City of Madison Landmarks Commission — APPLICATION

City of Madison Planning Division, 215 Martin Luther King Jr. Blvd., Suite LL.100, P.O. Box 2985, Madison, WI 53701-2985

1. LOCATION

Project Address: 1110 Spring Harbor Drive, Madison, WI 53705 **Aldermanic District:** District 19

2. PROJECT

Project Title / Description: Madison Metropolitan School District - Spring Harbor Middle School - Proposed addition to the front of the school from Spring Harbor Drive. This addition will provide a new main entry with lobby, offices, stair, and elevator to provide ADA accessibility. The proposed addition will require that the exit from the parking lot off of Spring Harbor Drive be redirected.

This is an application for: *(check all that apply)*

- ☒ **Alteration / Addition to a Designated Landmark**
- ☐ **Land Division/Combination of Designated Landmark site**
- ☐ **Alteration / Addition to a building adjacent to a Designated Landmark**
- ☐ **Alteration / Addition to a building in a Local Historic District** *(specify)*:
  - ☐ Mansion Hill ☐ Third Lake Ridge ☐ First Settlement
  - ☐ University Heights ☐ Marquette Bungalows
- ☐ **Land Division/Combination in a Local Historic District** *(specify)*:
  - ☐ Mansion Hill ☐ Third Lake Ridge ☐ First Settlement
  - ☐ University Heights ☐ Marquette Bungalows
- ☐ **New Construction in a Local Historic District** *(specify)*:
  - ☐ Mansion Hill ☐ Third Lake Ridge ☐ First Settlement
  - ☐ University Heights ☐ Marquette Bungalows
- ☐ **Demolition**
- ☐ **Variance from the Historic Preservation Ordinance (Chapter 41)**
- ☐ **Referral from Common Council, Plan Commission, or other referral**
- ☐ **Landmark Nomination/Rescission or Historic District Nomination/Amendment**
  (Please contact the Historic Preservation Planner for specific submission requirements.)
- ☐ **Other** *(specify)*: _____

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CITY OF MADISON
3:00 PM
MAR 1 2016

Planning & Community & Economic Development

3. APPLICANT

Applicant's Name: Steve Kieckhafer **Company:** Plunkett Raysich Architects, LLP
Address: 2310 Crossroads Drive, Suite 2000, Madison, WI 53718
Telephone: (608)240-9900 **E-mail:** skieckhafer@prarch.com

Property Owner *(if not applicant)*: Madison Metropolitan School District
Address: 545 W. Dayton Street, Madison, WI 53703

Property Owner's Signature: _____ **Date:** 2/23/2016

NOTICE REGARDING LOBBYING ORDINANCE: If you are seeking approval of a development that has over 40,000 square feet of non-residential space, or a residential development of over 10 dwelling units, or if you are seeking assistance from the City with a value of $10,000 (including grants, loans, TIF or similar assistance), then you likely are subject to Madison's lobbying ordinance (Sec. 2.40, MGO). You are required to register and report your lobbying. Please consult the City Clerk's Office for more information. Failure to comply with the lobbying ordinance may result in fines.

4. APPLICATION SUBMISSION REQUIREMENTS *(see checklist on reverse)*

All applications must be filed by 4:30 p.m. on the submission date with the Preservation Planner, the Department of Planning & Community & Economic Development, Planning Division, located in Suite LL-100, of the Madison Municipal Building, 215 Martin Luther King, Jr. Blvd. Applications submitted after the submittal date or incomplete applications will be postponed to the next scheduled filing time.

PLUNKETT RAYSICH
ARCHITECTS, LLP

February 29, 2016

Ms. Amy Scanlon, Preservation Planner
Landmarks Commission
City of Madison
215 Martin Luther King Jr. Blvd.
Madison, WI 53701

Re: Letter of Intent
Spring Harbor Middle School
1110 Spring Harbor, Madison, WI 53705
PRA Project No. 140248-11

Dear Ms. Scanlon:

The following submittal is our request for a certificate of appropriateness in compliance with Historic Preservation Ordinance 41.18(1).

Organizational Structure:

Owner:	Madison Metropolitan School District 545 W Dayton Street Madison, WI 53703 Contact: Rick Hopke rhopke@madison.k12.wi.us	Architect:	Plunkett Raysich Architects, LLP 2310 Crossroads Dr., Ste. 2000 Madison, WI 53718 Contact: Steve Kieckhafer SKieckhafer@prarch.com
Site/Civil:	Wyser Engineering, LLC 201 1/2 E Main Street Madison, WI 53572 Contact: Wade Wyse wadewise@wyserengineering.com	Lighting:	KJWW Engineering 802 West Broadway Madison, WI 53713 Contact: Scott Hole holess@kjww.com

Introduction:

The Madison Metropolitan School District developed a plan to present to the tax payers of the Madison Metropolitan School District that would update existing school facilities with the following categories; accommodate student capacity, handicap accessibility within buildings and safe/secure environment. The plan

that was developed affects additions/renovations and infrastructure upgrades to16 school buildings for a total of $39 Million dollars. That plan, accepted by the School Board to take to referendum, went to vote on April 7, 2015, and was successful with 82% of approval.

Project Description:

The proposed addition is to provide a new main entry with lobby, as well as offices and a new stair and elevator. By incorporating a new elevator, ADA accessibility will be improved throughout the building.

Landmarks Commission

Because there is a burial mound on school property and because the addition will require disturbing the earth even though the mound is not located near the area of earth disturbance, we are filing an application for compliance review. The mound is located on the northwest edge of the site and the proposed addition is located on the southeast edge of the site.

Building Elements

The addition will be located off of the existing main entry from Spring Harbor Drive. The architecture will be complementary to the existing building by incorporating similar design elements and materials that are a part of the existing building. The addition will be constructed using exterior face brick and the windows and entrances will be aluminum that will match existing finishes. The addition will force the drive for the parking lot to be shifted to the northeast.

Site Development Statistics

Lot Area	~7.28 acres	
Current building Gross Floor Area		31,876 s.f.
Proposed renovation of Gross Floor Area		642 s.f.
Proposed addition of Gross Floor Area		3,129 s.f.
New total Gross Floor Area		35,737 s.f.

Vehicle Parking

On-site surface Parking	93 spaces	4 accessible

Bike Parking
Bike Storage available to students, 68 spaces

Moped Parking
Moped parking not provided

Project Schedule:

This project is anticipated to start construction in June 2015 with completion scheduled for January 2017.

City Planning, Landmarks Commission, Alderperson and Neighborhoods:

The following is a list of dates of which meetings were held to discuss the proposed project

February 23, 2015- City Zoning to provide notification of District progressing to referendum
April 14-June7, 2015- Community/Parents to review project
June 9, 2015- City Zoning and UDC
October 8, 2015- City Zoning and UDC (determined by UDC review at staff)
October 29, 2015- Meeting with parents and school community
December 8, 2015- Meeting with Landmarks Commission
January 12, 2016- Meeting with parents and school community
February 29, 2016- Submit to Zoning for Site Plan Review
February 29, 2016- Submit to Historical Society
February 29, 2016 - Alder and Neighborhood notification

Estimated Project Costs:

The project costs are estimated to be $1,382,828.

Public Subsidy:

This project will be funded totally with public bonds issued to the District through the approval of the successful referendum vote.

Please contact us with any questions or for additional information that you request.

Thank you for your time in reviewing our proposal.

Best regards,

Steven A. Kieckhafer, AIA
Architect

Madison Metropolitan School District
Spring Harbor Middle School - 3rd Addition - 2016

1110 Spring Harbor Dr.
Madison, WI 53705

PLUNKETT RAYSICH ARCHITECTS, LLP

209 south water street milwaukee, wisconsin 53204 414 359 3060
2310 crossroads drive suite 2000 madison, wisconsin 53718 608 240 9900
205 north orange avenue suite 202 sarasota, florida 34236 941 348 3618

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Sheet Index

Project Information

Project Date:	29 FEB 16
PRA Project Number:	140248-11
Owner Project Number:	231_Addition_2016

CITY OF MADISON - LANDMARKS COMMISSION PERMIT APPLICATION

Applicable Codes and Zoning

2014 Wisconsin Commercial Building Code (SPS 360-366)
2009 International Building Code
Educational occupancy, Group E
City of Madison Code of Ordinances, Chapter 29, Building Code

Zoning: City of Madison Code of Ordinances, Chapter 28, Zoning Code
TR-C1 Traditional Residential - Consistent District 1

Type of Construction

Addition & Alteration
Type of construction, unprotected, type IIB - Non-Sprinklered

Building Area

Footprint:	25,065 SQ FT
Existing:	31,876 SQ FT
Remodel:	642 SQ FT
New:	3,219 SQ FT
Total:	35,737 SQ FT

Occupant Load

Room/Floor:	XXX (Design Capacity)
Room/Floor:	XXX (Design Capacity)
Room/Floor:	XXX (Design Capacity)
Room/Floor:	XXX (Design Capacity)

Parking Requirements

Parking	Required By Zoning	Regular Stalls	Accessible Stalls	Van Accessible	Total Stalls
Stalls	1 per classroom	15	1	1	17
Bicycle	1 per 5 students	78			78

Sanitary Facilities Requirements

Women	Required	Existing	Proposed	Total
W.C.	1 per 50=8	12	0	12
Lavs	1 per 50=8	8	0	8
Men	**Required**	**Existing**	**Proposed**	**Total**
W.C.	1 per 50=8	18	0	18
Lavs	1 per 50=8	7	0	7(-1)
Drinking	**Required**	**Existing**	**Proposed**	**Total**
Fountains	1 per 100=8	4	4	8
Unisex	**Required**	**Existing**	**Proposed**	**Total**
W.C.	0	4	1	5
Lavs	0	4	1	5

ADA Access Route

Refer to Sheet A200

Room Capacities

Room:	XXX (Design Capacity)
Room:	XXX (Design Capacity)
Room:	XXX (Design Capacity)
Room:	XXX (Design Capacity)

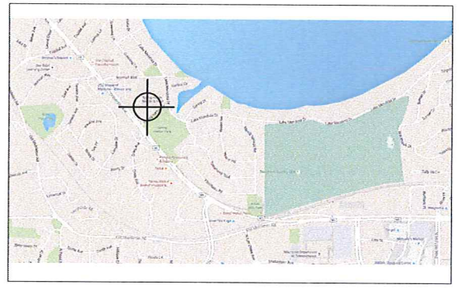
Exiting

Required Aggregate Exit Width: XXX"
Proposed Aggregate Exit Width: XXX"

Fireproofing Schedule, Fire-Resistive Rating Requirements

Building Elements:	Rating
Columns	0 HR
Beams	0 HR
Joists	0 HR
Deck	0 HR
Roof Framing	0 HR

Project Location



Project Team

OWNER
MADISON METROPOLITAN SCHOOL DISTRICT Tel (608) 204-7900
4711 Pflaum Road
Madison, WI 53718

CIVIL
WYSER ENGINEERING, LLC Tel (608) 583-9225
201 1/2 E. Main Street
Mt. Horeb, WI 53572

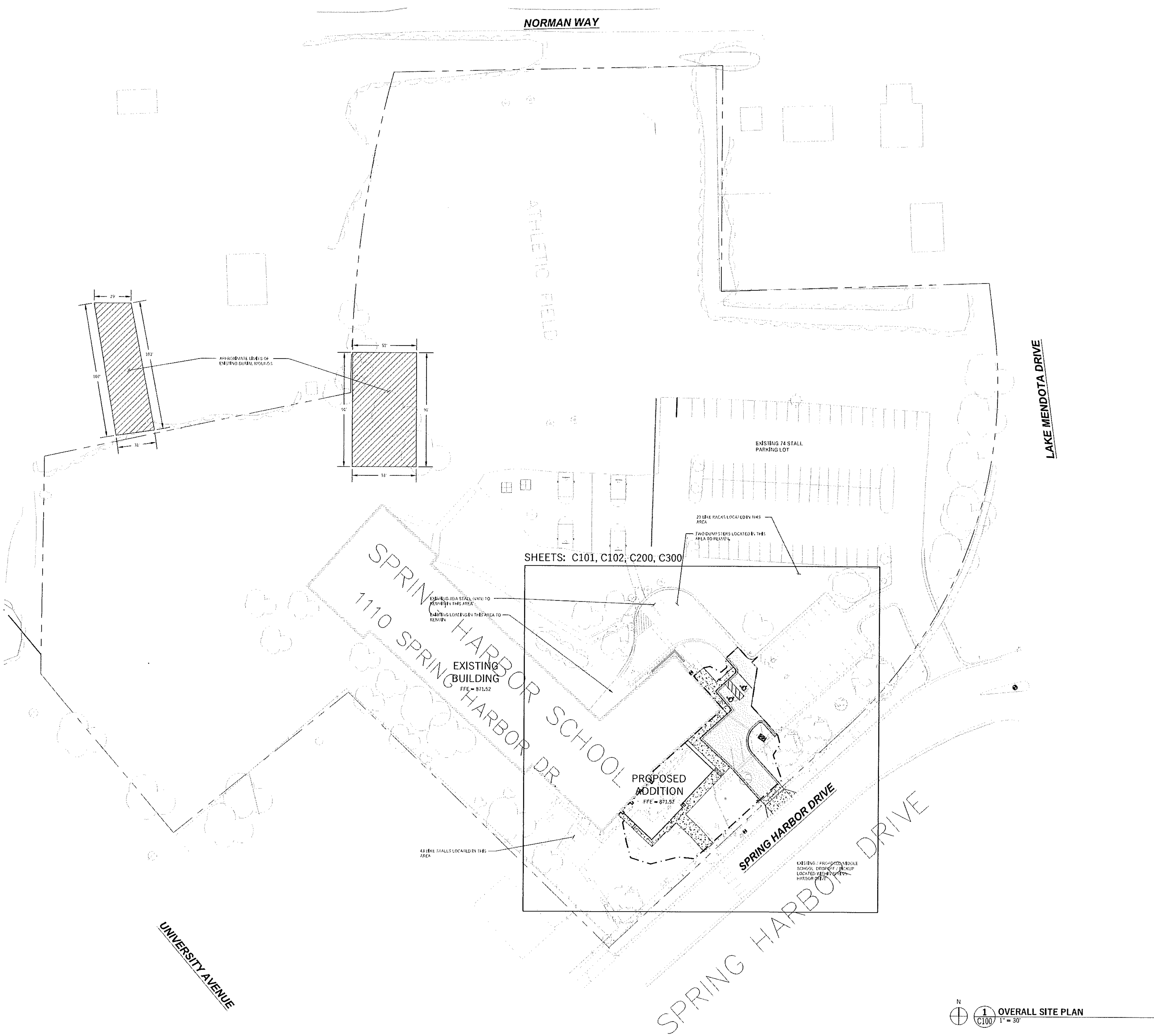
STRUCTURAL
KJWW Engineering Consultants Tel (608) 223-9600
1800 Deming Way, Suite 200
Middleton, WI 53562

PLUMBING
KJWW Engineering Consultants Tel (608) 223-9600
1800 Deming Way, Suite 200
Middleton, WI 53562

MECHANICAL
KJWW Engineering Consultants Tel (608) 223-9600
1800 Deming Way, Suite 200
Middleton, WI 53562

ELECTRICAL
KJWW Engineering Consultants Tel (608) 223-9600
1800 Deming Way, Suite 200
Middleton, WI 53562

TECHNOLOGY
KJWW Engineering Consultants Tel (608) 223-9600
1800 Deming Way, Suite 200
Middleton, WI 53562



1 OVERALL SITE PLAN
C100 1" = 30'

LEGEND (PROPOSED)

- APPROXIMATE PROPERTY BOUNDARY
- EASEMENT
- CONSTRUCTION FENCING
- BUILDING FOOTPRINT
- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- DISTURBANCE LIMITS

NORTH

0' 15' 30' 45'
1" = 30' on 30'x42'
NTS on 11'x17'

GENERAL NOTES

1. UNDERLYING SITE CONTOURS AND INFORMATION BASED ON TOPOGRAPHIC & UTILITY DATA AS WAS SHOT IN THE FIELD THE WEEK OF NOVEMBER 29TH, 2015. WYSER ENGINEERING SHALL NOT BE HELD RESPONSIBLE FOR ANY ERRORS OR OMISSIONS THAT MAY ARISE AS A RESULT OF ERRONEOUS OR INCOMPLETE INFORMATION PROVIDED BY OTHERS. CONTRACTOR TO CONFIRM ALL ELEVATIONS, GENERAL DRAINAGE AND EARTHWORK REQUIREMENTS PRIOR TO CONSTRUCTION.
2. BENCHMARK INFORMATION CAN BE FOUND ON THE EXISTING CONDITIONS MAP. THE BENCHMARK LOCATIONS ARE SHOWN FOR REFERENCE ONLY ON THIS PLAN. THE BENCHMARKS SHALL BE VALIDATED BY LICENSED LAND SURVEYOR PRIOR TO CONSTRUCTION. CONTRACTOR ASSUMES RISK ASSOCIATED WITH BENCHMARK ELEVATIONS UNTIL CONFIRMED.
3. CONTRACTOR TO OBTAIN APPROPRIATE PERMITS FOR STREET OPENINGS & TO WORK WITHIN THE CITY'S LAND IF REQUIRED.
4. WYSER ENGINEERING SHALL BE HELD HARMLESS AND DOES NOT WARRANT ANY DEVIATIONS BY THE OWNER OR CONTRACTOR FROM THE APPROVED CONSTRUCTION PLANS THAT MAY RESULT IN DISCIPLINARY ACTIONS BY REGULATORY AGENCIES.
5. IF ANY ERRORS, DISCREPANCIES, OR OMISSIONS WITHIN THE PLAN BECOME APPARENT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.
6. ALL MUNICIPAL UTILITY CONNECTIONS, WORK IN ROW, PUBLIC OUTLOTS AND PUBLIC EASEMENTS SHALL BE IN ACCORDANCE WITH CITY OF MADISON STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION- LATEST EDITION.

SITE INFORMATION BLOCK:

SITE ADDRESS: 1110 SPRING HARBOR DRIVE
LOT ACREAGE: 7.28 AC
SITE DISTURBANCE AS PART OF THIS PROJECT: 11,500 SF
PERCENT OF SITE DISTURBANCE TO LOT ACREAGE: 3.6%
USE OF PROPERTY: INSTITUTIONAL

TOTAL NUMBER OF EXISTING PARKING STALLS:
STANDARD: 93
ACCESSIBLE: 4
TOTAL NUMBER OF PARKING STALLS AFTER CONSTRUCTION:
STANDARD: 93
ACCESSIBLE: 4

TOTAL NUMBER OF EXISTING/PROPOSED BIKE STALLS: 68

EXISTING IMPERVIOUS AREA WITHIN SITE DISTURBANCE LIMITS:
ROOFTOP: 0 SF
PAVEMENT: 7,277 SF
IMPERVIOUS RATIO OF DISTURBANCE LIMITS: 0.63

REDEVELOPMENT IMPERVIOUS AREA:
ROOFTOP: 2,309 SF
PAVEMENT: 4,714 SF

MAINTENANCE IMPERVIOUS AREA (INCLUDED IN DISTURBED AREA):
ROOFTOP: 0 SF
PAVEMENT: 0 SF

NEW IMPERVIOUS SURFACE AREA:
ROOFTOP: 0 SQ.FT.
PAVED: 0 SQ.FT.

FINAL IMPERVIOUS AREA WITHIN SITE DISTURBANCE LIMITS:
ROOFTOP: 2,309 SQ.FT.
PAVED: 4,714 SQ.FT.
TOTAL IMPERVIOUS AREA: 7,023 SQ.FT.
IMPERVIOUS RATIO OF DISTURBANCE LIMITS: 0.61

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Madison Metropolitan School District
Spring Harbor Middle School - 3rd Addition - 2016
1110 Spring Harbor Drive, Madison, WI 53705

Revisions:

Drawn By: DOS
Date: 29 FEB 16
Job No.: 140248-11
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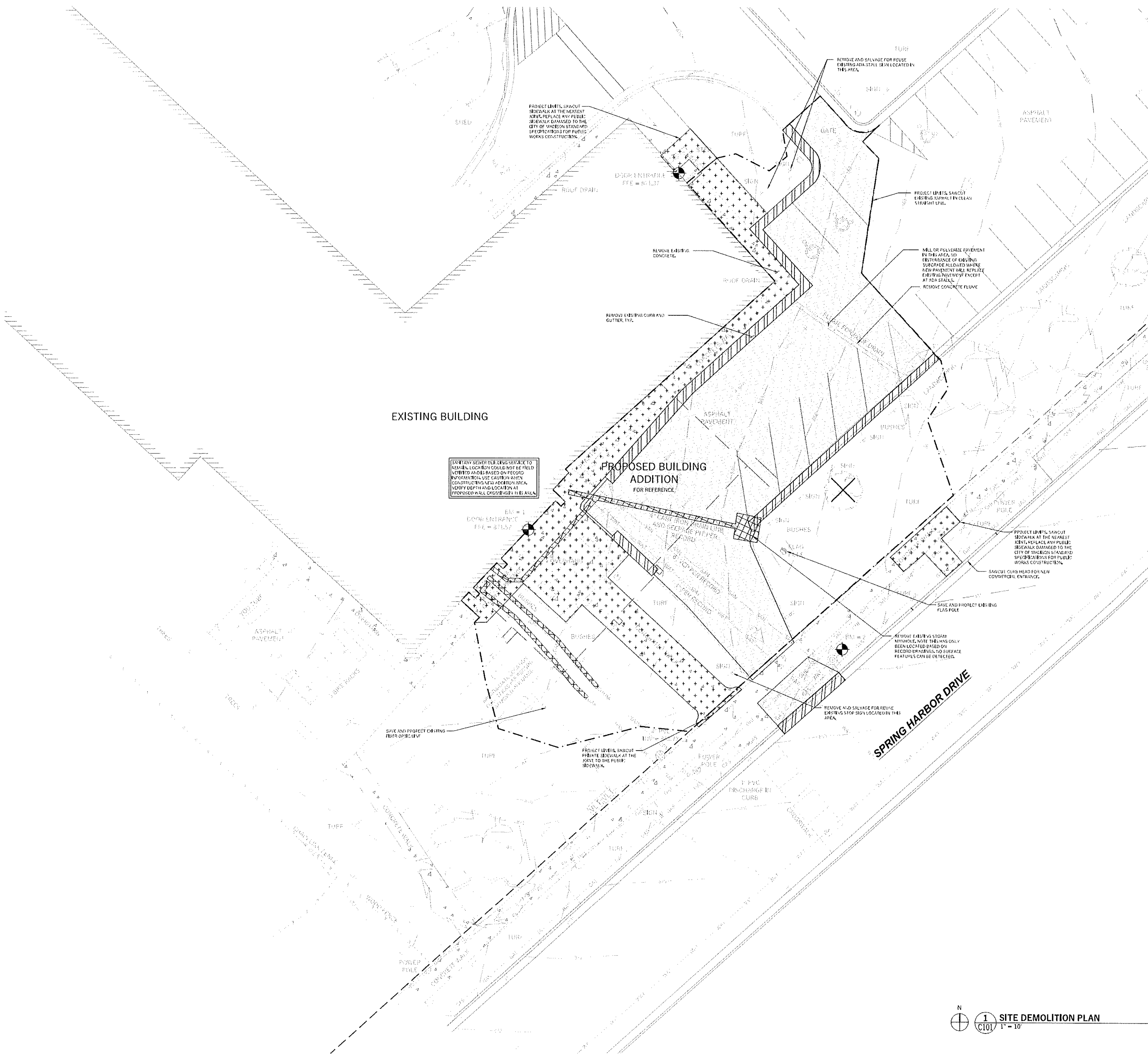

1 C101 SITE DEMOLITION PLAN
1" = 10'

LEGEND (PROPOSED)

- SUBJECT PARCEL PROPERTY LINE (GRAPHIC)
- CONSTRUCTION LIMIT LINE
- CONSTRUCTION FENCE
- NEW BUILDING (FOR REFERENCE)
- SAWCUT LIMITS
- ASPHALT REMOVAL AREA
- UTILITY REMOVAL
- TREE REMOVAL

NORTH

0' 5' 10' 15'
1" = 10' on 30"x42"
NTS on 11"x17"

GENERAL NOTES

1. UNDERLYING SITE CONTOURS AND INFORMATION BASED ON TOPOGRAPHIC & UTILITY DATA AS WAS SHOT IN THE FIELD THE WEEK OF NOVEMBER 29TH, 2015. WYSER ENGINEERING SHALL NOT BE HELD RESPONSIBLE FOR ANY ERRORS OR OMISSIONS THAT MAY ARISE AS A RESULT OF ERRONEOUS OR INCOMPLETE INFORMATION PROVIDED BY OTHERS. CONTRACTOR TO CONFIRM ALL ELEVATIONS, GENERAL DRAINAGE AND EARTHWORK REQUIREMENTS PRIOR TO CONSTRUCTION.
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3. CONTRACTOR TO OBTAIN APPROPRIATE PERMITS FOR STREET OPENINGS & TO WORK WITHIN THE CITY'S LAND IF REQUIRED.
4. WYSER ENGINEERING SHALL BE HELD HARMLESS AND DOES NOT WARRANT ANY DEVIATIONS BY THE OWNER OR CONTRACTOR FROM THE APPROVED CONSTRUCTION PLANS THAT MAY RESULT IN DISCIPLINARY ACTIONS BY REGULATORY AGENCIES.
5. IF ANY ERRORS, DISCREPANCIES, OR OMISSIONS WITHIN THE PLAN BECOME APPARENT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.
6. ALL MUNICIPAL UTILITY CONNECTIONS, WORK IN ROW, PUBLIC OUTLOTS AND PUBLIC EASEMENTS SHALL BE IN ACCORDANCE WITH CITY OF MADISON STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION–LATEST EDITION.

