Incorporated 1910

Major Subdivision & MLD Preliminary Plan Application

Please complete all areas of this application in black or blue ink. Submit the completed application to the Cranston Planning Department *together* with all required and supporting documents and materials. Illegible or incomplete applications will not be reviewed.

Project Info

Project Info

Project Name: 530-532 Wellington Avenue Self Storage Facility

Assessor's Plat(s): 3 Assessor's Lot(s): 107

Project Address: 530 Wellington Avenue

Contact Information

Applicant

Name: CanAm RI LLC

Address: 530 Wellington Avenue, Cranston, RI 02910

Phone: 905-971-5622 Email: mjobb@tomikoinc.ca

Property Owner (*All* owners of record must be included for all lots involved)

Name: CanAm RI LLC

Address: 530 Wellington Avenue, Cranston, RI 02910

Phone: 905-971-5622 Email: mjobb@tomikoinc.ca

(If there are more owners please check here submit an addendum with this application form)

Attorney

Name: Robert D. Murray, Esq.

Address: 21 Garden City Drive, Cranston, RI 02920

Phone: 946-3800 Email: rdmurray@taftmcsally.com

Engineer

Name: Joe Casali Engineering Inc.

Address: 300 Post Road, Warwick, RI 02886

Phone: 401-944-1300 Email: dan@joecasali.com

Land Surveyor

Name: _____

Address: _____

Phone: _____ Email: _____

Owner/Applicant Signature

I/we hereby certify that I/we own the subject property and seek Major Subdivision and/or Major Land Development Preliminary Plan approval as drafted in the accompanying plans for review by the City Plan Commission.

CanAm RI LLC
By: Michael Jobb Member

Applicant Name & Title (please print) **Applicant Signature**

Date: _____

CanAm RI LLC
By: Michael Jobb Member

Owner Name (if different than above) (please print) **Owner Signature**

Date: _____

Owner Name (please print) **Owner Signature**

Date: _____

(If there are more owners please submit an addendum with this application form)

PRELIMINARY PLAN SUBMISSION for a PROPOSED

SELF-STORAGE FACILITY

530-532 WELLINGTON AVENUE
CRANSTON, RHODE ISLAND
AP 3, LOT 107

ZONING DISTRICT: INDUSTRIAL M-2

RENDERING COURTESY OF TACOMA ENGINEERS

APPROVALS:

CITY OF CRANSTON PLAN COMMISSION - MASTER PLAN APPROVAL (JUNE 6, 2024)

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT - WQC/STW #24-154/RIPDES #RIR102710 (JANUARY 2, 2025)

FILINGS:

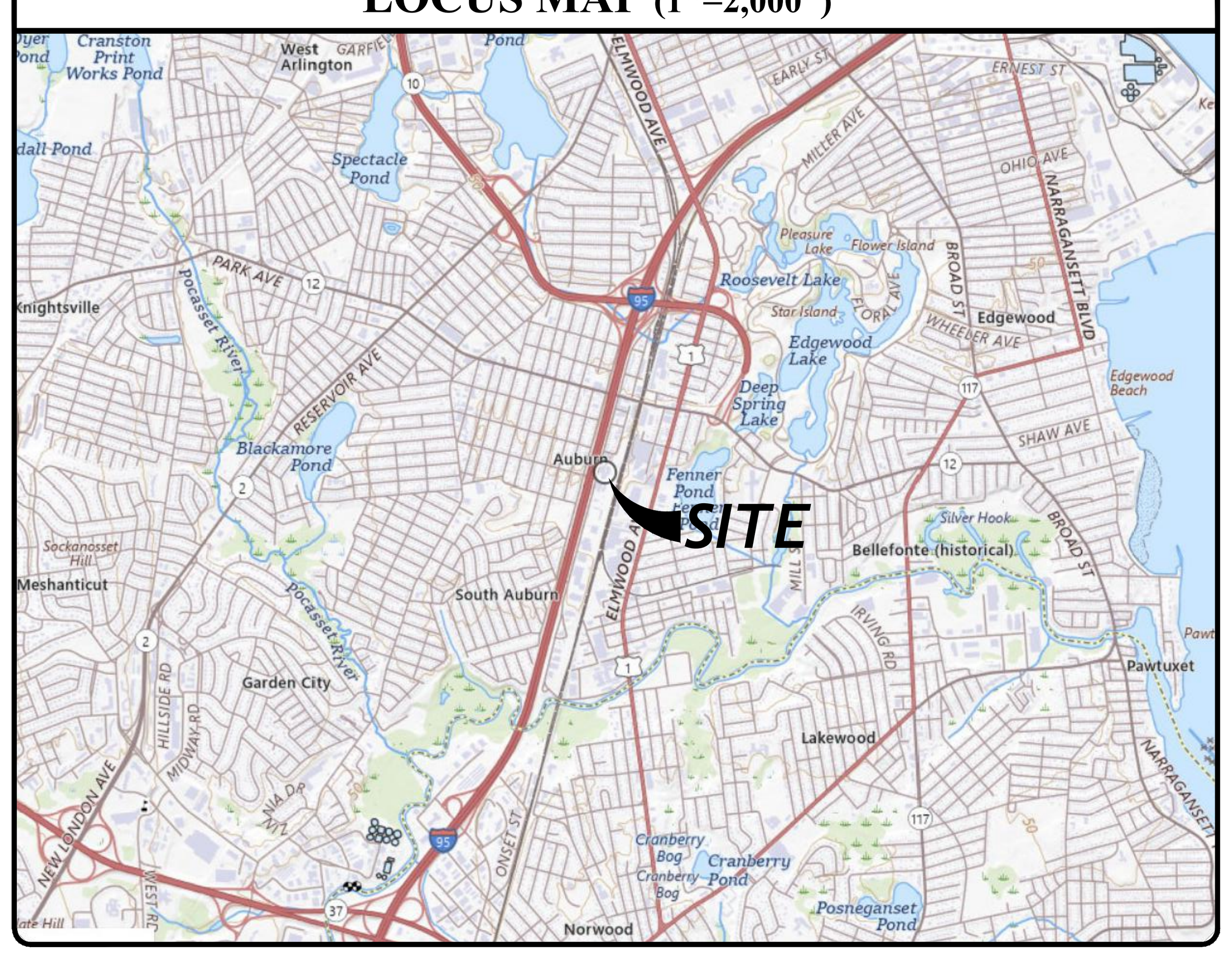
VEOLIA WATER / CRANSTON DEPARTMENT OF PUBLIC WORKS

PROVIDENCE WATER SUPPLY BOARD

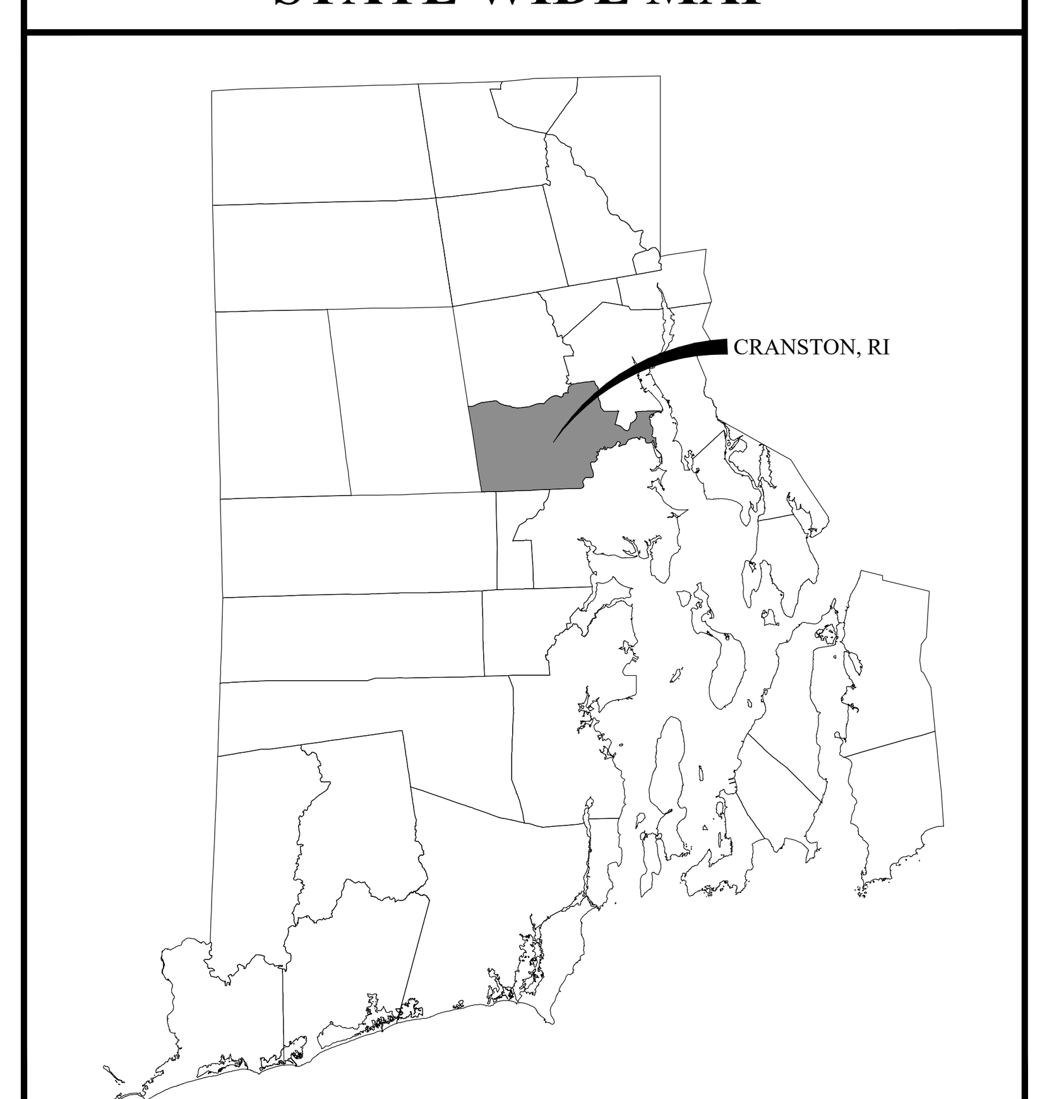
PROJECT TEAM

OWNER/ APPLICANT:	CANAM RI LLC / TOMIKO INC. ATTN: MIKE JOBB 530 WELLINGTON AVENUE CRANSTON, RI 02910-2950	*LAND SURVEYOR:*	GRS GROUP 300 SPECTRUM CENTER DR. SUITE 145 INVINE, CA 92618 PHONE: (300) 779-1167
CIVIL ENGINEER:	JOE CASALI ENGINEERING, INC. 300 POST ROAD WARWICK, RI 02888 PHONE: 401-944-1300 FAX: 401-944-1313 JOECASALI.COM	*LANDSCAPE ARCHITECT:*	DIANE SOULE & ASSOC. 422 FARNUM PIKE SMITHFIELD, RI 02917 PHONE: (401) 231-0736
ENVIRONMENTAL CONSULTANT:	SAGE ENVIRONMENTAL INC. 301 FRIENDSHIP STREET PROVIDENCE, RI 02903 PHONE: (888) 723-9920		

LOCUS MAP (1"=2,000')



STATE WIDE MAP



INDEX OF DRAWINGS

JCE
JOE CASALI ENGINEERING, INC.
CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WETLANDS · ISDS · TRAFFIC · FLOODPLAIN
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401)944-1313 FAX WWW.JOECASALI.COM

JOSEPH A. CASALI
No. 7250
REGISTERED PROFESSIONAL ENGINEER
CIVIL
1/7/2025

PROPOSED SELF-STORAGE FACILITY
530-532 WELLINGTON AVENUE
CRANSTON, RHODE ISLAND
AP 3, LOT 107

REVISIONS:

NO.	DATE.	DESCRIPTION

DESIGNED BY:	DRD
DRAWN BY:	JAS/SD
CHECKED BY:	JAC
DATE:	JAN. 2025
PROJECT NO:	24-25

PRELIMINARY, NOT FOR CONSTRUCTION

COVER SHEET

GENERAL NOTES:

1. ALTA/NSPS LAND TITLE SURVEY COMPLETED BY GRS GROUP, 300 SPECTRUM CENTER DRIVE, SUITE 145, IRVINE, CA 92618 IN APRIL 2023. AERIAL IMAGERY OBTAINED FROM NEARMAP.COM, MARCH 2023. LIMITED EXISTING CONDITIONS/TOPOGRAPHIC SURVEY COMPLETED BY JOE CASALI ENGINEERING, INC. IN APRIL 2024. THE SITE IS SUBJECT TO MULTIPLE EASEMENTS, RESTRICTIONS, AND ZONING BOARD DECISIONS; REFER TO THE ALTA/NSPS LAND TITLE SURVEY (REFERENCE PLAN 1) FOR ADDITIONAL DETAILS.
2. THE LOCATION AND DEPTH OF EXISTING UTILITIES ARE APPROXIMATE AND HAVE BEEN PLOTTED FROM THE LATEST AVAILABLE INFORMATION. THE UTILITY LOCATIONS ARE APPROXIMATE AND MAY NOT BE ALL INCLUSIVE. THE CONTRACTOR SHALL CHECK AND VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES, BOTH OVERHEAD AND UNDERGROUND, AND "DIG-SAFE" MUST BE NOTIFIED PRIOR TO COMMENCING ANY CONSTRUCTION OPERATIONS. RESTORATION AND REPAIR OF DAMAGE TO EXISTING UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR WITH NO ADDITIONAL COST TO THE OWNER. NO EXCAVATION SHALL COMMENCE UNTIL ALL UTILITY COMPANIES AND/OR TOWN STAKEHOLDERS, WHOSE FACILITIES MIGHT BE AFFECTED BY ANY WORK, TO BE PERFORMED BY THE CONTRACTOR, ARE NOTIFIED AT LEAST 72 HOURS IN ADVANCE.
3. THE ENTIRE PARCEL AND ALL SURROUNDING PARCELS LIE WITHIN THE CITY'S M-2 (INDUSTRIAL) ZONE.
4. THIS SITE LIES ENTIRELY WITHIN FLOOD ZONE X - AREAS DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD, AS DESIGNATED ON THE "NATIONAL FLOOD INSURANCE PROGRAM, FIRM FLOOD INSURANCE RATE MAP, PROVIDENCE COUNTY, RHODE ISLAND, CITY OF CRANSTON, MAP NO. 44007C0318H, MAP REVISED: OCTOBER 2, 2015, FEDERAL EMERGENCY MANAGEMENT AGENCY".
5. SOILS EXISTING ON THE SITE CONSIST OF URBAN LAND (Ur), THE PRIMARY COMPONENT OF WHICH IS HUMAN TRANSPORTED MATERIAL, OR FILL. Ur SOILS GENERALLY REQUIRE ON-SITE ANALYSIS TO DETERMINE SUITABILITY FOR USE.
6. PUBLIC WATER, SEWER, GAS AND ELECTRIC ARE AVAILABLE TO THE SITE FROM WITHIN WELLINGTON AVE.

SITE NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND LEGALLY DISPOSING (R&D) OF ALL MATERIALS INDICATED ON THE PLANS.
2. ACCESSIBLE ROUTES, PARKING SPACES, RAMPS, SIDEWALKS, AND WALKWAYS SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE FEDERAL AMERICAN WITH DISABILITIES ACT AND WITH ALL APPLICABLE STATE AND LOCAL LAWS AND REGULATIONS, WHICHEVER IS MORE STRINGENT.
3. STOCKPILES OF EARTH MATERIALS SHALL NOT BE LOCATED ADJACENT TO DRAINAGE STRUCTURES.
4. ALL DISTURBED AREAS OUTSIDE OF THE PAVED AREAS WILL RECEIVE A MINIMUM OF 6" OF LOAM AND SEED.
5. THE LAYOUT SHOWN REPRESENTS A GRAPHICAL DESIGN, AND PRIOR TO THE CONSTRUCTION, THE CONTRACTOR SHALL ENGAGE A PROFESSIONAL LAND SURVEYOR (PLS) REGISTERED IN THE STATE OF RHODE ISLAND TO SET AND VERIFY ALL LINES AND GRADES. ALL EXISTING UTILITY LOCATIONS AND ELEVATIONS ARE TO BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY ITEMS FOUND WHICH DO NOT MATCH THE PLANS MUST BE BROUGHT TO THE ENGINEERS ATTENTION PRIOR TO CONSTRUCTION FOR REVIEW. NO WORK SHALL PROCEED UNTIL AUTHORIZED BY THE ENGINEER.
6. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SURVEY LAYOUT SERVICES FOR THE WORK AND SHALL SUBMIT "AS-BUILT" DRAWINGS OF ALL WORK, WHICH SHALL BE STAMPED AND CERTIFIED BY A RHODE ISLAND REGISTERED PROFESSIONAL LAND SURVEYOR.
7. ANY ITEM OF WORK NOT SPECIFICALLY INDICATED ON THE PLANS BUT IS REQUIRED FOR THE COMPLETE CONSTRUCTION OF THE PROJECT WILL BE CONSIDERED INCIDENTAL TO THE CONTRACT AND INCLUDED IN THE CONTRACT BID PRICE. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING SITE CONDITIONS.
8. WHERE NECESSARY TO REMOVE CURBS, CATCH BASINS OR DRAINS TO COMPLETE WORK, THE CONTRACTOR SHALL REPLACE SUCH ITEMS TO THE SATISFACTION OF THE CONDOMINIUM ASSOCIATION AND ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
9. ANY EXISTING PIPE OR UTILITY DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR AT NO COST TO THE OWNER.
10. THE CONTRACTOR SHALL RESTORE TO ITS ORIGINAL CONDITION OR REPLACE TREES, SHRUBS, FENCES, SIGNS, GUARDRAILS, DRIVEWAYS, SIDEWALKS AND ANY OTHER OBJECT AFFECTED BY THIS OPERATION, UNLESS OTHERWISE NOTED ON THE SITE PLANS.
11. THE TOPS OF ALL VALVE BOXES AND CURB BOXES SHALL BE FLUSH WITH GROUND OR PAVEMENT SURFACE LEVEL AND PLUMB, UNLESS OTHERWISE DIRECTED.
12. ROADWAYS SHALL BE LEFT PASSABLE AT ALL TIMES. CLOSURE OF ROADWAY IS NOT PERMITTED.
13. ALL CONSTRUCTION WORK SHALL BE PERFORMED IN THE DRY. THE CONTRACTOR SHALL PROVIDE, OPERATE AND MAINTAIN ALL PUMPS, DRAINS, WET POINTS, SCREENS, OR OTHER FACILITIES NECESSARY TO CONTROL, COLLECT AND DISPOSE OF ALL SURFACE AND SUBSURFACE WATER ENCOUNTERED IN THE PERFORMANCE OF THE WORK.
14. ALL SITE WORK, INCLUDING BUT NOT LIMITED TO, BITUMINOUS PAVEMENT, ROADWAY CONSTRUCTION, AGGREGATE MATERIALS, DRAINAGE STRUCTURES, CURBING, SIDEWALK, LANDSCAPING, SAW CUTTING, ETC. SHALL CONFORM TO THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADWAY AND BRIDGE CONSTRUCTION, AMENDED DECEMBER 2010 (WITH LATEST ADDENDA) AND THE RIDOT STANDARD DETAILS, 1998 EDITION (WITH LATEST ADDENDA).

MAINTENANCE AND PROTECTION OF TRAFFIC NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MAINTENANCE AND PROTECTION OF PEDESTRIAN AND VEHICULAR TRAFFIC INCLUDING POLICE PROTECTION IF NECESSARY. ALL TEMPORARY AND VEHICULAR SIGNS, BARRICADES AND LANE CLOSURES SHALL BE IN CONFORMANCE WITH THE LATEST REVISION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. TEMPORARY CONSTRUCTION SIGNS AND ALL APPLICABLE TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF WORK IN ANY AREA OPEN TO TRAFFIC.
3. THE PRIVATE VEHICLES OF CONSTRUCTION WORKERS SHALL NOT BE PARKED IN THE CITY RIGHT-OF-WAY.
4. ALL MAINTENANCE AND PROTECTION OF TRAFFIC CONTROL SETUPS, SIGNS CHANNELING DEVICES, ETC, SHALL BE IN ACCORDANCE WITH THE LATEST REVISIONS OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, 2009 EDITION.
5. SIGN MOUNTINGS SHALL BE IN ACCORDANCE WITH THE RIDOT SPECIFICATIONS FOR TEMPORARY CONSTRUCTION SIGNS.

SOIL EROSION AND SEDIMENTATION CONTROL NOTES:

1. THE SILT FENCE / COMPOST SOCK LINE ILLUSTRATED ON THESE PLANS SHALL SERVE AS THE STRICT LIMIT OF DISTURBANCE FOR THE PROJECT.
2. THE LIMITS OF CLEARING, GRADING, AND DISTURBANCE SHALL BE KEPT TO A MINIMUM WITHIN THE PROPOSED AREA OF CONSTRUCTION. ALL AREAS OUTSIDE OF THESE LIMITS, AS DEPICTED ON THE PLAN SHALL BE TOTALLY UNDISTURBED, TO REMAIN IN NATURAL CONDITION.
3. ALL CATCH BASINS AND CULVERTS SHALL BE PROTECTED WITH STAKED HAYBALES (R.I. STD. 9.8.0) DURING CONSTRUCTION ACTIVITIES. ALL PROPOSED STORM WATER DISCHARGE AREAS SHALL BE LINED WITH A RIPRAP SPLASH PAD AND PROTECTED WITH STAKED HAYBALE OUTLET PROTECTION (R.I. STD. 9.1.0), OR STAKED HAYBALE WITH SILT FENCE (R.I. STD. 9.3.0) OUTLET PROTECTION (STAKED HAYBALE OR STAKED HAYBALE WITH SILT FENCE) SHALL ALSO BE INSTALLED AT ALL EXISTING STORMWATER DISCHARGE LOCATIONS WHERE DISTRIBUTING PIPES, CATCH BASINS, AND MANHOLES ARE TO BE CLEANED AND FLUSHED.
4. ALL DISTURBED SLOPES EITHER NEWLY CREATED OR CURRENTLY EXPOSED SHALL BE SEEDED, PROTECTED AND MAINTAINED BY THE CONTRACTOR. THE CONTRACTOR SHALL REGULARLY CHECK ALL SEEDED AREAS TO ENSURE THAT A GOOD STAND IS MAINTAINED.
5. ALL SILT FENCE, TEMPORARY TREATMENT (HAY, STRAW, ETC.) AND TEMPORARY EROSION PROTECTION SHALL BE MAINTAINED BY THE CONTRACTOR THROUGHOUT CONSTRUCTION AND SHALL REMAIN IN PLACE UNTIL AN ACCEPTABLE STAND OF GRASS OR APPROVED GROUND COVER IS ESTABLISHED.
6. STOCKPILES OF TOPSOIL SHALL NOT BE LOCATED NEAR WATERWAYS. THEY SHALL HAVE SIDE SLOPES OF NO GREATER THAN 2:1 AND SHALL BE TEMPORARILY SEEDED AND/OR STABILIZED PER CONTRACT SPECIFICATIONS.
7. THE SILT FENCE/HAYBALES SHALL BE CHECKED BY THE CONTRACTOR ON A WEEKLY BASIS AND AFTER EACH STORM FOR UNDERMINING OR DETERIORATION. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY SILT FENCE/HAYBALES AS NEEDED. THE CONTRACTOR SHALL CLEAN THE ACCUMULATED SEDIMENT IF HALF OF THE ORIGINAL HEIGHT OF THE HAY-BALES BECOMES FILLED WITH SEDIMENTS.
8. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL SOIL EROSION AND SEDIMENT CONTROLS ON THE PROJECT SITE FOR THE ENTIRE DURATION OF THE CONSTRUCTION PERIOD. THE CONTRACTOR SHALL FOLLOW THE DIRECTION OF THE RESIDENT ENGINEER WITH REGARD TO INSTALLATION, MAINTENANCE, AND REPAIR OF ALL SOIL EROSION AND SEDIMENTATION CONTROLS ON THE PROJECT SITE. TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROLS (HAYBALES, SILT FENCE, ETC.) SHALL BE MAINTAINED UNTIL ALL EXPOSED SOILS ARE SATISFACTORILY STABILIZED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING AND/OR RESEEDING ALL AREAS THAT DO NOT DEVELOP WITHIN ONE YEAR FROM THE COMPLETION OF CONSTRUCTION.
9. UPON FINAL STABILIZATION OF THE SITE, AS DETERMINED BY THE ENGINEER, CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND DISPOSAL OF ALL SOIL EROSION AND SEDIMENT CONTROL DEVICES.
10. ALL REFERENCED SOIL EROSION AND SEDIMENTATION CONTROLS INCLUDING MATERIALS USED, APPLICATION RATES AND THE INSTALLATION PROCEDURES SHALL BE PERFORMED PER THE "RHODE ISLAND EROSION AND SEDIMENTATION HANDBOOK", DATED 1993 AMENDED 2014.

LOAMING & SEEDING NOTES:

SEEDING ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH SECTION L.02 SEEDING OF THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADWAY AND BRIDGE CONSTRUCTION, 2010 EDITION (WITH LATEST ADDENDA), AND SHALL ALSO CONFORM TO THE FOLLOWING:

1. AFTER ROUGH GRADING IS COMPLETED, ALL DISTURBED AREAS AND AREAS LABELED AS 'LOAM AND SEED' ARE TO BE BROUGHT TO AN ELEVATION OF 6" BELOW THE PROPOSED FINISHED GRADE. SCARIFY THE SUBGRADE TO A DEPTH OF 12" WITH THE TEETH OF A BACKHOE OR A POWER RAKE TO RESULT IN AN UNCOMPACTED SUBSOIL. 6" OF GOOD QUALITY TOPSOIL IS TO BE APPLIED AND RAKED TO FINISHED GRADE.
2. THE TOPSOIL IS TO BE GOOD QUALITY LOAM, FERTILE AND FREE OF WEEDS, STICKS AND STONES OVER 3/4" IN SIZE AND OTHERWISE COMPLYING WITH SECTION M.18.01 OF THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADWAY AND BRIDGE CONSTRUCTION, 2010 EDITION (WITH LATEST ADDENDA),
3. PRIOR TO SEEDING OR SODDING, FERTILIZE WITH 10-10-10 OR EQUIVALENT ANALYSIS. AT LEAST 40% OF THE FERTILIZER NITROGEN SHALL BE IN SLOW RELEASE FORM. INCORPORATE THE FERTILIZER INTO THE TOP 1-2" OF THE PLANTING SOIL. APPLY AT A RATE OF 8 LBS. PER 1000 SQUARE FEET.
4. APPLY LIME AT A RATE OF ONE TON PER ACRE AND UNIFORMLY INCORPORATE INTO THE TOP 1-2" OF TOPSOIL.
5. SEEDING
   AFTER THE SEED BED IS PREPARED, SEED IS TO BE BROADCAST EVENLY OVER THE SURFACE AND WORKED INTO THE TOP 1" OF SOIL. SEED SHALL BE APPROVED URI #2 OR APPROVED EQUAL. APPLY AT A RATE OF 4-5 LBS. PER 1000 SQUARE FEET OR AS OTHERWISE DIRECTED BY THE MANUFACTURER.

   URI #2 IMPROVED SEED MIX, % BY WEIGHT:

   40% CREEPING RED FESCUE
   20% IMPROVED PERENNIAL RYEGRASS
   20% IMPROVED KENTUCKY BLUEGRASS
   20% KENTUCKY BLUEGRASS

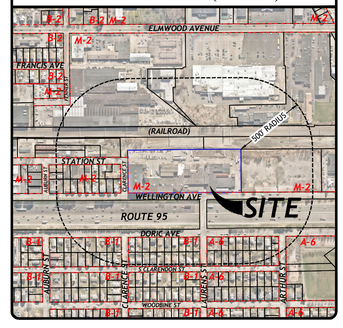
   RECOMMENDED SEEDING DATES ARE MARCH 15 TO JUNE 15 AND SEPTEMBER 15 TO NOVEMBER 15. AT THE CONTRACTORS DISCRETION, SEED MAY BE APPLIED BY HYDROSEEDING RATHER THAN THE METHOD DESCRIBED ABOVE.
6. THE TOP SOIL IN THE SAND FILTER SHALL CONSIST OF 40% COMPOST AND 60% SAND (ASTM C-33) THE TOPSOIL SHALL ALSO HAVE AN ORGANIC CONTENT BETWEEN 8-10% AND THE PERCENT PASSING THE #200 SIEVE BETWEEN 2-5%. TYPICAL GRADATION OF THE TOP SOIL MIXTURE SHALL MEET THE FOLLOWING:

SIEVE SIZE	PERCENT PASSING
3/8"	100
#4	95-100
#10	75-90
#40	25-40
#100	4-10
#200	2-5

LEGEND:

- EXISTING PROPERTY LINE
- ABUTTING PROPERTY LINE
- BUILDING SETBACK LINE
- BUILDING PHASE LINE
- 163.8x — EXISTING SPOT ELEVATION
- 100 — EXISTING CONTOUR
- 100 — PROPOSED CONTOUR
- EXISTING STONE WALL
- EXISTING CURB
- PROPOSED CURB (STATE)
- CHAIN LINK FENCE
- D — EXISTING DRAIN LINE
- D — PROPOSED DRAIN LINE
- (D) — EXISTING DRAINAGE MANHOLE
- PROPOSED DRAINAGE MANHOLE
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN
- UP/FT2 — EXISTING UTILITY POLE
- PROPOSED UTILITY POLE
- GAS — EXISTING GAS LINE
- GAS — PROPOSED GAS LINE
- W — EXISTING WATER LINE
- W — PROPOSED WATER LINE
- WG — EXISTING WATER GATE
- PROPOSED WATER GATE
- S — EXISTING SEWER LINE
- S — PROPOSED SEWER LINE
- (S) — EXISTING SEWER MANHOLE
- PROPOSED SEWER MANHOLE
- N/F — NOW OR FORMERLY
- TREELINE
- SILT FENCE
- LOD — LIMIT OF DISTURBANCE
- TEST HOLE
- HYDRANT
- LAMP POLE
- FDC — FIRE DEPTMENT CONTROL
- HANDICAP

ZONING MAP (1"=500')



1-888-DIG-SAFE
PROTECT YOURSELF, GIVE THREE WORKING DAYS NOTICE

LOCATION OF EXISTING UTILITIES SHOWN, ARE FROM GATE LOCATION AND EXISTING DOCUMENTATION AND MAY NOT BE ACCURATE. EXACT LOCATION TO BE DONE BY THE APPROPRIATE UTILITY COMPANY OR MUNICIPALITY PRIOR TO ANY EXCAVATION CALL DIGSAFE AT: 1-888-DIG-SAFE 1-888-344-7233

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JOSEPH A. CASALI
NO. 7250
REGISTERED PROFESSIONAL ENGINEER
CIVIL
1/7/2025

PROPOSED SELF-STORAGE FACILITY

530-532 WELLINGTON AVENUE
CRANSTON, RHODE ISLAND
AP 3, LOT 107

REVISIONS:

NO.	DATE.	DESCRIPTION

DESIGNED BY:	DRD
DRAWN BY:	JAS/SD
CHECKED BY:	JAC
DATE:	JAN. 2025
PROJECT NO:	24-25

PRELIMINARY, NOT FOR CONSTRUCTION

GENERAL NOTES AND LEGEND

SHEET 2 OF 9

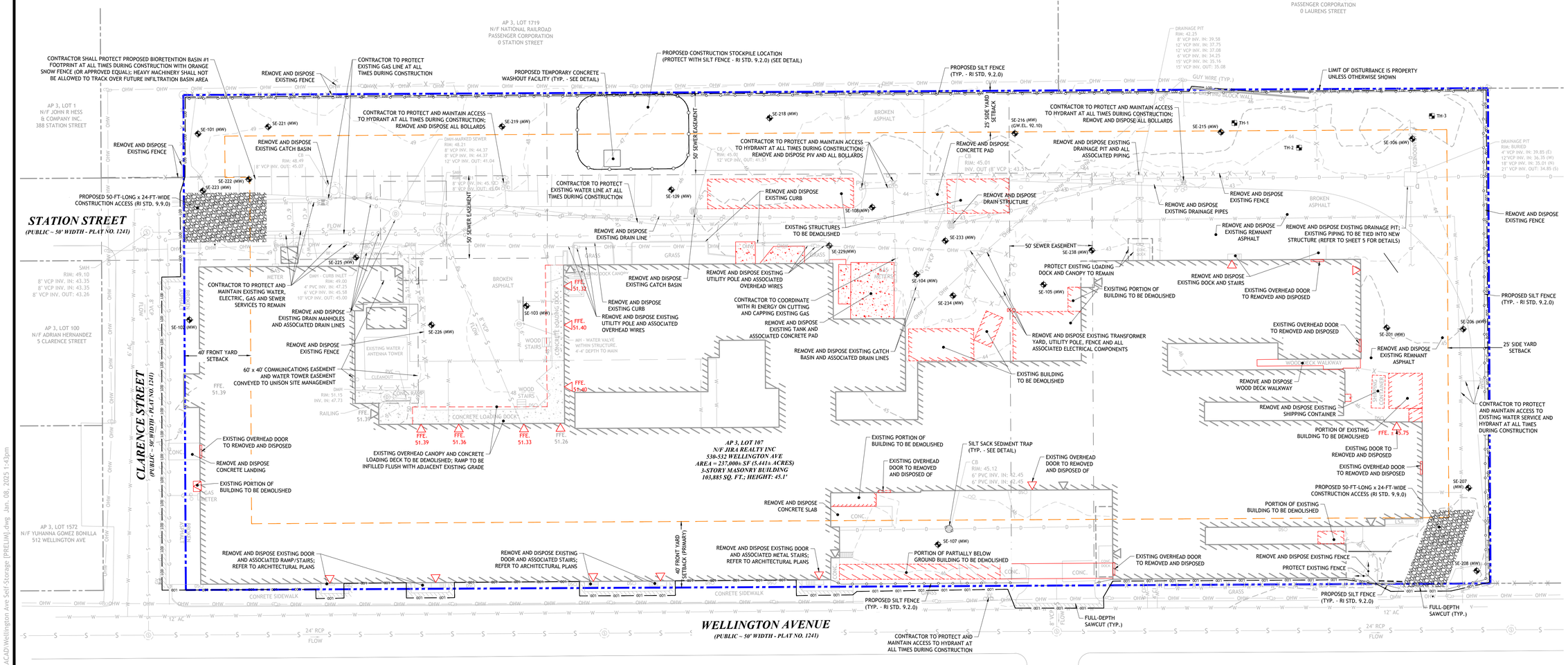
ZONING DIMENSIONAL REQUIREMENTS:

ZONING CRITERIA	REQUIRED	EXISTING
ZONING DISTRICT	M-2	M-2
MINIMUM LOT AREA	60,000 SF	237,000 SF
MINIMUM FRONTAGE	200 FT	249 FT
MINIMUM LOT WIDTH	200 FT	249 FT
MINIMUM FRONT YARD	40 FT	0 FT(2)
MINIMUM SIDE YARD	25 FT	42.6 FT
MINIMUM REAR YARD	30 FT	NA
MAXIMUM BUILDING HEIGHT	35 FT	45.1 FT(2)
MAXIMUM LOT COVERAGE	60%	43.8%

NOTES:
1. THE PROPOSED USE - SELF-STORAGE - IS ALLOWED BY RIGHT IN THE M-2 ZONE.
2. PRE-EXISTING, NON-CONFORMING CONDITION.

GROUNDWATER DATA		
EXPLORATION ID	SURFACE EL.	SHWT / EL.
TH-1	45.1	54" / 40.6
TH-2	43.9	48" / 39.9
TH-3	45.1	44" / 41.4
SE-101	49.0	96" / 41.0
SE-106	44.8	84" / 37.8
SE-215	45.2	72" / 39.2
SE-221	49.0	72" / 43.0
SE-222	48.8	72" / 42.8
SE-223	49.0	72" / 43.0

NOTE:
1. GROUNDWATER DATA IS PRESENTED FOR SUBSURFACE EXPLORATIONS WITHIN THE AREA OF PROPOSED STORMWATER MANAGEMENT BMPs ONLY.



SCALE (FEET)
0 15 30 60 120
1 INCH = 30 FT

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530-532 WELLINGTON AVENUE
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DESIGNED BY:	DRD
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CHECKED BY:	JAC
DATE:	JAN. 2025
PROJECT NO:	24-25

PRELIMINARY, NOT FOR CONSTRUCTION

EXISTING CONDITIONS AND SITE PREP. PLAN

SHEET 3 OF 9

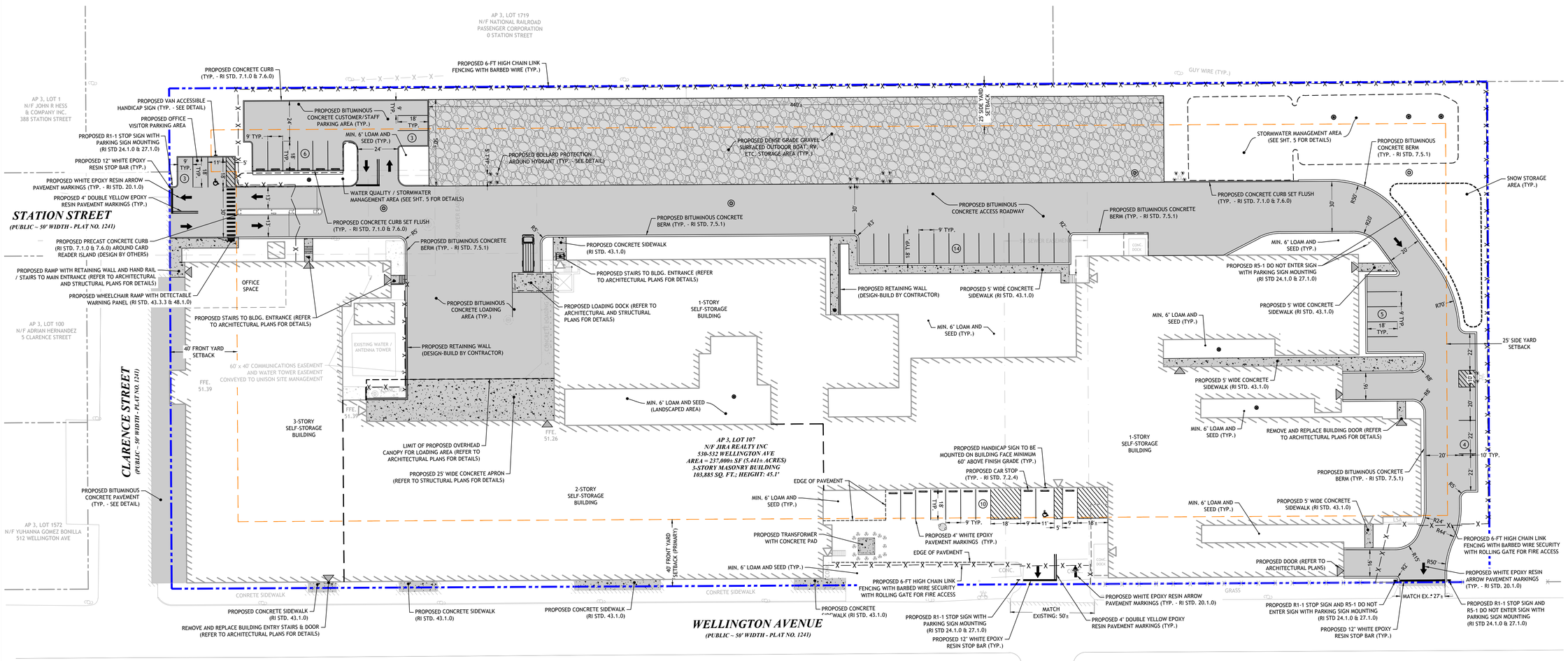
ZONING DIMENSIONAL REQUIREMENTS:

ZONING CRITERIA	REQUIRED	EXISTING	PROPOSED
ZONING DISTRICT	M-2	M-2	M-2
MINIMUM LOT AREA	60,000 SF	237,000 SF	237,000 SF
MINIMUM FRONTAGE	200 FT	249 FT	249 FT
MINIMUM LOT WIDTH	200 FT	249 FT	249 FT
MINIMUM FRONT YARD	40 FT	0 FT[2]	0 FT[2]
MINIMUM SIDE YARD	25 FT	42.6 FT	42.6 FT
MINIMUM REAR YARD	30 FT	NA	NA
MAXIMUM BUILDING HEIGHT	35 FT	45.1 FT[2]	45.1 FT[2]
MAXIMUM LOT COVERAGE	60%	43.8%	42.6%

NOTES:
1. THE PROPOSED USE - SELF-STORAGE - IS ALLOWED BY RIGHT IN THE M-2 ZONE.
2. PRE-EXISTING, NON-CONFORMING CONDITION.

CHAPTER 17.84-140 - LANDSCAPE STANDARDS:
MINIMUM LANDSCAPING: 15% OF THE SF OF THE LOT 237,000 SF TOTAL LOT AREA x 15% OF LOT AREA = 35,550 SF OF LANDSCAPING REQUIRED: 35,550 SF OF LANDSCAPING PROPOSED: 36,225± SF OF LANDSCAPING* *LANDSCAPE PLAN TO BE PROVIDED AT PRELIMINARY PLAN STAGE OF REVIEW.

