ADDENDUM NO. 1

October 14, 2024

Carmel Clay School District Witsken Tennis Complex Renovations
520 E. Main Street
Carmel, IN 46032

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications and the Drawings dated September 19, 2024, by Fanning/Howey. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of Pages ADD 1-1 through ADD 1-2 and attached Fanning/Howey Addendum No. 1 dated October 11, 2024, consisting of 5 Items, 1 page, New Project Manual Sections: 03 06 30.01 – Concrete Schedule, 03 30 53 Miscellaneous Cast-In-Place, Concrete, 04 20 00 – Unit Masonry, 04 72 00 – Cast Stone Masonry, 10 75 00 – Flagpoles and 32 31 19 – Ornamental Fences and Gates, New Drawing Sheet: E2.02 – Panelboard Schedule, Revised Drawing Sheets: GD1.00, G1.00, G1.01, G2.00, G4.01, L1.00, G3.1, G3.2, and E2.01.

A. <u>SPECIFICATION SECTION 01 12 00 – MULTIPLE CONTRACT SUMMARY</u>

1. 3.03 Bid Categories

A. Bid Category No. 1 – General Trades

<u>Add Specification Sections:</u>

Section 03 06 30.01 – Concrete Schedule
Section 03 30 53 – Miscellaneous Cast in Place Concrete
Section 04 20 00 – Unit Masonry
Section 04 72 00 – Cast Stone Masonry
Section 10 75 00 – Flagpoles
Section 32 31 19 – Ornamental Fences and Gates

Add Clarifications:

5. This contractor is responsible for the flagpole and for providing a flag at plan note 44 location on sheet G1.00.
6. This contractor is responsible for steel columns and footings at plan note 45 location on sheet G1.00. Include painting of these columns.

B. Bid Category No. 2 – Electrical

Add Clarifications:

2. Provide necessary constant hot circuit and building mounted LED flood light fixture with integral photo cell for control.

B. **SPECIFICATION SECTION 00 31 00 – INDIANA BID FORM**

1. Replace Section 00 31 00 in its entirety with attached here in Section 00 31 00.

C. **SPECIFICATION SECTION 01 23 00 – BID ALTERNATES**

1. Add Section 01 23 00 – Bid Alternates

D. **SPECIFICATION SECTION 01 32 00 – SCHEDULES AND REPORTS**

1. Add Section 01 23 00C – Guideline Schedule
2. Add Section 01 23 00D – Site Logistics Plan

CONTRACTOR'S BID FOR PUBLIC WORKS FORM NO. 96

Format (Revised 2013)
(Amended for CCS)

Carmel Clay School District Witsken Tennis Complex Renovations

(Carmel Clay Schools)
(Hamilton County, Indiana)

PART I

(To be completed for all bids. Please type or print)

Date (month, day, year):_____

BIDDER (Firm) _____

Address _____ P.O. Box _____

City/State/Zip _____

Telephone Number: _____ Email Address: _____

Person to contact regarding this Bid_____

Pursuant to notices given, the undersigned offers to furnish labor and/or materials necessary to complete the public works project of:

_____
Insert Category No. (s) and Name(s)

Of public works project, ***Carmel Clay School District Witsken Tennis Complex Renovations*** , in accordance with Plans and Specifications prepared by ***Fanning/Howey, 350 E. New York St., Suite 300, Indianapolis, IN 46204***, as follows:

BASE BID

For the sum of _____
(Sum in words)

_____DOLLARS ($_____)
(Sum in figures)

The undersigned acknowledges receipt of the following Addenda:
Receipt of Addenda No. (s) _____

PROPOSAL TIME

Bidder agrees that this Bid shall remain in force for a period of sixty (60) consecutive calendar days from the due date, and Bids may be accepted or rejected during this period. Bids not accepted within said sixty (60) consecutive calendar days shall be deemed rejected.

Attended pre-bid conference YES _____ NO_____

Has visited the jobsite YES _____ NO_____

The Bidder has reviewed the Guideline Schedule in Section 01 32 00 and the intent Of the schedule can be met. YES _____ NO_____

Bidder has included their Written Drug Testing Plan that covers all employees of the bidder who will perform work on the public work project and meets or exceeds the requirements set in IC 4-13-18-5 or IC 4-13-18-6. YES _____ NO_____

The Skillman Corporation's diversity initiative is to create a program to encourage, assist and measure the active participation of Minority- Owned, Women-Owned, Veteran – Owned and Disabled Individual-Owned Businesses. The Program is to ensure that MWVDBEs are provided full and equal opportunity to participate in all Skillman Corporation's Projects.

Bidder has included:
DBE: YES _____% NO _____
MBE: YES _____% NO _____
WBE: YES _____% NO _____
VBE: YES _____% NO _____

The undersigned further agrees to furnish a bond or certified check with this Bid for an amount specified in the Notice to Bidders. If Alternate Bids apply, submit a proposal for each in accordance with the Plans and Specifications.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract if accepted by the governmental unit. If the bid is to be awarded on a unit bases, the itemization of the units shall be shown on a separate attachment.

The contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS
(if applicable)

I, the undersigned bidder, or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States (I.C. 5-16-8-2). I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

ALTERNATE BIDS

A blank entry or an entry of "No Bid", "N/A", or similar entry on any Alternate will cause the bid to be rejected as non-responsive only if that Alternate is selected. If no change in the bid amount is required, indicate "No Change".

****MARK "ADD" OR "DEDUCT" FOR EACH ALTERNATE****

Alternate Bid No. 1 – Ornamental Fencing Plan Note 46 - A

Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT
(sum in figures)

Alternate Bid No. 2 – Ornamental Fencing Plan Note 46 - B

Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT
(sum in figures)

Alternate Bid No. 3 – Ornamental Fencing Plan Note 46 - C

Change the Base Bid the sum of_____
(sum in words)

PART II

(For projects of $150,000 or more – IC 36-1-12-4)

These statements to be submitted under oath by each bidder with and as a part of his bid. (Attach additional pages for each section as needed.)

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed for the period of one (1) year prior to the date of the current bid?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

2. What public works projects are now in process of construction by your organization?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you?_____If so, where and why?

_____

_____

_____

4. List references from private firms for which you have performed work.

_____

_____

_____

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed Work. (Examples could include a narrative of when you could begin, complete the project, number of workers, etc. and any other information which you believe would enable the governmental unit to consider your bid.)

2. Please list the names and addresses of all subcontractors (i.e. persons or firms outside your own firm who have performed part of the work) that you have used on public works projects during the past five (5) years along with a brief description of the work done by each subcontractor.

3. If you intend to sublet any portion of the work, state the name and addresses of each subcontractor, equipment to be used by the subcontractor, and whether you will required a bond. However, if you are unable to currently provide a listing, please understand a listing must be provided prior to contract approval. Until the completion of the proposed project, you are under a continuing obligation to immediately notify the governmental unit in the event that you subsequently determine that you will use a subcontractor on the proposed project.

4. What equipment do you have available to use for the proposed Project? Any equipment used by subcontractors may also be required to be listed by the governmental unit.

_____

_____

_____

_____

5. Have you into contracts or received offers for all materials which substantiate the prices used in preparing your proposal? If not, please explain the rationale used which corroborate the process listed.

_____

_____

_____

_____

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of Bidder's financial statement is mandatory. Any Bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the Contract must be specific enough in detail so that said governing body can make a proper determination of the Bidder's capability for completing the Project if awarded.

SECTION IV CONTRACTOR NON-COLLUSION AFFIDAVIT

The undersigned Bidder or agent, being duly sworn on oath, says that he has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to induce anyone to refrain from bidding, and that this Bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He further says that no person or persons, firms, or corporations has, have, or will receive directly or indirectly, any rebate, fee, gift, commission, or thing of value on account of such contract.

SECTION V OATH AND AFFIRMATION

I HEREBY AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE FACTS AND INFORMATION CONTAINED IN THE FOREGOING BID FOR PUBLIC WORKS ARE TRUE AND CORRECT

Dated at _____this _____ day of _____, 20

_____
(Name of Organization)

By
_____

_____
(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
) SS:
COUNTY OF _____)

Before me, a Notary Public, personally appeared the above-named
_____

Swore that the statements contained in the foregoing document are true and correct.

Subscribed and sworn to before me this _____ day of _____,
_____

(Title)

_____
Notary Public

My Commission Expires: _____

County of Residence: _____

END OF SECTION 00 31 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 PURPOSE

A. The Bids for the Alternates described herein are required in order for the Owner to obtain information necessary for the proper consideration of the Project in its entirety.

1.03 ALTERNATES

A. Definitions: Alternates are defined as alternate products, materials, equipment, installations or systems for the Work, which may, at Owner's option and under terms established by Instructions to Bidders, be selected and recorded in the Owner-Contractor Agreement to either supplement or displace corresponding basic requirements of Contract Documents. Alternates may or may not substantially change scope and general character of the Work; and must not be confused with "allowances", "unit prices", "change orders", "substitutions", and other similar provisions.

1.04 SCHEDULE OF ALTERNATES

A. ALTERNATE NO. 1: Ornamental Fencing Plan Note 46 – A
   a. This is the entrance to the Northwest (West Facing) and consists of the ornamental gate and masonry pilasters shown on sheet G4.01

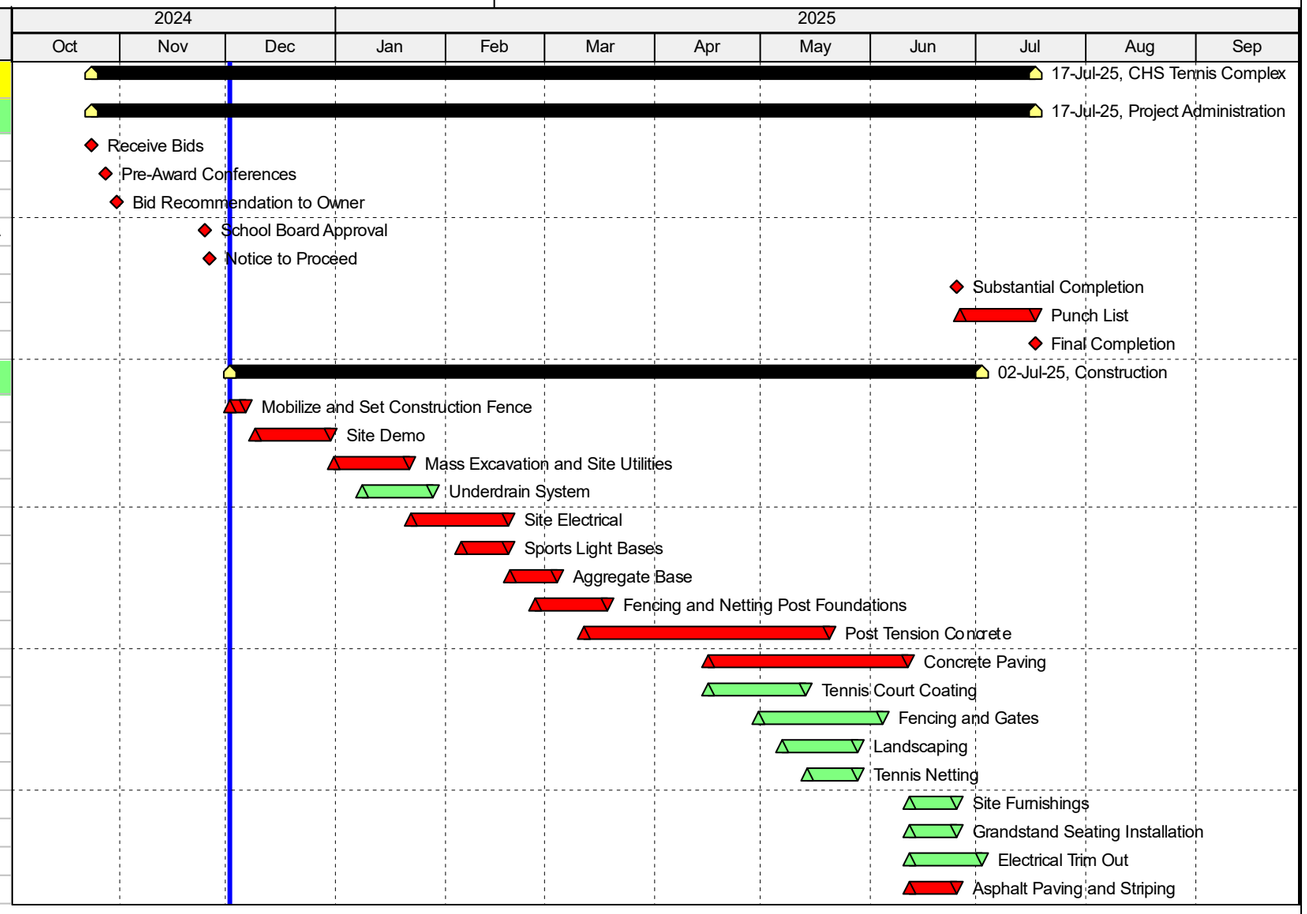
B. ALTERNATE NO. 2: Ornamental Fencing Plan Note 46 – B
   a. This is the entrance to the Southwest (South Facing) and consist of the ornamental gate and masonry pilasters shown on sheet G4.01

C. ALTERNATE NO. 3: Ornamental Fencing Plan Note 46 – C
   a. This includes the ornamental fence running east to west on the south fence line and includes the entrance to the Southeast (South Facing) shown in detail on sheet G4.01

PART 2 - PRODUCTS, PART 3 - EXECUTION (Not Used)

END OF SECTION 01 23 00

Activity Name	Original Duration	Start	Finish
CHS Tennis Complex	180	24-Oct-24 A	17-Jul-25
Project Administration	180	24-Oct-24 A	17-Jul-25
Receive Bids	0		24-Oct-24 A
Pre-Award Conferences	0		28-Oct-24 A
Bid Recommendation to Owner	0		31-Oct-24 A
School Board Approval	0		25-Nov-24 A
Notice to Proceed	0	26-Nov-24 A	
Substantial Completion	0		25-Jun-25
Punch List	15	26-Jun-25	17-Jul-25
Final Completion	0		17-Jul-25
Construction	150	02-Dec-24	02-Jul-25
Mobilize and Set Construction Fence	5	02-Dec-24	06-Dec-24
Site Demo	15	09-Dec-24	30-Dec-24
Mass Excavation and Site Utilities	15	31-Dec-24	21-Jan-25
Underdrain System	15	08-Jan-25	28-Jan-25
Site Electrical	20	22-Jan-25	18-Feb-25
Sports Light Bases	10	05-Feb-25	18-Feb-25
Aggregate Base	10	19-Feb-25	04-Mar-25
Fencing and Netting Post Foundations	15	26-Feb-25	18-Mar-25
Post Tension Concrete	50	12-Mar-25	20-May-25
Concrete Paving	40	16-Apr-25	11-Jun-25
Tennis Court Coating	20	16-Apr-25	13-May-25
Fencing and Gates	25	30-Apr-25	04-Jun-25
Landscaping	15	07-May-25	28-May-25
Tennis Netting	10	14-May-25	28-May-25
Site Furnishings	10	12-Jun-25	25-Jun-25
Grandstand Seating Installation	10	12-Jun-25	25-Jun-25
Electrical Trim Out	15	12-Jun-25	02-Jul-25
Asphalt Paving and Striping	10	12-Jun-25	25-Jun-25



Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

SKILLMAN

Carmel Clay School District Witsken Tennis Complex Renovations
Site Logistics Plan

A D D E N D U M N O. 1

Carmel High School – Witsken Tennis Complex Renovations

Carmel Clay Schools
Carmel, Indiana

Project No. 224063.00

Index of Contents

Addendum No. 1, 5 items, 1 page
New Project Manual Sections: 03 06 30.01 – Concrete Schedule, 03 30 53 Miscellaneous Cast-In-Place Concrete, 04 20 00 – Unit Masonry, 04 72 00 – Cast Stone Masonry, 10 75 00 – Flagpoles and 32 31 19 – Ornamental Fences and Gates
New Drawing Sheet: E2.02 – Panelboard Schedule
Revised Drawing Sheets: GD1.00, G1.00, G1.01, G2.00, G4.01, L1.00, G3.1, G3.2, and E2.01

October 11, 2024

FANNING/HOWEY ASSOCIATES, INC.
ARCHITECTS/ENGINEERS/CONSULTANTS

TO: ALL BIDDERS OF RECORD

ADDENDUM NO. 1 to Drawings and Project Manual, dated August 30, 2024, for the Carmel High School – Witsken Tennis Complex Renovations for Carmel Clay Schools, 5201 E. Main St., Carmel, Indiana 46033; as prepared by Fanning/Howey Associates, Inc., Indianapolis, Indiana.
This Addendum shall hereby be and become a part of the Contract Documents the same as if originally bound thereto.

The following clarifications, amendments, additions, revisions, changes, and modifications change the original Contract Documents only in the amount and to the extent hereinafter specified in this Addendum.

Each bidder shall acknowledge receipt of this Addendum in his proposal or bid.

NOTE: Bidders are responsible for becoming familiar with every item of this Addendum. (This includes miscellaneous items at the very end of this Addendum.)

RE: ALL BIDDERS

ITEM NO. 1. PROJECT MANUAL, TABLE OF CONTENTS

A. Book 1, page 00 01 10-2, ADD DIVISION 03: Add Sections 03 06 30.01 – Concrete Schedule and 03 30 53 Miscellaneous Cast-In-Place Concrete.

B. Book 1, page 00 01 10-2, ADD DIVISION 04: Add Sections 04 20 00 – Unit Masonry and 04 72 00 – Cast Stone Masonry.

C. Book 1, page 00 01 10 -2, ADD DIVISION 10: Add Section 10 75 00 - Flagpoles.

D. Book 1, page 00 01 10 – 3, DIVISION 32: Add Section 32 31 19 – Ornamental Fences and Gates

ITEM NO. 2. NEW PROJECT MANUAL SECTIONS

A. New Project Manual Sections: 03 06 30.01 – Concrete Schedule, 03 30 53 Miscellaneous Cast-In-Place Concrete, 04 20 00 – Unit Masonry, 04 72 00 – Cast Stone Masonry, 10 75 00 – Flagpoles and 32 31 19 – Ornamental Fences and Gates are included with and hereby made a part of this Addendum.

ITEM NO. 3. PROJECT MANUAL, SECTION 12 93 00 – SITE FURNISHINGS AND AMENITIES

A. Replace 2.2, A., as follows:

"A. Trash Receptacle. Cordia Receptacle, 36 Gallon, by Forms and Surfaces. Refer to Drawings for additional information."

ITEM NO. 4. NEW DRAWING SHEETS

A. Drawing Sheet No: E2.02 – Panelboard Schedule is included with and hereby made a part of this Addendum.

ITEM NO. 5. REVISED DRAWING SHEETS

A. Drawing Sheets: GD1.00, G1.00, G1.01, G2.00, G4.01, L1.00, G3.1, G3.2, and E2.01 have been revised, dated 10/11/24, and is included with and hereby made a part of this Addendum. These Drawings supersede the original documents.

END OF ADDENDUM

SECTION 03 06 30.01 - CONCRETE SCHEDULE

SUBMIT THIS SCHEDULE TO CONCRETE SUPPLIER PRIOR TO BIDDING

ITEM OR STRUCTURE	FINISH**	COMPRESSIVE STRENGTH AND OTHER REQUIREMENTS
Elevated (suspended) structural concrete slabs and concrete not otherwise indicated	SF-1.0 SF-2.0 if exposed	4000 P.S.I. at 28 days Max W/C Ratio = 0.45 Use mid-range water reducer
Trench footings, footings, and interior foundation and retaining walls	SF-1.0 SF-2.0 if exposed	4000 P.S.I. at 28 days Max W/C Ratio = 0.50
Foundation and retaining walls exposed to exterior	SF-1.0 SF-2.0, if exposed, UON Ab-Fn, where noted	4000 P.S.I. at 28 days air entrainment* Max W/C Ratio = 0.45 Use mid-range water reducer
Interior formed concrete exposed to view	SF-2.0, UON Ab-Fn, where noted	4000 P.S.I. at 28 days Max W/C Ratio = 0.55
Noncritical floors and floor slabs to receive mud-set mosaic and quarry tile	Flt-Fn	3500 P.S.I. at 28 days Max W/C Ratio = 0.45 Use mid-range water reducer
Exposed interior floor slabs and carpeted floors, unless otherwise noted	Tr-Fn1	3500 P.S.I. at 28 days Max W/C Ratio – 0.45 Use mid-range water reducer
Interior floor slabs scheduled to receive thin-set flooring, resilient flooring and other flooring types, unless otherwise noted	Tr-Fn2	3500 P.S.I. at 28 days Max W/C Ratio = 0.45 Use mid-range water reducer
Interior floor slabs scheduled to receive a polished surface, and where indicated	Tr-Fn3	3500 P.S.I. at 28 days Max W/C Ratio = 0.45 Use mid-range water reducer
Interior floor slabs scheduled to receive wood flooring, and where indicated	Tr-Fn4	3500 P.S.I. at 28 days Max W/C Ratio = 0.45 Use mid-range water reducer
Exterior walks, stoops, steps, aprons, and curbs; exterior formed concrete exposed to view; exterior concrete not otherwise indicated	NsBrm-Fn (Horizontal) Grt-Cl-Fn (Vertical)	4500 P.S.I. at 28 days air entrainment* Max W/C Ratio = 0.45 Use mid-range water reducer
Exterior paving	NsBrm-Fn	4000 P.S.I. at 28 days air entrainment* Max W/C Ratio = 0.40
Metal stair pan fill, topping over precast deck	N/A	2500 P.S.I. at 28 days #8 aggregate (maximum)
Flowable Fill – Type 1 Utility Trench	N/A	50-100 P.S.I. at 28 days Unconfined compression strength per

Backfill		ASTM D4832
Flowable Fill – Type 2 Under Foundations	N/A	100 P.S.I. at 28 days Unconfined compression strength per ASTM D4832
Lean concrete fill under footings and encasement of underground utilities or connections	N/A	1500 P.S.I. at 28 days Max W/C Ratio = 0.55 for non-air entrained mix

*Refer to Section 03 30 53 – Miscellaneous Cast-In-Place Concrete for percent of air entrainment required for concrete mix.

**Refer to Section 03 30 53 – Miscellaneous Cast-In-Place Concrete for definitions of finishes.

END OF SECTION 03 06 30.01

SECTION 03 30 53 - MISCELLANEOUS CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes, for noncritical applications of concrete and for projects using small quantities of concrete and for small amounts of patching and repair.

1.2 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. Comply with ACI 301, "Specification for Structural Concrete," including the following sections, unless modified by requirements in the Contract Documents:
   1. "General Requirements."
   2. "Formwork and Formwork Accessories."
   3. "Reinforcement and Reinforcement Supports."
   4. "Concrete Mixtures."
   5. "Handling, Placing, and Constructing."

B. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

2.2 FORMWORK

A. Furnish formwork and formwork accessories according to ACI 301.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Plain-Steel Wire: ASTM A 1064, as drawn.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 1064, fabricated from as-drawn steel wire into flat sheets.

D. Deformed-Steel Welded Wire Reinforcement: ASTM A 1064, flat sheet.

E. Reinforcement Accessories
   1. Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.
   2. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacturer bar supports from steel wire, plastic, or precast concrete according to CRSI’s “Manual of Standard Practice” of greater compressive strength than concrete.

2.4 CONCRETE MATERIALS

A. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

B. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project:
   1. Portland Cement: ASTM C 150, Type I or III. Supplement cement as necessary to meet project conditions.
      a. Fly Ash: ASTM C 618, Class C or F.
      b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Normal-Weight Aggregate: ASTM C 33, Class 3S, course aggregate or better, uniformly graded, 1-1/2-inch nominal maximum aggregate size.

D. Water: ASTM C 94; potable.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride. Admixtures shall conform to limit consistent with ACI 318 and ACI 301.
   1. Water-Reducing Admixture: ASTM C 494, Type A.
   2. Retarding Admixture: ASTM C 494, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
   6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.6 RELATED MATERIALS

A. Drainage Fill (Course): Washed narrowly graded moisture of crushed stone, or crushed or uncrushed gravel, ASTM D448; course-aggregate grading size 57; with 100 percent passing a 1 inch sieve and not more than 8 percent passing a No. 200 sieve.

B. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, ASTM D 1752, cork or self-expanding cork, or ASTM 4819, Type II, or ASTM D 1622 closed-cell compressible foam,.

2.7 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

2.8 CONCRETE MIXTURES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:
   1. Minimum Compressive Strength: As indicated on Concrete Schedule.
   2. Maximum Water-Cementitious Materials Ratio: As indicated on Concrete Schedule.
   3. Slump Limit: 4 inches or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
   4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.

2.9 PATCHING AND REPAIR MATERIALS

A. Epoxy Crack Injection Adhesive (Repair): ASTM C881, Type I, Grade 1, solvent free.
   1. Products:
      a. Sikadur 35 Hi-Mod LV; Sika Corp.
      b. Sure-Inject J56; Dayton Superior Corp.
      c. EUCO #452 LV; Euclid Chemical Co.
      d. MasterInject 1500; Construction Systems.
      e. Pro-Poxy 100; Unitex

B. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
   4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109.
   5. Products:
      a. Ardex K-15; Ardex Inc.
      b. Econolevel; Dayton Superior Corporation.
      c. MasterTop Topping 112; Construction Systems
      d. Skimflow ES; Dependable Chemical Co., Inc.
      e. EZ Level; TEC Specialty Products.
      f. Super FLO TOP; Euclid Chemical Co.
      g. Levelex; L & M Construction Chemical.

C. Job-Mixed Patching Mortar: 1 part portland cement complying with ASTM C 150, Type I, II, or III and 2-1/2 parts fine aggregate complying with ASTM C 144, except 100 percent passing a No. 16 (1.18-mm) sieve.

D. Cementitious Patching Mortar: Packaged, dry mix complying with ASTM C 928.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Cementitious Patching Mortar:
         1) Hicap; Kaufman Products, Inc.
         2) MasterEmaco S466 CI, MasterEmaco S 477 CI, or MasterEmaco S 488 CI; Construction System.
         3) Sikarepair 223 or Sikarepair SHB; Sika Corporation.
         4) Deep Pour Mortar; Sonneborn; Div. of ChemRex.
         5) Sto Full-Depth Repair Mortar; Sto Corp., Concrete Restoration Division.
         6) MasterEmaco S 440 MC; Construction System.
      b. Cementitious Patching Mortar, Rapid Setting:
         1) Pro Patching Cement; CGM, Incorporated.
         2) Day-Chem Perma-Patch, Re-Crete 5 Minute, or Re-Crete 20 Minute; Dayton Superior Corporation.
         3) Euco-Speed; Euclid Chemical Company (The).

4) FX-928 Rapid Hardening Mortar; Fox Industries, Inc.
5) Duracrete; Kaufman Products, Inc.
6) Sealtight Meadow-Patch 5, Sealtight Meadow-Patch 20, or Sealtight Futura-15; Meadows, W. R. Inc.
7) Sikaset Roadway Patch; Sika Corporation.
8) Road Patch; Sonneborn, Div. of ChemRex.
9) Sto Rapid Repair Mortar. Sto Corp., Concrete Restoration Division.
10) Speed Crete 2028; Tamms Industries, Inc.
11) MasterEmaco T 1060 or MasterEmaco T 1061; Construction System.
12) Patch Set 928; Unitex.
13) US Spec Transpatch; US MIX Products Company.
14) Wabo Renew 100; Watson Bowman Acme Corp., Admixtures, Inc.

E. Patching Material:
1. Use to repair honeycombed, damaged, and other defective concrete. Use for leveling and infill over existing concrete to match new conditions.
a. Products:
1) Five Star Structural Concrete; Five Star Products, Inc.
2) MasterEmaco S477 CI; BASF Construction Systems
3) Civil/Structural V/O; Dayton Superior Corporation
2. Use to repair vertical or overhead surfaces
a. Products
1) Five Star Structural Concrete V/O; Five Star Products, Inc.
2) MasterEmaco S488 CI; BASF Construction Systems
3) Civil/Structural V/O; Dayton Superior Corporation
3. Where patching material is being placed in thicknesses greater than 2”, it may be extended with pea gravel aggregate in accordance with the manufacturer’s recommendations.

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information.
1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items reuired for adjoining work attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS/DRAINAGE COURSE

A. Compact drainage course to required thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
1. Depth shall be 6 inches.

3.4 STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Locate and install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
   1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
   2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.6 CONCRETE PLACEMENT

A. Comply with ACI 301 for measuring, batching, mixing, transporting, and placing concrete.

B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

C. Do not add water to concrete during delivery, at Project site, or during placement.

D. Consolidate concrete with mechanical vibrating equipment.

E. Equipment Bases and Foundations:
   1. Coordinate sizes and locations of concrete bases with actual equipment provided.
   2. Construct concrete bases 4 inches high, unless otherwise indicated; and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated.
   3. Minimum Comprehensive Strength: 4000 psi at 28 days, unless otherwise noted.
   4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
   5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete substrate.
   6. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   7. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.7 FINISHING FORMED SURFACES

A. General: Refer to Concrete Schedule for location.

B. Rough-Formed Finish (Rm Fm-Fn): As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding 1/2 inch.

C. Smooth-Formed Finish (Sm Fm-Fn): As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.

D. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301, to smooth-formed finished as-cast concrete where indicated:
   1. Smooth-rubbed finish (Ab-Fn).
   2. Grout-cleaned finish (Grt-C1-Fn).

E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
   1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes, unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.

E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

G. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, ro windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

B. Tests: Perform according to ACI 301.
   1. Testing Frequency: One composite sample shall be obtained for each day's pour of each concrete mix exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

3.11 CONCRETE SURFACE REPAIRS

A. General: Comply with manufacturer’s written instructions and recommendations for application of products, including surface preparation.

B. Patching Mortar: Unless otherwise recommended by manufacturer apply as follows:
   1. Wet substrate thoroughly and then remove standing water. Scrub a slurry of neat patching mortar into substrate, filling pores and voids.
   2. Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch.
   3. Wet-cure cementitious patching materials for not less than seven days by water-fog spray or water-saturated absorptive cover.

3.12 CONCRETE WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess concrete materials are Contractor’s property. At completion of work, remove from Project site.
   1. Legally dispose of waste off Owner’s property.

END OF SECTION 03 30 53

SECTION 04 20 00.00 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:
   1. Concrete masonry units (CMUs).
   2. Clay face brick.
   3. Mortar and grout.
   4. Reinforcing steel bars.
   5. Masonry joint reinforcement.
   6. Ties and anchors.
   7. Embedded flashing.
   8. Miscellaneous masonry accessories.

B. Related Sections include the following:
   1. Division 03 Section “Cast-in-Place Concrete” for dovetail slots for masonry anchors.
   2. Division 04 Section “Cast Stone Masonry” for furnishing cast stone trim.
   3. Division 07 Section "Joint Sealants" for sealing control and expansion joints in unit masonry.