DEMOLITION NOTES

1. THIS PLAN INDICATES ITEMS ON THE SITE, NOT INCLUDING INTERNAL BUILDING DEMOLITION, INTENDED FOR DEMOLITION BASED ON THE CURRENT SITE DESIGN THAT HAVE BEEN IDENTIFIED BY A REASONABLE OBSERVATION OF THE EXISTING CONDITIONS THROUGH FIELD SURVEY RECONNAISSANCE, "DIGGER'S HOTLINE" LOCATION, AND GENERAL "STANDARD OF CARE". THERE MAY BE ADDITIONAL ITEMS THAT CAN NOT BE IDENTIFIED BY A REASONABLE ABOVE GROUND OBSERVATION, WHERE NOT INCLUDED WITHIN THE FIELD SURVEY BY OTHERS, OF WHICH THE ENGINEER WOULD HAVE NO KNOWLEDGE OR MAY BE A PART OF ANOTHER DESIGN DISCIPLINE. IT IS THE CONTRACTOR'S / BIDDER'S RESPONSIBILITY TO REVIEW THE PLANS, INSPECT THE SITE AND PROVIDE HIS OWN DUE DILIGENCE TO INCLUDE IN HIS BID WHAT ADDITIONAL ITEMS, IN HIS OPINION, MAY BE NECESSARY FOR DEMOLITION. ANY ADDITIONAL ITEMS IDENTIFIED BY THE CONTRACTOR / BIDDER SHALL BE IDENTIFIED IN THE BID AND REPORTED TO THE OWNER AND ENGINEER OF RECORD. WYSER ENGINEERING TAKES NO RESPONSIBILITY FOR ITEMS ON THE PROPERTY THAT COULD NOT BE LOCATED BY A REASONABLE OBSERVATION OF THE PROPERTY OR OF WHICH THEY WOULD HAVE NO KNOWLEDGE.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR:
   - 2.1. EXAMINING ALL SITE CONDITIONS RELATIVE TO THE CONDITIONS INDICATED ON THE ENGINEERING DRAWINGS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE OWNER AND ENGINEER AND RESOLVED PRIOR TO THE START OF CONSTRUCTION.
   - 2.2. VERIFYING UTILITY ELEVATIONS AND NOTIFYING OWNER AND ENGINEER OR ANY DISCREPANCIES. NO WORK SHALL BE PERFORMED UNTIL THE DISCREPANCIES ARE RESOLVED.
   - 2.3. NOTIFYING ALL UTILITIES PRIOR TO THE REMOVAL OF ANY UNDERGROUND UTILITIES.
   - 2.4. NOTIFYING THE OWNER, DESIGN ENGINEER AND LOCAL CONTROLLING MUNICIPALITY 48 HOURS PRIOR TO THE START OF CONSTRUCTION TO ARRANGE FOR APPROPRIATE CONSTRUCTION INSPECTION.
3. CONTRACTOR IS SOLELY RESPONSIBLE FOR SITE SAFETY DURING THE CONSTRUCTION OF THESE IMPROVEMENTS.
4. CONTRACTOR SHALL KEEP ALL STREETS AND ADJOINING SHARED ACCESS ROADWAYS FREE AND CLEAR OF ALL CONSTRUCTION RELATED DIRT, DUST AND DEBRIS.
5. ALL TREES WITHIN THE CONSTRUCTION LIMITS SHALL BE REMOVED UNLESS SPECIFICALLY CALLED OUT FOR PROTECTION. ALL TREES TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY. STUMPS SHALL BE GROUND TO PROPOSED SUBGRADE.
6. PERFORM TREE PRUNING IN ALL LOCATIONS WHERE PROPOSED PAVEMENT AND / OR UTILITY INSTALLATION ENCROACH WITHIN THE EXISTING DRIP LINE OF THE TREES TO REMAIN. ALL TRENCHING WITHIN THE EXISTING DRIP LINE OF THE TREES TO REMAIN SHALL BE DONE RADIALLY AWAY FROM THE TRUNK IF ROOTS IN EXCESS OF 1" DIAMETER ARE EXPOSED. ROOTS MUST BE CUT BY REPUTABLE TREE PRUNING SERVICE PRIOR TO ANY TRANSVERSE TRENCHING.
7. CONTRACTOR SHALL COORDINATE PRIVATE UTILITY REMOVAL / ABANDONMENT AND NECESSARY RELOCATIONS WITH RESPECTIVE UTILITY COMPANY. COORDINATION REQUIRED PRIOR TO CONSTRUCTION.
8. ABANDONED / REMOVED ITEMS SHALL BE DISPOSED OF OFF SITE UNLESS OTHERWISE NOTED.
9. THE CONTRACTOR SHALL INSTALL A PEDESTRIAN FENCE AROUND ALL EXCAVATIONS TO BE LEFT OPEN OVERNIGHT AS REQUIRED.
10. CONTRACTOR TO REMOVE EXISTING UTILITY PIPE AND BACKFILL WITH SELECT FILL OR PROVIDE PIPE BACK-FILLING WITHIN BUILDING FOOTPRINT USING "LOW DENSITY CONCRETE / FLOWABLE FILL".
11. GRANULAR BACKFILL MATERIALS ARE REQUIRED FOR FILL UNDER PROPOSED PAVED AREAS.
12. RESTORATION OF THE EXISTING RIGHT-OF-WAYS AS NEEDED ARE CONSIDERED INCIDENTAL AND SHOULD BE PART OF THE COST OF THE UNDERGROUND IMPROVEMENTS, DEMOLITION AND REMOVAL. THIS INCLUDES, BUT IS NOT LIMITED TO, CURB & GUTTER, SIDEWALK, TOPSOIL, SEEDING AND MULCHING.
13. ANY SANITARY SEWER, SANITARY SEWER SERVICES, WATER MAIN, WATER SERVICES, STORM SEWER, OR OTHER UTILITIES, WHICH ARE DAMAGED BY THE CONTRACTORS, SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE.
14. ALL SITE SIGNAGE SHALL BE SALVAGED FOR REUSE AND SHALL BE THE PROPERTY OF THE OWNER IF REUSE IS NOT NECESSARY ON THIS PROJECT.

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pra
PLUNKETT RAYSICH ARCHITECTS, LLP

WYSER

Madison Metropolitan School District
Spring Harbor Middle School - 3rd Addition - 2016
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Revisions:

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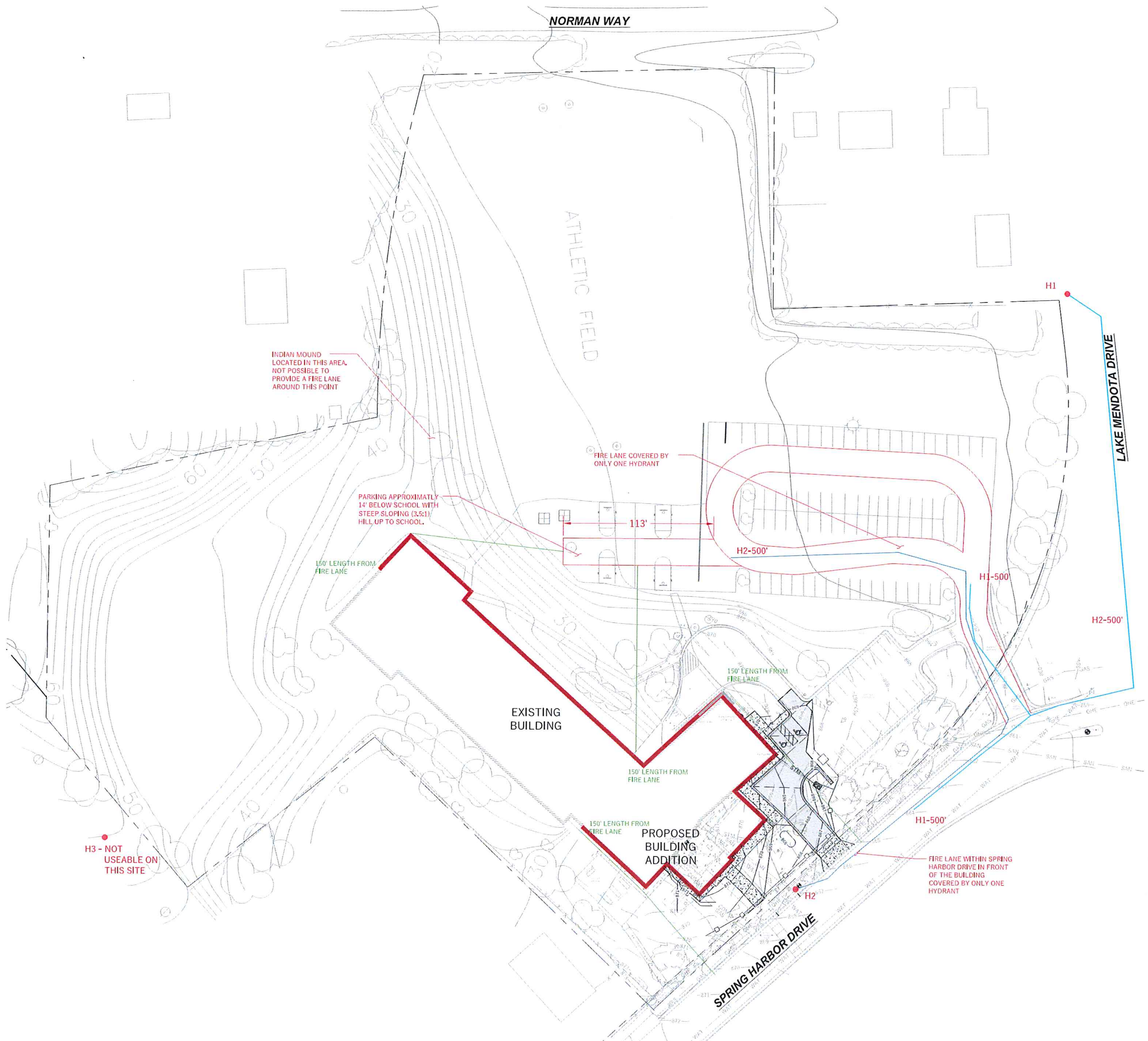

1 C101 **FIRE SITE PLAN** 1" = 30'

LEGEND (PROPOSED)

- PROPERTY BOUNDARY (APPROXIMATE)
- EASEMENT
- BUILDING FOOTPRINT
- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- DISTURBANCE LIMITS

NORTH

0' 15' 30' 45'
1" = 30' on 30'x42'
NTS on 11'x17'

GENERAL NOTES

1. UNDERLYING SITE CONTOURS AND INFORMATION BASED ON TOPOGRAPHIC & UTILITY DATA AS WAS SHOT IN THE FIELD THE WEEK OF JUNE 8TH, 2015. WYSER ENGINEERING SHALL NOT BE HELD RESPONSIBLE FOR ANY ERRORS OR OMISSIONS THAT MAY ARISE AS A RESULT OF ERRONEOUS OR INCOMPLETE INFORMATION PROVIDED BY OTHERS. CONTRACTOR TO CONFIRM ALL ELEVATIONS, GENERAL DRAINAGE AND EARTHWORK REQUIREMENTS PRIOR TO CONSTRUCTION.
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CITY OF MADISON FIRE DEPARTMENT

Fire Prevention Division, 325 W. Johnson St., Madison, WI 53703 • Phone: 608-266-4484 • FAX: 608-267-1153

Project Address: 1110 SPRING HARBOR DRIVE

Contact Name & Phone #: STEVE KIECKHAFER - 608.240.9900 EXT. 357

FIRE APPARATUS ACCESS AND FIRE HYDRANT WORKSHEET

REFER TO GRAPHIC

Question	Yes	No	N/A
1. Is the building completely protected by an NFPA 13 or 13R automatic fire sprinkler system?	☐	☒	☐
If non-sprinklered, fire lanes extend to within 150-feet of all portions of the exterior wall?	☐	☒	☐
If sprinklered, fire lanes are within 250-feet of all portions of the exterior wall?	☐	☐	☒
2. Is the fire lane constructed of concrete or asphalt, designed to support a minimum load of 85,000 lbs?	☒	☐	☐
a) Is the fire lane a minimum unobstructed width of at least 20-feet?	☒	☐	☐
b) Is the fire lane unobstructed with a vertical clearance of at least 13½-feet?	☒	☐	☐
c) Is the minimum inside turning radius of the fire lane at least 28-feet?	☒	☐	☐
d) Is the grade of the fire lane not more than a slope of 8%?	☒	☐	☐
e) Is the fire lane posted as fire lane?	☐	☐	☒
a. Is a detail of the signage included on the site plan?	☐	☐	☒
f) Is a roll-able curb used as part of the fire lane?	☐	☒	☐
a. Is a detail of the curb included on the site plan?	☐	☐	☒
g) Is part of a sidewalk used as part of the required fire lane?	☒	☐	☐
a. Is the sidewalk constructed to withstand 85,000-lbs?	☒	☐	☐
3. Is the fire lane obstructed by security gates or barricades? If yes:	☐	☒	☐
a) Is the gate a minimum of 20-feet clear opening?	☐	☐	☒
b) Is an approved means of emergency operations installed, key vault, padlock or key switch?	☐	☐	☒
4. Is the Fire lane dead-ended with a length greater than 150-feet?	☐	☒	☐
If yes, is the area for turning around fire apparatus provided by:			
a) A cul-de-sac with a minimum inside diameter of 70-feet?	☐	☐	☒
b) A 45-degree wye with a minimum length of 60-feet per side?	☐	☐	☒
c) A 90-degree tee with a minimum length of 60-feet per side?	☐	☐	☒
5. Is any portion of the building to be used for high-piled storage in accordance with IFC Chapter 23? If yes, see IFC 2306.6 for further requirements.	☐	☒	☐
6. Is any part of the building <u>greater than 30-feet</u> above the lowest level of fire apparatus access?	☐	☒	☐
If yes, answer the following questions:			
a) Is the aerial apparatus fire lane parallel to one entire side of the building?	☐	☐	☒
b) Is the near edge of the aerial apparatus fire lane between 15' and 30' from the building?	☐	☐	☒
c) Are there any overhead power or utility lines located across the aerial apparatus fire lane?	☐	☐	☒
d) Does the aerial apparatus fire lane have a minimum unobstructed width of 26-feet?	☐	☐	☒
7. Are all portions of the required fire lanes within 500-feet of at least (2) hydrants?	☐	☒	☐
Note: Distances shall be measured along the path of the hose lay as it comes off the fire apparatus	REFER TO GRAPHIC		
a) Is the fire lane at least 26' wide for at least 20-feet on each side of the hydrants?	☒	☐	☐
b) Is there at least 40' between a hydrant and the building?	☒	☐	☐
c) Are the hydrant(s) setback no less than 5-feet nor more than 10-feet from the curb or edge of the street or fire lane?	☒	☐	☐
d) Are hydrants located in parking lot islands a minimum of 3½-feet from the hydrant to the curb?	☐	☐	☒
e) Are there no obstructions, including but not limited to: power poles, trees, bushes, fences, posts located, or grade changes exceeding 1½-feet, within 5-feet of a fire hydrant?	☒	☐	☐
Note: Hydrants shall be installed and in-service prior to combustible construction on the project site.			

Attach an additional sheet if further explanation is required for any answers

This worksheet is based on **MGO 34.20** and **IFC 2006 Edition Chapter 5 and Appendix D**, please see the codes for further information.

Revised 4/2011

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Madison Metropolitan School District
Spring Harbor Middle School - 3rd Addition - 2016
1110 Spring Harbor Drive, Madison, WI 53705

Revisions:

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Date: 29 FEB 16
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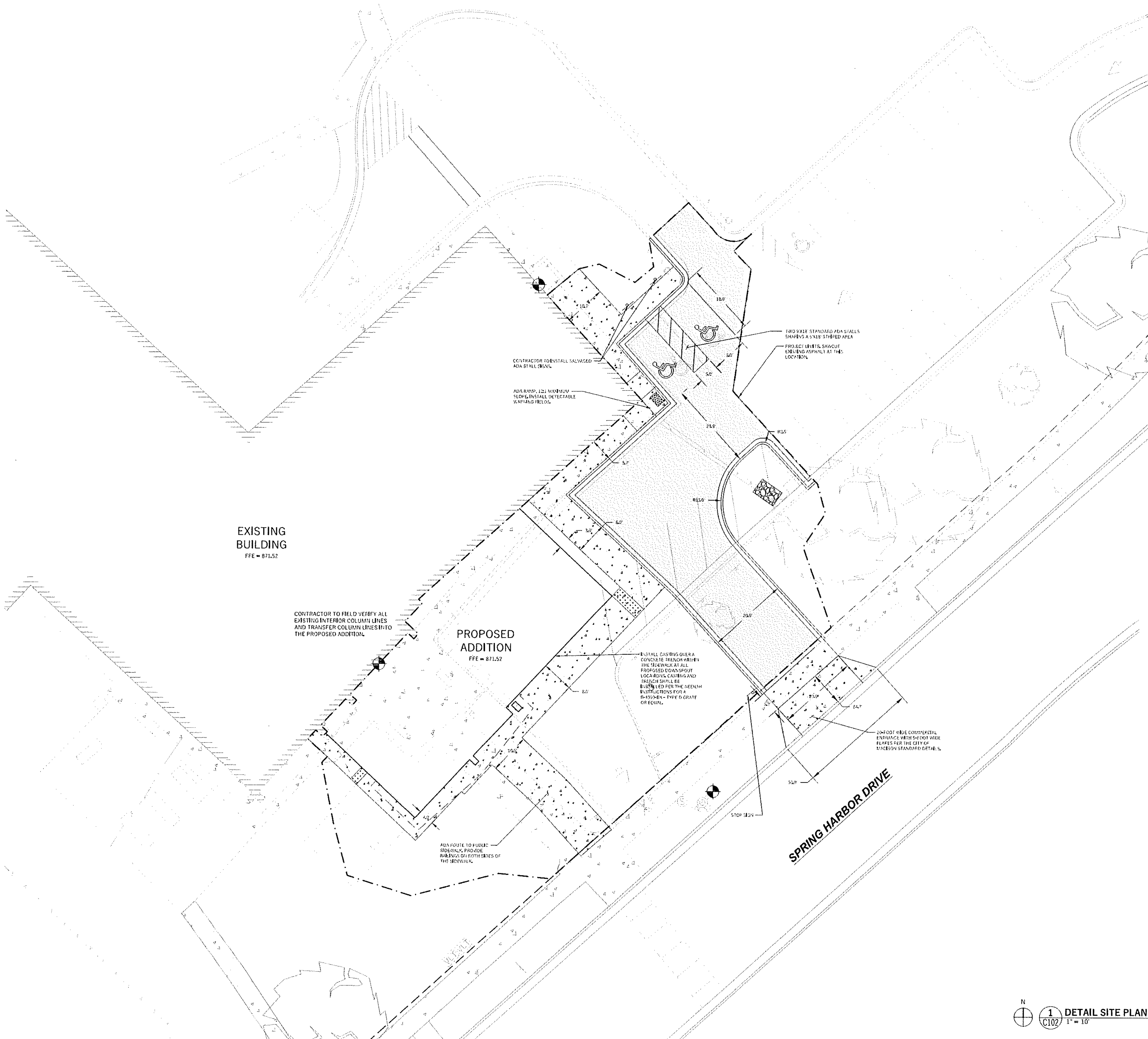

LEGEND (PROPOSED)

- PROPOSED PROPERTY BOUNDARY
- EASEMENT
- BUILDING FOOTPRINT
- 18" CURB AND GUTTER
- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- STORMWATER TREATMENT FACILITY

NORTH

0' 5' 10' 15'
1" = 10' on 30'x42'
NTS on 11'x17'

GENERAL NOTES

1. UNDERLYING SITE CONTOURS AND INFORMATION BASED ON TOPOGRAPHIC & UTILITY DATA AS WAS SHOT IN THE FIELD THE WEEK OF NOVEMBER 29TH, 2015. WYSER ENGINEERING SHALL NOT BE HELD RESPONSIBLE FOR ANY ERRORS OR OMISSIONS THAT MAY ARISE AS A RESULT OF ERRONEOUS OR INCOMPLETE INFORMATION PROVIDED BY OTHERS. CONTRACTOR TO CONFIRM ALL ELEVATIONS, GENERAL DRAINAGE AND EARTHWORK REQUIREMENTS PRIOR TO CONSTRUCTION.
2. BENCHMARK INFORMATION CAN BE FOUND ON THE EXISTING CONDITIONS MAP. THE BENCHMARK LOCATIONS ARE SHOWN FOR REFERENCE ONLY ON THIS PLAN. THE BENCHMARKS SHALL BE VALIDATED BY LICENSED LAND SURVEYOR PRIOR TO CONSTRUCTION. CONTRACTOR ASSUMES RISK ASSOCIATED WITH BENCHMARK ELEVATIONS UNTIL CONFIRMED.
3. CONTRACTOR TO OBTAIN APPROPRIATE PERMITS FOR STREET OPENINGS & TO WORK WITHIN THE CITY'S LAND IF REQUIRED.
4. WYSER ENGINEERING SHALL BE HELD HARMLESS AND DOES NOT WARRANT ANY DEVIATIONS BY THE OWNER OR CONTRACTOR FROM THE APPROVED CONSTRUCTION PLANS THAT MAY RESULT IN DISCIPLINARY ACTIONS BY REGULATORY AGENCIES.
5. IF ANY ERRORS, DISCREPANCIES, OR OMISSIONS WITHIN THE PLAN BECOME APPARENT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.
6. ALL MUNICIPAL UTILITY CONNECTIONS, WORK IN ROW, PUBLIC OUTLOTS AND PUBLIC EASEMENTS SHALL BE IN ACCORDANCE WITH CITY OF MADISON STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION LATEST EDITION.

