf areas are to be compacted to at least 92% of maximum dry density by mechanical means as determined by ASTM D 1557-02. The Contractor shall be responsible for maintaining appropriate soil moisture prior to and during compaction activities, the cost of which is to be included in the contract price.
- B. All rubberized track areas, including concrete paving at perimeter and asphalt paving directly below the rubberized surfacing shall be compacted to at least 95% of maximum dry density by mechanical means as determined by ASTM D 1557-02. The Contractor shall be responsible for maintaining at or above optimum soil moisture prior to and during compaction activities, the cost of which is to be included in the contract price.
- C. All natural turf surface areas are to be compacted to at least 85% but not greater than 90% of maximum dry density by mechanical means as determined by ASTM D 1557-02. The Contractor shall be responsible for maintaining appropriate soil moisture prior to and during compaction activities, the cost of which is to be included in the contract price.
- D. Care must be exercised during grading of the subgrade so as to achieve a uniform, true surface relative to finish grade.
- E. Finish subgrade for the field and track areas shall be established to within the tolerance of +0.00' or - 0.10' of the design subgrade elevation for these areas.
- F. Fill must be select material, found on site below the existing field and free of organic matter, clay, concrete and other extraneous material, compactable to a minimum of 95% of the maximum dry density. Fill shall be placed and compacted in lifts of 12" maximum loose depth.
- G. Upon completion of the subgrade establishment and Contractor confirmation for conformance with the tolerance, the Contractor shall notify the Field Landscape Architect and schedule an inspection for approval. The Contractor shall have a laser plane system with slope control available to the Field Landscape Architect for the inspections. The Contractor shall not be authorized to install the subsurface drainage system until the subgrade has been inspected and approved by the Field Landscape Architect.
- H. All other areas shall be compacted to a maximum of 90% of the maximum dry density. These areas shall be established to within the tolerance of +0.10' or - 0.10' of the design elevations and grades. All perimeter and swale areas shall be sloped in accordance with the grading plan. Swale grades shall include a constant slope between the designated high point and any catch basin rim elevations. Areas of ponding water in the swales shall not be accepted.

END OF SECTION 31 22 16
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Vista HS Track and Field Replacement	31 2216 - 3	Field and Track Subgrade Establishment
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**SECTION 31 2316
EXCAVATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Excavating for building volume below grade, footings, pile caps, slabs-on-grade, paving, site structures, and utilities within the building.
- B. Trenching for utilities outside the building to utility main connections.
- C. Temporary excavation support and protection systems.

1.02 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution and Closeout Requirements: General requirements for dewatering of excavations and water control.
- B. Section 31 2200 - Grading: Grading.
- C. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Temporary Support and Excavation Protection Plan.
- C. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.

1.04 QUALITY ASSURANCE

- A. Temporary Support and Excavation Protection Plan:
 - 1. Indicate sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property.

1.05 PROJECT CONDITIONS

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Protect plants, lawns, rock outcroppings, and other features to remain.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

PART 3 EXECUTION

2.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the work are as indicated.
- B. Determine the prevailing groundwater level prior to excavation. If the proposed excavation extends less than 1 foot (305 mm) into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by Architect. If the proposed excavation extends more than 1 foot (305 mm) into the prevailing groundwater, control groundwater intrusion with a comprehensive dewatering procedures, or as directed by Geotechnical Engineer.

2.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for additional requirements.
- C. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

2.03 EXCAVATING

- A. Excavate to accommodate new structures and construction operations.

Rancho Buena Vista HS Track and Field Replacement	31 2316 - 1	Excavation
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- B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Preparation for Piling Work: Excavate to working elevations. Coordinate special requirements for piling.
- D. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.
- E. Prior to excavating any trenches 5 feet or more in depth, the Contractor shall submit a detailed shoring plan showing the design of the shoring, bracing, sloping, or other provisions used for the worker's protection. If the shoring plan varies from the shoring system standards, the shoring plan shall be prepared by a licensed structural or civil engineer.
 - 1. If the Contractor fails to submit a shoring plan or fails to comply with the accepted shoring plan, the Contractor shall suspend work at the affected area. Such suspension of work shall not be the basis of a claim for extra work and the Contractor shall not receive additional compensation or contract time.
- F. Do not interfere with 45 degree bearing splay of foundations.
- G. Cut utility trenches wide enough to allow inspection of installed utilities.
- H. Hand trim excavations. Remove loose matter.
- I. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.
- J. Provide temporary means and methods, as required, to remove all water from excavations until directed by the Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- K. Remove excavated material that is unsuitable for re-use from site.
- L. Remove excess excavated material from site.

2.04 SUBGRADE PREPARATION

- A. See Section 31 2323 for subgrade preparation at general excavations.
- B. See Section 31 2316.13 for subgrade preparation at utility trenches.

2.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

2.06 PROTECTION

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	31 2316 - 2	Excavation
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**SECTION 31 2316.13
TRENCHING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Backfilling and compacting for utilities outside the building .

1.02 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop 2022, with Errata .
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) 2012 (Reapproved 2021).
- C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)) 2012 (Reapproved 2021).
- E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2015.
- F. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

1.03 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: 30 inches (____ mm) below finish grade elevations indicated on drawings to the top of the utility, unless otherwise indicated.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- C. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. Verify that survey bench marks and intended elevations for the Work are as indicated.
- C. Protect plants, lawns, rock outcroppings, and other features to remain.
- D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. General Fill - Fill Type ____: Conforming to State of California Public Works Department standard.
- B. Granular Fill - Fill Type ____: Coarse aggregate, conforming to State of California Public Works Department standard.
- C. Sand: Conforming to State of California Public Works Department standard.

2.02 PLASTIC WARNING TAPE

- A. Acid and alkali-resistant polyethylene film specifically manufactured for marking and identifying underground utilities.
 - 1. Minimum width, 6 inches; minimum thickness, 4 mils.
 - 2. Metallic core encased in protective jacket resistant to corrosion and detectable by metal detector when tape is buried 3-feet deep.

Rancho Buena Vista HS Track and Field Replacement	31 2316.13 - 1	Trenching
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- B. Continuous printed inscription shall describe utility. Tape color:
 1. Electric: Red.
 2. Gas: Yellow.
 3. Telephone: Orange.
 4. CATV: Orange.
 5. Water System: Blue.
 6. Sewer: Green.

2.03 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for additional requirements.
- C. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.03 TRENCHING

- A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
- G. Remove excavated material that is unsuitable for re-use from site.
- H. Remove excess excavated material from site.
- I. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- J. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot (305 mm) into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

3.04 PREPARATION FOR UTILITY PLACEMENT

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

Rancho Buena Vista HS Track and Field Replacement	31 2316.13 - 2	Trenching
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3.05 BACKFILLING

- A. Backfill and compact in 8" maximum lifts to contours and elevations indicated using specified materials.
- B. Fill up to subgrade elevations unless otherwise indicated.
- C. Employ a placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Correct areas that are over-excavated.
 - 1. Thrust bearing surfaces: Fill with concrete.
 - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.
- G. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Under paving and similar construction: 95 percent of maximum dry density.

3.06 BEDDING AND FILL AT SPECIFIC LOCATIONS

- A. Utility Piping, Conduits, and Duct Bank:
 - 1. Bedding: Use Fill Type sand gravel crushed aggregate or native free draining granular material having sand equivalent of not less than 50 and expansion coefficient of not more than .5 of 1%.
 - 2. Cover with general fill.
 - 3. Compact in maximum 8 inch (200 mm) lifts to 95 percent of maximum dry density.

3.07 TOLERANCES

- A. Top Surface of General Backfilling: Plus or minus 1 inch (25 mm) from required elevations.
- B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch (25 mm) from required elevations.

3.08 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

3.09 CLEANING

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	31 2316.13 - 3	Trenching
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**SECTION 31 2323
FILL**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Filling, backfilling, and compacting for building volume below grade, footings, pile caps, slabs-on-grade, paving, and utilities within the building.
- B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Removal and handling of soil to be re-used.
- B. Section 31 2200 - Grading: Site grading.
- C. Section 31 2316 - Excavation: Removal and handling of soil to be re-used.
- D. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.03 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop 2022, with Errata .
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) 2012 (Reapproved 2021).
- C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)) 2012 (Reapproved 2021).
- E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2015.
- F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) 2017, with Editorial Revision (2020).
- G. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

1.04 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: As indicated on drawings and/or as determined by paving or slab sections.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.
- C. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need as indicated in Contractor's approved logistics plan.
- B. When fill materials need to be stored on site, locate stockpiles where indicated.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.
- C. Verify that survey bench marks and intended elevations for the Work are as indicated.

Rancho Buena Vista HS Track and Field Replacement	31 2323 - 1	Fill
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PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. General Fill: Subsoil excavated on-site.
 - 1. Graded.
 - 2. Clean deposits free of roots, stumps, vegetation, deleterious matter, trash, debris, and unsuitable materials as approved in the field by the project geotechnical consultant.
- B. Concrete for Fill: Lean concrete.
- C. Granular Fill - Fill Type ____: Coarse aggregate, conforming to State of California Public Works Department standard.
- D. Topsoil - Fill Type ____: Topsoil excavated on-site, or imported.
 - 1. Graded.
 - 2. Free of roots, rocks larger than 1 inch (____ mm), subsoil, debris, large weeds and foreign matter.
- E. Bedding Material: Bedding material shall be sand, gravel, crushed aggregate or approved native material. Bedding material shall have a sand equivalent of not less than 30 or have a coefficient of permeability greater than 0.001 centimeters per second. Bedding material shall be sized within the following range:
 - 1. 3/4" Sieve: 100 percent passing.
 - 2. No. 4 Sieve: 35 to 65 percent passing.
 - 3. No. 200 Sieve: 0 to 10 percent passing.

2.02 ACCESSORIES

2.03 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for additional requirements.
- C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- D. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

- A. Scarify and proof roll subgrade surface to a depth of 6 inches (150 mm) to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

- A. Fill to contours and elevations indicated using specified materials.
- B. Fill up to subgrade elevations unless otherwise indicated.
- C. Employ a placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.

Rancho Buena Vista HS Track and Field Replacement	31 2323 - 2	Fill
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- F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches (150 mm) compacted depth.
- G. Slope grade away from building minimum 2 inches in 10 feet (50 mm in 3 m), unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Correct areas that are over-excavated.
 - 1. Load-bearing foundation surfaces: Fill with concrete.
 - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 90 percent of maximum dry density.
- I. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Under paving, slabs-on-grade, and similar construction: 90 percent of maximum dry density.
 - 2. At other locations: 90 percent of maximum dry density.
- J. Reshape and re-compact fills subjected to vehicular traffic.
- K. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS

- A. At Foundation Walls and Footings:
 - 1. Use general fill.
 - 2. Fill up to subgrade elevation.
 - 3. Compact each lift to 95 percent of maximum dry density.
 - 4. Do not backfill against unsupported foundation walls.
- B. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches:
 - 1. Bedding: Use sand or granular fill.
 - 2. Cover with general fill.
 - 3. Compact in maximum 8 inch (200 mm) lifts to 95 percent of maximum dry density.

3.05 TOLERANCES

- A. Top Surface of General Filling: Plus or minus 1 inch (25 mm) from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1/2 inch (12.5 mm) from required elevations.

3.06 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D 1557 ("modified Proctor"), ASTM D 698 ("standard Proctor"), AASHTO T 180, ASTM D 1557 ("modified Proctor"), ASTM D 698 ("standard Proctor"), AASHTO T 180, ASTM D 1557 ("modified Proctor"), or ASTM D 698 ("standard Proctor").
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

3.07 CLEANING

- A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	31 2323 - 3	Fill
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**SECTION 32 1123
AGGREGATE BASE COURSES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aggregate base course.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for base course.
- B. Section 31 2316.13 - Trenching: Compacted fill over utility trenches under base course.
- C. Section 31 2323 - Fill: Compacted fill under base course.
- D. Section 32 1216 - Asphalt Paving: Finish and binder asphalt courses.
- E. Section 32 1313 - Concrete Paving: Finish concrete surface course.

1.03 REFERENCE STANDARDS

- A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses 2017 (Reapproved 2021).
- B. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop 2022, with Errata .
- C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) 2012 (Reapproved 2021).
- D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).
- E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)) 2012 (Reapproved 2021).
- F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2015.
- G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) 2017, with Editorial Revision (2020).
- H. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) 2023.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Materials Sources: Submit name of imported materials source.
- C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- D. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. Aggregate Storage, General:
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.
- C. Verify that survey bench marks and intended elevations for the Work are as indicated.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Coarse Aggregate Type Class II Road Base: Coarse aggregate, conforming to State of California Public Works Department standard.

Rancho Buena Vista HS Track and Field Replacement	32 1123 - 1	Aggregate Base Courses
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- B. Fine Aggregate: Sand; conforming to State of California Public Works Department standard.
- C. Herbicide: Dupont Oust XP or equal. Herbicide must conform to California EPA requirements.

2.02 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of aggregate materials.
- B. Where aggregate materials are specified using ASTM D2487 classification, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

- A. Under Bituminous Concrete Paving:
 - 1. Place coarse aggregate to a total compacted thickness as indicated on drawings.
 - 2. Compact to 95 percent of maximum dry density.
- B. Place aggregate in maximum 4 inch (100 mm) layers and roller compact to specified density.
- C. Level and contour surfaces to elevations and gradients indicated.
- D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.
- F. Apply herbicide to finished surface.

3.04 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch (6.4 mm) measured with 10 foot (3 m) straight edge.
- B. Scheduled Compacted Thickness: Within 1/4 inch (6.4 mm).

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
- C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D698 ("standard Proctor"), or ASTM D1557 ("modified Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

3.06 CLEANING

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	32 1123 - 2	Aggregate Base Courses
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**SECTION 321216.36
TRACK ASPHALT PAVING**

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Include all labor, material, transportation and services to complete repairs to existing and installation of the aggregate base and asphalt paving as shown on the drawings for the track and field event areas including running track areas, long/triple jump runway areas in the north perimeter, pole vault areas in the east "D" zone and high jump areas of the west "D" zone including:
 - 1. Final subgrade establishment
 - 2. Base course aggregate
 - 3. Track and Field Event asphalt concrete paving (2 lifts)

1.02 STANDARD SPECIFICATIONS

- A. All sections of the standard specifications applicable to any and all parts of this project shall govern, except as specifically modified in these contract documents.
 - 1. The Green Book Standard Specifications for Municipal Public Works Construction, California State Chapter (latest edition).
 - 2. American Public Works Associations, Standard Specifications for Municipal Public Works Construction, (APWA), latest edition.
 - 3. American Society for Testing and Materials (ASTM).
 - 4. American Association of State Highway and Transportation Officials, (AASHTO).

1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

- 1. Section 03 30 53 Miscellaneous Cast-In-Place Concrete
- 2. Section 31 22 16 Field and Track Subgrade Establishment
- 3. Section 32 18 23.10 Rubberized Track Surfacing

1.04 QUALIFICATIONS

- A. Asphalt Paving Contractor shall have completed the successful placement of asphalt paving on a minimum of 5 full size running tracks within the previous 2 years, and submit documentation of projects at the time of submittal.

1.05 SUBMITTALS

- A. Submit to the Field Landscape Architect for approval:
 - 1. Class II aggregate sieve analysis
 - 2. Equipment and procedures to be utilized for the asphalt installation.
 - 3. Asphalt mix design or composition.
 - 4. Previous experience of the proposed asphalt installer with running track asphalt paving installations, including name of project, year completed, general contractor, owner contact, and contact phone numbers for each named individual.

PART 2 MATERIALS

2.01 ASPHALT CONCRETE PAVING

- A. All machine-placed and hand-placed asphalt concrete pavement shall be either "Greenbook C2 Dense Medium or D2- Dense Fine".

Rancho Buena Vista HS Track and Field Replacement	32 1216.36 - 1	Track Asphalt Paving
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- B. Thickness of running track and field event area pavement to be minimum 3-1/2" compacted depth, placed on a minimum depth of 8" aggregate base installed over a compacted subgrade. The track asphaltic concrete pavement shall be installed in 2 lifts. The first lift shall be a minimum 2" compacted depth of C2 Dense Medium asphaltic pavement and the second lift shall be a minimum 1-1/2" compacted depth of D2 Dense Fine asphaltic pavement
- C. Weather limitations: Construct asphalt paving only when atmospheric temperature is above 40 degrees F., when underlying base is dry and weather is not rainy.
- D. Grade control: Establish and maintain the required lines and grades and cross-slope.

2.02 AGGREGATE BASE MATERIAL

- A. For asphalt concrete base, maximum size 3/4" uniformly graded from coarse to fine. Use Class II crushed rock surfacing.

2.03 ASPHALTIC CONCRETE

- A. Use asphalt mix formula of asphalt concrete producer in accordance with "Greenbook C2 Dense Medium and D2-Dense Fine".

PART 3 EXECUTION

3.01 SUBGRADE

- A. Establish subgrade and thoroughly compact to minimum 95% of maximum dry density.

3.02 AGGREGATE BASE

- A. Place aggregate base only to existing compacted surface. Apply aggregate base and compact to a uniformly smooth hard surface with a minimum thickness of 6" or greater as required to conform to lines, grades and cross sections as shown or directed. Compact to a minimum of 95% of maximum dry density.

3.03 ASPHALTIC PAVING

- A. The grade tolerance of the compacted first lift of asphalt shall be +1/4" and -0". The asphalt shall not deviate from the true surface in excess of 1/4" on a 10' straight edge in all directions.
- B. The grade tolerance of the compacted second lift of asphalt shall be +1/8" and -0". The asphalt shall not deviate from the true surface in excess of 1/8" on a 10' straight edge in all directions.
- C. For the field event surfaced areas, the surface elevation of the final lift of paving, in the compacted condition, shall not deviate more than 1/8" from specified elevations. Trueness measurement to be taken from 10' long straight edge placed in all directions.
- D. All edges to be straight or a continuous smooth line retained by concrete curb. No reverse slopes or birdbaths will be allowed. The complete surface of the asphalt shall be of uniform texture, smooth uniform as to grade, and free from defects of all kinds. Verify elevation requirements prior to commencing paving.

3.04 HAND PLACING

- A. Spread, tamp, and finish mixture using hand tools in areas where machine spreading is not practical.
- B. Place mixture at rate that will ensure handling and compacting before mixture temperature drops below 230 degrees F.
- C. Edges must have a straight or continuous smooth line.

3.05 QUALITY CONTROL

Rancho Buena Vista HS Track and Field Replacement	32 1216.36 - 2	Track Asphalt Paving
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- A. Prior to acceptance, all pavement shall be exposed to a "flood" test. When deviations in excess of the tolerances noted above or obvious depressions (birdbaths) are found, the pavement surface shall be corrected by the addition of asphalt concrete mixture of an appropriate class to low places or the removal of material from high places by methods satisfactory to the Field Landscape Architect or by removal and replacement of the asphaltic concrete.
- B. Corrections of defects shall be carried out until there are no deviations anywhere greater than the allowable tolerances. All areas in which the surface of the completed pavement deviates more than twice the allowable tolerances described above shall be removed and replaced to the Field Landscape Architect's satisfaction.
- C. When any corrections are made, the entire area shall have a seal coat applied except for those areas where a rubberized surfacing shall be applied, so as to produce a new, non-repaired appearing surface. All costs involved in making the corrections of the defects described above shall be borne by the Contractor, and no additional compensation shall be made for this work.

3.06 CLEANING

- A. After completion of paving operations, clean surfaces of excess or spilled asphaltic materials.

3.07 PROTECTION

- A. Protect asphaltic paving from all damage of every kind. Do not permit vehicular traffic on asphaltic paving until it has cooled and hardened and in no case sooner than six hours after placing.
- B. Provide barricades and warning devices as required. Protect soil and other site features where asphalt is being laid.

END OF SECTION 32 12 16.36
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Rancho Buena Vista HS Track and Field Replacement	32 1216.36 - 3	Track Asphalt Paving
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**SECTION 32 1216
ASPHALT PAVING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aggregate base course.
- B. Asphalt Concrete Paving.
- C. Herbicide Treatment.
- D. Pavement-marking paint.
- E. Redwood Headers.
- F. Surface sealer.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for paving and base.
- B. Section 31 2323 - Fill: Compacted subgrade for paving.
- C. Section 32 1123 - Aggregate Base Courses: Aggregate base course.

1.03 REFERENCE STANDARDS

- A. AI MS-2 - Asphalt Mix Design Methods 2015.
- B. AI MS-19 - Basic Asphalt Emulsion Manual 2008.
- C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction 2009a.
- D. Standard Specifications for Public Works Construction ("Greenbook") - 1997 Edition.
- E. Standard Specifications, State of California, Department of Transportation (Caltrans).

1.04 SUBMITTALS

- A. Mix Design:
 - 1. Submit for approval each job-mix formula proposed for work of this section.
- B. Approved Mix:
 - 1. Furnish licensed weighmaster certificates with each load of asphalt concrete delivered to project. Yield of asphalt concrete material shall be twenty four (24) pounds per square foot of paving area based on two inch thickness after rolling. A five (5) percent tolerance will be allowed between total calculated weight and actual weight incorporated in the work.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with State of California Public Work's standard.
 - 1. Provide aggregate base asphalt concrete and installation complying with Standard Specifications for Public Works Construction (PWC Specifications), current edition, and the Regional Supplement Amendments to the Standard Specifications for Public Works Construction, current edition, and as herein specified.
- B. Mixing Plant: Conform to State of California Public Work's standard.
- C. Obtain materials from same source throughout.
- D. Installer's Qualifications: Firm specializing in paving installation, with not less than 5 years of experience in installation of paving similar to that required for this project.
- E. Testing and Inspection:
 - 1. The owner will engage an independent testing and inspection agency to perform quality control procedures and to prepare test reports.

1.06 REGULATORY REQUIREMENTS

- A. Conform to applicable code for paving work on public property.

Rancho Buena Vista HS Track and Field Replacement	32 1216 - 1	Asphalt Paving
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1.07 FIELD CONDITIONS

- A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.
- B. Place bitumen mixture when temperature is not more than 15 F degrees (8 C degrees) below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Asphalt Cement: ASTM D 946.
- B. Aggregate for Binder Course: In accordance with State of California Public Work's standards.
- C. Aggregate for Wearing Course: In accordance with State of California Public Work's standards.
- D. Fine Aggregate: In accordance with State of California Public Work's standards.
- E. Mineral Filler: Finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.
- F. Seal Coat:
 - 1. Parking area, driveways, asphalt walks and ramps: Fog seal of slow breaking asphalt emulsion, grade SS-1H per PWC Specifications 203-3.
- G. Herbicide: United States EPA-registered chemical herbicide suitable for application indicated.
 - 1. Manufacturer: Provide products complying with requirements of the contract documents and made by one of the following:
 - a. Ciba-Geigy Corporation.
 - b. DowElanco.
 - c. E. I. du Pont de Nemours and Company, Inc.
- H. Pavement-Marking Paint: Chlorinated rubber-alkyd paint (FS TT-P-115, Type III); factory-mixed, quick-drying, and non-bleeding.
- I. Wood Headers, Stakes, Benders and Splices: "Foundation" grade redwood as graded by Redwood Inspection Service. Minimum 2" thick lumber for headers and stakes and minimum 1" thick boards for splices. Use galvanized nails for fastening.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

- A. Base Course: State of California Public Work's standards.
- B. Binder Course: State of California Public Work's standards.
- C. Wearing Course: State of California Public Work's standards.
- D. Submit proposed mix design of each class of mix for review prior to beginning of work.
- E. Asphalt Concrete:
 - 1. Paving section shall be minimum 3" asphalt paving (rolled thickness) over 9" class two base over 95% compacted subgrade unless noted otherwise on drawings.

2.03 SOURCE QUALITY CONTROL

- A. Test mix design and samples in accordance with AI MS-2.

PART 3 EXECUTION

3.01 GENERAL

- A. Comply with cross sections, elevations, and grades indicated on the drawings.
- B. Prepare and install pavement structures in accordance with practices recommended in the "Asphalt Paving Manual"; Publication MS-8; Asphalt Institute, except to the extent that such practices are superseded by specific requirements of this section.

3.02 EXAMINATION

- A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

Rancho Buena Vista HS Track and Field Replacement	32 1216 - 2	Asphalt Paving
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- C. Notify architect in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.
- D. Commencement of paving work shall constitute acceptance of subbase conditions.

3.03 PREPARATION

- A. General: Immediately before placing asphalt concrete mix, remove all loose or deleterious material from surface over which pavement will be placed. Ensure that subbase is properly prepared to receive paving.
 - 1. Aggregate subbase:
 - a. Sweep loose granular particles from surface of aggregate course. Do not dislodge or disturb in any way the aggregate embedded in compacted surface of subbase course.
 - b. Proof roll prepared sub-base surface to check for unstable areas and areas requiring additional compaction. Repair these areas as required. Do not begin paving work until deficient sub-base areas have been corrected and are ready to receive paving.
- B. General Surface Applications to Prepared Subbase:
 - 1. Herbicide application over subbase:
 - a. Apply herbicide treatment over dry compacted subbase, adhering strictly to herbicide manufacturer's instructions.
 - b. Take extreme precaution to confine weed killer to only those areas to be covered by asphalt concrete and provide all necessary protection to prevent injury or damage to life and property.

3.04 INSTALLATION

- A. Techniques:
 - 1. Placing the mix:
 - a. Spread mix at minimum temperature of 225 degrees F.
 - b. Place asphalt concrete mix on prepared surface and strike off. Place inaccessible and small areas using hand tools.
 - 1) Check mat frequently during placement, to verify correct thickness.
 - c. Before rolling operations begin, check surface using template and straightedge, and correct irregularities.
 - d. Width of paving strips:
 - 1) Place mix in paving strips at least 10 feet wide.
 - 2) Roll first paving strip after placement. Place subsequent paving strips, extending rolling operation to overlap preceding strips.
 - e. Coursing requirements:
 - 1) Lifts:
 - (a) Base Course:
 - (1) Place plant-mixed asphalt concrete base course in single lift.
 - (2) Compact to 95 percent.
 - (3) Moisture Content: Use only the amount of moisture needed to achieve the specified compaction.
 - 2. Joints:
 - a. General: Construct joints to form continuous bond between adjoining portions of work. Ensure that texture and density of pavement are continuous across the joint. Surface across joint shall form smooth, uninterrupted plane and shall not pond water.
 - b. Joint locations include the following:
 - 1) Between pavements laid on successive days.
 - 2) At any point in paving where material already laid has become cold because of delay.
 - c. Clean by brushing, or cut fresh vertical face using power saw if necessary, wherever contact surface of previously constructed pavement has become coated by dust, sand, or other objectionable material.

