LITTLETON PUBLIC SCHOOLS

2020 CONSTRUCTION STANDARDS VOLUME I

Divisions 00 – 14, and 31 - 33

Issue Date: October 01, 2020

For use in all new projects as of the issue date

Projects in progress prior to the issue date should refer to the appropriate prior issue

TABLE of CONTENTS

INTRODUCTION to CONSTRUCTION STANDARDS

Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC) 2020 edition of its Construction Standards marks a new approach to providing Architects and/or other Consultants for the design and specification of District facilities and facility improvements.

The Construction Standards identify vendors, products, and equipment pre-approved for conformance to District standards and expectations. They are intended to promote consistent quality and reasonable continuity in products, materials, systems and workmanship for all District facilities.

The Construction Standards are not intended to limit creative design or functional problem-solving, and are not intended to serve as buildable technical specifications

Proposed deviation from the Construction Standards are expected when new codes, standards or products require the District's attention. Consultation with and acceptance by the LPS OMC.

Consultants are responsible for informing the District of any conflict found between the Guidelines and current codes, standards, or best practices.

Major revisions to the Construction Standard include:

- The standards have been compressed into a three-volume set
- Each volume is in pdf format with navigation improvements
    - The Table of Contents is linked to divisions and sections
    - Divisions and sections are bookmarked
- All information has been gathered under a single division heading rather than separated into Appendices or Specifications in different volumes
- CSI codes and descriptions have been updated to align with the June 2018 edition of MastFormat® Numbers & Titles
    - Volume I
        - Divisions 00 through 14
            - Division 00 and Division 01 are new for 2020
        - Divisions 31 through 33
    - Volume II
        - Divisions 21 through 23
            - References to Division 20 have been eliminated by updating the respective codes and descriptions
            - Division 22 has been simplified to provide general direction rather than model specifications. Specification reviews and dialogue with LPS OMC plumbers will provide consultants a greater understanding of basic requirements that might otherwise be lost in details or outdated information.
            - Divisions 21 and 23 remain relatively unchanged. Information found in Volume I, including Appendices have been combined under respective divisions

- Division 26
  - Division 26 has been simplified to provide general direction rather than model specifications. Specification reviews and dialogue with LPS OMC electricians will provide consultants a greater understanding of basic requirements that might otherwise be lost in details or outdated information.
- Volume III
  - Divisions 27 and Division 28 are now in Volume III
  - 27-10-00 Structured Cabling Standards July 19, 2019 update has been added
  - 28 10 00 Physical Security Equipment Standards April 2019 update has been added
- Volume IV No longer exists

- LPS Security Guidelines
  - LPS Security Guidelines are referenced and are to be treated as part of the Construction Standard in the same manner as Division 27 Design Typicals or Division 28 FAMN Schematics.

Consultants are required to coordinate with LPS resources including:

Division 27 Technology Design Typicals

Division 28 FA & MN Schematics

Safety and Security Guidelines for Facility Design

Construction Standards Volume 2 for Divisions 21-23, and 26

Construction Standards Volume 3 for Divisions 27-28

Resources can be found on LPS Manuals and Regulations web page:

https://littletonpublicschools.net/manuals-regulations

DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

00 01 01 Project Title Page

- Project Title Page is required for the Project Manual.
- No format requirements
- The following must be included:
  - The words "Project Manual"
  - Official project title,
  - Name and Address of the facility or site.
  - Date
  - Design consultant's firm name, address, phone, email
- Responsible party: design consultant

00 01 05 Certifications Page

- Written certifications: not a typical requirement for Littleton Public Schools (LPS) capital projects
- Coordinate with LPS Project Manager (PM).
- No format requirements
- Responsible party: design consultant

00 01 07 Seals Page

- Separate professional seals page is optional for the Project Manual.
- Professional seals and signatures may be located on the Title Page
- Conform to State requirements and with Authorities Having Jurisdiction.
- No format requirements
- Responsible party: design consultant

00 01 10 Table of Contents

- Table of Contents is required in the Project Manual.
- No format requirements
- Responsible party: design consultant

00 01 15 List of Drawing Sheets

- The list of Drawing Sheets is required on the Title Sheet of the Drawing set.
- Title Sheet is required on each volume of Drawings.
- Format: Uniform Drawing System (UDS)
- Responsible party: design consultant

00 01 20 List of Schedules

- Separate List of Schedules is required on the Title Sheet of the Drawings or the Project Manual, wherever the schedules are located.
- Coordinate schedule locations with LPS PM for Bid and Construction Documents.
- Format: Uniform Drawing System (UDS)
- Responsible party: design consultant

00 10 00 Solicitation

00 11 00 Advertisements and Invitations

- Project-applicable Invitation to Bid information is required under this heading in the Project Manual released to bidders.
- Coordinate Invitation to Bid with LPS:
  - Instructions to Bidders
  - Bid Bond
  - Construction Agreement
  - General and Supplementary Conditions of the Contract
  - Performance Bond
  - Labor and Material Payment Bond
  - LPS Project Manager
- Format: LPS current standard format template
  - LPS to provide Invitation to Bid template
  - Modifications to Invitation to Bid information are PROHIBITED without written consent of LPS.

00 11 19 Request for Proposal

- Requirements are project-specific
- Responsible party: LPS

00 11 53 Request for Qualifications

- Requirements are project-specific
- Responsible party: LPS

00 20 00 Instructions for Procurement

00 21 00 Instructions

00 21 13 Instructions to Bidders

- Instructions to Bidders are required under this heading in the Project Manual released to bidders.
- Format: LPS current standard format template

- Responsible party: design consultant
- Insert into the Project Manual without modification
- Coordinate Instructions to Bidders with:
  - Invitation to Bid
  - Bid Bond
  - Construction Agreement
  - General and Supplementary Conditions of the Contract
  - Performance Bond
  - Labor and Material Payment Bond
  - LPS Project Manager

00 22 00 Supplementary Instructions

00 22 13 Supplementary Instructions to Bidders

- AIA, CSI, and EJCDC protocols apply.
- Review project-specific requirements and coordinate with LPS Project Manager.
  - Include in the Project Manual only with approval of LPS Project Manager.
- Responsible party: design consultant

00 25 00 Procurement Meetings

00 25 13 Pre-Bid Meetings

- Pre-bid conference attendance is mandatory for LPS capital projects.
- Bids received from bidders not attending the Pre-bid conference will not be opened.
- Format: Coordinate agenda with LPS Project Manager
- Responsible party: design consultant

00 30 00 Available Information

- Project-specific information available to bidders is required to be listed in the Project Manual under this heading and either included or referenced in the Documents released to Bidders.
- No format requirements
- Responsible party: design consultant
  - Unedited information is provided to the design consultant by LPS for reference, drafting, preparation, or incorporation into the Bid and Construction Documents
  - Coordinate Available Information with LPS:
    - Instructions to Bidders
    - Bid Bond
    - Construction Agreement
    - General and Supplementary Conditions of the Contract

- Performance Bond
- Labor and Material Payment Bond
- LPS Project Manager

00 31 00 Available Project Information

00 31 19 Existing Condition Information

- Closed-out construction drawings, specifications, and files pertaining to existing buildings and sites are available upon request.
- A copy of the most recent site survey should be included for reference in the Bid and Construction Drawings.
- Bid Documents should clearly indicate other available supplemental information, such as pre-design reports, especially for projects in existing buildings.

00 31 21 Survey Information

- Project-specific survey information is required under this heading in the project manual released to bidders.

00 31 24 Environmental Assessment Information

- Project-specific environmental assessment information is required under this heading in the project manual released to bidders.

00 31 25 Existing Material Information

- Project-specific existing material information is required under this heading in the project manual released to bidders.
- Coordinate with LPS Operations, Maintenance and Construction Department (OMC), LPS PM, and 02 42 00 Removal and Salvage of Construction Materials.

00 31 26 Existing Hazardous Material Information

- LPS requires Bidders to become familiar with the potential constraints and special coordination necessary to avoid disturbing asbestos containing materials.
- Asbestos Hazard Emergency Response Act (AHERA) Management Plans are available to the public for review upon request.

00 31 32 Geotechnical Data

- Geotechnical Report(s) is available to the public for review upon request.

00 31 43 Permit Application

- Construction and other permit application, processing, fees, record keeping, compliance, and management are the exclusive responsibility of the contractor once the original permit has been executed.
- The consultant is responsible to submit the original review permit application in coordination with the LPS Project Manager.
    - LPS is responsible for the initial building permit application fee.

00 40 00 Procurement Forms and Supplements

00 41 00 Bid Forms

- Bid Forms and Supplements are required to be included under this heading in the Project Manual released to bidders.
- Coordinate Bid Forms and Supplements with LPS standard documents:
  - Instructions to Bidders
  - Bid Bond
  - Construction Agreement
  - General and Supplementary Conditions of the Contract
  - Performance Bond
  - Labor and Material Payment Bond
  - Written acknowledgment of all issued addenda.
  - Illegal Alien Certification
  - Criminal Records Certification
  - Acknowledgement & Attestation Form
- Cross-reference project-specific Bid Forms and Supplements in the Supplementary Instructions to Bidders.
- Responsible party: design consultant
  - Design consultant drafts and submits project-specific bid form to LPS Project Manager for review.
  - LPS provides written comments to the design consultant for revision and incorporation into the Project Manual released to bidders.
- Format: LPS current standard format templates

00 42 00 Proposal Forms

- Proposals Form minimum requirements:
  - Applicable standards including:
    - LPS Construction Standards
  - Project name and location
  - Scope of work
  - Responsible parties
  - Schedule and/or start and completion dates
  - Amount of remuneration
  - Payment protocols per the General Conditions
  - Modification of the proposal

00 43 00 Procurement Form Supplements

00 3 13 Bid Security Form (Bid Bond)

- Format: LPS or Bonding company standard form
- Responsible party: design consultant
  - Include in Project Manual released to bidders

00 43 21 Allowance Form

- Combine with Bid Form
- Responsible party: design consultant
  - Include in Project Manual released to bidders.

00 43 22 Unit Prices Form

- Combine with Bid Form
- Responsible party: design consultant
  - Include in Project Manual released to bidders.

00 43 23 Alternates Form

- Attachment to Bid Form
- Responsible party: design consultant and/or bidder
- Proposals for "Contractor (bid) Alternates" will be evaluated by LPS within 72 hours of the bid opening.

00 43 25 Substitution Request Form (During Procurement)

- Not permitted
- Use Bidder Alternate procedure per General Conditions

00 43 26 Estimated Quantities Form

- Not applicable

00 43 33 Proposed Products Form

- No requirements
- Bid submission implies full compliance with specifications.

00 43 36 Proposed Subcontractors Form

- No format requirements
- Responsibility: bidder
  - Three low bidders submit 1 signed copy within 24 hours of bid opening.
    - Fax is acceptable

00 43 43 Wage Rates Form

- Required only for projects involving Federal funding.
- Applicable Wage Rate Decision

00 43 73 Proposed Schedule of Values Form

- No standard form per the General Conditions
  - AIA form or equivalent

00 43 83 Proposed Construction Schedule Form

- No requirements

00 43 86 Proposed Work Plan Schedule Form

- No requirements

00 43 93 Bid Submittal Checklist

- Formal Bid Tabulation from the design consultant
- Letter of Award Recommendation from the consultant
- Bid Forms
- Illegal Alien Certification
- Background Check form
- Acknowledgment and Attestation form
- Finalized "Comprehensive Budget and Bid Evaluation Form"

00 45 00 Representations and Certifications

- Submit bidder, contractor, supplier, and/or worker qualification statements as required by individual specification sections prior to release of Notice to Proceed from LPS Project Manager.

00 50 00 Contracting Forms and Supplements

00 51 00 Notice of Award

- Format: LPS current standard format template
- Responsible party: (Joint) design consultant and LPS Project Manager.
  - LPS and prime consultant review bids
  - Prime consultant issues a Recommendation of Award letter to LPS.
  - LPS issues formal Notice of Award.

00 52 00 Agreement Form

- A copy of the Agreement and related forms are required to be included under this heading in the Project Manual released to bidders
- Coordinate Agreement with LPS Project Manager:
  - Instructions to Bidders
  - Construction Agreement
  - General and Supplementary Conditions of the Contract
- Format: LPS current standard format template
- Responsible party: LPS
  - Forward to selected bidder to execute within 10 days of Notice of Award.

00 54 00 Agreement Form Supplements

- Attachments and modifications to the standard LPS forms are PROHIBITED without written authorization of the LPS Chief Operations Officer.

00 55 00 Notice to Proceed

- Format: LPS current standard format template
- Responsible party: LPS
  - Notification letter is issued by LPS upon receipt of documentation requested in Notice of Award.

00 60 00 Project Forms

- Applicable Project Forms, Bonds, and Certificates are required to be included under this heading in the Project Manual released to bidders.
- Coordinate Project Forms with LPS:
  - Construction Agreement
  - General and Supplementary Conditions of the Contract
- Responsible party: design consultant
  - LPS Project Manager for current versions

00 61 13 Performance and Payment Bond Forms

- Format:
  - Bonding Agency standard form
  - LPS current standard format template
    - Modification is PROHIBITED.
- Responsible party: proposed general contractor
  - Submit copies to LPS Project Manager

00 62 00 Certificates and Other Forms

- No requirements

00 62 34 Recycled Content of Materials Form

- No requirements

00 62 39 Minority Business Enterprise Certification Form

- No requirements

00 62 76 Application for Payment Form

- No standard form per the General Conditions
  - AIA form or equivalent
- Responsible party: general contractor
  - Execute and return with original signature.
  - Attach LPS Payment Distribution Record form with original signature.
  - General contractor submits forms concurrently to design consultant and LPS PM for consultant review and payment authorization
  - If authorized, design consultant signs approved forms to LPS PM for processing.

00 63 00 Clarification and Modification Forms

00 63 25 Substitution Request Form (During Construction)

- See Section 01 62 00

00 63 57 Change Order Request Form

- No requirements

00 63 63 Change Order Form

- LPS current standard format template

00 65 00 Closeout Forms

- See Section 01 78 00

00 65 19 Certificate of Completion Forms

- Responsible party: contractor
  - Submit with final Application for Payment
  - Substantial Completion letter
  - Closeout Documents including
    - Red line As Built Documents to design consultant
    - Warranties
    - O&M's
    - Training videos
    - Extra/attic stock
    - Project records

- Release of Lien Form:
  - LPS current standard format template
- Consent of Surety for Final Payment Form
  - No requirements

00 65 73 Statutory Declaration Forms

- Asbestos Compliance Letter
  - Responsible party: architect/prime consultant
    - Letter containing the following text:
      - "To the best of my knowledge, no asbestos-containing materials, products, or equipment was specified or installed in the <*insert project name*> project."
    - Submit to LPS Project Manager upon project closeout.
- AHERA Forms
  - Responsible party: (Joint) design consultant and general contractor
    - Submit signed originals to LPS Project Manager
    - Format: LPS standard AHERA Management Plan Forms.
      - Modification is PROHIBITED

00 70 00 Conditions of the Contract

00 72 00 General Conditions

- Copies of the General Conditions are required to be included in the Project Manual released to bidders.
  - Format: LPS current standard form General Conditions.
    - Modification is PROHIBITED.
  - Design consultant includes unmodified standard form LPS Standard General Conditions of the Contract in the Project Manual released to bidders.

00 73 00 Supplementary Conditions

- Supplementary Conditions are required to be included in the Project Manual released to bidders, if required for the project.
  - Typical use to identify a change in value of the Liquidated Damages or changes in insurance requirements as listed in the General Conditions.
  - Coordinate with LPS Project Manager on Supplemental Conditions.
  - No format requirements
  - Responsible party: design consultant
    - The Design consultant shall recommend appropriate project-specific Supplementary Condition Articles and language to the LPS Project Manager.
    - LPS provides written comments to the design consultant for revision and incorporation into the Supplementary Condition Articles.

- Coordinate Supplementary Conditions with LPS:
  - Construction Agreement
  - CM/GC Agreement
  - Approved Method of Payment
  - General Conditions of the Contract
  - Performance Bond
  - Labor and Material Payment Bond
  - LPS Project Manager
- In the absence of other information, standards of the following organizations apply:
  - American Institute of Architects (AIA) Handbook of Professional Practice
  - Construction Specifications Institute (CSI) Manual of Practice
  - Engineers Joint Contract Documents Committee (EJCDC)

00 90 00 Revisions, Clarifications, and Modifications

- Coordinate Addenda and Modifications with LPS Project Manager:
  - Instructions to Bidders
  - Construction Agreement
  - General and Supplementary Conditions of the Contract
- In the absence of other information, standards of the following organizations apply:
  - American Institute of Architects (AIA) Handbook of Professional Practice
  - Construction Specifications Institute (CSI) Manual of Practice
  - Engineers Joint Contract Documents Committee (EJCDC)

00 91 00 Precontract Revisions

00 91 13 Addenda

- LPS Project Manager may require rescheduling of the bid opening when addenda are issued within forty-eight (48) hours of bid opening.

00 94 00 Record Modifications

- Refer to LPS Construction Standards Division 01

END OF DIVISION 00

DIVISION 01 GENERAL REQUIREMENTS

01 10 00 Summary

- Division 01 General Requirements have an immense impact on direct and indirect project costs and obligations incurred by Arapahoe County School District #6 dba Littleton Public Schools (LPS).
- Division 01 should not be "boiler plate," but rather a very carefully crafted summary of requirements that govern all Divisions of work relevant to a specific project.
- Under-specifying in Division 01 can result in substandard project administration and unnecessary repetition or conflicts in other sections of the specifications.
- Over-specifying in Division 01 increases the potential for conflicts with the General and Supplemental Conditions of the Contract, and Agreements.
- Coordinate Summary issues with LPS.
    - General Conditions of the Contract
    - LPS Project Manager (PM) during the entire project development process.

01 11 00 Summary of Work

- Section 01 11 00 is required in the Project Manual to identify:
    - Building Name & Address
    - Project Title and Number as assigned by LPS
    - Project Overview
        - Owner Name, Architect Name, Contract Type, and Work Covered by Contract

01 11 16 Work by Owner

- Required in the Project Manual when the overall scope of work includes or requires coordination with work to be performed by LPS.

01 11 19 Owner-Purchased Contracts

- Required when the overall scope of work includes or requires coordination with purchase contracts.

01 12 00 Multiple Contract Summary

- Consult with LPS regarding separate contracts for systems and components.
    - The section shall include a Summary of Contracts, Work Sequence, and Contract Interface.
- Pre-ordering long lead material is discouraged and requires approval of LPS Program Director
    - LPS encumbers material and transfers encumbrance to the General Contractor upon contract award.

  - General Contractor takes over the encumbrance and carries the encumbrance in Schedule of Values.

- Pre-purchasing long lead material is discouraged and requires approval of LPS Program Director.

01 14 00 Work Restrictions

01 14 13 Access to Site & Premises

- Shall be arranged in advance with LPS defining physical and schedule limitations.

01 14 16 Coordination with Occupants

- Shall allow for continued, UNDISTURBED occupancy of, access to and egress from non-construction areas, and in compliance with all applicable codes.

01 14 19 Use of Site

- Shall define the limits of the work, access, staging, storage, and other areas of concern.
- Only approved project personnel shall be allowed outside of the designated construction site. All other project personnel are PROHIBITED from being outside of the designated construction area.
- Space inside any facility, made available to the General Contractor, shall be vacated by the Completion Date, regardless of authorized adjustments to construction schedule, unless agreed to in writing by LPS.
- Use of elevators, lifts, and air conditioning is PROHIBITED unless authorized in writing by LPS

01 14 33 Work in Rights-of-Way

- It is the sole responsibility of the Contractor, including contacting, coordinating, scheduling, permitting, inspections, and acceptance.

01 18 00 Project Utility Sources

- Identify project-applicable utilities, including entity, contact person, telephone, fax, email, and mailing addresses.
  - Water
  - Sanitary Sewer
  - Storm Sewer
  - Gas
  - Electricity
  - Telephone/Data
  - CATV

- The contractor is responsible for providing documentation to the consultant and owner in support of the requirements for utility rebate programs.
- Provide LPS 72-hour notification prior to disrupting any utility service.
    - Completion and approval of the Utility Shut-Down request/notification w/cc's to
        - LPS Operations Maintenance and Construction Department (OMC)
        - LPS Security

01 20 00 Price and Payment Procedures

- Coordinate Price and Payment Procedures with LPS:
    - General Conditions
    - LPS PM

01 21 00 Allowances

- Cash Allowances shall be limited to CM/GC procurement and kept to a minimum.
- CM/GC shall submit copies of invoices for items governed under the allowance.
    - Balance the difference between the cash allowance and actual cost by Change Order.

01 22 00 Unit Prices

- Limit unit prices to items of variable/indeterminate scope.
    - Define unit and included/excluded scope.
    - Are inclusive of direct and indirect costs such as labor, material, equipment, overhead and profit.
    - Establish, define, and enforce mechanisms for measurement and verification.
    - Actual quantities are documented and incorporated by a change to the contract outlined in the General Conditions.

01 23 00 Alternates

- Bid Alternates should be kept to a minimum.
    - Alternates with a low value as a percent of the base bid are discouraged.
    - Minimize the number of trades involved in an alternate.
    - Add alternates are preferred over deduct alternates.
    - Maximum of ## bid alternates per project, unless otherwise authorized by LPS.
    - List and select alternates in priority order to prevent post-bid challenges.

- Bidder Alternates per Instructions to Bidders only.

01 25 00 Substitution Procedures

- Substitutions will not be considered unless the level of technical, specification, and graphic information is equivalent to that included in the contract documents.
- Procedure per the General Conditions.
  - Submittal approval is a courtesy and shall not qualify as a substitution.

01 26 00 Contract Modification Procedures

- Per General Conditions of the Contract

01 26 13 Request for Information (RFI)

- Shall be required and are to be written only.

01 26 39 Field Order / Architect's Supplemental Instructions / Directives / Interpretations

- Shall be required and are to be written only.

01 26 63 Change Orders

- Use LPS current standard form

01 29 00 Payment Procedures

- Coordinate Payment Procedures with LPS:
  - General Conditions
  - LPS PM
- Site walk to confirm % complete.
- Submit typed or printed information
  - AIA or equivalent form Application for Payment
  - Sub-contractor payment record
  - Schedule of Values
  - Current Certificate of Insurance (dated within 30 days of Payment Application date).
  - Monthly schedule update in native and PDF format with a narrative

01 29 73 Schedule of Values

- Typed or printed information on LPS standard form.
- Format shall identify each line item with number and title of each specification section listed in the Table of Contents of the Project Manual.
- Include a separate line item for

- General Conditions
- Fees
- Overhead and profit.

01 29 76 Progress Payments

- Submit no more frequently than monthly intervals.
- Submit end of fiscal year Application for Payment no later than July 7 for all work completed through June 30.
- Format and content should be identical to Schedule of Values
- Final Payment: Submit 2 separate applications
  - 100% completion, less retainage
  - Retainage release per General Conditions of the Contract
    - Retainage shall not be released until all required project close-out documents are submitted and approved.

01 30 00 Administrative Requirements

- Coordinate Price and Payment Procedures with LPS:
  - General Conditions
  - LPS PM
- Submit one copy of each administrative document to the LPS PM in electronic format.

01 31 00 Project Management and Coordination

01 31 13 Project Coordination

- Contract Documents must clearly define and specify unambiguous responsibilities in a project-specific matrix outlining Project Management and Coordination
- Related Sections
  - 01 91 00 Commissioning
- Wiring in divisions other than Division 26 - Electrical is limited to 50 volts or less except:
  - Division 23 – Control Wiring for Heating Ventilating and Air Conditioning
  - Division 25 - Integrated Automation up to 120 volts is to be performed by a journeyman electrician.
- Qualification requirements may be imposed upon one or more of the following, per individual specification sections:
  - Fabricator

- Installer
- Manufacturer
- Manufacturer Facilities / Support
- Supplier
- Testing Agency

- Commissioning:
  - LPS routinely performs or contracts Commissioning of systems in Facility Services Subgroup (Divisions 21 – 28) and reserves the right to perform or contract similar quality control measures at any time on systems in any other Division.

01 31 19 Project Meetings

01 31 19.13 Pre-Construction Meetings

- Mandatory for all LPS Bond Projects.

01 31 19.23 Progress Meetings

- Weekly “OAC” meetings are mandatory for all LPS Bond Projects.
- Use LPS current standard format
- The General Contractor is responsible for preparing and distributing Meeting Minutes to participants.
  - Submit a draft to the LPS PM for review/approval
  - Distribute to all meeting participants once approved.

01 31 19.33 Preinstallation Meetings

- Includes Commissioning coordination meetings:
- Pre-installation conference
  - Includes all members of the design and construction team including appropriate subcontractor(s) and second tier subcontractors as required.
  - Review process including
    - Scope of Work
    - Tasks
    - Schedules
    - Deliverables
    - Responsibilities for Commissioning plan implementation
- Equipment start-up meetings are required
- Pre-Functional performance testing meetings are required

01 32 00 Construction Progress Documentation

- Per General Conditions of the Contract.
- Job Site Information Sheet:
  - Use LPS current standard form
  - Required prior to prior to commencement of work
  - Jobsite Information Sheet must be posted
    - At the location of work
    - Copy to LPS Security
    - Copy to the LPS PM

01 32 13 Scheduling of Work

- Coordinate with the LPS PM
- Contract Documents shall indicate critical dates for work under separate contract (Moving Crews, Asbestos Abatement, Furnishings, etc.).

01 32 16 Construction Progress Schedule

- Submit schedule chart with separate listings for each major trade or operation
- Weekly update with a minimum 3-week look-ahead.
- Complete sequence of construction by activity.
  - Identifying work of separate stages and other logically grouped activities.
- Percentage of completion for each item of work at the time of each Application for Progress Payment.
- Action dates for: Shop drawings, Product data, Samples, other required submittals.
- Include product delivery dates, including those furnished by Owner or Others.
- Include school-specific activity dates, such as student registration, back-to-school night, summer schools, principal and staff return dates, and other scheduled activities that can affect or otherwise have an impact on the work schedule.
- Test and Balance activity
- Closeout activity

01 32 26 Construction Progress Reporting

- Updated daily and are mandatory for the following administrative activities:
  - Regulatory Requirements; permits and approvals

- Quality Control; testing and inspection
- Requests for Information (RFI) and responses
- Requests for changes or substitutions
- Architect's Supplemental Instructions / Field Orders / Proposal Requests
- Change Orders
- Submittals

- Submit in electronic format.

01 32 29 Periodic Work Observation

- Per the Agreement and General Conditions

01 32 33 Photographic Documentation

- Comprehensive pre-construction photographs and videos are mandatory.

01 33 00 Submittal Procedures

- Coordinate Submittal Procedures with LPS:
  - General Conditions
  - Submittal Schedule (per General Conditions)
  - LPS PM
  - Refer to specific requirements for submittals in other sections of Division 01 and in the individual specification sections of Divisions 02 through 33 of these Construction Standards.
    - Coordinate with 01 91 00 Commissioning
    - Coordinate with XX 08 00 Commissioning, within individual narrow scope sections of Project Manual

01 33 23 Shop Drawings, Product Data, and Samples

- Submittals constitute an implied statement by the Sub- and General Contractors that submitted items:
  - Have been reviewed and approved by the Sub- and General Contractor
  - Have been verified and coordinated with specifications, measurements, conditions, and relevant criteria of the Contract Documents.
  - Can be fabricated and delivered to the project site within the proposed Project Schedule.
- Submittals are not Change Orders

  - The purpose of submittals is to demonstrate that the Contractor understands the design concept and confirms such through proposed detailing, fabrication, and installation methods.
- No Finish selection will be made until all appearance-related submittals have been received.
- Under no circumstances shall un-reviewed or unapproved submittals be used in conjunction with the work.
- Review by the design consultant and LPS shall not relieve the Contractor from full compliance with the Construction Documents.
- Label each submittal to clearly identify:
  - Submittal, including specification section number.
  - Project
  - Architect or Prime Consultant
  - Owner: LPS
  - Manufacturer
  - Contractor
  - Subcontractor
  - Supplier, if different from Subcontractor
- Submittals are required to identify deviations from the Contract Documents.
- Provide space for review notes.
- Re-submittals:
  - Clearly identify changes made since previous submittal.
- Product Data (electronic format):
  - Submit manufacturer's standard catalog cuts, brochures, technical data, and specifications.
  - Mark each copy to identify project-specific applicable products, models, options, and other data.
  - Supplement manufacturers' standard data with information unique to the work.
- Shop Drawings
  - “As plotted” PDF files (CAD generated plots) are the preferred format for all Shop Drawings and are required per Section 01 78 39.
- Samples:
  - Finishes shall include full range of manufacturers' standard colors, textures, and patterns for selection.
  - Mock Up:

- Submit full or reduced sized samples to illustrate functional characteristics of the assembled product, with integral parts and attachment devices per specifications.
- Window fenestration/exterior wall.
- Roof coping
- Other critical construction details

- Submittals
  - Process:
    - Design Consultant identifies submittals requiring LPS OMC review and comment.
    - Design consultant forwards electronic submittals to LPS PM for distribution to LPS OMC
    - LPS OMC returns reviewed submittals with comments back through the LPS PM.
  - Include a summary / outline matrix of all submittal requirements of the Contract Documents in this section.
  - Commissioning Submittal Requirements:
    - Submit one copy of standard submittals for equipment to be commissioned to Mechanical Engineer.
    - May require additional documentation for the commissioning process.
      - Written requests are required for information from the Mechanical Engineer relative to specific equipment or system

01 35 00 Special Procedures

- IBC Type V (wood framed) construction is PROHIBITED for permanent buildings without approval of LPS OMC Director, and LPS Bond Program Director.

01 35 16 Alteration Project Procedures

- Shall be included in all Renovation and Reconstruction projects, including retrofit roofing projects, to Limit / contain smoke, dust, dirt, noise (including radios) to immediate work area.

01 35 23 Owner Safety Requirements

- Shall be included in all projects and coordinated with the LPS PM
- Health, Safety and Environmental (HSE) Requirements (Attachment A)

01 35 43 Environmental Procedures

- Asbestos Abatement

  - Schedule Construction to allow for abatement work under separate contract.
  - Coordinate with LPS OMC Abatement Consultant
  - Abatement and construction may occur simultaneously in different work areas of the same building.
  - Maintain the integrity of containment or temporary dust barriers erected by the Abatement Contractor.
  - Coordinate non-abatement construction activities that create dust or fumes with the Owner and the Abatement Contractor to avoid false air monitoring readings.

- Storm Water Management
  - Storm water management procedures (SWMP) shall comply with
    - State of Colorado requirements
    - SEMSWA requirements for Centennial and Arapahoe
  - The (site) general contractor shall obtain required storm water permits and construct protective measures.
  - The general contractor shall be responsible for:
    - Complying with the provisions of the permit, including inspection and maintenance, until the permit is deactivated.
    - The general contractor will be liable for any non-compliance notices or penalties issued by the State or municipality.
  - All runoff control items not supporting the final site drainage system shall be removed from the site prior to owner acceptance
  - A walk of the site's stormwater drainage system, as defined by the SWMP, shall be conducted prior to project acceptance, and shall include the General Contractor, Architect, Engineer, LPS OMC, and LPS PM.
  - Deactivation of the construction activity permit requires prior approval by LPS.
  - Consulting Architect and Engineer will recommend best management practices (BMPs) for post-construction maintenance of the site's stormwater drainage system and provide a stormwater outfall map.
  - At the District's discretion a third-party SWMP inspector may be hired to work with the contractor and monitor compliance with the program.

01 35 53 Security Procedures

- Per General Conditions of the Contract.
- Successful bidders will be required to complete Criminal Record Check, (Internet Name Check) on all employees who work on the site of the projects.

- Submit completed form to the LPS PM.
- Each Contractor will be responsible to adhere to any Federal, State or Local privacy and confidentiality requirements.

- Construction personnel are always required to wear identification while on LPS property.
  - Identification is to be compliant with District Badge Requirements.
- Contractor 24/7 contact information is required
  - Jobsite Information Sheet must be posted
    - At the location of work
    - Copy to LPS Security
    - Copy to the LPS PM.

01 40 00 Quality Requirements

- Either section 01 40 00 or individual narrow scope sections are required in the Project Manual.
- Coordinate Quality Requirements during the entire project development process with:
  - General Conditions of the Contract
  - LPS PM

01 41 00 Regulatory Requirements

- For each project-applicable regulatory requirement, the contract documents are required to identify:
  - Entity
  - Contact person
  - Telephone
  - Fax
  - Email
  - Mailing address
- The General Contractor is responsible for full compliance with applicable editions of codes and regulations with amendments, whether listed herein or not.
- Federal Regulatory Requirements and guidelines:
  - Environmental Protection Agency
    - Asbestos Hazard Emergency Response Act (AHERA)
    - Cleanup
    - Hazardous Waste

        - Indoor Air Quality Tools for Schools (IAQ/TFS)
        - Lead
        - Mercury
        - Mold
        - Polychlorinated Biphenyls (PCB):
            - Fluorescent lamp ballasts and HID capacitors or HID ballasts with internal capacitors dated 05-30-1979 or before and not labeled “NO PCB” may contain PCB.
            - Coordinate disposal of these items with LPS OMC.
        - Spills
        - Pesticide
        - Radon
        - Underground storage tanks (UST)
        - Volatile Organic Compounds (VOC)
        - Wastes, Debris
        - Wetlands
    - Occupational Safety and Health Administration (OSHA)
    - Americans with Disabilities Act (ADA)
        - ADA Architectural Guidelines (ADAAG)
        - ADAAG Recommendations for Accessibility Standards for Children's Environments
        - ANSI A117.1, and applicable codes.
    - U. S. Corps of Engineers
        - 404 Permit is required for work in or around natural watercourses.
- Current State of Colorado Regulatory Requirements, Guidelines and Agencies:
    - International Building Code (IBC)
        - Colorado Division of Fire Prevention and Control
    - International Fire Code (IFC)
        - Colorado Division of Fire Prevention and Control.
    - International Mechanical Code (IMC):
        - Colorado Division of Fire Prevention and Control
    - International Energy Conservation Code (IECC)
        - Colorado Division of Fire Prevention and Control
    - International Solar Energy Code (ISEC)

- Colorado Division of Fire Prevention and Control.

- International Plumbing Code (IPC):
  - Department of Regulatory Agencies, Examining Board of Plumbers
  - NOTE: Certain Water and Sanitation Districts reserve the authority to engineer service sizes, grease traps, and other components of the plumbing system.
- National Electrical Code (NEC)
  - Department of Regulatory Agencies, State Electrical Board
- ANSI/ASME A17.1 Safety Code for Elevators
  - Colorado Division of Oil and Public Safety.
- National Fire Protection Association (NFPA)
  - As referenced by one or more of the above state-adopted codes.
- Colorado State Board of Health, Consumer Protection Division
  - Tri- County Health Department
  - "Rules and Regulations Governing Schools in the State of Colorado." (6 CCR1010)
    - "Rules and Regulations Governing the Sanitation of Food Service Establishments in the State of Colorado."
  - Other regulations of the Colorado Department of Health as enforced by local Department of Health including but not limited to:
    - Colorado Primary Drinking Water Regulations
    - Water Quality - Cross Connection Control
    - Asbestos
    - Hazardous Materials
    - Solid Waste
- Colorado Air Quality Control Commission (AQCC)
- Colorado Department of Transportation, "Manual of Uniform Traffic Control Devices" (MUTCD)
- State of Colorado Water Quality Regulations Water Quality Control Division
  - Stormwater: Discharge Permit System (CDPS) / Stormwater Management Plan (SWMP)
  - Construction dewatering
  - The General Contractor is responsible for maintaining best management practices (BMPs) for the full term of the stormwater permit.
- American Society of Mechanical Engineers (ASME) Boiler Code

- Colorado Division of Oil and Public Safety

- State of Colorado Geological Standards and Regulations
  - Colorado Geological Survey
  - Review required for:
    - Raw land purchases
    - New school construction
    - Improvements to existing schools
  - Submit site plan and geotechnical report for review and approval.
- Rules Regulating Child Care Centers
  - Colorado Department of Human Services, Division of Early Care and Learning
- Arapahoe County Regulatory Requirements might apply to projects in unincorporated areas.
  - Zoning Ordinance
  - Land Development Regulations
  - Site Development Plan: Submit as a courtesy
  - Grading Permit: Contact local jurisdiction
- Municipality Regulatory Requirements
  - Zoning Ordinance
    - Submit a site development to the Planning Commission plan for review and comment prior to construction of any building or structure.
    - Unless directed by the State, municipal and county zoning regulations have no jurisdiction over LPS.
      - The District is required to consult with the Planning Commission having jurisdiction prior to acquiring a site in order that the proposed site shall conform to the adopted plan of the community insofar as is feasible.
    - Curb Cut Permit
      - Coordinate with design and construction requirements of local jurisdictions for work in rights-of-way.
- Industry Standards
  - Comply with industry standards identified in individual sections of these Construction Standards.
  - Underwriters Laboratories (UL) label is mandatory for all electrical apparatus, equipment, and devices.
- Other Regulatory Requirements

        - Fire/Smoke Detection/Alarm System installation requires review and authorization by the local fire protection district unless the installer has a valid permit issued by the State Electrical Board for general electrical work
        - State regulations may require other reviews based on project-specific scopes of work. Coordinate with Authorities Having Jurisdiction.
    - Climbing/Traversing walls
        - Colorado Division of Fire Prevention and Control
    - Proof of worker citizenship
        - Comply with applicable statutes

01 45 00 Quality Control

- Inspections
    - Coordinate Inspection Requirements during the entire project development process with:
        - General Conditions of the Contract
        - LPS PM
- LPS reserves the right to procure qualified independent evaluation of any materials and workmanship in the project.
- Specifications should define:
    - Criteria
    - Limits
    - Witnessing
    - Correction of non-complying construction.
- Independent field and/or laboratory testing for construction quality control.
    - May be procured directly by LPS for the following:
        - 02 50 00 Site Remediation
        - 02 80 00 Facility Remediation
        - 03 30 00 Concrete slab to receive finish flooring
        - 03 30 00 Cast-In-Place Concrete
        - 03 40 00 Precast Concrete
        - 04 20 00 Unit Masonry
        - 05 05 00 Structural welding
        - 09 80 00 Acoustics
        - 23 21 00 Hydronic Piping: Joint integrity
        - 31 23 00 Excavation and Fill

        - 31 60 00 Special Foundations and Load Bearing Elements
        - 32 10 00 Bases, Ballasts, Pavements
    - This list may not be comprehensive; review each section to determine testing and quality control specific to each project's needs.
        - Other sections not listed may include requirements for independent testing in coordination with the LPS PM.

01 50 00 Temporary Facilities and Controls

- Either section 01 50 00 or individual narrow scope sections are required in the Project Manual.

01 51 00 Temporary Utilities

- Coordinate Temporary Utility requirements with LPS:
    - General Conditions of the Contract
    - Facilities Team during the entire project development process.
- For general construction work in existing buildings, LPS usually provides the following utilities without charge to the Contractor:
    - Gas
    - Water
    - Electricity
    - Heat
    - Ventilation
    - Air conditioning shall not be provided unless authorized, in writing, by LPS
    - Use of sanitary sewer is permitted for normal wastewater only.
        - The General Contractor is responsible for the full costs of cleanout and correction of related damage due to blockages.
- The General Contractor is responsible for temporary voice and data systems.
- Special attention is required for Asbestos Abatement projects.
- Coordinate utility services to project-related temporary buildings:
    - Electricity
    - Gas
    - Paging
    - Telephone
    - Data
    - Fire detection/alarm
    - Security detection/alarm

- Water (as required)
- Sewer (as required)

01 58 00 Project Identification

- Coordinate Project Signage requirements with LPS:
  - One (1) exterior sign is required for all bond funded projects.
  - Confirm site signage requirements for projects of any value.
  - Signage to be coordinated with LPS School Community Relations Department
  - Comply with local municipality's requirements
- Conform to graphics template provided by LPS
  - Logo and colors
  - Facility name and/or project name
  - Design Consultant(s)
  - General Contractor
  - Source of funding
  - Other information as directed by LPS

01 60 00 Product Requirements

- Section 01 60 00 and/or 01 61 00 is required in the Project Manual.
- Coordinate Product requirements with LPS.
  - General Conditions of the Contract
  - LPS PM during the entire project development process.
- These Construction Standards assign each material, product, and system to one of four categories as follows:
  - Tier 1: Product/Model specific:
    - Proprietary; Sole source, closed specification restricted to specific products of specific manufacturers.
    - No substitutions or alternates.
  - Tier 2: Manufacturer specific:
    - Tier 2a
      - Restricted sources specification.
      - Preferred sources to be provided in base bid
      - Substitutions or alternates are required to meet preferred source as a basis of design and priced separately for comparison to preferred source.

        - Tier 2b
            - Proprietary; Restricted sources specification.
            - No substitutions or alternates
    - Tier 3: Performance criteria:
        - Unrestricted descriptive specification or reference standard.
        - Open to any materials, products, and systems that meet specified requirements.
    - Tier 4: Commodity:
        - Unrestricted descriptive specification or reference standard.
        - Open to any materials, products, and systems.
- LPS is a public entity and seeks to procure products and materials through open, competitive bidding to the greatest degree possible.
- LPS is a conservative purchaser, preferring known or proven products and materials over unknown or experimental ones.
- Domestically manufactured products and materials are strongly preferred over those of foreign manufacture.
- Standard production materials, products, systems, and finishes are preferred over custom.
- Local product support is strongly preferred.

01 62 00 Product Options

- Also see 01 60 00 Product Requirements.
- Materials, products, and systems identified as Tier 3 and 4 require no evaluation or approval of options.
- Options to Tier 1 and Tier 2 materials, products, and systems require formal written approval by the LPS PM.
- Options will be evaluated according to the following criteria:
    - Compliance with these Construction Standards and intended quality
    - Performance record in public schools in Colorado or adjacent states
    - Life cycle cost
    - Initial cost
    - Availability / Impact on construction schedule
    - Maintenance procedures, access, service, parts availability
    - Risk / reward
    - Compatibility with existing, including District-wide considerations
    - Ramifications for other components of the finished construction

  - Physical size, configuration for the intended use
  - Locally produced and supported
  - Tier 2a, pricing is always required for preferred source for comparison to acceptable proposed alternate pricing
- Product Substitution Procedures
  - Substitutions are governed by the General Conditions of the Contract
  - References to "equal" or "approved equal" in the project specifications are PROHIBITED unless the process governing consideration of such substitutions is defined in this section of the specifications.
- Product options and substitutions are categorically PROHIBITED without the confirmation of compliance with project-specific:
  - Specifications
  - Measurements
  - Details and interfaces
  - Schedule implications
  - Physical conditions
  - Operation and maintenance requirements
  - Other relevant criteria of the Contract Documents
- LPS Request for Substitution form is required to evaluate Product Options proposed after the bid opening.

01 64 00 Owner-Furnished Products

- Coordinate between Contractor and LPS PM.
  - See Section 01 31 00 – Project Management and Coordination

01 70 00 Execution and Closeout Requirements

- Coordinate Execution requirements with LPS:
  - General Conditions of the Contract
  - LPS PM
  - Section 01 77 00 – Closeout Procedures
  - Section 01 78 00 – Closeout Submittals

01 71 00 Examination and Preparation

- Field-verify condition and performance of existing pavement, components, systems, lines, etc. before beginning demolition or new construction, including retrofit/remodeling projects.
- Advise LPS, in writing, of substandard conditions or performance that could adversely affect work in the Contract for Construction

01 73 00 Execution

01 73 29 Cutting and Patching

- Coordinate in advance with LPS PM:
  - Scope
  - Schedule
  - Structure to be affected
  - Utilities to be affected
  - Hazardous material abatement
- Cutting of structural components is PROHIBITED without the written authorization of a licensed structural engineer.
- Reconstruct the affected area to replicate the function and appearance of the original construction to the great extent possible.

01 74 00 Cleaning and Waste Management

- Coordinate with CDPHE and LPS OMC.