1 C102 DETAIL SITE PLAN
1" = 10'

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Madison Metropolitan School District
Spring Harbor Middle School - 3rd Addition - 2016
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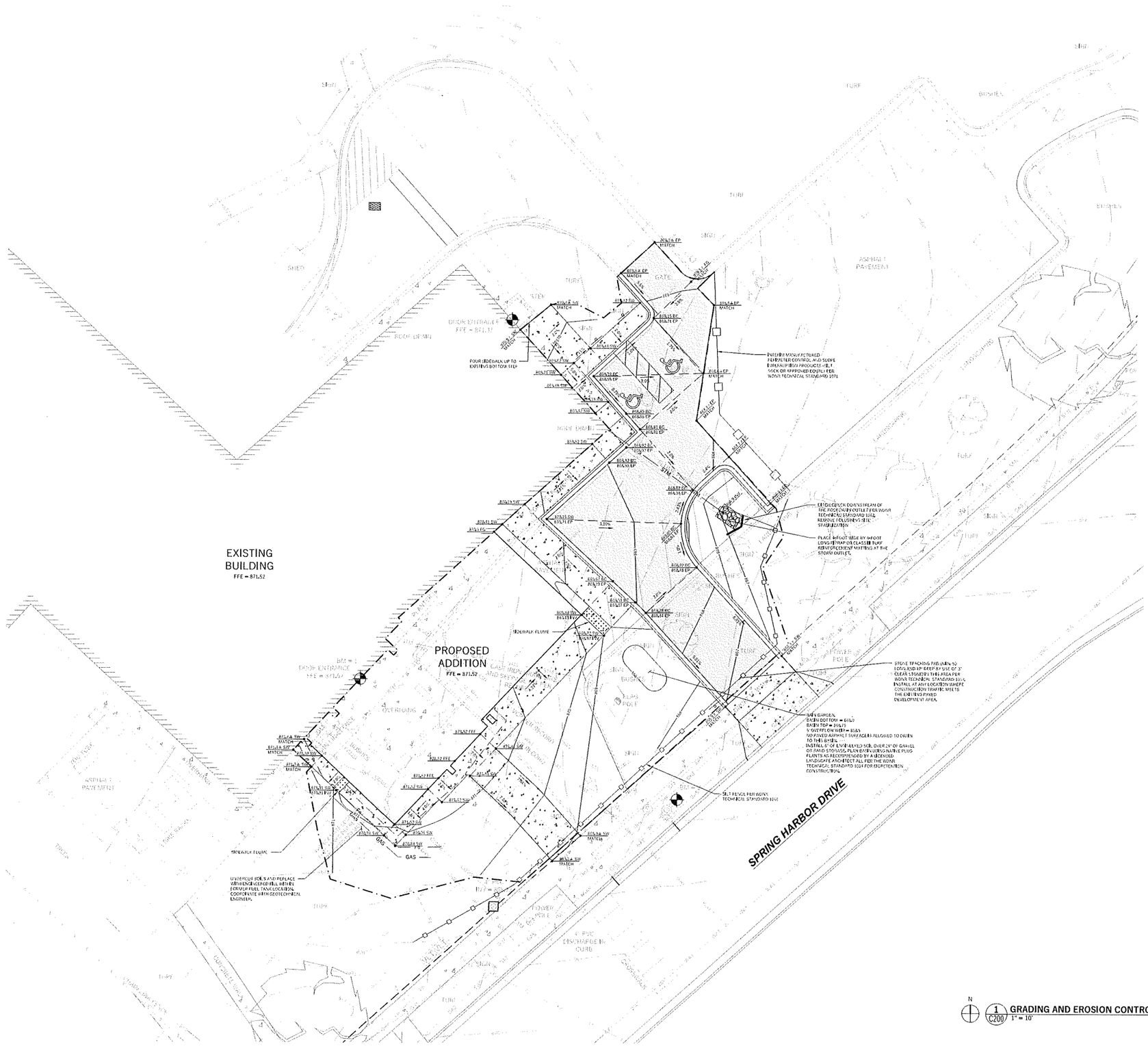

LEGEND (PROPOSED)

- PROPERTY BOUNDARY
- EASEMENT
- BITUMINOUS PAVEMENT
- 18" CURB AND GUTTER
- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- 872 PROPOSED MAJOR CONTOUR
- 873 PROPOSED MINOR CONTOUR
- STM PROPOSED STORM SEWER
- SILT FENCE
- INLET PROTECTION
- DITCH CHECK
- 869.75 EP SPOT GRADE
- DRAINAGE GRADE BREAK
- DRAINAGE ARROW

NORTH

0" 5" 10" 15"
1" = 10' on 30"x42"
NTS on 11"x17"

GENERAL NOTES

1. UNDERLYING SITE CONTOURS AND INFORMATION BASED ON TOPOGRAPHIC & UTILITY DATA AS WAS SHOWN THE FIELD THE WEEK OF NOVEMBER 28TH, 2015. WYSER ENGINEERING SHALL NOT BE HELD RESPONSIBLE FOR ANY ERRORS OR OMISSIONS THAT MAY ARISE AS A RESULT OF ERRONEOUS OR INCOMPLETE INFORMATION PROVIDED BY OTHERS. CONTRACTOR TO CONFIRM ALL ELEVATIONS, CENTRAL ENVIRONS AND EARTHWORK REQUIREMENTS PRIOR TO CONSTRUCTION.
2. BENCHMARK INFORMATION CAN BE FOUND ON THE EXISTING CONDITIONS MAP. THE BENCHMARK LOCATIONS ARE SHOWN FOR REFERENCE ONLY ON THIS PLAN. THE BENCHMARKS SHALL BE VALIDATED BY LICENSED LAND SURVEYOR PRIOR TO CONSTRUCTION. CONTRACTOR ASSUMES RISK ASSOCIATED WITH BENCHMARK ELEVATIONS UNTIL CONFIRMED.
3. CONTRACTOR TO OBTAIN APPROPRIATE PERMITS FOR STREET OPENINGS & TO WORK WITHIN THE CITY'S LANDFILL PROPERTY.
4. WYSER ENGINEERING SHALL BE HELD HARMLESS AND DOES NOT WARRANT ANY DEVIATIONS BY THE OWNER OR CONTRACTOR FROM THE APPROVED CONSTRUCTION PLANS THAT MAY RESULT IN DISCIPLINARY ACTIONS BY REGULATORY AGENCIES.
5. IF ANY ERRORS, DISCREPANCIES, OR OMISSIONS WITHIN THE PLAN BECOME APPARENT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REVISION MAY OCCUR.
6. ALL MUNICIPAL UTILITY CONNECTIONS WITHIN ROW, PUBLIC OUTLOTS AND PUBLIC EASEMENTS SHALL BE IN ACCORDANCE WITH CITY OF MADISON STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION - LATEST EDITION.

CONSTRUCTION SITE EROSION CONTROL REQUIREMENTS

1. ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE IMPLEMENTED IN ACCORDANCE WITH THE CURRENT WISCONSIN DEPARTMENT OF NATURAL RESOURCES (WDNR) EROSION AND SEDIMENT CONTROL TECHNICAL STANDARDS (TS) unless.
2. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO SITE DISTURBANCE.
3. ENGINEER / OWNER / CITY OF MADISON HAS THE RIGHT TO REQUIRE CONTRACTOR TO IMPLEMENT ADDITIONAL EROSION CONTROL MEASURES AS NECESSARY. CONTRACTOR MUST NOTIFY THE CITY OF MADISON BUILDING INSPECTOR TWO (2) WORKING DAYS IN ADVANCE OF ANY SOIL DISTURBANCE ACTIVITIES.
4. EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE INSPECTED ONCE PER WEEK AND FOLLOWING EACH RAINFALL EVENT. INSPECTION REPORTING SHALL BE IN ACCORDANCE WITH MUNICIPAL REQUIREMENTS. SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN EROSION AND SEDIMENT CONTROL PRACTICES IN WORKING ORDER. EROSION CONTROL MEASURES SHALL BE REMOVED ONLY AFTER SITE CONSTRUCTION IS COMPLETE WITH ALL SOIL SURFACES HAVING AN ESTABLISHED VEGETATIVE COVER.
6. DEWATERING PRACTICES SHALL COMPLY WITH TECHNICAL STANDARD 1061.
7. ALL SLOPES EXCEEDING 25% (4:1) SHALL BE STABILIZED WITH A CLASS I, TYPE B EROSION MAT.
8. DUST CONTROL SHALL BE MITIGATED IN ACCORDANCE WITH WDNR TECHNICAL STANDARD 1068.
9. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED IMMEDIATELY FOLLOWING FINAL GRADING ACTIVITIES.
10. SEED MIX AND RATE SHALL BE, AT A MINIMUM IN ACCORDANCE WITH WDOR TECHNICAL STANDARD 1059.
11. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL PROVIDE VEGETATION PLAN FOR ENGINEER / OWNER FOR APPROVAL.

GRADING, SEEDING & RESTORATION NOTES

1. ALL GRADES SHOWN ARE FINAL FINISHED SURFACE GRADES.
2. AREAS TO BE SEEDED SHALL HAVE A MINIMUM 6 INCHES FOR SOIL UNLESS OTHERWISE NOTED.
3. RESTORATION SHALL OCCUR AS SOON AS PRACTICABLE AFTER THE DISTURBANCE, WITHIN 7 DAYS OF TOPSOILING.
4. AREAS NOT RESTORED WITH EROSION MATTING OR OTHER STABILIZATION MEASURES SHALL BE STABILIZED WITH MULCH.
5. APPLY ANIONIC POLYMER TO DISTURBED AREAS IF EROSION BECOMES PROBLEMATIC.
6. INSTALL EROSION CONTROLS ON THE DOWNSTREAM SIDE OF STOCKPILES AND PROVIDE TEMPORARY SEEDING ON STOCKPILES WHICH ARE TO REMAIN IN PLACE FOR MORE THAN 7 DAYS.
7. CONTRACTOR TO DEEP TILL ALL COMPACTED PERVIOUS SURFACES PRIOR TO SEEDING AND MULCHING.
8. MULCH SHALL BE WEED-FREE STRAW AND SHALL BE INSTALLED AT THE RATE OF 2 TONS PER ACRE PER SECTION 627 OF "STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION" (WISDOT 2016).
9. PERMANENT SEEDING SHALL NOT OCCUR BETWEEN SEPTEMBER 15TH AND APRIL 15TH. ALTERNATE SEEDING/PLANTING METHODS AND/OR EROSION PROTECTION MAY BE NECESSARY FOR SEEDING/PLANTINGS THAT OCCUR DURING THAT TIME. COORDINATE WITH THE OWNER AS NECESSARY.
10. TEMPORARY STABILIZATION SHALL CONSIST OF ONE OR MORE OF THE FOLLOWING OPTIONS:
    a. TEMPORARY SEEDING CONSISTING OF ANNUAL RYE GRASS APPLIED AT A RATE OF 3.5 LBS PER 1000 SQUARE FEET.
    b. WISDOT FAL CLASSIF TYPE B URBAN EROSION CONTROL MAT.
11. ALL SLOPES EXCEEDING 4:1 SHALL BE STABILIZED WITHIN ONE MONTH OF DISTURBANCE WITH TEMPORARY SEEDING AND CLASS I, TYPE B HURRAH EROSION MATTING AND ALL DRAINAGE SWALES SHALL BE STABILIZED WITH CLASS I, TYPE B MATTING.

1 C200 GRADING AND EROSION CONTROL PLAN
1" = 10'

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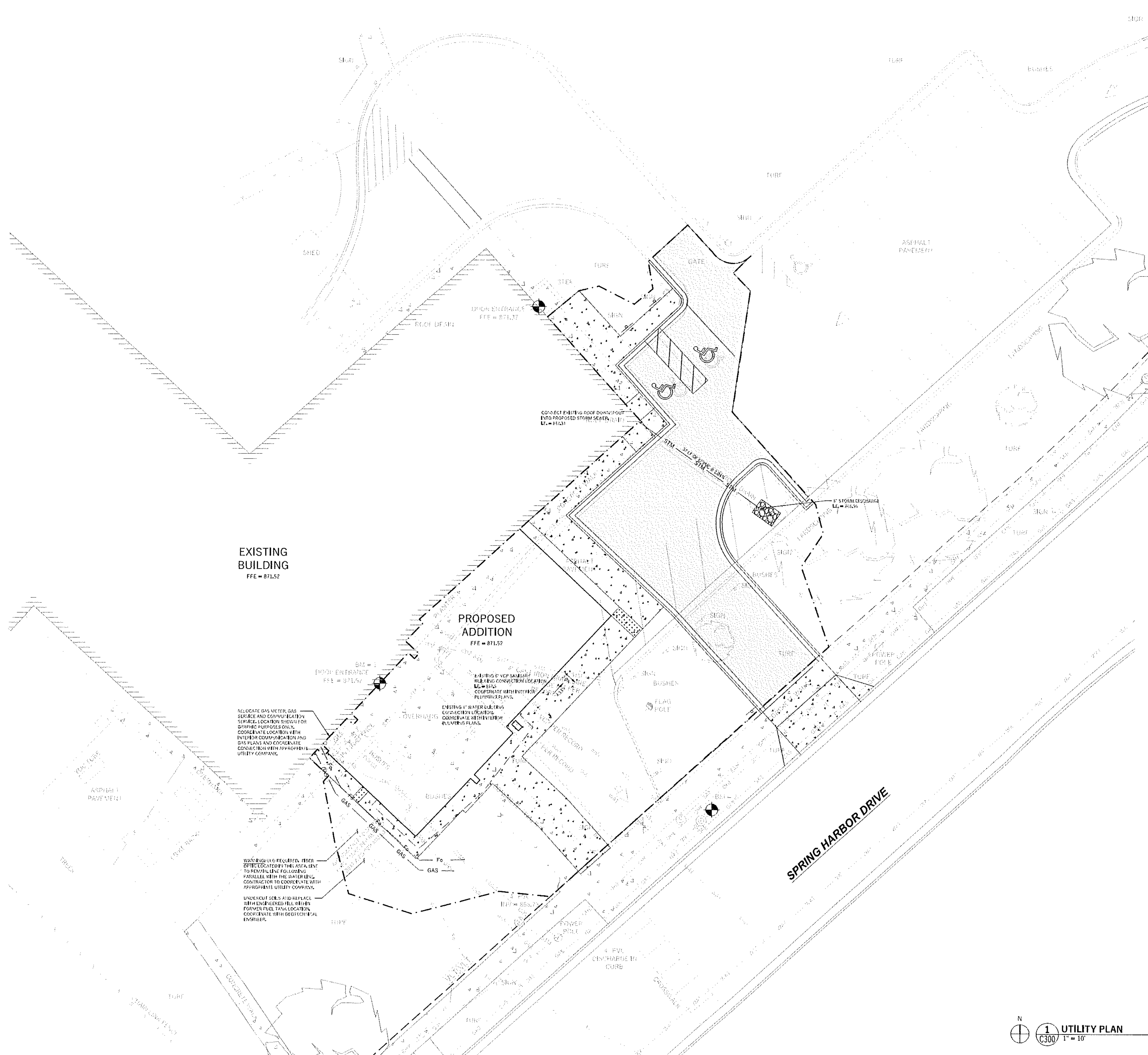

1 C300 **UTILITY PLAN** 1" = 10'

LEGEND (PROPOSED)

	PROPOSED PROPERTY BOUNDARY
	EASEMENT
	BUILDING FOOTPRINT
	18" CURB AND GUTTER
	ASPHALT PAVEMENT
	CONCRETE PAVEMENT
STM	PROPOSED STORM SEWER
GAS	PROPOSED GAS SERVICE (DESIGN BY OTHERS)
Fo	PROPOSED COMMUNICATION SERVICE (DESIGN BY OTHERS)

NORTH

0' 5' 10' 15'
1" = 10' on 30'x42'
NTS on 11'x17'

GENERAL NOTES

1. UNDERLYING SITE CONTOURS AND INFORMATION BASED ON TOPOGRAPHIC & UTILITY DATA AS WAS SHOT IN THE FIELD THE WEEK OF NOVEMBER 26TH, 2015. WYSER ENGINEERING SHALL NOT BE HELD RESPONSIBLE FOR ANY ERRORS OR OMISSIONS THAT MAY ARISE AS A RESULT OF ERRONEOUS OR INCOMPLETE INFORMATION PROVIDED BY OTHERS. CONTRACTOR TO CONFIRM ALL ELEVATIONS, GENERAL DRAINAGE AND EARTHWORK REQUIREMENTS PRIOR TO CONSTRUCTION.
2. BENCHMARK INFORMATION CAN BE FOUND ON THE EXISTING CONDITIONS MAP. THE BENCHMARK LOCATIONS ARE SHOWN FOR REFERENCE ONLY ON THIS PLAN. THE BENCHMARKS SHALL BE VALIDATED BY LICENSED LAND SURVEYOR PRIOR TO CONSTRUCTION. CONTRACTOR ASSUMES RISK ASSOCIATED WITH BENCHMARK ELEVATIONS UNTIL CONFIRMED.
3. CONTRACTOR TO OBTAIN APPROPRIATE PERMITS FOR STREET OPENINGS & TO WORK WITHIN THE CITY'S LAND IF REQUIRED.
4. WYSER ENGINEERING SHALL BE HELD HARMLESS AND DOES NOT WARRANT ANY DEVIATIONS BY THE OWNER OR CONTRACTOR FROM THE APPROVED CONSTRUCTION PLANS THAT MAY RESULT IN DISCIPLINARY ACTIONS BY REGULATORY AGENCIES.
5. IF ANY ERRORS, DISCREPANCIES, OR OMISSIONS WITHIN THE PLAN BECOME APPARENT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.
6. ALL MUNICIPAL UTILITY CONNECTIONS, WORK IN ROW, PUBLIC OUTLOTS AND PUBLIC EASEMENTS SHALL BE IN ACCORDANCE WITH CITY OF MADISON STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION- LATEST EDITION.

