CONSTRUCTION NOTES:

A. GENERAL:
1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE VIRGINIA STATEWIDE UNIFORM BUILDING CODE, THE 2012 INTERNATIONAL BUILDING CODE AND THE STANDARDS AND SPECIFICATIONS OF THE CITY OF WINCHESTER, VIRGINIA.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY "MISS UTILITY" BY TELEPHONE AT 811 AT LEAST TWO (2) WORKING DAYS BUT NOT MORE THAN TEN (10) WORKING DAYS PRIOR TO COMMENCEMENT OF ANY LAND DISTURBING ACTIVITIES.
3. THE CONTRACTOR SHALL BE LICENSED IN THE COMMONWEALTH OF VIRGINIA IN ACCORDANCE WITH CHAPTER 11 OF TITLE 54.1 OF THE CODE OF VIRGINIA. THE CONTRACTOR SHALL BE REQUIRED TO OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION. IT SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN WORKMAN'S COMPENSATION INSURANCE AND CONTRACTORS GENERAL LIABILITY COVERAGE. A CERTIFICATE OF INSURANCE SHALL BE SUBMITTED TO THE OWNER.
4. ALL WORK SHALL BE PERFORMED IN AN EXPEDITIOUS AND WORKMANLIKE MANNER AND IN ACCORDANCE WITH ALL GENERALLY ACCEPTED TRADE PRACTICES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN A CLEAN AND ORDERLY SITE THROUGHOUT THE CONSTRUCTION PROCESS.
5. THESE STRUCTURAL DRAWINGS SHALL BE READ IN CONCERT WITH ALL OTHER CONTRACT DOCUMENTS AND SPECIFICATIONS.
6. EVERY EFFORT HAS BEEN MADE TO VERIFY THE DIMENSIONS AND ENSURE THE ACCURACY OF THESE PLANS. HOWEVER, THE CONTRACTOR SHALL VERIFY DIMENSIONS PRIOR TO THE CONSTRUCTION PROCESS AND IF ANY DISCREPANCIES DO EXIST, THEN THE PROJECT ARCHITECT OR PROJECT ENGINEER SHALL BE NOTIFIED BEFORE THE NECESSARY ADJUSTMENTS ARE MADE.
7. DO NOT SCALE THE DRAWINGS. THE DIMENSIONS INDICATED ON THE PRINTS SHALL CONTROL.
8. THE TYPICAL DETAILS PROVIDED ON THESE DRAWINGS ARE TO DESCRIBE THE CONSTRUCTION STANDARDS TO BE APPLIED FOR THIS PROJECT. THE DETAILS MAY BE ADJUSTED, AS REQUIRED, TO ACCOUNT FOR VARYING CONDITIONS IN THE FIELD. SIGNIFICANT ADJUSTMENTS MUST BE PRESENTED TO THE PROJECT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY INSTALLATION OR FABRICATION. ALL TYPICAL DETAILS SHALL BE REVIEWED BY THE CONTRACTOR AND APPROPRIATE SUBCONTRACTORS PRIOR TO ANY DETAILING, FABRICATION, AND/OR INSTALLATION. ANY CONFLICTS OR CLARIFICATIONS SHALL BE RESOLVED BEFORE THE COMMENCEMENT OF WORK.
9. SHOP DRAWINGS OF ALL CONCRETE, STEEL, COLD-FORMED STEEL FRAMING, PRE-ENGINEERED STRUCTURAL COMPONENTS, ETC. SHALL BE SUBMITTED FOR REVIEW PRIOR TO ANY FABRICATION OR INSTALLATION.
10. COORDINATE SIZE AND INSTALLATION OF ALL OPENINGS, SLEEVES, INSERTS, TIES, EQUIPMENT PADS, EQUIPMENT SUPPORTS, ETC. WITH APPROPRIATE TRADES AND CONTRACT DRAWINGS PRIOR TO INSTALLATION OR FABRICATION.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE IMPLEMENTATION OF ALL O.S.H.A. STANDARDS, SO THAT THE CONSTRUCTION SITE IS SECURE AND THAT THE SAFETY OF THE PUBLIC AND ALL PARTIES INVOLVED IN THE CONSTRUCTION PROCESS IS PRESERVED.
12. IF APPLICABLE, ADEQUATE TEMPORARY SUPPORT STRUCTURES, SUCH AS SHEETING, SHORING, AND BRACING, SHALL BE INSTALLED DURING CONSTRUCTION UNTIL THE WIND RESISTING SYSTEMS AND THE SUPPORTING DIAPHRAGMS ARE IN PLACE AND HAVE ATTAINED 75% DESIGN STRENGTH. SHORING AND BRACING SHALL RESIST FORCES SUCH AS WIND AND UNBALANCED LOADING DUE TO CONSTRUCTION. BRACING SYSTEMS SHALL BE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF MARYLAND. IMPOSED CONSTRUCTION LOADS IN EXCESS OF THE STATED DESIGN LOADS MUST BE APPROVED BY THE STRUCTURAL ENGINEER PRIOR TO PLACING OF SUCH LOADS.
13. IF APPLICABLE, BOTH SIDES OF THE FOUNDATION WALL SYSTEM SHALL BE BACKFILLED SIMULTANEOUSLY SO AS TO PREVENT OVERTURNING OR LATERAL MOVEMENT OF THE WALLS. NO FOUNDATION WALLS SHALL BE BACKFILLED WITHOUT THE FLOOR DIAPHRAGM OR SUPPORTING SLAB AND ALL TEMPORARY SUPPORTS BEING CONSTRUCTED IN PLACE AND SECURE.

B. DESIGN CRITERIA:
1. CODES: (USE LATEST EDITIONS U.N.O.)
   a. 2012 INTERNATIONAL BUILDING CODE (2012).
   b. BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318)
   c. AISC MANUAL OF STEEL CONSTRUCTION (AISC-14th EDITION).
   d. BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES. (ACI 530-08/ASCE 5-08/TMS 402-08)
2. LIVE LOADS:

ROOF LOAD	30 PSF (MINIMUM)
FLOOR LOAD	125 PSF
DEAD LOADS: ACTUAL MATERIAL WEIGHTS	
FLAT ROOF DIAPHRAGM	115 PSF
COLLATERAL LOADS	5 PSF

3. WIND LOAD:

ULTIMATE WIND SPEED	115 MPH
BASIC WIND SPEED	90 MPH
IMPORTANCE FACTORS	1.0
EXPOSURE	C
COMPONENTS AND CLADDING	25 PSF

4. SNOW LOAD:

MEAN GROUND SNOW LOAD	35.0 PSF*
FLAT ROOF SNOW LOAD	30.0 PSF
SNOW EXPOSURE FACTOR	0.7
SNOW IMPORTANCE FACTOR	1.0

*ADJUST FOR SNOW ACCUMULATION, IF APPLICABLE.

5. EARTHQUAKE LOAD:

MAPPED SHORT PERIOD SPECTRAL RESPONSE ACCELERATION (Ss)	0.213
MAPPED 1 SECOND PERIOD SPECTRAL RESPONSE ACCELERATION (S1)	0.133
SHORT PERIOD SPECTRAL RESPONSE ACCELERATION (SDS)	0.142
1 SECOND PERIOD SPECTRAL RESPONSE ACCELERATION (SD1)	0.089
SOIL SITE CLASS	D
SEISMIC HAZARD EXPOSURE GROUP	II
SEISMIC PERFORMANCE CATEGORY	B
SEISMIC RESPONSE COEFFICIENT (Cs)	0.071
RESPONSE MODIFICATION FACTOR	2.0
ORDINARY REINFORCED MASONRY SHEAR WALLS	

6. FOUNDATION ANALYSES WERE BASED UPON THE BEST AVAILABLE GEO-TECHNICAL INFORMATION OBTAINED ABOUT THE SITE. NO FORMAL SOILS REPORT WAS PREPARED FOR THIS SITE. NO FOUNDATION DESIGN WAS NECESSARY FOR THE RENOVATION OF THIS PROJECT. A GENERAL REVIEW OF THE ORIGINAL DOCUMENTS WERE FOUND TO BE IN COMPLIANCE WITH THE SOIL BEARING CAPACITY TYPICAL FOR THIS AREA.
7. IF IT BECOMES NECESSARY TO PERFORM OR REVIEW FOUNDATION DESIGNS, THEN, ALL FOOTING EXCAVATIONS SHALL BE INSPECTED BY A LICENSED GEO-TECHNICAL ENGINEER OR CERTIFIED INSPECTOR, PRIOR TO PLACEMENT OF THE CONCRETE. FOR INITIAL DESIGN PURPOSES, A SOIL BEARING CAPACITY OF 2000 PSF SHALL BE USED UNLESS DETERMINED OTHERWISE BY THE GEOTECHNICAL ENGINEER. IF THE SOIL BEARING CAPACITY IS FOUND TO BE LESS THAN THE ASSUMED DESIGN VALUE, THEN THE FOOTINGS MUST BE REDESIGNED ACCORDINGLY.

C. CONCRETE:
1. CONCRETE USED FOR THIS PROJECT SHALL MEET OR EXCEED THE FOLLOWING COMPRESSIVE STRENGTH AT 28 DAYS:

FOUNDATION FOOTINGS	3000 psi NORMAL WT.
INTERIOR WALLS & COLUMNS	4000 psi NORMAL WT.
SLAB-ON-GRADE (INTERIOR)	4000 psi NORMAL WT.
SLAB-ON-GRADE (EXTERIOR)	3500 psi NORMAL WT.