01 75 00 Starting and Adjusting

- Section 01 75 00 is required in the Project Manual
- Coordinate with 01 91 00 Commissioning
- Start-up:
  - Installation
  - Inspection
  - Start-up
- Equipment shall not be temporarily started (for heating or cooling purposes) until:
  - Completion of all manufacturers' installation and start-up procedures
  - Moisture, dust and other environmental or building integrity issues have been addressed

01 77 00 Closeout Procedures

- Section 01 77 00 is required in the Project Manual.
- LPS expects to operate and maintain its facilities for a minimum of 50 years beyond the date of Final Acceptance.
  - Accurate and permanent "as constructed" records, in both electronic and reproducible formats, of every graphic and text document used directly or indirectly to execute the construction project are required.
- Coordinate Closeout Submittal requirements with LPS:

- General Conditions of the Contract
- Coordinate Deliverables including Formats
- LPS PM throughout the entire project development process
- Construction Contract and Project Closeout diagram
- 01 91 00 Commissioning requirements include receipt of approved commissioning documentation

- The mandatory sequence of events for acceptance and closeout of LPS capital construction projects is as follows:
  - Final change orders are submitted and processed.
  - Contractor's Inspection:
    - The Contractor personally inspects the work to certify completion of all contract requirements and identify deficiencies by discipline (i.e. Civil, Architectural, HVAC, Plumbing, Electrical, etc.).
      - Mechanical Contractor submits to the General Contractor the approved functional performance testing reports from the commissioning documentation.
  - Written Notification of Project Completion:
    - The Contractor certifies inspection, acceptance, and suitability of the work for the Design Consultant's Final Inspection and attaches the Preliminary Punch List.
  - Punch List Inspection:
    - Upon receipt of the written Notification of Project Completion, the Design Consultant schedules a Punch List Inspection with the Contractor and LPS PM to initiate Project Acceptance.
    - Partial Punch Lists by area of construction may be permitted with the approval of the LPS PM.
  - Punch List:
    - Design Consultant prepares and distributes a written Report of Inspection (Punch List) summarizing the Punch List Inspection.
  - Notice of Completion:
    - Upon completion of items identified in the Punch List, the Contractor advises the Design Consultant, in a written Notice of Completion, that the project is complete, inspected, and ready for the Final (Acceptance) Inspection.
      - Includes submittal of all requirements from 01 91 00 Commissioning
        - Exceptions may be allowed for required seasonal or pre-approved deferred testing.
  - Final (Acceptance) Inspection:

- Upon receipt of the Notice of Completion, the Architect schedules a Final Acceptance Inspection with the Contractor and the LPS PM.

- Project Closeout:
  - The Contractor executes requirements of Sections 01 78 00 through 01 79 00
  - Transmits closeout documents to the Prime Consultant.
- Project Record Documents:
  - Design consultant integrates Contractor information with other documentation
    - Post-award changes
    - Warranties
    - Operations and Maintenance data
    - Other closeout requirements of sections 01 78 00 – 01 79 00
  - Design consultant submits the final set of Project Record Documents directly to the LPS PM organized as follows:
    1. Location
    2. As-Builts (Both PDF and CAD formats are required)
    3. Project Information
       a. Submittals - Final/Approved
       b. RFIs - Final/Answered/Signed
       c. Permits
       d. Project Correspondence
    4. Warranties
       a. Warranty Contact List
    5. Operations & Maintenance Data
    6. Demonstration &Training
    - NOTE: Items 4 - 6 to be organized by LPS Construction Standards Divisions
- Application for Payment for 100% Completion:
  - Contractor submits application for final payment, minus retainage, per section 01 29 00
- Acceptance:
  - After all work and closeout submittals are executed to the satisfaction of the Design Consultant.
  - Design Consultant issues a written letter to LPS certifying final completion and recommending acceptance.

        - Include asbestos content certifications and the recommended date of acceptance.
    - Owner's Letter of Acceptance:
        - LPS issues a written letter to the Contractor confirming acceptance and acceptance date of the project.
    - Application for Payment of Retainage:
        - Contractor submits application for payment of retainage per section 01 29 00.
    - Final Payment:
        - Upon verification of the preceding items, the Design Consultant recommends Final Payment.
        - LPS issues Final Payment after a waiting period following the publications of Notices of Contractor's Settlement.

01 78 00 Closeout Submittals

- Refer to sections 01 78 13 – 01 79 00
- Coordination:
    - 01 91 00 Commissioning
    - 01 93 00 Operation and Maintenance

01 78 13 Completion and Correction List

- Per General Conditions of the Contract and Section 01 77 00.

01 78 19 Maintenance Contracts

- Per Section 01 77 00.

01 78 23 Operation and Maintenance Data

- Process:
    - Submit draft(s) within 90 days of contract execution
    - Contractor submits Operation and Maintenance data to Design Consultant per Section 01 77 00
        - Contractor shall submit individual copies to Mechanical Engineer directly, in addition to the prime Design Consultant, to facilitate concurrent review.
- Format
    - One single as-printed PDF version of the entire O &M Manual.
        - PDF file shall be bookmarked reflecting Table of Contents.
        - Bookmarks identified by LPS Construction Standards appropriate section number

- Indexed Adobe.pdf files are required for bookmark navigation.
- Equipment List:
  - Equipment schedules also to be provided in Microsoft Excel (.xlsx)

- Contents
  - Title Sheet:
    - “Operation and Maintenance Data and Instructions”
  - Location
  - Project Title
  - Identification of project participants.
    - Architect
    - Sub Consultant(s)
    - Owner: LPS
    - Manufacturer(s)
    - Contractor/ Construction Manager
    - Installing Subcontractor
    - Supplier, if different from Subcontractor
    - Maintenance contractor, if appropriate
    - Local source of supply for parts and replacement
  - Table of Contents for each volume
    - Arranged by specification division and section then presented alphabetically within each section.
  - Identify each product by:
    - Product name
    - Other identifying symbols consistent with the Contract Documents.
  - General catalog data sheets:
    - Include only those sheets pertinent to the installed product(s).
    - Annotate each sheet to clearly identify the installed product and data applicable to installation.
    - Delete or overwrite inapplicable information to create a true "as constructed" record.
  - Printed text to supplement product data and organize into a consistent format under separate headings for different procedures.
    - Provide logical sequence of instructions for each procedure.
  - List of manufacturer's recommended spare parts and recommended quantities to be maintained in storage.

- List proper procedures in event of failure.
- Itemize conditions which might affect validity of warranties or bonds.
- Drawings as necessary to clearly illustrate:
  - Relations of component parts of equipment and systems.
  - Control and flow diagrams of devices installed.
  - Correct illustration of completed installation.
- Diagrams and Charts
  - Each subcontractor's coordination drawings, and as-installed color-coded diagrams (required by contract and used in the project).
  - Charts of equipment with location and function of each.
- Instructions for operation, adjustment, maintenance and repair of installed equipment and systems by LPS OMC personnel.
- Manufacturers' Manuals for Equipment and Systems including:
  - Emergency instructions
  - Operating instructions, Controls
  - Precautionary instructions, including special summer and winter operation
  - Recommended procedures for start-up, break-in, stop, shut down
  - Routine care
  - Alignment, adjusting and checking
  - Lubrication schedule and list of required lubricants
  - Filter cleaning/replacement schedule
  - Parts replacement schedule including predicted life
  - Guide to trouble shooting
  - Maintenance guide
  - Disassembly, repair, and reassembly
  - Description of unit and component parts
  - Maintenance parts list, complete with nomenclature and commercial part number of replaceable parts
  - Function, normal operating characteristics and limiting conditions of parts and assemblies
  - Performance curves, engineering data and tests for pumps larger than ¾ HP and fans greater than 1000 cfm; Curves shall include flow rate, pressure, HP, RPM, and efficiency.
  - Illustrations, assembly drawings and diagrams
  - Regulations, compliance issues

        - Water treatment
    - Equipment List
        - Comprehensive list of equipment installed under Divisions 21-28
        - Equipment schedules also to be provided in Microsoft Excel (.xlsx)
    - Commissioning Information
        - Mechanical Contractor is responsible for review of Operations and Maintenance data for commissioned systems, to include:
            - Completeness of information
            - Adherence to the requirements of the Project Manual
        - Mechanical Contractor may add materials and information which:
            - Stress and enhance the importance of:
                - System interactions
                - System troubleshooting
                - Long term preventive maintenance
                - Long term operations
        - Review is in addition to Design Team review
        - Commissioning information shall be compiled and organized as noted above
            - Commissioning manual summarizes the following elements of the commissioning process:
                - Tasks
                - Findings
                - Documentation
            - Commissioning report information:
                - Addresses the actual performance of the building systems compared to:
                    - Design intent
                    - Contract documents

01 78 29 Final Site Survey

- A post-construction survey may be required for all capital projects where the scope of work includes sitework or alteration of the building footprint.
    - Included in the General Contract for new buildings on new sites only.
    - Separate contract for other projects where scope of work includes site work.
- When required, comply with survey criteria outlined by LPS OMC.

- Submit with record documents per Section 01 77 00
- Coordinate with the LPS PM if required.

01 78 33 Bonds

- Per Section 01 77 00

01 78 36 Warranties

- Purchased manufacturer warranties are typically limitations of liability and are RESTRICTED to LPS Construction Standards' requirements.
- When provided, extended term warranties must comply with the following:
  - Be underwritten by the product or system manufacturer.
  - Provide coverage term from the date of project final acceptance.
  - Provide full replacement product or material with no dollar limit.
  - Incremental Warranties (i.e. "5 plus 5") are not acceptable.
- Process:
  - Submit sample within 60 days of contract execution
  - Contractor submits original and 2 copies to design consultant at closeout, per Section 01 77 00.
    - Include contact information list for all warranties by Division.

01 78 39 Project Record Documents

- Field Record Documents
  - Maintain at the job site one "As Constructed" active record copy of:
    - Contract Drawings
    - Project Manual
    - Specifications
    - Addenda
    - Shop Drawings
    - Change Orders and other modifications to the Contract
    - Field inspection reports, permits, approvals, test reports, certifications, and other documents used in the construction of the facility or the fabrication of its components and systems.
  - Accurately mark these documents with all changes made during construction, using pencil or ink of a contrasting color.
    - Cable systems:
      - Accurately indicate system status including terminations, routing, and labels.

- Store Project Record Documents apart from documents used for construction.
- Maintain Project Record Documents in a clean legible condition.
- Label each document "PROJECT RECORD COPY" in large, bold letters.
- Keep record documents current.
- Do not permanently conceal any work until required information has been recorded.
- Make the project record documents always available for the Owner's, Architect's, or Engineer's inspection.

- Record Documents
  - At Contract closeout, the prime consultant is responsible for developing permanent Project Record Documents by transcribing information contained in the Field Record Documents onto original (electronic) media.
  - As-Constructed Record Specifications:
    - Three delivered formats required
      - A single MS Word Document
      - A single PDF Document
        - PDF file shall be bookmarked reflecting Table of Contents
        - Bookmarks identified by CSI MasterFormat appropriate section number
        - Word searchable
      - 1 hard copy set of specifications
    - Updated with the following annotations for each component or specification section as appropriate:
      - Per General Conditions, cross reference each specification section to a master list of subcontractor, suppliers, and installers, complete with addresses and telephone numbers.
      - Clearly differentiate between actual installed items and bid options or substitutions.
      - Indicate changes made by Addendum, Change Order, Alternate, and Field Order.
      - Identify manufacturer, trade name, catalog number and supplier of each product and item or equipment installed.
      - Document installed color, texture, and pattern.
    - As-Constructed Product/Finish/Equipment Schedules:

- Text, Spreadsheet or Database file plus one reproducible plot updated with the following annotations:
    - Manufacturer, trade name, catalog number and supplier of each product and item or equipment installed.
    - Color, texture, pattern.
    - Changes made by Addendum, Change Order, Alternate, and Field Order.

- As-Constructed Record Drawings:
    - Native AutoCAD Files
    - As Plotted PDF files
    - One full-sized paper plots
    - Updated with the following annotations and corrections:
        - Addenda
        - Bid Alternates accepted/not accepted
        - Change Orders, Field Orders, Supplemental Instructions
        - Differing/Uncovered conditions
        - Size/position/dimensional differences exceeding 4 inches
        - Locations of concealed or buried utilities and systems
        - Other information necessary to support facility operation for the full life cycle.
- Supplemental Documents
    - Per CSI Uniform Drawing System
    - Required As-Constructed Annotations
    - Cross reference both original document and supplement to each other
    - Identify supplemental documents in Index / Table of Contents
- Approved Shop Drawings:
    - Two delivered formats are required for specific systems
        - “As Plotted” PDF file
        - Native AutoCAD file
        - Coordinate with LPS OMC and LPS PM for specific department requirements regarding hand written field installation red lines for the following:
            - 21 00 00 Fire Suppression
            - 25 30 00 Integrated Automation Instrumentation (Temperature Controls)

        - 27 53 13 Clock System
        - 28 10 00 Access Control
        - 28 20 00 Electronic Surveillance
        - 28 30 00 Electronic Detection and Alarm Systems
        - 32 80 00 Irrigation System
    - Submittal log, complete with review comments, corrections, and authorizations
    - Project Files
        - One complete set of project administration records identified in Section 01 31 00.
        - Correspondence including PDF format copies of significant e-mail communications.
    - Label closeout submittals to clearly identify:
        - Submittal, including specification section number.
        - Project – specific title
        - Architect or Prime Consultant
        - Owner: Arapahoe County School District #6 dba Littleton Public Schools
        - Date
        - "As Constructed" when applicable
    - "As Constructed" Closeout submittals are not required for:
        - Demolition
        - Temporary Construction
        - Reference Documents provided by Owner.
    - Submit per Section 01 77 00.
    - Coordinate with LPS OMC and Construction Standards for format requirements.

01 78 43 Spare Parts

- Contract documents must clearly identify
    - Specific items
    - Quantities
    - Time of transmittal
    - Transmittal process
- Process:

  - Contractor submits directly to LPS OMC and forwards signed transmittal to LPS PM.
- Spare parts may not be used for post-construction warranty work.
- Submit per Section 01 77 00.

01 78 46 Extra Stock Materials

- Contract documents must clearly identify:
  - Specific items
  - Quantities
  - Time of transmittal
  - Transmittal process
- Provide products, spare parts and maintenance materials in quantities specified in each section of these Technical Guidelines.
- For items of work delayed materially beyond the Date of Final Acceptance provide updated submittal(s) within ten (10) days after acceptance, listing actual date(s) of the start of the warranty period.
- Process:
  - Contractor submits directly to LPS OMC in the presence of the LPS PM.
  - Submit draft list within 60 days of contract execution
  - Submit all extra stock material items to LPS OMC in the presence of the LPS PM with a single transmittal per Section 01 77 00.
- Extra stock materials may not be used for post-construction warranty work.

01 79 00 Demonstration and Training

- LPS requires Demonstration and Training (D&T) for systems in several Divisions.
- Video Recording is required for all demonstration and training
- Coordination
  - Specific requirements for D&T will be found in the individual specification sections of LPS Construction Standards Divisions 14 - 28.
    - 01 91 00 Commissioning
    - 01 92 00 Facility Operation
    - 01 93 00 Facility Maintenance
- LPS reserves the right to terminate and reschedule any D&T session that is not in full compliance with the following requirements.
- Sequence

- Submit outline draft of proposed D&T program within 60 days of the Notice to Proceed.
  - Submitted by each subcontractor and vendor responsible for demonstration and training
    - Written training plan submitted to LPS PM, Commissioning Agent (CxA) or MEP Specialist(s), for approval.
    - Plan will cover:
      - Equipment list
      - Agenda, including topics to be covered, such as
        - Design intent
        - Equipment inspections
        - Modes of operation
        - System interactions
        - Troubleshooting
        - Preventive maintenance
      - Expected duration of demonstration and training session (see schedule below)
      - Methods
        - Classroom lecture
        - Video
        - Site walk-through
        - Actual operational demonstrations
        - Written Handouts
        - Other
      - Instructor and qualifications
        - Controls contractor provides a discussion of the control of the primary HVAC equipment during the mechanical or electrical training conducted by others
  - Approved operations and maintenance manuals shall be used during the demonstration and training for equipment specific references
- Systems must be fully operational before D&T session can be scheduled.
- Complete final punch list items no later than 14 calendar days prior to the proposed D&T.
- Notify Architect a minimum of 7 calendar days in advance of proposed D&T and include a written agenda for the session.
- The D&T is considered scheduled once the Prime Consultant has approved the above.
- Conduct D&T session.

  - Upon completion of the D&T, the LPS PM will determine if it was successful and signoff completion of this requirement.

- Schedule for Demonstration and Training session
  - Tuesday, Wednesday, or Thursday except when immediately before or immediately after a holiday.
  - Commence session at 8:00 a.m. and complete by 2:00 p.m.
  - If additional time is required, schedule additional sessions.
  - If the D&T will run past 4 hours, schedule a lunch break.
- Attendees
  - Only qualified personnel are to conduct the D&T.
  - If the LPS PM determines at any time the person conducting the D&T does not adequately represent the intent of the D&T, that section will be terminated and rescheduled.
  - Company and person conducting the demonstration and training
  - General Contractor is responsible for notifying and scheduling appropriate contracting personnel.
  - LPS OMC equipment maintenance teams for HVAC (Chiller, Exhaust Fans), Electric (Main Switchgear), Elevator, etc.
  - LPS PM will be responsible for advising the appropriate District personnel.
- Resources required to conduct the D&T session
  - Written agenda
  - To the greatest extent possible, the completed and approved Operation and Maintenance Manual shall serve as the ‘textbook’ for instruction.
  - Keys, ladders, cellular phones, radios, access cards, access codes, contact numbers, lifts, ladders, and any associated equipment necessary to access, demonstrate and conduct training on the equipment and systems covered in the D&T session.
  - Attendance roster of participants including:
    - D&T systems to be covered that day
    - Date and time of D&T
    - First and last name
    - Organization
    - Phone number
    - Email address
  - Provide and maintain a separate sheet to list questions requiring responses after the D&T
- Responsibilities

  - General Contractor is responsible for training coordination, scheduling and ensuring completion of training
  - LPS CxA or LPS MEP Specialist is responsible for reviewing and approving the content of the training of Owner personnel for commissioned equipment
- Follow up submittals
  - Any outstanding questions will be answered in writing within 7 calendar days of the T&D. This response will be sent to the Architect
  - Include D&T attendance list(s) in the O&M manual.
- LPS PM or designee will be the ruling authority for issues requiring District response.

01 80 00 Performance Requirements

01 81 00 Facility Performance Requirements

- Accessibility
  - Comply with Americans with Disabilities Act (ADA), ADA Architectural Guidelines (ADAAG) and ICC/ANSI 117.1 for new construction including building additions, temporary buildings, sites, and playgrounds.
- Remodeling and retrofit construction, including site work, is to provide improved accessibility where feasible and as defined by the ADA and applicable codes.
- Acoustic Performance
  - Proper room acoustics are essential to student learning and a comfortable working environment for teachers and staff.
  - Refer to ANSI/ASA Standard S12.60 “Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools;” current edition.
- Appearance
  - LPS buildings and grounds are the visible image of the school district to the community.
  - Buildings and grounds should physically represent the underlying philosophies of the school district and be consistent with the current mission and belief statements adopted by the Board of Education.
  - Designs for additions and modifications to existing facilities are to respect, enhance, complement, and unify existing construction.
- Durability / Maintainability
  - The design and construction decisions must recognize that LPS anticipates operating and maintaining viable facilities for at least 50 years.

- Building components should be easily maintained yet durable. Recognize the District's limited resources when selecting products and systems that may require a significant maintenance commitment.
- Buildings and component parts should be resistant to vandalism and abuse typical of public / institutional facilities.
  - "Commercial" construction design and materials are generally unacceptable for educational occupancies.
- Layouts, designs, materials, and details must accommodate Colorado weather extremes including hail, snow, winds over 120 mph, ambient temperatures from -30°F to +105°F, hundreds of freeze-thaw cycles per year, and thermal shock of 60°F within a period of hours.
- Positive drainage from the highest roof level to the lowest elevation of the site is required.
- Building layouts, materials and components are to be maintainable (serviceable, repairable, in-kind replaceable) for the life of the facility.
  - Provide adequate access to service and replace components (i.e. lamps, glazing, valves, boilers, and air handling units).
- Design to discourage bird nests in exterior fenestration and exposed structure.

- Economy
  - LPS Construction Standards are intended to result in designs, materials, equipment, and facilities that will provide the best long-term value. Completed facilities are to be efficient and economical but not cheap, aesthetically mediocre. or trendy.
- Energy Efficiency
  - The consultant is encouraged to use systems that will conserve energy while providing an atmosphere conducive to learning.
  - Minimal compliance with energy codes is mandatory, going beyond minimum is encouraged when the cost of the upgrade will be recovered in a timely manner through energy savings.
  - Energy use goal is 35,000 BTU/sf/year for new construction
  - EPA Energy Star Target Finder Software Score = 75 or better
  - Coordinate energy efficiency options with the Xcel Energy Rebate Program.
- Flexibility
  - Design and construction of LPS buildings must consider demographic trends and educational programs are not constant and be able to accommodate inevitable changes.
  - Employ the principles of universal design to the greatest extent possible.

- The facility must allow for modification at minimal cost and within short time frames.
- Facilities are intended to serve multiple functions such as community centers, meeting places and other after-hours group activities.
- Additions and remodels during the life of the facility are likely.

- Portable or re-locatable components are preferred over built in.
  - With limited resources and an average facility life more than 50 years, individually customized facilities, spaces, and amenities are PROHIBITED.
- HVAC Criteria
  - Install all HVAC control devices in "Readily Accessible" locations as defined by Chapter 1, Article 100, of the most recent issue of the National Electrical Code.
    - Include access doors or hatches in hard ceiling or walls where needed to reach mechanical devices such as valves, strainers dampers, etc. or where in the judgment of the designer maintenance access will be necessary.
  - When reusing or connecting to existing piping, clarify to what extent the contractor is to clean and test the existing system.
    - Connections to existing pipe shall be made with new isolation valves.
  - Evaluate discharge plenums vs. horizontal discharge ductwork on Roof Mounted Air Handling Units for the effect on cost, noise, and unit efficiency.
  - Equipment Room Recommendations:
    - Comply with ASHRAE Standards 15-2004 with special emphasis on:
      - Oxygen Deprivation Sensor for A1 Refrigerants or a Refrigerant Sensor for B1 and all other refrigerants
      - Equipment Room Alarm
      - Mechanical Ventilation
  - Comply with ASHRAE 62-2001 Ventilation for Acceptable Indoor Air Quality Paragraph 6.1.3.1 Multiple Spaces
    - MDF and designated IDF are air conditioned regardless of location.
  - Design for major remodels of existing buildings that do not have air-conditioning shall include the addition of air-conditioning.
  - Heating and Cooling Calculations – When sizing heat transfer media quantities, heat transfer equipment, pumps, boilers, and chillers base calculations on the use of a 30% propylene glycol solution heat transfer media.
  - Roof mounted equipment and piping:
    - Refer to Division 07 of these Construction Standards.

- HVAC Design Conditions
  - See Division 23 of these Construction Standards.

- Safety/Security
  - Coordination
    - See Division 28 of these Construction Standards.
  - General
    - Electronic Safety and Security systems are standard components of LPS facilities.
      - Access Control
      - Intrusion Detection
      - Video Surveillance
        - Video surveillance systems are required for all new construction and major renovation at all facilities.
      - Fire detection and Alarm
  - Attractive Nuisances and Hazards
    - Avoid projections, details, site amenities, rustication, etc. which could permit unauthorized access to roofs or upper building levels.
    - Open, unsecured areaways are PROHIBITED.
    - Details and materials must not adversely affect the safety of occupants, students, staff, and community.
    - Non-slip walking surfaces are required.
    - Projections and sharp corners are PROHIBITED at student/pedestrian traffic patterns, interior and exterior.
  - Site
    - Layout and design to minimize ice buildup at pedestrian and vehicle areas.
    - Address snow removal and stockpiling
    - Separate pedestrian, bicycle, auto, bus and service traffic
  - Stairs and Steps
    - Tread/riser ratios: Per Architectural Graphic Standards, and applicable codes.
    - Exterior stairs:
      - Maximum riser = 6"
      - Minimum tread = 13.5"
  - Ramps per ADAAG

- Sustainable Design

- When required to meet funding or other requirements comply with LEED or Collaborative for High Performance Schools (CHPS) criteria.
- Optimize material use and recycling to minimize waste during construction.
- Design, install and maintain low water use, low maintenance landscaping appropriate to the local environment.
  - Investigate and utilize water district programs offering low usage water fixtures.
- Consider life cycle impacts of materials, from production to end-of-life recycling.
- Encourage the use of locally produced materials where possible.

01 90 00 Life Cycle Activities

- Preliminary Life Cycle Cost Analysis (LCCA) shall be performed during SD Phase with direction provided by LPS OMC during SD Review.
- A Life Cycle Cost Analysis shall be performed for a period of 30 years of ownership for at least three design alternates comparing ownership costs such as First Costs, Maintenance Costs, Utility Costs, and Part Replacement Costs if applicable.
- Life Cycle Cost Analysis activities shall be performed in accordance with the Office of the State Architect Energy Management Program Policies and Procedures Life Cycle Cost Policy.
- LCCA shall only consider systems meeting current IGCC Code.
- Life Cycle Cost Analysis activities shall be provided by the architect and include, but not be limited to:
  - First Costs
  - Maintenance Costs
  - Utility Costs
  - Part Replacement Costs if applicable
- The LCCA shall be reviewed by Director of LPS OMC LPS PM, and MEP Specialist. This group will provide direction or a list of clarifying questions to Architect and/or Engineer, through the LPS PM, which must be satisfied before the commencement of DD Phase.

01 91 00 Commissioning

- LPS routinely performs or contracts commissioning of systems in Facility Services Subgroup (Divisions 21-28) and reserves the right to perform or contract similar quality control measures at any time on systems in any other Division.
- The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product whether it is specifically stated or not.

- Commissioning during the construction, acceptance and warranty phases of a project is intended to achieve the following objectives:
  - Verify and document that equipment is installed and started per manufacturer's recommendations and to accepted industry standards.
  - Verify and document that equipment and systems receive complete operational checkout by installing contractors.
  - Verify the completeness of Operations and Maintenance information and materials.
  - Ensure that the Owner operating personnel are adequately trained on the operations and maintenance of building equipment and systems.
- Coordination
  - 01 33 00 Submittal Procedures
  - 01 75 00 Starting and Adjusting
  - 01 77 00 Closeout Procedures
  - Sections 01 78 13 – 01 79 00
  - 01 91 00 Commissioning
  - 01 93 00 Operation and Maintenance
  - 22 08 00 Commissioning of Plumbing
  - 23 08 00 Commissioning of HVAC
  - 26 08 00 Commissioning of Electrical Systems
  - 27 08 00 Commissioning of Communications

01 92 00 Facility Operation

- Section 01 92 00 Facility Operation is required in the Project Manual for mechanical, electrical, and other specialized equipment.
- Coordination
  - Section 01 78 00 Closeout Submittals
  - Section 01 79 00 Demonstration and Training
  - Section 01 91 00 Commissioning
- HVAC
  - General Contractor provides trended information from the temperature control system at a sampling rate of 15 minutes for 168 hours (minimum) for all temperature control points.

01 93 00 Facility Maintenance

- Section 01 93 00 Facility Maintenance is required in the Project Manual to delineate specialized requirements and procedures for operating the facility after commissioning.

- Ten Objectives of Maintenance
  - Improve accessibility.
    - The more often a component needs to be maintained, the better should be its accessibility.
    - Components functioning properly should not have to be removed or dismantled to gain access to the defective one, which leads to “Disturbance Maintenance.”
  - Use as few components as possible.
    - Reduce the number of parts to improve system reliability.
    - Avoid needless differences among similar components.
    - Arrange components in a logical and perceivable order.
      - Example: Different light fixtures and bulbs.
  - Use standardized components.
    - If and where possible, use readily available locally stocked components to reduce stock holding, delivery times and discourage storage of broken components for “cannibalizing”.
    - Follow LPS Construction Standards.
  - Improve parts replacement ability.
    - Components should be easily disconnected and adjusted without loss of reliability.
      - Special attention shall be given to components that must be replaced frequently.
  - Neutralize human errors.
    - Aim to design equipment that is “easy to use right and difficult to use wrong”.
    - Ensure that lockout/tagout requirements are included.
  - Reduce consequential damage.
    - Reduce the amount of damage of the initial failure by overload or continued use.
    - Ensure the failure of a component does not lead to failure of another object and/or secondary failure.
  - Increase condition monitoring.
    - The condition of critical components can be easily monitored when the components are in service.
      - Example: Installation of pressure gauges or site glass.
  - Increase “Autonomous Maintenance” and Ownership.

        - Changing filters, lubricating, readjustment, cleaning, and other preventative maintenance can be done by a Facilitator or semi-skilled technician, provided that minimal simple parts or tools are necessary.
        - Where this is difficult or too costly to incorporate in the design, the design should make it as easy as possible for a maintenance technician to perform these tasks quickly with a minimum of training.
    - Provide operations and maintenance documentation.
        - Include a faultfinding guide.
    - Apply modular construction.
        - Similar systems within a site are alike.
        - Architectural creativity is allowed, but repair and troubleshooting are the same within a site.

01 94 00 Facility Decommissioning

- Section 01 94 00 is required in the Project Manual when any aspect of facility decommissioning, regardless of scale, is included in the project scope.
- Coordinate Facility Decommissioning with
    - General Conditions of the Contract
    - LPS PM
    - LPS OMC
- Coordinate temporary and phased utilities and HVAC for partial occupancy.
- Follow LPS OMC environmental protocols when scope of work includes hazardous materials abatement.
- When fluids other than water are encountered:
    - Contain the fluid by appropriate means or containers.
    - Contact LPS PM.
- Coordinate with LPS OMC, LPS PM, and 02 42 00 Removal and Salvage of Construction Materials.

END OF DIVISION 01

DIVISION 02 EXISTING CONDITIONS

02 20 00 Assessment

02 26 00 Hazardous Material Assessment

- Consult with Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM) regarding potential disturbance of materials which may exist in building:
  - Asbestos
  - Lead based paint
  - Mercury containing lighting and switches
  - Mercury containing flooring
  - Other hazardous or regulated materials.
- Submittals
  - Summary report of scope of work related to disturbing or otherwise handling the above materials

02 40 00 Demolition and Structure Moving

02 41 00 Demolition

- Include salvage, demolition, disposition and/or removal from site of certain existing objectionable structures, elements, items, or materials not considered conducive nor desirable to remain or become part of new or remodel work.

02 41 19 Selective Demolition

- See applicable sections of Divisions 27 and 28.
  - Technology infrastructure systems include voice, data, video, intercom, clock/bell program or public address system, and smoke/fire detection and alarm systems.
  - The term system is defined as all components required for a fully functional technology operation meeting the stated purpose(s).
  - A preconstruction meeting will be required with LPS Innovative Technology Services Department (ITS) a minimum of 30 days before project commencement.
    - Review the project scope of work
    - Identify potential effects on existing technology systems
    - Appoint an LPS ITS point of contact for the project.
  - The LPS ITS contact will work with designers, project managers and building personnel to identify locations for technology components and interfaces.

- The designated LPS ITS contact must be notified a minimum of ten working days prior to any demolition involving existing LPS facilities.
- LPS ITS personnel will help identify potential disruptions to existing technology systems.
- Any technology system that needs to be disconnected due to new construction will be done under supervision of the LPS ITS contact.
- Upon completion of any construction project requiring the disconnection of a technology system, reconnection of that system will also be done under supervision of the LPS ITS contact.

- Contractor shall be responsible for replacing any technology system component(s) damaged due to contractor's construction activities.

02 80 00 Facility Remediation

- Architect/Engineers and Contractors shall be responsible for reviewing District records (AHERA Management plans, etc.) before beginning work in an LPS facility.
- Collaborate with LPS OMC and LPS PM to determine additional sampling and analysis needed to identify potentially hazardous materials that may be encountered due to planned demolition, remodeling, and new construction.
- Remediation will be engineered and completed ahead of such work to the greatest extent possible.
- Where suspected hazardous materials are encountered unexpectedly, work will be stopped immediately, and sampling and remediation will be expedited and certified by the District before work resumes.
- Removal of hazardous materials shall be coordinated with LPS OMC and LPS PM.
  - Remediation shall be performed in accordance with applicable local, state, and federal laws.
  - Submittals
    - Permits
    - Clearance reports
    - Laboratory analysis
    - Other pertinent legal information

END OF DIVISION 02

DIVISION 03 CONCRETE

03 05 00 Common Work Results for Concrete

- American Concrete Institute ACI 318 Recommended Practice for Reinforced Concrete and Building Code Requirements.

03 10 00 Concrete Forming and Accessories

03 11 00 Concrete Forming

- American Concrete Institute ACI 347 Recommended Practice for Concrete Formwork.
- Remove all inadequate sub-grade material and replace with road-base
- New or reused boards, plywood, metal, or combinations thereof, as required.
- New or reused boards, plywood, metal, or combinations thereof, as required.
- Board material may be used only to form concealed concrete surfaces, unless special design effects are approved by Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM)
- Framing, ties, coating(s): reuse as required
- Landscape edging is PROHIBITED
- Remove all organic materials used in forming when concrete work is complete
- Remove all excavated materials from site when project is complete

03 15 00 Concrete Accessories

03 15 16 Concrete Construction Joints

- Control and construction joints to be located and formed in accordance with American Concrete Institute ACI 318 Recommended Practice for Reinforced Concrete. Column isolation joint, slip joint, keyway, control joint, chamfer strip, dovetail anchor slot, and water stop material(s) and location(s) as required.
- Exterior Expansion/Contraction Joint Fillers
    - Full depth of slab, per ASTM D1751 Spec for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (non-extruding and resilient bituminous types)
    - Maximum 24'0" centers in walks, ramps, curbs, gutters, pads, aprons, truckwells and platforms.
- Interior Expansion/Contraction Joint Fillers
    - Between slabs-on-grade and concrete or masonry walls

- Full depth of slab, non-extruding resilient non-bituminous material meeting ASTM D1752 Spec for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

- Scoring
  - Tooled joints at maximum 4'0" centers each way and along edges in exterior sidewalks.

03 20 00 Concrete Reinforcing

- Comply with provisions of Concrete Reinforcing Steel Institute (CRSI) MANUAL OF STANDARD PRACTICE
- Bars, fabric(s), tendons, and specialties as determined and engineered by the A/E.
- One set of final approved shop drawings to LPS OMC.

03 30 00 Cast-in-Place Concrete

- American Concrete Institute ACI 301 Specs for Structural Concrete in Buildings as interpreted by the A/E shall be followed as a guide for answering questions and settling disputes that may arise concerning concrete requirements.
- Materials, Packaging, Products
  - Determined and engineered by the A/E
  - Delivered, stored, handled, and installed in manner to prevent weathering, damage, breakage, deterioration, intrusion, vandalism.
  - Accelerator
    - Calcium chloride or any other chloride-containing or salt-like admixture is PROHIBITED
  - Hardener-Sealer
    - Shall be provided on all interior and exterior flatwork slabs- on-grade
    - Compatible with finish materials or coatings
- Mixes
  - Supplier shall submit current mix design(s) with compressive test results in accordance with ACI 211.1, showing slump(s) and air entrainment (6% +/- 1%) and minimum 28-day compressive strength(s) at 4,000psi or higher as specified.
- Tolerances
  - Flatwork
    - Tops of footings and pads shall not be out of level more than 1/4" in 10' from elevation(s) specified.
    - Slabs, floors, ramps, platforms, aprons and walks shall not be out of level more than 1/8" in 10' from elevation(s) specified.
  - Walls and Piers

        - Shall not be out of plumb more than 1/8" in 10'
        - Shall not vary more than 1/4" from true straight line(s).
    - Tops of Walls
        - Shall not be out of level more than 1/4" in 10' length.
- Field Quality Control
    - The A/E or LPS will determine and have test cylinders taken and broken, at Owner expense, by an approved testing laboratory in accordance with ASTM C31 Standard Method of Making and Curing Concrete Test Specimens.
- Finishing
    - Interior Flatwork
        - Floor slabs shall be hard steel-troweled smooth, except heavy broom finish at hard tile beds
        - No dryers to accelerate set
        - Floor slabs free of ripples, ridges, and irregularities.
    - Exterior Flatwork
        - Walks, ramps, platforms, aprons, pads, and decks shall have wood float medium broom finish, except as otherwise determined and specified by the A/E.
    - Architectural Finishing
        - Exposed-to-view interior and exterior surfaces of concrete walls, columns, pilasters, and beams shall have projections removed, offsets leveled, voids or damaged areas saturated with water and patched to a true and even surface with a wood float
        - Provide a grout cleaned finish except as otherwise determined and specified by the A/E for design and aesthetic reasons.

03 38 00 Post-Tensioned Concrete

- Location(s), design, and engineering by the A/E; material(s) and finish(es) as determined by the A/E.
- Tendon Location Markers
    - Noncombustible (noncom) wood, plywood, or hardboard
    - Not over 1/4" (6.5mm) thick by 2" wide by 12" long,
    - Arrow shaped
    - Secured on top of bottom form material
    - Centered on and beneath each tendon.
- Anchorage Components
    - Shall meet minimum requirements set forth in "Tentative Specifications for Post-Tensioning Materials" prepared by Prestressed Concrete Institute.

03 40 00 Precast Concrete

- Work in this section includes structural and/or architectural precast and prestressed concrete columns, deck and framing panels, sections, and other elements.
    - Work includes design, engineering, furnishing and erecting of precast/prestressed members such as beams, columns, joists, panels; provision of inserts and anchorage items embedded in members; provision of loose connection clips, plates, rods, and bolts required to attach members and elements to one another and to other structures
- In the absence of other information, standards of the following organizations apply:
    - American Concrete Institute (ACI)
    - Portland Cement Association (PCA)
    - Colorado Ready Mixed Concrete Association (CRMCA)
- Coordination
    - Forms per 03 11 00
    - Reinforcement per 03 20 00
    - Accessories per Section 03 15 00
    - Cement, fine and coarse aggregates, plasticizer, air-entrainment, accelerator, and water per 03 05 00.
- Submittals
    - Shop drawings
    - Product data
    - Finish samples
    - Closeout:
        - Submittals updated to record status (samples excluded)

03 48 00 Precast Concrete Specialties

- Splash blocks
    - 36" long by 16" (tapered to 12") wide by minimum 4" high
    - Stock manufactured precast units for installation at each hose-bibb (wall hydrant) and rain leader (downspout) discharge
    - PROHIBITED where discharge is onto sidewalk or pavement.
        - Cast-in-place, built-in pans preferred

03 60 00 Grouting

- Where required, will include provision of catalyzed metallic, nonmetallic, or epoxy non-shrink grout packing at machinery or structural steel columns resting on masonry or concrete footings, piers, slabs, pads, or walls.
- Restrictions

- Epoxy grout may be used for patching and machinery bases only
  - PROHIBITED under column base plates.
- Metallic grout may be used in concealed situations only.
- Noncorrosive metallic or nonmetallic grout is acceptable for exposed and concealed conditions as installer option, provided there are no extra cost(s) or charge(s) to Owner.

03 61 00 Cementitious Grouting

03 61 13 Dry-Pack Grouting

- Where required, will include provision of a nonmetallic, damp bedding mortar for seating structural and nonstructural framing on masonry or concrete walls and partitions.
- Dry pack is PROHIBITED for grout packing of column or machinery base plates.

END OF DIVISION 03

DIVISION 04 MASONRY

04 05 00 Common Work Results for Masonry

04 05 13 Masonry Mortaring

- Materials
  - Cement
    - ASTM C150 Specification for Portland Cement
    - Type I, Portland
    - Type II if within or adjacent to earth.
  - Lime
    - ASTM C207 Specification for Hydrated Lime for Masonry Purposes
    - Type S
  - Fine Aggregate
    - ASTM C144 Specification for Aggregate for Masonry mortar
    - Natural sand.
  - Water
    - Fresh, clean, clear; potable, humanly consumable.
  - Calcium Chloride
    - **PROHIBITED** including any other salt, salt-like, or chloride-like admixture/accelerator shall not be used in mortar.
- Mix
  - ASTM C270 Specification for Mortar for Unit Masonry
  - Type S for bearing, nonbearing, and veneer walls; other type(s) per ASTM recommendations.

04 05 16 Masonry Grouting

- Cement, Fine Aggregate, Water, Calcium Chloride
  - Per preceding 04 05 13 Masonry Mortaring
- Coarse Aggregate
  - Same requirements as fine aggregate except washed gravel or crushed stone 1/8" to maximum 5/8".
- Mix
  - For bond beams, reinforced masonry walls, pilasters
  - Determined to fulfill Structural requirements.

04 05 23 Masonry Accessories

- Items Installed but Not Furnished
  - Masonry contractor shall install loose steel lintels, bearing plates, anchors, and other miscellaneous items furnished by others at no additional cost to Littleton Public Schools (LPS).
- Horizontal Joint Reinforcement
  - Truss or ladder type as required to fulfill Design, Code, and/or Engineering requirements.
- Vertical Reinforcement
  - Bars, ties, and tie wire as required to fulfill Design, Code, and/or Engineering requirements.
- Horizontal Flashing
  - Coordinate horizontal flashings to occur at critical locations, per BIA and RMMI recommendations, including:
    - Parapet
    - Heads of openings
    - Weep holes
    - Penetrations
  - Embedded Flashing
    - Flexible, self-adhering rubberized sheet (concealed) combined with stainless steel termination strip to or beyond the face of the tooled mortar joint
- Expansion Joint Fillers
  - Material, shape, and type to fulfill wall thickness conditions
  - Location(s) where required.
- Dovetail Anchors
  - 1" wide by nominal 4" long 14-gauge galvanized corrugated sheet steel
  - Spaced maximum 1'4" o.c. in dovetail slots provided by concrete contractor.

04 20 00 Unit Masonry

- In the absence of other information, standards of the following organizations apply in the following order:
  - American Concrete Institute/American Society of Civil Engineer (ACI/ASCE)
  - Brick Institute of America (BIA)
  - National Concrete Masonry Association (NCMA)
  - ASTM Standard Specification for Facing Brick

- Face Brick
  - Grade–SW Type–FBX modular-sized, match existing in Addition situations, conforming to ASTM C216 Spec for Facing Brick (Solid Masonry Units Made from Clay or Shale)
  - Texture and color approved by the LPS Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM)
- Glass Block
  - To meet Code and location requirements.
- Plain Block
  - Finish and weight required to meet Grade N Type 1 NI and NII of ASTM C90 Spec for Bearing Concrete Masonry Units and ASTM C145 Spec for Solid- Load Bearing Concrete Masonry Units.
  - Size(s)
    - Modular height, width, length to fulfill designed wall and partition requirements and conditions.
  - Solid Units or Concrete Core-filled Units
    - As required shall be installed horizontally and vertically immediately under all points of structural bearing.
- Block Brick
  - Like material, finish, strength as Plain Block
  - Solid, modular-sized 2- 1/4" x 3-5/8" x 7-5/8"
  - Compliance with ASTM C55 Spec for Concrete Building Brick.
- Textured Concrete Blocks
  - As required to meet manufacturer requirements and approved by LPS OMC and LPS PM.
- Patterned Concrete Blocks
  - As required by Design to meet manufacturer requirements and approved by LPS OMC and LPS PM
- Bond
  - Determined and Engineered by the A/E and approved by LPS OMC and LPS PM
- Coursing
  - Determined and Engineered by the A/E and approved by LPS OMC and LPS PM
- Joints
  - Determined and Engineered by the A/E and approved by LPS OMC and LPS PM

- Cleaning
  - Detergent-clean exposed walls and partitions; fiber brush from top down.

04 40 00 Stone Assemblies

04 43 00 Stone Masonry

- Marble, Granite and Fabricated Stone as required by design and approved by LPS OMC and LPS PM

END OF DIVISION 04

DIVISION 05 METALS

05 05 00 Common Work Results for Metals

- In the absence of other information, standards of the following organizations apply to work in this Division:
  - American Institute of Steel Construction (AISC)
  - American Welding Society (AWS)
  - Steel Joist Institute (SJI)
- Restrictions
  - "Pot metal" (cast zinc) is PROHIBITED in any form in any component of any product, item, or fabrication.
  - Steel Lintels and Shelf Angles for Masonry:
    - Hot dipped galvanized

05 10 00 Structural Metal Framing

05 12 00 Structural Steel Framing

- Temporary and permanent, shall conform to the AISC Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings
- Members, shapes, sizes, framing, connections, finish(es) and shop drawings, as required.
- Welding
  - Shall be in accord with Structural Welding Code-Steel of American Welding Society
  - Shall be made only by welders, tackers, or welding operators who have been qualified and certified within past six months by tests prescribed in AWS D1.1.
    - Copies of required certification shall be a required submittal prior to starting such work.
  - Exposed-to-view welds shall be ground smooth.

05 20 00 Metal Joists

05 21 00 Steel Joist Framing

05 21 19 Open Web Steel Joist Framing

- Fabrication and erection in accord with documents published by Steel Joist Institute and American Institute of Steel Construction; design, series selection, accessories, engineering, and shop drawing(s) as required.
- Welding as preceding Section 05 12 00

05 30 00 Metal Decking

- Conform to specifications for
  - Design of Light Gauge Cold-Formed Steel by American Iron and Steel Institute
  - Steel Deck Institute Code for Recommended Standard Practice
  - ASTM A611 Specification for Steel, Cold-Rolled Sheet, Carbon, Structural
  - Fed Spec QQ-S-775C; ribbed/ corrugated Grade C structural quality noncellular steel sheets; minimum 33,000 psi design strength; galvanized
  - ASTM A446 for roofs
  - ASTM A570 shop primed for floors.
- Fastening System
  - Pneumatic or percussion preferred
  - Welding as may be required and as acceptable to Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM).
- Submittal(s)
  - Shop Drawings
    - Shall include structural properties of decking; type, size, and location of openings; type, size, and extent of fastenings.

