GREENBRIER COUNTY BOARD OF EDUCATION
GREENBRIER COUNTY, WEST VIRGINIA

ALDERSON ELEMENTARY SCHOOL ADDITIONS AND RENOVATIONS
ADDENDUM #1
September 27, 2022

THRASHER PROJECT #060-10180

A Mandatory Pre-Bid Conference was held on-site at 317 Chestnut Ave., Alderson, WV, on Thursday, September 22, 2022 @ 1:00pm, for the above-referenced project, a copy of the sign-in sheet is attached to this Addendum. The following includes clarifications and responses to questions posed by contractors for the above reference project.

A. GENERAL

The following points were reviewed at the Pre-Bid Conference;

-Introductions
-Pre-Bid is MANDATORY.
-Sign-In Sheet
-Brief Description of Work
-Obtaining Bid Documents
-Addenda
-Questions
-Bid Process and Procedures
-Alternates
-Article 6; Construction Period
-SBA Requirements
-3 Envelope System
-Subcontractor / Material Suppliers List
-Contractor Qualification Statement and Evaluation Criteria
-Bid Date, Time, and Location
-Post Bid Requirements
-Award of Contract
-Liquidated Damages
-Environmental Conditions
-Geotechnical Report
-Quality Control / Testing

Bidder questions shall be submitted in writing to the following;

-Matt Breakey mbreakey@thethrashergroup.com
-Kenton Blackwood kqblackwood@thethrashergroup.com
-Tesla Smith tdsmith@thethrashergroup.com
-Tim Holbrook (COW) tholbrook@osteo.wvsom.edu

Bidders will have the opportunity to visit the site and inspect the existing conditions on October 6, 2022, between 10:00am and 2:00pm. A thorough examination of the existing conditions and full understanding of the Work are required by the Contract.

The Asbestos Building Inspection dated May 2022, which includes the ACM Survey and the Conclusions and Recommendations, is attached to this Addendum.

The Geotechnical Report, which includes the investigation and recommendations, is attached to this Addendum. Geotech Soils / Compaction Testing Services will be paid for by the Owner.

The Truview link below allows bidders to view the photographs and laser scans of many of the spaces around the building and site. See Sheet EA1.01. This is to be used for general reference only, existing conditions, sizes, etc. must be verified in the field.
TruView Enterprise 2020.0.0 - sitemap

B. SPECIFICATIONS

- **ADD** to Specification Section **011000 Summary**, Paragraph 1.2 – B.1 "Clerk of the Works: Tim Holbrook (304) 546-1893."
- **ADD** Specification Section **260573 – Overcurrent Protective Device Coordination Study** as attached to this Addendum.
- **REPLACE** Specification Section **263213 – Generator** as attached to this Addendum.
- **REPLACE** Specification Section **263600 – Transfer Switches** as attached to this Addendum.
- **OMIT** Specification Section **267260 – Public Address and Mass Notification Systems**.
- **OMIT** Specification Section **271300 – Communications Backbone Cabling**.
- **OMIT** Specification Section **271500 – Communications Horizontal Cabling**.
- **OMIT** Specification Section **275123.50 – Educational Telephone and Program Systems**.
- **REPLACE** Specification Section **275350 – Intercom System** as attached to this Addendum.
- **OMIT** Specification Section **281300 – Access Control System**.
- **OMIT** Specification Section **281310 – Video Intercom and Access Control System**.

C. DRAWINGS

P5.01

- Replace Dual Electric Water Heater Schedule with attached sketch **SK-P1**.

M6.01

- See Ductless Unit and Condensing Unit Schedule. DU-4 and DU-5 shall be Carrrier model number 38MARBQ09 with 12A FLA and 15A MCA, MOCP shall be 20A.

E1.01

- Add emergency ballast to one fixture in the following rooms: Elec 048, Mech 050, CLRM 015, Recp 004 and Nurse 035
- See Room ISS 010. Light fixture shall be an L2 and add to circuit H1-3. Provide light switch by door.
- Add Exit Sign and Remote head to exterior door in Elec Room 048. Connect to circuit H1-1.
- See Elev. Refer to sheet E5.01, detail Fire Alarm/Electrical Requirements for MRL Elevator for light fixtures.
- Trophy Cases Lighting. See attached sketch **SK-E1** for details. Use circuits indicated on sheet E1.03
- See Elec Room 047, lighting circuit number is H1-1
- See Corridor 017, lighting circuit number is H1-2
- See Classroom wing below office: See attached sketch **SK-E2** for new layout.
- Add Occupancy sensors to the following rooms: Janitor 049, Elec 047, Music 046, Office 045, Storage 044, Computer Lab 053, Studio 043, Media 054, Data 039, RR 038, RR/SWR 037, Nurse 035, Storage 016, 1st CLRM 015, JC 018, Staff RR 012, Principal 011, ISS 010, Conference 009 and GC 006.
- See RR/SWR 037, Add shower light above shower. Coordinate switch location with architect. Connect to circuit number H1-2. Use Juno model number 6RLS (or equal) light fixture.

E1.02

- See Main Floor Lighting Plan: Add emergency ballast to one fixture in the following rooms: 3rd Class Rm 110, 3rd Class Rm 112, 2nd Class Rm 113, Spec Ed 115 and 2nd Class Rm 117.
- See Main Floor Lighting Plan: Add (2) – three-way, keyed switches for corridor lights. Switches to be mounted at stairway doors. Field coordinate exact location with architect.
- See Upper Floor Lighting Plan: Add (2) – three-way, keyed switches for corridor lights. Switches to be mounted at stairway doors. Field coordinate exact location with architect.
- See Main Floor Lighting Plan: See attached sketch **SK-E3** for lighting in room above Vestibule 101. Provide light switch in Clos 102.

- See Main Floor Lighting Plan: Add occupancy sensors to the following rooms: Office 129, CIRC 126, RR 130, Dry Food 125, 3rd CLRM 110, 3rd Storage 111, 3rd CLRM 112, 2nd CLRM 113, Spec Ed 115, 2nd CLRM 117, Hall 109, Hall 107, Data 106, RR 120 and Café Storage 122.
- See Upper Floor Lighting Plan: Remove occupancy sensor from room 5th Storage 213.
- See Upper Floor Lighting Plan: Add occupancy sensors to the following rooms: 5th CLRM 215, 5th CLRM 216, 4th CLRM 212, Spec Ed 210, 4th CLRM 206 and CLOS 205.
- See Main Floor Lighting Plan: Multi-purpose 104 and Vestibule 101 lighting shall be circuited from panel "HK". Use circuit number HK-3.

E1.03

- See Gym Office: Connect receptacles to existing 120V panel in Gym.
- See Corridor 029. Heater EWH-1 circuit number changed from H1-22 to H4-3.
- See Elec Rm 040, Elec Rm 047, Mech Rm 050 and Janitor 049: See attached sketch **SK-E4** for new layout.
- See Concourse 019: Trophy cases, see attached sketch **SK-E1** for new layout.
- See Wait 003. Add TV Outlet on wall adjacent to Conference 009. Connect to circuit L1A-3.
- See Plan Notes: Plan Note "E", shall read; "See detail Fire Alarm/Electrical Requirements for MRL Elevator on sheet E5.01.
- See Plan Notes: Plan Note "G", shall read; "Receptacle shall be controlled per ASHRAE 90.1. See detail on sheet E1.02.
- Add Plan Note "G" to the following room: ISS 010, GC 006, Wait 003, Wait 005, Work 007, Nurse 035, Office 045, Gym Office 058, Computer Lab 053 and Media 054.
- Add (2) – duplex receptacles in room ISS 010. Use circuit L1A-27.

E1.04

- See Main Floor Power Plan. See 2nd Storage 121: See attached sketch **SK-E5** for new layout.
- See Main Floor Power Plan. See 3rd Storage 111: Circuit VAV-101 to H2-22.
- See Main Floor Power Plan. See Boys 114: Circuit VAV-105 to H2-23.
- See Main Floor Power Plan. See Girls 116: Circuit VAV-110 to H2-24.
- See Main Floor Power Plan. See 3rd CLRM 112. Computer receptacle in bottom left corner shall be connected to circuit L2-6.
- See Upper Floor Power Plan. See 5th CLRM 215 and 5th CLRM 216, see attached sketch SK-E6 for new layout.
- See Upper Floor Power Plan. Add GFI duplex receptacle on adjacent to Corridor in rooms Boys 211 and Girls 209. Connect to circuit L3-48.
- See Main Floor Power Plan. See attached sketch **SK-E7** for new layout of Multi-purpose 104 and Vestibule 101.

E1.05

- Replace sheet with attached **E1.05R.**

E1.06

- Replace sheet with attached **E1.06R.**

E1.07

- Replace sheet with attached **E1.07R.**

E1.08

- Replace sheet with attached **E1.08R.**

E5.01

- Replace sheet with attached **E5.01R.**

E6.01

- Replace sheet with attached **E6.01R.**

E6.02

- Replace sheet with attached **E6.02R.**

D. QUESTIONS AND RESPONSES

Q1: What are the OPCI items? The Specs indicate a list will be provided.
A1: No items have been identified to date.

Q2: Is there a City B&O or Municipal Tax?
A2: Under review, to be determined.

Q3: Are any building permits required?
A3: Under review, to be determined.

Q4: Will the remaining items in the building be removed by the time work is to start?
A4: Yes. Refer to Spec 024119 Selective Demolition and D Sheets.

Q5: Who is responsible for the utilities at the existing building.
A5: Refer to Spec 015000 Temporary Facilities and Controls, Use Charges.

Q6: If Bacon Davis Wage Rates do not apply, are certified payrolls required?
A6: Yes, the WV Jobs Act requires that information be made available to the Owner and State Tax Department.

Q7: Will any portions of the buildings or site be occupied during construction?
A7: No, but the school operations immediately adjacent to the site WILL continue.

Q8: What are the allowed hours of operation?
A8: Refer to Spec 011000 Summary, Work Restrictions.

E. CLARIFICATIONS

1. The location of the Bid Opening is listed as the Greenbrier County Schools Board Office. The room where the Bid Opening will be held is in the Arts and Sciences Building, just across the parking lot. See Map 1 attached to this Addendum.

2. Contractor staging / material lay-down area may include the piece of property where the house is currently being demolished, southwest corner of Lee St and Cedar Ave. A highlighted area on the Site 1 drawing attached to this Addendum for reference.

3. The existing building at the southeastern corner of the property will be removed prior to the anticipated start of construction.

4. The deadline for bidder questions will be October 7, 2022 @ 5:00pm. The final addendum will be issued on or about October 11.

If you have any questions or comments, please feel free to contact me at your earliest convenience. As a reminder, bids will be received until 1:30p.m. on Tuesday, October 18, 2022 at Greenbrier County Board of Education, located at 653 Church Street, Lewisburg, WV 24901. Good luck to everyone and appreciate your interest in the project.

Sincerely,

THE THRASHER GROUP, INC.

Kenton Blackwood

Senior Project Designer / Project Manager

GREENBRIER COUNTY BOARD OF EDUCATION
GREENBRIER COUNTY, WEST VIRGINIA
ALDERSON ELEMENTARY SCHOOL ADDITIONS AND RENOVATIONS

PRE-BID CONFERENCE
Thursday, September 22, 2022

Thrasher Project #060-10180

Name	Representing	Phone #	Email Address
Joyce VanGilder	SBA - WV	304-558-2541	joyce.a.vangilder@wv.gov
Sam Proctor	VERITAS Contracting	304-593-2285	Sproctor@veritaswv.com
Richard Milam	The Summit Electric Grp	304-562-7091	rm@tsegiinc.com
Zachary Perrine	H&M Electric	540-962-3953	Zperrine@hmelectric.net
Tim Holbrook	Greenbrier Co. BOE	304-546-1893	THolbrooke@stea.wvson.edu
Dee Braun	DCI/SHIRES, INC. PO BOX 1259, BLUEFIELD WV 24701 PH 304-323-1996 FAX 304-323-3037 EMAIL: robertdeeb@dcishires.com		
Randy Jarrell	A.S.A.P.	304 586-2913	RANDY@ASAPWV.COM
Scott Bays	Nitro Construction	304-558-1052	SBays@nitroCS.com

Name	Representing	Phone #	Email Address
DERRICK SEARS	FOSTER SUPPLY	304-553-6565	dsears@fostersupply.com
Steve Rogers	Central Supply	304-203-7213	SFrogers@centralsupplywv.com
Matt Bostic	Central Supply	304-646-4484	Matt.bostic@centralsupplywv.com
JUSTIN DOZIER	DANHILL CONST. CO.	304-632-1600	JUSTIN.dozier@DANHILLCONSTRUCTION.com
TRAVIS AREY	PARAMOUNT BUILDERS	304-932-6454	tarey@paramountwv.com.
PATRICK DOVE	SNOPE CONSTR.	304-900-0954	PDOVE@SNOPE.COM
Joe Kubin	Radford & Radford	304-252-5240	joe@rrnc.biz
Pam Romansic	Radford & Radford	304-252-5240	pam@rrnc.biz
KEVIN REDMOND	"	"	kevin@rrinc.biz
DAVID McCLUE	Greenbrier Cnty Bd of Ed	304-647-6460	dameclu@k12.wv.us
George Brooks II	Greenbrier Co. Schools	304-667-9924	gbrooke@k12.wv.us
Kaya Lee	Master Service Corp. (E.C.)	304-636-8170	Kaya@masterservicecorp-.com

Name	Representing	Phone #	Email Address
John Lynch	Lynch Construction	304-576-1890	john@lynchconstruction.net
Matthew Breakey	The Thrasher Group	(304) 624-4108	mbreakey@thethrashergroup.com
KENTON BLACKWOOD	The Thrasher Group	(304) 841-6691	kgblackwood@thethrashergroup.com

SECTION 260573 - OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

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. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

1. Study results shall be used to determine coordination of series-rated devices.

1.3 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

D. SCCR: Short-circuit current rating.

E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.

1. Coordination-study input data, including completed computer program input data sheets.
2. Study and equipment evaluation reports.
3. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.

a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Coordination Study Specialist.

B. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For the overcurrent protective devices to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. The following parts from the Protective Device Coordination Study Report:

1) One-line diagram.
2) Protective device coordination study.
3) Time-current coordination curves.

b. Power system data.

1.7 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

B. Coordination Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

C. Coordination Study Specialist Qualifications: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. Software Developers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. CGI CYME.
b. EDSA Micro Corporation.
c. ESA Inc.
d. Operation Technology, Inc.
e. Power Analytics, Corporation.
f. SKM Systems Analysis, Inc.

B. Comply with IEEE 242 and IEEE 399.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

1. Optional Features:

a. Arcing faults.
b. Simultaneous faults.
c. Explicit negative sequence.
d. Mutual coupling in zero sequence.

2.2 PROTECTIVE DEVICE COORDINATION STUDY REPORT CONTENTS

A. Executive summary.

B. Study descriptions, purpose, basis and scope. Include case descriptions, definition of terms and guide for interpretation of the computer printout.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.
2. Cable size and lengths.
3. Transformer kilovolt ampere (kVA) and voltage ratings.
4. Motor and generator designations and kVA ratings.
5. Switchgear, switchboard, motor-control center, and panelboard designations.

D. Study Input Data: As described in "Power System Data" Article.

E. Protective Device Coordination Study:

1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.

    a. Phase and Ground Relays:

        1) Device tag.
        2) Relay current transformer ratio and tap, time dial, and instantaneous pickup value.
        3) Recommendations on improved relaying systems, if applicable.

    b. Circuit Breakers:

        1) Adjustable pickups and time delays (long time, short time, ground).
        2) Adjustable time-current characteristic.
        3) Adjustable instantaneous pickup.
        4) Recommendations on improved trip systems, if applicable.

    c. Fuses: Show current rating, voltage, and class.

F. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.
2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
4. Plot the following listed characteristic curves, as applicable:

    a. Power utility's overcurrent protective device.
    b. Medium-voltage equipment overcurrent relays.
    c. Medium- and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
    d. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.

e. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
f. Cables and conductors damage curves.
g. Ground-fault protective devices.
h. Motor-starting characteristics and motor damage points.
i. Generator short-circuit decrement curve and generator damage point.
j. The largest feeder circuit breaker in each motor-control center and panelboard.

5. Series rating on equipment allows the application of two series interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Both devices share in the interruption of the fault and selectivity is sacrificed at high fault levels. Maintain selectivity for tripping currents caused by overloads.
6. Provide adequate time margins between device characteristics such that selective operation is achieved.
7. Comments and recommendations for system improvements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance. Devices to be coordinated are indicated on Drawings.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.2 PROTECTIVE DEVICE COORDINATION STUDY

A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.

B. Comply with IEEE 399 for general study procedures.

C. The study shall be based on the device characteristics supplied by device manufacturer.

D. Begin analysis at the service, extending down to the system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.
2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 125 kVA.

E. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

F. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:

a. Inrush current when first energized.
b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.

G. Motor Protection:

1. Select protection for low-voltage motors according to IEEE 242 and NFPA 70.
2. Select protection for motors served at voltages more than 600 V according to IEEE 620.

H. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

I. Generator Protection: Select protection according to manufacturer's written recommendations and to IEEE 242.

J. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

K. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and single line-to-ground fault at each of the following:

1. Electric utility's supply termination point.
2. Switchgear.
3. Unit substation primary and secondary terminals.
4. Low-voltage switchgear.
5. Motor-control centers.
6. Standby generators and automatic transfer switches.
7. Branch circuit panelboards.

L. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.

2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.
3. Any application of series-rated devices shall be recertified, complying with requirements in NFPA 70.

3.3 LOAD-FLOW AND VOLTAGE-DROP STUDY

A. Perform a load-flow and voltage-drop study to determine the steady-state loading profile of the system. Analyze power system performance two times as follows:

1. Determine load-flow and voltage drop based on full-load currents obtained in "Power System Data" Article.
2. Determine load-flow and voltage drop based on 80 percent of the design capacity of the load buses.
3. Prepare the load-flow and voltage-drop analysis and report to show power system components that are overloaded, or might become overloaded; show bus voltages that are less than as prescribed by NFPA 70.

3.4 MOTOR-STARTING STUDY

A. Perform a motor-starting study to analyze the transient effect of the system's voltage profile during motor starting. Calculate significant motor-starting voltage profiles and analyze the effects of the motor starting on the power system stability.

3.5 POWER SYSTEM DATA

A. Obtain all data necessary for the conduct of the overcurrent protective device study.

1. Verify completeness of data supplied in the one-line diagram on Drawings. Call discrepancies to the attention of Architect.
2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.

B. Gather and tabulate the following input data to support coordination study. The list below is a guide. Comply with recommendations in IEEE 551 for the amount of detail required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative.

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Electrical power utility impedance at the service.
3. Power sources and ties.
4. Short-circuit current at each system bus, three phase and line-to-ground.
5. Full-load current of all loads.
6. Voltage level at each bus.

7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
8. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
12. Maximum demands from service meters.
13. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
14. Motor horsepower and NEMA MG 1 code letter designation.
15. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
16. Medium-voltage cable sizes, lengths, conductor material, and cable construction and metallic shield performance parameters.
17. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:

    a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
    c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
    d. Generator thermal-damage curve.
    e. Ratings, types, and settings of utility company's overcurrent protective devices.
    f. Special overcurrent protective device settings or types stipulated by utility company.
    g. Time-current-characteristic curves of devices indicated to be coordinated.
    h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
    i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
    j. Panelboards, switchboards, motor-control center ampacity, and SCCR in amperes rms symmetrical.
    k. Identify series-rated interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Obtain device data details to allow verification that series application of these devices complies with NFPA 70 and UL 489 requirements.

3.6 FIELD ADJUSTING

A. Adjust relay and protective device settings according to the recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of the equipment manufacturer under the Startup and Acceptance Testing contract portion.

B. Testing and adjusting shall be by a full-time employee of the Field Adjusting Agency.

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters. Perform NETA tests and inspections for all adjustable overcurrent protective devices.

END OF SECTION 260573

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SECTION 263213- GENERATOR

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 packaged engine-generator sets suitable for use in mission critical applications with the features as specified and indicated. Engine generators will be used as the Standby power source for the system but shall be capable of providing reliable power with no run-time limitations while the primary source of power is unavailable.

1.3 DEFINITIONS

A. Emergency Standby Power (ESP): Per ISO 8528: The maximum power available during a variable electrical power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 200 hours of operation per year with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. The permissible average power output (Ppp) over 24 hours of operation shall not exceed 70 percent of the ESP unless otherwise agreed by the RIC engine manufacturer.

B. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.

2. Time-current characteristic curves for generator protective device.

3. Sound test data, based on a free field requirement.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.

2. Wiring Diagrams: Control interconnection, Customer connections.

C. Certifications:

1. Submit statement of compliance which states the proposed product(s) is certified to the emissions standards required by the location for EPA, stationary emergency application.

1.5 INFORMATIONAL SUBMITTALS

A. Source quality-control test reports.

1. Certified summary of prototype-unit test report. See requirements in Part 2 "Source Quality Control" Article Part A. Include statement indicating torsional compatibility of components.

2. Certified Test Report: Provide certified test report documenting factory test per the requirements of this specification, as well as certified factory test of generator set sensors per NFPA110 level 1.

3. List of factory tests to be performed on units to be shipped for this Project.

4. Report of exhaust emissions and compliance statement certifying compliance with applicable regulations.

B. Warranty:

1. Submit manufacturer’s warranty statement to be provided for this Project.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

D. Comply with NFPA 37 (Standard For the Installation and Use of Stationary Combustion Engines and Gas Turbines).

E. Comply with NFPA 70 (National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702).

F. Comply with NFPA 99 (Essential Electrical Systems for Health Care Facilities).

G. Comply with NFPA 110 (Emergency and Standby Power Systems) requirements for Level 1 emergency power supply system.

H. Comply with UL 2200.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: 0.0 deg C (32.0 deg F) to 25.0 deg C (77.0 deg F).

2. Relative Humidity: 0 to 95 percent.

3. Altitude: Sea level to 361.0 feet (110.0 m).

1.8 WARRANTY

A. Base Warranty: Manufacturer shall provide base warranty coverage on the material and workmanship of the generator set for a minimum of twenty-four (24) months for Standby product

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: The basis for this specification is Cummins Power Generation model 450 DFEJ, approved equals may be considered if equipment performance is shown to meet the requirements herein.

2.2 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

1. Rigging Information: Indicate location of each lifting attachment, generator-set center of gravity, and total package weight in submittal drawings.

C. Capacities and Characteristics:

1. Power Output Ratings: Electrical output power rating for Standby operation of not less than 450.0kW, at 80 percent lagging power factor, 277/480, Series Wye, Three phase, 4 -wire, 60 hertz.

2. Alternator shall be capable of accepting maximum 1749.0 kVA in a single step and be capable of recovering to a minimum of 90% of rated no load voltage. Following the application of the specified kVA load at near zero power factor applied to the generator set.

3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component. The engine-generator nameplate shall include information of the power output rating of the equipment.

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 0.5 percent of rated output voltage from no load to full load.

2. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 4 seconds. On application of a 100% load step the generator set shall recover to stable voltage within 10 seconds.

3. Steady-State Frequency Operational Bandwidth: 0.25 percent of rated frequency from no load to full load.

4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.

5. Transient Frequency Performance: Not more than 3 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within 2 seconds. On application of a 100% load step the generator set shall recover to stable frequency within 10 seconds.

6. Output Waveform: At full load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for any single harmonic. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50.

7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 8 seconds without damage to generator system components. For a 1-phase, bolted short circuit at system output terminals, system shall regulate both voltage and current to prevent over-voltage conditions on the non-faulted phases.

8. Start Time: Comply with NFPA 110, Level 1, Type 10, system requirements.

9. Ambient Condition Performance: Engine generator shall be designed to allow operation at full rated load in an ambient temperature under site conditions, based on highest ambient condition. Ambient temperature shall be as measured at the air inlet

to the engine generator for enclosed units, and at the control of the engine generator for machines installed in equipment rooms.

10. Load Sharing: Engine generator shall share real and reactive load proportionally within plus or minus 3 percent with all other engine generators in the system.

2.3 ENGINE

A. Fuel: ASTM D975 #2 Diesel Fuel

B. Rated Engine Speed: 1800RPM.

C. Lubrication System: The following items are mounted on engine or skid:

1. Lube oil pump: shall be positive displacement, mechanical, full pressure pump.

2. Filter and Strainer: Provided by the engine manufacturer of record to provide adequate filtration for the prime mover to be used.

3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

D. Engine Fuel System: The engine fuel system shall be installed in strict compliance to the engine manufacturer's instructions

E. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity and performance.

1. Designed for operation on a single 120 VAC, Single phase, 60Hz power connection. Heater voltage shall be shown on the project drawings.

2. Installed with isolation valves to isolate the heater for replacement of the element without draining the engine cooling system or significant coolant loss.

3. Provided with a 24VDC thermostat, installed at the engine thermostat housing

G. Governor: Adjustable isochronous, with speed sensing. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate as appropriate to the state of the engine generator. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed, and operating in various isochronous states.

H. Cooling System: Closed loop, liquid cooled

1. The generator set manufacturer shall provide prototype test data for the specific hardware proposed demonstrating that the machine will operate at rated standby load in an outdoor ambient condition of 40 deg C.

2. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.

3. Size of Radiator overflow tank: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.

4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.

5. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

I. Muffler/Silencer: Selected with performance as required to meet sound requirements of the application, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements. For generator sets with outdoor enclosures the silencer shall be inside the enclosure.

J. Air-Intake Filter: Engine-mounted air cleaner with replaceable dry-filter element and restriction indicator.

K. Starting System: 12 or 24V, as recommended by the engine manufacturer; electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.

2. Cranking Cycle: As required by NFPA 110 for level 1 systems.

3. Battery Cable: Size as recommended by engine manufacturer for cable length as required. Include required interconnecting conductors and connection accessories.

4. Battery Compartment: Factory fabricated of metal with acid-resistant finish.

5. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation. The battery charging alternator shall have sufficient capacity to recharge the batteries with all parasitic loads connected within 4 hours after a normal engine starting sequence.

6. Battery Chargers: Unit shall comply with UL 1236, provide fully regulated, constant voltage, current limited, battery charger for each battery bank. It will include the following features:

    a. Operation: Equalizing-charging rate of 10 Amp shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.

    b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 20 deg C to plus 40 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.

    c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.

    d. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.

    e. Provide LED indication of general charger condition, including charging, faults, and modes. Provide a LCD display to indicate charge rate and battery voltage. Charger shall provide relay contacts for fault conditions as required by NFPA110.

    f. Enclosure and Mounting: NEMA, Type 1, wall-mounted cabinet.

2.4 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Sub Base-Mounted Fuel Oil Tank: Provide a double wall secondary containment type sub base fuel storage tank. The tank shall be constructed of corrosion resistant steel and shall be UL 142 listed and labeled. The fuel tank shall include the following features:

1. Capacity: 1700 gallon .

2. Tank rails and lifting eyes shall be rated for the full dry weight of the tank, genset, and enclosure.

3. Electrical stub up(s)

4. Normal & emergency vents

5. Lockable fuel fill

6. Mechanical fuel level gauge

7. Low level switches to indicate fuel

8. Leak detector switch

9. Sub base tank shall include a welded steel containment basin, sized at a minimum of 110% of the tank capacity to prevent escape of fuel into the environment in the event of a tank rupture.

10. Tank design shall meet the regional requirements for the Project location

2.5 CONTROL AND MONITORING

A. Engine generator control shall be microprocessor based and provide automatic starting, monitoring, protection and control functions for the unit.

B. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. (Switches with different configurations but equal functions are acceptable.) When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local (generator set-mounted) and/or remote emergency-stop switch also shuts down generator set.

C. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local (generator set-mounted) and/or remote emergency-stop switch also shuts down generator set.

D. Configuration: Operating and safety indications, protective devices, system controls, engine gages and associated equipment shall be grouped in a common control and monitoring panel. Mounting method shall isolate the control panel from generator-set vibration. AC output power circuit breakers and other output power equipment shall not be mounted in the control enclosure.

E. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:

1. AC voltmeter (3-phase, line to line and line to neutral values).

2. AC ammeter (3-phases).

3. AC frequency meter.
4. AC kW output (total and for each phase). Display shall indicate power flow direction.
5. AC kVA output (total and for each phase). Display shall indicate power flow direction.
6. AC Power factor (total and for each phase). Display shall indicate leading or lagging condition.
7. Ammeter-voltmeter displays shall simultaneously display conditions for all three phases.
8. Emergency Stop Switch: Switch shall be a red “mushroom head” pushbutton device complete with lock-out/tag-out provisions. Depressing switch shall cause the generator set to immediately stop the generator set and prevent it from operating.
9. Fault Reset Switch: Supply a dedicated control switch to reset/clear fault conditions.
10. DC voltmeter (alternator battery charging).
11. Engine-coolant temperature gauge.
12. Engine lubricating-oil pressure gauge.
13. Running-time meter.
14. Generator-voltage and frequency digital raise/lower switches. Rheostats for these functions are not acceptable. The control shall adjustment of these parameters in a range of plus or minus 5% of the voltage and frequency operating set point (not nominal voltage and frequency values.) The voltage and frequency adjustment functions shall be disabled when the paralleling breaker is closed.
15. Fuel tank derangement alarm.
16. Fuel tank high-level shutdown of fuel supply alarm.
17. AC Protective Equipment: The control system shall include over/under voltage, reverse kVAR, reverse kW, over load (kW) short circuit, over current, loss of voltage reference, and over excitation shut down protection. There shall be a ground fault alarm for generator sets rated over 1000 amps, overload warning, and overcurrent warning alarm.
18. Status LED indicating lamps to indicate remote start signal present at the control, existing shutdown condition, existing alarm condition, not in auto, and generator set running.

19. A graphical display panel with appropriate navigation devices shall be provided to view all information noted above, as well as all engine status and alarm/shutdown conditions (including those from an integrated engine emission control system). The display shall also include integrated provisions for adjustment of the gain and stability settings for the governing and voltage regulation systems.

20. Panel lighting system to allow viewing and operation of the control when the generator room or enclosure is not lighted.

21. Data Logging: The control system shall log the latest 20 different alarm and shut down conditions, the total number of times each alarm or shutdown has occurred, and the date and time the latest of these shutdown and fault conditions occurred.

22. DC control Power Monitoring: The control system shall continuously monitor DC power supply to the control, and annunciate low or high voltage conditions. It shall also provide an alarm indicating imminent failure of the battery bank based on degraded voltage recover on loading (engine cranking).

F. Remote Alarm Annunciator: Comply with NFPA 110. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition.

G. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Overcurrent Protection: The generator set shall be provided with a UL Listed/CSA Certified protective device of 800 Amp 100% rated, that is coordinated with the alternator provided to prevent damage to the generator set on any possible overload or overcurrent condition external to the machine. The protective device shall be listed as a utility grade protective device under UL category NRGU. The control system shall be subject to UL follow-up service at the manufacturing location to verify that the protective system is fully operational as manufactured. Protector shall perform the following functions:

1. Initiates a generator kW overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.

2. Under single phase or multiple phase fault conditions, operates to switch off alternator excitation at the appropriate time to prevent damage to the alternator.

3. The operator panel shall indicate the nature of the fault condition as either a short circuit or an overload.

4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot greater than 120% of nominal voltage.

5. The protective system provided shall not include an instantaneous trip function.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H

D. Temperature Rise: 105 / Class F environment.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, over speed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Permanent Magnet Generator (PMG) shall provide excitation power for optimum motor starting and short circuit performance.

G. Enclosure: Drip-proof.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified. The voltage regulation system shall be microprocessor-controlled, 3-phase true RMS sensing, full wave rectified, and provide a pulse-width modulated signal to the exciter. No exceptions or deviations to these requirements will be permitted.

I. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

J. Subtransient Reactance: 12 percent maximum, based on the rating of the engine generator set.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Sound Attenuated Steel housing. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Instruments, control, and battery system shall be mounted within enclosure.

B. Construction:

1. Hinged Doors: With padlocking provisions. Restraint/Hold back hardware to prevent door to keep door open at 180 degrees during maintenance. Rain lips over all doors.

2. Exhaust System:

a. Muffler Location: Within enclosure.

3. Hardware: All hardware and hinges shall be stainless steel.

4. Wind Rating: Wind rating shall be 150 mph

5. Mounting Base: Suitable for mounting on sub-base fuel tank or housekeeping pad.

6. A weather protective enclosure shall be provided which allows the generator set to operate at full rated load with a static pressure drop equal to or less than 0.5 inches of water.

C. Engine Cooling Airflow through Enclosure: Housing shall provide ample airflow for engine generator operation at rated load in an ambient temperature of 40 deg C.

1. Louvers: Fixed-engine, cooling-air inlet and discharge.

D. Sound Performance: Reduce the sound level of the engine generator while operating at full rated load to a maximum of 74 dBA measured at any location 7 m from the engine generator in a free field environment.

E. Site Provisions:

1. Lifting: Complete assembly of engine generator, enclosure, and sub base fuel tank (when used) shall be designed to be lifted into place as a single unit, using spreader bars.

2.9 VIBRATION ISOLATION DEVICES

A. Vibration Isolation: Generators installed on grade shall be provided with elastomeric isolator pads integral to the generator, unless the engine manufacturer requires use of spring isolation.

2.10 FINISHES

A. Indoor and Outdoor Enclosures and Components: Powder-coated and baked over corrosion-resistant pretreatment and compatible primer. Manufacturer’s standard color or as directed on the drawings.

2.11 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters. In addition, the equipment engine, skid, cooling system, and alternator shall have been subjected to actual prototype tests to validate the capability of the design under the abnormal conditions noted in NFPA110. Calculations and testing on similar equipment which are allowed under NFPA110 are not sufficient to meet this requirement.

B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test engine generator set manufactured for this Project to demonstrate compatibility and functionality.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Steady-state governing.
6. Single-step load pickup.
7. Simulated safety shutdowns.
8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation, application, and alignment instructions and with NFPA 110.

B. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.

C. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.

D. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer’s instructions and seismic requirements of the site.

E. Equipment shall be initially started and operated by representatives of the manufacturer. All protective settings shall be adjusted as instructed by the consulting engineer.

F. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to initial operation and final testing of the system.

G. On completion of the installation by the electrical contractor, the generator set supplier shall conduct a site evaluation to verify that the equipment is installed per manufacturer's recommended practice.

3.2 ON-SITE ACCEPTANCE TEST

A. The complete installation shall be tested to verify compliance with the performance requirements of this specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests. The generator set manufacturer shall provide a site test specification covering the entire system. Tests shall include:

B. Prior to start of active testing, all field connections for wiring, power conductors, and bus bar connections shall be checked for proper tightening torque.

C. Installation acceptance tests to be conducted on site shall include a "cold start" test, a two hour full load (resistive) test, and a one-step rated load pickup test in accordance with NFPA 110. Provide a resistive load bank and make temporary connections for full load test, if necessary.

D. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service, and observing proper operation of the system for at least 2 hours. Coordinate timing and obtain approval for start of test with site personnel.

3.3 TRAINING

A. The equipment supplier shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided. The training program shall be not less than 4 hours in duration and the class size shall be limited to 5 persons. Training date shall be coordinated with the facility owner.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

3.5 SERVICE AND SUPPORT

A. The generator set supplier shall maintain service parts inventory for the entire power system at a central location which is accessible to the service location 24 hours per day, 365 days per year. The inventory shall have a commercial value of $3 million or more. The manufacturer of the generator set shall maintain a central parts inventory to support the supplier, covering all the major components of the power system, including engines, alternators, control systems, paralleling electronics, and power transfer equipment.

B. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical power system replacement parts in the local service location. Service vehicles shall be stocked with critical replacement parts. The service organization shall be on call 24 hours per day, 365 days per year. The service organization shall be physically located within 100 miles of the site.

C. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

END OF SECTION 263213

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SECTION 263600 - AUTOMATIC TRANSFER SWITCHES

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 transfer switches rated 600 V and less, including the following:

1. Automatic transfer switches

B. Related Sections include the following:

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.

1. Technical data on all major components of all transfer switches and other products described in this section. Data is required for the transfer switch mechanism, control system, cabinet, and protective devices specifically listed for use with each transfer switch. Include steady state and fault current ratings, weights, operating characteristics, and furnished specialties and accessories.

2. Single Line Diagram: Show connections between transfer switch, power sources and load

B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.

1. Dimensioned outline drawings of assembly, including elevations, sections, and details including minimal clearances, conductor entry provisions, gutter space, installed features and devices and material lists for each switch specified.

2. Internal electrical wiring and control drawings.

3. Interconnection wiring diagrams, showing recommended conduit runs and point-to-point terminal connections to generator set.

4. Installation and mounting instructions, including information for proper installation of equipment to meet seismic requirements.

C. Manufacturer and Supplier Qualification Data

1. The transfer switch manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

2. The manufacturer of this equipment shall have produced similar equipment for a minimum period of 10 years. When requested, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Features and operating sequences, both automatic and manual.

2. List of all factory settings of relays, timers and protective devices; provide setting and calibration instructions where applicable.

E. Warranty documents demonstrating compliance with the project's contract requirements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: The equipment supplier shall maintain a service center capable of providing training, parts, maintenance and emergency repairs to equipment, including transfer switch generator sets and remote monitoring equipment (if applicable) at the site within a response period of less than (eight hours or appropriate time period designated for Project) from time of notification.

1. The transfer switch shall be serviced by technicians employed by, and specially trained and certified by, the generator set supplier and the supplier shall have a service organization that is factory-certified in both generator set and transfer switch service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.

2. Submit names, experience level, training certifications, and locations for technicians that will be responsible for servicing equipment at this site.

3. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.

B. Source Limitations: All transfer switches are to be obtained through one source from a single manufacturer. The generator set manufacturer shall warrant transfer switches to provide a single source of responsibility for products provided.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked as suitable for use in emergency, legally required or optional standby use as appropriate for the connected load.

D. The automatic transfer switch installation and application shall conform to the requirements of the following codes and standards:

1. Transfer switches and enclosures shall be UL 1008 listed and labeled as suitable for use in emergency, legally required, and optional standby applications.

2. CSA 282, Emergency Electrical Power Supply for Buildings, and CSA C22.2, No. 14-M91 Industrial Control Equipment

3. NFPA 70, National Electrical Code. Equipment shall be suitable for use in systems in compliance with Articles 700, 701 and 702.

4. Comply with NEMA ICS 10-1993 AC Automatic Transfer Switches

5. IEEE 446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications

6. EN55011, Class B Radiated Emissions and Class B Conducted Emissions

7. IEC 1000-4-5 (EN 61000-4-5); AC Surge Immunity

8. IEC 1000-4-4 (EN 61000-4-4) Fast Transients Immunity

9. IEC 1000-4-2 (EN 61000-4-2) Electrostatic Discharge Immunity

10. IEC 1000-4-3 (EN 61000-4-3) Radiated Field Immunity

11. IEC 1000-4-6 Conducted Field Immunity

12. IEC 1000-4-11 Voltage Dip Immunity

13. IEEE 62.41, AC Voltage Surge Immunity

14. IEEE 62.45, AC Voltage Surge Testing

E. Comply with NFPA 99 – Essential Electrical Systems for Healthcare Facilities

F. Comply with NFPA 110 – Emergency and Standby Power Systems. The transfer switch shall meet all requirements for Level 1 systems, regardless of the actual circuit level.

G. The manufacturer shall warrant the material and workmanship of the transfer switch equipment for a minimum of one (2) years from registered commissioning and start-up.

H. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, and etc. during the minimum noted warranty period described above.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:

1. Notify (Architect/Construction Manager/Owner) no fewer than (insert appropriate number) days in advance of proposed interruption of electrical service.

2. Do not proceed with interruption of electrical service without (Architect/Construction Manager/Owner's) written permission.

3. Do not energize any new service or distribution equipment without notification and permission of the (Architect/Construction Manager/Owner).

1.6 COORDINATION

A. Size and location of concrete bases and anchor bolt inserts shall be coordinated. Concrete, reinforcement and formwork must meet the requirements specified in Division 03. See section "INSTALLATION" for additional information on installation

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cummins Power Generation model OTECD 800

B. Equipment specifications for this Project are based on automatic transfer switches manufactured by Cummins Power Generation. Switches manufactured by other manufacturers that meet the requirement of this specification are acceptable, if approved not less than two weeks before scheduled bid date. Proposals must include a line-by-line compliance statement based on this specification.

C. Transfer switches utilizing molded case circuit breakers do not meet the requirements of this specification and will not be accepted.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Provide transfer switches in the number and ratings that are shown on the drawings.

B. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer.

C. Fault-Current Closing and Withstand Ratings: UL 1008 WCR ratings must be specifically listed as meeting the requirements for use with protective devices at installation locations, under specified fault conditions. Withstand and closing ratings shall be based on use of the same set of contacts for the withstand test and the closing test.

D. Solid-State Controls: All settings should be accurate to +/- 2% or better over an operating temperature range of - 40 to + 60 degrees C (- 40 to + 140 degrees F).

E. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

F. Electrical Operation: Accomplished by a non-fused, momentarily energized solenoid or electric motor operator mechanism, mechanically and electrically interlocked in both directions (except that mechanical interlock is not required for closed transition switches).

G. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Switches using molded-case switches or circuit breakers, or insulated case circuit breaker components are not acceptable.

2. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in the Source 1 and Source 2 positions.

3. Main switch contacts shall be high pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.

4. Contacts shall be operated by a high-speed electrical mechanism that causes contacts to open or close within three electrical cycles from signal.

5. Transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with components that could be operating at line voltage levels.

6. The transfer switch shall include the mechanical and control provisions necessary to allow the device to be field-configured for operating speed. Transfer switch operation with motor loads shall be as is recommended in NEMA MG1.

a. Phase angle monitoring/timing equipment is not an acceptable substitute for this functionality

7. Transfer switches designated on the drawings as “3-pole” shall have a full current-rated neutral bar with lugs.

H. Factory wiring: Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism

I. Terminals: Terminals shall be pressure type and appropriate for all field wiring. Control wiring shall be equipped with suitable lugs, for connection to terminal strips.

J. Enclosures: All enclosures shall be third-party certified for compliance to NEMA ICS 6 and UL 508, unless otherwise indicated:

1. The enclosure shall provide wire bend space in compliance to the latest version of NFPA70, regardless of the direction from which the conduit enters the enclosure.

2. Exterior cabinet doors shall provide complete protection for the system's internal components. Doors must have permanently mounted key-type latches. Bolted covers or doors are not acceptable.

3. Transfer switches shall be provided in enclosures that are third party certified for their intended environment per NEMA requirements.

2.3 AUTOMATIC TRANSFER SWITCHES

A. Comply with requirements for Level 1 equipment according to NFPA 110.

B. Indicated current ratings:

1. Refer to the Project drawings for specifications on the sizes and types of transfer switch equipment, withstand and closing ratings, number of poles, voltage and ampere ratings, enclosure type, and accessories.

2. Main contacts shall be rated for 600 VAC minimum.

3. Transfer switches shall be rated to carry 100% of rated current continuously in the enclosure supplied, in ambient temperatures of -40 to +60 degrees C (-40 to +140 degrees F), relative humidity up to 95% (non-condensing), and altitudes up to 10,000 feet (3000 meters).

C. Relay Signal: Control shall include provisions for addition of a pre-transfer relay signal, adjustable from 0 to 60 seconds, to be provided if necessary for elevator operation, based on equipment provided for the project.

D. Transfer switches that are designated on the drawings as 3-pole shall be provided with a neutral bus and lugs. The neutral bus shall be sized to carry 100% of the current designated on the switch rating.

E. Automatic Transfer Switch Control Features

1. The transfer switch control system shall be configurable in the field for any operating voltage level up to 600 VAC. Voltage sensing shall be monitored based on the normal voltage at the site. Systems that utilize voltage monitoring based on standard voltage conditions that are not field configurable are not acceptable.

2. All transfer switch sensing shall be configurable from an operator panel or from a Windows XP or later PC-based service tool. Designs utilizing DIP switches or other electromechanical devices are not acceptable.

3. The transfer switch shall provide a relay contact signal prior to transfer or re-transfer. The time period before and after transfer shall be adjustable in a range of 0 to 60 seconds.

4. The control system shall be designed and prototype tested for operation in ambient temperatures from - 40 degrees C to + 60 degrees C (- 40 to +140 degrees F). It shall be designed and tested to comply with the requirements of the noted voltage and RFI/EMI standards.

5. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs and relays on all outputs, to provide optimum protection from line voltage surges, RFI and EMI.

6. The transfer switch network monitoring equipment, when supplied, shall be provided with a battery-based auxiliary power supply to allow monitoring of the transfer switch when both AC power sources are non-operational.

7. The indicator panel LEDs shall display:

   a. Which source the load is connected to (Source 1 or Source 2)

   b. Which source or sources are available

   c. When switch is not set for automatic operation, the control is disabled

   d. When the switch is in test/exercise mode

8. The indicator shall have pushbuttons that allow the operator to activate the following functions:

   a. Activate pre-programmed test sequence

   b. Override programmed delays, and immediately go to the next operation

F. Transfer Switch Control Panel: The transfer switch shall have a microprocessor-based control with a sealed membrane panel incorporating pushbuttons for operator-controlled functions, and LED lamps for system status indicators. Panel display and indicating lamps shall include permanent labels.

G. Control Functions: Functions managed by the control shall include:

   a. Engine start (prevents nuisance genset starts in the event of momentary power fluctuation): 0 to 10 seconds (default 3 sec)

   b. Transfer normal to emergency (allows genset to stabilize before load is transferred): 0 to 300 seconds (default 5 sec)

   c. Re-transfer emergency to normal (allows utility to stabilize before load is transferred from genset): 0 to 30 minutes (default 10 min)

   d. Engine cooldown: 0 to 30 minutes (default 10 min)

   e. Programmed transition: 0 to 60 seconds (default 0 sec)

2. Under frequency sensing (emergency side):

   a. Pickup: 90% of nominal frequency

b. Dropout: 85% of nominal frequency

H. Control features shall include:

1. Programmable genset exerciser: A field-programmable control shall periodically start and run the generator with or without transferring the load for a preset time period, then re-transfer and shut down the generator after a preset cool-down period.

2. In event of a loss of power to the control, all control settings and the engine start-time delay setting will be retained.

I. Control Interface

1. Provide one set Form C auxiliary contacts on both sides, operated by transfer switch position, rated 10 amps 250 VAC.

J. Engine Starting Contacts

1. One isolated and normally closed pair of contacts rated 8A at 30 VDC minimum.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Design each fastener and support to carry load indicated by seismic requirements and according to seismic-restraint details. See Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

B. Floor-Mounting Switch: Anchor to floor by bolting.

1. Floor-mounted transfer switches (except drawout switches supported by wheeled carriages, which must be rolled out at floor level) shall be mounted on concrete bases complying with the following requirements:

a. Concrete Bases: 4 inches (100 mm) high, reinforced, with chamfered edges. Extend base no more than 4 inches (100 mm) in all directions beyond the maximum dimensions of switch, unless otherwise indicated or unless required for seismic support. Construct concrete bases according to Division 26 Section "Hangers and Supports for Electrical Systems."

C. Annunciator Panel Mounting: Flush in wall, unless otherwise indicated.

D. Identify components according to Division 26 Section "Identification for Electrical Systems."

E. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by

manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.

B. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.

C. Transfer switch shall be provided with AL/CU mechanical lugs sized to accept the full output rating of the switch. Lugs shall be suitable for the number and size of conductors shown on the drawings.

D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 SOURCE QUALITY CONTROL

A. Prior to shipping, factory shall test and inspect components, assembled switches, and associated equipment to ensure proper operation.

B. Factory shall check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements.

C. Factory shall perform dielectric strength test complying with NEMA ICS 1.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: The supplier of the transfer switch(es) and associated equipment shall inspect, test, and adjust components, assemblies, and equipment installations, including connections, and report results in writing.

B. Manufacturer′s representative shall perform tests and inspections and prepare test reports.

C. After installing equipment and after electrical circuitry has been energized, installer shall test for compliance with requirements.

1. Perform recommended installation tests as recommended in manufacturer′s installation and service manuals.

2. After energizing circuits, demonstrate interlocking sequence and operational function for each switch.

a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.

b. Verify time-delay settings.

c. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

3.5 DEMONSTRATION

A. After generator set installation, the generator and transfer switch supplier shall conduct a complete operation, basic maintenance, and emergency service seminar covering generator set and transfer switch equipment, for up to 10 people employed by the Owner.

1. The seminar shall include instruction on operation of the transfer equipment, normal testing and exercise, adjustments to the control system, and emergency operation procedures.

2. The class duration shall be at least 8 hours in length, and include practical operation with the installed equipment.

END OF SECTION 263600

SECTION 275350- INTERCOM SYSTEM

1.1 GENERAL

A. Where applicable visit the site, verify all existing items shown on plans or specified, and be familiar with the working conditions, hazards, and local requirements involved. Submission of bids shall be deemed evidence of such visit. All proposals shall take these existing conditions into consideration before bidding.

B. All materials, unless otherwise specified, shall be new, free from any defects, and of the best quality of their respective kinds. All like materials used shall be of the same manufacture, model, and quality, unless otherwise specified.

C. Manufacturer's names are listed herein to establish a standard. The products of other manufacturers will only be acceptable if approved by the specifying architect 10 days prior to bid. These products must: be of equal or better quality than the features specified herein, will serve with equal efficiency and dependability, and satisfy the purpose for which the items specified were intended.

D. Contractor shall do all necessary cutting and drilling of present walls, floors, ceilings, etc., for the installation of new work; but no structural work shall be cut, unless specifically shown on drawings and/or approved by the Owner. All exposed building surfaces damaged by installation or removal of electrical work shall be patched and finished in the same materials and manner as adjacent areas by this Contractor.

E. Contractor shall co-ordinate their work with the Owner for times which changeover, removal of existing equipment, and new connections of existing systems can be completed.

1.2 RACEWAYS AND CABLES

A. Electrical work will conform to the National Electric Code and applicable local ordinances.

B. All 125-volt electrical conductors shall be installed in galvanized electrical metallic tubing with compression type fittings and couplings, minimum 1/2" size conduit.

C. All low-voltage wires and cables concealed in walls shall be run in EMT conduits from flush outlet boxes to above accessible ceilings. Provide conduits where cables penetrate firewalls above ceilings.

D. All EMT entering boxes shall be served with insulating throat connectors and locknuts.

E. No raceway shall be located in proximity of hot water lines or excessive heat.

F. Where raceways cannot be run concealed in walls, use Wiremold Series surface raceway complete with all fittings, box extension rings, and required accessories. Co-ordinate routing of surface raceways with the Owner.

G. Use Cast "C" clamps, "U" straps, or ring hangers attached to rods, and/or brackets fastened to structure.

H. No perforated straps or tie wires permitted for supporting raceways.

I. Use wire ties for supporting low voltage cables run concealed above ceilings. Do not run cables loose on ceiling tiles. Support from structure above. Group cables in bundles.

J. Tie mounts, plates, and anchors shall be used.

K. Ground all electrical apparatus in accordance with the National Electric Code.

1.3 QUALITY ASSURANCE

1 Manufactures: Firms regularly engaged in manufacture of integrated communication systems, time keeping systems, and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar service for no less than five years.

A. Installer's Qualifications: Firms with at least five years of successful installation experience with projects utilizing integrated communications systems and equipment similar to that required for this project.

B. All items of equipment including wire and cable shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

C. The Contractor shall be an established communications and electronics Contractor that has had and currently maintains a locally run and operated business for at least five years. The Contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.

D. The Contractor shall show satisfactory evidence, upon request, that they maintain a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Contractor shall maintain at their facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

E. Except where specifically noted otherwise, all equipment supplied shall be the standard product of a single manufacturer of known reputation and experience in the industry. The Contractor shall have attended the manufacturer’s installation and service school and upon request must show proof of attending such a school.

1.4 SCOPE OF WORK

A. Furnish and install all materials, labor, equipment, permits, etc., to provide communications system as described herein and illustrated on the drawings for a complete operating system.

B. All manufactured articles, material, and equipment shall be applied, installed connected, erected, used, cleaned, adjusted, and conditioned as recommended by the manufacturers, or as indicated in their published literature, unless specifically herein specified to the contrary.

C. All work shall be performed by competent professionals and executed in a neat and professional manner providing a thorough and complete installation. Work shall be properly protected during construction, including the shielding of soft or fragile materials. At completion, the installation shall be thoroughly cleaned and all tools, equipment, obstructions, or debris present as a result of this portion of work shall be removed from the premises.

D. Program the operational characteristics matching the operation described herein, adjusting for call routing, transfers, priorities, and volume levels.

E. Remove all existing conduit, wire device, etc., being abandoned due to relocation.

F. The Contractor shall provide a minimum of eight hours of in-service training with this system. These sessions shall be broken into segments, which will facilitate the training of individuals in the operation of this system. Operator Manuals and User Guides shall be provided at the time of this training.