CHAPTER 17.64 - OFF-STREET PARKING:
NOTE: THERE IS NO SPECIFIC USE WITHIN CHAPTER 17.64 - OFF-STREET PARKING ASSOCIATED WITH SELF-STORAGE. REFERENCE INSTITUTE OF TRANSPORTATION ENGINEERS (ITE) PARKING GENERATION MANUAL, 5TH EDITION, JANUARY 2019. LAND USE: 151 (MINI-WAREHOUSE) (TYPICALLY REFERRED TO AS SELF-STORAGE) PEAK PARKING DEMAND PER 100 STORAGE UNITS: MIN = 1.05; MAX = 2.38 1,191 TOTAL UNITS MIN: 1,191 UNITS / 100 * 1.05 = 13 SPACES MAX: 1,191 UNITS / 100 * 2.38 = 29 SPACES 29 SPACES REQUIRED 45 SPACES PROVIDED (2 ADA)



SCALE (FEET)
0 15 30 60 120
1 INCH = 30 FT

1-888-DIG-SAFE
PROTECT YOURSELF, DIG THREE WORKING DAYS NOTICE
LOCATION OF EXISTING UTILITIES SHOWN, ARE FROM SUITE LOCATION AND EXISTING DOCUMENTATION AND MAY NOT BE ACCURATE. EXACT LOCATION TO BE DONE BY THE APPROPRIATE UTILITY COMPANY OR MUNICIPALITY PRIOR TO ANY EXCAVATION CALL DIGSAFE AT 1-888-DIG-SAFE 1-888-344-7233

Q:\24-25 Mike Jobs\CAD\Wellington Ave Self-Storage [PRELIM].dwg Jan. 08, 2025 1:43pm

JCE
JOE CASALI ENGINEERING, INC.
CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WETLANDS · ISDS · TRAFFIC · FLOODPLAIN
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM

JOSEPH A. CASALI
NO. 7250
REGISTERED PROFESSIONAL ENGINEER
CIVIL
1/7/2025

PROPOSED SELF-STORAGE FACILITY
530-532 WELLINGTON AVENUE
CRANSTON, RHODE ISLAND
AP 3, LOT 107

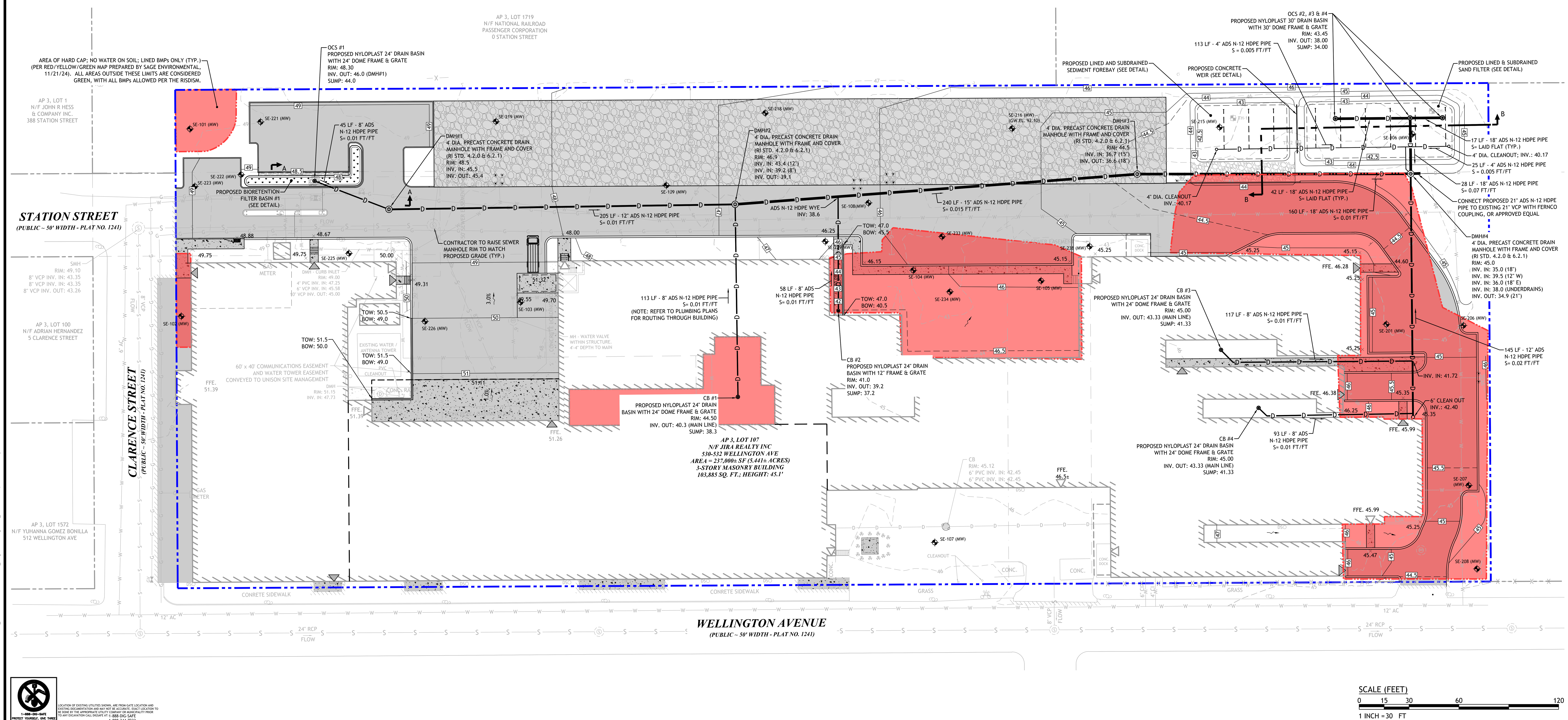
REVISIONS:	
NO.	DATE. DESCRIPTION

DESIGNED BY:	DRD
DRAWN BY:	JAS/SD
CHECKED BY:	JAC
DATE:	JAN. 2025
PROJECT NO:	24-25

PRELIMINARY, NOT FOR CONSTRUCTION

SITE PLAN

SHEET 4 OF 9


STATION STREET
(PUBLIC ~ 50' WIDTH - PLAT NO. 1241)
CLARENCE STREET
(PUBLIC ~ 50' WIDTH - PLAT NO. 1241)
WELLINGTON AVENUE
(PUBLIC ~ 50' WIDTH - PLAT NO. 1241)
AP 3, LOT 107
N/F JIRA REALTY INC
530-532 WELLINGTON AVE
AREA = 237,000± SF (5.441± ACRES)
3-STORY MASONRY BUILDING
103,885 SQ. FT.; HEIGHT: 45.1'
AP 3, LOT 1719
N/F NATIONAL RAILROAD
PASSENGER CORPORATION
0 STATION STREET
AREA OF HARD CAP; NO WATER ON SOIL; LINED BMPs ONLY (TYP.)
(PER RED/YELLOW/GREEN MAP PREPARED BY SAGE ENVIRONMENTAL,
11/21/24). ALL AREAS OUTSIDE THESE LIMITS ARE CONSIDERED
GREEN, WITH ALL BMPs ALLOWED PER THE RIDSM.
OCS #1
PROPOSED NYLOPLAST 24" DRAIN BASIN
WITH 24" DOME FRAME & GRATE
RIM: 48.30
INV. OUT: 46.0 (DMH#1)
SUMP: 44.0
PROPOSED BIORETENTION
FILTER BASIN #1
(SEE DETAIL)
DMH#1
4' DIA. PRECAST CONCRETE DRAIN
MANHOLE WITH FRAME AND COVER
(RI STD. 4.2.0 & 6.2.1)
RIM: 48.5
INV. IN: 45.5
INV. OUT: 45.4
DMH#2
4' DIA. PRECAST CONCRETE DRAIN
MANHOLE WITH FRAME AND COVER
(RI STD. 4.2.0 & 6.2.1)
RIM: 46.9
INV. IN: 43.4 (12")
INV. IN: 39.2 (8")
INV. OUT: 39.1
DMH#3
4' DIA. PRECAST CONCRETE DRAIN
MANHOLE WITH FRAME AND COVER
(RI STD. 4.2.0 & 6.2.1)
RIM: 44.5
INV. IN: 36.7 (15")
INV. OUT: 36.6 (18")
DMH#4
4' DIA. PRECAST CONCRETE DRAIN
MANHOLE WITH FRAME AND COVER
(RI STD. 4.2.0 & 6.2.1)
RIM: 45.0
INV. IN: 35.0 (18")
INV. IN: 39.5 (12" W)
INV. IN: 36.0 (18" E)
INV. IN: 38.0 (UNDERDRAINS)
INV. OUT: 34.9 (21")
OCS #2, #3 & #4
PROPOSED NYLOPLAST 30" DRAIN BASIN
WITH 30" DOME FRAME & GRATE
RIM: 43.45
INV. OUT: 38.00
SUMP: 34.00
PROPOSED LINED AND SUBDRAINED
SEDIMENT FOREBAY (SEE DETAIL)
PROPOSED CONCRETE
WEIR (SEE DETAIL)
PROPOSED LINED & SUBDRAINED
SAND FILTER (SEE DETAIL)
CONNECT PROPOSED 21" ADS N-12 HDPE
PIPE TO EXISTING 21" VCP WITH FERNCO
COUPLING, OR APPROVED EQUAL
CONTRACTOR TO RAISE SEWER
MANHOLE RIM TO MATCH
PROPOSED GRADE (TYP.)
205 LF - 12" ADS N-12 HDPE PIPE
S= 0.01 FT/FT
240 LF - 15" ADS N-12 HDPE PIPE
S= 0.015 FT/FT
113 LF - 8" ADS N-12 HDPE PIPE
S= 0.01 FT/FT
(NOTE: REFER TO PLUMBING PLANS
FOR ROUTING THROUGH BUILDING)
CB #1
PROPOSED NYLOPLAST 24" DRAIN
BASIN WITH 24" DOME FRAME & GRATE
RIM: 44.50
INV. OUT: 40.3 (MAIN LINE)
SUMP: 38.3
CB #2
PROPOSED NYLOPLAST 24" DRAIN
BASIN WITH 12" FRAME & GRATE
RIM: 41.0
INV. OUT: 39.2
SUMP: 37.2
CB #3
PROPOSED NYLOPLAST 24" DRAIN BASIN
WITH 24" DOME FRAME & GRATE
RIM: 45.00
INV. OUT: 43.33 (MAIN LINE)
SUMP: 41.33
CB #4
PROPOSED NYLOPLAST 24" DRAIN BASIN
WITH 24" DOME FRAME & GRATE
RIM: 45.00
INV. OUT: 43.33 (MAIN LINE)
SUMP: 41.33
160 LF - 18" ADS N-12 HDPE PIPE
S= 0.01 FT/FT
145 LF - 12" ADS
N-12 HDPE PIPE
S= 0.02 FT/FT
SCALE (FEET)
1 INCH = 30 FT

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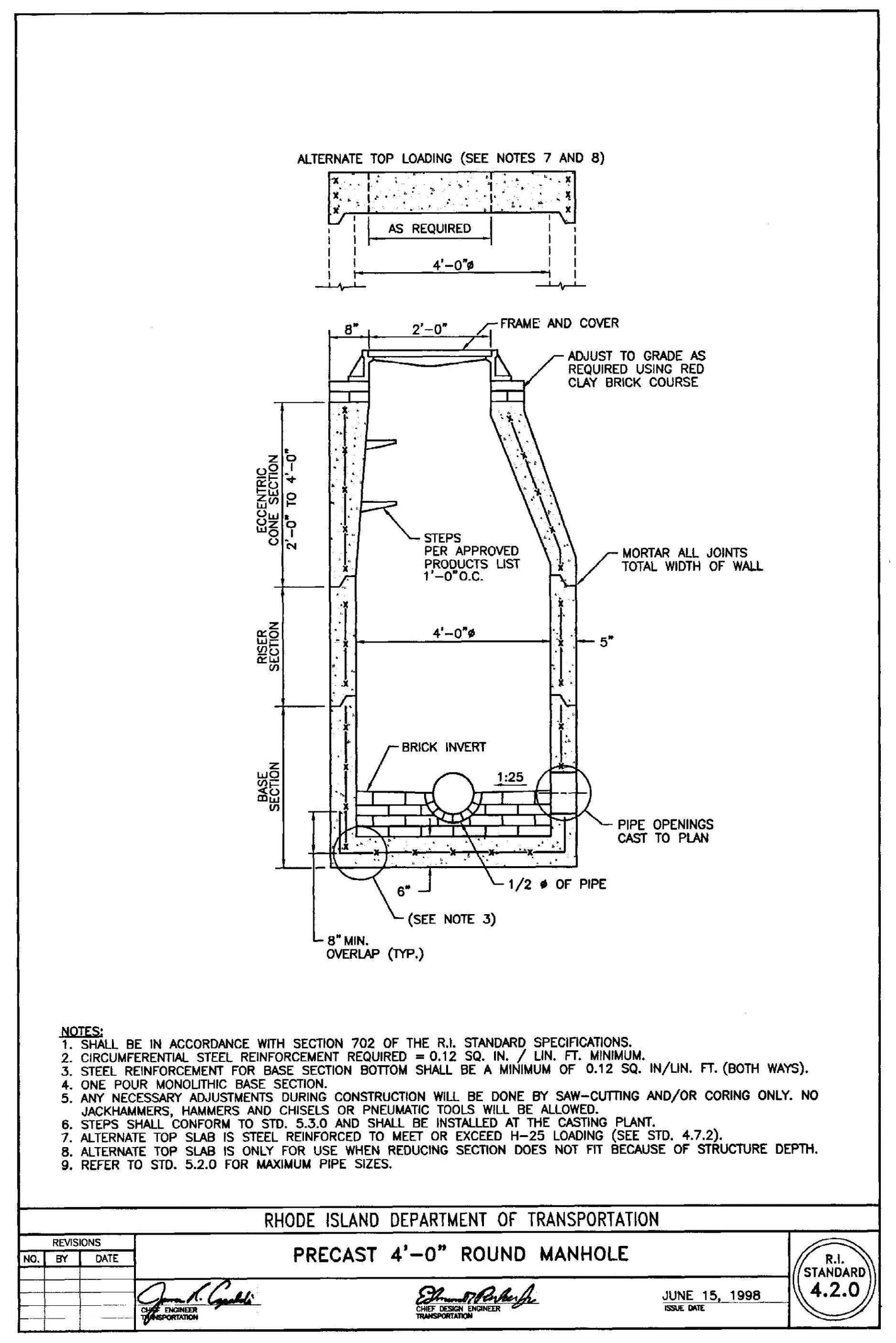
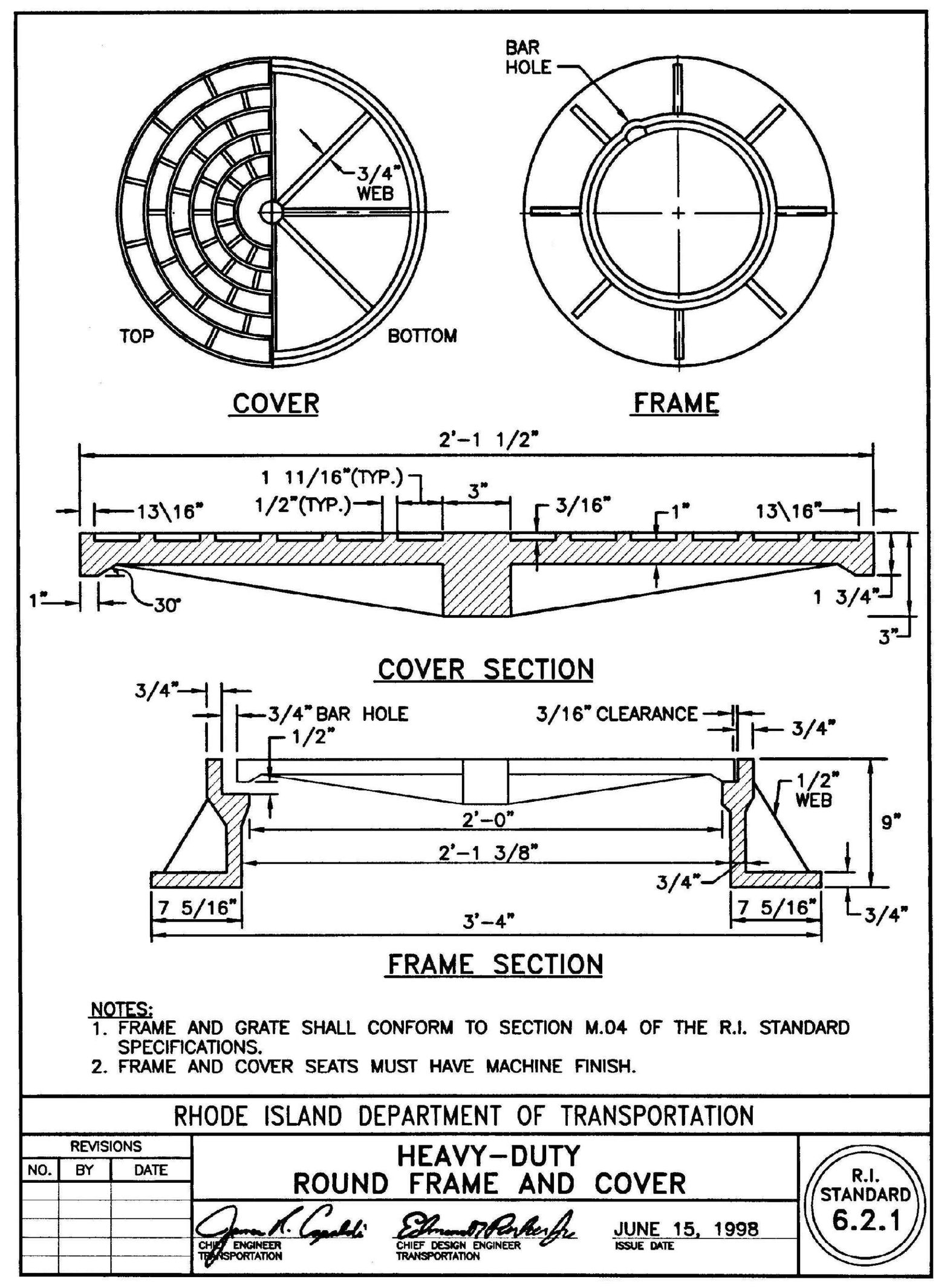
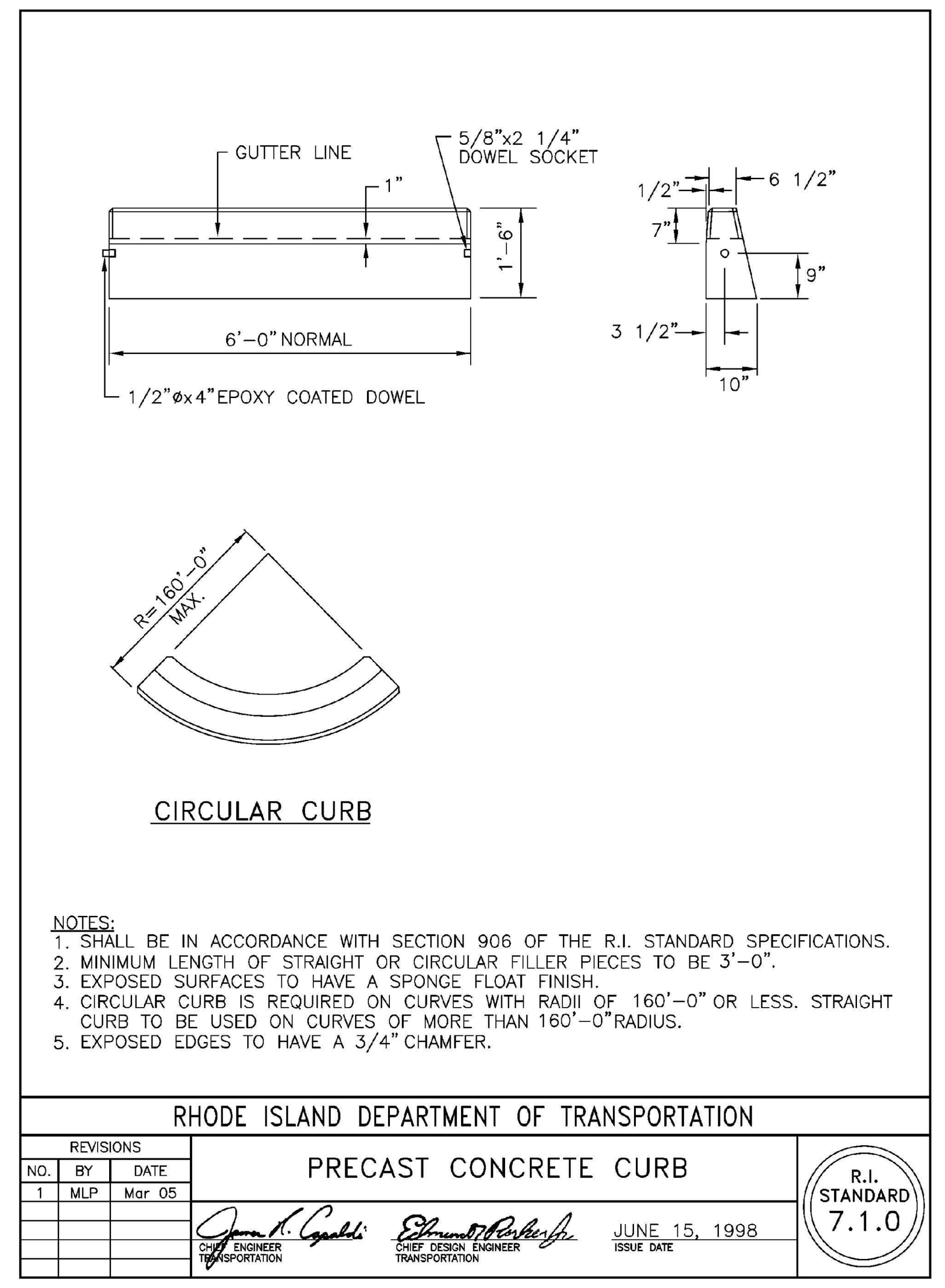
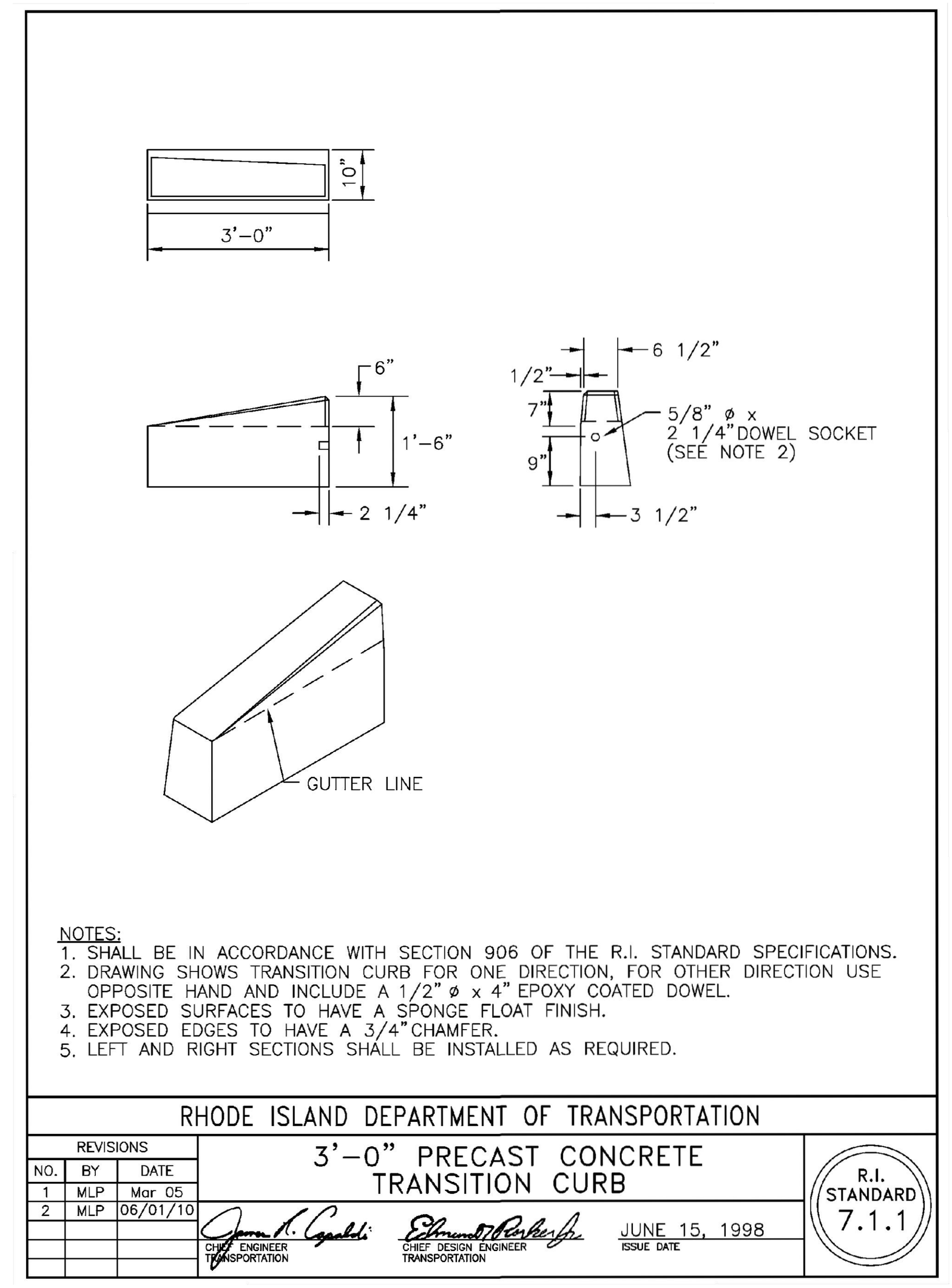
GRADING & DRAINAGE PLAN