UTILITY NOTES

1. DIMENSIONS TAKE PRECEDENCE OVER SCALE. CONTRACTOR TO VERIFY ALL DIMENSIONS IN FIELD.
2. LENGTHS OF ALL UTILITIES ARE TO CENTER OF STRUCTURES OR FITTINGS AND MAY VARY SLIGHTLY FROM PLAN. LENGTHS SHALL BE VERIFIED IN THE FIELD DURING CONSTRUCTION.
3. CONTRACTOR SHALL VERIFY ALL ELEVATIONS, LOCATIONS, AND SIZES OF SANITARY, WATER AND STORM LATERALS AND CHECK ALL UTILITY CROSSINGS FOR CONFLICTS.
4. THE PROPOSED IMPROVEMENTS MUST BE CONSTRUCTED IN ACCORDANCE WITH ENGINEERING PLANS DESIGNED TO MEET ORDINANCES AND REQUIREMENTS OF THE MUNICIPALITY AND WISDOT, WISDSPS, AND WDNR.
5. PRIOR TO CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR:
   - EXAMINING ALL SITES CONDITIONS RELATIVE TO THE CONDITIONS INDICATED ON THE ENGINEERING DRAWINGS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER AND RESOLVED PRIOR TO THE START OF CONSTRUCTION.
   - OBTAINING ALL PERMITS INCLUDING PERMIT COSTS, TAP FEES, METER DEPOSITS, BONDS, AND ALL OTHER FEES REQUIRED FOR PROPOSED WORK TO OBTAIN OCCUPANCY.
   - VERIFYING UTILITY ELEVATIONS AND NOTIFYING ENGINEER OF ANY DISCREPANCY. NO WORK SHALL BE PERFORMED UNTIL THE DISCREPANCY IS RESOLVED.
   - NOTIFYING ALL UTILITIES PRIOR TO THE INSTALLATION OF ANY UNDERGROUND IMPROVEMENTS.
   - NOTIFYING THE DESIGN ENGINEER AND MUNICIPALITY 48 HOURS PRIOR TO THE START OF CONSTRUCTION TO ARRANGE FOR APPROPRIATE CONSTRUCTION OBSERVATION.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE ENGINEER WITH AS-BUILT CONDITIONS OF THE DESIGNATED IMPROVEMENTS IN ORDER THAT THE APPROPRIATE DRAWINGS CAN BE PREPARED, IF REQUIRED. ANY CHANGES TO THE DRAWINGS OR ADDITIONAL ITEMS MUST BE REPORTED TO THE ENGINEER AS WORK PROGRESSES.
7. ANY SANITARY SEWER , SANITARY SEWER SERVICES, WATER MAIN, WATER SERVICES, STORM SEWER, OR OTHER UTILITIES, WHICH ARE DAMAGED BY THE CONTRACTORS, SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE. NO BLASTING IS ALLOWED WITHIN 30 FEET OF EXISTING UTILITIES.
11. ALL PRIVATE INTERCEPTOR WATER MAIN AND WATER SERVICES SHALL BE INSTALLED WITH A 6' MINIMUM BURY. PROVIDE INSULATION ABOVE PIPES WITH LESS THAN 5' OF GROUND COVER.
12. GRANULAR BACKFILL MATERIALS ARE REQUIRED IN ALL UTILITY TRENCHES UNDER SIDEWALKS AND PROPOSED PAVED AREAS (UNLESS OTHERWISE SPECIFIED BY A GEOTECHNICAL ENGINEER). ALL UTILITY TRENCH BACKFILL SHALL BE COMPACTED PER SPECIFICATIONS.
13. ALL WORK WITHIN THE RIGHT-OF-WAY SHALL BE INSTALLED PER CITY OF MADISON STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. PRE-CONSTRUCTION MEETING WITH THE CITY OF MADISON IS REQUIRED PRIOR TO INSTALLATION.
14. CONTRACTOR TO FIELD VERIFY LOCATION AND SIZE. REPORT ANY DISCREPANCIES TO ENGINEER PRIOR TO CONSTRUCTION. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF MADISON STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION PART VII.
15. ALL WATER MAIN AND ASSOCIATED FITTINGS SHALL MEET THE REQUIREMENTS OUTLINED WITHIN ARTICLE 702 WITHIN THE CITY OF MADISON STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
16. DEWATERING, IF APPLICABLE, SHALL BE CONDUCTED PER WDNR STORM WATER MANAGEMENT TECHNICAL STANDARD 1061.
17. ALL NON-METALLIC BUILDING SEWER AND WATER SERVICES MUST BE ACCOMPANIED BY MEANS OF LOCATING UNDERGROUND PIPE. TRACER WIRE VALVE BOXES SHALL BE INSTALLED ON ALL LATERALS AND AS INDICATED ON THESE PLANS.
18. ALL EXTERIOR CLEANOUTS SHALL BE PROVIDED WITH A FROST SLEEVE IN ACCORDANCE WITH SPS 382.35(3)(c) AND SPS 384.30-2(c).
19. ALL PRIVATE SANITARY BUILDING SEWER PIPE AND TUBING SHALL CONFORM TO SPS 384.30-3.
20. ALL PRIVATE STORM BUILDING PIPE AND TUBING SHALL CONFORM TO SPS 384.30-6.
21. ALL PRIVATE PIPE AND TUBING FOR WATER SERVICE SHALL CONFORM TO SPS 384.30-7.
22. ALL PRIVATE PIPE SHALL BE INSTALLED PER SPS 384.40-8 INCLUDING AT LEAST 8' OF HORIZONTAL DISTANCE BETWEEN WATER PIPING AND SANITARY SEWER FROM CENTER OF PIPE TO CENTER OF PIPE AND 6" OF SEPARATION BETWEEN STORM SEWER AND WATER PIPING.
23. THE CONTRACTOR SHALL ALLOW 10 WORKING DAYS FOR THE CONSTRUCTION OF GAS MAINS WHEN SCHEDULING THE WORK AND SHALL NOT RESTRICT ACCESS TO THE GAS MAIN CONTRACTOR OR OTHER UTILITY COMPANIES.
24. NO BLASTING SHALL OCCUR WITHIN 30 FEET OF ANY EXISTING UTILITIES.
25. CONTRACTOR SHALL VERIFY AND COORDINATE ALL UTILITY CONNECTIONS WITH THE BUILDING PRIOR TO CONSTRUCTION.

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1110 Spring Harbor Drive, Madison, WI 53705

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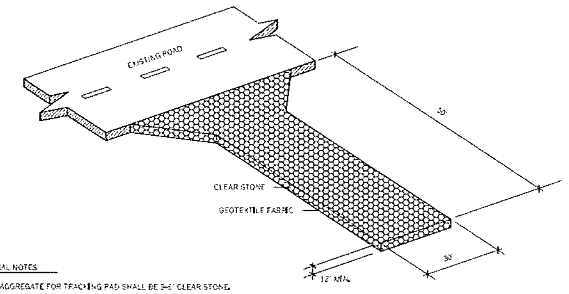


MATERIAL NOTES

1. THE AGGREGATE FOR TRACKING PAD SHALL BE 3-6" CLEAR STONE.

2. THE TRACKING PAD SHALL BE UNDERLAIN WITH A WDOT TYPE R GEOTEXTILE FABRIC.

INSTALLATION NOTES

1. INSTALLATION SHALL CONFORM WITH THE REQUIREMENTS OF WDNR CONSERVATION PRACTICE STANDARD 1057.

2. THE TRACKING PAD SHALL BE INSTALLED PRIOR TO ANY TRAFFIC LEAVING THE SITE. STONE TRACKING PAD SHALL BE USED AT ALL POINTS OF CONSTRUCTION EGRESS.

3. DIMENSIONS OF THE TRACKING PAD SHALL BE MINIMUM AS NOTED ON THE FIGURE ABOVE.

4. SURFACE WATER SHALL BE PREVENTED FROM PASSING THROUGH THE TRACKING PAD. FLOWS SHALL BE DIVERTED AWAY FROM TRACKING PADS OR CONVEYED UNDER AND AROUND THEM USING CULVERTS OR OTHER PRACTICES.

5. TRACKING PAD SHALL BE REMOVED OR INCORPORATED INTO GRAVEL DRIVEWAY ONLY AFTER CONSTRUCTION IS COMPLETE AND THE SITE HAS BEEN STABILIZED.

INSPECTION & MAINTENANCE NOTES

1. STONE TRACKING PADS SHALL BE INSPECTED WEEKLY AND WITHIN 24 HOURS AFTER EVERY PRECIPITATION EVENT THAT PRODUCES 0.5 INCHES OF RAIN OR MORE DURING A 24 HOUR PERIOD.

2. ADDITIONAL AGGREGATE SHALL BE PLACED IF THE TRACKING PAD BECOMES BURIED OR IF SEDIMENT IS NOT BEING REMOVED EFFECTIVELY FROM THE VEHICLE TIRES.

3. A MINIMUM 30-FEET WIDE BY 50-FEET LONG BY 12-INCH THICK PAD SHALL BE MAINTAINED AT ALL TIMES.

4. THE TRACKING PAD PERFORMANCE SHALL BE MAINTAINED BY SCRAPING OR TOP-DRESSING WITH ADDITIONAL AGGREGATE.

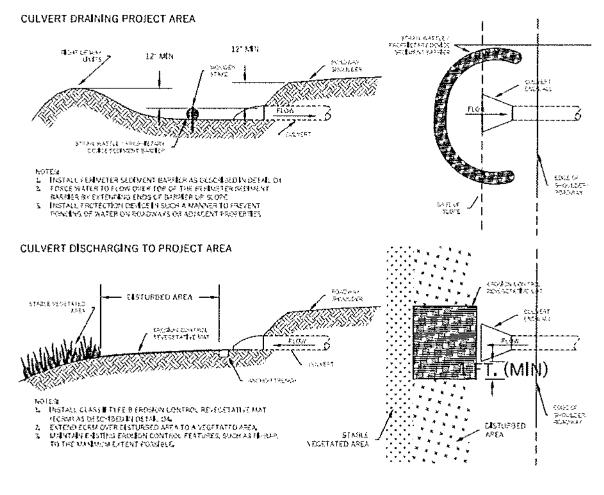
5. ANY SEDIMENT TRACKED ONTO A PUBLIC OR PRIVATE ROAD SHOULD BE REMOVED BY STREET CLEANING AT THE END OF EACH WORKING DAY.

6. MAINTENANCE SHALL BE COMPLETED AS SOON AS POSSIBLE WITH CONSIDERATION FOR SITE CONDITIONS.

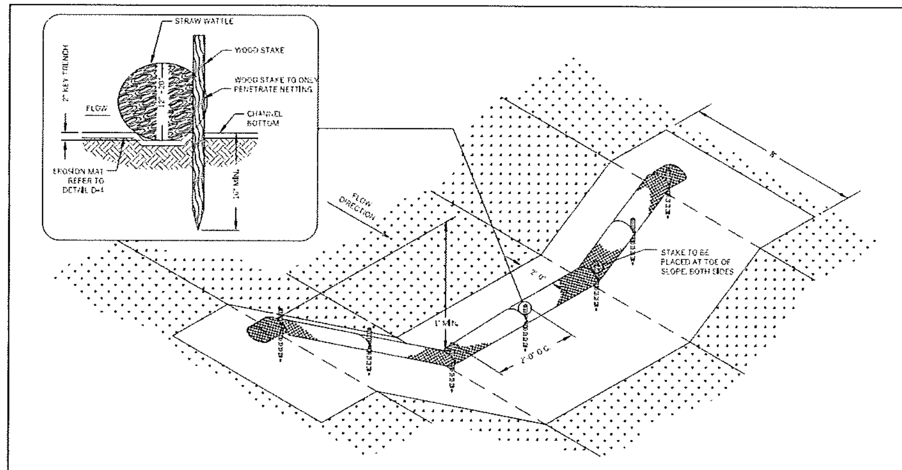
CONSTRUCTION ENTRANCE (TRACKING PAD)

CULVERT DRAINING PROJECT AREA

CULVERT DISCHARGING TO PROJECT AREA



OUTLET PROTECTION



MATERIAL NOTES

1. DITCH CHECKS SHALL BE CONSTRUCTED OF APPROVED MATERIALS LISTED IN WISCONSIN DEPARTMENT OF TRANSPORTATION EROSION CONTROL PRODUCT ACCEPTABILITY LIST (PAL) FOR TEMPORARY DITCH CHECKS.

2. EROSION MAT SHALL BE SELECTED AND INSTALLED PER THE REQUIREMENTS LISTED IN DETAIL D-7.

3. WOOD STAKES SHALL MEET THE FOLLOWING REQUIREMENTS:
   FOR 12" SEDIMENT LOGS: 1½" X 1½" X 30" AIR OR KILN DRIED HICKORY OR OAK STAKES
   FOR 20" SEDIMENT LOGS: 1½" X 1½" X 45" AIR OR KILN DRIED HICKORY OR OAK STAKES

INSTALLATION NOTES

1. INSTALLATION SHALL CONFORM WITH THE REQUIREMENTS OF WDNR CONSERVATION PRACTICE STANDARD 1062.

2. PROPRIETARY DITCH CHECKS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

3. DITCH CHECK SHALL BE INSTALLED SUCH THAT ENDS ARE HIGHER THAN THE CENTER CREATING A STABLE OVERFLOW POINT. ENDS SHOULD BE A MINIMUM OF 6" HIGHER THAN THE EXPECTED DESIGN WATER LEVEL.

4. DITCH CHECKS SHOULD BE INSTALLED SUCH THAT ADJOINING PROPERTY IS NOT NEGATIVELY IMPACTED.

5. DITCH CHECKS SHOULD BE USED IN CONJUNCTION WITH OTHER PERMANENT RESTORATION PRACTICES.

INSPECTION & MAINTENANCE NOTES

1. DITCH CHECKS SHALL BE INSPECTED WEEKLY AND WITHIN 24 HOURS AFTER EVERY PRECIPITATION EVENT THAT PRODUCES 0.5 INCHES OF RAIN OR MORE DURING A 24 HOUR PERIOD.

2. WHEN OBSERVING CONDITIONS OF DITCH CHECKS, PAY SPECIAL CONSIDERATION TO THE PRESENCE OF INDICATORS THAT WATER IS ERODING AROUND THE ENDS, UNDERCUTTING THE DITCH CHECK, OR SIGNIFICANT EROSION IS OCCURRING DOWNSTREAM OF THE DITCH CHECK. THESE ITEMS MAY INDICATE THE NEED FOR CLOSER SPACING ON DITCH CHECKS OR USE OF A DIFFERENT EROSION MAT.

3. SEDIMENT SHALL BE REMOVED FROM BEHIND THE DITCH CHECK WHEN IT REACHES ½ THE HEIGHT OF THE LOWEST ELEVATION OF THE DITCH CHECK.

4. DITCH CHECKS SHALL BE REMOVED ONCE CHANNEL IS STABILIZED WITH VEGETATION UNLESS PART OF A PERMANENT STORMWATER MANAGEMENT PLAN.

5. MAINTENANCE SHALL BE COMPLETED AS SOON AS POSSIBLE WITH CONSIDERATION FOR SITE CONDITIONS.

DITCH CHECK

MATERIAL	ASPHALT PAVEMENT	SPECIFICATION
BITUMINOUS UPPER LAYER	1.5"	SECTION 460, TABLE 460-1, 9.5 MM
BITUMINOUS LOWER LAYER	2.0"	SECTION 460, TABLE 460-1, 12.5 MM
DENSE GRADED BASE	10.0"	SECTION 301 AND 305, 31.5 MM
TOTAL THICKNESS	13.5"	

1. SPECIFICATIONS BASED ON GEOTECHNICAL REPORT AS PREPARED BY GGG, INC., DATED FEBRUARY 11, 2016. IF ANY DISCREPANCY BETWEEN THIS DETAIL AND THE GEOTECHNICAL REPORT IS FOUND, THE GEOTECHNICAL REPORT HOLDS.

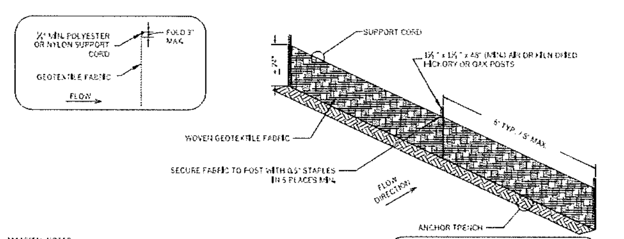
2. REFERENCED SPECIFICATION IS WISDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION, LATEST EDITION INCLUDING SUPPLEMENT SPECIFICATIONS.

3. COMPACTION REQUIREMENTS
   3.1. BITUMINOUS CONCRETE: REFER TO SECTION 460-3.
   3.2. BASE COURSE: REFER TO SECTION 301.3.4.2, STANDARD COMPACTION

4. MIXTURE TYPE E-0.3 BITUMINOUS PAVEMENT IS RECOMMENDED. REFER TO SECTION 460, TABLE 460-2 OF THE STANDARD SPECIFICATIONS.

5. REFER TO GEOTECHNICAL REPORT FOR ADDITIONAL DETAIL ON CONCRETE DESIGN AND CONSTRUCTION SEQUENCING REQUIREMENTS FOR PAVED AREAS.

PAVEMENT SECTIONS



MATERIAL NOTES

1. GEOTEXTILE FABRIC SHALL BE WOVEN AND SHALL CONFORM TO THE MATERIAL REQUIREMENTS LISTED IN SECTION 678 OF THE WISDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION, 2073 EDITION.

INSTALLATION NOTES

1. INSTALLATION SHALL CONFORM WITH THE REQUIREMENTS OF WDNR CONSERVATION PRACTICE STANDARD 1056.

2. CONSTRUCT THE SILT FENCE IN AN ARC WITH THE ENDS POINTING UPSLOPE TO AVOID EROSION AROUND THE ENDS OF THE FENCE.

3. FAILURE TO PROPERLY ANCHOR SILT FENCE COULD RESULT IN WATER AND SEDIMENT RELEASE BENEATH THE SILT FENCE. PROPERLY SECURE THE SILT FENCE INTO THE ANCHOR TRENCH.

4. CONSTRUCT THE FENCE FROM A CONTINUOUS ROLL OF GEOTEXTILE TO AVOID JOINTS. WHERE JOINTS ARE NECESSARY, OVERLAP TO THE NEXT POST OR WRAP ADJOINING FABRICS TOGETHER AROUND THE JOINT POST AND TIGHTLY FASTEN.

5. SILT FENCE SHALL NOT BE USED IN AREAS OF CONCENTRATED FLOW.

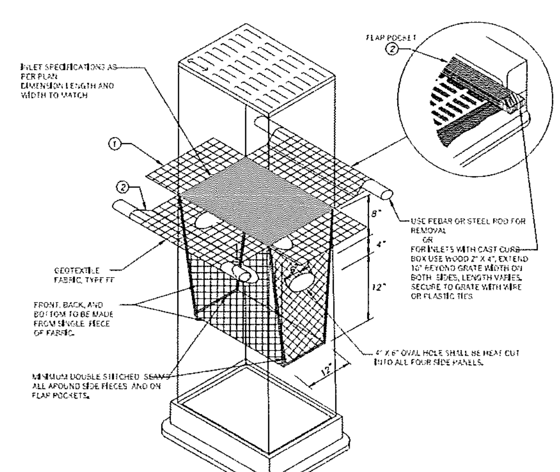
INSPECTION & MAINTENANCE NOTES

1. AT A MINIMUM, PERFORM INSPECTIONS WEEKLY AND WITHIN 24 HOURS OF PRECIPITATION EVENTS PRODUCING 0.5 INCHES OR MORE OF RAINFALL.

2. INSPECT FENCES FOR DAMAGE TO STAKES AND FABRIC, UNDERCUTTING, EXCESSIVE SEDIMENT ACCUMULATION (GREATER THAN ½ OF THE FENCE HEIGHT), AND INDICATIONS OF SCOUR AROUND THE EDGES.

3. REPAIR OR REPLACE SILT FENCE WITHIN 24 HOURS OF IDENTIFYING AND DEFICIENCIES.

SILT FENCE



GENERAL NOTES

THE WDNR TECHNICAL STANDARD 1060 FOR INLET PROTECTION SHALL BE FOLLOWED AT ALL TIMES. IF ANY VARIATION BETWEEN THIS DETAIL AND THE WDNR TECHNICAL STANDARD ARE FOUND, THE WDNR TECHNICAL STANDARD SHALL GOVERN.

INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

(1) FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.

(2) FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.

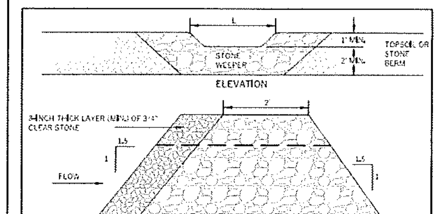
INSTALLATION NOTES

DO NOT INSTALL INLET PROTECTION TYPE D IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE. USE TYPE C INLET PROTECTION WITHIN SHALLOW INLETS.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

STONE BERM



ELEVATION

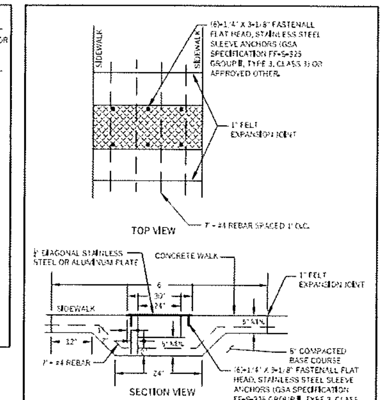
CROSS-SECTION

1. BERM TO BE CONSTRUCTED WITH 3" CLEAR STONE, 1.5' HIGH ABOVE THE SWALE BOTTOM AND LEVEL WITH THE CREST.

2. EXTEND BERM ACROSS SWALE TO MEET SWALE SIDE SLOPES GRADES. WHERE SWALE IS LESS THAN 1.5' DEEP, REDUCE BERM HEIGHT TO 1.0', WITH A 4' LENGTH.

3. INSTALL GEOTEXTILE FABRIC BAS UNDER CLEAR STONE.

STONE BERM



SIDEWALK FLUME

1 DETAILS
C400 NTS

pra. PLUNKETT RAYSICH ARCHITECTS, LLP

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WYSER

Madison Metropolitan School District
Spring Harbor Middle School - 3rd Addition - 2016
1110 Spring Harbor Drive, Madison, WI 53705

Revisions:

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Date: 29 FEB 16
Job No.: 140248-11
Sheet No.: C400

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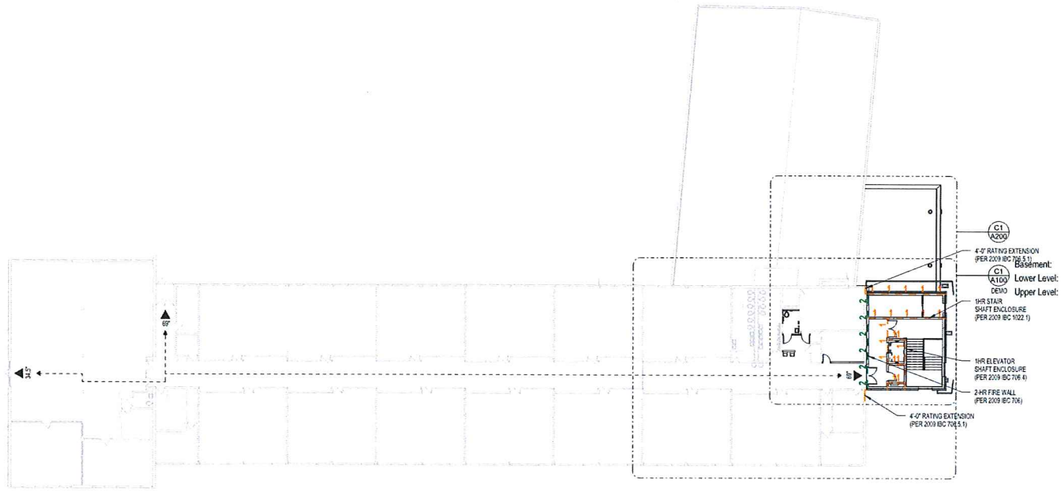
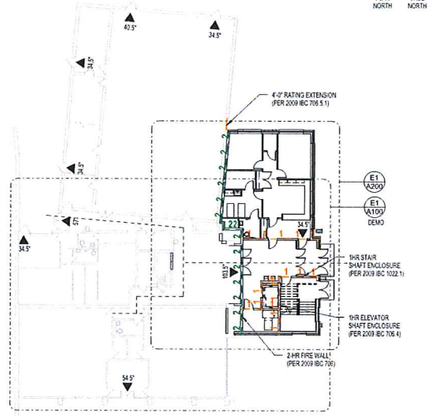


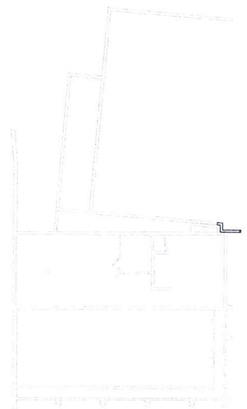
B3 A050 EXISTING SECOND FLOOR PLAN
1" = 20'-0"

PLAN NORTH | TRUE NORTH



D5 A050 EXISTING LOWER LEVEL
1" = 20'-0"

PLAN NORTH | TRUE NORTH



E5 A050 BASEMENT LIFE SAFETY PLAN
1" = 20'-0"

SUMMARY OF CODE REVIEW WORKSHEETS/INFORMATION:

- 1 1 — ONE HOUR FIRE RESISTIVE WALL ASSEMBLY
- 2 2 — TWO HOUR FIRE RATED FIRE WALL
- ▲ — EXIT / EGRESS
- ---------- — ACCESSIBLE MEANS OF EGRESS
- (000) — MAX OCCUPANTS ACCOMODATED BY EXIT
- X" — EXIT WIDTH
- F — FIRE EXTINGUISHER
- D — DRINKING FOUNTAIN

Occupant Load

9 (Design Capacity)
354 (Design Capacity)
539 (Design Capacity)

Notes:
Existing building occupant load remains unchanged with the proposed addition/remodel work.