1.5 SUMMARY

A. Work Included. The scope of work of this section consists of the design, installation, and programming of all materials to be furnished under this SECTION, and without limiting the generality thereof, consists of providing all labor, materials, equipment, plant, transportation, appurtenances, and services necessary and/or incidental to properly complete all work as shown on the drawings, as described in the specifications, or as reasonable inferred from either or, in the opinion of the Architect and Owner, as being required and in general, is as follows:

1. Supervised Network Intercom and Paging System, including but not limited to:

a. Supervised network amplifiers, back boxes, and all equipment, cabling and support required to interface the public address system to the Owner’s telephone system via SIP Trunk Interface.

b. Supervised network system speakers, and ceiling mounted speakers, wall mounted horn, both interior and exterior.

c. Cabling to support the Public Address System (NOTE: category 5/6 cable must conform to Owner guidelines. Coordinate with Owner prior to submission for approval).

d. Master and secondary clock system, clocks and cabling. Elapsed time indicator control panels where shown on the drawings.

e. Supervised network PA override signal to local sound systems. Coordinate with 27 40 00 contractor.

f. Supervised network emergency messaging display/clock capable of receiving and scrolling up to 64 character long custom messages without affecting or replacing display of time segments, and coded messages simultaneous with plain text message (displacement to time segments permissible for coded messages).

g. Interactive Graphical User Interface (IGUI) supporting a pictorial view of architectural room locations on a map, and controlling intercom functions including zone or all page, dynamic zone assignments, answering intercom call-ins, selecting and distributing program sources to any and all zones. IGUI will also annunciate, locate and indicate loss of communication to all supervised network devices including speakers, amplifiers, emergency messaging display/clocks, and notification switches.

h. Emergency communication shall be initiated by the local console or from a centrally located district office via a District Wide Emergency Communication platform (included/not included in this contract). Emergency communication shall include but not be limited to, pre-recorded audio, live audio, emergency textual message display activation, computer pop-up notification, SMS Text message, and email.

1.6 SUBMITTALS

A. Submit the shop drawings, product data, and quality control submittals specified below at the same time as a package.

B. Shop Drawings: Composite wiring and/or schematic diagrams of the complete system as proposed to be installed. Drawing shall include relative position of all major components, typical connections, field components, accessories, and cable types.

C. Product Data: Include catalogue data sheets, manufacturer’s default specifications, user operation guides, and bill of materials.

D. Quality control shall include the following:

1. Name, address, and telephone number of the nearest fully equipped service organization.

2. Submit a certificate of completion of installation and service training from the system manufacturer.

3. Submit a list of comparable completed projects. Furnish the name, address, telephone number, and contact name of end user.

2. PRODUCTS

2.1 GENERAL DESCRIPTION OF NETWORK INTERNAL COMMUNICATION SYSTEM

A. Supply and install a complete supervised network-based intercom system. Field wiring shall be CAT 5E or CAT 6 cable, control wiring for power distributions and very long runs, and utilize an optional fiber backbone (when distances exceed normal Ethernet limitations). All station equipment shall utilize standard RJ-45 modular connections. All remote devices utilizing standard structured cabling shall be capable of PoE (Power over Ethernet) or power supplied within the CAT 5E or CAT 6 cable jacket. Wiring shall be capable of either being installed in conduit or cable trays, where shown on the plans

B. The system shall be capable of interconnecting with the building LAN (Local Area Network). This connection shall be minimal and utilize only one Ethernet 100 Mbps (or optionally 1 Gb) connection per station to accomplish all intercom operations. Ethernet ports and associated network switches that are required to connect any intercom devices will be provided by the OWNER.

C. Provide a separate circuit for each room and administrative office so each room, speaker, amplifier, and emergency messaging display/clock can be individually addressed.

D. Overall intercom communications network shall utilize Ethernet or VoIP communications between all major components: administrative consoles, intercom stations, amplifiers and individual paging speakers, and network switches. Systems not utilizing Ethernet or VoIP communications protocol to each end-point device will not be acceptable. Systems not capable of supervising all networked devices including network amplifiers, network speakers, notification switches, and emergency messaging display/clocks will not be acceptable.

E. The network shall support a VLAN configuration to separate activity in the intercom system from other in building LAN traffic. In locations where the supervised network communications system will be considered as part of the facilities life safety systems, a dedicated and isolated network shall be required.

F. The system shall interface to the facilities iPBX via SIP trunk connectivity.

G. The Communications System shall include master clock support and synchronization of digital secondary clocks, event scheduling, and messaging software allowing the facility to configure multiple schedules per school, multi zone time tone signaling for class changes, and message notification.

2.2 DESCRIPTION OF NETWORK INTERCOM / PA / MESSAGING FEATURES

A. The system specified is based on the Telecor eSeries Supervised Network based Communications System providing at least the features and functions outlined below. The System shall be installed and programmed by a local authorized and certified Telecor dealer.

B. The system shall utilize a decentralized network structure not requiring any head-end equipment, central server, or any other control hardware to maintain system operation. Systems utilizing centralized electronics and subject to a single-point-of-failure (power supply, CPU, server, power, etc.) shall not be accepted unless the system has 100% duplication of all centralized operating equipment running concurrently and can automatically take over, including up to the minute programming configuration in the event of a failure of the main system head-end electronics or any required, centralized electronics

required to make the system fully operational. Systems that are not based on decentralized structure or systems that do not provide 100% duplication of head-end or systems that operate in a "down-graded" operational mode as the result of a centralized failure are not acceptable.

C. All station devices shall receive power and data through a Power-Over-Ethernet switch. Once plugged into the LAN through a Power-over-Ethernet network switch, all networked devices shall be immediately operational and as applicable shall be able to place or receive calls and pages from Stations as well as page all devices in the network. Consoles, intercom stations, clocks, emergency displays, or speakers connected to the network shall not require any network configuration or administration to function.

D. Each Intercom Station, Loudspeaker, clock/message display, shall be assignable to all or any combination of Unlimited Paging, Program Distribution or Time Zones in the system.

E. Each Classroom shall be provided with one call button with a "normal" call and an emergency call feature. This shall provide the ability for the classroom to generate a "normal" calls to a designated location while the also having the ability to make emergency level calls.

F. Speech shall be transmitted in the frequency range from 50 Hz to 7 kHz and shall use a maximum of 128 kbps of bandwidth during a call. In order to assure maximum intelligibility, all system audio shall be HD Audio as defined in Intel(TM) High Definition Audio Specifications, June 17, 2010.

G. Intercom communications between consoles and system devices shall be non-blocking with no channel restrictions or limitations (other than network capacity) to the number of simultaneous conversations at any time between pairs of intercom stations, intercom station to console, console to console, console to speaker or zone of speakers, program source to a speaker or zone of speakers, or bell tones to a speaker or zone of speakers regardless of number of stations or consoles.

H. Any and all device shall have the ability to have its programming downloaded, individually or simultaneously via the network. Programming shall be downloadable in a series of human readable, industry standard comma-separated values (CSV) files that can be saved and edited using common spreadsheet applications. Consoles, intercom stations, clocks, displays, and speakers residing on a network shall have the ability to update their programming, simultaneously from a CSV file. Furthermore, all devices shall also have the capability to be configured directly, such that device numbers, names, zones, and call-in destinations can be altered in real time without the uploading or downloading of their programming. System shall be capable of uploading firmware updates to all device classes simultaneously, via the network, without the requirement of tools, by authorized technician or qualified facility technician or representatives.

I. Audio communications between all devices shall be accomplished with latency values of a maximum of 0.1 seconds and connection times of 0.01s for 1 to 500 speakers.

J. The system shall support a minimum of 50 channels of simultaneous duplex communication paths on the intercom system LAN, plus a minimum of 10 simultaneous duplex channels for PBX integration.

K. The system shall be capable of routing calls from the Public Switched Telephone Network (PSTN) into any classroom, zone or the entire school via the District's SIP enabled Telephone System. This shall allow for remote monitoring and two-way voice communications from outside the facility to classrooms as well as paging into areas of the school. Additional features shall include:

a. The ability to place call-ins from classroom call stations to SIP Telephones

b. The ability to initiate calls from SIP Telephones to eSeries Classroom Speakers.

c. The ability to initiate zone and all call paging announcements from SIP Telephones to eSeries Speakers throughout the facility.

d. The ability to make outside calls from Administrative Consoles to the PSTN via the Districts Phone System.

L. The System shall allow users to configure multiple schedules per school, with an unlimited number of programmable events in each schedule. Each Event shall sound a user selectable tone, play a user provided audio file or an external audio source. In addition a textual message shall be able to be programmed to be displayed at associated message displays throughout the school. All scheduling assignments shall be performed via a simple to use, Graphical User Interface (GUI) from a non-dedicated PC, residing in the School. Programming shall also be accomplished from a non-dedicated PC at the District Office. The following features and functions shall be provided. Systems that cannot provide these, shall not be acceptable.

a. The system schedules shall facilitate the requirements of combined facilities (e.g. elementary and middle schools in a common building) where multiple schedules running concurrently would be required.

b. Each event shall play any of the available tones, audio files or audio sources provided. Events shall be directed to any one or more Time Zones in the systems.

c. Events shall include textual messages to clock/message displays. These shall be formatted as fixed, flashing or scrolling displays that can include up to 200 characters in length.

d. Time Tones may be manually activated from Administrative Consoles or selected SIP phones residing on the schools Ip pbx.

e. An integral Master Clock shall provide time synchronization to all secondary, digital clock / Message Displays throughout the school. The communications shall be capable of obtaining it’s time synch signal from any NTP time server.

M. The System shall be capable of automatically distribute SMS and email notifications to relevant staff members when an emergency event is occurring the facility. Notifications shall be distributed to user alert devices such as mobile phones and smart devices. Mobile phones shall receive the notifications as SMS messages while smart devices shall receive email messages. Emergency events include:

a. The activation of emergency-themed element icons on a PC GUI (e.g., Lockdown, Evacuate, etc.) i

b. Emergency Calls placed from Call Stations located room locations.

N. The system shall automatically distribute SMS and email notifications to appropriate technical support staff in the event that the system is experiencing a fault.

2.3 SUPERVISED NETWORK ADMINISTRATIVE CONTROL CONSOLE

A. The Supervised Network Administrative Control Console (subsequently referred to as

Console) shall be a Telecor model e300 or approved equal. The Console shall be supervised and allow the operator to establish two-way communications with an intercom station, talkback speaker, or another Console using the handset or speakerphone. VOX functioning shall be automatically enabled when the handset is used. The Push-to-Talk button shall toggle the Console between talk and listen mode when the speakerphone is used. The Console shall provide a 2-line by 20-character LCD display. The display shall be able to be tilted at different angles for optimum viewing. When there are no active calls, the display shall show the Console name and dial number. If a time server is connected to the network, the display shall also show the time and date.

B. Incoming calls to a Console shall show the originating station dial number and name on the Console display. Calls shall be displayed in the order they are received. The operator shall be able to scroll through the list of calls and answer them out of sequence. Emergency call-ins shall be distinctly annunciated both visually and audibly.

C. The Console shall allow call-ins to be forwarded to another Console, or for calls to be put on hold or transferred to another Console location. Additionally, call-ins or calls shall be forward/transfer-able to PBX telephone extensions via a SIP trunk interface.

D. The Console shall be able to select remote audio sources connected at any location on the local area network, and distribute the audio broadcast from the source to all speakers in a facility or to selected areas such as a speaker zone or a selection of speakers. The Console shall be capable of audio source verification by attendant prior to page zone activation. In this manner attendants shall be able to listen to the audio source locally, including listening to pre-recorded announcements, prior to system broadcast.

E. The Console shall be able select a tone or a pre-recorded announcement and broadcast the tone or announcement to all facility speakers or to select areas, such as a speaker zone or a selection of speakers.

F. The Console shall be equipped with digital volume control that shall allow for the separate adjustment of the speaker listen and handset listen volumes. The levels for intercom listen, tones, and program distributions shall be independently adjusted and stored in memory.

G. The system shall allow user programming of alphanumeric architectural room names and numbers. The Console shall be capable of using 1 to 7 digit sequences for dial out and call-in identification, and shall display station numbering, station name, and call-in priority.

H. The end-user shall be allowed to choose and determine the number and location of Consoles. The end-user shall not be limited by pre-set manufacturer limitations of the number of Consoles required by this project; allowing for unrestricted future expansion. Consoles may be added at any time. Consoles added by the end-user that exceed the engineered design for this project shall be at owner’s expense. Communication between consoles or consoles and intercom stations or rooms shall not be inhibited by channel number restrictions.

I. The Console shall be capable of displaying room statuses such as Privacy and Do Not Disturb and shall have the ability to override any status limiting communication between the Console and a station with Privacy or Do Not Disturb status activated. Temporary override shall not interfere with continued activation of Privacy and Do Not Disturb after communication has been established and electively terminated.

2.4 SUPERVISED ETHERNET TERMINATION BOARD UNIT

A. The Termination Unit shall be a Telecor Model eTBU-MI or approved equal. It shall reside

on the facilities LAN providing provide two-way intercom communications between Consoles and industry standard 25 Volt speaker stations.

B. The Termination Unit shall distribute program audio to speaker locations and detect call-in annunciation from call switches in room locations. It shall be able to selectively transmit Paging, Audio Programs and Time Tone Signals originating on the eSeries Network Devices, to individual rooms, all rooms, selected rooms, or zones of loudspeakers.

C. The Termination Unit shall be consistent with the ANSI/NEMA SB 40 Standard for Communications Systems for Life Safety in Schools, supporting multiple call-in locations per room. These include the support of call-in devices with LED call assurance and privacy or do-not-disturb indication for each room. Multiple devices at a room location shall be configured to place call-ins with different destinations and priority levels. If the call-in destination of these devices is a Console or an IP-PBX phone extension, the device display shall indicate the calling room location dial number, a textual room name, and the priority level of the call-in. Room locations can be configured with a primary, secondary, and back-up call-in destinations. Emergency priority call-ins placed from a room location shall be configured with a different call-in destination.

D. The Termination Unit shall support a Message Waiting (MW) feature. This feature shall use the LED on call stations to indicate waiting messages to room occupants. If no one is present in a room location to respond to a call or if the room is in Privacy or DND mode, the caller has the option to activate a MW indication. This causes the LED on the call station to pulse. When a call-in is initiated from the room, it shall be directed to the device that activated the MW indication and the MW indication will be deactivated.

E. The Termination Unit shall support the Privacy function on Call Stations that are equipped with a Privacy button. When pressed, the Privacy button shall place the room location in privacy mode. This shall prevent monitoring of audio in the room. In privacy mode, the LED on the Call Station shall illuminate to indicate privacy mode. When a call-in is placed from the room location, privacy mode shall automatically be suspended for the duration of the call and re-enabled afterwards. If a call is placed to the room location while in privacy mode, the caller shall be alerted to the privacy mode and given the option to connect the call, leave a message waiting indication, or to cancel the call.

F. The Termination Unit shall include support for the Do Not Disturb mode. Call Stations equipped with a Do Not Disturb (DND) button shall be able to place the room in DND mode when pressed. In DND mode, the LED on the Call Station shall flash to indicate that the station is in the DND mode. This shall suspend zone pages and normal priority audio distributions from being broadcast into that room. DND mode shall not prevent emergency priority operations from reaching the location. If a call is initiated from a room location that is in the DND state, the DND shall be automatically suspended for the duration of the call and re-enabled afterwards.

G. The Termination Unit shall also provide synchronization and correction of traditional Digital and Analog Clocks, as well as Electronic Message Displays. The digital signaling that provides support for these devices shall originate in the eSeries Network. Analog Clock correction formats supported by Legacy T2 or XL systems, shall also be supported by the Termination Unit.

H. The Termination Unit shall monitor the wiring of all room location call devices for call line failure. It shall analyze the wiring for an open circuit, short circuit, or short to ground conditions. In the event of a fault, the Termination Unit shall detect the fault and provide trouble notification messages to devices equipped with trouble LED and buzzers which will

annunciate the trouble signals.

I. The Termination Unit shall be equipped with an integrated 25 watt, dual-purpose intercom/paging amplifier. It shall be used to provide amplification for two-way intercom communications to room stations, as well as amplification for paging, audio programs, and time tone signals to speaker locations. In the event that the audio load is greater than 25 watts, a line level output shall provide for the connection of an external power amplifier.

J. All speakers, when connected to the Termination Unit shall reside on an “Off Bus.” This shall ensure failsafe operation, where even in the event that network connectivity is lost, a redundant audio source can be connected to the “Off Bus” and emergency paging announcements can be transmitted to all speakers connected to the Termination Unit.

K. The Termination Unit shall mount in a standard rack panel measuring 19" W x 1.75" H and shall occupy a single rack unit. It shall be ideally suited for use with the Telecor C5PPL patch panel. Alternatively, two 50-pin, RJ-21 connectors shall provide termination facilities to a pair of TM-2X25 terminal blocks for connecting field devices. The unit shall be powered from an external 24 VDC Power Supply.

2.5 SUPERVISED SPEAKER BREAKOUT MODULE

A. The Speaker Breakout Module shall be a Telecor model eSBM-TB or approved equal. It shall provide the means of integrating traditional analog speakers and call initiating devices to the eSeries System. The Module shall also be a Single Zone Paging Adapter that can drive an amplifier to provide paging coverage in a facility. The Module shall have three relay outputs that can activate automatically during a call processing operation.

B. The Module shall receive power and data through a Power-Over-Ethernet switch. Once plugged into the LAN through a Power over Ethernet network switch, the Module shall be able to place or receive calls and pages from the eSeries network. The Module shall not require any network configuration or administration to function.

C. Speech shall be transmitted through the Module in crystal-clear HD Audio. Audio shall be transmitted in the frequency range from 50 Hz to 7 kHz and shall use a maximum of 128 kbps of bandwidth during a call. Audio between the Module and eConsoles shall be non-blocking.

D. The Module shall support eSTB-12 2x2 Ceiling Inlay Speakers, which shall connect to the eSBM-TB via a standard CAT5 cable or conventional 8Ω/25V/70V speakers to provide paging and talkback operation from eSeries e300 eConsoles or phones via an eSIP and an IP-PBX.

E. The volume of the speakers shall be adjustable individually, by zone, or across the entire eSeries network via the ePort Management Interface or eCI Control Interface. Volume controls incorporated into certain eCS station models shall also allow a user to adjust the speaker volume locally. Volume levels shall be set by specific functions: intercom, paging, emergency paging, and Public Channel operations.

F. Call-in capabilities shall be provided with addition of any of Telecor's eSeries Call Stations. The eCS-6 and eCS-3 shall be used to initiate Normal and Emergency calls respectively. Advanced stations that provide additional features shall also be available: the eCS-1 (Privacy and Normal Call), eCS-2 (Do Not Disturb and Normal Call) , and eCS-4 (Volume Control, Public Channel Select and Normal Call). All eCS Call Stations shall also provide "message waiting" indication.

G. The eSBM-TB shall also support placing normal and emergency priority call-ins from simple pushbutton call switches. Pressing the normal call switch shall initiate a normal call-in, and either pressing it three times quickly or pressing and holding it for three seconds to shall place an emergency call-in. Pressing the emergency switch once shall place an emergency call-in.

H. The Module shall have the ability to direct normal and emergency call-ins to different devices. If the device that is configured to receive the call-in loses network connectivity, the Module shall automatically search for an alternate destination. If no other suitable call-in destinations exist, the Module shall audibly and visually indicate a fault.

I. The Module shall have a call-in roll-over feature where if a call-in to the primary call destination is not answered after a pre-set amount of time, the call shall be automatically copied to a secondary call destination. If both the primary and secondary call destinations are unavailable, the call shall be redirected to a back-up eConsole.

J. The Module shall have the capability to be configured as a member of one or more paging zones.

K. The Module shall have a built-in 4-watt audio amplifier that shall drive up to 4 watts of audio to a small zone of 25/70 volt loudspeakers. The module shall provide a line level audio output that can connect to an external power amplifier for applications where the speaker zone load exceeds 4 watts.

L. The Module shall be monitored for network connectivity. If the Module's network connection is lost, targeted e300 eConsoles shall report that station as absent and display its dial number. When the Module is used with eCS Call Stations, the Module shall also provide full supervision and monitoring for Call Station and call-in destination connectivity. If a wiring fault is detected between an eCS Call Station and the Module, the Module shall audibly and visually indicate the error utilizing the status LEDs on the Module. The eCS Call Stations shall pulse to indicate a trouble condition. In case of a fault, the ePort or eLog shall log the location, time, date and type of fault. If so configured, the ePort, eLog, eCI and eAmplifiers shall also generate an alarm tone.

M. The Module's status LED that shall flash in different patterns to indicate normal operation, call-in assurance, message waiting, a call or paging audio in progress, or to indicate an error.

N. The Module shall be equipped with three relays that can be used to operate auxiliary devices such as strobe lights, tone initiating devices and door locks.

O. The eSBM-TB shall be wall-mounted using the attached mounting brackets.

2.6 SUPERVISED NETWORK AMPLIFIERS

A. The Supervised Network Amplifier (subsequently referred to as Network Amplifier) shall provide a minimum of 25 watts for paging and public address and shall be capable of utilizing analog amplifiers to increase the amount of amplified signal from the network amplifier. The Network Amplifier shall be connected directly to the network switch by an RJ45 connector and shall receive signals directly from the network.

B. The Network Amplifier shall be supervised and in the event that network communications is lost, an audible alert shall sound on the Amplifier. The Network Amplifier shall provide a silence feature to mute the audible alert for 24 hours.

C. The Network Amplifier shall also be capable of receiving local input from local devices such as tape decks, iPod docks, CD players, etc. The network amplifier shall be capable of transmitting signals received from the local input to other network locations or locally to directly connected 25/70 volt or 8 ohm analog speakers.

D. Each Network Amplifier shall be capable of providing two audio inputs for local devices and shall be programmable as either a microphone or line-level input.

E. The Network Amplifier shall be controlled remotely such that audio programs, input, tones, textual messages, or announcements may be initiated by other devices connected at different locations on the local area network.

F. The Network Amplifier shall have a minimum of 4 local tone/pre-recorded announcement audio message control lines which when activated will distribute tones/pre-recorded audio messages to intended network amplifiers for re-distribution, network talk-back speakers (or a zone), and/or local 25/70 volt or 8 ohm analog speakers directly connected to amplifier. Each network amplifier shall be capable of storing four (4) pre-recorded announcements in addition to a minimum of 16 tones. Tones and announcements shall be activated locally or from other network devices.

G. The Network Amplifier shall store and transmit companion textual messages for each stored audio announcements. Textual messages shall be automatically broadcasted to the same zones along with the audio messages such that any device programmed for that zone automatically receives both the audio and textual announcement/message and automatically reproduced each or both messages to the extent of the devices' capabilities.

H. The Network Amplifier shall be capable of transmitting HD level audio as defined by Intel(^{TM}) High Definition Audio specifications, June 17th, 2010 at a minimum.

I. The Network Amplifier shall shut down to protect itself should an output short circuit fault or overload occur that jeopardizes the integrity of the Network Amplifier.

2.7 SUPERVISED INTERACTIVE GRAPHICAL USER INTERFACE

A. The system shall include an Interactive Graphical User Interface (subsequently referred to as IGUI). The software shall reside on Telecor provided PC and should have ability to interface to District Wide Emergency Communication system located in district office.

B. The IGUI shall be supervised and shall utilize an easy-to-use Graphical User Interface for quick and easy graphically aided navigation to access functionality for all intercom stations, paging zones, and program distribution sources. Emergency operations shall be simplified through the IGUI allowing stored audio files and alphanumeric messages for message displays to be activated from the IGUI. The IGUI shall allow common operations such as daily announcements to become simplified into single touch activated icons; removing multi-step console set ups and dial strings.

C. The voice device used to originate voice communication for the IGUI to selected locations shall be a system console, telephone handset, or microphone independent from the computer hosting the IGUI. The voice device shall remain functional and accessible regardless of the operational state of a computer supporting the IGUI.

D. The IGUI shall allow the creation of a custom operating screen(s) based on the floor plans of the facilities. Icons representing intercom stations, zones used for paging, tone distribution, textual Message distribution, and audio program distribution shall be incorporated onto the

floor plans. The IGUI software shall provide:

a. Simple routine call processing, including: hold, transfer, and forward
b. Activation of remote station auxiliary relays for applications such as door lock or release
c. Emergency functions
d. Paging
e. Audio program distribution
f. Customizable page elements
g. Customizable operating screen
h. Element library for emergency event icons
i. Initiation of emergency and non-emergency messaging, textual and audible
j. Remote station volume adjustment
k. Remote activation of do not disturb status and/or message waiting status
l. Remote station trouble indication
m. Remote station background music channel selection
n. Dynamic zone management for interactive on-the-fly console specific zones
o. Single touch emergency response (supporting both actual emergencies and drills) including but not limited to all or any combination of the following:

- Live voice notification
- Pre-recorded audio message
- Digital plain text messaging with simultaneous numerically coded message capability
- Remote system activation, i.e., access control systems, CCTV systems, door release systems, etc.

E. The IGUI must provide an efficient and reliable method of notifying the occupants within the facility of critical situations. A variety of emergency tone signals that reside within the intercom/paging system shall be activated by clicking on pre-programmed buttons on the IGUI screen, initiating the transmission of tone signals to speakers, and alphanumeric messages to message displays/digital clocks. A “lockdown” icon shall be designed as per Owner direction, with Owner selecting the appropriate tone. Whole building macros for emergency or off-normal response shall be built into the internal communication system as directed by the Owner. Each macro shall be capable of being activated by the console, the IGUI as indicated on plans or as directed by the Owner or AHJ. It shall be possible to activate a WAV file message or Owner selected tone coinciding with multi-language textual messages for distributions to zones as directed by the Owner, all from a single activation icon located on the IGUI. Other single action macros shall be activated in similar fashion via the IGUI and a custom labeled icon. Plain language labeling of all icons on the IGUI shall be user changeable.

2.8 CONTROL INTERFACE

A. The Control Interface shall be a Telecor model eCI or approved equal. The interface shall provide a Desktop Application for PC interaction with the Intercom and Paging system, a Command Interface Protocol for external system interaction with 3rd party systems, Group Zone functionality, and a Scripting Engine supporting multiple sequential operations.

B. The system shall incorporate a Windows based Desktop application that makes use of a Command Protocol Interface, allowing external systems to interact with the Network Intercom and Paging System. Combined with the Scripting and Group Zones features, the Desktop application shall be able to generate a preprogrammed series of operations from a single action. These features shall be used in conjunction with a graphical user interface and the Microsoft Windows desktop.

C. Default Scripts shall be used to generate customized shortcuts according to the needs of a facility. These shortcuts shall then be placed directly on the Windows desktop and shall be able to activate virtually any Intercom and Paging function by clicking on the shortcut icon. These shall include activating:

   a. Alerts, audio distributions, coded and plain text messages, intercom operations.
   b. Pre-Recorded Evacuate, Lockdown, and All Clear audio files.
   c. Companion text messages for audio alerts.
   d. Coded messages on all secondary digital clocks and displays.

D. The Desktop Application shall also be able to use to activate SMS text messages, computer pop-up notifications, and email distributions in conjunction with any Desktop Script. Desktop Icons such as a Panic Button shall be able to send SMS notifications to a crisis team, advance warning to building occupants through pop-ups to heighten the level of awareness.

E. Any Desktop location running the Application shall have the ability to create and send an instant message using the Desktop's keyboard any display. The textual message can be sent independently or as a companion message to an audible alert.

F. The Desktop Application shall be capable of utilizing Soft Call and Panic buttons. Soft Call buttons shall be able to be created to operate as a call button on the desktop with a normal or emergency call priority. They shall also be able to be combined with other preset or on-the-fly custom text messages. Panic buttons shall allow a user to unobtrusively activate an audio path from the panic button location to another eSeries device at a security location. This shall allow security personnel to listen to an occurring situation and provide the appropriate response.

G. The System shall be capable of streaming multiple audio programs over 10 available channels, simultaneously, to speaker locations in the facility. The ability to turn the broadcast on or off to a specific location shall be controlled from the Desktop Application.

H. A user from the Desktop Application shall be able to enable or disable Do Not Disturb (DND) mode for a group of devices such as speakers or intercom stations.

I. Volume Adjustments to individual devices, devices in a zone, or all devices in the intercom and Paging System shall be able to be made from the Desktop Application

J. The Desktop Application shall be able to be used to create a call directory to provide the user with the ability to quickly and easily place calls to a large number of prospective recipients and locations. The shortcuts shall be able to be customized with the name of the call recipient or location. The call directory shall also be able to contain shortcuts that activate message waiting indications in addition to the option of placing calls.

K. The system shall interface with other external systems using a Command Interface Protocol.

External systems include integrated security management or building management systems via devices such as computers, programmable logic controllers, or software-based annunciator panels.

L. The Command Interface Protocol shall be used to send real time commands and receive real time status messages between the 3rd party system and eSeries devices. The Command Interface Protocol shall be an ASCII protocol that includes both outbound messaging, and support for inbound command via a virtual COM port and a physical USB connection.

M. Scripting shall allow operations to be carried out in sequence. Scripts shall be activated in various ways including: automatically based on the day of week and time of day, using an eConsole or a phone, or by using eDesktop, or from other scripts.

N. When scripts from an eConsole or PBX phone (via eSIP), the name of the script shall be displayed on the eConsole or phone. Then the user shall be presented with options to enable or disable the script (depending on the current state of the script). eConsoles and PBX phones that dial the script number shall hear voice prompts for enabling or disabling the script.

O. Scripts shall be used for scheduling time tone programs that include tones, pre-recorded messages, and textual messages displayed on e365-TB Message Display/Clocks reoccurring at specific times and days.

P. Scripts shall be able to perform cascading evacuation operations where evacuation audio messages are automatically first distributed to zones closest to the location of an emergency before spreading outwards to other zones according to a time schedule, thus reducing evacuation route congestion throughout the facility.

Q. Group Zones shall allow groups of page zones or devices to be defined as a group zone with a dial number. Group Zones shall be able to be accessed from eDesktop, eConsoles or PBX phones.

R. Group zones shall be the destination for various functions including textual messages, or audio operations, such as pages or audio program distributions). Group zones shall be assigned customized names which will appear on eConsole or phone displays when they are dialed.

S. Group Zones shall make it possible for a dial number to forwarded to a different destination based on time and day. For example, common audio operations directed to a Group Zone dial number shall be able to be configured to go to the usual destination during regular hours but to a different destination outside of regular hours.

T. Group Zone shall support designated priorities, such as emergency. Operations that are to a zone with a priority are automatically elevated to override any normal or lower priority operations the devices in that group zone are receiving.

2.9 SUPERVISED SIP TRUNK IP/PBX INTERFACE

A. The system Session Internet Protocol (SIP) Interface shall be a VoIP PBX phone interface of the same manufacturer as the supervised network intercom and paging system. Third party gateway devices shall not be accepted.

B. The SIP Interface shall be supervised and shall connected directly to the facilities network and the PBX's network and shall provide the following:

i. Establish a barrier gateway between the intercom and paging network and the PBX

and/or common computer network.

ii. Transparent audio operation between VoIP PBX phones and any device on the supervised network intercom and paging system. Paging access from any telephone on the facility system VoIP PBX to any intercom speaker, speaker zone, intercom station, console, all speakers, or paging horns and zones throughout the facility.

iii. Any call-in from the supervised network intercom and paging system shall be capable of being routed directly to a VoIP PBX phone. Call-in stations can be configured and programmed to automatically dial any number on the publicly switched telephone network, landline, or cellular number through the SIP interface and via the PBX.

iv. Ability to escalate a call-in directed to a console to be redirected to a VoIP PBX connected phone via the SIP Interface. Escalation can also include the ability to dial any number on the publicly switched telephone network, landline, or cellular number through the SIP interface via the PBX.

v. Ability to initiate alarm and crisis response protocols from any VoIP PBX connected phone.

vi. Ability to require security access code to utilize the intercom or paging system emergency communication features.

vii. Minimum of 10 simultaneous telephone channels of access to/from VoIP PBX phone system. Full caller ID support from any supervised network intercom call-in device to a VoIP PBX connected phone identifying the calling station ID/Location.

viii. Emergency level call-in to be uniquely identified as emergency on the VoIP PBX phones.

ix. Activation of all supervised networked intercom and paging system emergency tones and pre-recorded announcements from any phone connected to the building VoIP PBX phone system.

x. The SIP Interface shall additionally allow for calls to be placed from a console to any phone number on the publicly switched telephone network (landline or cellular). Additionally, intercom calls at a console may be transferred to any number on the publicly switched telephone network to any landline or cellular number through the SIP interface via the PBX.

C. Systems that connect to a building or district phone system and are limited to a SLT or CO connection will not be accepted as a substitute for a fully operational SIP Interface.

2.10 MASTER CLOCK /MESSAGE HOST

A. The Master Clock / Message Host shall be a Telecor model eMH or approved equal. It shall be a time master device for the eSeries network which enables configuration and activation of eSeries operations from a web-based graphical user interface (GUI). An unlimited number of operations shall be managed for activation by schedules or use The application shall be web-based and secured via HTTPS certification. It shall be preconfigured with a variety of default operations, schedules, audio, and icons for quick customization. Users shall log into the application from any desktop computer or mobile smart device using a supported web-browser. Supported web browsers shall include Microsoft Edge, Mozilla Firefox, Google Chrome, and Apple Safari.

B. Master Clock functionality shall include central time keeping and synchronization of all other eSeries devices throughout the eSeries network.

C. The Master Clock shall manage an unlimited number of calendar-based schedules, which are collections of operations intended to be performed frequently, periodically, or on specific dates and times. For example, a schedule may be a series of bell tones that consistently indicate class changes. Users shall set schedules so that the operations they contain will activate accordingly.

D. Schedules shall be viewed, enabled or disabled in a calendar. The calendar shall display schedules on a daily, weekly, monthly or yearly basis. The eMH shall support scheduling operations up to 10 years into the future.

E. An unlimited number of holidays shall be specified and marked on the calendar. This shall indicate days where disabling all schedules may be appropriate.

F. The Master Clock shall obtain time from and synchronizes with Network Time Protocol (NTP) servers directly or via an NTP-enabled eSIP present on the eSeries network.

G. Operations shall include several components, including: pre-announce tones, pre-recorded audio, scrolling textual messages, and coded messages. If desired, specific details of the components shall be customized. Customization shall include: the number of times the pre-announce tone plays, the message scroll speed, and the delay before pre-recorded audio repeats. Depending on the operation type, user-activated operations shall be distributed immediately or queued for later distribution.

H. The Home page shall provide a quick overview of eMH-managed operations. This shall include the next scheduled operation, the schedules that are currently active, and the next scheduled school drill. The eMH shall include user specific short tutorial videos that explain various aspects of the GUI and provides built-in on demand training.

I. The Live page shall show currently active and upcoming operations. A history of recently performed operations shall confirm operations occurred as intended. Also, users shall easily initiate on-the-fly operations on the Live page by configuring and activating them on demand.

J. Routine operations shall include an unlimited number of pre-configured common audio distributions. Examples shall include announcements for special assemblies, bus arrivals, staff meetings, and festive events.

K. Operations shall be associated with eSeries eCI scripts so that they shall be activated by users. The GUI shall indicate if the eCI script is active even if it was activated via other means such as dial access code or Visual Console for eSeries. Other emergency operations (such as Lockdown) shall also be seamlessly integrated with Visual Console for eSeries.

L. Audio files shall be used for tones or announcements while images shall be used as icons throughout the GUI to represent different operations or schedules. Audio file formats shall include (WAV and MP3) and images to support operations.

M. Access shall be user-account controlled. An unlimited number of users shall be supported with a high level of individual customization. Users shall be given access to only the pages and operations relevant to their intended roles. For each page, users shall be granted permissions to activate or configure operations and schedules from a desktop or, for certain users, from mobile devices. An administrator account shall have full access to view and make configuration changes on all pages, while an operator account shall be limited to activating routine or emergency operations and enabling or disabling schedules.

N. Users with administrative privileges shall have the ability to configure the site name, time, time zone, test zone, and import and export databases. To aid installers with initial configuration, a test mode shall be provided as well as a database import/export feature. Test mode shall redirect all activated operations to a test zone (that only the installer occupies) to prevent disrupting other people during configuration and testing. Database import/export shall allow the configuration to be exported for backup purposes or to copy to other installations.

O. The system shall be configured for an unlimited number of dedicated emergency response operations. A corresponding drill operation shall be automatically created for each emergency situation. Users shall be able to activate emergency response operations from facility PCs or remote mobile devices.

2.11 Call Stations CS-2-MI Dual button call station

A. The Telecor CS-2-MI Dual button call station is designed to be used in conjunction with Telecor's Multi-input buffer unit (MIBU) TBU-IP-MI-MA IP Termination Unit (Multi-Input) , or eSeries eTBU-MI Ethernet Termination Unit. Only a single pair of wires is required for connection. The CS-2-MI has a pair of momentary action push-button switches. One switch is for initiating normal calls to the Administration console. The second switch is for initiating emergency calls. The call station utilizes all steel construction. The single gang face plate is manufactured from stainless steel.The switches are tamperproof and constructed using all steel button actuators and steel button caps. The cap color of the normal call switch is black and the Emergency call switch is red.

2.13 Speaker/Transformer/Baffle Assembly

A. The Telecor STB-12 is a cost-effective 8", 12W speaker housed within a 24" x 24" baffle assembly designed to be installed flush in a suspended ceiling. The speaker has a wide frequency response for general purpose voice and music reproduction. The assembly consists of an 8" cone loudspeaker, equipped with a dual 25/70 volt line-matching transformer, pre-assembled into a 24" x 24" square perforated steel baffle and combination backbox. The transformer features primary taps at 5, 2.5, .25, 0.63, and 0.32 watts. The baffle is finished in a mar-resistant, white epoxy coating.

The STB-12 is designed to be installed in a suspended ceiling. Installation is quick and simple as the 24" x 24" is designed to fit into a common 2 foot square ceiling grid. Tie off tabs allow the assembly to be secured to the building structure or ceiling grid to address any safety concerns.

2.15 Re-Entrant Horn/Loudspeaker

A. The Telecor STB-16 is a vandal-resistant loudspeaker assembly that utilizes a double re-entrant horn compression type loudspeaker. It is recommended for use in speaker installations where the environment dictates the use of vandal-proof devices. These are weatherproof units that are designed for outdoor installation. They are capable of delivering 16 watts of continuous power and include an integral 25/70 volt line-matching transformer. The transformer features color-coded primary

taps at 16, 8, 4, 2, and 1 watts. The nominal frequency range is 350 Hz to 10 kHz, with a sensitivity of 96 dB SPL (1 watt/1 meter).
The loudspeaker is assembled onto a 16 gauge steel baffle that incorporates a unique interwoven steel security screen for maximum speaker protection while remaining acoustically transparent. This prevents any object from penetrating the loudspeaker. The baffle is finished in a powder epoxy coating that provides a resilient surface suitable for harsh environments. The STB-16 is secured to the backbox with “pin-in-torx” tamper-proof screws, which are included with the unit.
The STB-16 is suitable for flush mounting using the H16 Recessed Back Box. alternatively, surface installations can be accommodated using the SH-16 Surface Enclosure.

B. The loudspeaker shall be a Telecor model A-15T or approved equal. It shall be a double re-entrant type, with a flared bell and an integral compression driver rated for 15 watts of continues audio power. The frequency response shall be 375 -14,000Hz. Nominal sensitivity shall be such that a sound pressure level of 110 dB at 1000 Hz (on axis) at distance of one meter is produced with an input of one watt. Sound dispersion shall be no less than 100 degrees, regardless of the mounting position. The horn shall contain a weatherproof, built-in, 25/70 volt line matching transformer. Power taps shall be at 0.48, 0.94, 1.8, 7.5 or 15 watts for a 25V line and 1, 2, 3.8, 7.5 or 15 watts for a 70 V line. The power taps shall be screwdriver adjustable. Impedance selection shall be 5,000, 2500, 1300, 666, 333, 87, or 45 ohms. The unit shall include a die-cast universal mounting bracket, allowing the horn to be positioned both in the vertical and horizontal planes with a single adjustment. The wiring terminals and the screwdriver power tap shall be enclosed by a clear plastic cover for security and weather protection. The horn shall be finished in a grey epoxy. Dimensions shall be 9 1/4" deep with a diameter of 8".

2.16 Digital Calendar Clock

A. The Telecor 2484 Digital Calendar Clock simultaneously displays the current time and date. The time is displayed in hours, minutes, and seconds. Hours and minutes are displayed with large 2.25” digits. Seconds are slightly smaller for easy distinction. The date is displayed in plain text by a 10 character, dot matrix display showing the day of the week, followed by the month and date. These clocks are designed for use in conjunction with Telecor’s TII/XL Communication Systems and/or the 2400 Master Clock. They are ideal for school and institutional applications. All secondary clocks are continuously synchronized with the Master; corrections are done instantaneously and all clocks display the identical time and date. In the event of a power failure, the Telecor system maintains proper timekeeping during the outage. Once power is restored, all clocks are immediately updated with the correct time and date. The 2484 utilizes AlGaAS “Super-Bright” LED displays which have exceptional visibility Characteristics and can be viewed from up to 120 feet away.

B. Enhanced Clock Messaging - In addition to displaying the time, the 2484 can be directly engaged by the Telecor software to display messages in the dot matrix section of the display. These messages can be used to alert personnel of an emergency or a situation of concern. This is ideal for communicating visual messages to hearing-impaired persons during critical situations. When the

messaging feature is used in conjunction with the Telecor II/XL System, messages are programmed using Telecor's TII/XL Editor software. The software utilizes a user-friendly web interface designed for programming the Telecor II/XL System. Message data is then transmitted from the system to all 2484 clocks on the network. The 2484 is available in 24, 117, or 220 VAC models. The clocks can operate from 24, 115, or 220 VAC power sources.

Messages can be activated by the Telecor II/XL Event Scheduler, allowing text to be displayed at specific times and days of the week. Messages can be displayed using a variety of visual effects including scrolling or flashing single lines of text, as well as alternating between different lines of text. The 2484 can also be used as an ancillary visual annunciator to display emergency calls placed on the Telecor II/XL communications System. When an emergency call is placed, it is shown in the messaging area of the display until the call is cleared from the system. The dot matrix display defaults back to the date when not displaying messages.

C. Elapsed Timer Operation - The 2484 can be used as an elapsed digital timer, providing stopwatch functionality, indicating elapsed time on the six-digit display. Elapsed timer functions include the ability to count upwards from zero to 24 hours, as well as counting down to zero from a specified value. The elapsed timer is controlled using the Telecor 2481-TBP Timer Button Panel, providing start, stop, and reset functionality. When not operating as an elapsed timer, the 2484 defaults back to displaying the current time. The 2484 is available in 24, 117, or 220 VAC models. The clocks can operate from 24, 115, or 220 VAC power sources.

D. Installation Options - The 2484 Digital Calendar Clock is suitable for surface or recessed installations using the appropriate enclosure. For surface installations, the 2431-BBS enclosure is required. For recessed installations, the 2431-BBF enclosure is used. Two surface-mount enclosures can be mounted back-to-back with a 2423 Dual Mounting Kit, creating a double-faced version of the 2484. The Dual Mounting Kit is supplied with a bracket that allows the clocks to be mounted on either a wall or ceiling, at a distance of 4" from either surface.

2.17 Digital Clocks

A. The Telecor 2421/2431 Digital Secondary Clocks indicate the current time in hours and minutes with a four-digit display. These clocks are designed for use in conjunction with Telecor Administrative Communication Systems and/or the eMH Master Clock. They are ideal for school and institutional applications. The clock design incorporates a single piece front cover that is free of grooves and gaps. This keeps infectious contaminants out of the clock. The cover's non-porous surface allows for easy, comprehensive, hygienic cleaning with anti-bacterial agents making this clock ideal for hospital environments. All secondary clocks are continuously synchronized with the Master; corrections are done instantaneously and all clocks maintain identical time. In the event of a power failure, the Telecor system maintains proper timekeeping during the outage. Once power is restored, all clocks are immediately updated with the correct time. In addition to providing the current time, the clock's display can be directly engaged by the Telecor software. This provides the ability to display alpha and numeric codes on the clock display to alert personnel

of an emergency or a situation of concern. Messages can be initiated from an administrative console, a 2400 Master Clock or from a remote contact closure. This is ideal for displaying visual messages for the hearing-impaired during emergency situations. The 2421 offers a 2.5" display while the 2431 provides a large 4" display which makes it an ideal clock for gymnasium and corridor locations. Both clocks utilize AlGaAs "Super-Bright" LED displays which have exceptional visibility characteristics: the 2421 can be viewed from up to 120 feet, while the 2431 can be viewed from up to 210 feet. The 2421 is available in 24, 117 or 220 VAC models.

B. The clocks can operate from 24, 115 or 220 VAC power sources. The 2421 and the 2431 are suitable for surface or recessed installations using the appropriate enclosure. Two surface mount clocks can be mounted back-to-back with a 2423 Dual Mounting Kit, creating a double-faced version of the 2421 or 2431. The Dual Mounting Kit is supplied with a bracket that allows the clocks to be mounted on either a wall or ceiling at a distance of 4" from either surface.
from either a 24 VAC or 24 VDC source. The microprocessor-based movement is extremely energy efficient, requiring only 20 mA for operation. In the event of a power failure, either the Telecor Administrative Communication System or Telecor Master Clock maintains proper timekeeping during the outage. Once power is restored, all Analog Clocks respond to the corrective signal transmitted by the Telecor time base. The units are equipped with a second hand The 2461-D Analog Clock has a 12" diameter display and is housed in a low-profile, semi-flush metal case designed for wall mounting. The 2464-D Analog Clock is a double-face version of the 2461-D, suitable for surface wall or ceiling mounting. The 2463-D Analog Clock has a 16" diameter display and is housed in a low-profile, semi-flush metal case designed for wall mounting. The 2465-D Analog Clock is a double-face version of the 2463-D, suitable for surface wall or ceiling mounting. The low profile design eliminates the need for custom backboxes and all clocks are designed to be mounted onto single gang electrical utility boxes.

2.19 Clock Controller/Transceiver

A. The Telecor 2490-TCR Clock Controller / Transceiver (transmitter/receiver) is designed to wirelessly transmit a clock correction signal to the Telecor 2490 Series of Wireless Secondary Clocks while receiving a time signal from the Telecor 2400, the Telecor II or XL microprocessor-based Administrative Communication System. The 2490-TCR comes standard with SNTP/NTP capability for synchronization to any Internet SNTP/NTP time source.

B. The Transceiver works on a 915-928 MHz frequency-hopping technology that allows for a better and clearer signal even if interference is in one of the frequencies. It is capable of transmitting up to 1.6 Km (5,280 feet) in open space. The Transceiver transmits the correction signal every minute, ensuring constant time correction. The front panel LED display on the Transceiver shows the time that is being received and transmitted, the date, the status of Daylight-Saving Time (enabled or disabled), as well as a host of diagnostic conditions.

C. The Transceiver has a temperature-controlled time base, allowing calibration of the time base during variants in temperature. The Transceiver is powered using a 110VAC or 220VAC source. The 2490-TCR is wall-mounted.

available, which allow a pair of single face clocks to be assembled onto the housing to provide dual face clock versions. These are suitable for ceiling or wall mounting

3. EXECUTION

1.1 INSTALLATION

A. Wiring Method: Install wiring in raceways except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum-board partitions where cable wiring method may be used. Use plenum cable in environmental air spaces, including plenum ceilings. Conceal cables and raceways except in unfinished spaces.

B. Install exposed cables parallel and perpendicular to surfaces or exposed structural members, and follow surface contours. Secure and support cables by straps, staples, or similar fittings designed and installed to avoid damage to cables. Secure cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, or fittings.

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess. Use lacing bars in cabinets.

D. Control-Circuit Wiring: Install number and size of conductors as recommended by system manufacturer for control functions indicated.

E. Separation of Wires: Separate speaker-microphone, line-level, speaker-level, and power wiring runs. Install in separate raceways or, where exposed or in same enclosure, separate conductors at least 12 inches for speaker microphones and adjacent parallel power and telephone wiring. Separate other school intercom and program equipment conductors as recommended by equipment manufacturer.

F. Splices, Taps, and Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

G. Match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.

H. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables so they identify media in coordination with system wiring diagrams.

I. Weatherproof Equipment: For units that are mounted outdoors, in damp locations, or where exposed to weather, install consistent with requirements of weatherproof rating.

1.2 GROUNDING

A. Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

B. Signal Ground Terminal: Locate at main equipment cabinet. Isolate from power system and equipment grounding.

C. Install grounding electrodes as specified in Division 16 Section "Grounding and Bonding."

1.3 SYSTEM PROGRAMMING

A. Programming: Fully brief Owner on available programming options. Record Owner's decisions and set up initial system program. Prepare a written record of decisions, implementation methodology, and final results.

1.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Schedule tests with at least seven days' advance notice of test performance.
2. After installing school intercom and program equipment and after electrical circuitry has been energized, test for compliance with requirements.
3. Operational Test: Test originating station-to-station, all-call, and page messages at each intercom station. Verify proper routing and volume levels and that system is free of noise and distortion. Test each available message path from each station on system.
4. Frequency Response Test: Determine frequency response of two transmission paths, including all-call and paging, by transmitting and recording audio tones. Minimum acceptable performance is within 3 dB from 150 to 2500 Hz.
5. Signal-to-Noise Ratio Test: Measure signal-to-noise ratio of complete system at normal gain settings as follows:

    a. Disconnect speaker microphone and replace it in the circuit with a signal generator using a 1000-Hz signal. Measure signal-to-noise ratio at paging speakers.
    b. Repeat test for three speaker microphones, one master station microphone, and for each separately controlled zone of paging loudspeakers.
    c. Minimum acceptable ratio is 45 dB.

6. Distortion Test: Measure distortion at normal gain settings and rated power. Feed signals at frequencies of 150, 200, 400, 1000, and 2500 Hz into each intercom, paging, and all-call amplifier. For each frequency, measure distortion in the paging and all-call amplifier outputs. Maximum acceptable distortion at any frequency is 5 percent total harmonics.
7. Acoustic Coverage Test: Feed pink noise into system using octaves centered at 500 and 4000 Hz. Use sound-level meter with octave-band filters to measure level at five locations in each paging zone. Maximum permissible variation in level is plus or minus 3 dB; in levels between adjacent zones, plus or minus 5 dB.
8. Power Output Test: Measure electrical power output of each paging amplifier at normal gain settings of 150, 1000, and 2500 Hz. Maximum variation in power output at these frequencies is plus or minus 3 dB.

9. Signal Ground Test: Measure and report ground resistance at system signal ground. Comply with testing requirements in Division 16 Section "Grounding and Bonding."

C. Retesting: Correct deficiencies and retest. Prepare a written record of tests.

D. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified. Prepare a list of final tap settings of paging and independent room speaker-line matching transformers.

E. Prepare written test reports.

1. Include a record of final speaker-line matching transformer-tap settings, and signal ground-resistance measurement certified by Installer.

1.5 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service and initial system programming.

B. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.

C. Complete installation and startup checks according to manufacturer's written instructions.

1.6 ADJUSTING

A. On-Site Assistance: Engage a factory-authorized service representative to provide on-site assistance in adjusting sound levels, resetting transformer taps, and adjusting controls to meet occupancy conditions.

B. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose, without additional cost.

1.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain school intercom and program equipment. Refer to Division 1 Section "Demonstration and Training."

1. Train Owner's maintenance personnel on programming equipment for starting up and shutting down, troubleshooting, servicing, and maintaining equipment.

END OF SECTION 275350

THRASHER

COMPLEX PROJECTS
REQUIRE RESOLVE
THRASHER'S GOT IT

Asbestos Building Inspection

ALDERSON SCHOOL

317 Chestnut Ave E
Alderson, West Virginia
Greenbrier County

Prepared by:
The Thrasher Group
600 White Oaks Blvd
Bridgeport, West Virginia 26330

May 2022
101-T90-11003

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Purpose and Scope of Work

The Thrasher Group, Inc. (Thrasher), conducted an asbestos containing material (ACM) survey on a school located on E. Chestnut Ave, Alderson, West Virginia (WV). The inspection was conducted on May 5, 2022, by Corey Lynn with WV Asbestos Building Inspector license number AI010780.

1.2 Site Location and Description

The inspection took place on E. Chestnut Ave at the Global Positioning System coordinates 37.728829°N, 80.636389°W. Site location maps are attached as Figure 1.

2.0 ACM SURVEY

2.1 Sampling Locations and Methods

Sample methodology was conducted in general accordance with United States Environmental Protection Agency and Occupational Safety and Health Administration (OSHA) regulations. Samples were submitted to Pinnacle Consultants, LLC (Pinnacle). Pinnacle is a WV-licensed asbestos analytical laboratory that performs analysis of bulk asbestos samples by polarized light microscopy (PLM) to identify the presence and type of asbestos, as described in 40 CFR 763: Asbestos Hazard Emergency Response Act and 40 CFR 63, Subpart M: National Emission Standards for Hazardous Air Pollutants (NESHAP). The homogeneous materials sheet identifies and provides descriptions of homogeneous areas, type of material, and analysis results (Appendix A).

Photographic documentation is provided in Appendix B. Representative bulk samples of suspect ACM were collected within each homogeneous area, which are areas with the same color, texture, installation date, and system. The collected bulk samples were stored in labeled and sealed zip-top bags and delivered to Pinnacle. Professional judgment was used in the selection of the number of bulk samples collected for laboratory testing and was in general accordance with OSHA and NESHAP requirements for asbestos sampling.

2.2 Analytical Test Results

ACM is defined as any material containing greater than one percent (>1%) asbestos, as determined using PLM. Analytical results are included in Appendix C. ACM was found in one flooring tile found in the basement, glue on the ceiling tiles in the stairwells, as well as in the window glaze/caulking.