2. ALL CONCRETE SUBJECT TO FREEZE/THAW CYCLES SHALL BE AIR ENTRAINED.
3. IF NEEDED, AND AS DIRECTED BY THE GEO-TECHNICAL SPECIALIST, THE FOOTINGS MAY BE PLACED DIRECTLY AGAINST THE SOIL WITH ADEQUATE FORMING.
4. IF NEEDED, ANY CONCRETE SLAB SHALL BE POURED IN A STRIP PATTERN. CONSTRUCTION JOINTS SHALL COINCIDE WITH THE CONTROL JOINTS (INDICATED AS C.J. ON THE PLANS). CONSTRUCTION JOINTS IN THE SLAB SHALL HAVE THE REINFORCING CONTINUE THROUGH THE JOINT U.N.O. IN THE DETAILS.
5. CONTROL JOINTS AND WATER-STOPS SHALL BE INSTALLED, AS NEEDED, IN ACCORDANCE WITH THE BUILDING CODE REQUIREMENTS, COMMON CONSTRUCTION PRACTICES AND THESE CONSTRUCTION DOCUMENTS.
6. ALL CONTROL JOINTS MAY BE SAW-CUT OR CONSTRUCTED WITH A METAL CONTROL JOINT FORM. CONTROL JOINTS SHALL BE SEALED WITH A SUITABLE JOINT SEALANT.
7. SAW-CUT OR TOOLED CONTROL JOINTS SHALL BE AS DETAILED. SAW-CUTS SHALL BE MADE AS SOON AS PRACTICAL WITHOUT DAMAGING THE FINISHED CONCRETE FLOOR SURFACE (WITHIN 12 HOURS, MAXIMUM OF CURING.)
8. A DIAMOND PATTERN CONTROL JOINT SHALL BE PROVIDED AT ALL ISOLATED COLUMN LOCATIONS, AS INDICATED ON THESE PLANS. THE CORNERS OF THE DIAMOND SHALL COINCIDE WITH THE CONTROL JOINTS, AS SPECIFIED ON THESE PLANS AND BE FILLED WITH 1/2" PREFORMED JOINT FILLER.
9. EXPOSED CONCRETE EDGES SHALL BE BUILT SQUARE AND RUBBED TO A MINIMUM RADIUS CHAMFER, UNLESS SPECIFIC CHAMFERS ARE CALLED FOR IN DETAILS.
10. CONCRETE FORMWORK SHALL BE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE COMMONWEALTH OF VIRGINIA.
11. ALL CONCRETE WALLS SHALL BE CONSTRUCTED TO THE NOMINAL DIMENSIONS AS INDICATED ON THE CONSTRUCTION PLANS. THE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 psi AT 28 DAYS, U.N.O., AND PLACED WITH A MAXIMUM SLUMP OF 4". ALL WORK SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE AMERICAN CONCRETE INSTITUTE.
12. ALL REINFORCING STEEL SHALL COMPLY WITH ASTM A615, GRADE 60 STEEL. MINIMUM COVER OVER THE STEEL SHALL BE 2" FOR ALL FOUNDATION WALL CONSTRUCTION. ALL REINFORCING STEEL FOR THE WALLS, HEADERS, GIRDERS, ETC. SHALL BE IN PLACE PRIOR TO THE POURING OF THE WALLS. THE REINFORCING STEEL SHALL BE PROPERLY TIED AND LOCATED IN ACCORDANCE WITH THE DESIGN PLANS.
13. INTER-LOCKING METAL FORMS SHALL BE USED FOR THE CONSTRUCTION OF THE CONCRETE WALL SYSTEM. ALL FORMS SHALL BE CLEAN, PLUM, SQUARE AND PROPERLY ALIGNED FOR CONCENTRIC LOADING ON THE WALL FOOTINGS. ALL DOOR AND WINDOW ELEMENTS SHALL BE BOXED-FRAMED INSIDE OF THE FORMWORK TO THE APPROPRIATE HORIZONTAL AND VERTICAL DIMENSIONS WITH PROPER ALLOWANCES MADE FOR THE FRAMEWORK OF THE DOOR AND WINDOW UNITS. THE FORM SYSTEM SHALL BE PROPERLY PREPPED SO AS TO PREVENT ADHESION OF THE CONCRETE TO THE FORMWORK DURING THE CURING PROCESS.
14. ALL THROUGH-WALL PENETRATIONS SHALL BE IN PLACE PRIOR TO THE POURING OPERATION AND PRECAUTIONS SHALL BE TAKEN TO PREVENT FUTURE LEAKAGE IN THE AREAS OF THESE PENETRATIONS (i.e. WATER-PROOF EXPANSIVE FILLER MATERIAL SHALL BE INJECTED INTO THE VOID AREAS OF THE PENETRATION).
15. SEE ARCHITECTURAL, BUILDING, MECHANICAL AND PLUMBING DRAWINGS FOR LOCATIONS OF OPENINGS AND SLEEVES. DO NOT CUT REINFORCEMENT.

D. REINFORCEMENT:
1. ALL REINFORCING STEEL SHALL BE DEFORMED BARS IN ACCORDANCE WITH ASTM A615 SPECIFICATIONS, GRADE 60.
2. WELDED WIRE FABRIC REINFORCING SHALL CONFORM TO ASTM A185. THE WELDED WIRE FABRIC SHALL HAVE A MINIMUM STEEL YIELD STRENGTH OF 65,000 psi. (Fy = 65,000 psi).
3. MAINTAIN MINIMUM CONCRETE COVERAGE FOR REINFORCING AS SPECIFIED IN ACI-318.

CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH:	3"
CONCRETE EXPOSED TO EARTH OR WEATHER:	2" (NO. 6 THROUGH NUM. 8 BARS)
	1-1/2" (NO. 5 BAR, W31 OR D31 WIRE OR SMALLER)
CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT w/ GROUND - SLABS, WALLS & JOISTS:	3/4" (NO. 11 BARS & SMALLER)

4. IF NEEDED, ALL CONTINUOUS REINFORCING IN FOOTINGS SHALL BE LAP-SPLICED 2'-0". ALL OTHER SPLICES SHALL BE CLASS B TENSION, 32" LAP (MIN.), U.N.O.
5. DETAILING, FABRICATION, AND INSTALLATION OF REINFORCING BARS SHALL COMPLY WITH THE LATEST EDITION OF THE "DESIGN HANDBOOK OF THE CRSI" AND THE MANUAL OF STANDARD PRACTICE OF THE ACI.
6. PROVIDE DOWELS TO MATCH REINFORCEMENT IN ALL WALLS, PIERS, COLUMNS, AND FOUNDATIONS.
7. ALL PEDESTALS OR HOLES IN THE CONCRETE SLAB SHALL HAVE, ADDITIONALLY, (2) #4 x (OPENING DIM. + 2 FT.) ALONG EACH SIDE OF OPENING AND (2) #3 x 2'-0" DIAGONALLY AT EACH PEDESTAL CORNER.

F. STRUCTURAL STEEL:
1. NO STRUCTURAL STEEL DESIGN WAS NEEDED FOR THE RENOVATION OF THIS PROJECT. IF IT BECOMES NECESSARY TO REPLACE, ALTER, OR DESIGN ANY STRUCTURAL STEEL ELEMENTS, THEN ALL STRUCTURAL STEEL WORK SHALL BE IN ACCORDANCE WITH ASTM SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE SUPPLIED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION MANUAL, THIS DESIGN, AND PROJECT SPECIFICATIONS.
2. ALL STRUCTURAL STEEL SHALL BE ASTM, A992-50 GRADE 50 STEEL, U.N.O., & A36 FOR PLATES, M, S, C, MC AND L SHAPES.
3. FRAMING BOLTS SHALL CONFORM TO ASTM A325N, 3/4" DIA. MIN., U.N.O.
4. ANCHOR BOLTS SHALL CONFORM TO ASTM A307, U.N.O. SEE DETAILS FOR LOCATION, TYPE, & SIZE.
5. WELDING SHALL CONFORM TO AMERICAN WELDING SOCIETY D1.1-1, E-70xx ELECTRODES. FILLER METAL SHALL HAVE A MINIMUM YIELD STRENGTH OF 57 KSI.
6. PROVIDE 1/2" SPACE BETWEEN ENDS OF CONTINUOUS ANGLES, SUPPORTING DECKING OR MASONRY.
7. THE CENTERLINES OF ALL COLUMNS AND BEAMS SHALL BE LOCATED ON THE CENTROID OF THE STRUCTURAL MEMBERS AND THE FOOTING ELEMENTS, UNLESS OTHERWISE SHOWN.
8. ALL CONNECTIONS SHALL BE STANDARD SHEAR CONNECTIONS, UNLESS NOTED OTHERWISE. WHERE CONNECTIONS OR REACTIONS ARE NOT SPECIFIED, THE FABRICATOR SHALL PROVIDE CONNECTIONS TO SUPPORT ONE-HALF OF THE ALLOWABLE UNIFORM LOAD SHOWN IN THE AISC MANUAL, 14th EDITION TABLES OF ALLOWABLE UNIFORM LOADS, PART 2 FOR THE GIVEN BEAM, SPAN AND GRADE OF STEEL SPECIFIED.
9. WHERE SLOTTED CONNECTION HOLES ARE USED, THE FABRICATOR SHALL ADJUST THE BOLT VALUES ACCORDINGLY.
10. THE FOLLOWING CONDITIONS SHALL BE CHECKED WHEN DESIGNING BEAM CONNECTIONS: BOLT SHEAR, BOLT BEARING ON CONNECTING MATERIAL, BLOCK WEB SHEAR ON THE NET AREA OF THE CONNECTING ANGLES OR PLATES AND LOCAL BENDING STRESSES.
11. UNLESS NOTED OTHERWISE, ALL ANCHOR BOLTS SHALL BE 3/4" Ø, ALL CARRIAGE BOLTS SHALL BE 1/2" Ø, ALL EXPANSION BOLTS SHALL BE 1/2" Ø AND ALL BOLTS FOR STEEL TO STEEL CONNECTIONS SHALL BE 3/4" Ø.
12. THE MINIMUM NUMBER OF BOLTS PER CONNECTION SHALL BE AS FOLLOWS:
    W8 & W10 SECTIONS : 2 BOLTS
    W12 & W14 SECTIONS: 3 BOLTS
    W16 & W18 SECTIONS: 4 BOLTS