Rancho Buena Vista HS Track and Field Replacement	32 1216 - 3	Asphalt Paving
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- d. Apply thin tack coat on vertical contact surface before beginning placement of new material.
- 3. Rolling:
 - a. Start rolling operation as soon as hot mix will bear weight of roller and can be compacted without unacceptable displacement of material.
 - b. Comply with roller manufacturer's recommended rolling speed, but in no case exceed 3 miles per hour.
 - c. Avoid sharp turns and abrupt starts and stops.
 - d. Compact mixture in areas inaccessible to rollers using hot hand tampers or vibrating plate compactors.
 - e. Breakdown rolling:
 - 1) If grade is not absolutely level, begin breakdown rolling on low side of spread. Progress toward high side.
 - 2) Execute initial breakdown pass with drive wheel forward toward the direction of paving.
 - 3) Examine surface immediately after breakdown rolling. Repair as necessary by loosening material in defective areas and filling with hot material.
 - f. Second (intermediate) rolling:
 - 1) Execute second rolling as soon as possible after breakdown rolling, while mixture is still hot enough to achieve maximum density.
 - 2) Continue repeating the pattern until mixture has been compacted thoroughly.
 - g. Finish rolling:
 - 1) Execute finish rolling while mixture is sufficiently warm to allow removal of roller marks.
 - 2) Continue rolling operation until maximum density is achieved and roller marks are entirely eradicated.
- 4. Asphalt Concrete Curbs:
 - a. Construct curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust.
 - b. Place curb material to cross-section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms as soon as material has cooled.
- 5. Seal Coat:
 - a. Parking Areas, Driveways, Walkways and Ramps: Dilute the asphalt emulsion with water at the rate of 1 part emulsion to 1 part water and apply at a rate of 0.1 gallons (of diluted material) per square yard. Emulsion shall be applied uniformly over entire area, and extreme care must be exercised so there will be no spots with excess material which would remain tacky.
 - b. Playground Areas:
 - 1) Prior to application of Plush-Tex, the asphalt concrete pavement surface shall be clean and free of all dust, dirt, debris and foreign matter. The pavement surface can be cleaned by use of power vacuums, compressed air and/or washing with water. If washed with water, allow surface of pavement to dry prior to application.
 - 2) Minor depressions and "bird baths" shall be located and leveled prior to application of seal coat. Locate minor depressions and "bird baths" which need to be filled by flooding area with water. All depressions of more than 1/8" under a 10 foot straight edge and all damaged areas such as foot prints, animal tracks or tire tracks are to be filled.
 - (a) Depressions of 1/4" or less shall be filled with undiluted Plush-Tex and struck off with a straight edge. Care should be taken to blend the outside edge of the area leveled into the existing pavement surface so as not to create an unsightly ridge or shadow.
 - (b) Depressions greater than 1/4" in depth may be filled with a mixture of one-part Plush-Tex to one-part clean sand by volume. For depressions greater than 1/4" in depth, the leveling may have to be done in multiple

applications. After the area leveled has cured dry, it shall be rolled with a mechanical roller.

- 3) Application: (Minimum of two.)
 - (a) Plush-Tex should be mixed thoroughly to an even consistency prior to application. Plush-Tex may be diluted up to 20 percent by volume with clean fresh water. Care should be taken to thoroughly mix the water with Plush-Tex so that the material is of an even consistency.
 - (b) Apply Plush-Tex to the surface by pouring from a can or wheeled container in continuous parallel lines and spreading immediately with rubber faced squeegees or with long-handled hair brooms. Pull the squeegee or broom on an angle from the line of spread so as to continually roll the material toward the operator and not overflow or "spill" on its forward edge away from the operator. After each coat has dried, remove any ridges or shadows with scrapers.
 - (c) Plush-Tex shall be applied in two or more applications. A minimum total of undiluted Plush-Tex for two applications should be 0.54 gallons per square yard. The controlling factor, however, shall not be the number of applications nor the quantity of Plush-Tex, but shall be the following specified result:
 - (1) After the final coat of Plush-Tex has been applied and allowed to dry thoroughly, its surface shall be smooth and uniform, showing no evidence of course or uneven texture.
 - (2) The completed surface shall not vary more than 1/8" from a 10-foot straight edge.

6. Patching:

- a. Remove paved areas which are contaminated with foreign materials or which are defective in any way. Replace removed material with fresh, hot mix. Compact by rolling until maximum density and smoothness are achieved and there is no detectable variation between patch and adjacent paving.
- b. Patch or re-pave area as required as a result of reconstruction or adjusting manholes, cleanouts, vaults, grates, etc. to proper grade.

7. Restriction of traffic:

- a. Upon completion of rolling operations, do not permit vehicular traffic on pavement until it has cooled and hardened sufficiently.
- b. Erect clearly-visible barricades and take other measures as required to protect pavement.

8. Wood Headers:

- a. Install along all edges of asphalt concrete paving except where concrete paving, walks and curbs occur. Set top edge of header to conform to grade of asphalt paving. Benders of lesser thickness may be used to form returns.
- b. Space stakes not exceed 4' on centers, unless otherwise noted. Drive stakes to a depth of 1" below the top of the header and nail to headers.
- c. Splice joints between individual header boards with a 1" thick board same height as header and not less than 24" long.

B. Interface with Other Products:

1. Pavement marking:

- a. Do not begin application of pavement-marking paint until architect has approved marking placement.
 - 1) Verify proper placement of each color of marking paint.
- b. Sweep and clean pavement surface thoroughly, immediately before application of marking paint. Pavement shall be dry and in proper condition to receive paint.
- c. Use mechanical paint applicator to create pavement marks with consistently even edges. Apply 2 coats at paint manufacturer's recommended spreading rates.
- d. Layout play courts to exact requirements of owner. Verify layout line widths and color prior to painting.

2. Installation Tolerances:

Rancho Buena Vista HS Track and Field Replacement	32 1216 - 5	Asphalt Paving
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- a. Maximum allowable variance of in-place compacted thickness from design thickness -- base course: Plus 1/2 inch, minus zero inches.
- b. Maximum allowable variance of surface smoothness - base course: Plus or minus 1/4 inch.
 - 1) Use 10-foot straightedge moved systematically over entire paved area to determine compliance with surface smoothness tolerance indicated.
- c. In-place density: Pavement shall be compacted to at least 96 percent of density obtained by laboratory compaction.

3.05 PREPARATION - PRIMER

- A. Apply primer in accordance with manufacturer's instructions.

3.06 PREPARATION - TACK COAT

- A. Apply tack coat in accordance with manufacturer's instructions.

3.07 PLACING ASPHALT PAVEMENT - SINGLE COURSE

- A. Install Work in accordance with State of California Public Work's standards.
- B. Place asphalt within 24 hours of applying primer or tack coat.
- C. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- D. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.08 SEAL COAT

3.09 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for quality control.
- B. General: Test in-place asphalt concrete courses for compliance with requirements for thickness, surface smoothness and density. Repair or remove and replace unacceptable paving as directed by Architect.
- C. Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness.
 - 1. Base Course: Specified thickness minus 1/2".
 - 2. Surface Course: Specified thickness plus or minus 1/4".
- D. Surface Smoothness: Test unfinished surface of each asphalt concrete course for smoothness, using 10' straight edge applied parallel with, and at right angles to centerline of paved area. Surface will not be acceptable if exceeding the following tolerances for smoothness.
 - 1. Base Course Surface: 1/4".
 - 2. Wearing Course Surface: 1/8".
- E. Flood Test: Prior to application of seal coats, perform a flood test in the presence of the Owner's representative.
 - 1. Method:
 - a. Flood the entire asphalt concrete paved areas with water by use of a tank truck or hoses.
 - b. If a depression occurs, where water ponds to a depth of more than 1/8", fill or otherwise correct to provide proper drainage.
 - c. Feather and smooth the edges of fill so that the joint between fill and original surface is invisible.
- F. Densities:
 - 1. Density of the asphalt concrete after rolling shall be 95 percent of the density obtained with the California Kneading Compactor per California Test 304.
 - a. Density of the aggregate base course shall be 95 percent of maximum relative density.
- G. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

Rancho Buena Vista HS Track and Field Replacement	32 1216 - 6	Asphalt Paving
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3.10 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for 10 days or until surface temperature is less than 140 degrees F (60 degrees C).

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	32 1216 - 7	Asphalt Paving
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**SECTION 32 1313
CONCRETE PAVING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete paving.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories.
- B. Section 03 2000 - Concrete Reinforcing.
- C. Section 03 3000 - Cast-in-Place Concrete.
- D. Section 31 2323 - Fill: Compacted subbase for paving.

1.03 REFERENCE STANDARDS

- A. 2022 California Building Code, Chapter 19A.
- B. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide 2022.
- C. ACI 301 - Specifications for Concrete Construction 2020.
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- E. ACI 305R - Guide to Hot Weather Concreting 2020.
- F. ACI 306R - Guide to Cold Weather Concreting 2016.
- G. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- H. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.
- J. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2023.
- K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- L. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- M. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.
- N. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.
- O. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2023, with Editorial Revision.
- P. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.
- Q. ASTM D1752 - Standard Specification for Preformed Sponge Rubber, Cork, and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction 2018 (Reapproved 2023).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit one sample panel, 4'-0" by 8'-0" inch (1,219 by 2,438 mm) in size illustrating broom finish.
- C. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

Rancho Buena Vista HS Track and Field Replacement	32 1313 - 1	Concrete Paving
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- D. Quality Control Submittals: Refer to Section 03 3000 Cast-In-Place Concrete. These requirements are applicable to this section.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Wood form material, profiled to suit conditions.
- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
 - 1. Thickness: 1/2 inch (12 mm).

2.02 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 80 (80,000 psi) (550 MPa) yield strength; deformed billet steel bars; unfinished.
- B. Steel Welded Wire Reinforcement: Plain type, ASTM A1064/A1064M; in flat sheets; unfinished.
- C. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi (280 MPa) yield strength; deformed billet steel bars; unfinished finish. Dowel sizing shall be as indicated on drawings.

2.03 CONCRETE MATERIALS

- A. Obtain cementitious materials from same source throughout.
- B. Cement: ASTM C150/C150M, Type II/V Portland cement, gray color.
- C. Fine and Coarse Mix Aggregates: ASTM C33/C33M.
- D. Fly Ash: ASTM C618, Class C or F.
- E. Water: Clean, and not detrimental to concrete.

2.04 ACCESSORIES

- A. Curing Compound: ASTM C 309, Type 1, Class A.
- B. Joint Sealer: Type as specified in Section 07900.

2.05 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- C. Concrete Properties:
 - 1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 3,250 psi (22.41 MPa).
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 3. Minimum cement content per cubic yard: 6.5 sacks.
 - 4. Maximum water-cement ratio per 94-pound sack of cement (gallons): 6.75.
 - 5. Water-Cement Ratio: Maximum 50 percent by weight.
 - 6. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
 - 7. Maximum Slump: 4 inches (100 mm).
 - 8. Maximum Aggregate Size: 1 inch (25.4 mm).

2.06 CODE REGULATIONS

- A. Portland cement concrete paving shall be stable, firm, and slip resistant and shall comply with CBC Sections 11B-302 and 11B-403.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

Rancho Buena Vista HS Track and Field Replacement	32 1313 - 2	Concrete Paving
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3.02 SUBBASE

- A. Prepare subbase in accordance with State of California Public Works standards.

3.03 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

- A. Place reinforcement at midheight of slabs-on-grade.
- B. Interrupt reinforcement at contraction joints.
- C. Place dowels to achieve pavement and curb alignment as detailed.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- D. Apply surface retarder to all exposed surfaces in accordance with manufacturer's instructions.

3.07 JOINTS

- A. Align curb, gutter, and sidewalk joints.
- B. Place 3/8 inch (10 mm) wide expansion joints at 20 foot (6 m) intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
 - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch (13 mm) of finished surface.
 - 2. Secure to resist movement by wet concrete.
- C. Provide scored joints.
 - 1. At 5 feet (1.524 m) intervals, or as indicated on the drawings.
 - 2. Between sidewalks and curbs.
 - 3. Between curbs and pavement.

3.08 FINISHING

- A. Sidewalk Paving: (Surfaces less than 5% slope): medium broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- B. Sidewalk / Ramp Paving: (Surfaces greater than 5% slope): heavy broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- C. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.09 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch (6 mm) in 10 ft (3 m).
- B. Maximum Variation From True Position: 1/4 inch (6 mm).

3.10 CONCRETE CURING

- A. Comply with requirements of ACI 308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

Rancho Buena Vista HS Track and Field Replacement	32 1313 - 3	Concrete Paving
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- B. Moist cure and maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than 5 days.
- C. Surfaces Not in Contact with Forms:
 - 1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
 - 2. Begin final curing after initial curing but before surface is dry.
 - a. Curing compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.11 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian traffic over pavement for 7 days minimum after finishing.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	32 1313 - 4	Concrete Paving
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request must be submitted a minimum of 6 business days prior to the bid opening. Substitution requests must include the following information for evaluation by the Owner and Field Landscape Architect.

1. Vendor Background and Experience: Describe your firm's history. Include information identifying the firm's annual volume and the firm's stability in the marketplace. Also include the firm's record relating to installation schedules and performance.
2. Provide information regarding local representation, and post-installation support.
3. Provide proof of bondability.
4. Product Manufacturer Background and Experience: Describe the history and experience of the product manufacturer with this specific product including years of experience and a count and listing of North American and worldwide synthetic turf field installations. The list shall include field locations, client, client contact names, address, telephone, material installed, date of installation, and general contractor (if any).
5. Product Installer Background and Experience: Describe the history and experience of the product installer with this specific product including years of experience and a count and listing of field installations. The list shall include field locations, client, client contact names, address, telephone, material installed, date of installation, and general contractor (if any). If the installer is not the manufacturer or vendor of the product, describe the experience the installer has with this specific product.
6. Product Samples: Provide the following samples with the substitution request.
Two 8"x 12" samples each of green turf without infill material showing backing with perforations.
Two 8" x 12" samples each of turf with the infill material.
Two samples of the proposed in-fill material.
7. Product Specification: Provide specification for the proposed synthetic turf product. Note any required deviations from the In-filled Synthetic Turf Technical Specifications included in this section.
8. Product Performance: The samples submitted with the proposal will be reviewed and evaluated. As a supplement to the samples, provide a written description of the following performance criteria for the proposed synthetic turf surfacing system:
 - a. Abrasive characteristics
 - b. Weekly, Monthly, and Annual Maintenance Requirements
 - c. Playability for Soccer, Softball, Lacrosse, & Rugby
 - d. Wet and Dry Traction
9. References: Supply a minimum of ten references, including contact name and telephone number, for other installations of this product.

1.04 APPROVED FIBER MANUFACTURERS

- A. The following fiber manufacturers are pre-approved for the In-filled Synthetic Turf Systems:

Astroturf, Bonar, Fieldturf, Hellas, Polytex, Shaw, Tencate

- B. The synthetic turf Contractor/Vendor shall provide written documentation in the form of a signed affidavit certifying the source of the fiber used for the field including both green and any other colors used for the lines and markings.
- C. Fiber shall be certified in writing to have less than 50 ppm or less of lead from both the fiber supplier and the turf vendor.

1.05 MINIMUM QUALIFICATIONS FOR SYNTHETIC TURF SYSTEM

- A. Approved Synthetic Turf System shall be manufactured, sold, and warranted by a single vendor. Manufacture of the system shall include, at a minimum, assembly of the constituent components, including tufting and coating, of the specified fiber into an approved backing.
- B. The manufacturer of the synthetic turf system must have produced a minimum of fifty (50)

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 2	Synthetic Turf Surfacing
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- successful in-filled fields of full size and outdoors within the past two (2) years.
- C. Installer of the synthetic turf system must have installed either a minimum of ten (10) successful in-filled synthetic turf football or soccer fields of full size within the past two (2) years or a minimum of twenty (20) successful in-filled synthetic turf football or soccer fields of full size within the past five (5) years. The installer shall have installed a minimum of five (5) successful in-filled synthetic turf football or soccer fields of full size with the product vendor.
- D. The synthetic turf surfacing system vendor shall have a designated employed representative available for service based in Southern California.
- E. The synthetic turf warranty shall be a comprehensive warranty, insured, for 8 years including all materials and workmanship including, but not limited to fiber, backing, secondary coating, infill and installation of the entire synthetic turf system. Separate, compartmentalized warranties for specific portions shall not be acceptable.

1.06 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. 03 30 53 Miscellaneous Cast-In-Place Concrete
- B. 31 22 16 Field and Track Subgrade Establishment

1.07 STANDARD SPECIFICATIONS

- A. For standards: American Society for Testing Materials (ASTM), (latest edition).
- B. The Green Book Standard Specifications for Municipal Public Works Construction, California State Chapter (latest edition).

1.08 POST AWARD SUBMITTALS

- A. Shop Drawings: Within 5 calendar days after issuance of Notice to Proceed, submit to the Field Landscape Architect an electronic copy of complete and detailed drawings showing all component parts of the synthetic turf system. The shop drawings shall be drawn to scale (1"=20') and shall include:
 - 1. total depth of infill
 - 2. edge details
 - 3. insert details including backing material
 - 4. seam details
 - 5. seam layout
 - 6. gluing patterns
 - 7. dimensional shop drawing for all field lines, markings and boundaries

- B. Synthetic Turf Samples: Within 5 calendar days after issuance of Notice to Proceed submit to the Field Landscape Architect:
 - 1. Two 12"x 12" samples each of each color turf showing backing with perforations.
 - 2. Two 12" x 12" samples each of turf showing method of seam makeup with perforations. One sample to have an example of inlaid lines.
 - 3. Two 12" x 12" samples each of the other colors proposed for use on the field for lines and markings.
 - 4. Two 1-pound samples of the proposed In-fill material(s).

- C. Manufacturer's Specifications and Warranty:
 - 1. Submit to the Field Landscape Architect one electronic copy of selected manufacturer's material specifications and installation instructions. Include detailed specifications of manufacturer's provisions for achieving permeability, stating rate in infiltration and permeability in inches per hour of system materials for the vertical draining system.
 - 2. Within 10 calendar days after Notice to Proceed, submit to the Field Landscape Architect

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 3	Synthetic Turf Surfacing
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an electronic sample copy of warranty package herein specified for review. Preliminary approval of warranty shall be a prerequisite for acceptance of the turf manufacturer/vendors product.

- D. Testing and Quality Control: Within 5 calendar days after issuance of Notice to Proceed, submit to the Field Landscape Architect the following test results for the system specified. An independent testing laboratory experience with testing of synthetic turf or carpeting materials shall certify these tests. The qualifications of the testing laboratory to be utilized for the submittal and the pre-shipment testing shall be submitted to the Field Landscape Architect for approval. Applicable minimum material ASTM tests:
 - 1. Dynamic Cushion Test - ASTM F355, Procedure A, (system); ASTM F355 procedure A at the 24" drop.
 - 2. Yarn and fabric characteristics.
 - 3. Pill Burn Test – ASTM D2859
- E. Maintenance and Operating Data:
 - 1. Prior to acceptance and/or occupancy by the Owner, furnish to the Field Landscape Architect one electronic copy and five (5) copies in hard cover form of maintenance and operating data with imprinted Project, Owner, Field Landscape Architect, Contractor and Turf Subcontractor names, and date of turf system installation.
 - 2. In addition, provide descriptions of any equipment recommended for maintenance and repair, citing specific vendors for each unit.
 - 3. Use and Limitations - Provide a separate page stating approved activity usage for the turf and activities not recommended relative to warranty.
 - 4. Index - Index with tab dividers for data as follows: Materials installed with their characteristics:
 - a. General maintenance
 - b. Small repair procedures
 - c. Minor seam repair
 - d. Discussion of precautions to be practiced, general maintenance, and uses to avoid to protect turf surface and to maintain installation's warranty
 - e. Recommendations for paint application and removal of lines and markings.

1.09 PRE-SHIPMENT SUBMITTALS

- A. Prior to shipment of the synthetic turf materials to the job site, synthetic turf material from every sixth roll shall be randomly sampled and the tested by an independent testing laboratory experience with testing synthetic turf materials. The testing laboratory shall be completely independent with no ties to the turf manufacturer. The testing shall include the following:

<u>Item</u>	<u>ASTM</u>	<u>Property</u>
1.	FTIR Spectrograph	Pile Composition
2.	D418	Pile Weight
3.	D418	Total Weight
4.	D418	Pile Height
5.	D418	Backing Perforation Diameter and Spacing
6.	D1335	Tuft Bind (without infill)
7.	D1682	Grab/Tear Strength.

- B. Copies of the test results shall be transmitted to the Owner and Field Landscape Architect directly from the testing laboratory. The synthetic turf materials shall not be shipped to the site without written authorization from the Field Landscape Architect after the Owner and Field Landscape Architect have approved the test results.
- C. Samples of the synthetic turf material tested from every sixth (6th) roll shall also be transmitted to the Field Landscape Architect for approval by the independent testing laboratory prior to shipment of the synthetic turf materials to the job site. Sample size shall be minimum 12" x 12".
- D. All fees and costs associated with the pre-shipment sampling and testing shall be paid by the

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 4	Synthetic Turf Surfacing
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Contractor.

1.10 CERTIFICATION OF THE BASE

- A. The Synthetic Turf Surfacing Contractor shall furnish to the Owner, prior to the synthetic turf system installation as applicable, a written certification of the acceptability by the turf vendor of the permeable aggregate for installation and warranty validation.

1.11 TURF SYSTEM HOLD HARMLESS

- A. The synthetic turf manufacturer and installer shall not infringe upon any current or pending patents held by other synthetic turf manufacturers or installers.
- B. The Contractor, their synthetic turf subcontractor, and the synthetic turf manufacturer shall hold the Owner, Owner's Representative, and the Field Landscape Architect harmless from infringement of any current or future patent issued for the synthetic turf surfacing system, installation methods and vertical draining characteristics. A notarized statement shall be provided as part of the submittal package.

1.12 WARRANTY OF SYNTHETIC TURF

- A. Warranty shall cover, in general, the usability of the turf surface, accessories, use characteristics, and suitability of the installation. All items covered by warranty are to be replaced or repaired with new materials, including installation at the sole expense of the warranting vendor/contractor for the period of eight (8) years to the Owner, for the designated uses enumerated as follows:
 - 1. Football
 - 2. Soccer
 - 3. Lacrosse
 - 4. Field Hockey
 - 5. Flag Football
 - 6. Track and Field activities
 - 7. Ultimate
 - 8. Physical exercises
 - 9. Physical education activities
 - 10. Pneumatic rubber-tired maintenance and service vehicles
 - 11. Pedestrian traffic and other similar uses
 - 12. Ceremonial and Entertainment Events
- B. A principal of the applicable firm, duly-authorized to make contracts, shall sign the turf vendor warranty. If the turf vendor is not the manufacturer, the manufacturing firm shall also sign the warranty. The term "Contractor" contained herein means the firm furnishing warranty. "Owner" is the Vista Unified School District. Warranty period shall be a minimum of eight years from date of acceptance of the installed system by the Owner.
- C. Furnish a pre-paid insurance policy in support of the warranty required for the field, for the entire warranty period from an A-rated domestic insurance carrier. The warranty shall be secured to the Owner with an insurance policy of not less than \$300,000 per claim and an aggregate of \$5,000,000.

1.13 FORM OF WARRANTY OF SYNTHETIC TURF SYSTEM

- A. Contractor/Vendor hereby warrants to Owner, subject to the limitations and conditions set forth below, that its synthetic turf system consisting of synthetic turf described as _____, and the adhesives used in the installation, is free from defects in material and workmanship and shall, for a period of eight years as applicable from the date of acceptance by the Owner, remain serviceable for multiple sports activities.
- B. Contractor/Vendor warrants to the Owner that its synthetic turf materials shall not fade, fail, shrink, wrinkle, or reflect excessive wear. Contractor/Vendor shall, at their sole expense and

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 5	Synthetic Turf Surfacing
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cost, replace such areas of the synthetic turf system not performing to these standards for the life of the warranty.

C. Definitions

1. The term "not fade" in the context of this warranty shall mean that the synthetic turf material shall remain a uniform shade of green, or other colors installed, with no significant loss of color.
2. The term "not fail" or "excessive wear" as used in the context of this warranty shall mean that the length and weight of the face yarn or pile material in the synthetic turf surface above the infill materials shall not have been decreased by more than 10% per year according to ASTM D418, nor exceed 50% during the warranty period. In the event that the synthetic turf system does not retain its fiber height or shock absorbency and is consequently no longer serviceable during the warranty period, the Contractor shall, at their sole expense, replace such portion of the system that is no longer serviceable.
3. The term "serviceable" in the context of this warranty shall mean that the synthetic turf system for the soccer field shall have a maximum "G" value according to ASTM F1936-10 and Procedure A, ASTM F355, not to exceed 120G's at any location upon installation and shall not exceed 160G's throughout life of the warranty period. This shall be determined by conducting dynamic cushioning tests at the locations designated in ASTM F1936-10 and at corners of the soccer penalty boxes at opposite sides of the field. Any increase from 120G's to allowable 160-G's maximum shall be at a relative uniform rate not to exceed 15 G's in any single yearly period.

D. Where applicable, the fabric seams shall remain attached to the underlying surface over the warranty period and shall not separate or become unglued or unattached, as applicable.

E. Contractor/Vendor warrants to the Owner that the permeable synthetic system shall drain vertically a minimum of 20 inches precipitation per hour without visible surface ponding.

F. Contractor/Vendor shall replace with new materials, at their sole expense, any damage to the synthetic turf system that extends more than 3 feet beyond the location of foreign combustibles, which may ignite and fire-damage the synthetic turf system. The Contractor shall not be held liable for any incidental or consequential damages. These warranties and the Contractor's obligations here-under are expressly conditioned upon;

1. The Owner making all minor repairs to the synthetic turf system upon the discovery of the need for such repairs;
2. The Owner maintaining and properly caring for the synthetic turf system in accordance with the Contractor's maintenance manual and instructions;
3. The Owner complying with the dynamic and static load specifications established by the Contractor.

G. The warranty is not to cover any defect, failure, damage or undue wear in or to the synthetic turf system caused by or connected with abuse, neglect, deliberate acts, act of God, casualty, static or dynamic loads exceeding Contractor's recommendations, footwear having cleats, spikes, or similar projections other than conventional baseball, football, soccer, or rugby shoes having cleats of not more than 1/2" in length, and other conventional running track shoes having spikes of not more than 1/4" in length, or use of improper cleaning methods.

H. Contractor/Vendor shall be allowed to examine the synthetic turf system regarding any claim that the Owner makes to be present at any time, to analyze the results of all tests conducted by the Owner or others, and to conduct such tests of their own. Contractor shall not be responsible for any costs or expenses incurred by the Owner or others with respect to such tests, except the Contractor shall pay for costs of all tests and analysis conducted or directed by their representative.

I. In the event the Contractor/Vendor does not respond to the Owner's written notice within 10 days of receipt of notice or does not submit, schedule and execute corrective work within 30 days for any material replacement and within 5 days for work limited to repairs of existing materials or repair that can be made with attic stock materials, the Owner has the option of having the work performed at the expense of the Contractor.

J. Sample form of warranty herein set forth is a suggested form for use for the work under this section. Manufacturer's standard form of warranty may be used provided all conditions

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 6	Synthetic Turf Surfacing
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specified are incorporated. All claims by the Owner under this warranty must be made in writing to Contractor's address at _____ within 30 days after the Owner learns of the defect giving rise to the claim. This warranty shall constitute a contract made in the State of California and shall be governed by the laws thereof.