05 40 00 Cold Formed Metal Framing

- Size(s), gauge(s), type(s), accessories, assembly, location(s), and finish(es) as required.
- Approved manufacturer(s)
  - AMICO
  - Bostwick
  - Inryco MILCOR
  - Keene
  - SPEED STEEL
  - USG
  - United States SUPER C
  - Wheeling STEEL FRAMING
  - Verco VERCOR

05 50 00 Metal Fabrications

- Steel per preceding Section 05 12 00.
- Fasteners and Anchors
  - Screws, bolts, clip angles, plates, brackets, connectors, and washers: same material and finish to match fabricated item.
- Lintels
  - Steel angles, channels, tees, beams, and plates as required to bridge masonry openings, minimum 6" bearing each end.
- Framed Roof Openings
  - Steel angle support frames between steel joists for openings in metal roof decks that are over 6" round or square and not over 4' square or diameter as required.
- Hand and Guardrails
  - Nominal 1¼" i.d. Standard Schedule 40 steel pipe with wall brackets, wall returns, flange accessories and screw, bolt, rawl plug, molly, toggle, tampin or expansion anchorage(s) suitable for back-up material encountered or specified.
- Guard Posts
  - Nominal 6" i.d. Standard Schedule 40 steel pipe filled with minimum 3,000 psi concrete and buried at least half the total length of post.
- Sidewalk Gutterboxes
  - Not desired
  - Where required, covers shall be solid with non-skid surface, galvanized steel, or aluminum.
- Trench Grating
  - Iron; selected as required.
- Access Ladders
  - Aluminum pipe, tube, bars, anchorages as required, with non- skid surface on rungs.
- Steel Pan Stairs
  - Stringers, carriages, supports, framing of structural steel members; meeting Building Code live-load requirements, design as required.
- Ship's Ladders
  - Stringers, carriages, supports, framing of structural steel members to meet Building Code live-load requirements, non-skid treads.
- Aluminum Trim
  - Extruded anodized joint covers, fillers, corners, running trim in size(s), shape(s), finish(es), color(s) approved by LPS OMC and LPS PM.

05 70 00 Ornamental Metal

- Material(s), size(s), location(s), finish(es) approved by LPS OMC and LPS PM.
- Submittals
    - Furnish product data edited for pertinence to project, shop drawings, samples, and calculations, certifying compliance with loading requirements.

END OF DIVISION 05

DIVISION 06 WOOD PLASTICS AND COMPOSITES

06 05 00 Common Work Results for Wood, Plastics & Composites

06 05 73 Wood Treatment

06 05 73.13 Fire-Retardant Wood Treatment

- Approved manufacturer(s) for interior use
  - Where relative humidity does not exceed 70 percent.
    - Hoover Universal INTERIOR FIRE-X
    - Koppers DRICON
    - Osmose FLAME PROOF LHC
  - Hardwood(s)
    - Loughman NCX
- Approved manufacturer(s) for exterior use
  - Where relative humidity may exceed 75 percent.
    - Hoover Universal EXTERIOR FIRE–X
    - Koppers NCX

06 05 73.33 Preservative Wood Treatment

- Approved manufacturer(s)
  - Hoover Universal DIXIE CCA, Koppers DIXIE CCA
  - Koppers WOLMANIZED (CCA) Chromated Copper Arsenate

06 10 00 Rough Carpentry

- Limit the use of wood-frame construction
- Temporary and permanent materials and methods of wood framing, sheathing, and decking for floors, walls, partitions, roof; setting of miscellaneous anchorages, back-up, and framing devices furnished by other trades.
- In the absence of other information, standards of the following organizations apply:
  - American Institute of Timber Construction (AITC)
  - American Plywood Association (APA)
  - National Forest Products Association (NFPA)
  - National Particleboard Association (NPA)
  - Western Wood Products Association (WWPA)
- Lumber
  - WWPA Standard Grading Rules for Western Lumber
  - Noncombustible or other pre-treatment as required by code.

- Board Lumber (1" thick by 2" or more wide)
  - For grounds, sleepers, furring, stripping, bucks, X-bridging, shims, and rungs.
  - Nominal dimension S4S S-Dry No. 3 Common or Standard and Better
- Light Framing and Studs (2" to 4" thick, 2" to 6" wide, 10' and shorter)
  - For studs, posts, joists, rafters, plates, framing, strips, blocking, lintels, ledgers, solid bridging, bracing, roof curbs, stringers, and carriages.
  - Nominal dimension S4S S-Dry No. 2 and Better minimum 1000Fb single
- Structural Joists and Planks and Appearance (2" to 4" thick, 5" and wider)
  - For grounds, sleepers, furring, stripping, bucks, nailers, cants and shims.
  - Nominal dimension S4S S-Dry Standard and Better or Stud Grade minimum 650Fb

- Special Construction Aids
  - Temporary ladders, runways, platforms, catwalks of Structural, Light Framing, Board Lumber as precedingly specified for general use by all trades.
- Rough Hardware
  - Nails, spikes, screws, bolts, ramsets, anchors, similar items not furnished by other trades but required to draw-up and rigidly secure members: wood-to-wood, wood-to-metal, wood-to-masonry, wood-to-concrete, metal-to-metal, metal-to- masonry, metal-to-concrete, and other materials to satisfactorily complete the various phases of construction toward erection of a sound, safe, no squeak structure.
- Plywood
  - Each panel identified with grade trademark of APA and meets requirements of PS 1
  - Noncombustible where noted or required by code; type, group, grade, finish, for purpose intended.
- Wall Sheathing
  - 5/8” Gypsum of fiberboard as determined and engineered by the A/E for purpose intended in compliance with code requirements.
- Blocking/Backing
  - In-the-wall/partition miscellaneous lumber/plywood back-up blocking/backing required for installation/mounting of fixtures, frames, hardware, railings, cabinets, casework, countertops, shelving, specialties, miscellaneous items of the work.

06 17 00 Shop Fabricated Structural Wood

06 17 33 Wood I-Joists

- Solid or laminated Douglas Fir or Hemlock chords

- 15 percent maximum moisture content
- Fingered, and glued scarf joints acceptable
- Structural I C-C EXT-APA plywood webs.
- Approved manufacturer(s)
  - Trus-Joist

06 17 36 Metal-Web Wood Joists

- Shop-fabricated roof and floor joists of wood top and bottom chords
- Tubular steel trussing steel pin jointed framing system
- Complete with associated bridging, bracing, anchorages, fasteners, supports
- Approved manufacturer(s)
  - Trus-Joist
  - Sanford SPAN-JOIST

06 17 53 Shop Fabricated Wood Trusses

- WWPA Douglas Fir-larch, Hem-Fir, Southern Yellow Pine or Spruce
- Minimum Fb=1650 psi for repetitive usage
- Maximum 15 percent moisture content
- Kiln dried lumber with no knots over 1" diameter, no splits, no warps, no twists
- Minimum E=1,500,000
- Maximum deflection L/480
- Die-stamped integral toothed galvanized steel connectors each side each joint
- Galvanized fasteners; galvanized bearing plate anchors and framing connectors.

06 18 00 Glued Laminated Construction

- Prefabricated glue-laminated wood arch, bent, column, beam, joist, purlin, truss, lintel units with associated hardware anchorages
  - AITC Architectural Grade coast region Douglas Fir or Southern Pine rough sawn (S4S) surfaced
  - Manufactured, quality marked, certified for Wet condition of service in conformance with Voluntary Products Standards PS 56.
  - Hardware
    - For joining members to each other and to supports shall be structural steel fabrications prime-shop-coat-painted for interior and zinc-coated for exterior locations.

- Prefabricated glued-laminated lumber beam, joist, purlin, rafter, lintel, stud, column units with associated hardware anchorages.
  - Parallel laminated 1/10" or 1/8" Douglas Fir
  - Continuous veneer strips waterproof glued-up
  - Approved manufacturer(s)
    - Trus-Joist MICRO-LAM

06 20 00 Finish Carpentry

- Includes provision of door and window hardware and hollow metalwork, thresholds, weatherstripping, doors, windows, frames, access panels, specialties, signs, millwork, siding, shelving, poles, hooks, paneling, trim, cabinetwork, counters, accessories, and other finish items not installed by other trades.
- In the absence of other information, standards of the following organizations apply:
  - Architectural Woodwork Institute (AWI)
    - "Architectural Woodwork Quality Standards, Guide Specifications, and Quality Certification Program", current editions.
  - National Particleboard Association (NPA)

06 40 00 Architectural Woodwork

- Determined and specified by the A/E with approval of Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM) approval.
- In the absence of other information, standards of the following organizations apply:
  - Architectural Woodwork Institute (AWI)
    - "Architectural Woodwork Quality Standards, Guide Specifications, and Quality Certification Program", current editions.

06 41 00 Architectural Wood Casework

06 41 16 Plastic Laminate-Clad Architectural Cabinets

- As determined and specified by the A/E with approval by LPS OMC and LPS PM.
- Plastic Laminates
  - NEMA LD 3-1.01 General Purpose, Post-forming, Cabinet liner, Backer, Specific Purpose, High Wear
  - Fire-Rated types based on service requirements
  - Minimum .050" thick facing sheets
  - Minimum .020" backing sheets
  - NEMA LD 3-4.03 2.0 and AWI 100-G-11 resorcinol and phenol-resorcinol, casein, epoxy, polyvinyl

- Contact adhesive appropriate for service intended.

06 41 80 Wood Countertops

- PROHIBITED for use with cut-in sinks or lavatories
  - Refer to Section 12 36 00 Countertops for solid surface requirements
- Particleboard
  - Flat panel, ANSI A208.1 Type 1
  - Medium density Grade B
  - Minimum 45#/c.f. (720kg/m3) class 2
  - Minimum ¾" (2cm) thick unless otherwise noted.
  - Approved manufacturer(s)
    - Bohemia
    - Boise Cascade
    - Georgia-Pacific
    - Weyerhaeuser
    - Willamette Industries
- Cleats/Blocking/Framing/Bracing
  - Per Section 06 10 00 Rough Carpentry, Nominal 2x Light Framing and Studs or Structural joists and Planks and Appearance
- Fabrication/Manufacture/Assembly/Construction
  - Shall be in accord with AWI Custom Grade requirements
- Countertops
  - Shall have a formed or milled front edge molding
  - Rolled edges are not required
  - Self-edging is PROHIBITED.

06 60 00 Plastic Fabrications

- Valance Louvers
  - Chrome finish or the A/E accepted equivalent customized panels to fit job site conditions.
  - Retainer Support Clips
    - Shop-coated sheet steel or aluminum inverted tees, well angles, or other shapes noted/detailed.
  - Approved manufacturer(s)
    - Scientific Lighting Products PARAVENT Functional Specular

END OF DIVISION 06

DIVISION 07 THERMAL AND MOISTURE PROTECTION

07 05 00 Common Work Results for Thermal & Moisture Protection

07 05 05 Selective Demolition for Thermal and Moisture Protection

- This Section includes selective demolition and renovation for re-roofing work.
    - Related Sections include:
        - 07 22 00 Roof and Deck Insulation
        - 07 22 16 Roof Board Insulation
        - 07 54 00 Thermoplastic Membrane Roofing
        - 07 72 00 Roof Accessories
- Execute demolition in a careful and orderly manner with least possible disturbance or damage to adjoining surfaces and structure.
- Avoid excessive vibrations in demolition procedures that would be transmitted through existing structure and finish materials.
- Disconnecting, extending, and reconnecting of services shall be performed by a mechanical, plumbing, and electrical company licensed to perform such work.
- Remove and reinstall existing equipment, HVAC units, and fans as required to facilitate installation of new roofing and flashing.
    - All HVAC units are to be lifted off the curb to allow new roof membrane to run over the top of the roof curb.

07 10 00 Dampproofing and Waterproofing

07 11 00 Dampproofing

07 11 13 Bituminous Dampproofing

- Required for all below-grade exterior foundation walls above finish floor levels.
- From top of footing or bottom of grade beam to indicated adjacent finish grade
    - Apply two separate coatings, primer, and one finish coat to produce a visibly unbroken film.
- Acceptable product(s):
    - MasterSeal 610 formerly Hydrocide 600
    - CELOTEX TAR BASE Dampproof Coating
    - Karnak BLACK ASPHALTUM COATING
    - J & P Petroleum Products TEX-MASTIC No. 720

- Equivalent major name product

07 12 00 Built-Up Bituminous Waterproofing

- Protection on miscellaneous below- grade items and materials.
- Provide a minimum 30-mil (.030") [1mm] trowel-grade.
  - Apply after bolting or welding is complete and prior to backfilling operations
- Coat all exposed-to-earth portions of steel, wood, and/or concrete columns and on miscellaneous steel anchorage items: angles, plates and bolts associated with on-site, below-grade masonry or poured-in-place concrete foundations.
- Acceptable Product(s):
  - J & P Petroleum Products TEX- MASTIC No. 712
  - Metropolitan Roofing Supplies DUREX DAMPPROOFING MASTIC
  - Equivalent major name product

07 13 00 Sheet Waterproofing

07 13 13 Bituminous Sheet Waterproofing

- At wall(s), deck(s), floor(s), floor area(s) and planter(s) to fulfill waterproof building requirements.

07 14 00 Fluid-Applied Penetrating Sealer

- Required on horizontal deck and vertical concrete and masonry wall surfaces, as determined, and engineered by A/E to fulfill building design requirements.

07 18 00 Traffic Coatings

- Fluid-applied, waterproof, elastomeric membrane for weather exposure wearing surface(s) subject to foot or automotive traffic
- RESTRICTED
  - When considered or required to match existing, must be approved by Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM).
- Acceptable manufacturer(s) and proprietary system(s)
  - Gaco Western GACODECK
  - Gibson Homans ETERNAFLEX
  - TOCH Carboline POLYTOK Deck Coating 131
  - Equivalent major name product

07 20 00 Thermal Protection

07 21 00 Thermal Insulation

07 21 13 Board Insulation

- Underfloor topping on horizontal deck

- Applied to the underside of deck, walls, or as otherwise required to fulfill building design requirements.
- Insulation Above Horizontal Deck
  - Extruded cellular polystyrene type
  - Thermal conductivity of 0.20 Btu/sq. ft./hr./°F/inch at 75°F
  - Minimum compressive strength of 40 psi
  - Maximum water vapor transmission 0.6 perm per inch
  - Maximum 1 percent water absorption by volume
  - Ship lapped edges like "Styrofoam SM" manufactured by Dow Chemical USA.
  - See also Sections
    - 07 22 00 Roof and Deck Insulation
    - 07 22 10 Roof Board Insulation
- Insulation Below Horizontal Deck
  - Produce minimum resistance value R-5.
  - Acceptable manufacturer(s) and proprietary system(s)
    - Celotex THERMAX exposed insulation boards in Interlocking PVC Strips Without Furring
    - Owens-Corning Commercial Use Board system
    - Equivalent major name product
- Rigid Wall Insulation
  - Boardstock, square edges, to produce a minimum Thermal "R" Resistance factor of 11.0
  - Acceptable product(s)
    - ZONALITE Styrene Foam
    - Dow THURANE
    - Owens-Corning URETHANE
    - Equivalent major name product
- Perimeter Insulation
  - Subgrade vertical- and horizontal- placed plastic board insulation on interior (and exterior) of building foundation walls (grade beams) and under slabs-on-grade to fulfill Code and building design and engineering requirements.
- Protection Board
  - Pre-molded semirigid composition board
  - 1/8" thick

- Asphaltic laminated

- Adhesive
  - As recommended by insulation manufacturer to securely adhere insulation to applicable surface.

07 21 16 Blanket Insulation

- Thermal Insulation
  - Minimum nominal thickness(es) to meet minimum resistance R Factors (R-30) required by local Code, Colorado Energy Code, IECC, and building design requirements.
  - Acceptable product(s):
    - United States Gypsum THERMAFIBER
      - Regular, Open- Faced, Foil-Faced in plenums, Flame Resistant, Fast-Fit, M-S, Z-Furring type(s) as relevant to location(s)
    - Comparable spun rock-wool, glass or mineral fiber blankets manufactured by:
      - Johns-Manville
      - Owens-Corning
      - Equivalent Premium Brands
- Sound Insulation
  - As required to fulfill requirements of local code, building design and LPS requirements.
  - Acceptable product(s):
    - United States Gypsum THERMAFIBER Sound Attenuation
      - Paperless, foil-less, semi-rigid mats, unfaced paperless rolls or batts
    - Comparable spun rock-wool, glass, or mineral fiber batts as manufactured by:
      - Johns-Manville
      - Owens-Corning
      - Premium Brand meeting FS HH-I-521E Type I
- Fire Safety Insulation
  - As required to fulfill design, engineering, and applicable code requirements.
  - Acceptable product(s):
    - United States Gypsum THERMAFIBER
      - Products meeting FS HH-I-558B, Form A, Classes 1 and 2

        - Comparable system(s)
- Top of Wall Insulation
    - Sound blankets or comparable paperless, foil-less, semi- rigid glass, rock, or mineral fiber mats, in single or multiple layers compressed to snugly fill void at juncture between top of walls or partitions and upper floor or roof deck.

07 21 23 Loose-Fill Insulation

- Pneumatic blown loose fill fibered glass nodules manufactured and fabricated free of formaldehyde and asbestos.
- Acceptable product(s):
    - CertainTeed INSUL-SAFE II
    - CertainTeed BLOWING WOOL
    - Manville BLOWING WOOL
    - Accepted equivalent

07 21 29 Sprayed Insulation

- Formaldehyde and asbestos-free spray-on thermal and sound insulation
- Acceptable product(s):
    - National Cellulose CELBAR
    - American Energy Products SprayDon Type SA
    - Thermo Products ThermoCon
    - Accepted equivalent.

07 22 00 Roof and Deck Insulation

- Work in this section is open to any product or material meeting the requirements of this Construction Standard
    - Material and manufacturer acceptable and responsible to Roofing Membrane manufacturer for compatibility with total roofing system
- Related Sections include:
    - 07 22 16 Roof Board Insulation.
    - 07 54 00 Thermoplastic Membrane Roofing
- Submittals
    - Product Data is required
    - Shop Drawings are required
    - Samples are preferred
    - Design Data & Test Reports are required
    - Closeout:

        - Submittals listed above updated to record status.
- Insulation requirements: Meet or exceed IECC.
- Under-deck roof insulation is not recommended due to condensation problems.
- Materials & Installation
    - Multiple layers with staggered joints
    - Bottom layer: Polyisocyanurate
    - Top layer REQUIRED one (1) inch minimum thickness
        - Perlite
        - Fiberglass
        - Wood Fiberboard
- Fasteners:
    - Coated types are PROHIBITED
- On fluted metal deck:
    - Align joints to occur on rigid surfaces only.
    - Joints parallel to the span of the metal deck are PROHIBITED over flutes/voids.
- Roof drain
    - Taper is MANDATORY
        - 24-inch minimum radius from drain
    - 1.5-inch minimum thickness in contact with drain fastener and plate

07 22 16 Roof Board Insulation

- Insulation shall be approved by Factory Mutual and Underwriters Laboratories for use as a roofing insulation.
- Flat and tapered insulation types and overly insulation board shall be supplied by roofing material manufacturer.
- 2.0" thick polyisocyanurate roof insulation (where scheduled)
- Acceptable product(s):
    - Section 01 60 00 et seq Tier 3 performance requirements
    - Must meet 07 50 00 Membrane Roofing requirements
- Overlay insulation board of ⅝” gypsum overlayment board over top of new polyisocyanurate roof insulation
    - Acceptable product(s):
        - Securerock® Gypsum-Fiber Roof Board
        - Dens-Deck® Prime
        - Equivalent major name product as outlined in

- Section 01 60 00 et seq Tier 3 performance requirements
- As needed to meet 07 50 00 Membrane Roofing requirements

▪ Equivalent major name product as outline in ASTM D 3746

- Over existing prepared modified roof system, in accordance with manufacturer's recommendations.
- Related Sections include:
  - 07 22 00 Roof and Deck Insulation.
  - 07 54 00 Thermoplastic Membrane Roofing

07 24 00 Exterior Insulation and Finish Systems

- PROHIBITED in new construction.
  - Permitted for repair/reconstruction of existing systems only
    - Built-up simulated cement plaster (stucco) walls and soffits, complete with sheathing and rigid insulation backup boards, adhesive, reinforcing fabric, synthetic cement waterproofing textured hard coat finish and sealant, where determined to fulfill building design requirements.

07 26 00 Laminated Vapor Retarder

- On top of crawlspace earth floor and under new interior concrete slabs-on-grade.
- Barrier
  - Heavy kraft paper laminated together with glass fiber reinforcement overcoated with black polyethylene film on each side
  - Resistant to decay when tested according to ASTM E154
  - Fabricated free of formaldehyde and asbestos
  - Acceptable product(s):
    - St. Regis MOISTOP
    - W. R. Meadows PREMOLDED MEMBRANE
    - Equivalent major name product
- Tape
  - As required to secure barrier to foundation walls and for sealing barrier lap joints.
  - Acceptable product(s):
    - Monsanto GER-PAK black 2½" (6.5 cm) wide
    - Equivalent major name product

07 30 00 Steep Slope Roofing

- In the absence of other information, standards of the following organizations apply:

- National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual - Current edition

- Submittals
  - Product Data required
    - Samples are required
    - Closeout:
      - Submittals listed above updated to record status.
      - Samples excluded.
  - Limit shingle applications to roofs steeper than 3:12 pitch
    - Requires approval of LPS OMC and LPS PM
  - Snow and wind loads must be considered prior to specifying shingles.

07 31 00 Shingles and Shakes

07 31 13 Asphalt Shingles

- RESTRICTED requires LPS OMC and LPS PM approval.
- Asphalt and modified composition only
  - SBS modified laminated
  - Class four impact resistant
  - 275 pounds per square
  - Exposure 5 ¼ inches to 5 ¾ inches
  - 110 miles per hour wind rating
  - Class A fire rated
  - Fungus/algae resistant not required

07 31 29 Wood Shingles and Shakes

- PROHIBITED

07 32 00 Roofing Tile System

- PROHIBITED

07 40 00 Roofing and Siding Panels

07 46 00 Siding

07 46 23 Wood, Plywood, Hardboard Siding

- PROHIBITED in new construction
  - Permitted for repair/reconstruction of existing systems only

07 46 43 Preformed Cladding/Siding

- PROHIBITED in new construction

- Permitted for repair/reconstruction of existing systems only

07 50 00 Membrane Roofing

- In the absence of other information, standards of the following organizations apply:
  - National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual - Current edition
- Related Sections include:
  - 05 00 00 Metals
  - 07 05 05 Selective Demolition for Thermal and Moisture Protection
  - 07 22 00 Roof and Deck Insulation
  - 07 22 10 Roof Insulation
  - 07 54 00 Thermoplastic Membrane Roofing
  - 07 62 00 Sheetmetal Flashing and Trim
  - 07 72 00 Roof Accessories
  - 22 05 29 Hangers and Supports for Plumbing Piping and Equipment
  - 22 14 26 Roof Drains
  - 26 05 29 Hangers and Supports for Electrical Systems
- Roof Design
  - Design of roof assemblies for LPS is restricted to:
    - Qualified licensed professional Roofing Consultants.
    - Licensed Architects / Engineers with demonstrated expertise in roofing
- Design roof system to withstand wind loads, snow loads, structural movement, thermally induced movement, exposure to wind, hail, sunlight, and temperature extremes and periodic foot traffic without failure.
- Design an integrated roof system comprised of fully compatible components.
- Performance targets for roof assembly:
  - 20-year minimum system life expectancy
  - UL Class A fire rating
    - Reference assembly designation in contract documents
  - Minimum FM I-90 Wind Uplift rating
    - Reference assembly designation in contract documents
- Plans need to clearly distinguish structure/deck slope from slope of tapered insulation.
- Membrane roofing systems RESTRICTED to Section 07 54 00 et seq.
- Drainage

  - Interior primary drainage is preferred over perimeter drainage.
  - Perimeter drainage is permitted for overflow.
  - Where upper level drains discharge onto lower levels, provide splash blocks.
  - Slope all roof sections to drains by means of tapered insulation or sloped structure.
    - 1/4 inch per foot minimum design slope with at least 1/8 inch per foot slope remaining after settlement due to maximum live loads and structural "creep."
    - 1/8 inch per foot minimum slope is allowed for roof retrofit when approved by LPS OMC and LPS PM.
    - Install crickets or saddles to allow immediate drainage away from membrane flashings wherever water may pond in valleys between drains, against walls and on the upslope side of large curbs.
    - Backslope must be minimum of twice the slope of the roof field.
- Locate drains and scuppers at distances proportional to insulation dimensions.
- Downspouts:
  - Design, detail, locate, and install to impede unauthorized access to roofs.
- Details
  - Keep the shapes of all roof surfaces, parapet walls, etc. as simple as possible; rectilinear configurations are preferred.
  - Maintain 18-inch minimum horizontal separation between individual roof details, curbs, penetrations, drains, valleys, crickets, and other changes in level.
  - Curb Heights: Minimum 16-inches above deck to accommodate required insulation depths.
  - Detail to maintain continuity at each termination, transition, intersection, interruption, penetration, change in direction, and seam.
  - Isometric details are preferred for transitions and intersections to avoid the need for field-based decisions by the installer(s).
  - Consider ice and drifting snow in detail designs.
  - Base flashings:
    - 8 inches minimum above the roof membrane.
  - Terminations
    - At non-bearing walls, detail base flashing attached to wood blocking secured to the roof deck, not the wall.
  - Penetrations
    - Detail counter-flashed jacks, vents, and flues.
    - Space vertical pipe and conduit penetrations to accommodate individual cone flashing with storm collar.

        - Clustered utility penetrations are preferred:
            - Detail watertight, sloped-top sheet metal jack with pipe and conduit penetrations on the side.
        - Do not rely on "self-flashing" flanges on skylights, HVAC units, etc.
            - Install true removable counterflashing on these curbs before mounting the unit.
    - Utilities and Equipment
        - Curb-less equipment is PROHIBITED.
        - Supports shall not penetrate the roof membrane.
        - Detail permanent non-combustible blocking equal to the thickness of the deck insulation at support locations where the loading will exceed the crushing strength of the roof insulation.
        - Detail base flashing or walk pad material between support material and the roof membrane.
        - Cooling towers:
            - Extend curb to the roof deck around the tower area to prevent lateral movement of water in the insulation.
        - Verify curb height requirements for re-roofing projects. Min. 16 –inches above deck to accommodate insulation depths.
    - Expansion Joint Locations:
        - Structural joints
        - Change in material or span direction of structure or deck
        - As required to form a rectangular roof area
        - To separate roof areas over differing interior temperature/humidity conditions.
        - Other locations recommended by NRCA
    - Miscellaneous
        - Perimeter blocking must be continuous and match the insulation thickness.
- Access
    - Design access to each roof level and area from walkout doors or scuttle hatches without having to re-enter the building.
    - Roof access ladders:
        - Per Construction Standard 05 Metals
        - Configure top step to bridge and protect parapet cap flashing.
- Coordinate various disciplines and trades; particularly mechanical, plumbing, and electrical at all stages of roof design and construction.

- Roofing (sub) contractor is responsible for finishing and flashing roof drains and scuppers.

- Submittals
  - Product Data is required
  - Shop Drawings are required
    - Indicate types, base flashing, lap configurations, nailing patterns, supplemental details, and other information necessary to determine compliance with specifications
  - Test Reports:
    - UL fire resistance
    - FM wind uplift
    - Flood testing of membrane roofing, in presence of Owner
  - Certificates:
    - Certification from the membrane manufacturer that the roofing (sub)contractor and superintendent are trained and authorized to install the specified system.
    - Certification from the membrane manufacturer indicating fasteners can provide a minimum static backout resistance of 15-inch pounds.
  - O&M Data is required
    - Include MSDS.
  - Samples are required
    - Terminations
      - Fasteners
    - Membrane
    - Base flashing
  - Manufacturer Field Reports
    - Upon completion of installation, provide a final inspection by a technical representative of roofing manufacturer to confirm that roofing system has been installed in accordance with manufacturer's requirements.
    - The roofing contractor, owner and roof consultant are required to be present for this inspection.
    - The manufacturer is to produce a written punch list and roof diagram of deficiencies found during their final inspection.
    - A copy of this punch list, diagram, and signed completion letter, will be provided to the owner’s roof consultant prior to the owner and consultant performing their final inspection.
  - Warranty:

- Applicator/Roofing Contractor 1 Year Warranty
- The manufacturer is to perform an 11-month inspection of the entire guaranteed roof system after the guaranty issuance date.
  - The roofing contractor, owner and roof consultant are required to be present for this inspection.
- The Manufacturer “20 Year No Dollar Limit (NDL) Total System Warranty”
  - Include repairs required to maintain roof and flashing in a watertight condition.
  - Make repairs at no expense to Owner.
  - Coverage to include:
    - All roof insulations, insulation fasteners, insulation adhesives, vapor retarders (where applicable), membrane fasteners and adhesives.
    - Roof membrane components and adhesives. All accessory products required for installation of membrane roofing system, including bonding adhesive, flashing membrane, stripping plies, clad metal, pipe boots, pourable sealant pockets, etc.
  - Shall not exclude coverage because of small areas of standing or ponding water.
  - Shall include hail (up to 1½") coverage for 20 years.
  - Shall not exclude coverage because of winds less than 85 m.p.h.
  - Shall not be limited by a dollar amount.
  - Owner shall notify both the manufacturer and the Applicator of any leaks as they occur during the period when both warranties are in effect.

- Closeout:
  - All submittals listed above, excluding samples, updated to record status.
  - Copies of the manufacturer's final inspection report.

- Source Quality Control
  - Provide UL labeled materials that have been listed in the current NRCA "Roofing Materials Directory" for the applications indicated.
  - Five consecutive year minimum firm history of manufacturing specified roofing items.
  - Seven consecutive year minimum history of roof system applications on commercial/institutional buildings in the western USA
    - With at least 5,000 squares installed in Colorado or similar climate.
    - "Roofing only" manufacturers are preferred.
  - Product Support:
    - Full time individual or firm based or branched in Colorado.

  - To the greatest extent possible, all roof system components should be from a single manufacturer.
- Acceptable Installers
  - Roofing (sub)contractor:
    - Roofing contractor authorized by the roof manufacturer prior to bid ("Applicator").
    - A single applicator with a minimum of 10 years previous successful experience in installation of similar systems.
    - Shall maintain a permanent office within 65 miles distance of project site to satisfy Owner that projects can be properly serviced during guaranty phase.
  - Project Superintendent:
    - Certified by the roofing manufacturer for warranted installations for at least 12 months prior to commencing work in this section.
    - Previous experience with no less than 500 squares of specified system.
    - Full-time presence at the jobsite during roofing activities.
- Preparation
  - An on-site pre-construction conference is mandatory before commencing work in this section.
    - Attendance: Owner, Roofing Consultant, Contractor, project superintendent, project foreperson, and Roof Manufacturer's Technical Representative.
    - Allow 14 days' notice to manufacturer for scheduling of their representative.
  - To the greatest extent possible, roofing work should not commence until drains, curbs, cants, blocking, nailers, penetrations and related construction work is completed.
- Installation
  - Provide for a minimum of two (2) on-site inspections of roof application by qualified technical representatives of roofing manufacturer.
- Retrofit Roofing
  - Remove old roof to structural deck.
  - Inspect and replace inadequate roof deck.
  - Venting base sheet or equivalent
  - Recondition drains and scuppers
    - Replace any missing/broken drain parts (i.e. clamping ring/bolts, etc.) with new to match existing.
    - Replace missing, broken, and plastic drain strainers with new steel drain strainers to match existing.

        - Clean existing drain bowl, parts, etc. and prime and paint (2 coats) all drain parts with Full Gloss, Alky Enamel: Two coats over rust inhibitive primer, S-W: SWP Gloss Oil.
    - Add overflow drains per Code.
    - Slope to drain
    - Replace inadequate sheet metal
    - Coordinate equipment curb heights
- Field Quality Control
    - Field verify positive drainage of substrate before commencing roofing work.
    - Details:
        - Where NRCA recommended details conflict with manufacturer's standard details, review both with LPS OMC and LPS PM for final disposition.
    - Roof Drains
        - Protect roof drain bowls, pipes, and clamping bolt holes from material and debris.
        - Seal drain perimeter daily to prevent moisture intrusion below roof membrane.
        - Clear roof drains and lines at the end of each workday.
    - Retrofit Roofing
        - Contain tear-off debris.
        - Start only that portion that can be completed that workday.
        - Daily work must have a temporary dry-in to existing roof at day's end.
        - Protect site, building, systems, vehicles, occupants, pedestrians.
        - Test roof drains both before and after roofing work
        - Raise curbs to specified design clearances
    - Shut down roof mounted utilities, including air handling equipment, before roofing.
    - Upon completion of the installation, the applicator shall:
        - Arrange for an inspection to be made by a technical (non-sales) representative employed by the roofing system manufacturer to determine whether corrective work will be required before the warranty will be issued.
        - Test electrical circuits for proper operation.
        - Test drain piping for leaks and proper flow.
        - Perform tests and inspections on gas piping as required by City.
            - Gas piping systems shall be left complete and operational with City inspection "green tags" at completion of work.

        - Test equipment that was removed and reinstalled to ensure that equipment is operating properly.
    - Material Safety Data Sheets (MSDS):
        - Must always be on location during the transportation, storage, and application of materials.
- Protection
    - Seal edges of in-progress roofing work before end of each workday.
    - Remove strainers and plug roof drains in areas where work is in progress.
        - Install flags or other telltales on plugs.
        - Remove plugs each night and screen drain.
        - Test drains at project completion.
    - Protect completed roofing from traffic, unusual wear, and damage by subsequent construction activities.
    - Protect building surfaces, finishes, furnishings and site improvements from roofing materials and activities.

07 54 00 Thermoplastic Membrane Roofing

- Ketone Ethylene Ester (KEE) Roofing is PROHIBITED

07 54 23 Thermoplastic-Polyolefin Roofing

- Thickness at least 60 mil
- Resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- Install adhered thermoplastic-polyolefin roofing membrane with flashings and other components to provide a roofing system with a manufacturer “20 Year No Dollar Limit (NDL) Total System Warranty.
    - Warranty to meet anticipated area wind & hail.
- Color is RESTRICTED to tan.
- Product requirements per 01 60 00 et seq.
    - Tier 3 Performance criteria
- Acceptable Manufacturers
    - Sika Sarnafil
    - Carlisle SynTec Incorporated
    - Firestone Building Products
    - Johns Manville
    - Versico Incorporated
    - Equivalent manufacturer approved prior to CD Development
        - Major name manufacturers only

- Re-labeled products are PROHIBITTED

07 60 00 Flashing and Sheet Metal

- In the absence of other information, standards of the following organizations apply:
  - Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Architectural Sheet Metal Manual, current edition.
  - National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual – Current Edition
- Submittals
  - Product Data is required for prefabricated components
  - Shop Drawings are preferred
  - Samples are preferred
  - Closeout:
    - Submittals listed above updated to record status.
    - Samples excluded.
- Do not attach or route any mechanical or electrical system components directly to the roof or in a manner that could interfere with future roof maintenance or replacement.
- Roof Expansion joints, minimum requirements:
  - Maximum spacing at 200 lineal feet; 150 lineal feet preferred.
  - At continuation of architectural/structural building joints
  - At transitions between new and existing roof areas.
  - At changes in roof deck material or direction.
  - At changes in roof direction so that all roof areas are approximately rectangular.
- Mount rooftop mechanical and electrical equipment and distribution systems only on flashed curbs or permanent pipe pedestals.
- Permanent walkway pads or pavers are required
  - Around the perimeter of major rooftop mechanical equipment
  - Between major rooftop equipment and access points.
- Restrictions
  - Surface applied reglet counterflashings are PROHIBITED.
  - Raceway conduits and gas lines must have a minimum 12” clearance from roof surface to bottom of pipe(s).
- Materials
  - Preferred:

        - Prefabricated, pre-formed, and prefinished manufactured composite profiles and components are preferred over site fabrications.
    - Masonry flashings per Construction Standard 04 Masonry
    - PROHIBITED:
        - Plastic
        - PVC
        - Aluminum
        - Lead
        - Zinc
        - “Weathering" type materials
- Minimum gauge standards for metal counter flashing and reglets (dimensions = exposed face):

Up to 6 inches	26 gauge
6 to 8 inches	24 gauge
8 to 10 inches	22 gauge
10 to 15 inches	20 gauge
Over 15 inches	Not recommended due to "oil canning"

- Fasteners:
    - Galvanized or stainless-steel screws with metal and neoprene washers
    - Continuous metal cleats are preferred for securing counterflashing
    - 24-inch o.c. maximum spacing
    - Conceal fasteners to the greatest extent possible.
    - Limit exposed fasteners to vertical surfaces.
- Design
    - Design, detail, and quality requirements of Section 07 50 00 apply.
    - Design sheet metal to shed water.
    - Extend drip edge ¼ inch minimum beyond face of wall at steel lintels, shelf angles, and other metals.
    - Flashing may terminate at tooled mortar joint elsewhere.
    - Specifications and details must clearly indicate the treatment of both horizontal and vertical ends of flashing and sheet metal assemblies.
    - Maintain continuity around corners and jogs.
    - End dams with overlapped and sealed corners are required at terminations and transitions.

  - Hem exposed edges
  - Locate seams above highest anticipated water level
  - In no case should water flow over horizontal metal except at a scupper.
  - Use of solder or rivets is PROHIBITED.
  - Provide standing seam or equivalent raised joints in all sheet metal exposed to the weather, including HVAC housings
  - Curb:
    - Detail and specify metal assemblies to disassemble to permit access to the base flashing without any interference with the operation of curb mounted equipment above.
- Gutters and Downspouts
  - NOT RECOMENDED
  - PROHIBITED at North exposure and on roofs with less than 2:12 slope
  - Minimum 1 DS per 50 lineal feet of gutter or oversize size gutter by 25% for every additional 10 lineal feet of DS separation.
  - Provide overflow at header
  - Open-front downspout design is preferred
    - Custom profiles require LPS OMC and LPS PM prior approval.
  - Design, detail, locate, and install to discourage unauthorized access to roof.
  - Surface discharge onto pavement is PROHIBITED.
- Scupper
  - Per SMACNA
- Gravel Stop
  - Per NRCA
- Head and shelf angle
  - Mandatory at all exterior fenestration and lintels
  - Extend flashing a minimum of 2 inches horizontally beyond the ends of the structural steel
- Sill
  - Flashing pans with upturned ends are mandatory at window sills.
  - Extend pan a minimum of 6 inches horizontally beyond each jamb.
- Foundation
  - Frame structure:
    - Terminate behind building wrap / vapor barrier.
    - Do not puncture with fasteners.

- Masonry cavity wall:
  - 4 inches minimum vertical leg + 4 inches minimum horizontal extension into bed joint of backup masonry.
  - Lap ends 6 inches and seal

- Masonry Parapet
  - Through-wall flashing is mandatory.
  - Cap flashing with continuous watertight cleat is MANDATORY
  - Slope toward roof at 1:12 minimum and extend 4 inches minimum below top of masonry.
- Counterflashing:
  - Establish counterflashing height from the highest membrane base flashing elevations
  - Detail counterflashing along the sides of sloped roof sections, especially at masonry.
  - Detail counterflashing to lap and cover at least 3 inches of roof membrane base flashing.
- Diverter:
  - MANDATORY where a sloped roof terminates adjacent to a parallel wall
- Expansion joints:
  - Required within 2 feet of corners & intersections.
  - Locate at 15 feet maximum spacing elsewhere (10 feet preferred).

07 61 00 Sheet Metal Roofing

- Scope of work includes, but is not necessarily limited to preformed panels, related accessories, valleys, hips, ridges, eaves, corners, rakes, miscellaneous flashings, and attaching devices.
- Related Sections include
  - 07 62 00 Sheet Metal Trim and Flashing.
- Coordinate various disciplines and trades; particularly mechanical, plumbing, and electrical at all stages of roof design and construction.
- Submittals
  - Product Data is required
  - Shop Drawings are required
    - Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details
  - Samples are required

        - For each type of metal panel indicated with factory-applied color finishes
    - Product Test Reports
    - Closeout:
        - Submittals listed above updated to record status.
            - Samples excluded.
        - O & M
        - Warranty
            - Applicator/Roofing Contractor 1 Year Warranty
            - Manufacturer's Special Warranty on Panel Finishes:
                - Finish Warranty Period: 30 years from date of Final Completion and Acceptance.
                - Manufacturer's Special Weathertightness Warranty: Minimum 20 years from date of Final Completion and Acceptance.
- Acceptable Installers
    - Installers and supervisors who are trained and approved by manufacturer.
    - At least five (5) years' experience applying these types of materials in successful completion of projects of similar scope.
- 10'x10' mockup required to establish objective minimum quality standards.
- Coordination
    - Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
    - Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leak-proof, secure, and noncorrosive installation.
- Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.
- Standing-Seam Metal Roof Panels
    - Factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps.
        - Include clips, cleats, pressure plates, and accessories required for weathertight installation.
    - Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs
        - Designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels

- Engage opposite edge of adjacent panels and mechanically seaming panels together.

- Nominal Thickness: 0.034 inch (0.86 mm)
  - Note: This is 21 gauge
- Approved manufacturer(s)
  - Berridge Manufacturing: Zee-Lock Double-Lock
  - Acceptable equivalent
- Accessories
  - Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- Flashing and Trim
  - Formed from same material as metal panels as required to seal against weather and to provide finished appearance.
  - Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers
  - Finish flashing and trim with same finish system as adjacent metal panels.
- Gutters
  - Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required
  - Fabricate in minimum 96-inch-(2400-mm-)long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual."
  - Furnish gutter supports spaced a maximum of 36 inches (914 mm) o.c., fabricated from same metal as gutters.
  - Provide wire ball strainers of compatible metal at outlets.
  - Finish gutters to match metal roof panels.
- Downspouts
  - Formed from same material as roof panels.
  - Fabricate in 10-foot-(3-m-)long sections, complete with formed elbows and offsets, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual."
  - Finish downspouts to match gutters.

07 62 00 Sheet Metal Flashing and Trim

- Scope of work includes but is not necessarily limited to wall and cap flashings, counterflashing, gravel stops, reglets, roof vents, gutters, conductor heads, scuppers, spitters, deflectors, divertors, rain leaders, downspouts, pitch pans, splash pans, associated anchor clips, straps, accessories, trim.
- Minimum 24-gauge galvanealed, Kynar, or baked enamel finish
- Submittals
  - Product Data is required
  - Shop Drawings are required
  - Closeout:
    - Submittals listed above updated to record status.
      - Samples excluded.
    - O & M
    - Warranty
      - Applicator/Roofing Contractor 1 Year Warranty
      - Manufacturer's Special Warranties
        - 30-year Kynar coating.
        - 20 year “Excel” Warranty covering wind blow off, leaking, and membrane failure, up to and including, winds of 110 miles per hour on Terminedge coping system.
          - Warranty to be covered under roof membrane manufacturer’s warranty.
- Flashings and Gravel Stops
  - 1" wide open expansion joints at maximum 10'10" centers covered with minimum 4" (10 cm) wide interlock cover
  - Joints closer than 2'0" to corners are PROHIBITTED
  - Overlap jointing are PROHIBITTED
- Hem
  - All exposed edges of flashings and stops ½" on underside.
- Miscellaneous
  - Clips, anchors, straps, same material as item to be anchored.
  - Clips shall be continuous, not strips, continuing through expansion joint covers, with clip expansion allowance(s) occurring midway between expansion joint covers.

