SPRINKLER DESIGN BASIS 1

PROTECTION AREA	NEW BUILDING ADDITION
SYSTEM TYPE	AUTOMATIC WET
DESIGN STANDARD	NFPA 13
OCCUPANCY CLASSIFICATION	LIGHT HAZARD
DESIGN BASIS CODE REFERENCE	NFPA 13 FIGURE 19.2.3 WATER DEMAND REQUIREMENTS - HYDRAULIC CALCULATION METHODS
DESIGN BASIS DENSITY	.10 GPM/FT²
REMOTE AREA COVERAGE	900 FT². QR REDUCTION FOR 10 FT CEILINGS [NFPA 13 19.2.3.2.3]
REQUIRED HOSE ALLOWANCE:	100 GPM INTERIOR
MAX. COVERAGE AREA:	400 FT²
MAX. SPACING:	20 Ft
HYDRAULIC CALCULATION SUMMARY	
NO. OF SPRINKLERS CALCULATED	4
HOSE STREAM INTERIOR	100 GPM
HOSE STREAM EXTERIOR	1000 GPM FIRE FLOW
SYSTEM DEMAND @ BASE OF RISER	208 GPM @ 46 PSI
TOTAL DEMAND @ CITY MAIN	1108 GPM @ 72.4 PSI
PRESSURE SAFETY MARGIN	54 PSI / 27 PSI

SPRINKLER DESIGN BASIS 2

PROTECTION AREA	EXISTING BLDG 2ND FLOOR
SYSTEM TYPE	AUTOMATIC WET
DESIGN STANDARD	NFPA 13
OCCUPANCY CLASSIFICATION	LIGHT HAZARD
DESIGN BASIS CODE REFERENCE	NFPA 13 FIGURE 19.2.3 WATER DEMAND REQUIREMENTS - HYDRAULIC CALCULATION METHODS
DESIGN BASIS DENSITY	.10 GPM/FT²
REMOTE AREA COVERAGE	945 FT². QR REDUCTION FOR 12 FT CEILINGS [NFPA 13 19.2.3.2.3]
REQUIRED HOSE ALLOWANCE:	100 GPM INTERIOR
MAX. COVERAGE AREA:	400 FT²
MAX. SPACING:	20 Ft
HYDRAULIC CALCULATION SUMMARY	
NO. OF SPRINKLERS CALCULATED	5
HOSE STREAM INTERIOR	100 GPM
HOSE STREAM EXTERIOR	1000 GPM FIRE FLOW
SYSTEM DEMAND @ BASE OF RISER	213.4 GPM @ 48.3 PSI
TOTAL DEMAND @ CITY MAIN	1113.4 GPM @ 74.6 PSI
PRESSURE SAFETY MARGIN	51.7 PSI / 24.7 PSI

1 SPRINKLER DESIGN BASIS
SCALE: NONE

HAZARD OCCUPANCY IDENTIFICATION SCHEDULE

ROOM HATCH PATTERN	OCCUPANCY	MINIMUM WATER DENSITY	MINIMUM REMOTE AREA	MAXIMUM SPRINKLER COVERAGE AREA		MAXIMUM SPRINKLER SPACING	
				STANDARD COVERAGE	EXTENDED COVERAGE	STANDARD COVERAGE	EXTENDED COVERAGE
	LIGHT HAZARD	.10 GPM/FT²	1,500 FT²	225 FT²	400 FT²	15'-0"	20'-0"
	ORDINARY HAZARD GROUP 1	.15 GPM/FT²	1,500 FT²	130 FT²	400 FT²	15'-0"	20'-0"
	ORDINARY HAZARD GROUP 2	.20 GPM/FT²	1,500 FT²	130 FT²	400 FT²	15'-0"	20'-0"
	NOT IN CONTRACT						