C. Products installed, but not furnished, under this Section include the following:
   1. Cast-stone trim, furnished under Division 04 Section "Cast Stone Masonry."
   2. Products furnished under Division 05 Section “Metal Fabrications”, including post installed anchors.

1.2 REFERENCES

A. Definitions
   1. General: Definitions, glossary and terminology used in this Section are from the National Concrete Masonry Association TEK 01-04.
   2. CMU(s): Concrete Masonry Units.
   3. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.
   4. Cavity: A continuous air space between wythes of masonry or between masonry and its backup system.
   5. Cavity Mortar Protection: Used in conjunction with flashing and weep vents to provide a system to properly evacuate moisture from a masonry cavity wall by providing a continuous path for incidental moisture to escape from weep vents.
   6. Cavity Wall: A multiwythe non-composite masonry wall with a continuous air space within the wall (with or without insulation), which is tied together with metal ties.
   7. Composite Wall: A multiwythe wall where the individual masonry wythes act together to resist applied loads. Transfer of stress between components of a member designed so that in resisting loads, the combined components act together as a single member.
   8. Wall, Loadbearing: Wall that supports vertical load in addition to its own weight. By code, a wall carrying vertical loads greater than 200 lb./ft. in addition to its own weights.
   9. Wall, Multiwythe: Wall composed of 2 or more masonry wythes.
   10. Wythe: Each continuous vertical section of a wall, one masonry unit in thickness.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate installation of masonry and masonry accessories with thermal and air barrier and other moisture protection work to provide a tested wall assembly.

B. Pre-installation Meeting: Conduct meeting at Project site. Note: As work progresses, additional pre-installation meetings might need to take place to coordinate installation of various components of exterior enclosure.
   1. Meet with Owner, A/E, CM, testing and inspection agency representative, mason, and other installers whose work interfaces with or affect masonry.

2. Review methods and procedures related to masonry installation, including manufacturers' requirements and recommendations.
3. Review temporary protection requirements.
4. Review mockup and cleaning requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, including but not limited to:
1. Flexible flashing materials, including manufacturer’s written installation instructions.

B. Shop Drawings: For the following:
1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes, including full return corner units.
2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI PRC-315, "Guide to Presenting Steel Design Details." Show elevations of reinforced walls.

C. Samples for Verification: For each type and color of the following:
1. Provide samples at the project site only.
2. Face brick, in the form of straps of five or more bricks.

1.5 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

A. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
1. Masonry units.
a. Provide material test reports substantiating compliance with requirements, if requested.
b. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances.
c. For exposed brick, include material test report for efflorescence according to ASTM C 67, and the following:
1) Compressive strength
2) 24 hour cold water absorption
3) 5 hour boil absorption
4) Saturation coefficient
5) Initial rate of absorption (suction)
d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing according to ASTM C 67 and a list of address of buildings in Project’s area where proposed bricks has been used successfully and with a history of durability.
2. CMU: Upon regular presentation within past 12 months of representative units by approved manufacturer, a test report from an independent laboratory showing resultant weight, compressive strength (based on net area), and water absorption properties, as well as adherence to standards where so specified, for:
a. Each proposed type and size of concrete masonry units.
b. Test reports shall conform to ASTM C140 and shall include:
1) Name of Manufacturer
2) Date of Manufacture of Test Specimen
3) Dimension Measurements (in.)
4) Calculated Gross Area (sq.in.)
5) Calculated Net Area (sq.in.)
6) Total Load (lbs.)
7) Net Unit Load (psi)
8) Sample Weight (lbs.)
9) Dry Weight (lbs.)
10) Wet Weight (lbs.)
11) Immersed Weight (lbs.)
12) Density (pcf)

13) Moisture Content (%)
14) Absorption (%)
15) Linear Shrinkage Coefficient (%)

a. CMU: Submit compression test results from an independent testing laboratory showing the compressive strength of each type and size of concrete masonry units delivered to the construction site during the first fifteen days of masonry construction. Submit additional tests from each type and size of concrete masonry units for each 10,000 sq.ft. of concrete masonry wall constructed. The independent testing laboratory is to select units to be tested from materials stockpiled on the Project site.

4. Cementitious materials. Include brand, type, and name of manufacturer.
5. Mortar admixtures.
6. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
7. Grout mixes. Include description of type and proportions of ingredients.
8. Reinforcing bars.
9. Joint reinforcement.
10. Anchors, ties, and metal accessories.
11. Flexible Flashing. Certification of compatibility by manufacturer, listing all materials on the Project with which the product and accessories may come into contact**.**

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.
2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement. For both fine and course grouts including complete identities and proportions of ingredients.
a. Weight of each ingredient including water.
b. Measured slump.
c. Water/cement ratio.
d. Sieve analysis for aggregates.

C. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in TMS 402/602.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Assume responsibility for acceptance of masonry units delivered to Project site being in compliance with specified ASTM requirements for chippage and dimensional tolerances.
1. Inspect decorative units upon delivery to ensure color match with required materials and accepted mock-up panel.

B. Store masonry units on elevated platforms in a dry location to prevent contamination by mud, dust or materials likely to cause staining or other defects. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
1. Cover masonry units at all times.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
1. Deliver cementitious and other packaged materials in unopened containers, plainly marked and labeled with manufacturers' names and brands.
2. Handle cementitious materials in a manner that will prevent the inclusion of foreign materials and damage by water or dampness.

D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

1. Stockpile and handle aggregates to prevent contamination from foreign materials. Store different aggregates separately.
2. Store sand on tarps to keep ground water from wicking into sand.

E. Deliver pre-blended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store pre-blended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

F. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
1. Deliver flexible flashing materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
2. Store flexible flashing materials as recommended by manufacturer. Keep away from open flame or sources of ignition.
3. Protect insulation from physical damage. Handle boards carefully so corners are not broken off or boards otherwise damaged.

1.7 FIELD CONDITIONS

A. Refer to Division 01 Section "Product Requirements".
1. Do not apply flexible flashing on wet or damp surfaces.
2. Apply flashing to surfaces free of dirt, oils, lubricants, and other debris.
3. Install flexible flashing materials at temperature above 40 deg. F. At temperature below 40 deg. F., apply primer in accordance with flashing manufacturer's recommendations, prior to installation of flashing.
4. Do not use metal reinforcements or ties coated with loose rust or other coatings, including ice, which will reduce bond.

B. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress. Refer to Section 1.8B ("Masonry Protection") in TMS 402/602. Note: Protection is required by Building Code.
1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
3. Continue to cover walls until tie-in to roof is complete and top of wall is protected from water penetration.

C. This structure is designed to be self-supporting and stable after the building is fully completed. Protect masonry walls against wind damage by bracing as required until support of walls is integral with the completed building structure. This includes the addition of whatever temporary bracing, guys, or tie-downs that might be necessary. Such material is not shown on the Drawings. If applied, they shall be removed as conditions permit, and shall remain the Contractor's property.
1. Safety: It is solely the Contractor's responsibility to follow all applicable safety codes and regulations governing this Work.
2. Load application after building masonry columns, piers, or walls
   a. Do not apply uniform design floor or roof loading for at least 12 hours.
   b. Do not apply concentrated loads for at least 3 days.

D. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

E. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with NCMA TEK 03-01C. Comply with cold-weather construction requirements contained in TMS 402/602 with special emphasis on the following:
   1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
      a. To assure mortar temperatures between 40 degrees F and 120 degrees F until used, heat mixing water or aggregates when air temperature is between 32 degrees F and 40 degrees F. When the air temperature is between 25 degrees F and 32 degrees F, heat both water and aggregate.
      b. Do not heat water or sand above 160 degrees F.
   2. Comply with the requirements of the governing code and with the "Construction and Protection Recommendations for Cold Weather Masonry Construction" of the Technical Notes of Brick and Tile Construction by the Brick Industry Association (BIA) and International Masonry Industry All-Weather Council, “Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.”

F. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 402/602 and the following:
   1. Masonry construction performed when ambient temperature exceeds 100 degrees F (or 90 degrees F with wind velocities greater than 8 mph) shall conform to the following requirements:
      a. Store materials in cool, shaded location.
      b. Cover aggregate stockpiles with black plastic sheet to retard the evaporation of moisture.
      c. Cool reinforcing steel, metal accessories, wheelbarrows, mixers and mortar boards by flushing with water.
      d. Wet high-suction brick.
      e. Increase lime and/or cement content to maximum allowed under ASTM C270 for mortar type specified.
      f. Increase water content of mortar and grout as needed.
      g. Spread mortar beds no more than 4 feet ahead of masonry, and set units within one minute of spreading mortar.
      h. Moist cure masonry by water fog spray after tooled joints have set.
      i. Cover walls to retard evaporation.
      j. Schedule work to avoid hottest part of day.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Products: Subject to compliance with requirements, provide one of the products specified.
   2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The “Substitution Request Form” and complete technical data for evaluation must accompany request for A/E’s approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

C. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

D. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate. Do not change source or brands of masonry mortar materials during the course of the Work.

2.2 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops indicated net-area compressive strengths (f'_m) at 28 days.
1. Determine net-area compressive strength (f'_m) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in TMS 402/602.

B. Regulatory Requirements: Comply with the provisions of the following codes, specifications, and standards, except as otherwise shown or specified:
1. TMS 402/602 “Building Code Requirements and Specification for Masonry Structures.”
   a. Maintain one copy of the standard in project field office at all times during construction. Contractor’s supervisory personnel shall be thoroughly familiar with this material as it applies to the project and shall be present at all times and direct work performed under this Section.
2. National Concrete Masonry Association (NCMA)
   a. NCMA TEK Bulletin 03-01C “All Weather Concrete Masonry Construction”.
   b. NCMA TEK Bulletin 03-02A “Grouting Concrete Masonry Walls”.
   c. NCMA TEK Bulletin 03-08A “Concrete Masonry Construction”.
   d. NCMA TEK Bulletin 03-04C “Bracing Concrete Masonry Walls Under Construction”.
   e. NCMA TEK Bulletin 05-02A “Clay and Concrete Masonry Banding Details”.
   f. NCMA TEK Bulletin 07-01D “Fire Resistance Rating of Concrete Masonry Assemblies”.
   g. NCMA TEK Bulletin 08-02A “Removal of Stains from Concrete Masonry.”
   h. NCMA TEK Bulletin 08-03A “Control and Removal of Efflorescence.”
   i. NCMA TEK Bulletin 08-04A “Cleaning Concrete Masonry”.
   j. NCMA TEK Bulletin 09-01A “Mortars for Concrete Masonry.”
   k. NCMA TEK Bulletin 10-01A “Crack Control in Concrete Masonry Walls”.
   l. NCMA TEK Bulletin 10-02D “Control Joints for Concrete Masonry Walls – Empirical Method”.
   m. NCMA TEK Bulletin 10-03 “Control Joints for Concrete Masonry Walls – Alternative Engineering Method.
   n. NCMA TEK Bulletin 10-04 “Crack Control for Concrete Brick and Other Concrete Masonry Veneers”.
   o. NCMA TEK Bulletin 12-04D “Steel Reinforcement for Concrete Masonry”.
   p. NCMA TEK Bulletin 14-04B "Strength Design Provisions for Concrete Masonry."
   q. NCMA TEK Bulletin 14-07C "Allowable Stress Design of Concrete Masonry (2012 IBC & 2011 MSJC)."
   r. NCMA TEK Bulletin 19-04A “Flashing Strategies for Concrete Masonry Walls”.
   s. NCMA TEK Bulletin 19-05A “Flashing Details for Concrete Masonry Walls.”
   t. NCMA TEK Bulletin 19-07 “Characteristics of Concrete Masonry Units with Integral Water Repellent”.
3. ASTM International:
   a. ASTM C33 "Standard Specification for Concrete Aggregates."
   b. ASTM C90 “Standard Specification for Loadbearing Concrete Masonry Units."
   c. ASTM C91 “Masonry Cement.”
   d. ASTM C140 “Standard Test Methods of Sampling and Testing Concrete Masonry Units.”
   e. ASTM C144 “Standard Specification for Aggregate for Masonry Mortar.”
   f. ASTM C150 “Standard Specification for Portland Cement.”
   g. ASTM C207 “Standard Specification for Hydrated Lime for Masonry Purposes.”

h. ASTM C270 “Standard Specification for Mortar of Unit Masonry.”
i. ASTM C426 “Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units.”
j. ASTM C 476 “Standard Specification for Grout for Masonry”.
k. ASTM C780 “Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.”
l. ASTM C979 “Standard Specification for Pigments for Integrally Colored Concrete.”
m. ASTM E514 “Standard Test Method for Water Penetration and Leakage Through Masonry”.

4. International Masonry Industry All-Weather Council (IMIAWC).
   a. “Recommended Practices and Guide Specifications for Cold Weather Masonry Construction – 1993”.
5. International Masonry Institute
   a. “Internal Bracing Design Guide for Masonry Walls Under Construction”.
   b. Detailing Series.
6. Underwriters’ Laboratory Inc. (UL)
   a. UL “Building Materials Directory”.
   b. UL 618 “Standard for Concrete Masonry”.
7. Brick Industry Association (BIA)
   a. BIA Technical Notes No. 1 – Revised 1992: All weather construction.
   b. BIA M1-88: Specifications for Portland Cement Lime Mortar for Brick Masonry.
   c. BIA Technical Notes No. 7 – Water Penetration Resistance – Design and Detail.
   d. BIA Technical Notes No. 18A – Accommodating Expansion of Brickwork.
   e. BIA Technical Notes No. 20 – Revised 1990: Cleaning Brick Masonry.
   f. BIA Technical Notes No. 27 – Revised 1994: Brick Masonry Rain Screen Walls.
   g. BIA Technical Notes No. 28B – Revised 1987: Brick Veneer.
   h. BIA Technical Notes No. 28C – Thin Brick Veneer.

2.3 MASONRY UNITS, GENERAL

A. Masonry Standard: Comply with ACI/ASCE 6/TMS 602, unless modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

C. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS (CMUs)

A. Shapes: Provide shapes indicated and as follows:
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide bullnose units for outside corners and at sills, unless otherwise indicated or sill is indicated to receive additional finish materials.
      a. At base of wall and where indicated (first CMU course above floor), provide exposed square edge external corners. Above base transition square edge to the bullnose above by grinding.
      b. Provide bullnose unit with 1 inch radius bullnose (BN1), unless otherwise noted.
      c. Provide double bullnose units 1 inch radius bullnose (BN2) at top of half wall as indicated.
   3. Provide two core type masonry units where required to receive vertical reinforcing.

4. Bond beam units shall be such that where two reinforcing steel bars are required in the bond beams, bars may be located not greater than 2-5/8 inch from both faces of the unit. Bond beam units that do not allow the two bars to be separated and to be within 2 5/8" of each face will not be acceptable.

B. Concrete Masonry Units: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
2. Weight Classification: Normal weight.
3. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

2.5 MASONRY LINTELS

A. Concrete Lintels: Not acceptable**.**

B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from specially formed "U" shaped lintel units with reinforcing bars placed as indicated and filled with coarse grout. Open-bottom, bond-beam type units are not acceptable for use as reinforced lintels. Cure prefabricated lintels before handling and installing. Temporarily support built-in-place lintels until cured. Prefabricated lintels shall have a faux head joint pattern on their exposed faces, and shall have their top side clearly marked in the factory. Prefabricated lintels are to be installed such that the faux head joint pattern aligns with that of the surrounding masonry.

2.6 BRICK

A. General: Provide shapes indicated and as follows:
1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Clay Face Brick: ASTM C 216, Grade SW, Type FBX or FBS.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
2. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
3. Norman: Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 11-5/8 inches long.
4. Application: Use where brick is exposed, unless otherwise indicated.
5. Products:
    a. Brick Type 1, Color A: Norman
        1) Color A: Blend of the following:
            a) Belden Brick Company, 20% Simulated Belcrest 500, velour.
            b) Belden Brick Company, 50% Simulated Belcrest 530, velour.
            c) Belden Brick Company, 20% Simulated Belcrest 540 Cross-Set, velour.
            d) Belden Brick Company, 10% Venetian Dark.
6. Provide special shapes as indicated on Drawings.

2.7 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color(s) indicated.
   1. Alkali content shall not be more than 0.6 percent when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 270, Type S.

D. Masonry Cement: ASTM C 91 veneer only.
   1. Products:
      a. Brixment or Velvet; Essroc, Italcementi Group.
         Mortamix Masonry Cement or Rainbow Mortamix Custom Buff Masonry Cement or White Mortamix Masonry Cement; Holcim (US) Inc.
      b. Magnolia Masonry Cement or Lafarge Masonry Cement or Trinity White Masonry Type S or Trinity White Masonry Type N; Lafarge North America Inc.
      c. Lehigh Masonry Cement or Lehigh White Masonry Cement; Lehigh Cement Company
      d. Richmortar; CEMEX.
      e. Miami Masonry Cement; Fairborn Cement Company.

E. Mortar Cement: ASTM C 1329.

F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
   1. Products:
      a. Bayferrox Iron Oxide Pigments; Bayer Corporation, Industrial Chemicals Div.
      b. True Tone Mortar Colors; Davis Colors.
      c. MasterColor; Master Builders Solutions.
      d. SGS Mortar Colors; Solomon Grind-Chem Services, Inc.
      e. Prism Pigments, a Division of Mix Manufacturing, Inc.
      f. Euclid Chemical Company.
      g. Lanxess Corp.
      h. Acme-Hardesty Co., Acme-Shield Plus Admixture; Cargill.

G. Colored Cement Product: Packaged blend made from Portland cement and lime, masonry cement, or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
   1. Products:
      a. Colored Portland Cement-Lime Mix:
         1) Rainbow Mortamix Custom Color Cement/Lime; Holcim (US) Inc.
         2) Eaglebond; Lafarge North America Inc.
         3) Lehigh Custom Color Portland/Lime Cement; Lehigh Cement Company.
         4) Color Mortar Blend; Glen-Gery Corp.
         5) Salyor’s PLUS; Essroc.
         6) PCL; CEMEX.
      b. Colored Masonry Cement:
         1) Flamingo-Brixment; Essroc, Italcementi Group.
         2) Rainbow Mortamix Custom Color Masonry Cement; Holcim (US) Inc.
         3) Magnolia Masonry Cement; Lafarge North America Inc.
         4) Lehigh Custom Color Masonry Cement; Lehigh Cement Company.
         5) Coosa Masonry Cement; National Cement Company, Inc.
         6) Richcolor Masonry Cement; CEMEX.
         7) Miamicolor Masonry Cement; Fairborn Cement Company.
   2. Formulate blend as required to produce color(s) indicated or, if not indicated, as selected from manufacturer's standard colors.

3. Pigments shall not exceed 10 percent of Portland cement by weight.
4. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.

H. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color(s), where required for mix design.

I. Aggregate for Grout: ASTM C 404.
1. Fine Aggregates: ASTM C404, clean, sharp, natural sand free from loam, clay lumps, or other deleterious substances.
2. Coarse Aggregates: ASTM C404, clean, uncoated, pea gravel containing no clay, mud, loam, or foreign matter. Maximum aggregate size 3/4 inch.

J. Admixtures, General:
1. No air-entraining admixtures or material containing air-entraining admixtures.
2. No antifreeze compounds shall be added to mortar.
3. No admixtures containing chlorides shall be added to mortar.

K. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, ASTM C 1384, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Products:
a. Accelguard 80; Euclid Chemical Company.
b. Morset; GCP Applied Technologies.
c. MasterSet AC 534 or MasterSet FP 20; Master Builders Solutions.

L. Water: Conform to ASTM C1602 for mixing water.

2.8 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615 or ASTM A 996, Grade 60 (Grade 420).
1. Size, length, and spacing shall be as indicated.
2. Where No. 3 and larger are indicated, they shall be deformed steel, conforming to ASTM A615, Grade 60.
3. Use #4 spacer bars at 48 inch spacing connected to longitudinal reinforcing bars in concrete masonry bond beams to hold bars in proper location.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.
1. Products:
a. No. 376, 377, 378, or 379 Rebar Positioner; Heckmann Building Products Inc.
b. #RB or #RB-Twin Rebar Positioner; Hohmann & Barnard, Inc.
c. Figure-8, Double Figure-8, O-Ring or Double O-Ring Rebar Positioner; Wire-Bond.

C. Masonry Joint Reinforcement, General: ASTM A 951 and as follows:
1. Provide welded wire units prefabricated in straight lengths of not less than 10 foot, with matching corner ("L") and intersection ("T") units.
2. Fabricate from cold-drawn steel wire complying with ASTM A82, with deformed or embossed continuous side rods and plain cross-rods, with unit width of 1-1/2 to 2 inches less than thickness of wall or partition.
3. Wire shall be galvanized in accordance with the following:
a. Joint reinforcement, interior walls or exposed to relative humidity less than or equal to 75 percent
1) ASTM A641, mill galvanized (0.10 oz. per sq.ft.)

b. Wire ties or anchors in interior walls or exposed to relative humidity less than or equal to 75 percent
    1) ASTM A641 (0.35 oz. per sq.ft.)
c. Joint reinforcement, wire ties, or anchors in exterior walls or a mean relative humidity exceeding 75 percent
    1) ASTM A153, Class B (1.50 oz. per sq.ft.)
d. Sheet metal ties or anchors, interior walls or exposed to relative humidity less than or equal to 75 percent
    1) ASTM A653, G60 (0.60 oz. per sq.ft.)
e. Sheet metal ties or anchors in exterior walls or a mean relative humidity exceeding 75 percent
    1) ASTM A153, Class B (1.50 oz. per sq.ft.)
f. Steel plates and bars
    1) ASTM A153, Class B

4. For single wythe interior CMU walls, provide ladder type joint reinforcing fabricated with two W1.7 or 0.148 inch steel side rods and W1.7 or 0.148 inch cross rods. Joint reinforcing shall be placed in every other CMU joint or not more than 16 inches o.c.
5. For interior walls consisting of CMU backup and face brick or CMU veneer, provide ladder type joint reinforcing fabricated with three W1.7 or 0.148 inch steel side rods and W1.7 or 0.148 inch cross rods. Joint reinforcing shall be placed in every other CMU joint or not more than 16 inches o.c.
6. For multi-wythe interior walls consisting of two wythes of CMU, provide ladder type joint reinforcing fabricated with four W1.7 or 0.148 inch steel side rods and W1.7 or 0.148 inch cross rods. Joint reinforcing shall be placed in every other CMU joint or not more than 16 inches o.c.
7. Multi-wythe exterior walls consisting of CMU backup, insulated cavity, and exterior face brick or CMU veneer.
    a. When both wythes are to be constructed simultaneously:
        1) Provide ladder type joint reinforcing fabricated with three W1.7 or 0.148 inch steel side rods and W1.7 or 0.148 inch cross rods. Joint reinforcing shall be placed in every other CMU joint or not more than 16 inches o.c.
    b. When each wythe is to be constructed separately:
        1) Backup Wythe
            a) Provide adjustable ladder type joint reinforcing fabricated with two W1.7 or 0.148 inch steel side rods, W1.7 or 0.148 inch cross rods, 3/16 inch eyes and 3/16 inch double legged pintles. Longitudinal rods shall be spaced for each face shell of CMU; eye sections shall extend into wall's cavity, and pintles shall rest upon bed joints of veneer. Joint reinforcing shall be placed in every other CMU joint or not more than 16 inches o.c.
        2) Veneer Wythe (CMU)
            a) Provide ladder type horizontal joint reinforcing fabricated with two W1.7 or 0.148 inch steel side rods and W1.7 or 0.148 inch cross rods continuous joint. Joint reinforcing shall be placed in every other CMU veneer joint or not more than 16 inches o.c.
    c. For multi-wythe walls in which the coursing in the face wythe does not align vertically with the coursing in the backup wythe use:
        1) Stone Tab 3700 with 1100 triangular ties; Wire-Bond.
        2) TIE-HVR-195VB; Hohmann & Barnard, Inc.
    d. For banding details in which CMU and clay masonry are combined:
        1) Refer to NCMA TEK 05-02A.
            a) Provide ladder type horizontal joint reinforcing fabricated with two W1.7 or 0.148 inch steel side rods and W1.7 or 0.148 inch cross rods. Reinforce joints separating two different materials.
8. For foundation walls consisting of two wythes of CMU, provide ladder type joint reinforcing fabricated with four W1.7 or 0.148 inch steel side rods and W1.7 or 0.148 inch cross rods. Joint reinforcing shall be placed in every CMU joint or no more than 8 inches o.c. Side rods shall align with face shells of CMU.

9. For single wythe foundation walls, provide ladder type joint reinforcing fabricated with two W1.7 or 0.148 inch steel side rods and W1.7 or 0.148 inch cross rods. Joint reinforcing shall be placed in every CMU joint or no more than 8 inches o.c.
10. For joint reinforcing in walls, other than those described above, refer to Drawings for particular requirements.
11. All ladder type joint reinforcing shall have cross rods spaced at 16 inches o.c.
12. All ladder type joint reinforcing shall be lapped 6 inches minimum.
13. All ladder type joint reinforcing shall be discontinuous across movement joints.

2.9 TIES AND ANCHORS

A. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.
1. Ensure components and materials are compatible with specified accessories and adjacent materials.

B. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with subparagraphs below, unless otherwise indicated.
1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 1064; with ASTM A 641, Class 1 coating, provide in interior walls where humidity is less than 75 percent.
2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 1064; with ASTM A 153, Class B-2 coating, unless otherwise noted.
3. Galvanized Steel Sheet: ASTM A 653, Commercial Steel, G60 (Z180) zinc coating, provide in interior walls where humidity is less than 75 percent.
4. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153, unless otherwise noted.
5. Steel Plates, Shapes, and Bars: ASTM A 36.
6. Stainless Steel bars: ASTM A 276 or ASTM A 666, Type 304.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
2. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
3. Wire: Fabricate from 3/16-inch diameter, hot-dip galvanized steel wire. Mill-galvanized wire ties may be used in interior walls, except in spaces where relative humidity can be expected to exceed 75-percent relative humidity (showers, locker rooms) or where otherwise indicated.

D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls, unless otherwise indicated.
2. Tie Section for Steel Frame: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.188-inch diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls, unless otherwise indicated.

E. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustments but resist tension and compression forces perpendicular to plane of wall.
1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.105 inch thick steel sheet, galvanized after fabrication.
2. Tie Section: Triangular-shaped wire tie made from 0.187 inch diameter, hot-dip galvanized steel wire.

F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins, unless otherwise indicated.
   1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153.

G. Adjustable Masonry-Veneer Anchors: Provide screw-attached, masonry-veneer anchors with separate horizontal reinforcing .
   1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
      a. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch.
      b. Anchor shall meet or exceed requirements for air leakage and water penetration established for Project.
   2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
      a. Fabricate sheet metal anchor sections and other sheet metal parts from 0.067-inch thick, steel sheet, galvanized after fabrication.
      b. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.188-inch diameter, hot-dip galvanized steel wire.
      c. Products:
         1) 315-D with 316 or Pos-I-Tie or 213-2X; Heckmann Building Products Inc.
         2) HB-213 with 2X Hook or Adjusto-Tie; Hohmann & Barnard, Inc.
         3) 1004, Type III or RJ-711; Wire-Bond.
         4) Thermal-Grip Masonry Veneer Anchor Pos-i-tie: TRUFAST Walls.
   3. Anchor Section: Corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed, washer head or tape to protect hole in sheathing.
      a. Products
         1) Pos-I-Tie; Heckmann Building Products.
         2) SureTie; Wire Bond.
         3) X-Seal Anchor or 2 Seal Tie Veneer Anchor; Hohmann and Barnard.
         4) Thermal Grip MVA or Pos-i-tie: TRUFAST Walls.
   4. Channel Slot System:
      b. Vertical Channel: 1-3/8-inch wide by 1/2- or 5/8-inch deep by 60-inch long by minimum 16-gauge hot-dip-galvanized steel channel designed for surface-mounting and having discontinuous slotted holes for inserting veneer ties [and minimum 12-gauge triangular spacer clips or factory-welded prongs sized to penetrate depth of cavity insulation and transfer compression loads to back-up substrate].
         1) Acceptable Products: Subject to compliance with requirements, provide one of the following.
            a) 133 Long Channel Slot [with Channel Slot T-Clips] and 133-P Bridge Plate and Fastener; Heckmann.
            b) 362-C[X] Gripstay Channel; Hohmann and Barnard.
            c) 1301[-X]; Wire-Bond.
      c. Veneer Anchor or Tie: Factory-assembled 12-gauge slot clip attached to a 3/16-inch diameter wire triangle sized for cavity.
         1) Acceptable Products: Subject to compliance with requirements, provide one of the following.
            a) Tri-03 Triangle Tie with Channel Clip; RKL Building Specialties.
            b) 129 Channel Slot Triangular Tie; Heckmann.
            c) 363 Flexible Gripstay Anchor; Hohmann and Barnard.

2.10 MISCELLANEOUS ANCHORS

A. Stabilization Anchors: Provide where masonry walls intersect concrete or existing masonry walls. Bonds masonry walls and restrains lateral movement while allowing expansion and control joints to perform as designed.

1. Products:
    a. Slip Set Stabilizer; Hohmann & Barnard, Inc.
    b. 1700; Wire-Bond.

B. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of dimensions indicated.

C. Intersecting Masonry Wall Joint Reinforcing: Where interior masonry walls supported on slabs intersect masonry walls, provide hot dip galvanized 1/2 inch by 16 gauge mesh ties spanning horizontally.
1. Products:
    a. #MWT Mesh Wall Tie; Hohmann & Barnard, Inc.
    b. Wire Mesh 269; Heckman Building Products.
    c. Wire Mesh Tie; Wirebond.
    d. Mesh Tie; MasonPro.

2.11 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
1. Reglets/Receivers: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with mitered and welded corners and junctions. Formed reglets must comply with requirements of Division 07 Section "Sheet Metal Flashing and Trim".
    a. Materials, provide one of the following:
        1) Stainless Steel: 0.0187 inch thick (fka 26 gauge).
    b. Masonry Type: Provide extension leg to extend to face of inner CMU wythe (or sheathing with a veneer wall configuration) with an off-set top flange.
2. Metal Terminations for Flexible Flashing: Fabricate from 26 or 28 gauge stainless steel. Extend into wall as indicated (but not less than 3 inches) and out to exterior face of wall. At exterior face of wall, bend metal down at an angle and back on itself for 3/4 inch to form a drip edge.
    a. Provide a bead of elastomeric silicone sealant between lintel and drip edge to prevent water from wicking back onto lintel.
    b. Provide hemmed edge turning back 180 degrees to be flush with face of veneer at base of wall only.
3. Stainless steel end dams may also be used in conjunction with flexible flashing.