07 70 00 Roof and Wall Specialties and Accessories

- Submittals
  - Product Data is required

  - Samples are preferred
  - Closeout:
    - Submittals listed above updated to record status.
    - Samples excluded.
- Do not attach or route any mechanical or electrical system components directly to the roof or in a manner that could interfere with future roof maintenance/replacement.
- Roof Expansion joints, minimum requirements:
  - Maximum spacing = 200 lineal feet; 150 lineal feet preferred.
  - At continuation of architectural/structural building joints
  - At transitions between new and existing roof areas.
  - At changes in roof deck material or direction.
  - At changes in roof direction so that all roof areas are approximately rectangular.
- Mount rooftop mechanical and electrical equipment and distribution systems only on flashed curbs or permanent pipe pedestals.
- Permanent walkway pads or pavers are required
  - Around the perimeter of major rooftop mechanical equipment
  - Between major rooftop equipment and access points.
- Restrictions
  - Surface applied reglet counterflashings are PROHIBITED.
  - Raceway conduits and gas lines must have a minimum 12” clearance from roof surface to bottom of pipe(s).
- Materials
  - Preferred:
    - Prefabricated, pre-formed, and/or prefinished manufactured composite profiles and components are preferred over site fabrications.
  - PROHIBITED:
    - Plastic
    - Aluminum
    - Lead
    - Zinc
    - “Weathering" type materials
- Manufactured Roof Specialties such as copings, counterflashings, gravelstops, gutters, and downspouts must have prefabricated corners and slip-type connectors.
  - Continuous sealant pocket as appropriate to the detail

- Roof expansion assemblies:
  - Continuous (rolled) expansion covers preferred over segmented type (to minimize joints).
  - Detail and specify manufacturers' standard prefabricated transition and termination pieces.
  - Locate within 2 feet of corners and intersections.
  - Locate at 15 feet maximum spacing elsewhere (10 feet preferred).
  - Detail to match height of base flashings.
- Jacks:
  - Prefabricated jacks with integral boot, base flange, and clamp.
- Cap flashing:
  - Use continuous watertight cleat or apply continuous sealant bead behind drip.
- Hem exposed edges
- Roof Hatch:
  - Must have insulated top and minimum 12" high curb
  - Locate hinge end opposite ladder end
  - Extendable ladders or extendable single pole hand hold to 4 feet above hatch opening.
  - Safety railing
- Scuttles and Smoke Vents
  - Must have insulated top and minimum 12" high curb
  - Galvanealed or similar metal finish ready for paint.
- Fasteners:
  - Galvanized or stainless-steel screws with metal and neoprene washers
  - Continuous metal cleats are preferred for securing counterflashing.
  - 24-inch o.c. maximum spacing
  - Conceal fasteners to the greatest extent possible
  - Limit exposed fasteners to vertical surfaces.
- Maintain sheet metal flashing and trim continuity around corners and jogs.
- End dams:
  - Required at terminations and transitions.
- Locate seams above highest anticipated water level, 6-inch minimum lap.
- Prefabricated Roof Curbs require LPS OMC and LPS PM review & approval.

07 80 00 Fire and Smoke Protection

- Owner reserves the right to perform separate commissioning inspection and/or retain the services of an independent testing agency to inspect, sample, and confirm compliance with work in this section.
  - In the absence of other information, the following standards shall apply
  - Underwriters Laboratories (UL) Fire Resistance Directory, current edition
  - UL 1479 Test method for fire tests of through-penetration firestops
  - ASTM E814-88 Standard test method for fire tests of through-penetration firestops
- Submittals
  - Product Data
    - Detailed specification of construction & fabrication
    - Manufacturer's installation instructions
    - MSDS
  - Shop drawings or materials schedule is preferred and is mandatory for projects with total contract value exceeding $1,000,000.
    - Details of each proposed assembly, for all types of fire rated construction and penetrating items encountered, identifying intended products and applicable UL System Number, or UL classified devices.
    - Manufacturer or manufacturer's representative shall provide qualified engineering judgments and drawings relating to non-standard applications as needed
  - Manufacturer instructions and field reports.
  - Closeout
    - All submittals listed above, updated to record status
- Thermal and Moisture Protection
  - Specify Underwriters Laboratories fire-rated assembly designations in the contract documents.
  - Firestops are required at every construction joint and penetration in fire-rated assemblies.
  - Sprayed cementitious fireproofing as required per IBC
    - Minimum bond strength per ASTM E736: 200 psf.
    - Air erosion per ASTM 859: 0.00 grams loss
    - Surface Burning per ASTM E84: Smoke = 0, Flame = 0, Fuel = 0
    - Use W/D ratio to determine application thickness.

- Remove paint, lubricant, compounds, and other contaminants from substrate metal as recommended by fireproofing manufacturer to assure specified bond strength.
- Mineral fiber fireproofing is PROHIBITTED.

07 90 00 Joint Protection

- Exterior Sealants
  - Building(s)
    - ConTech SONNEBORN SONOLASTIC NP II, Pecora
    - DYNATROL II two- or three-part non-sag sealant
    - Equivalent as accepted and approved by LPS OMC and LPS PM
  - Pavement and Walks
    - Pecora UREXPAN NR-200 self-leveling sealant
    - Equivalent as accepted and approved by LPS OMC and LPS PM
  - Windowwall/Curtainwall/Storefront
    - Internal
      - Dow Silicone Sealant
      - General Electric Silicone Sealant
    - Perimeter
      - Dow Silicone Sealant
      - General Electric Silicone Sealant
- Interior Caulking
  - Latex, acrylic, or oil base caulk
    - DAP
    - Gibson-Homans
    - Pecora
    - Tremco
  - Fire Resistant Seal
    - Fire resistant silicone foam sealant at all fire stops and wall/floor penetration seals.
      - Chase Technology Corporation CTC PR-855 CHASE-FOAM
- Joint Filler (backer rod)
  - Round, square, or rectangular as appropriate to joint requirement(s)
  - Compressible gray or white polyethylene, or polyurethane foamed plastic
    - DENVER FOAM

        - Dow ETHAFOAM SB
    - Untarred oakum or fiberglass
        - Installer option at no extra cost(s) charge(s) to LPS.
- Bond Breaker
    - Clear or opaque polyethylene tape or film; self-adhesive type where applicable.
- Joint Cleaner/Primer/Sealer
    - Material as recommended by the caulking or sealant manufacturer.
- Color(s)
    - Manufacturers' standard available colors.
    - Approved by LPS OMC and LPS PM

07 95 00 Expansion Control

07 95 13 Expansion Joint Cover Assemblies

- Prefabricated metal expansion joint covers for interior and exterior exposed applications; material(s), size(s), configuration(s), location(s), finish(es) as determined and engineered by the A/E.
- Submittals
    - Product Data is required and edited for pertinence to project
    - Shop Drawings are required
    - Samples are required
    - Calculations certifying compliance with loading requirements

END OF DIVISION 07

DIVISION 08 OPENINGS

08 10 00 Doors and Frames

08 11 00 Metal Doors and Frames

- Insulated hollow metal doors, pressed steel door/window frames, and stick system components for door openings, borrowed lights, casings, transoms and sidelights, associated louvers, view panels, moldings, labels, anchors, reinforcements, and accessory items.
- Manufacturers shall be Steel Door Institute (SDI) members.
- In the absence of other information, standards of the following organizations apply:

- NFPA 80, Standard for Fire Doors and Fire Windows
- Steel Door Institute (SDI)
- National Association of Architectural Metal Manufacturers (NAAMM)
  - Submittals
- Product Data is required
- Shop Drawings are required
- Door Schedule is required, including
  - Label/fire rating
  - Frame anchorage
- Closeout:
  - Submittals listed above updated to record status.
  - Frames
- All Frames
  - Frames over 48" in width shall be 14-gauge.
  - Fabricate frames with mitered and faces only welded corners
    - Re-prime at welded areas
    - All welds to be flush with neatly mitered or butted material cuts
      - Conceal fastenings unless otherwise indicated.
  - 5/8" integral stop
    - Except for weather- stripped frames, drill stops to receive
      - Three (3) silencers on strike jambs of single frames
      - Two (2) silencers on heads of double frames
  - Knock-down (KD) type RESTRICTED to interior installations

- Mortised, reinforced, drilled, and tapped for mortise hardware with minimums requirements:
  - 7- gauge hinge reinforcements
  - 14-gauge lock strike reinforcing
  - 12-gauge closer reinforcing
  - Reinforced for both surface-mounted and mortised hardware.
- Anchors, connection members, clips reinforcement(s) required by code(s), manufacturer, and Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM) for anchorage and support.
- Center mullions must be removable type, unless pre-approved by LPS OMC and LPS PM.
- Provide temporary shipping bars, to be removed before setting.

- Interior Frames
  - Shall be Level 2, 16-gauge, CRS.
- Exterior Frames
  - Shall be Level 3, 14-gauge, galvanized or galvanealed.
  - Reinforce all exterior frames for concealed continuous hinges.
  - Grout all exterior frames solid.
  - At frames with electronic devices and conduit
    - Provide minimum 0.0179" thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.
  - Basis of design
    - Curries M Series
      - Unequal rabbet.
  - Approved manufacturer(s)
    - Ceco
    - Steelcraft
  - Doors
- All Doors
  - Full flush panel type
    - Constructed of two panels minimum
    - 18-gauge prime commercial cold-rolled stretcher level steel free of pitting.
    - No face seams

- With or without edge seams

- 1 ¾" thick
- Shall have beveled edges 1/8" in 2"
- Shall have inverted top and bottom channel reinforcement not less than 16-gauge
  - Welded to the face sheets.
- Doors are REQUIRED to be reinforced for hardware as follows:
  - Exit devices 14-gauge
  - Door closers 12- gauge
- Materials and ANSI/SDI-100 grades and models specified below, or as indicated on drawings or schedules

- Interior Doors
  - Level 2, Model 2 – Seamless
  - Minimum 18-gauge cold-rolled steel with both lock and hinge rail edge of door intermittently welded
    - Filled and ground smooth the full height of door.
  - Cores shall be honeycomb, polystyrene or polyurethane as indicated for sound deadening
  - Louvers shall be fixed, except fusible-link in fire-rated locations.
  - Glazing moldings shall be minimum 18-gauge, mitered corners.
  - Vison panels shall have manufacturer's standard metal light frame formed of cold-rolled steel sheet with baked-enamel or powder-coated finish approved for use in doors of fire rating indicated and using single-pane glass.
  - Basis of Design
    - Curries 707
  - Approved manufacturer(s)
    - Ceco
    - Steelcraft
- Exterior Doors
  - Level 3, Model 2 – Seamless
  - Minimum 16-gauge steel with both lock and hinge rail edge of door intermittently welded
    - Filled and ground smooth the full height of the door.

- Doors shall be reinforced, stiffened, insulated, and sound deadened with continuous 20-gauge vertical steel stiffeners spaced not more than 6" (152) apart.
  - The stiffener ends shall be welded together at the top and bottom ends
  - All spaces between stiffeners shall be insulated as provided below
- Top and bottoms of all doors shall be closed flush by the addition of a 16-gauge screwed-in top cap and sealed to prevent water infiltration.
  - The bottom channel shall include weepholes.
- Cores shall be 75-pound density fiberglass insulation.
- Glazing moldings shall be minimum 18-gauge, mitered corners.
- Vison panels shall have manufacturer's standard metal light frame formed of cold-rolled steel sheet with baked-enamel or powder-coated finish approved for use in doors of fire rating indicated and using insulated glass units.
- Basis of Design:
  - Curries 747-16
- Approved manufacturer(s)
  - Ceco
  - Steelcraft

o Fire Rated Door Assemblies

- Shall be classified and listed in accordance with the latest edition of NFPASO and test in compliance with NFPA-252 and ULIOC.
- Physical label is to be affixed to the fire door at an authorized facility
  - Embossed labels are acceptable on standard 3-sided door frames.
- Submit manufacturer's certification for openings required to be fire rated exceeding limitations of labeled assemblies
  - Certify each door and frame assembly has been constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.
- Door assemblies and components required to be compliant with positive pressure and S•label requirements.
  - Specifications must be cross-referenced and coordinated with hardware and other door manufacturers to ensure that total opening engineering is compatible with ULIOC Standard for Positive Pressure Fire Tests of Door Assemblies.
  - Certification of compliance shall be made available upon request by the Authority Having Jurisdiction.
- Temperature rise rating shall be as required by Code.

- At stairwell enclosures, provide doors that have a temperature rise rating of not more than 450O F maximum to 30 minutes of fire exposure.

- Finish

- Doors and frames prefinished in Kynar/baked enamel acceptable to LPS OMC and LPS PM
  - Renovations or additions to existing facilities may be shop-primed and field-painted to match.
  - Labels
- Agency approved certified or labeled doors, frames, and anchors for minimum ratings required by code.

08 14 00 Wood Doors

- Interior Wood Doors

- Flush style, SWI Custom grade, SCL-5ply core or PC-5ply core with 4" (10 cm) stiles and 6" (15 cm) rails
- Premium Grade A face veneers
  - Minimum 1/8" thick
  - Matching solid top, bottom, and side edges bonded to the core
  - For transparent finish to match existing.
- Veneer cut, species, and face assembly (book match or running match) shall be coordinated for each project/building with the LPS OMC and LPS PM.
- Fire doors shall have AWI FD ratings of 1½, 1, ¾ hour, and 20 to 30 or 20 minute, per location, meeting UL requirements, ASTM E152 and used in accordance with NFPA 80.
  - Non-rated and 20-Minute Doors
- Engineered core complying with WDMA I.S.1 A, bonded to door faces, stiles and rails using a Type I adhesive.
- Components are to be assembled to meet or exceed 20- minute fire- door specifications for ULIOC fire test requirements.
- Door shall meet or exceed WDMA I.S.1A Extra Heavy-Duty performance standards.
- Basis of Design
  - Marshfield Door
- Approved Manufacturer(s)
  - Graham
  - VT Industries
  - Fire Rated Doors Over 20 Minutes

- Supply fire-resistive composite mineral core construction to provide the fire rating indicated, bonded to door faces, stiles and rails using a Type I adhesive.
- Hinge stiles shall have manufacturer's standard laminated-edge construction with improved screw holding capability and split resistance; outer stile shall match face veneer.
- Cross-reference and coordinate with hardware to ensure that total opening engineering is compatible with ULIOC Standard for Positive Pressure Fire Tests of Door Assemblies and UBC 7-2 Fire Tests of Door Assemblies.
- Basis of Design
  - Marshfield Door
- Approved Manufacturers
  - Graham

    VT Industries
- Mineral Core Doors
  - Shall include composite blocking approved for use in doors of fire ratings indicated
  - Screw holding capability and split resistance as necessary to eliminate the need for through-bolting hardware and as follows:
    - 5" top blocking
    - 4 ½" x 10" lock blocks
    - 5" mid-rail blocking at doors indicated to have exit devices
- Intumescent Seals
  - Category A or B shall be provided as required.
- Stairwell Enclosures and other locations as indicated
  - Shall have doors with a maximum transmitted temperature end- point of not more than 250o F above ambient after 30 minutes of standard fire-test exposure, as required by Code.
- Physical Label
  - Shall be permanently affixed to the fire door at an authorized facility.
- Certification of Compliance
  - For units exceeding sizes of tested assemblies shall be provided by a qualified testing agency, demonstrating that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
  - Certification(s) of compliance shall be made available upon request by the Authority Having Jurisdiction.
  - Miscellaneous

- Finish
  - All doors to receive a transparent finish at the factory using WDMA TR-6 catalyzed polyurethane for a Premium Grade, semi-filled finish, produced by applying an additional finish coat to partially fill the wood pores.
  - Field finish doors indicated to receive an opaque finish in accordance with Division 09, Finishes.
  - Stain and finish shall be coordinated for each project/building with LPS OMC and LPS PM.
- Louvers
  - Shall be extruded aluminum alloy AA6063-T5 Duranodic dark bronze finish (or as required to match existing)
  - Fixed 45-degree straight blades or vision-proof inverted V- or Y-blades constructed of galvanized 0.040" thick steel, power-coated or factory-primed for painted finish in baked-enamel.
  - Metal louvers for fire-rated doors shall include fusible link and closing device listed and labeled for use in doors with fire-protection rating of 1-1/2 hours or less.
  - Subject to compliance with rating requirements, louver construction and material shall be the same as non-rated versions.
- Vision Panels
  - Shall have manufacturer's standard metal light frame formed of 0.048" thick cold-rolled steel sheet with baked-enamel or powder-coated finish approved for use in doors of fire rating indicated, using single-pane glass.

08 30 00 Specialty Doors and Frames

08 31 00 Access Doors and Panels

- Steel, as sized and located on drawings
- Fire rated where required by Code

08 33 00 Coiling Doors and Grilles

08 33 23 Overhead Coiling Doors

- Interlocking
- Continuous length without splice
- Flat slat curtain
- Electric operated
- Fire-rated where required by code

08 33 26 Overhead Coiling Grills

- Aluminum
- Electric operation

08 36 00 Panel Doors

08 36 13 Sectional Doors

- Steel
- Full flush flat galvanized exterior and interior panels
- Insulated exterior location(s)
- Galvanized hardware
- Weather stripped exterior location(s)
- Electric operated with emergency manual chain hoist.

08 40 00 Entrances, Storefronts, and Curtain Walls

08 41 00 Entrances and Storefronts

08 41 13 Aluminum Framed Entrances and Storefronts

- NOT RECOMMENDED
    - Requires approval of LPS OMC and LPS PM
- Anodized or Kynar finish
- Wide-style profile:
    - Sides 5” + stops
    - Top rails 6.5”+ stops
    - Middle rails 8.25” + stops
    - Bottom rail 10” + stops
- No drop plates
    - Exit device to be centered in middle rail.
- Approved manufacturer(s)
    - Kawneer 2250
    - Kawneer Tri-Fab 451T thermal break
    - Approved equivalent

08 42 00 Entrances

08 42 29 Automatic Entrances

- RESTRICTED to installations required by
    - As required by ADA guidelines
    - Security planning

08 44 00 Curtain Wall and Glazed Assemblies

- NOT RECOMMENDED
    - Requires approval of LPS OMC and LPS PM
    - Refer to Section 08 41 13 Aluminum Framed Entrances and Storefronts.

08 45 00 Translucent Wall and Roof Assemblies

- Prefabricated flat or curved translucent glass fiber sandwich panel systems for wall or skylights
- Glass fiber reinforced thermoset resin specifically designed for architectural use.
- Faces shall not deform, deflect, drip, or detach when subjected to heat or flame and shall not discolor after extended exposure to sunlight.
- PROHIBITED within ten (10) feet of adjacent grade or finish floor
- Approved manufacturer(s)
    - Kalwall
    - Approved equal.

08 50 00 Windows

- In the absence of other information standards of the following organizations apply
    - Window and Door Manufacturer's Association (WDMA)
    - American Architectural Manufacturers Association (AAMA)
- Submittals
    - Product Data is required
    - Shop Drawings are required
    - Samples are preferred
    - Test Reports
        - Air infiltration test
        - Water resistance test
        - Wind load test
        - Thermal performance test

- System Performance/Quality Control:
  - Comply with IECC for full assembly performance requirements to include glazing.
- Certificates:
  - Submit manufacturer certifications/proofs of compliance with requirements of this section.
- Field Sample is required for projects with more than 500 square feet of window
- Extended warranty:
  - Underwritten by window manufacturer
  - 10 years minimum term from the date of project acceptance covering defects in materials and workmanship
  - 10 years minimum term from the date of project acceptance covering specified performance standards
  - Monetary limits at any time in the warranty period shall not be restricted to any amount less than the original (sub)contract amount
- Closeout:
  - Submittals listed above updated to record status.

- Exterior Windows
  - Acceptable
    - Thermal-break aluminum
    - Hollow metal framed
    - Fiberglass
    - Vinyl-clad wood
  - Dark Bronze-finish
  - Units may be of the following types:
    - Picture windows shall be fixed
    - Awning windows shall be top-hinged and project out
    - Sliding windows shall operate horizontally
- Interior Windows
  - Borrow-lights and vision panels should be steel hollow metal or aluminum construction
  - Moveable units shall be aluminum
- Operable Window Vents
  - Provide in each occupied room, even if building is air conditioned, to allow use of building in event of power outage or energy shortage.

  - Vents shall be
    - Bottom-hinged, in-swing
    - Weather-stripped
    - Shall not project beyond wall line
    - Shall have positive interior latch
- Screens
  - On vent portions of fenestration
  - Charcoal-colored metal or fiberglass screen cloth
  - Roll-formed or extruded aluminum frames
  - Factory-finished
  - Vandal resistant
- Glazing
  - Bronze-tinted high-performance triple-pane insulating glazing units with one low-e coated suspended film and inert gas-filled chambers
  - Performance Class Structural to be Commercial
    - CW-PG45 (fixed)
    - CW-PG50 (awning or hopper)
    - CW-PG30 (sliding)
  - Inside glaze with snap-on beads
- Natural Light
  - Provide exterior windows in principal stairways. Keep windows high to reduce glass breakage.
- Energy Efficiency
  - Follow requirements of ASHRAE 90 and Colorado Energy code for thermal design of exterior wall assemblies, which will affect number and size of windows used.
  - Whole Unit
    - U-Value performance shall be
      - U-0.20 maximum for fixed units
      - U-0.22 maximum for moveable units
    - Modeled in accordance with NFRC 100 standards
    - Ultraviolet blockage shall exceed 99% for all window elements
  - Center of Glass
    - U-Value performance shall be U-0,14 maximum
    - Solar Heat Gain Coefficients shall be SHGC-0.30 maximum for south, east, and west elevations

    - Visible light transmission shall be 40% minimum.

- Vandalism Reduction
    - Avoid using windows or window walls in areas that are screened from public view.
- Glass Cleaning
    - Provide hinged ventilators above ground level floor areas to allow cleaning of glazing from interior of building.
- Glass Height
    - Glazing below 3'0" above floor level is PROHIBITED
- Sound Transition
    - Windows shall be rated for not less than STC-30 when tested for laboratory sound transmission loss per ASTM E90 and ASTM E413.

08 54 00 Composite Windows

08 54 13 Fiberglass Windows

- Basis of Design
    - 525 Series Fiberglass Serious Windows
- Approved manufacturer(s)
    - 525 Series by Serious Materials, Inc., Sunnyvale, CA
    - Approved equivalent

08 60 00 Roof Windows and Skylights

- Individual units are NOT RECOMMENDED
    - Skylight systems must have approval of the LPS OMC and LPS PM prior to Construction Documents Phase.

08 70 00 Hardware

- REQUIRED hardware meeting with LPS OMC and LPS PM prior to Construction Documents Phase.

08 71 00 Door Hardware

- A hardware and keying conference is mandatory within 30 days of contract award.
- In the absence of other information, standards of the following organizations apply:
    - Builders Hardware Manufacturers Association (BHMA)
    - American National Standards Institute (ANSI)
    - National Fire Protection Association (NFPA)

- Submittals

- Product Data:
  - Required
    - Catalog cuts to include:
      - Item
      - Manufacturer
      - Type
      - Reference number
      - Finish
    - Manufacturer's installation instructions
- Hardware Schedule:
  - Required
  - Per DHI document, "Sequence and Format for the Hardware Schedule"
  - Clearly indicate the manufacturer of each item proposed. Reference template(s).
- Keying Schedule: Per DHI manual "Keying Procedures, Systems, and Nomenclature".
- Closeout:
  - Submittals listed above updated to record status.
  - O&M Data
    - Required for all specified hardware items.
    - Furnish three copies of Maintenance Manual covering Finish Hardware for each project.
      - Each manual should consist of printed sheets from the hardware manufacturer, bound in a three-ring binder and properly indexed.
      - A bitting schedule shall be included for master keying.
    - Bitting List also provided as electronic spreadsheet
  - Closeout submittal to be forwarded directly and securely to LPS OMC and LPS PM.
  - Provide door hardware as specified herein and approved by the LPS Locksmith
- 626 (US26D) Brushed Chrome
- 630 (US32D) Stainless Steel
  - Materials - Items
- Butt Hinges
  - Full mortise 4½ x 4½ Heavy Duty Steel

- Ball bearing
- NRP (Non-Removable Pin) at Reverse bevel locked doors
- Product requirements per 01 60 00 et seq.
  - Tier 3 performance criteria
    - Equivalent manufacturer approved prior to CD Development
    - Major name manufacturers only
- Provide as follows:
  - Doors over 36"
    - Stanley CB1961R
    - Bommer LB8005
    - Equivalent
  - Doors up to 36"
    - Stanley CB1960R
    - Bommer LB8002
    - Equivalent
  - Interior doors over 36"
    - Stanley CB1901R
    - Bommer LB8004
    - Equivalent
  - Interior doors up to 36"
    - Stanley CB1900R
    - Bommer LB8000
    - Equivalent

- Continuous Hinge
  - RESTRICTED applications requiring approval of LPS Locksmith during the required hardware meeting prior to CD Development
  - At selected or aluminum doors
    - Geared
      - Stanley 661 (standard duty)
      - Stanley 661D (heavy duty)
      - Select SL11 (standard duty)
      - Select SL11HD (heavy duty)
    - Pin and Barrel
      - Stanley 651 (standard duty)

        - Select equivalent
    - Floor Pivots
        - PROHIBITTED
    - Non-rated Spring Hinges
        - Bommer
        - Chicago
        - Milwaukee
    - Fire-rated Spring Hinges
        - McKinney
        - Stanley
        - Hager
    - Cylindrical Lock and Latch Sets
        - Approved Product
            - NO SUBSTITUTES
            - Tier 1 product/model specific per 01 60 00 et seq
                - Best 93K x 150 x SFIC PREP (New builds)
                - Coordinate requirements additions, renovations remodels
        - Cylinder and tailpiece as required for keyed functions.
        - Unless otherwise noted, all cylinders shall be furnished and keyed by the Contractor
        - Standard lock/latch functions
            - Specify as appropriate for each project/door and coordinate with the LPS locksmith:

Lock Type	Lock Function
UA	Entrance Lock of Office (for classrooms)
D	Storeroom Function
N	Passage
L	Privacy

        - Cylinders
            - Mortise and cam required; rim and tailpiece or lockset and tailpiece as required.
            - Tier 1 product/model specific per 01 60 00 et seq

- KABA Peaks cylinders
  - New construction to have Kaba C4 cylinders. SFIC for all except exterior doors which will be standard.
- Review the following locations with LPS OMC Locksmith and LPS PM for possible exemptions
  - Field Elementary School
  - East Elementary School
  - Wilder Elementary School
  - Transportation Services (TSC)

- Coordinate with Commercial Key Systems sales representative for LPS (303) 988-0247.

- Cylindrical Deadbolts
  - Cylinder and tailpiece as required for keyed functions
  - Finish to be coordinated with the LPS locksmith
  - Product requirements per 01 60 00 et seq.
    - NO SUBSTITUTES
    - Tier 1 manufacturer product model specific requirements
      - Marks 130 Series
- Exit Devices
  - Lever handles to match lockset design as required to meet ADA guidelines
  - Keyed removable center mullion where required
  - All other requirements as for Lock and Latch sets.
    - Escutcheon with standard pull where applicable
    - Escutcheon with lever and “08” function on classrooms, where applicable
    - "FL" fire rated devices at label openings
    - "SNB" Sex Nuts and Bolts at label doors as required
  - Product requirements per 01 60 00 et seq.
    - NO SUBSTITUTES
    - Tier 2a manufacturer specific requirements performance criteria
      - Preferred product and basis of design
        - Detex 10 Series with 08D Trim
      - Acceptable alternate exit devices for shelter devices requiring comparison pricing per 01 60 00 et seq
        - Precision 2100 Rim Series

- Precision KR822 keyed removable center mullion
- Precision Escutcheon with Standard Pull 1700A Series where applicable
- Precision Escutcheon with Lever 4900 Series with “08” function on classrooms, where applicable

- Closers
  - All doors with EDA parallel arm and 90-degree or 180-degree hold- open as appropriate
  - Ten-year guarantee against mechanical failure.
  - All door frames to be reinforced for closers, with "SNB" Sex Nuts and Bolts at labeled doors as required.
  - Product requirements per 01 60 00 et seq.
    - NO SUBSTITUTES
    - Tier 2a manufacturer specific requirements performance criteria
      - Preferred product and basis of design
        - LCN 4040XP EDA
      - Acceptable alternate exit devices for shelter devices requiring comparison pricing per 01 60 00 et seq
        - Stanley QDC100A
- Stops and Holders
  - Allow for maximum swing of doors.
  - Floor stops
    - Approved Products
      - Trimco 1211
      - Rockwood 441
  - Wall Stops
    - Concave Approved Products
      - Trimco 1270\W (Concave)
      - Rockwood 409 (Concave)
    - Convex Approved Products
      - Trimco 1270WX (Convex)
      - Rockwood 406 (Convex)
- Strips and Seals
  - Weather seals
    - All exterior doors and interior vestibule doors head and jambs

- Approved Products
  - Pemko 309 AP
  - National Guard equivalent

▪ Smoke seals
- Approved Products
  - Pemko S88
  - National Guard equivalent

▪ Sound seals
- Double row primarily at Music Rooms
- Approved Products
  - Pemko S88
  - National Guard equivalent

▪ Light seals
- Primarily at Dark Rooms
- At head and jambs, with door bottom and threshold as required
- Approved Products
  - Pemko 379 S
  - National Guard equivalent

o Thresholds and Sweeps

▪ Thresholds
- Approved Products
  - Pemko 272A (1/4”x6” saddle threshold)
  - National Guard equivalent

▪ Door sweeps
- Approved Products
  - Pemko 18062 NB (interior) or 345 NB (exterior)
  - National Guard equivalent

o Flush Bolts

▪ RESTRICTED applications requiring approval of LPS Locksmith during the required hardware meeting prior to CD Development

- Pulls and Push Plates
  - Pull plates
    - Approved Products
      - Trimco 1010 3/4”x16”
      - Rockwood 132 x 70C 4”x16”
  - Push plates
    - Approved Products
      - Trimco 1001 3/4”x16”
      - Rockwood 70C 4”x16”
- Kick Plates
  - Approved Products
    - Trimco K0050 10” high
    - Rockwood K1050 10” high
- Silencers
  - Approved Products
    - Corbin
    - Glynn-Johnson
    - Russwin
- Padlocks
  - Only as directed by LPS locksmith.
  - Laminated or steel case
  - Approved Product
    - Master 1K keyway, Rekeyable ProSeries
- Sliding, Pocket Hardware
  - Approved Products
    - Grant
    - Lawrence
    - Stanley
- Bifold Hardware
  - Approved Products
    - Grant
    - Lawrence
    - Stanley

- Electric Strikes
  - Product requirements per 01 60 00 et seq.
    - NO SUBSTITUTES
    - Tier 1 manufacturer product model specific requirements
      - H.E.S.
        - 9600 at non-rated exit device applications
        - 9500 at rated exit device applications
        - 8300 at rated exit device applications
- Automatic Doors
  - Where required at ADA specified locations or as directed by LPS
  - Electro-Mechanical Automatic Operators shall be low-energy heavy-duty devices
  - Product requirements per 01 60 00 et seq.
    - NO SUBSTITUTES
    - Tier 2a manufacturer specific requirements performance criteria
      - Preferred product and basis of design
        - Detex AO-19
      - Acceptable alternate exit devices for shelter devices requiring comparison pricing per 01 60 00 et seq
        - LCN 4642 Series Model 956
        - Parallel arm and wall-plate actuator
          - Actuation: IEI Easy Touch 0291400
          - Activate/Deactivate Key Switch: Compx SW2-3118AD KA221 for touch- pad and electric strikes
  - Hardware Supplier
- Shall have in his employ a member of the American Society of Architectural Hardware Consultants (AHC) who will directly supervise the scheduling, detailing, marking, and delivery of hardware.
- All installations must meet ADA requirements.
- Hardware (and keying, if assigned to supplier) must be approved by the LPS locksmith in pre-construction meeting with hardware supplier before submittals and schedules are released for ordering.
  - Security
- Certain parts of the building shall be secured from use by unauthorized persons.

- Mechanical and Electrical Equipment Rooms, Offices and Storage Rooms, Kitchen Areas, Attic and Crawl Spaces and Roofs are to be locked against access by students.
- Corridor fire-doors and isolation doors/gates should also be similarly secured, as permitted by applicable Code and AHJs.
    - Community Use
- Confine after hour community use and traffic to designated areas
- Location(s) of corridor gates and exit devices must be carefully studied to meet requirements of each building/addition and Building Code.
    - Provide metal gates in corridors where appropriate.
    - Locking exit devices as appropriate at stairway doors.
    - Three Butt Hinges
- (1-1/2 pair) minimum are required on each door/leaf.
    - Building Additions
- Hardware for Additions
    - Shall be similar in design to the original hardware, except that cylinder locks shall be the type described elsewhere in this guide specification, rather than mortise locks.
- Replacement
    - If an addition to an existing building is of substantial size or if the old hardware is obsolete or inadequate, it may be feasible to replace existing locks or cylinders with new hardware
    - Coordinate requirements with LPS OMC and LPS PM
    - Miscellaneous Hardware
- Required for window screens, windows, metal lockers, toilet compartments, metal-clad fire doors, rolling grilles, access doors, hatches, and roof scuttles is to be furnished with those items.
    - Cabinet Hardware
- Drawer extension glides, sliding door hangers, and track, sheaves, guides, stops, shelf standards, and support brackets shall be furnished and installed with the Millwork.
- Lockable cabinets and drawers to be keyed alike per area, or per cubicle in the case of multi-station offices.
- Product requirements per 01 60 00 et seq.
    - NO SUBSTITUTES
    - Tier 1 manufacturer product model specific requirements
        - Compx National C8050 Series cam-locks with D8785 keyway

- Keying

- Requirements
  - Coordinate with the LPS locksmith, who will coordinate with the building Principal as appropriate.
  - Keying and master-keying shall conform to the LPS Keying Diagram furnished by the Locksmith, except as otherwise directed in writing.
- Quantity
  - Two keys are to be furnished with each lock
  - Additional keys as directed by the LPS locksmith.
  - Note: This excludes telecom rooms (MDF or IDF), which shall be accessible via master keys only by LPS Security and ITS Department personnel.
- Hardware Supplier
  - Furnish key cut numbers for each key to LPS OMC and LPS PM
- New Keying
  - Cut to code only using the existing system.

08 79 00 Hardware Accessories

- Key Cabinet

- For new buildings or substantial additions to existing buildings
- Coordinate requirements with LPS OMC and LPS PM
- Provide wall-mounted, dual key tag cabinet with total capacity 50% over current lock quantity.
- Product requirements per 01 60 00 et seq.
  - NO SUBSTITUTES
  - Tier 1 manufacturer product model specific requirements
    - Telkee AWC wall-mounted series
  - Fire Department Lock Box
- At each building over 5,000 gross square feet
- Provide recess-mounted, dual-lock, black without tamper switch
- Top cylinder shall be keyed to local fire/rescue department; bottom cylinder shall be keyed as directed by LPS locksmith.
- Product requirements per 01 60 00 et seq.
  - NO SUBSTITUTES
  - Tier 1 manufacturer product model specific requirements

- Knox-Box model 3200 series, without tamper switch, as manufactured by the Knox Company, Phoenix, AZ.

08 80 00 Glazing

- Provide glass and plastic glazing for exterior and interior windows, doors, transoms, entrances, storefronts, sidelights, skylights, window walls, curtain walls, spandrels, borrowed-lite panels, fixed glazed panels, and unframed mirrors with associated anchorage accessories
- Related Sections include:
  - 08 50 00 Windows
  - 08 54 13 Fiberglass Windows
  - 08 60 00 Roof Windows and Skylights.
- General
  - New glass, best grade of respective kind, free from flaws, up to grade requirements
  - Each individual piece bearing a label which shall not be removed until professional cleaners have cleaned glass.
- Exterior Glazing
  - Type and thickness required by location to meet Code requirements for insulated glazing in exterior doors and windows
  - All exterior glazing shall be double pane insulating glass, with tints and/or coatings as determined by the A/E and approved by LPS OMC and LPS PM
- Interior Glazing
  - Wire glass for fire-rated openings, or as required by Code
  - Safety- or wire-glass for all other openings
  - Polycarbonate (Lexan) at gym office windows as approved by LPS and the AHJ
  - Thickness of material as recommended by glass manufacturer for size of opening
    - One thickness throughout, if possible.
- Code Requirements
  - Comply with Code and applicable portions of Colorado HB No. 1110 concerning safety of glazing materials in hazardous locations.
- Vision Strips
  - Required in all doors except Rest Rooms and Storerooms; wire or tempered glass; minimum 6" above panic bars; upper half of door only.
- Miscellaneous
  - Glazing Sealant

- Silicon rubber, one part elastomeric; acid type for nonporous channel surfaces, nonacid type for porous channel surfaces.

- Glazing Gaskets
  - Black molded or extruded neoprene
  - Profile and hardness as required for water tight construction
  - Complying with ASTM D2000, 2BC 415 to 3BC 620.
- Glazing Tape
  - Closed cell
  - Flexible
  - Self-adhesive
  - Non-extruding polyvinyl chloride foam
  - Recommended by manufacturer for exterior, exposed, water tight installation of glass, with only nominal pressure in glazing channel
  - Complying with ASTM D1667.
- Setting Blocks
  - Neoprene
  - 70-90 durometer hardness
  - Proven compatible with sealants used.
- Spacers
  - Neoprene, 40–50 durometer hardness
  - Proven compatible with sealants used.
- Compressible Filler Rod
  - Closed cell or waterproof jacketed rod stock of synthetic rubber or plastic foam
  - Proven compatible with sealants used
  - Flexible
  - Resilient with 5–10 psi (0.35–0.7kg/cm²) compression strength for 25% deflection.
- Cleaners, Primers, Sealers
  - Type recommended by sealant or gasket manufacturer.

08 90 00 Louvers and Vents

- Operable louvers and vents shall be tool-adjustable only.

END OF DIVISION 08

DIVISION 09 FINISHES

09 20 00 Plaster and Gypsum Board

09 21 00 Plaster and Gypsum Board Assemblies

- Shall meet requirements of National Gypsum Association; typically, one-hour fire rated throughout; water-resistant W/R on wet plumbing walls and all walls (not ceilings) in wet or damp areas such as restrooms, toilets, janitor closets, kitchens.
- DUROCK Tile Backer Board is an acceptable alternate to W/R board on wet walls and in wet or damp areas, provided it meets fire-resistive requirements and provided no extra cost(s) charge(s) to Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC).
- Neither W/R nor DUROCK type is an acceptable substitute for gypsum sheathing or Exterior Gypsum Ceiling Boards.
- High School lobbies and corridors, gypsum board shall be fiberglass-reinforced, or 1/4" plywood or other backing shall be installed, to resist vandalism.

09 22 00 Supports for Plaster and Gypsum Board

09 22 26 Suspension Systems

- Acoustical Exposed Grid System
  - Standard exposed one-hour rated, cold- rolled steel T-grid system with hold-down clips, matching wall angle moldings, standard baked enamel finish color selected by LPS OMC, all items same width of exposure.
- Drywall Suspension System
  - Chicago Metallic FIRE FRONT 650 or Roblin RIGID "X" sheet steel, hot dipped, electro-galvanized or painted, minimum one-hour UL fire-rated system.

09 23 00 Gypsum Plastering

- Metal lath, white gypsum base and Keene finish; total three-coat plaster, with associated accessories.

09 24 00 Cement Plastering

- Metal lath and three-coat cement plaster (stucco) on cold-formed stud/joist framing, masonry, or metal suspension system, with associated accessories.

09 30 00 Tiling

- Work in this section is open to any product or material meeting the requirement of this Construction Standard.
- In the absence of other information, standards of the following organizations apply:

  - Current edition of the Handbook for Ceramic Tile Installation published by the Tile Council of America (TCA).

- Submittals
  - Samples are required
  - Tile data including:
    - Manufacturer
    - Supplier
    - Size
    - Style
    - Texture
    - Color
  - Closeout:
    - Submittals listed above
      - Updated to record status
      - Samples excluded
    - Finish schedule including:
      - As-constructed record of material and color designations
  - Extra Materials:
    - Provide 3 percent of each material, color, style
    - Minimum 5 square feet of flooring, base and preformed profiles of each material and each color and pattern delivered to the Owner for on-site storage or as directed.
- Approved substrates:
  - Concrete
  - Masonry
  - Plaster
  - Cement backer board
  - Gypsum board
- Mortar Materials:
  - Latex mortar required for the following applications:
    - Exterior
    - Wet areas (kitchen, toilet rooms, locker rooms)
- Grout:
  - Epoxy joint filler with zero cementitious is required at all walls and floors within 36 inches of plumbing fixtures.

- White not permitted on floors

- Apply sealant to junction of tile and dissimilar materials and at junction of dissimilar planes, including:
  - Joints between plumbing fixtures and tile work.
  - Rake out and seal inside corners
  - Door frames
- Cleavage membrane is required at slabs over soils with swelling potential.
- Grout Sealer:
  - Water base penetrating type only
  - Apply only after set time recommended by manufacturer, but in no case less than 30 days after placement of grout.
- Quality Assurance
  - Sound tile after setting
    - Replace hollow sounding units.
  - Black light (UV) test may be used to confirm locations of epoxy joint filler.

09 30 13 Ceramic Tiling

- Wall Tile
  - ANSI A137.1, Section 6.1; types, finishes, sizes, patterns, colors, settings, approved by LPS OMC.
  - Thin set application permitted
  - Epoxy grout required
- Floor Tile
  - ANSI A137.1, Section 5.1; types, finishes, sizes, patterns, colors, settings, approved by LPS OMC.
  - Ceramic Tile Floor and Base is PROHIBITED
  - Porcelain Tile Floor and Base
    - Permitted at:
      - Student restrooms
      - Locker Room toilet areas
      - Locker Rooms shower areas
      - Optional at school kitchen areas with approval of LPS OMC
    - Installation by mortar only
      - Use of mastic is PROHIBITED

        - Minimize grout joints, cleanly cut and ease all tile edges at floor drains. Set and cut porcelain tile to avoid large numbers of small tile pieces at drains.

- Trim and Special Shapes
    - Rounded external out-corners; bullnose end cap trim shapes at head, jamb, sills of openings and terminations; coved base and inside corners; same material, size, finish as wall tile.
- Maintenance Material
    - Three percent (3%) in full-size units for each type, style, shape, size, pattern, and color, delivered to the Owner for storage on-site or as directed.

09 30 16 Quarry Tiling

- Floor Tiles
    - ANSI A137.1; types, finishes, sizes, pattern, colors, settings, approved by LPS OMC to fulfill design requirements.
    - Domestically manufactured products are preferred
        - Use of imported materials is not recommended.
    - Size:
        - Square or rectangular
        - 8 inch or 12-inch dimension is preferred to minimize joints
        - Full depth units
        - Thinset quarry tile is PROHIBITED
    - Square edge
    - Slip resistant surface finish
    - Setting Bed shall be full depth mortar bed
    - Location
        - School kitchen areas
- Base Tiles
    - ANSI A137.1; types, finishes, sizes, colors, settings, determined by the A/E to fulfill design requirements; bullnose outside corner units, coved inside corner units.
    - Tile width x 4 inches high
    - Bull-nosed top edge
        - Install bullnose profile where tile abuts dissimilar materials.
    - Coved internal corner
    - Single-piece external corner

- Pre-formed single piece is required at all external corners.
- Attachment by mortar only
  - Use of mastic is PROHIBITED

09 50 00 Ceilings

09 51 00 Acoustical Ceilings

- Suspension Grid
  - Armstrong Prelude XL white, 15/16" wide x ¾" high, direct hung, minimum Intermediate Duty
  - Equivalent by USG
  - Equivalent by USG or Chicago Metallic.
- Acoustical Tile
  - Armstrong Cortega FireGuard white, square-edge, minimum 5/8" thick
  - Equivalent approved by LPS OMC.
- Maintenance Material
  - Three percent (3%) in full-size units for each type, style, size, pattern and color of suspension system and tile.

09 60 00 Flooring

09 63 00 Masonry Flooring

09 63 13 Masonry Brick Flooring

- Paver Units
  - Split type in sizes, colors, and settings approved by LPS OMC.

09 63 40 Stone Flooring

- Natural granite, marble, slate, flagstone; in shapes, sizes and settings approved by LPS OMC.

09 64 00 Wood Flooring

- For work on new hardwood flooring, work in this section is open to any product or material meeting the requirements of this Construction Standard.
- In the absence of other information, the following standards shall apply for materials, finishes, and installation:
  - Maple Flooring to follow Maple Flooring Manufacturers Association, Inc. (MFMA)
  - Quality Control
    - Maintenance re-coat requires adhesion tests per MFMA guidelines.

- Submittals (Required for all products)
  - Product Data:
  - Test:
    - Substrate moisture tests are mandatory for new wood flooring systems placed over concrete slab-on-grade.
- Closeout:
  - Submittals listed above
    - Updated to record status
  - O & M Data
  - Record finish schedule including material and color designations
- Materials and Finishes
  - Tongue & Groove northern hard maple (acer saccharum) is preferred.
  - Cushioned sleeper system at new flooring systems in Gymnasia
  - Proprietary systems permitted with 10-year track record in Colorado
  - Prepare, design, and install in full compliance with MFMA, including moisture protection.
  - Finishes and Sealers
    - 01 60 00 et seq; Tier 3 performance criteria meeting MFMA Guidelines
    - LPS prefers the use of water-based sealers and finishes
      - Closely follow MFMA current bulletins regarding the use of water-based sealers.
      - Last known bulletin, MFMA cautions installers and end-users that the use of some water-based finishes has produced a sidebonding effect that can result in localized excessive and irregular separations ("panelization") between maple flooring strips.
      - While the development of "panelization" is certainly not limited to one brand of finish or to one particular subfloor design, the problem has been most closely associated with the use of water-based sealers and finishes on raw (untreated) maple strip flooring in areas of the country that experience distinctly different seasonal moisture conditions.
      - MFMA strongly recommends that end-users, project architects and specifiers consult with their flooring installer and finish manufacturer to obtain approved procedures for sealing and finishing a raw maple strip floor with water-based products.
    - All bids to include pricing for Oil and Water-base Finishes
      - Mandatory post bid – pre-installation meeting with flooring contractor to determine appropriate finish per MFMA recommendation

- Restrictions
  - For use in athletic competition gymnasia and performance stages/platforms only
  - Finger joint and parquet patterns PROHIBITED
  - PROHIBITED in multi-purpose spaces
  - Prepare, design, and install in full compliance with MFMA, including moisture protection.
- Coordination
  - Coordinate inserts and sleeves – Division 11

09 64 23 Wood Parquet Flooring

- Natural or plastic impregnated in sizes, species and finishes approved by LPS OMC.