Asbestos Survey Findings Table
ALDERSON SCHOOL
Chestnut Ave, Alderson, West Virginia
Greenbrier County

Sample ID	Sample Date	Material Description	Quantity	Analytical Results
Base.A.001 Base.A.002	5/5/2022	Gray and White Floor Tile	660 SQ FT	2-3%
F1.G.001 F1.G.002 F2.G.002 F2.G.003	5/5/2022	Window Caulking/glaze	3,133 SQ FT	2-3%
F2.J.001 F2.J.002	5/5/2022	Ceiling Tile	580 SQ FT	2-3%

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 ACM

According to the analytical results, ACM was found in one flooring tile found in the basement, glue on the ceiling tiles in the stairwells, as well as in the window glaze/caulking

3.2 Preparation for Construction

Due to the building still being in use and electrical still live throughout the structure there were some materials that were not able to be sampled for safety reasons. If any additional suspect ACM is uncovered during demolition, a WV-licensed asbestos building inspector must be present to sample. ACM removed during demolition should be disposed of according to state and Federal regulations.

4.0 LIMITATIONS

This report and the associated work have been provided in accordance with the principles and practices generally employed by the local environmental consulting profession. This is in lieu of all warranties, expressed or implied.

The conclusions presented in this report are professional opinions based solely upon indicated data described in this report. Thrasher does not assume any liability for information that has been misrepresented to Thrasher by others or for items not visible, accessible, or present on the subject property during the time of this investigation. The conclusions and recommendations are intended exclusively for the purpose outlined herein and for the site location and project indicated. This asbestos inspection has been prepared for use of WVDOH. This report shall not be relied upon by or transferred to any additional parties or used for any other purpose without the expressed written authorization of Thrasher.

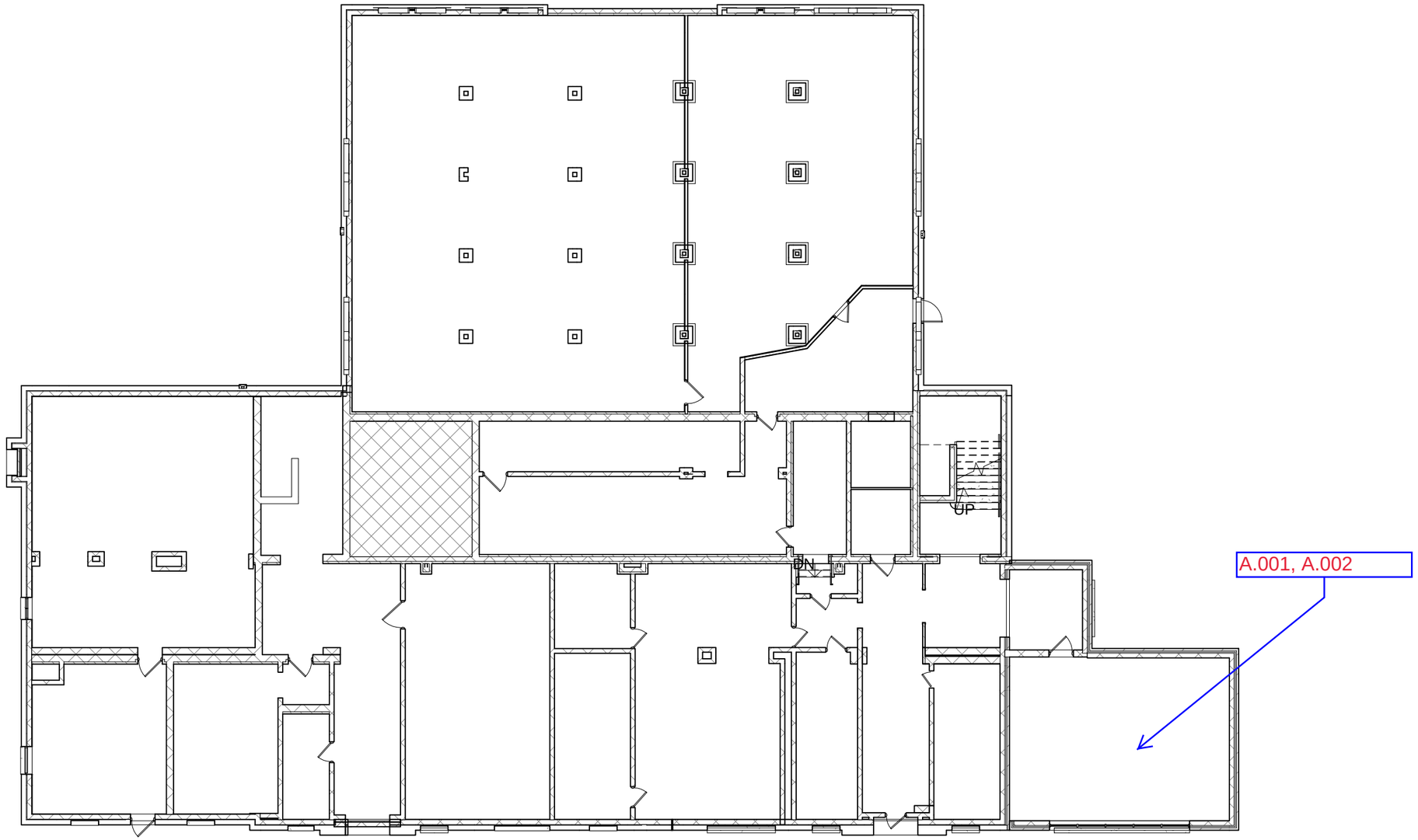
Opinions and recommendations presented herein apply to the site conditions existing at the time of Thrasher's investigation and cannot necessarily apply to site changes of which Thrasher is not aware and has not had the opportunity to evaluate. Changes in the conditions of this property may occur with time due to natural processes or anthropogenic activities on the subject site or adjacent properties. Changes in applicable standards may also occur as a result of legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond Thrasher's control. Opinions and judgments expressed herein are based on Thrasher's understanding and interpretation of current regulatory standards and should not be construed as legal opinions. Inspector credentials are included in Appendix D.

The Thrasher Group, Inc.

Robert J. Severt
Asbestos Building Inspector

Corey Lynn
Asbestos Building Inspector

FIGURES



1
7.01

(1) EXISTING - GROUND FLOOR PLAN

1/16" = 1'-0"

0' 10' 20' 40'

THRASHER
THE THRASHER GROUP INC.
600 WHITE OAKS BOULEVARD, BRIDGEPORT, WV 26330
PHONE: (304)624-4108 FAX: (304)624-7831

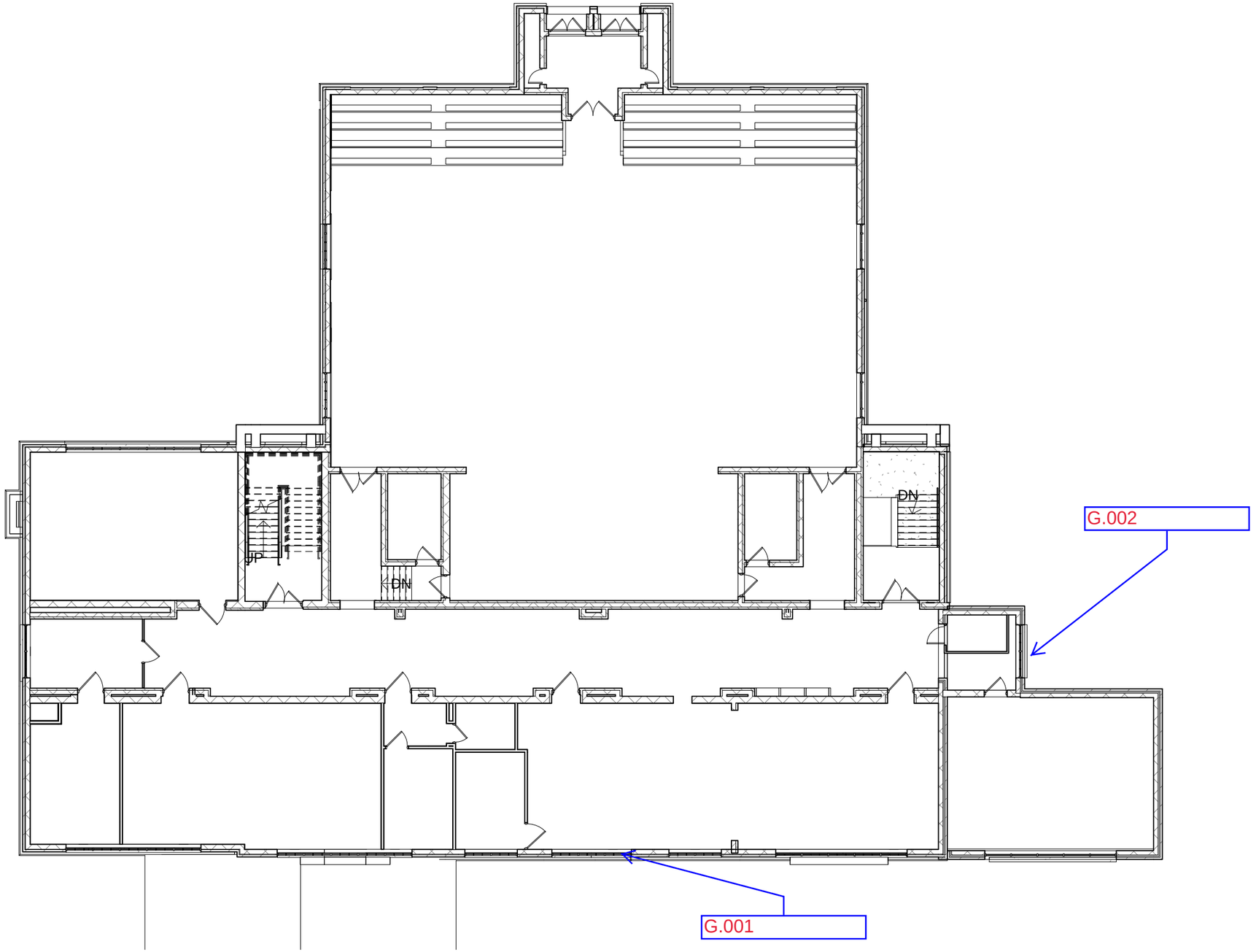
ASBESTOS TESTING GROUND FLOOR
ALDERSON ELEMENTARY SCHOOL

DRAWN:	CHECKED:	APPROVED:	ISSUED DATE:
Author	Checker	Approver	05/11/22

ADDENDUM REFERENCE / NUMBER:

7.01

PROJECT No. 060-10180



1 / 7.02 (1) EXISITING - MAIN FLOOR PLAN

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0' 10' 20' 40'

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THE THRASHER GROUP INC.
600 WHITE OAKS BOULEVARD, BRIDGEPORT, WV 26330
PHONE: (304)624-4108 FAX: (304)624-7831

ASBESTOS TESTING MAIN FLOOR
ALDERSON ELEMENTARY SCHOOL

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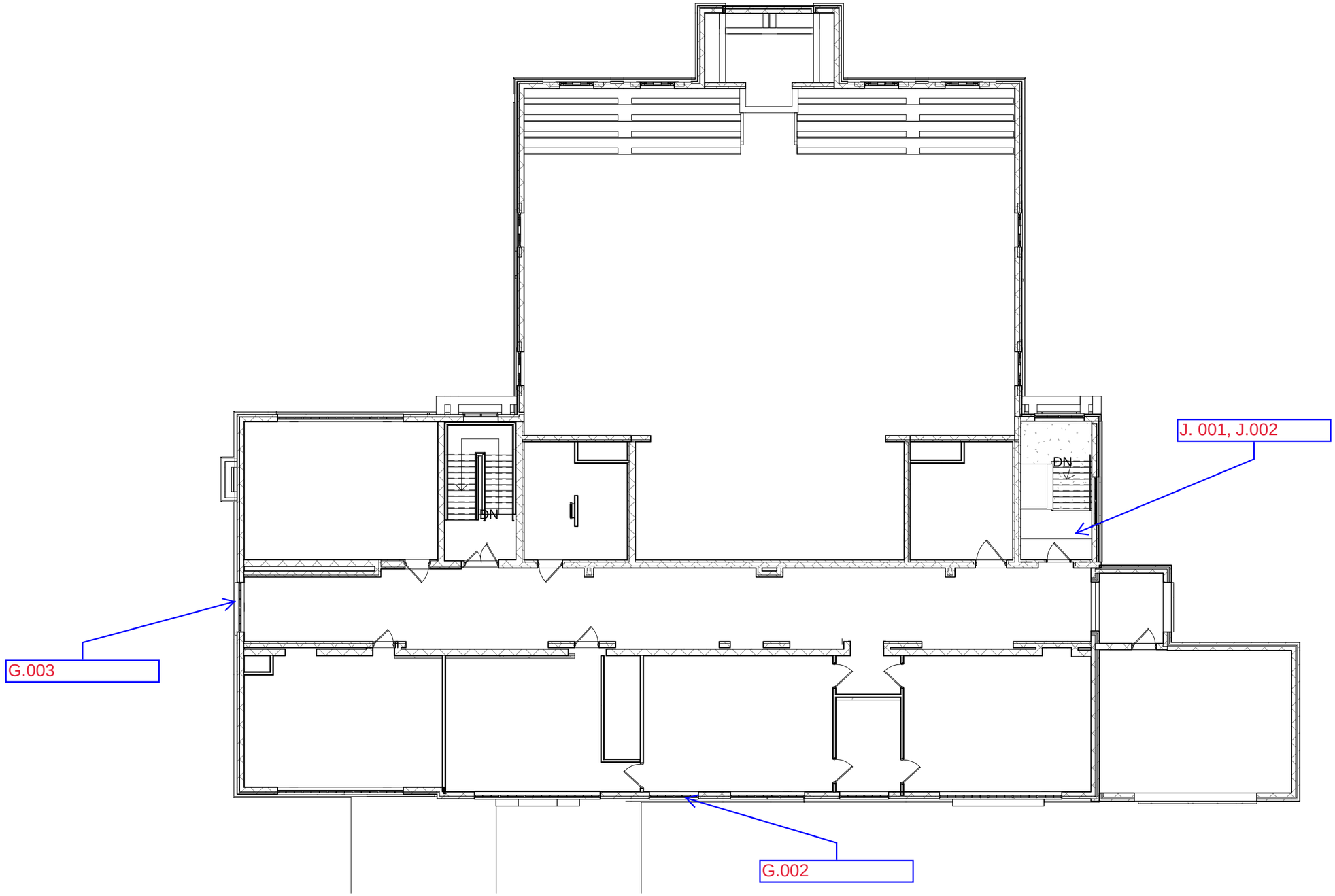

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THRASHER
THE THRASHER GROUP INC.
600 WHITE OAKS BOULEVARD, BRIDGEPORT, WV 26330
PHONE: (304)624-4108 FAX: (304)624-7831

ASBESTOS TESTING UPPER FLOOR
ALDERSON ELEMENTARY SCHOOL

DRAWN:	CHECKED:	APPROVED:	ISSUED DATE:
Author	Checker	Approver	05/11/22

ADDENDUM REFERENCE / NUMBER:

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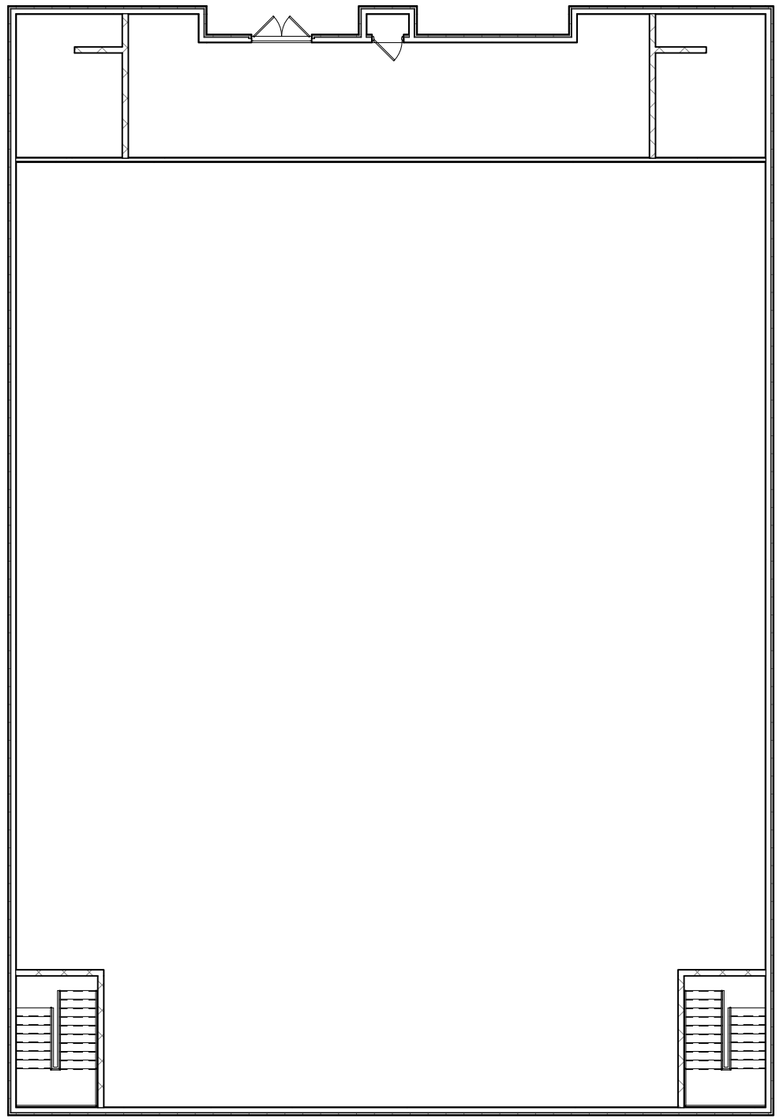
PROJECT No. 050-10180



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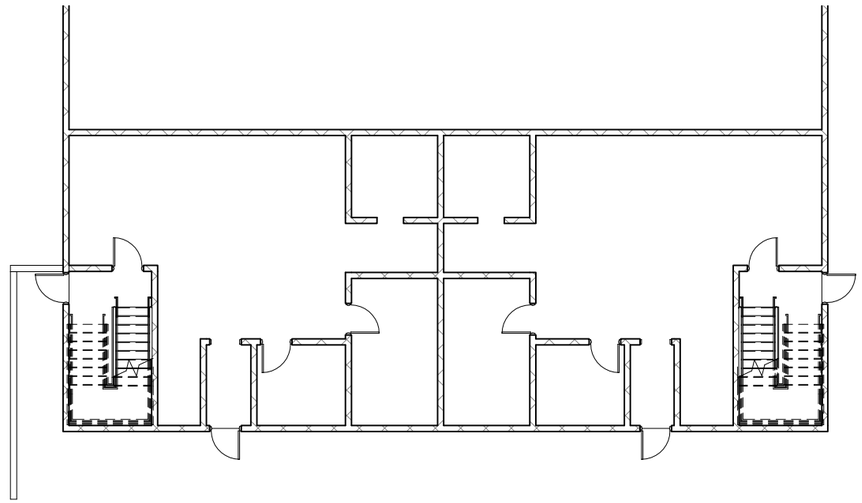


2 / 7.04 (1) EXISTING - GYM LOWER LEVEL

1/16" = 1'-0"

0' 10' 20' 40'

THRASHER
THE THRASHER GROUP INC.
600 WHITE OAKS BOULEVARD, BRIDGEPORT, WV 26330
PHONE: (304)624-4108 FAX: (304)624-7831

ASBESTOS TESTING GYM
ALDERSON ELEMENTARY SCHOOL

DRAWN:	CHECKED:	APPROVED:	ISSUED DATE:
Author	Checker	Approver	05/11/22

ADDENDUM REFERENCE / NUMBER:

7.04

PROJECT No. 050-10180

APPENDIX A – Homogenous Material Sheet

Homogenous Material Sheet

Corey Lynn
Created Sun, 08 May 2022, 7:00 PM (UTC-04)

Project Number	T93-11003	**Address**	Alderson, WV
Building	Basement	**Date**	Thu, 05 May 2022

Homogenous Material #	Sample #'s	Area Description	Type of Material	Friable / Non-Friable	Contains Abestos	% Asbestos	Estimated LF/SQFT
A	001, 002	Gray and white floor tile	M	Non-Friable	Yes	2-3%	660 SQ FT
B	001, 002	Ceiling tile	M	Non-Friable	No	N/A	N/A
C	001, 002, 003, 004	Pipe wrap	M	Friable	No	N/A	N/A
D	001, 002	Wall plaster	M	Non-Friable	No	N/A	N/A
F	001, 002	Dry wall	M	Non-Friable	No	N/A	N/A
G	001, 002	Window glaze	M	Non-Friable	No	N/A	N/A
H	001, 002	Black trim	M	Non-Friable	No	N/A	N/A

Inspector

Corey Lynn, Wed, 11 May 2022, 2:13 pm

Homogenous Material Sheet

Corey Lynn
Created Sun, 08 May 2022, 6:52 PM (UTC-04)

Project Number	T93-11003	**Address**	Alderson, WV
Building	F1	**Date**	Thu, 05 May 2022

Homogenous Material #	Sample #'s	Area Description	Type of Material	Friable / Non-Friable	Contains Abestos	% Asbestos	Estimated LF/SQFT
A	001, 002	Blue gray carpet	M	Non-Friable	No	N/A	N/A
B	001, 002	Floral wall paper	M	Non-Friable	No	N/A	N/A
C	001, 002	White gray laminate	M	Non-Friable	No	N/A	N/A
D	001, 002	White wall plaster	M	Non-Friable	No	N/A	N/A
E	001, 002	Lighthouse wall paper	M	Non-Friable	No	N/A	N/A
F	001, 002	White and brown tile	M	Non-Friable	No	N/A	N/A
G	001, 002	Window caulk	M	Non-Friable	Yes	2-3%	3133 SQ FT
H	001, 002	Structural mortar	M	Non-Friable	No	N/A	N/A
I	001, 002	Brown and white carpet	M	Non-Friable	No	N/A	N/A
J	001, 002	Yellow tile	M	Non-Friable	No	N/A	N/A

Homogenous Material #	Sample #'s	Area Description	Type of Material	Friable / Non-Friable	Contains Abestos	% Asbestos	Estimated LF/SQFT
K	001, 002	Fire door	M	Non-Friable	No	N/A	N/A

Inspector

Corey Lynn, Tue, 17 May 2022, 6:29 am

Homogenous Material Sheet

Corey Lynn
Created Sun, 08 May 2022, 6:57 PM (UTC-04)

Project Number	T93-11003	**Address**	Alderson, WV
Building	F2	**Date**	Thu, 05 May 2022

Homogenous Material #	Sample #'s	Area Description	Type of Material	Friable / Non-Friable	Contains Abestos	% Asbestos	Estimated LF/SQFT
A	001, 002	Ceiling plaster	M	Non-Friable	No	N/A	N/A
B	001, 002, 003	Insulation	M	Friable	No	N/A	N/A
C	001, 002	HVAC tape	M	Non-Friable	No	N/A	N/A
D	001, 002	Cream laminate	M	Non-Friable	No	N/A	N/A
E	001, 002	Wall patch	M	Non-Friable	No	N/A	N/A
F	001, 002, 003	Wall plaster	M	Non-Friable	No	N/A	N/A
G	001, 002, 003	Window caulk	M	Non-Friable	Yes	2%	3133 SQ FT
H	001, 002	Dry wall	M	Non-Friable	No	N/A	N/A
I	001, 002, 003	Paint	M	Non-Friable	No	N/A	N/A
J	001, 002	Ceiling tile	M	Non-Friable	Yes	2-3%	580 SQ FT

Inspector

Corey Lynn, Thu, 26 May 2022, 3:04 pm

Homogenous Material Sheet

Corey Lynn
Created Sun, 08 May 2022, 6:51 PM (UTC-04)

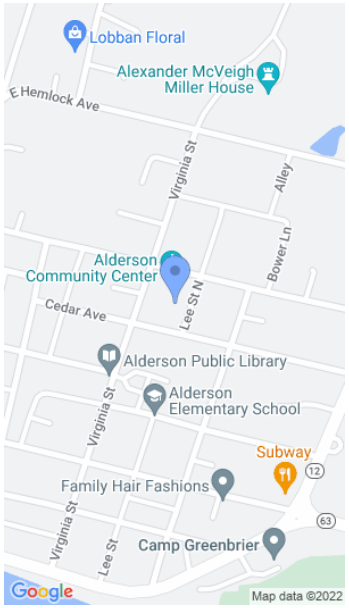
Project Number	T93-11003	**Address**	Alderson, WV
Building	Roof	**Date**	Thu, 05 May 2022

Homogenous Material #	Sample #'s	Area Description	Type of Material	Friable / Non-Friable	Contains Abestos	% Asbestos	Estimated LF/SQFT
A	001, 002	Roofing mat	M	Non-Friable	No	N/A	N/A

Inspector

Corey Lynn, Wed, 11 May 2022, 8:06 am

APPENDIX B – Site Photos



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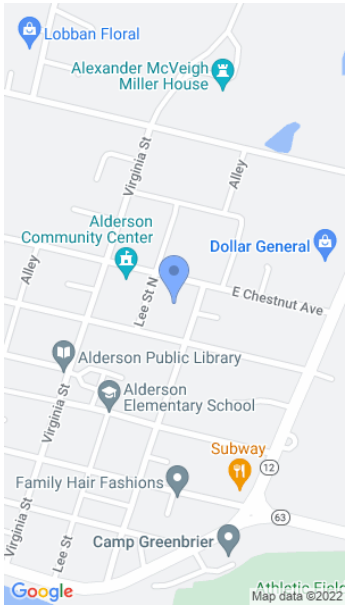

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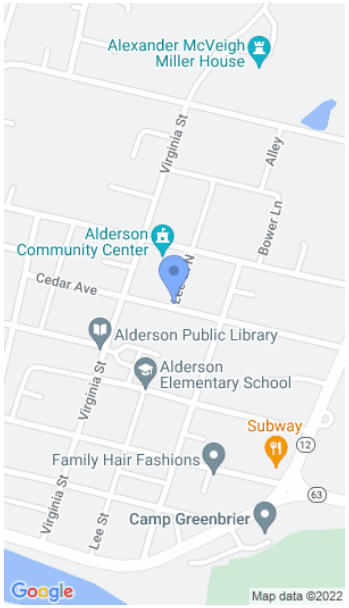

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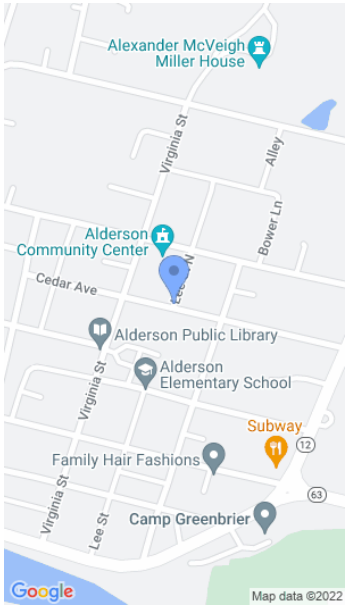

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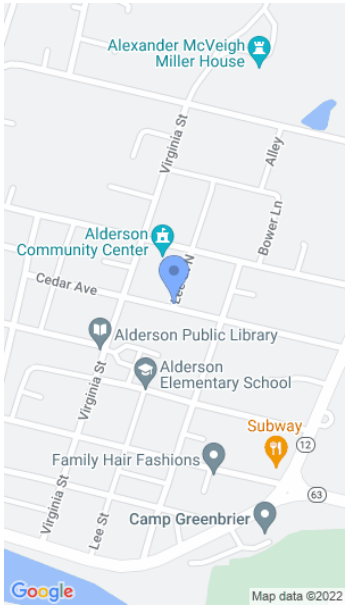

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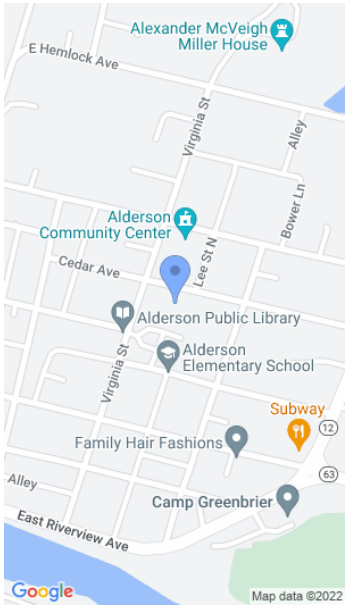

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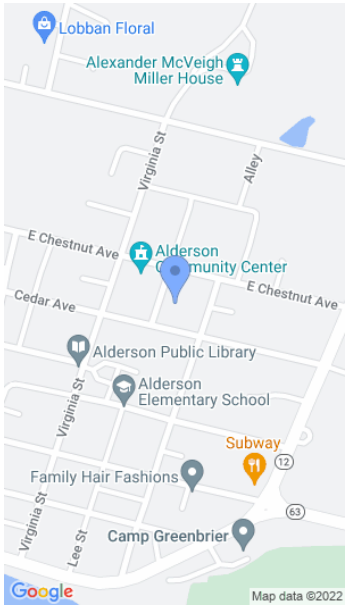

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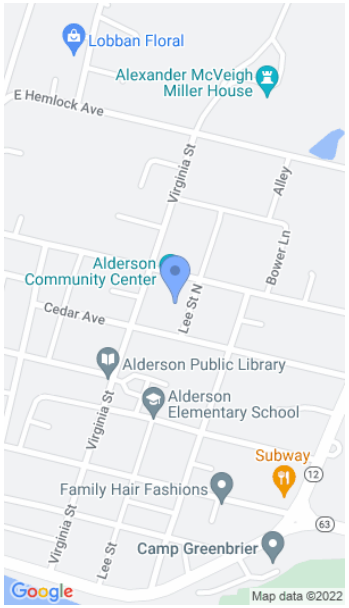

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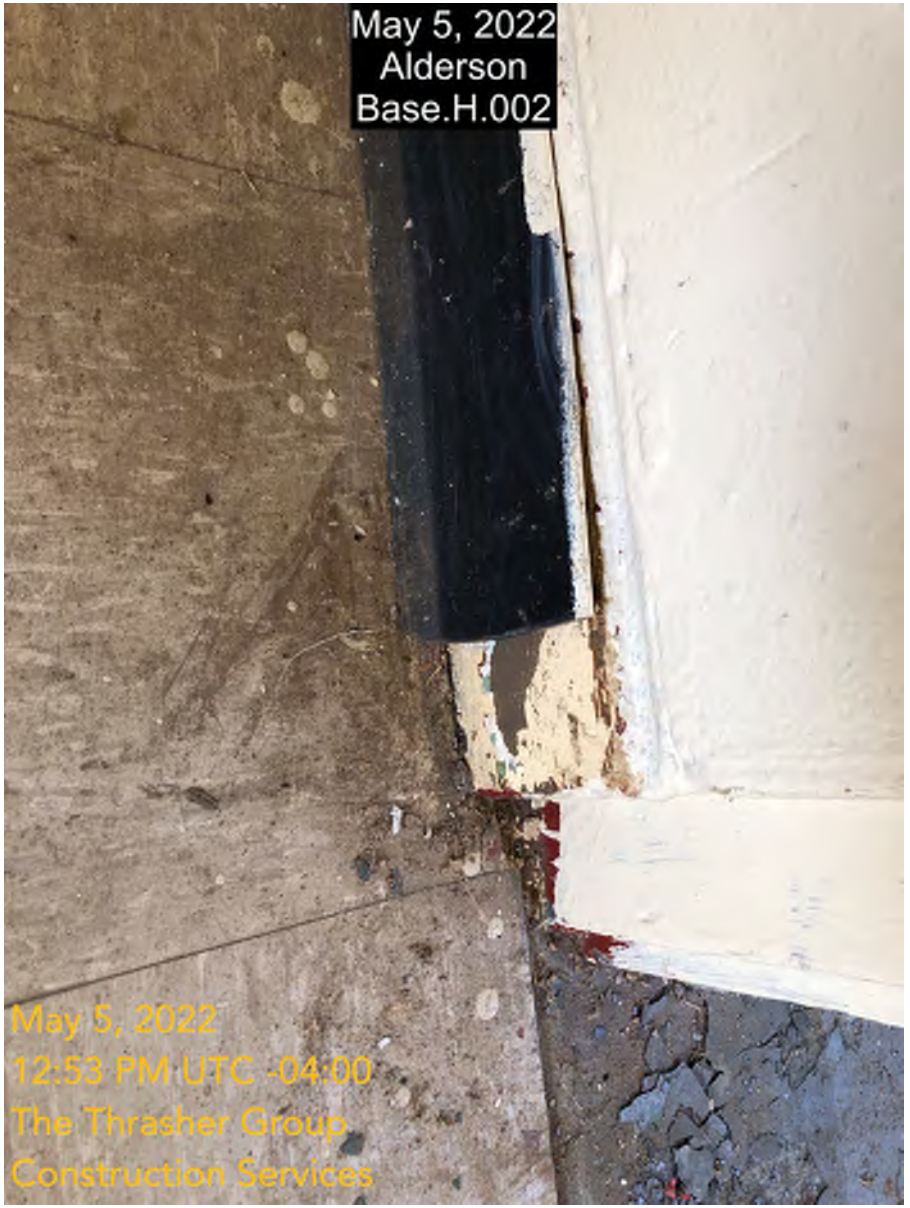

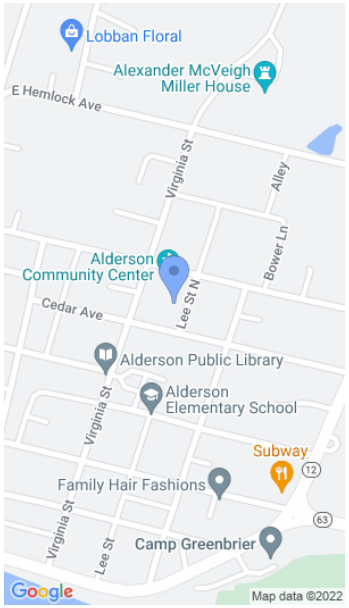

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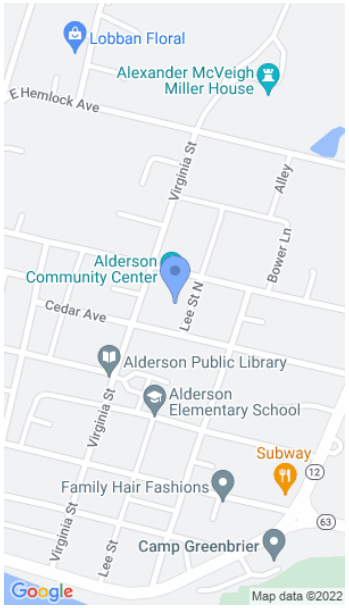

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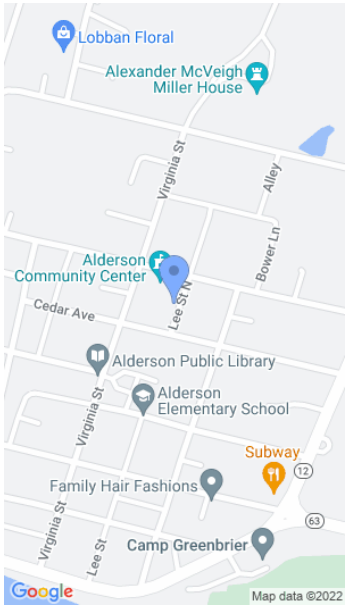

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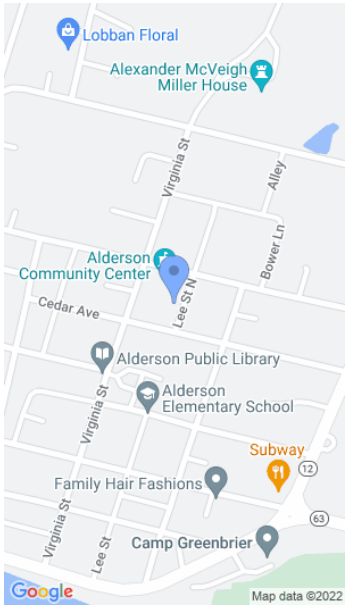

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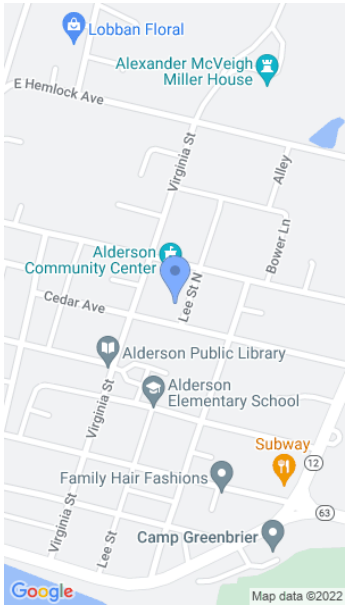

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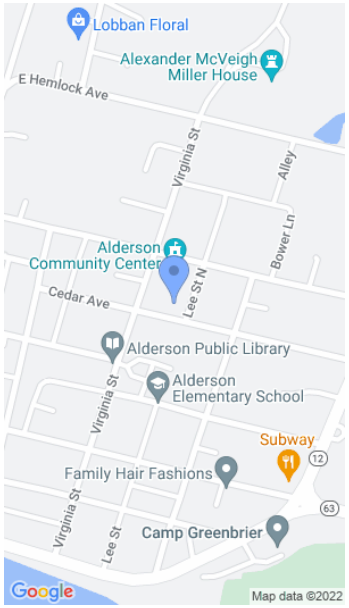

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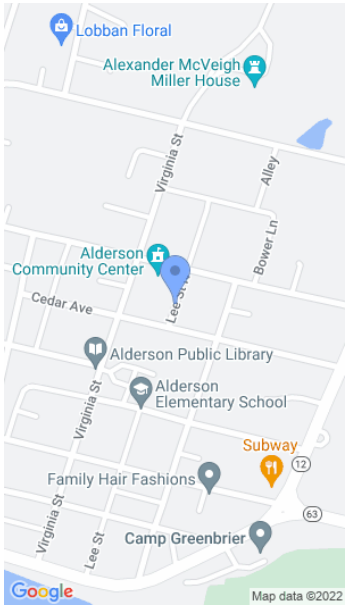

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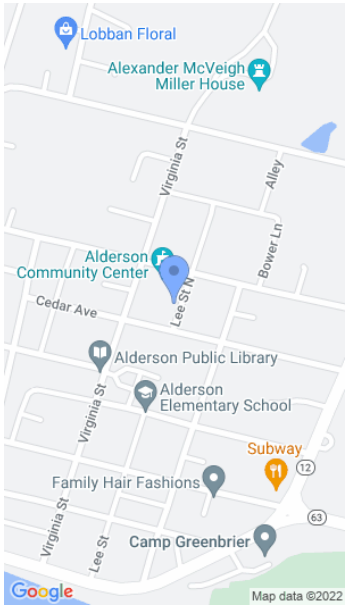

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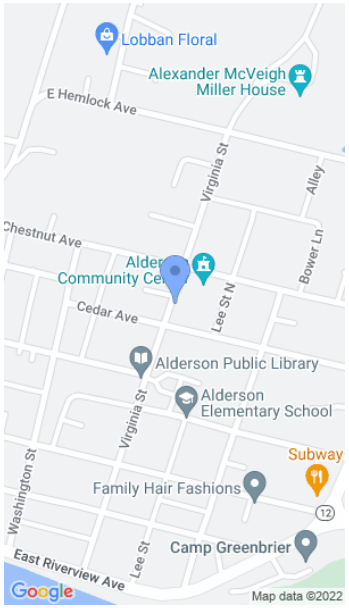

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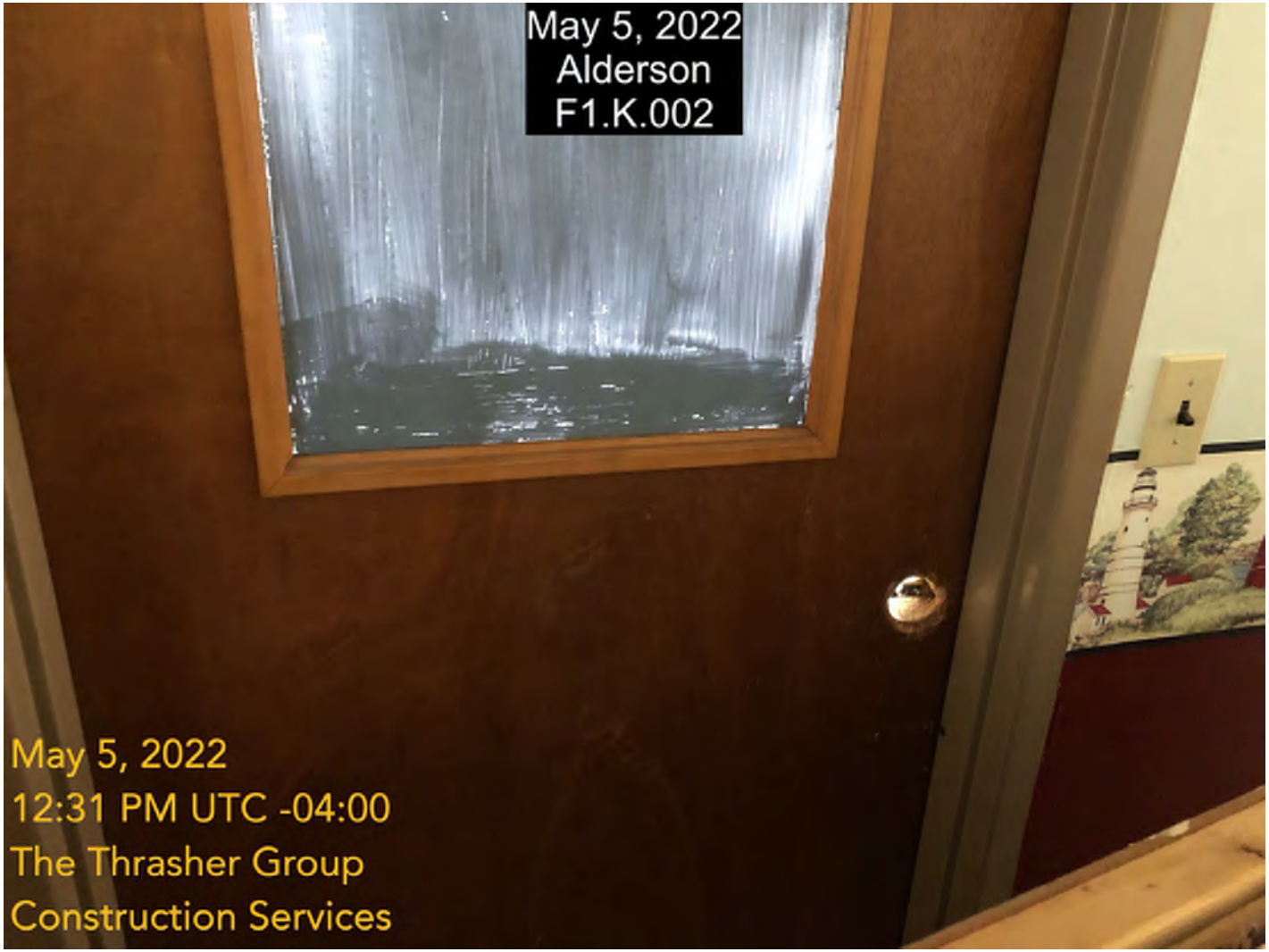

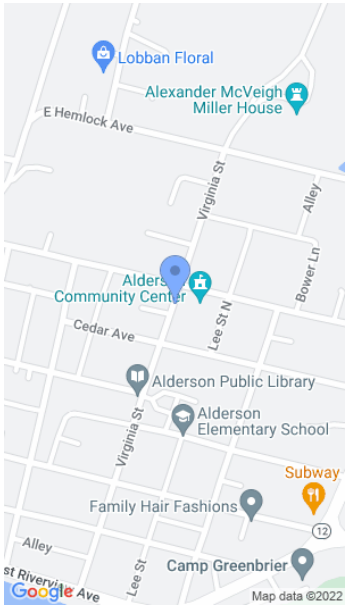

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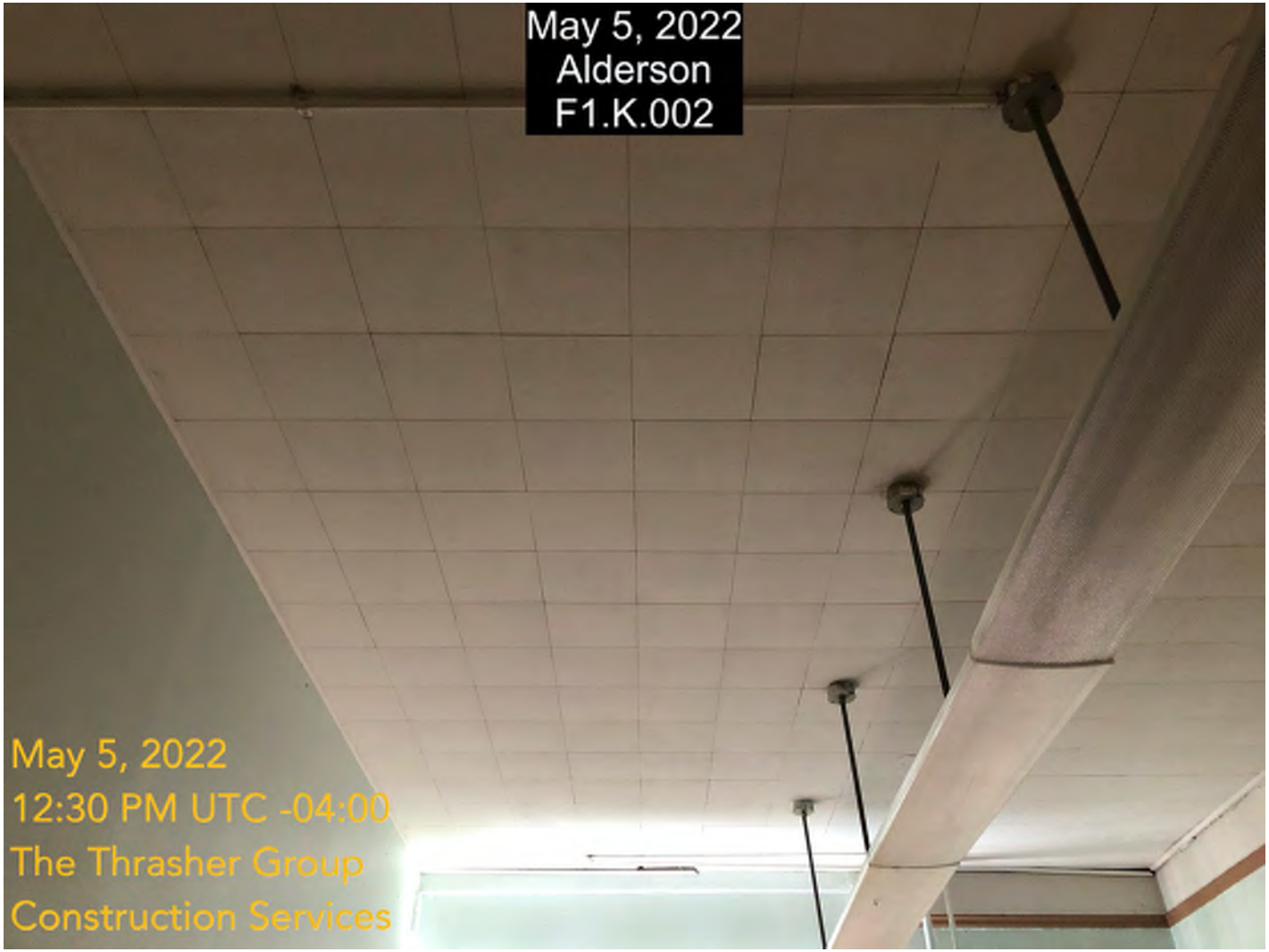

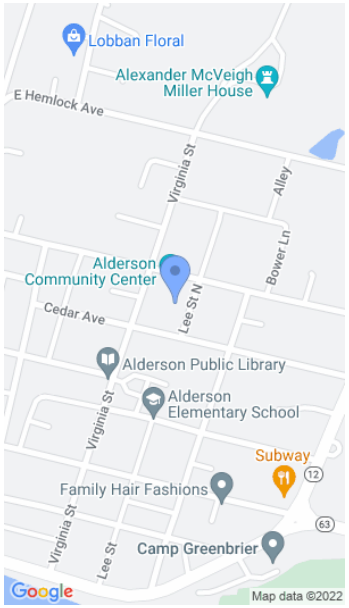

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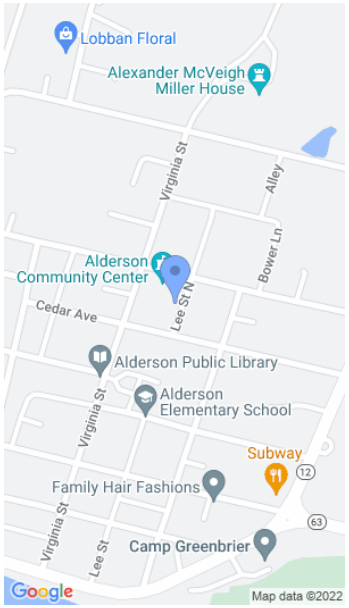

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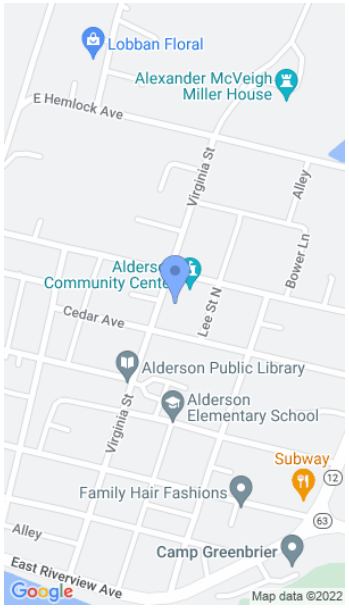

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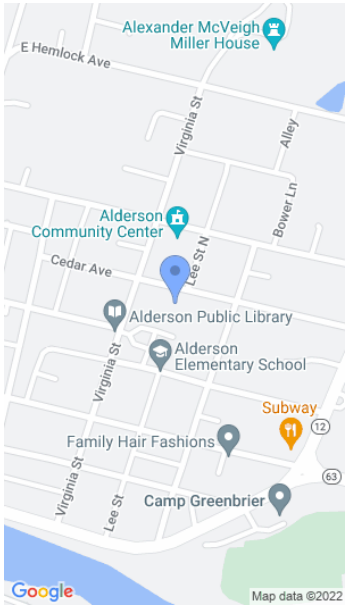

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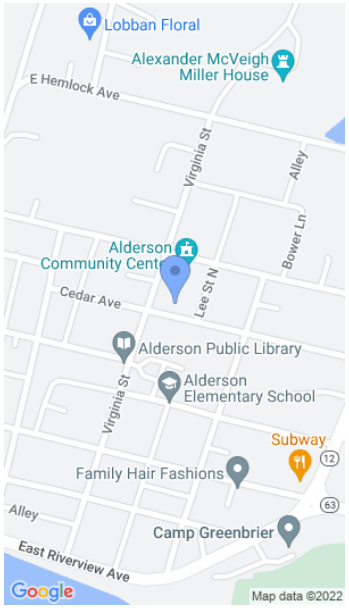

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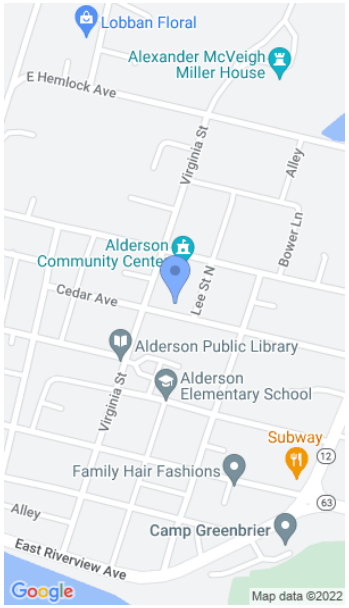

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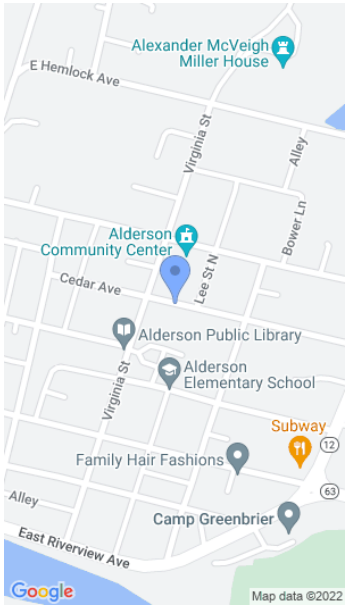

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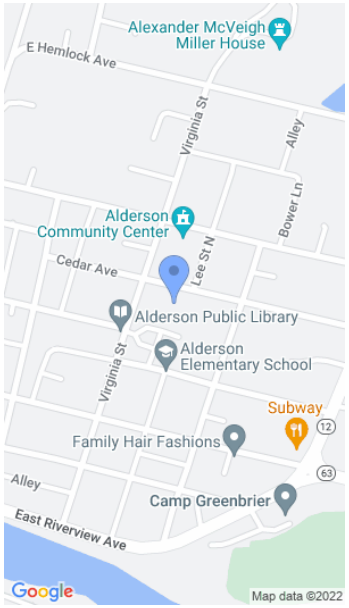