NOTES:
1. QUICK-RESPONSE SPRINKLERS SHALL NOT BE USED IN EXTRA HAZARD OCCUPANCIES.
2. HORIZONTAL SIDEWALL SPRINKLERS SHALL NOT BE USED IN EXTRA HAZARD OCCUPANCIES.
3. MAXIMUM SPRINKLER COVERAGE AREA AND SPRINKLER SPACING BASED ON NONCOMBUSTIBLE, UNOBSTRUCTED CONSTRUCTION WITH A HYDRAULICALLY CALCULATED SYSTEM. VALUES MAY BE DIFFERENT THAN SHOWN ABOVE IF CONSTRUCTION DIFFERS.
4. MAXIMUM SPRINKLER COVERAGE AREA AND SPRINKLER SPACING ARE FOR PENDENT AND UPRIGHT SPRINKLERS ONLY. FOR SIDEWALL, RESIDENTIAL, CMSA, AND ESFR SPRINKLER VALUES, REFER TO RELEVANT CHAPTERS 10 THROUGH 15 IN NFPA 13.
5. FOR LIGHT AND ORDINARY HAZARD OCCUPANCIES, A REDUCTION IN THE MINIMUM REMOTE AREA SHALL BE PERMITTED ON WET PIPE SYSTEMS WHERE QUICK-RESPONSE SPRINKLERS ARE USED IN A CEILING WITH A MAXIMUM CEILING HEIGHT OF 20 FEET. REFER TO SECTION 19.3.3.2.3 OF NFPA 13 FOR FULL LIST OF REQUIREMENTS AND FOR MORE INFORMATION.
6. MINIMUM REMOTE AREAS ASSUME FLAT CEILINGS AND WET PIPE CONFIGURATIONS. DESIGNER SHALL REFER TO NFPA 13 FOR REQUIREMENTS OF ALTERNATE CONFIGURATIONS.

SPRINKLER PIPE HANGER SCHEDULE (MAX DISTANCE BETWEEN HANGERS)

PIPE MATERIAL	NOMINAL PIPE SIZE (INCHES)											
	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"	8"
STEEL PIPE EXCEPT THREADED LIGHTWALL	N/A	12-0	12-0	15-0	15-0	15-0	15-0	15-0	15-0	15-0	15-0	15-0
THREADED LIGHTWALL STEEL PIPE	N/A	12-0	12-0	12-0	12-0	12-0	12-0	N/A	N/A	N/A	N/A	N/A
COPPER TUBE	8-0	8-0	10-0	10-0	12-0	12-0	12-0	15-0	15-0	15-0	15-0	15-0
CPVC	5-6	6-0	6-6	7-0	8-0	9-0	10-0	N/A	N/A	N/A	N/A	N/A
DUCTILE-IRON PIPE	N/A	N/A	N/A	N/A	N/A	N/A	15-0	N/A	15-0	N/A	15-0	15-0

HANGER ROD SIZES
3/8" DIAMETER FOR PIPE 4" AND SMALLER
1/2" DIAMETER FOR PIPE 5"-8"
5/8" DIAMETER FOR PIPE 10" AND LARGER

Schedule Notes

FIRE PROTECTION ABBREVIATIONS

(E)	EXISTING
ABD	AUTOMATIC BALL DRIP
AFF	ABOVE FINISHED FLOOR
AVV	AIR VENTING VALVE
BFP	BACKFLOW PREVENTER
BL	SPRINKLER BRANCH LINE
BOS	BOTTOM OF STEEL
BV	BUTTERFLY VALVE
CLG	CEILING
CM	SPRINKLER CROSS MAIN
CONT	CONTINUATION
CSR	COMBINATION STANDPIPE/RISER
CTE	CONNECT TO EXISTING
D-SPR	DRY PIPE SPRINKLER SYSTEM
DCDA	DOUBLE CHECK DETECTOR ASSEMBLY
DIP	DUCTILE IRON PIPE
DN	DOWN
DR	DRAIN RISER
EC	ELECTRICAL CONTRACTOR
EH	EXTRA HAZARD
ELEV	ELEVATION
EOR	ENGINEER OF RECORD
EXT	EXTERIOR
F	FIRE SERVICE SUPPLY PIPING
FDC	FIRE DEPARTMENT CONNECTION
FE	FIRE EXTINGUISHER
FFE	FINISHED FLOOR ELEVATION
FHC	FIRE DEPARTMENT HOSE VALVE CABINET
FHV	FIRE DEPARTMENT HOSE VALVE
FSC	FIRE SUPPRESION CONTRACTOR
GPM	GALLONS PER MINUTE
LH	LIGHT HAZARD
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NPT	NATIONAL PIPE THREAD
OH	ORDINARY HAZARD
OS&Y	OUTSIDE STEM AND YOLK
PIV	POST INDICATOR VALVE
PRV	PRESSURE REDUING VALVE
PSI	POUNDS PER SQUARE INCH
RPZ	REDUCED PRESSURE ZONE
SP	STANDPIPE
SR	SPRINKLER RISER
TH	TEST HEADER
TOS	TOP OF STEEL
TYP	TYPICAL
VIV	VALVE IN VERTICAL
VS	TAMPER SWITCH/VALVE SUPERVISORY
WF	WATERFLOW SWITCH
WPIV	WALL INDICATOR VALVE