1.14 FORM OF WARRANTY FOR SUPPLEMENTAL PAD SYSTEM

- A. Contractor/Vendor hereby warrants to Owner, subject to the limitations and conditions set forth below, that field underlayment system consisting of _____, is free from defects in material and workmanship and shall, for a period of eight years from the date of acceptance by the Owner, remain serviceable for multiple sports and snow removal activities.
- B. Contractor/Vendor warrants to the Owner that its field underlayment materials shall remain permeable and shall not fail, shrink or buckle. Contractor shall, at their sole expense and cost, replace such areas of the field underlayment system not performing to these standards for the life of the warranty.
- C. Definitions
 - 1. The term "permeable" in the context of this warranty shall mean that the field underlayment material shall provide a minimum vertical drainage rate of 20 inches per hour.
 - 2. The term "not shrink" in the context of this warranty shall mean that the field underlayment panels shall remain butted together without gaps exceeding ¼ inch in any location across the field.
 - 3. The term "buckle" in the context of this warranty shall mean that the field underlayment shall lay flat on the base without warping or creating surface irregularities in excess of ¼ inch.
- D. Contractor/Vendor shall replace with new materials, at their sole expense, any field underlayment materials that do not comply with these warranty requirements.
- E. These warranties and the Contractor's/Vendor's obligations here-under are expressly conditioned upon;
 - 1. The Owner maintaining and properly caring for the synthetic turf and field underlayment system in accordance with the Contractor's/Vendor's maintenance manual and instructions;
 - 2. The Owner complying with the dynamic and static load specifications established by the Contractor/Vendor.
- F. The warranty is not to cover any defect, failure, damage caused by or connected with abuse, neglect, deliberate acts, act of God, casualty, static or dynamic loads exceeding Contractor's / Vendor's recommendations.
- G. Contractor/Vendor shall be allowed to examine the field underlayment system regarding any claim that the Owner makes to be present at any time, to analyze the results of all tests conducted by the Owner or others, and to conduct such tests of their own. Contractor/Vendor shall not be responsible for any costs or expenses incurred by the Owner or others with respect to such tests, except the Contractor/Vendor shall pay for costs of all tests and analysis conducted or approved by the Owner's Representative.
- H. In the event the Contractor/Vendor does not respond to the Owner's written notice within 10 days of receipt of notice or does not submit, schedule and execute corrective work within 30 days, the Owner has the option of having the work performed at the expense of the Contractor/Vendor.
- I. Sample form of warranty herein set forth is a suggested form for use for the work under this section. Manufacturer's standard form of warranty may be used provided all conditions specified are incorporated. All claims by the Owner under this warranty must be made in writing to Contractor's address at _____ within 30 days after the Owner learns of the defect giving rise to the claim. This warranty shall constitute a contract made in the State of California and shall be governed by the laws thereof.

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 7	Synthetic Turf Surfacing
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1.14 WARRANTY TESTING

- A. The turf for the field shall be tested for dynamic cushioning (“G” Test) by an experienced independent testing laboratory acceptable to the Field Landscape Architect or Owner at the completion of the installation shortly prior to acceptance inspection by the Owner/Field Landscape Architect, at the anniversary date of the first year, second year, fourth year, sixth year, and 60 days prior to the anniversary date of the warranty expiration. If conditions of the Specifications and/or Warranty are not met, the Contractor/Vendor has the option of corrective work or replacement. In the event corrective work does not meet the requirements of the Specifications after a second attempt to bring the system within these limits, then the Contractor/Vendor shall to replace non-conforming areas or sections solely at the Owner’s discretion and direction.
- B. Tests shall be performed in accordance with ASTM F-1936-10 and F355.
- C. Test locations as designated in F-1936-10, Paragraph 8.1. Included in the report shall be the measured depth of the infill material at all test locations.
- D. All costs for the stated testing shall be paid by the Synthetic Turf Surfacing Contractor.
- E. If the Contractor/Vendor does not have the tests performed within 10 days of specified times listed, the Owner has the option of ordering the testing work at the expense of the Synthetic Turf Surfacing Contractor/Vendor.

PART 2 MATERIALS

2.01 GENERAL

- A. Infilled Synthetic Turf: The turf system shall be a vertical-draining permeable synthetic turf system. The turf system shall consist of a synthetic grass-like surface pile, which shall be tufted into a synthetic backing.
- B. All backing layers and coatings shall be firmly bonded together. Coating materials must be completely cured and bonded to the other backing layers. Synthetic turf panels or rolls that do not meet this requirement will be rejected.
- C. The entire system shall be resistant to weather, insects, rot, mildew, and fungus growth, and be non-allergenic and non-toxic. The entire system shall be constructed to maximize dimensional stability, to resist damage and normal wear and tear from its designated use, and to minimize ultraviolet degradation.
- D. All adhesives used in bonding the system together shall be resistant to moisture, bacterial and fungus attacks, and resistant to ultraviolet rays at any location upon installation.

2.02 DYNAMIC CUSHIONING REQUIREMENTS

- A. The dynamic cushioning of the system shall not exceed a maximum value of 130 G's per ASTM, F1936-10 snf ASTM, F355, procedure A at any location upon installation.

2.03 SUPPLEMENTAL PAD COMPOSITION

- A. The supplemental pad system shall be either an interlocking polypropylene panels or a paved in place elastic layer pad. The shock-absorbing pad shall become part of the base for the synthetic turf surfacing system where noted.
- B. Polypropylene Panels:
 - 1. The panels shall be interlocking with gaps that allow for thermal expansion and contraction but do not exceed 0.25 inches. The panels shall be designed and manufactured specifically for in-filled synthetic turf underlayment applications. The panels shall meet the following minimum requirements:

Size: 73.5 x 49 inches interlocking panels

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 8	Synthetic Turf Surfacing
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Area: Net coverage per panel 24.15+/- ft²
 Thickness: 1.0" (25mm) +/- .18" (2mm)
 Panel Weight: approximately 5.56 lbs / panel

2. Company must demonstrate successful installations totaling a minimum of 5 million square feet of manufacturer's material.
3. The panels shall provide the following minimum performance requirements:
 Surface contact: 50% minimum with synthetic turf backing,
 Friction coefficient: movement of artificial turf over 50mm distance 8.92N maximum force ISO 8295
 Shock Absorption: 65% per EN 14808
 Vertical Deformation: less than 6 mm per EN14809
 Repeated impact compression resistance: 106psi, repeated load, 20,000 cycle's system test with infilled turf; not to exceed 3%
 Bacteria and Fungi resistance: Pass per ASTM G22-76/G21-96
 Water Quality: ESSM 105-d/1997 Pass
 Material must be 100% recyclable, recycling for energy through combustion is not acceptable. Manufacturer must demonstrate recycling process as part of the pre-approval process.
4. Manufacturer Reference: Brock International Power Base YSR-25mm or pre-approved equal
 Brock International
 2840 Wilderness Place
 Boulder, CO 80301
 Telephone: (303) 544-5800 Fax: (303) 544-1273
5. Manufacturer Warranty: The interlocking polypropylene panels shall include a 25 year manufacturer's warranty.

C. Polyurethane Elastic Layer Pad

1. The shock-absorbing pad shall be a paved-in-place (in-situ) porous elastic layer and shall become part of the base for the system.
2. The elastic layer shall be porous and shall resist the effects of adhesives, water, freeze-thaw, heavy loads associated with athletic fields, compression/deflection, rot, mold, mildew, bacteria, and air-borne pollution.
3. Single Layer Installation: The paved-in-place (in-situ) elastic layer shall be installed in one lift to a minimum thickness of 25mm. The elastic layer shall contain only the following:

Components	% by Weight
Granulated SBR rubber (1-5mm)	43-47%
Clean-washed "bird's-eye" aggregate (3-6mm)	44-48%
Single component high quality polyurethane binder	6-8%

4. The exact material mix ratio may be altered to provide strength, shock attenuation (in conformance with the 120G limit specified herein) and to provide permeability as approved by the Field Landscape Architect. Successful bidder may submit an elastic layer formulation with minor modification for Field Landscape Architect's consideration and approval.

2.04 PERMEABILITY REQUIREMENTS OF THE SYNTHETIC TURF SYSTEM

- A. The system including the synthetic turf, infill materials and the supplemental pad shall drain vertically a minimum of 20 inches precipitation per hour without visible surface ponding.

2.05 SYNTHETIC TURF PILE SURFACE

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 9	Synthetic Turf Surfacing
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- A. The pile surface shall provide good traction in all types of weather with the use of conventional "sneaker-type shoes" and composition, molded-sole athletic shoes.
- B. The pile surface shall be suitable for both temporary and permanent line markings using rubber-base paint where applicable.
- C. Pile surface shall be nominally uniform in length for all portions of the field. Synthetic turf panels or rolls with irregular pile heights or with "J hooked" fibers that extend more than 1/4 inch above the surrounding fibers will be rejected.

2.06 SYNTHETIC TURF FABRIC SURFACE

- A. The fabric surface shall be constructed and installed in minimum 15-foot widths with no longitudinal or transverse seams, except for head or tee seams at field boundaries and inlaid lines within a finished roll assembly. The seams shall be 15'-0" spacing.
- B. Rolls that do not lay evenly and with full dimension width will be rejected. No fitted pieces or relief cuts will be allowed to true alignment.
- C. The color shall be uniform with no visible deviations in shade permitted. Rolls that do not meet this requirement will be rejected.

2.07 SYNTHETIC TURF SYSTEM MATERIAL COMPONENTS

- A. Pile fibers shall resemble freshly-grown natural grass in appearance, texture and colors.
- B. Fabric backing for the in-filled synthetic turf systems can be loose laid and anchored at the perimeter of the fields as shown in the details or adhered to the base.
- C. No transverse or "head" seams will be permitted within the football field grid (160' width x 360' length).
- D. All panel seams shall be secured with either sewing or adhesive with a supplemental fabric. Sewn turf seams shall utilized a high strength polyester fiber cord or nylon. Adhered seams shall include a minimum 12" width seam backing with adhesive to extend the length of the seam.

2.08 SYNTHETIC TURF PERFORATIONS

- A. Synthetic turf with tufted fibers and a coated backing must include either perforations in the backing for vertical drainage, or the turf shall include a partially coated backing providing permeability without the use of perforations. Certified independent test results indicating a minimum drainage rate of 40 inches per hour for the permeable backing must be provided.
- B. Perforations in turf backing to be a minimum of 3/16" diameter clear opening and shall be spaced a maximum of 4" uniformly on-center.
- C. The turf shall be perforated with a minimum of 95% integrity over entire surface. Holes must be full diameter, completely through the underside of the turf backing with no material residue or fragmented fibers remaining.
- D. Field Landscape Architect shall approve the turf perforations prior to shipment, upon shipment onsite, or during on-site perforating operations as applicable.
- E. If the non-permeable backing material exceeds 12 inches in width it shall be perforated in accordance with paragraph 2.7 of this section. Perforations shall be drilled from the surface after the adhesive has set.

2.09 LINES AND MARKINGS

- A. A complete field lining, marking and field boundary system with team area limits, etc., shall be provided with the initial installation of the surfacing system. Layouts shall be accurately surveyed and marked prior to installation.
- B. All lines and field markings shall be tufted in or installed as synthetic turf inlays. Wherever possible, lines shall be tufted into the turf panels in lieu of inlays. All markings shall be uniform in color, providing a sharp contrast with the turf color, and shall have sharp and distinct edges. Markings shall be true and shall not vary more than 7/32" from specified width and location.

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 10	Synthetic Turf Surfacing
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- C. Manufacturer shall guarantee the synthetic turf is adaptable to painted lines in the event painting is utilized in the future.
- D. For cemented seams, use supplemental backing material. The supplemental backing material shall bridge all inlaid lines and markings a minimum of 4 inches on each side of the seam. Supplemental backing material that is greater than 12 inches in width shall be perforated in accordance with paragraph 2.7 of this section. Perforations shall be drilled from the surface after the adhesive has set.

Combined Football/Soccer Field

Football:

- | | | |
|-----|---------------------------|---|
| 1. | Playing field boundaries: | 8" wide white |
| 2. | Goal line: | 8" wide white lines |
| 3. | Each 5-yard line: | 4" wide white lines |
| 4. | 50-yard line: | 4" wide white line framed in 4" wide yellow lines |
| 5. | Each 1-yard inbound line: | 4" x 2' white lines |
| 6. | Each 5-yard inbound line: | 4" x 6" white line (each side of yard line) |
| 7. | Each 1-yard marker: | 4" x 2' white line |
| 8. | 3-yard line: | 4" x 6' wide white line |
| 9. | Team box lines: | 4" wide white lines extending from the 25 yard line |
| 10. | Number size: | 6' high x 4' wide |
| 11. | Number face: | 12" |
| 12. | Number arrows: | 6" high and 18" wide white turf |
| 13. | Number color: | White |
| 14. | Mid Field Logo: | White, Red, Maroon, Grey and Black |
| 15. | Coaches Box: | 4" wide white lines |
| 16. | End Zone Color: | Maroon |
| 17. | End zone letters: | White with Black Border |

Soccer:

- | | | |
|----|-----------------------------|------------------------|
| 1. | Playing field boundaries: | 4" wide yellow lines |
| 2. | Mid-field line: | 4" wide yellow line |
| 3. | Goal and penalty boxes: | 4" wide yellow lines |
| 4. | Center circle & penalty arc | 4" wide yellow lines |
| 5. | Corner kick arc | 4" wide yellow lines |
| 6. | Corner kick hash marks | 4" wide x yellow lines |
| 7. | Center spot: | 9" diameter yellow dot |

Unified Lacrosse:

1. The lacrosse lines are 4" Blue. The lacrosse field shall be 270 feet long (goal to goal) and 180 feet wide. The goal line in the crease shall be 2" wide, blue. The goal crease line shall be 2" wide, within the 4", 5-yard line. Markings shall include traditionally installed women's and men's markings.

Field Hockey:

1. The field hockey lines are 4" black. The lacrosse field shall be 300 feet long (goal to goal) and 180 feet wide.

Flag Football:

1. The flag football lines are 4" grey. The flag football field shall be 240 feet long (goal to goal) and 120 feet wide.

2.09 MINIMUM SPECIFICATIONS FOR SYNTHETIC TURF SYSTEM MATERIALS

- A. The minimum material will be verified and enforced and will be the basis for Owner's testing. Material that fails to meet these minimum specifications will be rejected. The material specifications in this section are minimums. The manufacturer of the synthetic turf fiber and fabric may elect to exceed these specifications to ensure compliance with all requirements and the warranty as specified in this section.
- B. Color of synthetic turf to be medium green as approved by Owner. Additional turf colors shall be as called for in Section 2.8 for lines and markings. The fiber used for the lines and markings shall be of the same composition as that used for the green areas.

<u>Item</u>	<u>ASTM</u>	<u>Property</u>	<u>Minimum Specifications</u>
A.	D418	Pile Weight (slit film)	21 oz/sq yard
B.	D418	Pile Weight (monofilament)	21 oz/sq yard
C.	D418	Total Fiber Weight	44 oz/sq yard
D.	D418	Primary Backing	8 oz/sq yard total
E.	D418	Back Coating	16 oz/sq yard
F.	D418	Total Weight	68 oz/sq yard
G.	D418	Pile Height	2.25"-2.375" (2.25" minimum)
H.	D1335	Tuft Bind (without infill)	8 lbs.
I.	D1682	Grab/Tear Strength	200 lbs.
J.	D2859	Pill Burn Test	Pass

2.10 MINIMUM TURF MATERIAL SPECIFICATIONS

- A. For the Stadium Field pile fiber shall be a combination of long parallel slit film and monofilament fibers polyethylene athletic quality yarn designed specifically for outdoor use and stabilized to resist the effects of ultra-violet degradation, heat, wear, water and airborne pollution.
- B. Fiber shall be certified to have less than 50 ppm or less of lead from both the fiber supplier and the turf vendor.
- C. The monofilament fiber shall meet the following requirements:

<u>Item</u>	<u>ASTM</u>	<u>Property</u>	<u>Minimum Specifications</u>
1.	D1577	Yarn Denier / Ply	10800 / 6
2.	D1577	Base Filament Thickness	300 U Micron
3.	D1577	Monofilament Width	1.40 mm
4.	D2256	Yarn Breaking Strength	20 lbs
5.	D2256	Yarn Elongation to Break	50%
6.	D789	Yarn Melting Point	240° F.

- D. The long parallel silt film fiber shall meet the following requirements:

<u>Item</u>	<u>ASTM</u>	<u>Property</u>	<u>Minimum Specifications</u>
1.	D1577	Yarn Denier / Ply	5000 / 1
2.	D1577	Filament Thickness	100 U Micron
3.	D2256	Yarn Breaking Strength	20 lbs.
4.	D2256	Yarn Elongation to Break	50%
5.	D789	Yarn Melting Point	240° F.

- E. Fiber Wear Simulation: Fiber shall exhibit no splitting or appreciable degradation after a minimum of 20,000 cycles of simulated Lisport wear testing and shall remain serviceable without appreciable face weight loss after a minimum of 40,000 cycles of simulated Lisport wear testing.
- F. Fabric Composition: Shall consist of 100% polyethylene monofilament yarn tufted into polypropylene backings coated with high-grade polyurethane. Coating and backing materials

shall assure suitable tuft bind strength, dimensional stability, and long-term wearing properties.

2.11 INFILL MATERIALS

- A. The synthetic turf shall utilize a combination of sand and rubber infill materials. The maximum sand content shall not exceed 30% by volume and shall not be less than 20% by volume. Proprietary infill volumes with greater than 30% sand will be considered on a product by product basis. The exact in-fill material ratio may be altered to provide strength, shock attenuation, and to provide permeability by the vendor/installer as approved by the Field Landscape Architect, however the minimum sand by volume shall not be less than 20%.
- B. Infill material shall be applied in a dried condition when the turf is dry. It shall be applied in uniform layers effectively dragged and/or brushed to distribute the material uniformly onto the backing of the turf.
- C. The sand infill material shall be graded silica sand, sub-round to round, compaction resistant, washed and dried. The sand shall meet the following criteria:

Percent Silica	80-95%
Shape	Round to Sub-round
Sphericity	0.65 – 0.85
Roundness	0.60 – 0.70
Hardness (Moh)	7

The sand gradation shall meet the following wet sieve analysis:

<u>Sieve Size</u>	<u>Percent Retained</u>
#16	0% – 5%
#20	10% – 20%
#30	50% – 70%
#40	15% – 25%
#50	0% – 10%
#100	0% – 5%
Pan	0% – 2%

- D. Rubber Infill:
 - 1. The rubber shall be 100% SBR ambient or cryogenically processed free of any tire cord and steel materials or kevlar. SBR rubber shall be manufactured from North American automotive or truck tires and shall be generated from California based tires. Tires more than 10 years old from date of production are not allowed. The rubber infill material gradation shall meet the following size requirements:

2.0 – 1.5 mm	0% - 10%
1.5 – 1.0 mm	10% - 30%
1.0 – 0.5 mm	40% - 80%
0.5 – 0.0 mm	0% - 10%

- E. SBR rubber shall be certified in writing to have less than 50 ppm or less of lead from both the rubber supplier and the turf vendor.
- F. Infill material shall be applied in a dried condition when the turf is dry. It shall be applied in uniform layers effectively dragged to distribute the material uniformly to the backing of the turf.
- G. The application rate shall provide a total minimum weight of 3.0 lbs of rubber infill material per square foot of the turf area.
- H. Maximum exposed fiber height shall range from ¾” to ½” after infill placement, settling, and compaction, however in no instance shall exposed pile height conflict with any known patents.

2.12 PAINT

- A. Paint for lines and markings shall be specifically formulated for use with synthetic turf. Paint formulation shall be considered as a semi-permanent installation. Acceptable manufacturer and product include:
 1. Pioneer Athletics – ExtremeLine Paint
 2. Or approved equal.

2.13 MAINTENANCE EQUIPMENT – SWEEPER UNITS

- A. The Contractor shall provide one tow behind sweeper/ provide ground driven rotary brush for the cleaning and maintenance of the infilled synthetic turf. Unit shall:
 1. Provide for metered re-application of infill material with simultaneous dirt removal through 2 sieve trays
 2. Provide sieve trays with variable settings from 4-10MM;
 3. Adjustable depth row of tines for decompact infill material
 4. Working width to be nominally 6 ft.
 5. Rear mounted drag brush.
 6. Provide connections for tow behind standard tractor or utility vehicle.
- B. Manufacturer’s Reference: The sweeper unit shall be SMG TurfCare TCA 2000 or approved equal. Contact SMG Equipment LLC, (253) 350-8803 / www.smgequipment.com.

2.14 MAINTENANCE EQUIPMENT – DRAG BRUSH UNITS

- A. One tow-behind drag unit shall be furnished to the Owner with the playfield surfacing system.
- B. The drag brush unit shall include 3-point hitch, rear-mount with tow coupling.
- C. Include four specially-arranged brush rows to level surface of turf with infilling granulate
- D. Working width to be nominally 5 ft.
- E. Manufacturer’s Reference: The unit shall be SMG Turftuner TT1600 or approved equal. Contact SMG Equipment LLC, (253) 350-8803 / www.smgequipment.com.

2.15 ALTERNATE FIELD EQUIPMENT

- A. The synthetic turf vendor may request to substitute equipment for those specific units specified, provided an equivalent function is provided to the specified equipment.

PART 3 INSTALLATION

3.01 CERTIFICATION OF FIELD BASE INSTALLATION

- A. The Contractor or the Contractor's subcontractor shall perform an inspection of the permeable aggregate and submit written certification of acceptance of the base for the installation of the synthetic turf system.
- B. Summary of certification shall include, but not be limited to:
 1. Acceptance of the base construction "finish surfaces" as totally suitable for the application of work specified under this section.
 2. Verification and certification of the infiltration and permeability rates of the permeable aggregate as applying to the warranty.
- C. All discrepancies between the required materials, application and tolerance requirements noted by the turf installer shall be brought immediately to the attention of the Contractor and the Field Landscape Architect. Failure of the turf installer to immediately inform the Contractor and Field Landscape Architect of any prior work that does not meet the required specifications will result

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 14	Synthetic Turf Surfacing
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in the turf installer being required to perform any work needed to bring the base to acceptable condition.

3.02 SUPPLEMENTAL PAD INSTALLATION

A. Polypropylene Panel Installation:

1. Acceptance of the base construction "finish surfaces" as totally suitable for the application of work specified under this section.
2. Use only new materials manufactured and shipped for the specific installation. No used, recycled or refurbished materials are to be installed. Manufacturer must provide documentation of material content and MSDS sheet for submittal package.
3. Product to be shipped as flat panels on prepackaged pallets. Pallets to be wrapped with heavy-duty barrier for protection from moisture and UV exposure.
4. Seams should be mechanically locked into place by hand without use of additional materials, glue, fasteners or secondary processes or equipment.
5. Material must be installed using manufacturers guidelines.
6. Manufacturer must provide written procedures to selected turf supplier for the installation of turf on top of underlayment.
7. Surplus materials to be determined by the Owner prior to order and delivery of product to the installation site. Surplus quantities to be identified in writing by the General Contractor at the time of order placement.
8. Upon completion of installation, a walk-through will be conducted to inspect the quality of work and ensure all details meet specifications.
9. Perform all work in strict accordance to the drawings, shop drawings and manufacturer's installations and instructions.

B. Elastic Layer Pad Installation

1. The Superintendent shall thoroughly inspect all materials delivered to site both for quality and quantity to assure that the entire installation shall have sufficient material to maintain proper mixing ratios.
2. Installation of the elastic layer shall not take place if the ambient temperature is below 50 degrees F, if the material is wet, or if rain is falling or pending.
3. The material to be placed shall be mechanically mixed to obtain a homogeneous mixture. Extreme care shall be taken under the immediate supervision of the Superintendent in the weighing and mixing of the components to maintain a uniform mixture with predictable and consistent performance characteristics across the entire field area. The polyurethane shall be of sufficient volume to obtain satisfactory long-term bonding of the components but shall not be of such volume as to render the elastic layer hard and uncomfortable for athletic use.
4. The elastic layer shall be installed with a paving machine that utilizes an electrically heated finish surface screed bar. The paving machine must be operated by a minimum of two skilled technicians at all times.
5. All seams shall be hand rolled and cold pad joints shall be primed with a polyurethane primer supplied by the binder manufacturer.
6. The Superintendent must consistently monitor thickness of the elastic layer and supervise all mixing ratios by means of component weight checks.
7. The elastic layer pad must cure free of foot and equipment traffic for 48 hours after placement.
8. The finished elastic layer must be properly compacted, uniform in texture, density, thickness, and tolerance to grade and suitable as a shock attenuation pad providing dynamic cushioning for the turf system.
9. The elastic layer shall have minimum thickness of 25 mm. The finished surface shall not vary more than 1/4" in 10' (6.25mm in 3.0 meters) measured in any direction as gauged from a string line or straight edge.

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 15	Synthetic Turf Surfacing
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10. The Contractor shall test the permeability of the in-situ pad prior to synthetic turf installation. The pad shall be tested in a minimum of six (6) representative locations. The test results shall be submitted to the Field Landscape Architect prior to synthetic turf installation.

3.03 SYNTHETIC TURF INSTALLATION

- A. Perform all work in strict accordance to the drawings, specifications, shop drawings and manufacturer's specifications and instructions.
- B. Verification: The Contractor is responsible for inspecting, verifying, and accepting all installed work of this section.
- C. Environmental Conditions: Do not apply adhesive materials or infill material when:
 1. Ambient air temperature is below 50 degrees F.
 2. Material temperatures are below 50 degrees F.
 3. Rain is falling or pending
 4. Conditions exist, or are pending, that will be unsuitable to the installation of the system.
- D. Preparation:
 1. Accept base onto which the synthetic turf surfacing system and the anchoring system are to be applied, as specified above.
 2. Immediately prior to application of the synthetic turf, the base shall be thoroughly cleaned of all foreign material, soil, or any other substances that may be detrimental to permeability and the installation of the turf system.

3.04 INSPECTION OF MATERIALS

- A. Prior to installation, and immediately upon delivery of synthetic turf system materials to the project site, the Synthetic Turf Surfacing Contractor shall inspect material as follows:
 1. For damaged or defective items;
 2. Measure turf pile height and thickness of each roll;
 3. Measure backing perforation diameter and spacing;
 4. Reject damaged materials and all materials out of tolerance with this specification.
- B. After installation, inspect project area for acceptable seaming, adhesive bonding, uniformity of color of turf, bubble- and wrinkle-free surface smoothness as laid, field lines and markings, insert installations, edge details. Remove and/or repair deficient workmanship in a manner consistent with these specifications prior to requesting the Field Landscape Architect's inspection pursuant to completion and acceptance of the work.

3.05 OWNER'S TEST

- A. Owner may have samples of the turf submitted and tested for verification of conformance to specifications. Turf system acceptance is subject to the results of these tests.
- B. Any material so tested and found not conforming to specification will be rejected and replaced with material conforming to the specification at Synthetic Turf Surfacing Contractor's expense. Re-submittal shall be required.

3.06 SYNTHETIC TURF INSTALLATION

- A. Perform all work in strict accordance to the drawings, shop drawings and manufacturer's specifications and instructions.
- B. Verification: The Contractor is responsible for inspecting, verifying, and accepting all installed work of this section.
- C. Environmental Conditions: Do not apply adhesive materials or infill material when:
 1. Ambient air temperature is below 40 degrees F.
 2. Material temperatures are below 40 degrees F.
 3. Rain is falling or pending
 4. Conditions exist, or are pending, that will be unsuitable to the installation of the system.