G. FIBER-REINFORCED POLYMER (FRP) INSTALLATION
1. ALL WORK ASSOCIATED WITH THE REINFORCEMENT OF THE EXISTING CONCRETE ELEMENTS, SPECIFICALLY THE LITH-I-BAR ROOF JOISTS, SHALL BE DONE IN ACCORDANCE WITH THE STANDARDS, RECOMMENDATIONS, SPECIFICATIONS, PROCEDURES, AND DETAILS OF THE MANUFACTURER.
2. FOR THIS PROJECT, A SIMPSON STRONG-TIE COMPOSITE STRENGTHENING SYSTEM WAS USED FOR THE REINFORCEMENT DESIGN. CONTACT INFORMATION FOR THE SIMPSON STRONG-TIE SYSTEM IS AS FOLLOWS:
   MR. JUSTIN J. STREIM, P.E. - ICI FIELD ENGINEER
   SIMPSON STRONG-TIE, INC.
   8280 STAYTON DRIVE. SUITE A
   JESSUP, MARYLAND 20794
   PHONE: 443-970-6902
   EMAIL: JSTREIM@STRONGTIE.COM
3. ALL CARBON FABRIC MATERIALS, FILLERS, EPOXY ADHESIVES, ANCHORS, ETC. SHALL BE IN ACCORDANCE WITH THIS DESIGN AND APPROVED FOR USE IN THIS APPLICATION.
4. ALL SURFACES TO BE REINFORCED SHALL BE CLEAN, SOUND, AND FREE OF WATER. ALL DEBRIS, DUST, RESIDUE, GREASE, OR OTHER DELETERIOUS MATERIAL SHALL BE REMOVED PRIOR TO INSTALLATION.
5. ALL CRACKING WIDER THAN 0.01" MUST BE ROUTED, AS REQUIRED, AND PRESSURE INJECTED WITH AN EPOXY RESIN BONDING AGENT PRIOR TO THE FRP INSTALLATION. SMALLER CRACKS MAY BE RESIN INJECTED OR SEALED TO PROTECT THE EXISTING REINFORCING STEEL.
6. CONCAVE OR CONVEX SURFACES MUST BE FILLED WITH AN EPOXY PASTE OR REPAIR MORTAR, AS NEEDED.
7. THE CONCRETE SURFACE SHALL BE ABRASIVELY PREPARED TO APPROPRIATELY ROUGHEN THE SURFACE FOR INSTALLATION OF THE FRP SYSTEM.
8. ALL CARBON FABRIC MATERIALS SHALL BE ORIENTED IN THE APPROPRIATE DIRECTION AND INSTALLED AS DETAILED. ALL FRP ANCHORS SHALL BE INSTALLED TO THE DEPTHS, DIMENSIONS, AND INSTALLATION PROCEDURES, AS SPECIFIED THE MANUFACTURER AND THESE PLANS.
9. FOR FOLDED FRP ANCHORS, DRILL THE HOLE INTO THE SUBSTRATE, AS DIRECTED. CLEAN THE HOLE AND SURROUNDING AREA, SO THAT IT IS FREE OF DUST OR ANY DELETERIOUS MATERIAL PRIOR TO INSTALLATION.
10. THE CLEANED, EXPOSED REINFORCING STEEL AND CONCRETE SUBSTRATE IS SPALLED AND EXPOSED AREAS TO BE REPAIRED SHALL BE FULLY COATED WITH A BONDING AGENT, AS SPECIFIED ON THESE PLANS, PRIOR TO INSTALLATION OF THE REPAIR GROUT. THE BONDING AGENT MUST BE TACKY AT THE TIME OF THE GROUT INSTALLATION TO ENSURE A SECURE BOND. THE REPAIR GROUT SHALL BE APPLIED, AS NEEDED, TO MATCH THE ORIGINAL GEOMETRY OF THE SECTION TO BE REPAIRED.

ABBREVIATIONS:

AB	ANCHOR BOLT
ADJ	ADJACENT
ADDL	ADDITIONAL
ALT	ALTERNATE
ARCH	ARCHITECTURE
B	BOTTOM
BLT	BOLT
BM	BEAM
BRG	BEARING
CJ	CONTROL JOINT
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONN	CONNECTION
CONT	CONTINUOUS
CSJ	CONSTRUCTION JOINT
D	DEEP or DEPTH
DIAG	DIAGONAL
DIA or Ø	DIAMETER
DIM	DIMENSION
DN	DOWN
DWG	DRAWING
DWLS	DOWELS
EA	EACH
EF	EACH FACE
EL	ELEVATION
ELEC	ELECTRICAL
E-O-S	EDGE OF SLAB
EQ	EQUAL
EW	EACH WAY
EXP JT	EXPANSION JOINT
EXT	EXTERIOR
FF	FAR FACE
F. FLR.	FINISHED FLOOR
FLR	FLOOR
FOM	FACE OF MASONRY
FRMG	FRAMING
FRP	FIBER-REINFORCED POLYMER
FTG	FOOTING
GA	GAGE
GALV	GALVANIZED
HORIZ	HORIZONTAL
HP	HIGH POINT
IF	INSIDE FACE
INSUL	INSULATION
INT	INTERIOR
ISOL JT	ISOLATION JOINT
JT	JOINT
K	KIPS
L	LINTEL
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
ln	CLEAR SPAN
LP	LOW POINT
LW	LONG WAY
MANUF	MANUFACTURER
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
O.C.	ON CENTERS
OF	OUTSIDE FACE
OPNG	OPENING
OPP	OPPOSITE
ORIENT	ORIENTATION
PC	PRECAST
PL	PLATE
PLBG	PLUMBING
PR.	PROPOSED
REINF	REINFORCING(MENT)
REQ'D	REQUIRED
REQ'MTS	REQUIREMENTS
RW	RETAINING WALL
SCHED	SCHEDULE
SECT	SECTION
SIM	SIMILAR
SMP	SOLID MASONRY PIER
S-O-G	SLAB-ON-GRADE
STIFF	STIFFENER
SW	SHORT WAY
T	TOP
T.B.R.	TO BE REMOVED
T.O.F.	TOP OF FOOTING
T.O.S.	TOP OF SLAB
T.O.STL.	TOP OF STEEL
T.O.W.	TOP OF WALL
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
VB	VAPOR BARRIER
VERT	VERTICAL
(V.I.F.)	VERIFY IN FIELD
W/	WITH
WF	WIDE FLANGE
W/O	WITHOUT
WP	WATERPROOFING
WS	WATERSTOP
WWF	WELDED WIRE FABRIC

PERCY D. MILLER
WATER TREATMENT PLANT
MIDDLETOWN, VIRGINIA

List Of Drawings

SHT. S1/S5: GENERAL NOTES & CONSTRUCTION SPECIFICATIONS
SHT. S2/S5: MAIN LEVEL LAYOUT PLAN
SHT. S3/S5: LOWER ROOF FRAMING PLAN & PARTIAL ELEVATION
SHT. S4/S5: UPPER ROOF FRAMING PLAN & DETAILS
SHT. S5/S5: MATERIAL SPECIFICATIONS

SYMBOLS

SECTION MARK
DETAIL MARK
ELEVATION
TOP OF FTG. ELEVATION
SLAB DEPRESSION
F1 FOOTING TYPE
FMC FULL MOMENT CONNECTION
(+/- X'-X") ELEVATION DIFFERENCE
(XX'-XX") DESIGNATED JOIST BEARING TOP OF STEEL ELEVATION ABOVE DATUM
CENTERLINE
NUMBER
ELEVATION
16" STEP IN FOOTING (16" STEP)

NO.	DATE	DESCRIPTION	BY

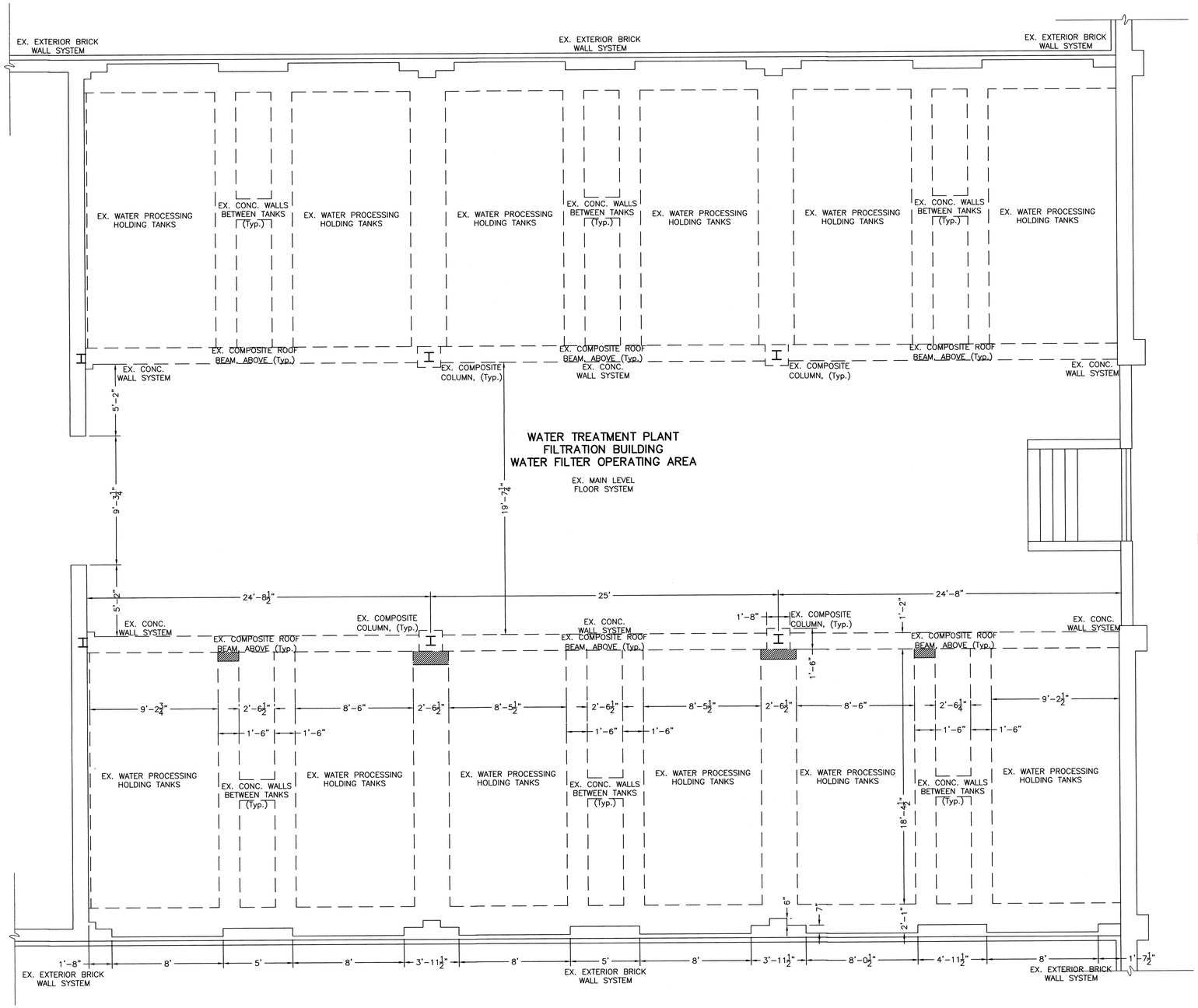
PROJECT:
PERCY D MILLER
WATER TREATMENT PLANT
MIDDLETOWN, VA
GENERAL NOTES &
CONSTRUCTION SPECIFICATIONS

CLIENT:
CITY OF WINCHESTER
15 NORTH CAMERON STREET
WINCHESTER, VA 22601
(540) 687-1815

PAINTER-LEWIS, P.L.C.
817 Cedar Creek Grade, Suite 120
Winchester, Virginia 22601
Telephone: (540) 662-5792
Facsimile: (540) 662-5793
Email: office@painterlewis.com
CONSULTING ENGINEERS

COMMONWEALTH OF VIRGINIA
TIMOTHY G. PAINTER
Lic. No. 018260
05/29/18
PROFESSIONAL ENGINEER

DRAWN BY: BAB
JOB NO.: 1609031
SCALE: N/A
DATE: 05/24/18
SHEET: S1/S5



PARTIAL FLOOR PLAN (AREA OF WORK)

SCALE: 1/4"=1'-0"

▨ INDICATES AREAS OF OBSERVED WATER INFILTRATION ALONG THE EXISTING STRUCTURE.