09 64 29 Wood Strip and Plank Flooring

- Size(s), Species, finish(es), fastening(s) as approved by LPS OMC; strips tongued and grooved, and end matched.
- Adhesive
  - Type recommended by flooring manufacturer, complying with flammability and environmental control regulations.
- Associated Wood Trim
  - Same species and cut as flooring.

09 65 00 Resilient Flooring

- Work in this section is open to any asbestos and formaldehyde-free product or material meeting the requirements of this Construction Standard.
- MANDATORY review with LPS OMC and LPS PM regarding resilient flooring options during schematic design – design development to determine suitable materials to meet programs assigned to spaces and life cycle cost analysis.
- Submittals
  - Product Data
    - Required to confirm physical and performance characteristics, sizes, and patterns.
  - Samples
    - Color/pattern samples for each specified product
    - Submit minimum 12 colors/patterns for each specified item.
  - Closeout
    - Submittals listed above

- Updated to record status.
- Samples excluded.

▪ O & M Data

▪ Record finish schedule including material and color designations

o Extra Materials

▪ Flooring:

- Provide 1 per cent of installed quantity
- No less than 50 square feet.

▪ Base and accessories:

- Provide 1 per cent of installed quantity
- No less than 12 lineal feet.

- Materials
  - o Durability, field reparability and general maintainability using current materials and equipment are critical issues in the selection of flooring materials to be used in Littleton Public School buildings.
  - o Rubber:
    - ▪ High content vulcanized styrene butadiene rubber (SBR) or
    - ▪ Vulcanized (SRR) rubber with zero vinyl content and minimal 'filler' (clay) material.
- Resilient Base and Accessories
  - o Base:
    - ▪ Roll stock rubber
    - ▪ 1/8-inch gauge
    - ▪ Top set coved
    - ▪ 4 inches high (other heights as required for retrofit).
    - ▪ Pre-molded rubber end stops and external corners with tabs
  - o Stair Accessories
    - ▪ Tread:
      - Rubber – for use to repair and patch existing rubber only
        - o Integral nosing type.
        - o 1/4-inch gauge with 5/32-inch minimum thickness
        - o Full width and depth of stair tread in one piece
        - o Raised pattern
        - o Smooth nosing

- Square or round nosing profile
- Aluminum
  - Full width and depth of stair tread in one piece
  - Integral rubberized grit strips or waffle pattern with integral grit rubber
  - Amstep or equivalent
- Concrete filled pan treads with aluminum cast-in nosings with integral grit strip

▪ Stringer base:

- Rubber (to patch and repair existing only)
  - Single piece construction sheet rubber
  - 1/8 inch thick
  - Maintain width sufficient to provide four inches above stair nose, measured perpendicular to stair slope.
- Open to any durable non-rubber or non-vinyl materials. Confirm material with LPS OMC for approval.

▪ Resilient Stair Risers:

- Rubber (to patch and repair existing only).085-inch-thick with toe
- Maintain full height and length in one piece.
- Combination One-Piece Resilient Stair Treads/Risers are permitted
- Open to any durable non-rubber or non-vinyl materials. Confirm material with LPS OMC for approval.

o Edge strips and reducer strips:

▪ Rubber or aluminum extrusion to match flooring thickness

▪ ADA compliant.

▪ Maximum slope: 1:2

- Resilient Sheet Flooring
  - Linoleum considered on a case by case basis.
    - Submit request for substitution information.
    - Detailing is critical for optimal performance of this product
- Resilient Tile Flooring
  - Rubber floor tile:
    - 1/8-inch minimum thickness
    - Self-adhered backing
    - Through-color smooth surface

- Fifty psi min. static load capacity.

- Vinyl Composition Tile
  - Premium grade solid vinyl tile
  - 1/8-inch-thick, 12 inches x 12 inches
  - Through-grained solid vinyl marbleized, molded
  - Fifty psi minimum static load capacity.
  - Flooring to be sealed and protected per manufacturer's written instruction
    - Clear, non-fade, nonslip type as manufactured or recommended by flooring manufacturer.
- Vinyl Tile: Luxury Vinyl Tile (LVT)
  - Printed film type, with transparent or translucent wear layer; acoustic interlayer or backing.

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"Luxury" Vinyl Tile - Minimum Product Standards	
Classification	ASTM F1700 Class III Type B
Minimum Total Thickness	2.5 mm (0.098")
Wear Layer Thickness	• High Traffic/Areas with a 20 Year Life Expectation: Minimum 40 mil (1 mm) • Light Traffic/Accent Colors/Expectation 10 years or less: Minimum 20 mil (0.51 mm)
Wear Layer	• Product must have a wear warranty specific to the wear layer. • Wear Layer must contain particles suspended in the Urethane with a Mohs' Hardness of 7 or higher
Edge Treatment	Micro-bevel preferred
Sizes	• All sizes of LVT are allowed based on the design. • Standard plank sizes and tile sizes from the manufacturer are acceptable.
Flexibility	ASTM F137 – 1" Mandrel – No Crack/Break
Dimensional Stability	ASTM F2199 – Max 0.020 in./lin.ft.
Squareness	ASTM F540 – 0.010 in. Max
Static Load	ASTM F970 mod. - 2000 PSI; Resid. Indent<= 0.005 in. Non-Modified tests – minimum 750 PSI
Residual Indentation	ASTM F1914: <8% Avg. / 10% Single Value
Flooring Radiant Panel	ASTM E648 - Class 1 to meet 0.45 watts/cm(2) or greater
Smoke Density	ASTM E662: < or =450 Flaming Mode
Slip Resistance	ASTM C1028: > or = 0.5 Leather; 0.6 Rubber
Resistance to Light	Meets or exceeds ASTM F1515
Chemical Resistance	Meets or exceeds ASTM F925
Resistance to Heat	Meets or exceeds ASTM F1514
Concrete Moisture	For all new construction, specify the manufacturer's solution for up to 99% RH. For remodels, add the solution as an alternate to be priced in the event high moisture is present
Floor Prep	For all remodels, must seal the floor to encapsulate old adhesives. Prepare subfloors properly and follow manufacturer's installation guidelines
Sustainability	LVT should be made in the USA and be Floorscore Certified for indoor air quality

        - Locations
            - High Traffic Areas
                - Minimum of 20-year warranty with a Separate Wear Layer Warranty matching the standard warranty
            - Light Traffic Areas
                - Minimum of 15-year warranty with a Separate Wear Layer Warranty matching the standard warranty
    - Resilient Tile Flooring (Heavy Duty)
        - Homogeneous quartz tile:
            - For use in corridors and other high abuse and wear areas.
                - PROHIBITED in kitchens
            - Texture: Smooth
            - Size: 12 x 12 or 24 x 24
            - ASTM F 970, modified static load - 3500 psi
            - ASTM F 1066, Class 1, Type A (meets or exceeds all requirements)
            - ASTM E 648, Class 1.
            - ASTM E 662, <450
            - ASTM D 2047, ADA compliant slip resistance.
            - ASTM F 925, excellent chemical resistance.
            - ASTM F 150, excellent abrasion resistance.
            - Min. Thickness: 0.08-inches (0.10-inches preferred)
            - Min. Weight: 0.82 lbs./SF
- Underlayment
    - Required for retrofit applications over wood floor.
    - APA underlayment grade
    - Sanded face plywood
    - 11/32-inch minimum thickness.
- Subfloor fillers, primers, and adhesives:
    - Waterproof
    - Types recommended by flooring manufacturer for each application and substrate condition.
    - Epoxy stair caulk is required for reinforcement of voids between step and resilient nosing.
- Installation:

- Apply filler at voids behind stair nosing to create a level, uniform, continuously solid substrate.
- Do not 'bridge' building joints with flooring
- Base
  - Minimize joints
    - 36 inches minimum spacing
    - 20 feet or greater is preferred.
  - Apply adhesive with fluted trowel.
    - Gun application is PROHIBITED.
- Stair Accessories
  - For treads over 6 feet long, scribe cut for hairline seam.
    - Stagger seams and located seams out of major traffic pattern flow.
  - Where tread depth exceeds product depth, treads may be site fabricated of specified tread material butted to matching flooring material.
  - Install stair stringer base configured tight to stair and stringer profile.
  - Bevel stringer ends as required to match and meet adjacent base.

- Quality Assurance
  - Control of concrete slab and sub-slab moisture and alkalinity are critical to achieve the anticipated performance of finish flooring installed on or below grade in Arapahoe County, Colorado.

09 65 66 Resilient Athletic Flooring

- Gymnasium flooring at all elementary schools (and elsewhere as directed or approved by LPS OMC shall be synthetic sheet material specifically designed for adhered athletic flooring applications.
- Coordinate project/program requirements with LPS OMC
- During DD Development, review program requirements with LPS OMC and LPS PM.
  - Determine appropriate thickness and recommend options for the following thicknesses:
    - 5 mm
    - 7 mm
    - 9 mm
- Acceptable Manufacturers
  - Subject to compliance with requirements, provide 5 mm thick products by:
    - Connor Sports Surface Solutions

        - Ecore
        - Gerflor
        - Johnsonite
        - Tarkett Sports
        - Other as acceptable to LPS OMC after DD Review
- Preparation
    - Concrete surfaces shall be prepared for flooring installation in accordance with ASTM F710, F1869 and F2170, and per manufacturer's instructions.
- Submittals:
    - Specifications and product data
    - Samples: large enough to show full range of pattern and color
    - O&M data
    - Installation instructions
    - Installer qualifications and certifications
    - Warranty: 1 year minimum.
- Materials
    - Sheet flooring with backing shall comply with ASTM F1301: wear-layer thickness Grade 1; overall thickness minimum 5.0mm; foamed plastic interlayer material; backing Class C (foamed plastic); roll size not less than 72 inches (1219mm) wide by longest length practical to minimize splicing during installation.
- Surface Finish
    - Factory-applied UV urethane finish with embossed traffic-surface texture; color and pattern as selected by the A/E and LPS OMC from manufacturer's full range.
- Products and Materials:
    - Prefabricated sheet product:
        - Integral wood grain floor design.
        - Maple wood design to closely replicate standard maple strip flooring in size, color, board length and grain appearance.
        - Vinyl welding thread to match floor.
        - Adhesives: One-component acrylic or two-component polyurethane supplied by manufacturer – full coverage.
            - Provide moisture-resistant adhesives to high-moisture content substrates.

- Game line paint: Two-component polyurethane supplied by manufacturer.
  - Option of standard colors
  - Closely coordinate the following striping with LPS OMC and LPS PM
  - Minimum of two half-court striping as part of a full court layout if enough space is available, otherwise truncated short courts to resemble a full court.
  - Volleyball court striping
  - Minimum of 10 feet run out under baskets. If less than 10 feet, provide wall safety pads.
- Moisture barrier (if required): 1mm PVC lay slip sheet as per manufacturer
- Flooring should be sealed around perimeter to wall or adjacent material to prevent moisture travelling under flooring.
- Wall base: vinyl wall base as approved by flooring manufacturer.

- Poured-type flooring is PROHIBITED.

- Installation
  - Seams shall be heat welded in compliance with ASTM F1516.
  - Concrete moisture vapor emission and pH testing as per manufacturer's requirements.
  - New concrete substrate finish and preparation: as per manufacturer's requirements
  - Existing concrete substrate finish and preparation per manufacturer's recommendations and field conditions.
  - Installer: Certified or otherwise approved by product manufacturer

09 67 00 Fluid-Applied Flooring

- Seamless, fluid-applied, high-build (broadcast or slurry), non-absorptive and non-porous, chemically inert flooring system with integral cove base and medium slip resistance, in minimum ¼" finished thickness.
- Work in this section is restricted to specific products of specific manufacturers that have been previously approved by LPS OMC.
- Product requirements per 01 60 00 et seq.
  - Tier 2a proprietary restricted sources criteria
  - NO SUBSTITUTIONS
  - Acceptable base bid products include:
    - General Polymers FasTop

        - S Urethane Slurry System
        - BASF SRS Degadur CF Double Broadcast Flake System
    - Acceptable alternates must be reviewed and approved by LPS OMC and LPS PM for equivalent manufacturer CD Development and comparison pricing per 01 60 00 et seq
        - Silikal
        - Dur-A-Flex
        - Approved equivalent to match existing floors
- Fluid applied resilient, elastomeric, and athletic flooring is not recommended.
- Submittals
    - Product Data is required
    - Samples of color, pattern, and texture
    - Test:
        - Substrate moisture and alkalinity tests are mandatory for Fluid Applied flooring work on concrete slab on grade.
        - Bonding
    - Extra Stock Materials
        - Provide colored flake blend for future maintenance
- Closeout:
    - Submittals listed above
        - Updated to record status
        - Samples excluded
- O & M Data
    - Record finish schedule including material and color designations
- Fluid Applied Resinous Flooring is permitted in the following locations (patch and repair of existing only):
    - Student toilet rooms
    - Locker room toilet rooms
- Materials:
    - Solvent-free 100% reactive resin based on Methyl Methacrylate (MMA) polymerization and peroxide initiator.
    - Thoroughly non-porous (urine resistant)
    - Medium slip resistance appropriate to area
        - No sand grit allowed
- Coordination

- At retrofit installations
  - Coordinate removal of partitions, plumbing fixtures, fittings, pipe, and trim within 8 inches of floor.

- Quality Assurance
  - Temperature and humidity per manufacturer recommendations
  - Confirm substrate is in full compliance with flooring manufacturer's criteria
  - Bonding test:
    - Slab aggregate should fracture before flooring delaminates.
- Preparation
  - Fully contain the work area
  - Mask surfaces not intended to receive flooring
  - Bag and seal HVAC, integrated automation, electrical, communications, and electronic safety/security devices in the work area.
  - Negative air pressure
- Installation
  - Integral cove base:
    - 5-inch-high ¼ inch plywood
    - 1/8-inch Masonite with rough side exposed
  - Five coat MMA system; 1/16 inch minimum, 1/8-inch maximum total thickness:
    - Primer
    - Glaze body coat with broadcast flakes #1
    - Glaze body coat with broadcast flakes #2
    - Top and seal coat #1
    - Top and seal coat #2
- Quality Assurance
  - Control of concrete slab and sub-slab moisture and alkalinity are critical to achieve the anticipated performance of finish flooring installed on or below grade in Arapahoe County, Colorado.

09 68 00 Carpeting

- Work in this section is restricted to specific manufacturers and styles that can meet or exceed the performance standards listed below.
  - Final acceptance and determination of adequacy of product proposed shall be determined by LPS OMC and approval shall be at the sole discretion of LPS OMC.
- Acceptable Manufacturers:

- Acceptable Manufacturers may provide products meeting or exceeding the performance standards listed.

- Product Type:
  - Broadloom and Modular Carpet Tile are acceptable
  - Carpet Tile is preferred over broadloom in classrooms.
    - Locations for broadloom and tile shall be reviewed with, and approved by, LPS OMC.

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Broadloom and Tile - Minimum Product Standards	
Fiber Type	Antron Lumena, Antron Legacy, Universal
Fiber Content	Nylon 6,6
Weave	Tufted level loop or tufted multi-level (patterned) loop
Dye Method	Solution Dyed and Yarn Dyed (Min. 60% Solution dyed)
Minimum stitches per inch	9.5 or 114 stitches per square inch
Minimum Gauge	1/10 inch
Dimensions	Modular: No less than 18 in. in one direction. Broadloom: 6-ft or 12-ft width rolls
Minimum Face Yarn Weight	20 OZ/SY. Review face weight with LPS OMC along with evaluation of other performance criteria listed.
Average Pile Density	5500 oz. per cu. yd. minimum
TARR Rating	Heavy (≥ 3.0 TARR) or Better
Backing General	Condensed at offices or high-traffic areas and closed-cell cushioned at classrooms or other instructional areas. Backing shall be reinforced for dimensional stability and shall be permanently anti-static.
Primary Backing	100% Synthetic (no SBR latex) Woven or non-woven
Secondary Backing (Broadloom)	Min.1/10-inch thickness Solid closed-cell non-aqueous polymeric vinyl composite
Secondary Backing (Modular)	Vinyl composite moisture barrier backing
Minimum Warranty Coverage (20 years). Non- prorated Warranty. “Lifetime” warranties are not acceptable.	Surface wear exceeding 15% of pile fiber, edge ravel, delamination, loss of adhesion to floor, yarn pulls, open seams (broadloom), zippering, static electricity above listed maximum, and moisture penetration. Turf bind warranty is not acceptable in lieu of edge ravel and zippering.
Adhesives	Non-toxic, low VOC, non-flammable, waterproof, full coverage. Manufacturer pre-applied adhesives are acceptable.
Stain/Soil Resistance	Permanent stain/soil inhibitor applied during fiber or carpet manufacturing. AATCC 175, CRI TM 102
Antimicrobial Protection	Permanent, for both face of carpet and backing, meeting GSA Requirements with 15 washings. (GSA Protocol - AATCC138; AATCC174 Part I or II, and Part III
Seams	Chemically Welded (Broadloom)
Electrostatic Propensity	AATCC 134: 3.5kV max.
Flammability	ASTM E 648: Class 1
Smoke Density	ASTM E 662: <450
Delamination	ASTM D3936: Min. 2.5 lbs./inch
Indoor Air Quality	Meets CRI Green Label Plus
Sustainability	Minimum NSF-140 Gold

- Coordinate the following with 12 48 00 Rugs and Mats for walk-off mat requirements

Entryway Walk-Off Systems – Minimum Product Standards	
Fiber Type	Antron Lumina, Antron Legacy, Universal
Fiber Content	Nylon 6,6
Weave	Tufted texture cut and loop
Dye Method	100% Solution Dyed
Minimum stitches per inch	10
Minimum Gauge	1/12
Dimensions	No less than 24-in. x 24-in. (Modular) and 6-ft or 12-ft width roles for welded seam
Minimum Face Yarn Weight	30 OZ/SY
Average Pile Density	7000 oz. per cu. yd. minimum
Foot Traffic (TARR)Tuft Bind	Severe
Primary Backing	100% Synthetic (no SBR latex) Woven or non-woven
Secondary Backing	Min.1/10-inch thickness Solid closed-cell non-aqueous polymeric vinyl composite

- Submittals
  - Product Data:
    - Required
  - Shop Drawing:
    - Required for installations over 500 square yards.
    - Indicate:
      - Seaming plan
      - Method of joining seams
      - Direction of carpet and pattern
      - Base conditions
      - Termination
      - Pattern/design features.
  - Samples:
    - Required
  - Design Data, Test Reports, Certificates, Manufacturer Instructions, Performance:
    - Required

        - Provide slab moisture tests prior to specifying carpeting to ensure the proper backing is specified prior to bid.
        - Moisture Resistance: Provide moisture/water resistant backing and adhesive products designed for slabs and substrates with high moisture content to eliminate water penetration into the backing and carpet product.
    - Closeout:
        - Submittals listed above
            - Updated to record status.
            - Samples excluded.
        - Record finish schedule including material and color designations
    - Extra Materials:
        - Deliver properly packaged and identified carpet tile
        - Deliver properly packaged and identified roll ends of less than 9 feet length and carpet pieces larger than 48 inches in length by 24 inches in width
            - Furnish an overrun in the amount of three percent (3%) in full-width for each type, pattern, and color/dye-lot.
        - Delivery to Owner's designated storage space.
        - Minimum = 1% of installed material.
- Restrictions
    - Carpeted steps and nosings are PROHIBITED except in low traffic areas where necessary for acoustical performance.
    - Carpet is PROHIBITED within 24 inches of plumbing fixtures unless approved by LPS OMC.
    - Carpet-over-carpet retrofit is PROHIBITED.
- Installation
    - Lay carpet on floors with run of pile in same direction as anticipated traffic.
    - Center seams under doors
        - Do not install carpet seams, at doorways, in the direction of traffic.
    - Extend carpet:
        - Under open-bottomed and raised-bottom obstructions and under removable flanges of obstructions.
        - Into closets and alcoves of rooms indicated to be carpeted unless another floor finish is indicated for such spaces.
        - Under all movable furniture and equipment, unless otherwise directed.

- Install carpet edge guard at every location where edge of carpet is exposed to traffic
  - Except where another device, such as an expansion joint cover system or threshold, is indicated with an integral carpet binder bar.
- Provide cut-outs where required and bind cut edges properly where not concealed by edge guards or overlapping flanges.
- Carpet materials in any contiguous area shall be from a single dye lot.
  - Visible differences in color or texture shall be grounds for rejection.
- Provide Manufacturer's Field Inspection Services during final inspection and as otherwise requested by the Owner.

09 70 00 Wall Finishes

09 72 00 Wall Coverings

- Including vinyl and upholstered fabric wall coverings, wrapped wall panels, wallpaper, flexible wood sheets, for approval and acceptance by LPS OMC.

09 80 00 Acoustical Treatment

- A 42 Sound Transmission Coefficient (STC)
  - Minimum value shall be provided in noncritical areas such as Kitchens, Classrooms, Corridors and Athletic Facilities.
- A 55 STC
  - Minimum value shall be furnished in critical areas such as Conference Rooms, Private Offices, Band Rooms and Vocal Rooms.
- Non-acoustical Areas
  - Include Storage Rooms, Mechanical Equipment Rooms, Janitor (Custodian) Rooms and Stairwells.
- Lay-in Panels
  - Size(s), finish, and ratings as approved by LPS OMC and meet local code requirements.

09 90 00 Painting and Coating

- Work in this section is RESTRICTED to specific products of specific manufacturers that have been previously approved by LPS OMC.
- Proprietary specifications are strongly recommended for work in this section, along with a comprehensive finish schedule that correlates specific products, locations, substrates, and colors.
- Submittals
  - Product Data:
    - Required

- Material Safety Data Sheet (MSDS) for each material.
- Manufacturer's standard application instructions
- Basic product information and specifications

- Samples:
  - Prior to the start of work, Field Quality Control Sample Panels shall be provided to LPS OMC for each substrate and each color/pattern.
    - Furnish for approval minimum 12" by 12" samples of surface(s) to be painted or finished.
    - Paint as specified shall be applied in manner clearly indicating degree of finish at various stages of completion, with succeeding coats overlapping previous coats, taking care to establish a definite line of demarcation.
    - Samples, when approved, will become standard of comparison, and finished surfaces not equal to sample color shall be refinished at Painting Contractor's expense.
- Closeout:
  - O & M Data
  - Record of application equipment and pressure settings is required for High Performance Multicolor Coatings.
  - Record as-constructed finish schedule including material and color designations.
    - Furnish all formulas to LPS OMC.
    - Furnish all formulas to LPS OMC's maintenance paint suppler in a format acceptable to the supplier for addition to LPS OMC's maintenance account.

      Sherwin Williams
      1500 W Littleton Blvd Ste 111, Littleton, CO 80120
      (303) 794-4575
- Extra Materials:
  - Full containers only
  - One gallon of each color and sheen scheduled with the exceptions for
    - Consult with LPS OMC and LPS PM for small areas, accent stripes, or a single wall to provide a 1 quart

- Product requirements per 01 60 00 et seq.
  - Tier 2a manufacturer specific requirements performance criteria
  - NO SUBSTITUTES
    - Preferred product and basis of design
      - Sherwin-Williams Co.

- Acceptable alternate paint manufacturers requiring comparison pricing per 01 60 00 et seq
  - Benjamin Moore
  - Devoe
  - Martin Senour
  - PPG Paints
  - Pratt & Lambert
  - Samuel Cabot

- Standard Painting Schedule
  - Shall be furnished to LPS OMC prior to application, covering painting and finishing of normally painted interior and exterior surfaces.
  - Any surface not specifically listed herein but normally being considered a surface to receive paint, unless specifically excluded, will be painted, or finished in identical manner as for comparable surfaces.
  - Regardless of door manufacturer pre-finishing paint or stain, finish all visible edges of overhead, coiling, wood, and hollow metal swing, sliding and pocket doors, same as balance of door, after fitting.
  - Colors & Sheen
    - Selected colors and sheen(s) require a final review and approval during the development of Design Documents to 95% Construction Drawings, by LPS OMC and LPS PM
    - To match existing wall colors, consult with LPS O&M Department for paint touchup on walls.
    - From manufacturer's complete catalog or brochure of factory-tinted colors & sheens
      - Custom colors are RESTRICTED and may only be used for accents with LPS OMC and LPS PM approval.
    - Apply only colors and sheen scheduled and approved.
    - LPS prefers "semi-gloss" sheen
      - Review budget and the practicality for spaces to receive a Level 5 Finish allowing for the application of a "semi-gloss" with LPS OMC and LPS PM.
      - Areas where Level 5 Finish is not practical shall receive an "eggshell" finish
    - All ceilings shall be the same color throughout the school, and depending on ceiling type apply corresponding sheen finish and paint type.
    - All wall finishes shall be semi-gloss or eggshell, except for stage back walls, which shall be a flat finish.

- Paint schedule per Sherwin-Williams Education Facility Guide Specification

  https://www.sherwin-williams.com/painting-contractors/project-solutions/education
- Field Quality Control
  - Required pre-installation meeting with LPS OMC to review and confirm paint samples and schedules with the paint subcontractor.
  - Prepare substrate surfaces to full compliance with paint manufacturer instructions.
  - Prime and Undercoats:
    - Tint each coat to distinguish it from the previous.
  - Apply each product in accordance with manufacturer's recommendations, including mil thickness application requirements.
  - Apply each product in accordance with manufacturer's recommendations.
  - Wet Film Thickness (Mil) Gauge is required to be in the possession of each working applicator on the jobsite when applying paint where wet mil film thicknesses are specified.
  - Manufacturer Representative is required to be present during start-up of application of special coatings and on call at other times during application.

09 96 00 High-Performance Coatings

- Work in this section is open to any product or material meeting the requirement of this Technical Guideline
- Graffiti-Resistant Coatings
  - One- or two-part EPA VOC compliant non-sacrificial, alkaline-stable barrier coating with 90% minimum water vapor transmission.
  - Water borne polyurethane compounds:
    - Preferred
  - Rubber silicone compounds:
    - Acceptable
  - Urethane compounds:
    - PROHIBITED on masonry

END OF DIVISION 09

DIVISION 10 SPECIALTIES

10 10 00 Information Specialties

10 11 00 Visual Display Units

10 11 13 Chalkboards

- PROHIBITTED

10 11 16 Markerboards

- Shall be approved and accepted by the Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM).
- Trim: Extruded 6063-T5 standard satin anodized aluminum.
- Colors: Require LPS OMC and LPS PM approval.
- Computer Areas: Will incorporate use of porcelain boards and compatible accessories.

10 11 23 Tackboards

- Shall be approved and accepted by the LPS OMC and LPS PM.
- Trim: Extruded 6063-T5 standard satin anodized aluminum.
- Colors: Selected with LPS OMC and LPS PM approval.

10 12 00 Display Cases

- Where required, shall be safety glass-fronted with lockable sliding access panels, tackable rear surface and adjustable tempered glass shelves.

10 13 00 Directories

- Not required.
- New buildings or remodeled front entries shall be coordinated with LPS OMC and LPS PM.

10 14 00 Signage

Overview, Naming, and Numbering

- Work in this section is open to any product or material meeting the requirements of this Construction Standard.
- All signs must comply with all Federal and State laws, codes and regulations and all municipal ordinances or regulations in effect at the time the work is performed.
- Submittals shall be in PDF file format or equivalent
  - Product Data: required
  - Signage Schedule: required

  - Samples: required
  - Dedication Plaque rubbing required prior to casting
  - Supplemental drawings indicating post-approval changes or alterations shall be submitted and approved before fabrication.
  - Closeout:
    - Submittals listed above updated to record status.
    - Samples excluded.
- Coordination
  - Review traffic and parking signs with appropriate jurisdictions including county and municipalities
  - LPS OMC and LPS PM.
- Quality Control:
  - Spell check signs submittals prior to fabrication
- Warranty
  - Anchorage, Mounting Devices and Spacers Accessories, anchorage, mounting devices, and spacers shall be guaranteed non-staining to adjacent walls and sign finish for a period of five (5) years from final acceptance.
    - Ferrous mountings may be sleeved with non-ferrous metal covers matching adjacent finishes, cemented on with non-hydroscopic glue, or other suitable protective measures may be proposed to comply with this guarantee.
- To the greatest extent possible, work in this section should be low-maintenance and vandal-resistant.
- Provide signs at entrances to all occupiable spaces

  Room Identification

  - All occupiable rooms or public spaces within LPS facilities shall be named and numbered in accordance with the following conventions.
  - The A/E shall confirm correct room numbers/names for each building and shall coordinate names and numbering for added or remodeled spaces with LPS OMC and LPS PM.
  - Signage required both inside and outside all doors

    Room Numbering

    - To standardize room numbering and coordinate data-based systems (building automation, tele/communications, fire alarm, security), room numbering should adhere to these guidelines:

- Each facility's room numbering system shall be structured so that numbers flow through the building in a consistent, comprehensible pattern. Numbering patterns shall be clear to staff, students, and visitors, minimizing confusion for individuals attempting to locate spaces. During renovations or building additions, all re-numbering of rooms shall be consistent with existing numbering of adjacent spaces.
- The first digit of a corridor or room number indicates the floor on which the room is located.
  - The main entry level, entered at or near grade, shall be designated floor number 1.
  - An at-grade accessible floor below the main entry level shall be designated floor number 0.
  - Floors (including roof or penthouse levels) above the main entry level shall be designated floor number 2, number 3, etc.
- Corridors shall be numbered in rising order starting left of the main entry and proceeding first left to right, then outward from the main entry. Generally, north-south corridors should be even numbered (20s, 40s, etc.) and east-west odd (10s, 30s, etc.) or vice versa within a given building.
  - All corridor numbers shall end in 0 (e.g., C140), except for smaller branch or dead-end corridors, which may end in 5 (e.g., C145).
  - Corridors shall be numbered consistent with the room numbers along a given corridor in order to distinguish that corridor and set of rooms from others—e.g., a main floor corridor serving rooms from 01 (or 11) through 19 should be numbered C110; the next corridor, serving rooms from the 20s into the 30s should be numbered C120 or C130; etc.
  - Continuous corridors, regardless of length or configuration, shall keep the same number. If a corridor is "sectioned" by a 2-hr door closure, or if separate sections serve distinctly different areas of the building, the corridor sections may be assigned different numbers or have alpha suffixes referencing compass direction (E or W, N or S). If a corridor is entered at or near its mid-point (e.g., from the main lobby), each section may be given a different number to facilitate room numbering sequences in each section.
  - Vestibules, lobbies and stairways are considered to be part of the corridor to which they connect and shall be labeled with an appropriate letter prefix followed by the corridor number and a letter suffix showing the space's compass location relative to the corridor—e.g., V110E would be the vestibule at the east end of corridor 110.
  - After corridor numbers are designated, no room shall have the same number as a corridor.
- Room numbers will be 3 or 4 characters long, except as follows:

- Smaller buildings (e.g., elementary schools) with less than 100 rooms per floor will have 3-digit numbers plus letter prefixes and/or suffixes as noted.
- Larger buildings (e.g., middle, and high schools) with over 100 rooms per floor will have 4-digit numbers plus letter prefixes and/or suffixes as noted.
- Letter prefixes to designate special room type or function:
    - Spaces affording movement through them will have a letter prefix by type, as follows:
        - C Corridor (not “hallway”)
        - V Vestibule (with an airlock between interior and exterior)
        - L Lobby opening off a corridor or vestibule
        - ST Stairway (followed by a corridor number plus N, E, S or W)
        - EV Elevator
    - Service spaces, whether directly accessible from a corridor/lobby or within a suite, will have a letter prefix designating their type of service, as follows:
        - R Restroom
        - J Custodial, including service storage M Mechanical or Electrical room
        - T Telecom room (MDFs shall begin with TA; IDFs with TB, TC, etc.)
        - U Utility chase, tunnel, or accessible crawlspace
    - Rooms accessible only from the exterior will begin with an X.
    - Modular classroom buildings will be numbered beginning XP
- Letter suffixes:
    - Rooms within a suite of rooms and not directly accessible from a corridor or lobby will have letter suffixes per room numbering below.
    - Rooms with direct access to the building exterior will end in X.
- No dashes or other punctuation shall be used in room numbers.

▪ Per room numbering above, the 2 or 3 digits after the corridor number will designate the room.

- Room numbers should be assigned with odds and evens on opposite sides consistently in each corridor from one end to the other, except that numbers in dead-end corridors may run down one side and back the other.
- First rooms on a corridor should end in a 1 or a 2, other rules permitting.

- Room numbers across a corridor from each other should roughly match— e.g., 125 should be across from 124 and/or 126.
- To the greatest extent possible consistent with other rules, rooms with the same final 2 digits should be in the same position in the building—e.g., rooms 055, 155 and 255 should roughly align vertically.
- Skip numbers as appropriate to adhere to above or to reserve numbers for future use—e.g., to allow for renovations that divide larger spaces into multiple rooms. Having numbers in reserve will avoid the need to renumber an entire level later.
- Each room shall have only one number, regardless of the number of doors opening into it, even from differently numbered corridors.
- Rooms that are part of a suite entered from a corridor or lobby by the same primary door will share the same room number with an added letter suffix.
    - Rooms accessed only from within a suite are numbered with the entrance room number plus a letter suffix, usually beginning with the room immediately left of the main entrance and proceeding alphabetically clockwise—e.g., rooms accessed only through 122 would be numbered 122A, 122B, 122C, etc.
    - Rooms accessed only from within a suite-accessed room are given a 2nd letter suffix—e.g., 122BA, 122BB, 122BC, etc.
    - The letters O and I are not used in suite room lettering.
    - Cubicles or work stations in large open rooms shall be designated in the same manner as rooms within a suite, using the whole number of the room where the cubicle is located followed by a letter suffix.
    - Cubicles or benches located in rooms already having a letter suffix shall be designated by the room number followed by an added number (122B1, 122B2, 122B3, etc.).

- All accessible spaces shall be numbered, including covered exterior spaces (walled or not) but excluding coat closets, etc., of less than 10 square feet.

Room Naming

- For consistency throughout the District, and especially to clarify for emergency responders the nature and likely occupancy of rooms, names of similar rooms and common spaces should adhere to these guidelines:
    - Main Office or Admin Offices
    - Health Services or Health (not Clinic, Nurse's Office, etc.)
    - Staff Room (not Teacher or Staff Lounge, Lunchroom, Dining, etc.)
    - Cafeteria, or Cafetorium when a stage or platform is attached/adjacent
    - Gymnasium, with or without a stage/platform (not Gym)

- Multipurpose Room shall not be used, except for a separate space in addition to a Cafeteria/Cafetorium and Gymnasium.
- Commons, Student Center, or other traditional name for casual gathering area
- Stage if the space is fully Code-compliant as such, Platform if not compliant
- Custodian/Custodial (not Janitor/Janitorial); variation: Building Facilitator

Interior Wall Signs

- Wall plaques with dimensional letters identifying room by number (and by name, for scheduled common/public spaces) as approved by the OMC Department per LPS standards herein and graphic details provided. The A/E shall confirm correct room numbers/names for each site with the OMC Department. See typical LPS details.
  - Graphics
    - Letters, numbers, and symbols on interior signs shall be white Helvetica Neue Regular (upper case only) on a solid background of "Reflex Blue" (matching District logo).
    - Precision "Routed Time-Bond System" is required, with raised Grade 2 Braille dots, per ADAAG guidelines.
  - Materials
    - Interior signs shall be acrylic (ASTM D4802, Type UVF)
    - Minimum over all thickness: 0.125 inches.
  - Fabrication
    - Room numbers on all wall panels shall have fixed, raised characters and Braille dots, with fixed room names/identification below room number as scheduled.
    - PROHIBITTED: Changeable signs, unless specifically authorized, in writing, by LPS OMC and LPS PM.
  - Mounting
    - Room signs shall be surface-mounted on corridor wall adjacent entry doors per ADAAG guidelines, using double-sided, tamper-resistant tape or, with prior written approval by LPS OMC and LPS PM, following manufacturer's written recommendation as appropriate for each mounting surface.
    - Centerline of signs shall be at 8" from edge of door frame (or from interior corner adjacent the frame, in alcoves).
    - Significant variations due to atypical situations shall be coordinated with LPS OMC and LPS PM.
    - Signs mounted on transparent surfaces shall have white vinyl backing on the back side of the glass or glass block, matching the sign size/shape.

- Signs for utility rooms (custodial, mechanical, electrical, telecom, elevator equipment) shall be mounted on the entry door at centerline, unless directed otherwise, in writing, by LPS OMC and LPS PM.

Door Frame Room Numbers

- Plastic signs with printed room numbers shall be mounted on the exterior face of all room entry door frames at the top latch-side corner using permanent adhesive. To assist substitute teachers unfamiliar with a building, similar signs shall be centered on the interior face of all classroom entry door frames and on the exterior face of each classroom's outside exit door frame.

Wayfinding Signs

- At lobbies, corridor intersections and other appropriate locations around each building, provide wayfinding wall plaques with fixed text and directional arrows identifying major common areas by name and/or groups of rooms by number range, as coordinated with the building staff LPS OMC, and LPS PM.

Approved Vendors

- Interior signage:
  - Image360
  - ASI Sign Systems
  - Avalis
  - Best Manufacturing
  - Equivalent approved by LPS OMC and LPS PM

Exterior Signs

- Cast aluminum dimensional letters with school name, post, and panel/pylon, illuminated or non-illuminated, as approved by LPS OMC and LPS PM.
- Match existing signage at each building or as otherwise directed.
- For exterior ground-mounted signs, survey of ground conditions related to soil content, density and compaction are the responsibility of the installer prior to submitting a bid.
  - Removal and/or replacement of asphalt, concrete, existing footings, and poles are the responsibility of the installer unless otherwise specified on drawings.

Model Specification

- LPS Section 10 14 00 Signage and Identifying Devices provides a “Model Specification” intended to assist consultants develop project specifications
    - Identification of technical requirements or prohibitions, pre-approved manufacturers, and preferred products or models is intended to optimize long-term value to the District and its facilities, balancing innovation and competitive first-cost with manageable standardization and sustainable life-cycle costing
    - The sections are not sufficiently complete to serve as specifications
        - Sections require customization to address conditions, needs and applications for specific projects
        - Detailed collaboration between consultants and LPS managers, technicians, and users is required
        - Proposed deviation requires consultation with and acceptance by the LPS Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM)
        - Consultants are responsible for informing the District of any conflict found between the model sections and current codes, standards, or best practices.

CONTINUED ON NEXT PAGE

SECTION 10 14 00 – SIGNAGE AND IDENTIFYING DEVICES

For **Room Naming and Numbering Conventions**, see 10 14 00 in **LPSCM – PART 1**.

Americans with Disabilities Act (ADA) Federal Guidelines

The information provided here is distilled from the 2010 ADAAG Final Rule and the ANSI A117.1 - 2010 Standards and shall be applied to all building interior signage at Littleton Public Schools.

A. ROOM IDENTIFICATION SIGNS:

(using characters that are both tactile and visual

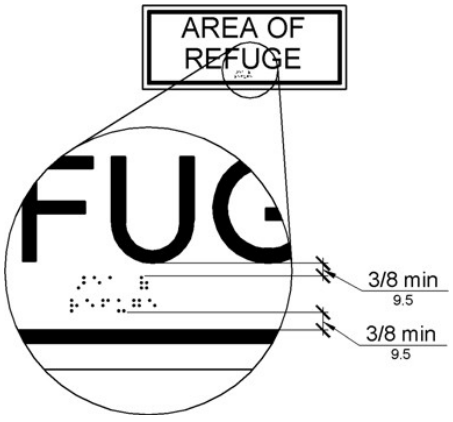
1. Material Finish: non-glare
2. Color Contrast:

   Light characters against dark backgrounds or Dark characters against light backgrounds
3. Tactile Character Depth:

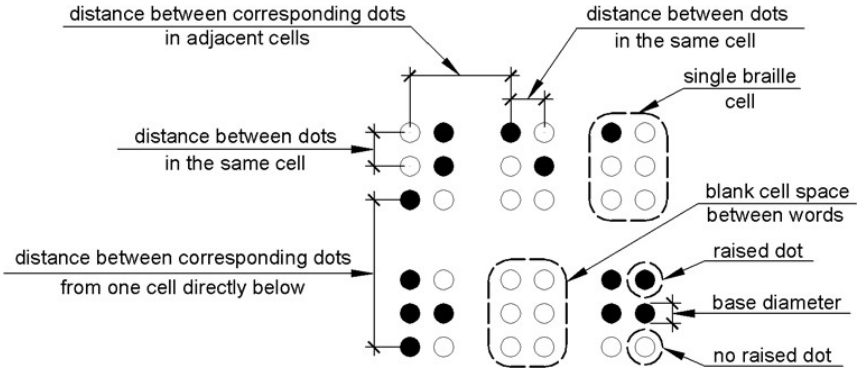
   1/32 inch minimum above their background.
4. Tactile (Raised) Character Form:
   - Uppercase only.
   - Sans Serif type styles only.
     Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms.
   - Character height:
     ½ inch minimum and 2 inches maximum.
   - Character proportions:
     Compliant fonts must meet the following: The width of the upper case “O” shall be 55% - 110% of the character height of the upper case “I”. The stroke thickness of the upper case “I” shall be 15% maximum of the character height.
5. Character (Letter) Spacing:

   1/8 inch minimum and 4 times the tactile character stroke width maximum, measured from the top surface of tactile text, between the two closest points of adjacent characters (excluding word spaces). Note: when using beveled letters, the law allows for a minimum character space of 1/16 inch measure from the base of the letters.
6. Line Spacing:

   3/8 inch minimum and 150% of the character height maximum.
7. Raised borders and decorative elements: 3/8 inch minimum from tactile characters.
8. Braille:
   Tactile characters must be accompanied by Grade 2 Braille.
   - Braille shall have a domed or rounded shape.
   - Braille shall be located below corresponding text.
   - If text is multi-lined, Braille shall be placed below the entire text.
   - Braille shall be separated by 3/8 inch minimum from tactile characters, raised borders or symbols:



- Braille must be lowercase. The indication of uppercase letter(s) shall only be used for proper nouns and names, individual letters of the alphabet, initials, acronyms or before the first word of sentences.
- Dot Height: 0.025-0.037 inch (0.6-0.9 mm)
- Dot base diameter: 0.059-0.063 inch (1.5-1.6 mm)
- Distance between any two dots in same cell, center to center: 0.090-0.100 inch (2.3-2.5 mm)
- Distance between corresponding dots in adjacent cells, center to center: 0.241-0.300 inch (6.1-7.6 mm)
- Distance between corresponding dots from one cell to the cell directly below, center to center: 0.395-0.400 inch (10.0-10.2 mm)



9. Pictograms:
   - Pictograms or symbols must be located on a field of at least 6 inches in height.
   - Pictograms and their fields should have a non-glare finish.
   - Pictograms should contrast with their backgrounds. Use either a light pictogram on a dark field, or a dark pictogram on a light field.
   - Pictograms are not required to be tactile.
   - Pictograms are required to have descriptive text located directly below the pictogram field. Braille and tactile text may not intrude into the 6-inch field.

10. Symbols:
    Symbols of accessibility shall have a non-glare finish and contrast with their backgrounds. These international symbols should be used to identify the following:

International Symbol of Accessibility

Volume-Controlled Telephone

International TTY Symbol

International Symbol of Access For Hearing Loss

11. Mounting height and location:
    - Height: All tactile characters shall be 48 inches minimum and 60 inches maximum above adjacent floor, measured from the baseline of the characters. NOTE: The District prefers that the bottom of signs in elementary schools be at 50 inches a.f.f. (higher only as circumstances require) and that the top of signs in all other buildings be at 60 inches a.f.f. (or lower, only as circumstances require).
    - Location: Room signs should be mounted adjacent to the latch side of the door. Exceptions:
    - Signs at double doors shall be mounted on the inactive leaf. If both doors are active, mount sign to the right of the right-hand door, clear of obstruction by the opened door.
    - Signs can be mounted on push doors that open in and have automatic door closures without hold-open devices.
    - If no wall space exists on the latch side of the door, mount sign on the nearest adjacent wall.
    - Distance from door: Signs should be centered 8” from the frame edge, with a minimum 18” x 18” space on the floor beyond the arc of door swing between closed position and 45° open position.