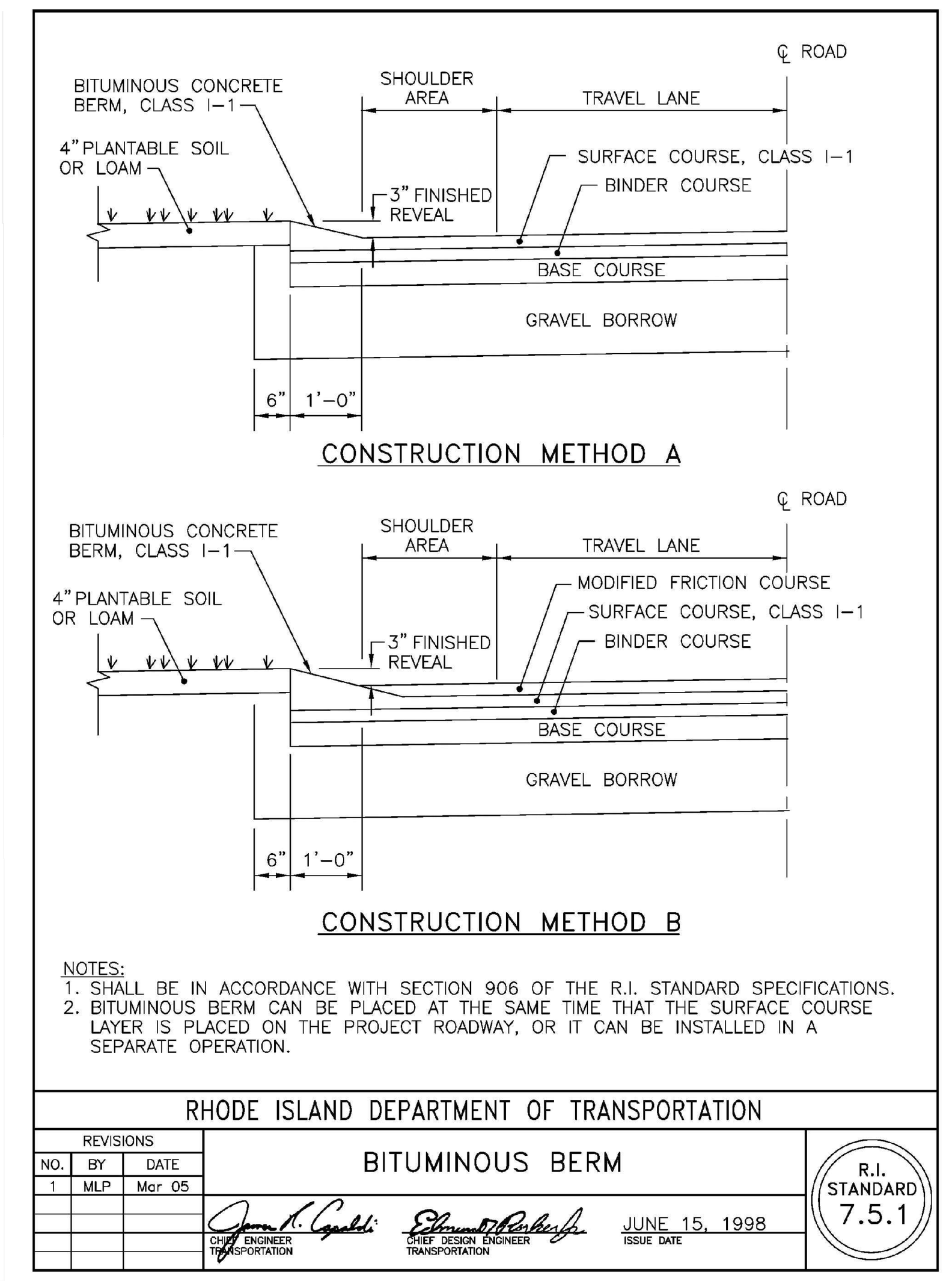
SHEET 5 OF 9

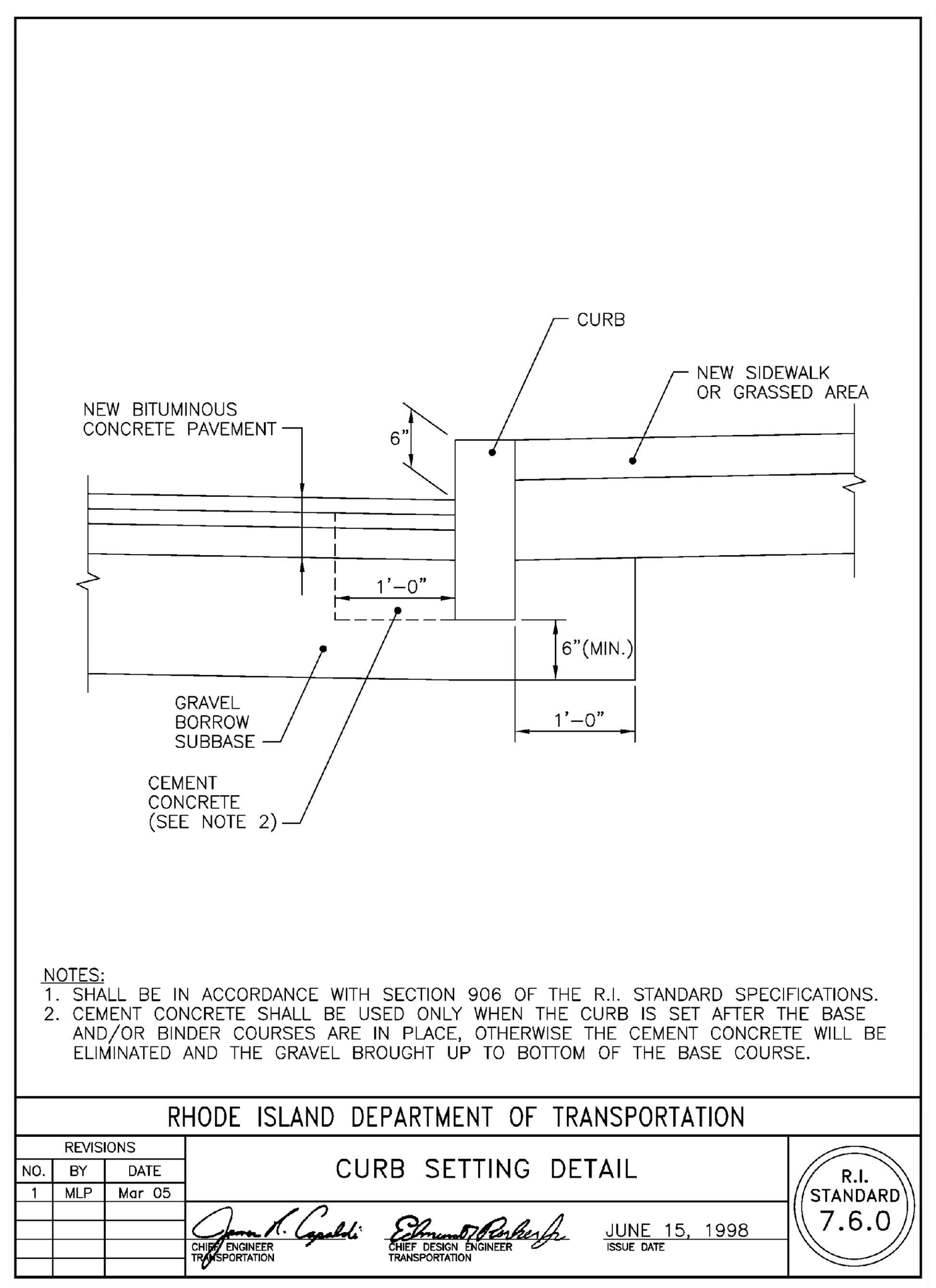


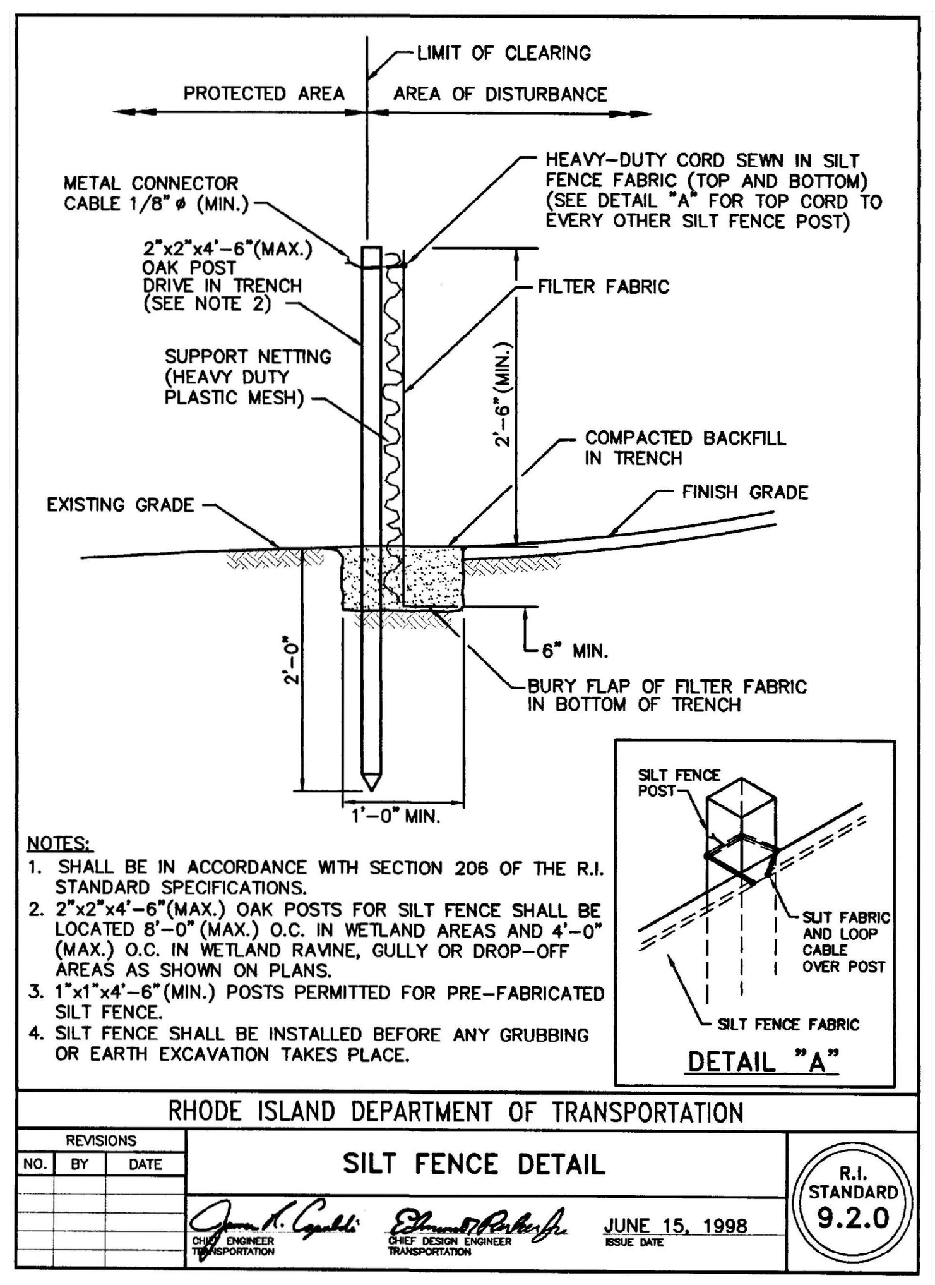


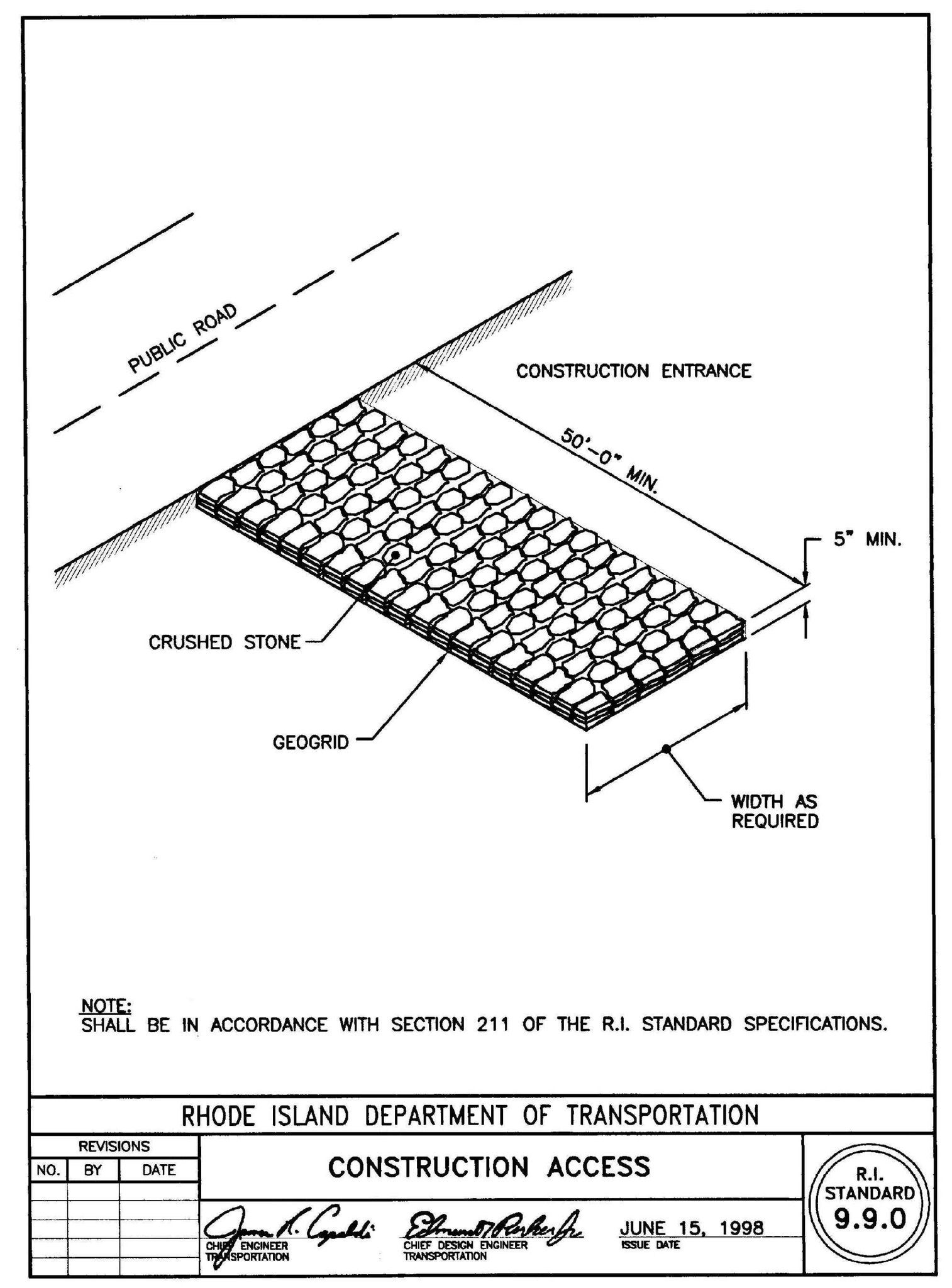


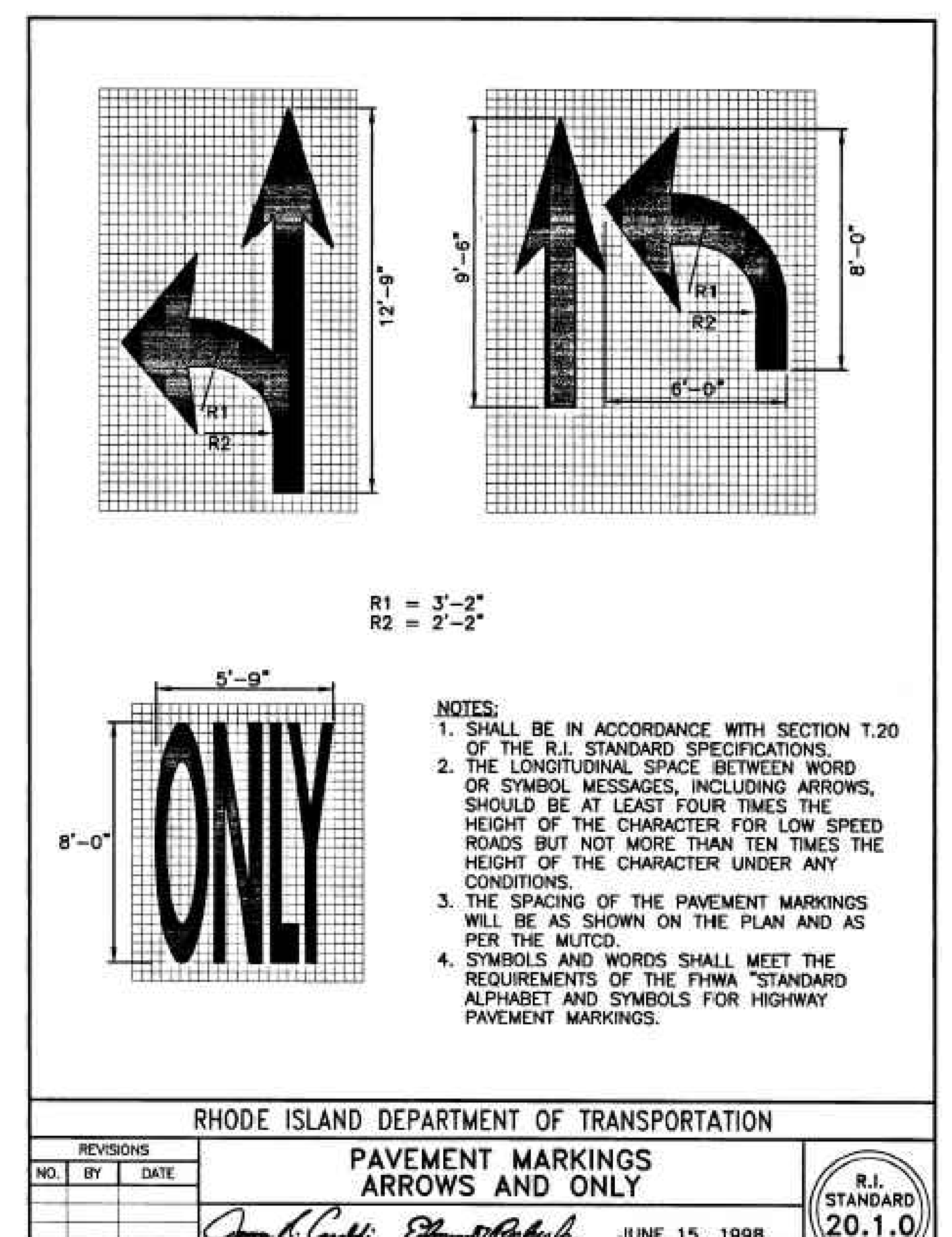


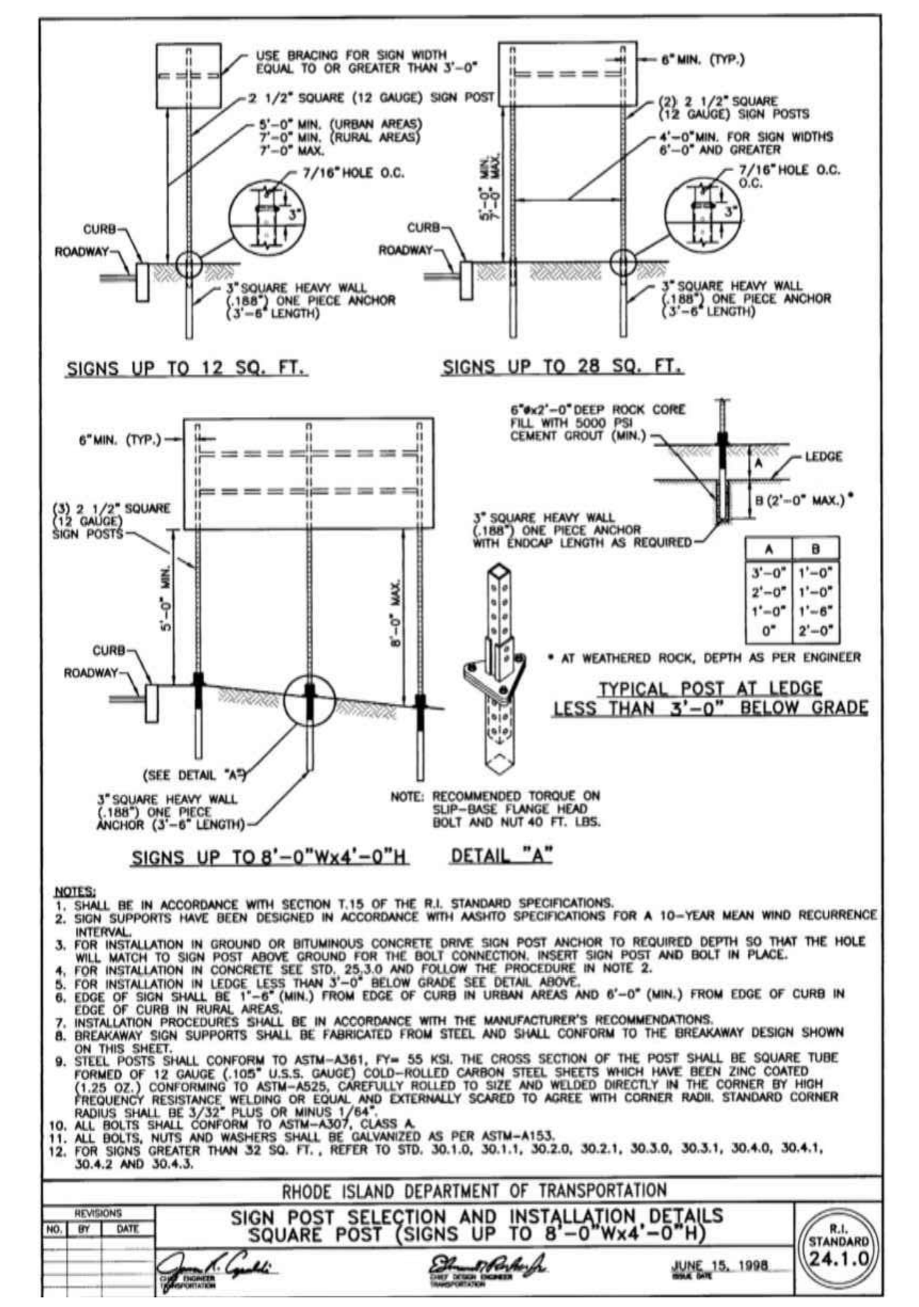


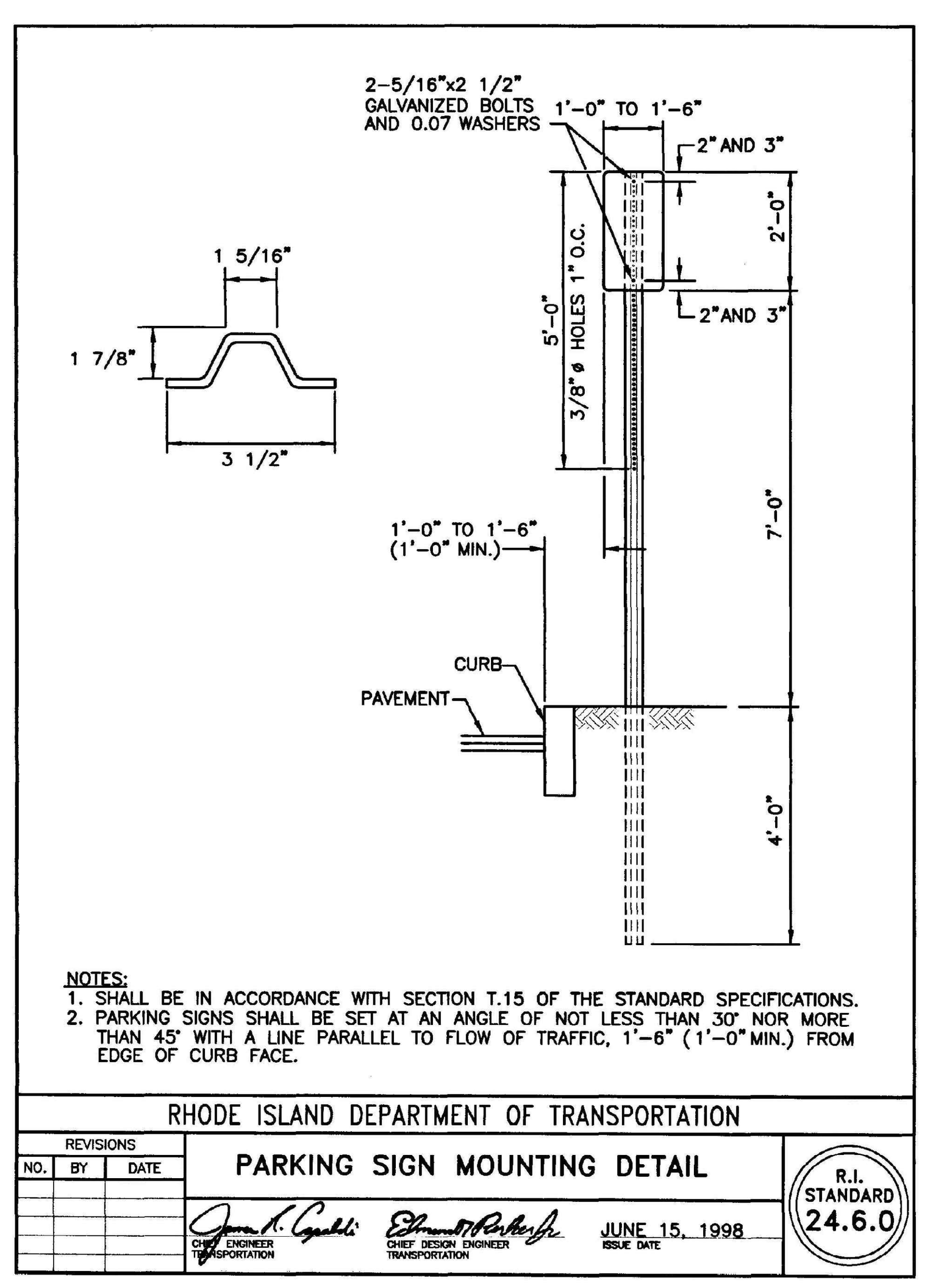


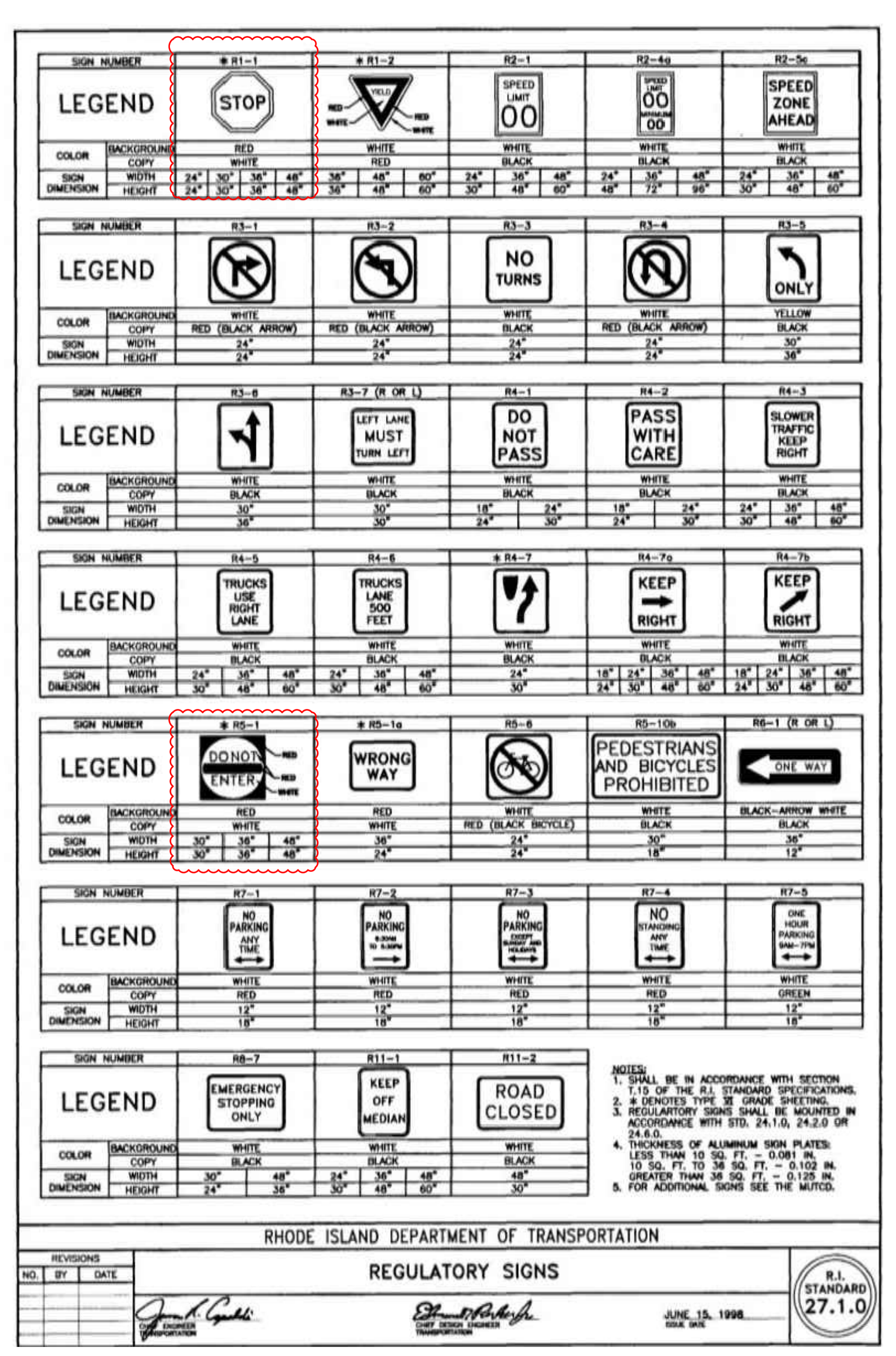


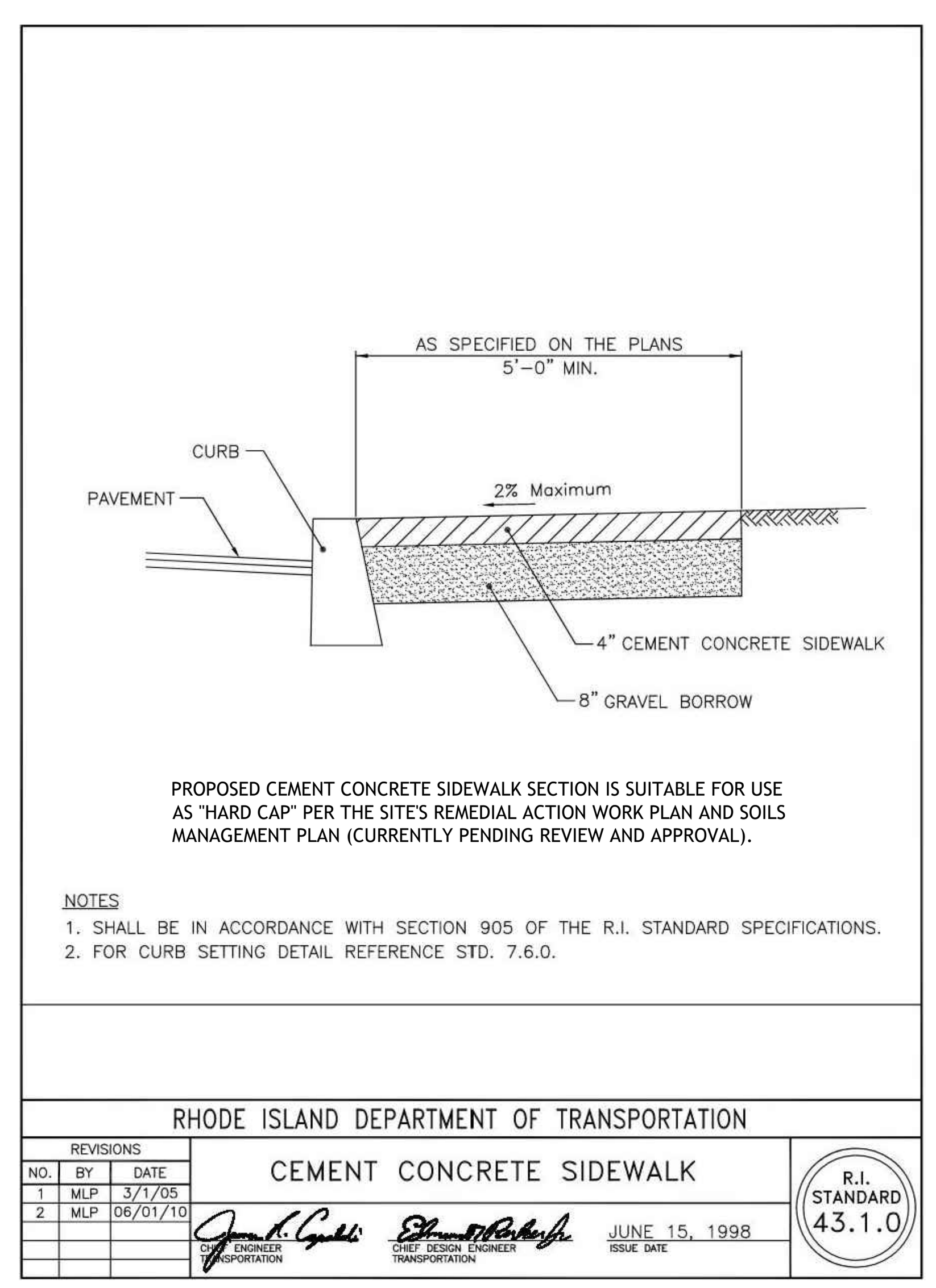


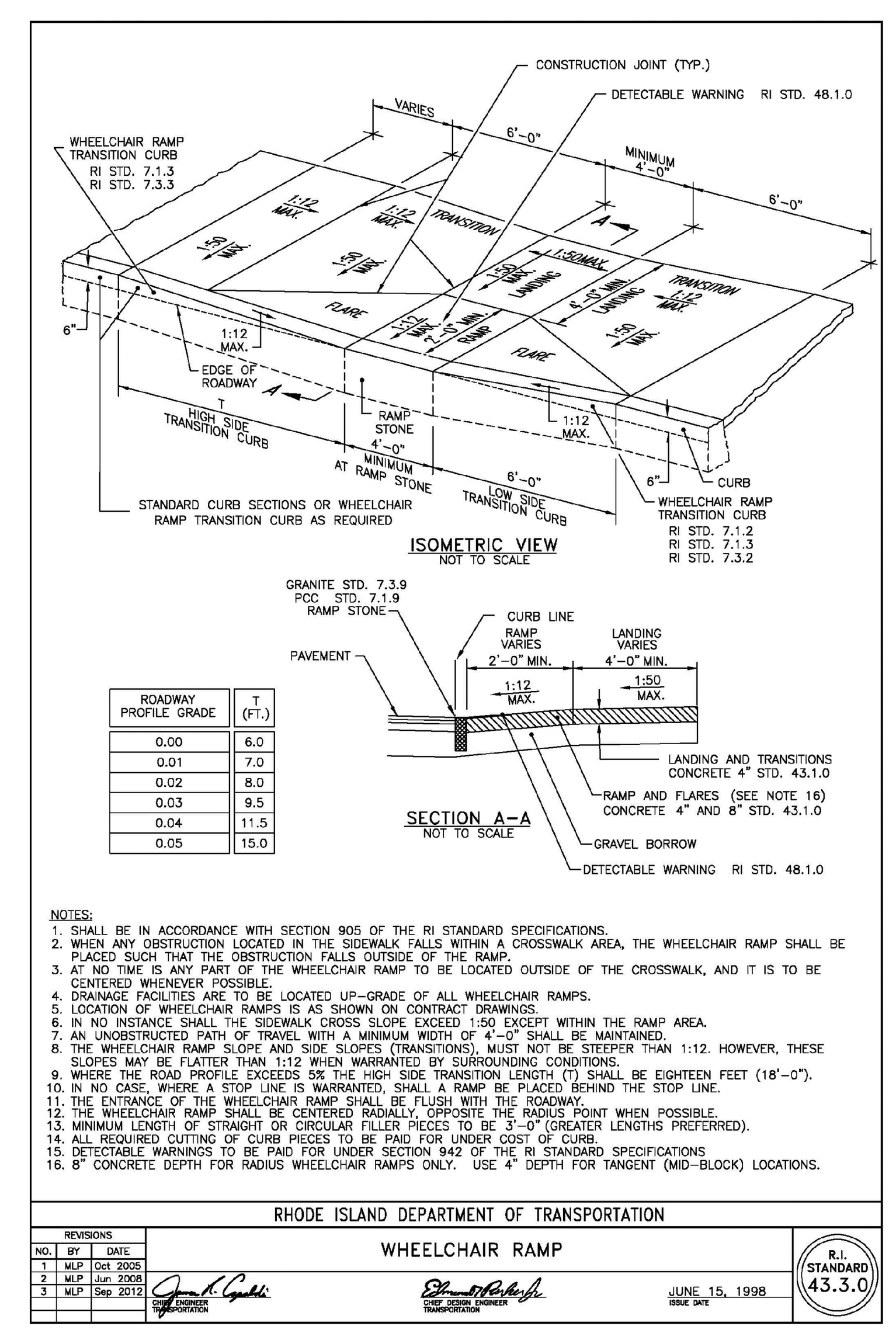


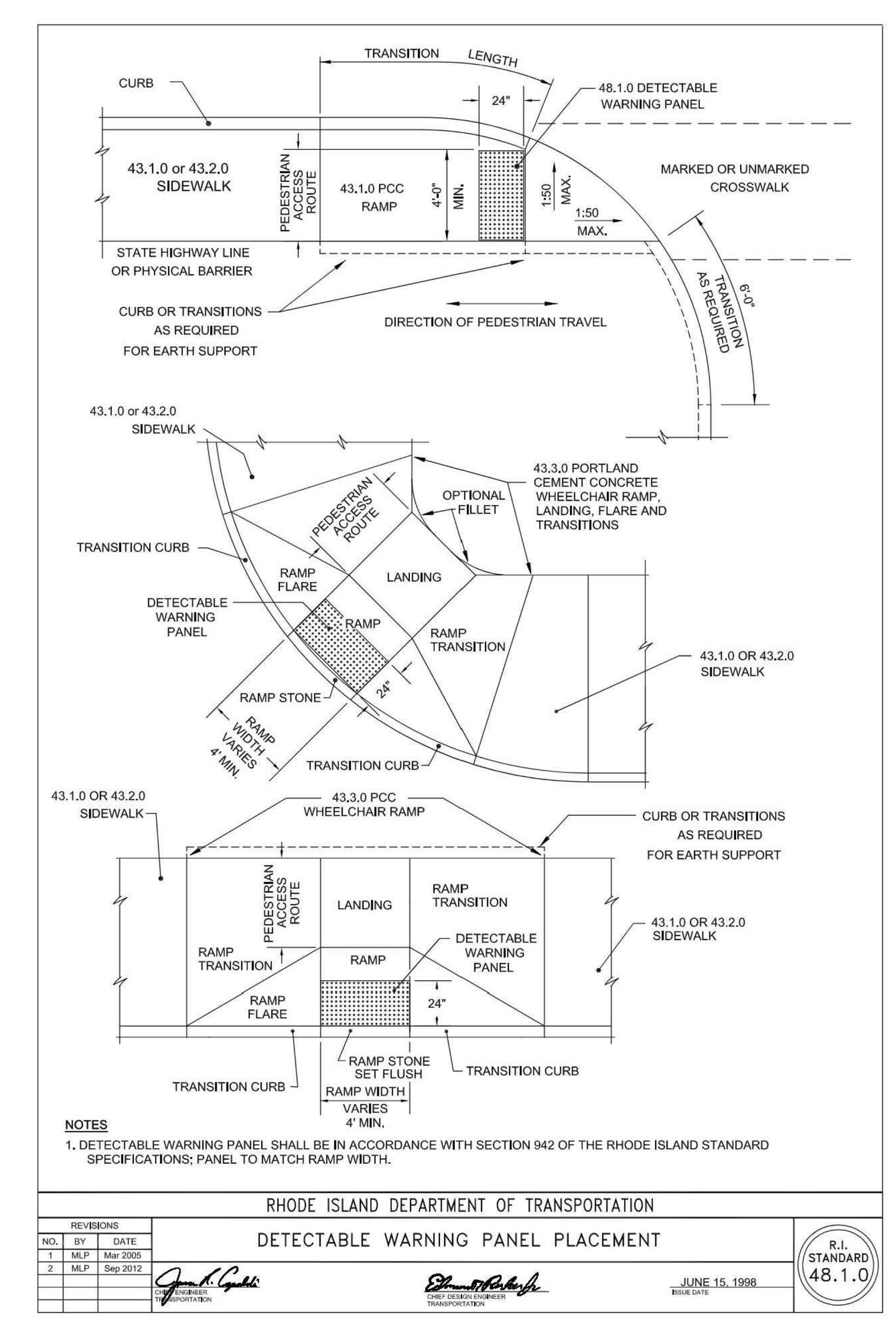












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1/7/2025

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AP 3, LOT 107

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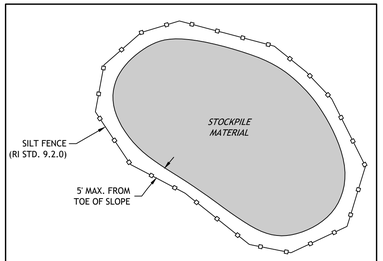
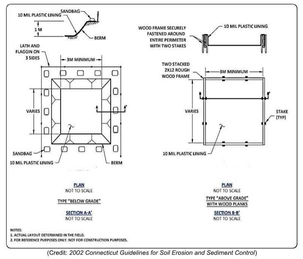
PRELIMINARY, NOT FOR CONSTRUCTION

RI STD. DETAILS

SHEET 6 OF 9

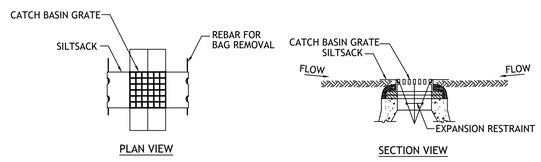


1 STOCKPILE DETAIL
NOT TO SCALE



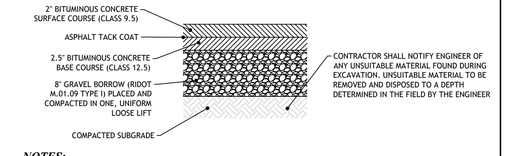
(Credit: 2002 Connecticut Guidelines for Soil Erosion and Sediment Control)

2 TEMP. CONCRETE WASHOUT FACILITY
NOT TO SCALE



Notes:
1. INSTALL SILTSACK IN ALL PROPOSED CATCH BASINS IDENTIFIED ON THE GRADING & DRAINAGE PLAN.
2. GRATE TO BE PLACED OVER SILTSACK. SILTSACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED. MAINTAIN UNTIL UPSTREAM AREAS HAVE BEEN PERMANENTLY STABILIZED.

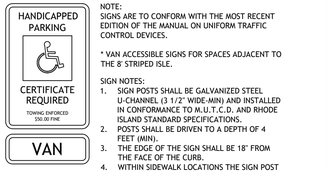
3 SILT SACK SEDIMENT TRAP
NOT TO SCALE



NOTES:

1. IF UNSUITABLE MATERIALS ARE ENCOUNTERED AT SUBGRADE ELEVATION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER. THE DEPTH OF UNSUITABLE MATERIAL TO BE REMOVED WILL BE DETERMINED IN THE FIELD. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE THE UNSUITABLE MATERIALS AND REPLACE WITH SUITABLE MATERIAL APPROVED BY THE ENGINEER.
2. MINIMUM COMPACTION FOR GRAVEL BORROW SUB-BASE AND SUBGRADE: 95% MODIFIED PROCTOR.
3. PROPOSED BITUMINOUS CONCRETE PAVEMENT SECTION IS SUITABLE FOR USE AS 'HARD CAP' PER THE SITE'S REMEDIAL ACTION WORK PLAN AND SOILS MANAGEMENT PLAN (CURRENTLY PENDING REVIEW AND APPROVAL).

4 BITUMINOUS CONCRETE PAVEMENT
NOT TO SCALE

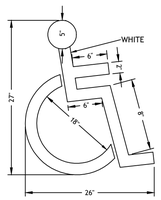


NOTE:
SIGNS ARE TO CONFORM WITH THE MOST RECENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

* VAN ACCESSIBLE SIGNS FOR SPACES ADJACENT TO THE 8' STRIPED ISLE.

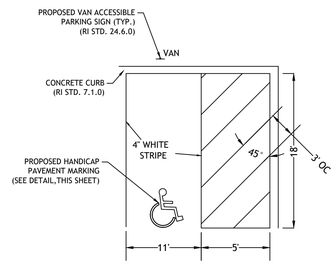
SIGN NOTES:
1. SIGN POSTS SHALL BE GALVANIZED STEEL U-CHANNEL (3 1/2" WIDE-MIN) AND INSTALLED IN CONFORMANCE TO M.U.T.C.D. AND RHODE ISLAND STANDARD SPECIFICATIONS.
2. POSTS SHALL BE DRIVEN TO A DEPTH OF 4 FEET (MIN).
3. THE EDGE OF THE SIGN SHALL BE 18" FROM THE FACE OF THE CURB.
4. WITHIN SIDEWALK LOCATIONS THE SIGN POST WILL BE INSTALLED WITHIN A 8"X8"X6" SQUARE BOX FORM.

5 HANDICAP PARKING SIGNS
NOT TO SCALE

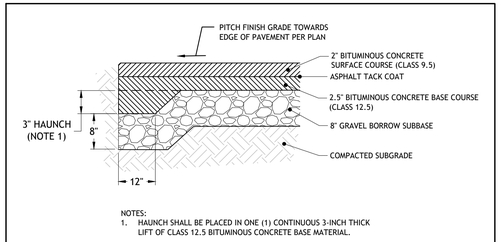


NOTE:
1. ALL HANDICAP PARKING AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE RHODE ISLAND STATE BUILDING CODE.

6 HANDICAP PAVEMENT MARKING
NOT TO SCALE



7 HANDICAP PARKING STALLS
NOT TO SCALE



NOTES:
1. HAUNCH SHALL BE PLACED IN ONE (1) CONTINUOUS 3-INCH THICK LIFT OF CLASS 12.5 BITUMINOUS CONCRETE BASE MATERIAL.

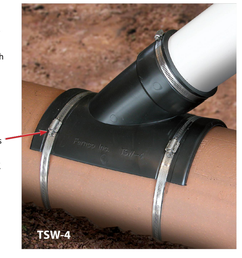
8 BITUMINOUS PAVEMENT HAUNCH DETAIL
NOT TO SCALE

Flexible Tap Saddles

The faster & less costly way to make sewer main connections

One *Fernco* Saddle will fit ALL 6" and larger sewer mains.

- Manufactured from a specially formulated high durometer PVC.
- Rigid, yet flexible enough for sewer mains:
  - 4" saddles fit 6" pipe and larger
  - 6" saddles fit 8" pipe and larger
- Includes special "slip-lock" clamps of 300 series stainless steel that make for fast and simple installations on any type of pipe from 6" to 15".
- Larger apron with locating ring fits 5" or 7" standard shell cutters.
- Large band grooves



Available for all **4" or 6"** plastic or cast iron drain pipe inlets in **Tee or Wye** configurations.

PART #	Description
TST-4	4" Cast Iron or Plastic Inlet - Tee Tap Saddle
TST-6	6" Cast Iron or Plastic Inlet - Tee Tap Saddle
TSW-4	4" Cast Iron or Plastic Inlet - Wye Tap Saddle
TSW-6	6" Cast Iron or Plastic Inlet - Wye Tap Saddle
312-300	Extension Clamps - For larger than 15" sewer mains
TSPK-46	Tap Saddle Pressure Kit - For a water tight seal

Fernco Inc.

2/12 Fernco, Inc. • Davison, MI • 810-503-900 • FAX: 810-503-1015 • www.fernco.com TI3512

Maximum test pressure: 4.3 PSI (29.6KPA)
Maximum operating temperature: 140° F nonconsistent

Fernco Flexible Couplings

The industry standard for sewer, drain, waste & vent piping.

Specially formulated PVC compound positively seals any sewer and drain connection.

Because of their quality and ease of installation, Fernco Flexible Couplings have found wide acceptance among sewer and plumbing contractors and municipalities. Fernco couplings are used for all types of in-house and sewer applications: drain waste, repairs, vent piping, house-to-main, cut-ins, conductor and roof drains and increasers-reducers.

Made of tough elastomeric polyvinyl chloride (PVC), they are strong, resilient and unaffected by soil conditions. They are also resistant to chemicals, ultraviolet rays, fungus growth, and normal sewer gases due to the inert nature and physical properties of the material. And they are leakproof, rootproof and seal against infiltration and exfiltration.

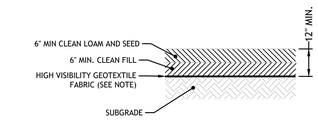
The dimensional flexibility of Fernco couplings ensures leakproof seals on virtually any pipe material: plastic, cast iron, asbestos cement, clay, concrete, steel, copper and ductile iron. All couplings are clearly marked with part number, size, and pipe materials that the coupling will connect. Fernco makes fast delivery of stock items with no minimum order required. For special applications, our custom design service can supply couplings to individual customer requirements.

Tested designs backed by over ***four decades of proven performance.***

- Positive seal against infiltration and exfiltration
- Leakproof and resistant to chemicals, ultraviolet rays, fungus growth, and normal sewer gases
- Conforms to ASTM D5926, C1173 and CSA B602
- Connects pipes of same or different sizes and materials quickly and easily
- Stainless steel clamps are corrosion-resistant and rustproof

Fernco Inc.

Fernco, Inc. • Davison, MI • PH: 810-653-9626 • FAX: 810-653-8714 • www.fernco.com



NOTES:

1. CLEAN FILL USED WITHIN LANDSCAPE AREAS SHALL MEET THE REQUIREMENTS FOR COMMON BORROW, IN ACCORDANCE WITH SECTION M.01 OF THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2004 EDITION WITH LATEST ADDENDA AND SHALL CONSIST OF WELL-GRADED, NATURAL SAND AND GRAVEL FREE OF EXCESSIVE CLAY, SILT, ORGANIC MATTER, AND OTHER DELETERIOUS MATERIALS. MATERIAL PASSING THE NO. 200 SIEVE SHALL BE NON-PLASTIC.
2. ALL FILL MATERIAL IMPORTED TO THE SITE MUST BE CLEAN AND TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE SOILS MANAGEMENT PLAN.
3. HIGH VISIBILITY GEOTEXTILE FABRIC SHALL BE MIRAFI 140N OR APPROVED EQUAL, MEETING THE FOLLOWING REQUIREMENTS:

TYPE:	NON-WOVEN GEOTEXTILE
MATERIAL:	POLYPROPYLENE STABLE FIBERS
APPARENT OPENING SIZE:	70 (US SIEVE, ASTM D4751)
FLOW RATE:	135 GAL/MIN/FT^2 (ASTM D4491)
GRAB TENSILE STRENGTH:	120 LBS (ASTM D 4632)
PUNCTURE:	120 LBS (ASTM D 4833)
COLOR:	ORANGE

4. SOILS MANAGEMENT PLAN DOCUMENT TAKES PRIORITY OVER PLANS. CONTRACTOR TO COORDINATE WITH SAGE ENVIRONMENTAL INC. AS NECESSARY THROUGHOUT CONSTRUCTION TO ENSURE COMPLIANCE WITH SOILS MANAGEMENT PLAN:

SAGE ENVIRONMENTAL INC.
ATTN: MR. JEFFREY D'ARRIGO, SENIOR ASSOCIATE
301 FRIENDSHIP STREET
PROVIDENCE, RI 02903

9 LANDSCAPE AREA REMEDIATION DETAIL
NOT TO SCALE

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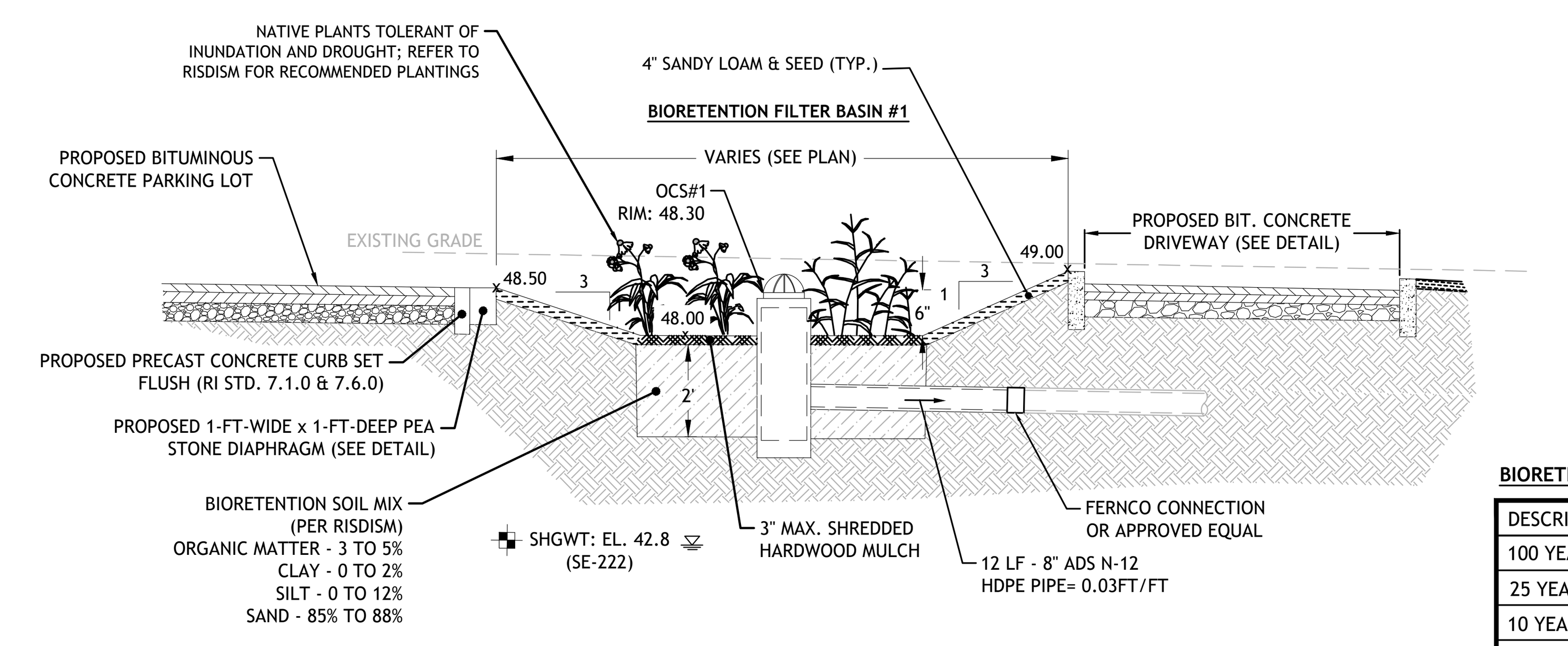
SHEET 7 OF 9

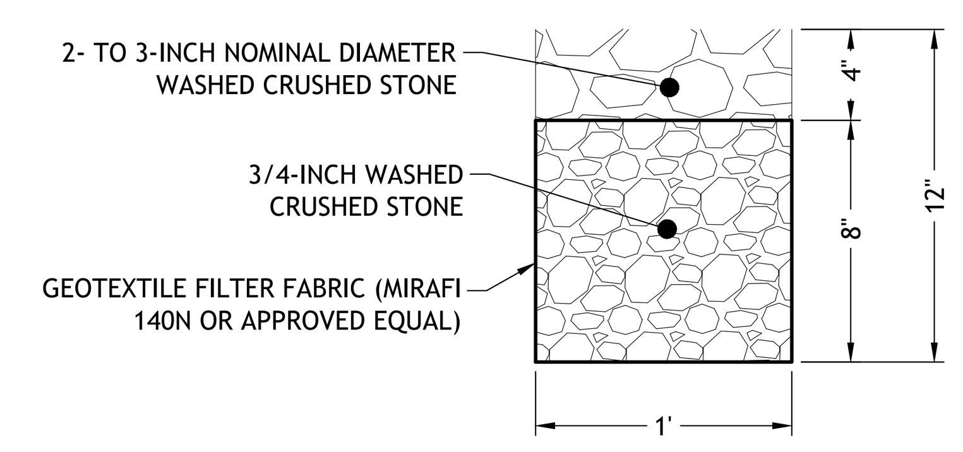
Q:\24-25 Mike Jobb\ACAD\Wellington Ave Self-Storage [PRELIM].dwg Jan. 08, 2025 1:46pm



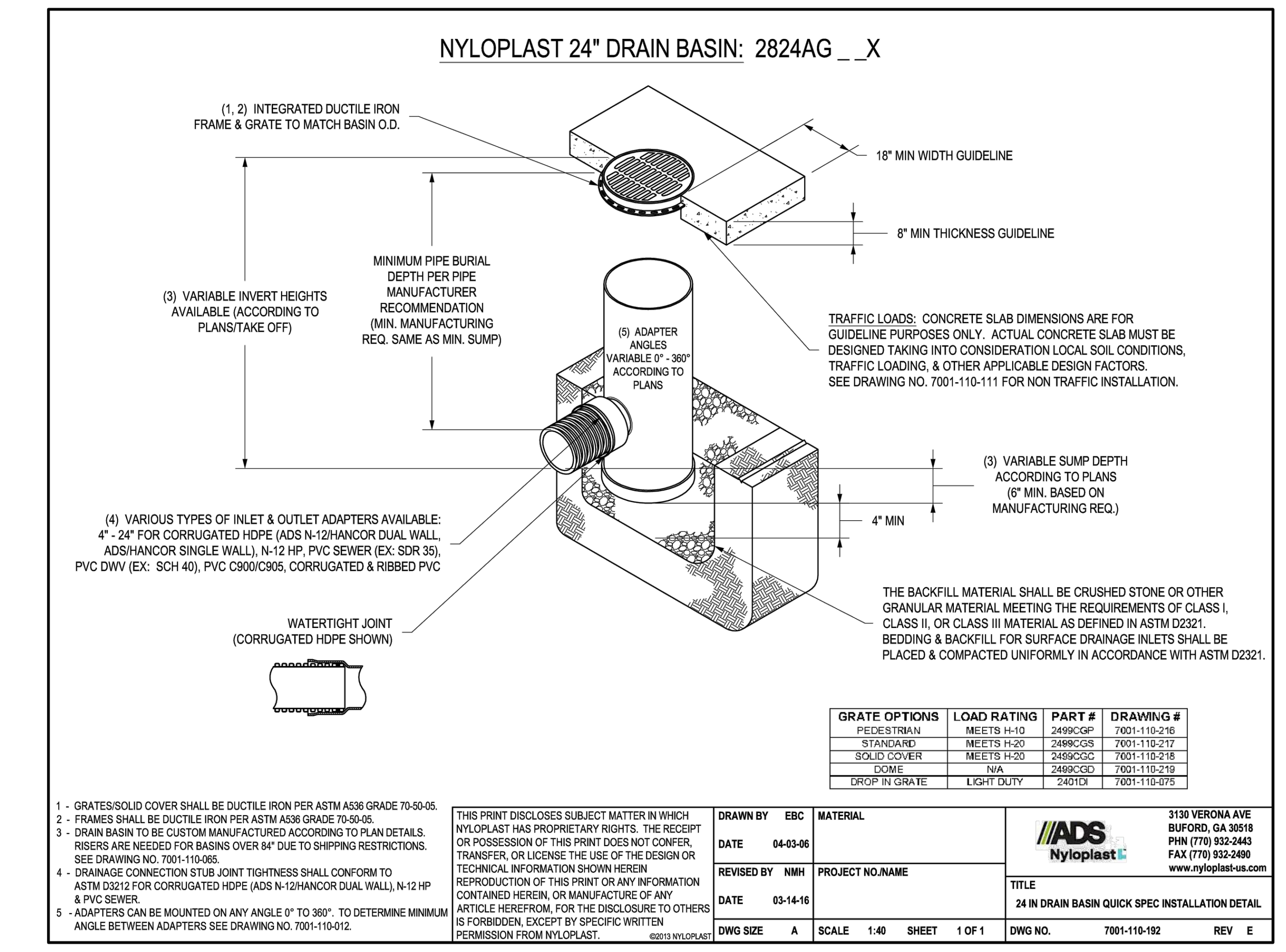
BIORETENTION FILTER BASIN #1

DESCRIPTION	ELEV.
100 YEAR STORM	48.49
25 YEAR STORM	48.44
10 YEAR STORM	48.41
2 YEAR STORM	48.33
1 YEAR STORM	48.16
TOP OF POND	48.50
BOTTOM OF POND	48.00
BOTTOM OF AMENDED SOIL	46.00

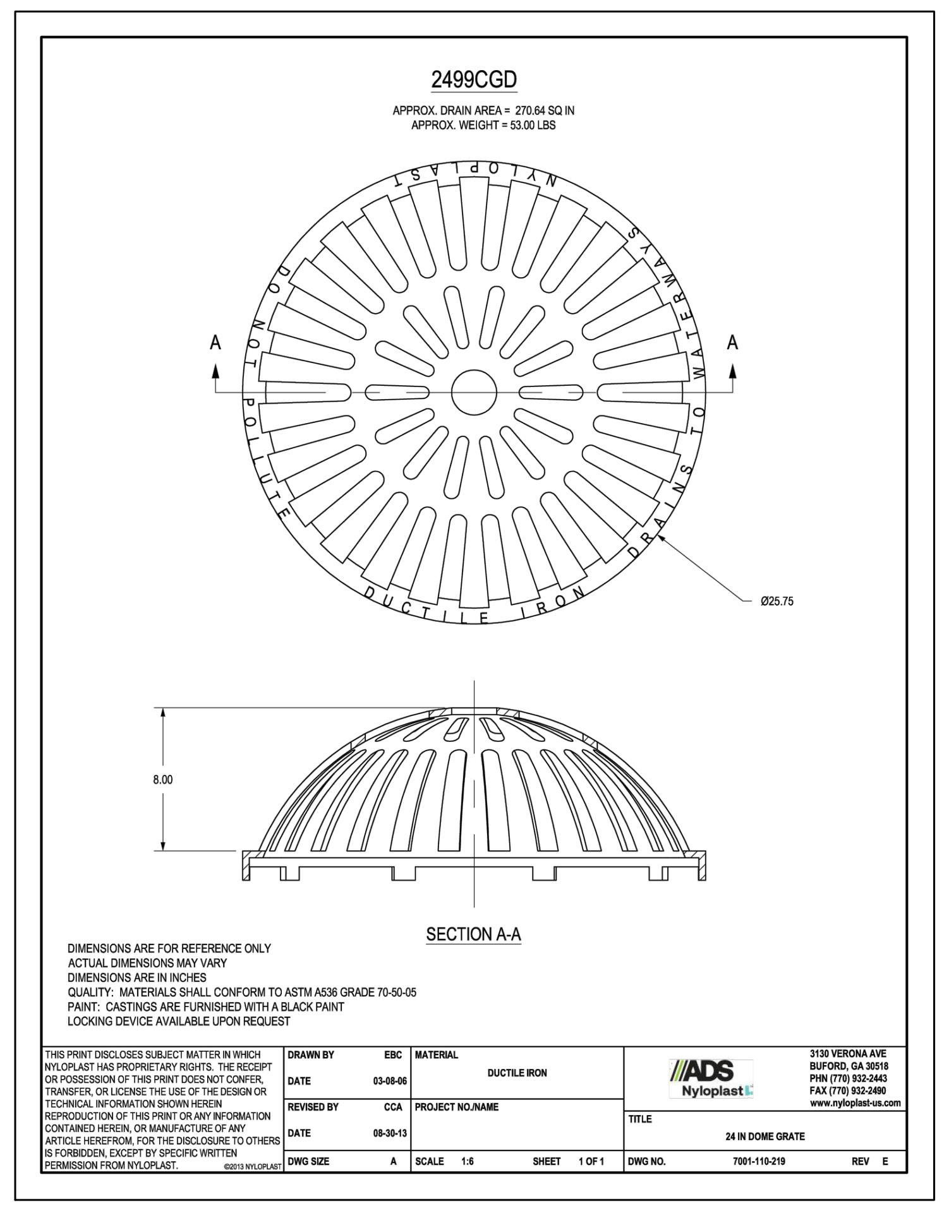
10 BIORETENTION FILTER BASIN #1 - SECTION A-A
NOT TO SCALE



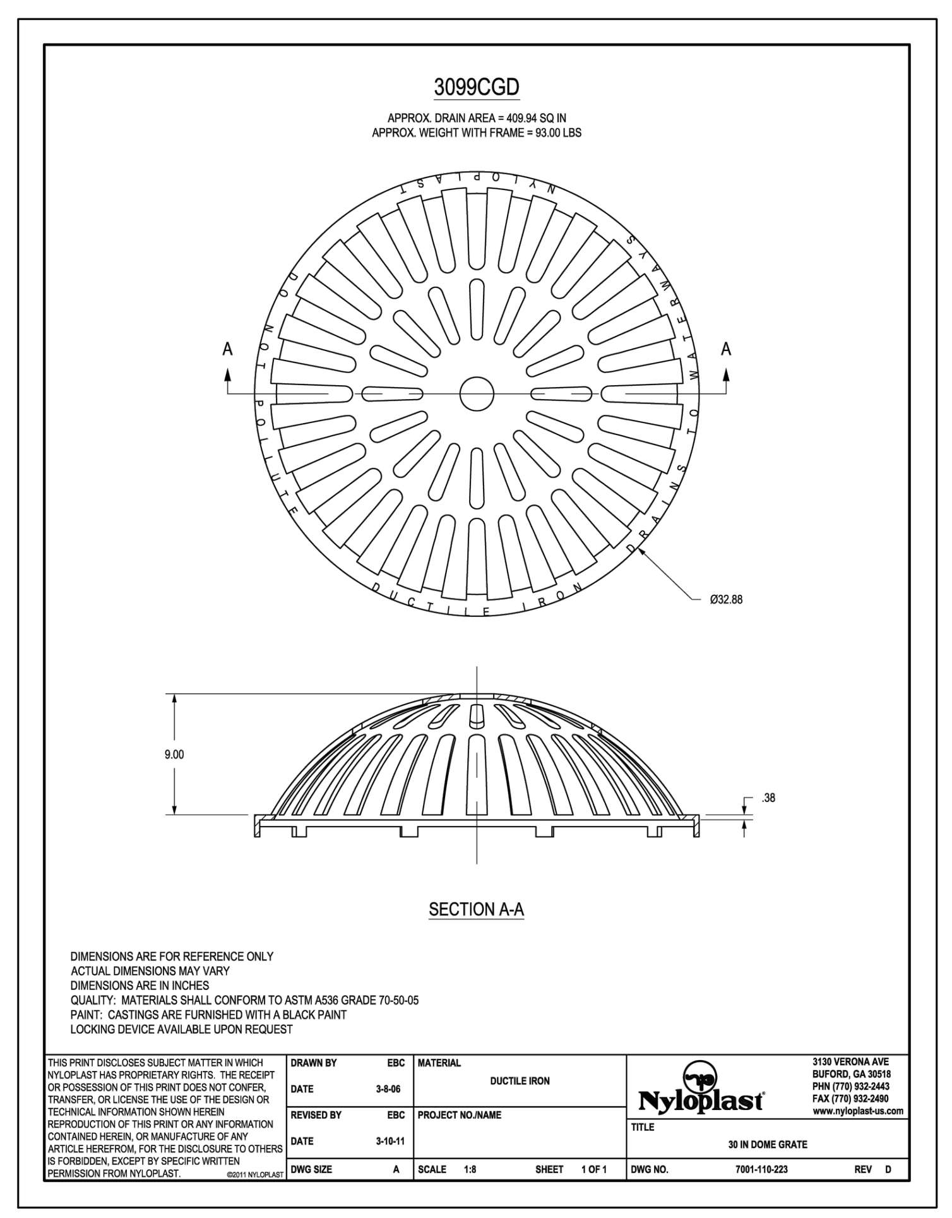
11 PEA GRAVEL DIAPHRAGM
NOT TO SCALE



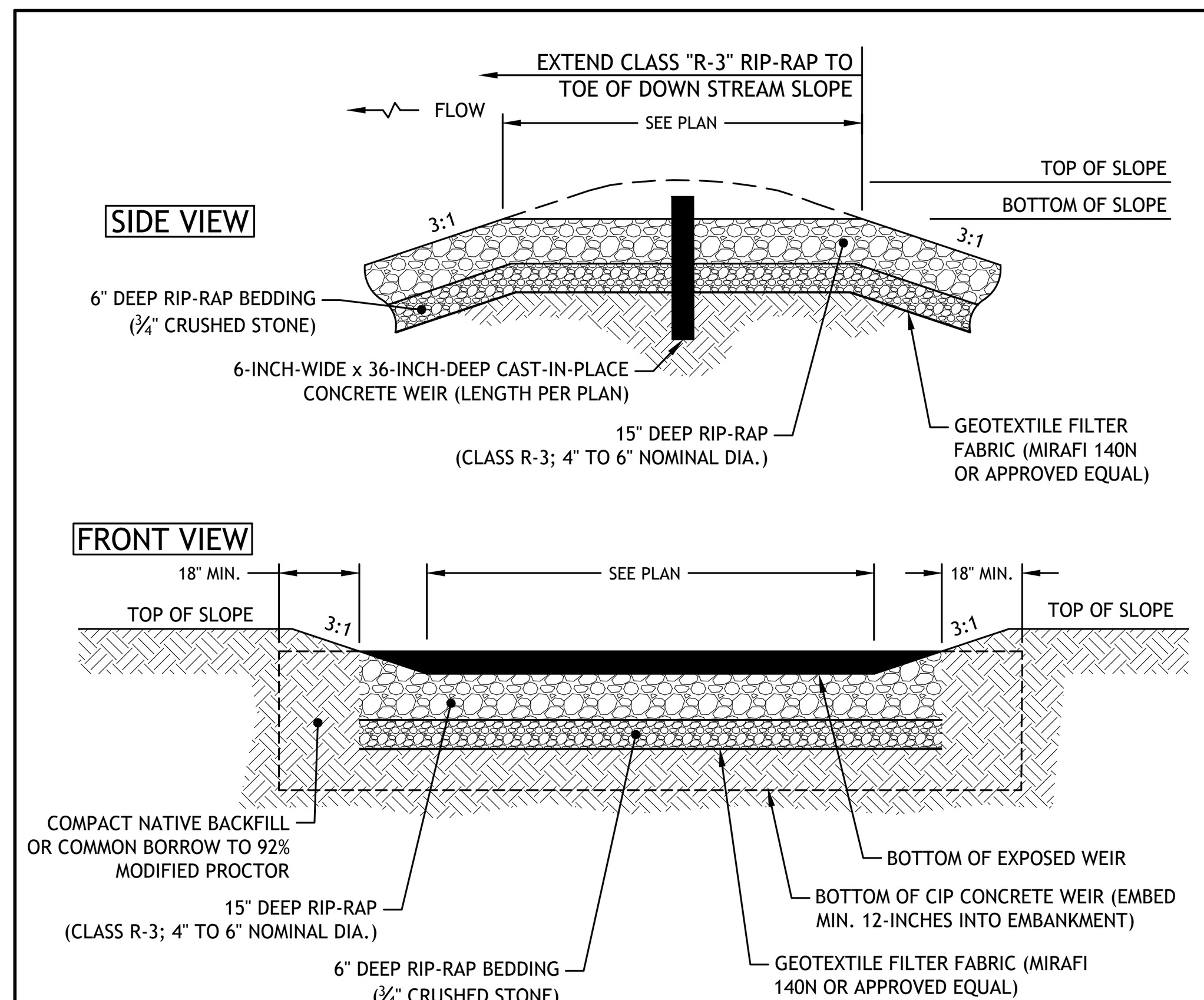
12 24" NYLOPLAST DRAIN BASIN DETAIL
NOT TO SCALE