– REPAIRS FOR THIS WATER INFILTRATION WILL BE ADDRESSED THROUGH THE IMPROVEMENTS AND RENOVATION PROPOSED FOR THIS PROJECT.

NO.	DATE	DESCRIPTION	BY

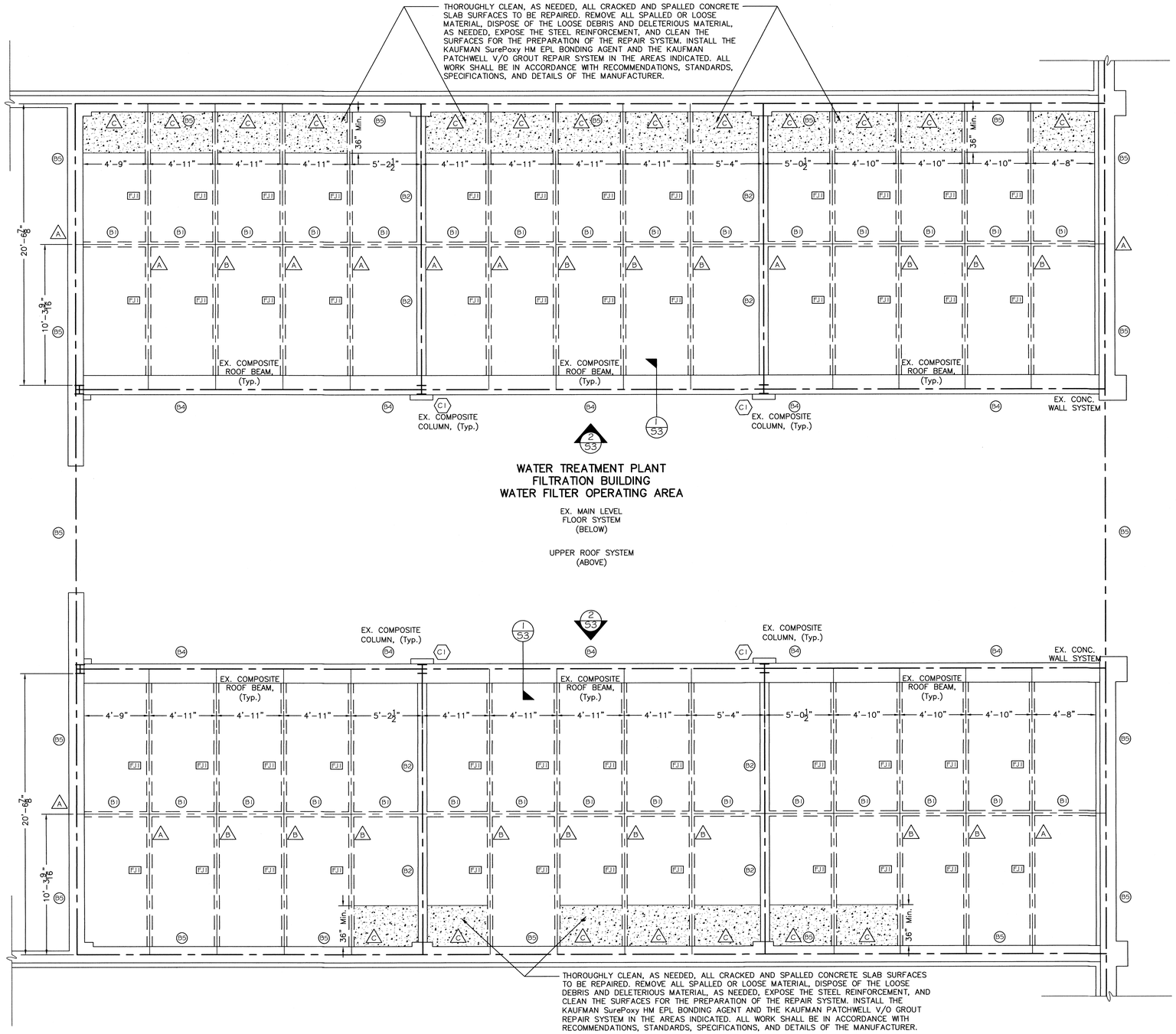
PROJECT:
PERCY D MILLER
WATER TREATMENT PLANT
MIDDLETOWN, VA
MAIN LEVEL (PARTIAL)
LAYOUT PLAN

CLIENT:
CITY OF WINCHESTER
15 NORTH CAMERON STREET
WINCHESTER, VA 22601
(540) 687-1815

PAINTER-LEWIS, P.L.C.
817 Cedar Creek Grade, Suite 120
Winchester, Virginia 22601
Telephone: (540) 662-5792
Facsimile: (540) 662-5793
Email: office@painterlewis.com
CONSULTING ENGINEERS

COMMONWEALTH OF VIRGINIA
TIMOTHY G. PAINTER
Lic. No. 018260
05/29/18
PROFESSIONAL ENGINEER

DRAWN BY: BAB
JOB NO.: 1609031
SCALE: 1/4"=1'-0"
DATE: 05/24/18
SHEET: S2/S5



PARTIAL LOWER ROOF FRAMING PLAN (AREA OF WORK)

SCALE: ¼"=1'-0"

ROOF JOIST SCHEDULE		
FJI		EX. LITH-I-BAR ROOF JOIST

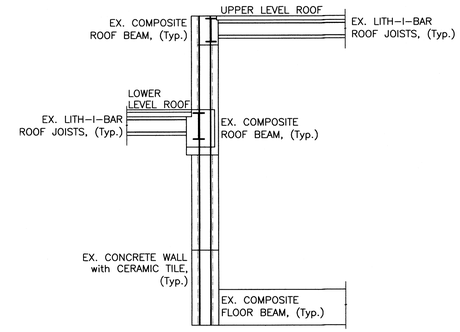
HEADER NO.	SHAPE	MEMBER SIZE
B1		EX. JOIST BRIDGING BEAM
B2		EX. CONCRETE BEAM
B3		EX. COMPOSITE BEAM
B4		EX. COMPOSITE BEAM
B5		EX. COMPOSITE BEAM

COLUMN NO.	SIZE	SUPPORTS
C1	EX. W8x31	CAP PLATE: UNKNOWN BASE PLATE: UNKNOWN

REPAIR SCHEDULE	
A	JOIST/BEAM EPOXY REPAIR SYSTEM, ONLY
B	FULL JOIST/BEAM EPOXY AND FRP REPAIR SYSTEMS SHALL BE INSTALLED
C	CONCRETE SLAB REPAIR SYSTEM

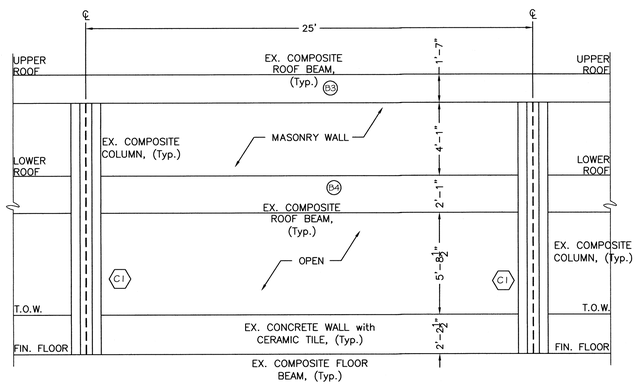
SEE SHEET S4 FOR FURTHER INFORMATION ON REPAIR SPECIFICATIONS

NOTE: TYPE "B" REPAIRS INCLUDE ALL WORK SPECIFIED FOR TYPE "A" APPLICATIONS, AS WELL.



1/S3 ROOF FRAMING SECTION VIEW

SCALE: ¼"=1'-0"



2/S3 ROOF FRAMING ELEVATION VIEW

SCALE: ¼"=1'-0"

NO.	DATE	DESCRIPTION	BY

PROJECT:
PERCY D MILLER
WATER TREATMENT PLANT
MIDDLETOWN, VA
LOWER ROOF (PARTIAL)
FRAMING PLAN

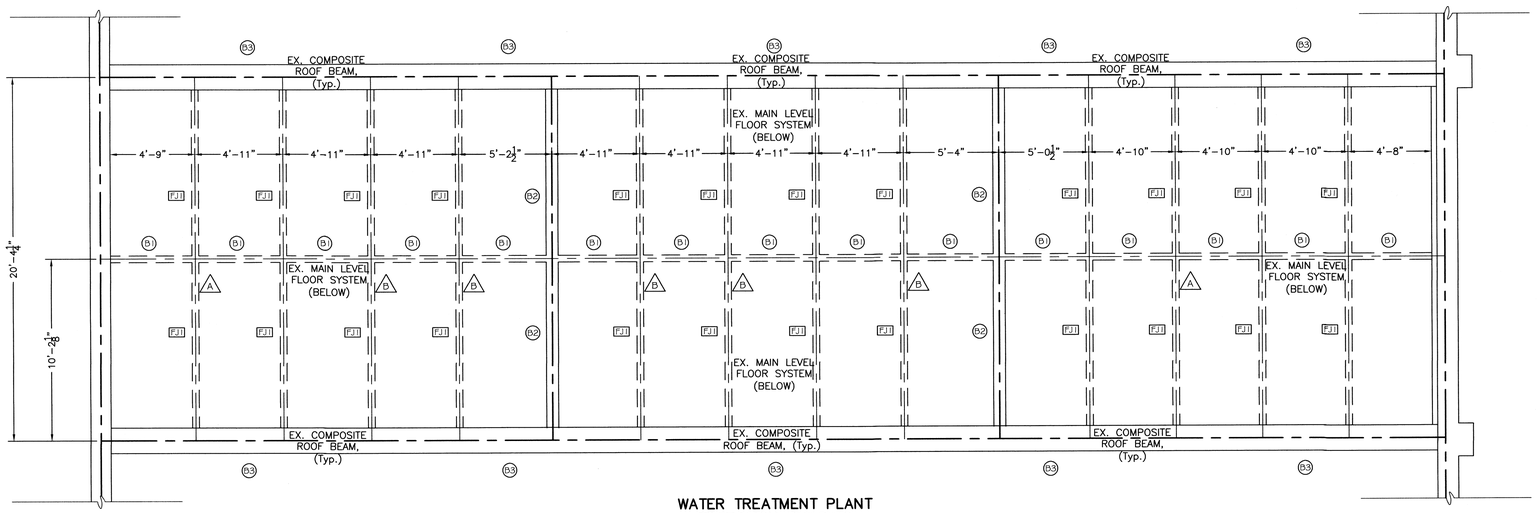
CLIENT:
CITY OF WINCHESTER
15 NORTH CAMERON STREET
WINCHESTER, VA 22601
(540) 687-18