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Spring Harbor Middle School - 3rd Addition - 2016

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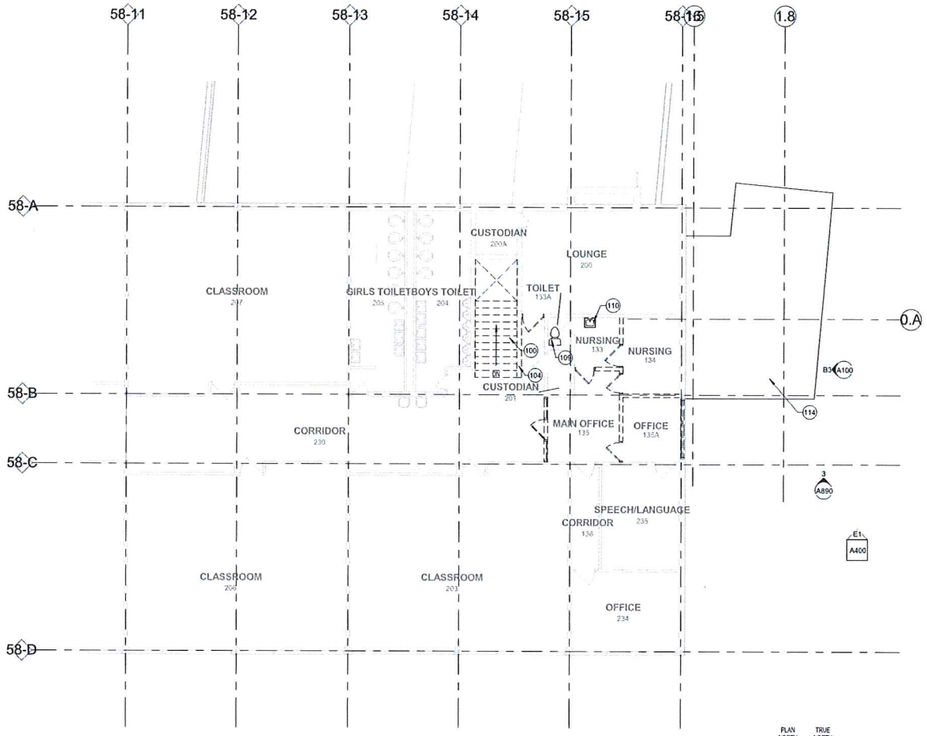
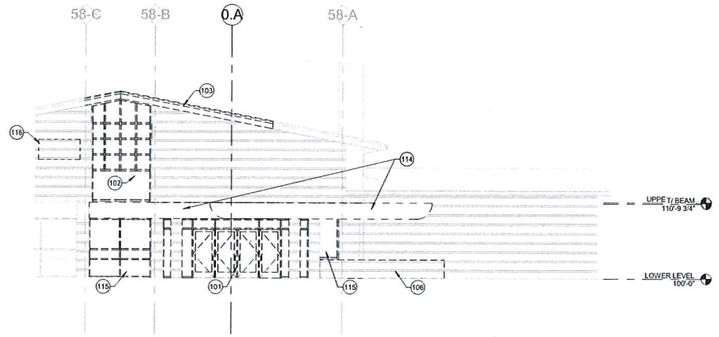
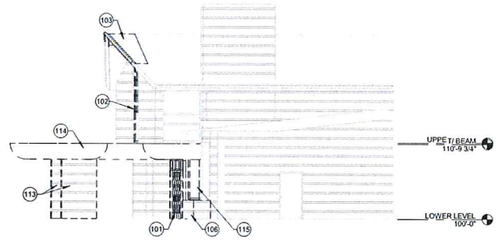


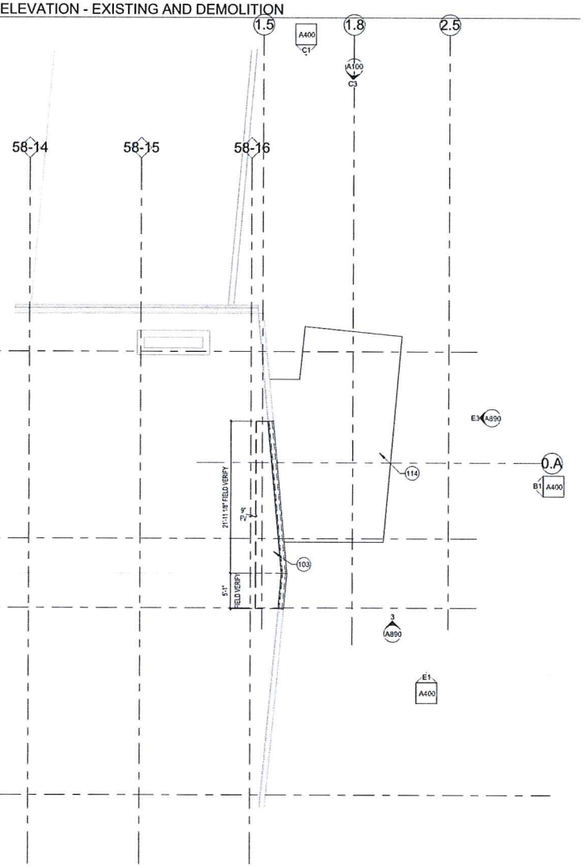
C1 A100 UPPER LEVEL DEMOLITION PLAN
1/8" = 1'-0"



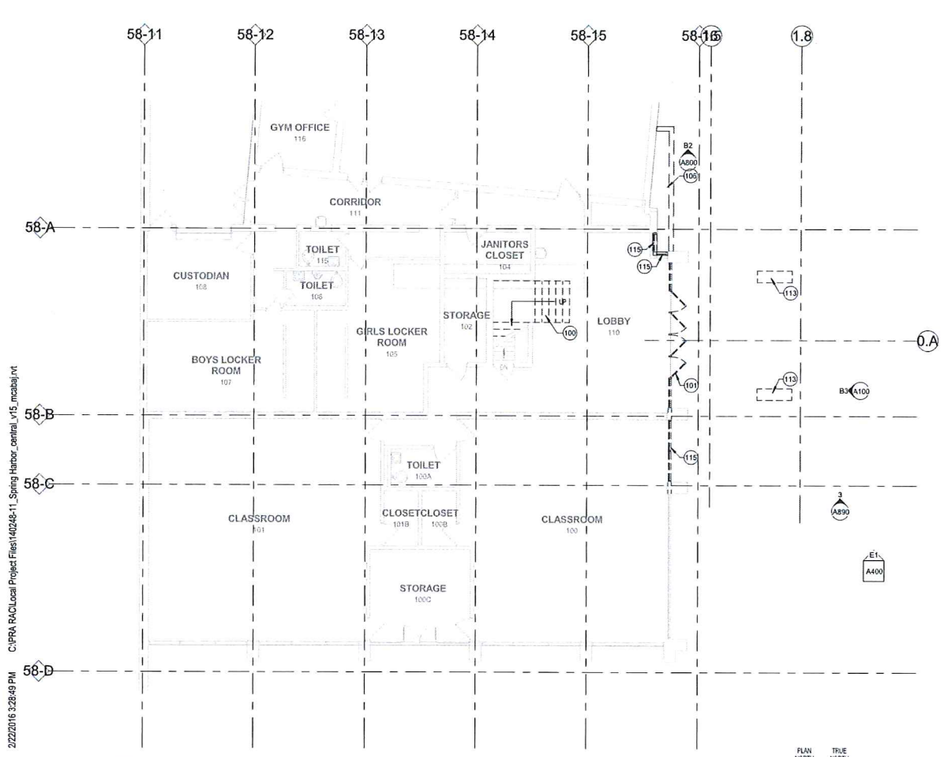
B3 A100 EAST ELEVATION - EXISTING AND DEMOLTION
1/8" = 1'-0"



C3 A100 NORTH ELEVATION - EXISTING AND DEMOLITION
1/8" = 1'-0"



E3 A100 ROOF DEMOLITION PLAN
1/8" = 1'-0"



E1 A100 LOWER LEVEL DEMOLITION PLAN
1/8" = 1'-0"

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DEMOLITION PLAN - SYMBOLS LEGEND

- EXISTING WALLS TO REMAIN
- EXISTING WALLS TO BE REMOVED
- EXISTING DOOR TO REMAIN
- EXISTING DOOR TO BE REMOVED
- EXISTING ITEM TO REMAIN
- EXISTING ITEM TO BE REMOVED
- 1 DEMOLITION PLAN KEYNOTE
- CONSTRUCTION LIMITS

DEMOLITION PLAN - GENERAL NOTES

A. VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE. PORTIONS OF EXISTING CONSTRUCTION MAY HAVE BEEN REMOVED BY OWNER.

B. VERIFY EXACT COMPOSITION OF EXISTING WALLS TO BE REMOVED

C. REMOVE FLOOR FINISHES, INCLUDING SETTING BED IN CERAMIC TILE AREAS, WHERE NEW FLOORING IS INDICATED IN ROOM FINISH SCHEDULE

D. REMOVE SUSPENDED CEILINGS AND RELATED HANGERS, OR GYPSUM BOARD/ PLASTER CEILINGS WHERE NEW CEILINGS ARE INDICATED ON REFLECTED CEILING PLAN OR ROOM FINISH SCHEDULE

E. REMOVE ALL COLUMN FINISHES, INCLUDING GYPSUM BOARD AND FURRINGS, FROM EXISTING STRUCTURAL COLUMNS.

F. REMOVE ALL INTERIOR AND WALL MOUNTED ITEMS IN AREAS TO BE REMODELED (REFER TO ROOM FINISH SCHEDULE), INCLUDING BUT NOT LIMITED TO, CABINETRY, EQUIPMENT, LOCKERS, TOILET PARTITIONS, SHELVING, HOOKSTRIPS, HANDRAILS, CLOSET POLES, CHALK AND TACK BOARDS, MIRRORS, WALL AND CEILING TRIM, BASE.

G. REFER TO PLUMBING, HVAC AND ELECTRICAL PLANS FOR ADDITIONAL DEMOLITION ITEMS AND NOTES. COORDINATE WORK WITH PLUMBING, HVAC AND ELECTRICAL REQUIREMENTS.

H. COORDINATE DEMOLITION OF LOAD BEARING WALLS WITH STRUCTURAL PLANS

I. MAINTAIN CONTINUOUS UTILITY SERVICE TO ALL SPACES IN THE BUILDING NOT AFFECTED BY THIS WORK. COORDINATE WITH OWNER ANY DISRUPTION IN SERVICES REQUIRED TO PERFORM WORK OR TO MODIFY EXISTING PIPING, DUCTWORK OR ANY ASSOCIATED EQUIPMENT.

J. CONSTRUCT A DUST PROOF PARTITION TO SEPARATE AREAS OF CONSTRUCTION FROM ADJACENT OCCUPIED AREAS OUTSIDE SCOPE OF CONSTRUCTION. REFER TO DETAIL A8/A800.

NOTE #	DEMOLITION PLAN NOTE
100	REMOVE STAIRS AND HAND RAILS.
101	REMOVE ALUMINUM STOREFRONT ENTRANCE SYSTEM
102	REMOVE ALUMINUM WINDOW SYSTEM. FIELD VERIFY EXACT EXTENTS.
103	REMOVE PORTION OF ROOF OVERHANG. FIELD VERIFY EXTENTS.
104	REMOVE CURB AND GUARDRAIL.
106	REMOVE PLANTER AND LOW WALL. FIELD VERIFY EXACT EXTENTS.
109	REMOVE TOILET AND PIPING.
110	REMOVE WALL MOUNTED SINK AND PIPING.
113	REMOVE MASONRY PIER.
114	REMOVE ENTRY CANOPY.
115	REMOVE WINDOW AND PATCH WALL TO MATCH EXISTING
116	REMOVE SPRING HARBOR SCHOOL SIGN AND SAVE FOR REUSE.

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Date: 29 FEB 16

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Sheet No.: A100

B1 A110 VIEW TOWARDS EXISTING MAIN ENTRY

B3 A110 VIEW TOWARDS EAST FACADE

B5 A110 VIEW TOWARDS EXISTING MAIN ENTRY

D1 A110 VIEW FROM ROOF TOWARDS LOCATION OF ADDITION

D3 A110 VIEW FROM EXISTING DRIVE TOWARDS LOCATION OF ADDITION

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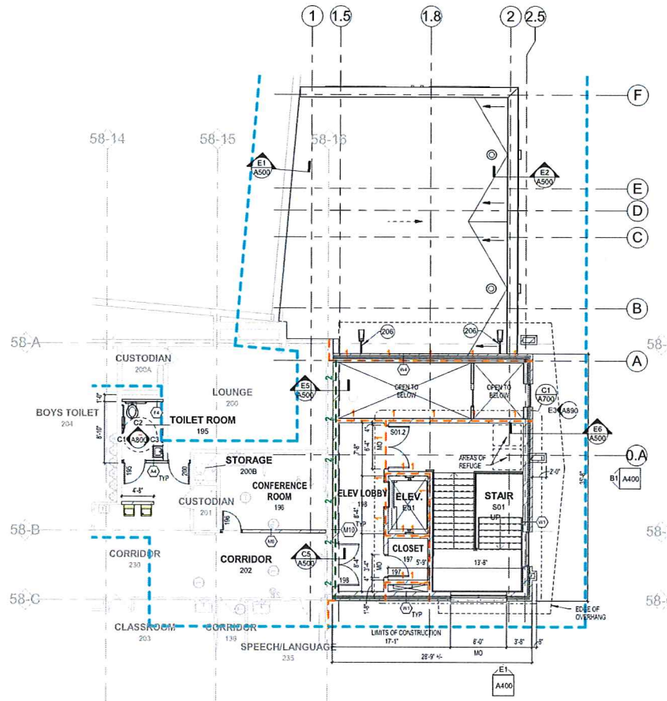
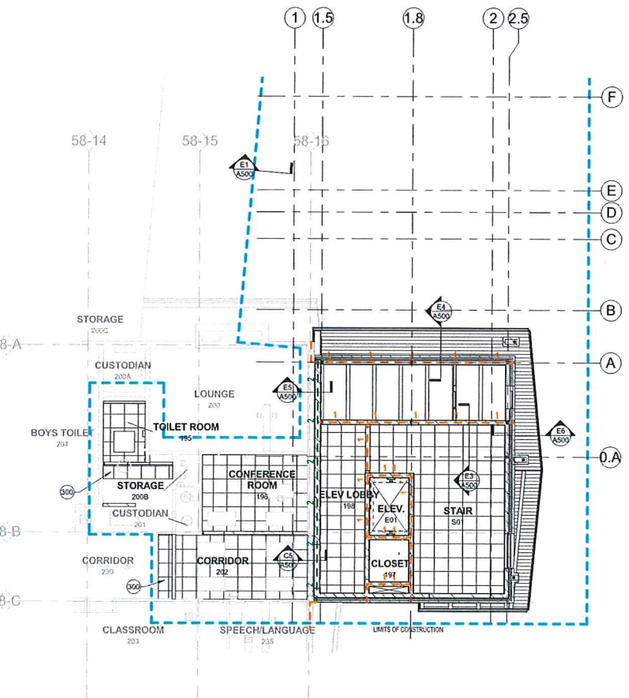


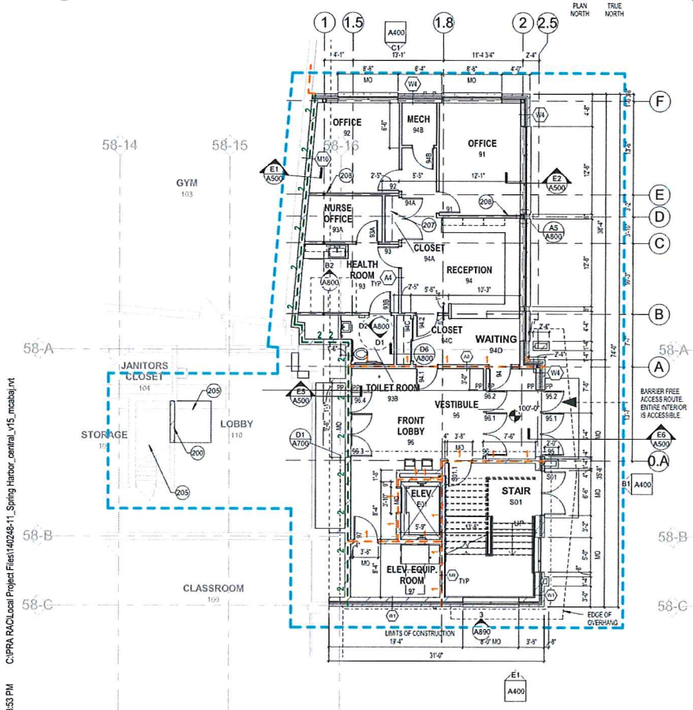
C1 A200 UPPER LEVEL PLAN
1/8" = 1'-0"

PLAN NORTH | TRUE NORTH



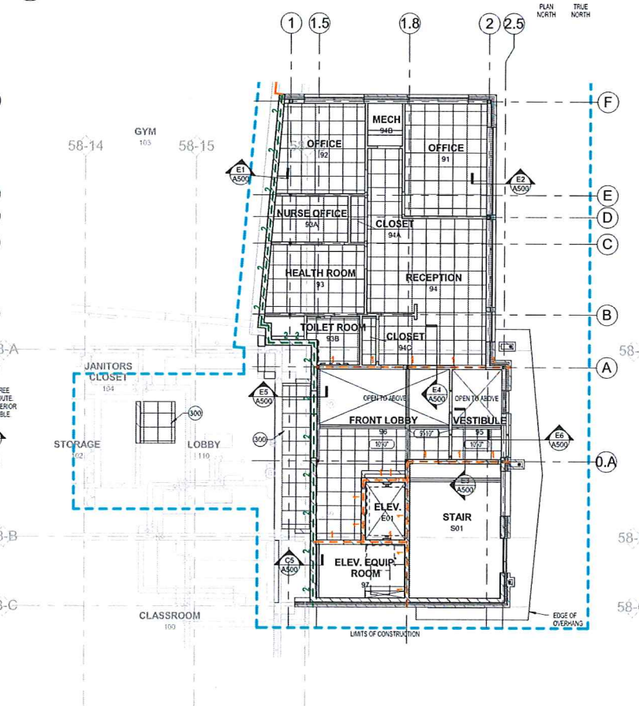
C3 A200 UPPER LEVEL REFLECTED CEILING PLAN
1/8" = 1'-0"

PLAN NORTH | TRUE NORTH



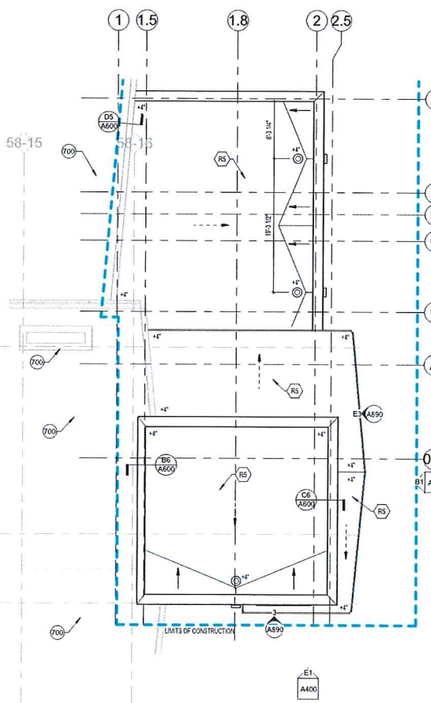
E1 A200 LOWER LEVEL PLAN
1/8" = 1'-0"

PLAN NORTH | TRUE NORTH



E3 A200 LOWER LEVEL REFLECTED CEILING PLAN
1/8" = 1'-0"

PLAN NORTH | TRUE NORTH



E5 A200 ROOF PLAN
1/8" = 1'-0"

PLAN NORTH | TRUE NORTH

REFLECTED CEILING PLAN - SYMBOLS LEGEND

- 2'-0" x 4'-0" SUSPENDED EXPOSED GRID ACOUSTIC CEILING TILE
- 2'-0" x 2'-0" SUSPENDED EXPOSED GRID ACOUSTIC CEILING TILE
- RETURN, TRANSFER, EXHAUST GRILLE
- SUPPLY GRILLE
- SLOT DIFFUSER
- 1 x 4 FLUORESCENT LIGHT
- 2 x 2 FLUORESCENT LIGHT
- 2 x 4 FLUORESCENT LIGHT
- FLUORESCENT SURFACE MOUNT LIGHT
- SURFACE MOUNTED LIGHT
- RECESSED DOWN LIGHT
- EXIT LIGHT
- AUDIO SPEAKER
- SMOKE DETECTOR
- HEAT DETECTOR
- CEILING RECESSED TV BRACKET
- GYPSUM BOARD CEILING OR BULKHEAD
- CEILING HEIGHT (9'-0")
- REFLECTED CEILING PLAN NOTE (XX)
- CONSTRUCTION LIMITS
- ONE HOUR FIRE RESISTIVE CONSTRUCTION
- TWO HOUR FIRE RESISTIVE CONSTRUCTION

REFLECTED CEILING PLAN - GENERAL NOTES

A. PERIMETER CEILING TILES SHALL NOT BE LESS THAN 4".

B. LOCATE ALL SPRINKLER HEADS, SMOKE DETECTORS, AUDIO SPEAKERS, HEAT SENSORS IN THE CENTER OF CEILING TILE (OR IN THE CENTER OF THE RAISED RECESSED FIELD OF A PATTERNED TILE).

C. REMOVE EXISTING CEILING SYSTEM WHERE NEW WALLS PENETRATE EXISTING CEILING SYSTEMS TO REMAIN. PATCH TO MATCH EXISTING CEILING SYSTEM TO NEW WALL.