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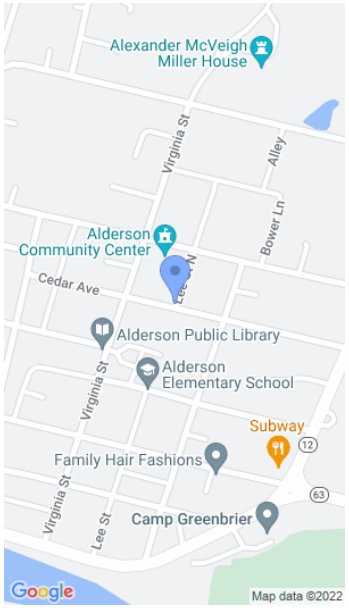

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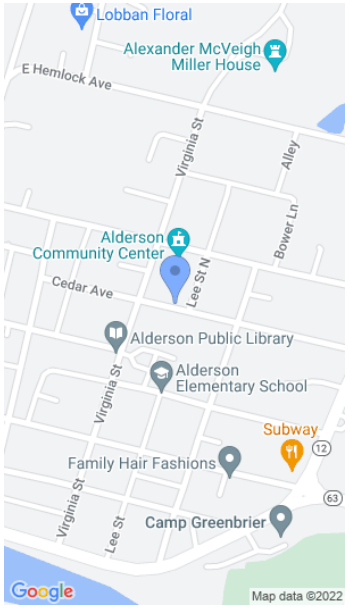

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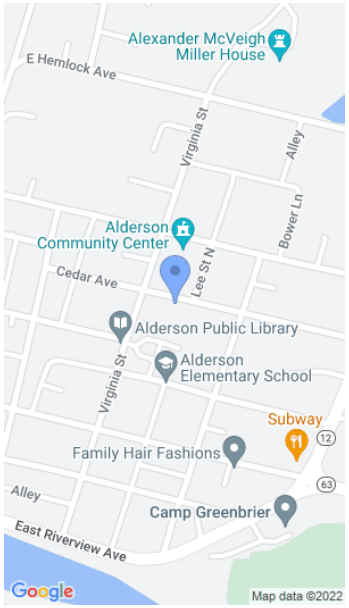

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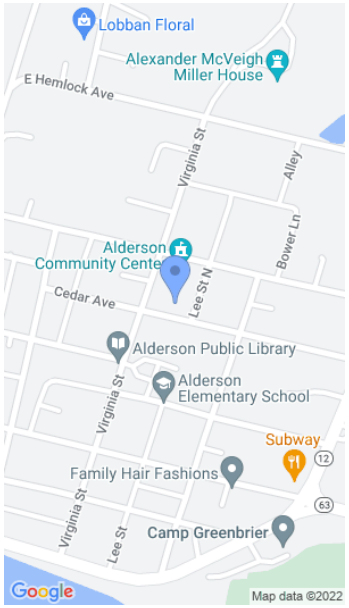

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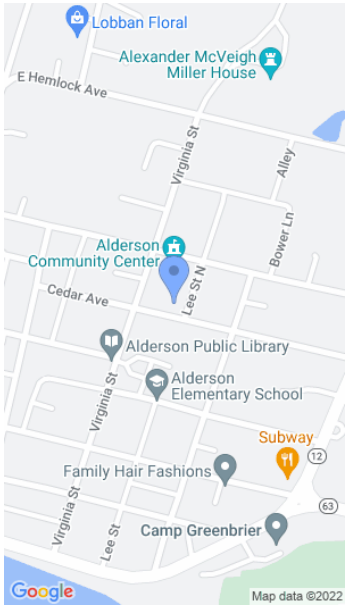

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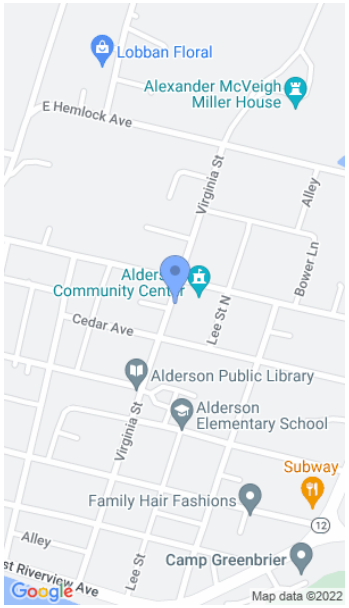

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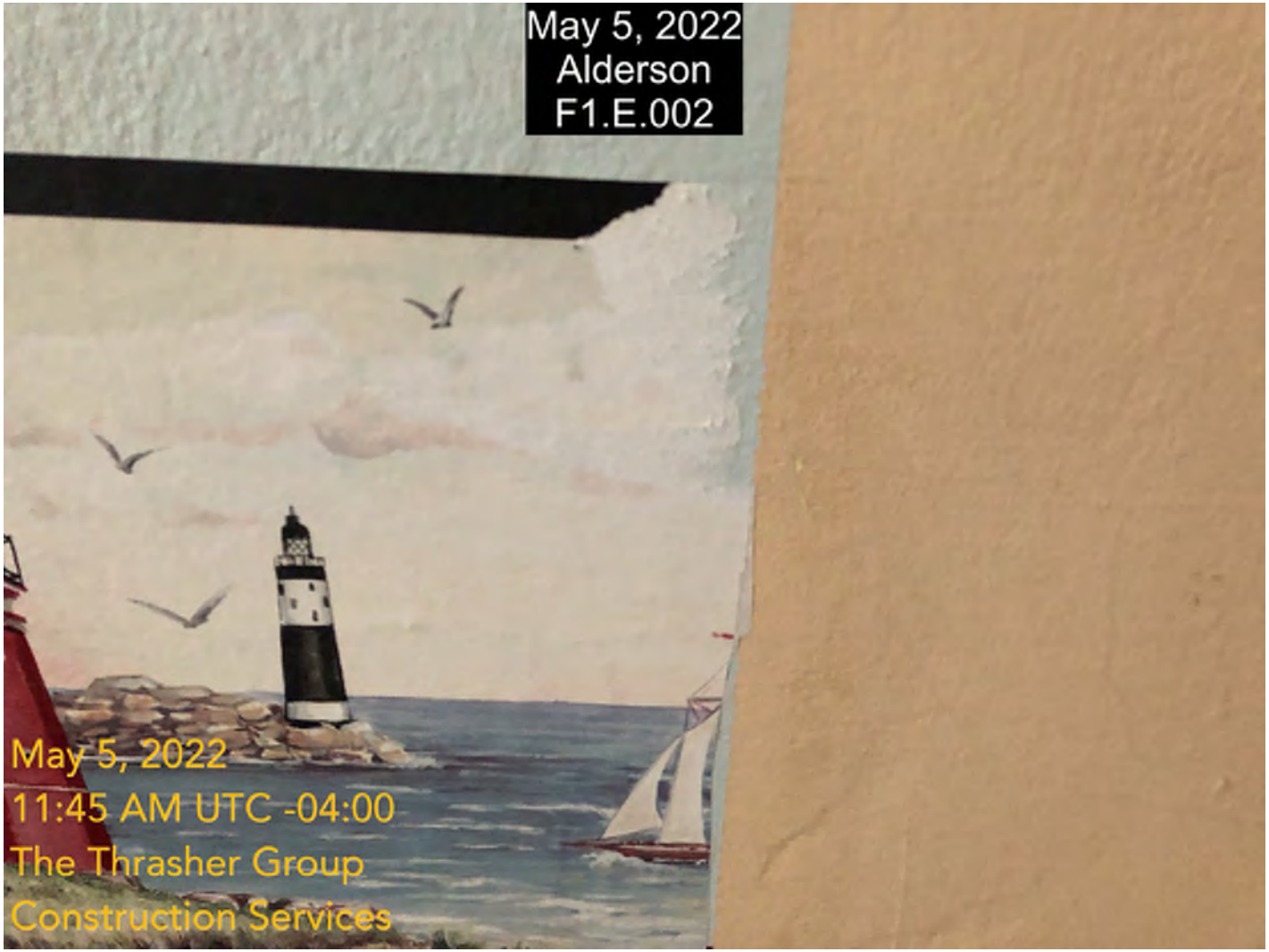

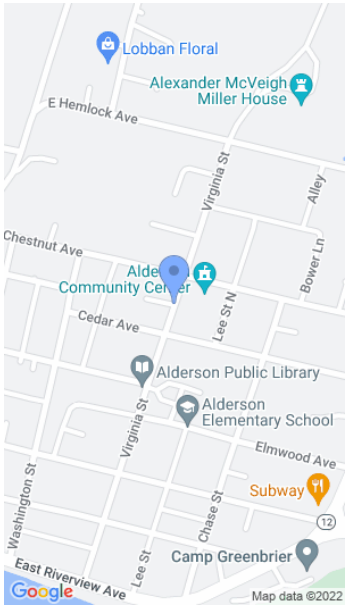

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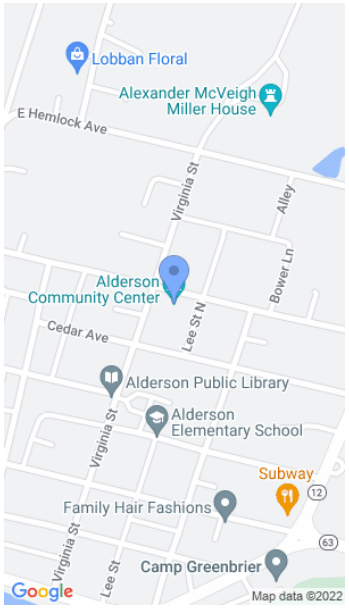

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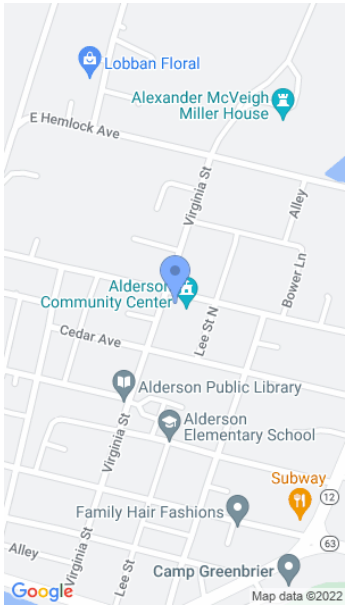

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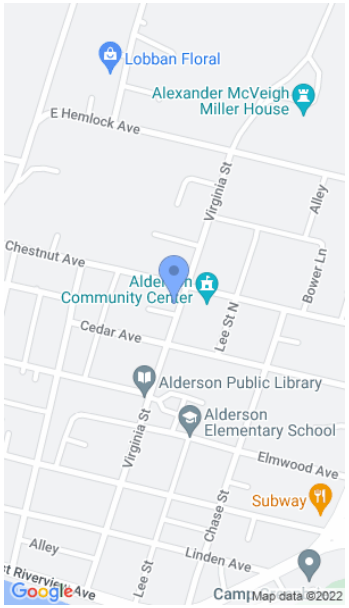

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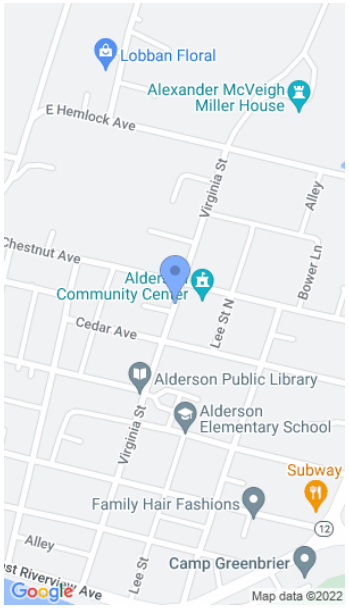

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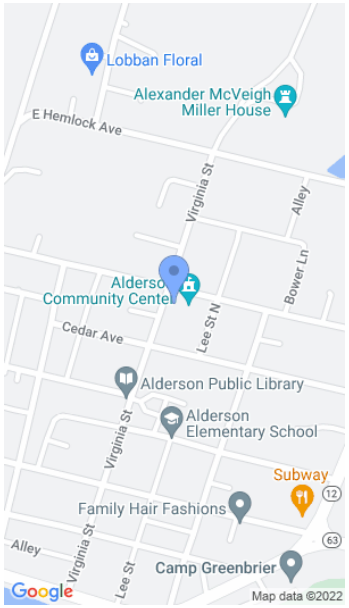

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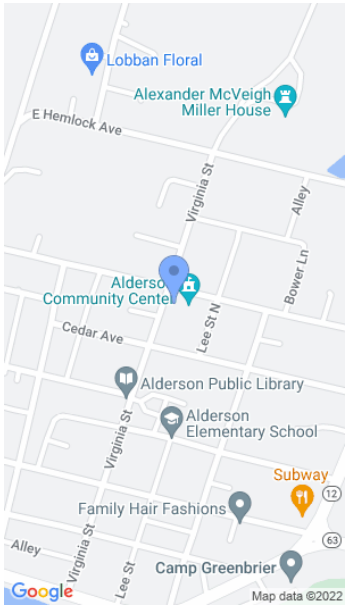

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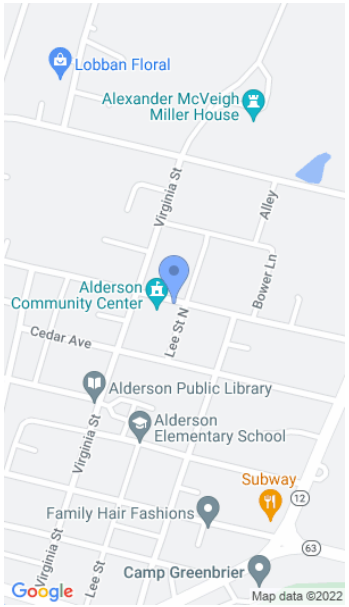

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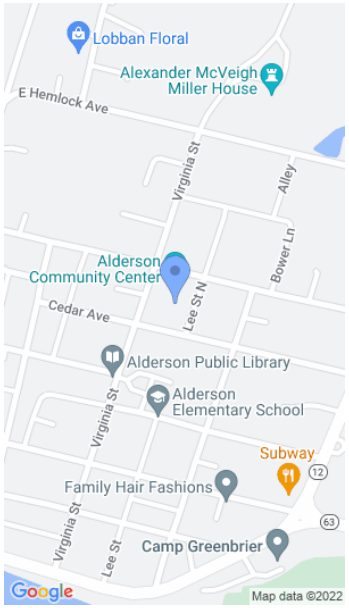

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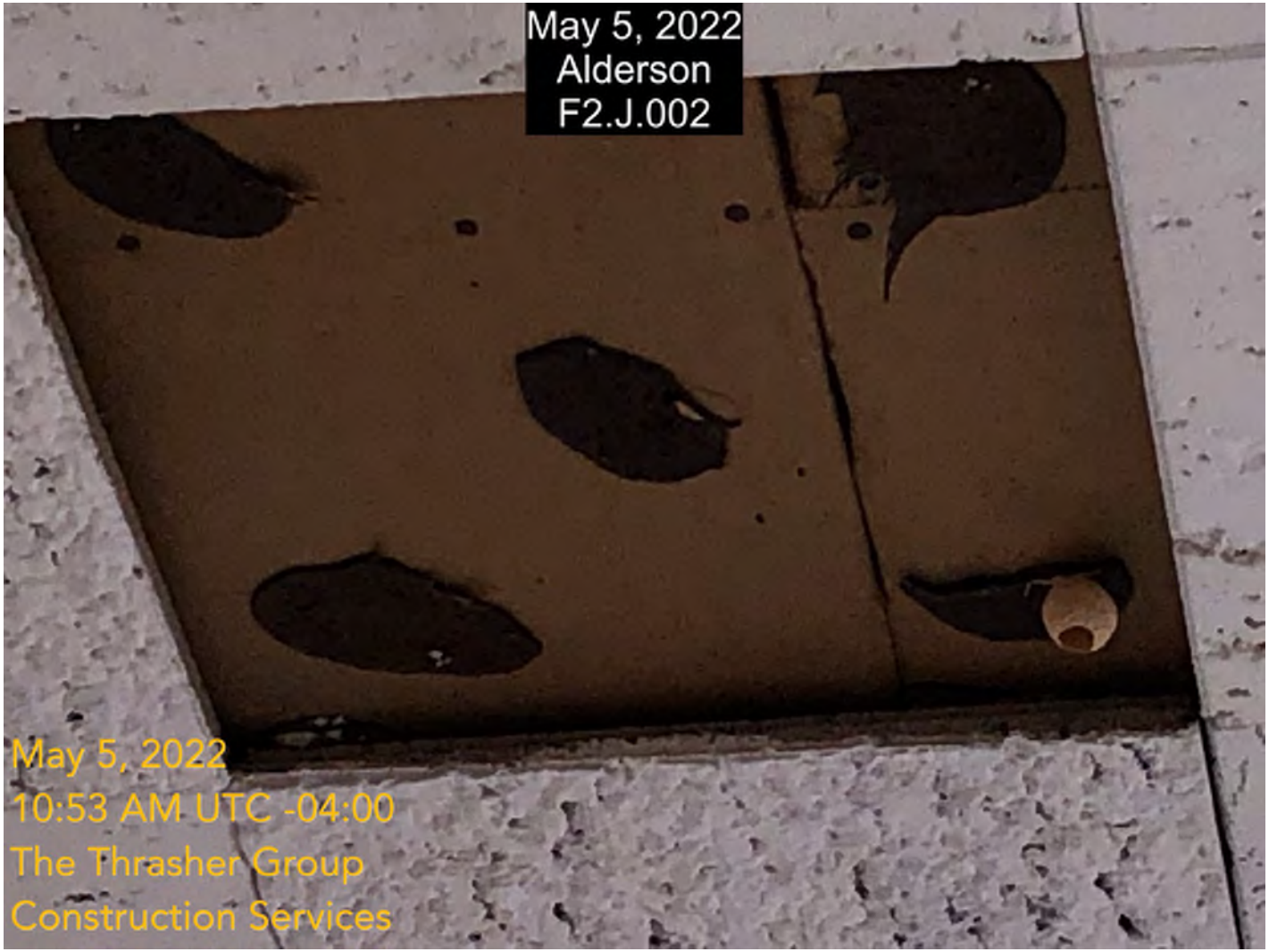

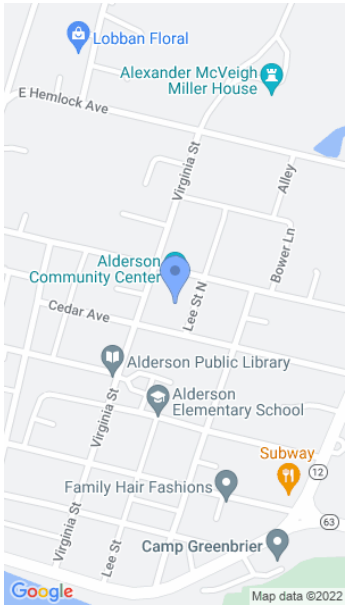

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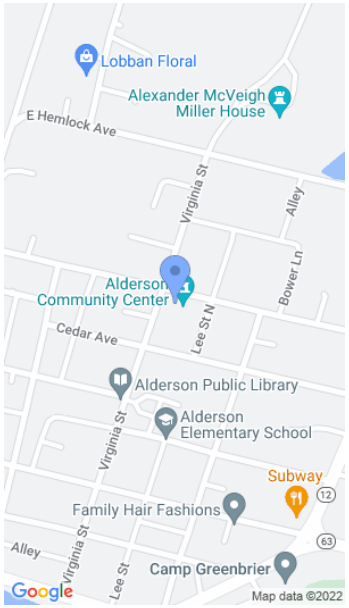

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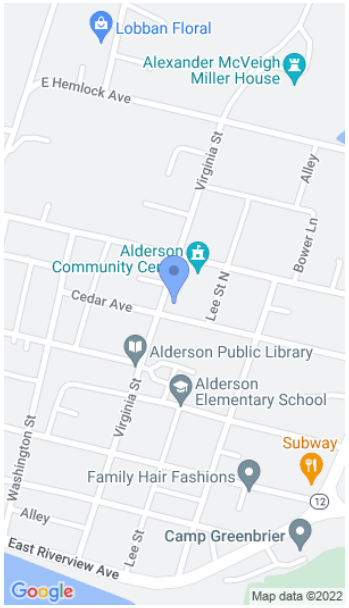

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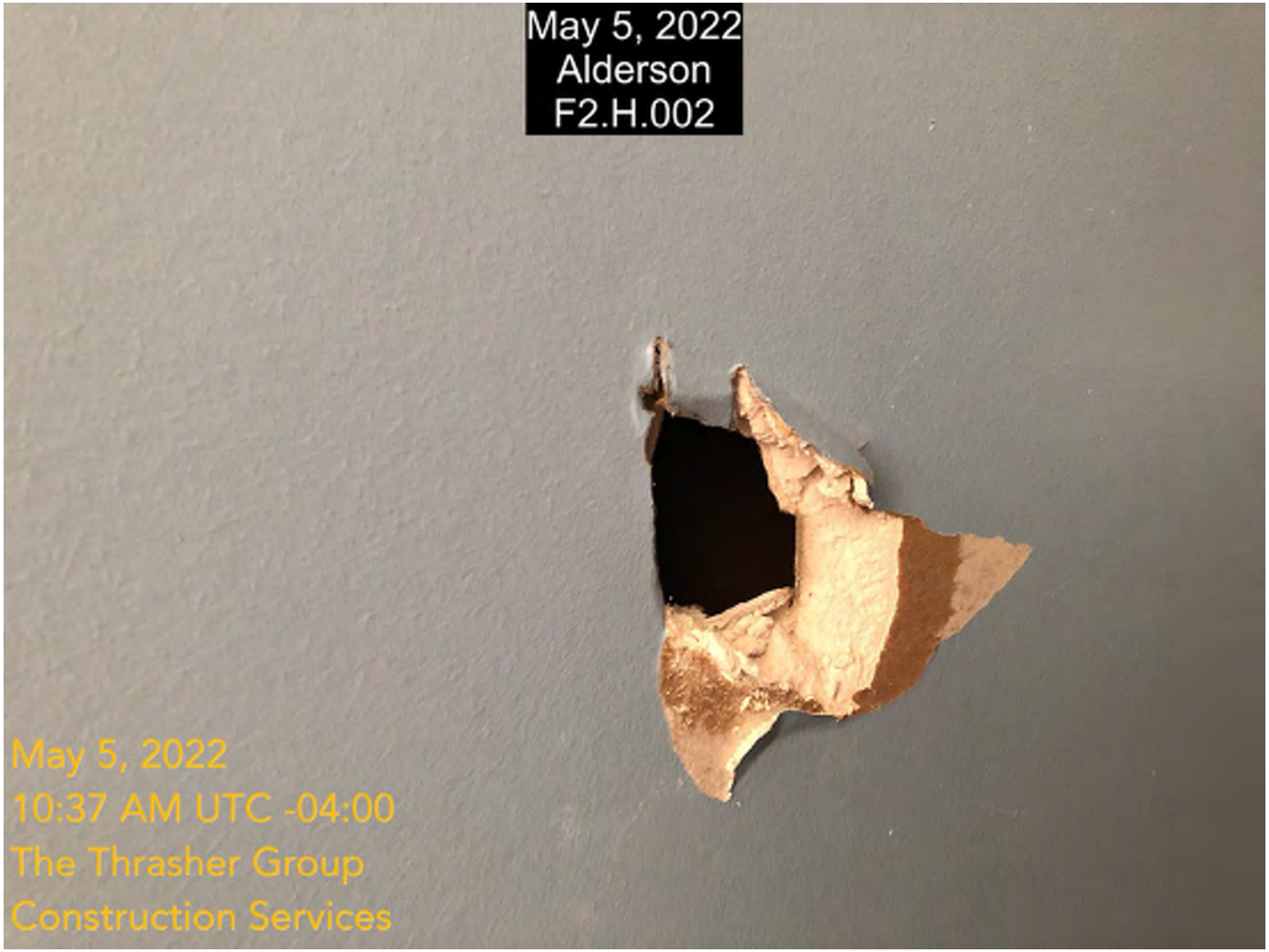

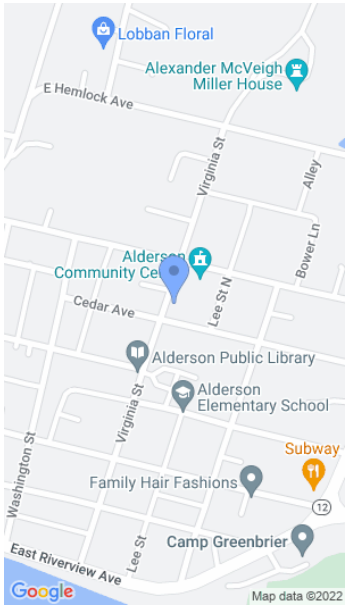

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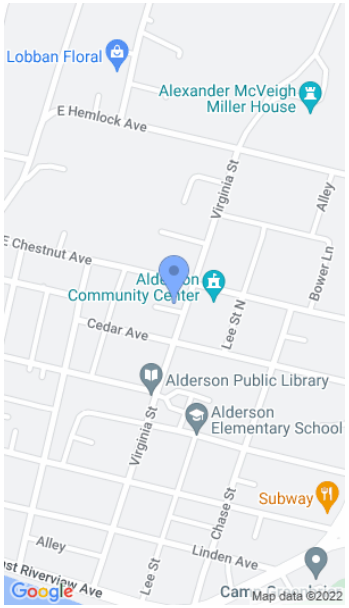

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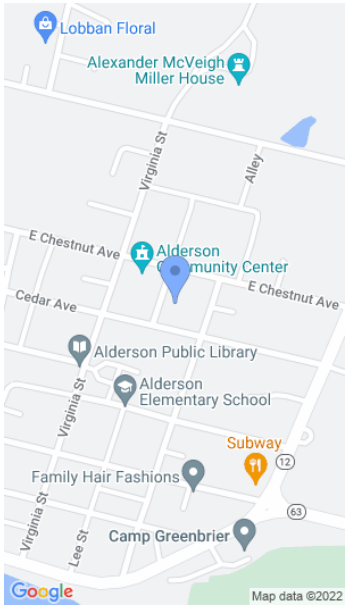

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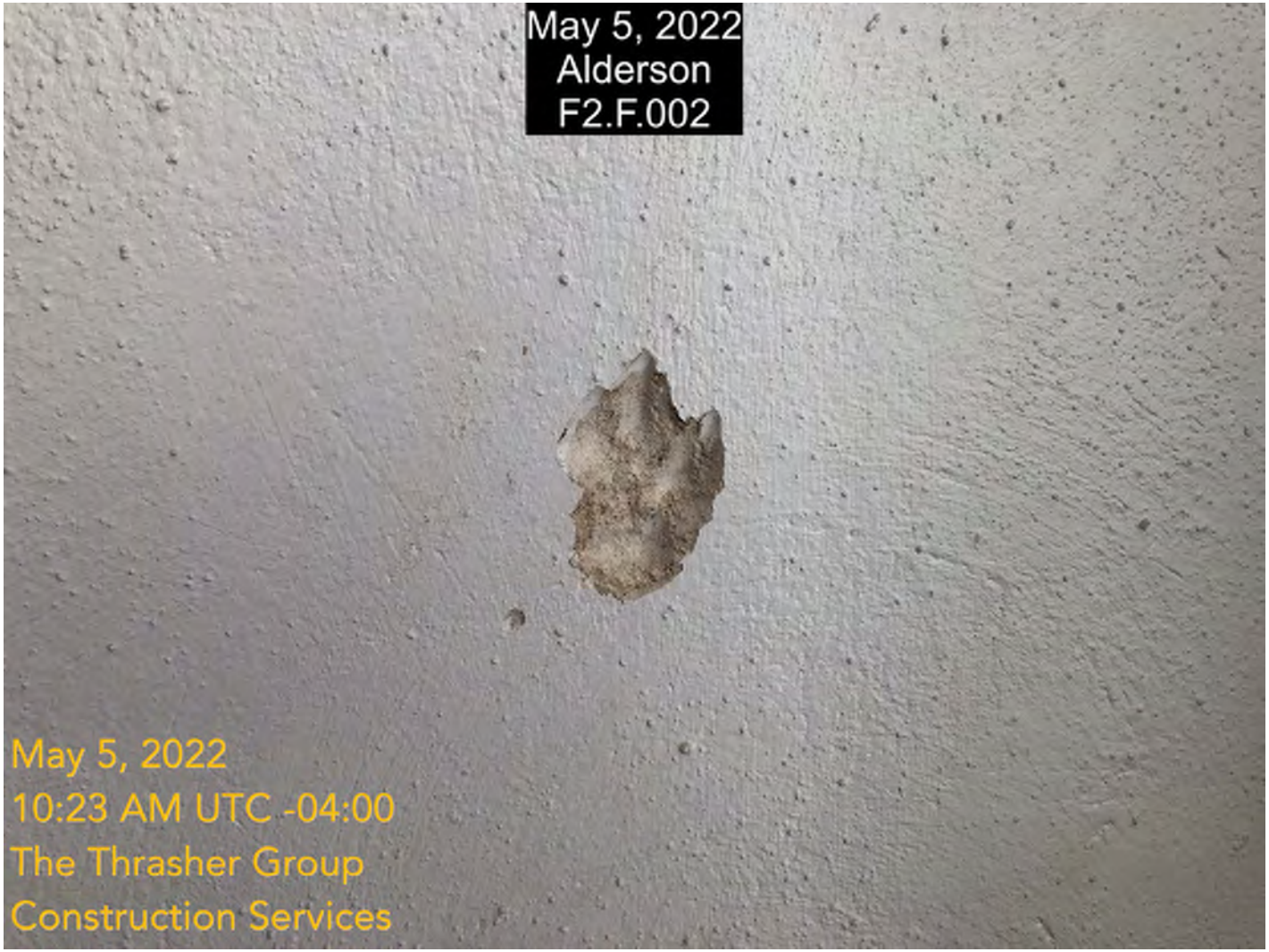

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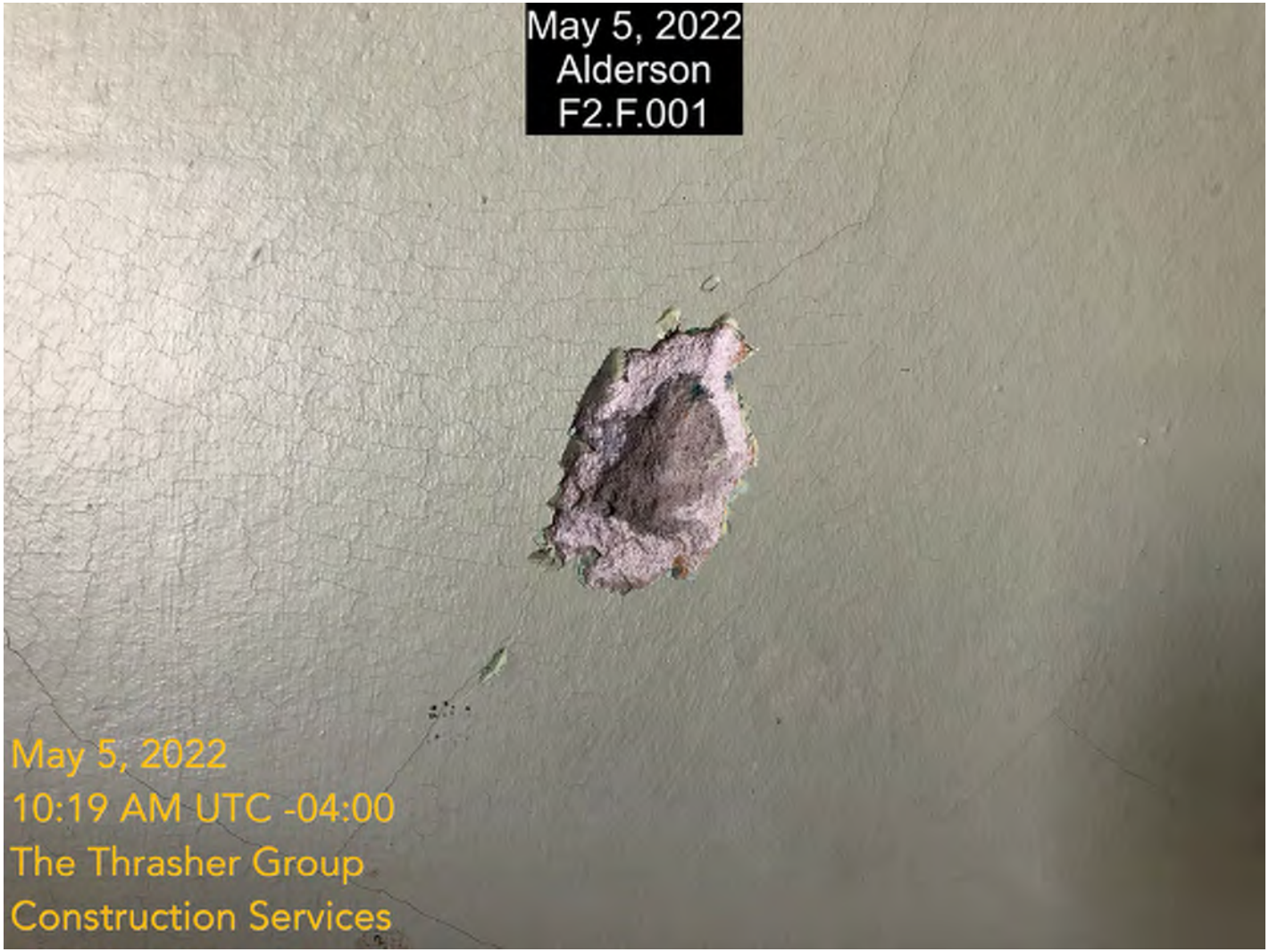
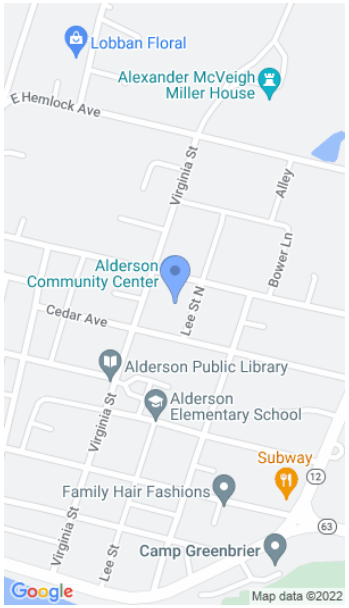
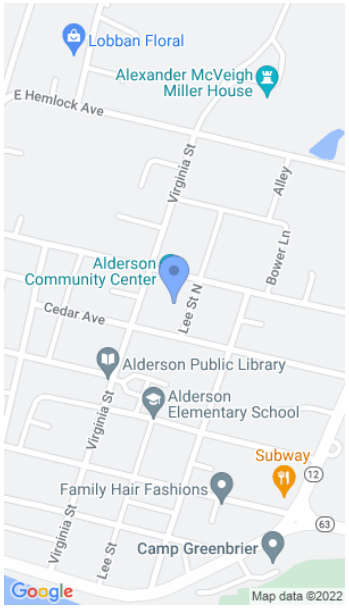


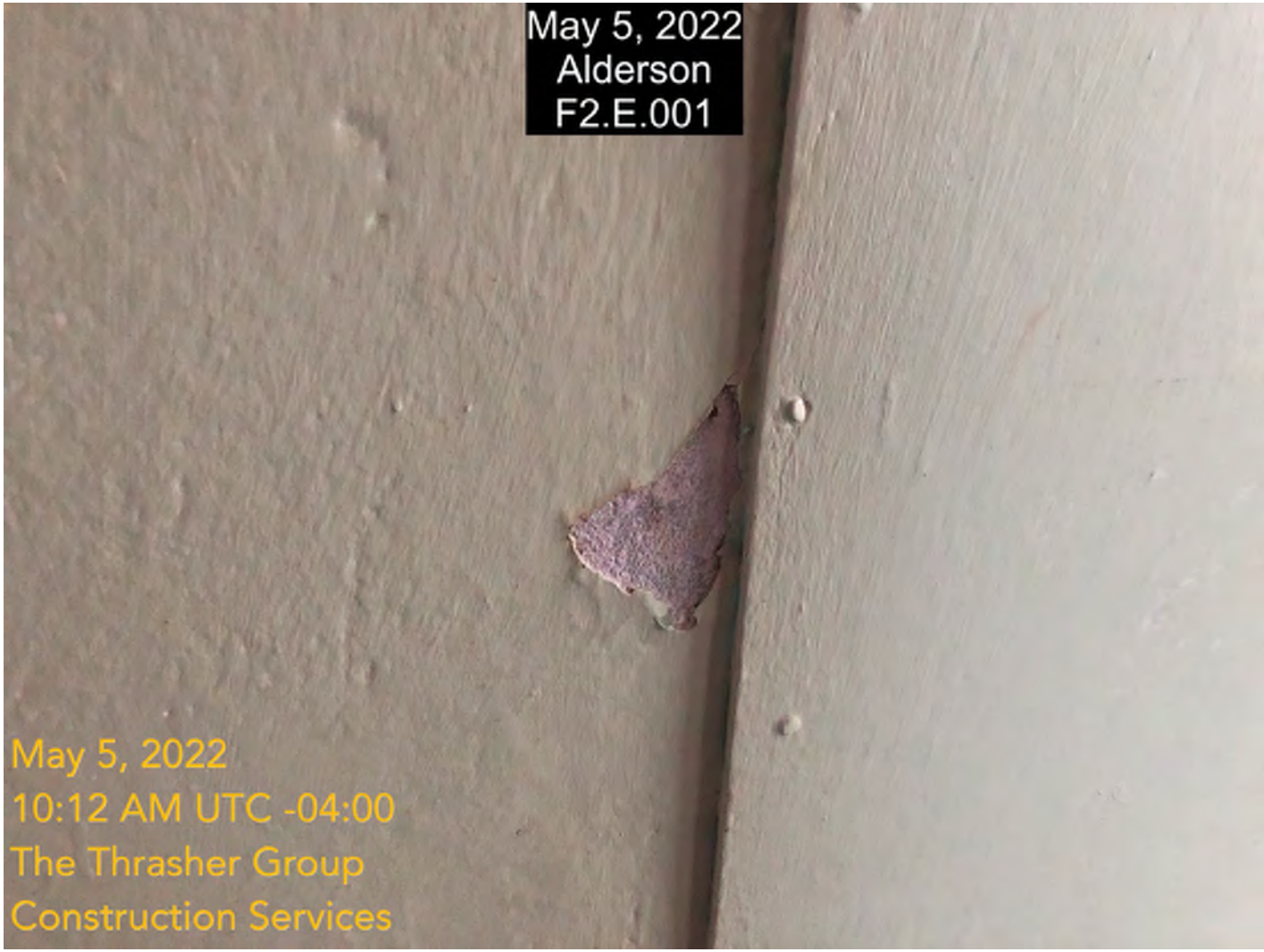


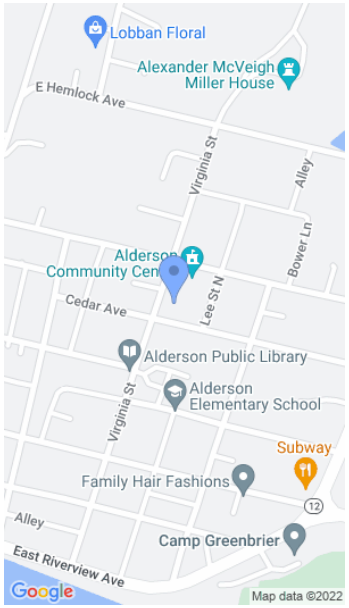
Captured by: Corey Lynn
Captured on: 05 May 2022, 10:14:31 am
Tags:
Description:
Comments:



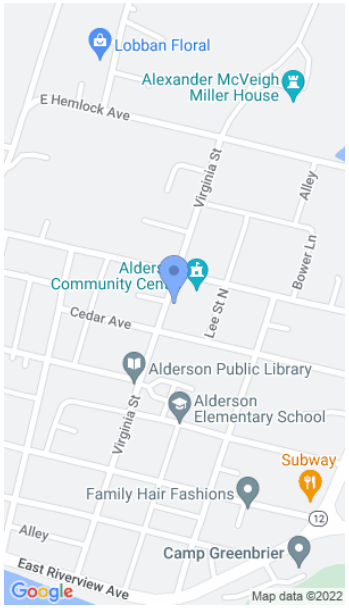
Captured by: Corey Lynn
Captured on: 05 May 2022, 10:13:03 am
Tags:
Description:
Comments:

Captured by: Corey Lynn
Captured on: 05 May 2022, 10:12:59 am
Tags:
Description:
Comments:





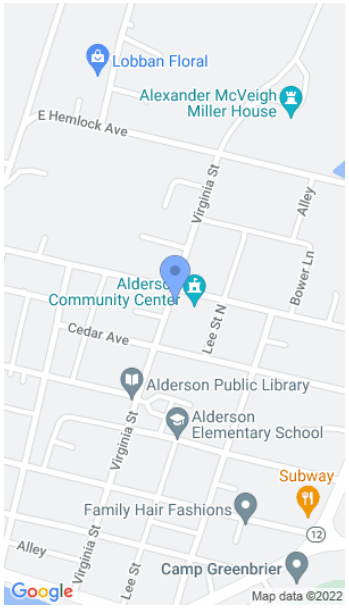
Captured by: Corey Lynn
Captured on: 05 May 2022, 10:07:25 am
Tags:
Description:
Comments:



Captured by: Corey Lynn
Captured on: 05 May 2022, 10:07:12 am
Tags:
Description:
Comments:

Captured by: Corey Lynn
Captured on: 05 May 2022, 10:01:40 am
Tags:
Description:
Comments:

Captured by: Corey Lynn
Captured on: 05 May 2022, 9:58:58 am
Tags:
Description:
Comments:



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Captured on: 05 May 2022, 9:56:51 am
Tags:
Description:
Comments:

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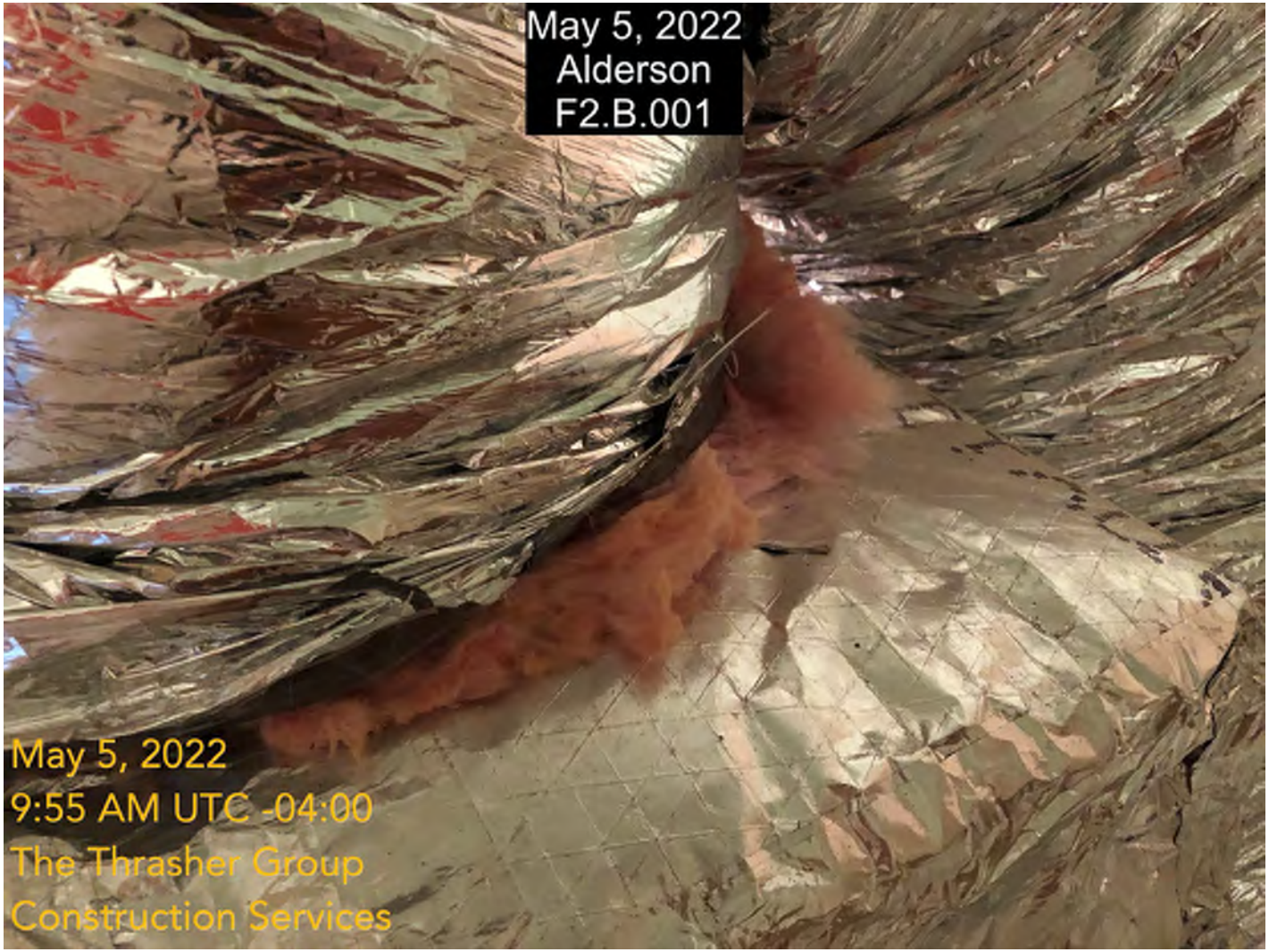
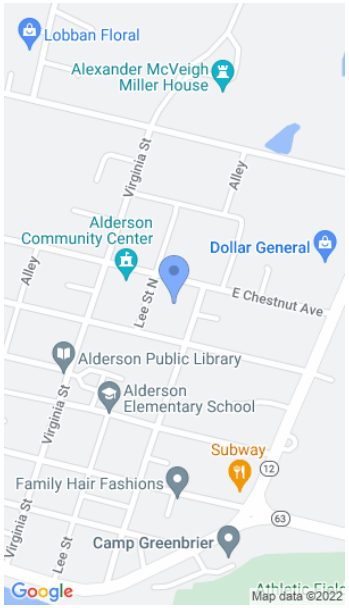
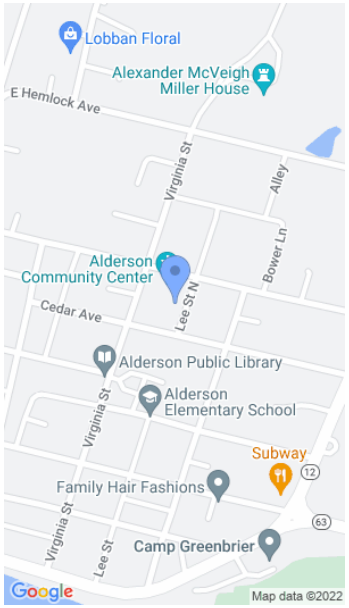
Captured on: 05 May 2022, 9:55:50 am
Tags:
Description:
Comments:





Captured by: Corey Lynn
Captured on: 05 May 2022, 9:54:02 am
Tags:
Description:
Comments:

Captured by: Corey Lynn
Captured on: 05 May 2022, 9:52:17 am
Tags:
Description:
Comments:



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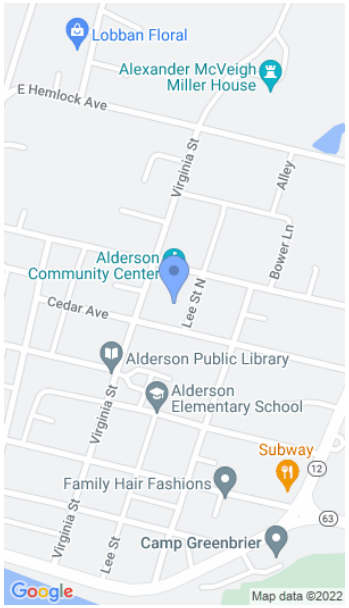
Captured on: 05 May 2022, 9:30:07 am
Tags:
Description:
Comments:



Captured by: Corey Lynn
Captured on: 05 May 2022, 9:29:44 am
Tags:
Description:
Comments:

APPENDIX C – Analytical Results

Pinnacle Consultants

10 INDEPENDENT AVENUE
NITRO, WV 25143
PHONE 304.757.5204
FAX 304.440.3465
www.pinnaclecorp.net

ASBESTOS IDENTIFICATION BY POLARIZED LIGHT MICROSCOPY ANALYSIS

Attn: Robert Severt
The Thrasher Group
600 White Oaks Blvd.
Bridgeport, WV 26330
RE: Alderson Basement

Client Project/PO#:
PC Project #:
Received Date: 5/9/2022
Analysis Date: 5/10/2022

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
A.001	22B-11163a		Grey

Texture/Description: Solid/Floor Tile
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%
Amosite: 0% Actinolite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
A.001	22B-11163b		White

Texture/Description: Solid/Floor Tile
TOTAL ASBESTOS: 3 %
Chrysotile: 3 % Tremolite: 0% Anthophyllite: 0%
Amosite: 0% Actinolite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 97 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
A.001	22B-11163c		Black

Texture/Description: Solid/Mastic
TOTAL ASBESTOS: 2 %
Chrysotile: 2 % Tremolite: 0% Anthophyllite: 0%
Amosite: 0% Actinolite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 98 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
A.002	22B-11164		Grey

Texture/Description: Solid/Floor Tile
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%
Amosite: 0% Actinolite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
A.002	22B-11164b		White

Texture/Description: Solid/Floor Tile
TOTAL ASBESTOS: 3 %
Chrysotile: 3 % Tremolite: 0% Anthophyllite: 0%
Amosite: 0% Actinolite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 97 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
A.002	22B-11164c		Black

Texture/Description: Solid/Mastic
TOTAL ASBESTOS: 2 %
Chrysotile: 2 % Tremolite: 0% Anthophyllite: 0%
Amosite: 0% Actinolite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 98 %

RE: Alderson Basement

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
B.001	22B-11165		White/Brown

Texture/Description: Solid/Ceiling Tile | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 80 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 20 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
B.002	22B-11166		White/Brown

Texture/Description: Solid/Ceiling Tile | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 85 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 15 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
C.001	22B-11167		Black/Yellow

Texture/Description: Fibrous/Pipe Wrap | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 75% | Others: 0% | Filler/Binder: 25 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
C.002	22B-11168		Yellow

Texture/Description: Fibrous/Pipe Wrap | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 100% | Others: 0% | Filler/Binder: 0 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
C.003	22B-11169		White

Texture/Description: Fibrous/Pipe Wrap | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 99% | Filler/Binder: 1 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
C.004	22B-11170		White

Texture/Description: Fibrous/Pipe Wrap | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 100% | Filler/Binder: 0 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
D.001	22B-11171	Wall	Brown

Texture/Description: Solid/Plaster | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
D.002	22B-11172	Wall	Brown

Texture/Description: Solid/Plaster | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

RE: Alderson Basement

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
F.001	22B-11173		White/Brown

Texture/Description: Solid/Drywall | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 40 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 60 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
F.002	22B-11174		White/Brown

Texture/Description: Solid/Drywall | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 45 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 55 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
G.001	22B-11175	Window	Green

Texture/Description: Solid/Glaze | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
G.002	22B-11176	Window	Green

Texture/Description: Solid/Glaze | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
H.001	22B-11177a		Black

Texture/Description: Solid/Trim | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
H.001	22B-11177b		Brown

Texture/Description: Solid/Glue | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 2% | Filler/Binder: 98 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
H.002	22B-11178a		Black

Texture/Description: Solid/Trim | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
H.002	22B-11178b		Brown

Texture/Description: Solid/Glue | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 4% | Filler/Binder: 96 %

RE: Alderson Basement

Analytical Method: Polarized light microscopy using dispersion staining (EPA-600/M4-82-020). PLM should not be used to demonstrate the absence of asbestos in floor tiles. All samples will be held for sixty (60) days unless otherwise requested. This report relates only to items tested and makes no statement as to the contents of surrounding materials and apply to the sample as received. Multi-layered material which have distinct and separable layers shall be reported separately. This report shall not be reproduced, except in full, without written permission. The results of this report should not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Analyzed by: Casey Brown

Reviewed by: Miranda Reedy

Pinnacle Consultants

10 Independent Drive
Nitro, West Virginia 25143
Tel: 304-757-5204
Fax: 304-440-3465
Web: www.pinnaclecorp.net

Company Name: The Thrasher Group	**TURNAROUND TIME REQUESTED**
Contact: Robert Severt	Emergency Rush ☐ 2-Day ☐
Address: 600 White Oaks Blvd	Same Day (4 hours) ☐ 3-5 Day ☐
City State Zip Bridgeport, WV 26330	Next Day (24 Hours) ☒
Email: rsevert@thethrashergroup.com	Phone: 304-288-8124

TYPE OF ANALYSIS REQUESTED

ASBESTOS	FUNGAL SPORE	LEAD
PCM (Air Samples) ☐ PLM (Bulk Samples) ☑	Spore Trap (Air) ☐	XRF ☐ Soil ☐
TEM Analysis ☐ Point Count (If Applicable) ☐	Direct Exam (Tape) ☐	Wipe ☐ Chips ☐
Analyze to Positive ☐		