B. Flexible Flashing: For flashing not exposed to the exterior, coordinate with air barrier system and use the following, unless otherwise indicated:
1. Provide one of the following:
    a. York 304 SA Self-Adhered, Stainless Steel; York Manufacturing, Inc.
    b. Gorilla Flash SS Peel and Stick Butyl; STS Coatings, Inc.
    c. IPCO Self-Adhesive Stainless Steel; Illinois Products, Inc.
    d. TK Self-Adhering Stainless Steel TWF; TK Products, Inc.
    e. Mighty-Flash-SA; Hohmann and Barnard Inc.
    f. Bond-N-Flash S.A.; Wire Bond
2. Characteristics/Properties
    a. Type: Stainless steel core with one stainless steel face with a butyl block co-polymer adhesive.
    b. Stainless steel type: 304, ASTM A 167.
    c. Adhesive: Block co-polymer.
    d. Size: Manufacturer's standard width rolls.
    e. Performance attributes
        1) Tensile strength, > 90,000 psi
        2) Puncture resistance, > 2,500 pounds average
        3) When tested as manufactured, product resists growth of mold pursuant to test method ASTM D 3273.

3. Accessories: Products shall be as recommended by flashing manufacturer
    a. Polyether Sealant
        1) UniverSeal US-100; York Manufacturing, Inc.
        2) GreatSeal LT-100; STS Coatings, Inc.
        3) R-Guard Joint Seam Sealer; Prosoco, Inc.
        4) HB Sealant; Hohmann and Barnard Inc.
        5) Quick Set Sealant; Wire Bond
    b. Splice Tape/Transition Flashing (Self Adhered)
        1) York 304SS; York Manufacturing, Inc.
        2) IPCO Self-Adhering Stainless Steel Flashing; Illinois Products, Inc.
        3) X-Seal Splice Tape; Hohmann and Barnard Inc.
        4) Anchorseal Tape: Wire Bond
    c. Corner and End Dams: Use only 26 gauge stainless steel pre-manufactured corners.
    d. Water-Based Primer: Provide when recommended by manufacturer for application indicated.
        1) Primer-SA; Hohmann and Barnard Inc.
        2) Aqua Flash Primer; Wire Bond

C. Solder and Sealants for Sheet Metal Flashings: As specified in Division 07 Section "Sheet Metal Flashing and Trim."
    1. Solder for Stainless Steel: ASTM B 32, Grade Sn96, with acid flux of type recommended by stainless-steel sheet manufacturer.
    2. Elastomeric Sealant: ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight. Sealant shall be approved by flexible flashing manufacturer for use with flashing.

D. Adhesives, Mastic, Sealant, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

E. Cavity Bridge: Stainless steel fabrication, Type 304 grade, 26 gauge. Provide pre-drilled holes as required for anchors to substrate
    1. Size and Confirguration as indicated on Drawings.

F. Termination Bar: 26 gauge, minimum predrilled stainless-steel approximately 1-1/2 inch wide by 8 foot sections, 45 deg. lip at top for sealant, to be used at top of flashing to secure it to backup.
    1. Acceptable Manufacturers/Products
        a. T-2 Termination Bar; Hohmann & Barnard, Inc.
        b. #4210 Termination Bar; Wire-Bond.
        c. Stainless Steel Accessories 45; York Flashings.
        d. Stainless Steel Termination Bar; IPCO.

2.12 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.
    1. Products:
        a. Neo-Seal IV 2218-3/Everlastic 1056 Joint Filler; Williams Products, Inc.
        b. #NS-Closed Cell Neoprene Sponge; Hohmann and Barnard, Inc.
        c. Neocell; IPCO.
        d. #NS-Closed Cell; National Construction Materials Corp.
        e. Sandell’s Closed Cell Neoprene; Sandell Construction Solutions.

B. Thermal Barrier (Break); Unfaced, Mineral-Wool Board Insulation: ASTM C 612; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Nominal density of 4.4 lb./cu.ft.
2. Moisture Resistance; ASTM C 1104: Moisture Sorption, 0.03 percent.
3. Thermal Resistance; ASTM C 518: R-value/inch at 75 deg. F., 4.2 hr.ft.^{2}. F/Btu.

C. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

D. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

E. Weep/Vent Products: Use one of the following, unless otherwise indicated:
1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color(s) selected from manufacturer's standard.
    a. Products:
        1) Mortar Maze weep vent; Advanced Building Products Inc.
        2) No. 85 Cell Vent; Heckmann Building Products Inc.
        3) Quadro-Vent; Hohmann & Barnard, Inc.
        4) Cell Vent, 3601; Wire-Bond.
        5) Sandell's Cell Vents; Sandell Construction Solutions.
        6) Cell Vent; MasonPro.
        7) Cell Vent; Mortar Net Solutions.
2. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color(s) selected from manufacturer's standard.
3. Adjustable Weep Vent: IPCO.
4. Stainless Steel Weep/Vent: Type 304 stainless steel.
    a. York Manufacturing Inc.

F. Cavity Mortar Protection Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity. Installer shall select product thickness(es) in the field based on observed clear air space between cavity insulation and outer wythe. Clear air space shall not exceed selected product thickness by more than 0.40-inch. Where clear air space exceeds manufacturer's thickest available product by more than 0.40-inch, Installer shall insert a supplemental wythe of extruded polystyrene (XEPS) insulation on inner face, sized to make up the difference.
1. Provide one of the following types:
    a. Profiled strips, 10-inches high, with dovetail shaped notches 7-inches deep that prevent mesh from being clogged with mortar droppings.
    b. Rectangular strips, not less than 10-inches high, with or without dimpled surface, designed to catch mortar droppings and prevent weep holes from being clogged with mortar.
    c. Sheets or rectangular strips installed continuously from flashing to height indicated, to prevent weep holes from being clogged with mortar.
2. Products:
    a. Mortar Break; Advanced Building Products Inc.
    b. CavClear Masonry Mat; Archovations, Inc.
    c. Mortar Web/Trap; Hohmann & Barnard Inc.
    d. Mortar Mitt; Sandell.
    e. Driwal Mortar Deflection/Driwall Masonry Vent System; Keene Building Products.
    f. Mason ProNet DT; MasonPro.
    g. Mortar Net; Mortar Net Solutions.
    h. Weep-Net; York Manufacturing Inc.
3. Fabric Mesh to Prevent Clogging of Weep Holes (Option): Non-woven polyester fabric used as part of masonry cavity drainage systems with flashing, weep holes or weep vents. Drapes over interior side of weep holes/vents keeping them free of mortar and debris; routes water to flashing and to weeps by draining through body of product.

a. Materials: Recycled polyester, free-draining mesh, made from polymer stands that will not degrade within cavity wall.
b. Mold Growth Resistance: In compliance with ASTM D 3273 and ASTM G 21.

G. Grout Sample Box: When approved by the A/E, grout sample box shall be proven by tests to yield comparable compressive strength values to samples cast by traditional methods regardless of CMU moisture content. Box shall perform as a mold and transport/shipping container in one as specified by ASTM C 1019.
1. Basis-of-Design: Deslauriers, Inc.

H. Column Isolation: Around all steel columns in masonry walls, provide 1/2 inch minimum isolation material to prevent the masonry from coming in contact with the displaced column during loading and to prevent mortar from being within the same joint.
1. Products:
a. Ceramar Flexible Foam; W.R. Meadows, Inc.
b. Econ-O-Foam; Williams Products.
c. Nomaboard; Nomaco Inc.
d. Column Backboard; Williams Products.
e. Column Wrap; MasonPro.

I. Grout Stop: Fiberglass, galvanized steel, or polypropylene screen.
1. Products:
a. Metal Lath 268; Heckmann Building Products, Inc.
b. MGS - Mortar/Grout Screen; Hohmann & Barnard, Inc.
c. Grout Stop 3612; Wire-Bond.
d. Grout Stop; MasonPro.

J. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 degrees F (minus 32 degrees C). Provide products with low compression set and of size and shape to provide a seal for compartmentalization.

2.13 MASONRY CLEANERS AND ACCESSORIES

A. Preformed Expansion Joint Filler: Provide closed cell sponge neoprene expansion joint filler conforming to ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated.

B. Bituminous Coating: Cold applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold applied asphalt emulsion complying with ASTM D1187, Type II.

C. Masonry Cleaners: Provide one of the following cleaning products expressly approved for intended use by cleaner manufacturer and manufacturer of unit being cleaned as verified on “mock-up”.
1. Job Mixed Detergent Solution: Solution of trisodium phosphate (1/2 cup dry measure) and laundry detergent (1/2 cup dry measure) dissolved in one gallon of water.
2. Proprietary Acidic Cleaner: Manufacturer's standard strength, general purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned. Do not use products containing hydrochloric (muriatic acid, hydrofluoric acid, or ammonium bifluoride.
a. For brick masonry not subject to metallic oxidation stains, use formulation consisting of a concentrated blend of surface acting acids, chelating, and wetting agents.
1) Products:
a) Sure Klean No. 600 Detergent; ProSoCo., Inc.
b) 202 Detergent; Diedrich Technologies.
c) NMD 80 New Masonry Detergent; EaCo Chem, Inc.

b. For dark colored brick masonry not subject to metallic oxidation stains, use formulation consisting of a liquid blend of surface acting acids and special inhibitors.
   1) Products:
      a) ProSoCo., Inc.; Sure Klean No. 101 Lime Solvent.
      b) Diedrich Technologies; 200 Lime Solv.
      c) EaCo Chem, Inc., NMD 80 New Masonry Detergent.

c. For brick masonry subject to metallic oxidation stains, use formulation consisting of a liquid blend of organic acids and special inhibitors.
   1) Products:
      a) Sure Klean Vana Trol; ProSoCo., Inc.
      b) 202 Vana-Stop; Diedrich Technologies.
      c) NMD 80 New Masonry Detergent; EaCo Chem, Inc.

D. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, if any, at rates indicated or recommended for pressure, measured at spray tip, and for volume. Adjust pressure and volume, as required, to ensure that damage to masonry does not result from cleaning methods.
   1. For chemical cleaner spray application, provide a low pressure tank or chemical pump suitable for the chemical cleaner indicated, equipped with a cone-shaped spray tip.
   2. For water spray application, provide a fan-shaped spray tip that disperses water at an angle of not less than 15 degrees.

2.14 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated. When specifically approved by the A/E, admixtures shall meet ASTM C1384 Standard Specification for Admixtures for Masonry Mortars.
   1. Do not use calcium chloride in mortar or grout.
   2. Maintain workability of standard grey mortar by remixing or retempering. No mortar shall be used beyond 2-1/2 hours after mixing. Do not retemper colored pigmented mortar because color variations may result.
   3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Mortar Batching
   1. For each unit volume of cementitious materials, provide 2.25 to 3.5 volumes of aggregates.
   2. In a running mechanical paddle mixer, add 2/3 of the water and 1/2 of the aggregate (sand), then add the cementitious materials. Follow by adding the remaining water. Mix for a minimum of 5 minutes, adding water if required to produce a workable consistency.
      a. Do not hand mix mortar, unless approved in writing by A/E.

C. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

D. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
   1. For masonry below grade use Type M, where indicated only.
   2. For masonry, use Type S, unless otherwise noted.
   3. For non-load bearing interior partitions, use Type N or S, unless otherwise noted.
   4. For exterior, above-grade, masonry veneer, use Type N or S, unless otherwise noted.

E. Use natural (noncolored) mortar for the following:
   1. Concrete masonry units, unless otherwise noted.

F. Colored Pigmented Mortar: Select and proportion pigments with other ingredients to produce color indicated or, if not indicated, as selected from manufacturer's standard formulation to compliment adjacent units.
   1. Use colored pigmented mortar for the following locations:
      a. Clay face brick
      b. Cast stone
   2. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color(s) required. Limit pigments to the following percentages of cement content by weight:
      a. For mineral oxide pigments and Portland cement lime mortar, not more than 10 percent.
      b. For carbon black pigment and Portland cement lime mortar, not more than 2 percent.
      c. For mineral oxide pigments and masonry cement mortar not more than 5 percent.
      d. For carbon black pigment and masonry cement mortar, not more than 1 percent.
   3. Color: Match existing..

G. Colored-Aggregate Mortar: Use colored aggregates and natural color or white cement as necessary to produce required mortar color(s).

H. Pointing mortar shall conform to ASTM C270, except that all sand shall pass a No. 16 sieve. Nonstaining and dirt resistant mortar shall be used to which ammonium stearate or calcium stearate is added to the amount equal to 3 percent of the weight of the cement used.
   1. Pointing mortar shall be proportioned by volume with one part portland cement, 1/8 part Type S hydrated lime, and 2 parts graded (50 mesh or finer) sand to which ammonium stearate or calcium stearate is added in an amount equal to 2 percent of the weight of the cement used. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
   2. Add colored mortar pigment to produce mortar colors required. Coordinate with CMU manufacturer to produce color(s) required to match CMU for repair of face.
   3. Use pointing mortar to repair chipped CMU units.

I. Grout for Unit Masonry (by Strength): Comply with ASTM C 476. Grout mixes shall be designed by strength, unless specifically noted otherwise in the Contract Documents.
   1. Conventional Grout
      a. General: Do not use admixtures, including pigment, air-entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated. Do not lower the freezing point of grout by use of admixtures or anti-freeze agents.
         1) Admixtures containing chlorides in excess of 0.2 percent chloride ions are not permitted to be used.
         2) Antifreezes are prohibited for use in grouts.
         3) Fly ash: ASTM C618-89a, Type C or F may be substituted for up to 20 percent of the total cementitious materials in the gout mix.
      b. Grout mixes shall be plant mix or factory blended (dry mix with water added at Project site).
      c. Field mixed grout designs are not acceptable.
      d. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in TMS 402/602 for dimensions of grout spaces and pour height.
      e. Provide grout with a slump of 8 to 10 inches as measured according to ASTM C 143.
   2. Self-Consolidating Grout
      a. Jobsite proportioning of self-consolidating grout is not permitted. Do not add water at jobsite except in accordance with self-consolidating grout manufacturer's instructions.
      b. Admixtures for Self-Consolidating Grout
         1) High-Range Water-Reducing Admixture
         2) Viscosity-Modifying Admixture
      c. Slump Flow: 24 to 30 inches as determined in accordance with ASTM C1611.

d. Visual Stability Index (VSI): Less than or equal to 1 as determined in accordance with ASTM C1611, Appendix X.1.
e. Consolidation or reconsolidation is not required for self-consolidating grout.

2.15 SOURCE QUALITY CONTROL

A. Concrete Masonry Inspection
1. Refer to Division 01 Section “Quality Requirements”.
2. Materials may require testing and retesting, as directed by the A/E, during the progress of the Work. Allow free access to material stockpiles, facilities and completed construction.
3. See structural plans for special inspection requirements for masonry walls.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work in accordance with TMS 402/602, Article 2.1.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify critical steel elevations to ensure flashing will be installed at proper locations.

B. Before installation, examine rough-in and built-in construction for piping systems or conduit to verify actual locations of connections.
1. Do not install anything in the cavity space of the exterior wall that:
a. Diminishes the designed R-Value of the cavity-wall insulation.
b. Encroaches on the required air gap.

C. Verify substrate and surface conditions are in accordance with flexible flashing manufacturer recommended tolerances prior to installation.
1. Review requirements for sequencing of installation of flexible flashing assembly with installation of windows, doors, louvers and wall penetrations to provide a weathertight flashing assembly.
2. Verify flexible flashing will be continuously supported by substrate, and not span any gaps or voids in excess of 1/2 inch.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General
1. If ice or snow has formed on masonry bed, remove by carefully applying heat until top surface is dry to the touch.
2. Remove all masonry deemed frozen or damaged.

B. Protect concrete floor from damage where floor will remain exposed.

C. Concrete Surfaces: Where masonry is to be placed, clean concrete of laitance, dust, dirt, oil, organic matter, or other foreign materials that would inhibit bond of mortar to the surface.

3.3 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
1. Note: In lieu of double wythe foundation walls, single wythe matching nominal overall width of double wythe may be provided.

B. Build chases and recesses to accommodate items specified in this and other Sections. Provide not less than 8 inches of masonry between chases or recesses and jamb of openings, and between adjacent chases and recesses.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
   1. Consult other trades and make provisions to permit installation of their work in a manner to avoid cutting and patching. Build in work specified under other Sections, as necessary, and as work progresses.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
   1. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
   1. When units are above 32 deg. F, heat water above 70 deg. F.
   2. When units are below 32 deg. F, heat water above 130 deg F.
   3. Recommended procedure to insure that brick are nearly saturated, surface dry when laid is to place a hose on the pile of brick until the water runs from the pile. This should be done one day before brick are to be used. In extremely warm weather, place hose on pile several hours before brick are to be used.

H. Do not wet concrete masonry units.

I. Cleaning Reinforcement: Before being placed, remove loose rust, ice, or other coatings from reinforcement.

3.4 TOLERANCES

A. General: Comply with construction tolerances in TMS 402/602 and the following:

B. Dimensions and Locations of Elements:
   1. For dimension in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
   2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
   3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
   4. If the above condition, cannot be meet due to previous construction, notify the A/E.

C. Lines and Levels
   1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet or 1/2 inch maximum.
   2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
   3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
   4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2 inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

D. Joints
1. Unless additional restrictions are indicated, horizontal mortar joints between masonry units shall be in the range of: 1/4 inch to 1/2 inch.
2. Vertical mortar joints between masonry units shall be in the range of: 1/8 inch to 3/4 inch.
3. For brick bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
4. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
5. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
6. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

E. Reinforcing Bars: Tolerances for placing reinforcing bars are:
1. Variation from *d* for flexural elements (measured from center of reinforcement to the extreme compressive face of masonry):
   a. $d \leq 8$ inch — $\pm$ 1/2 inch
   b. 8 inch < $d \leq 24$ inch — $\pm$ 1 inch
   c. $d > 24$ inch — $\pm$ 1-1/4 inch
2. For vertical bars in walls — 2 inch from the location along the length of the wall indicated on the project drawings.
3. In addition, a minimum clear distance between reinforcing bars and the adjacent face of a masonry unit of 1/4 inch for fine grout or 1/2 inch for coarse grout must be maintained so that grout can flow around the bars.

3.5 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
1. Do not install cracked, broken, or chipped masonry units exceeding ASTM allowances.
2. Clean units of surface dirt and contaminants before placing in contact with mortar.
3. Lay-up walls plumb and true and with courses level, accurately spaced, within specified tolerances, and coordinated with other work. Do not wedge partitions tight against structural ceiling or beams, but provide an acoustical joint between masonry and the structural roof deck, structural steel framing or structural floor deck at nonrated conditions. Refer to Division 07 Section “Acoustical Joint Sealants”. At rated walls, provide firestopping. Refer to Division 07 Section “Fire-Resistive Joint Systems.”
   a. Cut masonry as required to maintain 2 inches clearance between masonry and all steel or reinforced concrete structural members that pass through or above walls, but are not to be supported by the walls.
4. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors, unless otherwise indicated.

B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4 inch horizontal face dimensions at corners or jambs.
   1. One-half running bond with vertical joint in each course centered on units in courses above and below, unless otherwise noted.
   2. Provide 1/3 running bond, where indicated and with utility size facing brick.
      a. Match existing.
   3. Provide special bonding as indicated on Drawings.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
   1. Align unit cells or cores that are to be grouted.

D. Stopping and Resuming Work: Stop work at vertical control joints or by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
   1. Stop off horizontal run of masonry by racking back 1/2 length of unit in each course.
   2. Toothing is not permitted, except upon written acceptance of the A/E.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
   1. Install adjustable hollow metal frame anchors, locating anchors on jambs in horizontal bed courses near the top and bottom of each frame and at intermediate points not over 24 inches apart.

   2. Unless otherwise noted or thermal break is required, contractor may grout jambs of hollow metal door and window frames in accordance with ANSI 250.8.
      a. Where grout is installed during masonry installation, frames shall be braced or fastened in such a way that will prevent the pressure of the grout from deforming the frame members. Grout shall be mixed to provide a 4 inch maximum slump consistency, hand troweled into place. Grout mixed to a thin “pumpable” consistency shall not be used.
   3. Rake joints around exterior side of exterior hollow metal door frames for sealant under Division 7.
   4. Protect inside (concealed) faces of door frames in exterior masonry walls, using fibered asphalt emulsion coating. Apply over shop primer approximately 1/8 inch thick and allow to dry before handling.
   5. Where hollow metal frames do not wrap around masonry jambs and heads, rub exposed corners of block to remove sharp, irregular edges.
   6. Take particular care to embed all conduits and pipes within concrete masonry without fracturing exposed shells and to fit units around switch, receptacle and other boxes set in walls. Where electric conduits, outlets, switch boxes, and similar items occur, grind and cut units before building in services. Prepare cutouts in such a manner that units can be installed plumb and flush.
   7. Install anchors, reglets, and nailers for flashing and related work built into masonry work, where indicated.

F. Where built-in items are to be embedded in cores of hollow masonry units, place a grout stop (a layer of metal lath, wire mesh, or plastic mesh) in the joint below and rod mortar or grout into core.

G. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

H. Where non-loadbearing, full-height masonry walls intersect structural framing above, provide a minimum 1/2 inch clear joint around the member. Do not build masonry solid around open-web steel joists.
   1. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section “Joint Firestopping”.

2. At non-fire-rated, but acoustically rated partitions treat joint between top of partition and underside of structure above to comply with Division 07 Section “Acoustical Joint Sealants”.

3.6 MORTAR BEDDING AND JOINTING

A. Mortar Bedding; Brick and Concrete Masonry Units as follows:
   1. Mix mortar ingredients for a minimum of 5 minutes in a mechanical batch mixer. Use water clear and free of deleterious materials that would impair the work. Each mortar batch is allowed only one retempering. Do not use mortar, which has begun to set after the first retempering, or if more than 2-1/2 hours has elapsed since initial mixing. Retempering will be permitted only within 1-1/2 hours of mixing, to replace moisture lost by evaporation. Discard any mortar or grout that is partially set.
   2. Lay brick and other solid masonry units with completely filled bed and head joints. Do not deeply furrow bed joints. Butter ends with sufficient mortar to fill head joints and shove into place. Butter ends of brick in hand and in the wall at closures. Do not slush head joints. Rock closures into place with head joints thrown against adjacent brick in place.
      a. Do not pound corners and jambs to fit stretcher units after they are set in position. Where an adjustment must be made after mortar has started to harden, remove mortar and replace with fresh mortar.
   3. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells; also bed webs in mortar in starting course on footings and foundation walls, in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
      a. Construct bed joint of the starting course of foundation with a thickness not less than 1/4 inch and not more than 3/4 inch.
   4. Remove mortar protruding into cells or cavities that will be grouted. Do not permit mortar droppings to fall into cells, cavities of multi-wythe walls or to block weep holes. Maintain clear cavity width between facing and backing material and keep clear of mortar droppings by back beveling the mortar bed to prevent excess from extruding into cavity. Clean any excess that does occur by parging it to back of unit.
   5. Fill holes not specified in exposed and below grade masonry with mortar.

B. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
   1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
   2. Allow cleaned surfaces to dry before setting.
   3. Wet joint surfaces thoroughly before applying mortar.
   4. Rake out mortar joints for pointing with sealant, where indicated.

C. Joints: Maintain joint widths shown, except for minor variations required, to maintain bond alignment. Lay walls with 3/8 inch joints. Tool joints consistently with the same type round jointer when the mortar is thumb print hard. Use a jointer that is slightly larger than the joint width so that complete contact is made along the edges of the unit. Tool joints in exposed masonry walls at uniform moisture content to avoid color variations. Perform tooling so that the mortar is compressed and the joint surface is sealed. Cut joints flush for masonry walls that are to be concealed or to be covered by other materials. For exposed masonry, provide joints as follows:
   1. Exterior Joints
      a. Concave tooled, unless otherwise noted.
      b. Provide tooled joints horizontal and vertical at scored concrete masonry units, including score joint.
   2. Interior (Room Side) Joints
      a. Concave tooled, unless otherwise noted.
   3. Cavity Wall (Exterior Side of Inner Wythe) Joints: Cut joints flush for masonry walls to receive air barrier.

3.7 MULTIWYTHE (COMPOSITE) MASONRY, GENERAL

A. Bond wythes of multiwythe masonry (non-composite) together using one of the following methods:
   1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
      a. Where bed joints of wythes do not align or when wythes are not laid at the same time, use adjustable (two-piece) type ties.
   2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
      a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
      b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.

B. Corners: Provide interlocking masonry units bond in each wythe and course at corners, unless otherwise indicated.
   1. Provide continuity with masonry-joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.

C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond wall together as follows:
   1. Provide continuity with masonry-joint reinforcement by using prefabricated T-shaped units.
      a. Where indicated, provide individual metal ties not more than 16 inches o.c.
      b. Where indicated, provide rigid metal anchors not more than 48 inches o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

3.8 CAVITY WALLS

A. Bond wythes of cavity walls together using one of the following methods:
   1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
      a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
      b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.
   2. Masonry Joint Reinforcement: Provide unless otherwise noted. Install in horizontal mortar joints.
      a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes, if both wythes are concrete masonry and installed simultaneously. At no time shall a wythe be more than 16 inches higher than any other wythe being constructed concurrently.
      b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.
      c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align. Wythes may be laid up full height separate from facing wythe.
         1) Cavity width changes shall be accommodated by different sized wire ties; wire ties should not be bent or deformed to span the cavity space.
   3. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.

B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
   1. Keep cavity clean of mortar droppings by suspending by wires a wooden strip the width of the air space. Strip shall be lifted as each course of joint reinforcement is laid in facing wythe. Install cavity mortar protection in cavity above through wall flashing and where indicated for additional protection.

C. Apply air barrier to face of backup wythe to comply with Division 07 “Air Barrier” sections.

D. Installing Cavity-Wall Insulation: Place vertical strips of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
   1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry or butter all edges of insulation board with adhesive or seal gaps with tape as recommended by insulation board manufacturer to provide a continuous weather/thermal barrier.

3.9 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
   1. Space reinforcement not more than 16 inches o.c., unless otherwise noted.
   2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
   3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
      a. Reinforcement above is in addition to continuous reinforcement.
   4. Provide reinforcement in every other course of concrete masonry veneer, but not in the same course as the tie.

B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.10 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
   1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
   2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
   3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.11 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to wall framing concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
   1. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.

2. Fasten channel slots to concrete or existing masonry backup with metal fasteners of type and in quantity indicated (but not less than three per unit length).
3. Embed tie sections in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and exterior face of inner wythe or sheathing.
4. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
5. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.
6. Masonry veneer anchors shall be embedded a minimum of 1-1/2 inches into the mortar joint. Provide a minimum of 5/8 inch mortar coverage at veneer to the outside face.

B. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing or insulation.
1. Keep air space clean of mortar droppings and other materials during construction. Bevel beds away from air space, to minimize mortar protrusions into air space. Do not attempt to trowel or remove mortar fins protruding into air space.

3.12 CONTROL AND EXPANSION JOINTS (MOVEMENT JOINTS)

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Other than bond beams do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
1. Install an elastomeric tubing sealant backer rod at each control joint to compartmentalize masonry cavity.
2. Reinforcing and grout for masonry bond beams are to run continuous through vertical control joints.
3. Keep joints clean from all mortar and debris.

B. Form control joints in concrete masonry using one of the following methods:
1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick made from clay or shale as follows:
1. Build in compressible joint fillers, unless otherwise noted.

D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than 3/8 inch.
1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

E. Control Joint Locations in Reinforced CMU: Provide vertical control joints in CMU where called for on the Drawings.

F. Control Joint Locations in Unreinforced CMU: Provide vertical control joints in reinforced CMU where called for on the Drawings. Provide vertical control joints in unreinforced CMU in accordance with NCMA TEK Bulletins 10-01A, 10-02D, 10-03, and 10-04, and at all offsets, returns, openings, and intersections with dissimilar materials and as follows to prevent cracking:
1. At change from wall setting on foundation to wall setting on floor slab.
2. At change from exterior wall to interior wall.
3. At walls setting on floors that cross floor construction.
4. At columns within masonry walls.
5. At changes in wall thickness.

6. Stop joint reinforcement bars on either side of control joints. Extend reinforcing bars in bond beams continuously through control joints and sleeves for bond break 18 inches each side of joint.
7. Install control joints in concrete masonry units with prefabricated shear key.
8. At end of lintel bearing on one end of openings less than or equal to 6'-4" and at both ends of openings greater than 6'-4".
9. Straight runs as indicated below, with spacing related to wall height as follows:
    a. Walls less than 8 feet: Not more than 3 times wall height.
    b. Walls 8 feet or higher: Maximum 25 feet.
10. Distance between joints should not exceed the lesser of the following:
    a. A length-to-height ratio of 3 to 2.
    b. 25 feet.

G. Expansion Joint Locations in Brick: Provide in accordance with BIA Technical Note No. 18A at vertical expansion joints in brick masonry at all offsets, returns, openings, intersections with dissimilar materials, and elsewhere as shown on Drawings and indicated hereinafter. For brick work without openings, space no more than 25 feet o.c.
1. Place as follows:
    a. At or near corners
    b. At offsets and setbacks
    c. At wall intersections
    d. At changes in wall height
    e. Where wall backing system changes
    f. Where support of brick veneer changes
    g. Where wall function or climatic exposure changes
    h. At one jamb of openings 12 feet or wider.
2. Form open joint of width indicated but not less than 3/8 inch for installation of preformed expansion joint filler, and sealant and backer rod specified in Division 07 Section “Joint Sealants”. Maintain joint free and clear of mortar.

H. Building Expansion Joint Through Masonry
1. Form open joint of width indicated but not less than 3/8 inch for installation of preformed expansion joint filler, and sealant and backer rod specified in Division 07 Section “Preformed Joint Seals”. Maintain joint free and clear of mortar.
2. For expansion joints 2 inches and greater, refer to Division 07 Section “Expansion Control”.

3.13 LINTELS

A. Install loose steel lintels furnished under Division 05.
1. Shore steel lintels until the masonry has attained sufficient strength to carry its own weight. Limit the deflection of masonry during this period to L/600 or 0.3 inch (whichever is less). This shoring period should not be less than 24 hour. This minimum time period should be increased to three days when there are imposed loads to be supported. If the masonry is built in cold weather construction conditions, the length of cure should be increased.

B. Provide masonry lintels where shown and wherever openings of more than 8 inches for brick size units and 16 inches for block size units are shown without structural steel or other supporting lintels. Provide prefabricated or formed-in-place masonry lintels. Thoroughly cure prefabricated lintels before handling and installation. Temporarily support formed-in place lintels.
1. For hollow masonry lintels, use specially formed "U"-shaped lintel units with solid bottom and reinforcing bars placed as shown, and filled with coarse grout. Bond beam block shall not be used to form masonry lintels.
2. Bond pattern for masonry lintels shall match the pattern at the adjacent wall unless otherwise noted.