PIPING & VALVE LEGEND

	ELBOW - TURNED DOWN
	ELBOW - TURNED UP
	TEE - DOWN
	TEE - UP
	TOP CONENCTION
	BOTTOM CONNECTION
	REDUCER
	UNION
	FLANGED CONNECTION
	BLIND FLANGE
	CAP OR PLUG
	PIPE BREAK
	VALVE (GENERIC)
	OS&Y VALVE
	BALL VALVE
	INDICATING TYPE BUTTERFLY VALVE
	CHECK VALVE
	WYE STRAINER
	BASKET STRAINER
	POST-INDICATOR VALVE
	BACKFLOW PREVENTER - DOUBLE CHECK
VS	VALVE SUPERVISORY / TAMPER SWITCH
WF	WATERFLOW SWITCH
	PRESSURE GAUGE
F/Z	FLOOR/ZONE CONTROL VALVE ASSEMBLY
	RISER/STANDPIPE
	WET SYSTEM RISER

FIRE SUPPRESSION GENERAL NOTES:

1. DO NOT SCALE DRAWINGS.
2. THE FIRE SUPPRESSION SYSTEM AND SPECIFICATION ARE DIAGRAMMATIC ONLY AND ARE INTENDED FOR USE BY THE LICENSED SYSTEM DESIGNER AS A REFERENCE OF THE DESIGN CRITERIA ONLY.
3. THE FOLLOWING CODES AND STANDARDS SHALL GOVERN THE DESIGN OF THE FIRE SUPPRESSION SYSTEM(S):
   A. OHIO BUILDING CODE (OBC), 2024 EDITION
   B. OHIO FIRE CODE (OFC), 2025 EDITION
   C. NFPA 13 – STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS, 2022 EDITION
   D. NFPA 25 – STANDARD FOR THE INSPECTION, TESTING, AND MAINTENANCE OF WATER-BASED FIRE PROTECTION SYSTEMS, 2023 EDITION.
   E. CITY OF WESTLAKE LOCAL CODES AND ORDINANCES
4. THE FIRE SUPPRESSION CONTRACTOR'S SCOPE OF WORK SHALL INCLUDE, BUT IS NOT LIMITED TO THE FOLLOWING:
   A. PRODUCTION OF COMPLETE WORKING PLANS AND HYDRAULIC CALCULATIONS IN ACCORDANCE WITH NFPA 13 AND THE DESIGN CRITERIA DRAWINGS FOR ALL FLOORS OF THE ENTIRE BUILDING.
   B. PERFORM OR REQUEST REQUIRED FLOW TEST IN ACCORDANCE WITH NFPA 291.
   C. INSTALLATION OF A COMPLETE AND FULLY OPERATIONAL AUTOMATIC SPRINKLER SYSTEM THROUGHOUT AS SHOWN WITHIN THESE DRAWINGS COMPLIANT WITH NFPA 13 AND WITH ALL GOVERNING CODES AND STANDARDS.
   D. OBTAINING ALL LOCALLY REQUIRED PERMITS AND APPROVALS FROM THE AUTHORITY HAVING JURISDICTION AND, WHEN REQUIRED, APPROVAL OF THE OWNER'S INSURANCE CARRIER.
5. PRIOR TO COMMENCING INSTALLATION, THE CONTRACTOR SHALL SUBMIT ALL WORKING PLANS, HYDRAULIC CALCULATIONS, AND PRODUCT SUBMITTALS TO THE ARCHITECT/ENGINEER, AUTHORITY HAVING JURISDICTION, AND OWNER'S INSURANCE CARRIER (WHEN REQUIRED) FOR APPROVAL.
6. WORKING PLANS SHALL INCLUDE ALL APPLICABLE ITEMS AS OUTLINED IN SECTION 28.1 OF NFPA 13 AND BEAR THE SEAL OF THE STATE LICENSED SPRINKLER DESIGNER RESPONSIBLE FOR THEIR PREPARATION.
7. HYDRAULIC CALCULATIONS SHALL INCLUDE ALL APPLICABLE ITEMS AS OUTLINED IN SECTION 28.4 OF NFPA 13 AND BEAR THE SEAL OF THE STATE LICENSED SPRINKLER DESIGNER RESPONSIBLE FOR THEIR PREPARATION.
8. THE INDIVIDUAL RESPONSIBLE FOR THE PREPARATION OF ALL WORKING PLANS AND HYDRAULIC CALCULATIONS SHALL BE A LICENSED SPRINKLER DESIGNER, IN GOOD STANDING WITH THE STATE, AND POSSESS, AT MINIMUM, A NICET LEVEL 3 CERTIFICATION.
9. ALL SPRINKLER LOCATIONS SHALL BE COORDINATED WITH THE ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, HVAC DIFFUSERS, AND ALL OTHER CEILING MOUNTED EQUIPMENT. SPRINKLERS INSTALLED IN CEILINGS OF FINISHED AREAS SHALL BE SYMMETRICAL IN RELATION TO THE CEILING SYSTEM AND CEILING MOUNTED COMPONENTS AND BE LOCATED ALONG THE CENTERLINE OF THE LONG DIMENSION OF CEILING TILES.
10. ALL SPRINKLERS SHALL BE OF QUICK RESPONSE TYPE AND BE OF ORDINARY TEMPERATURE CLASSIFICATION UNLESS SPECIFICALLY REQUIRED TO BE OF A HIGHER TEMPERATURE CLASSIFICATION WITHIN THESE DOCUMENTS OR BY NFPA 13.
11. PROVIDE ADDITIONAL SPRINKLERS BELOW OBSTRUCTIONS GREATER THAN 4'-0" IN WIDTH SUCH AS DUCT WORK, OVERHEAD GARAGE DOORS, OR OTHER ARCHITECTURAL FEATURES.
12. WHERE SPRINKLERS ARE REQUIRED IN LIMITED AREAS SUBJECT TO TEMPERATURES LESS THAN 40° F SUCH AS WALK-IN COOLERS AND FREEZERS, VESTIBULES, OR EXTERIOR PROJECTIONS, DRY BARREL SPRINKLERS SUPPLIED FROM A WET PIPE SYSTEM MAY BE UTILIZED IN ACCORDANCE WITH THEIR LISTINGS.