B. DIRECTIONAL AND INFORMATIONAL SIGNS

Signs that provide direction to or information about spaces within a facility are generally wall mounted, projected, or suspended overhead. They are not required to contain tactile characters or Braille, but must meet the requirements for visual characters:

- Characters shall contrast with their background, and both shall have a non-glare finish.
- Characters can be uppercase, lowercase, or a combination of both.
- Type style shall be conventional in form and match typical room signage. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms.
- Character width shall be as described above for room signs.
- Character line spacing: 50%-100% (maximum) of the character height.
- Character stroke thickness of the uppercase letter "I" shall be 15% - 25% of the height of the character.
- Spacing between individual characters, excluding word spaces, shall be 10% - 25% of character height.
- Character height is based on height above the floor and minimum viewing distance. Refer to the chart below for character height recommendations. Standard mounting height shall be 84 inches from top of sign to finish floor; signs mounted higher on beams or soffits shall be centered on vertical face.

Visual Character Height		
Height to Finished Floor or Ground from Baseline of Character	**Assumed Horizontal Viewing Distance**	**Minimum Character Height**
40 - 70 inches	less than 10 feet	5/8 inch
	10 feet or more	5/8 inch, plus 1/8 inch per 5 feet of viewing distance beyond 10 feet
>70-120 inches	less than 25 feet	1 inch
	25 feet or more	1 inch, plus 1/8 inch per 10 feet of viewing distance beyond 25 feet
More than 120 inches	less than 25 feet	1.5 inches
	25 feet or more	1.5 inches, plus 1/8 inch per 10 feet of viewing distance beyond 25 feet

Character height is based on the uppercase letter "I".
Maximum viewing distance is measured as the horizontal distance where an obstruction prevents further approach toward the sign.

General Specifications

All signs must comply with all Federal and State laws, codes and regulations and all municipal ordinances or regulations in effect at the time the work is performed.

A. MATERIALS

All materials should be new and free from defects:

1. Plastics
   - Thickness, color, and type as specified in the sign type drawings.
   - Material to be free from scratches or defects and be clean and edges finished per manufacturer's instructions.
   - Sheet materials and sampling shapes shall be of thickness recommended by sign fabricator to produce straight or evenly curved surfaces, free from waviness, wrinkles, or other deformation except as otherwise herein specified or indicated on drawings.

2. Coatings and Finishes
   - All aluminum, metal or fasteners shall be finish coated with an appropriate primer and color coat, with corrosion inhibitors guaranteed for four (4) years against fading, chipping, cracking, peeling, and

discoloration. Colors as specified in sign type drawings.
- All holes, penetrations and cut edges of pre-finished metals must be free of burrs, primed and painted to maintain a corrosion-proof finish.

3. Miscellaneous Materials
   - Any metal hardware used for construction not previously covered shall be of stainless steel, aluminum, or steel with galvanized coating.
   - Wood, Alucobond, fiberglass, brick, stainless steel, or any other material must be of top-grade quality and as specified on drawings.

B. WORKMANSHIP

Any work required under this section that is not described in detail shall be constructed in accordance with approved shop drawings.

1. Accuracy of Work

   All work shall be fabricated and erected square, plumb, straight, and true. Cut-out letters, numbers, and images shall be cut to continuous, sharp, even line of profile as indicated on drawings. Provide all supporting and anchoring means as required for proper installation. All curved areas to be true. No kinks, creases, oil-canning, or dimpling will be accepted.

2. Exposed Joints

   Exposed joints should be continuously welded, ground, and polished smooth and shall not be visible. Mitered corners shall be snug, neat, and tight-fitting in an even, smooth plane.

Accessories, Anchorage, Mounting Devices and Spacers Accessories, anchorage, mounting devices and spacers shall be guaranteed non-staining to adjacent walls and sign finish for a period of five (5) years from final acceptance. Ferrous mountings may be sleeved with non-ferrous metal covers matching adjacent finishes, cemented on with non-hydroscopic glue, or other suitable protective measures may be proposed to comply with this guarantee.

C. INSTALLATION

All signs shall be placed as indicated above and/or on the drawings or as directed by LPS or its representative. Signs shall be secured with adhesive, two-sided foam tape, mechanical fasteners or as recommended by the manufacturer and approved on shop drawings specified hereinafter, of sizes required to assure secure attachment. For exterior ground-mounted signs, survey of ground conditions related to soil content, density and compaction are the responsibility of the installer prior to submitting a bid. Removal and/or replacement of asphalt, concrete, existing footings, and poles are the responsibility of the installer unless otherwise specified on drawings.

D. DRAWINGS

Shop drawings and final sign schedules showing text and location shall be submitted in PDF file format or equivalent; submittals must be approved by the District before any work under this section has begun. Supplemental drawings indicating post-approval changes or alterations shall be submitted to LPS or its representative and approved before fabrication, as needed.

E. SAMPLES

Furnish LPS representative samples of the finish materials. Colors shall match color samples or standard color system code furnished by LPS or its representative. All colors shall be approved by LPS or its representative.

F. GUARANTEE AND SERVICE

Contractor shall furnish a written guarantee to the effect that all material and work furnished under this section is guaranteed for one (1) year to be free from defects and faulty workmanship, and that any defective materials or work shall be promptly repaired or replaced without additional cost to LPS. Contractor shall, during the first year of operation, fully maintain and service the signs, making regular inspections, and servicing and replacing tubes and electrical equipment as may be necessary to maintain the signs in operation without additional cost to LPS. Any guarantees for additional time or services as required in other sections of this document or as noted on specifications are to be in addition to this section.

G. PROTECTION

All exposed surfaces shall be protected until final acceptance of the work in a manner sufficient to prevent damage or discoloration. Any work damaged or discolored in any way before final acceptance of the work

shall be replaced without additional cost to LPS.

H. CLEAN-UP
During the process of the work, the premises shall be kept reasonably free of all debris and waste materials resulting from the work under this section. Upon completion and before final acceptance of work, all debris, rubbish, leftover materials, tools, and equipment shall be removed from the site.

I. FINAL CLEANING
Final cleaning of all surfaces shall be carefully done strictly in accordance with manufacturer's instructions.

Quality of Manufacture

Sign sizes, layouts and formats have been carefully determined to meet existing codes, guidelines, and to form a visually cohesive sign system. Any deviation must be approved by the **LPS Operations, Maintenance and Construction (OMC) Department**.

A. COLOR PALETTE
1. Background: Reflex Blue
2. Text: Brilliant White
3. Bar/Stripe: Brilliant White

B. COLOR SPECIFICATIONS
Use the following material colors (or equivalent matches) for all LPS interior signage.
1. Reflex Blue
   a. Hex #001489 or equivalent
   b. Websafe #000099 or equivalent
   c. c. RGB: 0, 20, 137
   d. d. CMYK: cyan-100, magenta-89, yellow-0, black-0
2. White: Brilliant White

C. FABRICATION METHODS
1. Digital Printing
   Computer-generated artwork printed directly (or applied) to second surface of clear acrylic substrate. Print quality should be 1200 x 600 or higher resolution using UV-stable inks. Color management software should be used for consistent color reproduction.
2. Silk-screening
   Silk-screen ink applied to second surface of clear acrylic substrate.
   This is an economical method for producing custom background colors. Silk-screened text and/or graphics should only be considered for permanent signs where large quantities are needed.
3. Engraving
   The engraving process is commonly used to create tactile (raised) text and graphics through the layering of material. First an appliqué of contrasting color is adhered to the primary surface of the sign. Any desired text and/or graphics are cut out of the appliqué using a rotary engraver. The final step is to remove all unwanted appliqué, leaving behind the raised text and/or graphics on the primary surface of the sign.
4. Braille
   Use the Raster™ Method patented process for placing Braille dots on architectural signs using a special carbide engraving bit, manual insertion device (Raster™ Pen) or automated insertion device (Auto-Raster™) and UV stable clear acrylic Rasters™.
5. Painting
   Spray paint for consistent, even color and coverage.

D. MATERIALS
1. Acrylic:
   a. Clear non-glare P-99 Plexiglas or equivalent
   b. Clear non-glare P-95 Plexiglas or equivalent
   c. Reflex Blue matte Plexiglas or equivalent
2. Tape: Interior Sign Mounting, 3/4" VHB tape: 3M 4956 Gray, 3M 5962 Black, 3M 4910 Clear, or equal.
3. Braille: Clear Rasters™
4. Vinyl Backers: Matte White vinyl backer (3m Blockout Film or equal) at signs mounted on glass.

E. TYPOGRAPHY

To maintain design standards, it is important that not only the type style, but also the letter spacing, line spacing, use of upper- and lower-case letters, and layout style remain constant, no matter who is creating the signage.

5. Type Style (font):

Truetype **Helvetica Neue Regular** is the designated Littleton Public Schools font standard and should be used for all signage.

6. Letter Spacing:

Spacing between characters should be as follows:

- Tactile text - use a profile cutter to create beveled characters. This will allow the characters to be placed closer together for a more pleasing look.
- Letter spacing should match the drawings in this manual. This may require tighter spacing than 100%.

7. Line Spacing:
   - 50-100% of text height for related text
   - 100-150% of text height to separate unrelated text or lists
8. Layout / Paragraph Style: Flush left (except as noted below for door-mounted signs)
9. Letter Height: Refer to individual sign type drawings and descriptions below for specific character heights.
10. Use of Upper- and Lower-Case Letters:

Room identification signs shall use all upper-case letters. Directional signage may use a combination of upper- and lower-case letters, as in normal sentence construction.

F. ARROWS & SYMBOLS

11. Arrows

The standard arrow is a square tip arrow, white on the typical blue field, as shown below. The arrow is to be justified left and shall precede the copy to which it applies. If more complex arrows are included on a sign, all arrows shall be centered in the space preceding the copy.

12. ADA Symbols

International Symbol of Accessibility
is used to identify and show direction to accessible entries, exits and restrooms. The symbol should be sized large enough to be identified from a decision point. The symbol should always face to the right as shown and never be used with a slashed circle (indicating “No”).

13. Common Symbols

Type 1 – Room ID Numbers on Door Frames

Usage

Identification of room numbers on door frame header at entry to all occupiable rooms or spaces. Note: not required at coat closets, storage rooms filled with shelving, etc.

Size: 1.5" x 6.0" x 0.125" total thickness.

Front Face

- Material: 1/16" clear non-glare acrylic, with white text and Reflex Blue field applied on 2nd surface.

Alternative: 1/16" front piece, clear non-glare acrylic, with text and field on back piece as below.

- White room number, reverse-printed on 2nd surface with blue field: 1.0"height.
- Font: Helvetica Neue Regular or approved alternative.

Back Piece

- Material: 1/16" clear acrylic. *Alternative: 1/16" clear acrylic with white text and blue field on 1st surface; or 1/16" Reflex Blue acrylic with white text on 1st surface.*

Sign Manufacture

- All edges to be smooth and corners sanded to remove sharpness.
- All printed or screened colors to be opaque with even color and coverage.

Installation

- Outside interior entry doors to rooms, mount on door frame header above door latch, with edge of sign aligned with the latch edge of door. At doors without frames, or where header is too shallow, mount sign as near as possible to location prescribed, on adjacent wall or ceiling.
- At interior face of corridor entries to classrooms, mount at center of door frame header.
- At exterior exits from classrooms, mount on exterior face of door frame header above door latch.

Type 2 – Utility Room ID Signs with Permanent Information

Usage

Rooms related to building system functions or support and not subject to change, such as: Mechanical, Electrical, Custodial, Telecom, Elevator Equipment, and dedicated storage rooms (e.g., Bookroom, Chemical Storage, Instruments, Costumes, P.E. Equipment)

Size: 4.0" x 8.0" x 0.125" thick

Front Face

- Material: 1/16" clear non-glare acrylic, with Reflex Blue field applied on 2nd surface. *Alternative: 1/16" front piece, clear non-glare acrylic, with blue field on back piece as below.*
- White tactile room number: 1.0-inch number height, raised 1/32" with beveled edge.
- White tactile primary descriptive text: 0.75-inch letter height, raised 1/32" with beveled edge.
- White tactile supplemental descriptive text (e.g., Roof Access, Tunnel Access, Electrical Panels):

½ inch minimum letter height, raised 1/32".

- Font: Helvetica Neue Regular or approved alternative.

Back Piece

- Material: 1/16" clear acrylic. *Alternative: 1/16" clear acrylic with blue field on 1st surface; or 1/16" Reflex Blue acrylic.*

Sign Manufacture

- All edges to be smooth and corners sanded to remove sharpness.
- All printed or screened colors to be opaque with even color and coverage.

Installation

- Spacing and mounting heights as per A.11 above or centered on single-leaf door or inactive leaf of double doors where adjacent wall space is inadequate.

Type 3 – Normally Occupied Room ID Signs

Usage

Building primary functions where usage is instructional, collaborative, or administrative and only infrequently subject to change, such as: Classrooms, Offices, Teaching Labs, Lecture Rooms

Size: 4.0" x 8.0" x 0.125" thick

Front Face

- Material: 1/16" clear non-glare acrylic, with Reflex Blue field applied on 2nd surface. *Alternative: 1/16" front piece, clear non-glare acrylic, with blue field on back piece as below.*
- White tactile room number: 1.0-inch number height, raised 1/32" with beveled edge.
- Font: Helvetica Neue Regular or approved alternative.
- Clear Raster™ Braille.

Back Piece

- Material: 1/16" clear acrylic. *Alternative: 1/16" clear acrylic with blue field on 1st surface; or 1/16" Reflex Blue acrylic.*

Sign Manufacture

- All edges to be smooth and corners sanded to remove sharpness.
- All printed or screened colors to be opaque with even color and coverage.

Installation

- Spacing and mounting heights as per A.11 above.

Type 4 – Intermittently Occupied or Common Space ID Signs

Usage:

Building group or public functions where usage is for assembly, group activities, research/study, technical processes, or meetings and only infrequently subject to change, such as:

- Main Office/Admin Office
- Library/Media Center
- Theater/Auditorium
- Cafeteria/Cafetorium
- Kitchen
- Gymnasium
- Locker Room
- Staff Room (if scheduled)
- Conference Room (if scheduled)

Size: 4.0" x 8.0" x 0.125" thick

Front Face

- Material: 1/16" clear non-glare acrylic, with Reflex Blue field applied on 2nd surface. *Alternative: 1/16" front piece, clear non-glare acrylic, with blue field on back piece as below.*
- White tactile room number: 1.0-inch number height, raised 1/32" with beveled edge.
- White tactile descriptive text: 1.0 inch (preferred) to minimum 3/4-inch letter height, raised 1/32" with beveled edge.
- Font: Helvetica Neue Regular or approved alternative.
- Clear Raster™ Braille.

Back Piece

- Material: 1/16" clear acrylic. *Alternative: 1/16" clear acrylic with blue field on 1st surface; or 1/16" Reflex Blue acrylic.*

Sign Manufacture

- All edges to be smooth and corners sanded to remove sharpness.
- All printed or screened colors to be opaque with even color and coverage.

Installation

- Spacing and mounting heights as per A.11 above.

Type 5 – Restroom Identification Signs

Usage: All restrooms except ensuite toilets attached to private offices.

Size: 9.0" x 6.0" x 0.125" thick

Front Face

- Material: 1/16" clear non-glare acrylic, with Reflex Blue field applied on 2nd surface. *Alternative: 1/16" front piece, clear non-glare acrylic, with blue field on back piece as below.*
- White pictograms: Digital printed or silkscreened on 2nd surface with blue field for single-piece clear acrylic plate, or white tactile raised 1/32" applied to 1st surface of integral blue acrylic plate.

6-inch total field with proportional male and/or female figure(s), with or without wheelchair symbol shall be separated from text field by minimum 1/16" white bar.

- White tactile descriptive text: 1.0-inch number height, raised 1/32" with beveled edge.
- Font: Helvetica Neue Regular or approved alternative.
- Clear Raster™ Braille.

Back Piece

- Material: 1/16" clear acrylic. *Alternative: 1/16" clear acrylic with blue field on 1st surface; or 1/16" Reflex Blue acrylic.*

Sign Manufacture

- All edges to be smooth and corners sanded to remove sharpness.
- All printed or screened colors to be opaque with even color and coverage.

Installation

- Spacing and mounting heights as per A.11 above.

Type 6 – Miscellaneous Other Identification Signs

Usage: Elevators, stairs or ramps connecting two separate floors.

Size: 9.0" x 6.0" x 0.125" thick

Details: Similar to Type 5, above, as scheduled and adjusted for appropriate text and symbols.

Installation: Spacing and mounting heights as above.

Type 7 – Wayfinding Signs

Usage: At lobbies and corridor intersections, to direct visitors to common spaces or groups of rooms.

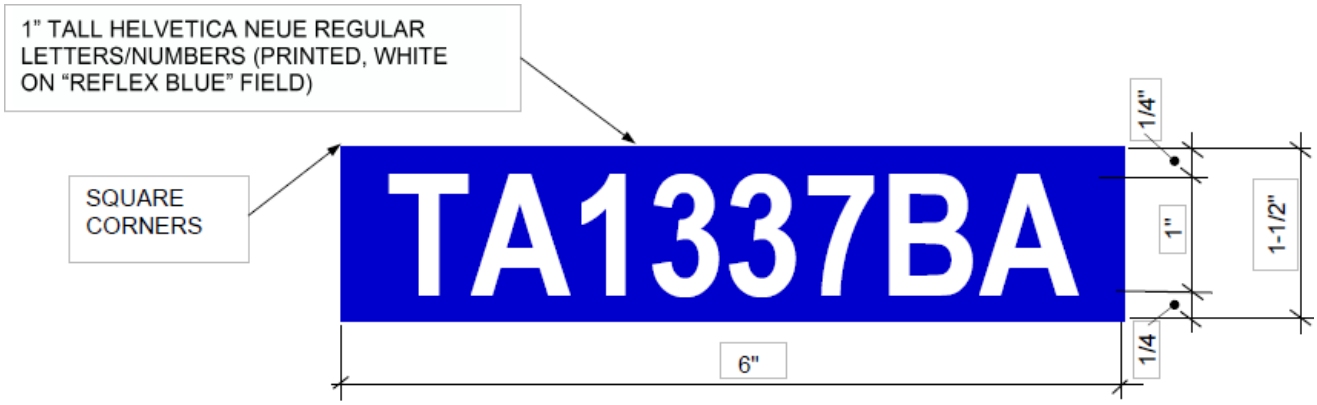
Size: 15.0" wide x 12.0" high (typical) x 0.125" thick, with maximum five (5) lines of text.

Details: Similar to room signs, as above, and per LPS Sign Templates below.

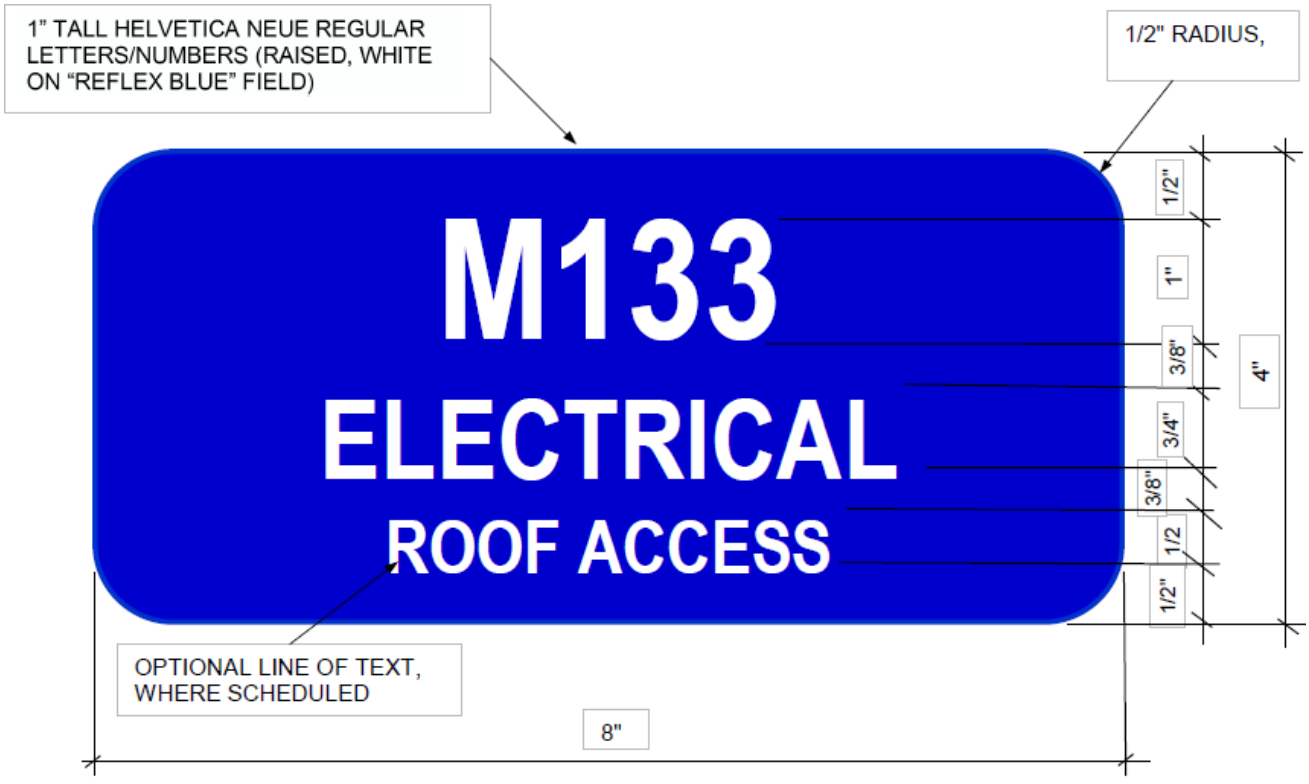
Installation:
Number, location, and text for wayfinding signs shall be determined by the building administrator and the **LPS Operations, Maintenance and Construction Department** after final approval of other new building signage. As noted above, standard mounting height shall be 84 inches from top of sign to adjacent finish floor (higher only as obstructions or other circumstances require). Signs mounted on beams or soffits shall be centered vertically on the face of the structural element (or otherwise as necessary to assure visibility).

Sign Templates, Types 1 - 7

See examples of typical sign graphics and details, below:

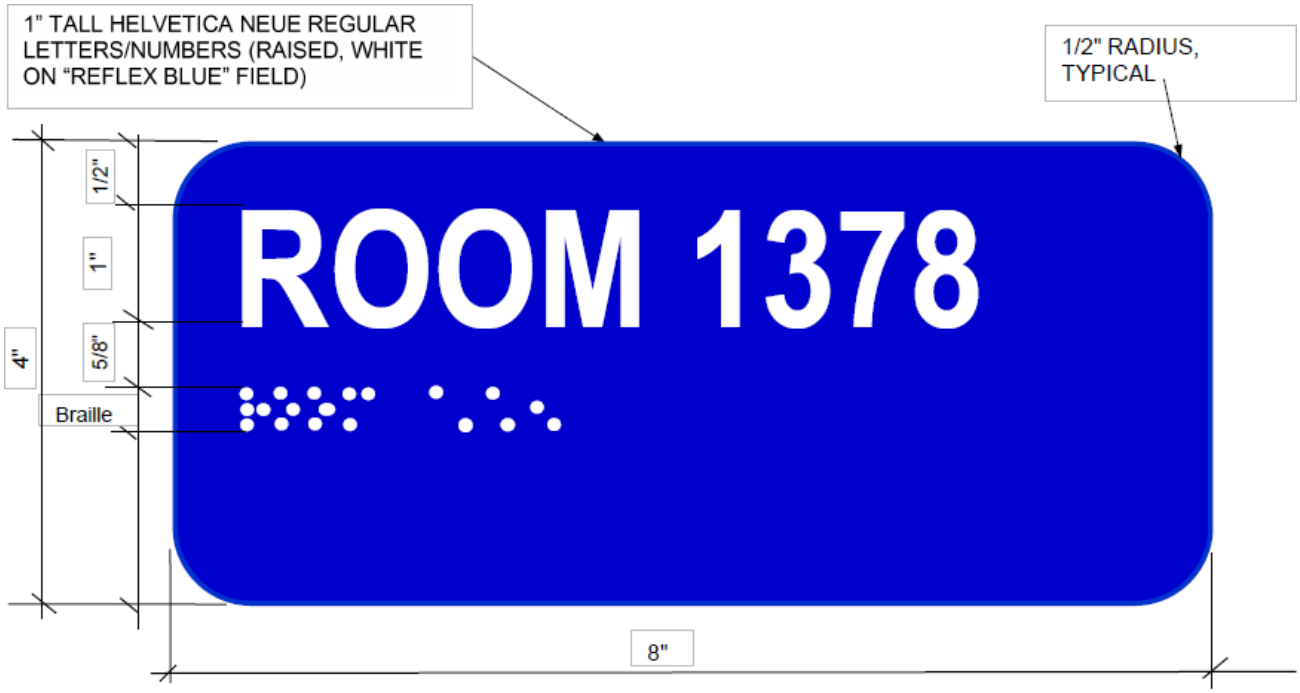


Type 1: Door Frame Room Number

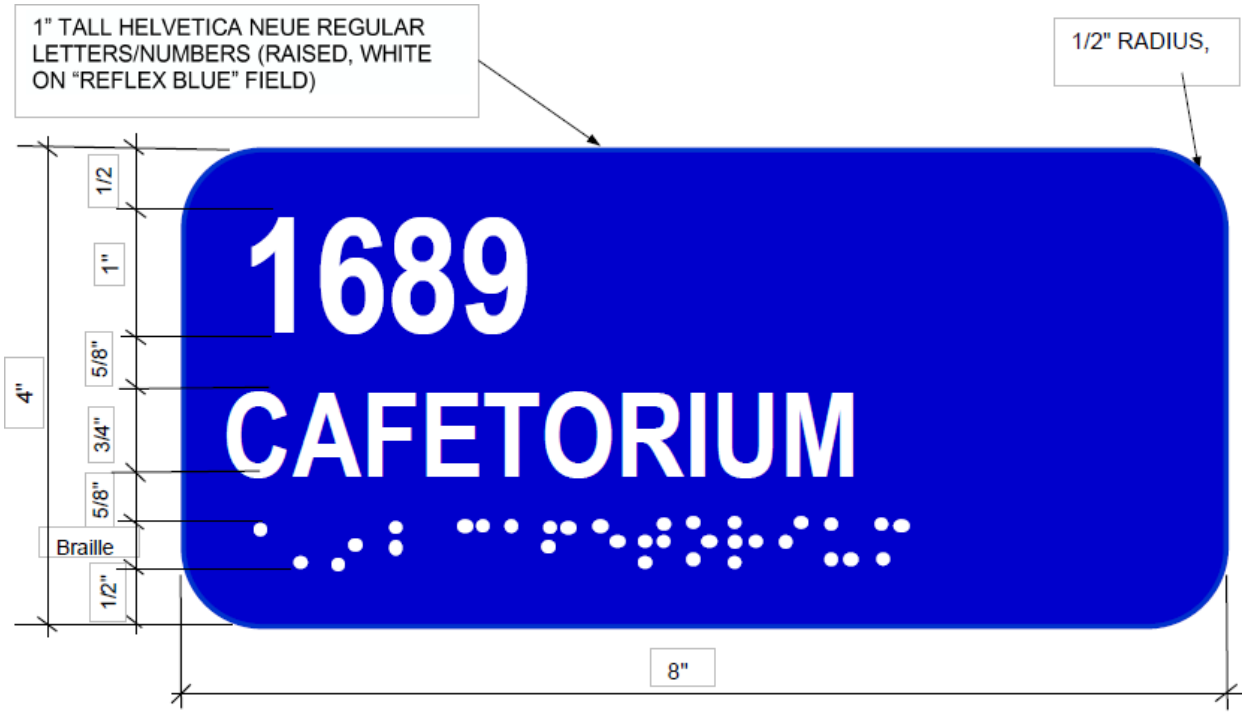


Type 2: Utility Room Sign

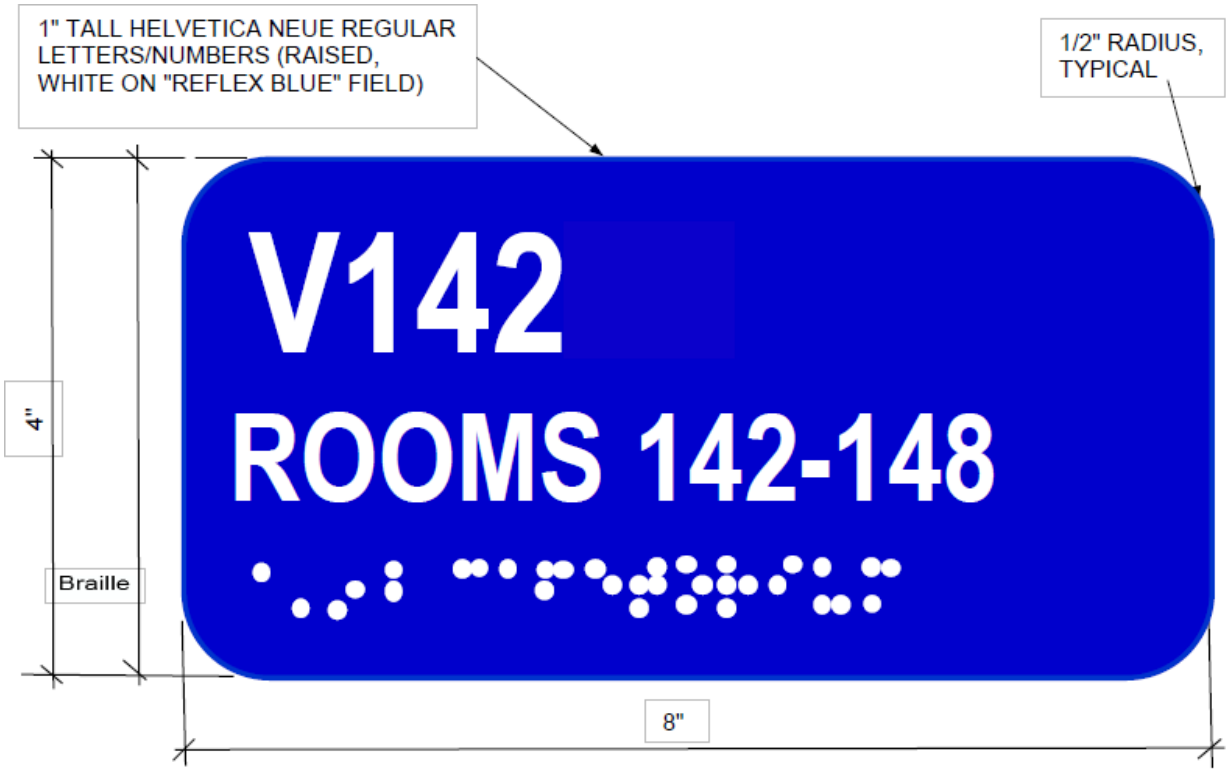
Note: Center (as shown) for door sign; left-align for wall sign



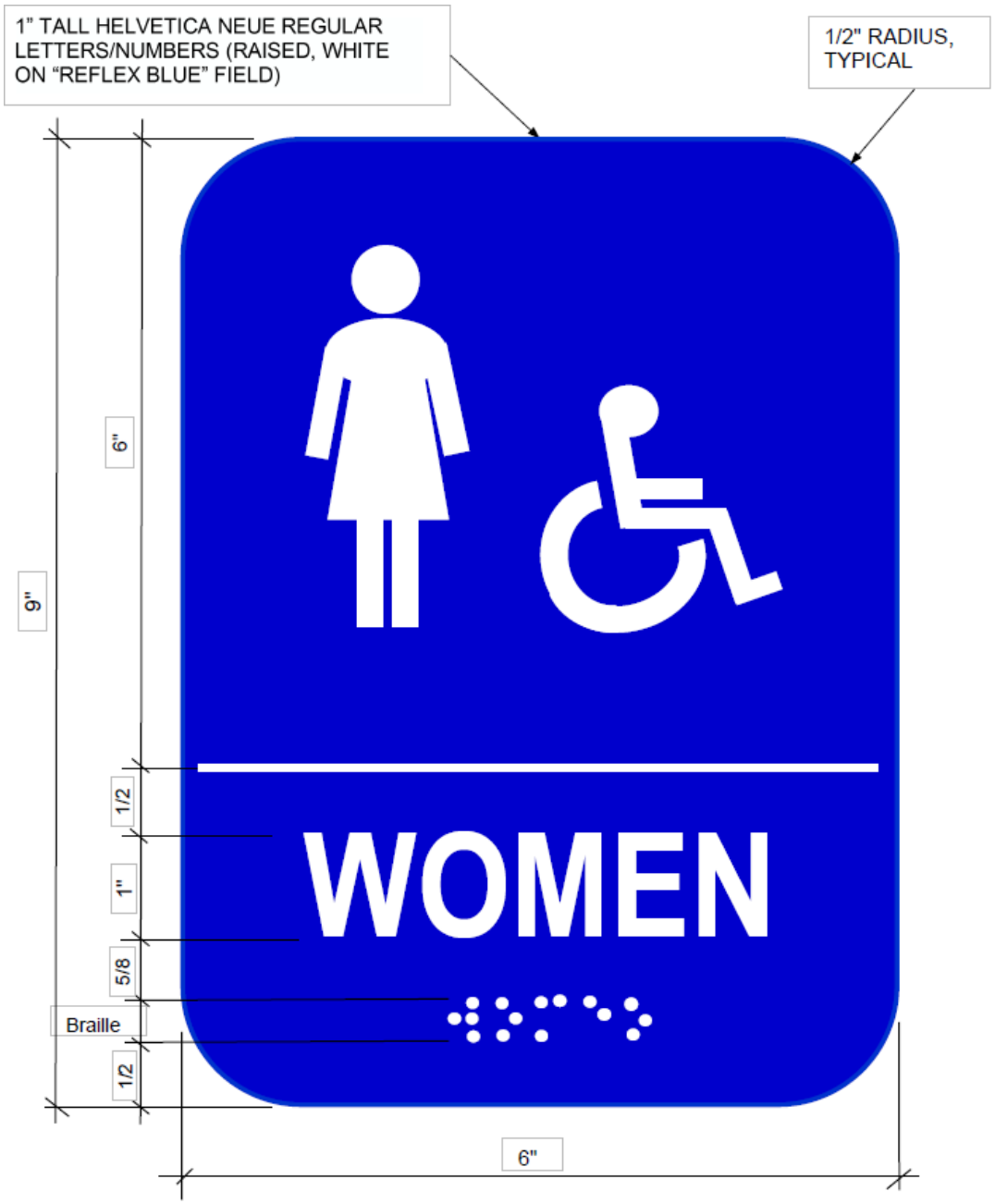
Type 3: Classroom/Office Wall Sign



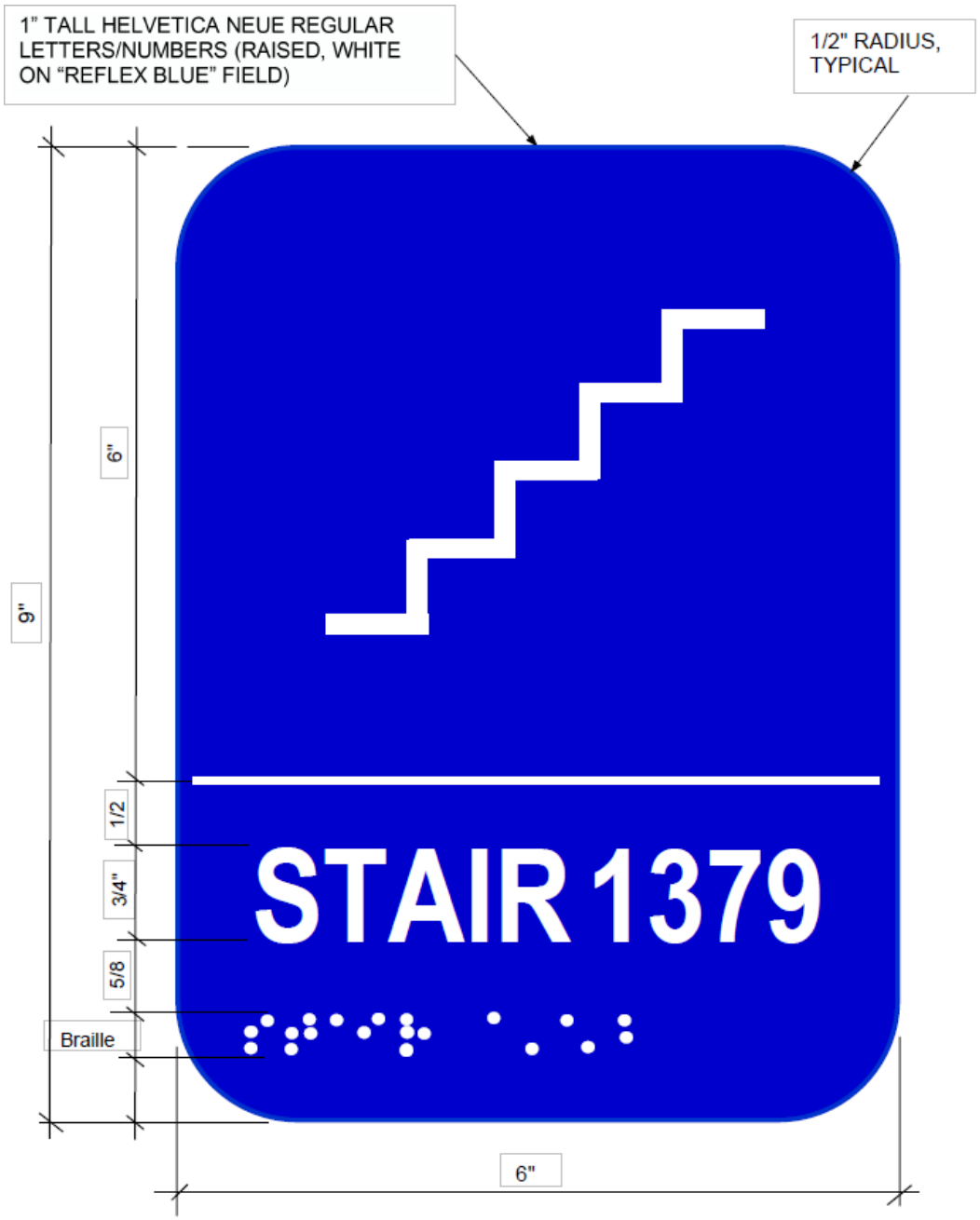
Type 4: Common Area/Room Wall Sign



Type 4a – Foyer/Shared Entry Wall Sign

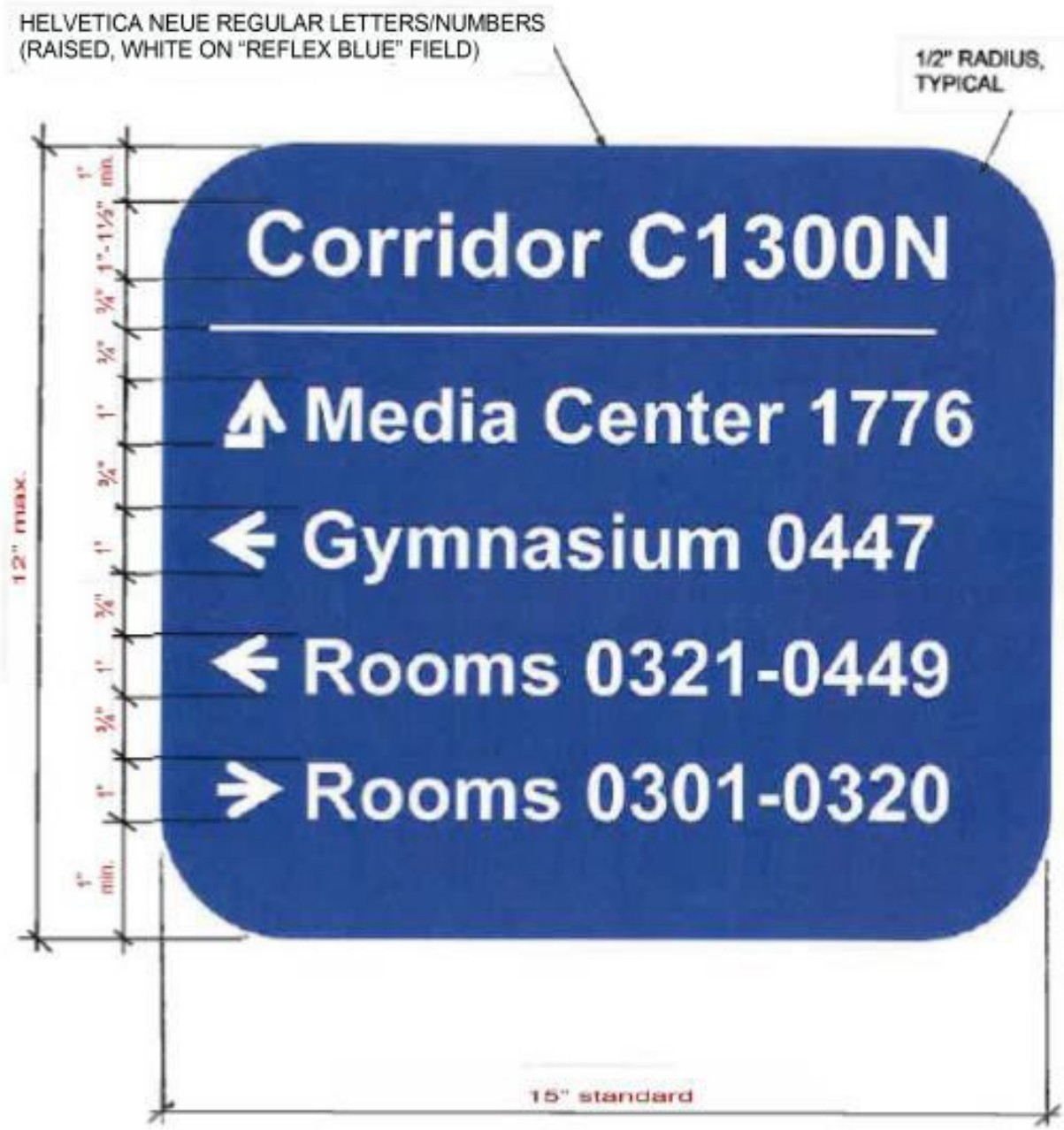


Type 5: Restroom Sign (typical)



Type 6: Stair Sign (typical)

Note: Ramp, Elevator & Other Signs similar, with appropriate symbols



Type 7: Wayfinding Sign (typical)

Note: Size and number of text lines vary by building

END OF SECTION 10 14 00

10 20 00 Interior Specialties

10 21 00 Toilet Compartments

- Head rail braced flush panel type; flush doors and pilaster fronts; stall compartment door each stall; wall-mounted urinal screens; privacy (entrance and sight) screens as required.
- PROHIBITTED: No metal toilet compartments allowed.
- Compartments shall be:
  - Bobrick 1092 Sierra Series
  - Equivalent approved by LPS OMC and LPS PM

10 22 00 Operable Partitions

- Paired Panels
  - Shall be top-supported, steel-faced with gypsum backing, nominal 4-in. thick, with interlocking vertical seals and mechanically retractable bottom seals (min. STC 52 rating).
  - Approved Manufacturers:
    - Moderco Signature Series 8500
    - Equivalent approved by LPS OMC and LPS PM
- Individual Panels
  - Shall be top-supported, steel-faced with gypsum backing, nominal 4-in. thick, with interlocking vertical seals and mechanically retractable bottom seals (minimum STC 52 rating), capable of turning 90 degrees for remote stacking.
  - Approved Manufacturers:
    - Moderco Signature Series 8600
    - Equivalent approved by LPS OMC and LPS PM

10 26 00 Wall and Door Protection

- Resilient pre-formed corner guards are required at exterior corners of corridors and public area stud and gypsum board partitions.
  - Approved Manufacturers:
    - Acrovyn
    - Equivalent approved by LPS OMC and LPS PM
  - Color to match or complement wall finish.
  - Corner guards to match existing (if any)
  - Minimum 4 feet high
  - Adhesive attachment typical; mechanical attachment at high-impact areas.

- Metal corner guards are required at exterior corners of delivery and material-handling areas
  - Mechanical attachment required, with wall-backing as appropriate.
  - Minimum 6 feet high
  - Stainless steel required in kitchens

10 28 00 Toilet and Bath Accessories

- Open except for owner provided
- Dispensers
  - The following provided by owner to be installed by contactor:
    - Paper towel dispenser
    - Toilet paper dispenser
    - Soap dispenser Model
- Grab-Bars and Railings
  - As required per ADAAG.

10 40 00 Safety Specialties

10 44 00 Fire Protection Specialties

- Cabinets
  - Recessed or semi-recessed cabinets, as approved by the LPS OMC and LPS PM.
- Extinguishers
  - Furnished and installed by LPS OMC where required by Code.
- Wall Brackets
  - Extinguisher manufacturer standard material and design
  - Provided by the General Contractor.
  - Coordinate requirements with LPS OMC and LPS PM

10 50 00 Storage Specialties

10 51 00 Lockers

10 51 13 Metal Lockers

- Cold rolled mild annealed or leveled sheet steel; welded and ventilated
- Baked enamel finish in color(s) approved by the LPS OMC and LPS PM
- Doors provided with lock hole filler to permit use of built-in key or combination lock
- Aluminum number plates with minimum 3/8" high embossed or etched figures near top of door.