C. Provide minimum 8 inch solid bearing at each end, unless otherwise noted. Provide solid masonry units or hollow units filled solid.
   1. Provide a slip plane in the form of flashing or other bond breaker between the lintel and masonry in unreinforced CMU walls.

D. For steel lintels in exterior wythe, rake back mortar in preparation for sealant as specified in Division 07 Section “Joint Sealants”.

E. Where formed-in-place masonry lintels are supported by steel angles over the opening during installation, the angles shall not extend more than 2-1/2 inches into the masonry on each jamb of the opening. When the angles are removed, the void remaining shall be packed tightly with a moist mixture of Type S mortar.

F. The reinforced masonry and lintel drawings are intended to show the major lintels required for windows, doors, louvers, and other major openings. Some lintels are shown for some mechanical duct and pipe openings, but the drawings are not intended to show all of these openings. The masonry contractor shall coordinate the size and location of openings required in masonry walls by the other contractors and provide steel or masonry lintels for these openings according to the lintel schedules in the Contract Documents whether shown on the Contract Documents or not.

3.14 FLASHING, WEEPS, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep vents in first course of masonry above ground level, at shelf angles, lintels, ledges, above doors, windows and other openings and under coping and sills, other obstructions to downward flow of water in wall. Flashing shall be installed longitudinally continuous or terminated with end dams. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities. Comply with NCMA recommendations for “drainage wall system” masonry construction.
   1. Install concealed through wall flashing in accordance with SMACNA “Architectural Sheet Metal Manual” Chapter 4 Flashing and with NCMA TEK Bulletins 19-04A and 19-05A details to ensure water resistant masonry construction.
   2. Apply primer, if required by manufacturer according to manufacturer’s written instructions.
   3. Install preformed corners and end dams, cants, if required, under flexible flashing membrane, bedded in sealant in appropriate locations along wall.
   4. Starting at a corner, remove release sheet, if applicable, and apply membrane to primed, if required by manufacturer for substrate indicated.
   5. Extend membrane through wall and leave 1/4 inch minimum exposed.
   6. Roll flashing into place. Ensure continuous and direct contact with substrate. Avoid trapping air and forming wrinkles.
   7. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
   8. Trim exterior edge of flexible flashing membrane 3/4 inch and secure to metal drip edge per manufacturers written instructions, where drip edge is required.
      a. Embedded flashing materials shall not be used for drip edges.
   9. Terminate flexible flashing membrane on vertical wall with a termination bar.
   10. Apply sealant bead at each termination.
   11. Protect installed flexible flashing from damage during construction.
      a. Inspect before covering and make repairs as necessary. Remove and replace damaged material. Repair holes and tears by covering with cut patch of similar product overlapping damage 2 inches minimum. Seal perimeter of patch repair with sealant/mastic.
      b. Cover flexible flashing as soon as possible after installation has been observed and tested. Do not expose longer than 60 days, unless otherwise approved by membrane manufacturer in writing.

B. Install flashing as follows, unless otherwise indicated:
   1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
      a. Install proprietary flashing/drainage system in accordance with manufacturer's installation instructions.
   2. At multiwythe masonry walls, including cavity walls, where wall intersects a roof or similar horizontal element, extend flashing through outer wythe, turn up 16 inches or a minimum of 6 inches above cavity mortar protection, and terminate on exterior face of inner wythe with termination bar and sealant. Install metal reglet/receiver, extending through cavity and turned up at exterior face of inner wythe, beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal reglet/receiver.
      a. Note: Embedded flashing must terminate a minimum of 12 inches above roofing surface. Coordinate termination with roofing contractor.
   3. At multiwythe masonry walls, including cavity walls, where wall intersects grade, extend flashing through outer wythe, turn up 16 inches or a minimum of 6 inches above cavity mortar protection, and terminate on exterior face of inner wythe with termination bar and sealant. Cut flexible flashing off flush at face of wall after masonry wall construction in completed.
   4. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 16 inches or a minimum of 6 inches above cavity mortar protection, and terminate with a termination bar and sealant. Terminate flashing at outer wythe using the same methods used at multiwythe masonry walls as specified hereinbefore.
   5. At lintels and shelf angles, extend flashing over top flange of angle across air space behind veneer and turn up a 16 inches or a minimum of 6 inches above cavity mortar protection, and terminate on exterior face of inner wythe or sheathing with termination bar and sealant. At outer wythe extend flashing at least 6 inches beyond end of lintel or shelf angle and turn up ends not less than 2 inches to form end dams. Install metal drip edges beneath flexible flashing at exterior face of wall and seal with sealant to lintel or shelf angle. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
      a. Where the lintel or shelf angle is bolt-mounted in place, cut-off excess bolt length at face of nut prior to installing the flexible flashing. After positioning the flexible flashing, cut a small "X" in the flashing to allow the flashing to fit over the nut and then apply compatible mastic to the flashing a minimum of 1 inch out from the "X" in all directions.

C. Install weep vents in head joints in exterior wythes of first course of masonry immediately above embedded flashing (not mortar) and as follows:
   1. Use specified weep/vent products to form weeps.
   2. Space weep vents 16 inches o.c., unless otherwise indicated.
   3. Keep weep holes and area above flashing free of mortar droppings.

D. Place cavity mortar protection material in cavities to comply with configuration requirements for cavity mortar protection material in Part 2 "Miscellaneous Masonry Accessories" Article.
   1. Option: Use geotextile drainage fabric as recommended by flashing manufacturer, and install to have the fabric reach the base of the flashing and covering the weep vents.
      a. Inspect flashing for holes prior to installing fabric mesh. Coordinate repair of holes with installer of flashing.
      b. Place a continuous row of fabric mesh one inch into the mortar joint of the third row of standard size exterior bricks in collar joints, cavity walls, or lintels. Drape excess material onto base of flashing. Ensure that flashing is clean of mortar droppings and debris. Adhesives and fasteners are not required; mortar need not have set.

c. If excessive droppings are expected, use a taller height fabric mesh and taller flashing.
d. Cut or tear to accommodate wall ties, conduit, plumbing or other materials that bridge or intrude into cavity between inner and outer walls.

E. Install vents in head joints in exterior wythes at 32 inches o.c., unless otherwise indicated. Use specified weep/vent products to form vents.
1. Close cavities off vertically with elastomeric tube sealant back rod in manner indicated. Install through-wall flashing and weep vents above horizontal blocking.

3.15 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 402/602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 402/602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. The low-lift grouting procedure shall be used as described in the Drawings and in NCMA-TEK 03-02A Grouting Concrete Masonry Walls.
a. High-Lift Grouting: Do not use unless approved by A/E. If high-lift grouting is approved, limit lifts to 12’-0” and use super plasticizer in grout to reduce water content.
3. Grout (slump 8 to 10 inches) shall be installed in the block cavities so as to completely fill each cavity with homogenous grout, extending from the lowest course to the top of the reinforced portion of the foundation or wall. Concrete or mortar shall not be used as grout for CMU.
4. Between 5 and 20 minutes after the grout is placed, it shall be consolidated with a mechanical vibrator. The top of the grout filling shall be stopped 1-1/2 inches below the top of the concrete block to form a key, except for the top course in the wall where the grout shall be struck flush with the top.
5. Aggregate used in the grout shall be small enough not to interfere with placement and plasticity.
6. Caging devices and centering clips shall be spaced vertically such that 2 clips or devices, one near its top and one near its bottom restrain every section of vertical reinforcing bar.
7. Where grouted cores do not extend the full height of a wall, install grout stop mesh at the lower limit of the grout.
8. Where required on the plans, grouting operations shall be observed by an independent testing agency.

3.16 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage qualified independent inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections. Minimum qualifications for the masonry inspector shall be 5 years of reinforced masonry inspection experience or acceptance by a State, municipality, or other governmental body having a program of examining and certifying inspectors for reinforced masonry construction. The masonry inspector shall be present during sampling and placing of masonry units, placement of reinforcement, inspection of grout space immediately prior to closing of cleanouts, and during grouting operations. The masonry inspector shall assure Contractor compliance with drawings and specifications**,** including flashing. The masonry inspector shall keep a complete record of all inspections and shall submit Masonry Inspection Reports and Special Inspection requirements set forth in the structural drawings for inspection requirements and a photographic documentation of flashing.
   1. Masonry Inspection: Provide masonry construction inspection of concrete or brick masonry walls indicated as requiring inspection on the Masonry Plans to insure that masonry construction is in conformance with the Contract Documents. Masonry inspection is required for those masonry elements that must be constructed to attain high design strengths.
      a. Inspection shall use NCMA-TEK 18-03B “Concrete Masonry Inspection” as a guideline.
      b. The individual or individuals who will perform the masonry inspection shall be present for the Preliminary Masonry Meeting.
      c. The masonry inspector shall prepare a written report or reports for each day of inspection. Masonry Inspection Report, following this Section, shall be used for all inspection reports. Inspecting reports shall be submitted to the A/E within 5 days of masonry inspection.
      d. The masonry inspector shall be present and observe all masonry construction operations in walls requiring inspection. The masonry inspector shall be present at the Project site within sufficient time, in advance of grouting operations, to inspect the construction to insure its conformance to the Contract Documents and that grouting may proceed. No grouting shall be permitted unless the masonry inspector is present and has indicated that the masonry construction is properly prepared for the grouting operation.
   2. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Level B special inspection according to the "TMS 402," unless otherwise noted.
   1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
   2. Place grouts only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
   3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq.ft. of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, per ASTM C 140 for compressive strength.
   1. Tests of Concrete Masonry Prisms: The Masonry Contractor shall coordinate with a qualified testing laboratory to perform field quality control testing during the masonry work.
      a. When required by the Masonry Plan, construct a set of 3 masonry prisms using mortar and concrete masonry units to be used in the masonry work. Unless otherwise noted, construct prisms 8 inches by 8 inches by 16 inches high (nominal).
      b. When prism tests are required to establish the strength of masonry in lieu of Masonry Inspection, provide a minimum of one set of 3 masonry prisms for testing for each 5000 sq.ft. (gross) of masonry wall construction.

c. Submit written reports for each prism tested. Provide the project identification name and number, date of report, name of Contractor, name of testing service, name of material suppliers, specific location where masonry represented by the prism is used, compression test strength results, and specified required strength.
d. If the compressive strength tests fail to meet the minimum strength specified in the Plans, the masonry represented by the tests shall be considered deficient.
e. When tests indicating deficient masonry represent masonry already constructed, such masonry shall be removed and replaced by the Contractor without additional cost to the Owner. In lieu of removal and replacement, additional cores may be grouted as required and directed by the A/E without additional cost to the Owner.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.

G. Mortar Test (Property Specification): For each mix provided, per ASTM C 780. Test mortar for mortar air content and compressive strength.
1. Tests for Mortar: The Masonry Contractor shall coordinate with a qualified testing laboratory to perform field quality control testing during the masonry mortar work.
a. For colored and noncolored mortars test for compressive strength by the methods of sampling and testing of ASTM C109 and ASTM C780.
1) Provide a minimum of six cubes for testing per 5,000 sq.ft. of masonry wall construction and as directed by A/E. Test two cubes at 7 days, two cubes at 28 days, and reserve two cubes for future testing.
b. Submit written reports for each material sampled and tested. Provide the project identification name and number, date of report, name of contractor, name of testing service, source of aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material, and test results. Indicate material is acceptable for intended use.
c. If the compressive strength tests fail to meet the minimum requirements specified; the mortar represented by such tests would be considered deficient in strength.
d. Deficient mortar shall be removed and replaced by the Contractor without additional cost to the Owner.

H. Grout Test (Compressive Strength): For each mix provided, per ASTM C 1019.
1. Place a piece of preservative-treated wood 1-5/8 inch thick and 3 inch square on a level surface. For masonry units with permeable paper, such as absorptive paper toweling, taped to one face shell are placed around the wood block to form the mold. The resulting mold is approximately 3 inches square by 6 inches high. Measure and record the slump of the grout in accordance with Test Method C143. Pour grout into the mold in two layers. Rod each layer 15 times with a tamping rod to eliminate air bubbles. Rod the bottom layer throughout its depth. Distribute the strokes uniformly over the cross-section of the mold. For the upper layer, allow the stick to penetrate about 1/2 inch into the underlying layer. After the second lift is puddled, level the top of the specimen with a straightedge and immediately cover the specimens with wet burlap or similar material to keep it damp. Protect the specimens against disturbance and extreme changes in temperature, and after 48 hours, remove the masonry units and carefully pack the specimens for transport to the laboratory where they will be stored in a moist room until tested.
2. Cap the specimens in accordance with the applicable provisions of "Method of Capping Cylindrical Concrete Specimens," ASTM C617. The specimens shall be tested in a damp condition in accordance with the applicable provisions of ASTM C39 "Methods of Test for Compressive Strength of Molded Concrete Cylinders."
3. Four test specimens shall be made and tested for each type of grout to be used in the work.
4. As an alternate to the method of sampling described above, grout samples may be formed in grout sample boxes, when requested and approved by A/E.
5. Tests for Grout: The Masonry Contractor shall coordinate with a qualified testing laboratory to perform field quality control testing during the masonry grout work.
a. Grout for filling reinforced or unreinforced concrete masonry cores or brick cavities: Test for compressive strength.

1) Provide a minimum of 4 test specimens for testing per 5,000 sq.ft. of masonry wall construction or for each ready mix truckload of grout and as directed by the A/E. Test one cylinder at 7 days, two cylinders at 28 days, and reserve one cylinder for future testing.

b. Submit written reports for each material sampled and tested. Provide the project identification name and number, date of report, name of Contractor, name of testing service, source of aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material, specific location where material represented by sample is used, slump and compression test results. Indicate whether material is acceptable for intended use.

3.17 REPAIRING, POINTING, AND CLEANING

A. Cleaning, General

1. Know your surface. Positively identify every substrate to be cleaned. Review all manufacturers literature for cleaning recommendations.
2. Always test before overall cleaning. Always test, and always clean under the same conditions you tested under. Retest if conditions change.
3. Use the mildest cleaner and dilution that still gives effective results.
4. Clean early:
   a. Don’t give mortar smears and films a chance to become as hard as the masonry. Get if off while it’s still relatively soft. Clean masonry within 7 to 21 days of installation.
   b. Clay brick may be cleaned within 14 to 28 days.
5. Use the right cleaner for the right job. Follow the masonry manufacturer’s guidelines for cleaning each type of masonry.
6. Never clean with raw acid.
7. Cleaning basics
   a. Don’t spare the water. Pre-wetting masonry is recommended. Rise with 400 psi to remove stains and cleaner residue.
   b. Clean bottom-to-top, and always keep lower areas wet to prevent streaking.
   c. Follow all safety precautions in the product literature.
   d. Cold weather
      1) Water-saturated masonry is vulnerable to freeze/thaw damage. Never clean if the masonry could freeze before drying.
      2) Chemical cleaners and rinse water rely on chemical reactions to dissolve and rinse away construction soiling. Cold temperatures slow these chemical reactions. Compensating for the cold by using a stronger cleaning solution may cause permanent damage to the masonry, especially colored concrete.
         a) Instead, extend the dwelling time of the properly diluted cleaning solution by 10-20 percent. Scrub areas of heavy soiling with a masonry washing brush. Pre-wetting and rinsing with hot water warms surface and improves results.
      3) Schedule wet cleaning for when air and surface temperatures are 40 deg. F. and rising. In cold weather this means your wet-cleaning window may be only a few hours. Use the time before and after to dry-brush and scrape away heavy accumulations of excess mortar and job dirt from the next day’s work area.
      4) If a limited cleaning window is impractical, enclose the work area with polyethylene and use approved heaters to warm masonry.
      5) Warm weather test panels won’t work for cold weather cleaning. Test in cold clean in cold.

B. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

1. Provide a 100 square foot area of patched CMU for A/E's review. Do not proceed with patching until area is approved. Wall shall appear uniform from a distance of 5 feet. If masonry units are colored, coordinate blend with unit manufacturer.

C. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
   1. Tuckpointing
      a. Rake mortar joints to a depth of not less than 1/2 inch nor more than 3/4 inch.
      b. Saturate joints with clean water.
      c. Fill solidly with pointing mortar.
      d. Tool joints.

D. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints. Dry brush exposed masonry with bristle brushes at end of each work day.
   1. Promptly remove excess wet mortar containing integral water-repellent mortar admixture from the face of the masonry as work progresses. Do not use strong acids, over-aggressive sandblasting or high-pressure cleaning.

E. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes or use methods used on approved mock-up. Obtain A/E's approval of sample cleaning before proceeding with cleaning of masonry.
      a. Where walls are a combination of CMU and brick only the less aggressive CMU cleaners shall be used.
      b. Comply with applicable environment laws and restrictions.
   3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
   5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
      a. Remove efflorescence in accordance with brick manufacturer's recommendations. Cleaning agents may be used only with approval of masonry unit manufacturer. Cleaning agents must be same as those used on test area.
      b. If chemical cleaners are to be sprayed on, the pressure shall not exceed 50 psi.
   6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
   7. Clean concrete masonry by cleaning method indicated in NCMA TEK 08-02A and 08-03A, applicable to type of stain on exposed surfaces.
      a. If additional cleaning is necessary for special CMU, consult with masonry unit manufacturer for approved method. Test method and gain A/E approval before proceeding.
      b. Water application method shall never exceed 400 psi without approval of A/E.
   8. Clean stone trim to comply with stone supplier's written instructions.

3.18 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove excess clean masonry waste and other masonry waste, and legally dispose of off Owner's property.

3.19 LIST OF SPECIAL INSPECTIONS

TABLE 1.19.2 (TMS 402-11)

LEVEL B QUALITY ASSURANCE

VERIFICATION AND INSPECTION	Frequency		Reference for Criteria	
	CONTINUOUS	PERIODIC	TMS 402	TMS 602
1. Verification of slump flow and VSI as delivered to the site for self-consolidating grout.	X	--	--	Art. 1.5 B.1.b.3
2. Verification of f'_m prior to construction except where specifically exempted by this code.	--	X	--	Art. 1.4 B
3. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.	---	X	---	Art. 1.5
4. As masonry construction begins, the following shall be verified to ensure compliance:				
a. Proportions of site-prepared mortar.	--	X	--	Art. 2.1, 2.6 A
b. Construction of mortar joints.	--	X	--	Art. 3.3 B
c. Location of reinforcement and connectors.	--	X	--	Art. 3.4
5. During construction the inspection program shall verify:				
a. Size and location of structural elements.	--	X	--	Art. 3.3 F
b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.	--	X	Sec. 1.16.4.3, 1.17.1	--
c.				
d. Preparation, construction and protection of masonry during cold weather (temperature below 40 deg. F) or hot weather (temperature above 90 deg F.)	--	X	--	Art. 1.8 C, 1.8 D
e. Placement of grout is in compliance	X	--	--	Art. 3.5
6. Prior to grouting, the following shall be verified to ensure compliance.				
a. Grout space.	--	X	--	Art. 3.2 D, 3.2 F
b. Grade, type, and size of reinforcement and anchor bolts.	--	X	Sec. 1.16	Art. 2.4, 3.4
c. Placement of reinforcement and connectors.	--	X	Sec. 1.16	Art. 3.4
d. Proportions of site-prepared grout.	--	X	--	Art. 2.6 B

e. Construction of mortar joints.	--	X	--	Art. 3.3 B
7. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.	--	X	--	Art. 1.4

END OF SECTION 04 20 00.00

SECTION 04 72 00 - CAST STONE MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Cast stone panels as part of entrance signage.
      a. Engraved and stained logo and letters.
   2. Cast stone trim including the following:
      a. Special shape column caps.

B. Related Sections include the following:
   1. Division 04 Section "Unit Masonry" for:
      a. Preinstallation meeting.
      b. Mortar materials and mixes.
      c. Installing and cleaning of cast stone units in unit masonry.

1.2 DEFINITIONS

A. Cast Stone: Architectural precast concrete building units intended to simulate natural cut stone.

1.3 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's specifications, data, and instructions for manufactured materials and products.
   1. Provide test results of cast stone components of manufacturer’s standard design mix, indicating compliance with ASTM C1364.
   2. Qualification Data: For fabricator.

B. Shop Drawings: Submit shop drawings showing complete information for fabrication and installation of cast stone units. Indicate member dimensions and cross-section location, size, and type of reinforcement.
   1. Unless otherwise specified, shop drawings shall provide for the following:
      a. Suitable wash on all exterior sill, projected course and pieces with exposed surfaces.
      b. All projecting pieces and sill stones shall have drips under the outer edge.
      c. Shop drawings shall show the setting mark of each stone and its location on the structure. The stones, when delivered, shall bear the same corresponding setting mark on an unexposed surface.
      d. Adequate draft on appropriate surfaces to facilitate removal from the mold to maintain good finish.
   2. Include building elevations showing layout of units and location of joints and anchors.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, with sufficient production capacity to manufacture required units.
   1. Manufacturer is a producing member of the Cast Stone Institute or has on file and follows a written quality-control plan approved by A/E that includes all elements of the Cast Stone Institute's "Quality Control Procedures Required for Plant Inspection."

B. Source Limitations for Cast Stone: Obtain cast stone units through one source from a single manufacturer.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery of cast stone with unit masonry work to minimize the need for on-site storage and to avoid delaying the Work.

B. Pack, handle, and ship cast stone units in suitable packs or pallets.
   1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
   2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.6 FIELD CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
   1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until cast stone has dried, but not less than 7 days after completing cleaning.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Products: Subject to compliance with requirements, provide one of the products specified.
   2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The “Substitution Request Form” and complete technical data for evaluation must accompany request for A/E’s approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 CAST STONE MATERIALS

A. General: Comply with ASTM C 1364 and the following:
   1. Portland Cement: ASTM C 150, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114. Provide natural color or white cement as required to produce cast stone color indicated.
   2. Coarse Aggregates: Granite, quartz, or limestone comply with ASTM C 33; gradation and colors as needed to produce required cast stone textures and colors.
   3. Fine Aggregate: Natural sand or crushed stone complying with ASTM C 33, gradation and colors as needed to product required cast stone textures and colors.

4. Color Pigment: ASTM C979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, non-fading, and resistant to lime and other alkalis.
5. Water absorption of cast stone shall not exceed 6 percent of dry weight when tested in accordance with requirements of this specification and in compliance with ASTM C642 or C1195.

B. Admixtures: Use only admixtures specified or approved in writing by A/E.
1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
3. Air-Entraining Admixture: ASTM C 260. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.

C. Reinforcement: Deformed steel bars complying with ASTM A 615. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches of cast stone material.
1. Epoxy Coating: ASTM A 775.
2. Galvanized Coating: ASTM A 767.

D. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666, Type 304 or steel complying with ASTM A 36, and hot-dip galvanized to comply with ASTM A 123.

2.3 CAST STONE UNITS

A. Provide cast stone units complying with ASTM C 1364 using the vibrant dry tamp or wet-cast method.
1. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666, Procedure A, as modified by ASTM C 1364, or are made from cast stone that has a history of successful resistance to freezing and thawing.

B. Fabricate units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces, unless otherwise indicated.
1. Slope exposed horizontal surfaces 1:12, unless otherwise indicated.
2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
3. Provide drips on projecting elements, unless otherwise indicated.

C. Fabrication Tolerances:
1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.

D. Cure units by one of the following methods:
1. Cure units with steam in enclosed curing room at temperature of 105 deg F or above and 95 to 100 percent relative humidity for 6 hours.
2. Cure units with dense fog and water spray in enclosed warm curing room at 95 to 100 percent relative humidity for 24 hours.
3. Cure units to comply with one of the following:
   a. Not less than 5 days at mean daily temperature of 70 deg F or above.
   b. Not less than 6 days at mean daily temperature of 60 deg F or above.
   c. Not less than 7 days at mean daily temperature of 50 deg F or above.
   d. Not less than 8 days at mean daily temperature of 45 deg F or above.

E. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

F. Color and Texture: Provide units with fine-grained texture and buff color resembling Indiana limestone.

G. Engraved Lettering and logo on panels where indicated on Drawings:
   1. Engrave via removal of cast stone material logo and lettering.
   2. Stain recess for logo and lettering “black”.

2.4 MORTAR MATERIALS

A. Provide mortar materials that comply with Division 04 Section "Unit Masonry."

2.5 MORTAR MIXES

A. Comply with requirements in Division 04 Section "Unit Masonry" for mortar mixes.

2.6 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666, Type 304.
   1. Provide embed blots, plates and angles within panel recess to secure panels together and to the structural channels provided by others.

B. Dowels: Round stainless-steel bars complying with ASTM A 276, Type 304, and 1/2-inch diameter.

C. At cast stone panels, large trim pieces and where required to fully support and stabilize cast stone, provide 3/16 inch diameter stainless steel wire stone anchor and plate stone anchors as manufactured by “Pos-I-Tie” or similar. Other stainless steel anchorage accessories will be considered with recommendation of manufacturer.
   1. Anchors shall be selected and designed with spacing requirements to resist the loads indicated on the Drawings in order to maintain the integrity of the wall construction.
   2. Anchorage component determination shall be made by the Cast Stone Fabricator and installing Contractor to comply with the requirements of this Section.
   3. Provide galvanized steel closure plate at top of panels to enclose panel slots and anchors. Make water resistant.

D. Proprietary Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cast stone manufacturer and expressly approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.
   1. Manufacturers:
      a. Diedrich Technologies, Inc.
      b. EaCo Chem, Inc.
      c. ProSoCo, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of cast stone.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING CAST STONE IN MORTAR

A. Install cast stone units to comply with requirements in Division 04 Section "Unit Masonry."

B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
   1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
   2. Coordinate installation of cast stone with installation of flashing specified in other sections.

C. Wet joint surfaces thoroughly before applying mortar or setting in mortar.

D. Set units in full bed of mortar with full head joints, unless otherwise indicated.
   1. If not indicated, set units with joints 3/8 to 1/2 inch wide.
   2. Build anchors and ties into mortar joints as units are set.
   3. Fill dowel holes and anchor slots with mortar.
   4. Fill collar joints solid as units are set.
   5. Build concealed flashing into mortar joints as units are set.
   6. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.
   7. Keep joints at shelf angles open to receive sealant.

E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

F. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated. Keep joints free of mortar and other rigid materials.
   1. Form open joint of width indicated, but not less than 3/8 inch.

G. Exterior Coping/low wall caps/column caps and in general, all stone areas either partially or totally horizontal, shall be set with unfilled vertical joints. After setting, insert properly sized back-up material or backer rod to proper depth, prime the ends of the stone, and apply sealant.
   1. Prepare joints indicated to receive sealant and apply sealant of type and at locations indicated to comply with applicable requirements in Division 07 Section "Joint Sealants."
      a. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant, unless otherwise indicated.

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

B. Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.

D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except due to warpage of units within tolerances specified.

3.4 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by A/E.

B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean cast stone as work progresses.
   1. Remove mortar fins and smears before tooling joints.
   2. Remove excess sealant immediately, including spills, smears, and spatter.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain A/E's approval of sample cleaning before proceeding with cleaning of cast stone.
   3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
   5. Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes No. 20.
   6. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 04 72 00

SECTION 107500 - FLAGPOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes new ground-set flagpoles made from aluminum.

B. Related Sections include the following:
   1. Division 03 Section "Cast-in-Place Concrete" for concrete footings for flagpoles.
   2. Division 07 Section "Joint Sealants" for elastomeric sealant filling the top of the foundation tube.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide flagpole assemblies, including anchorages and supports, capable of withstanding the effects of wind loads, determined according to NAAMM FP 1001, "Guide Specifications for Design of Metal Flagpoles."
   1. Base flagpole design on polyester flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.
   2. Basic Wind Speed: 90 mph; 3-second gust speed at 33 feet aboveground, unless otherwise noted as a greater wind speed.

1.4 SUBMITTALS

A. Quality Assurance/Control Submittals:
   1. Product Data: For each type of flagpole required.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain flagpole as a complete unit, including fittings, accessories, bases, and anchorage devices, from a single manufacturer.
   1. Obtain flagpoles through one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Postal Products Unlimited Inc. Company (Basis of design)
   2. American Flagpole; a Kearney-National Inc. Company.
   3. Baartol Company Inc. (The)
   4. Concord Industries, Inc.
   5. Eder Flag Manufacturing Company, Inc.
   6. Ewing International.
   7. Lingo Inc.; Acme Flagpole Division.
   8. Michigan Flagpole Inc.
   9. Morgan-Francis Div.; Original Tractor Cab Co., Inc.

10. PLP Composite Technologies, Inc.
11. Pole-Tech Company Inc.
12. Interstate Pole Industries
13. Adams Flagpole, Div. of Morgan Products

B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The “Substitution Request Form” and complete technical data for evaluation must accompany requests for A/E’s approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 FLAGPOLES

A. Flagpole Construction, General: Construct flagpoles in one piece if possible. If more than one piece is necessary, comply with the following:
1. Fabricate shop and field joints without using fasteners, screw collars, or lead calking.
2. For tapered flagpoles, provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.

B. Exposed Height: 35 and 60 feet - see plan for more information.

C. Aluminum Flagpoles: Provide cone-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241, Alloy 6063, with a minimum wall thickness of 3/16 inch. Heat treat after fabrication to comply with ASTM B 597, Temper T6.

D. Foundation Tube: Galvanized corrugated-steel foundation tube, 0.064-inch- minimum nominal wall thickness. Provide with 3/16-inch steel bottom plate and support plate; 3/4-inch- diameter, steel ground spike; and steel centering wedges all welded together. Galvanize steel parts, including foundation tube, after assembly. Provide loose hardwood wedges at top of foundation tube for plumbing pole.
1. Provide flashing collar of same material and finish as flagpole.
2. Overall length of embedded ground-set poles to be provided setting depth of not less than 10 percent of exposed length.

2.3 FITTINGS

A. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.
1. 0.063-inch spun aluminum, finished to match flagpole.

B. Internal Halyard, Winch System: Manually operated winch with control stop device and removable handle, stainless-steel cable halyard, and concealed revolving truck assembly with plastic-coated counterweight and sling. Provide flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

C. Halyard Flag Snaps: Provide two stainless-steel or nylon swivel snap hooks per halyard.
1. Provide with neoprene or vinyl covers.

2.4 MISCELLANEOUS MATERIALS

A. Concrete: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi.

B. Concrete: Provide concrete composed of Portland cement, coarse and fine aggregate, and water mixed in proportions to attain a 28-day compressive strength of not less than 3000 psi, complying with ASTM C 94/C 94M.

C. Elastomeric Joint Sealant: Single-component neutral-curing silicone joint sealant complying with requirements in Division 07 Section "Joint Sealants" for Use NT (non-traffic) and for Use M, G, A, and, as applicable to joint substrates indicated, O joint substrates.