Bill To If Different:	Comments/Instructions: Also send reports to:
Address: 600 White Oaks Blvd	tspear@thethrashergroup.com
City State Zip: Alt. Bridgeport, WV 26330	
Email:	

PAID BY: Cash ☐ Card ☐ Check ☐

Project ID: Alderson school	PO Number:
Sampling Date/Time: 5/5/22	Sampled By: CL

Project Description/Location: Alderson Basement

Sample ID	Description	Comments	Lab ID
A.001	Gray w white floor tile		22B-11163
A.002	↓		↓
B.001	Ceiling tile		
B.002	↓		
C.001	Pipe wrap		
C.002	↓		
C.003	↓		
C.004	↓		
D.001	Wall Plaster		
D.002	↓		
F.001	Dry Wall		
F.002	↓		
G.001	Window glaze		
G.002	↓		
H.001	Black trim		
H.002	↓		22B-11178

Relinquished By	Corey Fry	Date: 5/6/22	Laboratory Use:
Received By		Date:	RECEIVED
Relinquished By		Date:	MAY 09 2022
Received By	Casey [signature]	Date:	

Pinnacle Consultants

10 INDEPENDENT AVENUE
NITRO, WV 25143
PHONE 304.757.5204
FAX 304.440.3465
www.pinnaclecorp.net

ASBESTOS IDENTIFICATION BY POLARIZED LIGHT MICROSCOPY ANALYSIS

Attn: Robert Severt
The Thrasher Group
600 White Oaks Blvd.
Bridgeport, WV 26330
RE: Alderson F1

Client Project/PO#:
PC Project #:
Received Date: 5/9/2022
Analysis Date: 5/9/2022

CLIENT ID #	LAB ID #	LOCATION	COLOR
A.001	22B-11179		Gray/Blue

Texture/Description: Solid/Carpet
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 60% Filler/Binder: 40 %

CLIENT ID #	LAB ID #	LOCATION	COLOR
A.002	22B-11180		Gray/Blue

Texture/Description: Solid/Carpet
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 70% Filler/Binder: 30 %

CLIENT ID #	LAB ID #	LOCATION	COLOR
B.001	22B-11181		Brown

Texture/Description: Solid/Floral Wallpaper
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 80 % Fiber Glass: 0% Others: 0% Filler/Binder: 20 %

CLIENT ID #	LAB ID #	LOCATION	COLOR
B.002	22B-11182		Brown

Texture/Description: Solid/Floral Wallpaper
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 85 % Fiber Glass: 0% Others: 0% Filler/Binder: 15 %

CLIENT ID #	LAB ID #	LOCATION	COLOR
C.001	22B-11183		White/Grey

Texture/Description: Solid/Laminate
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 12 % Fiber Glass: 0% Others: 0% Filler/Binder: 88 %

CLIENT ID #	LAB ID #	LOCATION	COLOR
C.002	22B-11184		White/Grey

Texture/Description: Solid/Laminate
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 15 % Fiber Glass: 0% Others: 0% Filler/Binder: 85 %

RE: Alderson F1

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
D.001	22B-11185	Wall	White

Texture/Description: Solid/Plaster
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
D.002	22B-11186	Wall	White

Texture/Description: Solid/Plaster
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
E.001	22B-11187		White/Black

Texture/Description: Solid/Lighthouse Wallpaper
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 75 % Fiber Glass: 0% Others: 0% Filler/Binder: 25 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
E.002	22B-11188		White/Black

Texture/Description: Solid/Lighthouse Wallpaper
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 67 % Fiber Glass: 0% Others: 0% Filler/Binder: 33 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
F.001	22B-11189a		White/Brown

Texture/Description: Solid/Tile
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
F.001	22B-11189b		Yellow

Texture/Description: Solid/Mastic
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 2% Filler/Binder: 98 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
F.002	22B-11190a		White/Brown

Texture/Description: Solid/Tile
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
F.002	22B-11190b		Yellow

Texture/Description: Solid/Mastic
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 2% Filler/Binder: 98 %

RE: Alderson F1

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
G.001	22B-11191	Window	White

Texture/Description: Solid/Caulk | Chrysotile: 2 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 2 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 98 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
G.002	22B-11192	Window	White

Texture/Description: Solid/Caulk | Chrysotile: 3 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 3 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 97 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
H.001	22B-11193		Grey

Texture/Description: Solid/Structural Mortar | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
H.002	22B-11194		Grey

Texture/Description: Solid/Structural Mortar | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
I.001	22B-11195		Brown/White

Texture/Description: Solid/Carpet | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 55% | Filler/Binder: 45 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
I.002	22B-11196		Brown/White

Texture/Description: Solid/Carpet | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 50% | Filler/Binder: 50 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
J.001	22B-11197a		Yellow

Texture/Description: Solid/Floor Tile | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
J.001	22B-11197b		Black

Texture/Description: Solid/Mastic | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 5 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 95 %

RE: Alderson F1

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
J.002	22B-11198a		Yellow

Texture/Description: Solid/Floor Tile | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
J.002	22B-11198b		Black

Texture/Description: Solid/Mastic | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 3 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 97 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
K.001	22B-11199		White/Brown

Texture/Description: Solid/Fire Doors | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 25 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 75 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
K.002	22B-11200		White/Brown

Texture/Description: Solid/Fire Doors | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 33 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 67 %

Analytical Method: Polarized light microscopy using dispersion staining (EPA-600/M4-82-020). PLM should not be used to demonstrate the absence of asbestos in floor tiles. All samples will be held for sixty (60) days unless otherwise requested. This report relates only to items tested and makes no statement as to the contents of surrounding materials and apply to the sample as received. Multi-layered material which have distinct and separable layers shall be reported separately. This report shall not be reproduced, except in full, without written permission. The results of this report should not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Analyzed by: Casey Brown

Reviewed by: Miranda Reedy

Pinnacle Consultants

10 Independent Drive
Nitro, West Virginia 25143
Tel: 304-757-5204
Fax: 304-440-3465
Web: www.pinnaclecorp.net

Company Name: The Thrasher Group	**TURNAROUND TIME REQUESTED**
Contact: Robert Severt	Emergency Rush ☐ 2-Day ☐
Address: 600 White Oaks Blvd	Same Day (4 hours) ☐ 3-5 Day ☐
City State Zip Bridgeport, WV 26330	Next Day (24 Hours) ☑
Email: rsevert@thethrashergroup.com	Phone: 304-288-8124

TYPE OF ANALYSIS REQUESTED

ASBESTOS	FUNGAL SPORE	LEAD
PCM (Air Samples) ☐ PLM (Bulk Samples) ☑	Spore Trap (Air) ☐	XRF ☐ Soil ☐
TEM Analysis ☐ Point Count (If Applicable) ☐	Direct Exam (Tape) ☐	Wipe ☐ Chips ☐
Analyze to Positive ☐		

Bill To If Different:	Comments/Instructions: Also send reports to:
Address: 600 White Oaks Blvd	tspear@thethrashergroup.com
City State Zip: Alt. Bridgeport, WV 26330	
Email:	

PAID BY: Cash ☐ Card ☐ Check ☐

Project ID: Alderson school	PO Number:
Sampling Date/Time: 5/5/22	Sampled By: CL

Project Description/Location: Alderson FI

Sample ID	Description	Comments	Lab ID
A.001	Gray Blue Carpet		22B-11179
A.002			
B.001	Floral wall paper		
B.002			
C.001	white & gray laminate		
C.002			
D.001	White wall plaster		
D.002			
E.001	Lighthouse wall paper		
E.002			
F.001	white + brown tile		
F.002			
G.001	Window caulk		
G.002			
H.001	~~Dry wall~~ Structural Mortar		
H.002			
I.001	Brown + white carpet		
I.002			22B-11196

Relinquished By Cory Fry Date: 5/6/22 Laboratory Use:
Received By Date:
Relinquished By Date:
Received By Casey Brown Date:

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MAY 09 2022

Pinnacle Consultants

10 Independent Drive
Nitro, West Virginia 25143
Tel: 304-757-5204
Fax: 304-440-3465
Web: www.pinnaclecorp.net

Company Name: The Thrasher Group	**TURNAROUND TIME REQUESTED**
Contact: Robert Severt	Emergency Rush ☐ 2-Day ☐
Address: 600 White Oaks Blvd	Same Day (4 hours) ☐ 3-5 Day ☐
City State Zip Bridgeport, WV 26330	Next Day (24 Hours) ☒
Email: rsevert@thethrashergroup.com	Phone: 304-288-8124

TYPE OF ANALYSIS REQUESTED

ASBESTOS	**FUNGAL SPORE**	**LEAD**
PCM (Air Samples) ☐ PLM (Bulk Samples) ☑	Spore Trap (Air) ☐	XRF ☐ Soil ☐
TEM Analysis ☐ Point Count (If Applicable) ☐	Direct Exam (Tape) ☐	Wipe ☐ Chips ☐
Analyze to Positive ☐		

Bill To If Different:	Comments/Instructions: Also send reports to:
Address: 600 White Oaks Blvd	tspear@thethrashergroup.com
City State Zip: Alt. Bridgeport, WV 26330	
Email:	

PAID BY: Cash ☐ Card ☐ Check ☐

Project ID: Alderson school	PO Number:
Sampling Date/Time: 5/5/22	Sampled By: CL
Project Description/Location: Alderson FI	

Sample ID	Description	Comments	Lab ID
J.001	Yellow floor tile		22B-11197
J.002	"		"
K.001	Fire doors		"
K.002	"		22B-11200

Relinquished By Corey Ley Date: 5/6/22 Laboratory Use:
Received By _____ Date: _____ RECEIVED
Relinquished By _____ Date: _____
Received By Casey Boon Date: _____ MAY 09 2022

Pinnacle Consultants

10 INDEPENDENT AVENUE
NITRO, WV 25143
PHONE 304.757.5204
FAX 304.440.3465
www.pinnaclecorp.net

ASBESTOS IDENTIFICATION BY POLARIZED LIGHT MICROSCOPY ANALYSIS

Attn: Robert Severt
The Thrasher Group
600 White Oaks Blvd.
Bridgeport, WV 26330

RE: Alderson F2

Client Project/PO#:
PC Project #:
Received Date: 5/9/2022
Analysis Date: 5/9/2022

CLIENT ID #	LAB ID #	LOCATION	COLOR
A.001	22B-11201	Ceiling	Brown/White

Texture/Description: Solid/Plaster
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%

CLIENT ID #	LAB ID #	LOCATION	COLOR
A.002	22B-11202	Ceiling	Brown/White

Texture/Description: Solid/Plaster
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 2% Filler/Binder: 98 %

CLIENT ID #	LAB ID #	LOCATION	COLOR
B.001	22B-11203		Pink

Texture/Description: Fibrous/Insulation
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 99% Others: 0% Filler/Binder: 1 %

CLIENT ID #	LAB ID #	LOCATION	COLOR
B.002	22B-11204		Pink

Texture/Description: Fibrous/Insulation
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 95% Others: 0% Filler/Binder: 5 %

CLIENT ID #	LAB ID #	LOCATION	COLOR
B.003	22B-11205		Pink

Texture/Description: Fibrous/Insulation
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 98% Others: 0% Filler/Binder: 2 %

CLIENT ID #	LAB ID #	LOCATION	COLOR
C.001	22B-11206	HVAC	Silver

Texture/Description: Solid/Tape
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Amosite: 0% Tremolite: 0% Actinolite: 0% Anthophyllite: 0% Crocidolite: 0%
Cellulose: 10 % Fiber Glass: 0% Others: 0% Filler/Binder: 90 %

RE: Alderson F2

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
C.002	22B-11207	HVAC	Silver

Texture/Description: Solid/Tape | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 8 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 92 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
D.001	22B-11208		Cream

Texture/Description: Solid/Laminate | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 15 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 85 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
D.002	22B-11209		Cream

Texture/Description: Solid/Laminate | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 16 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 84 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
E.001	22B-11210	Wall	Green/White

Texture/Description: Solid/Patch | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
E.002	22B-11211	Wall	Grey

Texture/Description: Solid/Patch | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
F.001	22B-11212	Wall	Brown

Texture/Description: Solid/Plaster | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
F.002	22B-11213	Wall	Brown

Texture/Description: Solid/Plaster | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
G.001	22B-11214	Window	White

Texture/Description: Solid/Caulk | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

RE: Alderson F2

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
G.002	22B-11215	Window	Pink

Texture/Description: Solid/Caulk | Chrysotile: 2 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 2 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 98 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
G.003	22B-11216	Window	White

Texture/Description: Solid/Caulk | Chrysotile: 2 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 2 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 98 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
H.001	22B-11217		White/Brown

Texture/Description: Solid/Drywall | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 45 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 55 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
H.002	22B-11218		White/Brown

Texture/Description: Solid/Drywall | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 40 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 60 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
I.001	22B-11219		Green

Texture/Description: Solid/Paint | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
I.002	22B-11220		Green

Texture/Description: Solid/Paint | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
I.003	22B-11221		Green

Texture/Description: Solid/Paint | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 0% | Others: 0% | Filler/Binder: 100%

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
J.001	22B-11222a		White

Texture/Description: Solid/Ceiling Tile | Chrysotile: 0 % | Tremolite: 0% | Anthophyllite: 0%
TOTAL ASBESTOS: 0 % | Amosite: 0% | Actinolite: 0% | Crocidolite: 0%
Cellulose: 0 % | Fiber Glass: 67% | Others: 0% | Filler/Binder: 33 %

RE: Alderson F2

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
J.001	22B-11222b		Brown

Texture/Description: Solid/Glue
TOTAL ASBESTOS: 3 %
Chrysotile: 3 % Tremolite: 0% Anthophyllite: 0%
Amosite: 0% Actinolite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 97 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
J.002	22B-11223a		White

Texture/Description: Solid/Ceiling Tile
TOTAL ASBESTOS: 0 %
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%
Amosite: 0% Actinolite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 75% Others: 0% Filler/Binder: 25 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
J.002	22B-11223b		Brown

Texture/Description: Solid/Glue
TOTAL ASBESTOS: 2 %
Chrysotile: 2 % Tremolite: 0% Anthophyllite: 0%
Amosite: 0% Actinolite: 0% Crocidolite: 0%
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 98 %

Analytical Method: Polarized light microscopy using dispersion staining (EPA-600/M4-82-020). PLM should not be used to demonstrate the absence of asbestos in floor tiles. All samples will be held for sixty (60) days unless otherwise requested. This report relates only to items tested and makes no statement as to the contents of surrounding materials and apply to the sample as received. Multi-layered material which have distinct and separable layers shall be reported separately. This report shall not be reproduced, except in full, without written permission. The results of this report should not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Analyzed by: Casey Brown

Reviewed by: Miranda Headley

Pinnacle Consultants

10 Independent Drive
Nitro, West Virginia 25143
Tel: 304-757-5204
Fax: 304-440-3465
Web: www.pinnaclecorp.net

Company Name: The Thrasher Group
Contact: Robert Severt
Address: 600 White Oaks Blvd
City State Zip: Bridgeport, WV 26330
Email: rsevert@thethrashergroup.com

TURNAROUND TIME REQUESTED

Emergency Rush ☐ 2-Day ☐
Same Day (4 hours) ☐ 3-5 Day ☐
Next Day (24 Hours) ☒
Phone: 304-288-8124

TYPE OF ANALYSIS REQUESTED

ASBESTOS
PCM (Air Samples) ☐ PLM (Bulk Samples) ☑
TEM Analysis ☐ Point Count (If Applicable) ☐
Analyze to Positive ☐

FUNGAL SPORE
Spore Trap (Air) ☐
Direct Exam (Tape) ☐

LEAD
XRF ☐ Soil ☐
Wipe ☐ Chips ☐

Bill To If Different:
Address: 600 White Oaks Blvd
City State Zip: Alt. Bridgeport, WV 26330
Email:

Comments/Instructions: Also send reports to:
tspear@thethrashergroup.com

PAID BY: Cash ☐ Card ☐ Check ☐

Project ID: Alderson School
Sampling Date/Time: 5/5/22
PO Number:
Sampled By: CL

Project Description/Location:
Alderson F2

Sample ID	Description	Comments	Lab ID
A.001	Ceiling plaster		22B-11201
A.002			
B.001	Insulation		
B.002			
B.003			
C.001	HVAC Tape		
C.002			
D.001	Cream Laminate		
D.002			
E.001	Wall Patch		
E.002			
F.001	Wall Plaster		
F.002			
F.003			
G.001	Window Caulk		
G.002			
G.003			22B-11216

Relinquished By: Corey Fry Date: 5/6/22
Received By: Date:
Relinquished By: Date:
Received By: Casey Bloom Date:

Laboratory Use:
RECEIVED
MAY 09 2022

Pinnacle Consultants

10 Independent Drive
Nitro, West Virginia 25143
Tel: 304-757-5204
Fax: 304-440-3465
Web: www.pinnaclecorp.net

Company Name: The Thrasher Group	**TURNAROUND TIME REQUESTED**
Contact: Robert Severt	Emergency Rush ☐ 2-Day ☐
Address: 600 White Oaks Blvd	Same Day (4 hours) ☐ 3-5 Day ☐
City State Zip Bridgeport, WV 26330	Next Day (24 Hours) ☒
Email: rsevert@thethrashergroup.com	Phone: 304-288-8124

TYPE OF ANALYSIS REQUESTED

ASBESTOS	**FUNGAL SPORE**	**LEAD**
PCM (Air Samples) ☐ PLM (Bulk Samples) ☑	Spore Trap (Air) ☐	XRF ☐ Soil ☐
TEM Analysis ☐ Point Count (If Applicable) ☐	Direct Exam (Tape) ☐	Wipe ☐ Chips ☐
Analyze to Positive ☐		

Bill To If Different:	Comments/Instructions: Also send reports to:
Address: 600 White Oaks Blvd	tspear@thethrashergroup.com
City State Zip: Alt. Bridgeport, WV 26330	
Email:	

PAID BY: Cash ☐ Card ☐ Check ☐

Project ID: Alderson School	PO Number:
Sampling Date/Time: 5/5/22	Sampled By: CL

Project Description/Location: Alderson F2

Sample ID	Description	Comments	Lab ID
H.001	Dry wall		22B-11217
H.002	↓		↓
I.001	Paint		↓
I.002	↓		↓
I.003	↓		↓
J.001	Ceiling tile		↓
J.002	↓		22B-11223

Relinquished By Cody Fry Date: 5/6/22 Laboratory Use:
Received By Date:
Relinquished By Date:
Received By Ashley Brown Date:

REC
MAY 09 2022

Pinnacle Consultants

10 INDEPENDENT AVENUE
NITRO, WV 25143
PHONE 304.757.5204
FAX 304.440.3465
www.pinnaclecorp.net

ASBESTOS IDENTIFICATION BY POLARIZED LIGHT MICROSCOPY ANALYSIS

Attn: Robert Severt
The Thrasher Group
600 White Oaks Blvd.
Bridgeport, WV 26330

RE: Alderson Roof

Client Project/PO#:
PC Project #:
Received Date: 5/9/2022
Analysis Date: 5/10/2022

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
A.001	22B-11224		Black/White

Texture/Description: Solid/Roof Matting
TOTAL ASBESTOS: 0 %

Chrysotile:	0 %	Tremolite:	0%	Anthophyllite:	0%		
Amosite:	0%	Actinolite:	0%	Crocidolite:	0%		
Cellulose:	0 %	Fiber Glass:	10%	Others:	0%	Filler/Binder:	90 %

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
A.002	22B-11225		Black

Texture/Description: Solid/Roof Matting
TOTAL ASBESTOS: 0 %

Chrysotile:	0 %	Tremolite:	0%	Anthophyllite:	0%		
Amosite:	0%	Actinolite:	0%	Crocidolite:	0%		
Cellulose:	0 %	Fiber Glass:	0%	Others:	0%	Filler/Binder:	100%

Analytical Method: Polarized light microscopy using dispersion staining (EPA-600/M4-82-020). PLM should not be used to demonstrate the absence of asbestos in floor tiles. All samples will be held for sixty (60) days unless otherwise requested. This report relates only to items tested and makes no statement as to the contents of surrounding materials and apply to the sample as received. Multi-layered material which have distinct and separable layers shall be reported separately. This report shall not be reproduced, except in full, without written permission. The results of this report should not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Analyzed by: Casey Brown

Reviewed by: Miranda Ready

Pinnacle Consultants

10 Independent Drive
Nitro, West Virginia 25143
Tel: 304-757-5204
Fax: 304-440-3465
Web: www.pinnaclecorp.net

Company Name: The Thrasher Group	**TURNAROUND TIME REQUESTED**
Contact: Robert Severt	Emergency Rush ☐ 2-Day ☐
Address: 600 White Oaks Blvd	Same Day (4 hours) ☐ 3-5 Day ☐
City State Zip Bridgeport, WV 26330	Next Day (24 Hours) ☑
Email: rsevert@thethrashergroup.com	Phone: 304-288-8124

TYPE OF ANALYSIS REQUESTED

ASBESTOS	FUNGAL SPORE	LEAD
PCM (Air Samples) ☐ PLM (Bulk Samples) ☑	Spore Trap (Air) ☐	XRF ☐ Soil ☐
TEM Analysis ☐ Point Count (If Applicable) ☐	Direct Exam (Tape) ☐	Wipe ☐ Chips ☐
Analyze to Positive ☐		

Bill To If Different:	Comments/Instructions: Also send reports to:
Address: 600 White Oaks Blvd	tspear@thethrashergroup.com
City State Zip: Alt. Bridgeport, WV 26330	
Email:	

PAID BY: Cash ☐ Card ☐ Check ☐

Project ID: Alderson School	PO Number:
Sampling Date/Time: 5/5/22	Sampled By: CL

Project Description/Location: Alderson Roof

Sample ID	Description	Comments	Lab ID
A.001	roof / matting		22B-11224
A.002			22B-11225

Relinquished By Cody Long Date: 5/6/22 Laboratory Use:
Received By Date:
Relinquished By Date:
Received By Date:

RECEIVED
MAY 09 2022

APPENDIX D – Certification and License

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200718-0

Pinnacle Consultants, LLC

Nitro, WV

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2021-07-01 through 2022-06-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Pinnacle Consultants, LLC
10 Independent Avenue
Nitro, WV 25143
Ms. Miranda Reedy
Phone: 304-757-5204 Fax: 304-757-5205
Email: miranda.reedy@pinnaclecorp.net
http://www.pinnaclecorp.net

ASBESTOS FIBER ANALYSIS **NVLAP LAB CODE 200718-0**

Bulk Asbestos Analysis

Code	*Description*
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

For the National Voluntary Laboratory Accreditation Program

TSI TRAINING SERVICES INTERNATIONAL

Asbestos Building Inspector Initial

Certificate

This is to certify

Corey J. Lynn

XXX-XX-4737

has attended and successfully completed the Asbestos Hazard Emergency Response Act mandatory course for the Asbestos Building Inspector Initial and has passed an examination in that course with a minimum score of 70% or better. Training was in accordance with 40 CFR Part 763 (AHERA). The above student received the requisite training for asbestos accreditation under Title II of the Toxic Substances Control Act and State of Indiana requirements under 326 IAC 18-2 and Chapter 3745-22 Ohio Administrative Code.

Training Manager	Expiration Date	Date(s) of Course	Examination Date	Course Location
Robert Walter	12/1/22	11/29/21 - 12/1/21	12/1/21	Cleveland, OH

33150 Lakeland Blvd.
Cleveland, OH 44095
www.TSItraining.com

Course Certificate No. **21 TSI 88467 ii**

WEST VIRGINIA

Asbestos Program

Corey J. Lynn

IS LICENSED AS AN

ASBESTOS INSPECTOR

License # AI010780

Issued: 2/4/2022

Expires: 2/28/2023

Director
WV OEHS

TSI TRAINING SERVICES INTERN

WEST VIRGINIA
Asbestos Program

Robert J. Severt

IS LICENSED AS AN
ASBESTOS INSPECTOR

License #: AI010587
Issued: 8/9/2021
Expires: 8/31/2022

Director
WV OEHS

Asbestos Building Inspector Refresher

Certificate

This is to certify

Robert Severt

XXX-XX-3298

has attended and successfully completed the Asbestos Hazard Emergency Response Act mandatory course for the Asbestos Building Inspector Refresher and has passed an examination in that course with a minimum score of 70% or better. Training was in accordance with 40 CFR Part 763 (AHERA). The above student received the requisite training for asbestos accreditation under Title II of the Toxic Substances Control Act and State of Indiana requirements under 326 IAC 18-2 and Chapter 3745-22 Ohio Administrative Code.

	7/30/22	7/30/21	7/30/21	Online Webinar
Training Manager	Expiration Date	Date(s) of Course	Examination Date	Course Location

33150 Lakeland Blvd.
Cleveland, OH 44095
www.TSItraining.com

Course Certificate No. **21 TSI 87280 ir**

American Geotech, Inc.
601 Ohio Avenue
Charleston, WV 25302
(304) 340-4277
Fax 340-4278

AMERICAN GEOTECH, INC.

Geotechnical, Environmental and Testing Engineers

REPORT OF
GEOTECHNICAL EXPLORATION & ENGINEERING ANALYSIS
PROPOSED NEW ALDERSON ELEMENTARY SCHOOL
ADDITIONS AND ALTERATIONS
E. CHESTNUT AVENUE AND LEE STREET, N.
ALDERSON, WEST VIRGINIA

Prepared For

GREENBRIER COUNTY BOARD OF EDUCATION
LEWISBURG, WEST VIRGINIA
FEBRUARY - 2022

(This report contains 12 pages, plus appendices)

AMERICAN GEOTECH, INC.

GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS

601 OHIO AVENUE
CHARLESTON, WV 25302
(304) 340-4277
Fax (304) 340-4278

February 15, 2022

Greenbrier County Board of Education
% The Thrasher Group, Inc.
600 White Oaks Boulevard
Bridgeport, WV 26330

ATTN: Mr. Kenton Blackwood, AIA

Re: Report of Geotechnical Exploration & Engineering Analysis
Proposed New Alderson Elementary School and Additions
E. Chestnut Avenue and Lee Street, N.
Alderson, West Virginia

Dear Mr. Blackwood:

Upon your request and authorization, American Geotech, Inc. (AGI) is pleased to present the results of our geotechnical exploration and engineering analysis for the proposed 1 to 3 story alterations and additions to the existing Alderson Community Center building, located in Alderson, West Virginia. The detailed geotechnical report is attached herewith.

It is recommended that the contract documents must follow International Building Code (IBC) requirements, including a Schedule of Special Inspection Services for soils and foundations in the plans. At a minimum, the Geotechnical Engineer of Record (GER) shall provide on-site observation, testing, and special inspection services during site grading, soil compaction, and foundation and floor slab construction.

We appreciate the opportunity of providing these services to you. Please contact our office at 304-340-4277 if we can elaborate on any of the recommendations contained in this report, or provide additional information.

Respectfully Submitted,

AMERICAN GEOTECH, INC.

Kanti S. Patel, M.S.C.E., P.E.
Principal Engineer

GEOTECHNICAL EXPLORATION AND ENGINEERING ANALYSIS

PROPOSED NEW ALDERSON ELEMENTARY SCHOOL
ALDERSON, WEST VIRGINIA

EXECUTIVE SUMMARY

A brief summary of our recommendations for this project is presented below. This summary should be read in context with the entire report for proper interpretation.

Special Concerns

- Development of this site as planned will be somewhat difficult due to the change in elevation across the site and the associated requirement of foundation retaining walls for some sections. Retaining walls will be required on north and south sides of the site due to the proposed grading and cutting of the site to match the existing floor elevations.
- The controlling geotechnical concern at this site is the foundation construction, considering that the footings will encounter fill and natural soil materials at design bearing elevation. Over-excavation to depths of roughly 4.5 feet below the existing grades will be required for approximately 20% of the new foundations to provide bearing on natural materials.
- Temporary sheeting or shoring may be required for the walls and excavations along the eastern side of the building to protect the adjacent building foundations, utilities, and roadway, depending upon the final site grading plan.
- Foundation drains should be provided on all sides of the new building additions. The foundation drains will be critically important on the below grade sections of the building additions.
- The most critical aspects of the site construction include site grading, retaining structure construction, and building subgrade preparation. These activities must be monitored, tested, and verified by a licensed geotechnical engineer, or their authorized representative.
- It is recommended that the contract documents must follow International Building Code (IBC) requirements, including a Schedule of Special Inspection Services for soils and foundations in the plans. At a minimum, the Geotechnical Engineer of Record (GER) shall provide on-site observation, testing, and special inspection services during site grading, soil compaction, and foundation and floor slab construction.

Site Development

- All structural areas, as defined by the building footprint and areas to receive fill, should be stripped of all surface vegetation, topsoil, existing structures, relict concrete slabs or footings, existing fill, retaining walls, old utilities, and any other deleterious materials.
- Following the stripping and grading processes, all exposed soil subgrade areas should be proof-rolled by a rubber-tired, loaded, 15 ton dump truck or a smooth drum vibratory roller, under the supervision of a qualified geotechnical

representative. A minimum of four passes should be made across the entire site area by the proof-rolling equipment, in each of two perpendicular directions.

- The surface soils consist of silty and sandy clays, which can be susceptible to significant shear strength loss and degradation when wet and disturbed. Significant rutting and muddy conditions may be common during construction in wet seasons. The construction activities should be conducted during the dry months of the year.

Foundations

- The proposed building additions should be supported on conventional spread footing foundation systems bearing on firm natural soils. The spread footing foundation should be designed for a net allowable bearing capacity of 2,500 psf.
- Foundation construction will be somewhat non-routine for this project since the footings will step down across the site to follow the required bearing materials due to the sloping ground surface. These sections should be constructed with foundation steps to maintain the required bearing depth or follow suitable natural soils.
- Over-excavation of the foundation excavations will be required in approximately 20% of the footings to encounter natural materials due to localized fill deposits. The required over-excavations below the bearing surface can be backfilled using 300 psi flowable fill or CLSM to the final bearing elevation. An allowance of 30 c.y. of flowable fill/CLSM should be made in the contract.
- The base of all exterior footings should be at least 42 inches below the final exterior grade for adequate frost protection.

Floor Slab Support

- All existing underground utilities, unengineered fill and backfill materials, relict slabs, and foundations should be removed from the floor slab areas completely.
- After the subgrade has been prepared according to the guidelines in the Site Preparation section, the slab-on-grade sections can be designed based on a subgrade modulus of 120 PCI supported on new engineered fill or natural soils.

INTRODUCTION

This report presents the results of a geotechnical subsurface exploration and engineering analysis for the proposed new Alderson Elementary School in Alderson, West Virginia. The purpose of this exploration was to generally define the subsurface conditions at this site, and to characterize those conditions for the proposed building alterations and additions. The exploration included the drilling of seven (7) Standard Penetration Test soil borings, visual classification and laboratory testing of the representative material samples, and the report preparation. The exploration was authorized by Mr. Kenton Blackwood of Thrasher Group, and the work was performed in accordance with our written proposal/agreement dated September 13, 2021.

PROJECT INFORMATION

It is proposed to construct one and three story additions and alterations to the existing Alderson Community Center building at the previously referenced site. The new building sections will consist of masonry CMU exterior and interior walls with an exterior brick veneer to match the existing building. The ground floor will be constructed as an industry standard slab-on-grade. The finished floor elevation within the 3-story main office/classroom addition will be set to match the existing building floor elevations. The finished floor elevation within the new Pre-K/Kindergarten addition will be set several feet lower due to the sloping ground surface. As such, the existing ground surface within the building area will require roughly 4 feet of cut and 4 feet of fill inside the foundation wall. Structural loads will be supported on interior and exterior walls. Preliminary structural loads were not available at the time this report was prepared.

The site is currently occupied by open lawn areas, sections of the existing building, and concrete sidewalks. The existing surface profile at the site is described as gently sloping ground with overall relief toward the south. The site is presently occupied by a 3-story brick community center building (old high school) on the upper terrace, a pre-engineered metal building gymnasium with a partial basement on the rear southwestern corner, a metal auxiliary building on the southeastern rear corner, and significant areas of open lawn and landscaping. Existing gas, water, sanitary and storm sewer lines are present within the proposed building addition areas that will require relocation. We are aware that settlement related damage is present on the floor slab of the gymnasium building and this will be addressed in a separate report.

SUBSURFACE EXPLORATION

Seven (7) Standard Penetration Test (SPT) soil borings were drilled at this site on February 1 and 2, 2022. The borings were drilled at the approximate locations shown on the attached Test Boring Location Plan. The test borings were staked in the field by AGI personnel referencing the locations specified by the architect and the existing site features. The test borings were drilled in accordance with ASTM D 1586 procedures using track-mounted drilling equipment. The test borings were advanced between samples and the bore holes were maintained using 2.25-inch interior diameter hollow-stem augers. Split spoon samplers were used to recover the soil samples from the undisturbed material below the bottom of the augers. The split spoon sampler,

having an outside diameter of 2.0-inches and an inside diameter of 1⅜-inches, was driven into the soil with a 140-pound automatic hammer falling from a height of 30 inches. The soil samples were recovered at 2.5 foot intervals within the top 10 feet and at 5 foot intervals thereafter.

Upon completion of the drilling, the holes were backfilled with the auger cuttings and the samples were transported to our soil mechanics laboratory, where they were visually classified and grouped for laboratory testing by the project engineer. The laboratory testing program included natural moisture contents, pocket penetrometer readings, and two (2) unconfined compressive strength tests on the representative soil samples. The final test boring logs were then prepared and are attached to this report, along with the laboratory testing data.

SUBSURFACE CONDITIONS

Below the existing topsoil, unengineered fill or natural alluvial soils were encountered. Existing unengineered fill materials deposits were encountered in a few of the test borings to depths of 2.5 to 4.5 feet below the existing surface. Alluvial soils were encountered in all test borings to depths of 8.5 to over 16.5 feet below the present site grades. In general, the subsurface profile is described as unengineered fill, alluvium, and natural soil deposits underlain by weathered bedrock. Obvious or apparent alkali or other deleterious materials in the soils were not identified at the site.

Unengineered fill deposits encountered in borings B-1 and B-7 were described as brown, dark brown, and black sandy clay with rock fragments and trace organics. In B-4, the existing fill consisted of brown, yellowish-brown, dark brown and gray silty clay with trace sand and organics. The fill strata were noted as moist, with moisture contents of 15.9% to 23.1%. SPT N-values within the fill layers ranged from 5 to 11 blows-per-foot (bpf), which are classified as medium stiff to stiff in consistency. A pocket penetrometer reading of 2.5 tons-per-square-foot (tsf) was obtained on the sample from B-7. An unconfined compressive strength test on a sample from B-4 produced a strength of 1.32 tsf.

The natural soils, encountered below the existing topsoil and fill layers in all borings, are described as alternating layers of silty and sandy clay. These soil layers also contained various amounts of rock fragments and fine sand, depending upon the location. The colors of these materials include brown, reddish-brown, light brown, yellowish-brown, orangish-brown, grayish-brown, gray, maroon and tan. These materials were noted as moist to damp with natural moisture contents ranging from 16.6% to 34.7%. Pocket penetrometer readings of 0.25 to 4.5 tsf were obtained on these samples. The SPT N-values within these strata were 2 to 24 bpf, which are classified as soft to very stiff in consistency. An unconfined compressive strength test produced a result of 2.33 TSF. B-1 was extended to a completion depth of 16.5 feet below the existing surface. In most borings, these alluvial soil layers extended to depths of 8.5 to 15.5 feet below the existing surface and were underlain by weathered bedrock.

Granular soil materials were encountered at this site in B-4 below a depth of 9.5 feet. This soil layer was described as moist, brown clayey sand. This material was classified as very fine-

grained and loose in relative density. This stratum extended to a depth of 10.5 feet and was underlain by weathered bedrock.

Weathered bedrock was encountered in all of the borings (except B-1), below the described alluvial soils, at depths ranging from 8.5 to 15.5 feet below the existing surface. The encountered bedrock types included sandy shale, shale and sandstone. These weathered bedrock types ranged from being very soft to medium hard. While being relatively firm when undisturbed, the encountered bedrock materials are dry and weathered to a degree where exposure to wet conditions will rapidly degrade the rock structure back to a clayey condition. The colors of these materials include gray and brown. Split spoon sampler refusal occurred within the described soft to tough bedrock material strata at various depths at most referenced test boring locations. Test borings B-2 and B-3 were advanced to completion depths ranging from 15.2 to 16.4 feet below the existing surface. Auger refusal on medium hard bedrock occurred in B-4 to B-7 at depths ranging from 9.0 to 14.0 feet below the existing surface grades.

Groundwater was encountered in B-3 at a depth of 15.0 feet. Groundwater was not encountered, during drilling or at completion, in any of the other test borings at the site. We should state that fluctuations in the location of the groundwater table, as well as perched or trapped groundwater, can occur as a result of seasonal variations in precipitation, evaporation, surface runoff, and other factors not immediately apparent at the time of our exploration.

ANALYSIS AND RECOMMENDATIONS

Development of this site as planned will be somewhat difficult due to the change in elevation across the site and the associated requirement of foundation retaining walls for some sections. The rear south and front northern ground level building walls of the addition sections will have to be designed as reinforced cast-in-place concrete retaining walls.

The controlling geotechnical concern with respect to this project is the foundation construction, considering that the footings will encounter fill and natural soils at the design bearing elevation. Stepping down the foundation excavations will be required to follow suitable natural soil bearing materials due to the sloping ground surface. These foundation areas should be constructed with steps to maintain the required bearing depth across the sloping site.

Temporary sheeting or shoring may be required for the walls and excavations along the eastern side of the building to protect the adjacent building foundations, utilities, and roadway, depending upon the final site grading plan.

Site Preparation

All structural areas, as defined by the proposed building footprint and all areas to be modified for site development, should be stripped of all concrete pavements, surface vegetation, topsoil, utilities, trees (including the rootballs and rootmat), existing structures, footings, slabs, and any other deleterious materials. All existing underground utility lines should be relocated outside of the new building areas. Immediately following site stripping, all existing below grade elements

from the demolished building sections should be stripped to the level of natural materials and removed from the site. All existing unengineered fill/rubble deposits within the cut areas should also be removed from the site, as these mixed materials are not suitable for use as engineered fill within the new building area.

Following the stripping process, all exposed subgrade areas should be proof-rolled using a rubber-tired, loaded, 15 ton dump truck or a smooth drum vibratory roller, under the supervision of a qualified geotechnical representative. A minimum of four passes should be made across the entire site area by the proof-rolling equipment, in each of two perpendicular directions. Localized soft or disturbed areas should be undercut at least 2 feet and stabilized in order to provide a firm subgrade. Any required over-excavations to remove soft/wet soils or existing utility or foundation related backfill can be backfilled with compacted engineered fill.

Much of the encountered soil materials at the site are very sensitive when exposed to excessive moisture. These materials, which range in color from orange, tan and gray, quickly lose shear strength at higher moisture contents and take a significant amount of time and favorable weather conditions to dry out.

We recommend that all engineered fill or backfill be placed in maximum 8-inch thick lifts and compacted to 98% of the Standard Proctor maximum dry density, as determined by ASTM D 698. The lift thickness should be reduced to 4 inches whenever compaction will be accomplished using hand operated compaction equipment. We recommend that the engineered fill materials have a liquid limit less than 40, a plasticity index less than 15, and a maximum aggregate particle size of 4 inches in any dimension. The fill should be maintained within ±3% of its optimum moisture value before compaction and verified by on-site density gauge testing. The on-site natural materials are suitable for use as engineered fill, provided they are free from all deleterious materials and that the maximum particle size limitation is met. Existing fill materials are not suitable for use as new engineered fill and should be removed from the site.

Foundation Design

The proposed building can be founded on a conventional spread footing foundation system bearing on the underlying firm natural soils. The foundations should be designed for a net allowable bearing capacity of 2,500 PSF. It is recommended that all continuous foundation sections be at least 24 inches wide and 12 inches thick. All isolated column footings should be no less than 3 feet by 3 feet. The base of the exterior foundations should be at least 42 inches below the final exterior grade for adequate frost protection.

Foundation construction will be somewhat non-routine for this project since the building footings will need to step down to maintain the required bearing depth across the sloping site. Stepping down the foundation excavations may also be required in some areas to follow suitable bearing strata consisting of firm natural soils. Over-excavation to depths of roughly 4.5 feet below the existing grades will be required within approximately 20% of the footing excavations. We recommend that any soil materials, backfill, or relict foundations encountered at bearing elevation be completely removed. Any required over-excavations below the bearing surface can

be backfilled using 300 PSI flowable fill or Controlled Low Strength Material (CLSM) to the final bearing elevation.

The base of all foundation excavations should be observed and tested by the geotechnical engineer, or a qualified representative, prior to the placement of steel reinforcements or concrete. The bearing surface should be prepared as clean as possible and all loose materials should be removed from the footing excavations. Any required minor over-excavations below the bearing surface (to penetrate utility backfill, soil layers, *etc.*) can be backfilled using CLSM to the final bearing elevation.

Foundation drains should be provided on all sides of the new building additions. The foundation drains will be critically important on the below grade sections of the building additions.

For a foundation system designed and constructed as recommended above, the estimated total settlement should be approximately 1.0 inch, with possible differential settlement equal to the total settlement. The differential settlement will result in an angular distortion of approximately 0.004 inches per inch across a distance of 20 feet. If masonry walls are used, the potential effects of the settlement on the structure can be minimized by providing control/construction joints at critical locations and every 20 feet along the masonry walls. The control/construction joints should be provided where changes in the wall height or loading conditions occur.

Seismic Soils Classification and Seismic Hazard Evaluation

Site Class D is recommended for the seismic design considerations, based upon our test borings, our knowledge and understanding of the area geology, and Table 1613.5.2 of the 2015 International Building Code (IBC). The overburden soils at this site are identified as Site Class D. The depth of bedrock at this site varies from 8.5 feet to over 16.5 feet below the present surface and belongs to Site Class B. Although the IBC site classification is based on the average soil conditions within the top 100 feet of the subsurface profile, the IBC permits the soil properties to be estimated by a geotechnical engineer based upon known regional geologic conditions where site-specific data is not available to the depth of 100 feet. A 100 foot deep test boring, possibly in conjunction with more sophisticated laboratory testing or field geophysical testing, would be required to more accurately determine the soil properties and soil site class. The actual seismic design should be performed by a structural engineer. The following potential seismic hazards resulting from earthquake motion have been evaluated.

1. A slope stability analysis was not included in the scope of this exploration. The ground surface within the building area is gently sloping and appears to be stable. All fill slopes are recommended to be no steeper than 3H:1V, due to potential instability resulting from earthquake motion. All cut slopes should be protected by retaining walls.

2. The groundwater table was encountered only in B-3 during our exploration at a depth of 15.0 feet. The bearing materials consist of cohesive soil materials. The bearing strata, due to the cohesive nature of the materials, will not undergo liquefaction due to earthquake motions.

3. As no minor surface undulations, ponds or low lying areas are present within the immediate vicinity of the proposed building footprint, lateral spreading is not likely due to the shallow depth to bedrock.

4. As lateral spreading is unlikely and no faults are present within the site area, surface rupture is also unlikely.

The following seismic design recommendations are offered based on seismic design maps prepared and provided by IBC 2015.

- Mapped Acceleration Parameters
  $S_S = 0.207$
  $S_1 = 0.077$
- Site Coefficients
  $F_a = 1.6$
  $F_v = 2.4$
- Seismic Design Parameters
  $S_{MS} = 0.331$
  $S_{M1} = 0.185$
  $S_{DS} = 0.221$
  $S_{D1} = 0.123$

Floor Slab Support

After the subgrade has been prepared according to the guidelines in the Site Preparation section, the slab-on-grade sections can be designed based on a subgrade modulus of 120 PCI supported on new engineered fill or natural soil materials. As stated earlier, all existing utility related backfill materials, utility lines and relict footings within the floor slab areas should be removed to the level of natural soils and replaced using compacted, engineered fill. If subgrade areas become disturbed during construction, then the soft areas should be undercut and replaced with compacted, structural fill or crushed stone. A minimum 4 inch thick, free-draining granular base course is recommended beneath slabs constructed on grade. A vapor barrier, conforming to ASTM E 1745, should also be incorporated into the floor slab design within the enclosed sections that will include floor coverings, such as carpet or tile. The slab should be isolated from the building foundation so that any differential settlements would not induce shear stresses on the slab. This can be accomplished through the proper use and placement of construction joints. As much as 1.25 inches of settlement below the floor slab should be anticipated due to the cut and fill conditions.

Retaining Wall Design

In general, walls greater than four feet in height which are to retain unbalanced soil should be designed as retaining walls. Such retaining walls must be capable of resisting the lateral earth pressures that will be imposed on them. Lateral earth pressures to be resisted by the walls will be partially dependent upon the method of construction. Assuming that the structure walls are relatively rigid and structurally braced against rotation, they should be designed for a condition

approaching the "at-rest" lateral pressure. The following lateral earth pressure parameters are recommended for design, assuming a level backfill and assuming that hydrostatic water pressure does not develop behind the walls.

Lateral Earth Pressure Coefficient	Value
At-rest Coefficient (K_O)	0.5
Active Coefficient (K_A)	0.33
Passive Coefficient (K_P)	3.0
Unit Weight of Soil (Moist)	120 pcf
Friction Factor for Foundations and Bearing Materials	0.32

The above design parameters assume that a two foot wide blanket of clean, well graded granular backfill (less than 7% fines) is placed behind the wall in order to provide positive drainage. Any soil backfill should be compacted to 95% of its maximum dry density per ASTM D-698. We caution that operating compaction equipment directly behind the walls can create lateral earth pressures far in excess of those recommended for design. Therefore, bracing of the walls may be needed during backfilling operations.

Construction Considerations

The surface soils consist of silty and sandy clays, which can be susceptible to significant shear strength loss and degradation when wet and disturbed. Significant rutting and muddy conditions may be common during construction in wet seasons. If possible, the construction activities should be conducted during the dry months of the year. If conducted during wet weather, foot traffic should be minimized in and around the excavations. We recommend that the bearing surface in all open foundation trenches be protected using a 3 inch thick lean concrete "mud mat". Drainage should be maintained away from the foundations, both during and after construction. Each footing excavation should be inspected by geotechnical personnel to verify that the bearing conditions are consistent with the design assumptions.

Construction Monitoring

Close testing and monitoring by geotechnical personnel will be a critical aspect of this project. As a minimum, these services should be provided during site preparation, retaining structure construction, subgrade preparation, structural fill placement, the initial footing excavations, foundation construction, and floor slab construction.

LIMITATIONS

This report was prepared for use by Greenbrier County Board of Education, and their authorized consultants, to aid in the design of this project. The report has been prepared in accordance with accepted geotechnical engineering practices and no other warranties, either expressed or implied, are made. The recommendations stated herein are contingent on American Geotech observing and evaluating all geotechnical aspects of the required work. We cannot be held responsible for

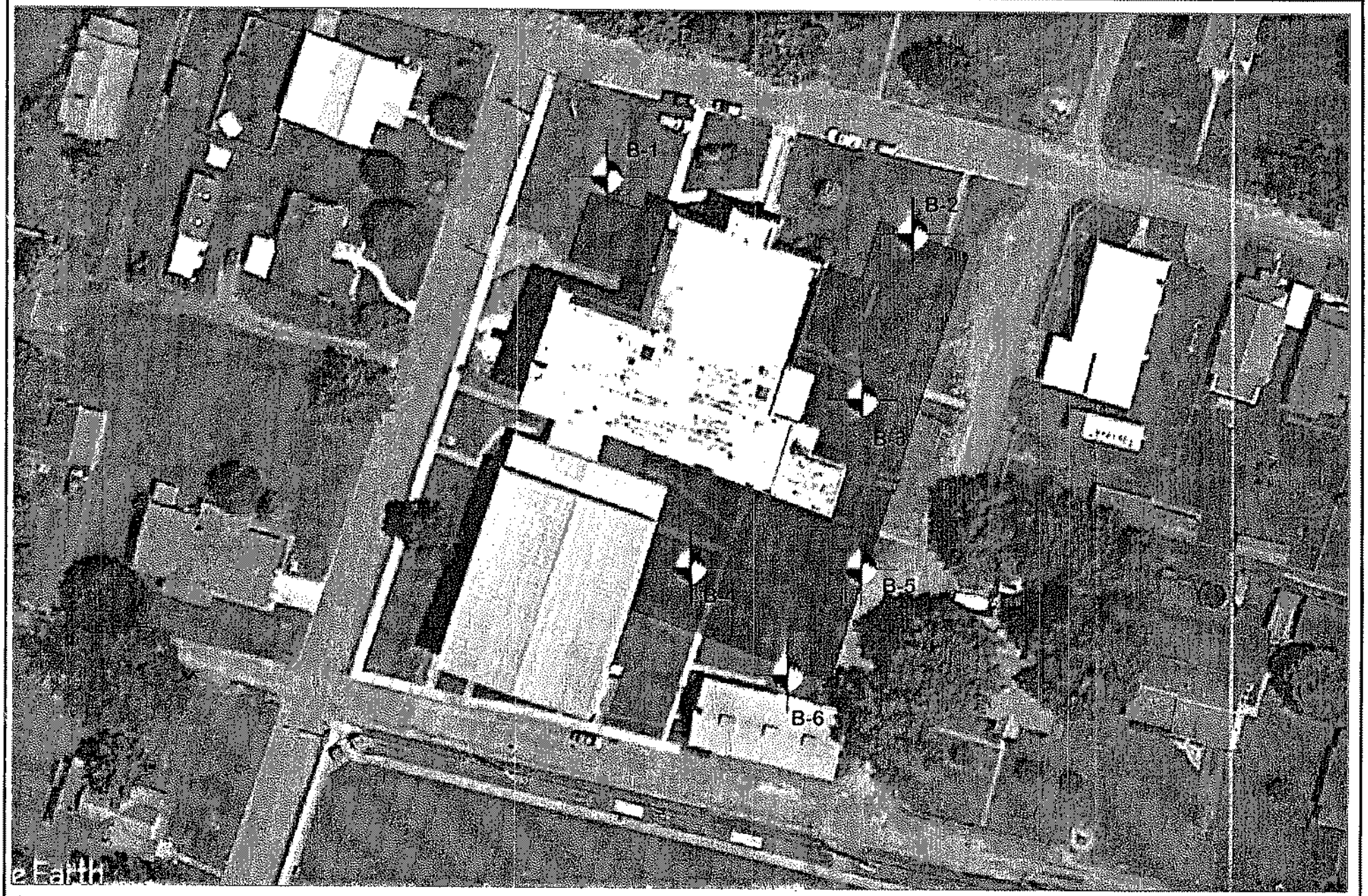
any misinterpretations or improper implementation of our recommendations by other firms providing quality control services.

The recommendations presented in this report are based on data obtained from test borings made at the approximate locations shown on the Test Boring Location Plan. Variations which may exist between the test borings may not become evident until during construction. If significant variations are noted, we should be contacted so that the field conditions can be examined and the applicable recommendations revised, if necessary. Similarly, in the event of changes in the nature, design or location of the structure, or if other developments are planned, we should be notified so that we may review such changes to verify or make appropriate modifications to our previous conclusions and recommendations, which may be invalidated by any such changes.

We recommend that this complete report be provided to the various design team members, the contractors and the project owner. Potential contractors should be informed of this report in the "Instructions to Bidders" section of the bid documents. The report should not be included or referenced in the actual contract documents.