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 16	Synthetic Turf Surfacing
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- D. Preparation:
 1. Accept base onto which the synthetic turf surfacing system and the anchoring system are to be applied, as specified above.
 2. Immediately prior to application of the synthetic turf, the base shall be thoroughly cleaned of all foreign material, soil, or any other substances that may be detrimental to permeability and the installation of the turf system.
- E. Equipment and Access:
 1. Passenger vehicles shall not be allowed to park or staged upon the completed aggregate surface either prior to or during installation of the synthetic turf.
 2. Equipment utilized during construction including compressors, generators, etc. shall be in complete working order, with exhaust systems oriented vertically and away from the synthetic turf surface. At any location where equipment is parked and/or staged on the turf surface during installation, adequate protection of the finish turf surface will be required including, but not limited to heat resistant panels to ensure 100% viability of the finish turf surface and fibers. Should a portion of the turf be damaged as a result of installation techniques, the entire turf panel may be subject to rejection and replacement at the direction of the Field Landscape Architect.
- F. The fabric surface shall be constructed and installed in 15 -foot minimum widths with no longitudinal or transverse seams, except for head or tee seams at field boundaries and inlaid lines within a finished roll assembly.
- G. Rolls that do not lay evenly and with full dimension width will be rejected. No fitted pieces will be allowed to true alignment.
- H. Bonding of Material Surfaces: The bonding or fastening of all system material components shall provide a permanent, tight, secure and hazard-free, athletic playing surface. System material components include:
 1. Bonding all seams and inlaid line and markings
 2. Bonding and seaming must maintain their integrity for total length of warranty period.
- I. Seams:
 1. All turf seams shall be either sewn with high strength polyester fiber cord or nylon or adhered to a supplemental backing material.
 2. Backing layers must lie flat on the field base to provide a uniform pile surface.
 3. The width between fiber rows at the seam locations shall not exceed that of the tufting gauge of the turf materials.
 4. All sewn seams shall be brushed to provide full coverage of fiber over the thread.
- J. Turf Edges: Turf edges to be as shown on the edge fastening detail and nailed at the perimeter.

3.07 LINING / MARKING INSTALLATION

- A. Complete field markings shall be provided with the initial installation of the surfacing system. Provide lines and markings in conformance with these specifications. Layouts shall be accurately surveyed and marked prior to installation.
- B. If overlapping backing materials are utilized for the inlaid lines and markings resulting in a non-permeable surface in excess of 12 inches wide, the backing materials shall be perforated in conformance with section 2.08 after gluing and prior to installation of the infill material.
- C. To the greatest extent practical, lines and markings shall be installed without compromising the primary backing.
- D. Painted lines and markings shall be crisp and distinct, with no weeping or overspray. Application of paint shall be exactly aligned with required dimensions and a guide wire/string line shall be used to produce straight lines.
- E. Contractor shall reapply paint if markings exhibit any appreciable fading or degradation within three months of initial application.

3.08 SYNTHETIC TURF EDGE ANCHOR INSTALLATION

- A. Anchor synthetic turf along the sides and ends with the existing edge nailer board as shown in

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 17	Synthetic Turf Surfacing
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the details. Complete any adjustments/additions to the turf nailer board to ensure the top of the infill meets and matches the top of the concrete or rubberized surface edge directly adjacent to the synthetic turf.

3.09 IN-FILL INSTALLATION

- A. The in-fill material shall be applied in a dry condition and when the synthetic turf is dry.
- B. The synthetic turf installer shall not infringe upon any current or pending patents held by other synthetic turf manufacturers or installers with the installation of the in-fill materials.
- C. The infill materials will be installed with a minimum of 12 applications.
- D. The infill installation shall not result in fiber material trapped below the surface of the infill material. If fiber is trapped below the surface, a portion or all of the infill material must be removed and reinstalled.
- E. The infill material shall be installed at a uniform depth across the entire field area. Infill depths shall not vary by more than +/- 5 mm from the design infill level indicated in the approved submittals across the entire synthetic turf surfacing area
- F. The in-fill materials shall be water settled to provide accelerated consolidation of the in-fill material prior to use by the Owner. Water is available from quick coupling valves located around the field, as well as the washwater/spray system. The Synthetic Turf Contractor shall utilize existing equipment to evenly apply a minimum of 1 inch of water over the entire field area for water settlement. Upon completion of the initial water settlement, the surface will be inspected the Owner and Field Landscape Architect for footing stability and in-fill consolidation. The Synthetic Turf Contractor shall provide any additional water settling as required by the Owner and Field Landscape Architect to achieve the desired level of in-fill stability and consolidation.

3.10 CLEANING

- A. Remove all excess materials of all types, equipment, debris, etc., from the site immediately after completion of the work. Remove all stains and other blemishes from all finished surfaces. Leave work in clean, new appearing condition, ready for use by Owner.
- B. The Contractor shall inspect the entire field area with a hand-held metal detector to identify any construction materials or tools left on the field. All such materials shall be removed prior to Owner occupancy of the field.

3.11 PROTECTION

- A. Adequate protection of materials and work from damage will be the responsibility of the installer during installation and until acceptance of their work. Synthetic Turf Surfacing Contractor will be responsible for protection after the acceptance of the work until final acceptance of all contract work by the Owner. All material damaged prior to acceptance by the Owner shall be replaced at no cost to the Owner.

3.12 EXTRA MATERIALS

- A. Deliver to Owner all extra materials herein specified. Receive Owner's written receipt for all materials. Deliver receipt to Field Landscape Architect.
- B. Infill Materials: Provide four (4) 33-gallon rubber trash containers with lids of each infill material used for each site.
- C. Turf for Future Repairs: Material may be roll-ends or cutoffs; however, each piece of fabric shall be at least 5' x 10'. At least one green piece shall be at least 10' x 15'. The following are minimum areas for the extra synthetic turf materials to be provided by the Synthetic Turf Surfacing Contractor to the Owner:

Minimum Quantities:

- 1. Medium Green Turf: 1,500 sf

Rancho Buena Vista HS Track and Field Replacement	32 1823 - 18	Synthetic Turf Surfacing
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- | | | |
|-----|--------------|-----------------|
| 2. | White Turf: | 100 lf 4" lines |
| 3. | Yellow Turf: | 100 lf 4" lines |
| 4. | Blue Turf: | 100 lf 4" lines |
| 5. | Black Turf | 100 sf |
| 6. | Black Turf | 100 lf 4" lines |
| 7. | Red Turf | 200 sf |
| 8. | Grey Turf | 100 sf |
| 9. | White Turf | 500 sf |
| 10. | Maroon Turf | 500 sf |

3.13 MAINTENANCE EQUIPMENT

- A. Contractor shall uncrate, assemble and demonstrate operation of equipment to Owner and Owner's Representatives.
- B. Following assembly of equipment, Contractor shall complete a minimum four (4) hour training session utilizing the equipment with a variety of maintenance personnel from the Vista Unified School District and Vista High School staff.

3.14 MAINTENANCE

- A. Vendor shall complete maintenance of the synthetic turf field at both 6 months and 1 year after the date of Substantial Completion. Minimum maintenance activities shall include:
 - 1. Inspect and repair as required each inlay and seam.
 - 2. Brush and remove surface debris, loose fibers and any other deleterious material. Use of a rotating, mechanical brush is recommended.
 - 3. Decompact and re-level infill materials. Import and place /top dress new infill material matching original infill materials as needed to establish original infill depth, with original installation height of exposed fiber.
- B. All maintenance activities shall be as approved and directed by the original manufacturer.
- C. All maintenance activities shall be coordinated with scheduled use of the facility and completed at the convenience of the owner and applicable user groups.

END OF SECTION 32 18 23
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**SECTION 32 18 23.10
RUBBERIZED TRACK SURFACING**

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Include all labor, material, equipment, transportation, and services to install complete all-weather track and field surfacing including rubberized running track, high jump, pole vault and long jump runway surfacing as shown on the plans and as specified herein.
- B. Rubberized track surfacing system shall be completed as part of the work by the Contractor.
- C. The system shall include the following:
 - 1. The surfacing for the body of the track shall be a red polyurethane sandwich system with light encapsulated finish. It shall include a rubber base matt bound with polyurethane paved over new or existing asphaltic concrete paving or concrete paving as applicable. The rubber base for all areas of rubberized surfacing shall be sealed with a red pigmented two-component self-leveling polyurethane. All areas of rubberized surfacing shall include a top coating of two component polyurethane red pigmented coating with embedded red EPDM rubber granules.
- C. Provide painted lines and striping as specified.
- D. Coordination and cooperation with all other contractors performing work relating to and affecting the work of this section.
- E. Review of and acceptance of installed work of other trades directly affecting the work of this section.
- F. The surface of all rubberized surfaces must have homogeneous texture. All areas, such as abutting seams that do not have uniform texture must be cut out and resurfaced with acceptable texture and finish appearance.
- G. Apply rubberized surfacing system to the long jump take off boards, and pole vault box covers and provide a full pour "plug" for each pole vault box.
- H. Warranty package.

1.02 RELATED WORK IN OTHER SECTIONS

- A. 32 18 23 Synthetic Turf Surfacing

1.03 STANDARD SPECIFICATIONS

- A. International Association of Athletic Federations (IAAF)
- B. NFSHSA Track & Field Rules (Latest edition)
- C. ASTM F 2157-09 Standard Specification for Synthetic Surfaced Running Tracks
- D. ASTM D2859-06(2012) Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.

1.04 PRE-APPROVED VENDORS/INSTALLERS

- A. Vendor for the rubberized field event surfacing shall be the same as the rubberized track surfacing. The following vendors/installers are pre-approved for installation of the rubberized running track and field event surfacing:
 - 1. Beynon Sport Surfacing (509) 840-1585
 - 2. Hellas Construction (512) 250-2910
 - 3. AstroTurf/Rekortan (760) 749-0583

1.05 SUBMITTALS

- A. Experience, References, and Installation:
 - 1. Vendors shall provide proof of IAAF Certification for all new, full-profile surfaces to be

Rancho Buena Vista HS Track and Field Replacement	32 1823.10 - 1	Rubberized Track Surfacing
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- installed under the Contract.
2. All vendors which are not pre-approved shall submit written evidence of a five-year minimum successful experience record of Manufacturer/Supplier/Installation team in the installation of a minimum of twenty (20) similar projects for NFHS track and field facilities that include poured-in-place, two-component elastomeric polyurethane synthetic track surfacing. List locations, client, client contact names, address, telephone, material installed, date of installation, general contractor (if any), whether a new project or a resurfacing.
 3. The material manufacturer must have a minimum of 5 years of experience with compound two-part polyurethane for athletic surfaces. Track vendors/ installers with less than this minimum experience record are not acceptable.
- B. Striping:
1. A minimum of 30 calendar days prior to the scheduled commencement of the surfacing installation, the Contractor shall submit to the Field Landscape Architect the name of track marking subcontracting firm and surveyor, their proposed foremen and key personnel, along with their experience record. The Field Landscape Architect must approve the marking subcontractor.
- C. Track Striping Shop Drawings
1. The Contractor shall submit a minimum of 30 calendar days prior to the scheduled commencement of the surfacing installation, complete and detailed track striping and marking plan with calculations showing all conditions of installation, connection to other work, dimensions, size, shape, color, and location of all lines and markings, including hurdle markers, lane numbers, relay exchange zones, etc. Drawings shall show the entire track on one sheet at 1"=20' scale.
 2. This shop drawing is for Field Landscape Architect review. The Contractor is not to proceed with painting until the drawing is approved by Field Landscape Architect or, as may be required, resubmitted for approval with revisions.
- D. Manufacturer's Specifications: Within 7 calendar days after Notice of Award, the Contractor/Vendor shall submit to the Field Landscape Architect for approval five copies of each of the selected manufacturer's surfacing material specifications and installation instructions.
- E. Sample Warranty Package: Within 21 calendar days after Notice to Proceed, submit to the Field Landscape Architect for review five (5) sample copies of the surfacing warranty package herein specified.
- F. Maintenance and Operating Data:
1. Furnish to the Field Landscape Architect, in manual form, four (4) copies of maintenance and operating data prior to final acceptance.
 2. Manual shall be enclosed in a hard cover with the following information appearing on the outside of the cover: Project name, Owner's name, Field Landscape Architect's name, Rubberized Surfacing, Consultant's name, Prime Contractor's name, Year of project completion
 3. Index manual with tab dividers for data as follows:
 - a. Materials installed with their characteristics
 - b. General maintenance
 - c. Lining and marking installation
 - d. Lining and marking removal
 - e. Small repair procedures
 - f. Discussion on precautions to be practiced and general maintenance and procedures to be avoided to prolong surface life and to maintain installation's warranty.
 - g. Snow removal procedures
 - h. Copy of warranty document

Rancho Buena Vista HS Track and Field Replacement	32 1823.10 - 2	Rubberized Track Surfacing
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1.06 QUALITY CONTROL

- A. Area and Base Acceptance:
 - 1. The Contractor/Surfacing Subcontractor/Installer (as applicable) shall inspect, verify and accept in writing to the Field Landscape Architect, all installed work of other trades directly affecting the work of this section and prepare existing surfaces.
 - 2. Installer must examine the areas and conditions in which rubberized surfacing is to be installed. The asphaltic concrete or concrete paved base shall be inspected for conformity with the lines and grades.
 - 3. The installer is to coordinate the required curing of any new asphalt concrete paving with the Prime Contractor prior to placing the first lift of rubberized surfacing.
- B. Track Marking Certification
 - 1. Upon completion of the track markings, the Contractor shall furnish an acceptable document or certificate of accuracy to the Owner attesting to the accuracy of the track markings and measurements and shall include copies of the computations, calculations, and drawings that were used to obtain this accuracy.

1.07 TESTS

- A. The Owner reserves the right to submit the surface system to various tests to verify whether or not surfacing system meets the minimum specifications or manufacturer's submitted specifications. Any section of the system so tested that is found to be out of specification shall be removed and replaced to the proper specification, at the sole expense of the Contractor.

1.08 WARRANTY

- A. In addition to the general warranty specified in the General Conditions of the specifications, an additional four-year vendor warranty (5-year total) for the rubberized surfacing system shall be provided to the Owner by the track surfacing vendor, protecting Owner against all manufacturing, material and installation defects associated with materials and workmanship under this section. Warranty to extend from date of final acceptance by Owner.
- B. Warranty shall cover in general the usability of the installed surfacing system, accessories use characteristics, suitability of the installation for the period specified, and for the designated uses enumerated as follows:
 - 1. Track and field events with spiked shoes
 - 2. Physical exercises
 - 3. Physical education activities
 - 4. Marching band
 - 5. Cheerleading activities
 - 6. Pneumatic rubber-tired maintenance and service vehicles
 - 7. Pedestrian traffic and other similar uses
 - 8. Community running and jogging
 - 9. Wheelchair traffic
- C. Conditions of the Warranty: Warranty shall agree to promptly repair or replace work, which deteriorates excessively or otherwise fails to perform as required due to failures of materials and workmanship. Striping and other painted markings are excluded from the warranty. For the purposes of this warranty, excessive deterioration is defined as a loss of fifty (50%) of the wearing surface or granular loss. Failure of material and workmanship is defined to include, but is not limited to, delaminating of the track from its asphaltic concrete base, or from integral layers of surfacing material, and leaching of binders or other surfacing components. All defects are to be promptly repaired. If the warrantor does not initiate repair work within 21 calendar days from receipt of complaint in writing, adverse weather conditions accepted, the Owner shall have the right to order the work performed by others and the warrantor shall be liable for costs accruing to the Owner.
- D. The parent company or corporation of the track surface installation firm shall issue the warranty. The warranty shall be signed by an authorized principal of the applicable firm,

Rancho Buena Vista HS Track and Field Replacement	32 1823.10 - 3	Rubberized Track Surfacing
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- duly-authorized to make contracts.
- E. A separate warranty from the General Contractor, the Track Installer and/or the Striping Subcontractor shall be issued for the marking and striping guaranteeing applied painting for a period of two (2) years from fading in color and intensity plus cracking or separating from the track surface.

PART 2 PRODUCTS

2.01 BASE MATT COMPOSITION

- A. A primer shall be applied to the asphalt or concrete pavement base prior to installation of the base matt. The primer shall be polyurethane base as specified by the surfacing system manufacturer.
- B. The base matt shall be composed of SBR rubber granules and single component polyurethane binder. The base matt shall be comprised of a maximum of 80% SBR and a minimum of 20% single component polyurethane by weight.
- C. The base matt layer shall be a minimum of 10 mm thick.
- D. SBR Rubber Granules:
1. The granules shall be recycled styrene butadiene rubber (SBR). There shall be no traces of fiber or steel with granulate.
 2. SBR shall be sourced from North America.
 3. Granulate particles shall meet the following gradation requirements:

Particle Size	Percentage by Weight
0-1.0mm	3.5%
1.0-2.0mm	15-25%
2.0-3.0mm	30-40%
3.0-4.0mm	30-40%
Larger than 4.0mm	0-5%

- E. Polyurethane Binder:
1. For the base layer utilize single component polyurethane.
 2. No mercury, lead or other heavy metals are to be present.
 3. No solvent or fillers are to be added.
 4. The polyurethane binder shall be manufactured in North American or Western Europe by a manufacturer that meets the experience requirements listed in subsection 1 of this section. The polyurethane manufacturer shall provide proof of IAAF Certification for all new, full-profile surfaces to be installed under the Contract.

2.02 BASE MATT SEALANT

- A. The base layer shall be sealed with two-component self leveling polyurethane or a combination of two-component self leveling polyurethane and fine mesh EPDM rubber. Sealant polyurethane and EPDM shall be pigmented red. If fine mesh EPDM is not added, an application rate of 3.0 lb./SY is required.
- B. The two-component polyurethane shall be self-leveling and compounded from pigmented polyol and MDI based isocyanate with no solvents or fillers added.
- C. The two-component polyurethane shall be manufactured in North American or Western Europe by a manufacturer that meets the experience requirements listed in subsection 1 of this section. The polyurethane manufacturer shall provide proof of IAAF Certification for all new, full-profile surfaces to be installed under the Contract.
- D. EPDM:
1. The granules may include shall be composed of fine mesh peroxide cured Ethylene Propylene Dien Polimerisat (EPDM) rubber.
 2. Granules shall have a specific density of 1.6 +/- 0.08.

Rancho Buena Vista HS Track and Field Replacement	32 1823.10 - 4	Rubberized Track Surfacing
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3. Materials to have shore hardness from 55 to 60.
4. Sulphur cured rubber is unacceptable.
5. EPDM Granulate shall be Melos GmbH, Gezolan Ag, or approved equal.

2.03 TOP COAT

- A. The top coat shall be comprised of pigmented two component polyurethane and embedded pigmented EPDM rubber granules. The top coat shall be installed with multiple applications of 60% two component polyurethane and a maximum of 40% EPDM granules. The minimum depth of the top coat shall be 5.0 mm.
- B. The two-component polyurethane shall be self-leveling and compounded from pigmented polyol and MDI based isocyanate with no solvents or fillers added.
- C. The two-component polyurethane shall be manufactured in North American or Western Europe by a manufacturer that meets the experience requirements listed in subsection 1 of this section. The polyurethane manufacturer shall provide proof of IAAF Certification for all new, full-profile surfaces to be installed under the Contract.
- D. The granulate for the top coat shall be composed of peroxide cured Ethylene Propylene Dien Polimerisat (EPDM) rubber. The EPDM granules shall meet the following requirements:
 1. The granules shall be composed of peroxide cured Ethylene Propylene Dien Polimerisat (EPDM) rubber.
 2. Materials to have shore hardness from 55 to 60.
 3. Granules shall have a specific density of 1.6 +/- 0.08.
 4. Sulphur cured rubber is unacceptable.
 5. The granules are to be graded from 1.0 mm to 3.0 mm in size.
- E. The top coat EPDM rubber granules and two component polyurethane shall be pigmented red.

2.04 ENCAPSULATION

- A. The top coat encapsulation layer shall consist of a single component pigmented elastomeric water based polyurethane spray consistent and compatible in color and performance with underlying materials.

2.05 PHYSICAL PROPERTIES OF SANDWICH SYSTEM

- A. The synthetic track surfacing system shall exhibit the following minimum performance standards as required by IAAF:

Thickness	> 13mm
Force Reduction	35 to 50%
Modified Vertical Deformation	0.6 to 1.8mm
Friction	> 47 TRRL Skid Resistance
Tensile Strength	> 0.5MPa
Elongation at Break	> 40%

- B. The synthetic track surfacing system shall exhibit the following minimum performance standards per ASTM:

Tensile Strength (D-412-61T)	300psi
Impact Resilience (D-2632)	0%
Compression Set (D-395-b)	90% - 95%
Compression Modulus (D-575-49):	10% and 50% 8kp/90kp
Gliding Behavior	Wet 0% - Dry 0%
Resistance to oil and normal cleaning solutions	Favorable

- C. The entire synthetic track surfacing system shall meet the acceptance criteria of ASTM D 2859-

Rancho Buena Vista HS Track and Field Replacement	32 1823.10 - 5	Rubberized Track Surfacing
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06(12), in which the ignition source/flame shall self-extinguish without igniting the track surfacing or reaching the test ring.

2.06 TRACK LINING AND MARKING

- A. The Contractor shall retain a Professional Engineer or Land Surveyor licensed in the State of California to layout the track markings. Calculate locations of specified event markings. The calculations shall be made to the nearest 1/10,000th of a foot and angles to the nearest second.
- B. A complete track lining and marking system shall be provided.
- C. All lines and markings are to have true sharp edges with no weeping.
- D. Marking Paint: The paint shall be polyethylene based, specifically manufactured to be compatible with and formulated for application on polyurethane synthetic track surfaces.
- E. Provide layouts in accordance with NFSHSA for the following events:

<i>Event</i>	<i>Notes</i>
100 METER HURDLES	Both directions
110 METER HURDLES	Both directions
300 METER HURDLES	1 Turn Stagger
100 METER DASH	Both directions
200 METER DASH	1 Turn Stagger
400 METER DASH	2 Turn Stagger
800 METER RUN	1 Turn Stagger
800 METER RUN	Waterfall start
1600 METER RUN	Waterfall start
3200 METER RUN	Waterfall start
4 x 100 METER RELAY	2 Turn Stagger
4 x 200 METER RELAY	3 Turn Stagger
4 x 400 METER RELAY	3 Turn Stagger
1 MILE RUN	Start Mark
2 MILE RUN	Start Mark
5000 METER RUN	Waterfall start
10000 METER RUN	Waterfall start

- F. Other markings shall include:
 1. Relay Exchange Zones: Colors as recommended in NFSHSA; solid equilateral triangles with side dimensions equal to clear distance between lane lines at both ends of exchange zone in each lane.
 2. Lane Numbers: Five sets of lane numbers "1" through "9", inclusive, with black shadowing as approved by the Field Landscape Architect. Separate templates are to be utilized for shadowing. Lane numbers shall be not less than 3" stroke and not less than 24" high.
 3. Lane lines shall be white.
 4. A black 2" x 2" square shall be painted at the intersection of the common finish line at each lane line
 5. Long Jump Runways shall be marked at 5 ft. intervals, beginning at the edge of the first take off board to the end of each runway. Markings shall consist of a 1" x 2" rectangle for the 1 ft. markings and a 2" equilateral triangle for the 5 ft. markings, with distance from the point of beginning indicated every 10 ft.
 6. Pole Vault Runway markings shall consist of a 1" x 2" rectangle for the 1 ft. markings and a 2" equilateral triangle for the 5 ft. markings, with distance from the point of beginning indicated every 10 ft. Additional markings/gradations shall be included at the center of the runway, approaching the vault box and take off area.
 7. Graphic lettering aligned with the 50 yard line of the field including "RANCHO BUENA VISTA HIGH SCHOOL" in lane 4 on the home side and "LONGHORNS" in lane 6 on the

home side. Color to be white, with black shadow. Lettering style to match field markings.

PART 3 EXECUTION

3.01 PREPARATION

- A. Accept the conventional asphaltic concrete or concrete base onto which the surfacing is to be applied.
- B. Immediately prior to application, all base construction shall be thoroughly cleaned of all dirt, debris or any other substances that will be detrimental to the installation.
- C. Apply such priming material as may be necessary to assure complete bond of polyurethane to the asphaltic concrete, and concrete base surfaces.
- D. Contractor must protect all adjacent areas from any contamination from rubberized surfacing installation procedures. Affix plastic sheeting to adjacent fences and pavements as necessary.

3.02 INSTALLATION

- A. General:
 - 1. Only experienced, specialized personnel are to be utilized in the installation of surfacing materials and applying the line and marking points. The Superintendent and the supervisory or technical personnel must be employees of the vendor/installer firm.
 - 2. Install in strict accordance with the specifications, drawings, approved shop drawings and manufacturer's specifications and instructions, when applicable.
- B. Environmental Conditions: Materials are not to be placed when:
 - 1. Ambient air temperature is below 50 degrees F.
 - 2. Material temperatures are below 50 degrees F.
 - 3. Surfaces are wet or damp.
 - 4. Precipitation is falling or pending.
 - 5. Conditions exist or are pending that will be unsuitable for the installation of the system.
- C. Equipment: The components shall be blended in a clean and dry, specifically designed, mixing machine with automatic proportioning controls to guarantee exact proportions of the polyols and isocyanates and the auxiliary components (rubber) which control the reactions and balance of the varying climatic conditions during the laying process.
- D. Base Matt Installation:
 - 1. The base layer shall be mechanically mixed to obtain a homogeneous mixture of 20% polyurethane and 80% SBR rubber granulate.
 - 2. Base material to be placed utilizing a mechanically operated finisher with an electrically heated, oscillating finishing screed bar.
 - 3. The base layer shall be placed with a minimum finished thickness of 8.0 mm as applicable.
- E. Base Matt Seal Coat Installation:
 - 1. The base layer for all areas shall be sealed with a two-component self-leveling polyurethane. Material shall be flow applied at the rate of 2.4 lbs./SY and may be mixed with up to .8lbs / SY of fine mesh EPDM. If fine mesh EPDM is not added, an application rate of 3.0 lbs./SY is required.
 - 2. The two-component polyurethane shall be homogeneously mixed in accordance with the manufacturer's recommendations.
 - 3. The material shall be uniformly applied over the entire surface with sufficient amounts to seal the base matt resulting in an impervious surface.
- F. Top Coat Installation
 - 1. The two-component polyurethane shall be homogeneously mixed in accordance with the manufacturer's recommendations.
 - 2. The material shall be uniformly applied over the entire surface in multiple lifts to provide a

Rancho Buena Vista HS Track and Field Replacement	32 1823.10 - 7	Rubberized Track Surfacing
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- minimum depth of 5.0mm.
- 3. The EPDM granules shall then be broadcasted over the surface at a minimum rate of 9 lbs per square yard.
- 4. The EPDM granules shall be broadcast evenly to provide a uniform surface texture.
- 5. The 1.0mm to 3.0mm EPDM granules shall be embedded into the two-component polyurethane to achieve the full depth of the 5mm wearing course.
- G. Light Encapsulation Installation
 - 1. The light encapsulation coat shall be applied in two (2) coats at the rate of .3 lbs./sq. yd. The coats must be applied in opposite directions and should be applied with an airless sprayer.

3.03 FINISH

- A. The finished rubberized track and field event surfacing shall not vary more than +3.0mm and -0.0 mm in 3 meters, measured in any direction as gauged from a straight edge. No reverse slopes or depressions will be allowed. The completed surface of the track and field events shall be of uniform texture and grade, and be free from defects of any kind.
- B. Contractor must protect all adjacent areas from any contamination from track installation procedures. Discoloring of any surfaces will be cause for required replacement if cleaning is deemed unacceptable by the Field Landscape Architect.