PAINTER-LEWIS, P.L.C.
817 Cedar Creek Grade, Suite 120
Winchester, Virginia 22601
Telephone: (540) 662-5792
Facsimile: (540) 662-5793
Email: office@painterlewis.com
CONSULTING ENGINEERS

COMMONWEALTH OF VIRGINIA
TIMOTHY G. PAINTER
Lic. No. 018260
05/29/18
PROFESSIONAL ENGINEER

DRAWN BY:	JOB NO.:
TGP	1609031
SCALE:	DATE:
AS NOTED	05/24/18

SHEET: S3/S5



WATER TREATMENT PLANT
FILTRATION BUILDING
WATER FILTER OPERATING AREA

UPPER ROOF FRAMING PLAN

SCALE: 1/4"=1'-0"

ROOF JOIST SCHEDULE		
FJ1		EX. LITH-I-BAR ROOF JOIST

HEADER NO.	SHAPE	MEMBER SIZE
B1		EX. JOIST BRIDGING BEAM
B2		EX. CONCRETE BEAM
B3		EX. COMPOSITE BEAM
B4		EX. COMPOSITE BEAM
B5		EX. COMPOSITE BEAM

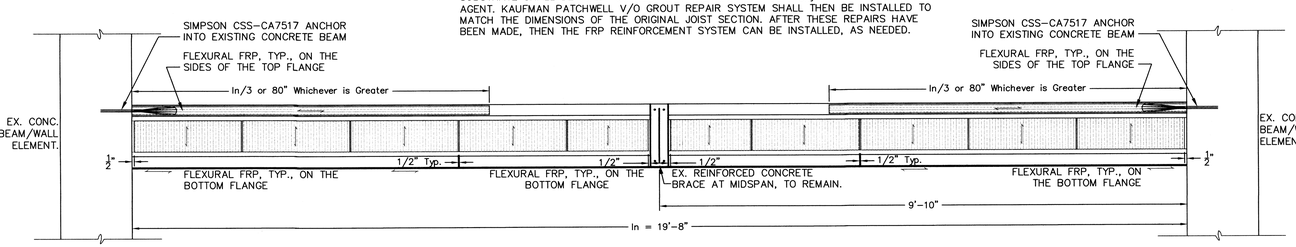
COLUMN NO.	SIZE	SUPPORTS
C1	EX. W8x31	CAP PLATE: UNKNOWN BASE PLATE: UNKNOWN

REPAIR SCHEDULE	
A	JOIST/BEAM EPOXY REPAIR SYSTEM, ONLY
B	FULL JOIST/BEAM EPOXY AND FRP REPAIR SYSTEMS SHALL BE INSTALLED
C	CONCRETE SLAB REPAIR SYSTEM

NOTE: TYPE "B" REPAIRS INCLUDE ALL WORK SPECIFIED FOR TYPE "A" APPLICATIONS, AS WELL

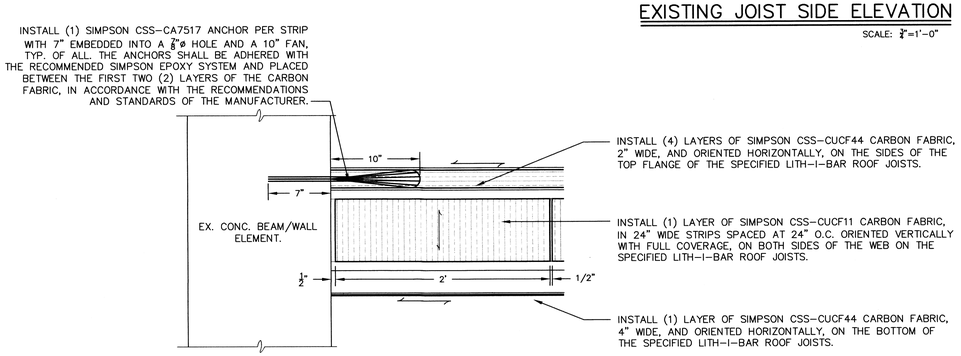
NOTE: JOISTS WITH LOOSE OR SPALLED CONCRETE MATERIALS
ALL LOOSE OR SPALLED MATERIALS SHALL BE CAREFULLY AND FULLY REMOVED. THE AREA SHALL BE CLEANED AND THE EXPOSED REINFORCING STEEL AND CONCRETE SUBSTRATE SHALL BE FULLY COATED WITH THE KAUFMAN SurePoxy HM EPL BONDING AGENT. KAUFMAN PATCHWELL V/O GROUT REPAIR SYSTEM SHALL THEN BE INSTALLED TO MATCH THE DIMENSIONS OF THE ORIGINAL JOIST SECTION. AFTER THESE REPAIRS HAVE BEEN MADE, THEN THE FRP REINFORCEMENT SYSTEM CAN BE INSTALLED, AS NEEDED.

NOTE: JOISTS WITH LOOSE OR SPALLED CONCRETE MATERIALS
ALL LOOSE OR SPALLED MATERIALS SHALL BE CAREFULLY AND FULLY REMOVED. THE AREA SHALL BE CLEANED AND THE EXPOSED REINFORCING STEEL AND CONCRETE SUBSTRATE SHALL BE FULLY COATED WITH THE KAUFMAN SurePoxy HM EPL BONDING AGENT. KAUFMAN PATCHWELL V/O GROUT REPAIR SYSTEM SHALL THEN BE INSTALLED TO MATCH THE DIMENSIONS OF THE ORIGINAL JOIST SECTION. AFTER THESE REPAIRS HAVE BEEN MADE, THEN THE FRP REINFORCEMENT SYSTEM CAN BE INSTALLED, AS NEEDED.



EXISTING JOIST SIDE ELEVATION

SCALE: 1/2"=1'-0"



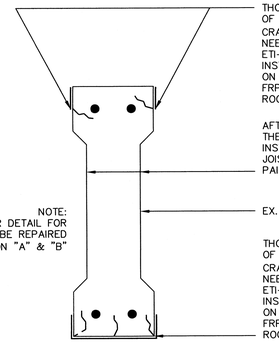
JOIST-to-BEAM CONNECTION

SCALE: 1½"=1'-0"

ROOF JOIST REINFORCEMENT DETAILS

SCALE: AS NOTED

INDICATES FIBER DIRECTION OF CARBON FABRIC



THOROUGHLY CLEAN ALL JOISTS TO BE REPAIRED AND DISPOSE OF ALL LOOSE DEBRIS AND DELETERIOUS MATERIAL. ROUT THE CRACKS TO A WIDTH OF ¼" AND A MAXIMUM DEPTH OF ½", AS NEEDED, AND PREPARE THE JOIST SURFACES FOR THE SIMPSON ETI-GV GEL-VISCOCITY EPOXY CRACK REPAIR SYSTEM TO BE INSTALLED. INSTALL SIMPSON CSS-EP EPOXY PASTE AND FILLER ON THE FACES OF THE FLANGES FOR THE INSTALLATION OF THE FRP REINFORCEMENT SYSTEM OF THE SPECIFIED LITH-I-BAR ROOF JOISTS TO BE REPAIRED.

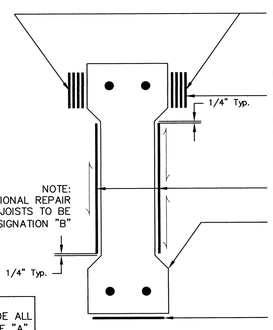
AFTER CRACKS HAVE BEEN REPAIRED AND THE FRP REINFORCEMENT SYSTEM HAS BEEN INSTALLED, PREPARE THE LITH-I-BAR ROOF JOISTS AND ROOFING SLABS FOR A FINISHED PAINTED SURFACE TO MATCH THE EXISTING.

EX. LITH-I-BAR ROOF JOIST.

THOROUGHLY CLEAN ALL JOISTS TO BE REPAIRED AND DISPOSE OF ALL LOOSE DEBRIS AND DELETERIOUS MATERIAL. ROUT THE CRACKS TO A WIDTH OF ¼" AND A MAXIMUM DEPTH OF ½", AS NEEDED, AND PREPARE THE JOIST SURFACES FOR THE SIMPSON ETI-GV GEL-VISCOCITY EPOXY CRACK REPAIR SYSTEM TO BE INSTALLED. INSTALL SIMPSON CSS-EP EPOXY PASTE AND FILLER ON THE FACES OF THE FLANGES FOR THE INSTALLATION OF THE FRP REINFORCEMENT SYSTEM OF THE SPECIFIED LITH-I-BAR ROOF JOISTS TO BE REPAIRED.

A B ROOF JOIST EPOXY REPAIR DETAIL

SCALE: 3"=1'-0"



INSTALL (4) LAYERS OF SIMPSON CSS-CUCF44 CARBON FABRIC, 2" WIDE, AND ORIENTED HORIZONTALLY, ON THE SIDES OF THE TOP FLANGE OF THE SPECIFIED LITH-I-BAR ROOF JOISTS.

AFTER CRACKS HAVE BEEN REPAIRED AND THE FRP REINFORCEMENT SYSTEM HAS BEEN INSTALLED, PREPARE THE LITH-I-BAR ROOF JOISTS AND ROOFING SLABS FOR A FINISHED PAINTED SURFACE TO MATCH THE EXISTING.

INSTALL (1) LAYER OF SIMPSON CSS-CUCF11 CARBON FABRIC, IN 24" WIDE STRIPS SPACED AT 24" O.C. ORIENTED VERTICALLY WITH FULL COVERAGE, ON BOTH SIDES OF THE WEB ON THE SPECIFIED LITH-I-BAR ROOF JOISTS.

EX. LITH-I-BAR ROOF JOIST.

INSTALL (1) LAYER OF SIMPSON CSS-CUCF44 CARBON FABRIC, 4" WIDE, AND ORIENTED HORIZONTALLY, ON THE BOTTOM OF THE SPECIFIED LITH-I-BAR ROOF JOISTS.