2.5 FINISHES

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

B. Aluminum: Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
   1. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete.

C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms and foundation tube, sleeve, or anchor bolts in position, to prevent displacement during concreting.

D. Place concrete immediately after mixing. Compact concrete in place by using vibrators. Moist-cure exposed concrete for not less than seven days or use non-staining curing compound.

E. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

A. General: Install flagpoles where shown and according to manufacturer's written instructions.

B. Foundation-Tube Installation: Install flagpole in foundation tube, seated on bottom plate between steel centering wedges. Provide a plumb flagpole and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch layer of elastomeric joint sealant and cover with flashing collar as recommended by manuf..
   1. Provide proper lightening ground for each flagpole, if required by manuf..

END OF SECTION 107500

SECTION 32 31 19 – ORNAMENTAL FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. 8’ Ornamental fencing and gates

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide fences and gates capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Determine minimum post size, group, and section according to ASTM F 1043 for framework up to 12 feet high, and post spacing not to exceed 10 feet.

B. Lightning Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

1.4 SUBMITTALS

A. Shop Drawings: Show locations of fences, gates, posts, rails, details of extended posts, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.

B. Quality Assurance/Control Submittals:
   1. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fences and gates.
      a. Fence and gate posts, rails, and fittings.
      b. Gates and hardware.
   2. Product Certificates: For fence and gate, signed by product manufacturer.
      a. Strength test results for framing according to ASTM F 1043.
   3. Qualification Data: For Installer.

C. Closeout Submittals:
   1. Maintenance Data: For the following to include in maintenance manuals:
      a. Polymer finishes.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed ornamental fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

B. Interruption of Existing Utility Service: Do not interrupt utility services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of utility services.
2. Do not proceed with interruption of utility services without Architect's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 Articles where titles below introduce lists, the following requirements apply to product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for Architect's approval must be accompanied by the "Substitution Request Form" and complete technical data for evaluation. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 ORNAMENTAL FENCE

A. Ornamental Fence: Basis of design shall be 8' tall "Aegis II majestic" classic 3 rail, industrial grade, coated aluminum fencing and gates in heights as noted on plans as manufactured by Ameristar Fence Products, Tulsa, OK,1-800-321-8724 or approved equal. Fencing shall be "Permacoated" and shall be black in color and shall include all fittings, connectors, hardware and closures as required.
1. All gates and hardware to be provided per ornamental fencing manufacturers recommendation

2.3 CAST-IN-PLACE CONCRETE

A. General: Comply with ACI 301 for cast-in-place concrete.

B. Materials: Portland cement complying with ASTM C 150 Type I or III, aggregates complying with ASTM C 33, and potable water for ready-mixed concrete complying with ASTM C 94. Measure, batch, and mix Project-site-mixed concrete according to ASTM C 94.
1. Concrete Mixes: Normal-weight concrete air entrained with not less than 3000-psi compressive strength (28 days), 3-inch slump, and 1-inch maximum size aggregate.

2.4 FENCE GROUNDING

A. Conductors: Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.
1. Material Above Finished Grade: Copper or aluminum.
2. Material On or Below Finished Grade: Copper.
3. Bonding Jumpers: Braided copper tape, 1 inch wide, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.

2.5 POLYMER FINISHES

A. Supplemental Color Coating: In addition to specified coatings, provide fence components with polymer coating (black).

B. Fittings, Post and Line Caps, Rail and Brace Ends, Top Rail Sleeves, Tension and Brace Bands, Tension Bars, Truss Rod Assemblies, Barbed Wire Arms, Clips, and Fasteners: Comply with ASTM F 626 for polymer coating applied to exterior surfaces and, except inside cap shapes, to exposed interior surfaces.
1. Polymer Coating: Not less than thickness per basis of design manufacturers specifications.

C. Color: black, unless otherwise noted.

2.6 GROUT AND ANCHORING CEMENT

A. Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Erosion-Resistant Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance.
   1. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.
   2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 DECORATIVE FENCE INSTALLATION

A. Install Ornamental fencing, gates and post footings per manufactures recommendations and specifications in locations as noted.

B. Install fences by setting posts as indicated and fastening rails and infill panels to posts. Peen threads of bolts after assembly to prevent removal.

C. Post Excavation: Drill or hand-excavate holes for posts in firm, undisturbed soil. Excavate holes to a diameter of not less than 4 times post size and a depth of not less than 24 inches plus 3 inches for each foot or fraction of a foot that fence height exceeds 4 feet.

D. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
   1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
   2. Concrete Fill: Place concrete around posts and sleeves and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
      a. Concealed Concrete, unless otherwise indicated: Top 2 inches below grade as indicated on Drawings to allow covering with surface material. Slope top surface of concrete to drain water away from post.
   3. Posts Set in Concrete, unless otherwise noted: Extend post to within 6 inches of specified excavation depth, but not closer than 3 inches to bottom of concrete.

3.4 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.5 GROUNDING AND BONDING

A. Fence Grounding: Install at fences at maximum intervals of 1500 feet except as follows:
   1. Fences within 100 Feet of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet.
      a. Gates and Other Fence Openings: Ground fence on each side of opening.
         1) Bond metal gates to gate posts.
         2) Bond across openings, with and without gates, except openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.

B. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet on each side of crossing.

C. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at the grounding location.

D. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.

E. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
   1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
   2. Make connections with clean, bare metal at points of contact.
   3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
   4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
   5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

F. Bonding to Lightning Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning protection down conductor or lightning protection grounding conductor complying with NFPA 780.

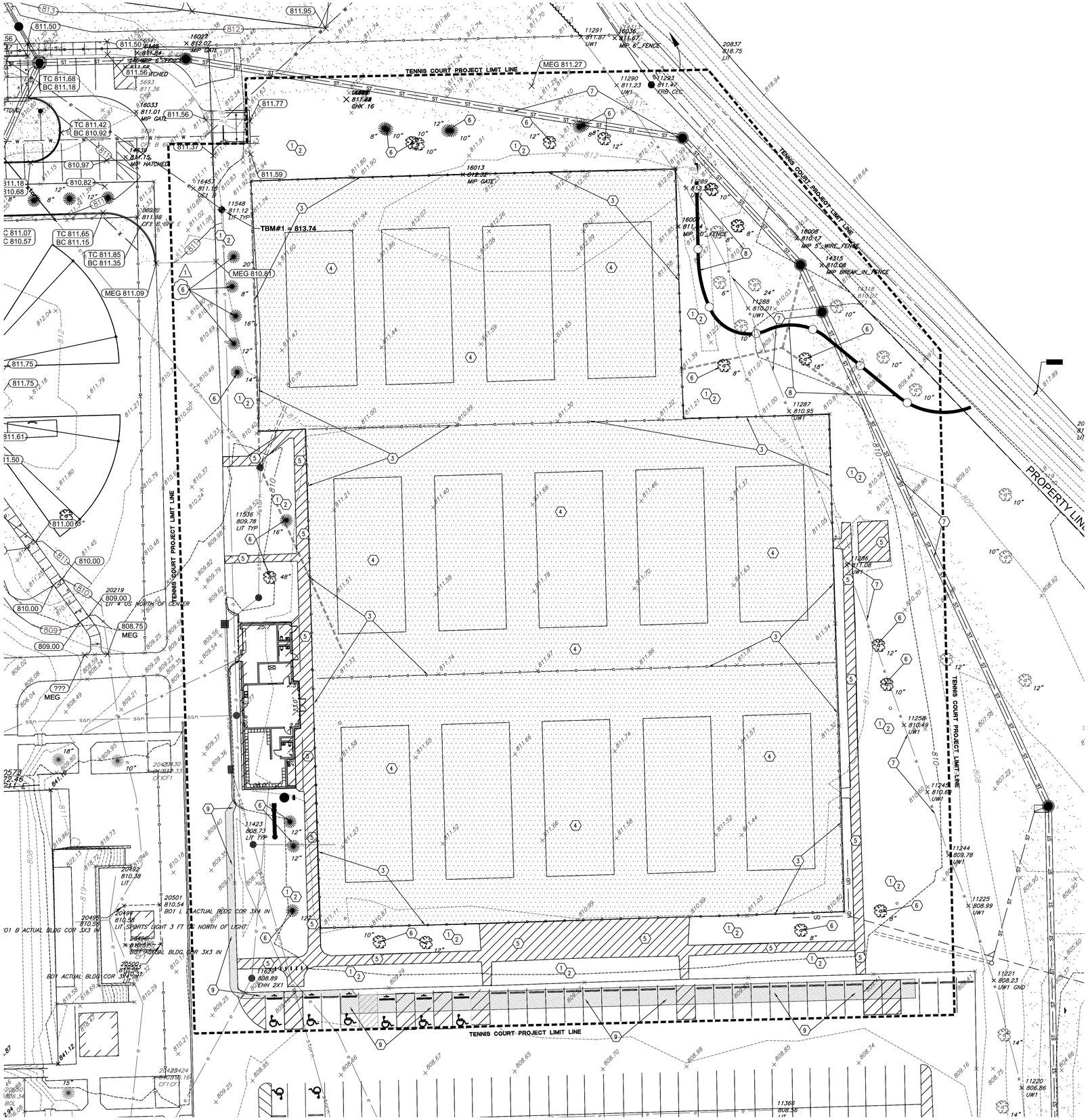
3.6 ADJUSTING

A. Gate: Adjust gate to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding. Coordinate work with installation of panic and other hardware as noted in section 087100.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain fencing and gates. Refer to Division 01 Section "Closeout Procedures."

END OF SECTION 32 31 13



SITE DEMOLITION PLAN

SCALE: 1" = 20'-0"

DEMO PLAN NOTES

1. STRIP EXISTING SOD IN ALL DISTURBED AREAS AND DISPOSE OF OFFSITE. SEE GRADING PLAN FOR PROPOSED GRADES AND DISTURBED LIMITS.
2. STRIP EXISTING TOPSOIL AND DISPOSE OF OFF SITE. CONTRACTOR IS TO DISPOSE OF ALL WASTE MATERIALS AND EXTRA TOPSOIL OFF SITE LEGALLY – FOLLOWING REMOVAL OF TOPSOIL STRIP SUBSOIL TO DEPTHS AS REQUIRED FOR NEW TENNIS COURT CONSTRUCTION.
3. REMOVE EXISTING TENNIS COURT FENCING INCLUDING POSTS, GATES, FOOTINGS AND FENCE FABRIC AND DISPOSE OF OFFSITE.
4. REMOVE EXISTING TENNIS COURT PAVING INCLUDING AGGREGATE BASE TO NEW SUBGRADES AS REQUIRED FOR NEW CONSTRUCTION AND DISPOSE OF OFF SITE.
5. REMOVE EXISTING CONCRETE PAVING INCLUDING AGGREGATE BASE TO NEW SUBGRADES AS REQUIRED FOR NEW CONSTRUCTION AND DISPOSE OF OFF SITE.
6. REMOVE EXISTING TREES IN THEIR ENTIRETY INCLUDING ROOTS AND ROOTBALL IN AREAS OF NEW CONSTRUCTION AND DISPOSE OF OFFSITE.
7. PROTECT EXISTING UTILITIES AND REPAIR OR MODIFY AS REQUIRED FOR NEW CONSTRUCTION, SEE SITE GRADING AND CIVIL PLANS FOR FURTHER INFORMATION.
8. PROTECT EXISTING TREES SHOWN TO REMAIN. INSTALL TREE PROTECTION FENCING AROUND TREE AT DRIP LINE TO MINIMIZE DISTURBANCE, SEE DETAIL F SHT SU2.2
9. SAWCUT AND REMOVE EXISTING PAVING AS NOTED BY SHADED AREA AND AS REQUIRED FOR NEW CONSTRUCTION.

224063.00
CARMEL HIGH SCHOOL
WITSKEN TENNIS COMPLEX RENOVATIONS
2460 E. SMOKY ROAD,
CARMEL, IN. 46302

CARMEL CLAY SCHOOLS
5201 E. MAIN STREET, CARMEL, IN. 463033
(317)-844-9961

ARCHITECT

FANNING HOWEY

317-848-0966
WWW.FHAI.COM

PLAN NORTH

KEY PLAN

100% CONSTRUCTION DOCUMENTS

PAUL A. MILLER
No. AR10800161

PROJECT MANAGER: MS
DRAWN BY: EB, JB
PROJECT NUMBER: 224063.00
PROJECT CONSTRUCTION ISSUE DATE: 08-30-2024

REV. NO.△	DESCRIPTION	DATE
1	ADDENDUM 1	10/11/2024

TENNIS COMPLEX RENOVATION
SITE DEMOLITION PLAN

GD1.00

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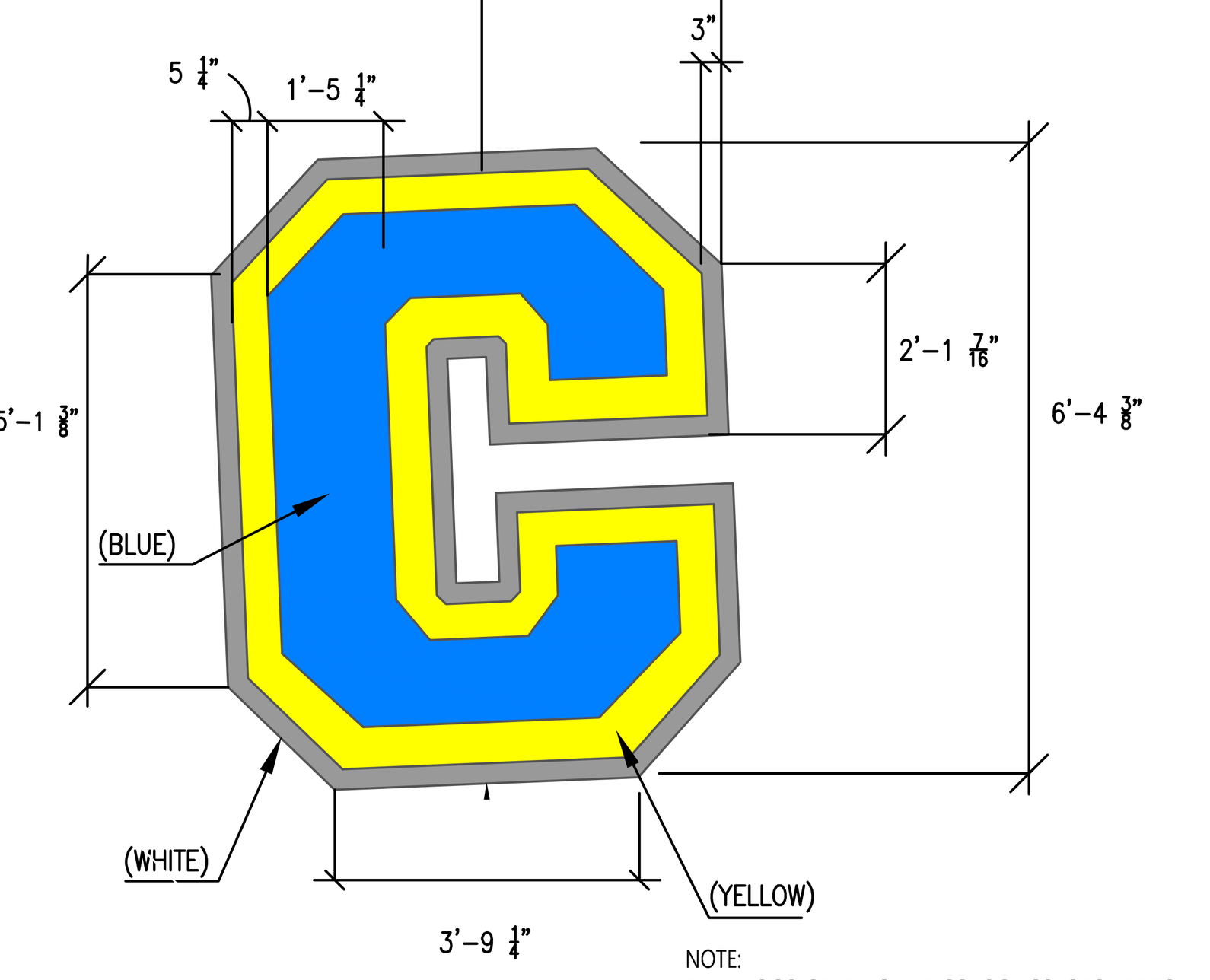
SITE LAYOUT PLAN

SCALE: 1" = 20'-0"



NOTE: FINAL LOGO GRAPHIC AND SCHOOL COLORS ARE TO BE PROVIDED BY OWNER - CONTRACTOR IS TO OBTAIN APPROVED LOGO AND COLORS FROM OWNER PRIOR TO THE START OF CONSTRUCTION TYP

ENLARGED "C" LOGO

NTS

PLAN NOTES

1. TENNIS COURT SURFACING : PLAYING SURFACE (GRAY), FROM MANUFACTURER STANDARD COLORS , REFER TO PROJECT MANUAL 32 18 26 TENNIS COURT SURFACING. SEE DETAIL #19 SHT G4.00 FOR COURT LAYOUT TYP - SEE LAYOUT FOR COURT NUMBERING TO BE PLACED AT EACH COURT IN NUMERICAL ORDER. STARTING AT NORTHWEST COURT AND WORKING EAST - LEFT TO RIGHT - NORTH TO SOUTH
2. TENNIS COURT SURFACING : PERIMETER COLOR (BLUE), FROM MANUFACTURER STANDARD COLORS, REFER TO PROJECT MANUAL 32 18 26 TENNIS COURT SURFACING. PREPARE ALL NEW AND EXISTING PTC SURFACES TO RECEIVE TENNIS COURT SURFACING, AND APPLY TENNIS COURT SURFACING PER PT MANUF / SYNTHETIC TENNIS COURT SURFACING MANUF. WRITTEN RECOMMENDATIONS - SEE DETAIL #19 SHT G4.00
3. COURT LINES; (WHITE) , 2" WIDE. LAYOUT PER NFHS AND US TENNIS REGULATIONS TYP., REFER TO DETAIL #19 ON G4.0O, AND THE PROJECT MANUAL 32 18 26 TENNIS COURT SURFACING.
4. SAWCUT JOINT TYP (PER PT MANUF. GUIDLINES); ALONG NET LINE AND BETWEEN INDIVIDUAL COURTS. - IF FOUND TO BE WARRANTED BY PT MANUF.. DEPTH OF CUT AS RECOMMENDED BY POST TENSION CONC. MANUFACTURER GUIDELINES. SEAL JOINT WITH PAINTABLE SEALANT MEETING THE REQUIREMENTS OF THE TENNIS COURT SURFACING MANUFACTURER GUIDELINES. SAWCUT AND SEALING OPERATION TO BE COMPLETED BEFORE COLOR SYSTEM INSTALLATION - REFER TO PROJECT MANUAL 03 38 16 UNBOUNDED POST TENSIONED CONC. - SEE DETAIL #19 SHT G4.00
5. NEW 10' HIGH CHAIN LINK FENCING - CLASS 2B - THERMALLY INFUSED ; 5" TERMINAL/GATE POST AND 3" LINE POSTS, 1 " 34" FABRIC, TOP MID AND BOTTOM RAIL, ALL MATERIAL IS TO BE BLACK VINYL, SEE DETAILS # 1-6 SHT G4.00. CONTRACTOR IS TO PROTECT ALL NEW POST AND RAILS WITH COVERINGS DURING INSTALL TO PREVENT SCUFFING AND OR DAMAGE TO FENCE COATING - ALL DAMAGED MEMBERS ARE TO BE REPLACED IN IT'S ENTIRETY PRIOR TO THE COMPLETION OF CONSTRUCTION.
6. NEW 8' OR 10' WIDE (SEE PLAN) x 8' 0"' TALL DOUBLE WIDE MAN GATES - CLASS 2B - THERMALLY FUSED - SEE DETAILS #16-17 AND #20 SHT G4.00 - DETAIL #1-#2 SHT G4.01. FOR CUSTOM GATE SIGNS - PROVIDE STANDARD 12"X14" HIGH SIGNS WITH BAY LETTERING AND GRAPHICS TO MATCH SCHOOL COLORS AND BRANDING GUIDELINES - CONTRACTOR IS TO COORDINATE AND SUBMIT SIGN LAYOUTS WITH ARCHITECT / OWNER PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR IS TO PROTECT ALL NEW POST AND RAILS WITH COVERINGS DURING INSTALL TO PREVENT SCUFFING AND OR DAMAGE TO FENCE COATING - ALL DAMAGED MEMBERS ARE TO BE REPLACED IN IT'S ENTIRETY PRIOR TO THE COMPLETION OF CONSTRUCTION.
7. NEW 4' WIDE x 8' 0"' TALL SINGLE WIDE MAN GATES - CLASS 2B - THERMALLY FUSED - SEE DETAILS #16-17 AND DETAIL #20 SHT G4.00 - DETAIL #1-2 SHT G4.01 FOR GATE DETAIL. PROVIDE CUSTOM GATE SIGNS - PROVIDE STANDARD 12"X14" HIGH SIGNS WITH BAY LETTERING AND GRAPHICS TO MATCH SCHOOL COLORS AND BRANDING GUIDELINES - CONTRACTOR IS TO OBTAIN APPROVED LOGO GRAPHIC FROM OWNER AND COORDINATE AND SUBMIT SIGN LAYOUTS WITH ARCHITECT / OWNER PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR IS TO PROTECT ALL NEW POST AND RAILS WITH COVERINGS DURING INSTALL TO PREVENT SCUFFING AND OR DAMAGE TO FENCE COATING - ALL DAMAGED MEMBERS ARE TO BE REPLACED IN IT'S ENTIRETY PRIOR TO THE COMPLETION OF CONSTRUCTION.
8. NEW TENNIS NET POSTS AND FOOTINGS AND ANCHOR (28 TOTAL); BLACK POWDER COATED NET POST - PROVIDE NEW NET POST AND ACCESSORIES AND ANCHORS - TENNIS BALL HOLDERS (28) +/- , SCORECARD HOLDERS (28) +/- , SEE DETAILS #9 ON SHEET G4.0 AND DETAIL #19 SHT G4.01, REFER TO PROJECT MANUAL 11 68 33 ATHLETIC FIELD EQUIPMENT. ADJUST POST HEIGHTS TO MEET REQUIRED NET HEIGHT PER NFHS AND US TENNIS ASSOCIATION STANDARDS.
9. NEW GRANDSTANDS (13 TOTAL) - 4 ROW AT GRADE BLEACHERS - BASELINE SERIES (BASIS OF DESIGN) - PROVIDE 2" X 10" ANODIZED SEAT PLANKS, SINGLE (1) 2" X 10" MILL FINISH FOOT PLANKS ON ROW 2-3 AND DOUBLE (2) 2" X 10" FOOT PLANKS AND RISERS PLANKS ON ROW 4 AND ABOVE. GRANDSTANDS ARE TO HAVE TOP AND BACK, AND SIDE CHAIN-LINK FENCING (12 TOTAL) - 14' x 4 1/2" WIDE MAX BY 27' LONG: IBC COMPLIANT , ALUMINUM PLANKS AND FRAMES, CHAIN-LINK GUARDRAIL SYSTEM, DOUBLE FOOTBOARDS GRANDSTAND SEATING AND FENCING . SECURE NEW GRANDSTANDS TO NEW CONC. PAVING PER MANUF. WRITTEN RECOMMONDATIONS AND PER MAUF. CONSTRUCTION DETAILS
10. TYP: EX. ASPHALT PAVING AND PAVEMENT MARKINGS TO REMAIN - PROTECT DURING CONSTRUCTION
11. NEW UNDER-DRAIN SYSTEM AND AGGREGATE BASE COURSE UNDER NEW PT TENNIS COURT CONC. PAVING AND SECTIONS OF HEAVY DUTY CONC. PAVING AS SHOWN WITHIN SHT G2.00 : SEE SHT G2.00 FOR FURTHER INFORMATION
12. TREE PROTECTION FENCING - SEE F / SU2.2 DRAWINGS FOR TREE PROTECTION DETAIL AND FOR FURTHER INFORMATION
13. NEW CENTER COURT NET TIE DOWN HARDWARE AND CONCRETE FOOTING (14), REFER TO DETAIL #3 SHT G4.00
14. NEW NETS (14 TOTAL); DOUGLAS TN-30 TENNIS NET WITH CENTER STRAP (BASIS OF DESIGN) - NETS ARE TO BE INSTALLED PER MANUF. WRITTEN INSTRUCTIONS - SPORTS FIELD SPECIALTIES - BASIS OF DESIGN
15. TENNIS COURT LAYOUT; SEE DETAIL #19 G4.O0
16. NOT USED
17. EX. DRAINAGE STRUCTURES NOT NOTED FOR NEW WORK - MARKED OR NOT ; TO REMAIN - PROTECT DURING CONSTRUCTION, REFER TO GD1.O AND SURVEY
18. NEW TRENCH DRAIN ; INSTALL ACCO 8" POLYMER CONCRETE, KLASSIC KS200 TRENCH DRAIN WITH PERFORATED STAINLESS STEEL GRATE INSTALLED IN LOCATIONS AS NOTED - PER MANUF. WRITTEN INSTRUCTIONS - SEE DETAIL #6 SHT G4.00 FOR STANDARD INSTALL AND SU1.1 - PROVIDE EXPANSION JOINT AROUND ALL SIDES OF NEW TRENCH DRAIN AND NEW CONC. INTERSECT
19. NEW POST TENSION CONC. SURFACE WITH TENSIONING CABLES - CABLES ARE TO BE CONFIGURED INTO A SPECIFIED GRID LAYOUT AND STRESSED TO THE APPROPRIATE LEVELS - WHICH IS TO BE SPECIFIED BY MANUF. PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR IS TO TREAT AND PREP EX. CONC. AND ASPHALT SURFACES AS NEEDED PRIOR TO INSTALLATION OF NEW PT SLAB. SEE ALL "PT" DETAILS AND #1-6 & #7-9 SHT G4.00 FOR FURTHER INFORMATION
20. EX. DUMPSTER ENCLOSURE TO REMAIN - PROTECT DURING CONSTRUCTION
21. NEW MONOLITHIC 6" REINFORCED CONC. WALKS INSTALL PER DETAILS #11-14 SHT G4.00 AND MANUF. WRITTEN RECOMMENDATION
22. NEW FRENCH DRAINS ; INSTALL FRENCH DRAINS WITH PERFORATED 4" DIA. DRAIN TILE SET INTO TRENCH WITH AGGREGATE BED EDGED WITH 5" TALL X $\frac{1}{4}$" THICK BLACK PAINTED STEEL EDGING. TIE INTO NEAREST DRAIN STRUCTURE, SEE DETAIL #18 SHT G4.00 (1)
23. (2) NEW CURB DRAINS AND DRAINAGE LATERALS : SEE CIVIL DRAWINGS FOR CONSTRUCTION DETAILS AND FOR FURTHER INFORMATION - LAYOUT SHOWN MAY DIFFER FROM FINAL CIVIL DRAWINGS - CONTRACTOR IS TO FOLLOW INSTRUCTIONS AND LAYOUTS SHOWN WITHIN CIVIL SHEETS TYP
24. DISTURBED LAWN; RE-SEED , HYDROMULCH DISTURBED LAWNS AND RESTORE BACK TO ACCEPTABLE CONDITIONS PRIOR TO THE CONCLUSION OF CONSTRUCTION , REFER TO PROJECT MANUAL
25. NEW LIGHT POLE BASES AND LIGHTS MEETING IHSAA REGULATIONS : SEE ELECTRICAL DRAWINGS FOR FURTHER INFORMATION
26. EX. TENNIS BUILDING TO REMAIN - PROTECT DURING CONSTRUCTION
27. EX. ELECTRICAL MANHOLES, PEDESTALS, BASES AND LIGHTS NOT NOTED FOR NEW WORK OR DEMOLITION IS TO REMAIN - NOTED OR NOT - PROTECT DURING CONSTRUCTION - SEE ELECTRICAL DRAWINGS FOR FURTHER CLARIFICATION
30. THICKENED EDGE PVMT @ EX. PVMT EDGE DETAIL; SEE DETAIL #10 SHT G4.00
31. MONOLITHIC CONC. CURB AND GUTTER AT EX. LAWN ; SEE DETAIL #21 SHT G4.00.
32. EX. LAWN AND LANDSCAPING TO REMAIN
33. CARMEL HIGH SCHOOL "C" LOGO ; - SEE ENLARGED "C" LOGO DETAIL ON SHT G1.00 - PROVIDE GRAPHIC AS SHOWN WITHIN LAYOUT - COLORS CONSISTING OF (WHITE, YELLOW, BLUE) - FINAL APPROVED LOGO MAY VARY FROM WHAT'S SHOWN - COLORS ARE TO MATCH CCS HIGH SCHOOL BRANDING GUIDELINES - CONTRACTOR IS TO OBTAIN OFFICIAL GRAPHIC STANDARDS FROM THE OWNER PRIOR TO THE START OF CONSTRUCTION
34. NEW 10" PERIMETER FENCING - SET WITHIN CONC. PVMT 3" CLEAR OF EDGE OF PAVEMENT. PROVIDE CONTINUOUS WINDSCREEN (8' WIDE) ; ALONG OUTSIDE FACE OF FENCE LINES INDICATED - NEW 10' HIGH CHAIN LINK FENCING, SEE DETAILS #16-18 AND DETAIL #20 SHT G4.00 FOR FURTHER INFORMATION. PROVIDE CUSTOM GRAPHICS, INCLUDING CUSTOM GRAPHICS ON 8' WIDE AND 7' 0"' TALL DOUBLE WIDE MAN GATES. GRAPHICS INCLUDING SCHOOL LOGO AND LETTERING, TO COMPLY WITH CARMEL CLAY SCHOOLS BRANDING STANDARDS AND GUIDELINES FOR THEIR HIGH SCHOOL ATHLETICS. CONTRACTOR IS TO COORDINATE WITH ARCHITECT AND OWNER TO SUBMIT LAYOUT OPTIONS FOR OWNER APPROVAL PRIOR TO THE START OF CONSTRUCTION (1)
35. NEW INVERTED "U" BIKE RACKS (8 TOTAL) : COLOR (BLACK) OWNER TO HAVE FINAL COLOR SELECTION PRIOR TO CONSTRUCTION. INSTALL PER MANUF. WRITTEN RECOMMENDATIONS - INSURE LAYOUT OF BIKE RACKS COMPLIES WITH MAUF. CONSTRUCTION DETAIL - OBTAIN DETAILS FROM MANUF. PRIOR TO CONSTRUCTION - SEE DETAIL #3 SHT G4.01 FOR FURTHER INFORMATION (1)
36. NEW STORM PIPING ; SEE G2.00 AND CIVIL DRAWINGS FOR FURTHER INFORMATION
37. (2) NEW NYLOPLAST STORM STRUCTURE ; INSTALL PER MANUF. WRITTEN INSTRUCTIONS - SEE SHT G2.00 AND CIVIL DRAWINGS FOR FURTHER INFORMATION
38. CROSSWALK AND OR ADA STRIPING TO MATCH EX. - PROVIDE 45 DEGREE PATTERN TO MATCH EX. FOUND ON SITE - SITE VERIFY EX. CONDITIONS PRIOR TO THE START OF CONSTRUCTION TYP - ADA PARKING SPACES (BLUE) - CROSS WALK (WHITE)
39. ADA ACCESSIBLE RAMP ; SEE DETAILS #4 SHT G4.01 FOR FURTHER INFORMATION
40. NEW FORMS AND SURFACES CORDIA TRASH RECEPTACLE WITH HOOD (BASIS OF DESIGN) - 36 GAL TRASH RECEPTACLES MATCHING CCS STANDARDS (15 TOTAL) COUNTS GIVEN ON PLANS SUPERCEDE PROJECT MANUAL TYPE AND QUANTITIES - TO MATCH TYPE AND STYLE FOUND AT CARMEL HIGH SCHOOL NATATORIUM- WITH HOOD AND ACCESSORIES ; INSTALL PER MANUF. WRITTEN RECOMMENDATIONS - SEE DETAIL #11 SHT G4.01 FOR FURTHER INFORMATION (1)
41. EX. CONC. PARKING BUMPERS (32 TOTAL) TO REMAIN ; PROTECT DURING CONSTRUCTION - WHERE NEW WORK IS BEING CALLED OUT - REMOVE EX. CONC. PARKING BUMPERS AS NEEDED PRIOR TO APPLYING NEW PAVING WORK - REINSTALL PER MANUF. WRITTEN RECOMMENDATIONS - INSTALL (2) DOWELS ONE AT EACH END OF EX. PARKING BUMPERS FIRMLY SECURING EX. BUMPERS TO NEW ASPHALTIC PAVING
42. SAW CUT AND REMOVE EX. ASPHALT IN AREAS IN SHADED AREAS AND WHERE NEW CONC. WALK IS INDICATED. INSTALL NEW PAVEMENT AND MILL AND WEDGE EX. ASPHALT PAVING WITHIN DOTTED HATCH AREA AS NEEDED TO MEET EX. SOUTH GRADES FLUSH - APPLY NEW PVMT MARKINGS TO MATCH EX. - SITE VERITY EX. CONDITIONS PRIOR TO THE START OF CONSTRUCTION
43. EX. HANDICAP PARKING SIGNAGE AND POLES (2 TOTAL) TO REMAIN : REMOVED EXISTING POST AND SIGN PRIOR TO THE START OF CONSTRUCTION AND STORE UNTIL THEY'RE REINSTALL WITHIN NEW HEAVY DUTY ASPHALT PVMT. AS SHOWN ON PLAN - PROVIDE (5) NEW HANDICAP SIGANAGE, POST AND FOOTINGS TO MATCH EX. FOUND ON SITE - FOR NEW ADA PARKING SPACES PROVIDE FOOTING PER LOCAL CODES AND ORDNANCES
44. NEW FLAGPOLE AND UP LIGHTING: INSTALL PER MANUF. WRITTEN RECOMMENDATION FOR INSTALLATION WITHIN HEAVY DUTY CONC. CONDITION - SEE DETAIL #1 SHT G1.01 AND ELECTRICAL DRAWINGS FOR FURTHER INFORMATION
45. NEW SCOREBOARD (TO BE PROVIDED BY OWNER) : SCOREBOARD MOUNTING HEIGHT (12') - CONTRACTOR IS TO PROVIDE AND INSTALL STEEL SUPPORT COLUMNS AND FOOTINGS PER LOCAL CODES - CONTRACTOR IS TO REFER TO ELECTRICAL DRAWINGS FOR FURTHER CLARIFICATION
46. ALTERNATE: PROVIDE NEW 8' ORNAMENTAL FENCING, COLUMNS AND GATES (3) WITHIN NOTED AREAS (1)
    1. ORNAMENTAL FENCING OPTION AREAS : A , B , C
    PROVIDE INDIVIDUAL PRICING FOR EACH AREA IDENTIFIED. SEE SHT G4.01 DETAILS # 5-10 FOR ORNAMENTAL FENCING AND GATE DETAILS