3.04 LINING AND MARKINGS

- A. Surfaces must be completely dry before and during paint application. Temperature must not be below 50°F when painting.
- B. Lines to be applied to sides of runways.
- C. All lines and markings to have true sharp edges with no weeping.
- D. Marking and striping plan to be submitted for approval prior to start of painting. Minor adjustments to marking shall be directed by Field Landscape Architect/Owner prior to starting.
- E. Event Markings: Provide layouts in accordance with NFSHSA.

3.05 CLEANING

- A. Remove all excess materials of all kinds, equipment, and debris from the site immediately after completion of the work.
- B. Remove all paint splatters, spots, stains, and other blemishes from all finished surfaces. Rubberized surfaces must have a new, uniform appearance.
- C. Leave work in clean condition ready for use by the Owner.

3.06 PROTECTION

- A. Adequate protection of damage from materials and work will be the responsibility of the Contractor during installation and until acceptance of this work. The use of the field and track areas shall be closed by the contractor and restricted from use by all users not authorized to enter the site until turnover of the track surface has been achieved. The Contractor will be responsible for protection of the synthetic turf field and rubberized track and field events until after the completion of the work and final acceptance of all contract work.
- B. All damaged material prior to, during and after installation shall be replaced at no cost to the Owner.

END OF SECTION 32 18 23.10
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Rancho Buena Vista HS Track and Field Replacement	32 1823.10 - 8	Rubberized Track Surfacing
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**SECTION 32 18 23.20
FIELD IMPORTED SANDS**

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install jump pit sand in long jump landing areas.

1.02 SUBMITTALS

- A. The Contractor shall submit sieve analysis for the jump pit sand materials.

1.03 RELATED WORK IN OTHER SECTIONS

- A. 11 68 24 Exterior Athletic Equipment
- B. 31 22 16.23 Field Subgrade Establishment
- C. 33 46 16.13 Field Subsurface Drainage

1.04 TESTING

- A. The Owner will be performing testing of materials delivered to the job site for the purpose of verifying compliance with the contract documents. The Owner's testing is for this purpose only and not for construction quality control by the Contractor.
- B. The Contractor shall provide testing and surveillance as required to assure materials and work fully comply with contract requirements.
- C. Owner's tests that do not meet specifications shall be paid for by the Contractor at a price equal to the Owner's contract testing agreement. The Contractor shall pay directly to testing organization upon invoice which has been approved by the Engineer.

PART 2 MATERIALS

2.01 JUMP PIT SAND

- A. The material shall be clean, natural sand, dry, conforming to ASTM "Fine Aggregate". The sand shall meet the following gradation:

<u>Sieve Size</u>	<u>% Passing</u>
No. 4	100
No. 10	100
No. 18	90-100
No. 35	45-55
No. 60	5-8
No. 100	0 – 3
No 150	0-2
No. 270 (wet sieve)	0 – 1

- B. Quality Standard shall be Gillibrand "ProTour" (805) 526-2195.

PART 3 EXECUTION

3.01 JUMP PIT SAND PLACEMENT

- A. Place materials so as to establish a minimum of finish settled depth, as specified on the drawings, and fine grade entire surface to final elevations shown; water settle and roll to achieve consolidated settled depth. Add material as necessary to achieve finish grade. Protect the

Rancho Buena Vista HS Track and Field Replacement	32 1823.20 - 1	Field Imported Sands
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- concrete curbing and adjacent surfaces during the sand installation.
- B. Apply moisture as necessary to settle for stabilization.
 - C. Finish grade tolerance is +0.10' and -0.00' to grading plan. Constant relative surface slope is to be maintained where indicated.

END OF SECTION 32 18 23.20
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Rancho Buena Vista HS Track and Field Replacement	32 1823.20 - 2	Field Imported Sands
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**SECTION 32 3113
CHAIN LINK FENCING AND GATES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Types of Fence
 - 1. Buried perimeter fencing shall be a fence with 8'-0" of chain link fabric, top, and bottom rails. The bottom rail and fabric shall be buried 6" below grade.
 - 2. Standard fencing shall be a fence with 8'-0" of chain link fabric and top rails. If required the bottom rail shall be within two inches above the finish grade.
 - 3. Standard fencing will be used as non-preimeter fences and for perimeter fences placed over concrete or asphalt paved surface. Exceptions to this rule shall be indicated on drawings.
 - 4. Safety Netting for sports fields.
- B. Relocation of Existing Fencing
 - 1. Any existing fence to be removed and relocated shall be taken down, have concrete broken off posts, and be reinstalled in accordance with these specifications. The contractor is permitted to keep the removed posts and install new posts. Splicing posts by welding is not permitted.
- C. Underground Utilities
 - 1. Identification and repair of any and all underground utilities (irrigation, power, water, and low voltage wiring) affected by work being done is the responsibility of the contractor.

1.02 REFERENCE STANDARDS

- A. ASTM A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 1989a.
- B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware - 1995.
- C. ASTM A 392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric; 1996.
- D. ASTM C 94 - Standard Specification for Ready-Mixed Concrete; 1996.
- E. ASTM F 567 - Standard Practice for INSTALLATION of Chain-Link Fence; 1993.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.
- C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

1.04 QUALITY ASSURANCE

- A. Chain link fence material shall be produced and installed by methods recognized as good commercial practices in accordance with the Chain Link Fence Manufacturers Institute.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- C. Gates that are part of the accessible route shall meet all the requirements of an accessible door in compliance with CBC section 11B-404.
- D. The lever actuated latches or locks for an accessible gate shall be curved with a return to within 1/2" of the (face of) gate to prevent catching on the clothing or persons per California Referenced Standards code, T-24 Part 12, Section 12-10-202, Item (F).
- E. Swing doors and gate surfaces within 10" of the finish floor or ground shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16" of the same as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped per CBC section 11B-404.2.10.

Rancho Buena Vista HS Track and Field Replacement	32 3113 - 1	Chain Link Fencing and Gates
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PART 2 PRODUCTS

2.01 MATERIALS

- A. Posts, Rails, and Frames: ASTM F 1083 Schedule 40 hot-dipped galvanized steel pipe, welded construction, minimum yield strength of 25 ksi.
- B. Wire Fabric: ASTM A 392 zinc coated steel chain link fabric.
- C. Concrete: ASTM C 94; Normal Portland Cement, 2,500 psi strength at 28 days, 3 inch slump; 3/4 to 1 inch nominal sized coarse aggregate.
- D. Fencing Materials: Posts, gate frames, braces, rails, stretcher bars, truss rods and tension wire shall be of galvanized steel. Gate hinges, post caps, stretcher bar bands, bolts, hardware, and other parts shall be of steel, malleable iron, ductile iron, except that post tops, rails ends, clips may be of aluminum. All fencing, pipe, fabric, and accessories shall conform to the specifications described in the "Product Manual" published by the Chain Link Fence Manufacturers Institute unless further restricted by this section.

2.02 COMPONENTS

- A. Line Posts: All line posts shall be nominal 2-3/8"inch, 2.375 inch O.D. galvanized tubing for fabric height up to 8 feet, and 2-7/8 inch O.D. for fabric height over 8 feet to 16 feet or less.
 - 1. 8' fabric height, with netting above - 2.875" o.d. steel pipe, 5.79 lbs. per l.f.
- B. Terminal Posts: Angels, corners, ends and pull posts shall be nominal 3-7/8 inch schedule 40 galvanized tubing for fabric height up to 8 feet, and, 4 inch O.D. for fabric height over 8 feet to 16 feet or less. 2.88 inch.
- C. 20' height, 6 5/8" o.d. Schedule 40 steel pipe, 18.99 lbs. per l.f., A-53, Grade B.(8' fence fabric height with 12' net fabric above)
- D. All posts shall be A-53, Grade B Steel.
- E. Top and Brace Rail: All top rails shall be nominal 1-5/8 inch schedule 40 galvanized tubing. Top rails shall be provided with expansion coupling and shall be securely fastened to gate and terminal posts by means of suitable hot-dipped galvanized connections. Top rail shall pass through the extension arms to form a continuous brace from end to end of each stretch of fence.
- F. Bottom Rail: All bottom rails shall be nominal 1-5/8 inch, 1.625 inch O.D schedule 40 galvanized tubing. Bottom rail shall be installed in accordance with manufacturer's directions using couplings.
- G. Gates: Gate frames shall be nominal 1-5/8 inch, O.D. schedule 40 galvanized tubing welded at all joints to provide rigid water-tight construction. Gate fabric shall match the line fence fabric in all regards with the exception of the mesh size which shall be 1 inch on the gates. Gates shall be 8-feet high with heavy malleable iron extension arms as previously described. Swing gates shall be furnished with pivot-type hinges, center stop, and hold open devices. Gates shall provide clear openings as shown on the drawings.
- H. Gate Posts
 - 1. Man Gate Posts: Posts shall be 4" OD schedule 40 galvanized steel pipe.
 - 2. Drive Through Gate Posts: Posts shall be 6-5/8" OD schedule 40 galvanized steel pipe.
 - 3. All gate posts shall be provided with heavy malleable iron extension arms as previously described.
- I. Fabric shall be ASTM A392, Class 1, zinc coated (1.2 oz.), steel wire/fabric, woven in a 2 inch mesh size, 9 gauge coated wire size, galvanized after weaving, with salvage knuckle end closed, bottom salvage knuckle end closed.
- J. Tension Wire: 9 gage thick steel, single strand.
- K. Tension Bar shall be 3/16" x 3/4 inch hot-dipped galvanized steel.
- L. Tie Wire: 9 gauge steel tie wire and hog rings zinc coated.
- M. Pipe: All posts, braces, rails and gate framing members shall be coated with zinc by the hot-dip process after fabrication. The strip steel used in the manufacturer of the pipe shall conform to

Rancho Buena Vista HS Track and Field Replacement	32 3113 - 2	Chain Link Fencing and Gates
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either ASTM A-120 (Schedule 40) or ASTM A0569 (SS 40 by Allied Tube and Conduit Corporation or equal). Pipe conforming to ASTM A-120 shall receive not less than 1.8 ounces per square foot of zinc coating. Pipe conforming to ASTM A-569 shall be triple coated with a minimum of 0.9 ounces per square foot of zinc, 15 micrograms per square inch of chromate, and 0.3 mils of polyurethane finish. Pipe shall be straight or have an installed deflection not greater than 1/2" per span or post.

- N. Bracing: Rails shall be nominal 1-5/8 inch, 1.660 inch O.D. schedule 40 galvanized tubing with adjustable truss braces 3/8" in diameter and all fittings hot-dipped galvanized. All end and corner posts, unless otherwise shown, shall be suitably braced with pipe set in horizontal position, with adjustable truss braces between terminal and first line posts, complete with all fittings. Terminal posts shall be braced laterally in an approved manner.

2.03 ACCESSORIES

- A. Caps: Formed steel, malleable cast iron, or aluminum, sized to post diameter with set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.
- C. Gate Hardware at Maintenance Gate Only: Fork latch with gravity drop; two 180-degree gate hinges per leaf and hardware for padlock.
- D. Accessible Gate Hardware: Refer to drawings and details.
 - 1. Gates equipped with panic hardware shall utilize the following hardware:
 - a. Von Duprin 99EO-626-299 w/ PA option.
 - b. Von Duprin 994L-626 Trim w/ breakaway lever.
 - c. Falcon Rim Cylinder 953-626.

2.04 FINISHES

- A. Components (Other than Fabric): Galvanized in accordance with ASTM A 123, at 1.8 oz/sq ft.
- B. Hardware: Galvanized to ASTM A 153/A 153M, 1.3 oz/sq ft coating.
- C. Accessories: Same finish as framing.

2.05 CODE REGULATIONS

- A. Gates that are part of the accessible route shall meet all the requirements of an accessible door in compliance with CBC section 11B-404.
- B. The levers of lever actuated latches or locks for accessible gates shall be curved with a return to within 1/2" of the gate surfaces to prevent catching on the clothing or persons. California Referenced Standards Code T-24 Part 12, Section 12-10-202, Item (F).
- C. Swing doors and gate surfaces within 10" of the finish floor or ground shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16" of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped. CBC section 11B-404.2.10.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that line of fence has been properly identified.
- B. Verify that proper grade has been established.
- C. Verify location of underground utilities and structures.
- D. Begin fence construction only after adequate clearance on both sides of fence is available.

3.02 INSTALLATION

- A. Concrete Placement: Posts and gate hold open devices shall be placed in concrete. Concrete shall meet the minimum requirements of Section 03 3000 Cast-In-Place Concrete.
- B. Post Setting and Spacing

Rancho Buena Vista HS Track and Field Replacement	32 3113 - 3	Chain Link Fencing and Gates
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1. All posts shall be spaced in the line of fence not to exceed 10-foot centers for a fence not exceeding 8 feet and 8-foot centers for a fence height greater than 8 feet not exceeding 16 feet.
 2. All post shall be set in a concrete foundation to a depth of not less than 36 inches for a fence not exceeding 8 feet and a minimum of 60 inches for a fence height greater than 8 feet not exceeding 16 feet.
 3. Set terminal posts (end, corner, and gate) at beginning and end of each continuous length of fence and at abrupt changes in vertical and horizontal alignments.
 4. Coordinate supply and Installation of Softball Field Foul Poles as corner/terminal posts within the run of outfield fence for the Softball Field.
- C. Install framework, fabric, accessories and gates in accordance with ASTM F 567. The fence erection, including all connections, shall be made in accordance with manufacturer's directions and the "Product Manual" published by the Chain Ling Manufacturers Institute.
- D. Place fabric on outside of posts and rails. Fabric shall be stretched out enough to resist a 6-inch deflection laterally, top or bottom, when force is exerted with the hand. Fabric shall be attached to and supported by terminal and gate posts by means of 3/16 x 3/4 inch hot-dipped galvanized tension bars.
1. Fabric shall be fastened to line posts and to the top and bottom rails by means of tie wire spaced approximately two feet apart. There shall be two complete wraps made with the tie wire around the fabric on all perimeter security fence.
 2. Posts bracing and other structural members of the fence shall be located on the inside of the security fence.
 3. The fence and gate fabric for fences 16 feet in height shall be 2 pieces of 8 foot high 9 gauge material overlapped 4 inches and hog tied every 12 inches using 9 gauge galvanized steel wire per SNL Standard Drawing CJI005STD.
- E. Set intermediate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.
- F. Line Post Footing Depth Below Finish Grade: ASTM F 567.
1. For fence less than 5'-0" in height footing shall be 32" dep, for fences between 5'-0" and 8'-0" footings shall be 36" deep.
 2. Diameter - 12" minimum.
- G. Corner, Gate and Terminal Post Footing Depth below Finish Grade: ASTM F 567. All posts shall be spaced in the line of the fence not to exceed 10-foot centers for a fence height not exceeding 8 feet. Gate post footings shall be a minimum of 12" in diameter and a minimum of 36" deep. Terminal and corner post footings shall be a minimum of 4 times the O.D. of the post diameter and 32" in depth for gates under 5'-0" and 36" deep for fences over 5'-0", but under 8'-0".
- H. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gateposts. All ends of corner posts, unless otherwise shown, shall be suitably braced with pipe set in horizontal position, with adjustable truss braces between terminal and first line of posts, complete with all fittings.
- I. Provide top rail through line post tops and splice with 6-inch long rail sleeves. Top rail shall pass through the extension arms to form a continuous brace from end to end of each stretch of fence.
- J. Install center brace rail on corner gate leaves.
- K. Do not stretch fabric until concrete foundation has cured 48 hours.
- L. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- M. Position bottom of fabric 2 inches above finished grade.
- N. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire or hog rings at maximum 15 inches on centers.
- O. Attach fabric to end, corner, and gateposts with tension bars and tension bar clips.
- P. Do not attach the hinged side of gate to building wall: provide gate posts.

- Q. Install gate with fabric to match fence. Install two hinges per leaf up to 4 feet, and 3 hinges per leaf anything over 4 feet, with latch, catches, and drop bolt.
- R. All bolts shall be cut flush on the face of the nut, and shall have a smooth surface.
- S. All screw, nuts, bolts, bars, wire mesh, hinges and hinge pins shall be securely fastened inward to preclude surreptitious removal and assure visual evidence of tampering. All bolts protruding into areas of travel or that will pose a threat of injury will be cut so as only 2 or less threads are exposed beyond the nut.
- T. Hardware accessible from outside the area shall be restrained by peening, brazing or spot welding to preclude removal.
 - 1. Exceptions: Carriage bolts with round head need not be restrained when used to connect top or bottom rail, latches or center stop. Carriage bolts need not be restrained when used on hardware where the nut is not accessible from the outside.
 - 2. Exceptions: Bolts and hardware on fence other than perimeter security fence shall not be restrained unless directed otherwise.
- U. Surfaces that have been cut, filed, or where the galvanized coating has been damaged shall be coated with a zinc enriched paint, anti corrosive aluminum paint or suitable substitute to prevent corrosion per ASTM A-780.
- V. Clearances
 - 1. The bottom rail shall be installed so that it is not over 2 inches above grade at any point (standard fence only).
 - 2. Provide suitable closure at irregularities in grade, such as curbs or ditches.
 - a. Provide suitable extension from the bottom rail made from an equivalent material.
 - b. Fabric closures shall be sufficiently secured to the bottom rail and extensions with fabric ties, Overlap the fabric for the enclosure a minimum of 6 inches above the bottom rail.
 - 3. Vertical posts shall not exceed 5 inches open space to the adjacent post or solid structure.
 - 4. Gates in the closed position shall have vertical and horizontal clearances not greater than 6 inches.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 1/8" Tolerance.
- B. Maximum Offset From True Position: 1/2 inch.
- C. Components shall not infringe adjacent property lines.
- D. The bottom rail shall be installed so that it is not over 2 inches above grade at any point.
- E. Vertical posts shall not exceed 6 inches open spaces to the adjacent post or solid structure.
- F. Gates in the closed position shall have vertical and horizontal clearance not greater than 6 inches.
- G. Provide suitable closure at irregularities in grade, such as curbs or ditches. This can be accomplished with suitable extensions from the bottom rail made from an equivalent material. Vertical posts shall not exceed 6 inches open spaces to the adjacent post or solid structure. If fabric is utilized in the closure it shall be sufficiently secured to the bottom rail and extensions with fabric ties. Overlap the fabric for the enclosure a minimum of 6 inches above the bottom rail.

3.04 PROTECTION

- A. Protect installed fencing and gates from subsequent construction operations.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	32 3113 - 5	Chain Link Fencing and Gates
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**SECTION 32 84 00
WASHWATER AND LANDSCAPE IRRIGATION**

PART 1 GENERAL

1.01 SUMMARY

- A. It is the intent of the specifications and drawings that the finished system is complete in every respect and shall be ready for operation satisfactory to the School District.
- B. The work shall include all materials, labor, services, transportation, and equipment necessary to perform the work as indicated on the drawings, in these specifications, and as necessary to complete the contract.
- C. The new improvements will connect existing mainline and valves as indicated on the drawings. A new backflow prevention device, controller and conductors serving the affected area and others will be installed as follows:
 - 1. Furnish and install new point of connection including but not limited to piping, Reduced Pressure Principal backflow device, valves, boxes, etc.
 - 2. Furnish and install valve in head spray system including quick coupling valves and boxes at the Football Field. Work to include layout, trenching, pipe installations, backfill, quick coupling valves and riser assemblies, valve boxes, spray rotors, isolation valves and related items.
 - 3. Furnish and install new Field Washwater and Irrigation Controller and irrigation control wiring to new system.
 - 4. Furnish and install new supplemental pump for Field Washwater system.
 - 5. Coordinate all work with existing utilities on site.
 - 6. Furnish and install comboxes, hand holes and empty conduit for electrical associated with this work. Coordinate with site electrical installations.
 - 7. Furnish new spray system for landscape planted areas including shrub, tree root watering system.
 - 8. Protect existing irrigation system to remain as noted and connect new main line to existing system.
 - 9. Coordinate work with new irrigation systems included for landscape and restoration areas all of which shall remain in operation throughout the entirety of the construction period.
- D. The Standard Specifications for Public Works Construction, "Greenbook", latest edition, is referenced as if herein contained and the Contractor shall keep a copy at the project site. These Specifications shall supersede conflicts with information given in the "Greenbook", unless otherwise determined by the School District.
- E. Definitions
 - 1. Owner: Vista Unified School District
 - 2. Architect: Architect or Architect's designated representative.
 - 3. Water Supplier: City of Vista
 - 4. Landscape Architect: Field Landscape Architect or his designated representative.

1.02 CONSTRUCTION DRAWINGS

- A. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, sleeves, etc. which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such fittings, etc. as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between irrigation systems, planting, and architectural features.
- B. All work called for on the drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the specifications. When an item is shown on the plans but not shown on the specifications or vice versa, it shall be deemed to be as shown on both. The Architect shall have final authority for clarification.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 1	Washwater and Landscape Irrigation
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- C. The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered in Architecting. Such obstructions or differences should be brought to the attention of the Architect as soon as detected. In the event this notification is not performed, the Irrigation Contractor shall assume full responsibility for any revision necessary.

1.03 QUALITY ASSURANCE

- A. Provide at least one English speaking person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed and the manufacturer's recommended methods of installation and who shall direct all work performed under this section.
- B. Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturer of articles used in this contract furnishes directions covering points not shown in the drawings and specifications.
- C. All local, municipal, and state laws, rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these specifications, and their provisions shall be carried out by the Contractor. Anything contained in these specifications shall not be construed to conflict with any of the above rules and regulations of the same. However, when these specifications and drawings call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by the above rules and regulations, the provisions of these specifications and drawings shall take precedence.
- D. All materials supplied for this project shall be new and free from any defects. All defective materials shall be replaced immediately at no additional cost to Owner.
- E. The Contractor shall secure the required licenses and permits including payments of charges and fees, give required notices to public authorities, verify permits secured or arrangements made by others affecting the work of this section.

1.04 SUBMITTALS

- A. Materials List:
 - 1. After award of contract and before any irrigation system materials are delivered to the job site, submit to the Architect a complete list of all irrigation systems, materials, or processes proposed to be furnished and installed as part of this contract.
 - 2. Show manufacturer's name and catalog number for each item, furnish complete catalog cuts and technical data, furnish the manufacturer's recommendations as to the method of installation.
 - 3. No substitutions will be allowed without prior written acceptance by the Architect.
 - 4. Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranties shall only supplement the guarantee.
- B. Substitutions:
 - 1. If the Irrigation Contractor wishes to substitute any equipment or materials for equipment or materials listed on the irrigation drawings and specifications, he may do so by providing the following information to the Architect for approval.
 - 2. Provide a written statement indicating the reason for making the substitution.
 - 3. Provide catalog cut sheets, technical data, and performance information for each substitute item.
 - 4. Provide in writing the difference in installed price if the item is accepted.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 2	Washwater and Landscape Irrigation
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1.05 EXISTING CONDITIONS

- A. The Contractor shall verify and be familiar with the locations, size and detail of points of connection provided as the source of water and electrical supply, connection to the irrigation system.
- B. Irrigation design is based on the available static water pressure anticipated to be on site. For design purposes, this is assumed to be 60 psi. Contractor shall verify static water on the project prior to the start of construction. Should a discrepancy exist, notify the Architect authorized representative prior to beginning construction.
- C. Prior to cutting into the soil, the Contractor shall locate all cables, conduits, sewer septic tanks, and other utilities as are commonly encountered underground and he shall take proper precautions not to damage or disturb such improvements. If a conflict exists between the such obstacles and the proposed work, the Contractor shall promptly notify the Architect who will arrange for relocations. The Contractor will proceed in the same manner if a rock layer or any other such conditions are encountered.
- D. The Contractor shall protect all existing utilities and features to remain on and adjacent to the project site during construction. Contractor shall repair, at his own cost, all damage resulting from his operations or negligence.

1.06 INSPECTIONS

- A. The Contractor shall permit the Architect to visit and inspect at all times any part of the work and shall provide safe access for such visits.
- B. Where the specifications require work to be tested by the Contractor, it shall not be covered over until accepted by the Architect. The Contractor shall be solely responsible for notifying the, Architect, a minimum of 48 hours in advance, where and when the work is ready for testing. Should any work be covered without testing or acceptance, it shall be, if so ordered, uncovered at the Contractor's expense.
- C. Inspections will be required for the following at a minimum:
 - 1. System layout
 - 2. Pressure test requirements:
 - a. Irrigation main line – one hour at 150 PSI
 - b. All lateral lines shall be pressure tested - 2 hours at 100 psi.
 - 3. Coverage test of irrigation system
 - 4. Final inspection prior to start of maintenance period
 - 5. Final acceptance
- D. Site observations and testing will not commence without the record drawings as prepared by the Irrigation Contractor. Record drawings must be complete and up to date for each site visit.
- E. Work that fails testing and is not accepted will be re-tested. Hourly rates and expenses of the Architect for re-inspection or re-testing will be paid by the Irrigation Contractor at no additional expense to the School District.

1.07 STORAGE AND HANDLING

- A. Use all means necessary to protect irrigation system materials before, during, and after installation and to protect the installation work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the Architect and at no additional cost to the School District.
- B. Exercise care in handling, loading, unloading, and storing plastic pipe and fittings under cover until ready to install. Transport plastic pipe only on a vehicle with a bed long enough to allow the pipe to lay flat to avoid undue bending and concentrated external load.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 3	Washwater and Landscape Irrigation
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1.08 CLEANUP AND DISPOSAL

- A. Dispose of waste, trash, and debris in accordance with applicable laws and ordinances and as prescribed by authorities having jurisdiction. Bury no such waste material and debris on the site. Burning of trash and debris will not be permitted. The Contractor shall remove and dispose of rubbish and debris generated by his work and workmen at frequent intervals or when ordered to do so by the Architect.
- B. At the time of completion the entire site will be cleared of tools, equipment, rubbish and debris which shall be disposed of off-site in a legal disposal area.

1.09 TURNOVER ITEMS

- A. Drawings of Record:
 - 1. Record accurately on one set of contract drawings all changes in the work constituting departures from the original contract drawings.
 - 2. The changes and dimensions shall be recorded in a legible and workmanlike manner to the satisfaction of the School District. Prior to final inspection of work, submit record drawings to the Architect.
 - 3. Dimensions from/to permanent points of reference such as buildings, sidewalks, curbs, etc. shall be shown. Data on record drawings shall be recorded on a day to day basis as the project is being installed. All lettering on drawings shall be minimum 1/8 inch in size.
 - 4. Show locations and depths of the following items:
 - a. Point of connection (including water P.O.C., master control valves, quick couplers, etc.)
 - b. Routing of sprinkler pressure lines (dimensions shown at a maximum of 100 feet along routing)
 - c. Isolation valves
 - d. Automatic remote control valves
 - e. Quick coupling valves
 - f. Routing of control wires
 - g. Irrigation controllers
 - h. Related equipment (as may be directed)
 - i. Maintain record drawings on site at all times. Upon completion of work, transfer all as-built information and dimensions to reproducible sepia prints.
- B. Controller Charts:
 - 1. Record drawings as "Drawings of Record" must be approved by the Architect before charts are prepared.
 - 2. Provide one controller chart for each automatic controller. Chart shall show the area covered by the particular controller.
 - 3. The chart is to be a reduced copy of the actual "Drawings of Record". In the event the controller sequence is not legible when the drawing is reduced, it shall be enlarged to a readable size.
 - 4. When completed and approved, the chart shall be hermetically sealed between two pieces of plastic, each piece being minimum 20 mils in thickness.
- C. Operation and Maintenance Manuals:
 - 1. Two individually bound copies of operation and maintenance manuals shall be delivered to the Architect authorized representative at least 10 calendar days prior to final inspection. The manuals shall describe the material installed and the proper operation of the system.
 - 2. Each complete, bound manual shall include the following information:
 - a. Index sheet stating Contractor's address and telephone number, duration of guarantee period, list of equipment including names and addresses of local manufacturer representatives.
 - b. Operating and maintenance instructions for all equipment.
 - c. Spare parts lists and related manufacturer information for all equipment.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 4	Washwater and Landscape Irrigation
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- D. Equipment:
 1. Supply as a part of this contract the following items:
 - a. Two (2) wrenches for disassembly and adjustment of each type of sprinkler head used in the irrigation system.
 - b. Two (2) 30-inch sprinkler keys for manual operation of control valves.
 - c. Two (2) keys for each automatic controller.
 - d. Two (2) quick coupler keys with a 1" bronze hose bib, bent nose type with hand wheel and two coupler lid keys.
 - e. One (1) valve box cover key or wrench.
 - f. Four (4) extra sprinkler heads of each size and type.
 2. The above equipment shall be turned over to the Architect at the final inspection.