13. ALL WORK SHALL BE COMPLETED IN A WORKMANLIKE MANNER AND WORKPLACE PRACTICES SHALL CONFORM TO OSHA AND OTHER LOCALLY ENFORCED SAFETY STANDARDS. HOT WORK PERFORMED ON THE PREMISES SHALL BE AVOIDED, USING SHOP FABRICATION WHEREVER POSSIBLE.
14. ALL SPRINKLER SYSTEM PENETRATIONS REQUIRED THROUGH FIRE RATED CONSTRUCTION SHALL BE PROTECTED AS REQUIRED BY OBC 714. FIRESTOPPING SHALL BE DONE USING APPROVED METHODS AND SHALL BE USED TO MAINTAIN FIRE SEPARATION RESISTANCE RATINGS. REFER TO ARCHITECTURAL LIFE SAFETY PLANS AND SPECIFICATIONS FOR WALL RATINGS, LOCATIONS, AND CONSTRUCTION TYPE. FIRESTOPPING METHOD SHALL BE INSTALLED PER SPECIFICATION 07 84 00 TO CONFORM TO WALL RATING AND CONSTRUCTION.
15. FIRE PROTECTION PIPING SHALL BE ROUTED CONCEALED IN FINISHED AREAS WHEREVER POSSIBLE AND SHALL NOT BE ROUTED THROUGH OR ABOVE ELECTRICAL SWITCHGEAR OR ROOMS, ELEVATOR SHAFTS, ELEVATOR MACHINE ROOMS, PIPING/DUCT SHAFTS, OR TECHNOLOGY ROOMS UNLESS SUPPLYING THAT SPECIFIC AREA.
16. DRAINS ASSOCIATED WITH FIRE PROTECTION SYSTEMS SHALL BE EXTENDED FULL SIZE TO BUILDING EXTERIOR 6" ABOVE GRADE WITH SPLASH BLOCK UNLESS OTHERWISE INDICATED. DISCHARGE MUST BE IN NON-PEDESTRIAN OR NON-PUBLIC ACCESS AREAS.
17. PROVIDE AN AIR VENT ON EACH WET PIPE SYSTEM PER SECTION 16.7 OF NFPA 13. AIR VENT SHALL BE LOCATED NEAR HIGH POINT OF THE SYSTEM TO ALLOW FOR AIR TO BE REMOVED FROM THAT PORTION OF THE SYSTEM BY ONE OF THE FOLLOWING METHODS: MANUAL VALVE 1/2" MIN., AUTOMATIC AIR VENT, OR OTHER APPROVED METHOD. IF INSTALLED HIGHER THAN 7'-0" AFF, MANUAL VALVES NOT PERMITTED.
18. PROVIDE INSPECTOR'S TEST CONNECTION DOWNSTREAM OF THE WATERFLOW OR INSPECTOR'S TEST AND DRAIN AT THE RISER. INSPECTOR'S TEST CONNECTION CAN BE COUPLED WITH THE AIR VENT ON A WET SPRINKLER SYSTEM.
19. ALL PIPING SHALL BE HUNG AND/OR SUPPORTED IN ACCORDANCE WITH CHAPTER 17 OF NFPA 13 WITH ALL APPURTENANCES SELECTED AND LOCATED BY THE SPRINKLER DESIGNER. THE SPRINKLER DESIGNER SHALL INFORM THE STRUCTURAL ENGINEER, IN WRITING, OF ANY SUSPENDED LOAD IN EXCESS OF 400 LBS.
20. ALL PIPING AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. SEE STRUCTURAL DRAWINGS AND SPECIFICATIONS FOR REQUIRED PRODUCTS AND INSTALLATION OF HANGARS AND SUPPORTS. FIRE PROTECTION EQUIPMENT AND PIPING SHALL NOT BE SUPPORTED FROM METAL DECK.
21. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL ITEMS NEEDED TO ELECTRONICALLY MONITOR AND SUPERVISE THE AUTOMATIC SPRINKLER SYSTEMS INSTALLED UNDER THIS PROJECT INCLUDING ALL SUPERVISORY SWITCHES AND FLOW SWITCHES. ALL SHUT OFF VALVES CAPABLE OF PREVENTING FLOW TO ONE OR MORE SPRINKLERS AND/OR FIRE DEPARTMENT HOSE VALVE SHALL BE AN INDICATING TYPE VALVE AND BE INSTALLED WITH A SUPERVISORY SWITCH MONITORED BY THE FIRE ALARM CONTROL PANEL. COORDINATE WIRING OF ELECTRICAL FIRE PROTECTION DEVICES AND EQUIPMENT WITH THE ELECTRICAL AND/OR FIRE ALARM CONTRACTOR AS APPLICABLE.
22. TEMPORARY ISOLATION VALVES SHALL BE PROVIDED AS REQUIRED DURING CONSTRUCTION FOR PRESSURE TESTING.
23. THE COMPLETE FIRE SUPPRESSION SYSTEM SHALL BE TESTED IN ACCORDANCE WITH ALL APPLICABLE CODES AND STANDARDS. ALL TESTING SHALL BE COORDINATED WITH THE OWNER, GENERAL CONTRACTOR, AND AUTHORITY HAVING JURISDICTION NO LESS THAN 48 HOURS PRIOR TO PLANNED TESTING.
24. THE CONTRACTOR SHALL PROVIDE AND INSTALL HYDRAULIC DESIGN INFORMATION SIGNS AND GENERAL INFORMATION SIGNS IN ACCORDANCE WITH SECTIONS 29.4 AND 29.6 OF NFPA 13.
25. THE CONTRACTOR SHALL PROVIDE AND INSTALL A SUPPLY OF SPARE SPRINKLERS IN ACCORDANCE WITH SECTION 16.2.7 OF NFPA 13.