TEST BORING LOCATION

American Geotech, Inc.
601 Ohio Avenue
Charleston, West Virginia 25302



TEST BORING LOCATION PLAN New Alderson Elementary School E. Chestnut Avenue and Lee Street, N. Alderson, West Virginia	AMERICAN GEOTECH, INC. 601 OHIO AVENUE CHARLESTON, WV 25302 (304) 340-4277	DATE 2-14-22	SCALE NONE
		DRAWN BY GoogleEarth	CHECKED BY KSP
		ADAPTED BY RDJ	SHEET 1 OF 1

Soil Test Boring Logs and Laboratory Data

American Geotech, Inc.
601 Ohio Avenue
Charleston, West Virginia 25302

Test Boring Log: Terminology and Symbols

Terminology

Grain Size

Soil Fraction		Particle Size	U.S. STD. Sieve Size
Boulders		Larger than 12"	Larger than 12"
Cobbles		3" to 12"	3" to 12"
Gravel	Coarse	¾" to 3"	¾" to 3"
	Fine	4.75 mm to ¾"	#4 to ¾"
Sand	Coarse	2.00 to 4.75 mm	#10 to #4
	Medium	0.425 to 2.00 mm	#40 to #10
	Fine	0.075 to 0.475 mm	#200 to #40
Fines	Clays & Silts	smaller than 0.075 mm	smaller than #200

Plasticity characteristics differentiate between silts and clays

Relative Density

Term	"N" Value
very loose	0 - 4
loose	5 - 10
medium dense	11 - 30
dense	31 - 50
very dense	over 50

Consistency

Term	ID Procedures	"N" Value
Soft	Easily penetrated by thumb	0 - 4
Medium Stiff	Penetrated by thumb with moderate effort	5 - 8
Stiff	Penetrated by thumb with great effort	9 - 15
Very Stiff	Readily indented by thumbnail	16 - 30
Hard	Indented by thumbnail with difficulty	31 - 50
Very Hard		over 50

Relative Moisture Description

Dry	Soil noticeably below optimum moisture
Moist	near optimum, but less then liquid limit
Damp	near or exceeding liquid limit
Wet	soil below water table

Symbols

Drilling and Sampling

RC - Rock Coring: Sizes AW, BW, NW, NQ
RQD - Rock Quality Designator
DC - Drive Casing
HSA - Hollow Stem Auger
FA - Flight Auger
AG - Auger
HA - Hand Auger
SS - 2" diameter Split Barrel Sampler
ST - 3" diameter Thin-Walled Tube Sampler
AS - Auger Sample
WS - Wash Sample
NR - No Recovery
S- Sounding
ATV - All Terrain Vehicle

Laboratory Tests

PP - Pocket Penetrometer Reading, Tons/ft^2
QU - Unconfined Strength, Tons/ft^2
W - Moisture Content, %
LL - Liquid Limit, %
PL - Plastic Limit,%
D - Dry Unit Weight, lbs/ft^3

Standard Penetration Test

The penetration resistance, or N-value as it is commonly referred to, is the summation of the number of blows required to drive the last two successive 6" penetrations of the 2" diameter -18" long split barrel sampler. The sampler is driven with a 140 lb. weight falling 30". The standard penetration test is performed in compliance with procedures as set forth in ASTM D-1586

Water Level Measurement

NW - No water encountered
WD - While drilling
BCR - Before casing removal
ACR - After casing removal
CW - Caved and wet
CM - Caved and moist
BP - Backfilled upon completion

LOG OF TEST BORING

CLIENT Greenbrier County Board of Education **BORING NO.** B – 1

PROJECT Proposed New Alderson Elementary School – Alderson, WV **DATE START** 2/2/22

BORING LOCATION As shown on plan **DATE COMP.** 2/2/22

ELEV. REF. None available **PO. NO.**

ELEV. FT.	DEPTH FT.	DESCRIPTION OF MATERIALS	SAMPLE				
			NO.	TP	DEPTH	BLOWS/6"	REC.
	0.0						
		0.5' Topsoil and stone.					
	0.5						
		Dark brown to black sandy clay					
		2.0' with rock fragments (FILL),	1	ss	0.0' – 1.5'	6-5-3	15"
		moist, medium stiff.					
	2.5						
		Light brown silty clay, trace fine	2	ss	2.5' – 4.0'	WOH-1-1	18"
		7.0' sand, very moist to moist, soft to	3	ss	5.0' – 6.5'	5-5-7	18"
		very stiff.	4	ss	7.5' – 9.0'	6-8-12	18"
	9.5						
		Maroon and brown silty clay with					
		7.0' sand and limestone pieces, moist	5	ss	10.0' – 11.5'	8-12-12	18"
		to very moist, very stiff to	6	ss	15.0' – 16.5'	2-3-3	6"
		medium stiff.					
	16.5						
		Boring completed.					

GENERAL NOTES
DRILLER J. Francis
RIG NO. CME-45
RIG TYPE Track
METHOD HSA/SS

AMERICAN GEOTECH, INC.
Geotechnical, Environmental & Testing Engineers
601 Ohio Avenue
Charleston, WV 25302
304-340-4277

WATER LEVEL OBSERVATIONS
IMMEDIATE NW FT.
AT COMPLETION NW FT.
AFTER BP HRS. NW FT.
WATER USED IN DRILLING NW FT.

LOG OF TEST BORING

CLIENT Greenbrier County Board of Education **BORING NO.** B – 2

PROJECT Proposed New Alderson Elementary School – Alderson, WV **DATE START** 2/2/22

BORING LOCATION As shown on plan **DATE COMP.** 2/2/22

ELEV. REF. None available **PO. NO.**

ELEV. FT.	DEPTH FT.	DESCRIPTION OF MATERIALS	SAMPLE NO.	TP	DEPTH	BLOWS/6"	REC.
	0.0						
		0.5' Topsoil.					
	0.5						
		4.0' Brown silty clay, very moist, stiff.	1	ss	0.0' – 1.5'	5-7-8	18"
			2	ss	2.5' – 4.0'	4-5-9	18"
	4.5						
		Brown and gray sandy clay, trace	3	ss	5.0' – 6.5'	7-7-10	16"
		5.0' rock fragments, moist, very stiff to stiff.	4	ss	7.5' – 9.0'	5-8-7	17"
	9.5						
		6.0' Brown and reddish-brown silty clay, very moist, stiff.	5	ss	10.0' – 11.5'	3-3-6	18"
	15.5						
		0.9' Brown sandy shale, highly weathered, soft.	6	ss	15.0' – 16.4'	11-23-$^{50}/_{5"}$	17"
	16.4						
		Boring completed.					

GENERAL NOTES
DRILLER J. Francis
RIG NO. CME-45
RIG TYPE Track
METHOD HSA/SS

AMERICAN GEOTECH, INC.
Geotechnical, Environmental & Testing Engineers
601 Ohio Avenue
Charleston, WV 25302
304-340-4277

WATER LEVEL OBSERVATIONS
IMMEDIATE NW FT.
AT COMPLETION NW FT.
AFTER BP HRS. NW FT.
WATER USED IN DRILLING NW FT.

LOG OF TEST BORING

CLIENT Greenbrier County Board of Education **BORING NO.** B – 3

PROJECT Proposed New Alderson Elementary School – Alderson, WV **DATE START** 2/2/22

BORING LOCATION As shown on plan **DATE COMP.** 2/2/22

ELEV. REF. None available **PO. NO.**

ELEV. FT.	DEPTH FT.	DESCRIPTION OF MATERIALS	SAMPLE NO.	TP	DEPTH	BLOWS/6"	REC.
	0.0						
		0.5' Topsoil.					
	0.5						
		1.5' Grayish-brown silty clay, very moist, medium stiff.	1	ss	0.0' – 1.5'	2-3-2	14"
	2.0						
		5.5' Brown, tan and gray silty clay, trace fine sand, moist, stiff.	2	ss	2.5' – 4.0'	4-6-4	18"
			3	ss	5.0' – 6.5'	5-5-6	18"
	7.5						
		Brown, reddish-brown and gray	4	ss	7.5' – 9.0'	6-7-7	18"
		7.5' sandy clay, with rock fragments @ 10 feet, moist, stiff.	5	ss	10.0' – 11.5'	8-6-9	10"
	▼ 15.0						
		0.2' Bedrock, tough.	6	ss	15.0' – 15.2'	$^{50}/_{2"}$	0"
	15.2						
		Boring completed.					

GENERAL NOTES
DRILLER J. Francis
RIG NO. CME-45
RIG TYPE Track
METHOD HSA/SS

AMERICAN GEOTECH, INC.
Geotechnical, Environmental & Testing Engineers
601 Ohio Avenue
Charleston, WV 25302
304-340-4277

WATER LEVEL OBSERVATIONS
IMMEDIATE 15.0 FT.
AT COMPLETION NW FT.
AFTER BP HRS. NW FT.
WATER USED IN DRILLING NW FT.

LOG OF TEST BORING

CLIENT Greenbrier County Board of Education **BORING NO.** B – 4

PROJECT Proposed New Alderson Elementary School – Alderson, WV **DATE START** 2/1/22

BORING LOCATION As shown on plan - Moved 30 ft SW **DATE COMP.** 2/1/22

ELEV. REF. None available **PO. NO.**

ELEV. FT.	DEPTH FT.	DESCRIPTION OF MATERIALS	SAMPLE NO.	TP	DEPTH	BLOWS/6"	REC.
	0.0						
		0.5' Topsoil.					
	0.5						
		Brown, yellowish-brown, dark					
		4.0' brown and gray silty clay, trace	1	ss	0.0' – 1.5'	6-7-4	13"
		sand and organics (FILL), moist,	2	ss	2.5' – 4.0'	3-3-2	8"
		stiff to medium stiff.					
	4.5						
		5.0' Brown and gray silty clay, moist,	3	ss	5.0' – 6.5'	6-7-6	18"
		stiff.	4	ss	7.5' – 9.0'	4-6-5	16"
	9.5						
		1.0' Brown clayey sand, very fine-	5	ss	10.0' – 10.8'	10-$^{50}/_{4"}$	10"
		grained, moist, loose.					
	10.5						
		0.5' Brown sandstone, medium hard.					
	11.0	Auger refusal @ 11.0 feet.					
		Boring completed.					

GENERAL NOTES
DRILLER J. Francis
RIG NO. CME-45
RIG TYPE Track
METHOD HSA/SS

AMERICAN GEOTECH, INC.
Geotechnical, Environmental & Testing Engineers
601 Ohio Avenue
Charleston, WV 25302
304-340-4277

WATER LEVEL OBSERVATIONS
IMMEDIATE NW FT.
AT COMPLETION NW FT.
AFTER BP HRS. NW FT.
WATER USED IN DRILLING NW FT.

LOG OF TEST BORING

CLIENT Greenbrier County Board of Education **BORING NO.** B – 5

PROJECT Proposed New Alderson Elementary School – Alderson, WV **DATE START** 2/1/22

BORING LOCATION As shown on plan **DATE COMP.** 2/1/22

ELEV. REF. None available **PO. NO.**

ELEV. FT.	DEPTH FT.	DESCRIPTION OF MATERIALS	SAMPLE				
			NO.	TP	DEPTH	BLOWS/6"	REC.
	0.0						
		0.5' Topsoil.					
	0.5						
		1.5' Brown sandy clay, very moist, medium stiff.	1	ss	0.0' – 1.5'	4-3-2	18"
	2.0						
		Brown and gray silty clay, trace	2	ss	2.5' – 4.0'	3-3-3	17"
		11.5' fine sand, moist to damp, soft to	3	ss	5.0' – 6.5'	4-6-6	18"
		stiff.	4	ss	7.5' – 9.0'	4-3-3	17"
			5	ss	10.0' – 11.5'	2-2-2	8"
	13.5						
		0.5' Gray shale, medium hard.					
	14.0	Auger refusal @ 14.0 feet. Boring completed.					

GENERAL NOTES
DRILLER J. Francis
RIG NO. CME-45
RIG TYPE Track
METHOD HSA/SS

AMERICAN GEOTECH, INC.
Geotechnical, Environmental & Testing Engineers
601 Ohio Avenue
Charleston, WV 25302
304-340-4277

WATER LEVEL OBSERVATIONS
IMMEDIATE NW FT.
AT COMPLETION NW FT.
AFTER BP HRS. NW FT.
WATER USED IN DRILLING NW FT.

LOG OF TEST BORING

CLIENT Greenbrier County Board of Education **BORING NO.** B – 6

PROJECT Proposed New Alderson Elementary School – Alderson, WV **DATE START** 2/1/22

BORING LOCATION As shown on plan **DATE COMP.** 2/1/22

ELEV. REF. None available **PO. NO.**

ELEV. FT.	DEPTH FT.	DESCRIPTION OF MATERIALS	SAMPLE				
			NO.	TP	DEPTH	BLOWS/6"	REC.
	0.0	0.5' Topsoil.					
	0.5	1.5' Brown sandy clay, moist, soft.	1	ss	0.0' – 1.5'	5-2-2	17"
	2.0	Tan and gray silty clay, trace	2	ss	2.5' – 4.0'	11-8-10	18"
		5.0' rock fragments, moist, very stiff to stiff.	3	ss	5.0' – 6.5'	5-6-6	17"
	7.0	Brown silty clay with rock					
		1.5' fragments, trace sand, very moist, stiff.	4	ss	7.5' – 9.0'	6-11-$^{50}/_{6}$"	14"
	8.5	0.5' Brown sandy shale to sandstone, medium hard.					
	9.0	Auger refusal @ 9.0 feet. Boring completed.					

GENERAL NOTES
DRILLER J. Francis
RIG NO. CME-45
RIG TYPE Track
METHOD HSA/SS

AMERICAN GEOTECH, INC.
Geotechnical, Environmental & Testing Engineers
601 Ohio Avenue
Charleston, WV 25302
304-340-4277

WATER LEVEL OBSERVATIONS
IMMEDIATE NW FT.
AT COMPLETION NW FT.
AFTER BP HRS. NW FT.
WATER USED IN DRILLING NW FT.

LOG OF TEST BORING

CLIENT Greenbrier County Board of Education **BORING NO.** B – 7

PROJECT Proposed New Alderson Elementary School – Alderson, WV **DATE START** 2/1/22

BORING LOCATION As shown on plan **DATE COMP.** 2/1/22

ELEV. REF. None available **PO. NO.**

ELEV. FT.	DEPTH FT.	DESCRIPTION OF MATERIALS	SAMPLE				
			NO.	TP	DEPTH	BLOWS/6"	REC.
	0.0						
		0.5' Topsoil.					
	0.5						
		Brown to dark brown sandy clay,					
		2.0' trace organics (FILL), moist,	1	ss	0.0' – 1.5'	4-4-3	16"
		medium stiff.					
	2.5						
		Brown, orangish-brown, tan and	2	ss	2.5' – 4.0'	3-5-7	18"
		7.5' gray silty clay, trace fine sand,	3	ss	5.0' – 6.5'	3-9-10	15"
		moist, stiff to very stiff.	4	ss	7.5' – 9.0'	3-6-7	15"
	10.0						
		0.5' Brown sandstone, highly	5	ss	10.0' – 10.4'	$^{50}/_{4}$"	3"
		weathered, soft to medium hard.					
	10.5	Auger refusal @ 10.5 feet.					
		Boring completed.					

GENERAL NOTES
DRILLER J. Francis
RIG NO. CME-45
RIG TYPE Track
METHOD HSA/SS

AMERICAN GEOTECH, INC.
Geotechnical, Environmental & Testing Engineers
601 Ohio Avenue
Charleston, WV 25302
304-340-4277

WATER LEVEL OBSERVATIONS
IMMEDIATE NW FT.
AT COMPLETION NW FT.
AFTER BP HRS. NW FT.
WATER USED IN DRILLING NW FT.

AMERICAN GEOTECH, INC.
601 Ohio Avenue
Charleston, West Virginia 25302

Greenbrier Co. Board of Education
Proposed New Alderson E.S.
Alderson, West Virginia

TABULATION OF TEST DATA

Hole No.	Sample No.	Depth (ft.)	Unconfined Compressive Strength (tsf)	Failure Strain (%)	Dry Density (pcf)	Water Content (%)	Pocket Penetrometer (tsf)
B-1	S-1	0.0 - 1.5				16.2	
	S-2	2.5 - 4.0				19.6	0.25
	S-3	5.0 - 6.5	2.33	8.95	116.0	17.1	
B-2	S-1	0.0 - 1.5				18.6	1.75
	S-2	2.5 - 4.0				21.5	3.5
	S-3	5.0 - 6.5				22.9	3.0
B-3	S-1	0.0 - 1.5				17.4	1.5
	S-2	2.5 - 4.0				19.9	2.25
	S-3	5.0 - 6.5				18.1	1.5
	S-4	7.5 - 9.0				16.9	2.5

AMERICAN GEOTECH, INC.
601 Ohio Avenue
Charleston, West Virginia 25302

Greenbrier Co. Board of Education
Proposed New Alderson E.S.
Alderson, West Virginia

TABULATION OF TEST DATA

Hole No.	Sample No.	Depth (ft.)	Unconfined Compressive Strength (tsf)	Failure Strain (%)	Dry Density (pcf)	Water Content (%)	Pocket Penetrometer (tsf)
B-4	S-1	0.0 - 1.5	1.32	10.75	112.6	18.0	
	S-2	2.5 - 4.0				23.1	
	S-3	5.0 - 6.5				28.0	3.5
	S-4	7.5 - 9.0				32.2	2.5
B-5	S-1	0.0 - 1.5				18.1	1.0
	S-2	2.5 - 4.0				18.9	2.0
	S-3	5.0 - 6.5				27.4	2.5
B-6	S-1	0.0 - 1.5				17.8	
	S-2	2.5 - 4.0				23.7	1.5
	S-3	5.0 - 6.5				24.3	3.25

AMERICAN GEOTECH, INC.
601 Ohio Avenue
Charleston, West Virginia 25302

Greenbrier Co. Board of Education
Proposed New Alderson E.S.
Alderson, West Virginia

TABULATION OF TEST DATA

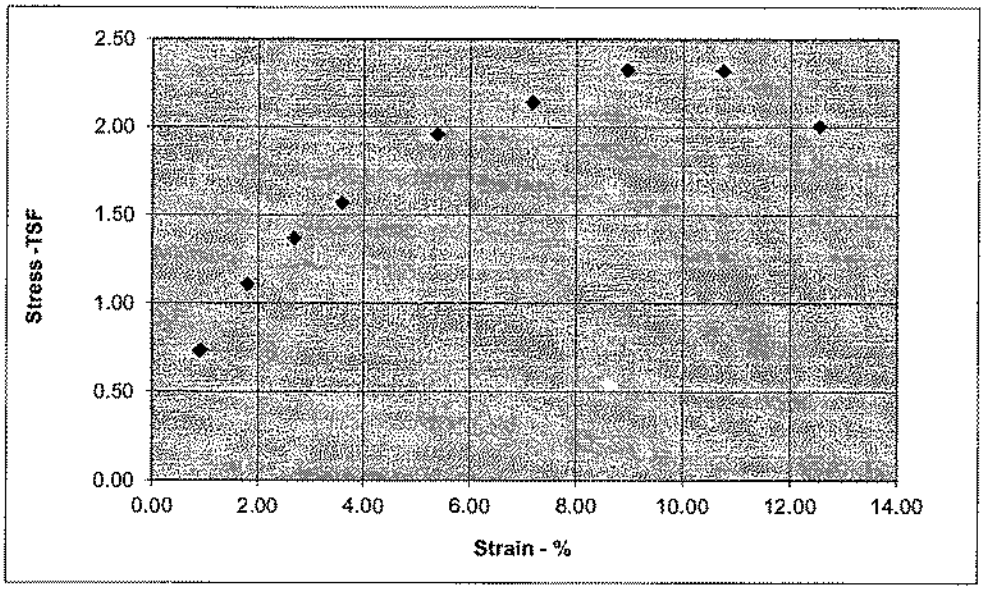
Hole No.	Sample No.	Depth (ft.)	Unconfined Compressive Strength (tsf)	Failure Strain (%)	Dry Density (pcf)	Water Content (%)	Pocket Penetrometer (tsf)
	S-4	7.5 - 9.0				32.1	0.5
B-7	S-1	0.0 - 1.5				15.9	2.5
	S-2	2.5 - 4.0				16.6	4.0
	S-3	5.0 - 6.5				19.6	4.5
	S-4	7.5 - 9.0				34.7	2.5

American Geotech, Inc.

Geotechnical, Environmental, and Testing Engineers
601 Ohio Avenue
Charleston, West Virginia 25302
(304) 340-4277

Client	Greenbrier County Board of Education			Job No.	
Project	Proposed New Alderson Elementary School - Alderson, WV				
Soil Description	Light brown silty clay, trace fine sand, very moist to moist				
Test By	RJ			Testing Date	2/3/2022
Boring Number	B-1	Sample Number	S-3	Depth	5.0 - 6.5
Confining Pressure		Dry Density	116.0	Water Content	17.1

Percent Strain (%)	Sample stress (TSF)
0.90	0.73
1.79	1.10
2.69	1.37
3.58	1.57
5.37	1.96
7.16	2.14
8.95	2.33
10.74	2.32
12.53	2.00



Unconfined Compressive Strength	2.33	TSF
Failure Strain	8.95	%

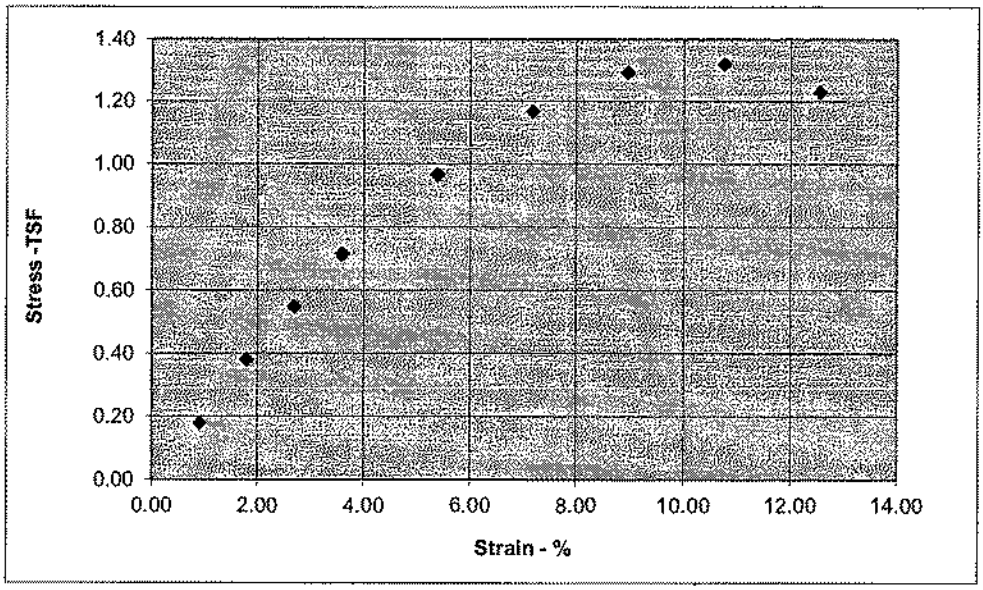
Remarks:

American Geotech, Inc.

Geotechnical, Environmental, and Testing Engineers
601 Ohio Avenue
Charleston, West Virginia 25302
(304) 340-4277

Client	Greenbrier County Board of Education		Job No.		
Project	Proposed New Alderson Elementary School - Alderson, WV				
Soil Description	Brown, yellowish-brown, dark brown and gray silty clay, trace sand and organics (FILL), moist				
Test By	RJ		Testing Date	2/2/2022	
Boring Number	B-4	Sample Number	S-1	Depth	0.0 - 1.5
Confining Pressure		Dry Density	112.6	Water Content	18.0

Percent Strain (%)	Sample stress (TSF)
0.90	0.18
1.79	0.38
2.69	0.55
3.58	0.71
5.37	0.97
7.17	1.17
8.96	1.29
10.75	1.32
12.54	1.23



Unconfined Compressive Strength	1.32	TSF
Failure Strain	10.75	%

Remarks:

ELECTRICAL KITCHEN EQUIPMENT SCHEDULE

NO.	QTY.	DESCRIPTION	MANUFACTURER	MODEL NO.	ELECTRICAL							REMARKS
					VOLTS	PH	AMPS	DIR.	C&P	NEMA	HEIGHT	
2	1	HOT FOOD TABLE	ADVANCE TABCO	HF-4E-240-DR	208	1	14.42		X	NEMA-L6-30P		
5	2	MILK COOLER	BEVERAGE AIR	SMF49HC-S	115	1	3		X	NEMA-5-15P		
7	1	DISHWASHER	HOBART	CL44EN-EGR	480	3	68	X				SINGLE POINT POWER
12	1	REACH-IN REFRIGERATOR	TRUE	T-23-HC	115	1	2.2		X	NEMA-5-15P		
13	2	REACH-IN WARMING CABINETS	SECURE TEMP	HS-2D-1-EW-HD	208	1	13		X	NEMA-6-20P		
15	1	DOUBLE DECK COV OVEN	VULCAN	VC44ED	480	3	30	X				
16	1	COMBI OVEN	RATIONAL	SCC-62	480	3	31.5	X				
17	1	TILT SKILLET	VULCAN	VE40	480	3	16	X				
19	1	EXHAUST HOOD										
20	1	FLOOR MIXER	HOBART	HL600	480	3	6.5	X				
22	1	ICE CUBER/W BIN	MANITOWOC	UDF-0140D	115	1	5					
26	1	WALK IN COOLER										
27	1	WALK IN FREEZER										
29	1	WASHER DRYER										

Branch Panel: HK

Location:
Supply From: PANEL EH
Mounting:
Enclosure: Type 1

Volts: 480/277 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 42,000
Mains Type: MCB
Mains Rating: 400A
MCB Rating: 400A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
HK-1	Lighting	20 A	1	910 VA	--					1	--	Space	HK-2
HK-3	Lighting	20 A	1			2620 VA	--			1	--	Space	HK-4
HK-5	Lighting CANOPYS	20 A	1					388 VA	--	1	--	Space	HK-6
HK-7				18667...	8333 VA								HK-8
HK-9	DISH WASH	90 A	3			18667...	8333 VA			3	40 A	DOUBLE DECKER OVEN	HK-10
HK-11								18667...	8333 VA				HK-12
HK-13				8715 VA	--					1	--	SHUNT	HK-14
HK-15	COMBI OVEN	40 A	3			8715 VA	5357 VA						HK-16
HK-17								8715 VA	5357 VA	3	30 A	TILT SKILLET	HK-18
HK-19	SHUNT	--	1	--	5357 VA								HK-20
HK-21						8715 VA	--			1	--	SHUNT	HK-22
HK-23	COMBI OVEN	40 A	3					8715 VA	2992 VA	1	20 A	EWH-13	HK-24
HK-25				8715 VA	2992 VA					1	20 A	EWH-12	HK-26
HK-27	SHUNT	--	1			--							HK-28
HK-29								1800 VA					HK-30
HK-31	FLOOR MIXER	20 A	3	1800 VA									HK-32
HK-33						1800 VA							HK-34
HK-35													HK-36
HK-37													HK-38
HK-39													HK-40
HK-41													HK-42
			Total Load:	55444 VA		54206 VA		54967 VA					
			Total Amps:	201 A		196 A		199 A					

Legend:

Notes:

Branch Panel: LK

Location:
Supply From: TK
Mounting:
Enclosure: Type 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

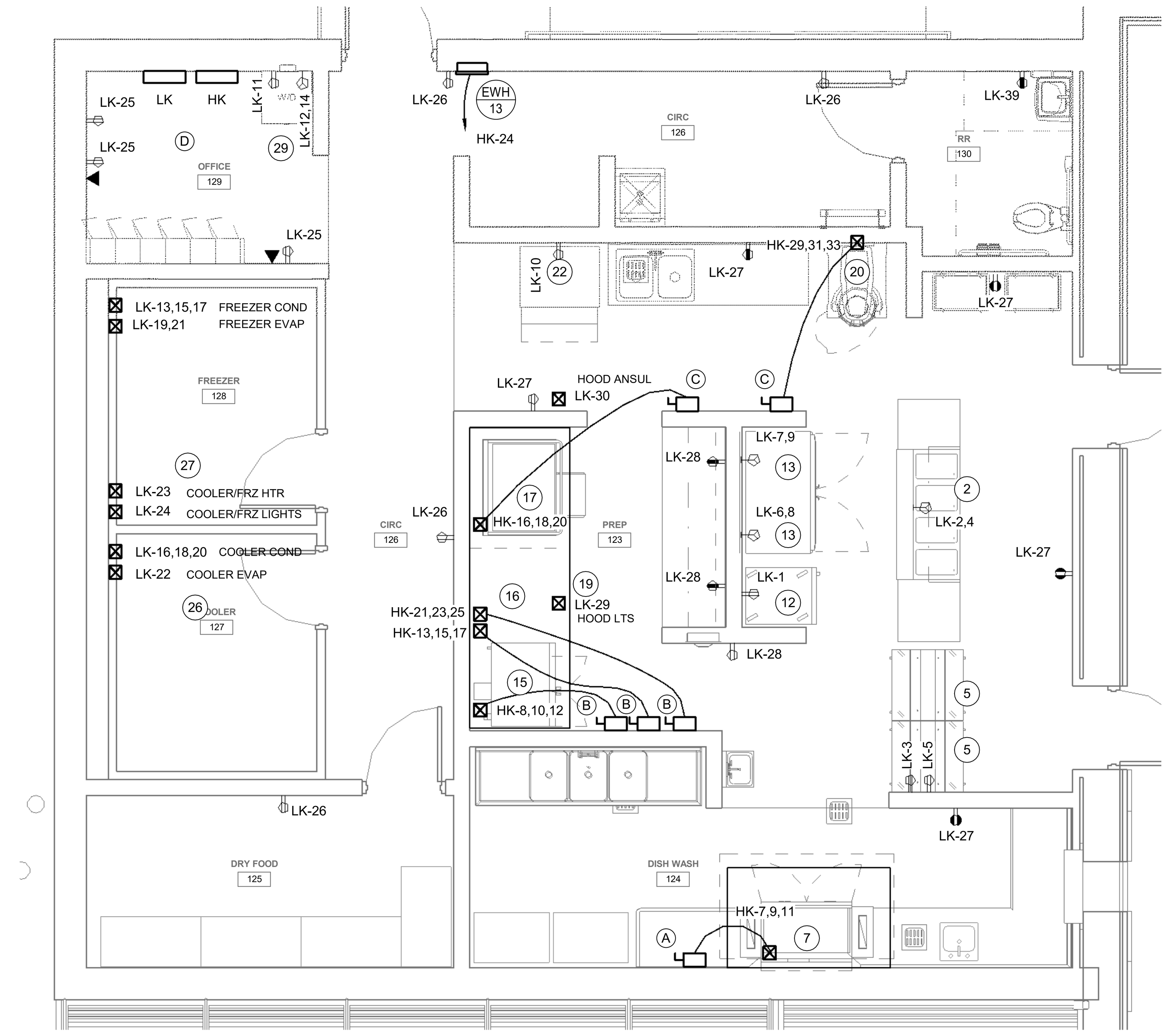
A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225A
MCB Rating: 225A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
LK-1	REACH IN REF	20 A	1	700 VA	1500...					2	20 A	HOT FOOD TABLE	LK-2
LK-3	MILK COOLER	20 A	1			360 VA	1500...						LK-4
LK-5	MILK COOLER	20 A	1					360 VA	1352...	2	20 A	REACH IN WARMING CAB	LK-6
LK-7	REACH IN WARMING CAB	20 A	2	1352...	1352...								LK-8
LK-9						1352...	780 VA			1	20 A	ICE CUBER	LK-10
LK-11	WASHER	20 A	1					1000...	2500...	2	30 A	DRYER	LK-12
LK-13				2765...	2500...								LK-14
LK-15	FREEZER COND	30 A	3			2765...	1440...						LK-16
LK-17								2765...	1440...	3	20 A	COOLER COND	LK-18
LK-19	FREEZER EVAP	20 A	2	811 VA	1440...								LK-20
LK-21						811 VA	200 VA			1	20 A	COOLER EVAP	LK-22
LK-23	COOLER/FREEZER DR HTR	20 A	1					1000...	200 VA	1	20 A	COOLER FREEZER LTS	LK-24
LK-25	Receptacle	20 A	1	540 VA	720 VA					1	20 A	Receptacle	LK-26
LK-27	Receptacle PREP 123	20 A	1			900 VA	540 VA			1	20 A	Receptacle PREP 123	LK-28
LK-29	HOOD LIGHTS	20 A	1					200 VA	200 VA	1	20 A	HOOD ANSUL	LK-30
LK-31				139 VA	719 VA								LK-32
LK-33	EF-21	20 A	3			139 VA	719 VA			3	20 A	EF-20	LK-34
LK-35								139 VA	719 VA				LK-36
LK-37	Equipment LIFT	20 A	1	1380...	1380...					1	20 A	Equipment LIFT	LK-38
LK-39	Receptacle RR 130	20 A	1			180 VA	900 VA			1	20 A	Receptacle	LK-40
LK-41	Receptacle	20 A	1					900 VA	300 VA	1	20 A	DOOR CTRL	LK-42
LK-43	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	LK-44
LK-45	Spare	20 A	1			0 VA	0 VA			1	20 A	Spare	LK-46
LK-47	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	LK-48
LK-49	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	LK-50
LK-51													LK-52
LK-53													LK-54
LK-55													LK-56
LK-57													LK-58
LK-59													LK-60
			Total Load:	17298 VA		12586 VA		13075 VA					
			Total Amps:	145 A		105 A		110 A					

Legend:

Notes:



3 ENLARGED KITCHEN POWER PLAN
E1.05R 1/4" = 1'-0"

PLAN NOTES: (X)

A. 3P/100A, 480V, HEAVY DUTY, NEMA-4X, STAINLESS STEEL FUSED DISCONNECT SWITCH. FUSE PER MANUFACTURER'S RECOMMENDATIONS.

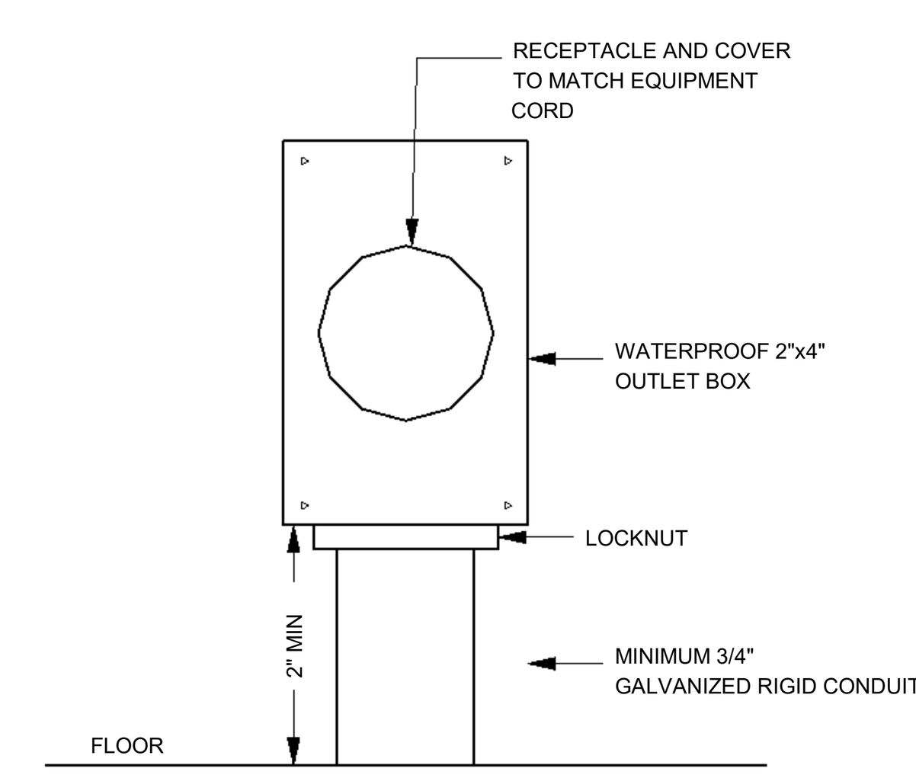
B. 3P/60A, 480V, HEAVY DUTY, NEMA-4X, STAINLESS STEEL FUSED DISCONNECT SWITCH. FUSE PER MANUFACTURER'S RECOMMENDATIONS.

C. 3P/30A, 480V, HEAVY DUTY, NEMA-4X, STAINLESS STEEL FUSED DISCONNECT SWITCH. FUSE PER MANUFACTURER'S RECOMMENDATIONS.

D. RECEPTACLES SHALL BE CONTROLLED PER ASHRAE 90.1. SEE DETAIL ON SHEET E1.02.

GENERAL NOTES:

1. DATA/PHONE CABLING BY OTHERS. CONTRACTOR TO PROVIDE CONDUIT AND BOXES.
2. CONTROLLED RECEPTACLES SHALL BE INDICATED PER NEC 406.3 (E).
3. PROVIDE GFCI PROTECTION PER NEC 210.8.
4. ALL EXTERIOR RECEPTACLES SHALL BE WEATHER RESISTANT AND SHALL HAVE WEATHERPROOF COVER EVEN WHILE "IN USE" PER NEC 406.9.
5. COORDINATE MOUNTING HEIGHTS WITH ARCHITECTURAL CASEWORK DETAILS PRIOR TO INSTALLATION.



KITCHEN FLOOR OUTLETS

NOT TO SCALE

THRASHER
600 WHITE OAKS BLVD.
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phone.304.722.3602
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FINAL COORDINATION 5/6/2022

NO. BY DATE DESCRIPTION

ALDERSON ELEMENTARY SCHOOL
ADDITIONS AND RENOVATIONS
CONSTRUCTION DOCUMENTS
SEPTEMBER 13, 2022
ALDERSON, WEST VIRGINIA
GREENBRIER COUNTY SCHOOLS

DRAWN: JCS DATE: 09/13/2022
CHECKED: JEH DATE: 09/13/2022
APPROVED: JEH DATE: 09/13/2022

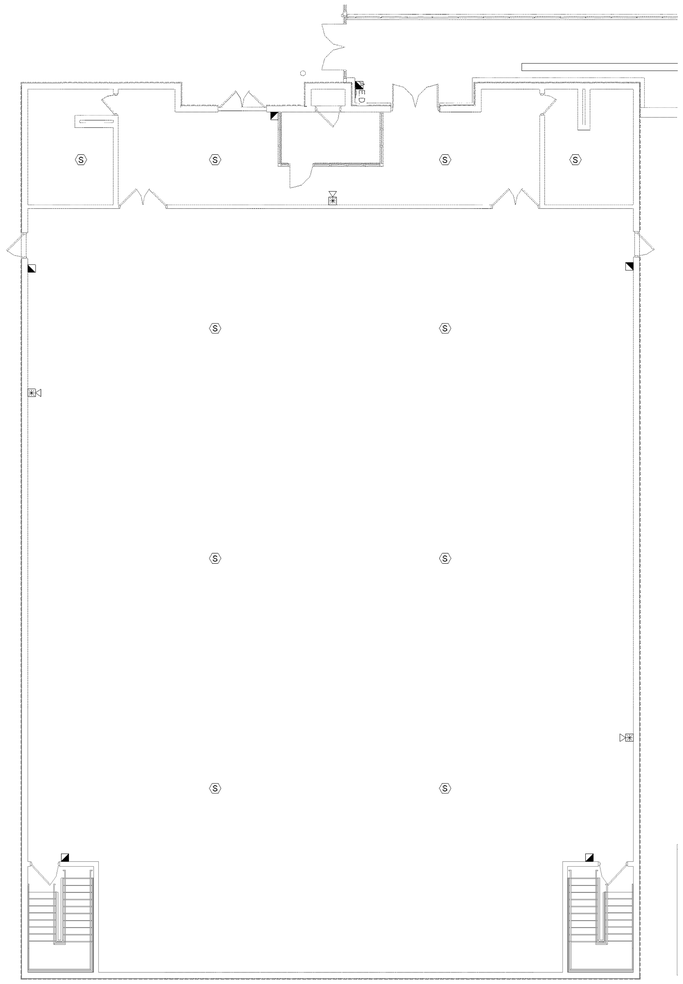
PROJECT No.
Project Number

ENLARGED KITCHEN POWER PLAN

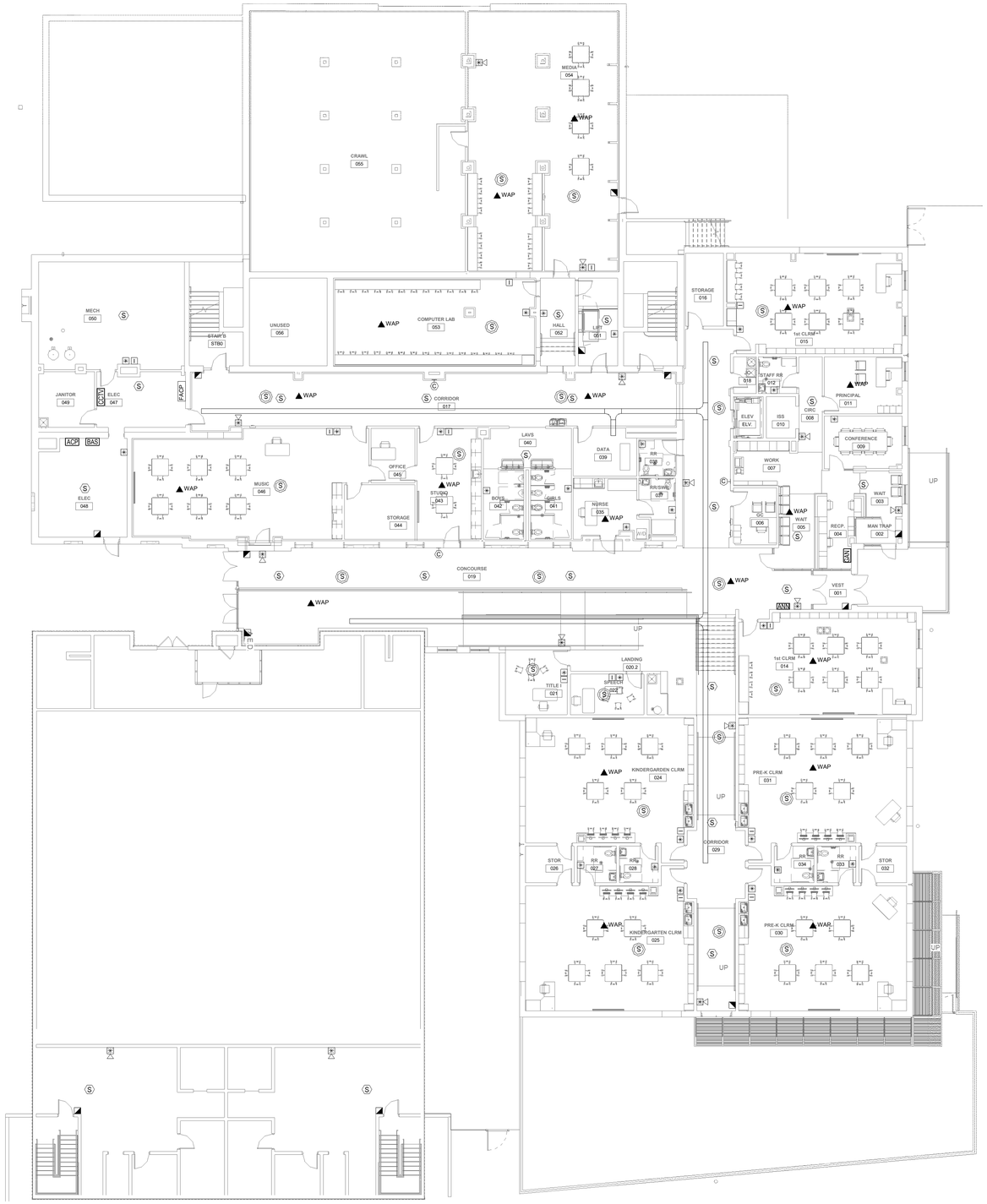
SHEET No.
E1.05R

GENERAL NOTES:

1. ACCESS CONTROL BY OTHERS. PROVIDE CONDUIT AND BOXES WITH PULL STRINGS TO ABOVE ACCESSIBLE CEILING.
2. CCTV BY OTHERS. PROVIDE CONDUIT, BOXES AND CAT 6 CABLES. ROUTE CABLES BACK TO DATA RACK. PROVIDE 8' OF SLACK FOR TERMINATION BY OTHERS.
3. INTERCOM MUST, INTERFACE WITH CISCO PHONE SYSTEM AND INFORMACAST SOFTWARE. COORDINATE EXACT REQUIREMENTS AND PROVIDE ALL COMPONENTS AND SOFTWARE AS REQUIRED FOR A COMPLETE AND OPERABLE SYSTEM.
4. COORDINATE CABLE TRY ROUTING WITH OTHER TRADES PRIOR TO INSTALLATION.
5. COORDINATE DOOR CONTROLS WITH HARDWARE SPECIFICATIONS.



2 E1.06R GYM SYSTEMS PLAN
1/8" = 1'-0"



1 E1.06R GROUND FLOOR SYSTEMS PLAN
3/32" = 1'-0"

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APPROVED: JEH DATE: 09/13/2022

PROJECT No.
Project Number

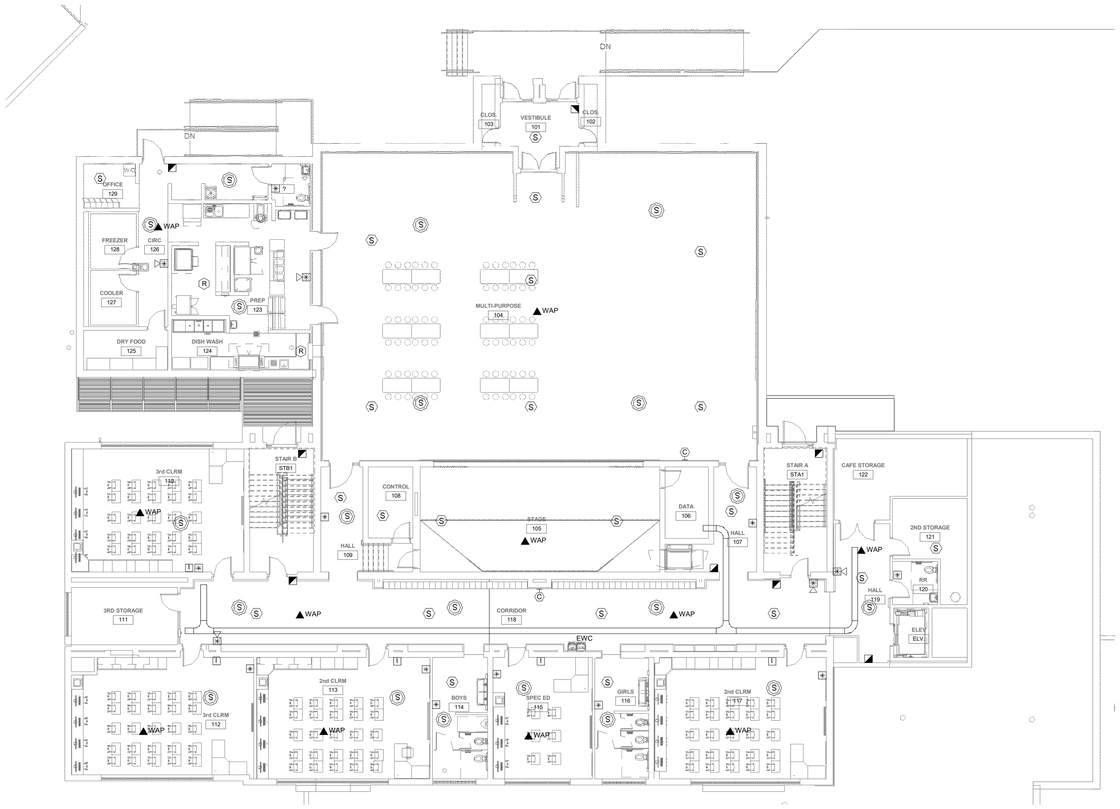
GROUND FLOOR SYSTEMS PLAN

SHEET No.
E1.06R

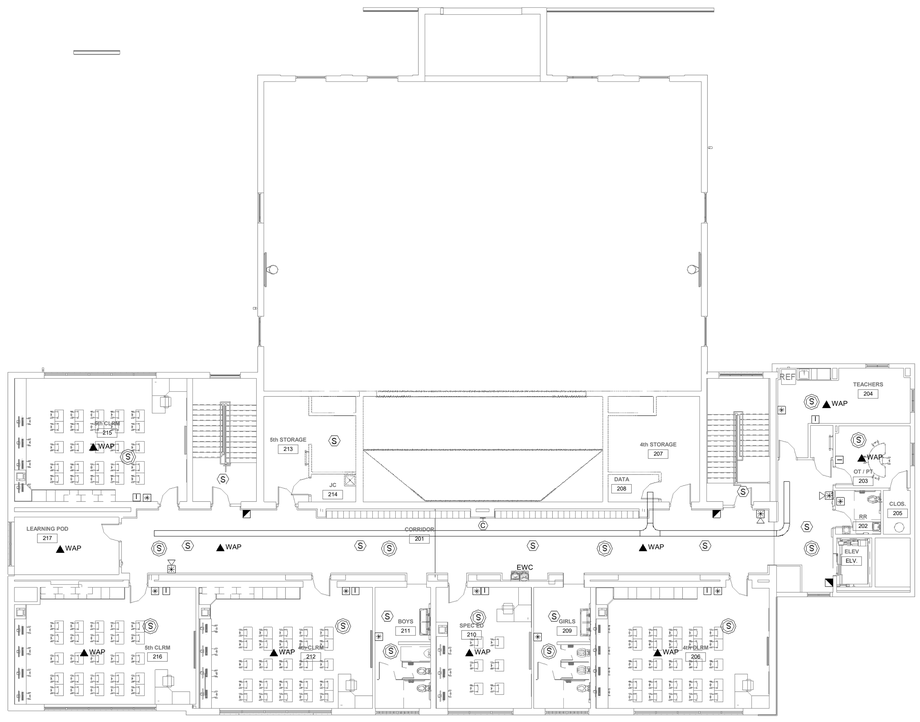
LAYOUT TAB: GROUND FLOOR SYSTEMS PLAN
CAD FILE: BIM 360://21063 Alderson Elementary School/21063 Alderson School MEP -21.rvt
PLOT DATE/TIME: 9/21/2022 1:10:59 PM
USER: JCS

GENERAL NOTES:

1. ACCESS CONTROL BY OTHERS. PROVIDE CONDUIT AND BOXES WITH PULL STRINGS TO ABOVE ACCESSIBLE CEILING.
2. CCTV BY OTHERS. PROVIDE CONDUIT, BOXES AND CAT 6 CABLES. ROUTE CABLES BACK TO DATA RACK. PROVIDE 8' OF SLACK FOR TERMINATION BY OTHERS.
3. INTERCOM MUST. INTERFACE WITH CISCO PHONE SYSTEM AND INFORMACAST SOFTWARE. COORDINATE EXACT REQUIREMENTS AND PROVIDE ALL COMPONENTS AND SOFTWARE AS REQUIRED FOR A COMPLETE AND OPERABLE SYSTEM.
4. COORDINATE CABLE TRY ROUTING WITH OTHER TRADES PRIOR TO INSTALLATION.
5. COORDINATE DOOR CONTROLS WITH HARDWARE SPECIFICATIONS.



1 / E1.07R MAIN FLOOR SYSTEMS PLAN
3/32" = 1'-0"



2 / E1.07R UPPER FLOOR SYSTEMS PLAN
3/32" = 1'-0"

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PROJECT No.
Project Number

MAIN AND UPPER FLOOR SYSTEMS PLANS

SHEET No.

E1.07R

LAYOUT TAB: MAIN AND UPPER FLOOR SYSTEMS PLANS
CAD FILE: I:\M 360\21095 Alderson Elementary School\21095 Alderson School MEP-21.rvt
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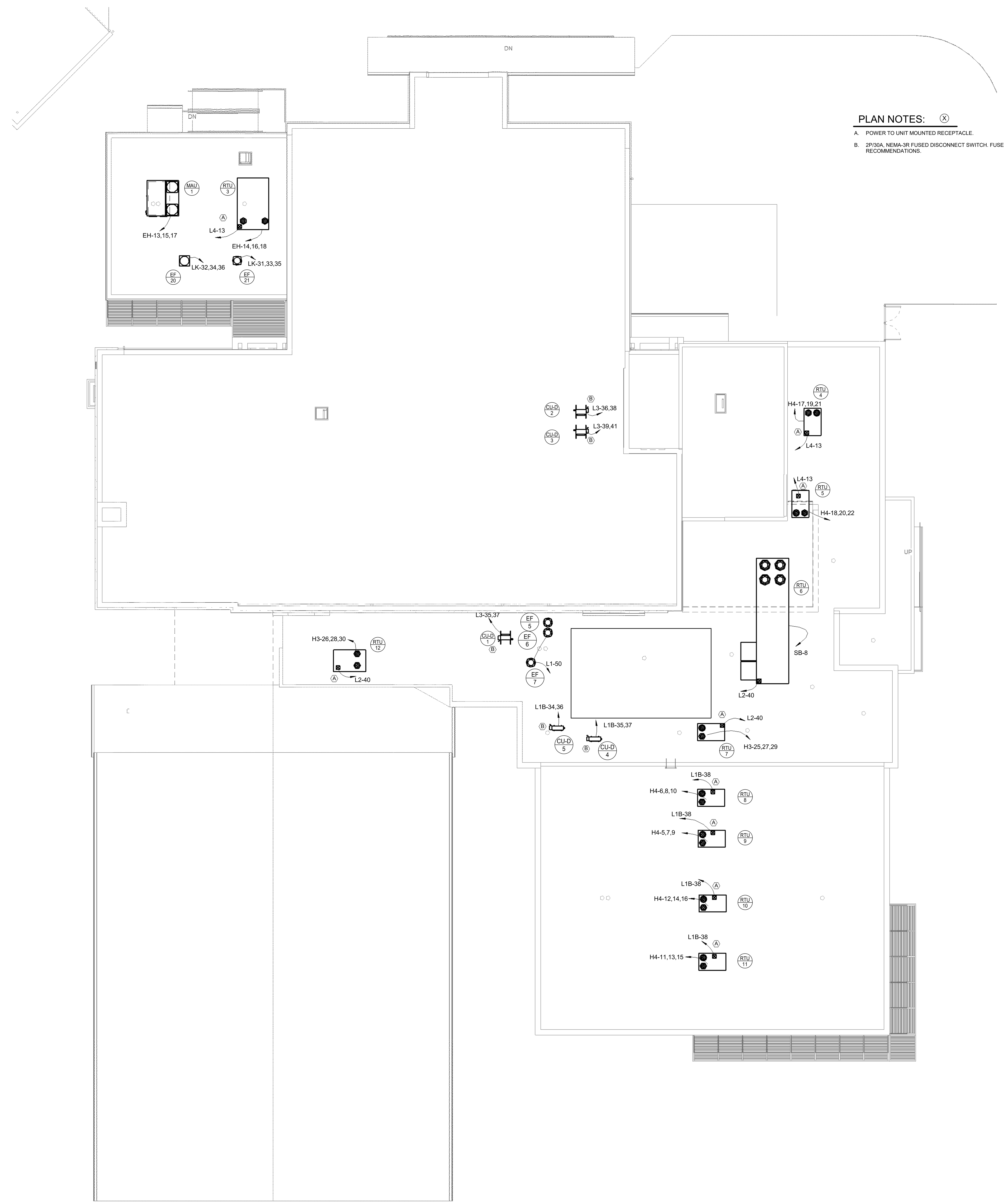

1 Power Plan Roof
E1.08R 3/32" = 1'-0"

PLAN NOTES: (X)

A. POWER TO UNIT MOUNTED RECEPTACLE.

B. 2P/30A, NEMA-3R FUSED DISCONNECT SWITCH. FUSE PER MANUFACTURER'S RECOMMENDATIONS.

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PROJECT No.
Project Number

ROOF POWER PLAN

SHEET No.
E1.08R

EMERGENCY LOCKDOWN SEQUENCE OF OPERATION

WHENEVER EITHER PANIC BUTTON IS PRESSED, EMERGENCY LOCKDOWN SHALL INITIATE. ALL DOORS SHALL LOCK. CARD READERS SHALL BE DISABLED. DOORS AND SHUTTERS INDICATED ON DRAWINGS SHALL RELEASE. EXISTING DOOR ALARM SYSTEM (BLUELIGHTS) SHALL BE ENABLED. DIALER SHALL NOTIFY MONITORING COMPANY.