- Non-recessed and freestanding type lockers shall have sloped top and front and end closed bases.
- Student Lockers
  - Recessed in Hallways; masonry backup; located in manner easily supervised by Faculty.
- Benches
  - Provide in Athletic Areas
  - Clear hardwood tops finished with three coats plastic sealers
  - Supported by steel standards finished in same color as lockers.

10 55 00 Postal Specialties

- No requirements.

10 70 00 Exterior Specialties

10 75 00 Flag Poles

10 75 16 Ground Set Flagpoles

- 25’ high, tapered aluminum complete with: ball finial; revolving, non-fouling truck; two sets of halyards, sheaves and cleats; collar, ground sleeve, ground spike and other fittings as required.

10 80 00 Other Specialties

10 82 00 Grilles and Screens

- Galvanized sheet steel or anodized aluminum.

END OF DIVISION 10

DIVISION 11 EQUIPMENT

11 40 00 Foodservice Equipment

- In the absence of other information, standards of the following organizations apply:
  - A.G.A.
  - A.S.M.E.
  - A.S.T.M.
  - N.F.P.A. – 96 for exhaust system
  - National Board of Fire Underwriters
  - National Sanitation Foundation (N.S.F.)
  - O.S.H.A.
  - Tri-County Health Department
  - Colorado Department of Health and Environment
  - U.S. Public Health Service
  - Underwriter Laboratories (U.L.)
- Coordination
  - With Littleton Public Schools (LPS) Nutrition Services (NS)
  - Permitting authorities.
  - LPS Operations, Maintenance and Construction Department, (OMC) and LPS Project Manager (PM) for specific project requirements.
  - MANDITORY pre-installation conference with LPS NS, LPS OMC, and LPS PM before work in this section is permitted to begin.
  - Utilities:
    - Electrical service
    - Gas
    - Hot and cold-water supply
    - Direct and indirect drainage
    - HVAC.
      - Locate equipment and connecting utilities to avoid restricting service access.
- Schedule
  - Equipment, both LPS- and Contractor-furnished
    - Shall be planned and scheduled on the Drawings
      - Keyed to minimum ¼"=1'0" scale

- Kitchen Area Layout Plan to include:
  - Equipment: description (manufacturer and catalog number),
  - Responsibility for furnishing and installation
  - Rough-in location(s) and connection(s) required by Mechanical and/or Electrical Contractor(s).

- Cafeterias
  - Multiple use shall be considered to decrease idle time of area when it is not being used for meal service.
  - Principal at each school shall be consulted to determine schedule for use of the Cafeteria for meal service.
  - Cafeterias shall be sized in proportion to school enrollment as follows:
    - up to 500 Minimum 1,000 square feet
    - 501 and 600 Minimum 1,500 square feet
    - 601 and 700 Minimum 1,800 square feet
    - 701 and 875 Minimum 2,450 square feet
    - 876 and 1000 Minimum 2,800 square feet.
  - Cafeterias in schools with enrollment between 501 and 1,000 shall be available for meal service between hours 11:30 a.m. and 1:30 p.m.
  - Cafeterias in schools with enrollment over 1,000 shall be sized so 1/3 of student body can be seated at one time, allowing 14 square feet per student; and should be available for meal service between 11:00 a.m. and 1:00 p.m.

- Serving Lines
  - Shall be contained within the kitchen space with attention to traffic flow- through circulation from entrance and exit.
  - Single point of sale shall be located at end of service line, with space for cashier and cash register with power source.
  - Number of serving lines to be based on the following enrollment:
    - up to 400 1-Line
    - 401 to 600 2-Lines
    - 601 to 800 3-Lines
    - 801 to 1,200 4-Lines
    - 1,201 to 1500 5-Lines
    - over 1500. 6-Lines

- Elementary schools
  - Each serving line shall consist of at least:
    - 4 hot-wells and a frost-top that services two (2) 18” x 26” sheet pans
    - Adjustable sneeze guards for the frost-top and a pass-through between the hot-well and frost-top
    - Top to be 14-gauge stainless steel with 18-gauge body
    - Seams to be field welded, with fill faucets integrated into the design
    - All switches to be centrally located in a common control panel assembly. with removable front for ease of maintenance and service
- Secondary schools
  - Each serving line shall consist of at least:
    - One 6-foot countertop refrigerated display unit with sliding door and lock unit
    - One Hatco Glo-Ray 5-foot designed merchandising warmer
  - One serving line shall also include:
    - Four (4) hot/cold holding wells and a frost-top that services two (2) 18”x 26” sheet pans
    - Adjustable sneeze guards for the frost top and a pass through between the hot well and frost top
    - Top to be 14-gauge stainless steel with 18-gauge body.
    - Seams to be field welded with fill faucets integrated into the design.
    - All switches to be centrally located in common control panel assembly with removable front for ease of maintenance and service.
- Manufacturers
  - NO SUBSTITUTIONS without approval of LPS NS.
  - Serving lines
    - Duke
      - Preference: Duke Expressions Collection.
  - Hot holding units
    - Hatco
  - Cold display units
    - Structural Concepts

- Dressing Rooms(s)
  - Shall include three full-length lockers per serving Line

- Space, hookups, and vents available for residential-sized:
  - Top-loading clothes washing machine
  - Front-loading clothes dryer
  - Located within six feet of Locker Room.

- Custodial Closet
  - Terrazzo receptor-type floor-sink in or closely adjacent to Kitchen
  - Space to allow for:
    - Cleaning chemicals
    - Mop bucket
    - Wringer and rack for four mops.

- Equipment and Space Requirements
  - As outlined in U.S. Department of Agriculture Program Aid No. 1091, "Equipment Guide for On-site School Kitchens".
    - Exceptions:
      - Walk-in Refrigerator
        - 72 square feet for nonkindergarten enrollment up to 700
        - 89 square feet for nonkindergarten enrollment 701 to 1,000
        - 96 square feet for nonkindergarten enrollment 1,001 to 1,100
        - 105 square feet for nonkindergarten enrollment 1,101 to 1,200
        - 140 square feet for nonkindergarten enrollment over 1,201
      - Walk-in Freezer:
        - 92 square feet for nonkindergarten enrollment up to 700
        - 132 square feet for nonkindergarten enrollment 701 to 1,000
        - 145 square feet for nonkindergarten enrollment 1,001 to 1,100
        - 158 square feet for nonkindergarten enrollment 1,101 to 1,200
        - 211 square feet for nonkindergarten enrollment over 1,201

- Walk-in Refrigerator and Freezers
  - Approved Manufacturer(s)
    - Thermo-Kool
  - Adjust lengths of shelving sections to utilize all interior cooler space.
  - Finish
    - Galvanized finish on un-exposed exterior surfaces
    - Type 304 stainless steel finish on all exposed exterior surfaces
    - White stucco aluminum interior walls and ceiling.
  - NSF-listed assembly shall be 9’-0” overall from bottom of floor panels to top of ceiling panels.
  - 34” x 76” entrance doors with hardware to also include:
    - Pilot lights and switch assembly
    - 14” x 24” view windows
    - Foot treadles
    - One (1) spring-loaded hinge per door
    - 48” aluminum tread plate
    - Interior and exterior kick plates
    - Dial thermometers
    - Door strip heaters.
  - Type 304 stainless steel closure strips/trim as required between units and at walls
    - Stainless steel trim to conceal gap between top of unit and ceiling.
    - Grain direction of all stainless steel is to match that of assembly exterior.
  - 120volt Component Hardware #VXS-100-PX vapor-proof lights with bulbs in each compartment
    - Fixtures pre-assembled with wiring and conduit insulated against air passage and pre-wired
    - Flush-mounted
    - 3-way switches with pilot lights and stainless-steel cover plates
    - Interior OSHA switches with constant "ON" pilot lights.
  - No exposed conduit inside assembly.
  - Heated pressure relief port.
  - Compartments to have 4-1/2" diameter vapor-activated, remote bulb dial thermometers with flush chrome bezels, mounted at 5'-6" a.f.f.

- Extra length capillary shall be provided in aluminum conduit with bulb mounted in return air stream of evaporator coil on stand-off bulb brackets.
- Range of thermometer to be minus 40o F to plus 60o F in two-degree gradations.
- Wall penetrations shall have a 5" diameter stainless steel escutcheon plate sealed with clear silicone sealant.

▪ Vaults must be installed by factory-trained, experienced mechanics, subject to approval of LPS NS and LPS's Kitchen Consultant.

▪ Delivery and erection of vaults and installation and start-up of refrigeration system shall be performed by a Factory-approved and -supplied installer ONLY.

- Kitchen Equipment Contractor must submit to the District's Kitchen Consultant a list of qualified installers for approval prior to installation of vaults and refrigeration system.
- Vault Installer shall:
  - Review and approve the work of others, including but not limited to electrical and refrigeration.
    - All wall penetrations and light fixture sealing also require acceptance
  - One (1) year free service including parts and labor on refrigeration system
  - Five (5) year warranty on condensing units.

o Freezer/Cooler/Dry Storage Shelving

▪ Approved Manufacturer(s)

- Metro Max

▪ Dry Storage shelving shall be provided in proportion to school enrollment, as follows:

- 210 square feet for nonkindergarten enrollment up to 700
- 300 square feet for nonkindergarten enrollment 701 to 1,000
- 330 square feet for nonkindergarten enrollment 1,001 to 1,100
- 360 square feet for nonkindergarten enrollment 1,101 to 1,200
- 480 square feet for nonkindergarten enrollment over 1,201

o Kitchen, Serving, Storage and Service Areas

▪ Shall require one (1) outside door opening to a dock or delivery area and allowing safe pedestrian traffic during unloading.

▪ Storage Areas

- Shall be near the outside door.
- Storage areas, including walk-in coolers, shall have one door opening into the Kitchen.
- Kitchen Contractor

- Shall obtain approval of both Kitchen design and finished Kitchen by:
  - Tri-County Health Department
  - All other agencies which regulate the food service industry.

- Kitchen Equipment
  - Shall be scheduled as furnished and installed by the Contractor:
    - Refrigerated Milk Cabinets:
      - Approved Manufacturer(s)
        - Mod-U-Serv model MCT-DM2
      - Two-sided drop front milk coolers
      - Mounted on casters.
    - Mobile Condiment Cart:
      - Approved Manufacturer(s)
        - Mod-U-Serv, Server model SE-SS-07125
      - Stainless steel construction with plastic laminate body panels
      - Stainless steel "V" bump tray-slide, to be an integral part of counter body
      - Remote counter top dispensers
        - One (1) per side with stainless steel food product bag holders mounted inside the cabinet.
        - Bag holders shall provide easy access for changing the product.
      - Cutouts for stainless steel silverware cylinders, with twenty-seven (27) cylinders for each unit
      - Cutouts for twelve (12) food pans per unit
        - Cambro model 64CW-110 (BLACK)
      - Two (2) built-in napkin dispensers
        - San Jamar Model H2000TBKSS
      - Lockable sliding stainless steel doors
      - Fully capped six-inch back splash
      - Heavy-duty 5" plate casters with brake models at all corners of cabinet.

- Microwave Oven on Shelf:
  - With custom- fabricated stainless-steel shelf sized to accept microwave oven selected.
  - Approved Manufacturer(s)
    - Amana RC-17 microwave oven
- Exhaust Hood:
  - All-welded 18-gauge Type 304 stainless steel construction
  - Suspended from structure above, including:
    - UL-listed stainless-steel baffle type filters and continuous drip trough
    - Stainless steel perforated front discharge make-up air panels
    - Recessed fluorescent light fixtures and lamps.
  - Coordinate fan and light switches remote-mounted on wall with Electrical.
  - Approved Manufacturer(s)
    - Gaylord Model HH-W-MAW-60 exhaust hood
    - Alternate models of equal specifications may be considered
      - Requires submission to the District's Kitchen Consultant for approval two weeks prior to bid opening
      - Ventmaster
      - Avtec
- Double Convection Ovens:
  - Approved Manufacturer(s)
    - Blodgett model # DFG-200
  - Six (6) racks per oven cavity
  - Fan Delay/Pulse-Plus
  - Stainless-steel front, sides, top, and enclosed back
  - Porcelain interior
  - Under hood flue diverter kit
  - Electric continuous sounding buzzer with timers
  - Doors to have dual pane thermal windows
  - Adjustable bullet feet

- Gas connector kit
  - ¾" inside diameter, 48" long
  - Supr-swivel couplings
  - Approved Manufacturer(s)
    - Dormont Model 1675KITBS48
- DO NOT MANIFOLD OVENS

- Proofer/Warmer
  - Differential control fan
  - Fourteen (14) adjustable rack supports
  - Doors hinged per plan, with windows on both doors
  - Full perimeter bumper
  - Four (4) five-inch casters, front two (2) to be locking
  - Auto-fill option
  - Approved Manufacturer(s)
    - Winston Model HA4522-HR-5 CVap Hold/Proof unit
- Double Steamer:
  - Coordinate placement of Floor Trough to ensure steamer legs do not rest on grate.
  - Double-stacked, open leg stand w/bullet feet
  - Five (5)12 x 20 x 2-1/2" pans capacity per compartment
  - Boiler-less
  - Doors hinged right
  - Stainless steel interior and exterior
  - Single water connection
  - Approved Manufacturer(s)
    - Groen Model (2)SSB-5GF steamer
      - Groen SmartSteam™ Convection Steamer
  - Natural gas; 62,000 BTU for each unit
    - DO NOT MANIFOLD UNITS
  - Gas connector kit
    - ¾" inside diameter, 48" long
    - Supr-swivel couplings

        - Approved Manufacturer(s)
            - Dormont Model 1675KITBS48
    - Water filtration at steam generator supply line
        - Approved Manufacturer(s)
            - Everpure “KleenSteam”
- 40-Gallon Tilting Skillet:
    - Manual-tilting electric-heated unit
    - Stainless steel exterior and legs
    - 9" deep pan with 2” tangent draw-off
    - Approved Manufacturer(s)
        - Groen Division/Dover Corporation Model #BPM-40E fry pan
- Range:
    - Four (4) burners with flame fail and spark ignition on all burners
    - Single rear gas connection
    - Stainless steel front and sides, optional back panel and low-profile back guard
    - Space-saver oven with porcelain interior
    - Adjustable stainless-steel legs 6” high
    - Approved Manufacturer(s)
        - Garland Commercial Industries Model #GFE24-4L 24” wide range
    - Gas connector kit
        - ¾" inside diameter, 48" long
        - Supr-swivel couplings
        - Approved Manufacturer(s)
            - Dormont Model 1675KITBS48
- Utility Faucet with Bracket:
    - Stainless steel wall bracket
        - T&S Brass Special Model No. 43-039 Assembly
            - Include two (2) 6-foot VB hose assemblies
        - Model B-0100 Spray Rinse with 68” braided stainless steel hose
        - Model B-102-A Pot Filler with 44” braided stainless steel hose.
        - T&S Model B-0166 hook assemblies.

- Ice Makers and Bin:
  - Adjustable stainless-steel legs 6" high
  - Approved Manufacturer(s)
    - Ice Maker
      - Hoshizaki Model KM-500MAH-E
    - Mounted on Stainless Steel Ice Bin
      - Hoshizaki Model B-300
  - Water Filter
    - Approved Manufacturer(s)
      - Everpure Insurice 2000 single water filter
        - Model #K-10 coarse filter
        - One (1) six-pack of replacement cartridges for each filter
  - Cord and plug
  - Warranty
    - Start-up and three (3) years parts and labor warranty
    - Five (5) year parts on compressor and evaporator warranty.
- Pass-Through Refrigerator
  - Full-height doors
  - Hinged per plan
  - Glass on Kitchen side
  - Solid on serving side
  - Ten (10) stainless steel wire shelves per section
  - Adjustable stainless-steel legs
  - Approved Manufacturer(s)
    - Traulsen Model RHT 1-32 WPUT
- Pass-Through Hot Food Cabinet
  - Differential control fan
  - Fourteen (14) adjustable rack supports
  - Pass-thru model, doors hinged per plan; half-height glass doors at Kitchen side, half-height solid doors at serving side
  - Adjustable stainless-steel legs 5” high
  - Top cover extensions to match height of pass-thru refrigeration.

- Approved Manufacturer(s)
  - Winston Model HA4522-PT-HR-5 CVap Hold/Proof

- Slicer on Stand
  - Slicer
    - 12" stainless steel carriage tray
    - Two (2) adjustable high fences
    - Approved Manufacturer(s)
      - Hobart Model 1612
  - Stand
    - Locking casters
    - Approved Manufacturer(s)
      - New Age Model #98001-B
- Utensil Rack
  - Stainless steel pot rack assemblies at wall cap shelf as shown
  - 1-5/8” diameter stainless steel supports
  - Thirty (30) sliding double-prong pot-rack hooks
    - Component Hardware Model J77-4401
  - Stainless steel rack band, fully- welded to supports and cross braced
    - Component Hardware Model J95-2250 ¼” x 2”
  - Rolled ends:
    - 9” radius top section
    - 4” radius mid-section
- Utility Carts
  - Three-tier mobile utility cart on casters
  - Approved Manufacturer(s)
    - Metro Model MUC2442-35

- Fire Suppression System:
  - System installed in accordance with manufacturer's recommendations and in compliance with NFPA 96 for exhaust hood(s)
  - Duct and plenum protection to hoods
  - Surface protection to equipment below
  - Chemical cylinders located as indicated on drawings, with piping to hoods totally concealed.
  - Exposed piping/fittings within cylinder location and exhaust hood to be chrome-plated or -sleeved with stainless steel tubing
  - Exposed pipe threads in and above food zone are PROHIBITED.
  - Remote manual releases located as shown on drawings
  - Electrical contractors as required for connection to school alarm system by others
  - Two (2) "K"-type handheld extinguishers mounted on brackets as per local code.
  - Approved Manufacturer(s)
    - Ansul Model No. R-102 Series
- Hand Sinks, Dispensers, and Glove Racks:
  - Two (2) hand-sinks
    - Electrically powered, electronic-eye faucet and trash receptacle
    - Approved Manufacturer(s)
      - Eagle Group Model HSA-10-FE-T-MG
  - Three (3) automated, touch-free towel dispensers
    - Two (2) units at hand-sink locations
    - One (1) unit in the Kitchen restroom.
    - Heavy-duty batteries to be included
    - Verify paper towel size with Owner
    - Approved Manufacturer(s)
      - Georgia Pacific Model #59460
  - Three (3) automated, touch-free soap dispensers
    - Two (2) units at hand-sink locations
    - One (1) unit in the Kitchen restroom.
    - Heavy-duty batteries to be included

        - Approved Manufacturer(s)
            - GOJO Model #2430-01
    - Two (2) glove racks with single service gloves
        - Installed in the Kitchen area.
        - Approved Manufacturer(s)
            - FoodHandler Model #11-0012, Eagle part #352855
- Three-Compartment Sink:
    - Shall be shown on drawings, with the following features:
        - 14-gauge stainless steel sound-deadened tops
            - All vertical and horizontal corners coved
            - 12" high splash at walls and 3" high x 1-1/2" rolled rims having 1" radius on exposed corners, where shown.
            - Cut top per plan and weld in disposer cone.
            - Three (3) #14-gauge stainless steel coved sinks per plan, elevations, and details.
    - Flat area on backsplash
        - Allow for vacuum breaker
            - T&S Brass and Bronze Works Model #B-0456-04
        - Polished chrome plated with slip flanges for mounting to splash.
    - Disposer
        - Disposer with 18” stainless steel disposer bowl
        - Neoprene silver trap
        - Scrap ring and splash guard.
        - Approved Manufacturer(s)
            - In-Sink-Erator Model #SS-150-B18-AS101
        - Aqua Saver control panel with stainless steel box mounted on custom bracket as detailed.
            - K.E.C. to set water shut-off at 45 seconds unless otherwise specified.
    - Pre-rinse spray
        - Approved Manufacturer(s)
            - T&S Brass and Bronze Works Model #B-0133
            - Include wall support Model #B-109
    - Two (2) 3/4" splash-mount mixing faucets

        - Approved Manufacturer(s)
            - T&S Brass Model B-290
    - Three (3) rotary drains with overflow and tailpieces
        - Approved Manufacturer(s)
            - Component Hardware Model No. D53-7215
    - 16-gauge stainless steel fully welded undershelves where shown with clearance below soiled end counter section for two (2) Item #49 trash containers per plan.
    - 2" x 1/4" stainless steel band-constructed utensil rack supported on 1-5/8" O.D. stainless steel tubing formed as per detail
        - With Component Hardware stainless steel sliding pot hooks on approximately 8" centers
        - Braced to wall as required for rigidity
        - One (1) #18-gauge stainless steel 8" wide over shelf, with rear and ends coved up and capped, mounted to utensil rack support.
        - Flat area to be provided on backsplash for sleeves of utensil rack supports.
- Work Table:
    - One (1) open-base preparation sink/table as per drawings
    - 36” wide by length shown
    - Sides turned down square with 1” radius corners
    - Type 304 stainless steel legs and gussets with adjustable bullet feet.
    - No front cross rail, per plans.
    - Approved Manufacturer(s)
        - Alternate: Advance/Tabco Spec Line or Universal Stainless Spec Line of equal specifications may be considered, if submitted to District’s Kitchen Consultant for approval two weeks prior to bid opening.
- Vegetable Cutter
    - Approved Manufacturer(s)
        - Mannhart Model #M-2000
        - Include plate accessories:
            - One (1) #S2 slicer
            - One (1) #S3 slicer
            - One (1) #S5 slicer

- One (1) #S11 slicer
- One (1) #SH7 shredder
- One (1) #D14 dicing grid
- One (1) #J2X2 julienne slicer

- Condensate Hood
  - All-welded 18- gauge Type 304 stainless steel construction
  - Size and shape per plan, mounted at 6'-6" a.f.f.
    - K.E.C. to verify field-verify length and as-built wall dimensions and adjust length of hood for a fit of 1" tolerance.
  - Fan switches remote to wall location, per plan
  - Drain line extended behind equipment with stainless steel tubing and routed to nearest floor drain.
  - Approved Manufacturer(s)
    - Gaylord Model VH2-W-48
    - Alternate models of equal specifications may be considered
      - Requires submission to the District's Kitchen Consultant for approval two weeks prior to bid opening
      - Ventmaster
      - Avtec
- Work Table with Sink:
  - One open-base preparation sink/table as per plans
  - Sides turned down 2" square with 1" radius corners
  - Type 304 s/s legs and gussets
  - 18"x20"x10" deep sink compartment
  - T&S Model B-0221 deck-mount faucet with swivel gooseneck faucet
  - 6-gauge stainless steel fully welded undershelves where shown
  - Two (2) Component Hardware Group Model S52 Series s/s drawer assemblies
  - Space for mobile trash container and place for mounting Can Opener, as per plan.
  - Approved Manufacturer(s)
    - Component Hardware Model No. D53-7215 rotary drain with overflow and tailpiece
    - Alternate models of equal specifications may be considered

- Requires submission to the District's Kitchen Consultant for approval two weeks prior to bid opening
- Advance/Tabco Spec Line
- Universal Stainless Spec Line

- Prep Sink:
  - One open-base preparation sink/table as per plans
  - Sides turned down 2" square with 1" radius corners
  - Type 304 s/s legs and gussets
  - Two (2) 20"x20"x10" deep sink compartments
  - T&S Model B-231 splash-mount faucet
  - Two (2) Component Hardware Model No. D53-7215 rotary drains with overflows and tailpiece.
  - 16-gauge stainless steel fully welded undershelves where shown
  - Component Hardware Group model S52 Series stainless steel drawer assembly
  - Space as shown for mobile trash container.
  - Approved Manufacturer(s)
    - Component Hardware Group model S52 Series stainless steel drawer assembly
    - Alternate models of equal specifications may be considered
      - Requires submission to the District's Kitchen Consultant for approval two weeks prior to bid opening
      - Advance/Tabco Spec Line
      - Universal Stainless Spec Line
- Work Table:
  - Open-base preparation sink/table as per plans
  - Sides turned down 2" square with 1" radius corners
  - 6" high backsplash and fully-capped side splash, anchored to wall
  - Approved Manufacturer(s)
    - Component Hardware Group Model S52 Series s/s drawer assembly.
    - Alternate models of equal specifications may be considered
      - Requires submission to the District's Kitchen Consultant for approval two weeks prior to bid opening
      - Advance/Tabco Spec Line

- Universal Stainless Spec Line

- Pan Rack:
  - Six (6) heavy-duty angle-ledge utility racks on 5" swivel casters with two brakes each.
  - Lifetime warranty.
  - Approved Manufacturer(s)
    - New Age Industrial Model 4331
- Baker's Table:
  - MapleTex top
  - 16-gauge Type 304 stainless steel legs and stainless-steel bullet feet
  - Coved risers back and sides.
  - Approved Manufacturer(s)
    - Tabco Model TBS-306 Baker's Table w/MapleTex

- Mobile Ingredient Bins:
  - Three (3) Rubbermaid Model 3602 mobile ingredient bins.
  - Approved Manufacturer(s)
    - Rubbermaid Model 3602
- MIXER:
  - Mixer with standard accessory package, plus:
  - One (1) additional stainless-steel bowl
  - One (1) Bowl truck
  - One (1) Ingredient chute
  - One (1) Bowl scrapper
  - One (1) Bowl splash cover 06 – One (1) "E" Dough hook 07 – One (1) "ED" Dough hook
  - One (1) 9" vegetable slicer with adjustable slicer plate for #12 hub
  - One (1) each plate holder assembly with 3/32", 3/16", 5/16" & 1/2" shredder plates
  - Size based on enrollment:
    - 30-quart for up to 600
    - 60-quart for 601 to 2,000.
  - Approved Manufacturer(s)
    - Hobart Corporation Model #HL300

- Mixer Accessory Rack:
  - Stainless steel utensil rack
  - Approved Manufacturer(s)
    - Advance/Tabco Model SW-36
- Wall Mounted Filler Faucet
  - Pot and Kettle Filler
  - Approved Manufacturer(s)
    - T&S Model B-605
- Mobile Trash Containers:
  - Eight (8) trash container with lid
  - Dolly for each container
    - Color to be red
  - Approved Manufacturer(s)
    - Trash container with lid:
      - Rubbermaid Model 3517
    - Dolly:
      - Rubbermaid Model 3530
- Utility Wall Shelving:
  - Two (2) two-tier wall-mounted wire- shelf assemblies, 12”x72” and 12”x48”
  - White epoxy finish
  - Cantilever-type shelves and mounting hardware
  - Field verify shelving lengths for accurate dimensions
  - Approved Manufacturer(s)
    - Amco
- Wall Shelf:
  - One (1) stainless wall-mounted shelf.
  - Approved Manufacturer(s)
    - Universal Stainless WSD-7212
    - Alternate(s):
      - Advance/Tabco
      - Custom Fab
- Bread Rack:

- By District's Vendor

- Pot-Washing Machine:
  - Zero (0") clearance on back and both sides.
    - K.E.C. to trim side and back to wall with stainless steel trim
    - Grain direction to match the machine.
  - Built-in booster heater
  - Pumped drain for both floor- and wall-drain applications
  - Fully automatic fill, start and reset
  - Self-cleaning cycle: automatic cleaning of wash chamber following shutdown of the machine
  - Stainless steel non-clogging wash and rinse arms
  - Integral wash tank soil removal system to maintain clean wash water and built-in temperature safeguards to guarantee washing and rinsing at minimum required temperatures regardless of incoming water temperature.
  - Water connection hookup to ¾" male garden hose fitting
    - Furnish 48" stainless steel braided hose to plumber for installation in lieu of standard hoses provided.
  - Approved Manufacturer(s)
    - Meiko Model FV 130.2
- Wall Cap Shelf:
  - Two (2) 16-gauge stainless steel wall cap shelves
  - 16" wide, full length of wall
  - Overhang ends ¾"
  - 2" square drop edge with 1" radius corners.
- Floor-Trough with Grate:
  - Four (4) complete assemblies
  - Heavy-duty removable grate
    - 18" maximum length by width shown on plan
  - Anti-spill design
  - 14-gauge, 18-8 Type 304 stainless steel, fully welded, coved- corner construction
  - Trough fitted with s/s waste cup and removable basket for 3½" waste pipe.
  - Approved Manufacturer(s)

        - Trough:
            - IMC/Teddy Model #ASFT “Anti-Spill”
        - Grate:
            - Chemgrate heavy-duty Model FS
- Dunnage Rack:
    - All square-bar aluminum construction
    - Fully heli-arch welded
    - Two (2) racks, 1-tier, 24"W x 60"L x 12"H, weight capacity 2000 lbs.
    - Four (4) racks, 1-tier, 24"W x 48"L x 12"H, weight capacity 2500 lbs.
    - Approved Manufacturer(s)
        - 2000 lbs.
            - New Age Industrial Model #2009
        - 2500 lbs.
            - New Age Industrial Model #2010
- Wall Cap:
    - Fabricate one (1) 16-gauge stainless steel wall cap full length of wall.
    - Overhang end and sides ¾”.
    - Provide 2” square drop edge with 1” radius corners.
    - Butt to end with 1” turn up.
    - Trim turn up to fit wall thickness and finish.
- Mop Organizer:
    - One (1) organizer/tool holder at 70” a.f.f.
    - Approved Manufacturer(s)
        - Unger Model HO700
- Utility Faucet:
    - One (1) service sink faucet
    - Built- in stops
    - Vacuum breaker
    - Lever handles
    - Wall brace and chrome finish.
    - Approved Manufacturer(s)
        - T&S Model B-0655-BSTP/R

- Clean-Dish Storage Shelving:
  - Three (3) shelving units
  - Sizes, widths, and lengths as per plan
  - Four tiers high
  - Each section with (4) 74PX posts.
  - Confirm vault sizes and conform within nearest increment (3" maximum tolerance).
  - Approved Manufacturer(s)
    - Intermetro MetroMax Shelving
- Dish-Drying Rack:
  - Two (2) mobile drying racks
  - 24"W x 48"L x 75-1/2" H
  - 4-tier, with 2 drop-ins
  - Cuttingboard/tray drying rack with built-in Microban® antimicrobial protection
  - 5"-diameter heavy-duty, N.S.F.-approved polyurethane-tired swivel casters with brakes on two (2) casters
  - Rotating, non-marking neoprene bumpers with stainless steel hubs, mounted just above the casters.
  - Approved Manufacturer(s)
    - Intermetro Corporation MetroMax® Mobile Drying Rack Unit, Model #PR48VX2
- Chemical Storage Shelving:
  - Stainless steel shelving:
  - Sizes, widths, and lengths as per plan
  - Four (4) tiers high
  - Each section with four (4) 74PS stainless steel posts.
  - Approved Manufacturer(s)
    - Intermetro Super Erecta
- Mobile Work Table:
  - Size and shape as indicated on plans
  - Sides turned down 2” square with 1” radius corners
  - Type 304 s/s legs and gussets
  - 16- gauge stainless steel fully welded undershelf where shown

- 5” heavy-duty casters, all with brakes

- Exhaust Hood:
  - Exhaust hoods without exhaust damper
  - All-welded 18-gauge Type 304 stainless steel construction
  - Sizes and shapes per plan.
    - K.E.C. to field-verify length and as-built wall dimensions and adjust length of hood as required for a fit of 1” tolerance.
  - Suspend from structure above, with bottom of hoods at 6’-6” a.f.f.
  - Stainless steel closure panels to enclose space between hoods (where exposed) at end and bottom with 18-gauge Type 304 stainless steel panels
  - UL-listed stainless-steel baffle-type filters
  - Stainless steel perforated front-discharge make-up air panels
  - Continuous drip-trough
  - Recessed fluorescent light fixtures and lamps
  - Coordinate fan/light switches location and furnished to electrical contractor for remote mounting on wall.
  - Approved Manufacturer(s)
    - Gaylord Model PG-ND-BDL-MAW-60
    - Alternate models of equal specifications may be considered
      - Requires submission to the District’s Kitchen Consultant for approval two weeks prior to bid opening
      - Ventmaster
      - Avtec

- Manual Can Opener:
  - Two (2) can openers
  - Mounted on tables as indicated on plan
  - One (1) additional cutter.
  - Approved Manufacturer(s)
    - Can Opener
      - Nemco Model 565050-1 CanPRO compact model
    - Cutter
      - Nemco Model 56029

- Electric Can Opener:
  - Set in place per plan.
  - Approved Manufacturer(s)
    - Edlund Model 270
- INGREDIENT SCALE:
  - Digital scale with removable platform
  - Cord and transformer plug.
  - Units of measure shall be 70 oz. x 0.1 oz. (2000 g. x 2 g.)
  - Approved Manufacturer(s)
    - Tanita Model KD-200
- Utility Table:
  - Open-base table, size and shape as indicated on plans
  - Sides turned down 2" square with 1" radius corners
  - 8" high splash per plan
  - Type 304 stainless steel legs and gussets with adjustable bullet feet
  - 16-gauge stainless steel fully welded undershelf.

11 50 00 Educational and Scientific Equipment

11 51 00 Library Equipment

- Theft protection systems, depositories, automated shelving/retrieval, etc.
- Submittals:
  - Product data
  - Shop drawings
  - Samples
  - Layout plan and details
  - Manufacturers' instructions
  - Schedule
  - Closeout:
    - Submittals updated to Record status
      - Samples excluded
    - O&M manual
    - On-site demonstration and training video for LPS staff
    - Warranties

- Book Theft Protection Equipment
  - Work in this section is restricted to specific manufacturers that have been previously approved by the LPS Purchasing Department:
    - Checkpoint
    - 3M
  - Fully functional within an environment of electromagnetic interference from computers, monitors, copiers, ballasts, and other sources.
  - Electromagnetic or radio frequency type
  - Portable or fixed station
  - Suitable for protecting both printed and electronic media
  - Manufacturer qualifications:
    - Minimum five (5) consecutive year firm history of manufacturing institutional grade Library Equipment
    - Minimum five (5) installations of the specific product in public schools or comparable institutional occupancies in Colorado or adjacent states.
  - Maintenance Service:
    - Full-time service based or branched in Colorado or adjacent state.
    - 24-hour a day, 365 days per year telephone support
    - Repair and service training for LPS Operations, Maintenance and Construction Department (OMC) personnel.
    - Optional renewable annual service contract for 72-hour response for factory authorized on-site repair and service.
- Book Drop (Depository)
  - Open to any product or material that is fully assembled wood fabrication with chute and “slow down” feature.

11 53 00 Laboratory Equipment

- Submittals:
  - Product data
  - Shop drawings
  - Samples
  - Layout plan including:
    - Utility connections
    - Manufacturers’ instructions
    - Schedule
  - Closeout:
    - Submittals updated to Record status (samples excluded)

  - O&M manual
  - On-site demonstration and training video for LPS staff
  - Warranties
- Coordination
  - Verify type, size and routing of water, waste, gas, HVAC and electrical with those trades.
- Equipment
  - Fume Hoods:
    - Pre-wired and pre-piped
    - Factory-finished sides, base, and filler panels.
    - Drains, water supplies or cup sinks are PROHIBITED
    - Restricted to specific manufacturers that have been pre-approved by LPS OMC:
      - Fisher-Hamilton
      - Air Master
      - Kewaunee
      - Taylor
  - Acid Storage Cabinet:
    - 18 ga. coated steel
    - Vented at rear
  - Ammonium Hydroxide Storage Cabinet:
    - Wood
  - Ammonium Nitrate Storage Cabinet:
    - Wood
  - Flammable Organics Cabinet
    - Noncombustible construction compliant with NFPA Code 30 and OSHA
  - Explosion proof refrigerator permitted.
  - Flammable Metals Cabinet:
    - Noncombustible construction compliant with NFPA Code 30 and OSHA
  - Explosion proof refrigerator permitted.

11 60 00 Entertainment and Recreation Equipment

11 61 00 Theater & Stage Equipment

- Rigging systems, lighting, curtains, etc.

- Submittals:
  - Product data
  - Shop drawings
  - Samples (as appropriate)
  - Layout plan and details
  - Manufacturers' instructions
  - Schedule
  - Closeout:
    - Submittals updated to Record status (samples excluded)
    - O&M manual
    - On-site demonstration and training video for LPS staff
    - Warranties
- Restrictions:
  - Professional legitimate stage type fly loft apparatus is PROHIBITED
- Choral/Instrumental Risers:
  - 3-tier assembly
  - Rectangular sections only
    - Triangular filler sections PROHIBITED
  - Non-skid surface
  - Uncarpeted
- Stage Curtains:
  - Velour
  - Certified flameproof
  - Pre-bagged
  - Pre-hung
  - Sized to 130% of proscenium width

11 66 00 Athletic Equipment

11 66 23 Gymnasium Equipment

- Submittals:
  - Product data
  - Shop drawings
  - Samples (as appropriate)
  - Layout plan and details

  - Manufacturers' instructions
  - Schedule
  - Closeout:
    - Submittals updated to Record status (samples excluded)
    - O&M manual
    - On-site demonstration and training video for LPS staff
    - Warranties
- Equipment
  - Typically provided by Owner
  - Coordinate with the LPS OMC
- Curtain Divider(s)
  - Shall be provided to divide cross courts for Physical Education (PE), with top portion to be open netting for air circulation.
- Lockers
  - Metal
  - Welded
  - Ventilated
  - Double-tiered
  - Prefinished in baked enamel
- Floor Anchors
  - Provide inserts, clamps, mat straps, etc., for ropes, nets, etc.
  - Coordinate location(s) with LPS OMC
  - Unless noted otherwise in Bid Documents, LPS will furnish equipment for installation by the Contractor(s).

11 68 00 Playfield Equipment and Structures

- In the absence of other information, standards of the following organizations apply:
  - United States Consumer Product Safety Commission (CPSC) Handbook for Public Playground Safety
  - ASTM F1487-11, Standard Consumer Safety Performance Specification for Playground Equipment for Public Use.
- Submittals
  - Product Data: required
  - Shop Drawing: required
  - IPEMA certification is required for each individual component.
  - Closeout: Submittals listed above, updated to record status.

- Heights
  - Play Surfaces
    - 3'-0" maximum play surface height for 2–5-year-olds, kindergarten/preschool.
    - 6'-0" maximum play surface height for 5–12-year-olds, primary.
    - All play surfaces over the maximum heights must be pre-approved.
  - Swing Sets
    - 8'-0" maximum swing set height for 2–5-year-olds, kindergarten/preschool.
    - 6'-0" maximum swing set height for 5–12-year-olds, primary.
- Safety Surfacing
  - Safety surfacing shall be installed under all play apparatus and within all play apparatus fall zones, use zones, and safety zones.
  - Safety surfacing materials shall have a Critical Height Value (see CPSC Guidelines) of at least the height of the highest accessible part of the play apparatus.
  - Maximize use of poured-in-place type safety material.
    - Maintain a 6'0" perimeter around all composite structures
    - Use as needed for ADA accessibility
  - Finish grade on safety surfacing not to exceed 2% slope.
  - PROHIBITED Materials
    - Sand
    - Wood chips, bark mulch, or wood mulch not certified by ASTM.
    - Any type of gravel including squeegee.
    - Loose mats (except "wear mats" indicated below).
    - Loose crumb rubber
  - Engineered Wood Fiber System
    - Install minimum depth of 15" EWF or as needed to allow for compaction (aged and used 90 days) to 12".
    - Provide a subsurface drainage system sufficient to prevent standing water in EWF areas.
      - Provide a minimum 3" deep layer of drainage rock beneath the entire EWF surface per manufacturer recommendation of EWF.
      - No free water remains 12 hours after precipitation ends.
      - Direct water to a storm water drainage system or to daylight.
    - Provide a minimum curb height of 3" above the surface of the compacted EWF.
    - Provide geotextile fabric between the EWF and the drainage layer.
      - Synthetic fabric non-woven.

- Minimum 3.5 ounce/square yard.

- Provide wear mats between EWF and geotextile fabric in high traffic zones including:
  - Beneath swing seats
  - Slide exits
  - Beneath slide poles
  - Base of ramps.
  - Minimum 4’ x 6’ x 1-1/2” thick at swings and 4’ x 4’ x 1-1/2” thick at slides.
- Wear mats to comply with EWF manufacturer specifications to avoid voiding product warranty.
- Provide ramps for accessible transitions between play area perimeters and surface of EWF.
  - Drop-offs are PROHIBITED
- Provide continuous paths or paths 5’ wide to allow disabled students to turn around once play activities are completed or provide a second means of egress.
  - Access paths shall not contain dead ends.
- It is preferred to use a resilient safety surface other than EWF for access path surfacing.

- Poured-in-place material
  - Thickness shall be determined by manufacturer, as appropriate to fall height and to meet certification requirements noted above.
  - Polyurethane binder shall be mixed throughout the entire thickness.
  - Bevel perimeter of the installation running from the thickness of the surface down to the base in a 1:8 slope.
    - The outside line of the bevel must be clear and follow the designed edge of the installation.
  - Granular base
    - Minimum depth of 1” to 4” depth is required
    - Compacted to a 95% Proctor density
    - Water percolation rate of 60 liters/m2/hour.
      - Install French drain if needed to meet minimum requirement.
  - Required written approval by LPS OMC and LPS Project Manager for color(s).
- Asphalt or concrete
  - Require a slope of no less than 2% to drain
- Rubber tile
  - Requires district review and approval.

- Certifications
  - EWF, wear mats, or poured-in-place material shall meet impact attenuation requirements of ASTM F1292 – Standard Technical Guidelines for Impact Attenuation of Surface Systems Under and Around Playground Equipment.
  - For EWF, wear mats and poured-in-place material:
    - G-max values shall comply with ASTM standards.
    - HIC values shall comply with ASTM standards.
- Submittals
  - Product Data required for:
    - Wear mats
    - EWF
    - Poured-in-place
    - Drainage
    - Play apparatus
- Acceptable EWF systems:
  - Fibar.
  - Pre-approved equivalent.

- New Apparatus
  - REQUIRED Installer Qualifications and Agreement include:
    - Manufacturer trained and certified installers.
      - LPS OMC in house projects require approval of Risk Management
    - Construction Agreement
    - General Conditions
    - Certificate of Insurance
  - Submittals
    - Shop Drawings
      - Both plan view and three-dimensional.
      - Indicate fall zones, safety zones, and use zones.
    - Product Data
      - Color samples.
        - Submitted to LPS OMC, LPS PM, for color determination and coordination with school principal.
    - Certifications

- Statement of Accessibility
  - Manufacturer shall indicate the total quantity of new ADA play components to be provided for each project.
  - Designer shall indicate which components of the new play apparatus are accessible as defined by the ADAAG.
- Extended Warranty not required for play apparatus.
- Operations and Maintenance
  - Tools – Safety dots.
  - Touch-up paint along with MSDS sheets.
  - Maintenance recommendations.
  - Recommendations for graffiti removal.
  - Spare parts including spare nuts and bolts.

- PROHIBITED Materials
  - Wood
  - Recycled plastic on composite structure or play apparatus
  - Synthetic lumber on composite structure or play apparatus
  - Concrete.
  - Rubber vehicle tires
  - "Homemade" apparatus.
- Materials and Fabrication.
  - Support posts and uprights
    - Galvanized steel, minimum 12 gauge.
    - Minimum 4-1/2" outside diameter (5" outside diameter preferred).
      - Primary Play 4-1/2", Pre-K 3-1/2"
      - Alternates may be used for cost savings, if approved by the district.
    - Finish: Baked on, polyester powder coated paint.
      - Epoxy or hybrid paints is PROHIBITED.
  - Handrails, guardrails, and other structural members
    - Galvanized steel
    - Diameter of steel tubing will vary according to manufacturer's recommendations. Minimum 1-5/16" outer diameter.
    - Finish: Baked on, polyester powder coated paint.
      - Epoxy or hybrid paints is PROHIBITED.
    - Textured or knurled handrail surfaces are preferred

- Plastic components.
  - Rotationally molded, linear, low density polyethylene with UV inhibitors.
  - Minimum wall thickness: 0.25” except as allowed for roofs.
- Decks, including platforms, ramps, walking surfaces, bridges, slide ladders.
  - Perforated 12-gauge steel horizontal surfaces
  - Fully welded
  - Vinyl coated.
- Slides.
  - One-piece double-wall plastic.
  - Sectionals preferred.
- Chain.
  - Galvanized or stainless 670-pound working load with 4.0 welded links.
- Roofs.
  - Rotationally molded plastic.
- Hardware, accessories, fittings.
  - Post caps.
    - Cast aluminum.
    - Baked on, polyester powder coated paint.
      - Epoxy or hybrid paints is PROHIBITED.
  - Clamps
    - Cast or die cast aluminum or stainless steel.
    - Baked on, polyester powder coated paint.
      - Epoxy or hybrid paints is PROHIBITED.
  - Fasteners.
    - All fasteners shall be tamper-proof stainless steel.
    - All nuts shall be lock nuts.
    - Lock nuts shall have safety caps.
    - All swings to have pipe swing hangers.
  - Permanent Labels
    - Apply to apparatus, or on sign close to apparatus.
    - Identify play apparatus manufacturer.
    - Include appropriate safety warnings.
    - Indicate age appropriateness of equipment.