PLAN LEGEND : SITE LAYOUT PLAN G1.00

- TENNIS COMPLEX: NEW POST TENSION CONC. WITH TENNIS COURT SURFACING – SEE ALL "PT" DETAILS SHT G4.00 FOR REFERENCE
- TENNIS COURTS: NEW POST TENSION CONC. WITH TENNIS COURT SURFACING – SEE ALL "PT" DETAILS SHT G4.00 FOR REFERENCE
- NEW 6" MONOLITHIC CONC. PAVING WITH GUTTER, SEE DETAIL #11,#12–#14 #22 SHT G4.00 SEE PLAN NOTES FOR FURTHER CLARIFICATION
- ASPHALT REPAIR : SAWCUT AND REMOVE IN IT'S ENTIRETY AND REPLACE PER PLAN NOTES – WEDGE NEW PAVING TO MEET EX. PAVING FLUSH TYP
- RENOVATED LAWN SPACE FROM CONSTRUCTION EFFORTS
- NEW SCOREBOARD SEE PLAN NOTE 45 AND ELECTRICAL DRAWINGS (1)
- NEW FLAGPOLE AND UP–LIGHT SEE PLAN NOTE 44 AND ELECTRICAL DRAWINGS

811 Know what's below. Call before you dig.
Call 811 or 1-800-382-5544 Before You Begin Any Digging Project. Call 48 hours or 2 working days before you dig. It's Fast, It's Easy and It's the Law in the state of Indiana!

CAUTION !!
THE LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLAN ARE BASED UPON ABOVE GROUND EVIDENCE (INCLUDING, BUT NOT LIMITED TO, MANHOLES, INLETS, VALVES, AND MARKS MADE UPON THE GROUND BY OTHERS) AND ARE SPECULATIVE IN NATURE. THERE MAY ALSO BE OTHER EXISTING UNDERGROUND UTILITIES FOR WHICH THERE IS NO ABOVE GROUND EVIDENCE OR FOR WHICH NO ABOVE GROUND EVIDENCE WAS OBSERVED. THE EXACT LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHALL BE VERIFIED BY CONTRACTOR PRIOR TO ANY AND ALL CONSTRUCTION.

LOCATIONS GIVEN ARE APPROXIMATE AND ARE TO BE SITE VERIFIED PRIOR TO THE START OF CONSTRUCTION. ALL CONCRETE AND ASPHALT PAVING NOT NOTED FOR WORK IS TO REMAIN – PROTECT DURING CONSTRUCTION TYP

224063.00
CARMEL HIGH SCHOOL WITSKEN TENNIS COMPLEX RENOVATIONS

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CARMEL, IN. 46302

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(317)-844-9961

ARCHITECT
FANNING HOWEY
317-848-0966 WWW.FHAI.COM

KEY PLAN

PLAN NORTH

100% CONSTRUCTION DOCUMENTS

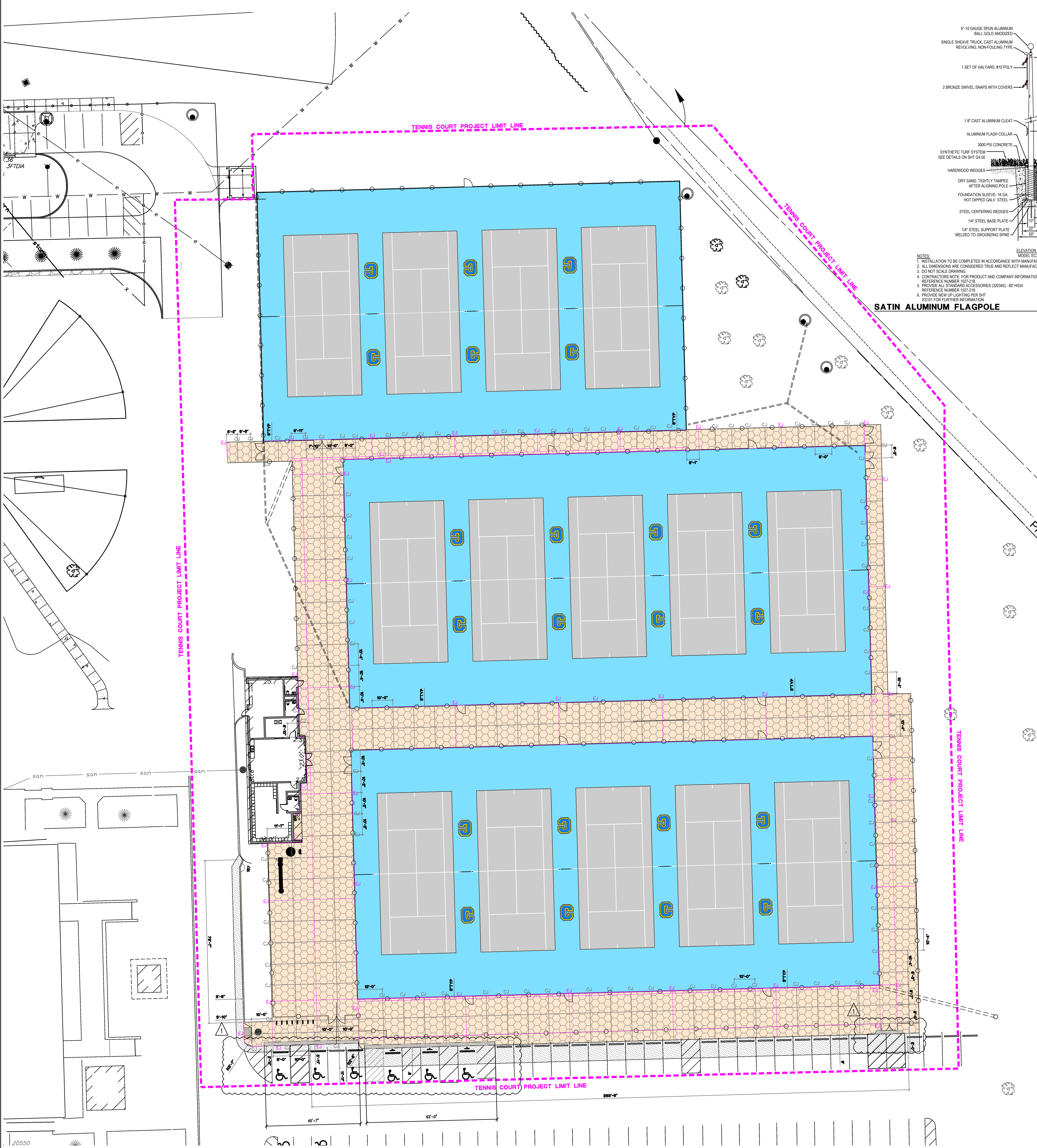
PAUL A. MILLER REGISTERED No. AR10800161 STATE OF INDIANA ARCHITECT

PROJECT MANAGER: MS
DRAWN BY: EB, JB
PROJECT NUMBER: 224063.00
PROJECT CONSTRUCTION ISSUE DATE: 08-30-2024

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM 1	10/11/2024

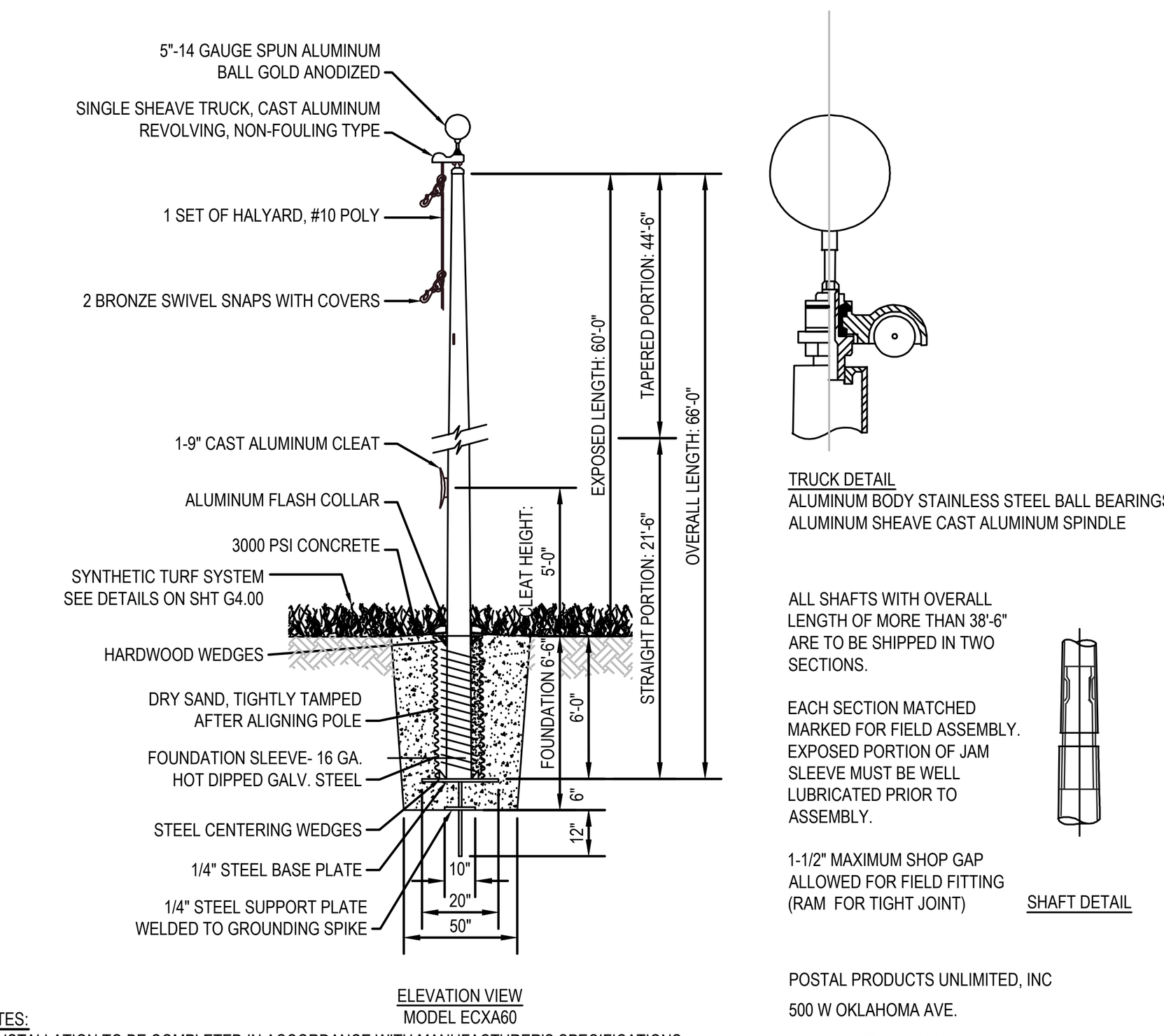
TENNIS COMPLEX RENOVATION
SITE LAYOUT PLAN

G1.00



SITE PAVING PLAN

SCALE: 1" = 20'-0"



NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. ALL DIMENSIONS ARE CONSIDERED TRUE AND REFLECT MANUFACTURER'S SPECIFICATIONS.
3. DO NOT SCALE DRAWING.
4. CONTRACTORS NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADdetails.com/info REFERENCE NUMBER 1527-218.
5. PROVIDE ALL STANDARD ACCESSORIES (320345) - 60' HIGH REFERENCE NUMBER 1527-218.
6. PROVIDE NEW UP LIGHTING PER SHT ES101 FOR FURTHER INFORMATION

POSTAL PRODUCTS UNLIMITED, INC
500 W OKLAHOMA AVE.
MILWAUKEE, WI 53207
TOLL FREE: 1-800-229-4500
PHONE: (414) 290-1500
FAX: (800) 570-0007
www.mailproducts.com

SATIN ALUMINUM FLAGPOLE 1
NTS

GENERAL NOTES

All contractors but not limited to the excavating contractor or contractors must take particular care when excavating in and around existing utility lines and equipment. Actual field locations of all the existing utilities are the contractors responsibilty and must be located either by the representive of the utility company or by a private underground utility locating company prior to the start of excavating. Verify minimum cover requirements so not to cause damage.

All construction methods and materials must conform to current standards and specifications of the Federal, State, County, City or Local requirements, whichever has jurisdiction.

Existing pavement, sidewalks curbs driveways, electrical transformer, ditches, drainage pipes and structures, fences, lawns, trees, bushes, mailboxes, signs, power poles etc., to remain shall be protected from damage by the contractor. Any damage during construction shall be restored, reconstructed or replaced by the contractor at his expense. All damages shall be restored or replaced to at least their original condition or as required or dictated by Federal, State, County, City or Local Codes.

All areas where the existing pavement or pavements are damaged during construction from heavy traffic or equipment, fuel oil, oil, gasoline, etc., by the General Contractor, Subcontractor, or Suppliers, shall be reconstructed

to it's original condition or as required or dictated by Federal, State, County, City or local agencies. This reconstruction and repair shall take place at the end of the project construction or during the scheduled grading and paving of those areas.

Removal of the existing improvements are as noted on the plans. The materials removed from the site shall be disposed of in a proper and legal manner per Federal, State, County, City, and or Local laws and ordinance.

It is the contractor's responsiblity to notify all the utilty companies and departments 72 hours before construction is to start to verify any utilities that may be present on site. All verifications, locations, size and depths shall be made by the appropriate utility companies or departments. When excavating around or over existing utilities, the contractor must notify the utility company so a representive of the utility can be present during the excavation to instruct and observe during the excavation.

It is the responsibility of the contractor to inspect each day and remove all mud, dirt, gravel and loose materials tracked, dumped, spilled or wind blown from this site onto other sites, right of ways, public or private streets or roads, driveways, yards or sidewalks. The contractor must clean or pick up daily if necessary. The contractor shall reduce the airborne dust during the entire construction schedule. Water may be used as a reducer.

The contractor shall verify all dimensions and elevations in the field before the start of construction. The contractor shall be responsible for all field dimensions and elevations during the entire construction schedule. If any discrepancies are found on the engineering plans or landscape plans from actual field conditions the contractor shall contact the A/E immediately. If any discrepancies are found on the survey plan or from actual field conditions the contractor shall contact the A/E immediately for instructions.

All radii indicated shall be formed as circular arcs.

All dimensions of pavements are to edge of finish pavement or face of curb unless otherwise noted.

All dimensions are parallel and perpendicular to the base lines, property lines and or building lines unless otherwise noted.

It is the responsibilty of the contractor or contractors to obtain all Federal, State, County, City, and Local permits for any and all work required unless otherwise noted.
This includes the submittal of soil erosion & sediment control plans as required for rule 5.
The contractor or contractors are responsible to pay for all required permits by any or all agenies mentioned above unless otherwise noted by the contract or specification.

PLAN LEGEND : SITE PAVING PLAN G1.01

(light blue)	TENNIS COMPLEX: NEW POST TENSION CONC. WITH TENNIS COURT SURFACING – SEE DETAILS #1–#6, & #7–#9 SHT G4.00 SEE PLAN NOTES FOR FURTHER CLARIFICATION
(grey)	TENNIS COURTS: NEW POST TENSION CONC. WITH TENNIS COURT SURFACING – SEE DETAILS #1–#6, & #7–#9 SHT G4.00 SEE PLAN NOTES FOR FURTHER CLARIFICATION
(hexagon pattern)	NEW 6" MONOLITHIC CONC. PAVING WITH GUTTER, SEE DETAIL #11,#12–#14 SHT G4.00 SEE PLAN NOTES FOR FURTHER CLARIFICATION
(dot pattern)	ASPHALT REPAIR : SAWCUT AND REMOVE IN IT'S ENTIRETY WHERE WALKS ARE PROPOSED AND REPLACE REAMING SCOPE WORK PER PLAN NOTES
EJ	EXPANSION JOINT TYP SEE PLANS FOR LOCATIONS AND DETAILS #11 & #14 SHT G4.00 FOR FURTHER INFORMATION
CJ	CONTROL JOINT TYP SEE PLANS FOR LOCATIONS AND DETAILS #11 & #14 SHT G4.00 FOR FURTHER INFORMATION

811
Know what's below. Call before you dig.
Call 811 or 1-800-382-5544 Before You Begin Any Digging Project. Call 48 hours or 2 working days before you dig. It's Fast, It's Easy and It's the Law in the state of Indiana!

CAUTION !!
THE LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLAN ARE BASED UPON ABOVE GROUND EVIDENCE (INCLUDING, BUT NOT LIMITED TO, MANHOLES, INLETS, VALVES, AND MARKS MADE UPON THE GROUND BY OTHERS) AND ARE SPECULATIVE IN NATURE. THERE MAY ALSO BE OTHER EXISTING UNDERGROUND UTILITIES FOR WHICH THERE IS NO ABOVE GROUND EVIDENCE OR FOR WHICH NO ABOVE GROUND EVIDENCE WAS OBSERVED. THE EXACT LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHALL BE VERIFIED BY CONTRACTOR PRIOR TO ANY AND ALL CONSTRUCTION.

LOCATIONS GIVEN ARE APPROXIMATE AND ARE TO BE SITE VERIFIED PRIOR TO THE START OF CONSTRUCTION. ALL CONCRETE AND ASPHALT PAVING NOT NOTED FOR WORK IS TO REMAIN – PROTECT DURING CONSTRUCTION TYP

224063.00
CARMEL HIGH SCHOOL WITSKEN TENNIS COMPLEX RENOVATIONS
2460 E. SMOKY ROAD,
CARMEL, IN. 46302

CARMEL CLAY SCHOOLS
5201 E. MAIN STREET, CARMEL, IN. 463033
(317)-844-9961

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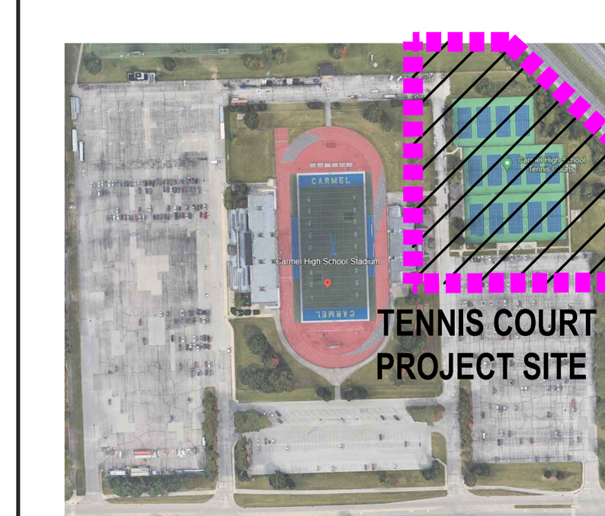

KEY PLAN

PLAN NORTH

100% CONSTRUCTION DOCUMENTS

PAUL A. MILLER REGISTERED No. AR10800161 STATE OF INDIANA ARCHITECT

PROJECT MANAGER: MS
DRAWN BY: EB, JB
PROJECT NUMBER: 224063.00
PROJECT CONSTRUCTION ISSUE DATE: 08-30-2024

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM 1	10/11/2024

TENNIS COMPLEX RENOVATION SITE PAVING PLAN

G1.01

SITE GRADING PLAN

SCALE: 1" = 20'-0"

NORTH

GRADING PLAN NOTES

1. INSTALL NEW 1X12" ADS FLAT PIPE UNDERDRAIN SYSTEM OVER FILTER FABRIC ON SUBGRADE IN AREAS OF NEW TENNIS COURTS. SLOPE SUBGRADE TO PROVIDE POSITIVE DRAINAGE.
2. CONNECT NEW UNDERDRAIN AND FRENCH DRAIN SYSTEMS OR SHORT TRENCH DRAIN WHERE NOTED TO EXISTING DRAINAGE STRUCTURES OR EXISTING UNDERDRAIN SYSTEM PIPING IN LOCATIONS NOTED OR WHEREVER ENCOUNTERED. UNDERDRAIN AND FRENCH DRAIN CONNECTION LINES OR SHORT TRENCH DRAIN CONNECTION LINE WHERE NOTED OF NEW COURTS SHALL BE 6" DIA. MIN. OR AS REQUIRED HDPE SOLID DUAL WALLED SMOOTH INTERIOR CORRUGATED LINE. SEE CIVIL PLANS FOR MORE INFORMATION.
3. INSTALL 6" TOPSOIL IN ALL DISTURBED LAWN AREAS OUTSIDE OF TENNIS COURTS. PROVIDE POSITIVE DRAINAGE IN ALL AREAS.
4. FINE GRADE, SEED AND HYDROMULCH ALL LAWN AREAS DISTURBED BY CONSTRUCTION AND GRADING ACTIVITIES.
5. IN SHADED AREAS AS NOTED MILL EXISTING ASPHALT 1-2" IN DEPTH AND WEDGE LEVEL NEW ASPHALT TO PROVIDE CONSISTANT BC ELEVATION AS NOTED. AT EDGE OF NEW ASPHALT MEET EXISTING ASPHALT FLUSH. RESTRIPE PARKING SPACES PER EXISTING SPACES.
6. INSTALL FRENCH DRAIN WITH PERFORATED 4" DIA. DRAIN TILE SET INTO TRENCH BELOW 6" DEEP LAYER WASHED RIVER GRAVEL AGGREGATE BED EDGED WITH 5" TALL X 1/4" THICK BLACK PAINTED STEEL EDGING. TIE INTO NEAREST DRAIN STRUCTURE.
7. INSTALL ACCO 8" POLYMER CONCRETE, KLASSIC KS200 TRENCH DRAIN WITH PERFORATED STAINLESS STEEL GRATE INSTALLED IN LOCATIONS AS NOTED – SEE DETAIL 6 SHT G4.00 AND SU1.1 FOR FURTHER INFORMATION
8. PROTECT EXISTING TREES SHOWN TO REMAIN. INSTALL TREE PROTECTION FENCING AROUND TREE AT DRIP LINE TO MINIMIZE DISTURBANCE – SEE DETAIL F SHT SU2.2 FOR TREE PROTECTION
9. CONNECT LONG ACCO 8" POLYMER CONCRETE, KLASSIC KS200 TRENCH DRAIN WITH 15" DIA. HDPE PIPING TO EXISTING STORM STRUCTURES AND PERFORATED STAINLESS STEEL GRATE INSTALLED IN LOCATIONS AS NOTED – SEE DETAIL 6 SHT G4.00 AND SU1.1 FOR FURTHER INFORMATION

SPOT ELEVATION KEY

BC- BOTTOM OF CURB
TC- TOP OF CURB
FFE- FINISH FLOOR ELEVATION
FG- FINISH GRADE
811.62' – EXISTING SPOT ELEVATION
811.62' – PROPOSED SPOT ELEVATION

224063.00
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WITSKEN TENNIS COMPLEX RENOVATIONS

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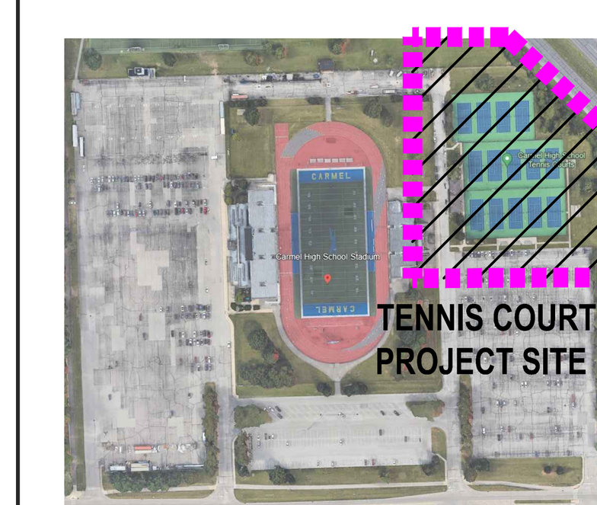

KEY PLAN

PLAN NORTH

100% CONSTRUCTION DOCUMENTS

PAUL A. MILLER REGISTERED No. AR10800161 STATE OF INDIANA ARCHITECT

PROJECT MANAGER: MS
DRAWN BY: EB, JB
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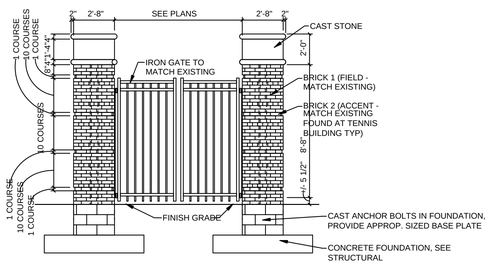
REV. NO.	DESCRIPTION	DATE
1	ADDENDUM 1	10/11/2024

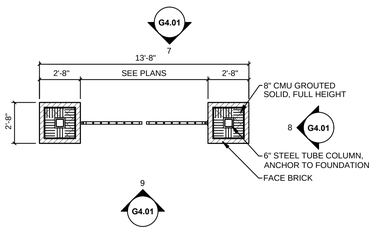
TENNIS COMPLEX RENOVATION

SITE GRADING PLAN

G2.00

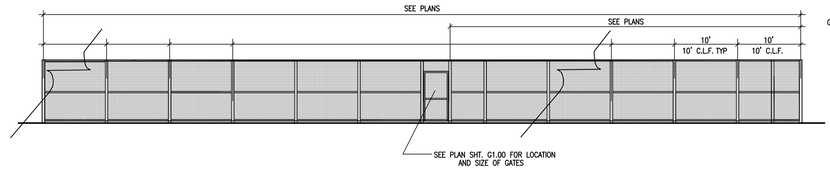


9 MASONRY ENTRY -NORTH ELEVATION
NTS



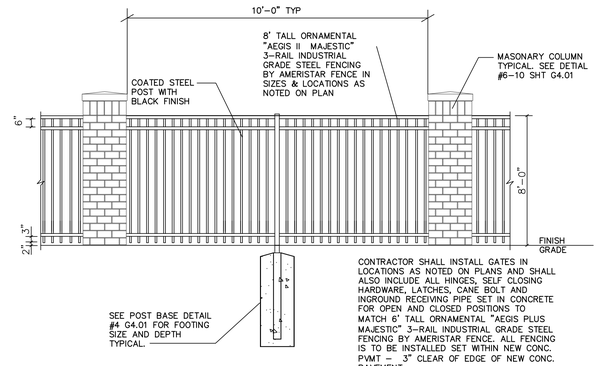
REFER TO SITE PLAN FOR GATE LOCATION AND ORIENTATION.