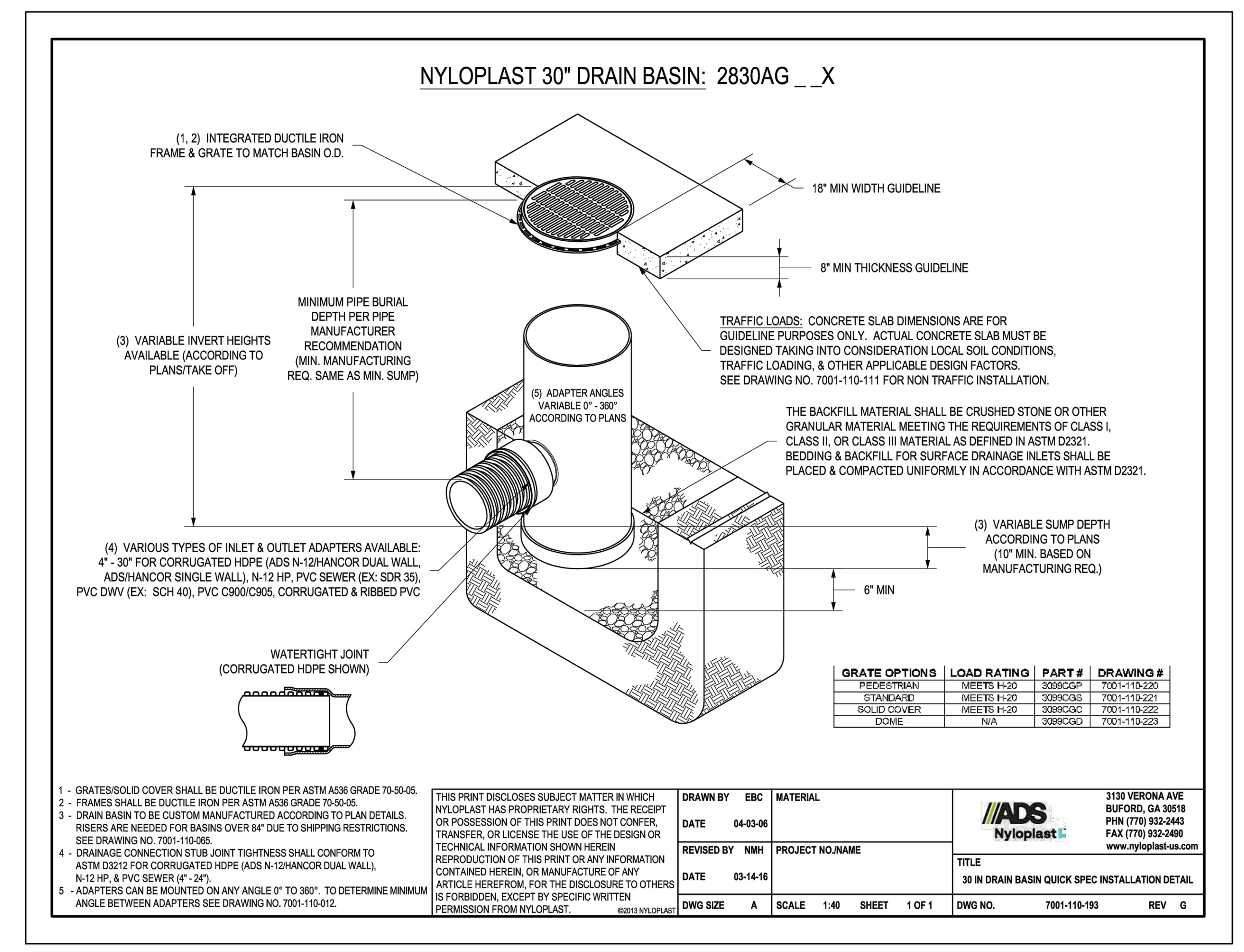
13 24" NYLOPLAST DOME GRATE DETAIL
NOT TO SCALE



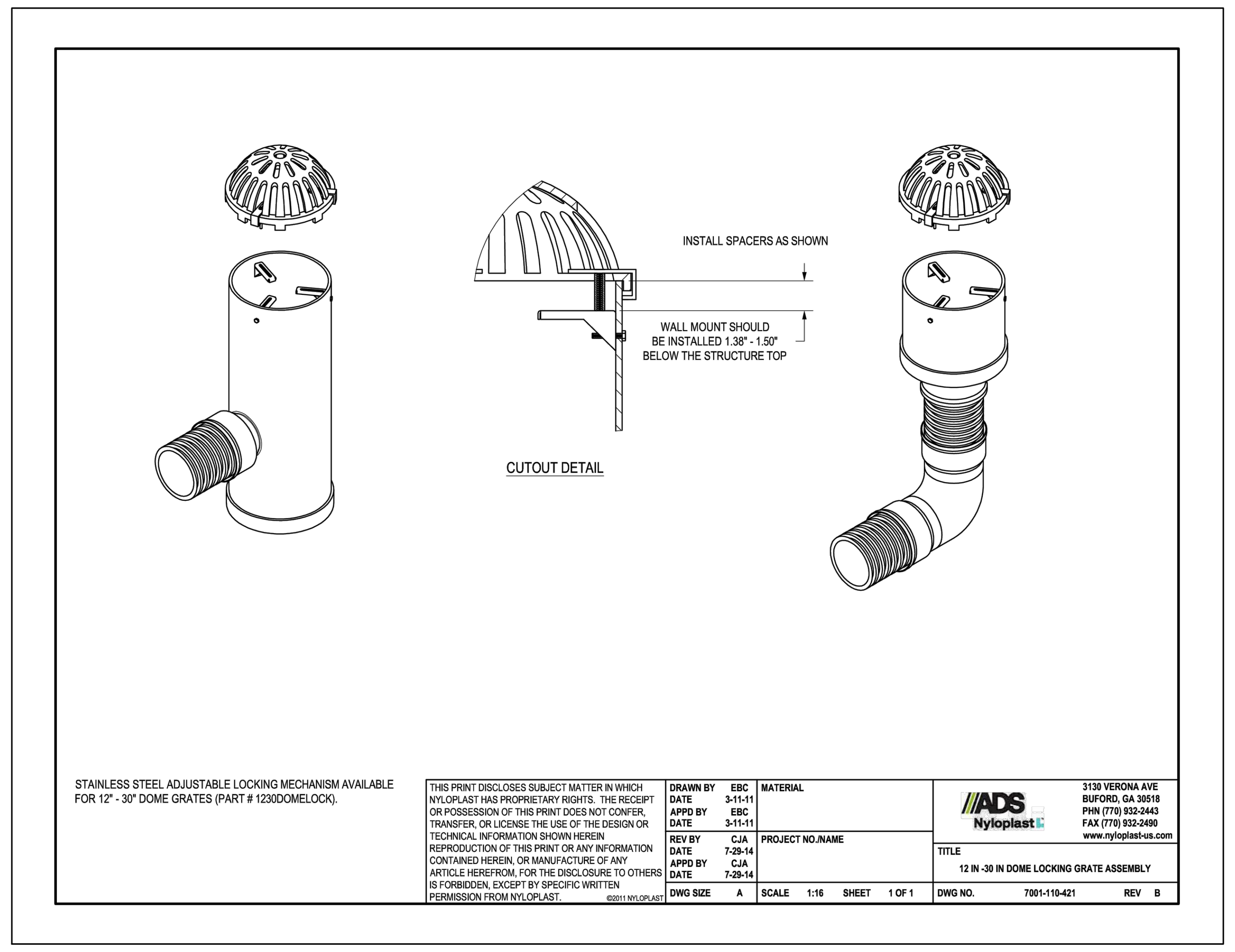
14 30" NYLOPLAST DOME GRATE DETAIL
NOT TO SCALE



15 BROAD CRESTED WEIR DETAILS
NOT TO SCALE



16 30" NYLOPLAST DRAIN BASIN DETAIL
NOT TO SCALE



17 NYLOPLAST DOME GRATE ASSEMBLY DETAIL
NOT TO SCALE

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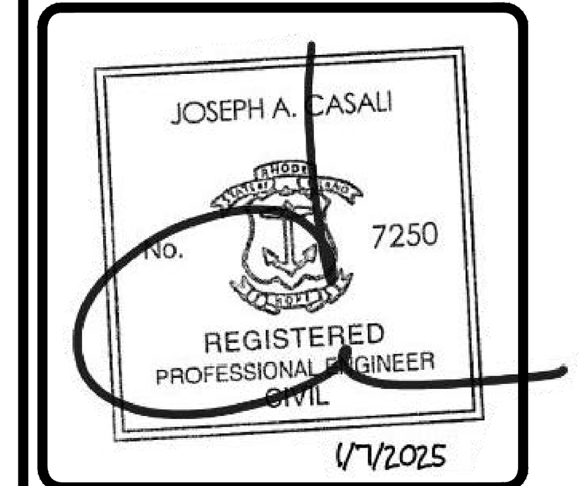
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM



PROPOSED SELF-STORAGE FACILITY
530-532 WELLINGTON AVENUE
CRANSTON, RHODE ISLAND
AP 3, LOT 107

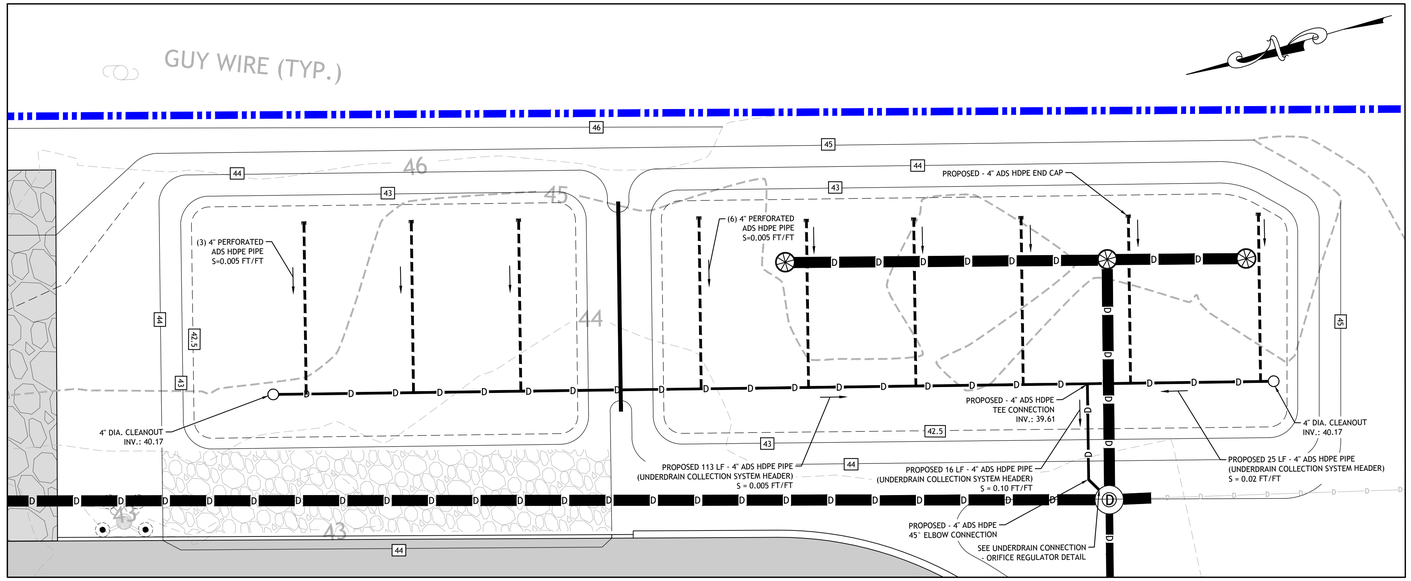
REVISIONS:
NO. DATE. DESCRIPTION

DESIGNED BY:	DRD
DRAWN BY:	JAS/SD
CHECKED BY:	JAC
DATE:	JAN. 2025
PROJECT NO:	24-25

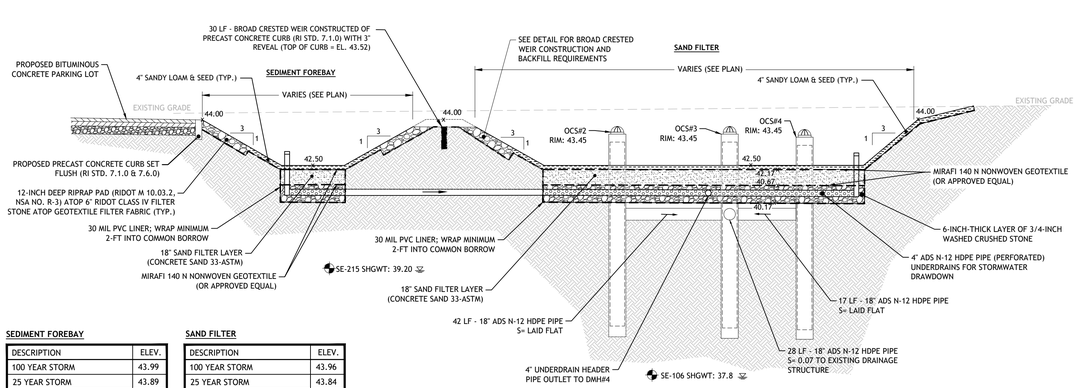
PRELIMINARY, NOT FOR CONSTRUCTION

CIVIL DETAILS II

SHEET 8 OF 9



SEDIMENT FOREBAY & SAND FILTER DETAIL PLAN
SCALE: 1 INCH = 10 FEET



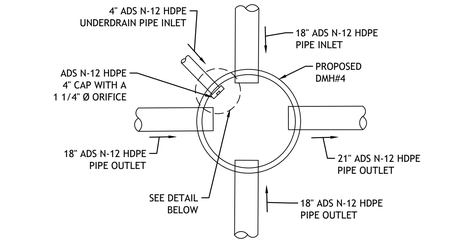
SEDIMENT FOREBAY

DESCRIPTION	ELEV.
100 YEAR STORM	43.99
25 YEAR STORM	43.89
10 YEAR STORM	43.83
2 YEAR STORM	43.75
1 YEAR STORM	43.71
TOP OF POND	44.00
BOTTOM OF POND	42.50
BOTTOM OF FILTER	40.67
BOTTOM OF STONES	40.17

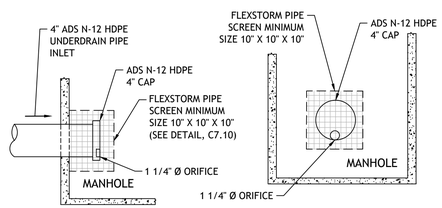
SAND FILTER

DESCRIPTION	ELEV.
100 YEAR STORM	43.96
25 YEAR STORM	43.84
10 YEAR STORM	43.78
2 YEAR STORM	43.68
1 YEAR STORM	43.59
TOP OF POND	44.00
BOTTOM OF POND	42.50
BOTTOM OF FILTER	40.67
BOTTOM OF STONES	40.17

18 LINED AND SUBDRAINED SEDIMENT FOREBAY & SAND FILTER - SECTION B-B
NOT TO SCALE



PLAN VIEW



PROFILE VIEW FRONT VIEW

19 UNDERDRAIN CONNECTION - ORIFICE REGULATOR DETAIL
NOT TO SCALE

1-888-DIG-SAFE
PROTECT YOURSELF, GIVE THREE WORKING DAYS' NOTICE

LOCATION OF EXISTING UTILITIES SHOWN, ARE FROM GATE LOCATION AND EXISTING DOCUMENTATION AND MAY NOT BE ACCURATE. EXACT LOCATION TO BE DONE BY THE APPROPRIATE UTILITY COMPANY OR MUNICIPALITY PRIOR TO ANY EXCAVATION CALL DIGSAFE AT 1-888-DIG-SAFE 1-888-344-7233

JCE
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JOSEPH A. CASALI
NO. 7250
REGISTERED PROFESSIONAL ENGINEER
CIVIL
1/7/2025

PROPOSED SELF-STORAGE FACILITY
530-532 WELLINGTON AVENUE
CRANSTON, RHODE ISLAND
AP 3, LOT 107

REVISIONS:

NO.	DATE.	DESCRIPTION

DESIGNED BY:	DRD
DRAWN BY:	JAS/SD
CHECKED BY:	JAC
DATE:	JAN. 2025
PROJECT NO:	24-25

PRELIMINARY, NOT FOR CONSTRUCTION

CIVIL DETAILS III

SHEET 9 OF 9

CITY OF CRANSTON LANDSCAPING STANDARDS

TITLE 17-ZONING. Supplementary Regulations, 17.83.140 Development and and Landscaping Design Standards

General Requirements

ZONING CRITERIA	REQUIRED	PROPOSED	REFERENCE
Corner lot visibility	*Nothing shall be erected to impede vision between a height of 2 ½ feet and 10 feet of a corner lot 30 feet from property boundary lines*	*Nothing erected to impede vision between a height of 2 ½ feet and 10 feet of a corner lot 30 feet from property boundary lines*	*17.20.100 A.*
Driveway visibility	*Nothing shall be erected to impede vision between a height of 3 ½ feet and 10 feet extending from either side of a driveway*	*Nothing erected to impede vision between a height of 3 ½ feet and 10 feet extending from either side of a driveway*	*17.20.100 B.*
15% of a development's parcel to be landscaped	*15% minimum or 35,550 sq. ft. (237,000 sq. ft. x 15%)*	*17% (41,235 sq. ft. landscape/237,550 sq. ft. lot)*	*17.84.140 C.(1)(b)*
Street trees along frontage	*1 tree for every 35 linear feet of frontage Wellington Ave: 785 lin. ft.=23 trees req'd Clarence Street: 300 lin. ft.=9 trees req'd*	*Wellington Ave: no trees provided due to building location Clarence Street: 1 tree due to pavement location*	*17.84.140 C.(4)(b)*
Deciduous tree minimum caliper	*2 ½ inch caliper*	*2 ½" caliper*	*17.84.140 C.(4)(c)*
Buffer area dimensions	*Minimum 8 feet in height. Minimum 10 foot wide landscape strip along property lines parallel to a street where parking or circulations areas abut a street*	*No buffer along parking at street frontages.*	*17.84.140 C.(6)(b)(i)*
	Minimum 8 feet in height. Minimum 5 foot wide landscape strip along side and rear property lines where parking and circulation areas are adjacent to abutting properties.	*7 foot wide buffer along side and rear property lines*	*17.84.140 C.(6)(b)(ii)*
	Minimum 8 feet in height. Where a more intensive use abuts a less intensive use, a 25 foot wide buffer strip may be required.	*Properties along south side zoned residential. 7 to 63 feet (measured at widest point) provided*	*17.84.140 C.(6)(b)(iii)*

Parking Area Landscaping Requirements

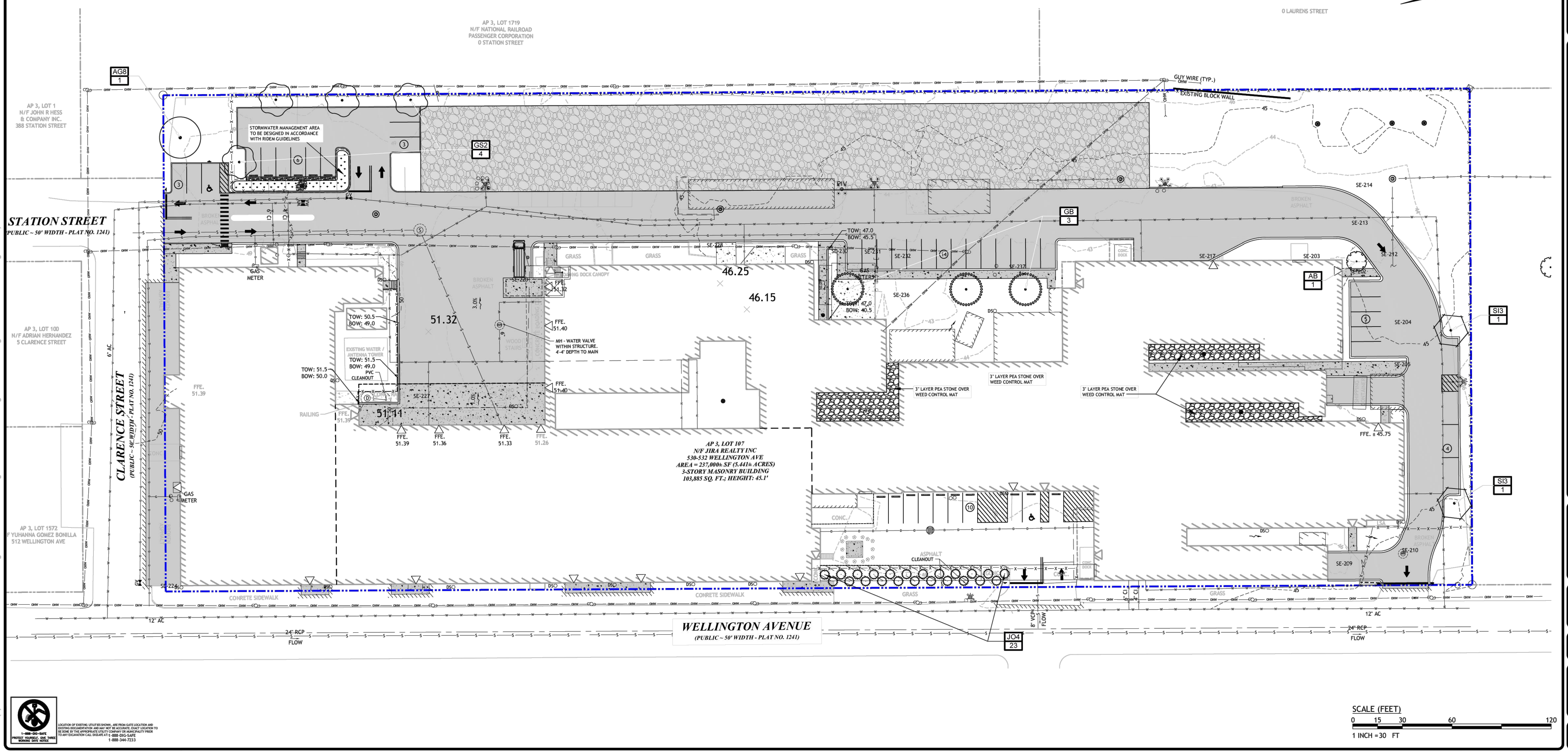
ZONING CRITERIA	REQUIRED	PROPOSED	REFERENCE
Landscape area required within a parking area	*Minimum 10 square feet for each parking space or 450 sq. ft. 45 spaces x 10 sq. ft.)*	*3,965 square feet*	*17.84.140 C.(7)(a)*
Parking area to be shaded by deciduous trees	*Minimum of 20% parking shading (using 706 sq. ft. or 30 foot diameter crown) surrounded by 100 sq. ft. of unpaved area' or 13,692 square feet x 20%=2,739 square feet /706 sq. ft.=8 trees*	*10 trees*	*17.84.140 C.(7)(b)*
Terminal island requirement	*Each row of parking spaces shall be terminated by a landscape island not less than 6 feet wide and 12 feet long.*	*2 feet minimum*	*17.84.140 C.(7)(c)*
Continuous island requirement	*1 continuous landscape island shall be provided between every 4 rows of parking spaces.*	*N/A*	*17.84.140 C.(7)(c)*

PLANT SCHEDULE

SYMBOL	CODE	BOTANICAL / COMMON NAME	SIZE	CONTAINER	QTY	DETAIL	REMARKS
DECIDUOUS TREES							
	AB	Acer rubrum `Bowhall Red`	2.5" Cal.	B&B	1		6`8" STD.
	AG8	Acer rubrum `October Glory` TM / October Glory Maple	2.5" Cal.	B&B	1		Native to RI
	GB	Ginkgo biloba `Princeton Sentry``	2.5" Cal.	B&B	3		Male trees only
	GS2	Gleditsia triacanthos `Skyline` / Skyline Honey Locust	2.5" Cal.	B&B	4		
FLOWERING TREES							
	SI3	Syringa reticulata `Ivory Silk` / Ivory Silk Japanese Tree Lilac	2.5" Cal.	B&B	2		Single Trunk
SHRUBS							
	JO4	Juniperus virginiana `Grey Owl` / Grey Owl Juniper	5 gal	CONT.	23		

NOTE: LOAM AND SEED ALL DISTURBED AREAS UNLESS NOTED OTHERWISE

Diane C. Soule & Associates, ASLA
Landscape Architecture
422 Farnum Pike
Smithfield, Rhode Island 02917
www.dianesouleandassociates.com
401.231.0736
email: diane@dcsa.ws



D:\DATA (D)\ALL MASTER FILES\DRAWINGS\JCE\Can Am Storage\Can Am Storage-Cranston\CamAm Storage - Cranston\CD's\Wellington Ave Self-Storage-Cranston-LANDSCAPE-7 Jan 25.dwg Jan. 08, 2025 11:40am

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PROPOSED SELF-STORAGE FACILITY

530-532 WELLINGTON AVENUE
CRANSTON, RHODE ISLAND
AP 3, LOT 107

REVISIONS:

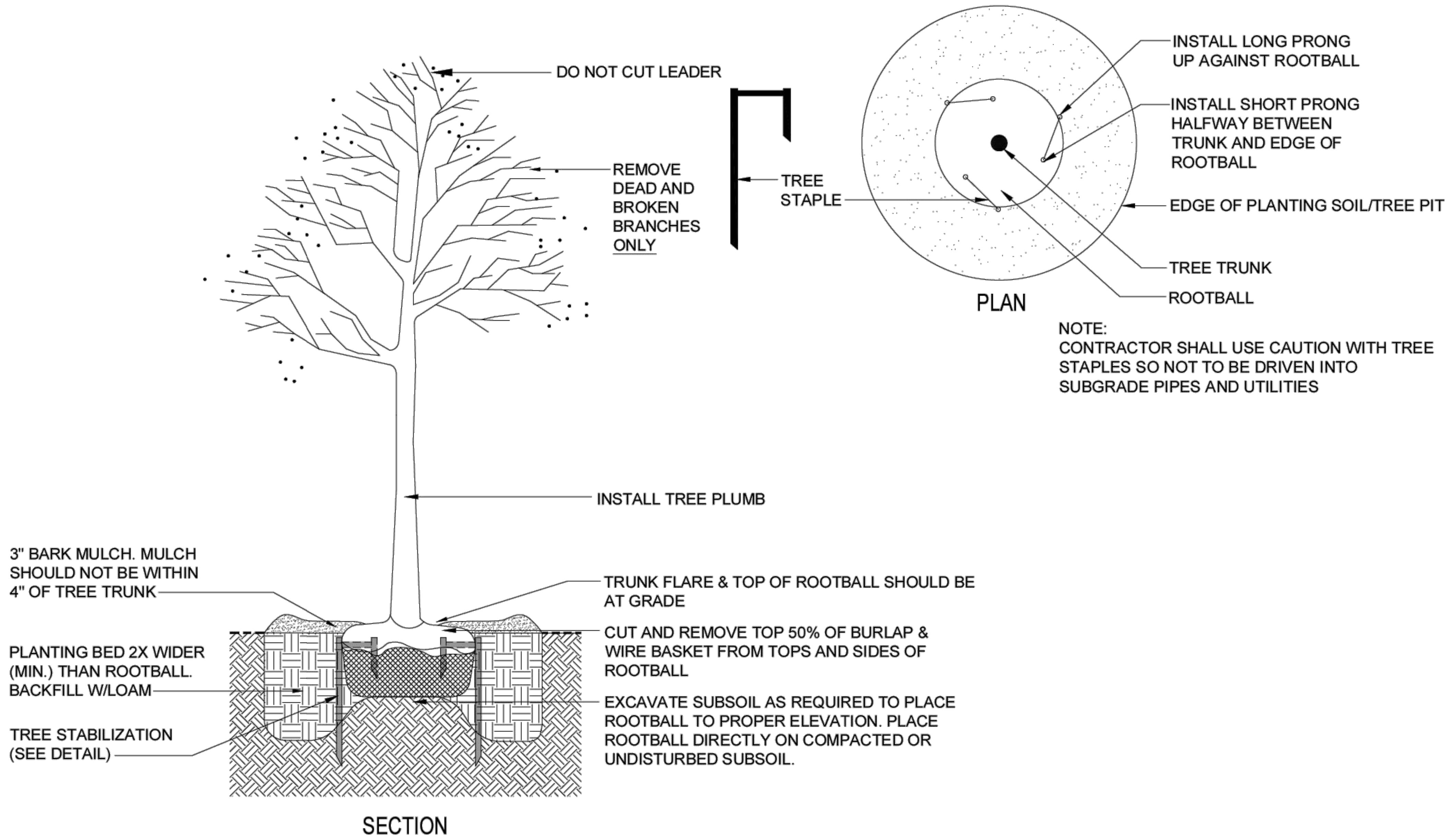
NO.	DATE.	DESCRIPTION
1	12/2024	RTC RIDEM

DESIGNED BY:	DCS
DRAWN BY:	DCS
CHECKED BY:	DCS
DATE:	JAN. 2025
PROJECT NO:	24-25

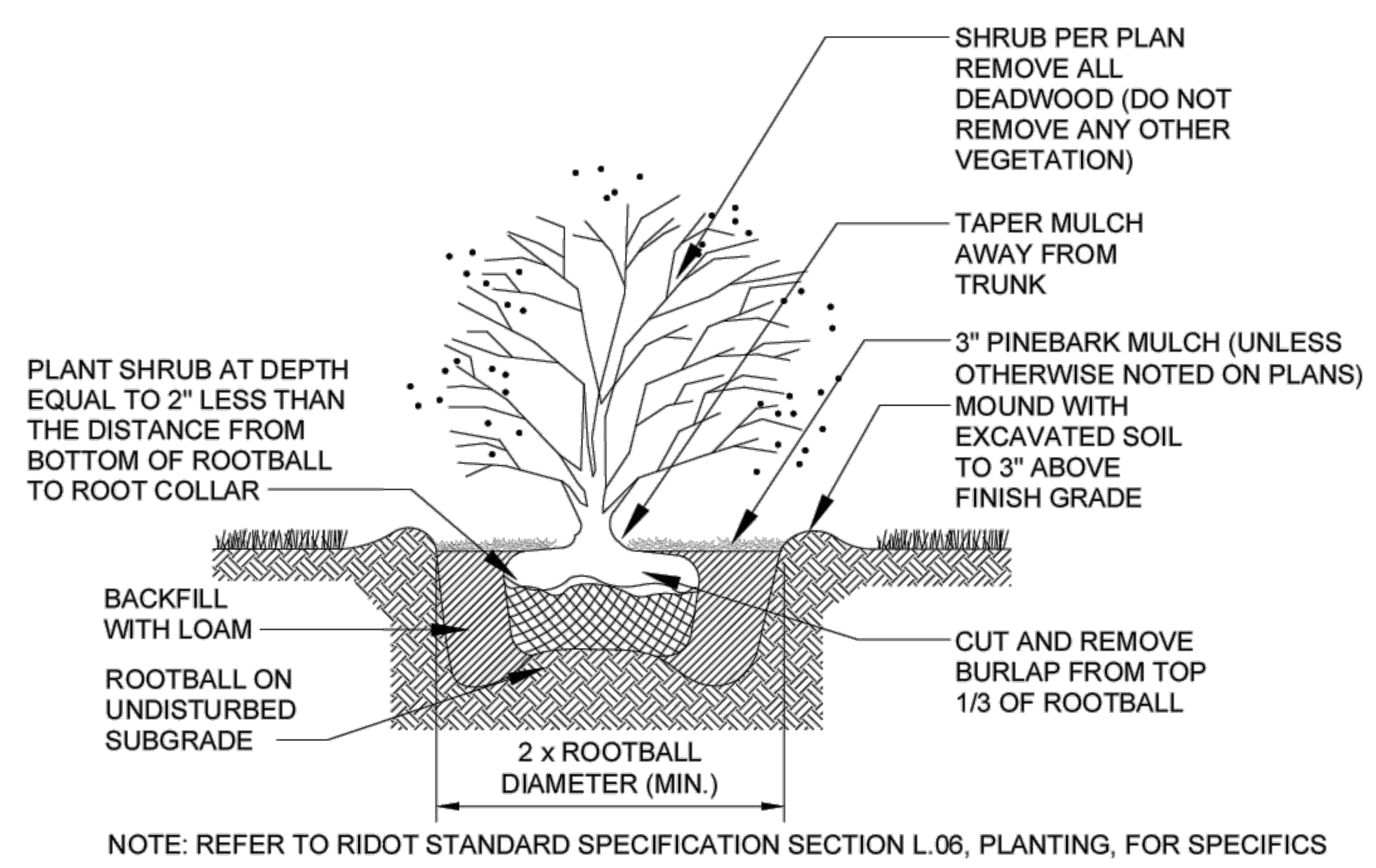
PRELIMINARY, NOT FOR CONSTRUCTION

LANDSCAPE PLAN

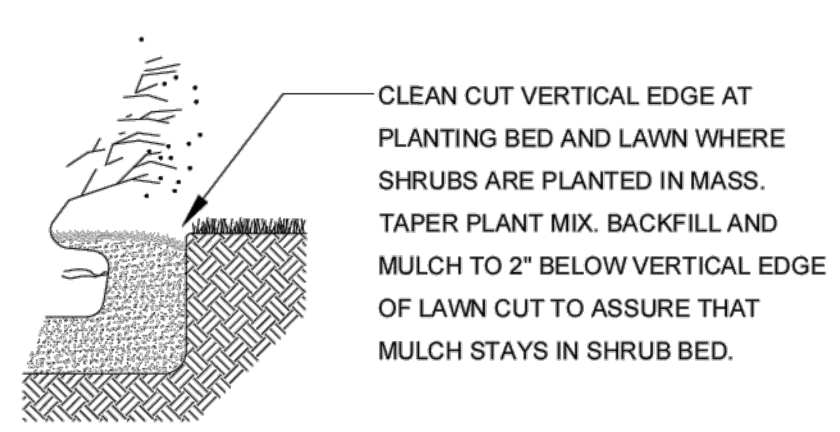
SHEET L1.0



TREE PLANTING DETAIL
no scale



SHRUB PLANTING DETAIL
no scale



SHRUB PLANTING AT LAWN EDGE
not to scale

PLANTING NOTES

1. Plant material shall be furnished and installed as indicated; including all labor, materials, plants, equipment, incidentals and clean-up.

2. The contractor shall be responsible for planting at correct grades and alignment. Layout to be approved by Owner's Representative prior to installation.

3. Plants shall be typical of their species and variety; have normal growth habits; well developed branches, densely foliated, vigorous root systems and be free from defects and injuries.

4. All plant material shall be guaranteed by the contractor to be in vigorous growing condition. Provisions shall be made for a growth guarantee of at least one year from date of acceptance for trees and shrubs. Replacements shall be made at the beginning of the first succeeding planting season. All replacements shall have a guarantee equal to that stated above.

5. Contractor shall report any soil or drainage conditions considered detrimental to the growth of plant material.

6. In so far as it is practical, plant material shall be planted on the day of delivery. In the event this is not possible, the Contractor shall protect stock not planted. Plants shall not remain unplanted for longer than a three day period after delivery. Any plants not installed during this period will be rejected.

7. Quality and size of plants, spread of roots, and size of balls shall be in accordance with ANSI 260 (REV. 1980) "American standard for Nursery Stock" as published by the American Association of Nurserymen, Inc.

8. All plants shall be in amended topsoil that is thoroughly watered and tamped as back filling progresses. Planting mix to be as shown on planting details. Large planting areas to incorporate fertilizer and soil conditioners.

9. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches. Plants shall be handled from the bottom of the ball only.

10. Planting operations shall be performed during periods within the planting season when weather and soil conditions are suitable and in accordance with accepted local practice. Plants shall not be installed in topsoil that is in a muddy or frozen condition. All plant material shall be sprayed with "wilt-pruf" or equal per manufacturer's instructions.

11. No plant except groundcovers, shall be planted less than two feet from existing structures and sidewalks.

12. Set all plants plumb and straight. Set at such a level that a normal or natural relationship to the crown of the plant with the ground surface will be established. Locate plant in the center of the pit.

13. All injured roots shall be pruned utilizing clean, sharp tools to make clean ends before planting. It is advisable to prune approximately $\frac{1}{3}$ of the root growth of large trees (2" caliper and over) by the removal of superfluous branches, those which cross, those which run parallel, etc. Main leader of trees will not be cut back. Long side branches, however, must be shorten.

14. Each tree and shrub shall be pruned in accordance with standard horticultural practice to preserve natural character of plant. Pruning shall be done with clean, sharp tools.

15. Trees shall be supported immediately after planting. All trees six (6) inches and over in caliper shall be guyed. Smaller trees shall be staked, Guying wires and stakes shall be installed as indicated. The landscape contractor shall remove staking, guying and tree wrap at the end of the one year maintenance and guarantee period.

16. The plants shall be watered immediately following planting, preferably when 2/3 of the backfill has been placed so that all air pockets are removed and the plant properly set. Additional watering shall be made at least once every 14 days unless otherwise directed until final acceptance of the plant material

17. All planting beds shall be mulched with a three (3) inch layer of shredded pine bark mulch.

18. New planting areas, grass seed and sod shall be adequately irrigated or watered to establish the proposed plants and lawn. Seeding Note: Use University of Rhode Island No. 2 Improved seed mix or equal.

19. Prior to the issuance of any Certificate of Occupancy, the proposed landscape as shown on the approved Landscape Plan must be installed, inspected and approved by the Owner's Representative or City/Town Landscape Architect if applicable. The inspector shall take into account seasonal considerations in this regard as follows. The planting of trees, shrubs, vines or groundcovers as required by or associated with a subdivision or Site Plan approval by the Planning Board or Zoning Board of Appeals shall be installed during the following planting seasons:

PLANTS	March 15 to October 15
LAWNS	March 15 to June 15
	September 15 to October 15

Furthermore, the following tree varieties shall not be planted during the fall planting season due to the hazards associated with planting these trees in this season. If grown in containers, this list shall not apply.

Acer rubrum	Populus varieties
Betula varieties	Prunus varieties
Carpinus varieties	Pyrus varieties
Crategus varieties	Quercus varieties
Koelreuteria	Salix varieties
Liqiuidambar varieties	Tilia tomentosa
Lirodendron tulipifera	Zelkova varieties
Platatnus acerfolia	

Any plantings installed in conflict with this requirement must receive the written approval of the Landscape Architect prior to planting. Failure to comply with this requirement will require removal of the planting in question. This requirement does not apply to seeding or sodding or plantings specifically for soil stabilization purposes. The planting associated with any lot given a Certificate of Occupancy outside of these periods shall be provided during the previous or next appropriate season.

20. All disturbed areas to be treated with four (4) inches of topsoil and seeded in accordance with permanent stabilization methods indicated on Soil Erosion Sediment Control sheet.

Diane C. Soule & Associates, ASLA
Landscape Architecture
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email: diane@dcsa.ws

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REGISTERED DIANE C. SOULE No. 168 LANDSCAPE ARCHITECT

PROPOSED SELF-STORAGE FACILITY
530-532 WELLINGTON AVENUE
CRANSTON, RHODE ISLAND
AP 3, LOT 107

REVISIONS:

NO.	DATE.	DESCRIPTION
1	12/2024	RTC RIDEM

DESIGNED BY:	DCS
DRAWN BY:	DCS
CHECKED BY:	DCS
DATE:	JAN. 2025
PROJECT NO:	24-25

PRELIMINARY, NOT FOR CONSTRUCTION

LANDSCAPE DETAILS

SHEET L2.0

1-888-DIG-SAFE

SCHEDULE B-II ITEMS

(7) — Sewer Easements recorded in Book 220 at Pages 37 and 38. (AFFECTS, PLOTTED AS SHOWN)

(8) — Matters cited in deed from The General Tire & Rubber Company to Five Thirty Wellington, Inc. recorded in Book 344 at Page 288. (AFFECTS, BLANKET IN NATURE)

(9) — City Council Resolution recorded in Council Records Book 17 at Page 386 being Resolution #388. (AFFECTS, CONTAINS NO PLOTTABLE EASEMENT ITEMS)

(10) — Restrictions, Covenants and Agreements set forth in deeds recorded in Book 281 at Page 431 and in Book 270 at Page 243. (UNABLE TO DETERMINE, ARTHUR STREET REFERENCED WITHIN APPEARS TO LIE WEST OF I-95)

(11) — Fence Agreement recorded in Book 295 at Page 45. (UNABLE TO DETERMINE, PLAT BOOK 2, PAGE 74 REFERENCED WITHIN NOT PROVIDED)

(12) — Violation recorded in Book 788 at Page 636; as affectred by Order recorded in Book 829 at Page 853 and Consent Agreement recorded in Book 829 at Page 855. (AFFECTS, CONTAINS NO PLOTTABLE EASEMENT ITEMS)

(13) — Zoning Board of Review Decisions recorded in Book 911 at Page 494, Book 2201 at Page 145 and in Book 3345 at Page 204. (AFFECTS, CONTAINS NO PLOTTABLE EASEMENT ITEMS)

(14) — Terms of Option and Lease Agreement as referenced in Memorandum of Option and Lease Agreement recorded in Book 916 at Page 80; as affected by Easement and Lease Assignment Agreement recorded in Book 3293 at Page 2; as amended by Amendment to Memorandum of Lease recorded in Book 4599 at Page 269, (AFFECTS, PLOTTED AS SHOWN)

(15) — Lease by and between JIRA Realty and Omnipoint Communications Enterprises, Inc. dated October 18, 1997 as evidenced by Memorandum/Notice of Lease recorded in Book 1001 at Page 4; as assigned by Assignment recorded in Book 3293 at Page 2, if still in force and effect. (AFFECTS, PLOTTED AS SHOWN)

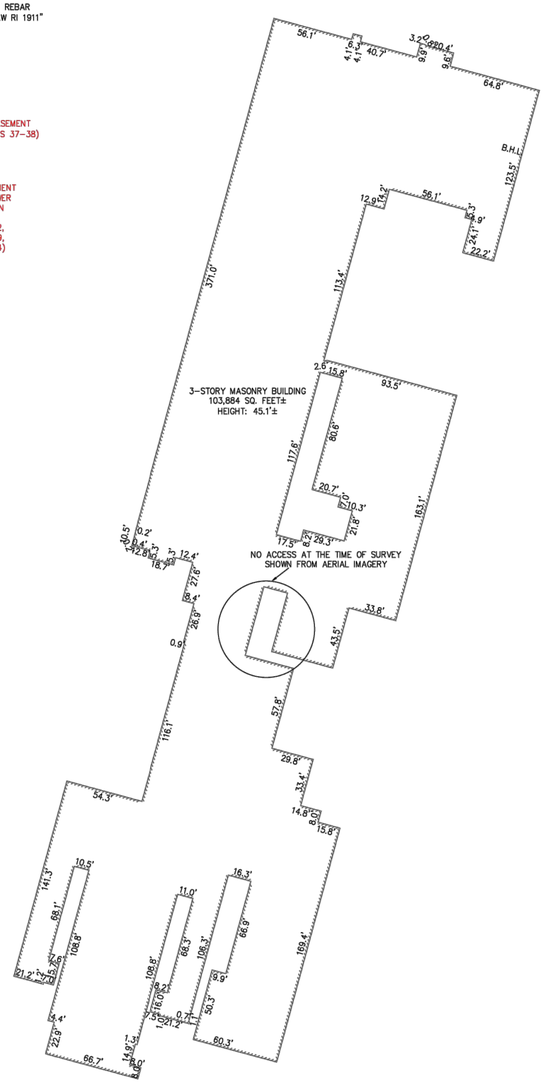
(16) — Easement and Lease Assignment by and between JIRA Realty, Inc. and Unison Site Management (RI) L.L.C. dated January 25, 2006 and recorded in Book 3293 at Page 2; as affected by Assignment of Easement to Cell Tower Lease Acquisition, L.L.C. recorded in Book 3293 at Page 19 and as affected by Assignment and Assumption Agreement recorded in Book 5302 at Page 54. (AFFECTS, PLOTTED AS SHOWN)

(17) — Bill of Sale recorded in Book 3293 at Page 16. (AFFECTS, APPARENT LOCATION PLOTTED AS SHOWN)

(18) — Grant of Easement from JIRA Realty Inc. to The Narragansett Electric Company and Verizon New England Inc. dated January 16, 2008 in Book 3824 at Page 80. (UNABLE TO DETERMINE, POLE #P.39 REFERENCED WITHIN NOT LOCATED)

(19) — Matters set forth on RI Condemnation Plat 1241 and Ross 531 for the layout of I-95. (DOES NOT AFFECT, EFFECTS LIE WEST OF THE SUBJECT PROPERTY IN THE I-95 RIGHT-OF-WAY)

BUILDING DETAIL



RECORD DESCRIPTION

That certain lot or parcel of land, with al the buildings and improvements thereon, situated on the southeaserly side of Wellington Avenue and the southwesterly side of Clarence Street, in the City of Cranston, County of Providence and State of Rhode Island and bounded and described as follows:

Beginning at the intersection of the southeasterly line of Wellington Avenue and the southwesterly line of Clarence Street, which point is the most northerly corner of the parcel hereby conveyed;

Thence running southeasterly along said southwesterly line of Clarence Street, three hundred (300.0) feet to a corner;

Thence turning an interior angle of ninety degrees (90°-00') and running southwesterly bounded southeasterly by land of National Railroad Passenger Corp., seven hundred and ninety (790.0) to a granite bound to a corner;

Thence turning an interior angle of ninety degrees (90°-00') and running northwesterly, bounded southwesterly by other land now or formerly of Five Thirty Wellington, Inc., three hundred (300.0) feet to a granite bound set in the said southeasterly line of Wellington Avenue to a corner;

Thence turning an interior angle of ninety degrees (90°-00') and running northeasterly along said southeasterly line of Wellington Avenue, seven hundred and ninety (790.0) feet to the first mentioned point and place of beginning, the last course forming an interior angle of ninety degrees (90°-00') with the first course.