1.10 COMPLETION

- A. At the time of the pre-maintenance period inspection, the Architect, and governing agencies will inspect the work, and if not accepted, will prepare a list of items to be completed by the Contractor. At the time of the post-maintenance period or final inspection the work will be re-inspected and final acceptance will be in writing by the Architect.
- B. The Architect shall have final authority on all portions of the work.
- C. After the system has been completed, the Contractor shall instruct School District's authorized representative in the operation and maintenance of the irrigation system and shall furnish a complete set of operating and maintenance instructions.
- D. The Contractor without any additional expense to the School District shall repair any settling of trenches, which may occur during the one-year period following acceptance, to the School District's satisfaction. Repairs shall include the complete restoration of all damage to planting, paving or other improvements of any kind as a result of the work.

1.11 GUARANTEE

- A. The entire sprinkler system, including all work done under this contract, shall be unconditionally guaranteed against all defects and fault of material and workmanship, including settling of backfilled areas below grade, for a period of one (1) year following the filing of the Notice of Completion.
- B. Should any problem with the irrigation system be discovered within the guarantee period, the Contractor at no additional expense to School District with the exception of existing equipment utilized shall correct it within ten (10) calendar days of receipt of written notice from the School District. When the nature of the repairs as determined by the School District constitute an emergency (i.e. broken pressure line) the School District may proceed to make repairs at the Contractor's expense. Any and all damages to existing improvement resulting either from faulty materials or workmanship, or from the necessary repairs to correct same, shall be repaired to the satisfaction of the owner by the Contractor, all at no additional cost to the School District.
- C. Guarantee shall be submitted on Contractors own letterhead as follows:

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 defective material with the exception of existing equipment utilized during the period of one year from date of filing of the Notice of Completion and also to repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the owner. We shall make such repairs or replacements within 10 calendar days following written notification by the owner. In the event of our failure to make such repairs or replacements within the time specified after receipt of written notice from owner, we authorize the

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 5	Washwater and Landscape Irrigation
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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 NAME:

PROJECT LOCATION:

CONTRACTOR NAME:

ADDRESS:

TELEPHONE:

SIGNED:

DATE:

1.12 QUALIFICATIONS

- A. The Contractor or subcontractor responsible for field and track subgrade establishment, field subsurface drainage, field washwater and irrigation systems, and field permeable aggregate placement and compaction shall be submitted to the Field Landscape Architect for approval. Specific prequalification requirements are included as follows:
 - 1. Contractor or sub-contractor shall be and has been actively and directly engaged in constructing similar natural or synthetic field projects for a period of five (5) or more years and shall provide proof of four (4) or more sports field base installations completed in the past two (2) years. as used in this section means a project similar in character to the work in which each respective firm or their employee will perform on this project. The "similar project" shall also be equal or greater in scale and complexity than the work for which each firm will be engaged to perform on this project. The "similar" project must be a natural or synthetic turf athletic field and/or a rubberized running track project, consisting of at least 75,000 sf of field surface area and a 400m, 8 lane running track. The Contractor's experience shall include completion of high school, college, or professional level competition fields. The playing field system shall include earthwork, washwater or irrigation systems, drainage and subsurface drainage systems, and base aggregate placement and compaction. Provide a listing of all construction contracts (whether completed or in progress) entered into or performed by the Contractor or subcontractor within the past five years for projects similar in scope, time and complexity to the work called for under this Contract; include the names of the contracts, and the names and contact information of the owners.

PART 2 MATERIALS

2.01 SUMMARY

- A. Use only new materials of the manufacturer, size and type shown on the drawings and specifications. Materials or equipment installed or furnished that do not meet School District's standards will be rejected and shall be removed from the site at no expense to the School District.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 6	Washwater and Landscape Irrigation
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2.02 PIPE

- A. Pressure supply lines downstream of point of connection 3” or greater shall be Class 315 solvent weld PVC. Piping shall conform to ASTM D2241. Pressure supply lines downstream of the point of connection 2 1-2” or less shall be Schedule 40, in conformance to ASTM D2241.
- B. Lateral pipe / non-pressure lines 3/4 inch in diameter and larger downstream of the remote control valve shall be Schedule 40 solvent weld PVC conforming to ASTM D1785.

2.03 PLASTIC PIPE AND FITTINGS

- A. Pipe shall be marked continuously with manufacturer's name, nominal pipe size, schedule or class, PVC type and grade, National Sanitation Foundation approval, Commercial Standards designation, and date of extrusion.
- B. All plastic pipe shall be extruded of an improved PVC virgin pipe compound in accordance with ASTM D2241 or ASTM D1785.
- C. All solvent weld PVC fittings shall be standard weight Schedule 80 conforming to ASTM D1785 at valve assemblies including all ells, tees, and unions with all other PVC fittings to be Schedule 40 and shall be injection molded of an improved virgin PVC fitting compound. Slip PVC fittings shall be the "deep socket" bracketed type. Threaded plastic fittings shall be injection molded. All tees and ells shall be side gated. All fittings shall conform to ASTM D2466.
- D. All threaded nipples shall be standard weight Schedule 80 with molded threads and shall conform to ASTM D1785.
- E. All solvent cementing of plastic pipe and fittings shall be a two-step process, using primer and solvent cement applied per the manufacturer's recommendations. Cement shall be of a fluid consistency, not gel-like or ropy. Solvent cementing shall be in conformance with ASTM D2564 and ASTM D2855.
- F. When connection is plastic to metal, female adapters shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be non-lead base Teflon paste, tape, or equal.
- G. Fittings, 3 Inch Size Pipe and Greater:
 - 1. Fittings: Ductile iron, slanted, deep bell, gasketed style made in accordance with ASTM A-536, Grade 65-45-12 & AWWA C153. Fittings shall have four lugs to accommodate joint restraints and other fittings. Bell section shall allow 5-degree freedom of pipe deflection within the bell end. All gaskets shall be manufactured of high grade EPDM rubber and shall be rib-enforced “U-Cup” design to seal and assist in restraining pipe at all pressures. Epoxy coating on interior & exterior surfaces of fittings shall be fusion bonded epoxy, 10-12 mil thickness. The epoxy coated fittings shall pass 90-day immersion tests per CSA Z245.20-98.

2.04 BACKFLOW PREVENTION UNITS

- A. Backflow prevention unit shall be Zurn Model 375, 3” Reduced Pressure Principal Assembly.
- B. Enclosure shall be Strong Box, Model SBBC-45AL constructed of marine grade aluminum alloy and stainless-steel hardware. Product available from V.I.T. Products, Inc., (800) 729-1314.

2.05 MASTER VALVE

- A. Manufacturers:
 - 1. 3”, Superior Normally Open #3100 Brass Valve.
- B. Master valve shall be globe, electrically controlled, hydraulically operated, single seat, normally closed, brass or cast iron only with spring loaded, packless diaphragm.
- C. Master valve shall be as specified on the plans. Reference irrigation plan, detail, and legend for size and appropriate model number.
- D. Valve Box and Cover: All boxes are to be flush with adjacent landscape surface.

2.06 FLOW SENSOR

- A. The flow sensor shall be a 3” schedule 80 PVC tee fitted with a removable sensor. The sensor must be capable of transmitting the signal a minimum of 2000’. The flow sensor must

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 7	Washwater and Landscape Irrigation
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accommodate flow rates between 1 and 30 feet per second. Flow Sensor shall be Data Industrial or Calsense.

- B. The flow sensor shall be compatible with the Hunter and ITS controller. Install communication cable compatible with flow sensor
- C. The flow sensor shall be installed in a Carson #1419-12 valve box with a plastic lid. The cover shall be secured with stainless steel bolts.

2.07 VALVES

- A. Gate Valves
 1. Gate valves shall be of the manufacturer, size, and type indicated on the drawings.
 2. Gate valves shall be constructed of a bronze body, gate and stem with a malleable iron hand wheel. Gate valves shall have threaded connections.
 3. All gate valves shall have a minimum working pressure of not less than 150 psi and shall conform to AWWA standards.
 4. Quality Standard to be Clow F-6102 flanged resilient wedge gate valve.
- B. Ball Valves
 1. All parts shall be accessible for repair or maintenance without removing the body from the line.
 2. The body shall be a full port design. Quality Standard to be brass, A.Y. McDonald #76101 or Jones Valve J-1900 curb stops, with unions on both inlet and outlet side of valve.
 3. The ball valve shall be rated for 200 psi WWP.
 4. Two valve operating keys are to be furnished to the Owner onsite.
- C. Quick Coupler Valves:
 1. Potable Quick-coupling valves shall be bronze two-piece construction or iron body, bronze mounted, globe pattern. Pressure rating to be 150 psi. Connections shall be iron pipe, threaded. Cover shall be yellow. Valves to be Rainbird 44-LRC, 1", two-piece. Potable water valves shall have dual lug configuration.
 2. Contractor is to furnish to the Owner six couplers with 1 " x 1" swivel and hose assemblies. Hose swivels shall be attached with two coupler keys.
 3. Valves to be housed as shown in the details, for installation in or adjacent to the concrete turf anchor.
 4. Work to include layout, trenching, pipe installations, backfill, quick coupling valves, valve boxes, riser assemblies, and related items.
 5. Quick Coupler Valves shall be installed with as Lasco Swing Joint #G332-212.
- D. Automatic Control Valves:
 1. Automatic control valves shall be Superior #950 Series valves as noted on the drawings.
 2. Size shall be as indicated on the drawings.
 3. Automatic control valves shall be electrically operated.

2.08 VALVE BOXES

- A. Valve boxes shall be fabricated from a durable, weather-resistant plastic material resistant to sunlight and chemical action of soils.
- B. The potable valve box covers shall be green in color and secured with a hidden latch mechanism or bolts.
- C. The cover and box shall be capable of sustaining a load of 1,500 pounds.
- D. Valve box extensions shall be by the same manufacturer as the valve box.
- E. Automatic control valve boxes shall be Carson No. 1420 Jumbo Box. Valve box covers shall be marked "RCV" with the valve identification number "heat branded" onto the cover in 2 inch high letters / numbers.
- F. Ball, gate and quick coupler valve boxes shall be Carson No. 1220 rectangular plastic boxes with plastic lids. Valve box covers shall be marked with either "BV", "GV" or "QCV" "heat branded" onto the cover in 2-inch-high letters.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 8	Washwater and Landscape Irrigation
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2.09 SYNTHETIC TURF FIELD AUTOMATIC CONTROLLER

- A. The controller assembly shall be utilized for the field washwater system. The controller assembly include a UL listed stainless steel vandal resistant enclosure with a removable backboard, 120 VAC outlet receptacle and terminal wire board.
- B. The electrical junction box shall include an on/off power switch and duplex receptacles with ground fault interrupt circuit.
- C. The terminal wiring board shall be pre-mounted and wired through the rear side of the backboard and shall include screw-less cage type terminal block connections including up to two slots per terminal and may accept 12 or 14 gauge AWG wires. The terminal board shall also include a resettable fuse and sensor bypass switch.
- D. The terminal board(s) shall have a maximum of forty eight (48) valve station locations including additional terminals for up to four (4) common wires, master valves, two rain sensor terminals pump start, flow sensors and two wire communication cables.
- E. The Coaches switch shall be capable of operating master valves, flow sensors, pumps, and two-wire decoder systems. The Coach's Switch is password protected capable and has both a coaches mode and maintenance mode.
- F. Controller shall be pedestal mount, front entry enclosure.
- G. Controller assembly shall be installed in supplemental stainless-steel enclosure with louvered / filtered ventilation and keyed lock entry, mounted to a concrete pad. Enclosure shall be V.I.T./Strongbox SB-24SS on a PED-24SS Pedestal riser for a total height of 60". V.I.T. Products, Inc., 1-800-729-1314.
- H. Quality Standard shall be ITS (Imperial Technical Services) ICA6-TS2-, with controller stations as required for Field Washwater (10 valve stations). Controller shall include high flow sensing, high flow alarm light, pump start relay for pump activation, and mounting pad for front entry.

2.10 LOW VOLTAGE CONTROL WIRING

- A. Remote control wire shall be direct-burial AWG-UF type, size as indicated on the drawings, and in no case smaller than 14 gauge.
- B. Connections shall be either epoxy-sealed packet type or Penn-Tite connectors.
- C. Ground wires shall be white in color.

2.11 VALVE AND HEAD TURF ROTOR SYSTEM

- A. New infield turf irrigation system to utilize Hunter STG-900 VAH (valve adjacent to head) system STK-2 or equal which integrates the following system components into each assembly;
 - 1. Turf Rotor: Hunter STG-900-73, 3" Pop-up, 1.5" inlet, Factory Installed #73 nozzle, 103' radius @ 100PSI, adjustable arc.
 - 2. Turf Rotor Swing Joint to be Hunter ST2008VA 6-pivot schedule 80 2" pre-manufactured swing joint.
 - 3. Automatic Solenoid Valve: Hunter ICV-151G-FS-AS 1.5" Globe Valve with optional "Filter Sentry" (FS) filter screen and "Accu-Set" (AS) pressure regulation. Operating Specifications:
 - a. Flow: 0.10 to 200 GPM
 - b. Pressure: 20 to 200 psi
 - c. Temperature: up to 150°F
 - d. Heavy-duty solenoid: 24VAC,
 - e. 370mA inrush current, 190mA
 - f. holding current, 60 cycles
 - g. 475mA inrush current, 230mA
 - h. holding current, 50 cycles
 - i. Accu-Set™: 20 psi minimum operating pressure. Regulates from 20 to 100 psi.
 - 4. Automatic Solenoid Valve Isolation Valve to be a PVC Ball Valve, 235psi or greater rating.
 - 5. Quick Coupler Valve, for this assembly only, to be Hunter HQ5RC brass body, stainless steel 1" lug, HK-55 key interchangeable with RainBird 44 LRC.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 9	Washwater and Landscape Irrigation
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- 6. Enclosure to be Hunter ST173026 Polymer-Concrete vault with 3-piece, split lid with QCV's cover.

2.12 PUMP

- A. A supplemental irrigation pump system shall be furnished consisting of a complete prefabricated system with pump, piping, electrical and structural elements.
- B. Pump shall be single stage end suction close coupled centrifugal, cast-iron bronze fitted construction, with electric motor, control panel relay, starter and Hand-Off-Auto switch. The entire pump assembly shall be housed in a NEMA 4 enclosure.
- C. The pump motor bearings shall be of such size that the average life rating is no less than three (3) years, or 10,000 hours of life.
- D. 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 shall be equipped with pipe support on suction and discharge piping. All nuts and bolts and washers to be heavy zinc coated steel on skid and piping. Skid shall include mounting hardware and integral aluminum lockable enclosure.
- E. Pump shall be capable of boosting the static pressure of approximately 50 PSI to 110 PSI under flow conditions of approximately 100 GPM utilizing a 5-10 HP motor.
- F. Acceptable manufacturers include Flowtronex, Barrett Pump or John Deere Landscapes GT.

2.13 DETECTABLE MARKING TAPE

- A. Detectable marking tape: Christy's 3" detectable marking tape consists of a minimum 5 mil overall thickness; five ply composition; ultra-high molecular weight; 100% virgin polyethylene; acid, alkaline and corrosion resistant. The tape shall have a 20 gauge solid aluminum foil core, encapsulated within 2.55 mil polyethylene backing. Tape tensile strength shall be in accordance with ASTM D882-80A and be not less than 7,800 psi. Tape legend—Caution Irrigation Line Below. TA-DT-3-GI.

2.14 SLEEVING

- A. All pipe and wire sleeves shall be schedule 40 PVC. Valve control wires shall be installed in a separate sleeve. All sleeving shall be installed 24 inches below finish grade.

2.15 MARKING TAGS

- A. All appurtenances shall be installed with polyurethane warning tags manufactured by T. Christy Enterprises or approved equal. Tags shall read valve number, which shall match the zone valve designation at the controller. Tags shall be yellow, with black ink.

2.16 CONTROLLER WIRING

- A. Conventional
 - 1. All direct-bury pilot and common control wiring shall be UF14 single-conductor wire unless otherwise specified by Grounds Supervisor and/or Irrigation Landscape Architect. Any wire run exceeding 500-feet shall be increased to 12-guage UF wire for the entire length.
 - 2. Colors shall be the following unless otherwise specified by Irrigation Landscape Architect:
 - a. White for common wires
 - b. Black for pilot wires
 - c. Red for spares
 - 3. No direct-buried splices are permitted.
 - 4. No junction boxes are permitted unless the length of wiring run is found to exceed 500-feet by the Grounds Supervisor and/or Field Landscape Architect.
 - 5. Wiring shall be in their own dedicated sleeve and not installed inside any other sleeve.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 10	Washwater and Landscape Irrigation
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2.17 WIRE SPLICE KIT

- A. No direct-burial splicing permitted without prior authorization by Grounds Supervisor.
 - 1. For any approved direct bury splicing use only 3M 3570G-N.
- B. Wire splices inside valve and junction boxes shall be either:
 - 1. Spears DS-100 Dri-Splice with DS-300 sealant only.
 - 2. DBRY-6 for Hunter products.

PART 3 - EXECUTION

3.01 SITE CONDITIONS

- A. Inspections:
 - 1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
 - 2. Verify that irrigation system may be installed in strict accordance with all pertinent codes and regulations, the original design, the referenced standards, and the manufacturer's recommendations.
- B. Discrepancies:
 - 1. In the event of discrepancy, immediately notify the Architect.
 - 2. Do not proceed with installation in areas of discrepancy until all discrepancies have been resolved.
- C. Grades:
 - 1. Before starting work, carefully check all grades to determine that work may safely proceed, keeping within the specified material depths with respect to finish grade.
 - 2. The Architect shall accept final grades before work on this section will be allowed to begin.
- D. Field Measurements:
 - 1. Make all necessary measurements in the field to ensure precise fit of items in accordance with the original design. Contractor shall coordinate the installation of all irrigation materials with all other work.
 - 2. All scaled dimensions are approximate. The Contractor shall check and verify all size dimensions prior to proceeding with work under this section.
 - 3. Exercise extreme care in excavating and working near existing utilities. Contractor shall be responsible for damages to utilities, which are caused by his operations or neglect.
- E. Layout:
 - 1. Prior to installation, the Contractor shall stake out all pressure supply lines, routing and location of sprinkler heads, valves, backflow preventer, and automatic controller.
 - 2. Layout irrigation system and make minor adjustments required due to differences between site and drawings. Where piping is shown on drawings under paved areas, but running parallel and adjacent to planted areas, install the piping in the planted areas.
- F. Water Supply:
 - 1. Connections to, or the installation of, the water supply shall be at the locations shown on the drawings. Minor changes caused by actual site conditions shall be made at no additional expense to the School District.
- G. Electrical Service:
 - 1. Connections to the electrical supply shall be at the locations shown on the drawings. Minor changes caused by actual site conditions shall be made at no additional expense to School District.
 - 2. Contractor shall make electrical connections to the irrigation controller.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 11	Washwater and Landscape Irrigation
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3.02 CONNECTIONS TO EXISTING MAINS

- A. All connections shall be made to existing pipes by wet tap. All size on size taps will require a full cast iron (Mueller Type), or an epoxy coated type JCM fabricated steel tapping sleeve per Water District Standards. All connections to existing mains shall be in strict accordance with the appropriate subsections APWA Section 742.

3.03 BACKFLOW PREVENTION DEVICE

- A. Install as detailed on drawings. Bottom of check valve assembly to be a minimum 24" above concrete slab.
- B. Install enclosure per manufacturer's recommendation and installation instructions.

3.04 FLOW SENSOR

- A. Flow sensor shall be installed per manufacturer's recommendations. Conductors shall be extended to controller assembly. Terminate all conductors with connector kits.

3.05 PUMP

- A. Pump shall be installed per manufacturer's recommendation as indicated on the drawings. Complete all required electrical connections to existing panel board and circuitry at existing power source and distribution panel for press box.
- B. Pump shall be permanently mounted on concrete pad per details.

3.06 TRENCHING

- A. Excavations shall be straight with vertical sides, even grade, and support pipe continuously on bottom of trench. Trenching excavation shall follow layout indicated on drawings to the depths below finished grade and as noted. Where lines occur under paved area, these dimensions shall be considered below subgrade.
 - 1. Provide minimum cover of 24 inches on pressure supply lines.
 - 2. Provide minimum cover of 24 inches for control wires.
 - 3. Provide minimum cover of 18 inches for non-pressure lines.
 - 4. Pipes installed in a common trench shall have a 6-inch minimum space between pipes.

3.07 BACKFILLING

- A. Backfill material 6" below and 6" above pipe shall be clean washed sand. Backfill material above sand for all lines shall be the same as adjacent soil free of debris, litter, and rocks over 1/2 inch in diameter, except where backfill may occur within synthetic turf field aggregate or lateral drain line trenches where backfill shall match adjacent materials.
- B. Backfill shall be tamped in 4-inch layers under the pipe and uniformly on both sides for the full width of the trench and the full length of the pipe. Backfill materials shall be sufficiently damp to permit thorough compaction, free of voids. Backfill shall be compacted to 90% relative compaction and shall conform to adjacent grades.
- C. Flooding in lieu of tamping is not allowed.
- D. Under no circumstances shall truck wheels be used to compact backfill.
- E. Provide sand backfill a minimum of 6 inches over and under all piping under paved areas.

3.08 PIPING

- A. Piping under existing pavement may be installed by jacking, boring, or hydraulic driving. No hydraulic driving is permitted under asphalt pavement.
- B. Cutting or breaking of existing pavement is not permitted.
- C. Carefully inspect all pipe and fittings before installation, removing dirt, scale, burrs, and reaming. Install pipe with all markings up for visual inspection and verification.
- D. Remove all dented and damaged pipe sections.
- E. All lines shall have a minimum clearance of 6 inches from each other and 12 inches from lines of other trades.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 12	Washwater and Landscape Irrigation
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- F. Parallel lines shall not be installed directly over each other.
- G. In solvent welding, use only the specified primer and solvent cement and make all joints in strict accordance with the manufacturer's recommended methods including wiping all excess solvent from each weld. Allow solvent welds at least 15 minutes setup time before moving or handling and 24 hours curing time before filling.
- H. PVC pipe shall be installed in a manner, which will provide for expansion and contraction as recommended by the pipe manufacturer.
- I. Centerload all plastic pipe prior to pressure testing.
- J. All threaded plastic-to-plastic connections shall be assembled using Teflon tape or Teflon paste.
- K. For plastic-to-metal connections, work the metal connections first. Use a non-hardening pipe dope on all-threaded plastic-to-metal connections, except where noted otherwise. All plastic-to-metal connections shall be made with plastic female adapters.

3.09 CONTROLLER

- A. The Field Landscape Architect shall approve the exact location of field controller before installation however generally this is shown adjacent to the concrete paved area south of the home grandstand.
- B. The Irrigation Contractor shall be responsible for the final electrical connections up to the irrigation controller, and connection of antenna system connecting to the District Central control system.
- C. Field valve signal and common wires from the remote-control valves to designated terminals on the controller.
- D. Electrical wiring shall be installed according to local electrical code by a licensed electrician. The cost of all electrical work necessary to make the automatic equipment operate properly shall be included in this contract.
- E. A diagram and schedule shall be posted in the controller to facilitate the selection of the valves to be operated.

3.10 CONTROL WIRING

- A. Low voltage control wiring shall occupy the same trench and shall be installed along the same route as the pressure supply lines whenever possible.
- B. Where more than one wire is placed in a trench, the wiring shall be taped together in a bundle at intervals of 10 feet. Bundle shall be secured to the mainline with tape at intervals of 20 feet.
- C. All connections shall be of an approved type and shall occur in a valve box. Provide an 18-inch service loop at each connection.
- D. An expansion loop of 12 inches shall be provided at each wire connection and/or directional change, and one of 24 inches shall be provided at each remote-control valve.
- E. A continuous run of wire shall be used between a controller and each remote-control valve. Under no circumstances shall splices be used without prior approval.

3.11 VALVES

- A. Automatic control valves, quick coupler, and gate valves are to be installed in the approximate locations indicated on the drawings.
- B. Valve shall be installed in shrub areas whenever possible.
- C. Install all valves as indicated in the detail drawings.
- D. Valves to be installed in valve boxes shall be installed one valve per box.

3.12 VALVE BOXES

- A. Valve boxes shall be installed in shrub areas whenever possible.
- B. Each valve box shall be installed on a foundation of 3/4 inch gravel backfill, 3 cubic feet minimum. Valve boxes shall be installed with their tops 1/2 inch above the surface of surrounding finish grade in lawn areas and 2 inches above finish grade in ground cover areas.
- C. Install grounding to each valve/valve as required per National Electrical Code.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 13	Washwater and Landscape Irrigation
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3.13 QUICK COUPLING VALVE (QCV) INSTALLATION

- A. All piping shall be thoroughly flushed through extended risers before quick coupling valves (QCV) are attached.
- B. Quick coupling valves shall be installed as indicated in the details, perpendicular to the surface. Valve top to be between 1" to 1-1/2" below inside surface of box lid.
- C. When installing QCV the top nipple of the riser assembly is to be threaded to QCV above ground, carefully checking so as not to cross-thread. Then thread nipple with QCV to intermediate coupling.

3.14 QUICK COUPLING VALVE BOX INSTALLATION

- A. Valves to be housed in box and combination with spray rotor as shown in the details, for installation adjacent to or within concrete turf anchor.
- B. The valve box shall be set at a slope to match the surface of the field edge transition.

3.15 IRRIGATION HEADS

- A. Irrigation heads shall be installed as indicated on the drawings.
- B. Spacing of heads shall not exceed maximum indicated on the drawings.
- C. Riser nipples shall be of the same size as the riser opening in the sprinkler body.
- D. Install synthetic turf field rotor assembly and associate vaults parallel to the edge of the field/concrete curb. Rotor head/cap to have synthetic turf adhered to surface of assembly.

3.16 MISCELLANEOUS EQUIPMENT

- A. Install all assemblies specified herein according to the respective detail drawings or specifications, using best standard practices.
- B. Quick coupler valves shall be set approximately 12 inches from walks, curbs, header boards, or paved areas where applicable.