D. CEILING HEIGHTS SHALL BE (9'-0") UNLESS NOTED OTHERWISE ON THE REFLECTED CEILING PLANS.

NOTE #	REFLECTED CEILING PLAN NOTE
300	PATCH CEILING TILE AND GRID WHERE WALL WAS REMOVED.

ROOF PLAN - SYMBOLS LEGEND

- DIRECTION OF STRUCTURAL SLOPE TO DRAIN
- SLOPE DIRECTION OF INSULATION TAPER SLOPE TO DRAIN. MINIMUM ALLOWABLE TAPER SLOPE SHALL BE 1/4" PER FOOT UNLESS NOTED OTHERWISE
- TAPERED INSULATION VALLEY OR RIDGE
- RD ROOF DRAIN
- "X" TAPERED INSULATION THICKNESS
- (700) ROOF PLAN NOTE
- CONSTRUCTION LIMITS

ROOF PLAN - GENERAL NOTES

A. COORDINATE AND VERIFY ALL ROOF OPENINGS AND PENETRATIONS WITH STRUCTURAL, PLUMBING, HVAC, AND ELECTRICAL REQUIREMENTS.

B. PROVIDE WATER TIGHT INTEGRITY AT ALL PENETRATIONS AND EQUIPMENT PER ROOFING MANUFACTURERS STANDARD DETAILS AND REQUIREMENTS FOR WARRANTY AND CURRENT NRCA STANDARDS.

C. PROVIDE POSITIVE ROOF DRAINAGE INCLUDING TAPERED INSULATION LAYOUT. PROVIDE SADDLES AND CRICKETS AT ALL ROOF TOP EQUIPMENT AND PENETRATIONS TO ENSURE POSITIVE DRAINAGE.

NOTE #	ROOF PLAN NOTE
700	EXISTING ROOF, FASCIA, GUTTER, AND CHIMNEY NOT IN CONTRACT (NIC).

FLOOR PLAN - SYMBOLS LEGEND

- NEW WALL PARTITION
- 100.0 NEW DOOR
- SECTION REFERENCE (DTL / SHT)
- EXTERIOR ELEVATION (DTL / SHT)
- INTERIOR ELEVATION (DTL / SHT)
- (20) FLOOR PLAN KEYNOTE
- CONSTRUCTION LIMITS
- ONE HOUR FIRE RESISTIVE CONSTRUCTION
- TWO HOUR FIRE RESISTIVE CONSTRUCTION
- EXISTING WALL TO REMAIN
- EXISTING DOOR TO REMAIN
- DETAIL REFERENCE (DTL / SHT)
- (1) WINDOW TYPE
- W1 WALL/PARTITION TYPE
- (R) FLOOR DRAIN - PITCH FLOOR TO DRAIN

FLOOR PLAN - GENERAL NOTES

A. DIMENSIONS ON FLOOR PLAN ARE BASED ON FACE OF FINISHED WALL TO FACE OF FINISHED WALL (NOMINAL).

B. VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE. PORTIONS OF EXISTING CONSTRUCTION MAY HAVE BEEN REMOVED BY OWNER.

C. MAINTAIN CONTINUOUS UTILITY SERVICE TO ALL SPACES IN THE BUILDING NOT AFFECTED BY THIS WORK. COORDINATE WITH OWNER ANY DISRUPTION IN SERVICES REQUIRED TO PERFORM WORK OR TO MODIFY EXISTING PIPING, DUCTWORK OR ANY ASSOCIATED EQUIPMENT.

D. REFER TO SHEET A890 FOR ROOM FINISH SCHEDULE AND NOTES.

E. REFER TO SHEET A890 FOR DOOR SCHEDULES, DOOR TYPES, AND NOTES.

NOTE #	FLOOR PLAN NOTE
200	PATCH WALL FINISH TO MATCH ADJACENT SURFACES.
205	PATCH FLOOR FINISH TO MATCH ADJACENT SURFACES. FIELD VERIFY EXACT EXTENTS.
206	DOWNSPOUT AND SPLASHBLOCK.
207	CLOSET SHELF AND POLE SEE DETAIL D6/A530
208	CENTER WALL ON COLUMN GRID LINE.

KEYNOTE LEGEND - EXTERIOR WALL TYPES	
TAG	EXTERIOR WALL DESCRIPTION
W1	EXTERIOR WALL: MASONRY CAVITY WALL CONSISTING OF 4" FACE BRICK (EDIT FOR OTHER MATERIALS), 1-3/4" AIR SPACE, 3" RIGID INSULATION, SPRAY APPLIED AIR AND VAPOR BARRIER SYSTEM ON 8" CONCRETE MASONRY UNIT BACK-UP WALL WITH ADJUSTABLE (TWO-PIECE) HORIZONTAL MASONRY JOINT REINFORCING @ 16" OC. PROVIDE CAVITY DRAINAGE MATERIAL, FLASHING, CAVITY WEEPS/VENTS @ 24" OC AND MASONRY EXPANSION AND CONTROL JOINTS. COMPARTMENTALIZE THE CAVITY AND PROVIDE CAVITY WEEPS/VENTS AT TOP/BOTTOM OF CAVITY.
W4	EXTERIOR WALL: MASONRY VENEER STUD WALL CONSISTING OF 4" FACE BRICK, 1-3/4" AIR SPACE, 3" RIGID INSULATION, SPRAY APPLIED AIR AND VAPOR BARRIER SYSTEM ON 5/8" GYPSUM SHEATHING, 6" GALVANIZED COLD FORMED STEEL STUDS (REFER TO STRUCTURAL DRAWINGS FOR GAUGE) AND (1) LAYER 5/8" GYPSUM BOARD AT INTERIOR FACE. PROVIDE ADJUSTABLE MASONRY VENEER ANCHORS @ 16" EW. PROVIDE HORIZONTAL MASONRY JOINT REINFORCING @ 16" OC. PROVIDE CAVITY DRAINAGE MATERIAL, FLASHING, MASONRY EXPANSION AND CONTROL JOINTS. PROVIDE CAVITY WEEPS/VENTS @ 24" OC. COMPARTMENTALIZE THE CAVITY AND PROVIDE CAVITY WEEPS/VENTS AT TOP/BOTTOM OF CAVITY.
WB3	EXTERIOR WALL (BELOW GRADE): REINFORCED CAST-IN-PLACE CONCRETE FOUNDATION WALL. PROVIDE 2" RIGID FOUNDATION INSULATION, EXTEND 48" VERTICALLY ON WALL AND 24" HORIZONTALLY BELOW FLOOR SLAB.
WB4	EXTERIOR WALL (BELOW GRADE): 12" REINFORCED CAST-IN-PLACE CONCRETE FOUNDATION WALL WITH SHEET MEMBRANE WATERPROOFING. TERMINATE ALL MEMBRANE PERIMETER EDGES WITH 1/8" x 1" ALUMINUM COMPRESSION BAR WITH CONTINUOUS SEALANT. (EDIT FOR: DAMPPROOFING). SHEET MEMBRANE MUST INTERFACE WITH VERTICAL WALL AIR & VAPOR BARRIER LINE. PROVIDE 2" RIGID FOUNDATION INSULATION, EXTEND FULL HEIGHT VERTICALLY.

KEYNOTE LEGEND - INTERIOR PARTITION TYPES	
TAG	INTERIOR PARTITION DESCRIPTION
A4	INTERIOR STEEL STUD PARTITION: 3-5/8" STEEL STUDS @ 16" OC WITH 3" SOUND ATTENUATION INSULATION AND ONE LAYER 5/8" GYPSUM BOARD @ EACH FACE. PROVIDE 1 HR RATED UL #U405 DESIGN WHERE 1 HR CONSTRUCTION IS INDICATED ON PLANS.
A6	INTERIOR STEEL STUD PARTITION: 6" STEEL STUDS @ 16" OC WITH FULL THICKNESS SOUND ATTENUATION INSULATION AND ONE LAYER 5/8" GYPSUM BOARD @ EACH FACE. PROVIDE 1 HR RATED UL #U465 DESIGN WHERE 1 HR CONSTRUCTION IS INDICATED ON PLANS.
F4	INTERIOR FURRING (PARTITION): 3-5/8" STEEL STUDS @ 16" OC WITH ONE LAYER 5/8" GYPSUM BOARD.
M6	INTERIOR MASONRY PARTITION: 6" CONCRETE BLOCK.
M8	INTERIOR MASONRY PARTITION: 8" CONCRETE BLOCK.

GYPSUM BOARD PARTITIONS - GENERAL NOTES

ALL GYPSUM BOARD PARTITIONS SHALL BE (A4) UNLESS OTHERWISE NOTED ON FLOOR PLAN.

GYPSUM BOARD PARTITION DIMENSIONS ON FLOOR PLAN ARE BASED ON FACE OF FINISHED PARTITION TO FACE OF FINISHED PARTITION (NOMINAL).

REFER TO GYPSUM BOARD SPECIFICATION FOR LOCATION AND TYPE(S) OF GYPSUM BOARD MATERIAL REQUIRED.

PROVIDE FIRE RATED GYPSUM BOARD AT ALL FIRE RATED PARTITIONS.

SEAL ALL WALL PENETRATIONS AT PERIMETER AND FIRESTOP ALL FIRE RATED PARTITIONS.

EXTEND ALL GYPSUM BOARD PARTITIONS FULL HEIGHT TO UNDERSIDE OF STEEL DECK ABOVE. AT METAL DECK CONSTRUCTION ABOVE PROVIDE SLIP JOINT BETWEEN TOP OF PARTITION AND UNDERSIDE OF METAL DECK / STRUCTURAL STEEL MEMBER ABOVE. REFER TO DETAIL B6/A500.

CORRIDORS: PROVIDE ABUSE RESISTANT GYPSUM PANELS TO 8'-0" AFF.

MASONRY PARTITIONS - GENERAL NOTES

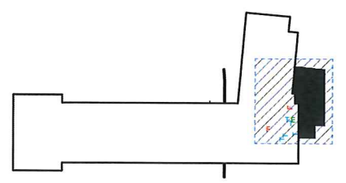
MASONRY PARTITIONS INDICATED WITH THE FOLLOWING HATCH PATTERN:

ALL MASONRY PARTITIONS SHALL BE 8" CONCRETE BLOCK UNLESS OTHERWISE NOTED OR DIMENSIONED. REFER TO FLOOR PLAN FOR PARTITION THICKNESS.

PROVIDE UL RATED CONCRETE BLOCK AT ALL FIRE RATED PARTITIONS.

SEAL ALL WALL PENETRATIONS AT PERIMETER AND FIRESTOP ALL RATED PARTITIONS.

EXTEND CONCRETE BLOCK PARTITIONS FULL HEIGHT TO UNDERSIDE OF STEEL DECK ABOVE. REFER TO DETAIL B6/A500. PROVIDE HORIZONTAL MASONRY JOINT REINFORCEMENT AT 16" OC VERTICALLY. REFER TO STRUCTURAL DRAWINGS FOR VERTICAL REINFORCEMENT REQUIREMENTS.



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Spring Harbor Middle School - 3rd Addition - 2016

1110 Spring Harbor Dr.
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Revisions

Drawn By: GGW, MT

Date: 29 FEB 16

Job No.: 140248-11

Sheet No.: A200

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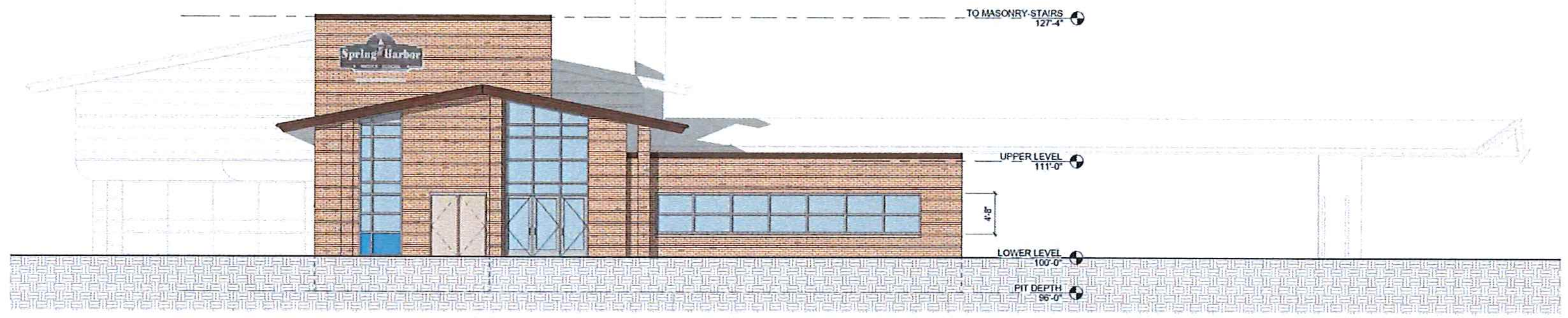
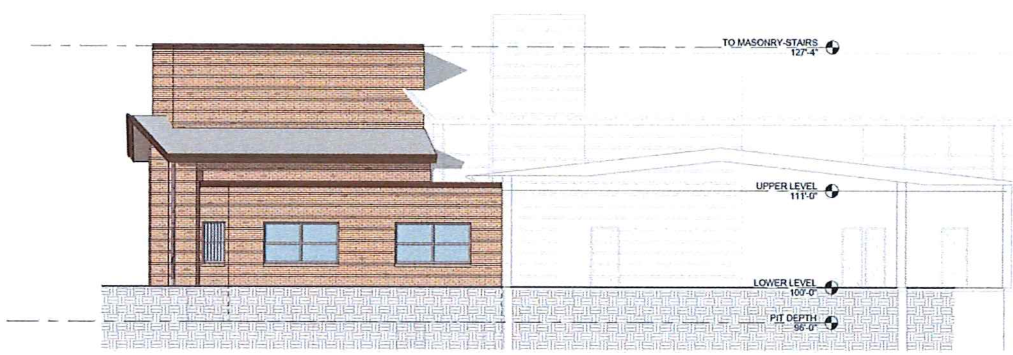
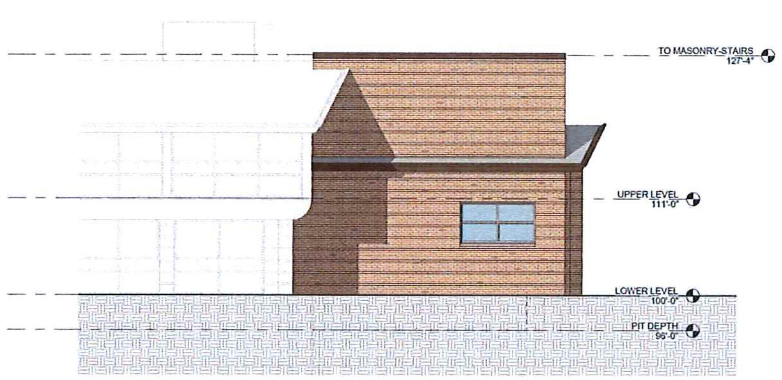


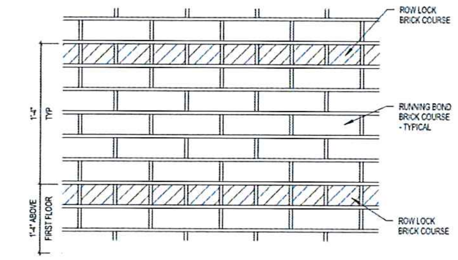
B1 A400 PARTIAL EAST ELEVATION - ADDITION
1/8" = 1'-0"



D1 A400 PARTIAL NORTH ELEVATION - ADDITION
1/8" = 1'-0"



E1 A400 PARTIAL SOUTH ELEVATION - ADDITION
1/8" = 1'-0"



A5 A400 TYPICAL WALL PATTERN
1 1/2" = 1'-0"

EXTERIOR FINISH PATTERNS

BRICK

EXTERIOR ELEVATIONS - GENERAL NOTES

A. PAINT ALL EXPOSED STEEL LINTELS TO MATCH ADJACENT MASONRY COLOR

B. REFER TO SHEET A890 FOR WINDOW FRAME ELEVATIONS

C. SEALANT COLORS TO MATCH ADJACENT FINISHED SURFACES.

NOTE #	EXTERIOR ELEVATION NOTE
400	RELOCATED SPRING HARBOR SCHOOL SIGN.
401	DOWNSPOUT AND SPLASHBLOCK.
402	OVERFLOW SCUPPER. REFER TO DETAIL D6/A600.
403	KEY VAULT.
404	BRICK VENEER. SEE A5/A400 FOR DECORATIVE WALL PATTERN.

KEYNOTE LEGEND - CONSTRUCTION TYPES

TAG	CONSTRUCTION DESCRIPTION
C1	LAY-IN CEILING PANELS IN EXPOSED GRID SYSTEM SUSPENDED FROM STRUCTURE ABOVE.
C3	1 HR RATED SHAFT WALL CEILING: WHI DESIGN 495 PSH 0154/0167, ONE LAYER 5/8" TYPE 'X' GYPSUM BOARD ON 2-1/2" STEEL SHAFTWALL STUDS @ 24" OC WITH 1" TYPE 'X' GYPSUM BOARD LINER PANEL @ CONCEALED FACE.
C14	EXTERIOR SOFFIT: METAL SOFFIT PANEL SYSTEM (25% PERFORATED) ON (EDIT FOR FRAMING SYSTEM)
E2	ALUMINUM STOREFRONT SYSTEM WITH INSULATING GLASS.
E3	ALUMINUM ENTRANCE SYSTEM WITH TEMPERED INSULATING GLASS (EDIT FOR SCHOOLS: 1/4" TEMPERED GLASS IN DOORS).
E7	INSULATED STEEL DOOR WITH INSULATING GLASS.
G1	METAL FASCIA SYSTEM: METAL GRAVEL STOP ON TREATED 2x WOOD BLOCKING
G2	METAL COPING SYSTEM: METAL COPING ON TREATED 2x WOOD BLOCKING
G4	METAL SCUPPER. (EDIT FOR SIZE AND STYLE)
G9	METAL COUNTERFLASHING: TWO PIECE "SNAP-IN" METAL COUNTERFLASHING WITH SURFACE MOUNTED RECEIVER WITH MECHANICAL FASTENERS @ 12" OC WITH NEOPRENE WASHERS @ EXPOSED FASTENER HEADS.
G10	METAL COUNTERFLASHING: TWO PIECE "SNAP-IN" METAL COUNTERFLASHING WITH RECEIVER BUILT INTO MASONRY MORTAR JOINT.
J1	PRECAST CONCRETE SILL. SEE DETAIL XXX FOR PROFILE.
J2	PRECAST WATERTABLE. SEE DETAIL A4A/A600 FOR PROFILE.
R1	
R2	SINGLE PLY ROOFING SYSTEM: FULLY ADHERED EPDM MEMBRANE ON X" OF RIGID INSULATION (ON VAPOR RETARDER) ON 5/8" EXTERIOR SHEATHING ON (EDIT FOR ROOF FRAMING/DECKING/VAPOR RETARDER).
R3	SINGLE PLY ROOFING SYSTEM: FULLY ADHERED THERMOPLASTIC MEMBRANE ON X" OF RIGID INSULATION (ON VAPOR RETARDER) ON 5/8" EXTERIOR SHEATHING ON (EDIT FOR ROOF FRAMING/DECKING/VAPOR RETARDER).
R5	BUILT-UP ROOFING (BUR) SYSTEM: GRAVEL SURFACING ON BUILT-UP ROOFING ON 4" OF RIGID INSULATION (ON VAPOR RETARDER) ON (EDIT FOR ROOF FRAMING/DECKING/VAPOR RETARDER).
S1	
S3	X" CAST-IN-PLACE REINFORCED CONCRETE ON METAL DECK. (EDIT FOR THICKNESSES)

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E1 / A410 AREA B - VIEW FROM PARKING LOT