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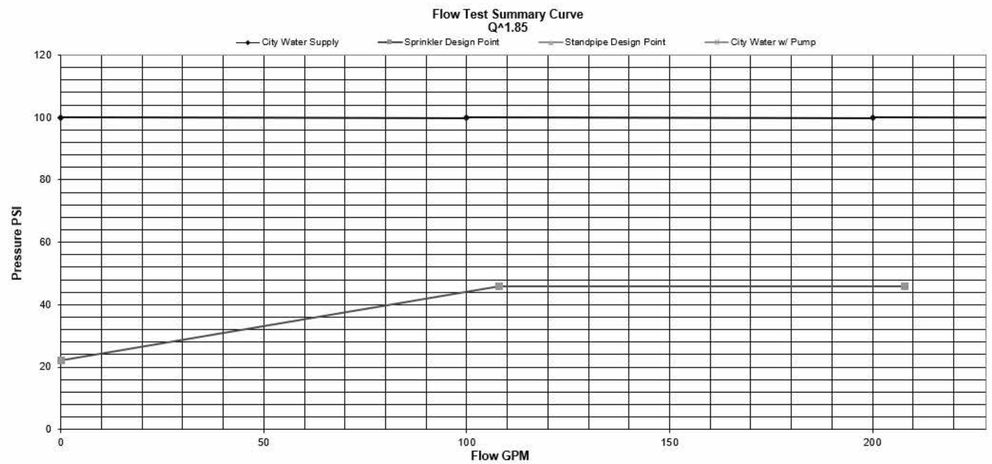
SPRINKLER DESIGN BASIS 1