Property address: 530-532 Wellington Avenue, Cranston, RI 02920
Plat: 3-2 Lot(s): 107

FLOOD NOTE

FLOOD NOTE: BASED ON MAPS PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AVAILABLE ONLINE AT WWW.MSC.FEMA.GOV, AND BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS LOCATED IN ZONE "X" ON FLOOD INSURANCE RATE MAP NUMBER 44007C0318H, WHICH BEARS AN EFFECTIVE DATE OF 10/02/2015 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. BY REVIEWING FLOOD MAPS PROVIDED BY THE NATIONAL FLOOD INSURANCE PROGRAM WE HAVE LEARNED THIS COMMUNITY DOES PARTICIPATE IN THE PROGRAM. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THE ACCURACY OF THE MAPS AND/OR TO APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

TITLE COMMITMENT INFORMATION

THE PROPERTY HEREON DESCRIBED IS THE SAME AS THE PERTINENT PROPERTY AS DESCRIBED IN CHICAGO TITLE INSURANCE COMPANY, COMMITMENT FILE NO.: 23RI00075 (10988070), WITH A COMMITMENT DATE OF FEBRUARY 24, 2023 AT 8:00 AM.

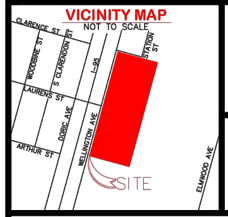
GENERAL SURVEY NOTES

1. ALL STATEMENTS WITHIN THE CERTIFICATION, AND OTHER REFERENCES LOCATED ELSEWHERE HEREON, RELATED TO: UTILITIES, IMPROVEMENTS, STRUCTURES, BUILDINGS, PARKING, EASEMENTS, SERVITUDES, AND SIGNIFICANT OBSERVATIONS ARE BASED SOLELY ON ABOVE GROUND, VISIBLE EVIDENCE, UNLESS ANOTHER SOURCE OF INFORMATION IS SPECIFICALLY REFERENCED HEREON.
2. THIS DRAWING MEETS OR EXCEEDS THE SURVEYING STANDARDS AND STANDARDS OF CARE AS SET FORTH IN SECTION 3 OF THE 2021 ALTA/NSPS SURVEYING REQUIREMENTS.
3. AT THE TIME OF SURVEY, THERE WAS NO RECORD OR OBSERVED EVIDENCE OF A CEMETERY, BURIAL GROUNDS OR LOCATION OF ISOLATED GRAVESITES.
4. THE BASIS OF BEARING FOR THIS SURVEY IS GRID NORTH PER RHODE ISLAND STATE PLANE COORDINATE SYSTEM, NAD83-2011, AS MEASURED ALONG THE EASTERLY RIGHT-OF-WAY LINE OF WELLINGTON AVENUE, WHICH BEARS N 15°12'58" E PER GPS COORDINATE OBSERVATIONS
   LATITUDE: 41°46'23.3873"
   LONGITUDE: -71°25'33.5564"
   CONVERGENCE ANGLE: 00°02'57.5003"
5. THE SUBJECT PROPERTY SHOWN HEREON FORMS A MATHEMATICALLY CLOSED FIGURE AND IS CONTIGUOUS WITH THE ADJOINING PUBLIC RIGHT-OF-WAY AND/OR ADJOINING PARCELS WITH NO GAPS OR OVERLAPS.
6. THE SUBJECT PROPERTY HAS DIRECT PHYSICAL ACCESS TO WELLINGTON AVENUE AND CLARENCE STREET, BOTH BEING A DEDICATED PUBLIC RIGHT-OF-WAY.
7. AT THE TIME OF THE FIELD WORK, THERE WAS NO OBSERVABLE EVIDENCE OF SUBSTANTIAL AREAS OF REFUSE.
8. AT THE TIME OF THE FIELD WORK, OWNERSHIP OF FENCING SHOWN HEREON WAS UNKNOWN TO THIS SURVEYOR.
9. CONCERNING TABLE 'A' ITEM 2, THE ADDRESS ON SITE WAS 530 WELLINGTON AVENUE PER RECORD DOCUMENTS.
10. CONCERNING TABLE 'A' ITEM 7(A), THE BUILDING AREA SHOWN HEREON IS FOR THE FOOTPRINT OF THE BUILDING ONLY AT GROUND LEVEL.
11. CONCERNING TABLE 'A' ITEM 14, THE NEAREST INTERSECTION OF STREETS IS THAT OF WELLINGTON AVENUE & CLARENCE STREET LOCATED ABUTTING THE NORTHWEST CORNER OF THE SUBJECT PROPERTY.
12. CONCERNING TABLE 'A' ITEM 16, THERE WAS NO EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK.
13. CONCERNING TABLE 'A' ITEM 17, AT THE TIME OF THE ALTA SURVEY THERE WERE NO CHANGES IN STREET RIGHT-OF-WAY LINES EITHER COMPLETED OR PROPOSED, AND AVAILABLE FROM THE CONTROLLING JURISDICTION & THERE WAS NO OBSERVABLE EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION REPAIRS.
14. THE DISTANCES SHOWN HEREON ARE UNITS OF GROUND MEASUREMENT.
15. THE LOCATION OF UTILITIES SHOWN HEREON ARE FROM OBSERVED EVIDENCE OF ABOVE GROUND APPURTENANCES ONLY. THE SURVEYOR WAS NOT PROVIDED WITH UNDERGROUND PLANS OR SURFACE GROUND MARKINGS TO DETERMINE THE LOCATION OF ANY SUBTERRANEAN USES.

SITE PICTURE

VICINITY MAP

NOT TO SCALE



LAND AREA

237,000 SQUARE FEET±

5.441 ACRES±

PARKING SPACES

REGULAR= 23 HANDICAP= 0

TOTAL= 23

ZONING DATA

ZONING ITEM	REQUIRED
ZONING DISTRICT	"M2" – GENERAL INDUSTRIAL DISTRICT
PERMITTED USE	WAREHOUSE WITH MANUFACTURING, OFFICE AND A BREWERY
MINIMUM LOT AREA (SQ.FT.)	60,000 SQUARE FEET
MAX BUILDING COVERAGE	60%
MAX BUILDING HEIGHT	35 FEET
BUILDING SETBACKS	
FRONT	40 FEET
SIDE	25 FEET
REAR	30 FEET

NOTES:

PARKING REQUIREMENTS: ONE SPACE FOR EACH EMPLOYEE-USED VEHICLE OR ONE SPACE FOR EACH FOUR EMPLOYEES EMPLOYED AT MAXIMUM EMPLOYMENT, WHICHEVER IS GREATER, PLUS SPACE FOR EVERY COMPANY OWNED AND OPERATED VEHICLE PLAYS SPACE FOR CUSTOMERS' VEHICLES AS DETERMINED APPROPRIATE BY THE INSPECTOR OF BUILDINGS. (ESTIMATED 75 EMPLOYEES EMPLOYES AT MAXIMUM EMPLOYMENT / 4 = 18.75; 19) 19 TOTAL PARKING SPACES

CONTACT: THE PLANNING & ZONING RESOURCE COMPANY
PHONE: 405-840-4344
FAX: 405-840-2608
REPORT DATE: 04/18/2023
PROJECT SITE #: 165540-1

SIGNIFICANT OBSERVATIONS

1. BUILDING APPEARS TO CROSS PROPERTY LINE BY AS MUCH AS 2.8'.
2. BUILDING APPEARS TO CROSS SEWER EASEMENT DESCRIBED IN BOOK 220, PAGES 37-38 BY AS MUCH AS 138.6'.
3. BUILDING APPEARS TO CROSS COMMUNICATIONS EASEMENT DESCRIBED IN BOOK 3293, PAGE 2 BY AS MUCH AS 11.8'.
4. BUILDING APPEARS TO CROSS SIDE SETBACK LINE BY AS MUCH AS 27.8'.
5. BUILDING APPEARS TO CROSS FRONT SETBACK LINE BY AS MUCH AS 36.5'.

LEGEND

◉	FOUND MONUMENT AS NOTED	FH	FIRE HYDRANT
○	SET MONUMENT AS NOTED	WV	WATER VALVE
⌖	COMPUTED POINT	OPIV	POST INDICATOR VALVE
(M)	MEASURED/CALCULATED DIMENSION	MW	MONITORING WELL
(R)	RECORD DIMENSION	GV	GAS VALVE
N/F	NOW OR FORMERLY	GM	GAS METER
R/W	RIGHT-OF-WAY	GI	GRATED INLET
C/L	CENTERLINE OF RIGHT-OF-WAY	D	STORM MANHOLE
P.O.B.	POINT OF BEGINNING	S	SANITARY MANHOLE
B.H.L.	BUILDING HEIGHT LOCATION	CO	CLEANOUT
SQ.FT.	SQUARE FEET	UP	UTILITY POLE
☼	LIGHT POLE	GA	GUY ANCHOR
•	BOLLARD		PROPERTY LINE
⊸	SIGN	OHP OHP	OVERHEAD POWER LINE
MB	MAILBOX	x x	FENCE LINE
OVH	OVERHANG		EASEMENT
NG	NATURAL GROUND		RIGHT-OF-WAY
CC	CONCRETE		CENTERLINE OF ROAD
PS	PARKING SPACE(S)		NO PARKING AREA
♿	HANDICAP PARKING SPACE		

ALTA/NSPS LAND TITLE SURVEY

CRANSTON INDUSTRIAL

530-532 WELLINGTON AVENUE

PROVIDENCE COUNTY CRANSTON, RHODE ISLAND 02910

SURVEYOR'S CERTIFICATE

TO: CHICAGO TITLE INSURANCE COMPANY; and GRS GROUP an NV5 COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 3, 4, 6A, 6B, 7A, 7B1, 7C, 8, 9, 13, 14, 16, 17, AND 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON 04/10/2023.
DATE OF PLAT OR MAP: 04/14/2023

HOLLAND E. SHAW
No. 1911
PROFESSIONAL LAND SURVEYOR

DATED:07/31/2023

HOLLAND E. SHAW, PLS, NO. 1911
COA NO. 769
435-RICR-00-001.9, LIMITED CONTENT, CLASS 1,
2021 ALTA/NSPS LAND TITLE SURVEY

SURVEYED BY:
BLEW & ASSOCIATES, P.A.
3825 N SHILOH DRIVE
FAYETTEVILLE, AR 72703.
SURVEY@BLEWINC.COM

GRS PROJECT NO. / JOB NO. 23-6341.1 | SCALE: 1" = 50' | DRAWN BY: TJS | APPROVED BY: AC

DATE	REVISION HISTORY
04/24/2023	ZONING INFORMATION & CLIENT COMMENTS

SURVEY COORDINATED BY:

GRS GROUP AN NV5 COMPANY
300 SPECTRUM CENTER DRIVE, SUITE 145, IRVINE, CALIFORNIA 92618 | FIELDSURVEYORS@GRS-GLOBAL.COM | PHONE: 330-779-1167

GENERAL NOTES

1. ALL CONSTRUCTION WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND ORDINANCES OR AGENCIES HAVING JURISDICTION OVER THIS PROJECT.
2. ESTABLISH AND MAINTAIN PROJECT SAFETY DURING CONSTRUCTION TO PROTECT PERSONNEL, TENANTS, AND BUILDING OCCUPANTS. REQUIREMENTS INCLUDE, BUT SHALL NOT BE LIMITED TO OSHA PART 1926 LATEST EDITION.
3. THE GENERAL CONTRACTOR SHALL ARRANGE ALL INSPECTIONS AND TESTS AS SPECIFIED OR REQUIRED BY THE BUILDING DEPARTMENT AND SHALL PAY ALL COSTS AND FEES FOR SAME. THE CONTRACTOR SHALL SECURE ALL BUILDING PERMITS AND UPON COMPLETION OF THE PROJECT (PRIOR TO FINAL PAYMENT) DELIVER TO THE OWNER A CERTIFICATE OF OCCUPANCY OR USE FROM THE BUILDING DEPARTMENT.
4. ALL PLUMBING AND ELECTRICAL WORK SHALL BE PERFORMED BY STATE LICENSED CONTRACTORS. CONTRACTORS SHALL SUBMIT ALL REQUIRED PERMITS, CERTIFICATES, AND SIGN-OFFS TO OWNER AND DESIGNER FOR THEIR RECORDS.
5. THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS, BE FAMILIAR WITH THE EXISTING CONDITIONS, AND BRING ANY DISCREPANCIES TO THE ATTENTION OF THE DESIGNER PRIOR TO SUBMISSION OF CONSTRUCTION PROPOSAL AND BEFORE COMMENCEMENT OF THE WORK. THE DRAWINGS REFLECT CONDITIONS REASONABLY INFERRED FROM THE EXISTING VISIBLE CONDITIONS BUT CANNOT GUARANTEED BY THE DESIGNER DRAWINGS MAY BE SCALED FOR ESTIMATING PURPOSES AND FOR GENERAL REFERENCE ONLY. FOR ALL OTHER DIMENSIONS OR LOCATIONS CONSULT THE DESIGNER OR REFER TO DIMENSIONS ON DRAWINGS. VERIFY ALL DIMENSIONS IN THE FIELD.
6. CONTRACTOR SHALL FIELD VERIFY ALL MEASUREMENTS, LOCATIONS, AND CHARACTERISTICS OF ALL WORK AND EQUIPMENT (WHETHER SUPPLIED BY THE OWNER OR OTHERS) WITH THE SUPPLIER OR MANUFACTURER PRIOR TO THE START OF RELATED WORK.
7. THE GENERAL CONTRACTOR SHALL LAY OUT ALL WORK AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS FOR TRADES SUCH AS ELECTRICAL, PLUMBING, ETC.
8. THE GENERAL CONTRACTOR/CONSTRUCTION MANAGER SHALL PROVIDE AND MAINTAIN ACCESS TO THE PREMISES AT ALL TIMES.
9. THE GENERAL CONTRACTOR SHALL KEEP THE CONSTRUCTION SITE FREE AND CLEAR OF ALL DEBRIS AND KEEP OUT ALL UNAUTHORIZED PERSONS. UPON COMPLETION OF WORK, THE ENTIRE CONSTRUCTION AREA IS TO BE THOROUGHLY CLEANED AND PREPARED FOR OCCUPANCY BY OWNER. ALL MATERIALS AND DEBRIS RESULTING FROM THE CONTRACTOR'S WORK SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY. CARE SHALL BE TAKEN DURING CONSTRUCTION THAT NO DEBRIS OR MATERIALS ARE DEPOSITED IN ANY RIGHT OF WAY AREA.
10. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW CONDITIONS AND MATERIALS ON THE SITE. ANY DAMAGE CAUSED BY OR DURING THE EXECUTION OF THE WORK IS THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE.
11. ANY VARIATIONS FROM INDICATED DIMENSIONS OR CONDITIONS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGNER.
12. NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGNER.
13. NO CUTTING OR DAMAGE TO BUILDING STRUCTURAL COMPONENTS WILL BE ALLOWED WITHOUT WRITTEN AUTHORIZATION FROM THE DESIGNER.
14. PROVIDE BRACING, BLOCKING, AND/OR STRUCTURE AS REQUIRED TO FACILITATE INSTALLATION OF ALL WALL AND MILLWORK MOUNTED EQUIPMENT, IN NEW AND EXISTING WALLS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE SUPPORT REQUIRED TO MAINTAIN THE INTEGRITY OF THE WALLS AND THE SECURITY OF THE EQUIPMENT.
15. ALL WOOD BLOCKING SHALL BE FIRE RETARDANT TREATED. PROVIDE WOOD BLOCKING IN ALL STUD WALLS AT MILLWORK AND SPECIAL ITEM ANCHORING POINTS. WOOD BLOCKING SHALL BE MOISTURE TREATED IF LOCATED IN DAMP LOCATIONS OR ADJACENT TO CONCRETE OR MASONRY CONSTRUCTION. IF WOOD BLOCKING IS NOT PERMITTED BY CODE, THEN METAL STRIPS SHALL BE USED.
16. THE CONTRACTOR IS RESPONSIBLE FOR FIELD DIMENSIONS OF ALL MILLWORK, GLASS, DOOR OPENINGS, AND OTHER STRUCTURES PRIOR TO COMMENCEMENT OF FABRICATION.
17. ALL WORK SHALL CONFORM IN QUALITY TO ACCEPTED INDUSTRY STANDARDS. ALL MILLWORK SHALL CONFORM TO A.W.I. PREMIUM GRADE STANDARDS, UNLESS OTHERWISE NOTED.
18. THE MATERIALS USED FOR CONSTRUCTION OF SPACE SHALL NOT CONTAIN ASBESTOS, P.C.B, OR ANY OTHER HAZARDOUS MATERIALS OF ANY TYPE. MANUFACTURERS' NAMES AND TRADEMARKS SHALL NOT BE PROMINENTLY VISIBLE TO THE PUBLIC.
19. ALL WALLS TO BE LAID OUT AT 90-DEGREE ANGLES UNLESS OTHERWISE NOTED.
20. THE SCOPE OF WORK OF ALL TRADES IS TO INCLUDE ALL MATERIALS AND LABOR REQUIRED TO TOTALLY COMPLETE THE PROJECT AND BE FUNCTIONALLY CONSISTENT WITH THE DESIGN INTENT AS EXPRESSED IN THE CONSTRUCTION DOCUMENTS.
21. ALL UTILITIES SHALL BE CONNECTED TO PROVIDE GAS, ELECTRIC, AND WATER TO ALL EQUIPMENT WHETHER SAID EQUIPMENT IS IN CONTRACT OR NOT. EQUIPMENT SHALL BE GUARANTEED TO FUNCTION PROPERLY UPON COMPLETION.
22. MANUFACTURER'S STANDARD SPECIFICATIONS AND MATERIALS APPROVED FOR PROJECT USE ARE HEREBY MADE PART OF THESE NOTES WITH SAME FORCE AND EFFECT AS IF WRITTEN OUT IN FULL HEREIN. ALL APPLIANCES, FIXTURES, EQUIPMENT, HARDWARE, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND PROCEDURES.
23. THERMOSTATS SHALL NOT BE LOCATED IN THE CENTER OF A WALL, ON AN ACCENT/SPECIALTY WALL, OR IN A LOCATION WHICH CONFLICTS WITH FURNISHINGS WITHOUT THE ARCHITECT'S APPROVAL.
24. WRITTEN WORDS TAKE PRECEDENCE OVER DRAWN LINES. LARGE-SCALE DETAILS AND PLANS TAKE PRECEDENCE OVER SMALLER DETAILS AND PLANS. SHOULD A CONFLICT ARRIVE BETWEEN THE SPECIFICATIONS AND DRAWINGS, THE REQUIREMENTS DEEMED MOST STRINGENT SHALL BE USED.
25. MINOR DETAILS NOT USUALLY SHOWN OR SPECIFIED BUT NECESSARY FOR PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION, OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE DESIGNER SHALL BE INCLUDED IN THE WORK AS IF IT WERE SPECIFIED OR INDICATED ON THE DRAWINGS.
26. ALL DRAWINGS AND CONSTRUCTION NOTES ARE COMPLIMENTARY. WHAT IS INDICATED AND CALLED FOR BY ONE SHALL BE BINDING AS THOUGH CALLED FOR BY ALL. NO DEVIATION FROM THE DRAWINGS OR SPECIFICATIONS OR INTENT OF SAME SHALL BE MADE WITHOUT THE DESINERS WRITTEN AUTHORIZATION.
27. ALL WORK SHALL BE GUARANTEED FOR ONE YEAR AFTER FINAL APPROVAL. THE GENERAL CONTRACTOR SHALL SIGN THE WRITTEN GUARANTEE AS PROVIDED BY THE OWNER. THE GUARANTEE SHALL COVER ALL GENERAL AND SUBCONTRACTOR WORK. ALL DEFECTS DISCOVERED DURING THIS PERIOD SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE.
28. ALL DIMENSIONS ARE TO FACE OF STUD OR CENTERLINE OF STRUCTURE UNLESS OTHERWISE NOTED.
29. DOOR AND WINDOW DETAILS ARE INDICATED ON THE DOOR AND WINDOW SCHEDULES. DOOR AND WINDOW DIMENSIONS ARE TO CENTERLINES OF UNITS UNLESS OTHERWISE NOTED.

SYMBOL LEGEND

- A — Wall Type (see wall type schedule)
- 101 — Door Type (see door schedule)
- A — Window Type (see window schedule)
- A / A3.0 — Building Section
- 1 / A4.0 — Wall Section
- X / A.X — Detail Number
- 1 / A4.0 — Elevation (without line)
- 3 A5.5 2 — Interior Elevation Mark
- +8'-0" — Elevation Mark
- ROOM 110 — Room Name / Number
- A.8 — Column Line
- ℄ — Centerline
- 1 — Revision Tag

SYMBOL LEGEND

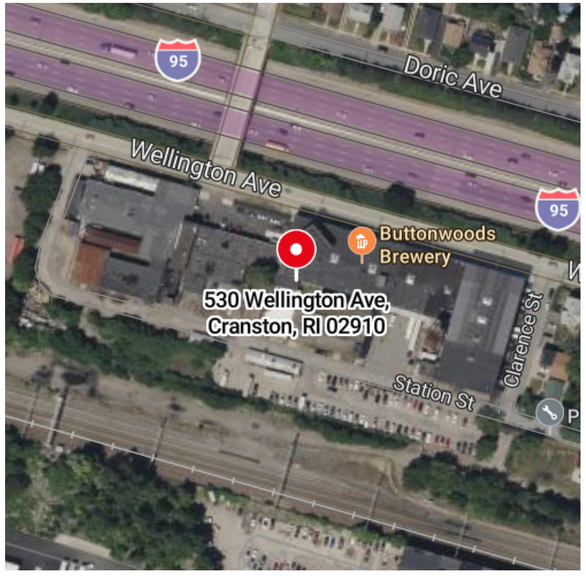
A.C.I.	AMERICAN CONCRETE INSTITUTE
BLDG.	BUILDING
CONC.	CONCRETE
C.J.	CONTROL JOINT
COL.	COLUMN
DET.	DETAIL
DIA.	DIAMETER
DN.	DOWN
EL/ELEV.	ELEVATION
ELEC.	ELECTRICAL
EQ.	EQUAL
FIN.	FINISH
FLR.	FLOOR
GALV.	GALVANIZED
GYP.	GYPSUM
I.D.	INSIDE DIAMETER
JT.	JOINT
MECH.	MECHANICAL
MIN.	MINIMUM
N.T.S.	NOT TO SCALE
NO.	NUMBER
O.C.	ON CENTER
OPG.	OPENING
O.D	OUTSIDE DIAMETER
U.N.O.	UNLESS NOTED OTHERWISE
REF.	REFERENCE
R.	RISER
R.O.	ROUGH OPENING
RM.	ROOM
S/STL.	STAINLESS STEEL
STRUCT.	STRUCTURAL
SPEC.	SPECIFICATIONS
T.O.	TOP OF (...)
T.O.CONC.	TOP OF CONCRETE
T.O.F.	TOP OF FRAMING
T.O.STL.	TOP OF STEEL
T.O.W.	TOP OF WALL
T.	TREAD
TYP.	TYPICAL
@	AT
+	AND
BD.	BOARD
A.F.F.	ABOVE FINISHED FLOOR
U.O.N.	UNLESS OTHERWISE NOTED
V.I.F.	VERIFY IN FIELD

SCOPE OF WORK

PROPOSED EGRESS STAIRS AT
EXISTING MILL BUILDING.

SCHEDULES

DRAWING LIST



LOCUS

530 WELLINGTON AVE

PAUL V. SATAS
No. 2469
REGISTERED
ARCHITECT

LICENSED: RI #2469, MA #10470, NJ #AI14727, IL #001-010503, CT. #9929

ARCHITECTS

PAUL V. SATAS, AIA
ARCHITECT
1467 CENTERVILLE RD
WARWICK, RI 02886

E: ARCHITECTURAINCMAIL@GMAIL.COM
P: 401-714-2130

No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT
3	11-21-24	ISSUED FOR PERMIT

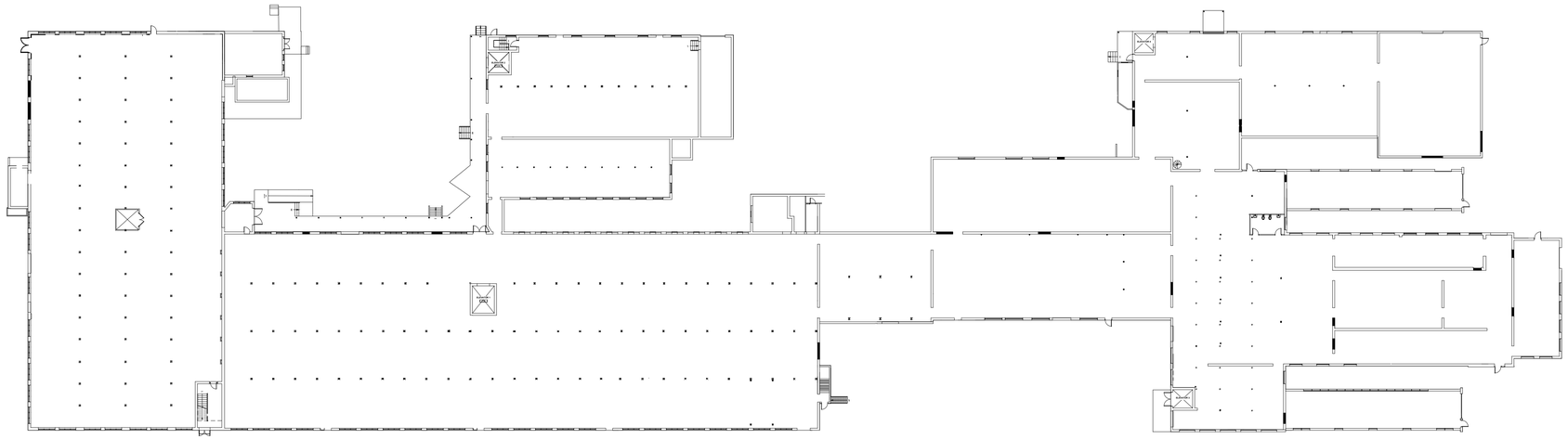
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

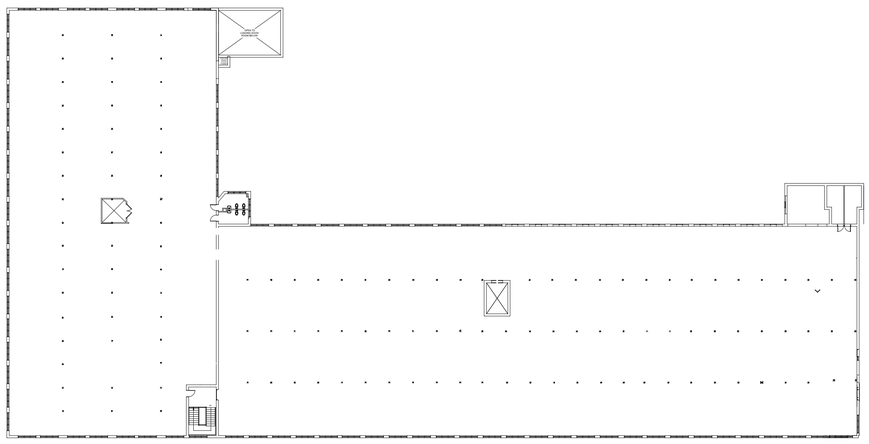
DEMOLITION PLANS
ENLARGED
DEMOLITION PLANS

A101

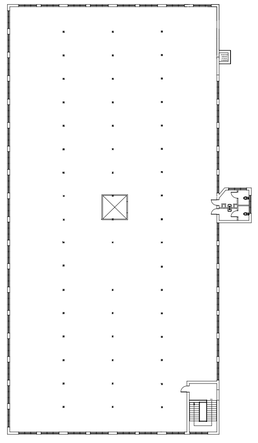
SCALE: AS NOTED



1 / A102 EXISTING FIRST FLOOR PLAN
Scale: 1/16"=1'-0"



2 / A102 EXISTING SECOND FLOOR PLAN
Scale: 1/16"=1'-0"



3 / A102 THIRD FLOOR PLAN
Scale: 1/16"=1'-0"

B. CONSTRUCTION TYPES & SEPARATION REQUIREMENTS -CHAPTER 5

NON-SEPARATED MIXED USE IF SPRINKLERED, 0 HR RATING BETWEEN USES REQUIRED PER IBC TABLE 508.3.3

CONSTRUCTION TYPE: IIIB* (IBC TABLE 503) III NFPA 220

C. ALLOWABLE AREA AND HEIGHT

1. AREA IBC TABLE 503 FOR IIIB CONSTRUCTION
   OCCUPANCY S-1 = 52,500 SF/FLOOR

2. HEIGHT IBC TABLE 503 FOR IIIB CONSTRUCTION
   OCCUPANCY S-1 = 3 STORIES/75 FEET ABOVE GRADE

3. AREA AND HEIGHT CALCULATIONS

BASEMENT LEVEL	41,065GSF
FIRST LEVEL -S-1 STORAGE	91,644GSF
FIRST LEVEL -MERCANTILE	1,465GSF
SECOND LEVEL	59,362GSF
THIRD LEVEL	24,504GSF

BASIC ALLOWABLE	2 STORIES, 55 FEET
AUTOMATIC SPRINKLER SYSTEMS	+ 1 STORY, 20 FEET
ALLOWABLE BUILDING HEIGHT	= 3 STORIES, 75 FEET

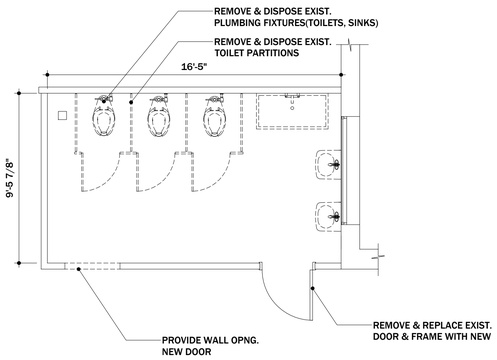
3. BUILDING AREA MODIFICATIONS

FRONTAGE CALCS
F = 2,675 ft
P = 2819 ft
W = 30 (ALL ALLOWABLE FRONTAGE EXCEEDS 30 ft)

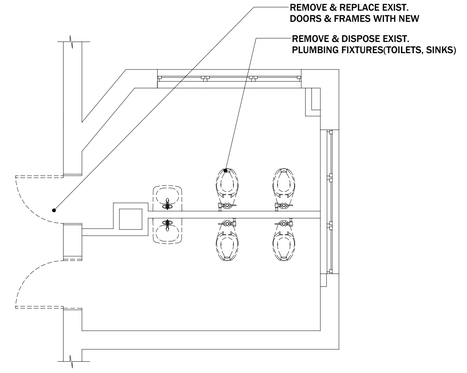
AREA FACTOR INCREASE
If= [F/P -0.25]W/30
If= [2,675 ft / 2819 ft -0.25]30/30 = 0.7

S-1 ALLOWABLE AREA
Aa= [At+ (NS x If)]
Aa= [52,500 sf + (17,500 sf x 0.7] = 64,750 PER STORY*

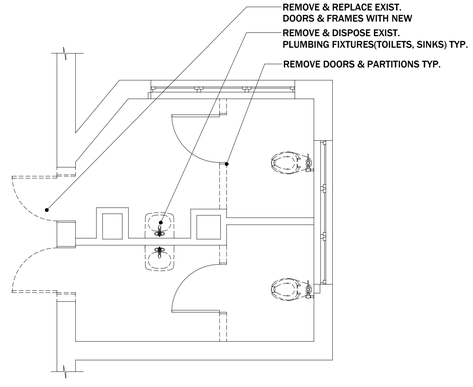
*PER RISRC-1 2002 702.4.2 -WHERE OCCUPANCY CHANGES TO EQUAL HAZARD VALUE, THE HEIGHT AND AREA OF EXISTING BUILDING SHALL BE DEEMED ACCEPTABLE.



4 / 2 FIRST FLOOR RR. DEMO PLAN
Scale: 1/4=1'-0"



5 / 2 SECOND FLOOR RR. DEMO PLAN
Scale: 1/4=1'-0"



6 / 2 THIRD FLOOR RR. DEMO PLAN
Scale: 1/4=1'-0"

530 WELLINGTON AVE

LICENSED: RI #2469, MA #10470, NJ #AI14727, IL #001-010503, CT. #9929

ARCHITECTS

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E: ARCHITECTURAINCMAIL@GMAIL.COM
P: 401-714-2130

No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT
2	11-18-24	CODE REVIEW
3	11-21-24	ISSUED FOR PERMIT

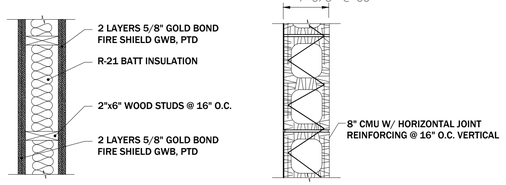
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

DEMOLITION PLANS ENLARGED DEMOLITION PLANS

A102

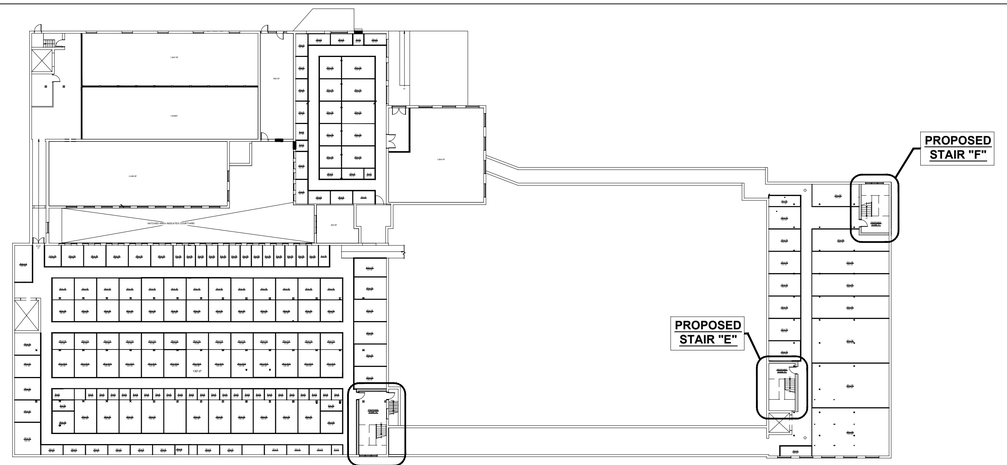
SCALE: AS NOTED



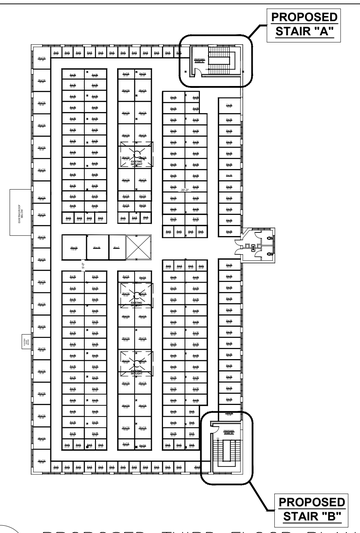
A — 2 HOUR WOOD STUD WALL
UL# DES: U301

C8 — 8" CMU BLOCK
2 HR FIRE RATED
UL# DES U906

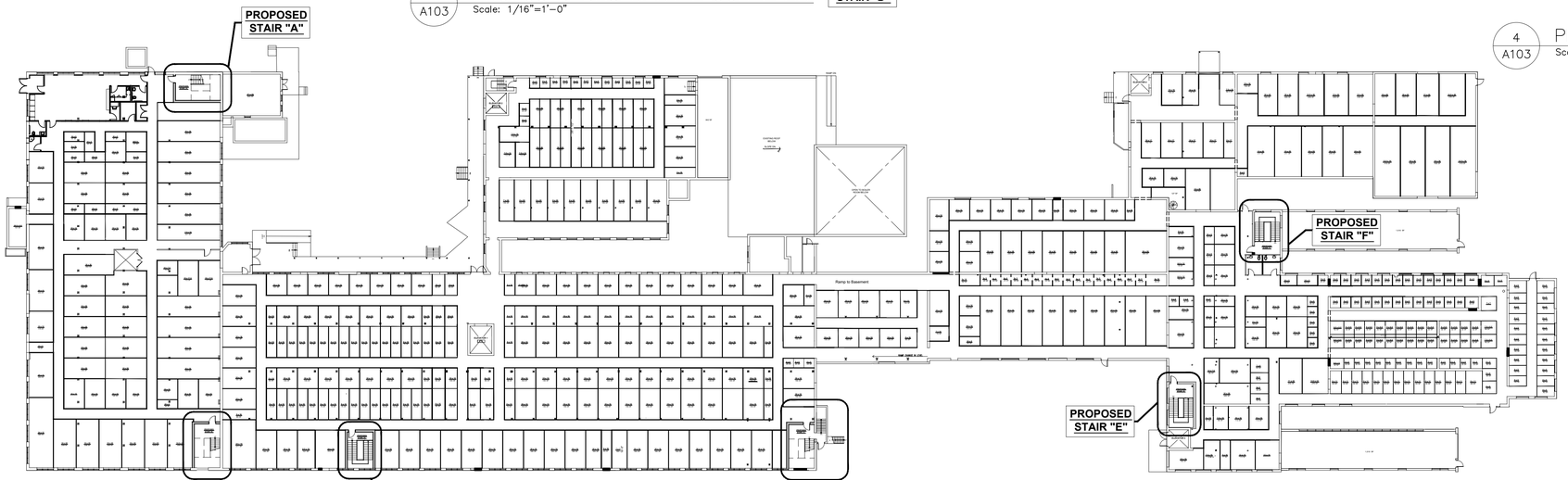
6 / A103 WALL TYPE
Scale: 1"=1'-0"



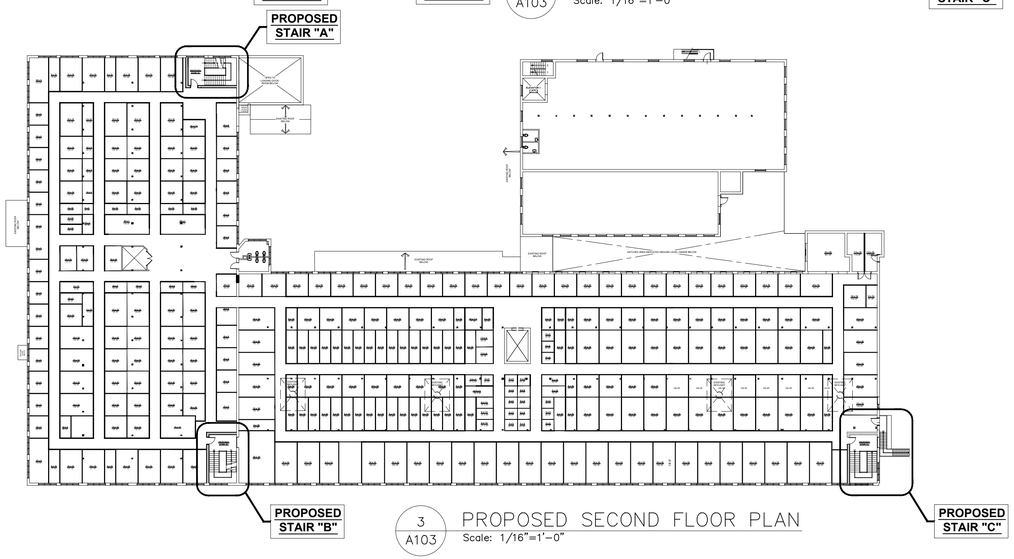
1 / A103 PROPOSED BASEMENT FLOOR PLAN
Scale: 1/16"=1'-0"



4 / A103 PROPOSED THIRD FLOOR PLAN
Scale: 1/16"=1'-0"



2 / A103 PROPOSED FIRST FLOOR PLAN
Scale: 1/16"=1'-0"



3 / A103 PROPOSED SECOND FLOOR PLAN
Scale: 1/16"=1'-0"

530 WELLINGTON AVE

LICENSED: RI #2469, MA #10470, NJ #AI14727, IL #001-010503, CT. #9929
ARCHITECTS

PAUL V. SATAS, AIA
ARCHITECT
1467 CENTERVILLE RD
WARWICK, RI 02886

E: ARCHITECTURAINCMAIL@GMAIL.COM
P: 401-714-2130

No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT
3	11-21-24	ISSUED FOR PERMIT
4	11-27-24	WALL TYPES

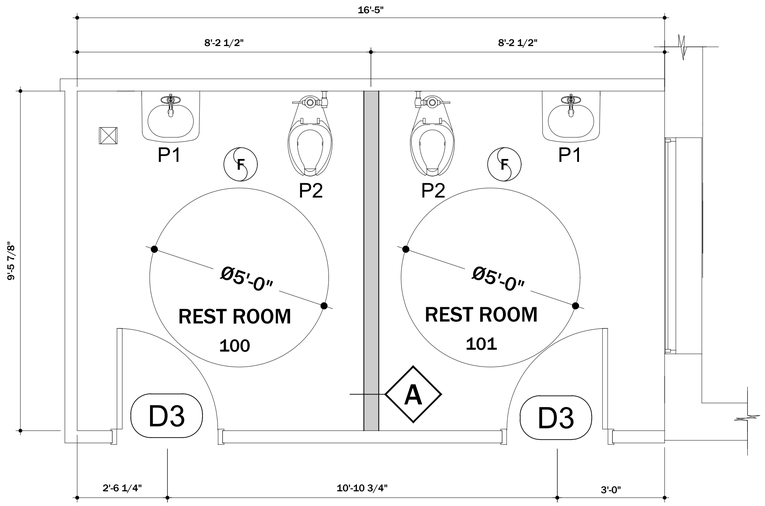
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

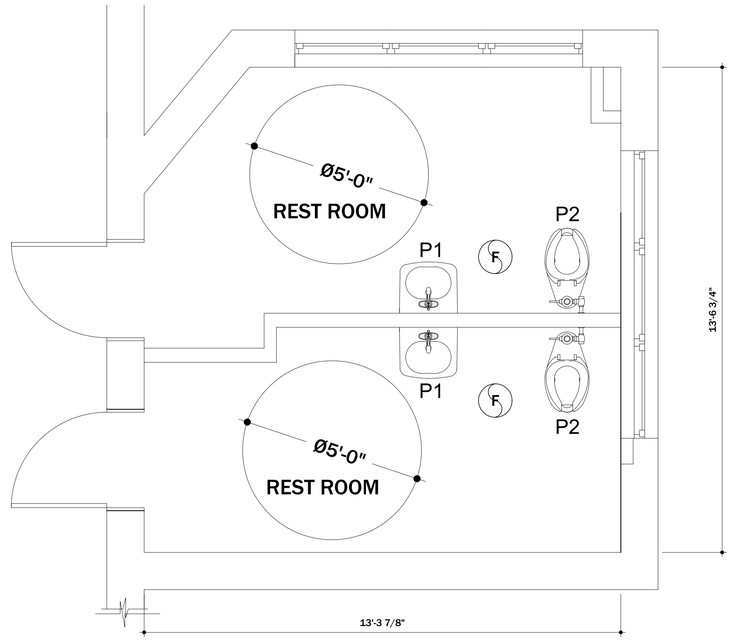
PROPOSED FLOOR PLANS

A103

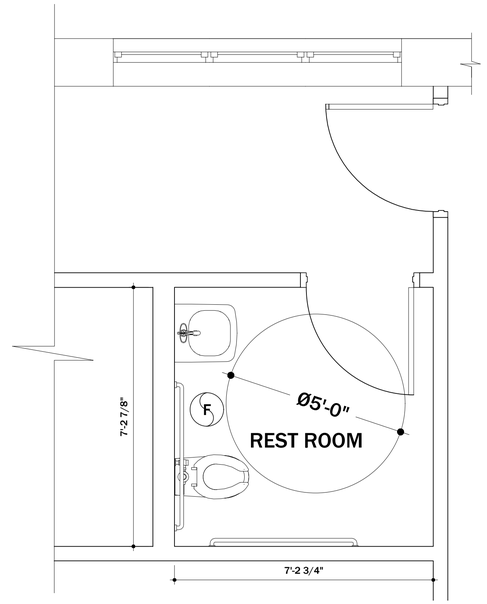
SCALE: AS NOTED



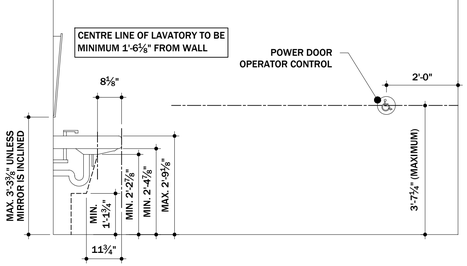
1/4 ENLARGED PROPOSED R.R. FIRST FLOOR PLAN
Scale: 1/2=1'-0"

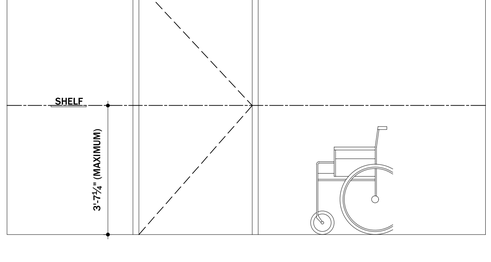


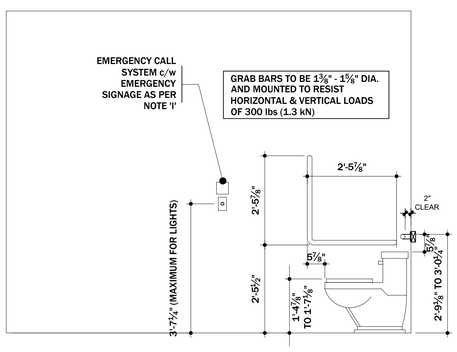
2/4 ENLARGED PROPOSED R.R. @ SECOND & THIRD FLOOR PLAN
Scale: 1/2=1'-0"

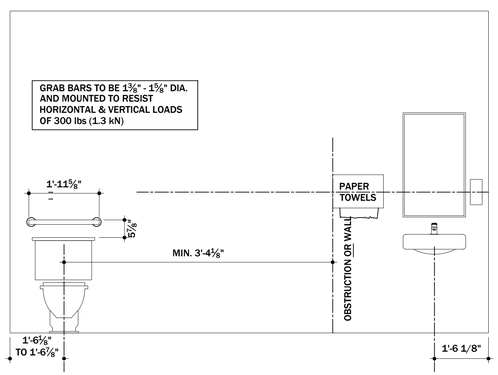


3/4 ENLARGED PROPOSED RR. @ STAFF AREA
Scale: 1/2=1'-0"









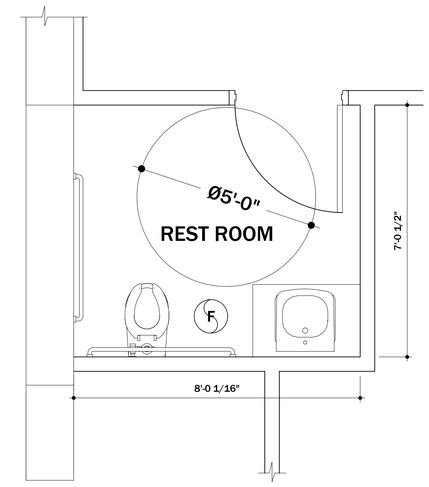
4/4 TYP. MOUNTING HEIGHTS HC. REST ROOMS
Scale: 1/2=1'-0"

BARRIER-FREE WASHROOM DESIGN REQUIREMENTS:

BARRIER-FREE ACCESSIBILITY NOTES:

1. WORK AND ACCESSORIES REQUIRED TO "ACCESSIBLE" WASHROOM:
   - A) PROVIDE ONE TILT MIRROR DESIGNATED AS "ACCESSIBLE".
   - B) INSULATE WASTE AND HOT WATER SUPPLY PIPING AT U/S OF LAVATORY.
   - C) WALL HUNG LAVATORY SHALL BE EQUIPPED WITH APPROVED "WING-HANDLED" TRIM.
   - D) MOUNT ALL FIXTURES AND ACCESSORIES AT 3'-11¼" A.F.F.
   - E) DOOR TO BE CAPABLE OF LOCKING FROM THE INSIDE AND RELEASED FROM THE OUTSIDE IN CASE OF EMERGENCY.
   - F) PROVIDE COAT HOOK AND SHELF AT 3'-11¼" A.F.F.
   - G) PROVIDE SOAP DISPENSER (ONE-HAND OPERABLE) AT 3'-11½" A.F.F.
   - H) PROVIDE TOWEL DISPENSER (ONE-HAND OPERABLE) OR HAND-DRYING EQUIPMENT AT 3'-11¼" A.F.F.
   - I) UNIVERSAL WASHROOMS ARE TO BE EQUIPPED WITH AN EMERGENCY CALL SYSTEM THAT CONSISTS OF AUDIBLE AND VISUAL DEVICES INSIDE AND OUTSIDE OF THE WASHROOM THAT ARE ACTIVATED BY A CONTROL DEVICE INSIDE THE WASHROOM. ALSO PROVIDE AN EMERGENCY SIGN THAT CONTAINS THE WORDS "IN THE EVENT OF AN EMERGENCY PUSH EMERGENCY BUTTON AND AUDIBLE AND VISUAL SIGNAL WILL ACTIVATE" IN LETTERS AT LEAST 1" HIGH WITH A 3/16" STROKE AND POSTED ABOVE THE EMERGENCY BUTTON.
   - J) WHERE A WASHROOM IS REQUIRED TO ACCOMMODATE PERSONS WITH DISABILITIES, PROVIDE AN ACCESSIBILITY SIGN CONSISTING OF THE "INTERNATIONAL SYMBOL OF ACCESS"

2. CLEARANCE REQUIREMENTS:
   - A) WATER CLOSETS LOCATED IN A BARRIER-FREE WATER CLOSET STALL AND UNIVERSAL WASHROOMS SHALL BE PROVIDED WITH A CLEAR TRANSFER SPACE OF AT LEAST 2'-11¾" WIDE AND 4'-11" DEEP ADJACENT TO THE WATER CLOSET.
   - B) LAVATORIES LOCATED IN A WASHROOM REQUIRED TO BE BARRIER-FREE SHALL BE PROVIDED WITH A CLEAR SPACE IN FRONT OF THE LAVATORY OF 3'-0½" WIDE AND 4'-5⅞" DEEP FLOOR SPACE TO ALLOW FOR A FORWARD APPROACH. A MAXIMUM OF 1'-7⅜" CAN BE LOCATED UNDER THE LAVATORY.
   - C) A CLEAR SPACE NOT LESS THAN 2'-7⅞" WIDE AND 6'-0" LONG SHALL BE PROVIDED FOR AN ADULT-SIZE CHANGE TABLE, IF APPLICABLE.
   - D) MINIMUM TURNING RADIUS SIZE:
     - 5'-6⅞" FOR UNIVERSAL WASHROOMS
     - 4'-11" FOR BARRIER-FREE WATER CLOSET STALLS.
   - E) ENSURE MINIMUM 1'-11⅞" CLEAR SPACE ON LATCH SIDE OF DOOR AT IN-SWING SIDE.
   - F) ENSURE MINIMUM 11¾" CLEAR SPACE ON LATCH SIDE OF DOOR AT OUT-SWING SIDE.