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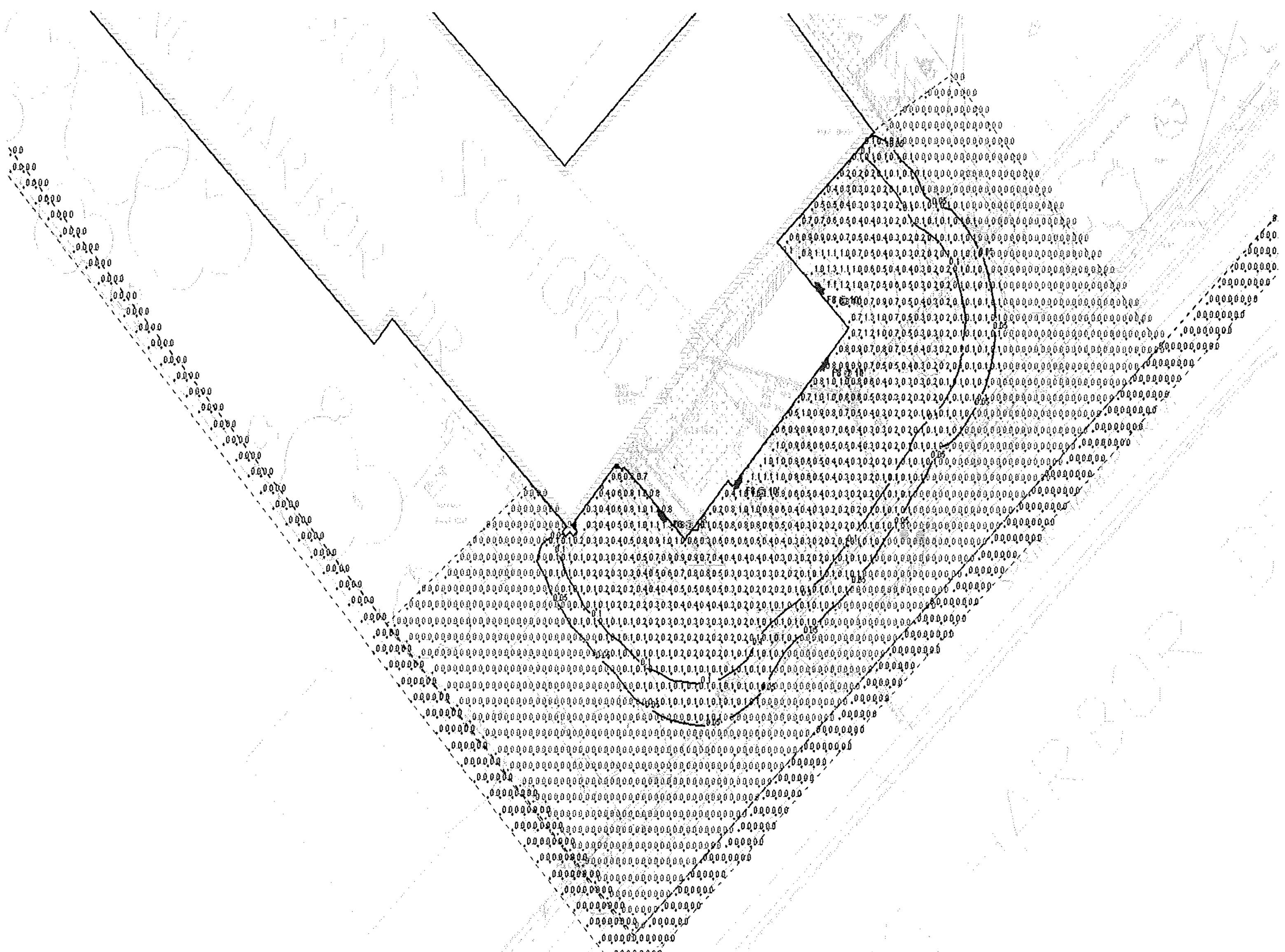
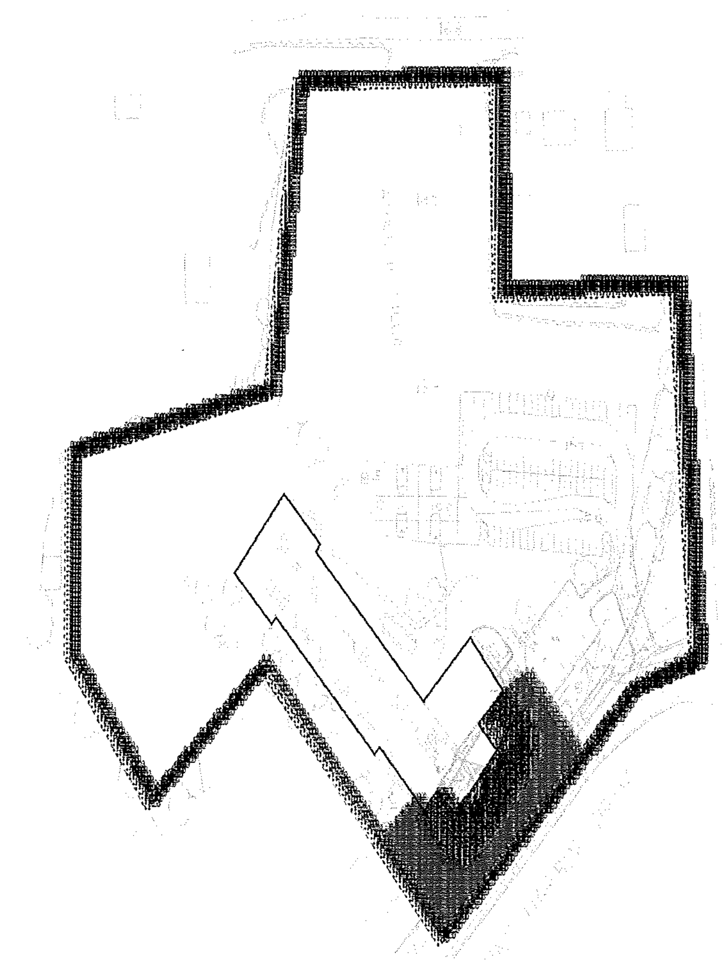
Schedule

Symbol	Label	QTY	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	LLF	Wattage	Polar Plot
▯	F8	4	TWP LED 10C 700 50K T3M	TWP LED, 10 LED'S, 700mA DRIVER, 5000K CCT, TYPE 3 OPTIC	LED	1	1614.11	0.8	26	Max: 894cd

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Exterior	+	0.2 fc	1.3 fc	0.0 fc	N/A	N/A
Property Line	+	0.0 fc	0.0 fc	0.0 fc	N/A	N/A





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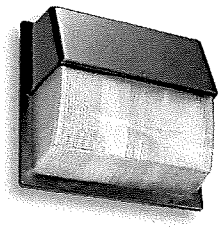
KJWW ENGINEERING CONSULTANTS



TWP LED
LED Wall Luminaire

Catalog Number

Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements

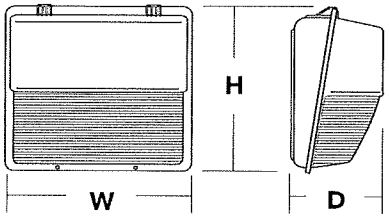
Specifications

Width: 16-1/8" *(41.0 cm)*

Height: 15-1/2" *(39.4 cm)*

Depth: 7-3/4" *(19.7 cm)*

Weight: 15 lbs *(6.8kg)*



Introduction

The popular TWP luminaire is now available with LED technology. Cast in a traditional dayform, the TWP LED offers a classic appearance and is powered by advanced LEDs. A one-piece polycarbonate cover delivers enhanced durability and is vandal resistant, making the TWP LED ideal for lower mounting heights or high-traffic areas.

The new TWP LED luminaire is powerful yet energy efficient, capable of replacing up to a 250W metal halide luminaire while saving up to 77% in energy costs. Offering an expected service life of more than 20 years, the TWP LED eliminates frequent lamp and ballast replacements associated with traditional technologies.

Ordering Information

EXAMPLE: TWP LED 30C 700 50K T3M MVOLT DDBXD

TWP LED

Series	Performance Package	Distribution	Voltage	Control Options	Other Options	Finish *(required)*
TWP LED	**LEDs** 10C 10 LEDs (one engine) 20C 20 LEDs (two engines) 30C 30 LEDs (one engine) **Drive current** 700 700 mA **Color temperature** 50K 5000 K (standard) 40K 4000 K (optional)	T3M Type III Medium	MVOLT [1] 120 [1] 208 [1] 240 [1] 277 [1] 347 [2] 480 [2]	**Shipped installed** DMG 0-10V dimming driver (no controls) PE Photoelectric cell, button type [3]	**Shipped installed** SF Single fuse (120, 277, 347V) [4] DF Double fuse (208, 240, 480V) [4] TP Tamper proof screws NOM NOM Certified SPD Separate surge protection [5] **Shipped separately** WG Wire guard [6]	DDBXD Dark bronze DBLXD Black DWHXD White DDBTXD Textured dark bronze DBLBXD Textured black DWHGXD Textured white

Stock configurations are offered for shorter lead times:

Standard Part Number	Stock Part Number
TWP LED 10C 700 50K T3M MVOLT DDBXD	TWP LED 10C 50K
TWP LED 20C 700 50K T3M MVOLT DDBXD	TWP LED 20C 50K
TWP LED 30C 700 50K T3M MVOLT DDBXD	TWP LED 30C 50K

Accessories

Ordered and shipped separately.

TWPWG U Wire guard accessory [7]

NOTES

1. MVOLT driver operates on any line voltage from 120-277V (50/60 Hz). Specify 120, 208, 240 or 277 options only when ordering with fusing (SF, DF options) or photocontrol (PE).
2. Not available with 10C option.
3. Must specify voltage; not available with MVOLT or 480 voltage options.
4. Single fuse (SF) requires 120, 277 or 347 voltage option. Double fuse (DF) requires 208, 240 or 480 voltage option.
5. See the electrical section on page 2 for more details.
6. Also available as a separate accessory; see Accessories information at left.
7. Requires field modification (only when ordered as a separate accessory).

LITHONIA LIGHTING

One Lithonia Way • Conyers, Georgia 30012 • Phone: 800.279.8041 • Fax: 770.918.1209 • www.lithonia.com

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

LEDs	Drive Current (mA)	Performance Package	System Watts	Dist. Type	40K (4000 K, 70 CRI)					50K (5000 K, 65 CRI)				
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
10C (10 LEDs)	700	10C 700 --K	26 W	T3M	1,478	0	3	2	57	1,614	0	3	2	62
20C (20 LEDs)	700	20C 700 --K	45 W	T3M	2,877	0	3	3	64	3,149	0	3	3	70
30C (30 LEDs)	700	30C 700 --K	67 W	T3M	4,157	0	3	3	62	4,377	0	3	3	65

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient		Lumen Multiplier
0°C	32°F	1.02
10°C	50°F	1.01
20°C	68°F	1.00
25°C	**77°F**	**1.00**
30°C	86°F	1.00
40°C	104°F	0.98

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the **TWP LED 30C 700** platform in a **25°C ambient**, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	0.97	0.96	0.94

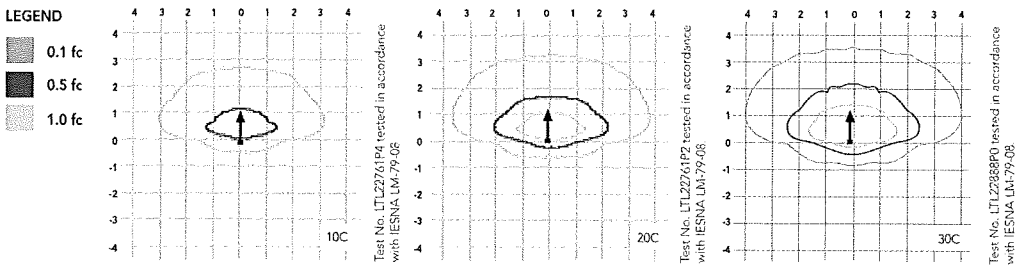
Electrical Load

LEDs	Drive Current (mA)	System Watts	Current (A)					
			120V	208V	240V	277V	347V	480V
10C	700	26 W	0.24	0.14	0.12	0.10	-	-
20C	700	45 W	0.42	0.24	0.21	0.18	0.14	0.10
30C	700	67 W	0.62	0.36	0.31	0.27	0.21	0.16

Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's TWP LED homepage.

Isofootcandle plots for the TWP LED --- 700 50K T3M. Distances are in units of mounting height (15').



FEATURES & SPECIFICATIONS

INTENDED USE
The energy savings, long life and easy-to-install design of the TWP LED make it the smart choice for building-mounted doorway and pathway illumination for nearly any facility.

CONSTRUCTION
Die-cast aluminum rear housing has an impact-resistant, UV-stabilized polycarbonate front housing and refractor that is fully gasketed. Modular design allows for ease of maintenance. The LED driver is mounted to the front casting to thermally isolate it from the light engine for low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants.

FINISH
Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in textured and non-textured finishes.

OPTICS
Protective polycarbonate lens covers the light engine's precision-molded proprietary acrylic lenses. Light engines are available in 5000 K (65 min. CRI) configurations.

ELECTRICAL
Light engine(s) consist of 10 or 30 high-efficacy LEDs mounted to a metal-core circuit board and integral aluminum heat sink to maximize heat dissipation and promote long life (L94/100,000 hrs at 25°C). The electronic driver has a power factor of >90%, THD <20%, and a minimum 2.5 KV surge rating. When ordering the SPD option, a separate surge protection device is installed within the luminaire which meets a minimum Category C low operation (per ANSI/IEEE C62.41.2).

INSTALLATION
Top 3/4" threaded wiring access. Back access through removable 3/4" knockout. Feed-thru wiring can be achieved by using a condulet tee. Mount on any flat, vertical surface.

LISTINGS
UL listed for wet locations. Rated for -40°C minimum ambient.

WARRANTY
Five year limited warranty. Full warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx.

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

Photometric Report

CATALOG NUMBER: TWP LED 10C 700 50K T3M

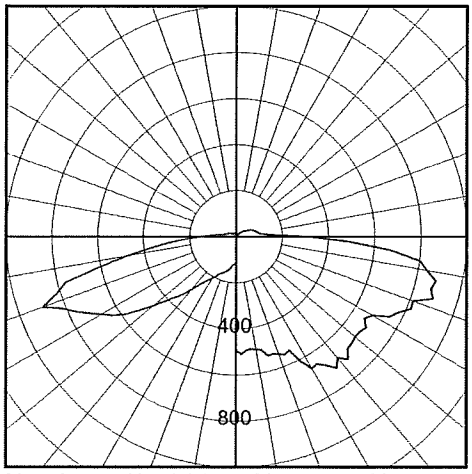
FILENAME: TWP_LED_10C_700_50K_T3M.IES

IESNA:LM-63-2002
[TEST] LTL22761P4
[TESTDATE] 12/7/2012
[ISSUEDATE] 2/11/2013
[TESTLAB] SCALED PHOTOMETRY
[TESTMETHOD] IES LM- 79-08
[MANUFAC] Lithonia Lighting
[LUMCAT] TWP LED 10C 700 50K T3M
[LUMINAIRE] TWP LED, 10 LED'S, 700mA DRIVER, 5000K CCT, TYPE 3 OPTIC
[LAMPCAT] NICHIA 219B 5000K
[LAMP] LED
[BALLAST] LEDINTA0700C210DO
[BALLASTCAT]
[DISTRIBUTION] TYPE IV, MEDIUM, BUG RATING: B0 - U3 - G2
[_TOTALLUMINAIRELUMENS] 1614.2
[_LAMPPOSITION] 0 , 0
[_LAMPWATTAGE] 26
[_MOUNTING] Wall
[_FAMILY] TWP LED
[_PRODUCTID] 8af4d28c-949a-4d6f-b3c1-fced365f693d

SUMMARY DATA

EFFICIENCY (Total):	- 161410.9 %
EFFICIENCY (Down / Up):	- 138822.2 % / - 22588.7 %
EFFICIENCY (Street / House):	0.0 % / 0.0 %
LUMENS/LAMP:	-1
NO. OF LAMPS:	1
LUMINOUS OPENING:	RECTANGULAR
Width:	0.38 (Feet)
Length:	1.13
Height:	0.50
INPUT WATTS:	26

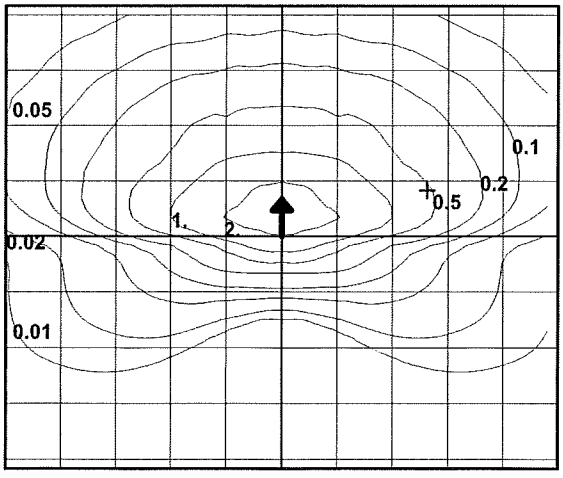
PLANE & CONE DIAGRAM



Max plane at H = 72.5 Max cone at V = 70

MAX CANDLEPOWER: 893.504

ISO-ILLUMINANCE DIAGRAM



Mounting Height = 8 Feet. Each box represents one mounting height.

Mounting Height	Multiplier
10	0.640
15	0.284
20	0.160
25	0.102
30	0.071
35	0.052
40	0.040
45	0.032
50	0.026

+ = Point of max candela

Photometric Report

CATALOG NUMBER: TWP LED 10C 700 50K T3M

FILENAME: TWP_LED_10C_700_50K_T3M.IES

CANDELA TABLE

Vertical	Horizontal Angles											
Angle	0	2.5	5	7.5	10	12.5	15	17.5	20	22.5	25	27.5
0	117	117	117	117	117	117	117	117	117	117	117	117
2.5	126	130	130	129	129	128	128	128	128	128	128	128
5	142	149	148	147	147	147	148	149	149	148	146	144
7.5	164	167	166	166	168	170	171	169	166	161	159	158
10	175	173	174	176	177	177	173	169	168	169	168	166
12.5	178	179	181	183	182	177	173	173	171	169	169	169
15	189	193	196	196	191	186	184	181	179	177	176	175
17.5	205	210	212	208	203	199	194	192	191	188	188	191
20	224	230	231	223	218	212	210	208	205	206	209	211
22.5	232	235	233	227	222	219	216	218	220	226	229	232
25	240	242	237	233	227	225	226	225	232	236	240	244
27.5	244	244	239	238	230	230	232	236	244	247	249	248
30	248	246	244	241	234	234	237	244	245	248	248	252
32.5	252	255	252	248	242	243	247	250	251	251	255	254
35	271	277	275	267	265	265	266	266	265	265	266	269
37.5	303	307	306	297	297	297	294	293	290	291	292	294
40	321	327	326	318	319	317	318	315	317	321	325	318
42.5	338	342	340	332	337	332	335	334	336	342	346	341
45	354	360	356	349	353	348	350	350	357	361	356	354
47.5	364	366	366	364	365	366	364	367	369	378	368	362
50	360	358	361	367	360	368	369	375	379	382	379	378
52.5	364	366	370	377	364	378	381	386	390	391	388	389
55	379	379	383	389	375	391	396	401	410	409	407	408
57.5	381	385	391	394	384	394	405	415	422	422	423	433
60	397	408	412	416	408	410	426	434	433	431	433	447
62.5	446	479	472	477	461	455	473	474	470	464	456	478
65	536	563	544	548	537	530	550	547	553	543	517	548
67.5	537	551	537	538	540	541	573	573	578	586	556	619
70	492	510	495	491	496	502	534	532	542	553	544	610
72.5	447	451	436	430	439	456	483	481	485	494	503	548
75	365	360	348	342	349	373	393	388	394	401	425	459
77.5	299	311	289	291	290	314	323	318	316	318	337	360
80	278	297	269	275	271	293	297	290	285	278	287	295
82.5	274	287	259	264	263	286	287	280	273	263	268	270
85	251	259	233	242	241	269	265	262	257	249	253	256
87.5	224	225	202	216	211	243	233	233	230	227	235	238
90	194	191	174	189	183	212	196	199	198	203	208	214
92.5	167	163	150	164	158	184	165	171	169	177	181	187
95	144	138	129	141	135	158	139	148	144	152	156	161
97.5	121	115	109	118	114	132	118	126	123	130	134	138
100	102	96	92	98	96	110	100	107	105	112	114	117
102.5	85	81	79	83	82	91	86	90	90	96	97	100
105	73	69	68	71	71	76	74	77	77	83	83	86
107.5	64	61	61	63	63	66	66	68	68	73	73	75
110	58	56	56	57	57	60	60	60	61	65	66	68
112.5	54	52	52	53	53	54	55	56	57	59	60	61
115	50	48	48	49	49	50	51	52	52	54	54	56
117.5	45	44	44	45	45	46	47	48	49	50	51	52
120	42	41	41	42	42	43	44	46	47	48	49	50
122.5	40	40	40	41	42	43	44	45	46	48	49	50
125	41	41	41	42	42	43	45	46	47	49	49	50
127.5	41	41	41	42	42	43	45	46	47	49	49	50
130	40	40	40	41	41	42	43	45	46	47	48	49
132.5	39	39	40	40	40	41	42	43	45	46	46	47
135	38	38	38	38	39	40	40	42	43	44	44	45
137.5	36	35	36	36	37	38	38	39	40	41	41	42
140	34	32	33	34	34	35	35	35	36	37	38	38
142.5	31	29	30	30	31	31	32	32	32	33	33	34
145	27	26	26	27	28	28	28	28	29	29	29	29
147.5	23	22	23	23	24	24	24	24	24	24	24	24
150	18	17	17	18	18	19	20	19	19	19	18	18
152.5	12	11	11	12	13	13	13	13	13	12	10	10
155	5	3	3	4	4	4	5	6	7	8	8	9
157.5	0	0	1	1	3	4	4	5	6	7	7	8
160	0	0	1	1	2	3	4	4	5	6	6	7
162.5	0	0	0	1	1	2	3	4	4	5	5	6
165	0	0	0	0	1	1	1	3	3	4	4	4
167.5	0	0	0	0	0	1	1	1	2	3	3	4
170	0	0	0	0	0	1	1	1	1	1	2	3
172.5	0	0	0	0	0	1	1	1	1	1	1	1
175	0	0	0	0	0	0	1	1	1	1	1	1
177.5	0	0	0	0	0	1	1	1	1	1	1	1
180	1	1	1	1	1	1	1	1	1	1	1	1

Vertical	Horizontal Angles											
Angle	30	32.5	35	37.5	40	42.5	45	47.5	50	52.5	55	57.5
0	117	117	117	117	117	117	117	117	117	117	117	117
2.5	128	128	127	127	127	127	126	126	125	124	124	124
5	142	140	139	137	135	134	133	131	130	129	127	127
7.5	157	155	154	152	149	148	146	144	142	140	137	135
10	165	164	163	162	160	159	158	157	157	155	153	151
12.5	168	167	168	169	170	171	171	171	173	173	171	169
15	177	177	177	178	180	182	183	184	185	185	183	181
17.5	192	193	193	194	196	195	192	188	187	185	183	181
20	212	213	213	210	208	201	196	192	189	187	188	187
22.5	236	233	229	222	213	208	206	207	200	195	193	190
25	244	241	235	230	231	230	223	216	210	209	204	199
27.5	248	243	247	247	244	238	233	230	226	219	213	209
30	251	258	256	253	250	247	242	240	237	236	233	229
32.5	261	260	258	255	252	250	251	256	259	258	258	255
35	269	265	260	255	254	260	267	274	278	284	280	278
37.5	287	278	269	266	269	277	286	293	296	296	301	298
40	311	298	293	291	296	300	302	305	309	312	311	314
42.5	331	322	325	326	329	329	328	322	322	323	328	327
45	349	347	356	360	365	360	355	350	347	345	349	358
47.5	367	372	382	388	395	384	385	385	382	390	391	392
50	386	398	406	410	414	408	417	422	422	431	426	421
52.5	399	420	425	429	429	436	447	458	465	464	459	456
55	428	442	447	454	454	466	482	495	495	500	496	496
57.5	459	469	474	483	485	497	514	526	526	528	524	531
60	479	496	497	510	517	530	551	548	548	552	553	575
62.5	510	523	536	540	549	558	577	566	566	570	583	612
65	575	573	596	586	588	597	604	594	585	585	597	614
67.5	657	646	667	668	640	662	637	620	625	624	631	630
70	659	653	680	717	686	719	685	682	676	676	687	661
72.5	593	596	629	655	656	679	673	695	701	702	711	705
75	498	507	545	552	573	585	601	647	667	673	693	677
77.5	385	397	432	440	462	478	507	544	567	589	589	600
80	306	315	334	343	360	371	401	432	450	468	471	488
82.5	275	278	278	281	286	289	308	326	340	348	358	374
85	260	261	255	255	252	246	254	257	264	263	270	281
87.5	243	245	238	237	231	223	223	218	219	212	215	218
90	221	224	219	217	213	202	202	193	191	182	176	177
92.5	194	198	198	196	196	183	183	173	170	160	150	146
95	168	173	177	172	177	164	165	155	152	142	131	125
97.5	144	147	154	149	157	145	148	139	134	126	115	107
100	123	124	132	128	134	126	127	121	116	110	100	91
102.5	104	105	112	109	112	108	107	104	98	93	85	78
105	88	89	94	92	93	92	90	88	82	79	73	67
107.5	77	77	81	79	79	79	75	74	70	66	63	59
110	68	68	70	69	68	67	64	63	60	58	56	54
112.5	61	61	61	61	60	59	57	56	54	53	52	51
115	56	56	56	55	54	54	53	53	52	51	50	49
117.5	53	53	53	53	53	53	52	52	51	50	49	47
120	51	52	52	53	53	53	52	51	50	49	47	46
122.5	51	52	53	54	54	54	53	52	50	48	46	44
125	52	53	53	54	54	54	53	52	50	47	45	42
127.5	51	52	53	53	54	53	52	51	49	47	43	40
130	50	51	52	52	52	51	50	49	47	45	43	39
132.5	48	49	49	49	49	48	47	46	45	43	40	36
135	46	46	46	46	46	46	44	43	41	39	36	32
137.5	42	43	43	43	43	42	42	40	38	35	31	25
140	38	39	39	39	39	38	36	35	32	29	24	21
142.5	34	34	34	33	33	32	31	29	25	21	20	20
145	29	28	28	27	26	25	23	19	19	19	20	20
147.5	24	22	21	20	18	15	15	15	16	17	18	18
150	18	15	13	12	12	12	13	13	14	15	15	15
152.5	10	10	11	11	12	12	12	12	12	13	13	13
155	10	10	10	11	11	12	12	12	12	12	12	12
157.5	9	9	10	10	10	10	11	11	11	11	11	11
160	7	8	8	9	10	10	10	10	10	10	10	10
162.5	6	7	7	7	8	8	8	9	9	9	9	9
165	5	5	6	6	6	7	7	7	7	7	7	7
167.5	4	4	4	4	5	5	5	5	5	5	5	5
170	3	4	4	4	4	4	4	4	4	4	4	4
172.5	1	2	2	2	2	3	3	3	3	3	3	3
175	1	1	1	1	1	1	1	1	1	1	1	1
177.5	1	1	1	1	1	1	1	1	1	1	1	1
180	1	1	1	1	1	1	1	1	1	1	1	1