NOTE: PRELIMINARY HYDRAULIC CALCULATIONS WERE PERFORMED USING THE 2026 HYDRANT FLOW TEST. A REMOTE AREA REDUCTION TO 900 FT WAS APPLIED FOR A 9'-0" CEILING PER NFPA 13 19.2.3.2.3. A 2 1/2" MAIN WAS ASSUMED TO BRING WATER TO THE NEW ADDITION.

Project:	Julie Biliart Westlake								
Test Date:	12/21/2020			Design Basis:	0.1 GPM/SF over 900 SF		Balancing Factor:	1.2	
Static Hydrant:	Crocker, 2nd hyd N Hummingbird			Sprinkler Design:	208 GPM / 46 PSI		Sprinkler K-factor:	5.6	
Flow Hydrant:	Crocker, 1st hyd N Hummingbird & 3rd hyd N of Hummingbird			Sprinkler Riser/Tie-in Size:	2.5 in / 6 in		Total Hose Demand:	100 GPM	
Ps	100.0 PSI	Test Static Pressure Reading		Standpipe Design:	N/A		Est. Floor Pressure Loss:	10.0 PSI	
Pr	90.0 PSI	Test Residual Pressure Reading		Standpipe Riser/Tie-in Size:	N/A		Est. Fixed Pressure Losses:	8.0 PSI	
GPMr	4751 GPM	Test Flow at Residual Pressure		Fire Pump Rating:	N/A		Dry Pipe/Pitched Roof:	N / N	
				PSI Headroom Sprinkler:	54.0 PSI	54%	PSI Headroom Standpipe:	N/A	N/A
				GPM Headroom Sprinkler:	3392 GPM	1631%	GPM Headroom Standpipe:	N/A	N/A



HYDRANT FLOW TEST DATA

TEST PERFORMED BY: CLEVELAND DIVISION OF WATER	
LOCATION: CROCKER RD	
DATE OF TEST:	05/08/2026
TIME OF TEST:	11:10 AM
MAIN SIZE:	16"
STATIC PRESSURE:	100 PSI
RESIDUAL PRESSURE:	90 PSI
FLOW DURING TEST:	4,751 GPM
FLOW AT 20 PSI RESIDUAL:	14,602 GPM
TEST HYDRANT ELEVATION:	706' AMSL

DS ARCHITECTURE
Cleveland, Ohio
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Julie Billiart Westlake Expansion
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Westlake, OH 44145

Julie Billiart Schools

Issue Description:
DEVELOPMENT PLANS

Revision Schedule

#	DATE	DESCRIPTION

Project #: 25058
Issue Date: 08/12/2026

FP0.01

FIRE PROTECTION NOTES