5/4 ENLARGED PROPOSED RR. @ OFFICE/SALES
Scale: 1/2=1'-0"

PLUMBING SCHEDULE			
No.	SIZE	TYPE	REMARKS
P1		HAND SINK	BY OWNER
P2		TOILET	BY OWNER

530 WELLINGTON AVE

PAUL V. SATAS No. 2469 REGISTERED ARCHITECT

LICENSED: RI #2469, MA #10470, NJ #AI14727, IL #001-010503, CT. #9929

ARCHITECTS

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ARCHITECT
1467 CENTERVILLE RD
WARWICK, RI 02886

E: ARCHITECTURAINCMAIL@GMAIL.COM
P: 401-714-2130

No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT

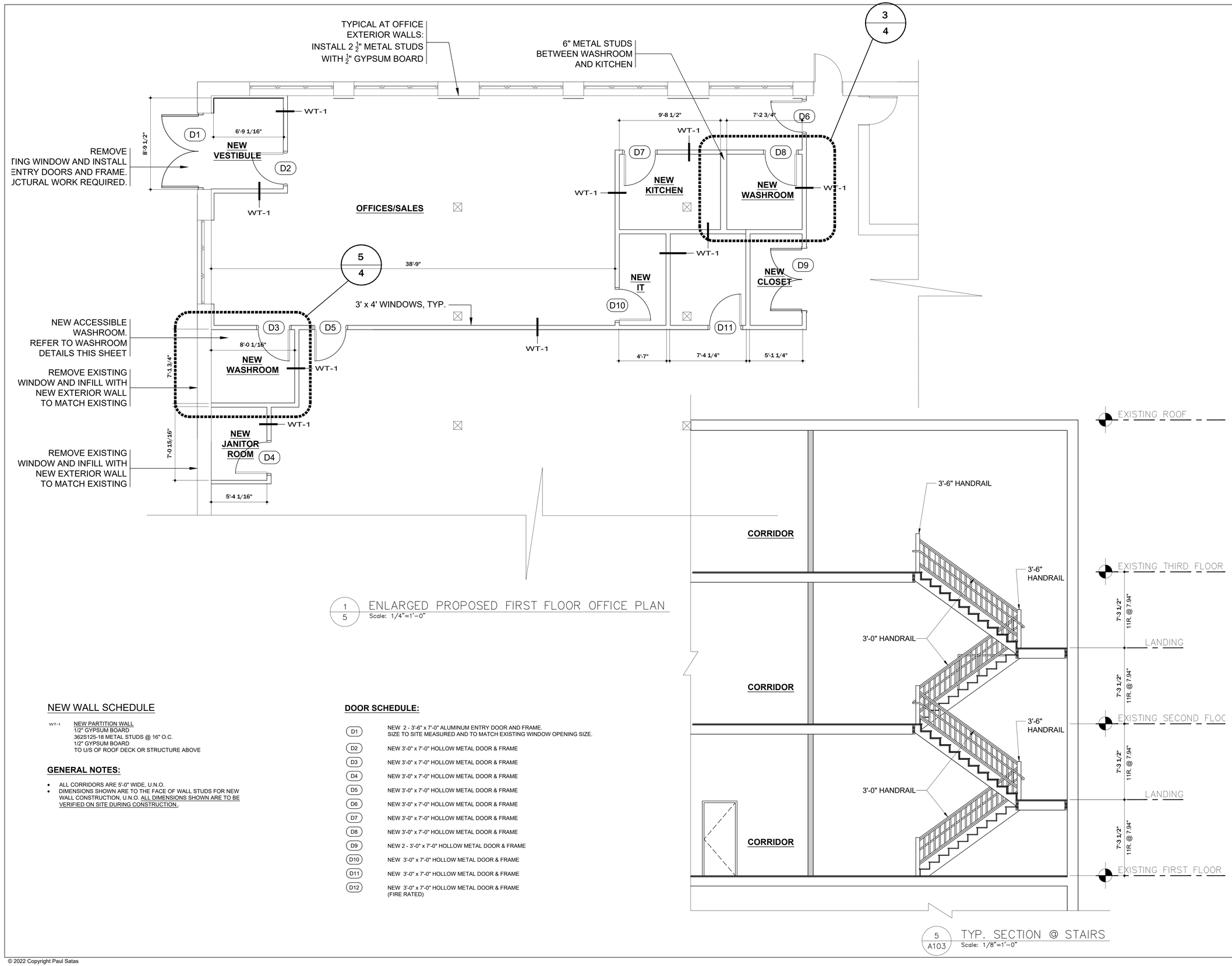
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

PROPOSED RR. PLANS
DETAILS
NOTES

A104

SCALE: AS NOTED



1/5 ENLARGED PROPOSED FIRST FLOOR OFFICE PLAN
Scale: 1/4"=1'-0"

5/A103 TYP. SECTION @ STAIRS
Scale: 1/8"=1'-0"

NEW WALL SCHEDULE

WT-1 NEW PARTITION WALL
1/2" GYPSUM BOARD
362S125-18 METAL STUDS @ 16" O.C.
1/2" GYPSUM BOARD
TO U/S OF ROOF DECK OR STRUCTURE ABOVE

GENERAL NOTES:

- ALL CORRIDORS ARE 5'-0" WIDE, U.N.O.
- DIMENSIONS SHOWN ARE TO THE FACE OF WALL STUDS FOR NEW WALL CONSTRUCTION, U.N.O. ALL DIMENSIONS SHOWN ARE TO BE VERIFIED ON SITE DURING CONSTRUCTION..

DOOR SCHEDULE:

D1	NEW 2 - 3'-6" x 7'-0" ALUMINUM ENTRY DOOR AND FRAME. SIZE TO SITE MEASURED AND TO MATCH EXISTING WINDOW OPENING SIZE.
D2	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D3	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D4	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D5	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D6	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D7	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D8	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D9	NEW 2 - 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D10	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D11	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D12	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME (FIRE RATED)

530 WELLINGTON AVE

PAUL V. SATAS
No. 2469
REGISTERED ARCHITECT

LICENSED: RI #2469, MA #10470, NJ #AI14727, IL #001-010503, CT. #9929

ARCHITECTS

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1467 CENTERVILLE RD
WARWICK, RI 02886

E: ARCHITECTURAINCMAIL@GMAIL.COM
P: 401-714-2130

No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT

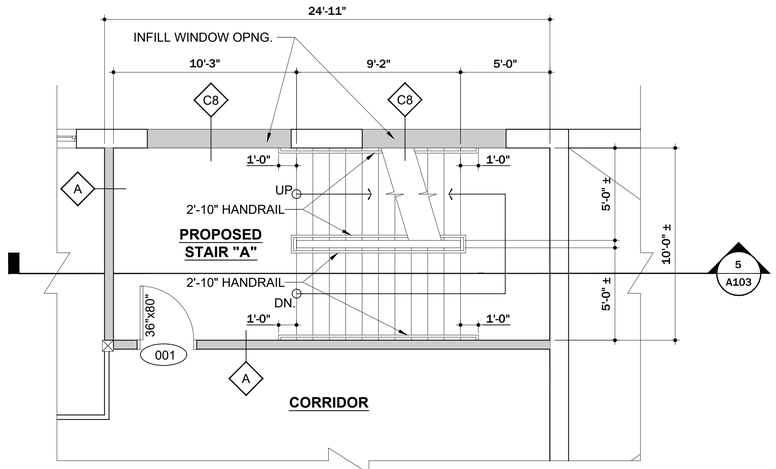
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

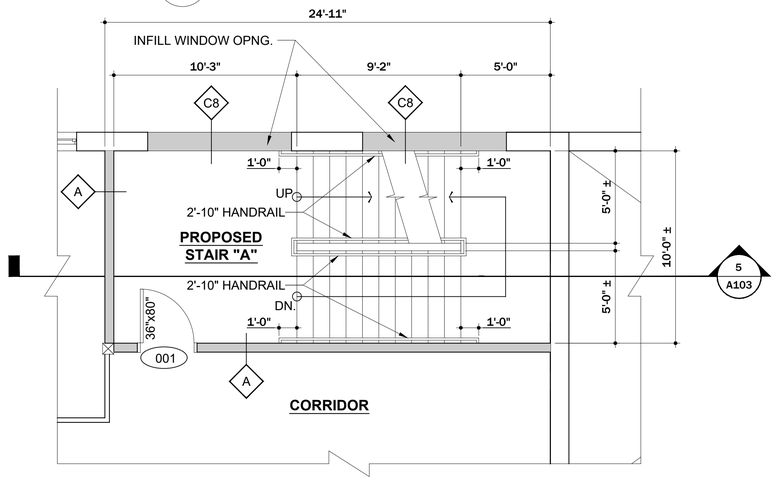
PROPOSED 0FFICE FLOOR PLAN SCHEDULES NOTES

A105

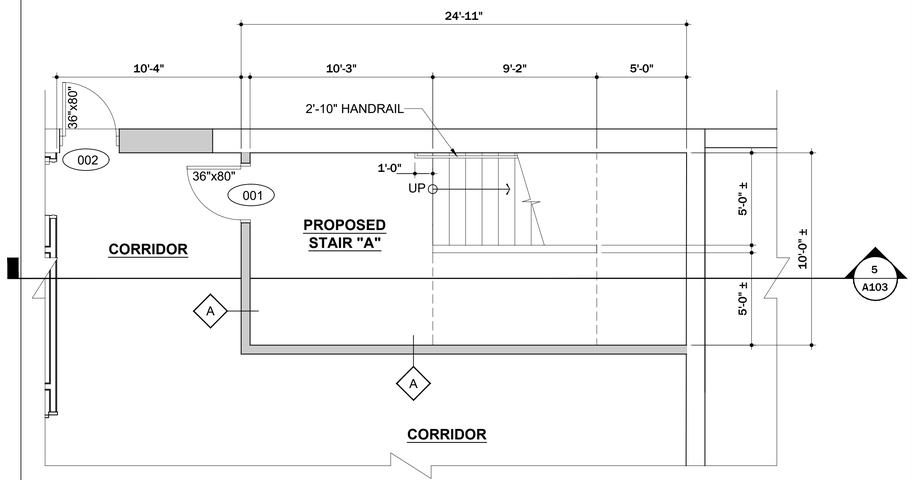
SCALE: AS NOTED



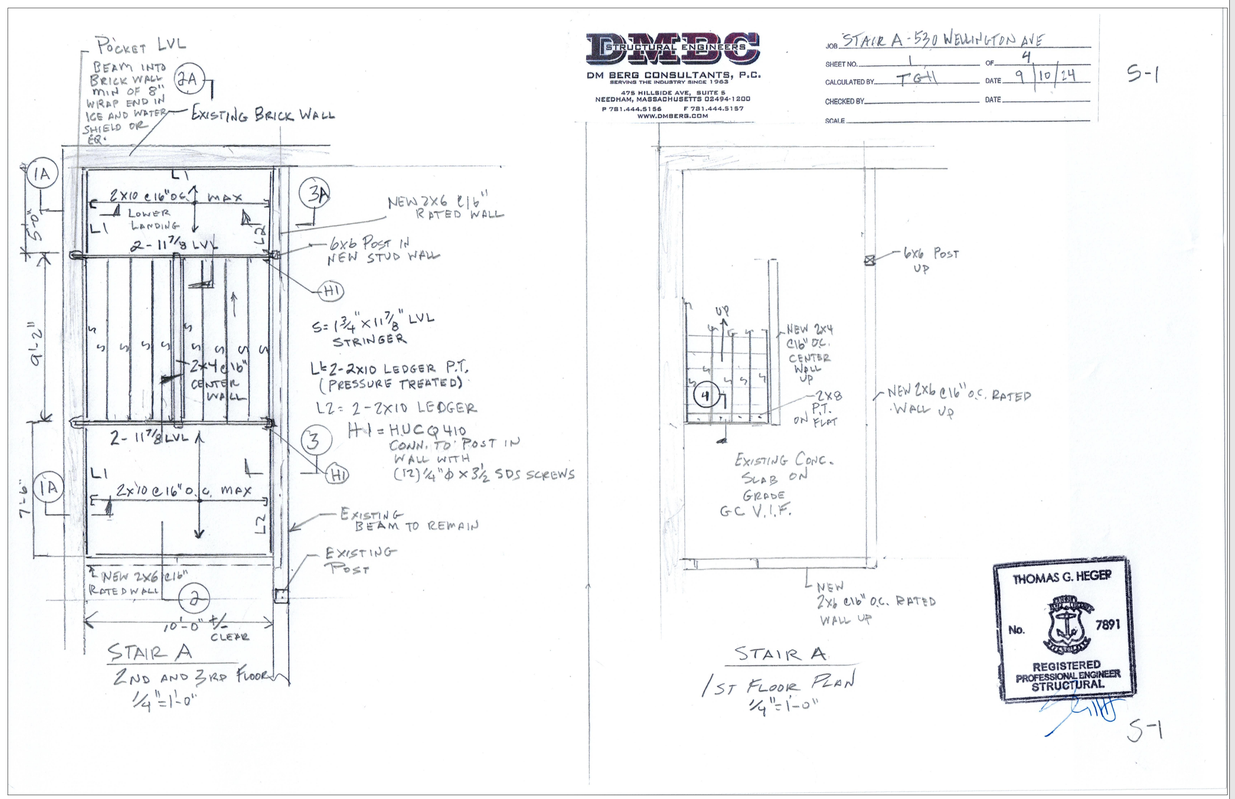
3 / A104 STAIR A @ THIRD FLOOR
Scale: 1/8"=1'-0"



2 / A104 STAIR A @ SECOND FLOOR
Scale: 1/8"=1'-0"



1 / A104 STAIR A @ FIRST FLOOR
Scale: 1/8"=1'-0"



530 WELLINGTON AVE

PAUL V. SATAS
No. 2469
REGISTERED
ARCHITECT

LICENSED: RI #2469, MA #10470, NJ #AI14727, IL #001-010503, CT. #9929

ARCHITECTS

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1467 CENTERVILLE RD
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P: 401-714-2130

No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT
3	11-21-24	ISSUED FOR PERMIT
4	11-27-24	WALL FIRE RATING

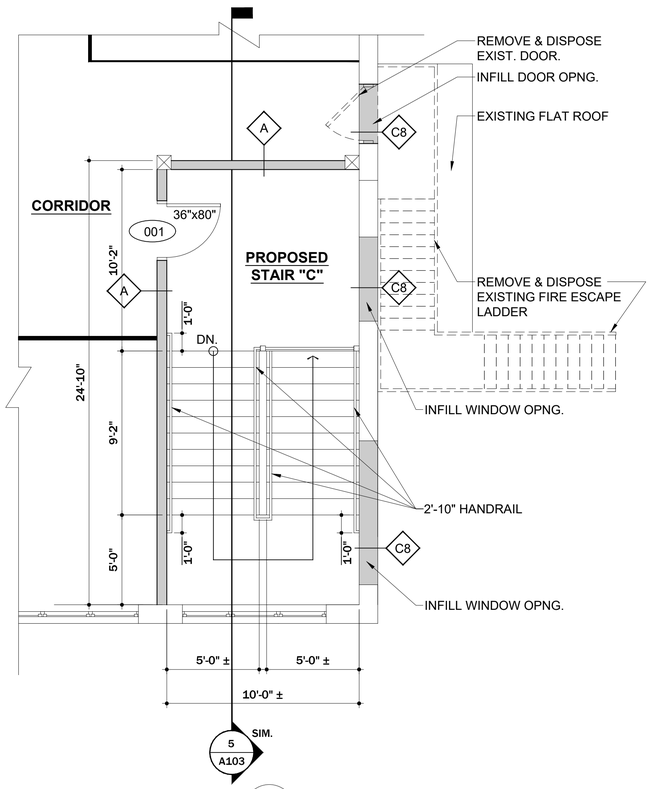
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

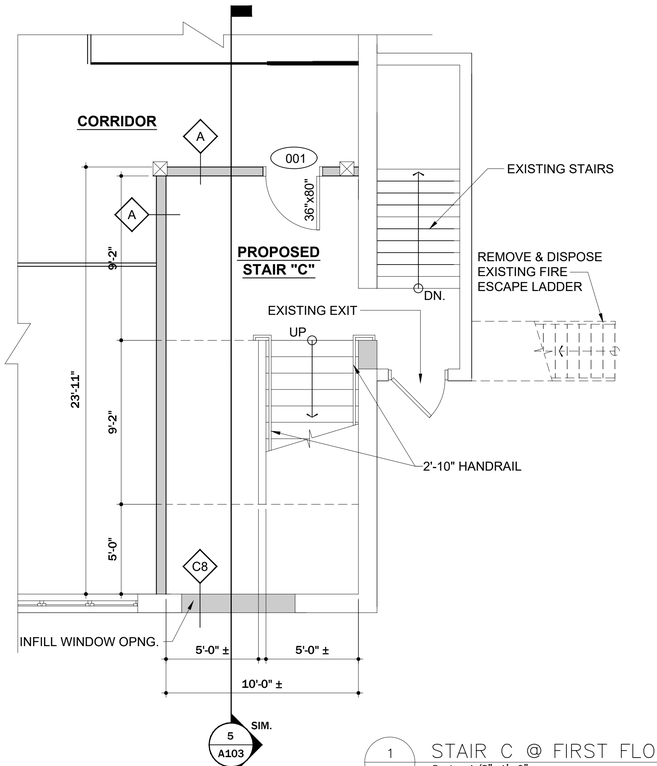
STAIR A FLOOR PLAN
STRUCTURAL FLR. PLANS

A106

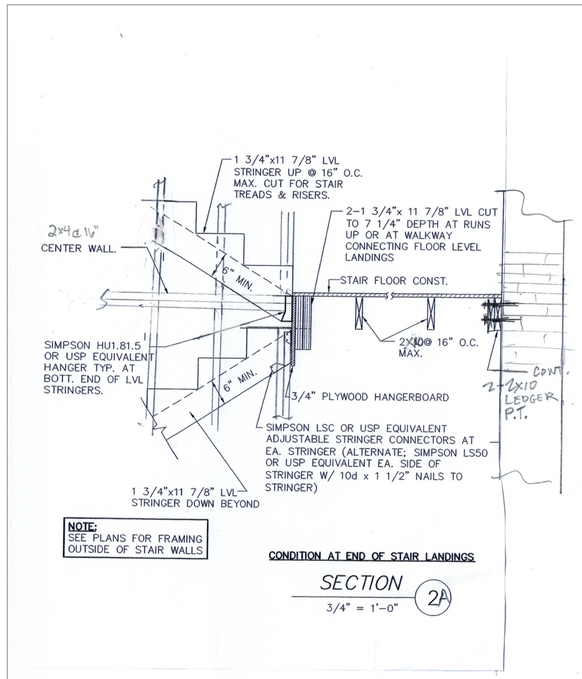
SCALE: AS NOTED

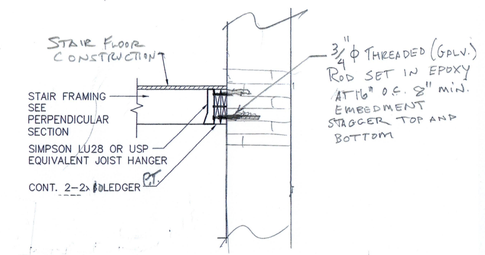


2 / A105 STAIR C @ SECOND FLOOR
Scale: 1/8"=1'-0"



1 / A105 STAIR C @ FIRST FLOOR
Scale: 1/8"=1'-0"

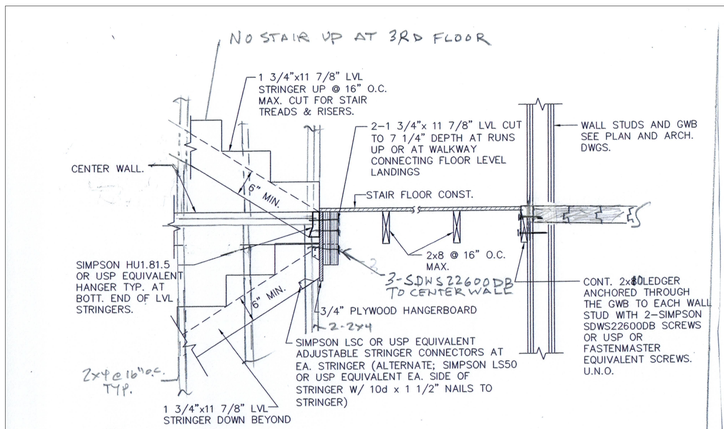


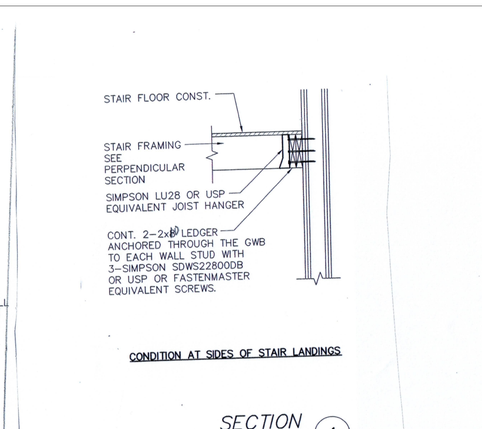


THOMAS G. HEGEP
No. 7891
REGISTERED PROFESSIONAL ENGINEER
STRUCTURAL

DMBC STRUCTURAL ENGINEERS
DM BERG CONSULTANTS, P.C.
SERVING THE INDUSTRY SINCE 1963
478 HILLSIDE AVE, SUITE 5
NEEDHAM, MASSACHUSETTS 02494-1200
P 781.444.5156 F 781.444.5157
WWW.DMBERG.COM

JOB 530 WELLINGTON AVE
SHEET NO. 3 OF 4
CALCULATED BY TGH DATE 9/10/2024
CHECKED BY DATE
S-3





THOMAS G. HEGER
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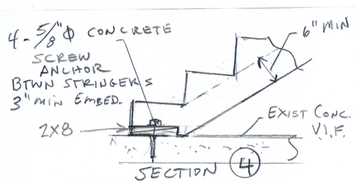
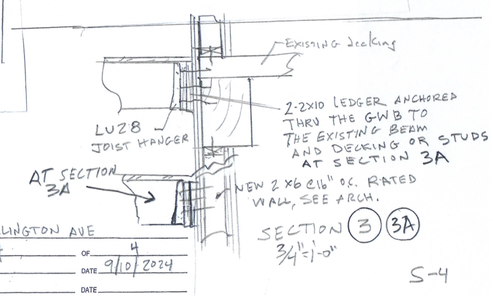
REGISTERED PROFESSIONAL ENGINEER
STRUCTURAL





DMBC STRUCTURAL ENGINEERS
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NEEDHAM, MASSACHUSETTS 02494-1200
P 781.444.5156 F 781.444.5157
WWW.DMBERG.COM

JOB 530 WELLINGTON AVE
SHEET NO. 4 OF 4
CALCULATED BY DATE 9/10/2024
CHECKED BY DATE
S-4

530 WELLINGTON AVE

PAUL V. SATAS No. 2469 REGISTERED ARCHITECT

LICENSED: RI #2469, MA #10470, NJ #AI14727, IL #001-010503, CT. #9929

ARCHITECTS

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1467 CENTERVILLE RD
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E: ARCHITECTURAINCMAIL@GMAIL.COM
P: 401-714-2130

No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT
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4	11-27-24	WALL FIRE RATING

INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

STAIR C FLOOR PLAN
STRUCTURAL DETAILS

A107

SCALE: AS NOTED

530 Wellington Ave 100' Radius Plat 3 Lot 107

4/25/2024, 9:41:50 AM

Selected Parcels in Buffer	Parcels	A80	B2	M1
SelectedParcels	Buildings	A20	C1	M2
Parcels In Buffer	Zoning Dimensions	A12	C2	EI
Parcel ID Labels	Historic Overlay District	A8	C3	MPD
Streets Names	**Zoning**	A6	C4	S1
Cranston Boundary	none	B1	C5	Other

1:3,729

0 0.045 0.09 0.18 mi

0 0.05 0.1 0.2 km

City of Cranston

Web User
City of Cranston |

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
235 Promenade Street, Providence, Rhode Island 02908-5767

January 2, 2025

Canam RI, LLC / Tokimo Inc.
Mr. Julian Mallah
530 Wellington Avenue
Cranston, RI 02910

RE: WQC/STW File No. 24-154; RIPDES File No. RIR 102710
CanAm Self-Storage Facility
Located at 530-532 Wellington Avenue
Cranston, RI 02910
Assessor's Plat 3, Lot 107

Dear Mr. Mallah,

The Rhode Island Department of Environmental Management Office of Water Resources (RIDEM OWR) has reviewed the above-referenced project for compliance with the Rhode Island Pollutant Discharge Elimination System Construction General Permit (CGP). As stated in the application materials, the purpose of the project is to redevelop the existing site by demolishing four existing buildings, removing an existing underground storage tank, demolishing several small portions of the site's main building, and re-purposing the remainder of the site's main building into a self-storage facility that is serviced by public water and sewer in order to construct and maintain a new re-oriented driveway and parking area, compacted gravel outdoor vehicle storage area, and a closed stormwater management system consisting of one pea stone diaphragm, one bioretention basin, one sediment forebay and one lined and underdrained sand filter as is further described in your application and detailed on site plans consisting of 10 sheets as prepared by Joseph A. Casali, P.E. of Joe Casali Engineering, Inc., received by RIDEM-OWR on December 6, 2024.

This letter serves as your permit/authorization to discharge for the above-referenced project, provided that you comply with the application materials, the CGP and the following conditions:

1) You **must** submit the Notice of Start of Construction Form prior to commencement of any permitted site alterations or construction activity. The Start of Construction Form can be found on the Stormwater Construction Permitting website.

2) Prior to construction, you **must** erect or post a sign resistant to the weather and at least twelve (12) inches wide and (eighteen) inches long, which identifies the initials "DEM" and the application number(s) assigned to this permit. The sign must be posted in a conspicuous location near the site access and maintained until the project is complete.

3) A copy of this permit, any inspection records, and a signed and updated SESC Plan, **must** be kept at the site at all times until the project is complete. Copies of this permit must be made available for review by any RIDEM or City/Town representative upon request. Electronic versions of required documents that are readily accessible from the construction site are acceptable.

4) All fill material **shall** be clean and free of matter that could cause pollution of the waters of the State.

5) The stormwater collection and treatment system approved herein is for the discharge of stormwater only. Any other discharge is prohibited.

6) Any alterations, additions or modifications to the stormwater system from that approved herein, including permanent closure, **must** be reviewed and approved by RIDEM OWR prior to implementation.

7) You **must** submit the Notice of Termination Form upon completion of the project and final site stabilization. The Notice of Termination Form can be found on the Stormwater Construction Permitting website.

8) You are responsible for the long-term inspection, cleaning and maintenance of the stormwater collection and treatment system to ensure proper performance of all components until documentation is provided to indicate that this responsibility has been assumed by another entity. Long-term operation and maintenance is to be as described in the Post-Construction Operation and Maintenance Plan entitled "Stormwater Operation, Maintenance and Pollution Prevention Plan for a Proposed Redevelopment Project: Self Storage Facility Located at 530-532 Wellington Avenue – Cranston, Rhode Island – AP 3, Lot 107", dated December 6, 2024, and prepared by: Joe Casali Engineering, Inc.

RIDEM's Rules and Regulations Governing the Establishment of Various Fees require that RIPDES CGP permit holders pay an Annual Fee of $100.00. An invoice will be sent to the owner on record in May/June of each year if the construction was still active as of December 31st of the previous year. The owner will be responsible for the Annual Fee until the construction activity has been completed, the site has been properly stabilized, and a completed Notice of Termination (NOT) has been received.

Your authorization to discharge **expires at midnight, on September 25, 2025.** If construction has not been completed by that date, there will be measures in place for you to reauthorize.

You are required to adhere to all above terms and conditions; and carry out this project in compliance with the CGP at all times. Issuance of this permit does not bar the Rhode Island Department of Environmental Management, or any of its various Divisions, from initiating any investigation and/or enforcement actions that it may deem necessary for violations this permit or of any and all applicable statutes, regulations and/or permits.

This permit has the full force and effect of a permit issued by the Director. This permit does not relieve your obligation to obtain any other applicable local, State, and federal permits prior to commencing construction and does not relieve you of any duties owed to adjacent landowners with respect to changes in drainage. RIDEM assumes no responsibilities for damages resulting from faulty design or construction.

If you have any questions regarding the contents of the permit, you may contact Christopher H. Dill, E.I.T. at Christopher.dill@dem.ri.gov or at (401)-537-4219.

Sincerely,

Nicholas A. Pisani, P.E.

Nicholas A. Pisani, P.E.
Environmental Engineer IV
Stormwater Engineering and 401 Permitting
Office of Water Resources
Rhode Island Department of Environmental Management

ec:
Joseph A. Casali, P.E. – Joe Casali Engineering, Inc.
Ashley Blauvelt, P.E., OLRSMM – Site Remediation Program

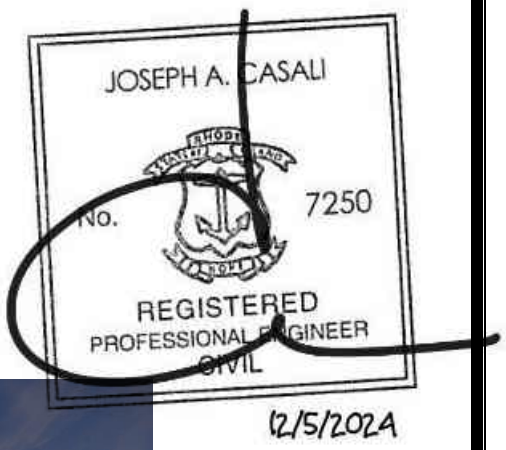
Project Narrative and Stormwater Management Report

For a Proposed Redevelopment Project

Self-Storage Facility

Located at

530-532 Wellington Avenue
Cranston, Rhode Island
AP 3, Lot 107



Prepared for:
CANAM RI LLC
c/o Mr. Mike Jobb
530 Wellington Avenue
Cranston, RI 02910-2950

Submission Date:
September 2024; Revised December 2024

Submitted by:

JCE
JOE CASALI ENGINEERING, INC.
CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WETLANDS · ISDS · TRAFFIC · FLOODPLAIN
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401)944-1313 FAX WWW.JOECASALI.COM

TABLE OF CONTENTS

APPENDICES

1 INTRODUCTION

On behalf of our client, CANAM RI LLC, Joe Casali Engineering, Inc. (JCE) has prepared the following Project Narrative and Stormwater Management Report to identify existing conditions and proposed site improvements associated with the proposed redevelopment of a mill complex. The scope includes the redevelopment of the existing mill complex located at 530-532 Wellington Avenue, in Cranston, Rhode Island to a self-storage facility containing approximately 1,191 storage units or various sizes. The subject property can also be identified as Tax Assessor's Plat Map (AP) 3, Lot 107, and has frontage on Wellington Avenue in the City of Cranston.

2 SITE LOCATION AND PHYSICAL DESCRIPTION

According to a July 2023 Class I Property Line Survey performed by Holland E. Shaw, PLS, the total area of the subject property is 237,000 sq. ft. (5.441 acres). The parcel is currently occupied by a mill complex consisting of a series of buildings internally subdivided with multiple varied uses, parking areas, and outdoor storage areas. The majority of the varied uses within the facility have been vacated as of the date of this report. The parcel is accessed via existing curb cuts on Wellington Avenue and Station Street. The subject parcel is bound by multi-family residential properties to the north, an Amtrak Corridor to the east, a vacant lot to the south, and Wellington Avenue and Interstate 95 to the west, as shown below in Figure 1 – Locus Map.

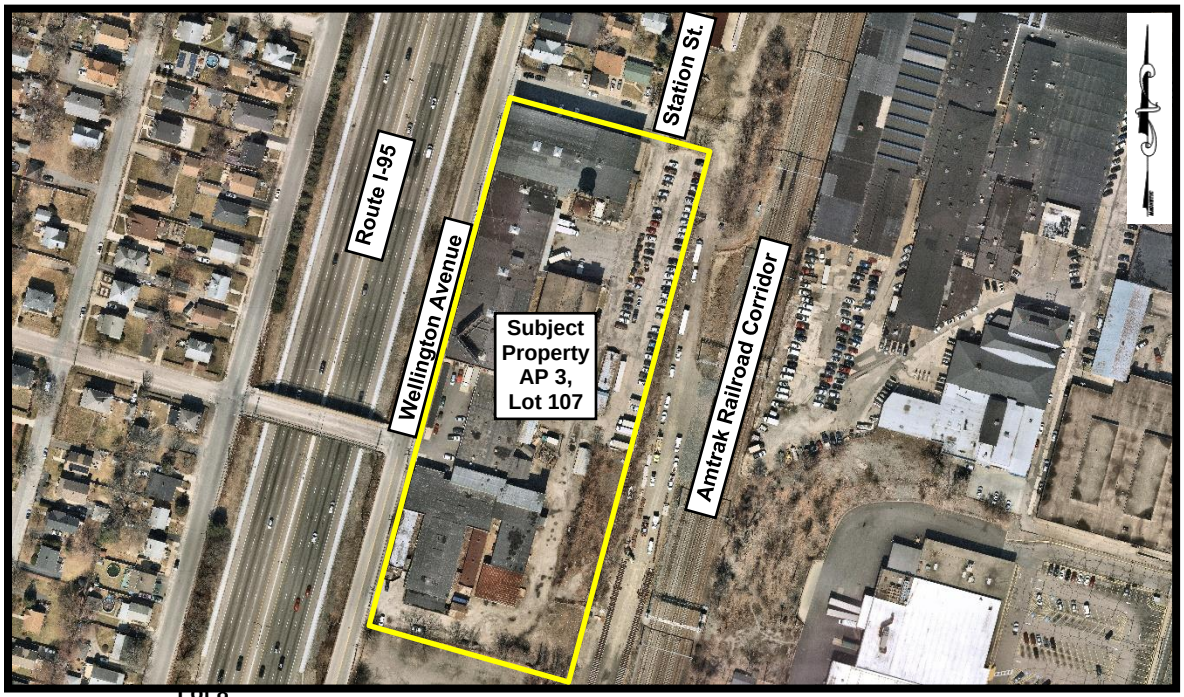


Figure 1 – Locus Map

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2.1 Soil Classification

According to the *Web Soil Survey (WSS)* operated by the US Department of Agriculture Natural Resources Conservation Service (NRCS), produced by the National Cooperative Soil Survey, the soils on the site consist of Udorthents-Urban land complex (UD) and Merrimac-Urban land complex, 0 to 8 percent slopes (MU). UD soils consist of human transported material. These soils have a very low runoff class and belong to hydrologic soil group A. MU soils consist of loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss. These soils are somewhat excessively drained, have a very low runoff class and belong to Hydrologic Soil Group A.

Figure 2 – Soils Map

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Soil evaluations were observed and documented by JCE in July 2024 to determine the depth to the seasonal high groundwater table (SHGWT) and to estimate infiltration capacity of existing in-situ soil for design of stormwater mitigation measures. Three (3) soil evaluation test pits were excavated, to 108-inches below the ground surface. In general, the SHGWT ranged from about 44-inches to 54-inches below the existing ground surface when encountered. Ledge was not encountered. A Soil Evaluation Test Pit Location Plan and Soil Evaluation Test Hole Logs are included in Appendix A.

In addition, multiple groundwater observation wells have been installed throughout the site by various environmental consultants over the course of the last few years. Data from the installation of these wells has also been assessed and incorporated into the design. Groundwater observation well locations are included on the Site Plan prepared by Sage Environmental in Appendix B; logs are included in Appendix A.

2.2 Environmental Considerations

SAGE Environmental (Sage) completed a conducted an American Society for Testing and Materials (ASTM) Phase I Environmental Site Assessment (ESA) in April 2023. Results of the Phase I ESA identified Recognized Environmental Conditions (RECs), which are explained in more detail in the Phase I ESA (can be provided under separate cover) but are generally summarized below.

- REC #1 - Historic and Current Usage of the Site for Manufacturing and Associated Infrastructure: Building occupants have engaged in manufacturing operations, including but not limited to, vinyl coated products, a rubber heel factory, plastics manufacturing, cabinet manufacturing, jewelry manufacturing, upholstery manufacturing, knife manufacturing, a veterinary laboratory, chemical manufacturers (including resin, algaecides, germicidal detergents, deodorants, sanitizers, and disinfectants), assayers and refiners of precious metals, electroplating operations, spray coating/spray painting/screen-printing, metal and plastic grinding/sharpening, a brewery, appliance repair, sewing, exercise related businesses, real estate businesses, material rental businesses, storage businesses, educational businesses, janitorial services, electricians, an elevator company, and retail businesses, since the early 1900's. In addition to the former property use, several observations of associated infrastructure and potential for releases of oil and/or hazardous materials (OHM) from these past operations were made during the Phase I. These included potentially leaking electrical transformers, stained soil, drains, sumps, pits, hydraulic equipment, and OHM storage containers.
- REC #2 - Historic Environmental Investigations and Known Release Conditions [Underground Storage Tank (UST)-15319, Leaking Underground Storage Tank (LUST) 0713-LS, State Hazardous Waste Site (SHWS SR-07-1035), and SEMS Archive:
    - UST Summary (RIDEM File Number UST-15319: In general, the Site has had at least 25 underground storage tanks (USTs), ranging in capacity from 500-gallons to 10,000-gallons, and utilized for the storage of gasoline, #6

oil, unspecified fuel oil, mineral oil, aromatic solvents, and plasticizers (converted to water storage in circa 1960). On March 16, 1987, RIDEM issued a Certificate of Closure which stated that all regulated tanks "which existed from May 8, 1985", "have either been removed or filled in accordance with State UST Regs". Please note that additional vent pipes were observed, indicating that additional tanks may exist which were previously unidentified.

- LUST Summary (RIDEM Case Number 0713-LS): Two (2) of the USTs, historically utilized for the storage of gasoline and aromatic solvents (i.e., USTs 1 and 9), are documented to have resulted in a release condition to soil and groundwater on the southwest portion of the Site, extending into the municipal right-of-way identified as Wellington Avenue. Contaminants of Concern (COCs) identified in soil and groundwater, at concentrations in excess of the applicable RIDEM criteria, include benzene, toluene, ethylbenzene, and xylenes, and Light Non-aqueous Phase Liquid (LNAPL) (i.e., identified as consisting of a petroleum distillate/paint thinner and/or petroleum with a carbon range of C7 through C18.). The most recent groundwater monitoring event occurred in September 2020. At that time, no LNAPL was detected; however, a sheen was noted on groundwater in each of the four (4) groundwater monitoring wells. According to McPhail Associates, LLC, the plume is/was stable. No groundwater monitoring data from 2022 or 2023 was reported within the RIDEM file and a Letter of Compliance or No Further Action deeming that the release is closed were identified in the RIDEM files. Therefore, the Site may be out of compliance with the RIDEM Regulations.
- State Hazardous Waste Site (SHWS) (SR-07-1035)012/Superfund Enterprise Management System (SEMS)-Archive (RID01201771): In 1986, Rizzo Associates, Inc. conducted a limited subsurface assessment on the Site which identified the following COCs at concentrations in excess of the applicable RIDEM soil and/or groundwater criteria, select polynuclear aromatic hydrocarbons (PAHs). Remediation reportedly included soil excavation and the importation of fill (source of fill material not provided); In circa 1990, the US EPA identified the Site as a potentially hazardous waste site due to activities conducted by Gannon & Scott (RID01201771), a reclaimer of precious metals from plating and stripping solutions from the 1950s through the 1980s. The Site was subsequently investigated on behalf

of the US EPA as part of the Superfund Site Assessment and Removal program which identified the following COCs at concentrations in excess of the applicable RIDEM soil and/or groundwater criteria: select chlorinated VOCs (CVOCs), select PAHS, and toluene. In 2002, the USEPA archived (i.e., removed) from the CERCLIS database and was not a candidate for inclusion on the National Priorities List (NPL) because there was not a drinking water well located in proximity to the Site. As a result, the Site was assigned the status of No Further Remedial Actions Planned (i.e., NFRAP). A NFRAP designation means that no further Federal Superfund Remedial Action was anticipated, under the jurisdiction of CERCLA. Please note that this is not meant to imply compliance with the RIDEM regulations; therefore, the lack of additional assessment and/or remediation due to the above exceedances may represent non-compliance with the RIDEM Remediation Regulations.

- REC #3: Adjoining Land Usage: Based on information provided in the Sanborn Maps, two (2) parcels of land located immediately north of the Site (i.e., 388 and 433 Station Street) were historically utilized for jewelry manufacturing (i.e., 433 Station Street) from circa 1950 through 1972, and a repair shop in circa 1900 (i.e., 388 Station Street which was owned by the New York, New Haven, and Hartford railroad in 1900). No additional information regarding these businesses was obtained during the course of this assessment; however, usage of these properties for jewelry manufacturing and repairs associated with railroad machinery represents a REC.

These locations and conditions are summarized in the Red/Yellow/Green Map, 530 Wellington Ave., Cranston, Rhode Island, prepared by Sage, dated November 21, 2024, included in Appendix B. A Site Investigation Report was filed with RIDEM in August 2024; the development of a Remedial Action Work Plan (RAWP) is in progress.