Vertical Angle	Horizontal Angles 60	62.5	65	67.5	70	72.5	75	77.5	80	82.5	85	87.5
0	117	117	117	117	117	117	117	117	117	117	117	117
2.5	123	123	122	121	121	120	119	118	118	118	117	116
5	125	124	124	123	122	121	121	120	118	118	116	116
7.5	133	132	130	128	127	126	125	124	122	121	120	118
10	148	145	142	140	137	135	133	131	130	128	127	124
12.5	167	163	160	155	151	147	143	140	137	134	132	130
15	177	172	169	164	158	152	147	142	139	135	133	131
17.5	178	177	174	171	167	160	153	147	141	138	135	131
20	183	180	177	176	172	167	160	153	146	141	137	133
22.5	190	187	184	181	177	171	166	158	150	144	139	135
25	193	191	188	186	184	181	176	169	160	153	148	144
27.5	207	203	201	198	197	195	191	183	174	165	160	155
30	226	224	218	215	211	209	205	198	188	178	171	166
32.5	250	244	240	233	228	223	219	208	197	187	178	171
35	274	267	256	249	244	239	234	224	212	203	195	187
37.5	293	287	280	274	272	266	259	248	237	227	218	207
40	312	310	309	307	305	300	291	279	265	251	241	224
42.5	333	339	343	350	347	339	326	311	294	276	256	237
45	371	379	389	392	387	371	354	336	316	299	279	258
47.5	398	411	422	434	422	415	395	376	355	337	311	288
50	422	435	450	471	471	469	449	431	417	386	360	317
52.5	461	470	489	514	518	523	508	491	475	444	408	353
55	498	513	528	551	574	587	583	560	546	503	447	371
57.5	539	556	577	584	621	636	631	613	588	545	484	392
60	587	595	609	628	657	673	674	669	657	608	538	422
62.5	609	635	648	681	703	718	726	714	706	677	585	470
65	629	654	703	733	772	770	802	772	784	734	644	500
67.5	680	682	737	771	827	816	849	859	855	811	687	512
70	682	749	775	818	815	894	873	887	840	802	671	490
72.5	702	730	776	796	811	814	834	837	801	729	620	436
75	707	703	719	726	753	765	726	721	701	617	504	343
77.5	620	640	645	651	637	606	593	558	528	461	366	237
80	506	545	527	528	508	481	452	428	393	344	263	171
82.5	395	411	406	408	386	366	348	332	298	244	185	120
85	300	307	306	302	294	287	269	239	213	171	130	91
87.5	227	230	232	230	224	214	196	176	152	121	92	67
90	180	181	180	175	169	157	141	123	105	83	63	48
92.5	145	144	141	134	127	117	102	88	72	57	46	39
95	120	116	113	106	98	88	77	66	56	46	40	38
97.5	102	96	91	85	77	69	61	54	46	41	38	37
100	86	80	74	69	63	57	50	46	41	38	36	37
102.5	73	68	63	59	54	49	45	41	38	35	35	37
105	63	60	56	53	49	45	41	38	35	34	35	38
107.5	56	54	52	49	46	42	39	36	34	33	35	38
110	52	50	48	46	43	40	36	34	32	33	35	39
112.5	49	47	46	43	40	38	34	32	31	32	35	38
115	47	46	43	41	38	35	31	29	29	31	34	37
117.5	46	44	42	39	36	32	28	26	28	30	32	36
120	44	42	39	36	32	26	24	24	26	28	31	33
122.5	41	39	36	32	26	22	21	22	24	26	29	31
125	39	36	32	27	22	18	19	21	22	24	26	28
127.5	37	33	28	22	18	17	18	19	21	22	24	25
130	35	29	22	18	16	17	18	18	19	20	21	22
132.5	32	25	19	17	17	17	17	18	18	18	18	20
135	26	21	18	18	18	17	17	17	17	17	17	17
137.5	21	20	19	19	18	18	18	18	17	16	16	16
140	20	20	19	19	18	18	18	18	17	16	15	15
142.5	20	20	20	19	19	18	18	17	16	15	14	14
145	20	19	19	19	19	18	17	16	15	14	14	13
147.5	18	18	18	18	18	17	16	15	14	13	13	12
150	16	16	16	16	15	15	14	14	13	12	11	11
152.5	13	13	13	13	13	13	12	11	10	10	10	9
155	12	12	11	11	11	10	10	9	9	8	8	8
157.5	11	10	10	10	10	9	8	8	7	7	7	7
160	10	10	9	9	8	8	8	7	7	7	7	6
162.5	8	8	8	8	7	7	7	7	7	6	6	6
165	7	7	7	7	6	6	6	6	6	5	5	5
167.5	5	5	5	5	5	4	4	4	4	4	4	4
170	4	4	4	4	4	4	4	4	4	4	3	3
172.5	3	3	3	3	3	3	3	3	3	2	2	3
175	1	1	1	1	1	1	1	1	1	1	1	1
177.5	1	1	1	1	1	1	1	1	1	1	1	1
180	1	1	1	1	1	1	1	1	1	1	1	1

Vertical	Horizontal Angles											
Angle	90	92.5	95	97.5	100	102.5	105	107.5	110	112.5	115	117.5
0	117	117	117	117	117	117	117	117	117	117	117	117
2.5	116	116	116	115	115	115	115	115	115	114	114	114
5	115	114	114	113	113	113	113	112	112	111	110	110
7.5	117	116	116	115	114	114	113	112	111	110	110	109
10	123	121	120	120	118	117	116	115	113	112	110	108
12.5	127	126	124	123	122	120	119	117	115	113	110	109
15	128	126	125	124	122	120	118	116	113	111	109	106
17.5	129	127	125	124	122	119	117	114	111	109	106	104
20	131	128	127	124	122	118	116	112	109	106	103	101
22.5	132	130	127	124	121	117	114	110	107	104	100	96
25	140	137	134	130	126	121	117	113	109	104	98	93
27.5	149	146	141	132	127	122	117	113	107	102	96	91
30	157	149	144	137	128	122	116	109	103	98	92	86
32.5	164	155	147	138	130	121	112	105	98	92	87	81
35	176	166	154	139	128	118	111	103	96	89	81	75
37.5	194	176	158	139	127	115	107	99	91	85	77	72
40	205	184	161	141	127	114	105	95	85	79	73	68
42.5	213	189	162	141	125	113	102	91	82	75	69	64
45	229	198	162	138	124	111	99	89	80	73	67	62
47.5	247	203	160	135	120	109	97	87	79	72	66	60
50	265	205	158	131	116	104	94	85	78	71	65	57
52.5	283	210	157	128	115	104	93	84	77	70	62	54
55	286	204	149	123	111	100	91	82	75	68	61	54
57.5	286	195	140	117	105	95	88	81	73	66	60	53
60	300	197	138	116	107	96	87	78	71	66	59	52
62.5	320	198	136	113	103	93	86	79	73	66	59	53
65	325	191	133	111	102	93	86	80	73	67	60	55
67.5	329	182	127	107	100	93	89	83	77	70	64	59
70	315	170	121	104	97	93	90	85	79	75	70	65
72.5	272	148	113	98	95	93	89	85	81	77	72	67
75	208	116	98	92	92	91	91	89	86	82	77	69
77.5	155	96	88	86	89	91	92	92	90	87	82	74
80	119	84	79	79	82	85	87	89	90	87	84	78
82.5	90	73	71	73	77	82	86	88	88	87	83	78
85	70	61	62	68	74	81	85	88	88	87	83	77
87.5	54	52	55	63	70	76	82	88	90	89	86	81
90	43	46	51	58	66	74	80	85	88	88	87	84
92.5	40	43	49	55	63	69	74	79	82	83	82	80
95	40	42	47	52	58	64	68	74	75	77	77	74
97.5	39	40	43	47	52	58	63	68	70	71	71	70
100	39	40	43	44	49	52	57	61	63	65	65	64
102.5	40	40	42	43	46	49	52	55	57	58	59	59
105	40	40	41	41	43	46	49	50	51	52	52	52
107.5	40	41	41	40	41	43	44	45	46	46	47	46
110	41	41	40	39	39	40	40	40	41	41	41	40
112.5	41	41	39	38	37	37	37	37	37	37	36	35
115	39	39	38	35	35	35	35	34	34	33	32	31
117.5	38	38	36	34	32	32	32	32	32	31	29	28
120	35	35	34	32	31	30	30	29	29	27	26	25
122.5	32	33	31	29	28	28	27	26	25	24	23	22
125	30	30	29	26	25	25	24	24	22	21	21	19
127.5	26	26	25	24	22	21	21	20	20	19	18	17
130	23	23	22	20	19	18	18	18	17	17	16	15
132.5	20	20	19	18	17	16	16	15	15	15	15	14
135	18	18	17	16	15	15	15	15	14	14	13	13
137.5	16	16	15	15	14	14	13	13	13	13	12	12
140	15	15	14	14	13	13	13	12	12	11	11	11
142.5	14	14	13	13	13	12	11	11	11	11	10	10
145	13	13	13	12	12	11	11	10	10	10	10	10
147.5	12	12	11	11	11	10	10	10	10	9	9	9
150	10	10	10	10	10	10	9	9	8	8	8	7
152.5	9	9	8	8	8	8	7	7	7	7	7	7
155	8	7	7	7	7	7	7	6	6	6	6	5
157.5	7	7	6	6	6	6	6	6	5	5	5	5
160	6	6	6	6	6	6	5	5	5	5	5	5
162.5	6	6	6	5	5	5	5	5	5	4	4	4
165	5	5	4	4	4	4	4	4	4	4	4	4
167.5	4	4	4	4	4	4	4	4	3	3	3	3
170	3	3	3	3	3	3	3	3	3	3	3	3
172.5	2	2	2	2	2	2	2	2	2	2	2	2
175	1	1	1	1	1	1	1	1	1	1	1	1
177.5	1	1	1	1	1	1	1	1	1	1	1	1
180	1	1	1	1	1	1	1	1	1	1	1	1

Vertical	Horizontal Angles											
Angle	120	122.5	125	127.5	130	132.5	135	137.5	140	142.5	145	147.5
0	117	117	117	117	117	117	117	117	117	117	117	117
2.5	114	114	114	114	114	113	113	113	113	113	113	113
5	110	110	109	109	109	109	109	109	109	109	108	107
7.5	108	107	106	105	105	104	103	102	102	102	101	100
10	107	105	104	103	102	100	99	98	97	96	96	95
12.5	107	105	102	101	99	98	96	95	93	92	91	90
15	104	102	101	99	97	95	93	91	90	89	87	85
17.5	102	99	97	95	93	91	89	87	85	82	80	78
20	98	95	92	90	88	85	82	79	77	74	72	70
22.5	93	90	87	84	80	77	74	72	70	68	66	64
25	89	85	80	77	73	70	68	66	64	63	62	61
27.5	85	81	76	72	68	66	64	62	61	59	58	57
30	80	75	71	68	66	63	60	58	56	53	51	49
32.5	75	71	67	64	62	59	56	53	49	46	42	38
35	70	66	63	60	57	53	50	46	41	36	33	30
37.5	68	63	59	55	52	47	43	39	35	31	28	26
40	63	59	54	50	45	40	36	33	30	27	25	24
42.5	60	54	49	44	39	36	32	29	27	25	24	23
45	56	50	45	40	36	33	31	28	26	24	23	22
47.5	53	47	42	38	35	32	29	27	25	24	22	21
50	50	45	41	38	34	31	28	26	24	22	20	18
52.5	49	44	40	37	34	30	27	24	21	20	18	16
55	49	44	40	37	32	29	26	22	20	18	15	14
57.5	48	43	40	36	31	27	24	21	18	15	14	12
60	48	43	39	35	30	26	22	19	17	14	12	10
62.5	48	43	40	35	30	26	22	18	15	13	11	8
65	50	46	40	36	31	26	22	18	15	12	10	7
67.5	54	49	43	38	32	27	23	18	15	11	9	7
70	58	51	45	39	34	28	23	18	15	12	9	7
72.5	60	54	47	41	35	29	24	20	16	13	10	7
75	63	56	50	43	38	31	26	21	17	14	11	8
77.5	67	60	54	47	39	32	27	22	18	14	11	8
80	71	66	58	50	42	35	29	24	19	15	12	9
82.5	73	68	61	52	44	37	30	25	20	16	13	10
85	74	68	60	52	44	37	31	26	21	17	13	10
87.5	76	69	60	52	43	37	31	26	21	17	13	10
90	79	72	63	54	45	38	31	25	21	16	13	10
92.5	78	72	64	54	46	39	32	26	21	16	13	10
95	72	67	60	53	46	40	34	28	22	17	13	10
97.5	68	63	56	49	44	38	33	27	22	18	13	10
100	63	58	52	47	41	36	31	26	21	17	13	10
102.5	57	53	49	43	39	34	29	24	20	16	13	10
105	50	47	43	40	36	32	27	23	19	15	12	10
107.5	44	41	38	36	32	29	25	21	18	15	12	10
110	39	36	34	31	28	25	22	19	16	13	11	9
112.5	34	32	30	28	25	22	19	17	14	12	10	8
115	29	27	26	24	22	20	18	15	13	11	10	8
117.5	26	24	22	21	19	17	15	14	12	10	9	8
120	23	21	20	18	17	15	14	13	11	10	8	7
122.5	20	19	17	16	15	14	13	11	10	9	8	7
125	18	17	15	15	14	13	11	10	10	8	7	6
127.5	16	15	15	14	13	12	10	10	9	7	7	6
130	15	14	13	13	11	10	10	8	8	7	6	5
132.5	14	13	12	11	10	10	9	8	7	7	6	5
135	12	12	11	10	10	9	8	7	7	7	6	5
137.5	11	11	10	10	9	9	8	7	7	6	6	5
140	10	10	10	9	9	8	7	7	7	6	5	4
142.5	10	10	9	9	8	7	7	7	6	6	5	4
145	9	9	8	8	7	7	7	6	6	5	4	4
147.5	8	8	8	7	7	7	6	6	5	4	4	3
150	7	7	7	6	6	6	5	4	4	4	3	3
152.5	6	6	6	5	5	4	4	4	4	3	3	3
155	5	5	5	5	5	4	4	4	4	4	3	3
157.5	5	5	5	4	4	4	4	4	4	3	3	2
160	4	4	4	4	4	4	4	3	3	3	2	2
162.5	4	4	4	4	4	4	3	3	3	3	2	2
165	4	4	3	3	3	3	3	2	2	2	1	1
167.5	3	3	3	3	2	2	2	2	2	1	1	1
170	2	2	2	2	2	2	2	1	1	1	1	1
172.5	2	1	1	1	1	1	1	1	1	1	1	1
175	1	1	1	1	1	1	1	1	1	1	1	1
177.5	1	1	1	1	1	1	1	1	1	1	1	1
180	1	1	1	1	1	1	1	1	1	1	1	1

Vertical	Horizontal Angles											
Angle	150	152.5	155	157.5	160	162.5	165	167.5	170	172.5	175	177.5
0	117	117	117	117	117	117	117	117	117	117	117	117
2.5	113	113	113	113	112	112	112	112	112	112	112	111
5	107	107	107	106	106	106	105	105	105	105	105	105
7.5	100	100	100	100	99	99	99	99	98	98	98	98
10	94	93	93	93	93	93	92	92	92	91	91	91
12.5	89	88	88	87	86	86	86	85	85	85	85	85
15	84	83	81	80	79	78	77	77	77	76	76	75
17.5	76	74	72	71	69	68	68	67	66	66	66	66
20	68	66	65	63	63	61	60	60	60	59	59	58
22.5	63	61	60	59	58	57	57	57	56	55	54	54
25	60	58	57	55	54	53	52	52	51	50	49	48
27.5	55	53	51	48	46	45	43	43	41	40	38	38
30	46	43	40	37	35	32	31	29	28	27	26	26
32.5	35	32	30	28	26	24	24	23	22	22	21	21
35	28	26	24	24	23	22	21	21	21	20	20	20
37.5	25	24	23	22	22	21	21	21	21	21	21	21
40	24	23	22	22	21	21	21	21	21	20	20	20
42.5	22	22	21	21	20	20	18	18	17	17	16	16
45	21	21	19	18	17	17	15	15	14	14	14	13
47.5	19	18	17	15	14	14	13	12	11	11	11	11
50	17	15	14	13	12	11	10	10	9	8	8	8
52.5	14	13	12	10	10	8	7	7	7	6	6	6
55	12	11	10	8	7	7	6	5	5	4	4	4
57.5	10	9	7	6	6	4	4	3	3	3	3	3
60	8	7	6	4	4	3	2	2	1	1	1	1
62.5	7	6	4	3	2	1	1	1	1	1	1	1
65	6	4	3	2	1	1	0	0	0	0	0	0
67.5	5	4	2	1	1	0	0	0	0	0	0	0
70	5	4	3	1	1	0	0	0	0	0	0	0
72.5	6	4	3	2	1	0	0	0	0	0	0	0
75	6	4	3	2	1	1	0	0	0	0	0	0
77.5	6	4	3	2	1	1	0	0	0	0	0	0
80	7	5	4	3	1	1	0	0	0	0	0	0
82.5	7	5	4	3	2	1	1	1	0	0	0	0
85	7	6	4	3	2	1	1	1	1	0	0	0
87.5	7	6	4	3	2	1	1	1	1	1	1	1
90	7	6	4	3	2	1	1	1	1	1	1	1
92.5	7	6	4	4	2	1	1	1	1	1	1	1
95	8	6	5	4	2	1	1	1	1	1	1	1
97.5	8	7	5	4	3	1	1	1	1	1	1	1
100	8	7	5	4	3	1	1	1	1	1	1	1
102.5	8	7	5	4	3	1	1	1	1	1	1	1
105	8	6	5	4	2	1	1	1	1	1	1	1
107.5	8	6	5	4	2	1	1	1	1	1	1	1
110	7	6	4	3	2	1	1	1	1	1	0	1
112.5	7	6	4	3	2	1	1	1	1	1	0	0
115	7	6	4	3	2	1	1	1	1	0	0	0
117.5	7	5	4	3	2	1	1	1	1	1	0	0
120	6	5	4	3	2	1	1	1	1	0	0	0
122.5	6	4	4	2	1	1	1	1	0	0	0	0
125	5	4	3	2	1	1	1	1	0	0	0	0
127.5	5	4	3	2	1	1	1	1	0	0	0	0
130	4	4	3	2	1	1	1	0	0	0	0	0
132.5	4	4	3	2	1	1	1	1	0	0	0	0
135	4	4	3	2	1	1	1	0	0	0	0	0
137.5	4	3	3	1	1	1	1	1	0	0	0	0
140	4	3	2	1	1	1	0	0	0	0	0	0
142.5	4	3	2	1	1	1	1	0	0	0	0	0
145	3	2	2	1	1	1	1	0	0	0	0	0
147.5	3	2	2	1	1	1	1	1	0	0	0	0
150	2	2	1	1	1	1	1	0	0	0	0	0
152.5	2	2	1	1	1	1	0	0	0	0	0	0
155	2	2	1	1	1	1	1	0	0	0	0	0
157.5	2	1	1	1	1	1	0	0	0	0	0	0
160	1	1	1	1	1	1	1	1	0	0	0	0
162.5	1	1	1	1	1	1	1	1	0	0	0	0
165	1	1	1	1	1	1	1	0	0	0	0	0
167.5	1	1	1	1	1	1	1	0	0	0	0	0
170	1	1	1	1	1	1	1	0	0	0	0	0
172.5	1	1	1	1	1	1	1	1	0	0	0	0
175	1	1	1	1	1	1	1	0	0	0	0	0
177.5	1	1	1	1	1	1	1	0	0	0	0	0
180	1	1	1	1	1	1	1	1	1	1	1	1

Vertical Angle	Horizontal Angles 180
0	117
2.5	110
5	103
7.5	96
10	89
12.5	83
15	72
17.5	62
20	57
22.5	53
25	46
27.5	34
30	24
32.5	21
35	21
37.5	21
40	20
42.5	16
45	13
47.5	11
50	8
52.5	6
55	4
57.5	3
60	2
62.5	1
65	0
67.5	0
70	0
72.5	0
75	0
77.5	0
80	0
82.5	0
85	1
87.5	0
90	0
92.5	1
95	0
97.5	1
100	1
102.5	1
105	0
107.5	0
110	0
112.5	0
115	0
117.5	0
120	0
122.5	0
125	0
127.5	0
130	0
132.5	0
135	0
137.5	0
140	0
142.5	0
145	0
147.5	0
150	0
152.5	0
155	0
157.5	0
160	0
162.5	0
165	0
167.5	0
170	0
172.5	0
175	0
177.5	0
180	1