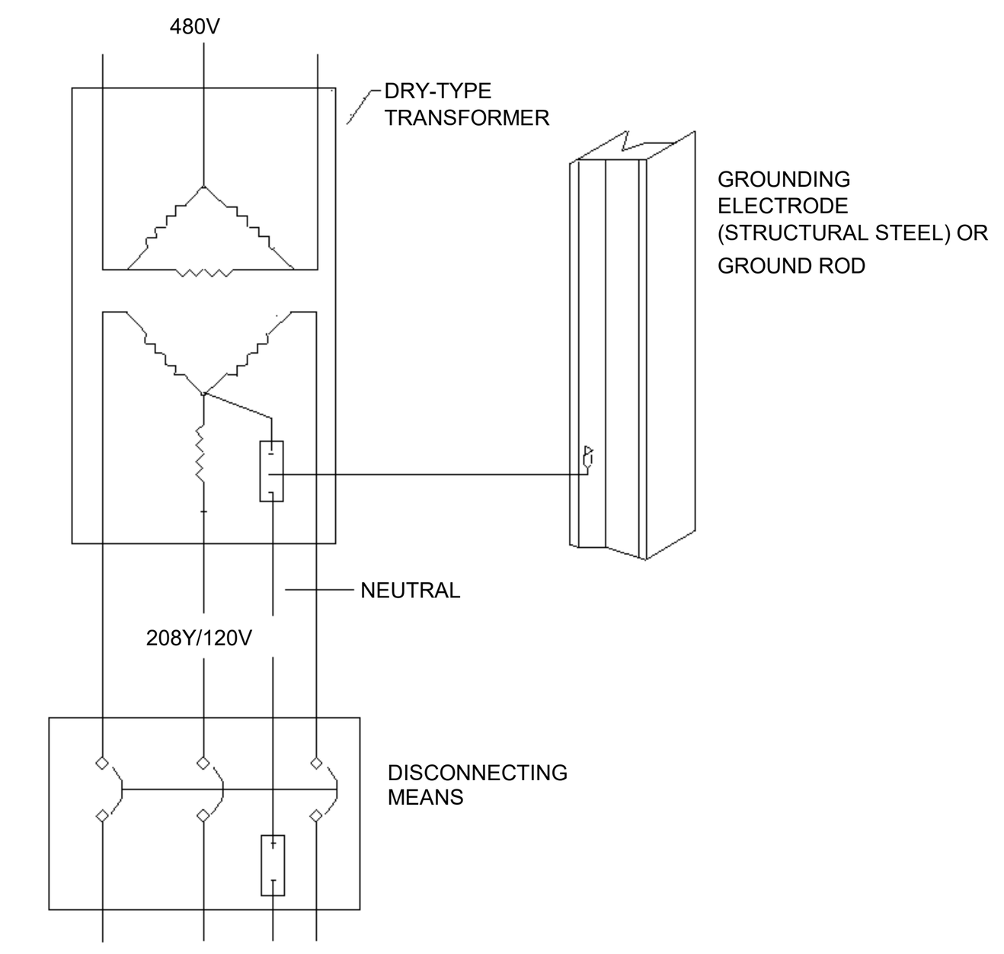
GENERAL FIRE ALARM NOTES

1. PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL A COMPLETE AND OPERABLE FIRE ALARM SYSTEM DEVICES AS INDICATED ON THE DRAWINGS ARE SCHEMATIC IN NATURE. CONTRACTOR SHALL PROVIDE ANY ADDITIONAL WORK AR REQUIRED BY LOCAL AHJ AT NO ADDITIONAL COST TO THE OWNER.
2. IT SHALL BE THE CONTRACTORS SOLE RESPONSIBILITY TO PROVIDE A FIRE ALARM SYSTEM IN FULL COMPLIANCE WITH THE LATEST EDITION OF (NFPA 72, WV STATE FIRE CODE, AND ADA).
3. THIS BUILDING WILL BE PARTIALLY SPRINKLED PER NFPA 13.
4. SUPPLY A 120 VOLT CONNECTION AS REQUIRED AT ALL SYSTEMS EQUIPMENT.
5. DEVICES SHOWN ARE APPROXIMATE LOCATIONS. FIELD VERIFY ACTUAL CONDITIONS.
6. DO NOT SUPPORT RACEWAYS FROM PIPES DUCTS OR CEILING SUSPENSION SYSTEM.
7. EXPOSED RACEWAY AND BLANK COVERS SHALL BE PAINTED TO MATCH EXISTING SURFACES.
8. SURFACES DAMAGED BY THIS CONTRACTOR SHALL BE REPAIRED.
9. WHERE SURFACES ARE REQUIRED TO BE PATCHED OR REPAIRED, SURFACE SHALL BE PAINTED TO MATCH ADJACENT SURFACE.
10. ALL JUNCTION BOX COVERS IN FIRE ALARM RACEWAY SHALL BE PAINTED RED.
11. MOUNTING HEIGHT OF FIRE ALARM STROBE SHALL BE 80" AFF.
12. SYSTEM SHALL INTERFACE WITH HOOD SUPPRESSION SYSTEM PER NFPA.
13. SYSTEM SHALL INTERFACE WITH SHUNT TRIP BREAKERS OR GAS VALVE FOR ALL EQUIPMENT LOCATED UNDER THE KITCHEN HOOD.

FIRE ALARM SYSTEM NOTES

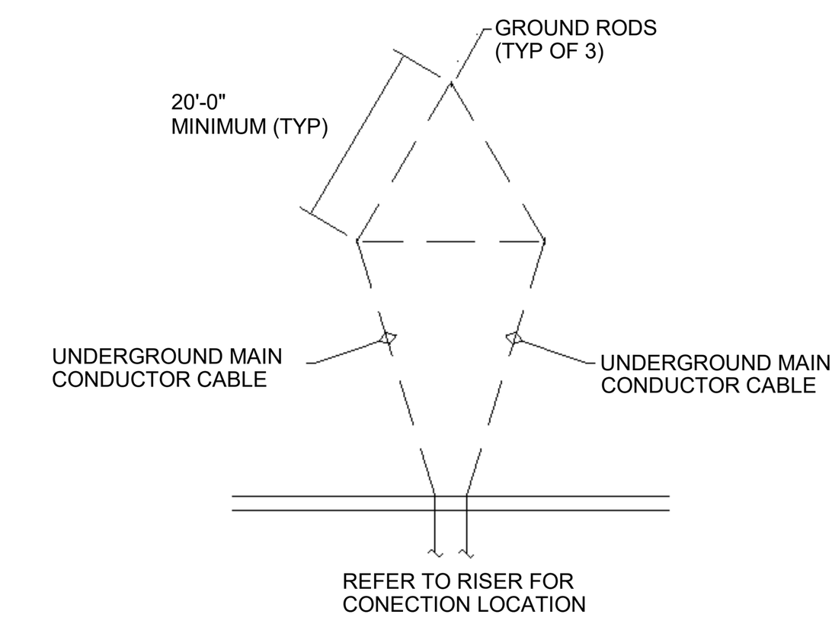
(SPRINKLERED)

1. ALL EXTERIOR DOORS SHALL HAVE A PULL STATION MOUNTED ADJACENT TO THE DOOR. SPACING OF PULL STATIONS SHALL NOT EXCEED 200' ALONG PATH OF EGRESS.
2. FIELD VERIFY LOCATION AND QUANTITY OF AIR HANDLING UNITS GREATER THAN 2000 CFM. PROVIDE A DUCT SMOKE DETECTOR IN THE RETURN AIR DUCT OF EACH UNIT. EACH AIR HANDLER DUCT SMOKE DETECTOR SHALL BE SEPARATELY ANNUNCIATED BY THE FIRE ALARM PANEL AND THE ANNUNCIATOR. PROVIDE REMOTE LED INDICATOR AT CEILING BELOW EACH DETECTOR.
3. FIELD VERIFY LOCATION AND QUANTITY OF ELECTRICAL PANELS. PROVIDE A SMOKE DETECTOR IN EACH OF THESE ROOMS.
4. PROVIDE SMOKE DETECTORS IN CORRIDOR A MAXIMUM 15' FROM EACH END AND A MAXIMUM OF 30' ON CENTER.
5. PROVIDE STROBES IN ALL TOILETS.
6. PROVIDE HORN/STROBES AS REQUIRED BY NFPA 72. SPACING AND SOUND LEVEL SHALL BE SUCH THAT THE AUDIBLE ALARM CAN BE EFFECTIVELY HEARD ABOVE THE AMBIENT NOISE LEVEL OBTAINED UNDER NORMAL OCCUPIED CONDITIONS.
7. PROVIDE STROBES IN ALL PUBLIC SPACES EXCEPT COMMON AREAS AS DEFINED IN THE AMERICAN WITH DISABILITIES ACT. SPACING SHALL BE PER NFPA 72.



TRANSFORMER GROUNDING DETAIL

NTS

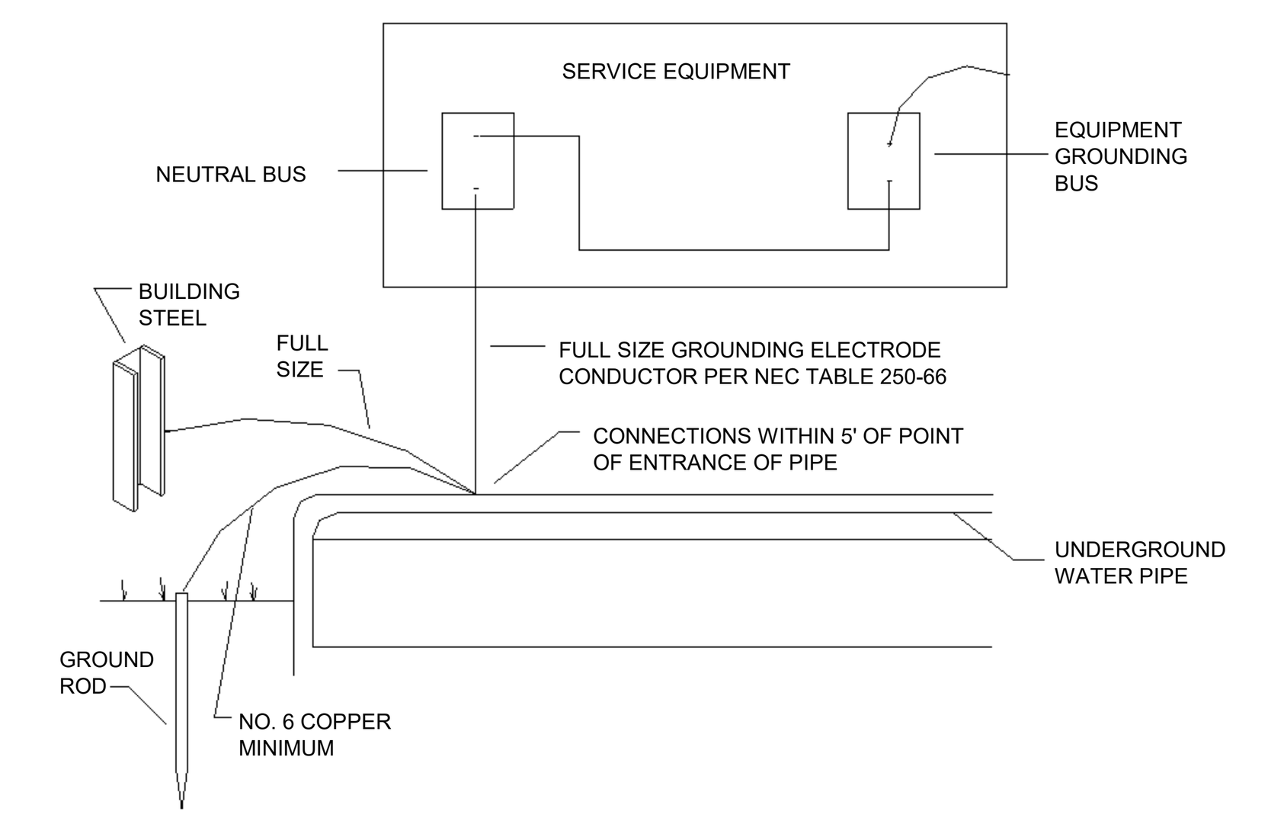


GROUNDING PROTECTION NOTES:

1. BOND GROUND SYSTEM TO BUILDING STEEL.
2. ALL CONDUCTOR CABLES SHALL BE STRANDED COPPER.
3. PROVIDE MINIMUM OF TWO PATHS TO GROUND FROM EACH GROUND ROD. MINIMUM SEPARATION IS 20'-0".
4. BONDING CONDUCTOR CABLE SHALL BE 1/0 MINIMUM.
5. PROVIDE GROUND GRID USING THREE 5/8" MINIMUM DIAMETER GROUND RODS. LENGTH OF RODS 10'-0" MINIMUM.
6. MINIMUM CONDUCTOR CABLE BEND IS 90 DEG., MINIMUM RADIUS OF BEND IS 8".
7. NO DEAD END CABLES ARE ALLOWED.
8. ALL WORK TO COMPLY WITH NFPA ARTICLE 780, NEC ARTICLE 250-66 AND NEC ARTICLE 250-106.

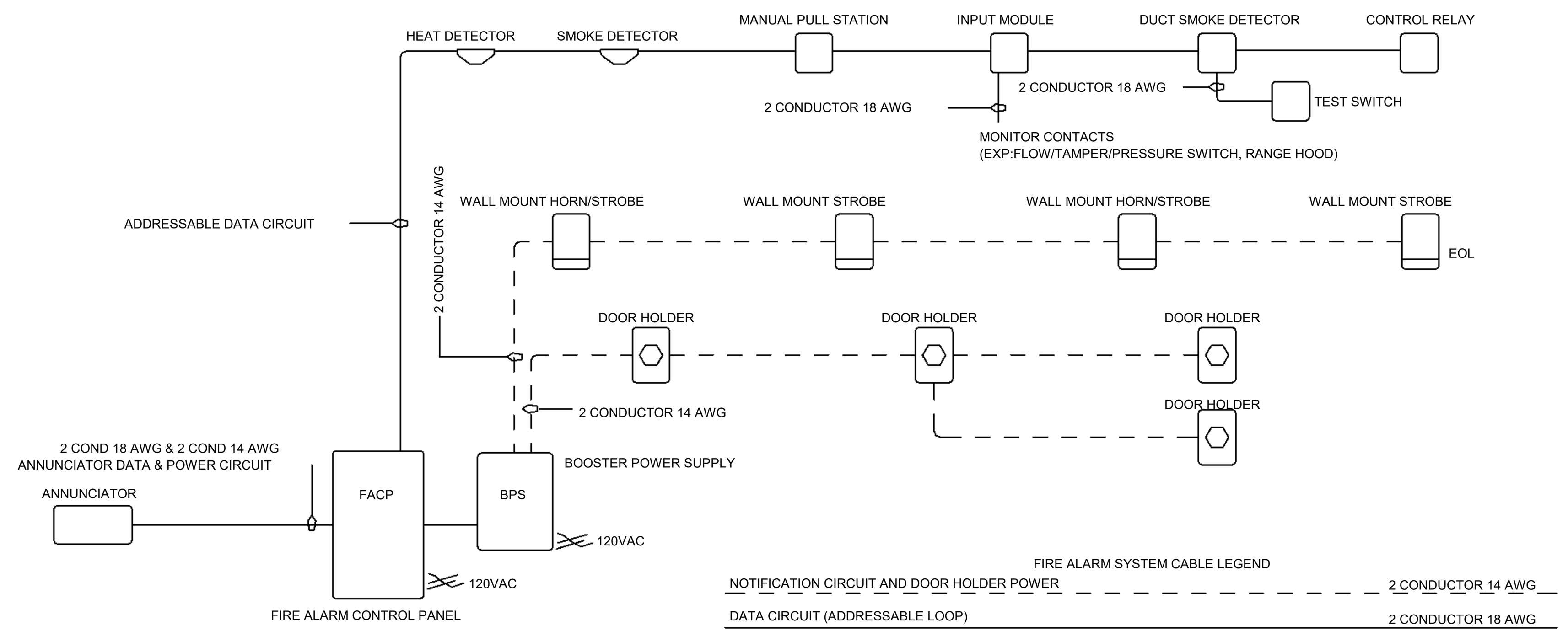
GROUNDING DETAIL

NOT TO SCALE



SERVICE ENTRANCE GROUNDING

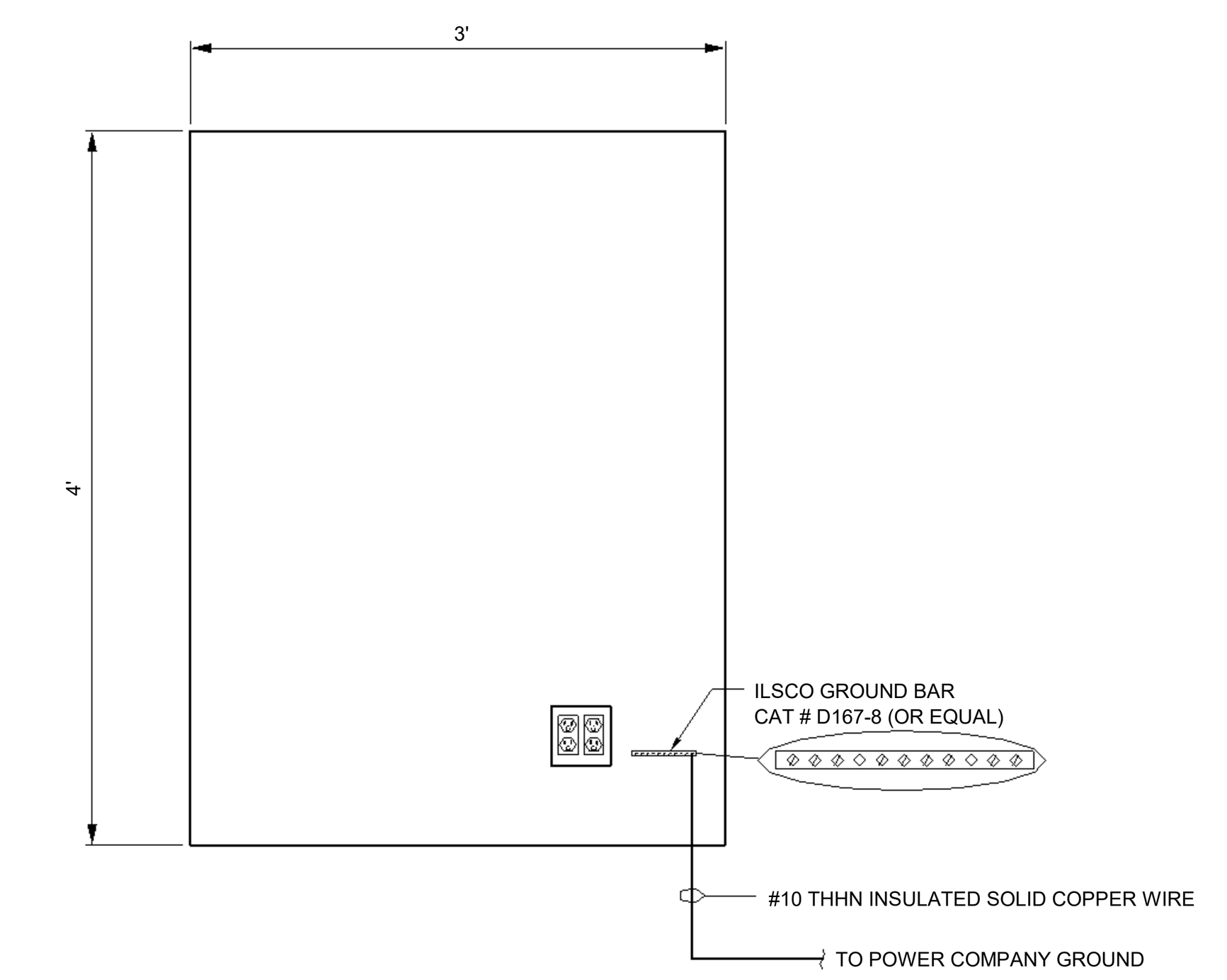
SCHEMATIC



FIRE ALARM SYSTEM RISER

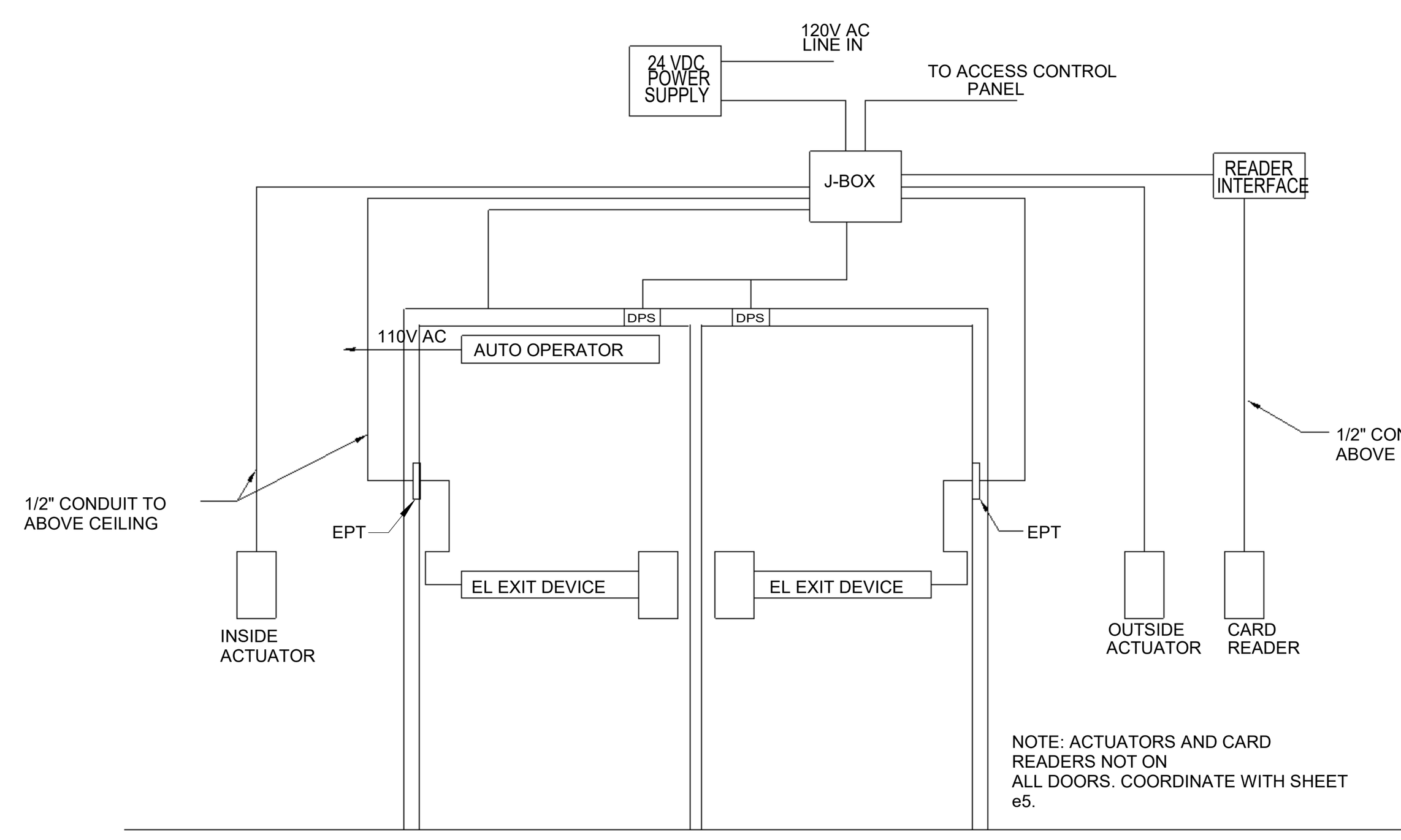
NOTES: FIRE ALARM SYSTEM DOES NOT REFLECT ACTUAL DEVICE QUANITIES OR LOCATIONS. PLEASE SEE THE BUILDING FIRE ALARM PLAN DRAWINGS. REUSE EXISTING ANNUNCIATOR AND FACP. SEE SYSTEM PLANS FOR NEW LOCATION.

SCALE: N/A



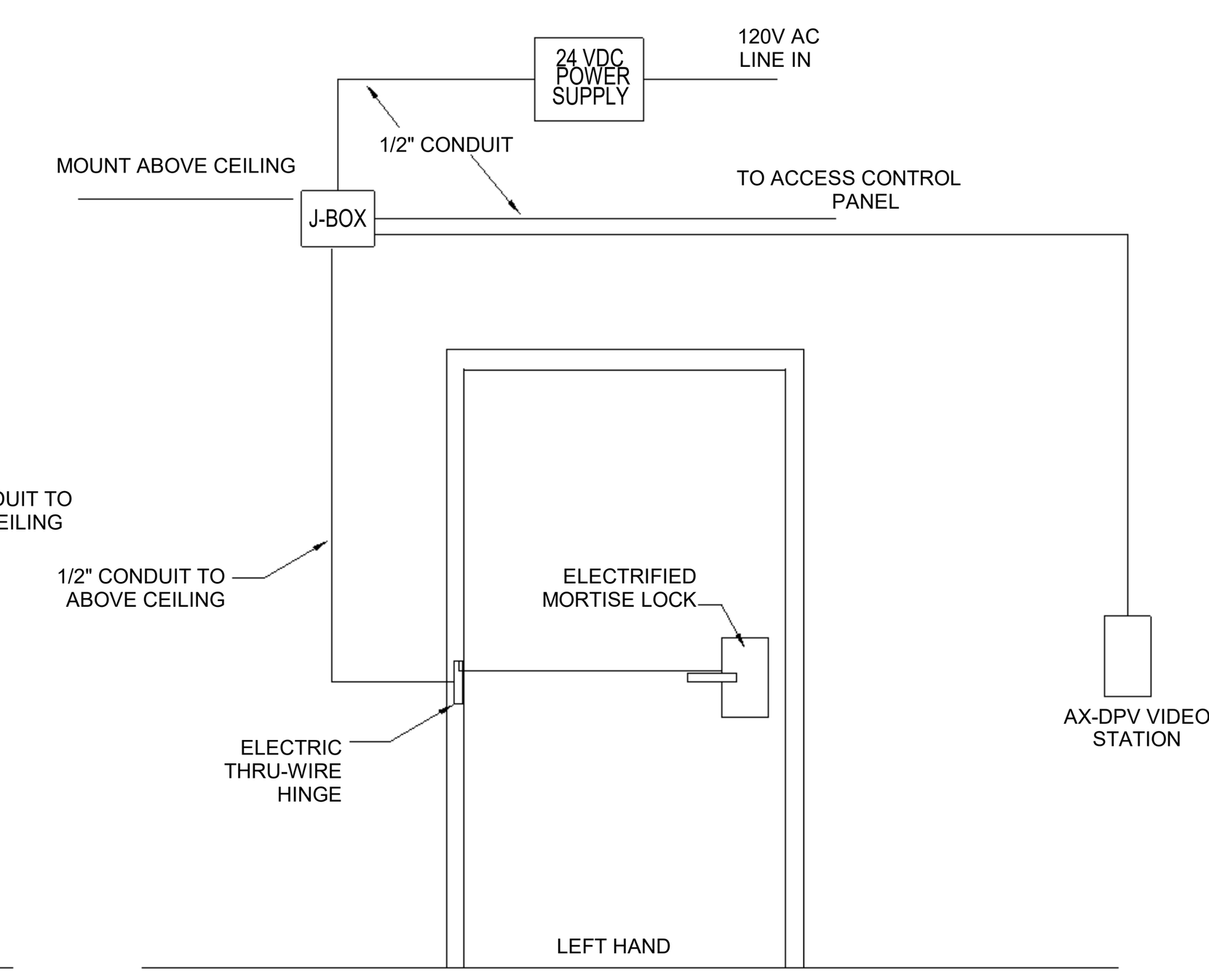
TELEPHONE CONNECTION BOARD DETAIL (TCB)

NOT TO SCALE



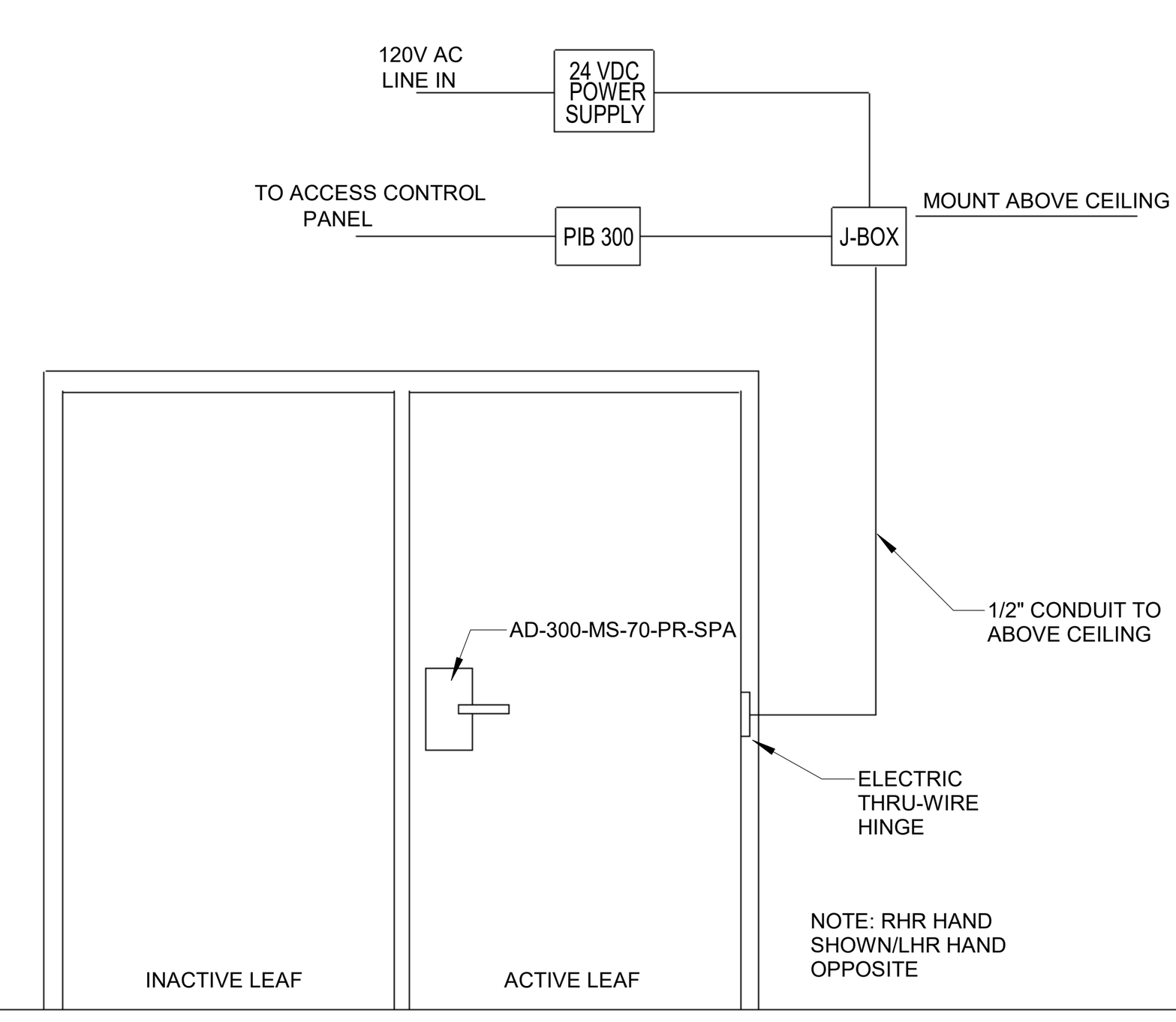
TYPICAL ACCESS CONTROL DOUBLE DOOR

TYPE C



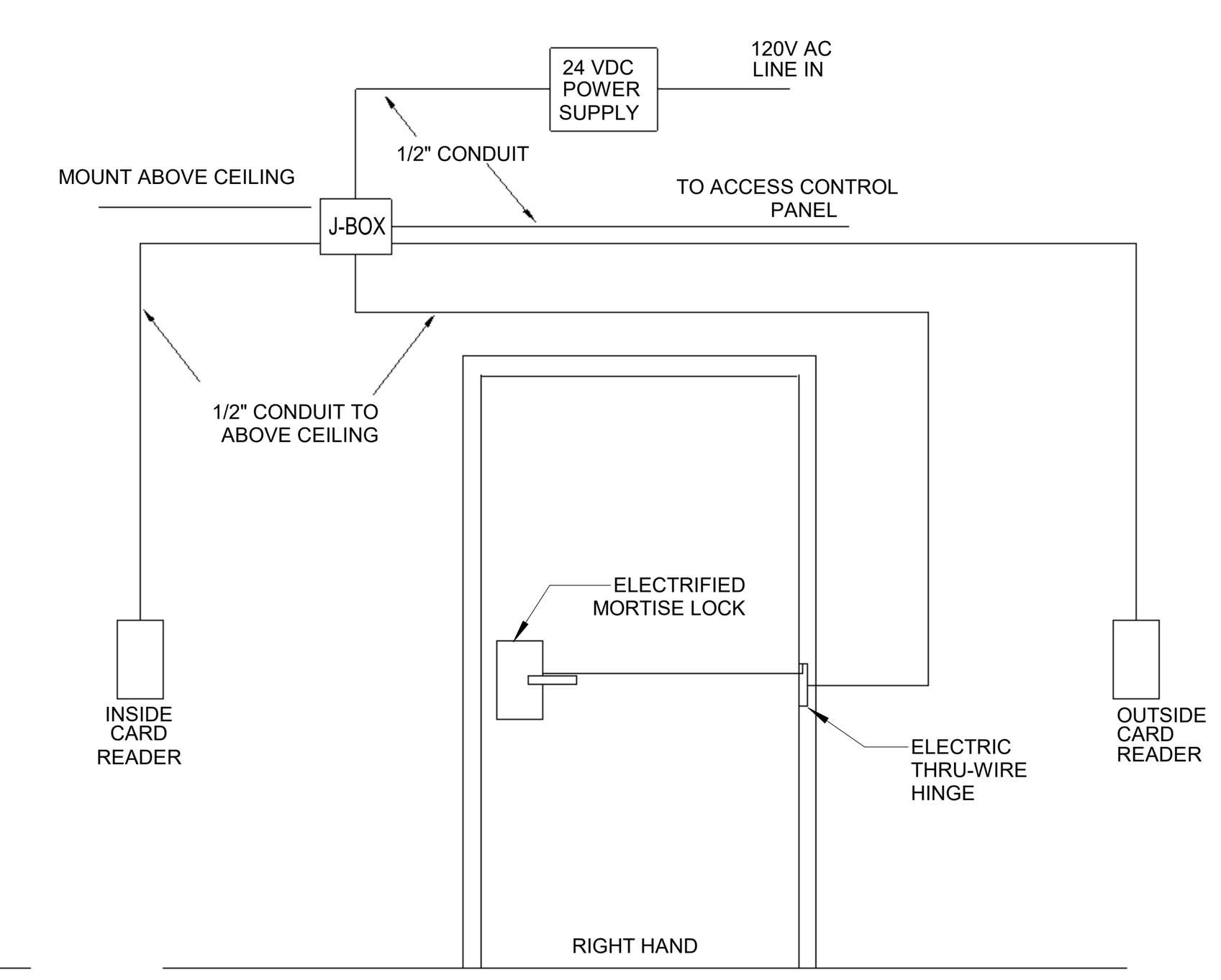
TYPICAL ACCESS CONTROL SINGLE DOOR

TYPE F



TYPICAL ACCESS CONTROL DOUBLE DOOR

TYPE A



TYPICAL ACCESS CONTROL SINGLE DOOR

TYPE E

NOTES

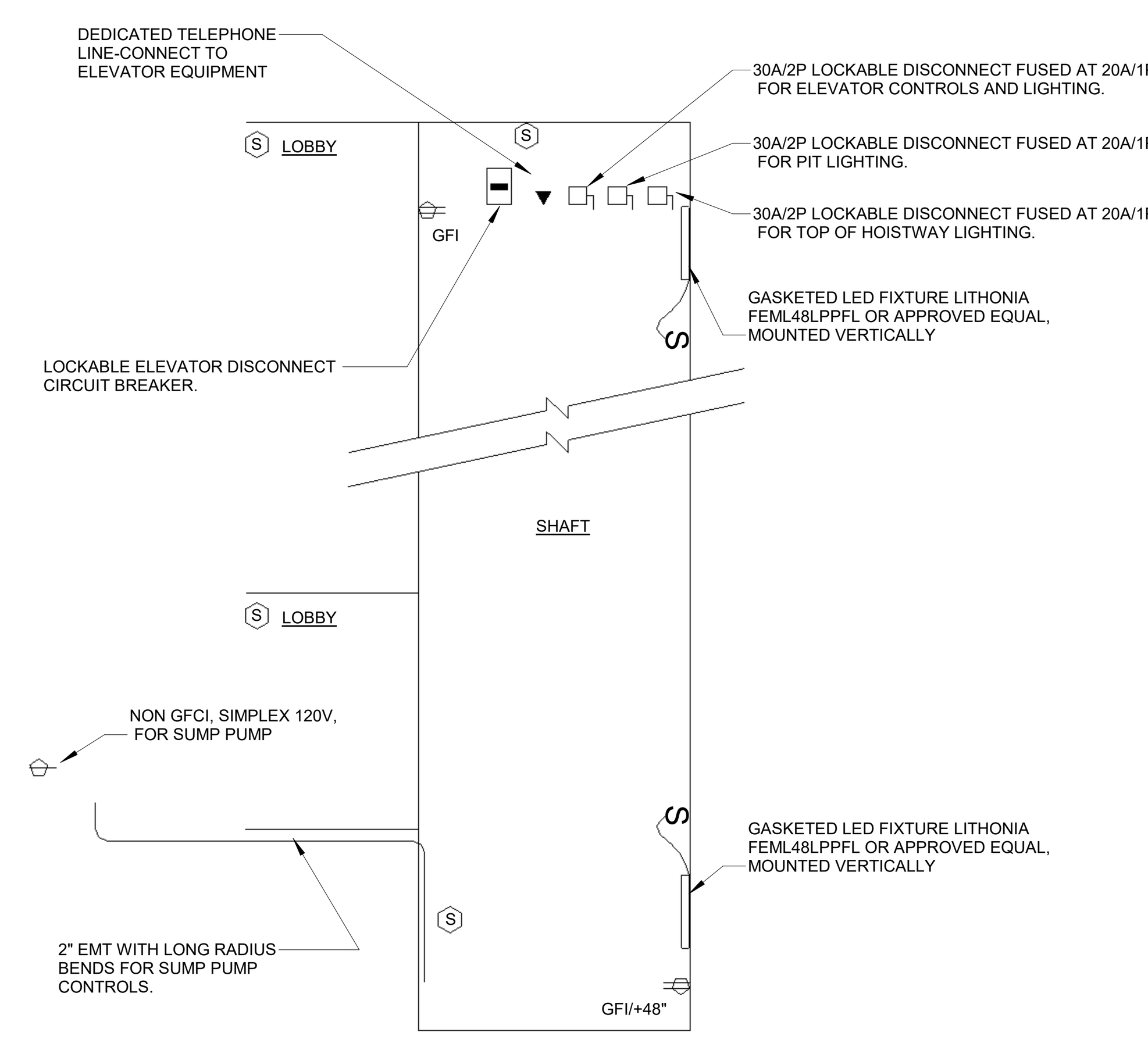
1. ELEVATORS WITH BATTERY EMERGENCY LOWERING WILL RETURN TO DESIGNATED FLOOR UPON LOSS OF POWER AND DOORS WILL OPEN.

2. COORDINATE EXACT LOCATION OF LIGHTS, RECEPTACLES, TELEPHONE CONNECTION, AND ALL DISCONNECTS WITH ELEVATOR SUPPLY PRIOR TO BIDDING .

3. INSTALLATION SHALL MEET ASME A17.1, NEC, AND ALL STATE AND LOCAL CODES.

4. FEEDER, CIRCUIT BREAKER, AND DISCONNECT SIZE SHALL BE COORDINATED AND SIZED PER NEC AND ELEVATOR MANUFACTURER.

5. ALL DISCONNECTS SHALL BE LOCKABLE IN THE OPEN POSITION AND ACCESSIBLE FROM OUTSIDE THE HOISTWAY.



FIRE ALARM / ELECTRICAL REQUIREMENTS FOR MRL ELEVATOR

NO SCALE

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600 WHITE OAKS BLVD.
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GREENBRIER COUNTY SCHOOLS

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PROJECT No.
Project Number

ELECTRICAL DETAILS

SHEET No.

E5.01R

Branch Panel: PANEL H1

Location: | **Supply From:** SB | **Mounting:** | **Enclosure:** Type 1
Volts: 480/277 Wye | **Phases:** 3 | **Wires:** 4
A.I.C. Rating: 42,000 | **Mains Type:** MCB | **Mains Rating:** 400A | **MCB Rating:** 400A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
H1-1	Lighting	20 A	1	2761 VA	3116 VA					1	20 A	Lighting	H1-2
H1-3	Lighting	20 A	1			2419 VA							H1-4
H1-5								4000 VA	4000 VA				H1-6
H1-7	VAV-001	20 A	3	4000 VA	4000 VA					3	20 A	VAV-002	H1-8
H1-9						4000 VA	4000 VA						H1-10
H1-11								4667 VA	4000 VA				H1-12
H1-13	VAV-003	30 A	3	4667 VA	4000 VA					3	20 A	VAV-004	H1-14
H1-15						4667 VA	4000 VA						H1-16
H1-17								4000 VA	2500 VA	1	20 A	VAV-006	H1-18
H1-19	VAV-005	20 A	3	4000 VA	4500 VA					1	30 A	VAV-007	H1-20
H1-21						4000 VA							H1-22
H1-23	EWH-2	20 A	1					2992 VA	2992 VA	1	20 A	EWH-3	H1-24
H1-25	EWH-5	20 A	1	2992 VA	2992 VA					1	20 A	EWH-6	H1-26
H1-27	EWH-4	20 A	1			2992 VA	4800 VA			1	30 A	EWH-9	H1-28
H1-29	EWH-8	30 A	1					4800 VA	2992 VA	1	20 A	EWH-11	H1-30
H1-31	EWH-10	20 A	1	2992 VA	148 VA					1	20 A	Lighting CANOPYS	H1-32
H1-33	Site Lighting	20 A	1			1400 VA	1200 VA			1	20 A	Site Lighting	H1-34
H1-35													H1-36
H1-37					22964...								H1-38
H1-39							22996...			3	225 A	T1	H1-40
H1-41									18430...				H1-42
	Total Load:			63081 VA		56442 VA		55373 VA					
	Total Amps:			228 A		204 A		200 A					

Legend:

Notes:

Branch Panel: H2

Location: | **Supply From:** SB | **Mounting:** | **Enclosure:** Type 1
Volts: 480/277 Wye | **Phases:** 3 | **Wires:** 4
A.I.C. Rating: 42,000 | **Mains Type:** MCB | **Mains Rating:** 225A | **MCB Rating:** 225A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
H2-1	Lighting	20 A	1	1980 VA	1650 VA					1	20 A	Lighting	H2-2
H2-3													H2-4
H2-5								3167 VA	3167 VA				H2-6
H2-7	VAV102	20 A	3	3167 VA	3167 VA					3	20 A	VAV-103	H2-8
H2-9						3167 VA	3167 VA						H2-10
H2-11								3167 VA	3167 VA				H2-12
H2-13	VAV-104	20 A	3	3167 VA	3167 VA					3	20 A	VAV-113	H2-14
H2-15						3167 VA	3167 VA						H2-16
H2-17	VAV-109	30 A	1					4500 VA					H2-18
H2-19	VAV-112	20 A	1	4000 VA	2500 VA					1	20 A	VAV-111	H2-20
H2-21	EWH-7	20 A	1			2992 VA	2500 VA			1	20 A	VAV-101	H2-22
H2-23	VAV-105	20 A	1					2000 VA	2000 VA	1	20 A	VAV-110	H2-24
H2-25													H2-26
H2-27													H2-28
H2-29													H2-30
H2-31													H2-32
H2-33													H2-34
H2-35													H2-36
H2-37					8380 VA								H2-38
H2-39							6980 VA			3	125 A	T2	H2-40
H2-41									5460 VA				H2-42
	Total Load:			31016 VA		25139 VA		26627 VA					
	Total Amps:			113 A		91 A		97 A					

Legend:

Notes:

Branch Panel: H3

Location: | **Supply From:** SB | **Mounting:** | **Enclosure:** Type 1
Volts: 480/277 Wye | **Phases:** 3 | **Wires:** 4
A.I.C. Rating: 42,000 | **Mains Type:** MCB | **Mains Rating:** 400A | **MCB Rating:** 400A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
H3-1	Lighting	20 A	1	2130...	1450...					1	20 A	Lighting	H3-2
H3-3													H3-4
H3-5								3167...	3167...				H3-6
H3-7	VAV-201	20 A	3	3167...	3167...					3	20 A	VAV-203	H3-8
H3-9						3167...	3167...						H3-10
H3-11								3167...	3167...				H3-12
H3-13	VAV-209	20 A	3	3167...	3167...					3	20 A	VAV-204	H3-14
H3-15						3167...	3167...						H3-16
H3-17	VAV-202	20 A	1					3000...	2000...	1	20 A	VAV-208	H3-18
H3-19	VAV-206	20 A	1	2000...	3000...					1	20 A	VAV-210	H3-20
H3-21	VAV-205	20 A	1			3000...	3500...			1	20 A	VAV-211	H3-22
H3-23	VAV-207	30 A	1					4500...	2500...	1	20 A	VAV-212	H3-24
H3-25				5093...	1240...								H3-26
H3-27	RTU-7	30 A	3			5093...	1240...			3	60 A	RTU-12	H3-28
H3-29								5093...	1240...				H3-30
H3-31													H3-32
H3-33													H3-34
H3-35													H3-36
H3-37					1272...								H3-38
H3-39							1018...			3	125 A	T3	H3-40
H3-41									1295...				H3-42
	Total Load:			51265 VA		46828 VA		54962 VA					
	Total Amps:			188 A		169 A		201 A					

Legend:

Notes:

Branch Panel: L1

Location: | **Supply From:** T1 | **Mounting:** | **Enclosure:** Type 1
Volts: 120/208 Wye | **Phases:** 3 | **Wires:** 4
A.I.C. Rating: 22,000 | **Mains Type:** MCB | **Mains Rating:** 400A | **MCB Rating:** 400A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
L1-1	Receptacle	20 A	1	800 VA	800 VA					1	20 A	Receptacle	L1-2
L1-3	Receptacle	20 A	1			800 VA	800 VA			1	20 A	Receptacle	L1-4
L1-5	Receptacle	20 A	1					800 VA	800 VA	1	20 A	Receptacle	L1-6
L1-7	Receptacle	20 A	1	800 VA	720 VA					1	20 A	Receptacle	L1-8
L1-9	Receptacle	20 A	1			800 VA	800 VA			1	20 A	Receptacle	L1-10
L1-11	Receptacle	20 A	1					800 VA	800 VA	1	20 A	Receptacle	L1-12
L1-13	Receptacle	20 A	1	720 VA	540 VA					1	20 A	Receptacle	L1-14
L1-15	Receptacle	20 A	1			540 VA	530 VA			1	20 A	Receptacle	L1-16
L1-17	Receptacle	20 A	1					900 VA	360 VA	1	20 A	Receptacle	L1-18
L1-19	Receptacle	20 A	1	360 VA	245 VA					1	20 A	EF-10,L-1	L1-20
L1-21	Receptacle	20 A	1			900 VA	900 VA			1	20 A	Receptacle	L1-22
L1-23	Receptacle	20 A	1					360 VA	540 VA	1	20 A	Receptacle	L1-24
L1-25	Receptacle	20 A	1	720 VA	540 VA					1	20 A	Receptacle	L1-26
L1-27	Receptacle	20 A	1			180 VA	180 VA			1	20 A	Receptacle	L1-28
L1-29	Receptacle	20 A	1					720 VA	1000...	1	20 A	Receptacle Washer	L1-30
L1-31	DRYER	30 A	2	2500...	360 VA					1	20 A	Receptacle	L1-32
L1-33						2500...	2000...			2	30 A	Receptacle DATA-	L1-34
L1-35	Receptacle	20 A	1					360 VA	2000...	1	20 A	Receptacle	L1-36
L1-37	Receptacle	20 A	1	800 VA	800 VA					1	20 A	Receptacle	L1-38
L1-39	Receptacle	20 A	1			800 VA	800 VA			1	20 A	Receptacle	L1-40
L1-41	Receptacle	20 A	1					800 VA	800 VA	1	20 A	Receptacle	L1-42
L1-43	Receptacle	20 A	1	800 VA	800 VA					1	20 A	Receptacle	L1-44
L1-45	Receptacle	20 A	1			800 VA	800 VA			1	20 A	Receptacle	L1-46
L1-47	DOOR CONTROLS	20 A	1					620 VA	900 VA	1	20 A	Receptacle	L1-48
L1-49	DISPLAY CASES	20 A	1	615 VA	1125...					1	20 A	EF-5,6,7	L1-50
L1-51	Receptacle	20 A	1			250 VA	79 VA			1	20 A	Cooling	L1-52
L1-53	Receptacle	20 A	1					360 VA	1200...	1	20 A	CCTV	L1-54
L1-55	FACP	20 A	1	1200...	1200...					1	20 A	BAS	L1-56
L1-57	ACP	20 A	1			1200...	0 VA			1	20 A	Spare	L1-58
L1-59	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	L1-60
L1-61	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	L1-62
L1-63	Spare	20 A	1			0 VA	0 VA			1	20 A	Spare	L1-64
L1-65	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	L1-66
L1-67	Receptacle	20 A	1	540 VA	1200...					1	20 A	Gen. Battery Charger	L1-68
L1-69	Gen. Heater	20 A	1			1500...							L1-70
L1-71													L1-72
L1-73													L1-74
L1-75													L1-76
L1-77													L1-78
L1-79					4780...								L1-80
L1-81							5852...			3	100 A	L1A	L1-82
L1-83									4310...				L1-84
	Total Load:			22964 VA		22996 VA		18430 VA					
	Total Amps:			197 A		197 A		154 A					

Legend:

Notes:

Branch Panel: L2

Location: | **Supply From:** T2 | **Mounting:** | **Enclosure:** Type 1
Volts: 120/208 Wye | **Phases:** 3 | **Wires:** 4
A.I.C. Rating: 22,000 | **Mains Type:** MCB | **Mains Rating:** 225A | **MCB Rating:** 225A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
L2-1	Receptacle	20 A	1	800 VA	800 VA					1	20 A	Receptacle	L2-2
L2-3	Receptacle	20 A	1			900 VA	360 VA			1	20 A	Receptacle	L2-4
L2-5	Receptacle	20 A	1					400 VA	800 VA	1	20 A	Receptacle	L2-6
L2-7	Receptacle	20 A	1	360 VA	720 VA					1	20 A	Receptacle	L2-8
L2-9	Receptacle	20 A	1			800 VA	360 VA			1	20 A	Receptacle	L2-10
L2-11	Receptacle	20 A	1					800 VA	720 VA	1	20 A	Receptacle	L2-12
L2-13	Receptacle	20 A	1	800 VA	800 VA					1	20 A	Receptacle	L2-14
L2-15	Receptacle	20 A	1			360 VA	800 VA			1	20 A	Receptacle	L2-16
L2-17	Receptacle	20 A	1					800 VA	360 VA	1	20 A	Receptacle	L2-18
L2-19	Receptacle	20 A	1	540 VA	1080 VA					1	20 A	Receptacle	L2-20
L2-21	Receptacle	20 A	1			540 VA	400 VA			1	20 A	Receptacle 3rd CLRM 110	L2-22
L2-23									500 VA	1	20 A	Receptacle EWC	L2-24
L2-25	Receptacle DATA RACK	20 A	1	1000 VA	900 VA					1	20 A	Receptacle	L2-26
L2-27	Receptacle	20 A	1			720 VA							L2-28
L2-29													L2-30
L2-31													L2-32
L2-33	Receptacle	20 A	1			800 VA	400 VA			1	20 A	Receptacle	L2-34
L2-35	Receptacle	20 A	1					180 VA	900 VA	1	20 A	Receptacle	L2-36
L2-37	Receptacle	20 A	1	180 VA	400 VA					1	20 A	Receptacle	L2-38
L2-39						540 VA				1	20 A	RTU RECPT	L2-40
L2-41	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	L2-42
L2-43	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	L2-44
L2-45	Spare	20 A	1			0 VA	0 VA			1	20 A	Spare	L2-46
L2-47													L2-48
L2-49													L2-50
L2-51													L2-52
L2-53													L2-54
L2-55													L2-56
L2-57													L2-58
L2-59													L2-60
	Total Load:			8380 VA		6980 VA		5460 VA					
	Total Amps:			72 A		60 A		46 A					