NOTE:
TYPE "B" REPAIRS INCLUDE ALL WORK SPECIFIED FOR TYPE "A" APPLICATIONS, AS WELL

B ROOF JOIST FRP REPAIR DETAIL

SCALE: 3"=1'-0"

INDICATES FIBER DIRECTION OF CARBON FABRIC

NO.	DATE	DESCRIPTION	BY

PROJECT:
PERCY D MILLER
WATER TREATMENT PLANT
MIDDLETOWN, VA
UPPER ROOF (PARTIAL)
FRAMING PLAN

CLIENT:
CITY OF WINCHESTER
15 NORTH CAMERON STREET
WINCHESTER, VA 22601
(540) 687-1815

PAINTER-LEWIS, P.L.C.
817 Cedar Creek Grade, Suite 120
Winchester, Virginia 22601
Telephone: (540) 662-5792
Facsimile: (540) 662-5793
Email: office@painterlewis.com
CONSULTING ENGINEERS

COMMONWEALTH OF VIRGINIA
TIMOTHY G. PAINTER
Lic. No. 018260
05/29/18
PROFESSIONAL ENGINEER

DRAWN BY: TGP
JOB NO.: 1609031
SCALE: AS NOTED
DATE: 05/24/18
SHEET: S4/S5

Simpson Strong-Tie® Composite Strengthening Systems™

CSS-EP

Epoxy Paste and Filler

SIMPSON Strong-Tie®

DESCRIPTION

CSS-EP is a two-component, high-strength, high-modulus epoxy paste system used to fill and transition irregular substrates and adhere Simpson Strong-Tie® Composite Strengthening Systems (CSS) laminates in both surface-mounted and near-surface-mounted (NSM) applications. This product has been evaluated per ICC-ES AC125 for concrete and unreinforced masonry strengthening using externally bonded fiber-reinforced polymer (FRP) composite systems. This product is NSF-listed safe for potable water. Please refer to the NSF listing for the NSF 61-listed application. This product is part of the tested assembly in UL Design No. N861, which achieved a four-hour fire rating when subjected to ASTM E119 / UL 263 full-scale fire testing. Please refer to UL Online Certifications Directory for the UL listing.

CODES

ICC-ES ESR-3403

MATERIAL PROPERTIES

Part A & B Properties

Consistency	Non-sag thixotropic paste
Color	**Part A:** White **Part B:** Black **Mixed:** Gray
Density	**Part A:** 12.45 lbs/US gal (1.49 kg/L) **Part B:** 11.24 lbs/US gal (1.35 kg/L) **Mixed:** 12.05 lbs/US gal (1.44 kg/L)

Cured Epoxy Properties

Property	ASTM	Cure Schedule	Test Value
Tensile Strength	D638	7 days at 72°F (22°C)	3,090 psi (21 MPa)
Tensile Modulus	D638	7 days at 72°F (22°C)	685,000 psi (4,720 MPa)
Elongation at Break	D638	7 days at 72°F (22°C)	0.56%
Flexural Strength	D790	7 days at 72°F (22°C)	7,450 psi (51 MPa)
Flexural Modulus	D790	7 days at 72°F (22°C)	920,000 psi (6,340 MPa)
Compressive Strength	D695	7 days at 72°F (22°C)	15,300 psi (106 MPa)
Compressive Modulus	D695	7 days at 72°F (22°C)	689,000 psi (4,750 MPa)
T_g	D3418	7 days at 72°F (22°C)	144°F (62°C)

MADE IN USA with GLOBAL MATERIALS

PERFORMANCE FEATURES

- Long working time
- High elongation
- Ambient cure
- NSF listed (info.nsf.org/certified/pwscomponents)
- High versatility
- VOC compliant
- Minimal odor
- UL listed (www.ul.com/database)

APPLICATIONS

Seismic Retrofit
- Shear strengthening
- Displacement/ductility
- Life safety

Load Rating Upgrade
- Increased live loads
- New equipment
- Change of use

Damage Repair
- Deterioration/corrosion
- Blast/vehicle impact

Defect Remediation
- Size/layout errors
- Low concrete strengths

Blast Mitigation
- Hardening
- Progressive collapse

STRUCTURES

- Buildings
- Bridges
- Parking garages
- Chimneys
- Piers/wharfs
- Tunnels
- Pipes

ELEMENTS

- Columns
- Beams
- Slabs
- Walls
- Piles
- Pier caps

SUBSTRATES

- Concrete
- Masonry
- Timber
- Steel

PACKAGING

Kit Size	Model No.
3 US gallon (11.4 L)	CSS-EP-3KT

MIXING RATIO

2A:1B by volume

SHELF LIFE

2 years in unopened container

STORAGE

Store material in a dry area between 45°F (7°C) and 95°F (35°C) with no exposure to moisture.

CSS-EP Epoxy Paste and Filler

Surface Preparation
Repair existing substrate per ICRI Guideline No. 310.1R. Concrete shall be abrasively prepared to achieve an open pore structure and CSP-3 in accordance with ICRI Guideline No. 310.2R by means of grinding, sand blasting, shot blasting, or pressure washing. Application surface shall be clean, sound, and free of standing water at time of application. All dust, laitance, grease, curing compounds, and other foreign materials that may hinder the bond must be removed before installation.

Mixing
Combine components A and B into a clean mixing container at a 2A:1B mix ratio by volume. Mix with a drill and mixing paddle until uniformly blended (approximately 5 minutes at 500 rpm).

Application
Apply paste to substrate surfaces using a trowel. Use a paste profiler or trowel when applying to laminates. This product may also be used for near surface mounted (NSM) applications.

Pot Life: 1 hour at 70°F (21°C).

Cure Time: 72 hours at 70°F (21°C).

Coverage Rates:

Laminates* **50mm (1.97 in.) width:** ~100 LF/US gal (~8.1 m/L)
60mm (2.36 in.) width: ~85 LF/US gal (~6.8 m/L)
80mm (3.15 in.) width: ~65 LF/US gal (~5.2 m/L)
90mm (3.54 in.) width: ~55 LF/US gal (~4.4 m/L)
100mm (3.94 in.) width: ~50 LF/US gal (~4.0 m/L)
120mm (4.72 in.) width: ~40 LF/US gal (~3.2 m/L)
150mm (5.90 in.) width: ~35 LF/US gal (~2.8 m/L)

*Highly dependent on waste. These are typical values

Limitations
- Only install when the ambient and substrate temperatures are between 45°F (7°C) and 95°F (35°C)
- Do not thin epoxy paste
- Where moisture vapor transmission is expected, note that CSS-EP will create a vapor barrier
- Do not apply CSS-EP in lifts greater than 1 in. (25 mm)

CAUTION

Component "A": May cause eye and/or skin irritation. Prolonged or repeated exposure may cause skin sensitization.

Component "B": CORROSIVE! Severe irritation to eyes and skin. Prolonged or repeated exposure may cause skin sensitization. Components of this product may affect the central nervous system.

Protective Measures: The use of safety glasses and chemically resistant gloves is recommended. Use appropriate clothing to minimize skin contact. The use of NIOSH-approved respirator is required to protect respiratory tract when ventilation is not adequate to limit exposure below the PEL. Refer to Material Safety Data Sheets (MSDS) available at **strongtie.com/msds** for detailed information.

FIRST AID

Eye Contact: Immediately flush eyes with plenty of cool water for at least 15 minutes while holding the eyes open. If redness, burning, blurred vision, or swelling persists, **CONSULT A PHYSICIAN**.

Skin Contact: In case of contact, remove product and immediately wash affected area with plenty of soap and water for at least 5 minutes. Do not apply greases or ointments. Remove contaminated clothing. Clean contaminated clothing with soap and water before re-use. If redness, burning or swelling persists, **CONSULT A PHYSICIAN**.

Ingestion: DO NOT INDUCE VOMITING. Never administer anything by mouth to an unconscious person. Rinse out mouth with water, then drink sips of water to remove taste from mouth. **CONSULT A PHYSICIAN**. Do not leave affected person unattended. If vomiting occurs spontaneously, lay affected person on side and keep head lower than waist to prevent aspiration.

Inhalation: If respiratory irritation or distress occurs, remove victim to fresh air. If breathing is difficult, give oxygen. If breathing stops, apply artificial respiration. **CONSULT A PHYSICIAN**.

CLEAN UP

Environmental Precautions
Construct a dike to prevent spreading. Keep out of sewers, storm drains, surface waters and soils.

Small Spills: Soak up with an absorbent material, such as clay, sand or other suitable non-reactive material. Place in leak-proof containers. Seal tightly for proper disposal.

Large Spills: Approach suspected leaks with caution. Construct a dike or trench to contain material. Soak up with an absorbent material, such as clay, sand or other suitable non-reactive material. Place in leak-proof containers. Seal tightly for proper disposal.

Disposal
Dispose of container and unused portions in accordance with local, state and federal regulations. Emptied container may contain product residue and should not be reused.

LIMITED WARRANTY

See **strongtie.com** for information.

IMPORTANT INFORMATION
It is the responsibility of each purchaser and user of each Product to determine the suitability of the Product for its intended use. Prior to using any Product, consult a qualified design professional for advice regarding the suitability and use of the Product, including whether the capacity of any structural building element may be impacted by a repair. As jobsite conditions vary greatly, a small-scale test patch is required to verify product suitability prior to full-scale application. The installer must read, understand, and follow all written instructions and warnings contained on the product label(s), Product Data Sheet(s), Material Safety Data Sheet(s), and the **strongtie.com** website prior to use. For industrial use only by qualified applicators. KEEP OUT OF REACH OF CHILDREN!
Proposition 65: Products named within this document contain materials listed by the state of California as known to cause cancer, birth defects, or reproductive harm.

ETI-GV

Structural Injection Epoxy Gel

SIMPSON Strong-Tie®

CSI Specification: 03 01 00 Maintenance of Concrete

ASSESSMENT

DESCRIPTION

ETI-GV Structural Injection Epoxy Gel is a two-component, high-solids, moisture-tolerant, thixotropic epoxy designed for pressure injection of concrete cracks. ETI-GV is suitable for vertical and horizontal crack sealing, securing injection ports, and general concrete repair applications. It is available in side-by-side cartridges and bulk packaging.

SPECIFICATION COMPLIANCE

Meets the requirements of ASTM C881 Type I and IV, Grade 3.