10 MASONRY ENTRY AND GATE ELEVATION
NTS

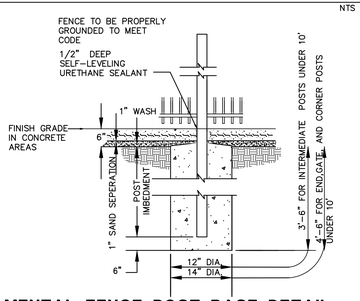


GENERAL NOTE:
1. PROVIDE HEAVY DUTY CUSTOM WINDSCREENS IN COLOR AS SELECTED BY OWNER IN LOCATIONS AS NOTED ON LAYOUT PLAN G1.00.
2. PROVIDE ALL REQUIRED ACCESSORIES AND HARDWARE NEEDED FOR PROPER FENCE/WINDSCREEN INSTALL
3. NEW FENCING IS TO BE PROPERLY GROUNDED TYP

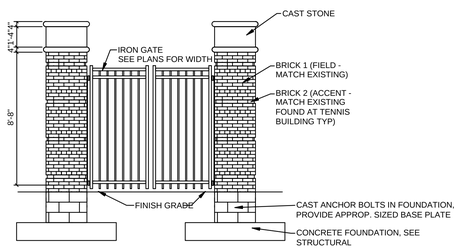
1 TYPICAL TENNIS COURT FENCING SECTION
NTS



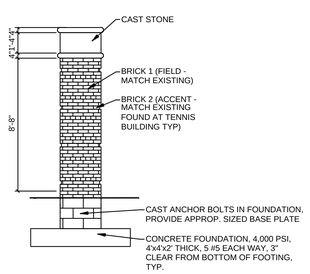
5 ORNAMENTAL FENCING DETAIL
NTS



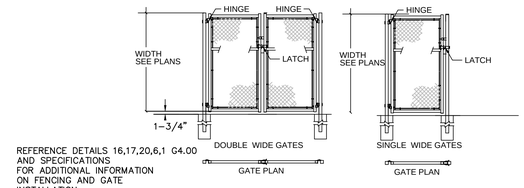
6 ORNAMENTAL FENCE POST BASE DETAIL
NTS



7 MASONRY ENTRY -SOUTH ELEVATION
NTS

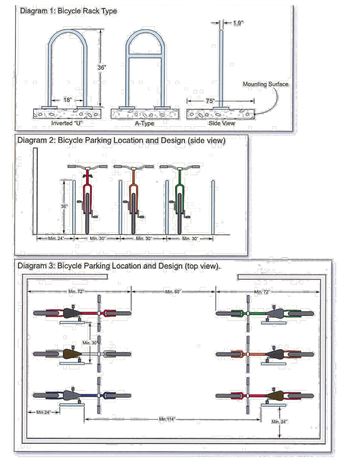


8 MASONRY ENTRY -WEST ELEVATION
NTS

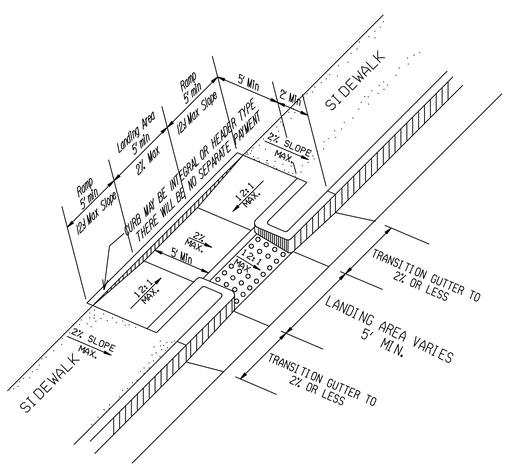


REFERENCE DETAILS 16,17,20,6,1 G4.00 AND SPECIFICATIONS FOR ADDITIONAL INFORMATION ON FENCING AND GATE INSTALLATION.

2 GATE DETAIL



3 BICYCLE RACK DETAIL
NTS



4 TYPE C ADA RAMP
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224063.00 CARMEL HIGH SCHOOL WITSKEN TENNIS COMPLEX RENOVATIONS

2460 E. SMOKY ROAD,
CARMEL, IN. 46302

KEY PLAN

100% CONSTRUCTION DOCUMENTS

PAUL A. MILLER REGISTERED ARCHITECT PA10400161 STATE OF INDIANA ARCHITECT

PROJECT MANAGER: MS
DRAWN BY: EB, JB
PROJECT NUMBER: 224063.00
PROJECT CONSTRUCTION ISSUE DATE: 08-30-2024

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM 1	10/11/2024

TENNIS COMPLEX RENOVATION SITE DETAILS

G4.01

LANDSCAPE PLANTING PLAN

SCALE: 1" = 20'-0"

PLAN NOTES

1. FINE GRADE, SEED, & HYDROMULCH ALL DISTURBED LAWN AREAS WHETHER NOTED OR NOT OR THOSE AREAS NOT COVERED WITH OTHER IMPROVEMENTS. SEED ATHLETIC TURF AT DOUBLE SPECIFIED SEEDING RATE. REFER TO G2 SERIES DRAWINGS FOR EROSION BLANKET.
2. 6" MINIMUM TOPSOIL IN LAWN & PLANTING AREAS AS NOTED. ADJACENT TO CURBS OR CONCRETE PAVEMENT BACKFILL WITH TOPSOIL FLUSH WITH FINISH GRADE OF PAVEMENT SURFACES.
3. 4" MIN. LAYER OF MULCH AROUND ALL TREES (4' DIA. CIRCLE MIN.) TYPICAL AS NOTED. COMPOSITION OF MULCH LAYER SHALL BE: TYPE AAA HARDWOOD MULCH AS APPROVED BY ARCHITECT.

GENERAL LANDSCAPE NOTES

LANDSCAPE CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT IN WRITING PRIOR TO BID DATE OF ANY PLANTS HE/SHE FEELS MAY NOT SURVIVE IN LOCATIONS NOTED ON PLANS.

FINAL PLACEMENT OF PLANT MATERIALS, ETC.. SHALL BE APPROVED BY LANDSCAPE ARCHITECT AND OWNER BEFORE PLANTING OPERATIONS ARE TO PROCEED. ALL TREE LOCATIONS SHALL BE MARKED WITH A WOOD STAKE INDICATING VARIETY AND SIZE OF TREE. ALL GROUND COVER AND PLANTING BED LINES SHALL BE MARKED W/ HIGHLY VISIBLE PAINT LINES W/ OCCASIONAL WOOD STAKES FOR REFERENCE. ALL STAKES SHALL BE REMOVED FOLLOWING PLANTING OPERATIONS. LANDSCAPE ARCHITECT RESERVES THE RIGHT TO ADJUST PLANT LOCATIONS ON SITE.

SUBSTITUTIONS OF PLANT MATERIALS WILL NOT BE ALLOWED. IF PLANTS SHOWN ARE NOT AVAILABLE, THE CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT "PRIOR TO BID" IN WRITING. ALL PLANTS SHALL BE TAGGED WITH PLANT NAME AND PROJECT I.D. AT NURSERY OR CONTRACTORS OPERATIONS PRIOR TO MOVING TO JOB SITE. PLANTS MAY BE INSPECTED AND APPROVED OR REJECTED AT THE NURSERY OR THE JOB SITE BY LANDSCAPE ARCHITECT.

THE LANDSCAPE ARCHITECT SHALL INSPECT, TAG AND OR APPROVE PLANTS AT NURSERY OR AT SITE "BEFORE" PLANTING FOR COMPLIANCE AND ACCEPTANCE. LANDSCAPE ARCHITECT ALSO RETAINS THE RIGHT TO OBSERVE PLANTS AT ANY TIME DURING PROGRESS OF WORK FOR ACCEPTANCE. REMOVE REJECTED PLANTS IMMEDIATELY FRO THE PROJECT SITE.

ALL LANDSCAPE PLANTING BEDS AND TREE PLANTING PITS SHALL BE COVERED W/ 4"MIN. LAYER OF SHREDDED HARDWOOD BARK MULCH. MULCH SHALL BE AAA GRADE APPROVED BY LANDSCAPE ARCHITECT AND SHALL BE UNIFORM IN TEXTURE AND COLOR AND SHALL BE OBTAINED FROM SAWMILL OR LUMBERING OPERATION. NO UTILITY MULCH OR PROCESSED TREE TRIMMINGS WILL BE ALLOWED.

PLANTS AND ALL OTHER MATERIALS TO BE STORED ON SITE WILL BE PLACED WHERE THEY WILL NOT CONFLICT W/ CONSTRUCTION OPERATIONS AND AS DIRECTED BY LANDSCAPE ARCHITECT.

PEATMOSS TO BE USED ON PROJECT SHALL BE DOMESTIC OR IMPORTED SPHAGNUM PEAT MOSS, CHOCOLATE BROWN IN COLOR AND COMPOSED OF PARTIALLY DECOMPOSED VEGETABLE MATERIAL. PEAT MOSS TO BE MILDLY ACIDIC IN CHARACTER AND SHALL BE APPROVED BY LANDSCAPE ARCHITECT.

ALL PLANTS SHALL MEET OR EXCEED AMERICAN STANDARDS FOR NURSERY STOCK, CURRENT EDITION, AS SET FORTH BY AMERICAN ASSOCIATION OF NURSERYMEN.

ALL LANDSCAPE PLANTINGS TO BE MAINTAINED BY CONTRACTOR FOR 60 DAYS MIN. FOLLOWING COMPLETE INSTALLATION AND FINAL INSPECTION BY LANDSCAPE ARCHITECT. ALL SODDED AREAS 30 DAYS MIN., SEEDED AREAS 60 DMIN. DAYS FOLLOWING COMPLETE INSTALLATION AND FINAL INSPECTION BY LANDSCAPE ARCHITECT AFTER WRITTEN REQUEST FROM LANDSCAPE CONTRACTOR. MAINTENANCE SHALL INCLUDE WATERING, WEEDING, CULTIVATING, MULCHING, MOWING, AND ALL OTHER NECESSARY OPERATIONS REQUIRED FOR PROPER ESTABLISHMENT OF LAWNS AND PLANTINGS. CONTRACTOR TO SUBMIT UNIT PRICES ON EVERY TYPE OF WORK AS REQUIRED BY LANDSCAPE ARCHITECT.

ALL SEEDED AREAS SHALL BE GUARANTEED TO HAVE A FULL UNIFORM AND ACCEPTABLE STAND AT THE END OF THE ONE YEAR GUARANTEE PERIOD WITH NO BARE SPOTS COMPRISING MORE THAN 3% OF ANY AREA. ANY AREA SO NOTED WILL BE RESEEDED UNTIL AN ACCEPTABLE STAND IS ESTABLISHED.

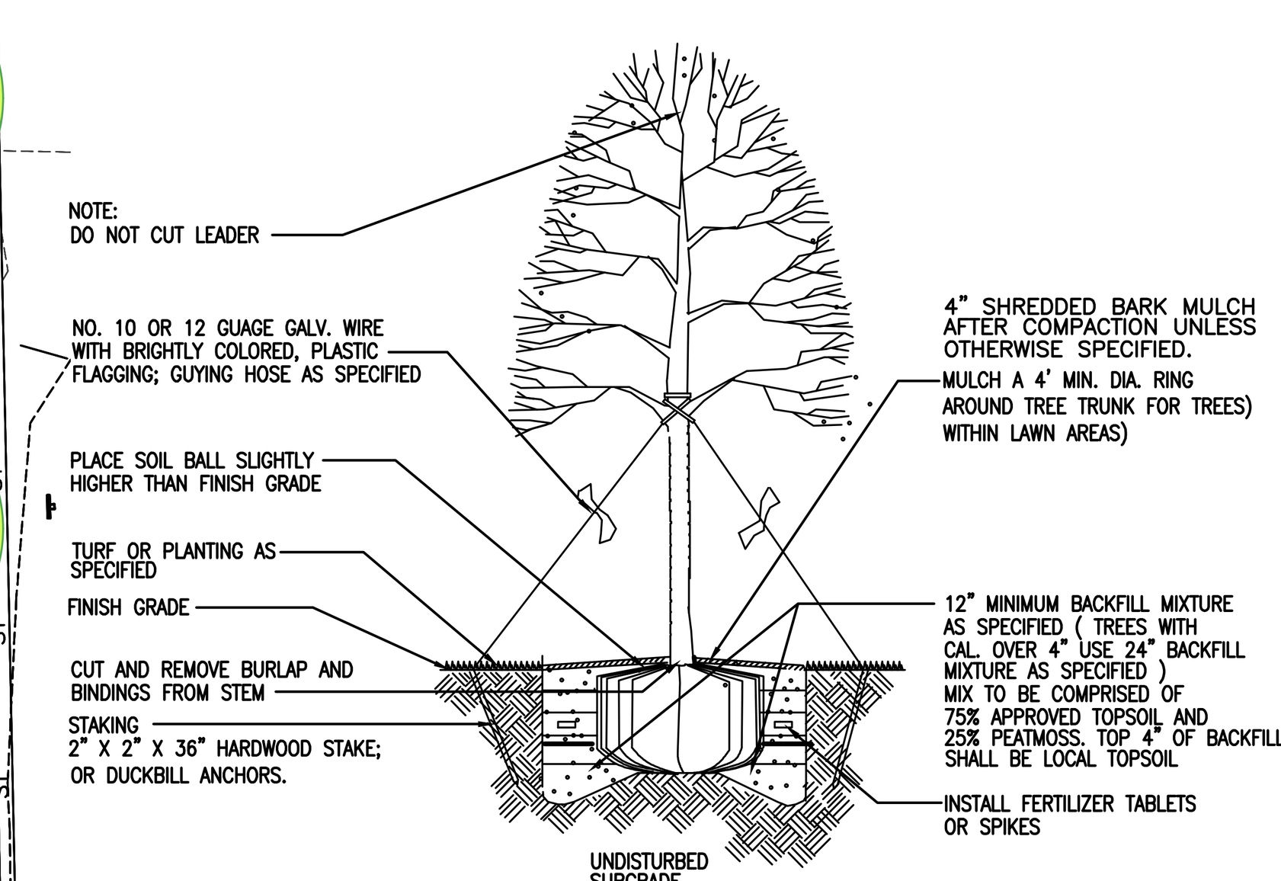
THE LANDSCAPE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND FEES THAT MAY BE REQUIRED FOR HIS PORTION OF WORK.

ALL LANDSCAPE PLANTINGS SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FOLLOWING FINAL INSPECTION BY LANDSCAPE ARCHITECT. AT THE END OF THIS PERIOD, PLANT MATERIAL TERMED DEAD OR UNSATISFACTORY BY LANDSCAPE ARCHITECT SHALL BE REPLACED AT NO ADDITIONAL CHARGE BY THE LANDSCAPE CONTRACTOR.

AN APPROVED PRE-EMERGENT HERBICIDE SHALL BE APPLIED IN ALL PLANTING BEDS AT A RATE SPECIFIED BY MANUFACTURER FOR EACH PLANT VARIETY.

PLANT SCHEDULE

	KEY	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
20	CCP	CERCIS CANADENSIS 'FORES PANSY'	FOREST PANSY REDBUD	8'	BB, SINGLE STRAIGHT LEADER, FULL HEAD
8	NS	NYSSA SLYVATICA	BLACK GUM	3" CAL.	BB, SINGLE STRAIGHT LEADER, FULL HEAD



1 TYPICAL TREE PLANTING DETAIL

NTS

224063.00
CARMEL HIGH SCHOOL
WITSKEN TENNIS COMPLEX RENOVATIONS
2460 E. SMOKY ROAD,
CARMEL, IN. 46302

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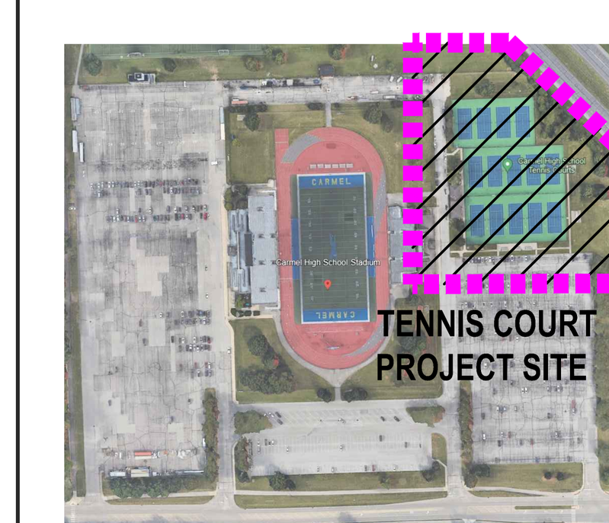

KEY PLAN

100% CONSTRUCTION DOCUMENTS

PAUL A. MILLER REGISTERED No. AR10800161 STATE OF INDIANA ARCHITECT

PROJECT MANAGER: MS
DRAWN BY: EB, JB
PROJECT NUMBER: 224063.00
PROJECT CONSTRUCTION ISSUE DATE: 08-30-2024

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM 1	10/11/2024

TENNIS COMPLEX RENOVATION
SITE LANDSCAPING PLAN

L1.00

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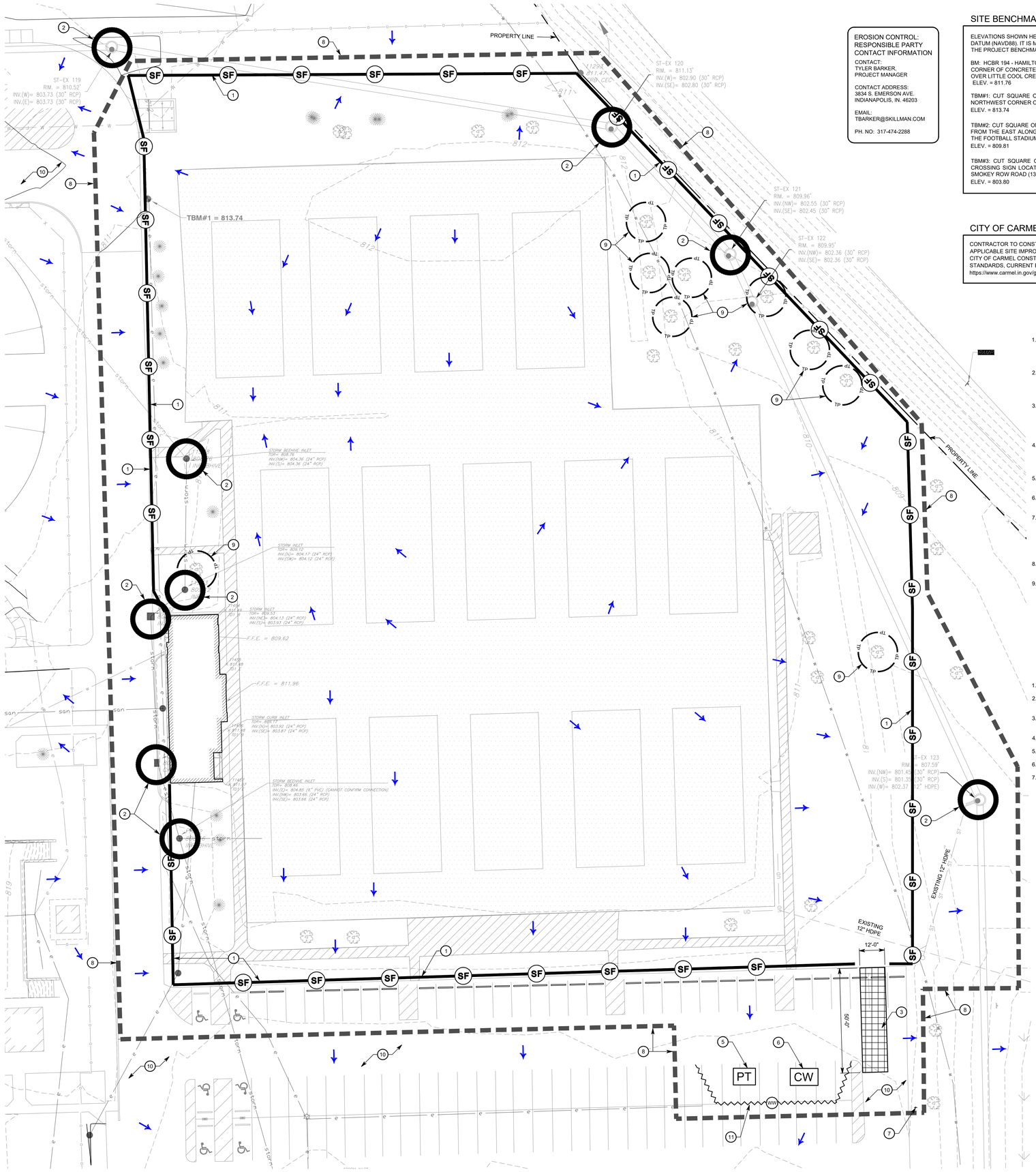

EROSION CONTROL: RESPONSIBLE PARTY CONTACT INFORMATION

CONTACT:
TYLER BARKER,
PROJECT MANAGER

CONTACT ADDRESS:
3834 S. EMERSON AVE.
INDIANAPOLIS, IN. 46203

EMAIL:
TBARKER@SKILLMAN.COM

PH. NO: 317-474-2288

SITE BENCHMARK INFORMATION

ELEVATIONS SHOWN HERON ARE BASED UPON THE 1988 NORTH AMERICAN VERTICAL DATUM (NAVD88). IT IS MY OPINION THAT THE UNCERTAINTY IN THE ELEVATION OF THE PROJECT BENCHMARK DOES NOT EXCEED 0.10 FOOT.

BM: HCBR 194 - HAMILTON COUNTY GEODETIC CONTROL DISK IN THE NORTHWEST CORNER OF CONCRETE BRIDGE DECK OF THE BRIDGE CARRYING RANGE LINE ROAD OVER LITTLE COOL CREEK.
ELEV. = 811.76

TBM#1: CUT SQUARE ON WEST SIDE OF CONCRETE LIGHT BASE LOCATED AT THE NORTHWEST CORNER OF THE TENNIS COURTS.
ELEV. = 813.74

TBM#2: CUT SQUARE ON EAST SIDE OF CONCRETE LIGHT BASE OF THE THIRD LIGHT FROM THE EAST ALONG THE SOUTH SIDE OF THE PARKING LOT DIRECTLY SOUTH OF THE FOOTBALL STADIUM.
ELEV. = 809.81

TBM#3: CUT SQUARE ON THE EAST SIDE OF CONCRETE BASE OF A PEDESTRIAN CROSSING SIGN LOCATED IN THE NORTHWEST QUADRANT OF STADIUM DRIVE AND SMOKEY ROW ROAD (136TH ST.)
ELEV. = 803.80

CITY OF CARMEL STANDARDS

CONTRACTOR TO CONSTRUCT ALL APPLICABLE SITE IMPROVEMENTS TO THE CITY OF CARMEL CONSTRUCTION STANDARDS, CURRENT EDITION.
https://www.carmel.in.gov/government/departments-services/engineering/construction-design

PRECONSTRUCTION EROSION CONTROL GENERAL NOTES

1. CONTRACTOR SHALL AT ALL TIMES INSURE THAT EROSION CONTROL MEASURES PROTECTING EXISTING DRAINAGE FACILITIES BE IN PLACE PRIOR TO THE COMMENCEMENT OF ANY PHASE OF CONSTRUCTION OR LAND ALTERATION ACTIVITY.
2. AS SOON AS AREAS ARE BROUGHT TO FINISH GRADE OR NEW DRAINAGE FACILITIES ARE CONSTRUCTED, CONTRACTOR SHALL CONSTRUCT THE APPLICABLE EROSION CONTROL MEASURES REQUIRED BY AND DELINEATED ON THE APPROVED PLAN.
3. DURING SITE CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL: MAINTAIN ALL PERIMETER SILT BARRIERS, PREVENT CONSTRUCTION SILTS FROM LEAVING THE SITE AT ALL TIMES AND PLACE EXCAVATED MATERIALS AWAY FROM ANY DIRECT DRAINAGE FLOW RUNOFF FROM THE SITE.
4. DURING CONSTRUCTION KEEP PAVEMENTS AND SIDEWALKS CLEAN AND WORK AREAS IN AN ORDERLY CONDITION. CLEAN WHEELS OF VEHICLES BEFORE LEAVING THE SITE TO AVOID TRACKING SOIL ONTO ROADS, WALKS, OR OTHER PAVED AREAS.
5. INLET EROSION CONTROL MEASURES SHALL BE INSTALLED AT ALL INLET STRUCTURES TO KEEP PIPING SYSTEMS FREE OF SILTATION.
6. THE IMPLEMENTATION AND MAINTENANCE OF THE EROSION CONTROL IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
7. ALL PROPOSED EROSION AND SEDIMENT CONTROL SHALL BE IN CONFORMANCE WITH CHAPTERS 600 AND 700 OF THE CITY OF CARMEL ENGINEERING CONSTRUCTION AND DESIGN STANDARDS, LATEST EDITION. DISCREPANCIES BETWEEN THE PLANS AND THE MANUAL SHALL NOT ALLEVIATE THE CONTRACTOR FROM ADHERING TO THE REQUIREMENTS SET FORTH IN THE CITY STANDARDS.
8. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED BY IDEM, HCCSW AND/OR THE CITY OF CARMEL.
9. ALL PROPOSED STORM SEWER AND DRAINAGE APPURTENANCES SHALL BE IN CONFORMANCE WITH THE CITY OF CARMEL STORMWATER SPECIFICATIONS AND DETAILS, LATEST EDITIONS. DISCREPANCIES BETWEEN THE PLANS AND THE MANUAL SHALL NOT ALLEVIATE THE CONTRACTOR FROM ADHERING TO THE REQUIREMENTS AS SET FORTH IN THE MANUAL.

PRECONSTRUCTION EROSION CONTROL MEASURES SEQUENCING

1. INSTALL PROJECT INFORMATION SIGN
2. CONTRACTOR SHALL INSTALL INLET PROTECTION ON EXISTING OPEN GRATES DEPICTED ON THIS PLAN.
3. FOLLOWING INLET PROTECTION, CONTRACTOR SHALL INSTALL SILT FENCE AT LOCATIONS SHOWN ON THIS PLAN.
4. WEIGHTED WATTLES SHALL BE INSTALLED AT LOCATIONS SHOWN ON THIS PLAN.
5. PLACE CONSTRUCTION TRAILER
6. PLACE CONCRETE WASHOUT AND SIGN.
7. PLACE PORTABLE TOILETS IN LOCATIONS SHOWN

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CAUTION !!

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NORTH

20 0 20 40 60

GENERAL NOTES

1. TOPOGRAPHIC CONDITIONS AND EXISTING UTILITIES SHOWN WERE PROVIDED BY THE SURVEYOR. THE ENGINEER MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED.
2. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE PROJECT AREA INCLUDING UNDERGROUND UTILITY CONDITIONS, LOCATION AND DEPTH PRIOR TO ANY OTHER SITE CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER.
3. NO EARTH DISTURBING ACTIVITY MAY COMMENCE WITHOUT AN APPROVED STORM WATER MANAGEMENT PERMIT.
4. INLET EROSION CONTROL MEASURES SHALL BE INSTALLED AT ALL INLET STRUCTURES TO KEEP PIPING SYSTEMS FREE OF SILTATION.
5. UTILITY RELOCATIONS REQUIRED BY THE PROJECT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER. UTILITY LINE RELOCATIONS REQUIRED FOR ROAD PROJECTS THAT RESULT IN A CONFLICT WITH PROPOSED DEVELOPMENT SHALL BE THE DEVELOPERS RESPONSIBILITY TO RESOLVE WITH THE UTILITY. EXISTING POLE LINES REQUIRED TO BE RELOCATED TO WITHIN ONE FOOT OF PROPOSED RIGHT-OF-WAY LINE.
6. DAMAGE TO THE EXISTING RIGHT-OF-WAY SHALL RESTORED/REPAIRED TO THE SATISFACTION OF THE CITY AT THE COMPLETION OF THE PROJECT. THE CONTRACTOR IS ENCOURAGED TO INSPECT THE RIGHT-OF-WAY WITH THE CITY PRIOR TO THE START OF CONSTRUCTION TO DOCUMENT THE EXISTING CONDITION OF THE RIGHT-OF-WAY.
7. REFER TO EROSION CONTROL DETAILS ON SHEET G3.4
8. THE PROPOSED STORM SEWER SYSTEM FOR THIS PROJECT WILL BE PRIVATE OWNED.
9. UTILITY RELOCATIONS REQUIRED BY THE PROJECT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER. UTILITY LINE RELOCATIONS REQUIRED FOR ROAD PROJECTS THAT RESULT IN A CONFLICT WITH PROPOSED DEVELOPMENT SHALL BE THE DEVELOPERS RESPONSIBILITY TO RESOLVE WITH THE UTILITY. EXISTING POLE LINES REQUIRED TO BE RELOCATED TO WITHIN ONE FOOT OF PROPOSED RIGHT-OF-WAY LINE.
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○ EROSION CONTROL KEYNOTES

1. SILT FENCE, PER DETAIL A/G3.4
2. INLET SEDIMENT PROTECTION, PER DETAIL B/G3.4
3. CONSTRUCTION ENTRANCE DRIVE, PER DETAIL D/G3.4
4. SEED DISTURBED AREAS - SEE SHEET G3.4
5. PORTABLE TOILET - ANCHOR TO PREVENT SPILLS
6. CONCRETE WASHOUT AND SIGNAGE, PER DETAILS F/G3.4 & G/G3.4
7. SWPPP INFORMATION BOARD, PER DETAIL H/G3.4
8. CONSTRUCTION LIMITS
9. TREE PROTECTION, PER DETAIL F/SU2.2
10. DURING CONSTRUCTION KEEP PAVEMENT AND SIDEWALKS CLEAN AND WORK AREAS IN AN ORDERLY CONDITION. CLEAN WHEELS OF VEHICLES BEFORE LEAVING SITE TO AVOID TRACKING SOIL ONTO ROADS OR OTHER PAVED AREAS.
11. WEIGHTED WATTLES, PER DETAIL C/G3.4

EROSION CONTROL LEGEND

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- CONSTRUCTION FENCE
- EXISTING DRAINAGE FLOW DIRECTION
- TREE PROTECTION REQUIRED

224063.00
CARMEL HIGH SCHOOL WITSKEN TENNIS COMPLEX RENOVATIONS

2460 E. SMOKY ROAD,
CARMEL, IN. 46032

CARMEL CLAY SCHOOLS

5201 E. MAIN STREET, CARMEL, IN. 463033
(317)-844-9961

ARCHITECT

FANNING HOWEY

317-848-0966 WWW.FHAI.COM

KEY PLAN

100% CONSTRUCTION DOCUMENTS

PETE MIR RANDOVICH
REGISTERED
No.
19700317
STATE OF
INDIANA
PROFESSIONAL ENGINEER

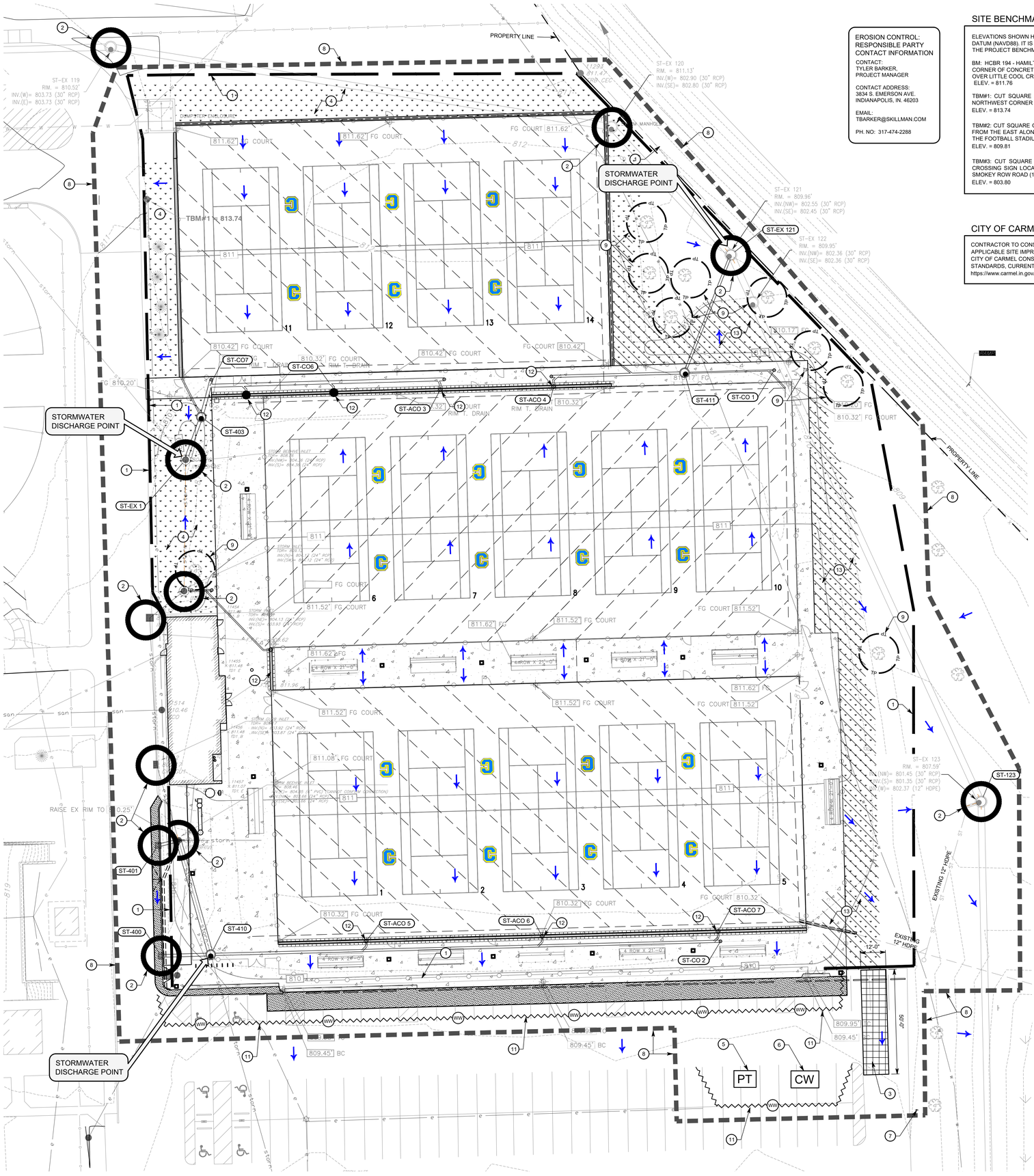
PROJECT MANAGER: PMR
DRAWN BY: GMC
PROJECT NUMBER: 224063.00
PROJECT CONSTRUCTION ISSUE DATE: 08-30-2024

REV. NO.	DESCRIPTION	DATE

PRE-CONSTRUCTION EROSION CONTROL PLAN

G3.1

Drawing Path: P:\2024\300\338\CAD\Civil\Active\2024-338 - G3.1 - ECPRE.dwg
Plotted By: gcameron Time of Plot: 10/1/24 - 2:06pm Last Edited: 9/19/24 - 2:02pm



EROSION CONTROL: RESPONSIBLE PARTY CONTACT INFORMATION

CONTACT:
TYLER BARKER,
PROJECT MANAGER

CONTACT ADDRESS:
3834 S. EMERSON AVE.
INDIANAPOLIS, IN. 46203

EMAIL:
TBARKER@SKILLMAN.COM

PH. NO: 317-474-2288

SITE BENCHMARK INFORMATION

ELEVATIONS SHOWN HERON ARE BASED UPON THE 1988 NORTH AMERICAN VERTICAL DATUM (NAVD88). IT IS MY OPINION THAT THE UNCERTAINTY IN THE ELEVATION OF THE PROJECT BENCHMARK DOES NOT EXCEED 0.10 FOOT.