Legend:

Notes:

Branch Panel: L3

Location: | **Supply From:** T3 | **Mounting:** | **Enclosure:** Type 1
Volts: 120/208 Wye | **Phases:** 3 | **Wires:** 4
A.I.C. Rating: 22,000 | **Mains Type:** MCB | **Mains Rating:** 225A | **MCB Rating:** 225A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
L3-1	Receptacle	20 A	1	800 VA	800 VA					1	20 A	Receptacle	L3-2
L3-3	Receptacle	20 A	1			540 VA	720 VA			1	20 A	Receptacle	L3-4
L3-5	Receptacle	20 A	1					720 VA	540 VA	1	20 A	Receptacle	L3-6
L3-7	Receptacle	20 A	1	800 VA	800 VA					1	20 A	Receptacle	L3-8
L3-9	Receptacle	20 A	1			540 VA	540 VA			1	20 A	Receptacle	L3-10
L3-11	Receptacle	20 A	1					800 VA	800 VA	1	20 A	Receptacle	L3-12
L3-13	Receptacle	20 A	1	540 VA	540 VA					1	20 A	Receptacle	L3-14
L3-15	Receptacle	20 A	1			540 VA	360 VA			1	20 A	Receptacle	L3-16
L3-17	Receptacle	20 A	1					800 VA	800 VA	1	20 A	Receptacle	L3-18
L3-19	Receptacle	20 A	1	360 VA	720 VA					1	20 A	Receptacle	L3-20
L3-21	Receptacle EWC	20 A	1			500 VA	540 VA			1	20 A	Receptacle	L3-22
L3-23	Receptacle DATA	20 A	1					1180 VA	720 VA	1	20 A	Receptacle	L3-24
L3-25	Receptacle	20 A	1	900 VA	400 VA					1	20 A	Receptacle	L3-26
L3-27	Receptacle	20 A	1			400 VA	400 VA			1	20 A	Receptacle	L3-28
L3-29	Receptacle	20 A	1					180 VA	800 VA	1	20 A	Receptacle	L3-30
L3-31	Receptacle	20 A	1	800 VA	180 VA					1	20 A	Receptacle	L3-32
L3-33	Receptacle	20 A	1			400 VA	233 VA			1	20 A	EF-17, EF-18, EF-19	L3-34
L3-35	CU-D-1	20 A	2					1248 VA	1248 VA	2	20 A	CU-D-2	L3-36
L3-37				1248 VA	1248 VA								L3-38
L3-39	CU-D-3	20 A	2			1248 VA	500 VA			1	20 A	ELEV CTRL	L3-40
L3-41								1248 VA	500 VA	1	20 A	ELEV SUMP	L3-42
L3-43	WH-1	30 A	2	2250 VA	750 VA					1	20 A	Receptacle REF	L3-44
L3-45						2250 VA	700 VA			1	20 A	Receptacle COFFEE	L3-46
L3-47	Receptacle MW	20 A	1					1560 VA	360 VA	1	20 A	Receptacle BOYS 211	L3-48
L3-49	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	L3-50
L3-51	Spare	20 A	1			0 VA	0 VA			1	20 A	Spare	L3-52
L3-53	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	L3-54
L3-55													L3-56
L3-57													L3-58
L3-59													L3-60
	Total Load:			12725 VA		10189 VA		12952 VA					
	Total Amps:			109 A		85 A		111 A					

Legend:

Notes:

Branch Panel: L1A

Location: | **Supply From:** L1 | **Mounting:** | **Enclosure:** Type 1
Volts: 120/208 Wye | **Phases:** 3 | **Wires:** 4
A.I.C. Rating: 22,000 | **Mains Type:** MCB | **Mains Rating:** 100A | **MCB Rating:** 100A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
L1A-1	Receptacle GC 006	20 A	1	720 VA	1000...					1	20 A	Receptacle WORK 007	L1A-2
L1A-3	Receptacle WAIT 005	20 A	1			540 VA	400 VA			1	20 A	Receptacle RECP. 004	L1A-4
L1A-5	Receptacle RECP. 004	20 A	1					400 VA	400 VA	1	20 A	Receptacle RECP. 004	L1A-6
L1A-7	Receptacle CONFERENCE...	20 A	1	720 VA	600 VA					1	20 A	Equipment WORK 007	L1A-8
L1A-9	Receptacle PRINCIPAL 011	20 A	1			940 VA	62 VA			1	20 A	HVAC STAFF RR 012	L1A-10
L1A-11	Receptacle JC 018	20 A	1					180 VA	720 VA	1	20 A	Receptacle 1st CLRM 015	L1A-12
L1A-13	Receptacle 1st CLRM 015	20 A	1	400 VA	180 VA					1	20 A	Receptacle 1st STORAGE...	L1A-14
L1A-15	Receptacle 1st CLRM 015	20 A	1			800 VA	2250...			2	30 A	WH-1	L1A-16
L1A-17	Receptacle 1st CLRM 015	20 A	1					360 VA	2250...				L1A-18
L1A-19	Receptacle 1st CLRM 015	20 A	1	800 VA	360 VA					1	20 A	Receptacle LANDING 020	L1A-20
L1A-21	DOOR CONTROL	20 A	1			500 VA	0 VA			1	20 A	Spare	L1A-22
L1A-23	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	L1A-24
L1A-25	Spare	20 A	1	0 VA	0 VA					1	20 A	Spare	L1A-26
L1A-27	Receptacle ISS 010	20 A	1			360 VA							L1A-28
L1A-29													L1A-30
L1A-31													L1A-32
L1A-33													L1A-34
L1A-35													L1A-36
L1A-37													L1A-38
L1A-39													L1A-40
L1A-41													L1A-42
	Total Load:			4780 VA		5852 VA		4310 VA					
	Total Amps:			40 A		49 A		36 A					

Legend:

Notes:

Branch Panel: L1B

Location: | **Supply From:** PANEL L4 | **Mounting:** | **Enclosure:** Type 1
Volts: 120/208 Wye | **Phases:** 3 | **Wires:** 4
A.I.C. Rating: 22,000 | **Mains Type:** MCB | **Mains Rating:** 125A | **MCB Rating:** 125A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
L1B-1	Receptacle TITLE I 021	20 A	1	720 VA	900 VA					1	20 A	Receptacle	L1B-2
L1B-3	Receptacle	20 A	1			180 VA	800 VA			1	20 A	Receptacle	L1B-4
L1B-5	Receptacle	20 A	1					540 VA	720 VA	1	20 A	Receptacle	L1B-6
L1B-7	Receptacle	20 A	1	900 VA	360 VA					1	20 A	Receptacle	L1B-8
L1B-9	Receptacle	20 A	1			800 VA	720 VA			1	20 A	Receptacle	L1B-10
L1B-11	Receptacle	20 A	1					720 VA	800 VA	1	20 A	Receptacle	L1B-12
L1B-13	Receptacle	20 A	1	800 VA	400 VA					1	20 A	Receptacle	L1B-14
L1B-15	Receptacle	20 A	1			400 VA	540 VA			1	20 A	Receptacle	L1B-16
L1B-17	Receptacle	20 A	1					800 VA	800 VA	1	20 A	Receptacle	L1B-18
L1B-19	Receptacle	20 A	1	360 VA	540 VA					1	20 A	Receptacle	L1B-20
L1B-21	EF-1,EF-2,EF-3,EF-4	20 A	1			156 VA	2250...			2	30 A	WH-2	L1B-22
L1B-23	Receptacle 1st CLRM 014	20 A	1					900 VA	2250...				L1B-24
L1B-25	Receptacle 1st CLRM 014	20 A	1	360 VA	800 VA					1	20 A	Receptacle 1st CLRM 014	L1B-26
L1B-27	Receptacle 1st CLRM 014	20 A	1			800 VA	800 VA			1	20 A	Receptacle	L1B-28
L1B-29	Receptacle	20 A	1					800 VA	400 VA	1	20 A	Receptacle 1st CLRM 014	L1B-30
L1B-31	Receptacle	20 A	1	400 VA	400 VA					1	20 A	Receptacle	L1B-32
L1B-33	Receptacle	20 A	1			360 VA	1498...			2	20 A	CU-D-5	L1B-34
L1B-35	CU-D-4	20 A	2					1498...	1498...				L1B-36
L1B-37				1498...	720 VA					1	20 A	RTU RECPT	L1B-38
L1B-39													L1B-40
L1B-41													L1B-42
	Total Load:			8904 VA		9049 VA		11270 VA					
	Total Amps:			74 A		76 A		94 A					

Legend:

Notes:

THRASHER
600 WHITE OAKS BLVD.
P.O. BOX 940
BRIDGEPORT, WV 26330

P (304) 624-4108
F (304) 624-7831

www.thethrashergroup.com

Harper Engineering
52 B Street
St. Albans, WV 25177
phone.304.722.3602
fax.304.722.3603

NO.	BY	DATE	DESCRIPTION
		5/6/2022	FINAL COORDINATION

ALDERSON ELEMENTARY SCHOOL
ADDITIONS AND RENOVATIONS
CONSTRUCTION DOCUMENTS
SEPTEMBER 13, 2022
ALDERSON, WEST VIRGINIA
GREENBRIER COUNTY SCHOOLS

DRAWN: JCS DATE: 09/13/2022
CHECKED: JEH DATE: 09/13/2022
APPROVED: JEH DATE: 09/13/2022

PROJECT No.
Project Number

PANELBOARD SCHEDULES

SHEET No.
E6.01R

LAYOUT TAB: PANELBOARD SCHEDULES USER: JCS
CAD FILE: BIM 360://21065 Alderson Elementary School/21065 Alderson School MEP 21.rvt PLOT DATE/TIME: 9/21/2022 1:12:05 PM

RISER NOTES:

(A) (2) - 5" CONDUITS WITH PULL STRINGS.

(B) (5) - 4" CONDUITS WITH (4) - 600 MCM.

(C) 4" CONCRETE HOUSEKEEPING PAD.

(D) 4" CONDUIT WITH (4) - 500 MCM, #3 GND.

(E) 2 1/2" CONDUIT WITH (4) - 4/0, #4 GND.

(F) GROUND PER NEC.

(G) 2 1/2" CONDUIT WITH (3) - 4/0, #4 GND.

(H) SEE TRANSFORMER SCHEDULE FOR FEEDER SIZES.

(J) (2) - 4" CONDUITS WITH (4) - 500MCM, 1/0 GND.

(K) 1 1/2" CONDUIT WITH (3) - #1, #6 GND.

(L) 2" CONDUIT WITH (4) - #1, #6 GND.

(M) (2) - 1" CONDUITS FOR COMMUNICATIONS. COORDINATE REQUIREMENTS WITH GENERATOR MANUFACTURER.

(N) 1 1/2" CONDUIT WITH (4) - #2, #8 GND.

(P) 1" CONDUIT WITH (4) - #12, #12 GND FOR GENERATOR HEATER AND BATTERY CHARGER. PROVIDE (2) -1P/20A, 120V BREAKERS IN PANEL "L1". COORDINATE WITH GENERATOR MANUFACTURER.

(Q) DIESEL GENERATOR: 450KW, 277/480V, 3-PHASE, 4W, WITH 3P-800A, 100% RATED MAIN BREAKER; 1700 GALLON DOUBLE WALL BASE MAOUNTED FUEL TANK, CONTROL PANEL; SOUND LEVEL II ENCLOSURE; BATTERY CHARGER; BLOCK HEATER AND MUFFLER.

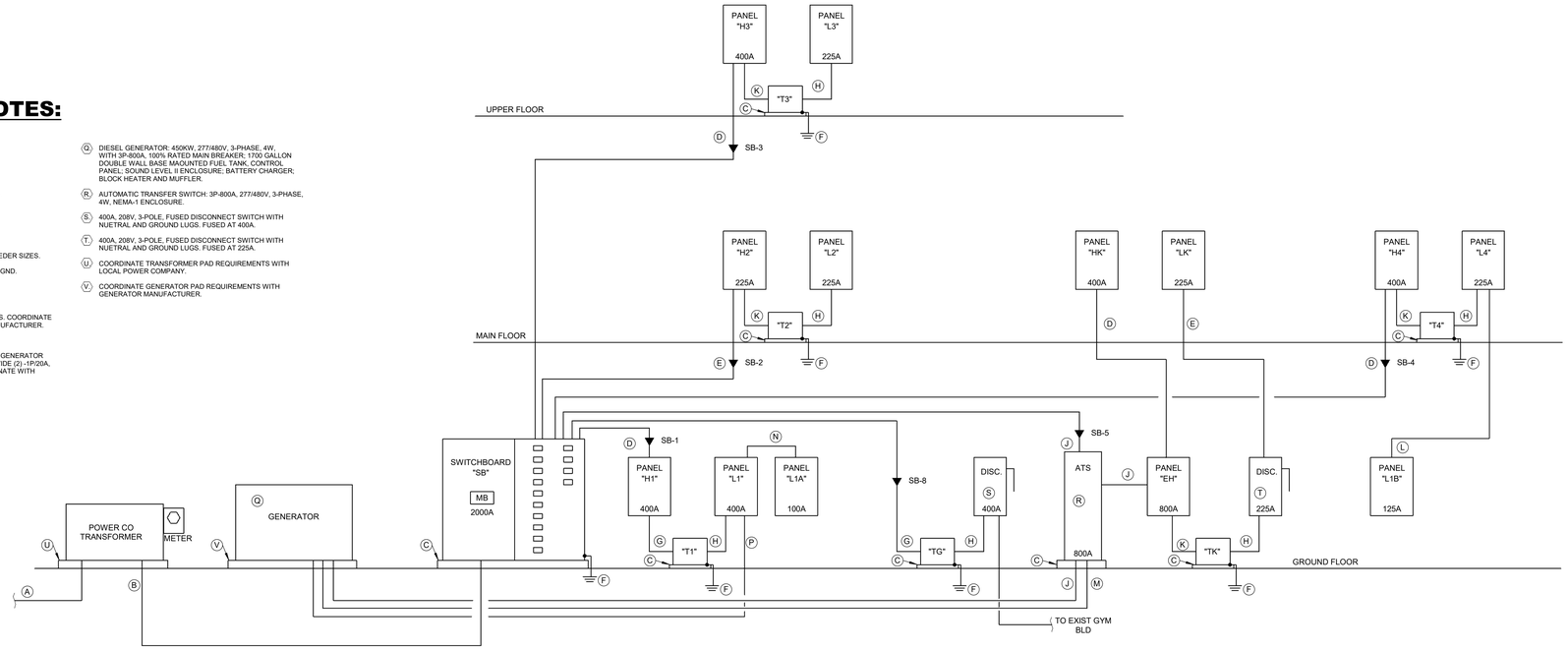
(R) AUTOMATIC TRANSFER SWITCH: 3P-800A, 277/480V, 3-PHASE, 4W, NEMA-1 ENCLOSURE.

(S) 400A, 208V, 3-POLE, FUSED DISCONNECT SWITCH WITH NUETRAL AND GROUND LUGS. FUSED AT 400A.

(T) 400A, 208V, 3-POLE, FUSED DISCONNECT SWITCH WITH NUETRAL AND GROUND LUGS. FUSED AT 225A.

(U) COORDINATE TRANSFORMER PAD REQUIREMENTS WITH LOCAL POWER COMPANY.

(V) COORDINATE GENERATOR PAD REQUIREMENTS WITH GENERATOR MANUFACTURER.



ELECTRICAL RISER

NOT TO SCALE

Branch Panel: PANEL EH

Location:
Supply From: SB
Mounting:
Enclosure: Type 1

Volts: 480/277 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 42,000
Mains Type: MCB
Mains Rating: 800A
MCB Rating: 800A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
EH-1				1500...	15000...								EH-2
EH-3	WH-3	70 A	3			15000...	15000...			3	70 A	WH-4	EH-4
EH-5								15000...	1500...				EH-6
EH-7				5544...	17298...								EH-8
EH-9	HK	400 A	3			54206...	12586...			3	125 A	75 kVA TK	EH-10
EH-11								54967...	1307...				EH-12
EH-13				2997...	23761...								EH-14
EH-15	MAU-1	140 A	3			29977...	23761...			3	125 A	RTU-3	EH-16
EH-17								29977...	2376...				EH-18
EH-19													EH-20
EH-21													EH-22
EH-23													EH-24
EH-25													EH-26
EH-27													EH-28
EH-29													EH-30
		Total Load:		156479 VA		150530 VA		151780 VA					
		Total...		566 A		543 A		549 A					

Legend:

Notes:

Branch Panel: PANEL L4

Location:
Supply From: T4
Mounting:
Enclosure: Type 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225A
MCB Rating: 225A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
L4-1				8904...	540 VA					1	20 A	Receptacle	L4-2
L4-3	L1B	125 A	3			9049...	391 VA			1	20 A	Receptacle	L4-4
L4-5								11270...	2250...	2	30 A	WH-5	L4-6
L4-7	Spare	20 A	1	0 VA	2250...								L4-8
L4-9	Spare	20 A	1			0 VA	0 VA			1	20 A	Spare	L4-10
L4-11	Spare	20 A	1					0 VA	0 VA	1	20 A	Spare	L4-12
L4-13	RTU RECEPT	20 A	1	540 VA									L4-14
L4-15													L4-16
L4-17													L4-18
L4-19													L4-20
L4-21													L4-22
L4-23													L4-24
L4-25													L4-26
L4-27													L4-28
L4-29													L4-30
		Total Load:		12221 VA		9438 VA		13496 VA					
		Total...		105 A		79 A		116 A					

Legend:

Notes:

Branch Panel: Panel H4

Location:
Supply From: SB
Mounting:
Enclosure: Type 1

Volts: 480/277 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 42,000
Mains Type: MCB
Mains Rating: 400A
MCB Rating: 400A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
H4-1	Lighting	20 A	1	1870...	1021...					1	20 A	Lighting	H4-2
H4-3	EWH-1	20 A	1			2992...	0 VA			1	20 A	Spare	H4-4
H4-5								5093...	8858...				H4-6
H4-7	RTU-9	30 A	3	5093...	8858...					3	40 A	RTU-8	H4-8
H4-9						5093...	8858...						H4-10
H4-11								7972...	7972...				H4-12
H4-13	RTU-11	40 A	3	7972...	7972...					3	40 A	RTU-10	H4-14
H4-15						7972...	7972...						H4-16
H4-17								7972...	7972...				H4-18
H4-19	RTU-4	40 A	3	7972...	7972...					3	40 A	RTU-5	H4-20
H4-21						7972...	7972...						H4-22
H4-23													H4-24
H4-25													H4-26
H4-27													H4-28
H4-29													H4-30
H4-31													H4-32
H4-33													H4-34
H4-35													H4-36
H4-37					1222...								H4-38
H4-39							9438...			3	125 A	T4	H4-40
H4-41									1349...				H4-42
		Total Load:		60817 VA		58232 VA		59242 VA					
		Total Amps:		220 A		210 A		214 A					

Legend:

Notes:

Transformer Schedule

Transformer	KVA	Phase	Voltage Primary	Secondary Voltage	Secondary Feeder	Ground Conductor	Notes
T1	150 kVA	3	277/480V	120/208	(4)-500 MCM 4" CONDUIT	1-1/0	
T2	75 kVA	3	277/480V	120/208	(4)-4/0 2-1/2" CONDUIT	1-#2	
T3	75 kVA	3	277/480V	120/208	(4)-4/0 2-1/2" CONDUIT	1-#2	
TG	150 kVA	3	277/480V	120/208	(4)-500 MCM 4" CONDUIT	1-1/0	
TK	75 kVA	3	277/480V	120/208	(4)-4/0 2-1/2" CONDUIT	1-#2	
T4	75 kVA	3	277/480V	120/208	(4)-4/0 2-1/2" CONDUIT	1-#2	

Switchboard: SB

Location: ELEC 048
Supply From:
Mounting:
Enclosure:

Volts: 480/277 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 65,000
Mains Type: MCB
Mains Rating: 2000 A
MCB Rating: 2000 A

Notes:

CKT	Circuit Description	# of Poles	Frame Size	Trip Rating	Load	Remarks
SB-1	PANEL H1	3	400 A	400 A	174894 VA	
SB-2	PANEL H2	3	225 A	225 A	82768 VA	
SB-3	PANEL H3	3	400 A	400 A	153038 VA	
SB-4	PANEL H4	3	400 A	400 A	178287 VA	
SB-5	PANEL EH THRU ATS	3	800 A	800 A	458789 VA	
SB-6	RTU-1	3	225 A	100 A	48495 VA	
SB-7	RTU-2	3	225 A	100 A	48495 VA	
SB-8	RTU-6	3	225 A	150 A	84369 VA	
SB-9	TG TO EXIST GYM BUILDING	3	225 A	225 A	72000 VA	
SB-10	ELEVATOR	3	100 A	40 A	22410 VA	
SB-11	Spare	3	225 A	225 A	0 VA	
SB-12	Spare	1	225 A	225 A	0 VA	
SB-13	Spare	1	100 A	100 A	0 VA	
SB-14						
SB-15						
SB-16						
SB-17						
SB-18						
SB-19						
SB-20						
				Total Conn. Load:	1308037 VA	
				Total Amps:	1573 A	

Legend:

Notes:

THRASHER
600 WHITE OAKS BLVD.
P.O. BOX 940
BRIDGEPORT, WV 26330

P (304) 624-4108
F (304) 624-7831

www.thethrashergroup.com

Harper Engineering
52 B Street
St. Albans, WV 25177
phone.304.722.3602
fax.304.722.3603

NO.	BY	DATE	DESCRIPTION
		5/6/2022	FINAL COORDINATION

ALDERSON ELEMENTARY SCHOOL

ADDITIONS AND RENOVATIONS

CONSTRUCTION DOCUMENTS

SEPTEMBER 13, 2022

ALDERSON, WEST VIRGINIA
GREENBRIER COUNTY SCHOOLS

DRAWN: JCS DATE: 09/13/2022
CHECKED: JEH DATE: 09/13/2022
APPROVED: JEH DATE: 09/13/2022

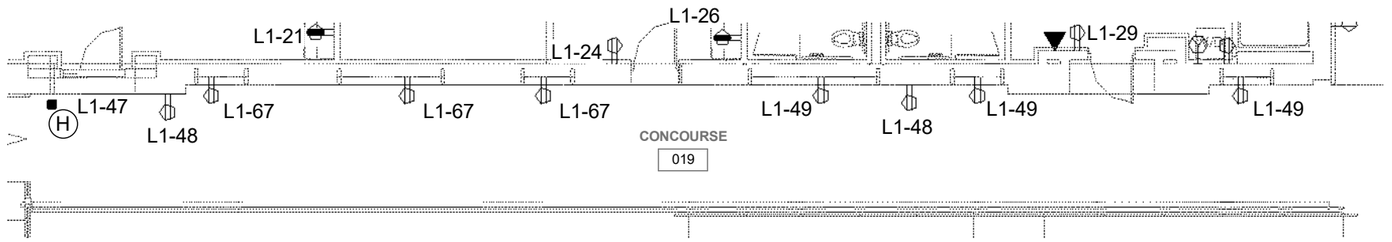
PROJECT No.
Project Number

PANELBOARD SCHEDULES

SHEET No.

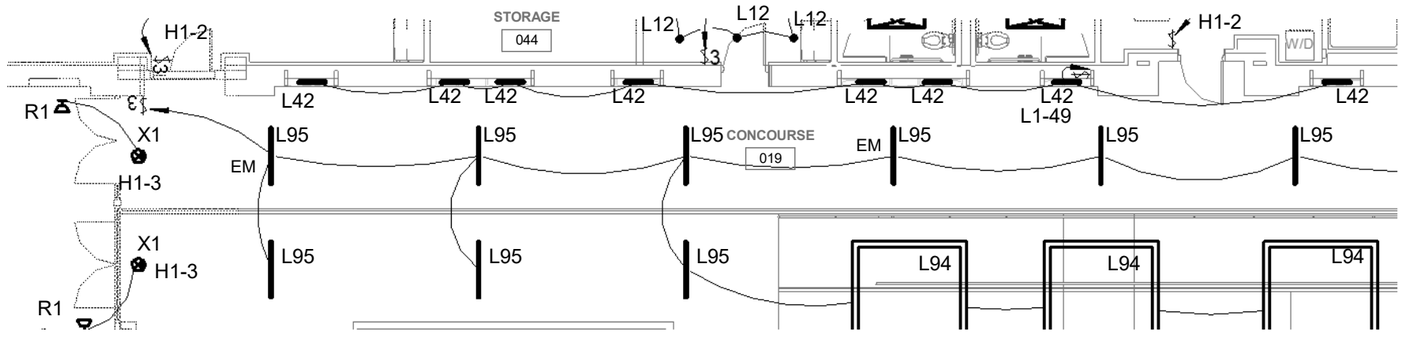
E6.02R

LAYOUT TAB PANELBOARD SCHEDULES
CAD FILE: BM 300-21065 Alderson Elementary School\21065 Alderson School MEP r21 r14
PLOT DATE/TIME 9/13/2022 1:16:59 PM
USER JCS



2 SK-E1 GROUND FLOOR POWER PLAN -SK-E1

3/32" = 1'-0"



1 SK-E1 GROUND FLOOR LIGHTING PLAN SK-E1

3/32" = 1'-0"

FIXTURES TYPE L42 ADDED TO DISPLAY CASES
CIRCUIT WITH RECEPTACLES IN CASES. L1-49
L42-(MARK-S2LS 2FT 80CRI 40K)

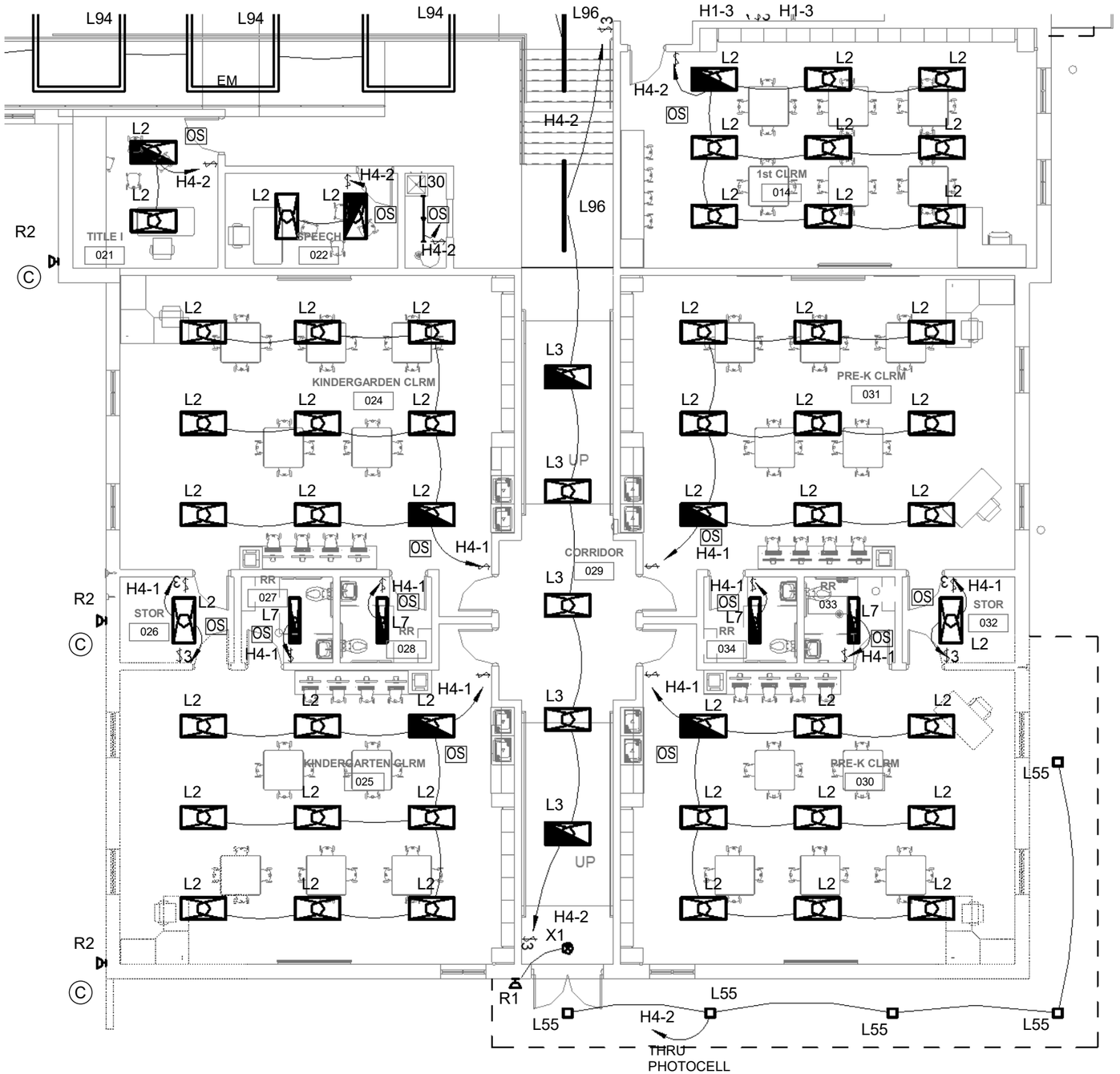
CONSTRUCTION DOCUMENTS
ALDERSON ELEMENTARY SCHOOL

ALDERSON, WEST VIRGINIA
GREENBRIER COUNTY SCHOOLS

Harper Engineering
52 B Street
St Albans, WV 25177
p. 304.722.3602 f. 304.722.3603

SK-E1

Date: 9/19/22



CONSTRUCTION DOCUMENTS
ALDERSON ELEMENTARY SCHOOL

ALDERSON, WEST VIRGINIA
GREENBRIER COUNTY SCHOOLS

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52 B Street
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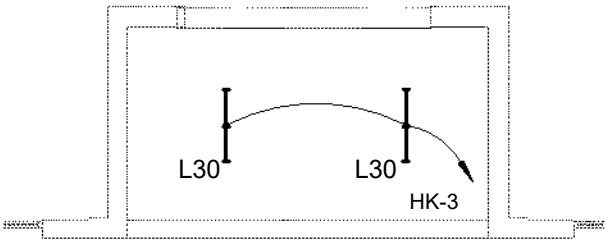
SK-E2

Date: 9/19/22



1
SK-E3
UPPER FLOOR LIGHTING PLAN - SK-E3
3/32" = 1'-0"

ADD 2-L30 FIXTURES IN ROOM ABOVE VESTIBULE 101. SWITCH AT BOTTOM OF ACCESS LADDER

CONSTRUCTION DOCUMENTS

ALDERSON ELEMENTARY SCHOOL

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GREENBRIER COUNTY SCHOOLS

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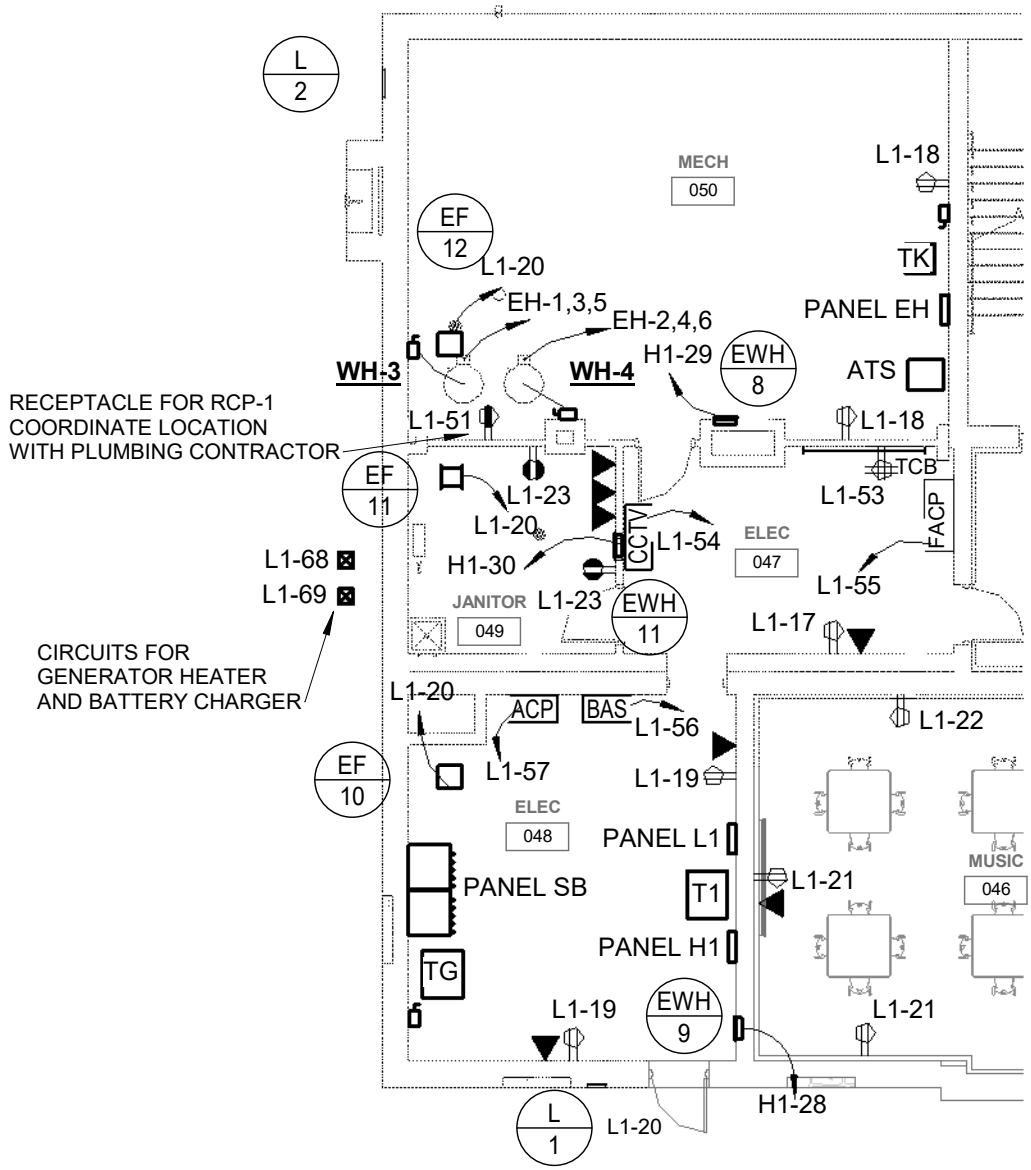
SK-E3

Date: 09/19/2022



1 / SK-E4 GROUND FLOOR POWER PLAN -SK-E4

3/32" = 1'-0"

CONSTRUCTION DOCUMENTS

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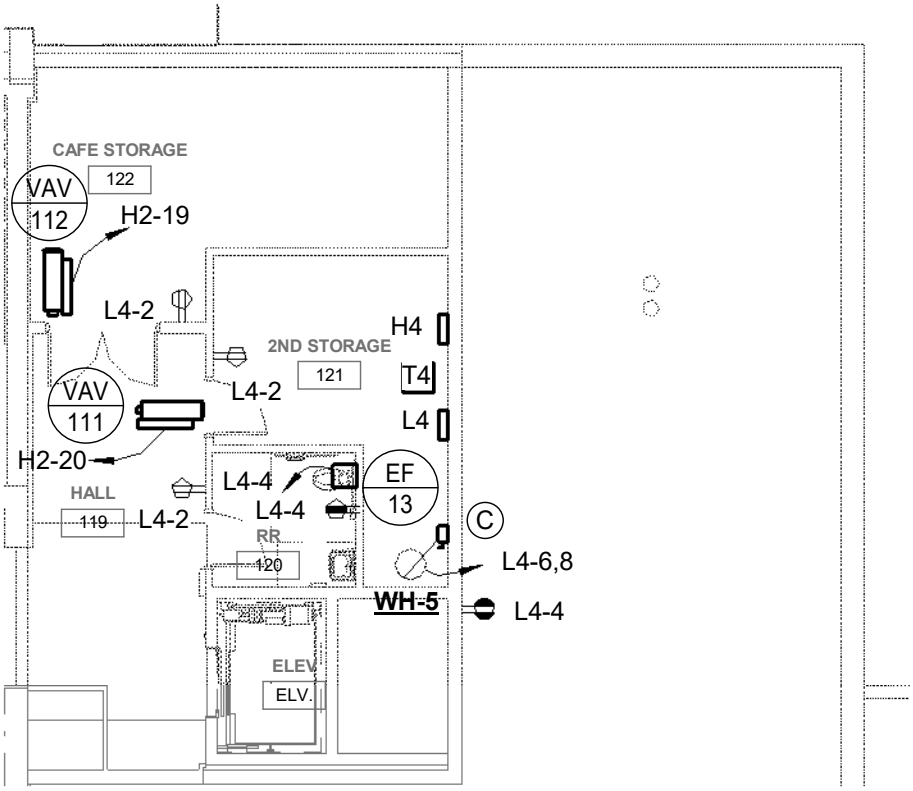
SK-E4

Date: 09/19/2022



1 / SK-E5 MAIN FLOOR POWER PLAN -SK-E5

3/32" = 1'-0"

CONSTRUCTION DOCUMENTS

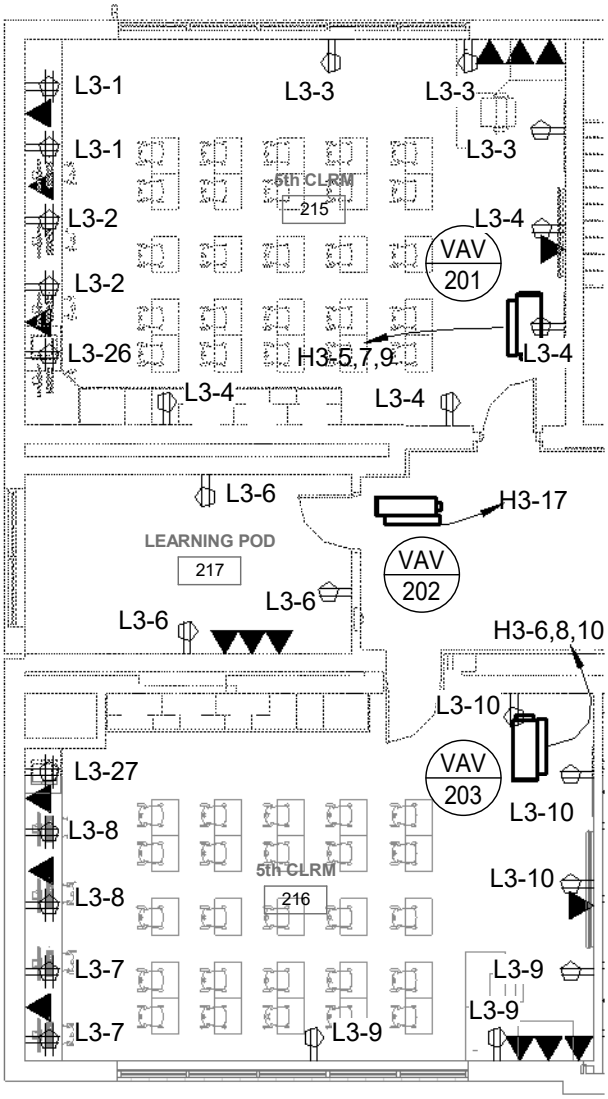
ALDERSON ELEMENTARY SCHOOL

ALDERSON, WEST VIRGINIA
GREENBRIER COUNTY SCHOOLS

Harper Engineering
52 B Street
St Albans, WV 25177
p. 304.722.3602 f. 304.722.3603

SK-E5

Date: 09/19/2022



1 / SK-E6 UPPER FLOOR POWER PLAN - SK-E6

3/32" = 1'-0"

CONSTRUCTION DOCUMENTS

ALDERSON ELEMENTARY SCHOOL

ALDERSON, WEST VIRGINIA
GREENBRIER COUNTY SCHOOLS

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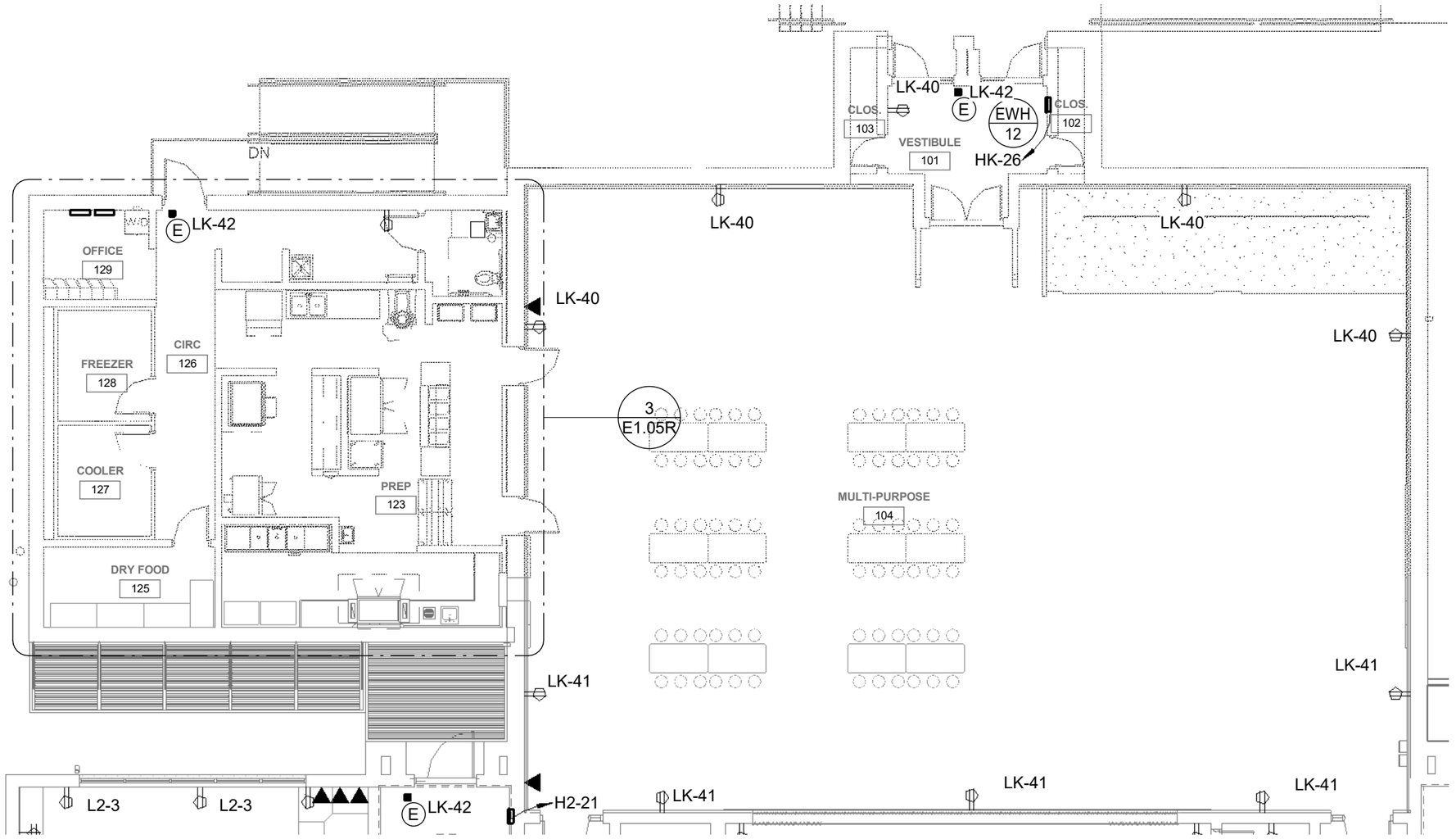
St Albans, WV 25177
p. 304.722.3602 f. 304.722.3603

SK-E6

Date: 09/19/2022



1 / SK-E7 MAIN FLOOR POWER PLAN - SK-E7

3/32" = 1'-0"

CONSTRUCTION DOCUMENTS
ALDERSON ELEMENTARY SCHOOL

ALDERSON, WEST VIRGINIA
GREENBRIER COUNTY SCHOOLS

Harper Engineering
52 B Street
St Albans, WV 25177
p. 304.722.3602 f. 304.722.3603

SK-E7

Date: 9/19/22

DUAL ELECTRIC WATER HEATER SCHEDULE

MARK	MFGR.	MODEL NO.	TOTAL K.W.	ELEMENTS	VOLT.	PHASE	K.W. EACH ELEMENT	GAL. STOR.	UEF RATING	REMARKS
WH-3	AO SMITH	DSE-65A	45	1	480 V	3	15	65	N/A	1
WH-4	AO SMITH	DSE-65A	45	1	480 V	3	15	65	N/A	1

CONSTRUCTION DOCUMENTS

ALDERSON ELEMENTARY SCHOOL

ALDERSON, WEST VIRGINIA
GREENBRIER COUNTY SCHOOLS

Harper Engineering
52 B Street
St Albans, WV 25177
p. 304.722.3602 f. 304.722.3603

SK-P1

Date: 09/15/2022

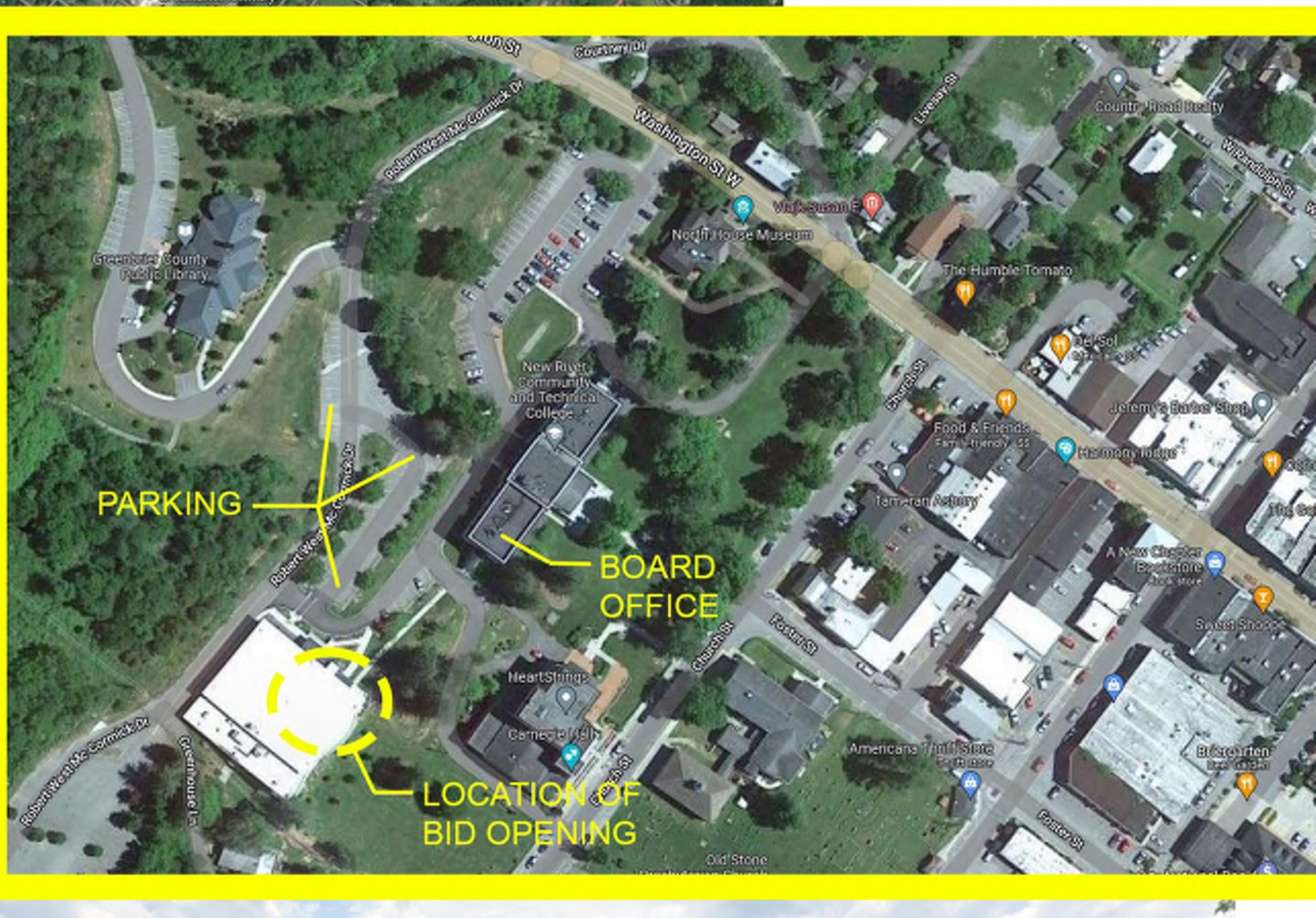
Additions and Renovations

ALDERSON ELEMENTARY

Greenbrier County Schools

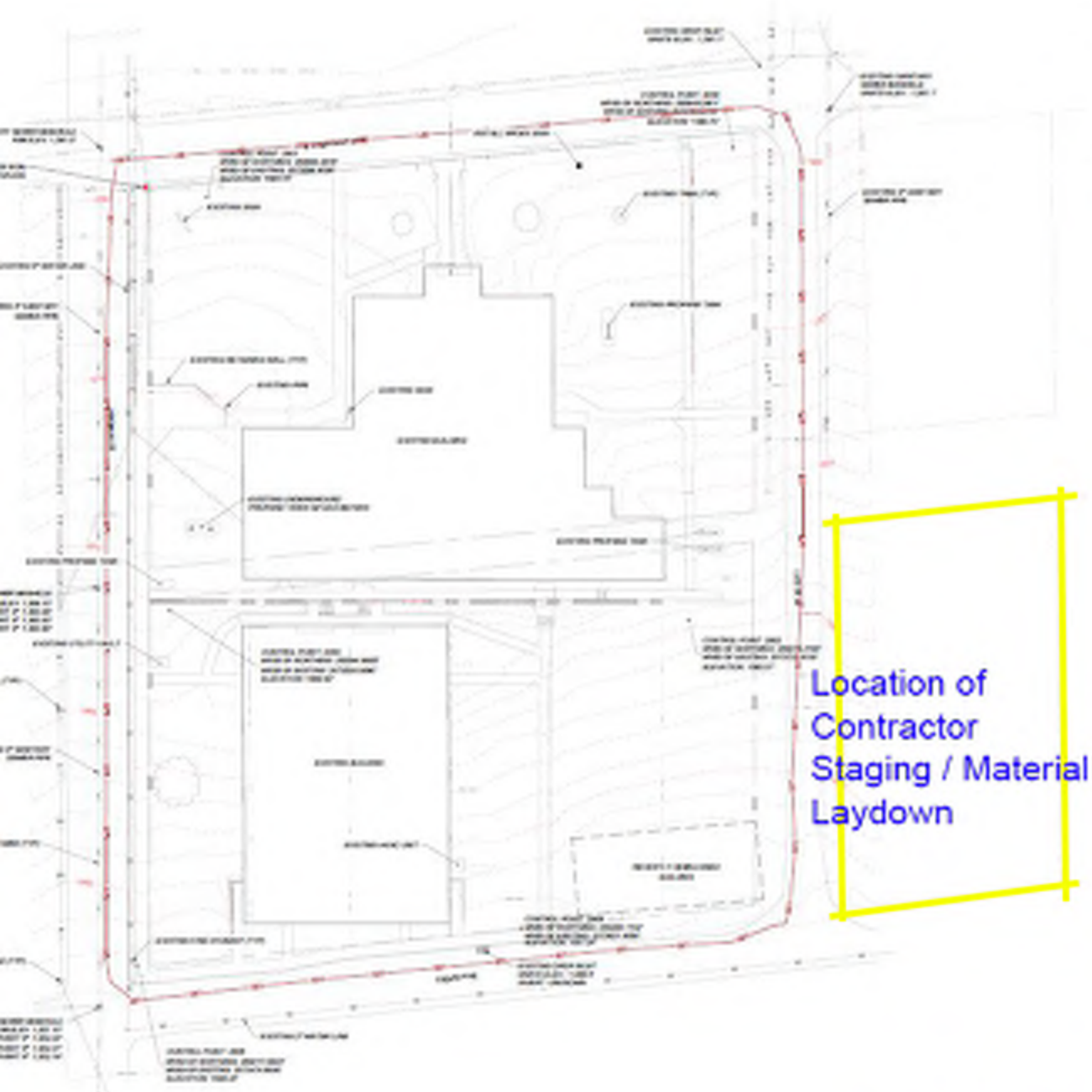
BID OPENING LOCATION:

KYLE AND LYNN FORT
ARTS AND SCIENCES BUILDING
New River Community and Technical College



ALDERSON ES
Addendum No. 1

MAP 1



ALDERSON ES
Addendum No. 1

SITE 1