Based on correspondence between the RI Department of Environmental Management (RIDEM) Office of Water Resources (OWR) and the RIDEM Office of Land Revitalization and Sustainable Materials Management (OLRSMM) in November/December 2024, given the presence of several underground storage tanks on the Southern side of the site along with the existing contamination on the site located to the South (groundwater generally appears to flow towards that site), we understand that the OLRSSM has concerns primarily about the infiltration in the Southeast corner of the site.

Because there is such an extensive history of contamination in this area, it was recommended that the stormwater management design omit infiltration on the Southern end of the site. It is important to note that this will affect the ability to meet groundwater recharge requirements, and a waiver from this requirement is being sought. Details are further discussed in Section 5 below.

2.3 Flood Zone Classification

The site is located on the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) for the City of Cranston, Map Number 44007C0318H, effective date October 2, 2015, as depicted below on Figure 3. The property lies completely within FEMA Flood Zone X, which is defined as areas outside of the 0.2% annual chance floodplain.

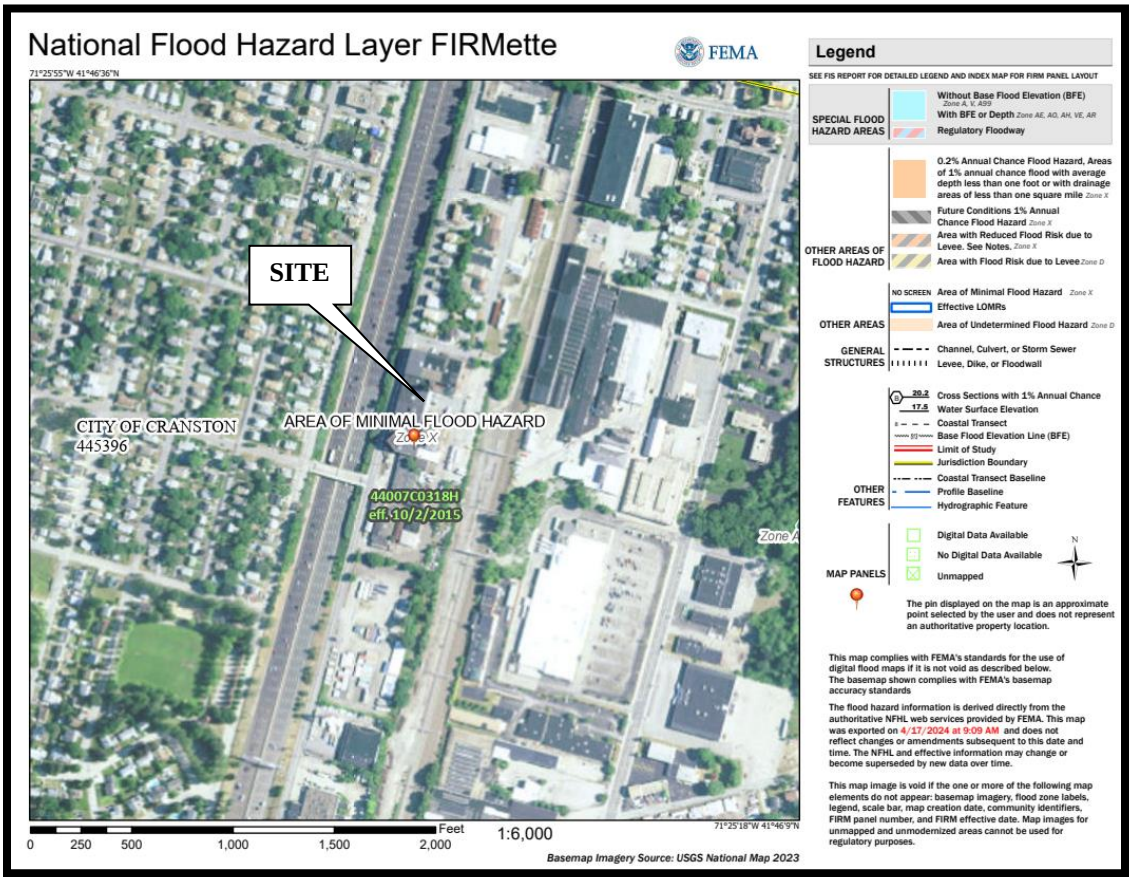

Figure 3 – FEMA Flood Insurance Rate Map
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2.4 Natural Resources

According to the RIDEM Environmental Resource Map, the site is located within the Pawtuxet River Watershed (ID No. 010900040609). Stormwater runoff from the site is

ultimately directed to Fenner Pond (RI0006017L-08) via a buried stream, which ultimately discharges to the Pawtuxet River. Fenner Pond is located on the State of Rhode Island 2022 Impaired Water Report List. The cause of impairment within Fenner Pond is due to the phosphorus levels. There are no total maximum daily loads (TMDL) established at this time. The site is not within any State-designated natural heritage area, unfragmented forest tracts, state, regional, or community greenways and green space priorities. The site does not contain any land in active agricultural use.

2.5 Zoning

The subject property is located within the City of Cranston's General Industry District (M-2). The following are the dimensional requirements for the M-2 zone, along with existing conditions associated with the existing mill complex:

Zoning Criteria	M-2 Requirement	Existing
Min. Lot Area	60,000 SF	237,000 SF
Min. Frontage & Lot Width	200 feet	249 feet
Min. Front Yard Depth	40 feet	0 feet(1)
Min. Side Yard Depth	25 feet	42.6 feet
Min. Rear Yard Depth	30 feet	NA
Maximum Building Coverage	60%	43.8%
Max. Building Height	35 feet	45.1 feet(1)

1. Pre-existing, non-conforming condition.

2.6 Easements

According to a July 2023 Class I Property Line Survey performed by Holland E. Shaw, PLS. Multiple easements exist on site. Two communications easements exist on the northern portion of the site. These easements are referenced in Deed Book 3293, Page's 2 & 19, and Deed Book 5302, Page 54. Also, three sewer easements exist traveling south down the eastern side of the subject property and turning towards Wellington Avenue. These easements are referenced in Deed Book 220, Pages 37 & 38.

2.7 Existing Utilities

Water: Based on a review of existing conditions information obtained from the Providence Water Supply Board (PWSB), a 12-inch asbestos concrete (AC) water main exists within Wellington Avenue, and a 6-inch AC water main exists within Clarence Street. Based on a field review of existing conditions performed by JCE in April 2024, domestic water appears to be provided to the site via a 4-inch cast iron (CI) service from Clarance Street,

and via a 4-inch CI service from Wellington Ave. In addition, fire protection water service appears to be provided to the site via a 6-inch CI service from Clarance Street, and via a 6-inch CI service from Wellington Ave.

Sewer: Based on a review of existing conditions information obtained from the City of Cranston, a 24-inch reinforced concrete sewer main exists within Wellington Avenue and an 8-inch vitrified clay (VCP) sewer main exists within Clarence Street. Based on field investigations performed by JCE in April 2024, it appears that two (2) 6-inch sewer services exist from the existing building(s). An 8-inch VCP conveys effluent from the northern portion of the development to the existing main within Clarence Street; and an 8-inch VCP conveys effluent from the southern portion of the development to the existing main within Wellington Ave.

Gas: Based on a review of existing conditions information from Rhode Island Energy, gas mains exist within Clarence Street and Wellington Avenue. Based on field investigations by JCE in April 2024, it appears that a gas service enters the site from Clarence Street, with multiple meters on the existing building servicing the former tenants.

Electric/Telecommunications: Existing overhead electrical and telecommunication services are provided to the site via the overhead lines along Wellington Avenue, Station Street, and Clarence Street.

Stormwater: Based on field investigations performed by JCE in April 2024, multiple drywells appear to exist throughout the site, particularly within the open space at the eastern portion of the property. Many of these existing structures are deteriorated, filled with debris/sediment, and are likely non-functional. It appears that a series of catch basins are located within the rear portion of the site, which are tied into a 21-inch vitrified clay pipe, which is routed through the property located to the south, ultimately tying into a 4’x4’ box culvert (owned by the City of Cranston). Ultimately, the box culvert crosses through the adjacent Johnston Controls property, continuing to the east across Elmwood Avenue, discharging into Fenner Pond.

3 PROPOSED DEVELOPMENT

The Applicant, CANAM RI LLC, is proposing a complete redevelopment of the site to accommodate a self-storage facility. The scope of improvements to the site includes demolition of multiple existing free-standing accessory structures and demolition of portions of the existing main building on the site. The existing main building is proposed to undergo complete interior and exterior renovation, including a small main office at the northeastern corner of the existing complex. The remainder of the facility is proposed to consist of approximately 1,191 variably sized self-storage units.

The main office is proposed to be accessed from Clarence Street / Station Street with a small 3-stall parking area for potential clients. The remainder of the site is fenced off with key card access for self-storage customers. A 3-stall parking lot is proposed adjacent to the entrance from Station Street, which includes one (2) handicap accessible space. This parking area is located outside the perimeter fence line, and its purpose is for potential customers to park and access to the self-storage main office located at the northeast corner of the existing building. Within the site, multiple parking areas are proposed for customer access to loading areas, loading docks, etc. Overall, a total of 56 parking spaces are proposed throughout the site, including two (2) handicap accessible spaces, in accordance with the Americans with Disabilities Act (ADA).

According to the City of Cranston's Zoning Ordinance, there is no specific use within Chapter 17.64 "Off Street Parking" fitting the definition of self-storage facilities. As such, JCE referenced the Institute of Transportation Engineers (ITE) Parking Generation Manual, 5th edition, dated January 2019. The ITE Manual identifies self-storage as "mini-warehouse", land use code 151. Based on the ITE Manual, peak parking demand per 100 storage units ranges from a minimum of 1.05 to a maximum of 2.38. Based on the 1,191 self-storage units proposed, this equates to a parking requirement ranging from 13 to 29 spaces. The currently proposed 56 spaces exceeds the anticipated peak parking demand per the ITE Manual.

Additional site improvements include perimeter fencing, loading dock canopy, a compacted gravel outdoor storage area for RVs, boats, etc., perimeter paved access road for customers and Fire Department access, landscape improvements, and stormwater management improvements.

3.1 Zoning

As previously noted, the subject property is located within the City of Cranston's General Industry District (M-2). The proposed use, self-storage, is allowed by right in the M-2 zone. However, due to the pre-existing non-conformities associated with the existing building, dimensional variances will be required, as summarized in the following table: conditions associated with the existing mill complex:

Zoning Criteria	M-2 Requirement	Existing	Proposed
Min. Lot Area	60,000 SF	237,000 SF	237,000 SF
Min. Frontage & Lot Width	200 feet	249 feet	249 feet
Min. Front Yard Depth	40 feet	0 feet(1)	0 feet(1)
Min. Side Yard Depth	25 feet	42.6 feet	42.6 feet
Min. Rear Yard Depth	30 feet	NA	NA
Maximum Building Coverage	60%	43.8%	42.6%
Max. Building Height	35 feet	45.1 feet(1)	45.1 feet(1)

1. Pre-existing, non-conforming condition.

3.2 Proposed Utilities

Water: Modifications to the domestic and fire protection water services to the development are not anticipated. However, due to the change in use and resulting change in demand, review and approval from the Providence Water Supply Board will be required.

Sewer: Modifications to the existing sewer services are not anticipated. However, due to the change in use and resulting change in flow, review and approval from Veolia Water / Cranston Department of Public Works will be required.

Gas/Electric/Telecommunications: Major modifications to the site's gas and telecommunications services are not anticipated. However, due to the change in use, review and approval from Rhode Island Energy – Gas will likely be required. The proposed development will likely necessitate a new transformer, which will require coordination with Rhode Island Energy – Electric.

Stormwater: The proposed development includes a reduction in impervious area of approximately 2.7-percent, or about 6,500 square feet. In addition, beautification of the site, including placement of new loam and seed as well as landscape plantings, will assist

in providing natural groundwater infiltration and water quality. Environmental assessments have been completed and identify areas on the site where groundwater infiltration is recommended; refer to "heat map" within Appendix B for additional details. The site's stormwater management system has been designed in accordance with all applicable State and local Standards, improving water quality, groundwater recharge, and reducing peak stormwater runoff rates and total stormwater runoff volumes to the maximum extent practicable.

4 PERMIT REQUIREMENTS

4.1 Local Permit Requirements

4.1.1 City of Cranston Plan Commission

The project team met with the City for a pre-application review of the project in March 2024. The project is considered a Major Land Development, requiring three (3) stages of review, Master Plan, Preliminary Plan and Final Plan with the City Plan Commission. The project received Master Plan approval at the June 6, 2024 City Plan Commission meeting.

4.1.2 Providence Water Supply Board

Due to the change in use and resulting change in demand, review and approval from the Providence Water Supply Board will be required.

4.1.3 Veolia Water/ Cranston Dept. of Public Works

Due to the change in use and resulting change in flow, review and approval from Veolia Water / Cranston Department of Public Works will be required.

4.2 State Permit Requirements

4.2.1 RI Department of Environmental Management

Given the overall area of disturbance associated with development of this site, a submission to the Rhode Island Department of Environmental Management (RIDEM) Office of Water Resources/Stormwater Program is required for a Construction Stormwater Application (CSA). In addition, review and approval will be required by the DEM's Office of Waste Management for review and approval of the site's Remedial Action Work Plan (RAWP), Soils Management Plan (SMP), and Environmental Land Usage Restriction (ELUR).

5 STORMWATER MANAGEMENT PLAN

5.1 General

The proposed development is subject to the requirements of the Rhode Island Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8), a recodification of the regulatory portions of the Stormwater Manual implemented by both the Rhode Island Department of Environmental Management (RIDEM) and the Rhode Island Coastal Resources Management Council (CRMC). In general, all stormwater runoff from the eastern portion of the site sheet flows to existing drywells within the site, which conveys stormwater in a southerly direction, routed to existing drainage network to the property to the south. Stormwater from the western portion of the site sheet flows to a series of catch basins located further down Wellington Avenue. Stormwater runoff from the site is ultimately directed to Fenner Pond via a large box culvert.

The site's proposed stormwater management system has been designed to generally mimic existing conditions. The stormwater management design adheres to all State (RIDEM) and local (City of Cranston) standards of attenuation of peak stormwater runoff rates for the 1-, 2-, 10-, 25-, and 100-year storm event, reduction in stormwater volumes leaving the site while promoting groundwater recharge and improving the quality of the stormwater leaving the site.

In addition, the proposed Stormwater Management Plan takes into account that Fenner Pond is listed as impaired for total phosphorus. Overall water quality of the stormwater leaving the site is improved by implementing the use of a pea gravel diaphragm and sediment forebay for pre-treatment of the stormwater and a new sand filter basin to treat for water quality. As previously noted, due to widespread contamination throughout the site, due to the concerns of the RIDEM OWR and OLRSMM, the sand filter basin located at the Southern end of the site is proposed to be lined and under-drained to aid in mitigation of the conveyance of potential contaminants off site.

5.2 Standard 1: LID Planning and Design Strategies

Low Impact Development (LID) site planning and design strategies must be used to the maximum extent practicable.

Standard Waived – However, Standard Met

LID practices, which include installation of structural stormwater management systems including a bioretention basin and a lined and under-drained sand filter basin, have been

included in the design. The proposed system will provide the necessary water quality treatment and groundwater recharge to the maximum extent practicable. In addition, the proposed drainage patterns closely mimic that of the existing conditions.

5.3 Standard 2: Groundwater Recharge

Stormwater must be recharged within the same sub-watershed to maintain base flow at pre-development recharge levels to the maximum extent practicable.

Standard Not Met – Waiver Requested

Groundwater recharge will be provided on site through a bioretention basin at the northern end of the site. A sand filter basin is proposed at the southern end of the site which is proposed to be lined and under-drained due to subsurface contaminants in this area of the site. A waiver is being requested from the groundwater recharge requirement due to the extensive subsurface contamination around the site. The groundwater recharge standard has been met to the maximum extent practicable via the implementation of the infiltrating bioretention basin. Natural groundwater recharge is also achieved via the reduction in overall impervious areas throughout the site. As such, the Applicant is respectfully requesting a waiver from this requirement. All calculations were completed in accordance with Section 8.8 of the Stormwater Rules using the following formula:

$Re_v = (1") (F) (I) / 12$

Based on the results of the soil evaluation test pits, a recharge factor of 0.35 was used, associated with Hydrologic Soil Group B.

Table 5.1: Recharge Requirements

Subwatershed	**1A**	**1B**
Treatment System	Bioretention Basin #1	Infiltration Basin #1
Impervious Area (SF)	2,621	43,709
Recharge factor (in)	0.35	0.35
Required Recharge Volume (CF)	76	1,275
Required Recharge Volume @ 50% (CF)	38	637
Provided Recharge Volume (CF)	389	0
Recharge Requirement Met?	Yes	No[(4)]

Notes: 1. Refer to Proposed Watershed Map located in Appendix E for BMP locations.
2. Based on Routing Analysis of WQ_v, the entire water quality volume is infiltrated.
3. Recharge Volumes are calculated as the Static Storage Volume.
4. Waiver from groundwater recharge requirement requested due to subsurface contamination.

5.4 Standard 3: Water Quality

The stormwater runoff from the site must be treated prior to discharge.

Standard Met

Based on the Stormwater Rules, the site is considered a redevelopment as more than 10,000 sq. ft. of existing impervious area is being improved and 40% or more existing impervious surface coverage exists within the subject parcel. Therefore only 50% of all disturbed impervious areas must be treated for water quality. Stormwater runoff associated with the pavement are treated by the bioretention basin and lined and under-drained sand filter basin. Calculations were completed in accordance with Section 8.9 of the Stormwater Rules.

Tables 2 and 3 below provide sizing calculations for the Water Quality Volume (WQ_V) of the pretreatment area and the treatment area, respectively. The rooftop area is exempt from pre-treatment requirements. Water quality calculations for impervious surfaces are included in Appendix F.

Table 5.2: Pretreatment Requirements

Subwatershed	**1A**	**1B**
Treatment System	Crushed Stone Diaphragm	Sediment Forebay #1
Impervious Area (SF)	2,621	43,709
Water Quality Factor (in)	1.00	1.00
Required Water Quality Volume @50% (CF)	109	1,821
Required Static Volume for Pretreatment (25% of WQv)	27	455
Provided Static Storage Volume for Infiltration System (CF)	36	3,314
Pretreatment Requirement Met?	Yes	Yes

Table 5.3: Treatment Requirements		
Subwatershed	**1A**	**1B**
Treatment Type	Bioretention Basin #1	Sand Filter Basin #1
Impervious Area (sf)	2,621	43,709
Water Quality Factor (in)	1.00	1.00
Required Water Quality Volume (CF) @50%	109	1,821
Required Static Volume for Treatment	82	1,366
Provided Static Storage Volume for Treatment (CF)	389	4,901
Treatment Requirement Met	Yes	Yes

Notes:

1. Static Storage Volume = Storage volume of system below outlet (for infiltrating practices) or storage volume within basin and sand filter void space (prior to discharge to underdrain).

As shown in Tables 5.1 through 5.3 above, the site's proposed stormwater management system exceeds the requirements of groundwater recharge volume, water quality pre-treatment volume and water quality volume. This is in accordance with the Stormwater Rules and the City of Cranston's standards, and ultimately reduces any instances of untreated stormwater flow towards Fenner Pond.

5.5 Standard 4: Conveyance and Natural Channel Protection

This standard is designed to prevent erosive flow within natural channels and drainage ways.

Standard Waived – However, Standard Met

The proposed site improvements fall under the redevelopment standard, which does not require peak flow mitigation. However, the large reduction in impervious areas throughout the site coupled with the proposed stormwater management BMPs results in reductions in peak stormwater runoff rates and total runoff volumes to all design points through the 100-year design storm. Calculations are provided in Appendices E and G.

5.6 Standard 5: Overbank Flood Protection

Downstream overbank flood protection must be provided by attenuating the post-development peak discharge rate to the pre-development levels for the 1–, 10-, and 100-year, Type III design storm events.

Standard Waived – However, Standard Met

The proposed project is eligible from this requirement because it is a redevelopment. However, the large reduction in impervious areas throughout the site coupled with the proposed stormwater management BMPs results in reductions in peak stormwater runoff rates and total runoff volumes to all design points through the 100-year design storm. Calculations are provided in Appendices E and G.

5.7 Standard 6: Redevelopment and Infill Projects

For redevelopment sites with 40% or more existing impervious surface coverage and infill sites, only Standards 2, 3, and 7-11 must be addressed.

Standard Met

As shown below, the proposed site improvements are not considered a redevelopment:

Existing Site Area	Existing Impervious Area	Percent Impervious	Redevelopment?
237,000 sf	209,137 sf	88.2%	Yes

5.8 Standard 7: Pollution Prevention

All development sites require the use of source control and pollution prevention measures to minimize the impact that the land use may have on stormwater runoff quality.

Standard Met

Soil erosion and pollution control measures including a crushed stone construction access, compost sock and catch basin silt sacks are proposed to be used during construction. A Soil Erosion and Sediment Control Plan (SESCP), has been prepared in accordance with the Manual and has been submitted separately. A long-term Operation and Maintenance Plan (O&M) has been prepared in accordance with the Manual and has been submitted separately.

5.9 Standard 8: Land Uses with Higher Potential Pollutant Loads

Stormwater discharges from land uses with higher potential pollutant loads (LUHPPLs) require the use of specific source control and pollution prevention measures and the specific stormwater BMPs approved for such use.

A stormwater LUHPPL is defined by the following land uses and activities:

1. Areas within an industrial site (as defined in RIPDES Rule 31(b)(15)) that are the location of activities subject to the RIPDES Multi-Sector General Permit (except

where a No Exposure Certification for Exclusion from RIPDES Stormwater Permitting has been executed);
2. Auto fueling facilities (i.e., gas stations);
3. Exterior vehicle service, maintenance and equipment cleaning areas;
4. Road salt storage and loading areas (if exposed to rainfall); and
5. Outdoor storage and loading/unloading of hazardous substances.

Standard Not Applicable

The subject site does not meet the definition of a LUHPPL, as it does not maintain or require a RIPDES Multi-Sector General Permit.

5.10 Standard 9: Illicit Discharges

All illicit discharges to stormwater management systems are prohibited, including discharges from OWTS, and sub-drains and French drains near OWTSs that do not meet the State's OWTS Rules.

Standard Met

There are no known existing illicit discharges at the site nor are any proposed as part of this project.

5.11 Standard 10: Construction and Erosion Sedimentation Control

Erosion and sedimentation control (ESC) practices must be utilized during the construction phase as well as during any land disturbing activities

Standard Met

Erosion control practices have been employed to avoid and minimize impacts to abutting properties. Detailed notes have been included in the plans to ensure effective implementation of erosion and sedimentation controls, which include a straw wattle/silt fence around the perimeter of the site, Siltsack sediment traps within all catch basins within and adjacent to the site, and a crushed stone construction access at the entrances to the site. The soil erosion and sedimentation control measures will be installed prior to the initiation of construction activities and maintained throughout construction. Once established, these measures will be monitored daily until construction activities are complete. The straw wattle/silt fence line will serve as the strict limits of disturbance for the project. No alterations, including vegetative clearing or surface disturbance, will occur beyond this line. The limits of clearing, grading, and disturbance will be kept to a minimum within the

proposed area of construction. All areas outside of these limits, as depicted on the project site plans, will remain undisturbed, in a completely natural condition.

5.12 Standard 11: Stormwater Management System Operation and Maintenance

The stormwater management system, including all structural stormwater controls and conveyances, must have an Operation and Maintenance Plan to ensure that it continues to function as designed.

Standard Met

A long-term Stormwater Operation and Maintenance Plan has been prepared for the development in accordance with the Manual and is provided under separate cover.

6 DRAINAGE ANALYSIS

6.1 Methodology

The comparative pre- versus post-development hydrologic analysis was performed using the Soil Conservation Service, Technical Release 20 and 55 (TR-20 and TR-55) methodology. The 1-, 2-, 10-, 25-, and 100-year storm events were modeled for a 24-hour, Type III storm utilizing HydroCAD version 10.00. HydroCAD modeling reports for the existing and proposed conditions can be found in Appendices F and H, respectively.

6.2 Existing Conditions

The existing site consists of two (2) watersheds discharging to two (2) off-site design points further described as the existing drainage network (DP1) and the existing drainage inlets within Wellington Avenue (DP2). In general, all stormwater runoff from the eastern portion of the site sheet flows to existing drywells and catch basins within the site, which convey stormwater in a southerly direction to an existing drainage network (DP1). This drainage line is routed through the property to the south, tying into an existing 4’x4’ box culvert, owned and maintained by the City of Cranston. Stormwater from the western portion of the site sheet flows to a series of catch basins located further down Wellington Avenue (DP2). These catch basins are also tied into the existing 4’x4’ box culvert, owned and maintained by the City of Cranston. This box culvert continues to the east, through the adjacent Johnston Controls property, under Elmwood Avenue, ultimately discharging to Fenner Pond. An Existing Conditions Watershed Map is included in Appendix C.

Design Point 1 – Existing Drainage Network

Watershed 1: Consists of 174,413 sq. ft. of paved parking areas and roofs associated with the eastern portion of the parcel. This watershed area consists mostly of impervious area and has a minimum T_C of 6.0 minutes and a composite CN Runoff Number of 93. Stormwater runoff from this area is collected via a closed drainage system that conveys stormwater runoff in a southerly direction, routed to an existing drainage network to the property to the south, Design Point 1.

Design Point 2 – Existing Drainage Inlets within Wellington Avenue

Watershed 2: Consists of 62,600 sq. ft. of the western portion of the project site. This watershed area consists mostly of impervious areas (pavement and rooftop areas) and has a T_C of 6.0 minutes and a composite CN Runoff Number of 98. Runoff from this area sheet flows towards the existing drainage inlets within Wellington Avenue (Design Point 2).

6.3 Proposed Conditions

In general, the proposed drainage patterns mimic existing conditions, discharging to the same design points as under existing conditions. Water quality is achieved by means of infiltration practices. Stormwater runoff from the eastern portion of the project area is conveyed through proposed drainage infrastructure prior to discharging to the existing drainage network, while the remainder of the western portion of the site will continue to sheet flow to the existing catch basins within Wellington Avenue. These conditions are shown in detail on the Proposed Conditions Watershed Map included in Appendix E.

Design Point 1 – Existing Drainage Network

Under proposed conditions, Watershed 1 is subdivided into two (2) subwatersheds.

Subwatershed 1A: Subwatershed 1A consists of 11,579 sq. ft. of mostly pervious areas. This subwatershed area has a minimum T_C of 6.0 minutes and a composite CN Runoff Number of 79. Stormwater runoff from the parking area sheet flows to a crushed stone diaphragm for pre-treatment and then Bioretention Basin #1 for water quality and groundwater recharge. Excess treated stormwater runoff from this area is collected via an outlet control structure that ties into the existing drainage network that conveys stormwater to the property to the south, Design Point 1.

Subwatershed 1B: Consists of 162,834 sq. ft. of mostly pavement areas and roof areas associated with the project site. This subwatershed a T_C of 6.0 minutes and a composite CN Runoff Number of 90. Stormwater runoff from this area sheet flows to Sediment Forebay #1 for pre-treatment and Sand Filter Basin #2 for water quality treatment. Excess treated stormwater runoff from this area is collected via an underdrain system and outlet control structure that ties into the existing drainage network that conveys stormwater to the property to the south, Design Point 1.

Design Point 2 – Existing Drainage Inlets within Wellington Avenue

Subwatershed 2: Consists of 62,600 sq. ft. of the western portion of the project site. This watershed area remains mostly unchanged; however, elimination of some smaller rooftop areas and paved areas are being converted to grassed/landscaped area are proposed. As such, this watershed area consists mostly of impervious areas (pavement and rooftop areas) and therefore has been assigned a T_C of 6.0 minutes and a composite CN Runoff Number of 94. Runoff from this area sheet flows towards the existing drainage inlets within Wellington Avenue (Design Point 2).

6.4 Results

A runoff analysis of the pre- and post-construction conditions was completed using the TR-20 methodology and is summarized in Table 3 below. Supporting calculations for the pre- and post-construction conditions are included in Appendices F and H respectively.

Table 6.1: Watershed Data

	Area (SF)	CN	Tc (min.)
Exist. Watershed 1	174,413	93	6.0
Exist. Watershed 2	62,600	98	6.0
Existing Totals	**237,013**	**94**	--
Prop. Subwatershed 1A	11,579	79	6.0
Prop. Subwatershed 1B	162,834	90	6.0
Watershed 2	62,600	94	6.0
Proposed Totals	**237,013**	**91**	**--**
Delta (Δ)	**0**	**-3**	**--**

Note: Minimum Tc = 6 minutes; Average CN is a weighted average.

As shown in Table 6.1 above, the overall watershed area remains unchanged when comparing existing to proposed conditions. However, due to the decrease in impervious

areas associated with the proposed development, the CN value has been decreased by 3 when comparing existing to proposed conditions.

Table 6.2.1: Peak Discharge (cfs) to Design Point 1

	WQ	1-YR	10-YR	100-YR
Existing Condition	3.62	8.84	17.70	32.69
Proposed Condition	0.12	4.08	15.48	30.13
Delta (Δ)	***-3.50***	***-4.76***	***-2.22***	***-2.56***

Table 6.2.2: Peak Discharge (cfs) to Design Point 2

	WQ	1-YR	10-YR	100-YR
Existing Condition	1.52	3.66	6.73	11.99
Proposed Condition	1.35	3.29	6.45	11.81
Delta (Δ)	***-0.17***	***-0.37***	***-0.28***	***-0.18***

As shown in Tables 6.2.1 and 6.2.2 above, the peak stormwater runoff rates realized at Design Point 1 (Existing Drainage Network) and Design Point 2 (existing catch basins within Wellington Avenue) have decreased for all design storm events. This will result in significantly less stress on the public drainage system, specifically the existing 4'x4' box culvert.

Table 6.2.3: Total Runoff Volume (cf) to Design Point 1

	WQ	1-YR	10-YR	100-YR
Existing Condition	8,883	28,609	59,587	114,207
Proposed Condition	6,667	17,050	45,447	98,348
Delta (Δ)	***-2,216***	***-11,559***	***-14,140***	***-15,859***

Table 6.2.4: Total Runoff Volume (cf) to Design Point 2

	WQ	1-YR	10-YR	100-YR
Existing Condition	5,142	12,883	24,327	44,132
Proposed Condition	3,507	10,751	21,959	41,620
Delta (Δ)	***-1,635***	***-2,132***	***-2,368***	***-2,512***

As shown in Tables 6.2.3 and 6.2.4 above, the total stormwater runoff volumes realized at Design Point 1 (Existing Drainage Network) and Design Point 2 (existing catch basins within Wellington Avenue) have decreased for all design storm events. This will result in

significantly less stress on the public drainage system, specifically the existing 4'x4' box culvert.

7 CONCLUSIONS

As shown in Sections 4, 5 and 6 above, the proposed improvements have been designed to minimize impacts of the proposed site development by reducing peak stormwater runoff rates for the 1, 10, and 100-year design storm vents while treating for water quality by the installation of BMP's including a bioretention basin and a lined and under-drained sand filter basin.

Due to the addition of the bioretention basin and the lined and under-drained sand filter basin, which infiltrate (bioretention only) and detain stormwater, both Design Points experiences reduction in peak stormwater runoff rates and provides water quality for the runoff leaving the watershed. The proposed stormwater management system has been designed to be in compliance with the rules and regulations stipulated in the Stormwater Rules. The stormwater management system as designed will not have any negative impacts to the existing drainage system within the subject property and within Wellington Avenue. In addition, as shown within this report, the WQv design storm is completely infiltrated on-site thereby improving current water quality conditions. Lastly, the proposed Stormwater Management Plan considers the existing TMDL for Fenner Pond by improving the overall water quality through infiltration practices.

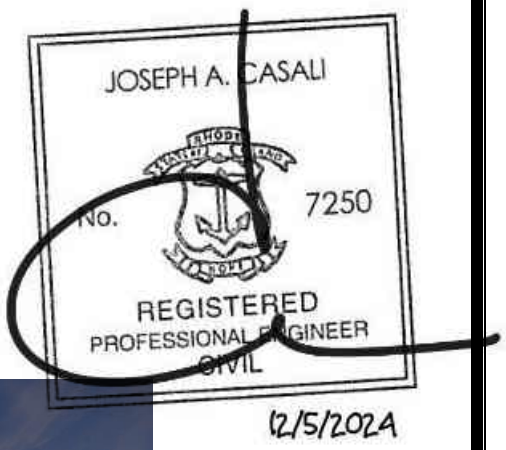
Project Narrative and Stormwater Management Report

For a Proposed Redevelopment Project

Self-Storage Facility

Located at

530-532 Wellington Avenue
Cranston, Rhode Island
AP 3, Lot 107



Prepared for:
CANAM RI LLC
c/o Mr. Mike Jobb
530 Wellington Avenue
Cranston, RI 02910-2950

Submission Date:
September 2024; Revised December 2024

Submitted by:

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APPENDICES

1 INTRODUCTION

On behalf of our client, CANAM RI LLC, Joe Casali Engineering, Inc. (JCE) has prepared the following Project Narrative and Stormwater Management Report to identify existing conditions and proposed site improvements associated with the proposed redevelopment of a mill complex. The scope includes the redevelopment of the existing mill complex located at 530-532 Wellington Avenue, in Cranston, Rhode Island to a self-storage facility containing approximately 1,191 storage units or various sizes. The subject property can also be identified as Tax Assessor's Plat Map (AP) 3, Lot 107, and has frontage on Wellington Avenue in the City of Cranston.

2 SITE LOCATION AND PHYSICAL DESCRIPTION

According to a July 2023 Class I Property Line Survey performed by Holland E. Shaw, PLS, the total area of the subject property is 237,000 sq. ft. (5.441 acres). The parcel is currently occupied by a mill complex consisting of a series of buildings internally subdivided with multiple varied uses, parking areas, and outdoor storage areas. The majority of the varied uses within the facility have been vacated as of the date of this report. The parcel is accessed via existing curb cuts on Wellington Avenue and Station Street. The subject parcel is bound by multi-family residential properties to the north, an Amtrak Corridor to the east, a vacant lot to the south, and Wellington Avenue and Interstate 95 to the west, as shown below in Figure 1 – Locus Map.

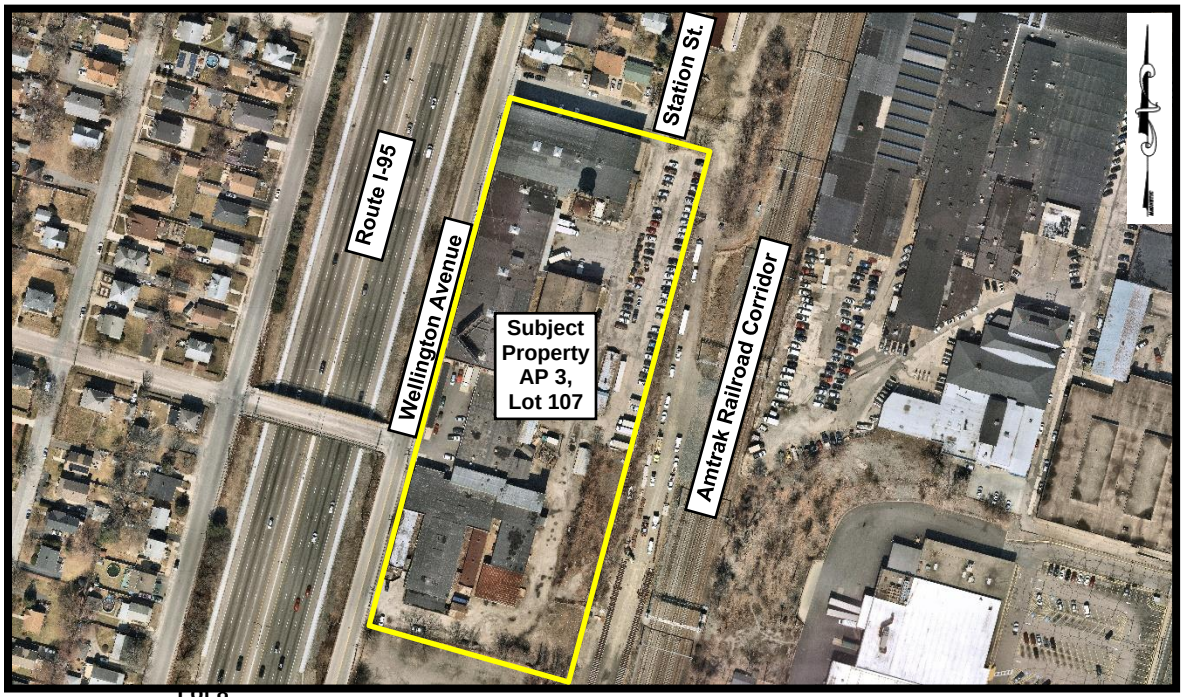

Figure 1 – Locus Map

NOT TO SCALE

2.1 Soil Classification

According to the *Web Soil Survey (WSS)* operated by the US Department of Agriculture Natural Resources Conservation Service (NRCS), produced by the National Cooperative Soil Survey, the soils on the site consist of Udorthents-Urban land complex (UD) and Merrimac-Urban land complex, 0 to 8 percent slopes (MU). UD soils consist of human transported material. These soils have a very low runoff class and belong to hydrologic soil group A. MU soils consist of loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss. These soils are somewhat excessively drained, have a very low runoff class and belong to Hydrologic Soil Group A.

Figure 2 – Soils Map

NOT TO SCALE

Soil evaluations were observed and documented by JCE in July 2024 to determine the depth to the seasonal high groundwater table (SHGWT) and to estimate infiltration capacity of existing in-situ soil for design of stormwater mitigation measures. Three (3) soil evaluation test pits were excavated, to 108-inches below the ground surface. In general, the SHGWT ranged from about 44-inches to 54-inches below the existing ground surface when encountered. Ledge was not encountered. A Soil Evaluation Test Pit Location Plan and Soil Evaluation Test Hole Logs are included in Appendix A.

In addition, multiple groundwater observation wells have been installed throughout the site by various environmental consultants over the course of the last few years. Data from the installation of these wells has also been assessed and incorporated into the design. Groundwater observation well locations are included on the Site Plan prepared by Sage Environmental in Appendix B; logs are included in Appendix A.

2.2 Environmental Considerations

SAGE Environmental (Sage) completed a conducted an American Society for Testing and Materials (ASTM) Phase I Environmental Site Assessment (ESA) in April 2023. Results of the Phase I ESA identified Recognized Environmental Conditions (RECs), which are explained in more detail in the Phase I ESA (can be provided under separate cover) but are generally summarized below.

- REC #1 - Historic and Current Usage of the Site for Manufacturing and Associated Infrastructure: Building occupants have engaged in manufacturing operations, including but not limited to, vinyl coated products, a rubber heel factory, plastics manufacturing, cabinet manufacturing, jewelry manufacturing, upholstery manufacturing, knife manufacturing, a veterinary laboratory, chemical manufacturers (including resin, algaecides, germicidal detergents, deodorants, sanitizers, and disinfectants), assayers and refiners of precious metals, electroplating operations, spray coating/spray painting/screen-printing, metal and plastic grinding/sharpening, a brewery, appliance repair, sewing, exercise related businesses, real estate businesses, material rental businesses, storage businesses, educational businesses, janitorial services, electricians, an elevator company, and retail businesses, since the early 1900's. In addition to the former property use, several observations of associated infrastructure and potential for releases of oil and/or hazardous materials (OHM) from these past operations were made during the Phase I. These included potentially leaking electrical transformers, stained soil, drains, sumps, pits, hydraulic equipment, and OHM storage containers.
- REC #2 - Historic Environmental Investigations and Known Release Conditions [Underground Storage Tank (UST)-15319, Leaking Underground Storage Tank (LUST) 0713-LS, State Hazardous Waste Site (SHWS SR-07-1035), and SEMS Archive:
    - UST Summary (RIDEM File Number UST-15319: In general, the Site has had at least 25 underground storage tanks (USTs), ranging in capacity from 500-gallons to 10,000-gallons, and utilized for the storage of gasoline, #6

oil, unspecified fuel oil, mineral oil, aromatic solvents, and plasticizers (converted to water storage in circa 1960). On March 16, 1987, RIDEM issued a Certificate of Closure which stated that all regulated tanks "which existed from May 8, 1985", "have either been removed or filled in accordance with State UST Regs". Please note that additional vent pipes were observed, indicating that additional tanks may exist which were previously unidentified.

- LUST Summary (RIDEM Case Number 0713-LS): Two (2) of the USTs, historically utilized for the storage of gasoline and aromatic solvents (i.e., USTs 1 and 9), are documented to have resulted in a release condition to soil and groundwater on the southwest portion of the Site, extending into the municipal right-of-way identified as Wellington Avenue. Contaminants of Concern (COCs) identified in soil and groundwater, at concentrations in excess of the applicable RIDEM criteria, include benzene, toluene, ethylbenzene, and xylenes, and Light Non-aqueous Phase Liquid (LNAPL) (i.e., identified as consisting of a petroleum distillate/paint thinner and/or petroleum with a carbon range of C7 through C18.). The most recent groundwater monitoring event occurred in September 2020. At that time, no LNAPL was detected; however, a sheen was noted on groundwater in each of the four (4) groundwater monitoring wells. According to McPhail Associates, LLC, the plume is/was stable. No groundwater monitoring data from 2022 or 2023 was reported within the RIDEM file and a Letter of Compliance or No Further Action deeming that the release is closed were identified in the RIDEM files. Therefore, the Site may be out of compliance with the RIDEM Regulations.
- State Hazardous Waste Site (SHWS) (SR-07-1035)012/Superfund Enterprise Management System (SEMS)-Archive (RID01201771): In 1986, Rizzo Associates, Inc. conducted a limited subsurface assessment on the Site which identified the following COCs at concentrations in excess of the applicable RIDEM soil and/or groundwater criteria, select polynuclear aromatic hydrocarbons (PAHs). Remediation reportedly included soil excavation and the importation of fill (source of fill material not provided); In circa 1990, the US EPA identified the Site as a potentially hazardous waste site due to activities conducted by Gannon & Scott (RID01201771), a reclaimer of precious metals from plating and stripping solutions from the 1950s through the 1980s. The Site was subsequently investigated on behalf

of the US EPA as part of the Superfund Site Assessment and Removal program which identified the following COCs at concentrations in excess of the applicable RIDEM soil and/or groundwater criteria: select chlorinated VOCs (CVOCs), select PAHS, and toluene. In 2002, the USEPA archived (i.e., removed) from the CERCLIS database and was not a candidate for inclusion on the National Priorities List (NPL) because there was not a drinking water well located in proximity to the Site. As a result, the Site was assigned the status of No Further Remedial Actions Planned (i.e., NFRAP). A NFRAP designation means that no further Federal Superfund Remedial Action was anticipated, under the jurisdiction of CERCLA. Please note that this is not meant to imply compliance with the RIDEM regulations; therefore, the lack of additional assessment and/or remediation due to the above exceedances may represent non-compliance with the RIDEM Remediation Regulations.

- REC #3: Adjoining Land Usage: Based on information provided in the Sanborn Maps, two (2) parcels of land located immediately north of the Site (i.e., 388 and 433 Station Street) were historically utilized for jewelry manufacturing (i.e., 433 Station Street) from circa 1950 through 1972, and a repair shop in circa 1900 (i.e., 388 Station Street which was owned by the New York, New Haven, and Hartford railroad in 1900). No additional information regarding these businesses was obtained during the course of this assessment; however, usage of these properties for jewelry manufacturing and repairs associated with railroad machinery represents a REC.

These locations and conditions are summarized in the Red/Yellow/Green Map, 530 Wellington Ave., Cranston, Rhode Island, prepared by Sage, dated November 21, 2024, included in Appendix B. A Site Investigation Report was filed with RIDEM in August 2024; the development of a Remedial Action Work Plan (RAWP) is in progress.

Based on correspondence between the RI Department of Environmental Management (RIDEM) Office of Water Resources (OWR) and the RIDEM Office of Land Revitalization and Sustainable Materials Management (OLRSMM) in November/December 2024, given the presence of several underground storage tanks on the Southern side of the site along with the existing contamination on the site located to the South (groundwater generally appears to flow towards that site), we understand that the OLRSSM has concerns primarily about the infiltration in the Southeast corner of the site.

Because there is such an extensive history of contamination in this area, it was recommended that the stormwater management design omit infiltration on the Southern end of the site. It is important to note that this will affect the ability to meet groundwater recharge requirements, and a waiver from this requirement is being sought. Details are further discussed in Section 5 below.

2.3 Flood Zone Classification

The site is located on the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) for the City of Cranston, Map Number 44007C0318H, effective date October 2, 2015, as depicted below on Figure 3. The property lies completely within FEMA Flood Zone X, which is defined as areas outside of the 0.2% annual chance floodplain.