3.17 FIELD QUALITY CONTROL

- A. Field inspection will be performed by the School and system Designer.
- B. Inspections by School Representative:
 - 1. Material inspection: Inspection at the job site of all materials to be used on the job. The contractor shall store the materials at the job site in a locked container. Note: no work shall start until all the materials to be used on the job are approved by the School representative. NOTE: The School shall not be responsible for the theft or damage of any tools or materials left on site.
 - 2. Irrigation main line and drinking fountain line open trench inspection. Note: the contractor at his discretion may partially back fill the trenches before inspection. All pipe joints must be exposed for inspection.
 - 3. Irrigation main line open trench equipment inspection: remote control valves, quick couplers, air valves etc.
 - 4. Lateral line open trench inspection. Note: the contractor, at his discretion, may partially backfill the trenches before inspection and approval. The pipe joints, swing joints, spray and rotor heads must be exposed for inspection.
 - 5. Coverage test.
 - 6. Final inspection and approval.
 - 7. After each inspection, no work shall start on the next phase until the work to date has been approved in writing and all corrections are completed by the contractor.
- C. Pressure Test: Prior to complete backfilling, test all pressure lines for leakage.
 - 1. Test all pressure lines under hydrostatic pressure of 150 pounds per square inch or 50 pounds more than normal static pressure (whichever is greater), and prove watertight for one hour.
 - a. Note: If any of the threaded metal pipe joints assembled with Permatex 51 D pipe joint compound are leaking and causing the system to fail the pressure test, re-test the

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 14	Washwater and Landscape Irrigation
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system for twenty-four hours under the required test pressure before disassembling the leaking fittings. Permatex 51 D has self-sealing properties under pressure and time.

2. The School Representative may require (at his/her discretion) the pressure testing of the main line prior to installation of electric control valves, quick couplers, saddles or any other equipment that might prevent a proper test from being performed.
 3. Test all piping under paved areas under hydrostatic pressure of 150 pounds per square inch for two hours, and prove watertight prior to paving.
 4. Test all lateral piping lines under hydrostatic pressure of 100 pounds per square inch, or 50 pounds more than normal static pressure (whichever is greater), and provide water tight for 2 hours.
 4. Sustain pressure in lines for no less than one hour (main line) and two hours (lateral lines). If leaks develop (more than 5 percent), replace joints and repeat test until entire system is proved watertight.
 5. All hydrostatic tests shall be conducted only in the presence of the School Representative. Do not completely backfill pipe until it has been inspected, tested and approved in writing.
 6. Furnish necessary force pump and all other test equipment.
 7. When the sprinkler irrigation system is completed, perform a coverage test in the presence of the School Representative to confirm that water coverage for planting areas is complete and adequate. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from plans, or where the system has been willfully installed as indicated on the drawings when it is obviously inadequate without notifying the School Representative. This test shall be accomplished before any planting occurs.
 8. Provide handheld walkie-talkie or personnel as necessary to accomplish this task expeditiously.
 9. Upon completion of each phase of work, test and adjust entire system to meet site requirements.
 10. Test any low voltage wiring more than 50 feet long installed under paving for continuity prior to paving.
- D. System is acceptable if no leakage or loss of pressure occurs during test period.

3.18 FLUSHING THE SYSTEM

- A. Prior to installation of irrigation heads, the valves shall be opened and a full head of water used to flush out the lines and risers.
- B. Irrigation heads shall be installed after flushing the system has been completed.

3.19 ADJUSTING THE SYSTEM

- A. Contractor shall adjust valves, align heads, and check the coverage of each system prior to coverage test.
- B. If it is determined by the Architect that additional adjustments or nozzle changes will be required to provide proper coverage, all necessary changes or adjustments shall be made prior to any planting.
- C. The entire system shall be operating properly before any planting operations commence.
- D. Automatic control valves are to be adjusted so that the irrigation heads operate at the pressure recommended by the manufacturer.

3.20 TESTING AND OBSERVATION

- A. Do not allow or cause any of the work of this section to be covered up or enclosed until it has been observed, tested and accepted by the Architect.
- B. The Contractor shall be solely responsible for notifying the Architect, a minimum of 48 hours in advance, where and when the work is ready for testing.
- C. When the sprinkler system is completed, the Contractor shall perform a coverage test of each system in its entirety to determine if the water coverage for the planted areas is complete and adequate in the presence of the Architect.

Rancho Buena Vista HS Track and Field Replacement	32 8400 - 15	Washwater and Landscape Irrigation
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- D. The Contractor shall furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from the plans, or where the system has been willfully installed as indicated on the drawings when it is obviously inadequate, without bringing this to the attention of the Architect. This test shall be accepted by the Architect and accomplished before starting any planting.
- D. Final inspection will not commence without record drawings as prepared by the Irrigation Contractor.

3.21 MAINTENANCE

- A. During the maintenance period the Contractor shall adjust and maintain the irrigation system in a fully operational condition providing complete irrigation coverage to all intended plantings.

3.22 COMPLETION CLEANING

- A. Clean-up shall be made as each portion of the work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed, and any damage sustained on the work of others shall be repaired to original conditions.

END OF SECTION 32 84 00
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Rancho Buena Vista HS Track and Field Replacement	32 8400 - 16	Washwater and Landscape Irrigation
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**SECTION 32 93 00
PLANTING**

PART 1 GENERAL

1.01 DESCRIPTION

- A. The general requirements apply to all Landscaping work operations. Provide labor, materials, tools, transportation and all incidentals necessary to perform work as indicated on the Plans and as herein specified.
- B. Related Sections.
 - 1. Section 32 84 00: Washwater and Landscape Irrigation
- C. The Standard Specifications for Public Works Construction, "Greenbook", latest edition, is referenced as if herein contained and the Contractor shall keep a copy at the project site. These Specifications shall supersede conflicts with information given in the "Greenbook", unless otherwise determined by the School District.
- D. Definitions
 - 1. School District: Vista Unified School District
 - 2. Project Site: Rancho Buena Vista High School
 - 3. Landscape Architect: Field Landscape Architect, or his designated representative.
 - 4. Agronomic Soils Test: Agricultural Fertility and Suitability Soils Testing and Report(s) supplied by Contractor at no additional cost to the School District.

1.02 QUALITY ASSURANCE

- A. Comply with all applicable local, state, federal requirements regarding materials, methods of work, and disposal of excess and waste materials.
- B. Manufacturer's directions, specifications and detailed drawings will be followed in all cases where articles used furnish directions covering points not delineated on the Plans or Specifications.
- C. The work included in this section will be done to the satisfaction of the School District and the decision by the School District as to the true construction meaning of the Plans and Specifications will be final.
- D. All drop slips for landscape materials (including plants, fertilizers, pesticides, seed mixes) shall be given to the Field Landscape Architect.

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Do not install landscape materials when ambient temperatures may drop below 45 degrees F (12 degrees C) or above 95 degrees F (39 degrees C).
- B. Do not install landscape materials when wind velocity exceeds 30 mph (48 k/hr).

1.04 AGRONOMIC SOILS TESTING

- A. Take three (3) samples of site soil at a depth of 6 to 12 inches, within proposed planting area, after completion of grading and prior to weed control and soil preparation. Sample areas shall be selected by the Field Landscape Architect. At least 3 separate areas of the site will require soil sampling – the field west of the stadium; the west embankment east of Hilltop Dr. and the north embankment / erosion area.
- B. Request tests for fertility and suitability analysis with written recommendations for soil amendment, fertilizer and chemical conditioners, application rates for soil preparation, planting backfill mix and post-maintenance fertilization programs at the three (3) locations. Soils report recommendations shall take precedence over the amendment and fertilizer application rates specified in this Section.
- C. Request (3) growth trials to test for Herbicide contamination. Soil samples to be taken at the depth of 12" – 24". Testing for herbicide contamination shall be completed only where planting will occur in areas of existing paving.

Rancho Buena Vista HS Track and Field Replacement	32 9300 - 1	Planting
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- D. Testing laboratory shall be Soil and Plant Laboratory, Inc., 1594 N. Main, Orange, CA 92667 (714) 282-8777, Wallace Laboratories, 365 Coral Circle, El Segundo, CA 90245, Phone (310) 615-0118. Tests shall be paid for by the Contractor.
- E. Submit testing laboratory's interpretation, recommendations, and comments to Field Landscape Architect within 7 days after the completion of rough grading.
- F. For bidding purposes, the Contractor shall provide the following soil amendments for soil preparation and backfill mix in tree, shrub and groundcover planting areas.
 - 1. Soil preparation per 1,000 s.f. of planting area:
 - a. 4 cubic yards Composted Soil Amendment (Agriservice Humic Compost)
 - b. 20 lbs. Gro Power
 - c. 20 lbs. Soil Sulphur
 - 2. Backfill Mix:
 - a. 6 parts by volume on-site soil
 - b. 4 cubic yards Composted Soil Amendment (Agriservice Humic Compost)
 - c. 18 lb. Gro Power per cu. yd. of mix
 - d. 2 lbs. Iron Sulphate per cubic yard of mix

PART 2 PRODUCTS

2.01 REFERENCES

- A. ANSI Z60.1 - Nursery Stock.
- B. California State Department of Agriculture - Regulations for nursery inspections, rules, and grading.

2.02 PLANT MATERIAL

- A. Trees and shrubs shall be grown by an established nursery having been in the business of growing trees and shrubs a minimum of five (5) years. At the option of the Field Landscape Architect, plants shall be inspected and tagged at the nursery prior to shipment to the planting site.
 - 1. Trees: All trees shall be of the specified container size and of the species specified.
 - 2. Shrubs: Shrubs shall be of the specified type and size, selected from high quality, well-shaped nursery stock.
- B. Plant names indicated or listed in the "Plant Legend" on the Plans, conform to the approved names given in "An Annotated Checklist of Woody Ornamental Plants in California, Oregon, and Washington, Manual 4091", published by the University of California (1979). Except for names not covered therein, the established custom of the nursery is followed.
- C. Condition of plants shall be in accordance with the California State Department of Agriculture's regulations for nursery inspections, rules, and grading and shall be symmetrical, typical for variety and species, sound, healthy, vigorous, free from plant disease, insect pests, or their eggs, and shall have healthy normal root systems, well filling their containers, but not to the point of being root bound.
- D. Plants shall not be pruned prior to delivery, except as authorized by the School District. In no case shall trees be topped before delivery.
- E. The size of the plants shall correspond with that normally expected for species and variety of commercially available nursery stock, or as specified on the Plans. The minimum acceptable size of all plants, measured before pruning with the branches in normal position, shall conform with the measurements, if any, specified on the Plans. Plants larger in size than specified may be used with the approval of the School District, but the use of larger plants will make no change in contract price.
- F. All plant material shall be subject to the inspection and acceptance of the School District before planting. A representative number of plants as determined by the School District may be inspected for size and condition of root growth, insects, injuries and defects, at the source location as well as following delivery to the project site. Plants not accepted are to be removed from the site immediately and replaced with suitable plants. The School District reserves the right to reject entire lots of plants represented by defective samples.

Rancho Buena Vista HS Track and Field Replacement	32 9300 - 2	Planting
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2.03 ROOT BARRIERS

- A. Root Barrier Panels: NDS "EP Series" modular root barrier panels or approved equal.
 - 1. Material: Injection-molded, high-impact polypropylene (HIPP) with UV inhibitors.
 - a. Post-Consumer Content: 50 percent.
 - 2. Panel Size:
 - a. Depth: 36 inches
 - b. Width: 24 inches.
 - c. Wall Thickness: 0.090 inch.
 - 3. Joiner Strips: Factory installed, interlocking, independent.
 - 4. Top Edge: 0.98 inch by 0.57 inch.
 - 5. Base Flange: External ground anchoring, extends out 0.355 inch, 2.65 inches long.
 - 6. Reinforcing Ribs:
 - a. Raised vertical ribs running perpendicular to panels, 1/2 inch deep.
 - b. Spacing: 6 inches on center.
 - 7. Color: Black
- B. Physical Properties:
 - 1. Tensile Stress, ASTM D 638: 3,600 psi to 4,200 psi.
 - 2. Yield Elongation, ASTM D 638: 12 percent.
 - 3. Flexural Modulus, ASTM D 790: 150,000 psi.
 - 4. Notched Izod Impact, ASTM D 256: 3.0 psi at 73 degrees F.
 - 5. Rockwell Hardness, ASTM D 785: R70.

2.04 FERTILIZERS, SOIL CONDITIONING MATERIALS AND WATER

- A. General
 - 1. Fertilizing and soil conditioning materials shall comply with the applicable requirements of the State Food and Agricultural Code. All materials shall be packaged first grade, commercial quality products identified as to source, type of material, weight, and manufacturer's guaranteed analysis. Fertilizing and soil conditioning material shall not contain toxic ingredients or fillers in quantities harmful to human life, animals, or plants.
 - 2. The Contractor shall furnish a Certificate of Compliance stating that the material substantially meets the specifications.
 - 3. Exact fertilizing and conditioning materials and the required composition and quantities shall be determined by agronomic soils test.
- B. Commercial Fertilizer.
 - 1. Commercial fertilizer shall be a palletized or granular product having a chemical analysis as specified on the Plans or in the Specifications. Commercial fertilizer shall be free-flowing material delivered in unopened sacks. Material which becomes caked or otherwise damaged shall not be used
 - 2. Fertilizer composition and type to be determined by the agronomic soils test and will be supplied by the Contractor at no additional cost to the School District.
- C. Organic Soil Amendment.
 - 1. Organic soil amendment shall be a fine textured, Composted Soil Amendment derived from composted yard trimmings. No animal or sludge wastes shall be allowed. Product shall pass through a 3/8" screen. Product standard shall be Agriservice Humic Compost or approved equal.
- D. Water
 - 1. Water shall be clean, fresh and free of substances or matter which could inhibit vigorous growth of plants
 - 2. Water shall be supplied at Contractor's expense at no additional cost to School District through the end of the maintenance period.

2.05 HERBICIDE

- A. Non-selective herbicide for weed abatement shall be Round-Up or approved equal.
- B. Pre-emergent herbicide shall provide nine (9) month control.

Rancho Buena Vista HS Track and Field Replacement	32 9300 - 3	Planting
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2.06 WOOD CHIP MULCH

- A. Mulch shall be "Forest Floor" (0-2") or Plants Choice FF Mulch 200 Available from or equal to:
Aguinaga
 7992 Irvine Boulevard
 Irvine, CA 92618
 (949) 786-9558
Plant's Choice, Inc.
 42284 Winchester Road
 Temecula, CA 92590
 (619) 585-9909

- B. The mulch shall consist of fibrous, woody bark mixture of varied particle size with the following characteristics:

<u>nt Passing</u>	<u>Size</u>
0	nm (1")
0	nm (1/2")
0	nm (1/4")

- C. Mulch shall be packaged in bales or bags unless the District approves a bulk source in advance of delivery to the site of the work. The Contractor shall submit one sample of three (3) different mulch materials. The Field Landscape Architect, has the right to reject all samples and request additional samples until a suitable mulch material is approved.

2.07 PRE-EMERGENCE WEED CONTROL

- A. In areas of woody ornamental plants use Ronstar, or approved equivalent.

2.08 SAMPLES

- A. Samples of products and materials shall be required by the School District. Submittals for inspection shall be stored on the site until furnishing of material is complete.
- B. Delivery of products and materials may begin upon acceptance of samples or as directed by the School District.

2.09 PLANT TABLETS

Plant tablets shall be Scotts Agriform 20-10-5 applied at the following rates:

Tablet Size	21 Gram					5 Gram
Container Size	1 Gallon	5 Gallon	15 Gallon	24" Box	36" Box and Larger	Ground Cover Plants
Application Rates (No. of Tablets)	1	3	8	20	One Tablet per each foot of height	1

PART 3 EXECUTION

3.01 GENERAL

- A. Earthwork and topsoil placement shall include the preparation for and the spreading, densification, cultivation, and raking of topsoil, including fertilization and conditioning.
 1. Unless otherwise provided, walls, curbs, planter boxes, walks, irrigation systems, and similar improvements required by the Plans or Specifications shall be constructed following rough grading and before landscaping.
 2. Planting holes and backfill shall be as herein specified.
 3. Preliminary rough grading and related earthwork to prepare areas for landscaping work shall be to within one-tenth foot (0.1') of finish grade.

Rancho Buena Vista HS Track and Field Replacement	32 9300 - 4	Planting
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3.02 SOIL PREPARATION AND CONDITIONING

- A. General
 - 1. The type and thickness of topsoil shall be as shown on the Plans, or if not shown, shall be Class "A".
 - 2. Planting areas shall be free of weeds and other extraneous materials to a depth of twelve inches (12").
 - 3. Soil shall not be worked when it is so wet or so dry as to cause excessive compaction or the forming of hard clods or dust.
- B. Fertilizing and Conditioning Procedures
 - 1. The planting area shall be brought to finish grade before spreading the fertilizers or conditioning materials specified.
 - 2. Fertilizing and conditioning materials shall be mechanically spread at a uniform rate. The quantities of materials necessary for the planting area shall be at the site and shall be verified by delivery tickets furnished to the Field Landscape Architect before spreading.
 - 3. After spreading, the fertilizing and conditioning materials shall be uniformly cultivated into the upper six inches (6") of soil by suitable equipment, rototiller or equal, operated in at least two directions approximately at right angles. The resulting soil shall be a friable condition.
 - 4. Fertilizer and soil amendment guidelines under agronomic soils testing shall be used for bidding purposes for planting areas, however, the Contractor shall amend it as necessary per the soils test report at no additional cost to the School District.

3.03 WEED ABATEMENT

- A. The weed abatement program shall proceed upon the completion of the irrigation system and after all existing weeds and growth has been removed from the planting areas.
- B. Irrigate all areas two (2) times daily 10 minutes per setting for ten (10) consecutive days and until weed seeds have germinated. Cease watering for three (3) days. Spray a non-selective herbicide (Roundup) to eradicate the germinated weeds. Allow herbicide to kill all weeds. Rake or hoe off all dead weeds to a depth of 1/4 inch below the surface of the soil. Repeat above after fifteen (15) days.

3.04 FINISH GRADING

- A. After fertilizing and conditioning, the soil shall be watered and allowed to settle to provide a stable surface, not overly densified to the extent that it will prevent aeration and water infiltration. After the soil has dried out to a workable condition, the planting areas shall be regraded, raked, and smoothed to the required grades and contours. Finish surfaces shall be clean and suitable for planting.
- B. The finish grade shall be smooth, uniform, and free of abrupt grade changes and depressions to ensure surface drainage.
- C. The finish grade below adjacent paving, curbs, or headers shall be one inch (1") in lawn areas and two inches (2") in shrub or ground cover areas.

3.05 PLANTING GENERAL

- A. All sprinkler/irrigation work shall be inspected and accepted by the School District, prior to start of any work of this subsection.
- B. Location of utility, structures and lines
 - 1. Prior to excavation for planting or placing of stakes, locate all utilities, electric cables, conduits, irrigation lines, heads, valves and valve control wires, and all utility lines so that proper precautions may be taken not to damage such improvements.
 - 2. In the event of a conflict between utilities and plant locations, promptly notify the School District, which shall arrange for one or the other to be relocated. Failure to follow this procedure shall place upon the Contractor the responsibility to make, at his own expense, any and all repairs for damages resulting from work.

Rancho Buena Vista HS Track and Field Replacement	32 9300 - 5	Planting
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- C. All plants will be inspected by the School District or its representative prior to planting, including plants previously approved at the nursery. The Contractor shall be responsible for the condition of all plants, planted or otherwise, until acceptance.
- D. Quantities
 - 1. Plant materials shall be furnished in the quantities and/or spacing as shown or noted for each location, and shall be of the species, kinds, sizes, etc., as symbolized, and/or described in the Plant Legend, as indicated on the Plans.
 - 2. The Contractor is to verify all sizes and quantities on the Plans. Promptly report any discrepancy to the Field Landscape Architect.
- E. Substitution
 - 1. Any plant material or any development materials specified by trade name or equal, shall be according to these Plans and Specifications.
 - 2. Installation and use of substitute items shall not be made until the Contractor is in receipt of written approval from the School District. Substitution proposals for plant material must be accompanied by written proof of non-availability within a three-hundred-mile radius of the project site for material originally specified and proof that material was ordered in a timely matter upon award of contract.
- F. Protection and Storage
 - 1. The Contractor shall regularly water all nursery stock in containers and place them in a cool area protected from sun and drying winds.
 - 2. The Contractor shall not allow plants to dry out before or while being planted. Keep exposed roots moist by means of wet sawdust, peat moss or burlap at all times during planting operations. Do not expose roots to the air except while being placed in the ground. Wilted or diseased plants, whether in place or not, will not be accepted and shall be replaced at the Contractor's expense.
- G. The Contractor shall moisten prepared surface immediately prior to installing plant material.
- H. The Contractor shall install plant material within 24 hours after delivery to site.
- I. The Contractor shall water landscaped areas immediately after installation.
- J. Layout and Plant Location.
 - 1. Planting areas, borders and boundaries, will be surveyed and staked by the Contractor and approved by the Field Landscape Architect.
 - 2. Detailed layout within the planting areas shall be performed by the Contractor and approved by the Field Landscape Architect prior to planting.
 - 3. The Contractor shall locate first row of plants in areas designated for center to center spacing. Plants shall be located one-half of designated spacing from the edges of the areas.

3.06 TREE AND SHRUB PLANTING

- A. Planting Holes. Planting holes shall be approximately square for container grown plants. The holes shall be twice the width of the plant container, unless otherwise shown on the Plans. The holes shall be one-and-half times the depth of the root ball, or as shown on the Plans. The hole shall be larger, if necessary, to permit handling and planting without injury or breakage of the root ball or root system. Any plant having a broken or cracked root ball before or during planting shall not be planted.
- B. Underground Obstructions. In the event that underground construction work or obstructions are encountered in the planting operation, alternate locations for plant material will be selected by the School District. Operation will be done at no extra cost to the School District.
- C. Planting Procedures.
 - 1. The following material shall be thoroughly blended and used as a backfill mix.

6 parts by volume on-site soil
 4 parts by volume Organic Amendment
 1 lbs. 16-20-0 per cubic yard of mix
 2 lbs. Iron Sulfate per cubic yard of mix

Rancho Buena Vista HS Track and Field Replacement	32 9300 - 6	Planting
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The actual material and amounts, as determined by the agronomic soils test, shall be supplied by the Contractor at no additional cost to the School District. No mixing for individual planting holes will be permitted. Mix planting soil prior to backfilling and stockpile at the site. Iron sulfate shall not contact cement surfaces because severe staining could occur; repair and or replacement of stained cement shall be the responsibility of the Contractor.

2. Remove all plants from their containers and set so that, when settled, they bear the same relation to the required grade as they bore to the natural grade before being transplanted. Plant each plant in the center of the pit and backfill with prepared soil. Compact the backfill mix around the ball or roots. Do not use soil in muddy condition for backfilling. Do not fill around trunks or stems. Cut off all broken or frayed roots.
 3. Thoroughly water each plant when the hole is one-half filled.
 4. After watering, backfill the remainder of the hole and tamp the soil in place until the surface of the backfill is level with the surrounding area and the crown of the plant is at the finished grade of the surrounding area.
 5. After backfilling, a basin shall be constructed around each plant. Each basin shall be of a depth sufficient to hold at least two inches (2") of water. Basins shall be the same size as the container size of each individual plant. The basins shall be constructed of amended backfill material.
 6. Set the plant tablets to be used with each plant on the top of the root ball so the required number of tablets to be used in each hole can be easily verified. Bury tablets upon approval by the Field Landscape Architect.
 7. Immediately after planting, apply water to each tree and shrub by means of a hose. Apply water in a moderate stream in the planting hole until the material about the roots is completely saturated from the bottom of the hole to the top of the ground.
 8. Apply water in sufficient quantities and as often as seasonal conditions require to keep the planted areas moist at all times, well below the root system of grass and plants.
 9. Stake trees per detail drawings immediately after planting.
- D. Pruning. Pruning shall be limited to the minimum necessary to remove injured twigs and small branches. No pruning shall be done before delivery of plants, except by approval of the School District's representative.

3.07 GROUND COVER PLANTING

- A. Soil preparation and fine grading shall be completed prior to ground cover planting.
- B. Ground cover shall be planted in moist soil and spaced as indicated on the Plans.
- C. Following planting, ground cover areas shall be regraded to restore smooth finish grade and to ensure proper surface drainage. Mulch shall be spread over the planted areas. Watering shall begin immediately following mulching.
- D. When necessary to prevent plant damage from pedestrian traffic during the initial growing stage, the Contractor shall erect temporary protective fencing to be removed at the end of the maintenance period.

3.08 MULCHING

- A. Mulch, shrub areas and trees after planting with two inches (2") of mulch.

3.09 MAINTENANCE AND PLANT ESTABLISHMENT

- A. Maintenance period will be a minimum of ninety (90) days after "Date of Acceptance of Installation" of all planting areas. The Contractor shall request in writing from the Field Landscape Architect notification of the date of the start of the maintenance period. At the acceptance of all planting areas, the Contractor shall request in writing from the Field Landscape Architect notification of the date of the completion of the maintenance period. The maintenance period shall not officially begin or end without written notification from the Field Landscape Architect.

Rancho Buena Vista HS Track and Field Replacement	32 9300 - 7	Planting
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- B. The Contractor shall maintain all planted areas on a continuous basis as they are completed during the progress of the work and during the establishment and maintenance period, and shall continue to maintain them until final acceptance in accordance with the following.
 - 1. Water, weed, fertilize, prune, spray and apply topdressing as necessary to promote a healthy growing condition. All planted areas shall be kept free of debris and shall be weeded and cultivated at intervals not to exceed ten (10) days. Keep project neat and attractive throughout the maintenance period.
 - 2. Apply herbicides for weed control, as needed or directed by School District, in accordance with manufacturer's instructions and applicable laws and regulations. Pre-emergent herbicide shall be required in all shrub and ground cover areas. Remedy damage resulting from the use of herbicides.
 - 3. Exterminate rodents and insects as require and in accordance with applicable laws and regulations. Remedy damage from use of insecticides.
 - 4. Adjust the irrigation system to sufficiently saturate root zone without rotting shrubs and ground cover.
 - 5. Repair or replace any damaged item caused by vehicles, vandals, bicycles, or foot traffic during the maintenance period.
 - 6. Fertilize with "Gro-Power Plus" at 30 lbs./1,000 s.f. every **thirty (30) calendar days** (twice during the maintenance period), or as indicated by the agronomic soils test. Apply "Gro-Power Controlled Release Nitrogen" **five (5) calendar days** before the end of the maintenance period, or as indicated by the agronomic soils test. The Contractor shall adhere to fertilization requirements of the soil's tests at no additional cost.
- C. Maintenance period shall be extended if plant material is not in a healthy growing condition. When all maintenance work has been completed to the satisfaction of Field Landscape Architect, the Field Landscape Architect will issue the Contractor a written notice of completion of maintenance.

3.10 INSPECTION

- A. All inspections herein specified shall be made by the School District. The Contractor shall request inspection at least forty-eight (48) hours in advance of the time the inspection is required. Requested inspections, subsequently canceled without twenty-four (24) hours notice, will be billed to the Contractor.
- B. Inspection will be required for, and not necessarily limited to, the following parts of the work.
 - 1. At completion of the incorporation of soil amendments and fine grading.
 - 2. Prior to digging plant pits for shrubs.
 - 3. During backfilling of plant pits with amended backfill.
 - 4. Final inspection at the end of the maintenance period.

END OF SECTION 32 93 00
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Rancho Buena Vista HS Track and Field Replacement	32 9300 - 8	Planting
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**SECTION 33 4211
STORMWATER GRAVITY PIPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Storm drainage piping, fittings, and accessories.
- B. Catch basins, Paved area drainage, and Site surface drainage.