- Elevation of Safety Surfacing.
  - Manufacturer shall permanently mark optimum safety surfacing grade level on every post. Marking shall be a simple line and shall not be identified.

- Installation
  - Playground designer and installer shall ensure that all potential underground utilities and structures are located prior to digging.
  - Installer shall verify that sub grades are properly prepared and compacted.
  - Beginning of installation indicates acceptance of existing conditions.
  - Installer shall field verify locations of all apparatus with district representative before proceeding with installation.
  - Building permit is required for apparatus installation. Installer shall coordinate inspections as required by permit.
  - Installer shall provide concrete footings to dimensions indicated by play apparatus manufacturer.
  - Concrete shall meet district technical guidelines.
  - Protect all excavations from erosion and flooding during apparatus installation.
  - General installation to include:
    - Apparatus in position and temporary bracing.
    - Install concrete in footing voids.
    - Remove temporary bracing after concrete has set for 48 hours minimum.
    - Place geotextile fabric as detailed on construction documents, and secure to each post with manufacturer's recommended adhesive.
    - Set components plumb, level, and free of warp or racking.
    - Secure components in position using anchorage devices recommended by the apparatus manufacturer.
    - Apply thread adhesive to anchors.
    - Protect components from staining, use, cracking, chipping, vandalism, and damage until apparatus has been accepted by the district.
  - REQUIRED observations and consultant sign off include:
    - Drainage.
    - Sub grade.
    - Equipment installation.
    - Safety surfacing.
    - Completion.

- Other Playground Landscape Components
  - Curbs
    - Provide retaining curbs at perimeters of EWF, PIP.
      - Top of curb shall be minimum 3" above finished surface with flow material and flush with PIP of material to be contained.
      - Do not use wood for retaining curbs at fencing or other perimeters.
    - Preferred curbing materials include cast-in-place concrete and plastic.
      - PROHIBITED: Synthetic lumber (composed of wood chips or sawdust in a synthetic binder) for curbs.
    - Provide cut section of top of curb to top of transition for critical height.
  - Geotextile Fabric
    - Minimum 3.5 ounce/square yard.
    - Non-woven synthetic.
  - Landscape Edging
    - Edging at landscape transitions such as edges of lawns and planting beds shall be resilient material only.
    - Concrete mow bands are acceptable.
  - Walks and Paving
    - Sidewalks within playgrounds, for tricycles and other rolling play equipment, are acceptable
      - PROHIBITED: Asphalt sidewalks.
- Hard Surface Play
  - Game Lines
    - Playground designer shall design and layout game lines on plans.
    - Coordinate requirements with LPS PM and school.
    - Minimum of one (1) wheelchair hopscotch game per site.
    - Provide templates, where used for marking game lines, to LPS OMC at Closeout.
  - Game Equipment
    - Playground designer shall design and layout game equipment on all surfaces.
    - Relocation and modification of existing play equipment requires evaluation by certified playground equipment professional.
    - Funnel ball (also drop shot, toss up, etc.).
      - Normally provided by play apparatus manufacturer.
      - Name and style vary by manufacturer.

- Baseball Fields
  - Fencing:
    - All posts and rails LG40 wall thickness
    - Line-posts 2.375” O.D.; corner posts 3” O.D.; rails 1.625” O.D.
    - 4” O.D. posts at gates 6’-0” wide or bigger; 3” O.D. posts at smaller gates
    - Standard 9 ga. steel fabric, knuckle to knuckle
    - Backstop: Include backstop kick plate made of Trex.
    - Provided by Owner; coordinate selection, design, mounting and utility connections with the LPS Operations, Maintenance and Construction (OMC) Department.

END OF DIVISION 11

DIVISION 12 FURNISHINGS

12 20 00 Window Treatments

12 21 00 Window Blinds

- Applications
  - Required at all exterior windows.
    - Instructional areas
      - Alternative: Shades; see Section 12 24 00
    - Administration areas
  - Permitted at interior glazing.
  - Maintain minimum separation distance between window blinds and glazing in strict compliance with glazing manufacturer recommendations.
- Submittals:
  - Product data
  - Shop drawings
  - Samples
  - Layout plan and details
  - Schedule
  - Closeout:
    - Submittals updated to record status (samples excluded)
    - O&M manual
    - Warranties
- Configuration:
  - Horizontal blinds preferred
  - Vertical blinds PROHIBITED
  - Operation:
    - Manual only, unless otherwise approved by the Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC), and LPS Project Manager (PM).
    - Tilt Wand: Field-replaceable 5/16-inch hexagonal-profile transparent acrylic plastic
    - Cord Lock: Crash-proof mechanism; 0.042-inch corrosion-resistant steel
    - Ladder-braid: UV-stabilized polyester yarn with reinforced core; 23” maximum spacing

- Frame and Mounting:
  - Headrail: U-profile 0.25-inch corrosion-resistant steel with concealed hardware
  - Bottom rail: 0.031-inch corrosion-resistant steel
  - Mounting Brackets: 0.048-inch corrosion-resistant steel with rivet-hinge safety lock front cover to permit removal of headrail without lateral movement
  - Tilter: 0.042-inch corrosion-resistant steel housing with a self-lubricating and automatically disengaging nylon worm-gear mechanism to eliminate overdrive; gear ratio 1:4 or 1:1
  - Cradle: 0.042-inch corrosion-resistant steel
  - Drum: Die-cast steel or engineered polymer
- Slats:
  - 0.072-inch minimum thickness copper-free 5000-series magnesium aluminum alloy
  - Reprocessed metal, vinyl or plastic slats are PROHIBITED.
- Finish:
  - Painted, alkyd resin with no lead content

12 24 00 Window Shades

- Applications
  - Coordinate requirements with LPS OMC and LPS PM.
- Submittals:
  - Product data
  - Shop drawings
  - Samples
  - Layout plan and details
  - Schedule
  - Closeout:
    - Submittals updated to Record status (samples excluded)
    - O&M manual
    - Warranties
- Configuration:
  - Manually operated standard
  - PVC-coated polyester material
  - Openness factor:
    - South-facing 5%
    - Other locations 14%

- Warranty:
  - 25-year manufacturer hardware, chain, and shade cloth.
- Approved Manufacturers:
  - Springs Window Fashions
  - MechoShade Systems, Inc.
  - Levelor Contract Division
  - Hunter Douglas Window Fashions
  - Draper Shade & Screen Co.

12 30 00 Casework

12 36 00 Countertops

- Science labs and classrooms, tech/arts classrooms.
- Submittals:
  - Product data
  - Shop drawings
  - Samples
  - Layout plan and details
  - Schedule
  - Closeout:
    - Submittals updated to Record status (samples excluded)
    - O&M manual
    - Warranties
- Science Classrooms:
  - Solid monolithic material; epoxy resin with the following characteristics:
    - Non-porous
    - Resistant to all instructional laboratory chemicals, including acetone and acetic acid
    - Flame resistant
    - Abrasion resistant
    - Color: Black
  - Twenty-five-year service life without degradation of appearance

- Tech/Arts Classrooms
  - Wood, metal, or epoxy resin
  - Resistant to cuts, gouging and staining
- Other Countertops with Sinks or Lavatories
  - Laminate is PROHIBITED
  - Solid material (e.g., Corian or equal) as approved by the LPS MC and LPS PM.

12 40 00 Furnishings and Accessories

12 48 00 Rugs and Mats

12 48 43 Entrance Floor Mats

- Entry mats shall be nylon carpet scraper mats with finished edges.
- Recessed, framed or metal-tread or-slatted entrance mats are PROHIBITED.

12 50 00 Furniture

12 59 00 Systems Furniture

12 59 16 Free-Standing Component System Furniture

- Standard for office cubicles, partitions, desks, etc.
- Coordinate with the LPS OMC ad LPS PM.
- Approved Manufacturer(s)
  - Herman Miller
  - Approved equal

12 60 00 Multiple Seating

- Submittals:
  - Product data
  - Shop drawings
  - Samples
  - Layout plan and details
  - Schedule
  - Closeout:
    - Submittals updated to Record status (samples excluded)
    - O&M manual
    - Warranties

12 61 00 Fixed Audience Seating

- Floor mounted; upholstered in theaters and auditoriums unless directed otherwise by LPS OMC and LPS PM
- Standards: Heavy-gauge rectangular profile tubular steel welded to mounting plate, seat, back and armrest
- Seat: One-piece construction, mechanically restrained from separating from standards
- Hinge: Compensating-type heavy-duty cast iron or steel; noiseless self-rising mechanism
- Arm rest (if directed by LPS OMC and LPS PM): Steel, aluminum, solid wood, or solid molded plastic; veneer or laminated construction is PROHIBITED
- Aisle lights built into seating end-panels:
  - LED Technology
  - UL-listed with rectangular louvered metal faceplate

12 62 00 Portable Audience Seating

12 62 23 Portable Bleachers

- Exterior use only
- Fixed aluminum tiered bleachers with concrete-set anchors and skid-resistant surfaces; safety rails and handrails as required by Code and local authority.

12 63 00 Stadium and Arena Seating

- Wood approved for interior use only
  - Exterior use PROHIBITED
- Molded plastic or aluminum bench seating on bolted-down metal brackets, as approved by LPS OMC and LPS PM

12 66 00 Telescoping Stands

- Design Criteria
  - Comply with applicable sections of the International Building Code and ICC/ANSI 117.1 as required by Division of Fire Safety, Colorado Department of Regulatory Agencies.
  - Design loads:
    - Vertical live load 100 PSF, but not less than 120 PLF at seat and footboards.
    - Sway force horizontal 24 PLF, 10 PLF perpendicular to the seat.
  - Cold-formed steel complying with ASTM A570 Grade C; ASTM A653-Grade 33, 50; ASTM A500 Grade B46.

- Construction
  - Seats:
    - 18-inch-wide one-piece, ribbed, individual seating modules constructed of high-density polyethylene
    - Each seat module to have longitudinal and transverse internal ribbing
    - Steel to steel attachment of each seating module to the nose-beam
    - Interlock each seating module to the adjacent module at the perimeter and internal ribs to assure proper alignment.
  - Decking:
    - Minimum 19/32" Douglas Fir CC Grade with exterior glue and solid cross-bands. Aluminum “H” connector between deck panels. Wear surfaces finished in high-density polyethylene. Clear coat not permitted.
  - Frame assembly :
    - Steel truss design
    - Continuous steel wheel channel to accommodate 8 -12 wheels per row
    - Size wheels appropriately with non-marring face to protect finished floor.
  - Configuration :
    - Wall mounted vertical flush-front stack.
      - Reverse folding configuration is permitted for special applications only.
    - Row spacing: 25 inches minimum
    - Installations:
      - 6 rows or higher: Row-rise of 10" or 12" is acceptable. Typical of Main Gyms.
      - 5 rows or lower: Row-rise of 10” only. Typical of Auxiliary Gyms.
    - Provide additional bracing to prevent deflection in closed position.
    - Capacity: Assume 18 lineal inches per occupant.
    - In closed position, horizontal gaps between sections may not exceed ½”.
    - Comply with applicable codes and regulations for aisles, railings.
- Operation
  - Motorized systems are required for installations of 10 rows or more when unit Length (in feet) x number of Rows exceeds 250.
  - Propulsion:
    - Coordinate power supply with available voltage.
    - Power system to lock unit in any position
    - Limit-switch to regulate extended and closed positions
    - Motor starter, limit-switches, and key control switch by manufacturer

- Accessories:
  - Self-storing 42" high end rails
  - Wheelchair seating:
    - 36" notch outs at section joints only.
    - Fascia-board finish to match deck-board.
  - Pendant control style operation for extension and retraction.
    - Single receptacle in first row of each section.
  - Vinyl end curtains to close-off exposed units in extended position.
  - Flush-mounted board closure between last row and wall.
  - Signage to indicate no sitting or standing on bleachers in closed position.

- Field Quality Control
  - Confirm lateral load capacity of wall structure.
  - Provide on-site operation/maintenance instruction for LPS personnel by manufacturer's authorized representatives.

END OF DIVISION 12

DIVISION 13 SPECIAL CONSTRUCTION

13 10 00 Special Facility Components

13 11 00 Swimming Pools

- Work includes repairs and resurfacing of existing concrete pools, gutter system renovation, and replacement of ancillary furnishings and equipment.
  - No new swimming pool construction is contemplated for Littleton Public Schools (LPS).
- Standards
  - All systems shall be designed and constructed to meet all national and local codes and to comply with
    - Applicable sections of ANSI/NSPI-2 1999
    - Rules and regulations of the NCAA
    - USA Swimming
    - National Federation of State High School Associations
    - Colorado High School Activities Association (CHSAA).
- Submittals:
  - Product data
  - Shop drawings
  - Samples
  - Plans
  - Schedule
  - Closeout:
    - Submittals updated to record status (samples excluded)
    - O&M manual
    - Warranties
- Finished Surfaces
  - Internal pool surfaces shall be a Diamond Brite or Pebble Tec finish with slip resistant surface and vertical tile band.
  - Pool markings and trim shall be
    - 2” x 2” black unglazed tile
      - American Olean
      - Approved equal
    - Lane lines and targets shall be 12 inches wide.
    - Break lines at transition into deep end shall be 4 inches wide.

        - Match existing at perimeter tile deck band, end wall parapet, gutter nosing, depth markings and warning signs and all other tile installations.
    - Tolerances for overall dimensions within the pool shall be maintained in strict compliance with CHSSA requirements for competitive swimming pools.
- Construction
    - Sawcut and chip old plaster/concrete and caulking under gutters and around any penetration (min. 2") leading into the pool.
    - Replace broken return fittings.
    - Remove any existing paint of the concrete with sandblasting or similar method to remove 100% of the old paint, protecting gutters, return inlets and main drain from collecting any debris.
    - Remove recessed steps and install new white ones to match the new plaster.
    - Install water plug or hydraulic cement around any penetration and under gutters to seal the shell where concrete wash chipped out, leaving ½" to feather–in the new plaster.
    - Wash down surfaces with an acid solution and neutralize with pressure washing (at least 3,500 psi).
    - Apply bond coating for adhesion of new plaster to old.
        - SGM Bond Kote
        - Approved equal
    - Apply new exposed aggregate at 3/8" to ½" thick, tapered into old penetrations for smooth transitions.
        - CLI Sunstone
        - SGM Diamond Brite Blue Quartz
    - Expose new plaster using a light acid wash to bring out the blue aggregate in the plaster and limit plaster dust.
    - Coat interior surfaces of gutter trough with a white or other Owner-approved light-colored high-build epoxy or other waterproofing material:
        - Xypex
        - Vandex
        - Planiseal 88
        - Thoroseal
        - Aquafin 2KM
        - Pre-approved equal

- Equipment
  - Single Post Starting Platforms
    - Shall be custom blocks like Legacy Starting Platform
    - Rear step and backstroke bar by:
      - SR Smith
      - Keifer Competitor
      - Paragon Track Start Quickset
      - Pre-approved equal
    - Blocks shall include anchor system
      - SR Smith Rock Solid Anchor System 27-107
      - Pre-approved equal
    - Frames shall be 2.5” square x 0.120” wall thickness 304 stainless steel tubing with powder-coat finish in color selected by Owner.
    - Rear access step shall be 8” x 12”
    - Backstroke bar shall allow both horizontal and vertical grab positions.
    - Platform top shall be 24” x 32” constructed of acrylic outer body skin and slip resistant sanded tread over solid laminated board covered with fiberglass and resin roving.
    - Platform block height shall not exceed 29-1/2" above water level
      - Verify height of platform above water before ordering.
    - Platforms shall have number plates on both sides, numbered as directed by Owner.
    - Each starting platform shall also have two labels affixed stating "Warning: Execute Shallow Racing Dive - Impact with Pool Bottom can Cause Permanent Injury."
  - Diving Stands
    - For one-meter and three-meter springboards shall be
      - Durafirm by Duraflex International Corp.
    - Installed as shown on the plans.
    - Stands shall consist of heavy aluminum castings dipped in Iridite chromic acid solution, followed by a 20-mil coat of baked epoxy, with field touch-up if damaged in shipping or assembly.
    - Roller tube and tracks shall be heat-treated extruded aluminum processed by Alcoa Duranodic hard-anodizing process.
    - Bearings for roller tube and slide shall be nylon with grease fittings, adjustable and field replaceable.

- Diving board anchor hinges and pins shall be heat-treated aluminum forgings with a design tensile strength of 35,000 psi and shall receive Alcoa Duranodic hard anodizing.
- Hinges shall be designed to allow 180-deg. rotation of the diving board to the rear of the stand and shall be mounted on a transverse casting machined to allow 7 leveling positions in one-inch increments.
- Diving board anchor bolts shall be 5/8-inch diameter by 3-1/2-inch-long silicon bronze.
- Diving stands shall be supplied with top and intermediate guard rails on two sides, using stainless steel tubing firmly attached to guard rail supports with stainless steel band fasteners.
- Rails shall extend to the edge of the swimming pool, and the rail ends shall be fitted with rubber safety tips.
- Fulcrum shall have an adjusting wheel at one end that can be turned by hand or foot.
  - One Meter:
    - Durafirm Catalog #70-231-400
    - Eight (8) Bronze Deck Anchors
      - Durafirm Catalog #70-231-900
  - Three Meter:
    - Durafirm Catalog #70-231-300
    - Eight (8) Bronze Deck Anchors
      - Durafirm Catalog #70-231-900

- Diving Boards
  - Shall be shall be aluminum extrusion type springboards
    - Maxi-Flex Model "B" by Duraflex International, Inc., Model #66-231-330
    - Approved equal
  - Boards shall be 16 ft long and 19-5/8 inches wide.
  - Top surfaces shall be finished with three coats combined with a mixture of sand and white aluminum oxide to affect the non-skid surface with 200 perforations.
- Lifeguard Chairs
  - Shall be movable and provided with a molded plastic seat at 6 feet above the deck.
  - Seats shall be capable of 360-degree swivel and shall be supported on a stainless-steel tube structure.
  - Platform shall be laminated wood coated with fiberglass and polyester resin in a non-skid surface.
  - Access to the platform shall be by means of a sloping front ladder 26" wide.
  - Ladder steps shall be

- Injection molded ABS, UV stabilized
- 26" long x 5" wide with raised non- skid tread

▪ Framework of the chair shall be rigidly bolted.

▪ Ladder and guard rails shall be manufactured of stainless-steel tube

- 1.90” OD x 0.065” wall thickness
- Type316L polished and buffed to a 320-grit finish.

▪ Wheels of 7" diameter shall be attached to the bottom of the front leg and means of attaching a rescue tube shall be provided.

▪ Chairs shall be

- Paragon Aquatics Catalog No. 20302
- Pre-approved equal

o Pool Lift

▪ Shall be a portable, battery-powered handicap lift with footrest assembly:

- PAL Lift
- Pre-approved equal.

▪ Lift shall be capable of lifting 300 lbs. and shall include the following:

- Arm rest assembly
- Seat belt assembly
- Lift cover
- Stability vest
- Extra battery and spine board attachment.

▪ Contractor shall confirm that pool lift fits on pool perimeter and operates correctly.

o Sockets and Anchors

▪ For accessories and deck equipment shall be stainless steel or cast bronze.

▪ Contractor shall confirm compatibility of deck equipment and anchors with equipment manufacturer(s).

▪ All anchors or sockets shall be furnished with flush closure caps and escutcheons with set screws as indicated.

- Warranty
  - o Provide minimum one-year warranty on workmanship and standard manufacturers’ warranties on the new plaster and on all deck equipment.

13 30 00 Special Structures

13 34 00 Fabricated Engineered Structures

13 34 13 Greenhouses

- Applications
  - Coordinate with the LPS Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM).
  - Structures more than 120 square feet must secure a building permit through the Department of Public Safety.
  - Occupancy group as defined by the International Building Code is Group U.
  - Greenhouses shall not be available to the public.
- Standards
  - Greenhouses shall be designed to current code for roof and snow loads.
  - Calculations by a Colorado Professional Engineer shall be provided.
  - Greenhouse installer shall meet requirements for an MS4 stormwater permit.
  - Subcontractor shall have 5 years' minimum experience in the manufacture and installation of greenhouses.
- Submittals
  - Product data
  - Shop drawings
  - Samples
  - Plans
    - Dimensioned drawings shall include
      - Site plan
      - Floor plan
      - Elevations and wall section showing construction method and materials.
  - Schedule
  - Closeout:
    - Submittals updated to record status (samples excluded)
    - O&M manual
    - Warranties

- Construction
  - Greenhouse shall have concrete foundations and floor slab.
  - Plumbing Systems shall comply with these Construction Standards and applicable plumbing codes.
  - Minimum plumbing installation consists of a three cubic foot sediment container with accessible grate.
  - Specialty plumbing systems consisting of misters or hydroponics shall be provided by the greenhouse manufacturer.
  - Hydroponic systems (optional) shall connect to a sanitary sewer system
    - If a sewer system is not available, a drainage field consisting of buried perforated pipe shall be provided.
  - Ventilation and Heating optional
    - If provided, systems shall meet requirements of these Construction Standards and mechanical codes.
    - Mechanical ventilation and/or heating shall be provided by the greenhouse manufacturer.
  - Electrical Power and Lighting optional
    - If provided, installations shall meet the requirements of these Construction Standards and electrical codes.
    - Any specialty electrical shall be provided by the greenhouse manufacturer.

END OF DIVISION 13

DIVISION 14 CONVEYING EQUIPMENT

- Systems shall comply with all applicable building codes, regulations, Americans with Disabilities Act Guidelines, laws, and ordinances, including both the technical provisions and the administrative guidelines of the State of Colorado.
- Emergency (battery) backup power shall be provided
- All elevators, incline lifts, and platform lifts shall be key access only.
- Littleton Public Schools provides their own 24/7 Elevator Emergency phone monitoring service.
- All elevators need to have a ring down and recorded message that automatically dials 303 347- 3420 security main line for Emergency Response.

14 20 00 Elevators

- Elevators shall comply with all applicable codes under current ANSI A17.1
- Only commercial grade elevators will be approved.
- Only major suppliers shall be used:
  - Kone
  - Otis Elevator Co.
  - Schindler Group
  - Thyssen Elevators Co.
- Littleton Public Schools must be contacted before scheduling any inspections.

14 40 00 Lifts

- Shall comply with all applicable Codes and current edition of ANSI A18.1
- Approved manufacturer(s)
  - Garaventa
  - Equivalent with prior approval.

END OF DIVISION 14

DIVISION 31 EARTHWORK

31 10 00 Site Clearing

- Include clearing, grubbing, and tree, shrub, and sod removal or relocation as per instructions by the Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM)
- Stockpiling of reusable topsoil and squeegee; protection of trees, shrubs and groundcovers remaining on job site and adjacent properties.
- Rototill 12" using topsoil and sterilized compost in planters and lawn areas.

31 20 00 Earth Moving

- Include site grading, rock removal, excavation, trenching, backfilling, granular fill, compacting, and finish grading.

31 25 00 Erosion and Sedimentation Controls

- Contractor(s) shall adhere to Cities of Littleton or Centennial, Arapahoe County and State of Colorado regulations for erosion and fugitive dust control during construction.
- Proper work sequencing is responsibility of Contractor(s) to prevent erosion damage to work performed under the Construction Contract, to existing site improvements, and to adjoining properties.

31 60 00 Special Foundations and Load Bearing Elements

31 63 00 Bored Piles

31 63 26 Drilled Caissons

- Include, as necessary: excavation, drilling, casing, concreting of shafts for drilled piers; provision of steel casings, reinforcing, anchor bolts, dewatering, disposal of excavated materials, and cleaning of loose debris from bottom of excavation
- Provide unit prices for extra charges or credit for caisson depths below or above established bid depth elevation(s).
- Suitable bearing elevation(s) to be confirmed by Soils Engineer during drilling.

END OF DIVISION 31

DIVISION 32 EXTERIOR IMPROVEMENTS

32 00 00 General

- Bus and auto loading and unloading shall be developed on perimeter of site(s).
- Student loading and unloading are from right-hand side of bus.
- PROHIBITED Cross Traffic Flow between Cars, Buses, and Students

32 10 00 Bases, Ballasts, and Paving

- Include walks, circulation and parking paving, and associated accessories.
- Parking areas, tennis courts, drives, sidewalks, and other exterior flatwork shall be placed on non-expansive soils per the Soils Engineer Report.
- Parking Areas
    - Required for faculty, administrative staff, visitors, maintenance vehicles, and high school students.
    - Standard size parking spaces are preferred
        - Ratio of Standard size to Compact size shall be kept to a minimum
            - Ratio shall not exceed 50-50, standard to compact size
    - Design should consider maintenance activities such as night time snow removal
- Service Truck Traffic
    - Should be developed for each site and kept separate from other traffic and parking.
    - Provisions shall be made for turnaround immediately adjacent to unloading area(s) and allowance(s) for deliveries and pickups as follows:
        - Daily Trash Pickup
            - Include dumpster or roll-off location
            - 8-inch thick, rebar- reinforced concrete slab on compacted subsoil to carry loaded container and truck without cracking
        - Weekly deliveries of school and custodial supplies
        - Occasional supplier deliveries
        - Food service deliveries to the kitchen.
        - One (1) Space for a Littleton Public School (LPS) Operations, Maintenance and Construction Department (OMC) vehicle.
- Access Roads
    - MINIMUM 16' wide for one-way traffic.
    - MINIMUM 24' wide for two-way traffic.

- Signage and surface paint for "NO PARKING ALLOWED."

- Concrete Curb and Gutter
  - 6" vertical curb with 24" gutter pan
  - Coordinate design with LPS OMC maintenance procedures for snow removal
    - Provide Rolled Curbs in areas identified by LPS OMC.
- Flexible (Asphaltic Concrete) Paving
  - Automobile only parking and drives
    - Minimum base and asphalt layer of 10” consisting of:
      - Minimum 6" compacted granular base course on compacted sterilized earth subgrade
      - Minimum 4" compacted asphaltic concrete granular wearing surface on prime coat
    - Alternate: Requires LPS OMC and LPS Project Manager (PM) approval.
      - Deep Strength Single Lift Asphalt minimum of 6”
  - Service and access roads for buses and trucks
    - Minimum base and asphalt layer of 14” consisting of:
      - Minimum 8" compacted granular base course on compacted sterilized earth subgrade
      - Minimum 6" compacted asphaltic concrete granular wearing surface on prime coat
    - Alternate: Requires LPS OMC and LPS PM approval.
      - Deep Strength Single Lift Asphalt minimum of 8”
- Concrete Paving
  - Medium broom finish
  - Sealed
  - Steel rod- reinforced concrete slabs
  - Minimum 8" thick
    - Minimum 6" reinforced concrete in refuse disposal areas
    - Minimum 4" thick compacted granular fill on compacted sterilized earth subgrade as determined by A/E.
- Concrete Walks
  - Location(s) most advantageous to shortcuts for student use to and from playgrounds, streets, and parking.

- Medium broom finish
- Sealed
- Thickness
  - Minimum 4" thick, steel rebar- reinforced concrete slabs
  - Minimum 6" thick unreinforced concrete slabs
  - Minimum 3" thick compacted granular fill on compacted sterilized earth subgrade
- Width
  - Differentiate walkways to allow for snow removal by small trucks
  - 8'0" preferred width
  - 6'0" absolute minimum
- Stabilize walks at egress/doorways
  - Foundation stoops preferred over rebar pinned to foundation

- Aggregate Walks
  - 6’0” wide preferred
    - Up to 8’0” wide acceptable
  - Minimum 4” thick
  - Granite Sand or crusher fines

32 14 00 Unit Paving

- RESTRICTED use
  - Only for specially designated areas or memorials
- 100% compacted sand base is mandatory.
- Material(s), thickness(es), size(s), shape(s), color(s), location(s), pattern(s), finish(es), waterproofing(s), bedding(s), coating(s), compliance(s), protective(s), grout, and mortar as determined by the A/E with LPS OMC and LPS PM approval.

32 17 00 Paving Specialties

- On school property shall conform to:
  - "Uniform Traffic Control Device Manual" published by Colorado Department of Highways, Planning, and Research Division
  - LPS sign and striping standards
- Signage
  - Shall be approved in advance by the LPS Operations, Maintenance and Construction (OMC) Department.

- REQUIRED signage for each ADA parking space in addition to ADA striping and stenciling

- Striping and Stenciling
  - One coat white traffic paint as specified
  - RESTRICTED colors
    - Yellow only as designated by LPS OMC
    - Blue only where required by code
    - Red only where required by code
- Wheel Stops
  - RESTRICTED use
    - Do not interfere with snow removal operations
    - Only provide where parking abuts curb-less walks and landscape termination(s).
  - Minimum 6" x 6" x 6'0" precast concrete curbs
  - Driven 5/8" round by 2'0" long deformed steel reinforcing rod anchors at each end

32 18 00 Athletic and Recreational Surfacing

- General requirements
  - For student safety avoid the following:
    - Steep slope(s)
      - Maximum 1 foot vertical in 50 feet horizontal unless sodded.
    - Open drain swales across playgrounds or playfields.
    - Retaining Walls creating fall hazards
  - Provide means to exclude autos, buses, trucks, and motor scooters from all athletic, recreational, and playground area(s).
  - Allow access for maintenance and emergency vehicles
  - Provide protected access ways at normal lines of pedestrian traffic.
  - Provide access for sweepers and snow removal equipment to playfields, and minimum 16-foot wide access from major street(s) for fire trucks.
  - Provide athletic surface rated equipment (groomer/tractor/pusher) for all athletic surfaces
- Synthetic Turf Fields
  - Monofilament synthetic turf system
    - Carpet
      - Tufted UV-resistant polyethylene fibers in perforated or permeable backing

- Minimum 45-oz. face weight
- Backing grab tear strength (X – Y) > 250-400 lbs. minimum

▪ Infill Mix

- Review and recommend rubber graded SBR mix, including mix with sand, with LPS OMC and LPS PM
- Sand mix
- Spread with an SMG SandMatic mechanically driven rubber infill injection/leveling system

▪ Standards:

- Maintain a G-Max rating of between 100-120, on the field held Kleg Hammer Scale, for the entire 8-year life of the system.

▪ Basis of design

- Greenfields Slide Max XQ

▪ Approved Manufacturers/Products:

- ACT Global SX 60
- Greenfields Slide Max XQ
- Shaw Sports Turf Powerblade Bolt.

▪ Options:

- Slit Film or Hybrid systems (lower face-weight) from same manufacturers may be considered, in consultation with LPS OMC and LPS PM
- Subsurface perimeter drainage system for on-site storm water control
  - Nyloplast
  - Equal pre-approved by LPS OMC and LPS PM

- Baseball Fields
  - Infield mix shall be “Stabilized Gold Infield Mix”, a mixture, by volume, of
    - 29% silt and clay
    - 71% sand
    - Fortified with organic binders.
  - Coordinate closely with Athletic Department for pitching mound requirements
- Running Tracks
  - Secondary school sites shall have cast-in-place, durable, resilient, all-weather running tracks
    - High School tracks shall be polyurethane based.

        - Middle School tracks shall be latex based.
    - Minimum ½"-thick rubber surface course consisting of liquid binder and specifically graded SBR with a gradation of 0.5-4.0mm
        - Sealed, and topped with two structural spray layers of liquid binder and EPDM colored rubber granulate graded at 0.5-1.5mm
        - Applied uniformly at a minimum rate of 1.5 lbs. per sq. yd. per coat and sprayed in opposite directions to achieve a uniform application.
    - Approved manufacturer(s):
        - Tier 3, open to any manufacturer meeting these standards.
- Tennis Courts
    - All new tennis courts shall be post-tensioned concrete.
    - Existing asphaltic concrete courts shall be patched, and crack filled as needed, recoated, and striped as directed by LPS.
        - Severely damaged courts may require a 2-inch overlay of asphaltic concrete on a geotextile mat in addition to patching and crack-fill, plus new topcoat, and striping, as determined in consultation with the OMC Department.

32 30 00 Site Improvements

32 31 00 Fences and Gates

- Chain-link type with manual operating and lockable swinging or sliding gate(s)
- Minimum 9-gauge, knuckle to knuckle
- Along with accessories, posts, bracing and hardware.
- Vehicle gates must be minimum 10' across
    - Two 5' gates are acceptable.
- New fencing
    - Black coated
- Match existing fencing
    - Galvanized

32 33 00 Site Furnishings

32 33 13 Site Bicycle Racks

- Hot dipped galvanized per ASTM A53 Spec for Pipe
- Steel, Black, and Hot Dipped,
- Zinc-Coated Welded and Seamless, Schedule 40 pipe 2.375" o.d. by 0.154" wall
- Anchor as required to prevent vandalism or theft.

- Approved manufacturer(s)
  - Tier 3, open to any manufacturer meeting these standards.
  - Basis of design
    - Brandir International RIBBON RACK model RB-7

32 80 00 Irrigation

- Underground automatic sprinkler system design and head selection shall treat water-efficiency as a primary criterion for each area, based on location, contours, drainage, adjacent structures, shading, and plantings.
- PVC mainline piping of 160 psi gained with complete bell joints
  - Joints with clean coat and appropriate adhesive
- Poly piping laterals flexible polyethylene utility pipe 80 PSI minimum with stainless steel clamps; swing joints.
- Stainless-steel Worm Drive Clamps required for piping over 1”
- Heads and laterals must be installed a minimum of 12” away from buildings, structures, and sidewalks.
  - 2-wire path design
  - No ¼” or 1¼” lateral sizes
- Submittals
  - Product Data is required
  - Shop Drawing:
    - System layout including:
      - Wiring
      - Wiring schematic
      - Controller chart
  - Design Data, Test Reports, Certificates, Manufacturer Instructions, Manufacturer Field Reports
    - Written certification of backflow prevention test
  - Closeout:
    - All submittals listed above updated to record status.
    - Operation and Maintenance manual including a DVD demonstration of operation
    - 3 laminated copies of zone chart
    - Reproducible as-built system CAD file and drawings
    - One-year system operation warranty

- Approved products:
  - Central Control System is Tier One sole source
    - Rainbird IQ
    - Solenoids are required to work with Rainbird IQ
    - Alternate requiring written approval to match existing systems
      - Rainbird Maxicom
  - Controllers
    - Rainbird
  - Valves
    - Rainbird PEB (brass or plastic)
  - Heads
    - Rainbird Falcon
    - Rainbird 1800 series spray pop-ups
    - Hunter (I-40, I-25, I-20)
    - PGP heads are PROHIBITED
  - Nozzles
    - Hunter MP rotators
    - Rainbird R-Van
- Installation
  - All trenching to be properly filled and compacted to prevent tripping hazards
  - Required LPS OMC walk through with LPS PM, landscape architect, and contractors to ensure system performance in compliance with contract documents.
  - Post punch list walk, upon LPS first grooming of the field, any defects missed on a final walk shall be added to the punch list.
  - All new irrigation must have as-builts
    - Review specific field installation redline drawing requirements with LPS OMC

32 90 00 Planting

- Relocate salvageable trees and shrubs.
- Provide new trees, shrubs, plants, grass, or sod where existing will be contaminated or destroyed
- Include topsoil, soil preparation, fine grading in new planting areas, fertilizing, planting, guying, and staking; maintenance through one-year guaranty/warranty period.

- Topsoil
  - Re-use existing acceptable on-site material, to the greatest extent possible, while still insuring a compliant installation.
  - Import material
    - Sandy loam, ripped 4" to 6" after spreading
    - Minimum pH factor 7
    - Free from subsoil stones, stumps, roots, weeds, clay lumps and debris over 1" diameter.
  - Athletic Fields
    - 8" deep with less than 20 percent clay
    - 3" per hour permeability desirable
- Soil Amenities
  - Compost
    - Well-rotted
    - Un-leached
    - No animal manure/fertilizer
    - Reasonably free from shavings, sawdust, refuse and harmful materials.
  - Peat Humus
    - Shredded peat
    - Low mineral and wood content
    - Minimum 50 percent decomposed organic matter by weight
    - Oven dry
  - Superphosphate
    - Soluble mixture of treated minerals
    - 20 percent available phoric acid
  - Commercial Fertilizer
    - Neutral character with some elements derived from organic sources, as follows:
      - Spring Application formula:
        - 28-7-7-65-3FE (50% nitrogen from sulfur-coated urea).
      - Fall Application formula:
        - 12-11-11-55-3FE (quick-release nitrogen).
  - Plant Bed Mulch
    - Red Cedar mulch is to be used at a minimum thickness of 3”
    - Alternate with pre-approval by LPS

- ¾” granite rock mulch

- Grass
  - Sod
    - Large roll application
    - Minimum 1" thickness
    - Free of holes
    - Sufficient density to prevent tearing or stretching while unrolling
    - Strongly rooted
    - Not less than two years old
    - Free of weeds and undesirable native grasses.
      - Sod shall not contain more than two percent other grasses and weeds
      - Shall be free of objectionable weeds such as crabgrass, bentgrass, tall fescues, clover, dandelions, plantain, thistle, bindweed, etc.
    - Typical Lawn Areas
      - 1/3 Barton
      - 1/3 Merion
      - 1/3 Nugget
    - Athletic fields
      - Same as for typical lawn areas
      - Fescues and Ryes may be included if approved in advance by LPS OMC and LPS PM
  - Seeding
    - Standard Dryland Seed Mix, by weight percentage for each species:
      - Review requirements with LPS OMC
      - Native grass seed mix
        - 20% Crested Wheatgrass “Fairway”
        - 20% Western Wheatgrass “Arriba” or “Barton”
        - 20% Smooth Brome “Lincoln” or “Manchar”
        - 20% Tall Fescue “K-31”
        - 10% Sideoats Grama
        - 10% Blue Grama
      - Turf grass seed mix
        - 50% Bluegrass

        - 50% Rye grass
    - Hill and perimeter areas above 1 ft. in 3 ft. slope may be native grass.
- Miscellaneous Materials
    - Wrapping
        - Tree-wrap tape not less than 4" wide
        - Designed to prevent sun scald and dehydration
        - Extend above guy-wire height
        - Include a plastic tube slit down one side and fit over tree trunk to prohibit infestation by bugs.
    - Wood Stakes & Guys
        - Provide in accordance with good practice.
- Excavation for Trees and Shrubs
    - Excavate pits, beds, and trenches with vertical sides and with bottom of excavation slightly raised at center for proper drainage.
    - Balled-and-burlap stock
        - Excavate at least twice as wide as ball diameter
        - Ball to rest on unexcavated or compacted subsoil
        - Do not over-excavate planting pit depth.
    - Container Grown Stock
        - Excavate as specified for balled-and-burlap wrapped stock, except
            - Conform to container width and depth
            - Cut root balls vertically from top to bottom 1" into side in at least three locations around the ball.
    - Dispose off-site all unacceptable subsoils removed from landscape grading and excavations.
    - Where existing soil is unacceptable for backfill.
        - Prepare planting pits properly by removal of rubble or other acceptable methods.
        - Mix two parts topsoil to one part each of peat and manure.
- Mechanical Spade Planting
    - Larger trees and shrubs may be planted by means of mechanical spade equipment at Contractor’s option.
    - Larger plants being moved from existing locations to new locations must be transplanted by this method.
    - Use equipment that will dig, carry, and replant with the same unit.

- Equipment size must be adequate for size of plant and not less than 8" of space diameter at 15" of depth per caliper inch of trunk diameter.
- Contractor shall assume responsibility for contacting line location service and obtaining underground public utility locations prior to excavating.

- Sod Installation
  - Area(s) to be sodded shall be fine graded and raked to meet LPS approved finish grade(s).
  - Where sod adjoins paved areas
    - Surface of sodded lawn shall be approximately 3/4" below pavement surface
  - Uniform grades shall be established between paving and other established elevations
  - Coarse soil lumps, rocks over 1/2" diameter, roots and weeds shall be removed.
  - Surface of ground shall be firm and smooth and of fine texture immediately before placing sod.
  - All trenching to be properly filled and compacted to prevent tripping hazards
  - Lay Sod within 24 hours from time of stripping.
  - Do not plant dormant sod or if ground is frozen.
  - Lay Sod to form a solid mass with tightly fitted joints.
    - Butt the ends and sides of sod strips evenly, leaving no cracks.
    - Do not overlap joints; stagger strips to offset joints in adjacent courses.
    - Tamp or roll lightly to ensure contact with subgrade after first watering.
  - Secure sod on slopes with wood pegs to prevent slippage.
  - Water sod thoroughly with a fine spray immediately after planting.
  - Furnish by Contractor for 90 calendar days as follows:
    - Irrigation shall start immediately after 300 square feet of sod is installed to ensure against shrinkage of or damage to sod.
    - Perform routine maintenance of watering, weeding, and mowing of grass.
    - Do necessary weeding, reseeding, re-sodding, and removal of dead material(s).
    - Fertilize sod twice during contract maintenance period.
    - Erect signage, fencing, or barricades to prohibit traffic or playing on new lawns until notified after acceptance by LPS.
  - Required LPS OMC walk through with LPS PM, landscape architect, and contractors to ensure system performance in compliance with contract documents.

- Post punch list walk, upon LPS first grooming of the field, any defects missed on a final walk shall be added to the punch list.

- Trees and Shrubs
  - Approved Trees and Shrubs
    - Native landscaping is desired, requiring little watering (drought- tolerant) and minimum fertilizer.
    - Preferred hardiness rating 5a, 5b, 6a regions.
  - PROHIBITED Trees and Shrubs
    - Cottonwoods (not even cottonless cottonwood)
    - Hedging
    - Russian Olive trees
    - Thorny bushes
    - Thorny trees
    - Trees without burlap ball roots.
  - Planting
    - Trees shall be staked with not less than two stakes
    - Top of the ball crown must be at least 2” to 3” above the surrounding grade.
    - All trees and shrubs must be watered immediately after planting.
    - Trees should be planted at least 20’ away from buildings and at least 15’ away from irrigation main lines.
    - Evergreen trees should have landscape underneath the branches (they will kill grass).
  - Warranty
    - Shall cover replacement of shrubs and trees as needed through one full calendar year.

END OF DIVISION 32

DIVISION 33 UTILITIES

33 00 00 General Utilities Requirements

- Underground water, natural gas, sanitary and waste service, distribution, and transmission systems as per applicable code(s) and public utility provider(s).

33 05 00 Common Work Results for Utilities

33 05 61 Concrete Manholes

- Sanitary Sewer Manholes
  - Constructed from pre-cast concrete sections
  - Heavy-duty cast-iron traffic cover and rim
  - Coordinate mechanical plans for invert elevations of inlet and outlet piping
  - Base shall be constructed from heavy density concrete poured at least 48 hours prior to setting the precast sections.
    - Flow channels that provide smooth flow and maintain the sewer grade shall be formed in cement mortar on the base.
    - Channels troweled smooth
  - The bottom manhole section shall be set in a full mortar base (21inches thick) while the base is still moist.
  - All succeeding sections shall be joined in a similar manner, and all holes and imperfections shall be filled with cement mortar
  - Manhole cover installed with cast iron receiving frame and adjustable rings flush with pavement or grade.
    - Cover suitable for A.A.S.H.O. H-20-wheel loading

33 40 00 Stormwater Utilities

- Dewatering, foundation, and under-slab drainage systems as required by Soils Investigation Report(s)
- Site drainage
  - Coordinate with 22 14 00 Facility Storm Drainage
  - Surface runoff preferred
  - Drainage to basins and inlets where available or established to area drains
  - Corrugated metal pipe culvert permitted if property entry is off frontage road
- Drainage Study
  - Study shall encompass flow, retention, and dispersal of water to and from the site.

- Attention shall be given to ground water, including seasonal fluctuations and surface water.
- Weather and natural characteristics of the site, including wind and soil conditions, shall be addressed.
- Submit study for approval and acceptance prior to finalizing site layout to the Littleton Public Schools (LPS) Operations, Maintenance and Construction Department (OMC) and LPS Project Manager (PM).

- Positive Drainage
  - Shall be provided away from building(s).
  - Consideration shall be given to discharging roof drains into a collector system.
  - Where roof drains discharge onto site, set at base of bank, not on top.
  - Discharges shall not cross over sidewalks or near building parking area(s) and shall be away from building(s).
- LPS Standards
  - Slopes Adjacent to Building(s)
    - Minimum 1:5
    - Maximum 1:2
    - Consult with LPS OMC and LPS PM where the minimum slope is not achievable at existing facilities.
  - Slopes NOT Adjacent to Building(s)
    - Minimum 2:100
    - Maximum 1:4
    - No flat area(s)
  - Building Floor(s)
    - Shall be minimum 7" above surrounding finish grades; ramps shall slope to top of walks.
  - Berms
    - RESTRICTED
    - Permitted only with LPS OMC and LPS PM approval and acceptance.

33 90 00 Power and Communication

- Underground electrical, telephone, and cable service, supports and distribution as per applicable code(s) and public utility provider(s) LPS Technology Standards.
- Confirm existing underground service lines with the LPS ITS Department prior to beginning design for any sitework or building addition.

END OF DIVISION 33