BM: HCBR 194 - HAMILTON COUNTY GEODETIC CONTROL DISK IN THE NORTHWEST CORNER OF CONCRETE BRIDGE DECK OF THE BRIDGE CARRYING RANGE LINE ROAD OVER LITTLE COOL CREEK.
ELEV. = 811.76

TBM#1: CUT SQUARE ON WEST SIDE OF CONCRETE LIGHT BASE LOCATED AT THE NORTHWEST CORNER OF THE TENNIS COURTS.
ELEV. = 813.74

TBM#2: CUT SQUARE ON EAST SIDE OF CONCRETE LIGHT BASE OF THE THIRD LIGHT FROM THE EAST ALONG THE SOUTH SIDE OF THE PARKING LOT DIRECTLY SOUTH OF THE FOOTBALL STADIUM.
ELEV. = 809.81

TBM#3: CUT SQUARE ON THE EAST SIDE OF CONCRETE BASE OF A PEDESTRIAN CROSSING SIGN LOCATED IN THE NORTHWEST QUADRANT OF STADIUM DRIVE AND SMOKEY ROW ROAD (136TH ST.)
ELEV. = 803.80

CITY OF CARMEL STANDARDS

CONTRACTOR TO CONSTRUCT ALL APPLICABLE SITE IMPROVEMENTS TO THE CITY OF CARMEL CONSTRUCTION STANDARDS, CURRENT EDITION.
https://www.carmel.in.gov/government/departments-services/engineering/construction-design

NORTH

20 0 20 40 60

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11. WEIGHTED WATTLES, PER DETAIL C/G3.4
12. TRENCH DRAIN INLET PROTECTION, PER DETAIL E/G3.4
13. EROSION CONTROL BLANKET, PER DETAIL J & K/G3.4

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224063.00
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PROFESSIONAL ENGINEER

PROJECT MANAGER: PMR
DRAWN BY: GMC
PROJECT NUMBER: 224063.00
PROJECT CONSTRUCTION ISSUE DATE: 08-30-2024

REV. NO.△	DESCRIPTION	DATE

POST CONSTRUCTION EROSION CONTROL PLAN

G3.2

Drawing Path: P:\2024\300\338\Cad\Civil\Active\2024-338 - G3.2 - ECPOST.dwg
Plotted By: gcameron Time of Plot: 10/1/24 - 2:07pm Last Edited: 10/1/24 - 11:14am

GENERAL NOTES:

A. COORDINATE ALL UNDERGROUND OBSTRUCTIONS PRIOR TO STARTING EXCAVATION ACTIVITIES. PROVIDE PUBLIC AND PRIVATE UTILITY LOCATE SERVICES AND COORDINATE WITH OWNER. AVOID ALL UNDERGROUND OBSTRUCTIONS WHETHER IDENTIFIED OR NOT IDENTIFIED IN THESE DOCUMENTS.
B. THE TERM "PROVIDE" INDICATES CONTRACTOR SHALL FURNISH AND INSTALL ITEMS AND CONNECT AS REQUIRED TO OBTAIN A COMPLETE AND OPERABLE SYSTEM.
C. WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ALL LOCAL, STATE AND NATIONAL CODES INCLUDING, BUT NOT LIMITED TO NFPA 70 (NATIONAL ELECTRIC CODE), NFPA 72, NFPA 101, INTERNATIONAL BUILDING CODE, ETC.
D. CONFLICTS BETWEEN THE APPLICABLE CODES, STANDARDS, AND THE PLANS AND SPECIFICATIONS SHALL BE SUBMITTED TO THE ARCHITECT IN WRITING PRIOR TO PROCEEDING WITH WORK.
E. ADDITIONAL ELECTRICAL REQUIREMENTS MAY BE SHOWN ON PLANS FROM OTHER DISCIPLINES IN THIS SET. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW ALL PLANS AND SPECIFICATIONS FOR A COMPLETE UNDERSTANDING OF THE PROJECT REQUIREMENTS.
F. WHERE CONFLICTS ARE FOUND BETWEEN DRAWINGS, DETAILS, OR SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL APPLY. NOTIFY ARCHITECT OF DISCREPANCY IN WRITING.
G. INITIATING WORK CONSTITUTES CONTRACTOR ACCEPTANCE OF THE EXISTING CONDITIONS ASSOCIATED WITH THE WORK IN QUESTION.
H. CONTRACTOR SHALL CONTACT UTILITIES AND VERIFY UTILITY REQUIREMENTS PRIOR TO COMMENCING CONSTRUCTION. CONFLICTS BETWEEN UTILITY REQUIREMENTS AND THE PLANS OR SPECIFICATIONS SHALL BE SUBMITTED TO THE ARCHITECT IN WRITING PRIOR TO PROCEEDING WITH WORK. CONTRACTOR SHALL ARRANGE A PRE-CONSTRUCTION MEETING WITH THE UTILITY COMPANY TO REVIEW REQUIREMENTS. INCOMING SERVICE CONDUITS AND SUBSTRUCTURES SHALL BE INSTALLED PER UTILITY COMPANY STANDARDS.
I. THESE DRAWINGS AND SPECIFICATIONS DO NOT INDICATE METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND IS RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, PROCEDURES, AND SAFE PRACTICES.
J. DRAWINGS ARE DIAGRAMMATIC IN NATURE AND CANNOT SHOW EVERY CONNECTION, JUNCTION BOX, WIRE, AND CONDUIT, ETC. THE EXACT LOCATIONS AND ARRANGEMENT OF PARTS SHALL BE DETERMINED AS THE WORK PROGRESSES. ITEMS NOT INDICATED ON DRAWINGS REASONABLY INFERRED TO BELONG TO THE WORK DESCRIBED SHALL BE FURNISHED AND INSTALLED TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM.
K. WORK SHALL BE COORDINATED WITH EXISTING CONDITIONS, NEW CONSTRUCTION, OWNER'S VENDORS, OTHER TRADES, AND THEIR DOCUMENTS. THE CONTRACTOR SHALL VISIT THE SITE BEFORE SUBMITTING HIS BID. CONTRACTOR SHALL CONTACT OWNER FOR AN APPOINTMENT TO VISIT THE SITE.
L. AN INSULATED GROUND CONDUCTOR SIZED PER NEC SHALL BE PROVIDED WITH EACH FEEDER AND BRANCH CIRCUIT.
M. PROVIDE A DEDICATED NEUTRAL FOR EACH LINE TO NEUTRAL CIRCUIT. MULTI-WIRE BRANCH CIRCUITS ARE NOT PERMITTED UNLESS SPECIFICALLY INDICATED ON PLANS.
N. CONDUITS DESIGNATED AS EMPTY OR FUTURE SHALL BE PROVIDED WITH A #12 PULL LINE. OPEN ENDED CONDUITS SHALL BE PROVIDED WITH INSULATED THROAT BUSHINGS.
O. PROVIDE TEMPORARY OR PERMANENT END CAPS FOR STUBBED CONDUITS.
P. MINIMUM WIRE SIZE IS #10 AWG. SEE SPECIFICATIONS FOR MINIMUM CONDUIT SIZE.
Q. ELECTRICAL PANELS INCLUDING BUT NOT LIMITED TO LIGHTING CONTROL PANELS, POWER DISTRIBUTION WILL HAVE A MAX DEVICE HEIGHT OF 72" AFF.
R. CONTRACTOR SHALL PROVIDE RIGID METAL SLEEVES TO FACILITATE PATHWAYS THROUGH FULL HEIGHT WALLS FOR ELECTRICAL AND TELECOMMUNICATIONS WIRING.
S. JUNCTION BOXES LOCATED ABOVE ACCESSIBLE CEILINGS SHALL BE LOCATED NO MORE THAN 36" ABOVE CEILING LEVEL. LABEL EACH BOX IN AREA OF WORK WITH A PERMANENT MARKER OR IN ACCORDANCE WITH SPECIFICATIONS, WHICHEVER IS MORE STRINGENT.
T. PROVIDE GROUNDING TYPE EXPANSION FITTINGS OR OTHER APPROVED METHODS TO ALLOW FOR EXPANSION, CONTRACTION, AND DEFLECTION.

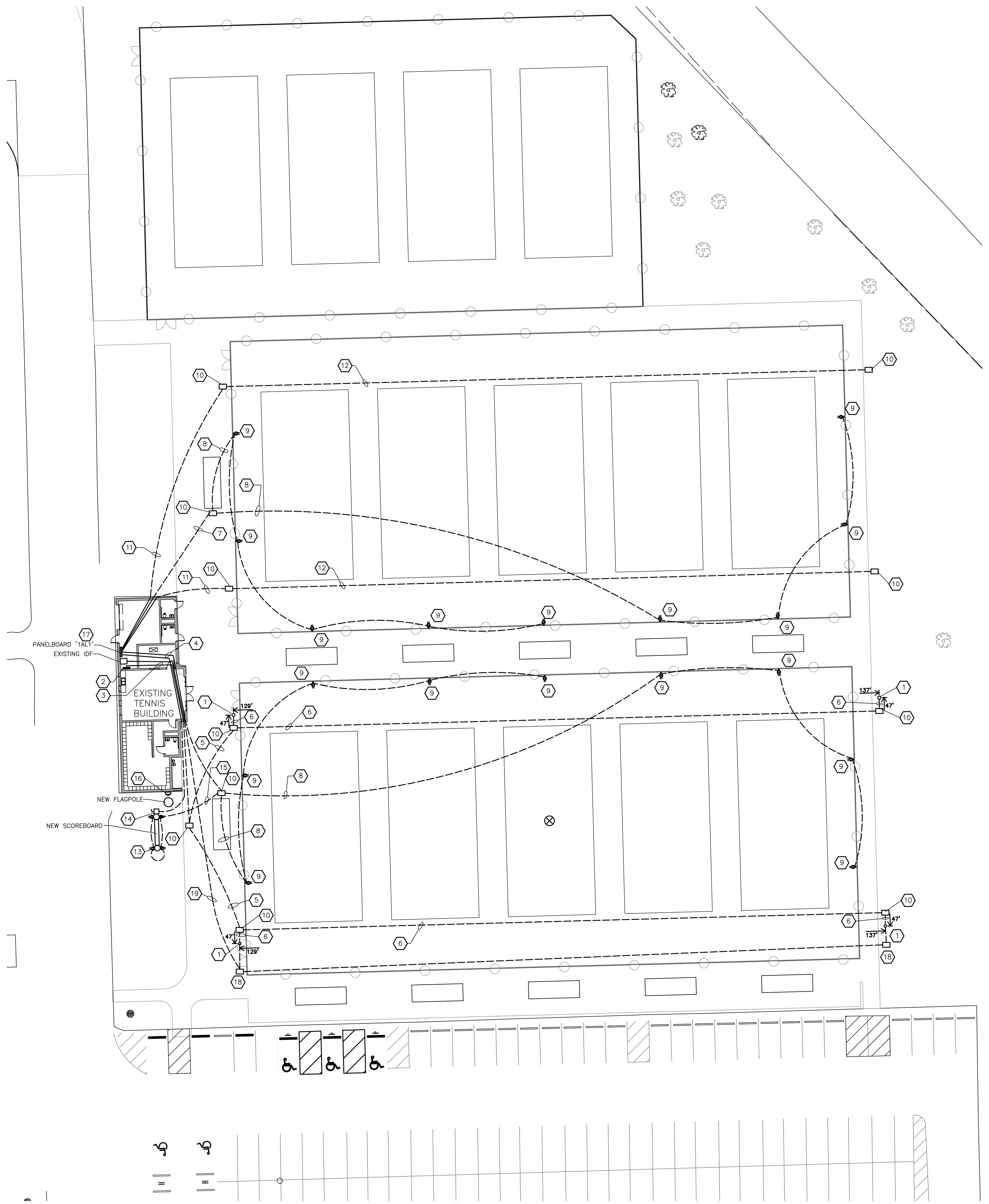
ELECTRICAL ABBREVIATIONS

ABBREVIATIONS USED ON THE CONTRACT INCLUDE BUT ARE NOT LIMITED TO THOSE LISTED BELOW

#	NUMBER
(N)P(N)W	NUMBER OF POLES, NUMBER OF WIRES
AWG	AMERICAN WIRE GAUGE
C	CONDUIT (GENERIC TERM FOR RACEWAY, PROVIDE AS SPECIFIED)
EC	ELECTRICAL CONTRACTOR
ETR	EXISTING TO REMAIN
EX	EXISTING
LFMC	LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT
LFNC	LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT
NM	NONMETALLIC SHEATHED CABLE
NTS	NOT TO SCALE
PB	PULL BOX
SP	SPARE
UNO	UNLESS NOTED OTHERWISE
WP	WEATHERPROOF

POWER SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING HEIGHT TO BOTTOM
(solid line)	CONDUIT CONCEALED ABOVE CEILING OR IN WALL	
(dashed line)	CONDUIT CONCEALED IN OR BELOW FLOOR, OR UNDER GROUND	
X 1AL1-1	20 AMP, 125 VOLT, NEMA 5-20R DUPLEX RECEPTACLE WITH COMMON COVER PLATE MOUNTED VERTICALLY +16" TO BOTTOM. LETTER(S) IN FRONT INDICATES LOAD TYPE, SEE BELOW. SINGLE LINE INDICATES HORIZONTAL MOUNTING, DOUBLE LINE INDICATE QUAD, DARK CENTER INDICATES ABOVE COUNTERTOP MOUNTING (44") NEMA 5-20R, UNO. CIRCUIT NUMBER (e.g. "1AL1-1") ADJACENT TO THE SYMBOL ON PLANS INDICATES PANELBOARD/CIRCUIT NUMBER SERVING RECEPTACLE, UNO. B RECEPTACLE WITH 20 AMP SINGLE POLE SWITCH IN 2 GANG BOX AND COMMON COVER PLATE C CASEWORK, COORDINATE WITH ARCHITECTURAL CO COPY MACHINE CM COFFEE MAKER E RED RECEPTACLE AND STAINLESS COVER PLATE, CONNECT TO BACKUP POWER GF GROUND FAULT CIRCUIT INTERRUPTING TYPE I ISOLATED GROUND M MONITOR - 60" AFF MW MICROWAVE R REFRIGERATOR - 48" AFF TL TWIST LOCK TR TAMPER RESISTANT U DUPLEX RECEPTACLE WITH (2) USB PORTS UR UNDER COUNTER REFRIGERATOR V VENDING MACHINE, FEED FROM 30 mA GFCI BREAKER IN PANELBOARD. VP WALL MOUNTED VIDEO PROJECTOR, 96" AFF UNO WB WHITEBOARD WC ELECTRIC WATER COOLER. FEED FROM 5 mA GFCI BREAKER IN PANELBOARD. WF WASHFOUNTAIN/LAVATORY. CONNECT TO NEAREST THROUGH FEED GFCI RECEPTACLE. WM WASHING MACHINE. FEED FROM 30 mA GFCI BREAKER IN PANELBOARD. WP WEATHER RESISTANT GFCI WITH IN-USE TYPE WEATHERPROOF COVER HINGED AT TOP X EXPLOSION PROOF	
(panelboard symbol)	SURFACE CIRCUIT BREAKER PANELBOARD	-



ELECTRICAL SITE PLAN

1" = 20'-0"

PLAN NOTES:

1. PROVIDE NEW MUSCO PRECAST BASE AND INSTALL NEW SPORTS LIGHTING POLE. CONNECT NEW LIGHT FIXTURES TO SPORTS LIGHTING CIRCUIT. PROVIDE WIRE ACCESS FOR POLE-MOUNTED CAMERAS TO BE MOUNTED AT 25'-0" ON NEW SPORTS LIGHTING POLE. CAMERAS TO BE PROVIDED BY OWNER.
2. INSTALL NEW MUSCO LIGHTING CABINET IN THIS SPACE. WIRE CONDUCTORS SERVING NEW SPORTS LIGHTING TO CONTACTORS IN LIGHTING CABINET. WIRE EACH CONTACTOR TO A NEW 30A, 3P CIRCUIT BREAKER IN PANEL '1AL1'. CONNECT MUSCO LIGHTING CONTROL POWER TO 1AL1-29.
3. PROVIDE FOUR (4) SETS OF 3 #8, #10 G IN 2" CONDUIT FOR SPORTS LIGHTING. ROUTE CONDUIT ABOVE CEILING AND PENETRATE EXTERIOR WALL. ROUTE CONDUIT DOWN SURFACE OF EXTERIOR WALL TO BELOW GRADE.
4. PROVIDE TWO (2) SETS OF 2 #10, #10 G AND ONE (1) SET OF 2 #12, #12 G IN 1" CONDUIT FOR TENNIS COURT AND SCOREBOARD RECEPTACLES. ROUTE CONDUIT ABOVE CEILING AND PENETRATE EXTERIOR WALL. ROUTE CONDUIT DOWN SURFACE OF EXTERIOR WALL TO BELOW GRADE. TENNIS COURT RECEPTACLES TO 1AL1-4 AND 1AL1-6, AND SCOREBOARD RECEPTACLES TO 1AL1-22.
5. PROVIDE TWO (2) SETS OF 3 #8, #10 G IN 1-1/4" CONDUIT FOR SPORTS LIGHTING.
6. PROVIDE 3 #8, #8 G IN 1" CONDUIT FOR SPORTS LIGHTING.
7. PROVIDE TWO (2) SETS 2 #10, #10 G IN 3/4" CONDUIT FOR TENNIS COURT RECEPTACLES. ROUTE CONDUIT ABOVE CEILING AND PENETRATE EXTERIOR WALL. ROUTE CONDUIT DOWN SURFACE OF EXTERIOR WALL TO BELOW GRADE. CONNECT TO 1AL1-3 AND 1AL1-5.
8. PROVIDE 2 #10, #10 G IN 1/2" CONDUIT FOR TENNIS COURT RECEPTACLES.
9. PROVIDE WEATHERPROOF, 20A DUPLEX GROUND FAULT RECEPTACLE WITH WEATHERPROOF WHILE IN USE COVER, DEVICE AND BOX TO BE BLACK IN COLOR. MOUNT TO NEAREST FENCE POST, COORDINATE WITH SITE DRAWINGS.
10. PROVIDE 24" X 36" FLUSH BOX AT THIS LOCATION FOR SITE POWER.
11. PROVIDE EMPTY 1-1/4" CONDUIT FOR FUTURE SPORTS LIGHTING. ROUTE CONDUIT ABOVE CEILING AND PENETRATE EXTERIOR WALL. ROUTE CONDUITS DOWN SURFACE OF EXTERIOR WALL TO BELOW GRADE.
12. PROVIDE EMPTY 1-1/4" CONDUIT FOR FUTURE SPORTS LIGHTING.
13. PROVIDE WEATHERPROOF, 20A DUPLEX GROUND FAULT RECEPTACLE WITH WEATHERPROOF WHILE IN USE COVER. MOUNT TO SURFACE OF SCOREBOARD SUPPORT AT 18" ABOVE GRADE. TYPICAL OF FOUR.
14. PROVIDE HEAVY DUTY, 120V, 20A, 1P, NEMA 3R, NONFUSED DISCONNECT SWITCH MOUNTED TO SURFACE OF SCOREBOARD SUPPORT. PROVIDE PROVIDE 2 #12, #12 G IN 1/2" CONDUIT. ROUTE CONDUIT ABOVE CEILING AND PENETRATE EXTERIOR WALL. ROUTE CONDUIT DOWN SURFACE OF EXTERIOR WALL TO BELOW GRADE. CONNECT SCOREBOARD THROUGH DISCONNECT SWITCH TO 1AL1-33.
15. PROVIDE 2 #12, #12 G IN 1/2" CONDUIT FOR SCOREBOARD RECEPTACLES.
16. PROVIDE LITHONIA DSXF2 FLOODLIGHT, NARROW SPOT DISTRIBUTION, 8000 LUMENS, 4000K, MVOLT DRIVER, TENON MOUNT, BOTTOM-MOUNTED VISOR, OR APPROVED EQUAL. MOUNT ON SURFACE OF EXTERIOR WALL AT 9'-0" ABOVE GRADE. CONNECT TO 1AL1-7 SERVING EXISTING EXTERIOR LIGHTING IN THIS BUILDING.
17. REMOVE EXISTING PANELBOARD '1AL1'. DISCONNECT EXISTING FEEDER AND ALL EXISTING CIRCUITS AND TIE BACK FOR RECONNECTION. PROVIDE NEW PANELBOARD AND RECONNECT EXISTING FEEDER AND ALL EXISTING CIRCUITS TO NEW PANELBOARD. MANUFACTURER OF NEW PANELBOARD SHALL BE EATON, SQUARE D, OR SIEMENS.
18. PROVIDE 24" X 36" FLUSH BOX AT THIS LOCATION FOR SITE DATA.
19. PROVIDE FIBER CABLE FROM EXISTING IDF IN 1" CONDUIT FOR OWNER-PROVIDED POLE-MOUNTED CAMERAS. ROUTE CONDUIT ABOVE CEILING AND PENETRATE EXTERIOR WALL. ROUTE CONDUIT DOWN SURFACE OF EXTERIOR WALL TO BELOW GRADE. PROVIDE FIBER TO ETHERNET MEDIA CONVERTER IN FLUSH BOX AT POLE BASE. PROVIDE CATEGORY 6 CABLE FROM MEDIA CONVERTER UP TO CAMERA LOCATION AND TERMINATE. COORDINATE WITH OWNER TO ENSURE ALL DEVICES ARE COMPATIBLE WITH CAMERAS.

CARMEL CLAY SCHOOL DISTRICT- WITSKEN TENNIS COMPLEX RENOVATIONS

2460 E. SMOKY ROAD,
CARMEL, IN. 46302

CARMEL CLAY SCHOOLS

ARCHITECT

FANNING HOWEY

317-848-0966 WWW.FHAI.COM

KEY PLAN

CONSTRUCTION DOCUMENTS

BRIAN W. BUTLER REGISTERED No. PE 11600305 STATE OF INDIANA PROFESSIONAL ENGINEER

PROJECT MANAGER: MS
DRAWN BY: ISD
PROJECT NUMBER: 224063.00
PROJECT CONSTRUCTION ISSUE DATE: 08-30-2024

REV. NO.	DESCRIPTION	DATE
1	Addendum #1	10-11-2024

ELECTRICAL SITE PLAN

E2.01

Branch Panel: 1AL1

Location: A107 | **Volts:** 120/208 Wye | **A.I.C. Rating:** 22,000
Supply From: Existing Transformer | **Phases:** 3 | **Mains Type:** MCB
Mounting: Surface | **Wires:** 4 | **Mains Rating:** 175 A
Enclosure: Type 1 | | **MCB Rating:** 225 A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	2
3	Middle Tennis Courts Receptacles	20 A	1			0 VA	0 VA			1	20 A	South Tennis Courts Receptacles	4
5	Middle Tennis Courts Receptacles	20 A	1					0 VA	0 VA	1	20 A	South Tennis Courts Receptacles	6
7	Security Lights (Note 1)	--	1	--	--					1	--	Receptacles A105-A107 (Note 1)	8
9	Lights A104-A107 (Note 1)	--	1			--	--			1	--	Receptacles A104 (Note 1)	10
11	Lights A101-A103 (Note 1)	--	1					--	--	1	--	Receptacles A103 (Note 1)	12
13	HP-1 Outside (Note 1)	--	3	--	--					1	--	Receptacles A103 (Note 1)	14
15	--	--	--			--	--			1	--	Receptacles A101, A102 (Note 1)	16
17	--	--	--					--	--	1	--	Vending Machine Outside (Note 1)	18
19	AH-1 Rm. A107 (Note 1)	--	3	--	--					1	--	Vending Machine Outside (Note 1)	20
21	--	--	--			--	640 VA			1	20 A	Scoreboard Receptacles	22
23	--	--	--					--	--	1	--	IWH-1 A106 (Note 1)	24
25	Lighting A101-A107 (Note 1)	--	1	--	--					1	--	IWH-1 A105 (Note 1)	26
27	EF-1 A101 (Note 1)	--	1			--	--			1	--	IWH-1 A102 (Note 1)	28
29	Musco Lighting Control Panel	20 A	1					180 VA	--	1	--	Garbage Disposal A103 (Note 1)	30
31	Phone Board (Note 1)	--	1	--	--					2	--	IWH-2 A103 (Note 1)	32
33	Scoreboard	20 A	1			180 VA	--			--	--	--	34
35	South Tennis Courts Sports Lighting	30 A	3					1410...	1410...	3	30 A	South Tennis Courts Sports Lighting	36
37	--	--	--	1410...	1410...					--	--	--	38
39	--	--	--			1410...	1410...			--	--	--	40
41	South Tennis Courts Sports Lighting	30 A	3					1410...	1410...	3	30 A	South Tennis Courts Sports Lighting	42
43	--	--	--	1410...	1410...					--	--	--	44
45	--	--	--			1410...	1410...			--	--	--	46
47	Space (Note 2)	--	3					--	--	3	--	Space (Note 2)	48
49	--	--	--	--	--					--	--	--	50
51	--	--	--			--	--			--	--	--	52
53	Space (Note 2)	--	3					--	--	3	--	Space (Note 2)	54
55	--	--	--	--	--					--	--	--	56
57	--	--	--			--	--			--	--	--	58
59	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	60
61	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	62
63	Spare	20 A	1			0 VA	0 VA			1	20 A	Spare	64
65	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	66
67	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	68
69	Spare	20 A	1			0 VA	0 VA			1	20 A	Spare	70
71	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	72
73	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	74
75	Spare	20 A	1			0 VA	0 VA			1	20 A	Spare	76
77	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	78
79	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	80
81	Spare	20 A	1			0 VA	0 VA			1	20 A	Spare	82
83	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	84
			Total Load:	5640 VA		6460 VA		5820 VA					
			Total Amps:	47 A		54 A		49 A					

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Spare	17920 VA	100.00%	17920 VA		
				Total Conn. Load:	17920 VA
				Total Est. Demand:	17920 VA
				Total Conn.:	50 A
				Total Est. Demand:	50 A

Notes:
1. EXISTING LOAD CONNECTED TO NEW PANELBOARD.
2. SPACE RESERVED FOR FUTURE TENNIS COURT LIGHTING.

NEW SHEET ISSUED IN ADDENDUM 1

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PLAN NORTH

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PANELBOARD SCHEDULE

E2.02

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