1.02 RELATED REQUIREMENTS

- A. Section 31 2316 - Excavation: Excavating of trenches.
- B. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.

1.03 DEFINITIONS

- A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.04 REFERENCE STANDARDS

- A. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120 2021a.
- B. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications 2020.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Field Quality Control Submittals: Document results of field quality control testing.
- D. Project Record Documents:
 - 1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.
 - 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.01 STORMWATER PIPE MATERIALS

- A. Plastic Pipe: ASTM D1785, Schedule 40, Poly Vinyl Chloride (PVC) SD material; inside nominal diameter of 18 inches (____ mm), bell and spigot style solvent sealed joint end.

2.02 PIPE ACCESSORIES

- A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

PART 3 EXECUTION

3.01 TRENCHING

- A. See Section 31 2316.13 - Trenching for additional requirements.
- B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION - PIPE

- A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
 - 1. Plastic Pipe: Also comply with ASTM D2321.

Rancho Buena Vista HS Track and Field Replacement	33 4211 - 1	Stormwater Gravity Piping
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- B. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch (3 mm) in 10 feet (3 m).
- C. Connect to building storm drainage system, foundation drainage system, and utility/municipal sewer system.

3.03 INSTALLATION - CATCH BASINS, TRENCH DRAINS AND CLEANOUTS

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Form and place cast-in-place concrete base pad, with provision for stormwater pipe end sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated.
- D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.04 PROTECTION

- A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

Rancho Buena Vista HS Track and Field Replacement	33 4211 - 2	Stormwater Gravity Piping
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**SECTION 33 46 16.13
FIELD SUBSURFACE DRAINAGE**

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install complete subsurface drainage system for the synthetic turf football / soccer field.
- B. Trench to line and grade as shown on the drawings utilizing laser-controlled equipment.
- C. Dispose of excavated trench material.
- D. Collector Tubing:
 - 1. For non-perforated collector, install corrugated polyethylene (CPEP) collector tubing. Backfill with select site soil, 8" maximum lifts, compacted to 95%.
 - 2. For perforated collector, install corrugated polyethylene (CPEP) collector tubing. Backfill with pea gravel.
- E. Remove all loose material from collector and lateral trench bottom.
- F. For round pipe perforated lateral drainage piping, place a minimum 2" depth of specified washed pea gravel bedding for perforated lateral piping. For flat drainage piping, install perforated lateral piping directly on structural fabric.
- G. Install perforated corrugated tubing lateral system plumbed to collector piping.
- H. Bed and backfill round perforated tubing trenches with specified washed pea gravel. Backfill over corrugated tubing in jump pits with pea gravel.
- I. Upon completion of this work, restore subgrade to specified condition and tolerances, compacted to 95% density with no loose material on surface.
- J. Furnish and install slot drains at field perimeter/inside edge of rubberized running track and adjacent to long/triple jump venue north of the track.

1.02 STANDARD SPECIFICATIONS

- A. American Public Works Association, Standard Specifications for Municipal Public Works Construction (APWA) (latest edition).
- B. United States Department of Agriculture, Soil Conservation Service, Engineering Standard 606.
- C. The Green Book Standard Specifications for Municipal Public Works Construction, California State Chapter (latest edition).

1.03 RELATED WORK IN OTHER SECTIONS

- A. 03 30 53 Miscellaneous Cast-In-Place Concrete
- B. 11 68 24 Exterior Athletic Equipment

1.04 SUBMITTALS

- A. Submit to the Engineer for approval:
 - 1. Pea gravel sieve analysis
 - 2. Product data for perforated and non-perforated tubing
 - 3. Product data for all fittings and connections

1.05 QUALIFICATIONS

- A. The Contractor or subcontractor responsible for field base establishment, field subsurface drainage, field washwater and irrigation systems, and field permeable aggregate placement and compaction shall be submitted to the Field Landscape Architect for approval. Specific prequalification requirements are included as follows:
 - 1. Contractor or sub-contractor shall be and has been actively and directly engaged in constructing similar natural or synthetic field projects for a period of five (5) or more years and shall provide proof of four (4) or more sports field base installations completed in the past two (2) years. as used in this section means a project similar in character to the work in which each respective firm or their employee will perform on this project. The

Rancho Buena Vista HS Track and Field Replacement	33 4616.13 - 1	Field Subsurface Drainage
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“similar project” shall also be equal or greater in scale and complexity than the work for which each firm will be engaged to perform on this project. The “similar” project must be a natural or synthetic turf athletic field and/or a rubberized running track project, consisting of at least 75,000 sf of field surface area and a 400m, 8 lane running track. The Contractor’s experience shall include completion of high school, college, or professional level competition fields. The playing field system shall include earthwork, washwater or irrigation systems, drainage and subsurface drainage systems, and base aggregate placement and compaction. Provide a listing of all construction contracts (whether completed or in progress) entered into or performed by the Contractor or subcontractor within the past five years for projects similar in scope, time and complexity to the work called for under this Contract; include the names of the contracts, and the names and contact information of the owners.

PART 2 PRODUCTS

2.01 PEFORATED AND NON-PERFORATED TUBING

- A. The piping shall be corrugated polyethylene drainage tubing. The non-perforated collector tubing shall be smooth interior wall CPEP.
- B. Material shall conform to requirements of Type III, Grade 4, Class "C" polyethylene as specified in ASTM D1248.
- C. Dimensions:
 - 1. Inside diameter variance shall not exceed -0.0% or +5%.
 - 2. Lengths shall be in coiled configuration with a -0.0% tolerance.
- D. Tubing shall conform to U.S. Department of Agriculture Soil Conservation Service, Engineering Standard 606.
- E. For perforated collector piping, water inlet areas shall be slotted with a width of 1/16" "0.020" to a maximum of 3/32" "0.030" uniformly spaced circumferential slots located on the inner depression of the corrugation, totaling a minimum of 1.25 square inches per lineal foot. The perforations shall provide a clear opening. Tubing with perforations that are punched with a flap type opening or that are not uniform will be rejected.
- F. Flat Drains: For perforated piping, use "AdvanEdge" flat pipe, 1" x 12" **without** geotextile fabric wrapping. Water inlet areas shall be slotted with a width of 1/16" (0.020) to a maximum of 3/32" (0.030) uniformly spaced circumferential slots located on the inner depression of the corrugation, totaling a minimum of 1.25 square inches per lineal foot. The perforations shall provide a clear opening. Tubing with perforations that are punched with a flap type opening or that are not uniform will be rejected. Use manufacturers end caps, couplers, and fittings to connect to the collector pipe.
- G. For perforated piping within field event area, utilize single wall CPEP pipe without geotextile fabric wrapping. Water inlet areas shall be slotted with a width of 1/16" (0.020) to a maximum of 3/32" (0.030) uniformly spaced circumferential slots located on the inner depression of the corrugation, totaling a minimum of 1.25 square inches per lineal foot. The perforations shall provide a clear opening. Tubing with perforations that are punched with a flap type opening or that are not uniform will be rejected.
- H. Fittings and Connections:
 - 1. Fittings shall be as furnished by the manufacturer of the pipe.
 - 2. Connections of tubing lengths shall be with split coupling or snap-in-type couplings utilizing polyethylene or construction tape.
 - 3. Tubing is to be inserted into sockets for the full socket length. "Slip-fit" connections will not be permitted.
 - 4. All split coupling connections are to be fully taped. All connections at fittings and connections are to be taped at interface of exposed joint.

2.02 PEA GRAVEL

- A. Pea-gravel bedding for perforated pipe shall be clean, washed, uniformly graded 3/8" to 1/8". The pea gravel material graduation must meet the following sieve analysis:

Rancho Buena Vista HS Track and Field Replacement	33 4616.13 - 2	Field Subsurface Drainage
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Sieve Size	Percent Passing
1/ 2"	100
3/ 8"	90 - 100
# 4	5 - 15
# 8	0 - 10
# 100	0 - 0.6
# 200 (wet sieve)	0 - 0.4
# 270 (wet sieve)	0 - 0.2

2.03 TESTING

- A. The Owner will be performing testing of materials delivered to the job site for the purpose of verifying compliance with the contract documents. The Owner’s testing is for this purpose only and not for construction quality control by the Contractor.
- B. The Contractor shall coordinate directly with the Owner’s testing firm relative to the delivery schedules of the imported materials.
- C. The Contractor shall provide testing and surveillance as required to assure materials and work fully comply with contract requirements.
- D. The Contractor at a price equal to the Owner’s contract testing agreement shall pay for owner’s tests that do not meet specifications. The Contractor shall pay directly to the testing organization upon invoice to the owner, which has been approved by the Engineer.
- F. Slot drain catch basins shall be in-line catch basins and plastic trash bucket. Outlet pipe shall be 6” diameter.
- G. Slot drain catch basin shall match product used for slot drain.

2.04 SLOT DRAINS – INSIDE TRACK EDGE

- A. The slot drain shall be pre-manufactured as modular interlocking units.
- B. Slot drain body shall be composed of polymer concrete or HDPE.
- C. Slot drain internal dimensions shall be a minimum of 4” width and an 8” minimum depth.
- E. Slot drain shall be ACO System 2000 or approved equal, with a neutral bottom.
- F. Slot drain catch basins shall be in-line catch basins with polymer concrete cover and plastic trash bucket. Outlet pipe shall be 6” diameter.
- G. Slot drain catch basin shall match product used for slot drain.

PART 3 EXECUTION

3.01 TRENCHING

- A. Coordination: It is the responsibility of the Contractor to ensure that electrical conduits and irrigation/wash water piping is installed at a sufficient depth below subgrade before the trenching for the subsurface drainage system to avoid conflicts between systems.
- B. Excavation shall be made to the alignment, elevation, grade and slope as indicated on the drawings.
- C. Trenching shall be accomplished utilizing equipment with slope and depth control, such as "Laser Plane Control System", so as to ensure accuracy in the bottom of the trench.
- D. No high points above designated invert or calculated trench bottom elevation will be permitted. No sloughing of site material or loose excavated soil will be permitted to remain in the trenches.
- E. Surplus excavated soil shall be removed from the field area. Excavated material may not remain on subgrade. Excess soil material shall be disposed of off site.
- F. Provide a smooth, even subgrade after removal of the trench material. Subgrade to be compacted to 95% density. Leave no loose material on the subgrade.

3.02 PLACEMENT

- A. Excavation below invert grade must be established to a depth so as to provide for specified placement of pea gravel bedding at bottom of pipe elevation prior to laying the tubing.

Rancho Buena Vista HS Track and Field Replacement	33 4616.13 - 3	Field Subsurface Drainage
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- B. Pea-gravel bedding for perforated pipe shall be clean, washed, uniformly graded 3/8" to 1/8".
- C. No foreign material will be permitted inside, alongside, under, or on top of, installed tubing.

3.03 BACKFILL

- A. The backfill for all round perforated pipe shall be clean washed pea gravel, uniformly graded 3/8" to 1/8".
- B. Specified bedding shall not be placed until Engineer approves the trench.
- C. Trench backfill shall not be placed before Engineer approves perforated pipe placement.
- D. During placement of specified trench backfill, pipe must be held in place with a hand device to prevent displacement and provide for achieving specified invert elevation. Do not damage pipe or allow pipe to be displaced by placement of backfill material.

3.04 CONNECTIONS

- A. All connections are to be made with approved fittings as recommended by the tubing manufacturer and approved by the Engineer.
- B. Tubing is to be inserted into sockets for the entire length. Tape all connections utilizing polyethylene or construction tape.
- C. No foreign material will be permitted inside the installed tubing.
- D. Cap the ends of all lateral runs as shown on the drainage plan. All open ends during construction are to be temporarily capped or plugged.
- E. Connection of laterals to collector drains shall be made with a combination reducing tee and reducing saddle tee or end tee as applicable, utilizing snap connections.

3.05 EQUIPMENT MOVEMENT

- A. No trucks or equipment will be allowed to drive over the top of the trenches except track-equipped machinery utilized in spreading imported granular materials. Backfilled trenches are to be staked and "flagged" 3' above grade a maximum 20' spacing for identity.

3.06 SLOT DRAIN INSTALLATION

- A. Install slot drains per manufacturer's recommendations. Slot drain channels shall be installed in minimum 6" thick concrete foundation envelope per details.
- B. The top of the slot drain shall be flush with adjacent concrete or asphalt paving and shall permit positive water drainage into the slot drain without surface water ponding. The slot drain surface will be covered with rubberized surfacing, allowing for a coarse finish at the surface.
- C. Protect surfaces and interior of channel during placement of concrete.
- D. Following final set of concrete, remove slot and grate protection, place covers in final position and engage locking bolts in correct location.

END OF SECTION 33 46 16.13
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Rancho Buena Vista HS Track and Field Replacement	33 4616.13 - 4	Field Subsurface Drainage
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**SECTION 33 46 23.16
FIELD PERMEABLE AGGREGATE**

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Include all labor, material, transportation and services to complete installation of the permeable aggregate base materials as shown on the drawings for the field including:
 - 1. Final subgrade establishment
 - 2. Structural Soil-Bearing Fabric
 - 3. Base Course Permeable Aggregate
 - 4. Top Course Permeable Aggregate
 - 5. Recycled Plastic Edge Anchor

1.02 STANDARD SPECIFICATIONS

- A. All sections of the standard specifications applicable to any and all parts of this project shall govern, except as specifically modified in these contract documents.
 - 1. The Green Book Standard Specifications for Municipal Public Works Construction, California State Chapter (latest edition).
 - 2. American Society for Testing and Materials (ASTM).
 - 3. American Association of State Highway and Transportation Officials, (AASHTO).

1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. Section 03 30 53 Miscellaneous Cast-In-Place Concrete
- B. Section 31 00 00 Earthwork
- C. Section 31 22 16 Field Subgrade Establishment
- D. Section 33 34 00 Site Storm Drainage
- E. Section 33 46 16.13 Field Subsurface Drainage

1.04 SUBMITTALS

- A. Submit to the Field Landscape Architect for approval:
 - 1. Qualifications of base contractor.
 - 2. Permeable structural fabric product data.
 - 3. Concrete Anchors.
 - 4. Base Course Permeable Aggregate sieve analysis.
 - 5. Base Course Permeable Aggregate infiltration rate (for material compacted to a minimum density of not less than 98% of maximum dry density as determined by ASTM D698).
 - 6. Top Course Permeable Aggregate sieve analysis.
 - 7. Top Course Permeable Aggregate infiltration rate (for material compacted to a minimum density of not less than 98% of maximum dry density as determined by ASTM D698).
 - 8. Equipment and procedures to be utilized for the permeable aggregate installation.
 - 9. Recycled Plastic; Manufacturers Published Product Data.

1.05 QUALIFICATIONS

- A. The Contractor or subcontractor responsible for field base establishment, field subsurface drainage, field washwater and irrigation systems, and field permeable aggregate placement and compaction shall be submitted to the Field Landscape Architect for approval. Specific prequalification requirements are included as follows:
 - 1. Contractor or sub-contractor shall be and has been actively and directly engaged in constructing similar natural or synthetic field projects for a period of five (5) or more years and shall provide proof of four (4) or more sports field base installations completed in the past two (2) years. as used in this section means a project similar in character to the work in which each respective firm or their employee will perform on this project. The "similar project" shall also be equal or greater in scale and complexity than the work for

Rancho Buena Vista HS Track and Field Replacement	33 4623.16 - 1	Summary
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which each firm will be engaged to perform on this project. The "similar" project must be a natural or synthetic turf athletic field and/or a rubberized running track project, consisting of at least 75,000 sf of field surface area and a 400m, 8 lane running track. The Contractor's experience shall include completion of high school, college, or professional level competition fields. The playing field system shall include earthwork, washwater or irrigation systems, drainage and subsurface drainage systems, and base aggregate placement and compaction. Provide a listing of all construction contracts (whether completed or in progress) entered into or performed by the Contractor or subcontractor within the past five years for projects similar in scope, time and complexity to the work called for under this Contract; include the names of the contracts, and the names and contact information of the owners.

PART 2 MATERIALS

2.01 STRUCTURAL SOIL-BEARING FABRIC

- A. Fabric
 - 1. Material: Fabric to be 100% Polypropylene, non-woven, needle-punched fabric with a minimum weight of 4.0 oz/sy.
 - 2. Physical Properties:

Tensile Strength, lbs., (ASTM D-4632):	100
Elongation (%), (ASTM D4632):	50
Puncture Strength, (lbs), (ASTM D4833):	65
Mullen Burst Strength (PSI), (ASTM D3786):	225
Trapezoidal Tear, (lbs), (ASTM D4533):	45
Abrasion Res. % Str. Ret., (ASTM D4886):	80
Coefficient. of Perm., cm/sec., (ASTM D4491):	0.22
Flow Rate Gal./Min./Sq. Ft.) (ASTM D4491):	140

2.02 BASE COURSE PERMEABLE AGGREGATE

- A. The base course permeable aggregate shall be installed below the top course permeable aggregate as applicable.
- B. Aggregate to be open-graded, fractured, friction course. To ensure free drainage, material to be clean with minimal fines. The compacted base course permeable aggregate minimum infiltration rate shall be 40 inches per hour when the material is compacted to a minimum density of not less than 98% of maximum dry density as determined by ASTM D698.
- C. Base course material to be a minimum of 75% fractured with at least one fractured face by mechanical means on each individual particle larger than 1/4". A sand and gravel source may be acceptable for this material.

Gradation: Aggregate to meet the following particle size limitations:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
1-1/4"	100
1"	90 - 100
3/4"	80 - 100
1/2"	50 - 80
3/8"	40 - 60
No. 4	15 - 40
No. 8	10 - 20
No. 30	5 - 15
No. 100	0 - 3
No. 200 (wet sieve)	0 - 2.0

2.03 TOP COURSE PERMEABLE AGGREGATE

- A. Aggregate to be open-graded, fractured, friction course. To ensure free drainage, material to be clean with minimal fines. The compacted top course permeable aggregate minimum

Rancho Buena Vista HS Track and Field Replacement	33 4623.16 - 2	Summary
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infiltration rate shall be 20 inches per hour when the material is compacted to a minimum density of not less than 98% of maximum dry density as determined by ASTM D698.

- B. Top course material to be 100% fractured crushed rock material. A quarry source is required for this material.
- C. Gradation: Aggregate to meet the following particle size limitations:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
3/4"	100
1/2"	90 - 100
3/8"	70 - 90
No. 4	30 - 60
No. 8	20 - 40
No. 30	5 - 15
No. 100	2 - 5
No. 200 (Wet Sieve)	0 - 3.0
No. 270 (Wet Sieve)	0 - 1.5

2.04 TESTING

- A. The Owner will be performing testing of materials delivered to the job site for the purpose of verifying compliance with the contract documents. The Owner’s testing is for this purpose only and not for construction quality control by the Contractor.
- B. The Contractor shall coordinate directly with the Owner’s testing firm relative to the delivery schedules of the imported materials. Sampling will be scheduled each day deliveries occur.
- C. The Contractor shall provide testing and surveillance as required to assure materials and work fully comply with contract requirements.
- D. The Contractor at a price equal to the Owner’s contract testing agreement shall pay for owner’s tests that do not meet specifications. The Contractor shall pay directly to the testing organization upon invoice to the owner, which has been approved by the Field Landscape Architect.

2.05 RECYCLED PLASTIC EDGE ANCHOR

- A. Includes all materials required to provide a secure recycled plastic edge for establishment of Permeable Aggregate grade and anchoring of synthetic turf.
- B. A recycled plastic lumber nailer board shall be installed per the details to secure the turf. Product shall be manufactured from 100% recycled materials, consisting of HDPE Plastic Lumber. Material should be dimensional lumber in lengths no shorter than 6'.
 - 1. Where attachment is scheduled to concrete curbing, provide minimum 2"x4" nominal dimensional lumber.
- C. Manufacturer’s reference: Product is available from RESCO Plastics, Inc., Coos Bay, Oregon. (800) 266-5097 (Maxituf); or Black Rhino Recycling, Inc. (2x4 UG-2X4BL8); (800) 974-4669’ www.blackrhinoproducts.com.
- D. Concrete Anchoring: Concrete wedge anchor, zinc plated, 3/8" x5" length, partially threaded, with zinc plated washer and nut.
- E. Steel power-load driven or ram-set Concrete Anchor Nail, minimum shank diameter 5/32", minimum head/washer diameter 3/8", sufficient length to insure a minimum 2" embedment. Individual anchors shall develop a minimum 450 lb shear, 350 lb tension in 4,000 psi concrete at 2" embedment.

PART 3 EXECUTION

3.01 SUBGRADE ESTABLISHMENT

- A. No work shall be performed in this section until subgrade is 100% completed and accepted by the Field Landscape Architect.
- B. Finish subgrade shall be compacted to a minimum 95% maximum dry density.
- C. Subgrade shall be established to within the tolerance of +0.00' or -0.10' of the design subgrade

Rancho Buena Vista HS Track and Field Replacement	33 4623.16 - 3	Summary
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elevation.

3.02 STRUCTURAL SOIL-BEARING FABRIC INSTALLATION

- A. No loose material is allowed on subgrade prior to placement of structural fabric. Loose material is to be removed prior to placement.
- B. Fabric to be laid on smooth, compacted, subgrade surface over the entire surface area, including below drainage lateral piping.
- C. Placement of structural-bearing fabric requires approval of subgrade conditions by Field Landscape Architect.
- D. Structural fabric must be flat on stabilized subgrade for full width.
- E. Dimensions to be a minimum width of 12.5' and minimum continuous length of 150 lf.
- F. When the length of the fabric is not continuous, the lateral seam shall have a minimum overlap of 24".
- G. Fabric shall not be folded or turned up along the edges.
- H. The fabric shall be field cut as necessary to meet specified tolerances of distance from drainage trenches.
- I. In no instance shall fabric cover drainage lateral piping.
- J. Stabilization: Immediately upon laying, the fabric is to be covered with base aggregate. No loaded trucks are to be permitted to move over fabric-covered surfaces until a minimum of 4" of aggregate has been placed, except if specifically approved by the Field Landscape Architect. The Contractor must execute strict, direct - 100% - control of all vehicle movement on site.

3.03 EQUIPMENT MOVEMENT

- A. No trucks or equipment will be allowed to drive over the top of the drainage pipe or trenches except track-equipped machinery utilized in spreading base aggregate materials, or where a 12" depth base aggregate temporary roadway has been established. Backfilled trenches are to be staked and "flagged" 3' above grade at 20' minimum intervals for identity.
- B. In the event non track-equipped traffic is observed or evidenced to cross piping or trenches, the Contractor shall, at their own expense, expose the drainpipe in the area directed for observation by the Field Landscape Architect, repair any damage promptly and reinstall backfill per specifications.

3.04 AGGREGATE PLACEMENT

- A. Moisture Content: Aggregate to contain 3.5% to 4.0% moisture content to ensure that fines do not migrate and to facilitate proper compaction. Contractor must ensure that aggregate leaving the source plant meets this requirement and is required to apply water to aggregate on site to attain and maintain this minimum moisture content in stockpile and during all placement operations.
- B. Prior to aggregate placement, remove any foreign material or contamination from the surface of the structural fabric and drainage trench or lateral piping.
- C. Surface must be free of standing water and subgrade stabilized with structural fabric in place prior to placement.
- D. Materials to be placed in layers not exceeding 6" compacted in depth. Each layer must be spread uniformly with equipment that will not cause perceptible separation in gradation (segregation), preferably a self-propelled paving machine.
- E. Should there occur, during any stage of the spreading or stockpiling, a separation of the material particles, the Contractor must immediately remove and dispose of segregated material and correct or change handling procedures to prevent any further separation.
- F. A single lift of permeable aggregate material may be utilized in lieu of the two lifts specified, provided the overall depth is equivalent to the total of the two lifts specified, and that the most restrictive tolerances and permeability requirements are met. The permeability rate must be a minimum of 40" per hour throughout the entire aggregate column, and the finish grade tolerances are met.

Rancho Buena Vista HS Track and Field Replacement	33 4623.16 - 4	Summary
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3.05 AGGREGATE COMPACTION

- A. Each layer shall be compacted to a minimum density of not less than 92-95% of maximum dry density as determined by ASTM D698 and measured using a nuclear method.
- B. Use Static Tandem Drum-type roller of not less than five tons weight.

3.06 AGGREGATE TOLERANCES

- A. The Contractor shall utilize a laser plane system for grade control.
- B. The surface of the base course permeable aggregate in areas to be covered with top course aggregate as applicable shall not deviate from designated compacted grade within the range of -0.50" and +0.00".
- C. The surface of the top course permeable aggregate shall not deviate from designated compacted grade with the range of -0.00" and +0.25".
- D. Upon completion of the fine grading, compaction, and Contractor confirmation of conformance with the tolerances, the Contractor shall notify the Field Landscape Architect and schedule an inspection for approval. The Contractor shall have a laser plane system available to the Field Landscape Architect for the inspections. The Contractor shall not be authorized to place synthetic turf over the permeable aggregate until it has been inspected and approved by the Field Landscape Architect.
- E. Upon completion of elevation verification, the entire permeable aggregate surface shall be inspected for planarity. Planarity inspection shall be completed in conjunction, coordination with the synthetic turf vendor. The installation foreman for the synthetic turf shall be present at the time of the inspection. Inspection shall consist of stretching a stringline taut over the finished permeable aggregate surface at such interval as may be required to confirm surface planarity and acceptance for installation of synthetic turf surface. Any deviation greater than ¼" shall require remediation efforts as may be required to meet subgrade tolerance.

3.07 RECYCLED PLASTIC EDGE ANCHOR

- A. Prior to proceeding with Edge Anchor installation, confirm with the Engineer the final elevation for installation relative to adjacent surfaces.
- B. The Edge Anchor may be temporarily set with temporary hardware to establish the proper line and grade. This temporary hardware may remain after final installation.
 - 1. Wedge Anchor
 - a. The Plastic Edge Anchor may be temporarily set with power-loads to establish the proper line and grade. This temporary hardware may remain after final installation.
 - b. Once the initial line and grade has been established, pre-drill the edge anchor and establish a void in the adjacent concrete surface that meets the approved anchor supplier's requirements for proper securing of the anchor.
 - c. Minimum requirements for anchor installation:
 - i. Depth of Embedment: 3" or as recommended by the anchor supplier, whichever is greater.
 - ii. Horizontal Spacing: no greater than 36" on center and 12" from end of any length of lumber.
 - iii. Nut Torque: Per approved manufacturer's recommendation.
 - iv. Do not trim bolt ends. Bolts with trimmed or damaged ends will be rejected and must be removed.
 - 2. Concrete Anchor Nail
 - a. The Plastic Edge Anchor may be temporarily set with power-loads placed at the Contractors option to assist in establishing the proper line and grade. This temporary hardware may remain after final installation.
 - b. Once the initial line and grade has been established, install the specified ram-set or power-load driven Concrete Anchoring Nails in manner consistent with the approved manufacturers printed instruction and the specified spacing.
 - c. Minimum requirements for Concrete Anchor Nail installation:
 - i. Depth of Embedment: 2" or as recommended by the anchor supplier, whichever is greater.

- ii. Horizontal Spacing: no greater than 21” on center and 6” from end of any length of lumber.
- iii. Stagger the spacing of each Anchor up and down within the middle one-half the face of the Recycled Edge Anchor.

END OF SECTION 33 46 23.16
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Rancho Buena Vista HS Track and Field Replacement	33 4623.16 - 6	Summary
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