WHERE TO USE

- As a gel-viscosity epoxy for repair of medium cracks ³⁄₃₂" – ¼" (2.4 – 6 mm) in width
- For structural repairs
- For vertical and horizontal crack sealing
- As a pick-proof sealant

FEATURES

- Chemically bonds with the concrete to provide a structural repair. ETI-GV seals the crack from moisture, protecting rebar in the concrete from corrosion.
- Gel-viscosity
- Moisture-tolerant, can be used on dry and damp surfaces
- Can be feather edged
- Formulated for maximum penetration under pressure
- Decreases in viscosity under pressure for increased flowability
- Non-shrink and resistant to oils, salts, and mild chemicals
- Excellent resistance to freeze/thaw cycles
- Can be used with metered pressure-injection equipment

PRODUCT DATA

All testing performed at 73°F (23°C) and 50% R.H.

Generic Description
Epoxy resin

Packaging
22 fl. oz. (650 mL) dual cartridge (ETI-GV22)
2 US gallon (7.6 L) kit (ETI-GVKT2) contains:
- 1 US gallon (3.7 L) can of Component "A" (ETIGV-1A)
- 1 US gallon (3.7 L) can of Component "B" (ETIGV-1B)

10 US gallon (37.9 L) kit (ETI-GVKT15) contains:
- 5 US (18.9 L) gallon pail of Component "A" (ETIGV-5A)
- 5 US (18.9 L) gallon pail of Component "B" (ETIGV-5B)

100 US gallon (379 L) kit (ETI-GVKT150) contains:
- 50 US gallon (189.3 L) drum of Component "A" (ETIGV-50A)
- 50 US gallon (189.3 L) drum of Component "B" (ETIGV-50B)

Color
Mixed Epoxy: Gray

Mixing Ratio
1A:1B by volume

Product Yield
231 in.³/US gal. (0.001 m³/L) neat

Cure Times:

Pot Life	30 minutes
Initial Cure	24 hours
Full Cure	7 days

Storage
Store dry between 45° and 90°F (7°–32°C).

Shelf Life
2 years in unopened packaging

VOC
4 g/L (mixed)

TECHNICAL INFORMATION

All testing performed at 73°F (23°C) and 50% R.H. and applies to Clear formula only

Viscosity ASTM D2393
Non-sag gel

Bond Strength (moist cure) ASTM C882
2 days 1,109 psi 7.6 MPa
14 days 3,994 psi 27.5 MPa

Compressive Yield Strength, 7 days ASTM D695
11,564 psi 79.7 MPa

Compressive Modulus ASTM D695
403,200 psi 2,780.0 MPa

Deflection Temperature ASTM D648
131°F 55°C

Water Absorption, 24 hours ASTM D570
0.58%

Linear Coefficient of Shrinkage ASTM D2566
0.000

Gel Time, 60 gram mass ASTM C881
135 minutes

Chemical Resistance
Very good to excellent against distilled water, inorganic acids, and alkalis. Fair to good against organic acids and alkalis, and many organic solvents. Poor against ketones.

ETI-GV Structural Injection Epoxy Gel

PLANNING

LIMITATIONS

- For optimal product performance, do not apply to surfaces below 40°F (4°C) or above 90°F (32°C)
- For use in non-moving cracks only
- Product may discolor if exposed to direct sunlight
- Not for use in actively leaking or seeping cracks
- Remove active hydrostatic pressure before attempting injection
- For cracks wider than ¼ in. (6 mm), consult a qualified engineer

Please note: This product has not been evaluated for resisting long-term sustained loads in anchor applications. Refer to the current *Anchoring and Fastening Systems for Concrete and Masonry* catalog or www.strongtie.com for code-listed structural anchoring adhesives.

PREPARATION

SURFACE PREPARATION

Concrete must be sound, clean, and free of all contaminants that could impair product adhesion or performance. Concrete should be a minimum of 28 days old and fully cured prior to application.

Pressure Injection: Prepare surface area around crack by abrasive blasting or other mechanical means, taking care not to impact any debris into the crack. Blow out the crack with 80 psi (min.) oil-free, compressed air to remove any visible debris. For surface mounted ports, follow mixing instructions and use ETI-GV to adhere ports to concrete surface. For drill-in ports, drill the appropriate sized hole and set. Paste over and seal the entire crack, and port bases using a putty knife. Apply the paste-over material at a minimum thickness of ³⁄₁₆ in. (4.7 mm) and 1 in. (25 mm) wide. Cover port bases with a minimum thickness of ¼ in. (6 mm) and extend the paste-over at least 1 in. (25 mm) beyond the base of the port. If possible, seal the backside of the crack. Allow ETI-GV to fully cure before injecting.

General Concrete Repair: Prepare the surface by abrasive blasting or other mechanical means to achieve an open pore structure and profile per ICRI Guideline 310.2 CSP3-6.

MIXING

For optimal product performance, condition individual components to 70°F (21°C) and stir thoroughly prior to use. Do not prepare more material than can be used within the pot life of the product. Proportion components at a 1A:1B ratio by volume in a clean pail or use calibrated mixing equipment. Mix thoroughly with a low-speed (300–600 rpm) drill and mixing paddle for 2–3 minutes, scraping unmixed material from sides and bottom of mixing container as needed to achieve a uniform consistency. Avoid entrapping air into mixture. Do not thin ETI-GV.

Dual Cartridges: Hold cartridge upright, unscrew retaining nut and remove plugs. Attach Simpson Strong-Tie EMNO22 mixing nozzle (included) to the top of cartridge and secure with retaining nut. Insert cartridge into dispensing tool. When using a pneumatic dispensing tool, regulate air pressure to 80–100 psi. **IMPORTANT:** Cartridge must be equalized prior to use. Failure to follow these instructions can result in product not properly curing. To ensure proper mixing ratio, orient the cartridge and tool in an upward direction so any entrapped air can escape into the mixing nozzle. Begin by squeezing the trigger on the tool until the mixing nozzle is completely full. Once full, re-orient the cartridge and tool to the side and dispense 3 full trigger pulls (approximately ½ fl. oz./30 mL) and insure all air bubbles are out of the cartridge before beginning the injection process. Repeat if necessary. Dispose of unmixed adhesive in accordance with local regulations. When properly mixed, ETI-GV will be a uniform gray color. Modification or improper use of mixing nozzle may impair adhesive performance. To store partially used cartridges, leave hardened nozzle in place. To re-use, attach new nozzle. Adhesive will start to gel in the nozzle if allowed to stand beyond the listed pot life. Adhesive will gel faster at higher temperatures. Material under pressure can blow out the back of the cartridge if the adhesive in the nozzle hardens.

EXECUTION

APPLICATION

Remove all standing water by vacuum or blowing with oil-free, compressed air prior to installation. ETI-GV can be installed on damp or dry surfaces. Do not install through standing water. Avoid installing at high temperatures or windy conditions to maximize open time. Avoid applying in direct sunlight.

For Pressure Injection: With all ports open, begin injecting ETI-GV at the lowest port and work your way up. For horizontal applications, choose one end of the affected site and work your way to the other end. Begin injecting ETI-GV into the first port to establish flow. If the next port shows material, close that port and continue pumping until the first port refuses material. If the first port refuses material prior to showing at the next port, close the first port and re-establish flow at the second port. Repeat until all ports refuse material. When injection is complete, and following initial set time, remove installation ports and seal holes with FX-922 Plug and Fast Set or ETI-GV. Remove cured paste-over epoxy by mechanical means.

General Concrete Repair/Adhesive: Apply properly mixed ETI-GV to the prepared substrates with a putty knife. Secure in place until fully cured.

ETI-GV Structural Injection Epoxy Gel

SAFETY

WARNING

Resin: WARNING! Causes skin irritation. Causes serious eye irritation. May cause an allergic skin reaction. Toxic to aquatic life with long-lasting effects.

Hardener: DANGER! Combustible liquid. Harmful if swallowed. Harmful in contact with skin. Harmful if inhaled. Causes severe skin burns and eye damage. May cause an allergic skin reaction. Toxic to aquatic life with long-lasting effects.

Protective Measures: The use of safety glasses and chemically resistant gloves is recommended. Use appropriate clothing to minimize skin contact. The use of a NIOSH-approved respirator is required to protect respiratory tract when ventilation is not adequate to limit exposure below the PEL. Refer to Material Safety Data Sheet (MSDS) available at **www.strongtie.com/msds** for detailed information.

FIRST AID

Eye Contact: Hold open eyes under running water for 15 minutes. Seek medical attention.

Skin Contact: Wash skin with soap and water. Seek medical attention if irritation develops.

Inhalation: Remove victim to fresh air. If necessary, use artificial respiration. Seek medical attention.

Ingestion: If product is swallowed, call physician or poison control center. Do not induce vomiting, or give diluents to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice.

CLEAN-UP

Spills: Construct a dike to prevent spreading. Soak up with absorbent material such as clay, sand or other non-reactive material. Place in leak-proof containers. Keep out of sewers, storm drains, surface waters, and soils.

Surface Area: Wipe up uncured material with cotton cloths. If desired scrub area with abrasive, water-based cleaner and flush with water. If approved, solvents such as FX-Epoxy Cleaner, ketones (MEK, acetone, etc.), or adhesive remover can be used. Cured material can only be removed by mechanical means.

Tools and Equipment: Remove uncured material with FX-Epoxy Cleaner, ketones (MEK, acetone, etc.), or adhesive remover. Cured material can only be removed by mechanical means.

Skin: Use a non-toxic, pumice-based soap, citrus-based hand cleaner or waterless hand-cleaner towel. Never use solvents to remove product from skin.

Disposal: Dispose of container and unused contents in accordance with federal, state, and local requirements. Containers may be recycled; consult local regulations for exceptions.

Distributor

IMPORTANT INFORMATION
It is the responsibility of each purchaser and user of each product to determine the suitability of the product for its intended use. Prior to using any product, consult a qualified design professional for advice regarding the suitability and use of the product, including whether the capacity of any structural building element may be impacted by a repair. As jobsite conditions vary greatly, a small-scale test patch is required to verify product suitability prior to full-scale application. The installer must read, understand and follow all written instructions and warnings contained on the Limited Warranty, product label(s), Product Data Sheet(s), Material Safety Data Sheet(s) and the **www.strongtie.com** website prior to use. For industrial use only by qualified applicators. KEEP OUT OF REACH OF CHILDREN!
Proposition 65: Products named within this document contain materials listed by the state of California as known to cause cancer, birth defects, or reproductive harm

KAUFMAN

PRODUCT INFORMATION

KAUFMAN PRODUCTS INC. 3811 CURTIS AVENUE BALTIMORE, MARYLAND 21226-1131 www.kaufmanproducts.net 410-354-8600 800-637-6372

SurePoxy HM EPL

Description

SurePoxy HM EPL is a unique, three-component, extended pot life, moisture insensitive mixture combining the benefits of a 100% solids epoxy resin system and specially graded aggregates and cement. This perfect blend produces a structural adhesive/coating that has an extended tack free time of fifteen hours. The longer open time, allows the end-user significantly more time to construct forms around the area, prior to placement of concrete or repair mortars. SurePoxy HM EPL may be used neat as a bonding agent, or mixed with component C to produce a thick protective coating and bonding agent on rebar that prevents corrosion. Unlike water-dispersed epoxy coating systems that do not form a vapor barrier, and thus allow for the potential of corrosion, SurePoxy HM EPL is 100% solids and does form a vapor barrier. As a result, SurePoxy HMEPL offers the ultimate in corrosion protection, while also offering a longer open time to make it easier for the contractor to use the product correctly.

Uses

SurePoxy HM EPL is especially recommended for bonding fresh concrete overlays, toppings, patches and shotcrete to existing substrates. The long open time allows SurePoxy HM EPL to be applied up to fifteen hours before topping an existing substrate. This gives workmen plenty of time after applying SurePoxy HM EPL, to place the reinforcement or forms before pouring the concrete. It is excellent for one-sided forming. In these instances, the third component is not suggested.

SurePoxy HM EPL is also excellent as an anti-corrosion coating to protect reinforcing steel because it forms a vapor barrier, unlike water-dispersed epoxy protective coatings.

Features

100% Solids System
Does Not Contain Water
Corrosion Resistance
Extended Tack Free Time
Cures at About the Same Rate as Concrete
Self-Contained, Factory-Proportioned Units
Free of Organic Solvents
VOC Compliant
May be applied between 60-95°F
Clean Up with Water

Physical Properties @ 72°F and 50% relative humidity.

Uncured

Color-Neat	Clear
Color W/ Component C	Concrete Tan
Initial Viscosity, neat	800 cps
W/aggregate	3,500-4,500 cps.
Shelf life	1 year minimum
Gel Time, 200 grams neat	4 hours
Tack-Free Time	up to 15 hrs. @ 72°F
Final Cure	28 days

Cured, 28 days unless otherwise noted

HDT (ASTM D-648)	121°F
Slant Shear Bond Strength (ASTM C-882)	2,900 psi. @ 7 Days
Shore D Hardness	75
Compressive Yield Strength (ASTM D-695)	8,600 psi. @ 7 days 10,500 psi @ 14 days
Compressive Modulus (ASTM D-695)	350,000 psi.
Tensile Strength (ASTM D-638 at 28 Days)	3,100 psi.
Tensile Elongation (ASTM D-638)	3.0%
Water Absorption, 24 hrs. (ASTM D-570)	.20
Shrinkage (ASTM D-2566)	.002

All values approximate - will vary with temperature and humidity. Stated test values take into consideration the extended open time of SurePoxy HM EPL, with regard to the testing protocols of ASTM C-881specific to elapsed time between casting of lab samples and physical testing.

Specifications

ASTM C-881, Types I, II, IV & V, Grade 2, Class C*
AASHTO M-235, Types I, II, IV & V, Grade 2, Class C*

*(Above compliances modified due to the significantly longer tack free time of SurePoxy HM EPL. *In addition, SurePoxy HMEPL meets the tensile strength requirements of Type II systems only.)*

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Packaging Yield

This product is used as either a 2 or 3-component mix. For all uses it consists of a carton containing two 1-gallon cans of components A & B. Optionally add 1 bag of Part C containing 37# of an aggregate blend.

Each complete 2 gallon unit with Component C added will yield approximately 3.85 gal. (889 in³) of material. When applied at 80 ft²/gal., one unit will cover 308 ft². If applied at 160 ft²/gal., one unit will cover 616 ft².

Directions

Surface Preparation

Concrete -Surface must be clean and sound. It may be dry or damp but free of standing water. Remove laitance, and all foreign matter as per ASTM D-4258 and D-4259. Water-blasting followed by shotblasting is the preferred method of preparation, to provide a fractured aggregate profile of at least 1/8" equal to texture #4-#5 from ICRI. Also satisfactory are sandblasting or shotblasting individually. Acid etching according to ASTM D-4260 15-20% muriatic acid solution can be used as an alternative. Wash acid and loose mortar off with high-pressure water until slush is removed. Test with litmus paper to be sure acid is removed. Final rinse with 1% ammonia solution is beneficial for final rinsing after acid.

Expansion/control joints, joint sealants, floor drains and floor termination joints require special attention. SurePoxy HM EPL will not usually adhere to sealant joint products. Test first. Steel - Sandblast to white metal.

Proportioning/Mixing

Remove all ingredients from pails. Stir each gallon can well and empty contents into 5 gal. pail. Mix the two gallons in the pail with low speed (400-600 rpm) drill until uniform. Pour one bag of Component C into the pail containing the two gallons of epoxy, and mix again for two minutes if using the SurePoxy HM EPL as an anti-corrosion coating. Keep material well stirred until used.

Application

Bonding Fresh Concrete to Hardened Concrete:
Apply SurePoxy HM EPL to hardened concrete at 80 ft²/gl. (20 mils) with a stiff brush, broom, squeegee promptly after mixing. Apply fresh concrete up to 15 hours after application of SurePoxy HM EPL when applied at 70°F. If SurePoxy HM EPL looses its gloss due to suction into the substrate or if used in high temperatures, apply additional coat, while first coat is still tacky.

For Corrosion Protection of Steel:
Apply by stiff bristled brush or airless spray at approximately 160 ft²/gl. (10 mils). Be sure to coat the exposed steel completely. Allow coating to dry 2-3 hours at 75°F, and then apply a second coat at the same coverage rate. Allow the system to dry again for 2-3 hours, before the repair mortar or concrete is placed.

Precautions

Do not thin SurePoxy HM EPL. Pot life will vary substantially due to different temperatures. The contractor shall use the test method prescribed in ACI 503R to determine that the preparation produced a surface capable of providing tensile bond strength greater than 250 psi. SurePoxy HM EPL is a vapor barrier after cure. Store this product above 45°F. Read Safety Data Sheet before using. Please refer to the *General Epoxy Instructions* for complete details on proper application during cold and hot weather.

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Patchwell V/O

Description

Patchwell V/O is a single component polymer modified, cement based fast setting non-sag mortar. It consists of portland cements, lightweight hollow silica spheres, corrosion inhibitors and proprietary modifiers. When mixed with water it forms an extremely workable quick setting, polymer modified mortar that possesses high strength with excellent adhesion and low permeability against carbon dioxide and chloride intrusion. The coefficient of thermal expansion is similar to concrete.

Uses

Patchwell V/O is recommended for vertical and overhead concrete repairs. Under normal conditions, it is self-curing and allows for quick, easy repairs of both interior and exterior surfaces. Use for patching scaled and spalled concrete as well as resurfacing damaged and honeycombed surfaces. It is ideal for use on parking structures, bridges, retaining walls, ceilings, sloped surfaces, or anywhere concrete surfaces need repair. Use from 1/4" up to 2" thick overhead and 3" thick on vertical surfaces.

Physical Properties - @ 75°F

Vicat Set Times		
Initial, 25 mm		20-25 min.
Final		50-60 min.
Compressive Strength (ASTM C-109)	1 day	3,500
	7 days	6,500
	28 days	8,100
Slant Shear Bond Strength (ASTM C-882)	1 day	1,150
	7 days	2,290
	28 days	2,700
Tensile Strength (ASTM C-496)	1 day	310
	7 days	510
	28 days	750
Flexural Strength (ASTM C-348)	1 day	700
	7 days	1020
	2 days	1450
Coefficient of Linear Thermal Expansion	4.5 x 10	

Packaging /Yield

50 lb. bag of powder, yielding .45 ft³ (3.36 gal.)

Surface Preparation

The concrete substrate must be structurally sound. The concrete surface must be clean, free of all contaminants and all deleterious materials. The surface must be prepared to a minimum of 1/16" or to a Concrete Surface Profile (CSP) of five, as per Guideline Number 03732, Selecting & Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays from the International Concrete Repair Institute (ICRI). Additionally, once prepared properly, the concrete surface must be saturated surface dry (SSD), unless using a bonding agent. If steel reinforcement is exposed, it should be prepared by mechanical means to remove all rust. If corrosion has occurred the steel should be prepared with high-pressure water after the mechanical preparation. For proper priming of the steel, use SurePoxy HMEPL, SurePoxy HM Gel, or SurePoxy HM 24.

Mixing

Pour approximately 1 gallon of clean water into a mixing container and then slowly add the dry powder. Mix mechanically with a ½" drill and mixing paddle. Continue to mix until uniform. Do not ever add plasticizers, accelerators, retarders, or any other ingredients besides potable water unless advised by Kaufman Products in writing.

Application

Patchwell V/O must be scrubbed into the substrate, filling all pores and voids. Force material against edge of repair, working toward center. After filling repair, consolidate, then screed. Material may be applied in multiple lifts or at least ¼" to 3". When using multiple lifts, be sure to score top surface of each lift to produce a roughened surface for the next lift, make certain that the prior lift is saturated with potable water prior to applying the next lift, and use either a bonding agent or a slurry coat to enhance the bond of subsequent lifts. Allow preceding lift to reach final set before placing fresh material. For structural bond strength, use SurePoxy HM 24 or SurePoxy HM GEL. Do not add additional water for finishing, but rather use VaporAid.

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Curing

As per ACI recommendations for portland cement concrete, curing is beneficial. Moist cure with wet burlap or polyethylene, a fine mist of potable water or a solvent-based curing & sealing compound, such as Krystal 25, Krystal 30, Krystal 25 OTC, Krystal 30 OTC, Krystal 25 PCBTF, or Krystal 30 PCBTF. Do not apply subsequent lifts to a surface that has had curing compound applied.

Precautions

Not recommended for use less than 1/4" thick. Temperatures during application should be at least 45°F and rising. Do not allow material to freeze. Do not apply outdoors when rain or moving water is expected within 5 hours. Substrate strength should be tested in accordance with ACI 503 Appendix A prior to application. Shelf life is approximately one year. Read complete Safety Data Sheet before using.

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NO.	DATE	DESCRIPTION	BY

PROJECT:
PERCY D MILLER
WATER TREATMENT PLANT
MIDDLETOWN, VA
MATERIAL SPECIFICATIONS

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WINCHESTER, VA 22601
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COMMONWEALTH OF VIRGINIA
TIMOTHY G. PAINTER
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05/29/18
PROFESSIONAL ENGINEER

DRAWN BY: TGP	JOB NO.: 1609031
SCALE: N/A	DATE: 05/24/18
SHEET: S5/S5	