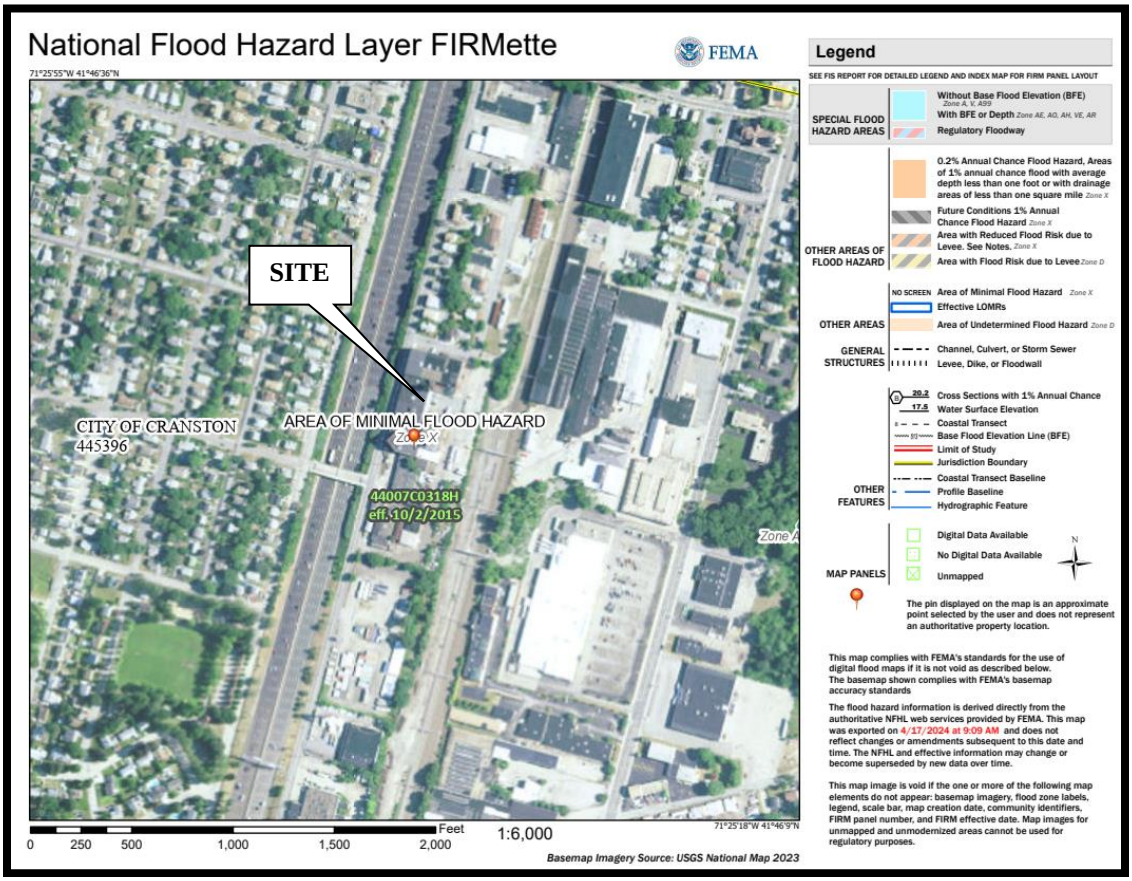

Figure 3 – FEMA Flood Insurance Rate Map
NOT TO SCALE

2.4 Natural Resources

According to the RIDEM Environmental Resource Map, the site is located within the Pawtuxet River Watershed (ID No. 010900040609). Stormwater runoff from the site is

ultimately directed to Fenner Pond (RI0006017L-08) via a buried stream, which ultimately discharges to the Pawtuxet River. Fenner Pond is located on the State of Rhode Island 2022 Impaired Water Report List. The cause of impairment within Fenner Pond is due to the phosphorus levels. There are no total maximum daily loads (TMDL) established at this time. The site is not within any State-designated natural heritage area, unfragmented forest tracts, state, regional, or community greenways and green space priorities. The site does not contain any land in active agricultural use.

2.5 Zoning

The subject property is located within the City of Cranston's General Industry District (M-2). The following are the dimensional requirements for the M-2 zone, along with existing conditions associated with the existing mill complex:

Zoning Criteria	M-2 Requirement	Existing
Min. Lot Area	60,000 SF	237,000 SF
Min. Frontage & Lot Width	200 feet	249 feet
Min. Front Yard Depth	40 feet	0 feet(1)
Min. Side Yard Depth	25 feet	42.6 feet
Min. Rear Yard Depth	30 feet	NA
Maximum Building Coverage	60%	43.8%
Max. Building Height	35 feet	45.1 feet(1)

1. Pre-existing, non-conforming condition.

2.6 Easements

According to a July 2023 Class I Property Line Survey performed by Holland E. Shaw, PLS. Multiple easements exist on site. Two communications easements exist on the northern portion of the site. These easements are referenced in Deed Book 3293, Page's 2 & 19, and Deed Book 5302, Page 54. Also, three sewer easements exist traveling south down the eastern side of the subject property and turning towards Wellington Avenue. These easements are referenced in Deed Book 220, Pages 37 & 38.

2.7 Existing Utilities

Water: Based on a review of existing conditions information obtained from the Providence Water Supply Board (PWSB), a 12-inch asbestos concrete (AC) water main exists within Wellington Avenue, and a 6-inch AC water main exists within Clarence Street. Based on a field review of existing conditions performed by JCE in April 2024, domestic water appears to be provided to the site via a 4-inch cast iron (CI) service from Clarance Street,

and via a 4-inch CI service from Wellington Ave. In addition, fire protection water service appears to be provided to the site via a 6-inch CI service from Clarance Street, and via a 6-inch CI service from Wellington Ave.

Sewer: Based on a review of existing conditions information obtained from the City of Cranston, a 24-inch reinforced concrete sewer main exists within Wellington Avenue and an 8-inch vitrified clay (VCP) sewer main exists within Clarence Street. Based on field investigations performed by JCE in April 2024, it appears that two (2) 6-inch sewer services exist from the existing building(s). An 8-inch VCP conveys effluent from the northern portion of the development to the existing main within Clarence Street; and an 8-inch VCP conveys effluent from the southern portion of the development to the existing main within Wellington Ave.

Gas: Based on a review of existing conditions information from Rhode Island Energy, gas mains exist within Clarence Street and Wellington Avenue. Based on field investigations by JCE in April 2024, it appears that a gas service enters the site from Clarence Street, with multiple meters on the existing building servicing the former tenants.

Electric/Telecommunications: Existing overhead electrical and telecommunication services are provided to the site via the overhead lines along Wellington Avenue, Station Street, and Clarence Street.

Stormwater: Based on field investigations performed by JCE in April 2024, multiple drywells appear to exist throughout the site, particularly within the open space at the eastern portion of the property. Many of these existing structures are deteriorated, filled with debris/sediment, and are likely non-functional. It appears that a series of catch basins are located within the rear portion of the site, which are tied into a 21-inch vitrified clay pipe, which is routed through the property located to the south, ultimately tying into a 4’x4’ box culvert (owned by the City of Cranston). Ultimately, the box culvert crosses through the adjacent Johnston Controls property, continuing to the east across Elmwood Avenue, discharging into Fenner Pond.

3 PROPOSED DEVELOPMENT

The Applicant, CANAM RI LLC, is proposing a complete redevelopment of the site to accommodate a self-storage facility. The scope of improvements to the site includes demolition of multiple existing free-standing accessory structures and demolition of portions of the existing main building on the site. The existing main building is proposed to undergo complete interior and exterior renovation, including a small main office at the northeastern corner of the existing complex. The remainder of the facility is proposed to consist of approximately 1,191 variably sized self-storage units.

The main office is proposed to be accessed from Clarence Street / Station Street with a small 3-stall parking area for potential clients. The remainder of the site is fenced off with key card access for self-storage customers. A 3-stall parking lot is proposed adjacent to the entrance from Station Street, which includes one (2) handicap accessible space. This parking area is located outside the perimeter fence line, and its purpose is for potential customers to park and access to the self-storage main office located at the northeast corner of the existing building. Within the site, multiple parking areas are proposed for customer access to loading areas, loading docks, etc. Overall, a total of 56 parking spaces are proposed throughout the site, including two (2) handicap accessible spaces, in accordance with the Americans with Disabilities Act (ADA).

According to the City of Cranston's Zoning Ordinance, there is no specific use within Chapter 17.64 "Off Street Parking" fitting the definition of self-storage facilities. As such, JCE referenced the Institute of Transportation Engineers (ITE) Parking Generation Manual, 5th edition, dated January 2019. The ITE Manual identifies self-storage as "mini-warehouse", land use code 151. Based on the ITE Manual, peak parking demand per 100 storage units ranges from a minimum of 1.05 to a maximum of 2.38. Based on the 1,191 self-storage units proposed, this equates to a parking requirement ranging from 13 to 29 spaces. The currently proposed 56 spaces exceeds the anticipated peak parking demand per the ITE Manual.

Additional site improvements include perimeter fencing, loading dock canopy, a compacted gravel outdoor storage area for RVs, boats, etc., perimeter paved access road for customers and Fire Department access, landscape improvements, and stormwater management improvements.

3.1 Zoning

As previously noted, the subject property is located within the City of Cranston's General Industry District (M-2). The proposed use, self-storage, is allowed by right in the M-2 zone. However, due to the pre-existing non-conformities associated with the existing building, dimensional variances will be required, as summarized in the following table: conditions associated with the existing mill complex:

Zoning Criteria	M-2 Requirement	Existing	Proposed
Min. Lot Area	60,000 SF	237,000 SF	237,000 SF
Min. Frontage & Lot Width	200 feet	249 feet	249 feet
Min. Front Yard Depth	40 feet	0 feet(1)	0 feet(1)
Min. Side Yard Depth	25 feet	42.6 feet	42.6 feet
Min. Rear Yard Depth	30 feet	NA	NA
Maximum Building Coverage	60%	43.8%	42.6%
Max. Building Height	35 feet	45.1 feet(1)	45.1 feet(1)

1. Pre-existing, non-conforming condition.

3.2 Proposed Utilities

Water: Modifications to the domestic and fire protection water services to the development are not anticipated. However, due to the change in use and resulting change in demand, review and approval from the Providence Water Supply Board will be required.

Sewer: Modifications to the existing sewer services are not anticipated. However, due to the change in use and resulting change in flow, review and approval from Veolia Water / Cranston Department of Public Works will be required.

Gas/Electric/Telecommunications: Major modifications to the site's gas and telecommunications services are not anticipated. However, due to the change in use, review and approval from Rhode Island Energy – Gas will likely be required. The proposed development will likely necessitate a new transformer, which will require coordination with Rhode Island Energy – Electric.

Stormwater: The proposed development includes a reduction in impervious area of approximately 2.7-percent, or about 6,500 square feet. In addition, beautification of the site, including placement of new loam and seed as well as landscape plantings, will assist

in providing natural groundwater infiltration and water quality. Environmental assessments have been completed and identify areas on the site where groundwater infiltration is recommended; refer to "heat map" within Appendix B for additional details. The site's stormwater management system has been designed in accordance with all applicable State and local Standards, improving water quality, groundwater recharge, and reducing peak stormwater runoff rates and total stormwater runoff volumes to the maximum extent practicable.

4 PERMIT REQUIREMENTS

4.1 Local Permit Requirements

4.1.1 City of Cranston Plan Commission

The project team met with the City for a pre-application review of the project in March 2024. The project is considered a Major Land Development, requiring three (3) stages of review, Master Plan, Preliminary Plan and Final Plan with the City Plan Commission. The project received Master Plan approval at the June 6, 2024 City Plan Commission meeting.

4.1.2 Providence Water Supply Board

Due to the change in use and resulting change in demand, review and approval from the Providence Water Supply Board will be required.

4.1.3 Veolia Water/ Cranston Dept. of Public Works

Due to the change in use and resulting change in flow, review and approval from Veolia Water / Cranston Department of Public Works will be required.

4.2 State Permit Requirements

4.2.1 RI Department of Environmental Management

Given the overall area of disturbance associated with development of this site, a submission to the Rhode Island Department of Environmental Management (RIDEM) Office of Water Resources/Stormwater Program is required for a Construction Stormwater Application (CSA). In addition, review and approval will be required by the DEM's Office of Waste Management for review and approval of the site's Remedial Action Work Plan (RAWP), Soils Management Plan (SMP), and Environmental Land Usage Restriction (ELUR).

5 STORMWATER MANAGEMENT PLAN

5.1 General

The proposed development is subject to the requirements of the Rhode Island Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8), a recodification of the regulatory portions of the Stormwater Manual implemented by both the Rhode Island Department of Environmental Management (RIDEM) and the Rhode Island Coastal Resources Management Council (CRMC). In general, all stormwater runoff from the eastern portion of the site sheet flows to existing drywells within the site, which conveys stormwater in a southerly direction, routed to existing drainage network to the property to the south. Stormwater from the western portion of the site sheet flows to a series of catch basins located further down Wellington Avenue. Stormwater runoff from the site is ultimately directed to Fenner Pond via a large box culvert.

The site's proposed stormwater management system has been designed to generally mimic existing conditions. The stormwater management design adheres to all State (RIDEM) and local (City of Cranston) standards of attenuation of peak stormwater runoff rates for the 1-, 2-, 10-, 25-, and 100-year storm event, reduction in stormwater volumes leaving the site while promoting groundwater recharge and improving the quality of the stormwater leaving the site.

In addition, the proposed Stormwater Management Plan takes into account that Fenner Pond is listed as impaired for total phosphorus. Overall water quality of the stormwater leaving the site is improved by implementing the use of a pea gravel diaphragm and sediment forebay for pre-treatment of the stormwater and a new sand filter basin to treat for water quality. As previously noted, due to widespread contamination throughout the site, due to the concerns of the RIDEM OWR and OLRSMM, the sand filter basin located at the Southern end of the site is proposed to be lined and under-drained to aid in mitigation of the conveyance of potential contaminants off site.

5.2 Standard 1: LID Planning and Design Strategies

Low Impact Development (LID) site planning and design strategies must be used to the maximum extent practicable.

Standard Waived – However, Standard Met

LID practices, which include installation of structural stormwater management systems including a bioretention basin and a lined and under-drained sand filter basin, have been

included in the design. The proposed system will provide the necessary water quality treatment and groundwater recharge to the maximum extent practicable. In addition, the proposed drainage patterns closely mimic that of the existing conditions.

5.3 Standard 2: Groundwater Recharge

Stormwater must be recharged within the same sub-watershed to maintain base flow at pre-development recharge levels to the maximum extent practicable.

Standard Not Met – Waiver Requested

Groundwater recharge will be provided on site through a bioretention basin at the northern end of the site. A sand filter basin is proposed at the southern end of the site which is proposed to be lined and under-drained due to subsurface contaminants in this area of the site. A waiver is being requested from the groundwater recharge requirement due to the extensive subsurface contamination around the site. The groundwater recharge standard has been met to the maximum extent practicable via the implementation of the infiltrating bioretention basin. Natural groundwater recharge is also achieved via the reduction in overall impervious areas throughout the site. As such, the Applicant is respectfully requesting a waiver from this requirement. All calculations were completed in accordance with Section 8.8 of the Stormwater Rules using the following formula:

$Re_v = (1") (F) (I) / 12$

Based on the results of the soil evaluation test pits, a recharge factor of 0.35 was used, associated with Hydrologic Soil Group B.

Table 5.1: Recharge Requirements

Subwatershed	**1A**	**1B**
Treatment System	Bioretention Basin #1	Infiltration Basin #1
Impervious Area (SF)	2,621	43,709
Recharge factor (in)	0.35	0.35
Required Recharge Volume (CF)	76	1,275
Required Recharge Volume @ 50% (CF)	38	637
Provided Recharge Volume (CF)	389	0
Recharge Requirement Met?	Yes	No[(4)]

Notes: 1. Refer to Proposed Watershed Map located in Appendix E for BMP locations.
2. Based on Routing Analysis of WQ_v, the entire water quality volume is infiltrated.
3. Recharge Volumes are calculated as the Static Storage Volume.
4. Waiver from groundwater recharge requirement requested due to subsurface contamination.

5.4 Standard 3: Water Quality

The stormwater runoff from the site must be treated prior to discharge.

Standard Met

Based on the Stormwater Rules, the site is considered a redevelopment as more than 10,000 sq. ft. of existing impervious area is being improved and 40% or more existing impervious surface coverage exists within the subject parcel. Therefore only 50% of all disturbed impervious areas must be treated for water quality. Stormwater runoff associated with the pavement are treated by the bioretention basin and lined and under-drained sand filter basin. Calculations were completed in accordance with Section 8.9 of the Stormwater Rules.

Tables 2 and 3 below provide sizing calculations for the Water Quality Volume (WQ_V) of the pretreatment area and the treatment area, respectively. The rooftop area is exempt from pre-treatment requirements. Water quality calculations for impervious surfaces are included in Appendix F.

Table 5.2: Pretreatment Requirements

Subwatershed	**1A**	**1B**
Treatment System	Crushed Stone Diaphragm	Sediment Forebay #1
Impervious Area (SF)	2,621	43,709
Water Quality Factor (in)	1.00	1.00
Required Water Quality Volume @50% (CF)	109	1,821
Required Static Volume for Pretreatment (25% of WQv)	27	455
Provided Static Storage Volume for Infiltration System (CF)	36	3,314
Pretreatment Requirement Met?	Yes	Yes

Table 5.3: Treatment Requirements		
Subwatershed	**1A**	**1B**
Treatment Type	Bioretention Basin #1	Sand Filter Basin #1
Impervious Area (sf)	2,621	43,709
Water Quality Factor (in)	1.00	1.00
Required Water Quality Volume (CF) @50%	109	1,821
Required Static Volume for Treatment	82	1,366
Provided Static Storage Volume for Treatment (CF)	389	4,901
Treatment Requirement Met	Yes	Yes

Notes:

1. Static Storage Volume = Storage volume of system below outlet (for infiltrating practices) or storage volume within basin and sand filter void space (prior to discharge to underdrain).

As shown in Tables 5.1 through 5.3 above, the site's proposed stormwater management system exceeds the requirements of groundwater recharge volume, water quality pre-treatment volume and water quality volume. This is in accordance with the Stormwater Rules and the City of Cranston's standards, and ultimately reduces any instances of untreated stormwater flow towards Fenner Pond.

5.5 Standard 4: Conveyance and Natural Channel Protection

This standard is designed to prevent erosive flow within natural channels and drainage ways.

Standard Waived – However, Standard Met

The proposed site improvements fall under the redevelopment standard, which does not require peak flow mitigation. However, the large reduction in impervious areas throughout the site coupled with the proposed stormwater management BMPs results in reductions in peak stormwater runoff rates and total runoff volumes to all design points through the 100-year design storm. Calculations are provided in Appendices E and G.

5.6 Standard 5: Overbank Flood Protection

Downstream overbank flood protection must be provided by attenuating the post-development peak discharge rate to the pre-development levels for the 1–, 10-, and 100-year, Type III design storm events.

Standard Waived – However, Standard Met

The proposed project is eligible from this requirement because it is a redevelopment. However, the large reduction in impervious areas throughout the site coupled with the proposed stormwater management BMPs results in reductions in peak stormwater runoff rates and total runoff volumes to all design points through the 100-year design storm. Calculations are provided in Appendices E and G.

5.7 Standard 6: Redevelopment and Infill Projects

For redevelopment sites with 40% or more existing impervious surface coverage and infill sites, only Standards 2, 3, and 7-11 must be addressed.

Standard Met

As shown below, the proposed site improvements are not considered a redevelopment:

Existing Site Area	Existing Impervious Area	Percent Impervious	Redevelopment?
237,000 sf	209,137 sf	88.2%	Yes

5.8 Standard 7: Pollution Prevention

All development sites require the use of source control and pollution prevention measures to minimize the impact that the land use may have on stormwater runoff quality.

Standard Met

Soil erosion and pollution control measures including a crushed stone construction access, compost sock and catch basin silt sacks are proposed to be used during construction. A Soil Erosion and Sediment Control Plan (SESCP), has been prepared in accordance with the Manual and has been submitted separately. A long-term Operation and Maintenance Plan (O&M) has been prepared in accordance with the Manual and has been submitted separately.

5.9 Standard 8: Land Uses with Higher Potential Pollutant Loads

Stormwater discharges from land uses with higher potential pollutant loads (LUHPPLs) require the use of specific source control and pollution prevention measures and the specific stormwater BMPs approved for such use.

A stormwater LUHPPL is defined by the following land uses and activities:

1. Areas within an industrial site (as defined in RIPDES Rule 31(b)(15)) that are the location of activities subject to the RIPDES Multi-Sector General Permit (except

where a No Exposure Certification for Exclusion from RIPDES Stormwater Permitting has been executed);
2. Auto fueling facilities (i.e., gas stations);
3. Exterior vehicle service, maintenance and equipment cleaning areas;
4. Road salt storage and loading areas (if exposed to rainfall); and
5. Outdoor storage and loading/unloading of hazardous substances.

Standard Not Applicable

The subject site does not meet the definition of a LUHPPL, as it does not maintain or require a RIPDES Multi-Sector General Permit.

5.10 Standard 9: Illicit Discharges

All illicit discharges to stormwater management systems are prohibited, including discharges from OWTS, and sub-drains and French drains near OWTSs that do not meet the State's OWTS Rules.

Standard Met

There are no known existing illicit discharges at the site nor are any proposed as part of this project.

5.11 Standard 10: Construction and Erosion Sedimentation Control

Erosion and sedimentation control (ESC) practices must be utilized during the construction phase as well as during any land disturbing activities

Standard Met

Erosion control practices have been employed to avoid and minimize impacts to abutting properties. Detailed notes have been included in the plans to ensure effective implementation of erosion and sedimentation controls, which include a straw wattle/silt fence around the perimeter of the site, Siltsack sediment traps within all catch basins within and adjacent to the site, and a crushed stone construction access at the entrances to the site. The soil erosion and sedimentation control measures will be installed prior to the initiation of construction activities and maintained throughout construction. Once established, these measures will be monitored daily until construction activities are complete. The straw wattle/silt fence line will serve as the strict limits of disturbance for the project. No alterations, including vegetative clearing or surface disturbance, will occur beyond this line. The limits of clearing, grading, and disturbance will be kept to a minimum within the

proposed area of construction. All areas outside of these limits, as depicted on the project site plans, will remain undisturbed, in a completely natural condition.

5.12 Standard 11: Stormwater Management System Operation and Maintenance

The stormwater management system, including all structural stormwater controls and conveyances, must have an Operation and Maintenance Plan to ensure that it continues to function as designed.

Standard Met

A long-term Stormwater Operation and Maintenance Plan has been prepared for the development in accordance with the Manual and is provided under separate cover.

6 DRAINAGE ANALYSIS

6.1 Methodology

The comparative pre- versus post-development hydrologic analysis was performed using the Soil Conservation Service, Technical Release 20 and 55 (TR-20 and TR-55) methodology. The 1-, 2-, 10-, 25-, and 100-year storm events were modeled for a 24-hour, Type III storm utilizing HydroCAD version 10.00. HydroCAD modeling reports for the existing and proposed conditions can be found in Appendices F and H, respectively.

6.2 Existing Conditions

The existing site consists of two (2) watersheds discharging to two (2) off-site design points further described as the existing drainage network (DP1) and the existing drainage inlets within Wellington Avenue (DP2). In general, all stormwater runoff from the eastern portion of the site sheet flows to existing drywells and catch basins within the site, which convey stormwater in a southerly direction to an existing drainage network (DP1). This drainage line is routed through the property to the south, tying into an existing 4’x4’ box culvert, owned and maintained by the City of Cranston. Stormwater from the western portion of the site sheet flows to a series of catch basins located further down Wellington Avenue (DP2). These catch basins are also tied into the existing 4’x4’ box culvert, owned and maintained by the City of Cranston. This box culvert continues to the east, through the adjacent Johnston Controls property, under Elmwood Avenue, ultimately discharging to Fenner Pond. An Existing Conditions Watershed Map is included in Appendix C.

Design Point 1 – Existing Drainage Network

Watershed 1: Consists of 174,413 sq. ft. of paved parking areas and roofs associated with the eastern portion of the parcel. This watershed area consists mostly of impervious area and has a minimum T_C of 6.0 minutes and a composite CN Runoff Number of 93. Stormwater runoff from this area is collected via a closed drainage system that conveys stormwater runoff in a southerly direction, routed to an existing drainage network to the property to the south, Design Point 1.

Design Point 2 – Existing Drainage Inlets within Wellington Avenue

Watershed 2: Consists of 62,600 sq. ft. of the western portion of the project site. This watershed area consists mostly of impervious areas (pavement and rooftop areas) and has a T_C of 6.0 minutes and a composite CN Runoff Number of 98. Runoff from this area sheet flows towards the existing drainage inlets within Wellington Avenue (Design Point 2).

6.3 Proposed Conditions

In general, the proposed drainage patterns mimic existing conditions, discharging to the same design points as under existing conditions. Water quality is achieved by means of infiltration practices. Stormwater runoff from the eastern portion of the project area is conveyed through proposed drainage infrastructure prior to discharging to the existing drainage network, while the remainder of the western portion of the site will continue to sheet flow to the existing catch basins within Wellington Avenue. These conditions are shown in detail on the Proposed Conditions Watershed Map included in Appendix E.

Design Point 1 – Existing Drainage Network

Under proposed conditions, Watershed 1 is subdivided into two (2) subwatersheds.

Subwatershed 1A: Subwatershed 1A consists of 11,579 sq. ft. of mostly pervious areas. This subwatershed area has a minimum T_C of 6.0 minutes and a composite CN Runoff Number of 79. Stormwater runoff from the parking area sheet flows to a crushed stone diaphragm for pre-treatment and then Bioretention Basin #1 for water quality and groundwater recharge. Excess treated stormwater runoff from this area is collected via an outlet control structure that ties into the existing drainage network that conveys stormwater to the property to the south, Design Point 1.

Subwatershed 1B: Consists of 162,834 sq. ft. of mostly pavement areas and roof areas associated with the project site. This subwatershed a T_C of 6.0 minutes and a composite CN Runoff Number of 90. Stormwater runoff from this area sheet flows to Sediment Forebay #1 for pre-treatment and Sand Filter Basin #2 for water quality treatment. Excess treated stormwater runoff from this area is collected via an underdrain system and outlet control structure that ties into the existing drainage network that conveys stormwater to the property to the south, Design Point 1.

Design Point 2 – Existing Drainage Inlets within Wellington Avenue

Subwatershed 2: Consists of 62,600 sq. ft. of the western portion of the project site. This watershed area remains mostly unchanged; however, elimination of some smaller rooftop areas and paved areas are being converted to grassed/landscaped area are proposed. As such, this watershed area consists mostly of impervious areas (pavement and rooftop areas) and therefore has been assigned a T_C of 6.0 minutes and a composite CN Runoff Number of 94. Runoff from this area sheet flows towards the existing drainage inlets within Wellington Avenue (Design Point 2).

6.4 Results

A runoff analysis of the pre- and post-construction conditions was completed using the TR-20 methodology and is summarized in Table 3 below. Supporting calculations for the pre- and post-construction conditions are included in Appendices F and H respectively.

Table 6.1: Watershed Data

	Area (SF)	CN	Tc (min.)
Exist. Watershed 1	174,413	93	6.0
Exist. Watershed 2	62,600	98	6.0
Existing Totals	**237,013**	**94**	--
Prop. Subwatershed 1A	11,579	79	6.0
Prop. Subwatershed 1B	162,834	90	6.0
Watershed 2	62,600	94	6.0
Proposed Totals	**237,013**	**91**	**--**
Delta (Δ)	**0**	**-3**	**--**

Note: Minimum Tc = 6 minutes; Average CN is a weighted average.

As shown in Table 6.1 above, the overall watershed area remains unchanged when comparing existing to proposed conditions. However, due to the decrease in impervious

areas associated with the proposed development, the CN value has been decreased by 3 when comparing existing to proposed conditions.

Table 6.2.1: Peak Discharge (cfs) to Design Point 1

	WQ	1-YR	10-YR	100-YR
Existing Condition	3.62	8.84	17.70	32.69
Proposed Condition	0.12	4.08	15.48	30.13
Delta (Δ)	***-3.50***	***-4.76***	***-2.22***	***-2.56***

Table 6.2.2: Peak Discharge (cfs) to Design Point 2

	WQ	1-YR	10-YR	100-YR
Existing Condition	1.52	3.66	6.73	11.99
Proposed Condition	1.35	3.29	6.45	11.81
Delta (Δ)	***-0.17***	***-0.37***	***-0.28***	***-0.18***

As shown in Tables 6.2.1 and 6.2.2 above, the peak stormwater runoff rates realized at Design Point 1 (Existing Drainage Network) and Design Point 2 (existing catch basins within Wellington Avenue) have decreased for all design storm events. This will result in significantly less stress on the public drainage system, specifically the existing 4'x4' box culvert.

Table 6.2.3: Total Runoff Volume (cf) to Design Point 1

	WQ	1-YR	10-YR	100-YR
Existing Condition	8,883	28,609	59,587	114,207
Proposed Condition	6,667	17,050	45,447	98,348
Delta (Δ)	***-2,216***	***-11,559***	***-14,140***	***-15,859***

Table 6.2.4: Total Runoff Volume (cf) to Design Point 2

	WQ	1-YR	10-YR	100-YR
Existing Condition	5,142	12,883	24,327	44,132
Proposed Condition	3,507	10,751	21,959	41,620
Delta (Δ)	***-1,635***	***-2,132***	***-2,368***	***-2,512***

As shown in Tables 6.2.3 and 6.2.4 above, the total stormwater runoff volumes realized at Design Point 1 (Existing Drainage Network) and Design Point 2 (existing catch basins within Wellington Avenue) have decreased for all design storm events. This will result in

significantly less stress on the public drainage system, specifically the existing 4'x4' box culvert.

7 CONCLUSIONS

As shown in Sections 4, 5 and 6 above, the proposed improvements have been designed to minimize impacts of the proposed site development by reducing peak stormwater runoff rates for the 1, 10, and 100-year design storm vents while treating for water quality by the installation of BMP's including a bioretention basin and a lined and under-drained sand filter basin.

Due to the addition of the bioretention basin and the lined and under-drained sand filter basin, which infiltrate (bioretention only) and detain stormwater, both Design Points experiences reduction in peak stormwater runoff rates and provides water quality for the runoff leaving the watershed. The proposed stormwater management system has been designed to be in compliance with the rules and regulations stipulated in the Stormwater Rules. The stormwater management system as designed will not have any negative impacts to the existing drainage system within the subject property and within Wellington Avenue. In addition, as shown within this report, the WQv design storm is completely infiltrated on-site thereby improving current water quality conditions. Lastly, the proposed Stormwater Management Plan considers the existing TMDL for Fenner Pond by improving the overall water quality through infiltration practices.

Appendix A

Soil Evaluation Test Pit Location Plan and Soil Evaluation Test Pit Logs

prepared by Joe Casali Engineering, dated August 2024

TEST HOLE LOCATION: See Test Hole Location Plan

GROUND SURFACE EL. / DATUM: 836.96' / NAVD88

EXCAVATOR TYPE: Mini Excavator

OPERATOR: Jim - Dubon Masonry

DATE START/FINISH: July 5, 2024

WEATHER: Sunny, 90 Deg. F

EXCAVATOR REACH: Approx. 12-ft

JCE REPRESENTATIVE: D. DeCesaris, PE (RI 10162)

TH-1

DEPTH (FT)	SAMPLE TYPE/NO.	LAYER	REMARKS/ NOTES	SOIL / ROCK DESCRIPTION	EST. HYDRAULIC CONDUCTIVITY
1		FILL	Pockets of iron oxide staining/mottling observed at 54-inches.	(0-2") ASPHALT (2-12") SILTY SAND (SM); Brown, dry, 60% fine to coarse sand, 35% nonplastic fines, 5% fine to coarse gravel. (12-14") ASPHALT (14-24") SILTY SAND (SM); Light brown, dry, 65% fine to coarse sand, 20% fine to coarse gravel, 15% nonplastic fines. *USDA Class: Loamy Sand.*	N/A
2		GLACIAL DEPOSITS		(24-60") SILTY SAND (SM); Brown, dry, 70% fine to coarse sand, 20% nonplastic fines, 10% fine to coarse gravel. *USDA Class: Loamy Sand.*	HSG B 2.41 in/hr
5				(60-108") POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); Light brown, dry to moist, 75% fine to coarse sand, 15% fine to coarse gravel, 10% nonplastic fines. *USDA Class: Loamy Sand.*	HSG B 8.27 in/hr
9				Bottom of test hole at 108-inches; excavation backfilled with previously excavated material upon completion.	
10					
11					
12					
13					

NOTES:

SHGWT: 54-inches

IMPERVIOUS / LIMITING LAYER: Not encountered

PROJECT NAME: 530 Wellington Ave, Cranston

PROJECT NUMBER: 24-25

JCE
JOE CASALI ENGINEERING, INC.
CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WETLANDS · ISDS · TRAFFIC · FLOODPLAIN
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM

TEST HOLE LOCATION: See Test Hole Location Plan

GROUND SURFACE EL. / DATUM: 836.96' / NAVD88

EXCAVATOR TYPE: Mini Excavator

OPERATOR: Jim - Dubon Masonry

DATE START/FINISH: July 5, 2024

WEATHER: Sunny, 90 Deg. F

EXCAVATOR REACH: Approx. 12-ft

JCE REPRESENTATIVE: D. DeCesaris, PE (RI 10162)

TH-2

DEPTH (FT)	SAMPLE TYPE/NO.	LAYER	REMARKS/ NOTES	SOIL / ROCK DESCRIPTION	EST. HYDRAULIC CONDUCTIVITY
1		FILL	Pockets of iron oxide staining/mottling observed at 48-inches.	(0-2") ASPHALT (2-32") SILTY SAND (SM); Brown, dry, 65% fine to coarse sand, 35% nonplastic fines, 5% fine to coarse gravel.	N/A
2					
3		GLACIAL DEPOSITS		(32-60") SILTY SAND (SM); Brown, dry, 70% fine to coarse sand, 20% nonplastic fines, 10% fine to coarse gravel. *USDA Class: Loamy Sand.*	HSG B 2.41 in/hr
4					
5				(60-108") POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); Light brown, dry to moist, 75% fine to coarse sand, 15% fine to coarse gravel, 10% nonplastic fines. *USDA Class: Loamy Sand.*	
6					
7					HSG B 8.27 in/hr
8					
9				Bottom of test hole at 108-inches; excavation backfilled with previously excavated material upon completion.	
10					
11					
12					
13					

NOTES:

SHGWT: 48-inches

IMPERVIOUS / LIMITING LAYER: Not Encountered

PROJECT NAME: 530 Wellington Ave, Cranston

PROJECT NUMBER: 24-25

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(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM

TEST HOLE LOCATION: See Test Hole Location Plan

GROUND SURFACE EL. / DATUM: 836.96' / NAVD88

EXCAVATOR TYPE: Mini Excavator

OPERATOR: Jim - Dubon Masonry

DATE START/FINISH: July 5, 2024

WEATHER: Sunny, 90 Deg. F

EXCAVATOR REACH: Approx. 12-ft

JCE REPRESENTATIVE: D. DeCesaris, PE (RI 10162)

TH-3

DEPTH (FT)	SAMPLE TYPE/NO.	LAYER	REMARKS/ NOTES	SOIL / ROCK DESCRIPTION	EST. HYDRAULIC CONDUCTIVITY
1		FILL		(0-16") ASPHALT MILLINGS	
2				(16-44") SILTY SAND (SM); Light brown, dry, 70% fine to coarse sand, 15% nonplastic fines, 15% fine to coarse gravel.	N/A
3					
4		GLACIAL DEPOSITS	Pockets of iron oxide staining/mottling observed at 44-inches.	(44-120") SILTY SAND (SM); Dark brown, dry to wet, 70% fine to coarse sand, 25% nonplastic fines, 5% fine to coarse gravel. *USDA Class: Loamy Sand.*	
5					
6			Pockets silt observed within excavation from 44- to 120 inches.		HSG B 2.41 in/hr
7					
8			Groundwater penetration observed at 118-inches.		
9				Bottom of test hole at 108-inches; excavation backfilled with previously excavated material upon completion.	
10					
11					
12					
13					

NOTES:

SHGWT: 44-inches

IMPERVIOUS / LIMITING LAYER: Not encountered

PROJECT NAME: 530 Wellington Ave, Cranston

PROJECT NUMBER: 24-25

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SOIL BORING/MONITORING WELL LOG: SE-101(MW)

PROJECT NUMBER: S4504

DRILLING DATE: 5/4/23

LOGGED BY: Matthew Gallup

DRILLED BY: SAGE Envirotech Drilling Services, Inc.

WEATHER CONDITIONS: Cloudy, 50s

SCREENING EQUIPMENT: PID

DRILLING RIG:3100 GT Truck Rig

DRILL METHOD: Direct Push

SAMPLE METHOD: 5' Macrocore

BORING TOTAL DEPTH: 15'

BORING REFUSAL: No

BORING/MW DIAMETER: 1"

LENGTH OF RISER: 5

LENGTH OF SCREEN: 10

DEPTH (FEET BSG)	DRIVE INTERVAL (FEET BSG)	INCHES RECOVERY	SAMPLE INTERVAL (FEET BSG)	PID (PPMV)	MATERIAL DESCRIPTION (MOISTURE CONTENT, COLOR, DENSITY, CLASSIFICATION, NOTES)	LITHOLOGY GRAPHIC LOG	DTW (FEET BSG)	WELL CONSTRUCTION (VISUAL)	WELL CONSTRUCTION (DEPTH INTERVALS (BSG))
0	0-5	36	0-3	0.1	(0'-3') Light brown, dry, loose, poorly graded, gravelly sands, little or no fines. Top 1' consisted of crushed asphalt.				Filter Pack
3			NR	NR	(3'-5') No recovery.				Bentonite
5	5-10	36	5-8	0.3	(5'-8') Light brown, dry, loose, poorly graded, gravelly sands, little or no fines.		8' ▼		
8			NR	NR	(8'-10') No recovery.				Filter Pack
10	10-15	60	10-15	2.0	(10'-15') Tan, dense, wet, poorly graded, gravelly sands, little or no fines. End of boring and well installed 15' bsg.				
15									

COMMENTS:
THIS BORE LOG IS INTENDED FOR ENVIRONMENTAL NOT GEOTECHNICAL PURPOSES.
NS: Not Sampled; NR: No Recovery; BSG: Below Surface Grade

SOIL BORING/MONITORING WELL LOG: SE-221(MW)

SAGE ENVIRONMENTAL

PROJECT NUMBER: S4504
DRILLING DATE: 03/13/2024
LOGGED BY: Matthew Gallup
DRILLED BY: SAGE EnviroTech Drilling Services, Inc.
WEATHER CONDITIONS: 50F Sunny
SCREENING EQUIPMENT: PID
DRILLING RIG: 7822 DT Track Rig

DRILL METHOD: Direct Push
SAMPLE METHOD: 5' Macrocore
BORING TOTAL DEPTH: 15
BORING REFUSAL: No
BORING/MW DIAMETER: 2"
LENGTH OF RISER: 5'
LENGTH OF SCREEN: 10'

DEPTH (FEET BSG)	DRIVE INTERVAL (FEET BSG)	INCHES RECOVERY	SAMPLE INTERVAL (FEET BSG)	PID (PPMV)	MATERIAL DESCRIPTION (MOISTURE CONTENT, COLOR, DENSITY, CLASSIFICATION, NOTES)	LITHOLOGY GRAPHIC LOG	DTW (FEET BSG)	WELL CONSTRUCTION (VISUAL)	WELL CONSTRUCTION (DEPTH INTERVALS (BSG))
0	0-2	24	0-2	0.2	(0'-2') Brown, dry, loose, well graded, gravelly sands, little or no fines, with urban fill material consisting of asphalt.				Filter Pack
2	2-5	24	2-4	0.2	(2'-4') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				Bentonite
4			NR	NR	(4'-5') No recovery.				
5	5-10	36	NS	NS	(5'-6') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				
6			6-8	0.6	(6'-8') Tan/gray, wet, dense, sand-silt mixtures.		6 ▼		
8			NR	NR	(8'-10') No recovery.				Filter Pack
10	10-15	48	10-13	1.3	(10'-13') Gray, wet, dense, organic silts and organic silty clays of low plasticity.				
13			13-14	0.7	(13'-14') Gray, wet, dense, organic silts and organic silty clays of low plasticity.				
14			NR	NR	(14'-15') No recovery. End of boring at 15' BSG.				
15									

COMMENTS:
THIS BORE LOG IS INTENDED FOR ENVIRONMENTAL NOT GEOTECHNICAL PURPOSES.
NS: Not Sampled; NR: No Recovery; BSG: Below Surface Grade

SOIL BORING/MONITORING WELL LOG: SE-222(MW)

PROJECT NUMBER: S4504
DRILLING DATE: 03/13/2024
LOGGED BY: Matthew Gallup
DRILLED BY: SAGE EnviroTech Drilling Services, Inc.
WEATHER CONDITIONS: 50F Sunny
SCREENING EQUIPMENT: PID
DRILLING RIG: 7822 DT Track Rig

DRILL METHOD: Direct Push
SAMPLE METHOD: 5' Macrocore
BORING TOTAL DEPTH: 15
BORING REFUSAL: No
BORING/MW DIAMETER: 2"
LENGTH OF RISER: 5'
LENGTH OF SCREEN: 10'

DEPTH (FEET BSG)	DRIVE INTERVAL (FEET BSG)	INCHES RECOVERY	SAMPLE INTERVAL (FEET BSG)	PID (PPMV)	MATERIAL DESCRIPTION (MOISTURE CONTENT, COLOR, DENSITY, CLASSIFICATION, NOTES)	LITHOLOGY GRAPHIC LOG	DTW (FEET BSG)	WELL CONSTRUCTION (VISUAL)	WELL CONSTRUCTION (DEPTH INTERVALS (BSG))
0	0-2	24	0-2	0.2	(0'-2') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				Filter Pack
2	2-5	24	2-4	0.2	(2'-4') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				Bentonite
4			NR	NR	(4'-5') No recovery.				
5	5-10	36	NS	NS	(5'-6') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.		6 ▼		
6			6-8	0.7	(6'-8') Gray, wet, loose, sand-silt mixtures.				
8			NR	NR	(8'-10') No recovery.				Filter Pack
10	10-15	48	10-12	1.4	(10'-12') Gray, wet, loose, sand-silt mixtures.				
12			12-14	3.6	(12'-14') Gray, wet, dense, organic silts and organic silty clays of low plasticity.				
14			NR	NR	(14'-15') No recovery. End of boring at 15' BSG.				
15									

COMMENTS:
THIS BORE LOG IS INTENDED FOR ENVIRONMENTAL NOT GEOTECHNICAL PURPOSES.
NS: Not Sampled; NR: No Recovery; BSG: Below Surface Grade

SOIL BORING/MONITORING WELL LOG: SE-223(MW)

PROJECT NUMBER: S4504
DRILLING DATE: 03/13/2024
LOGGED BY: Matthew Gallup
DRILLED BY: SAGE EnviroTech Drilling Services, Inc.
WEATHER CONDITIONS: 50F Sunny
SCREENING EQUIPMENT: PID
DRILLING RIG: 7822 DT Track Rig

DRILL METHOD: Direct Push
SAMPLE METHOD: 5' Macrocore
BORING TOTAL DEPTH: 20
BORING REFUSAL: No
BORING/MW DIAMETER: 2"
LENGTH OF RISER: 5'
LENGTH OF SCREEN: 10'

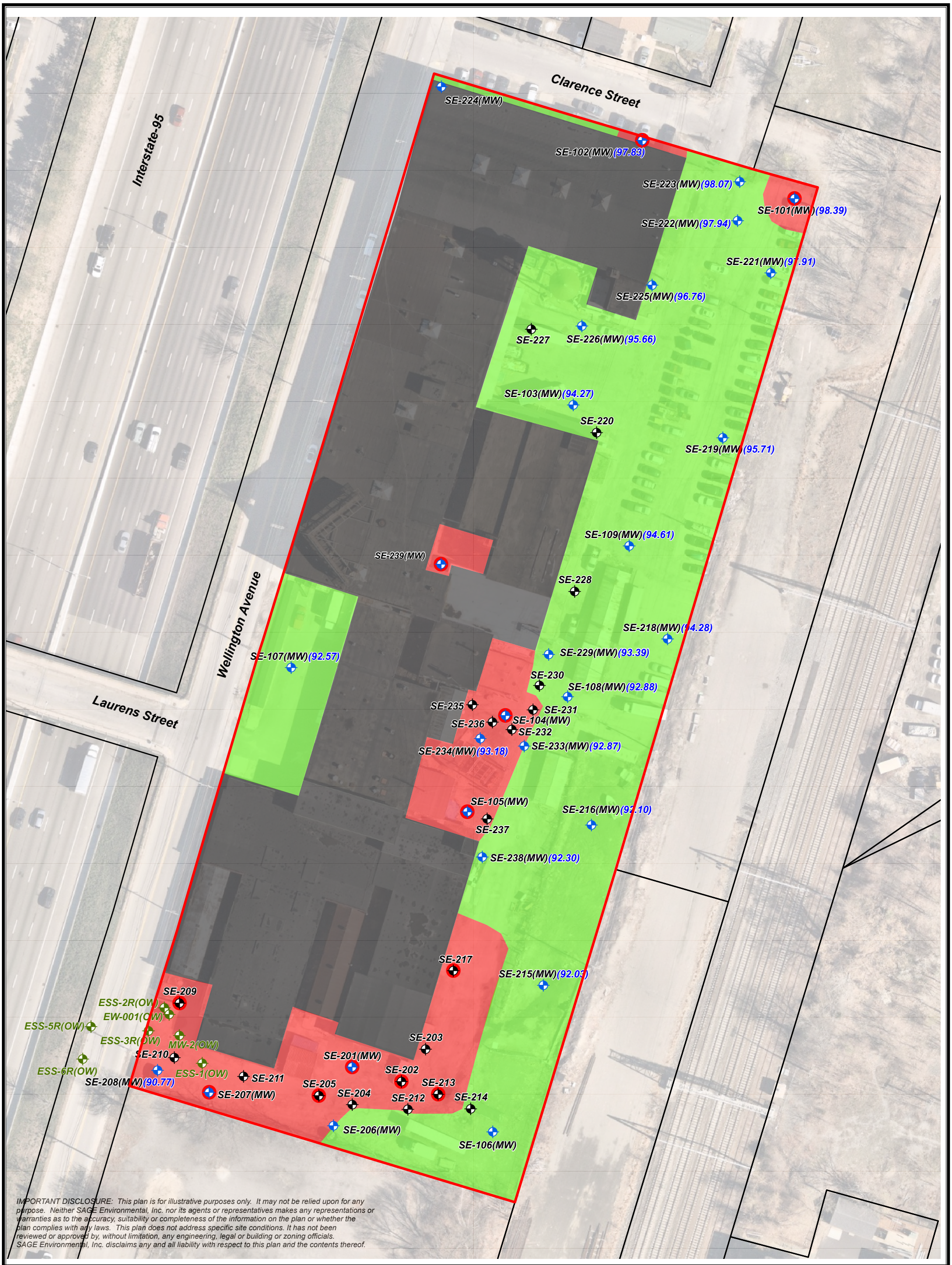
DEPTH (FEET BSG)	DRIVE INTERVAL (FEET BSG)	INCHES RECOVERY	SAMPLE INTERVAL (FEET BSG)	PID (PPMV)	MATERIAL DESCRIPTION (MOISTURE CONTENT, COLOR, DENSITY, CLASSIFICATION, NOTES)	LITHOLOGY GRAPHIC LOG	DTW (FEET BSG)	WELL CONSTRUCTION (VISUAL)	WELL CONSTRUCTION (DEPTH INTERVALS (BSG))
0	0-2	24	0-2	0	(0'-2') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				Filter Pack
2	2-5	24	2-4	0	(2'-4') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				Bentonite
4			NR	NR	(4'-5') No recovery.				
5	5-10	24	5-6	0	(5'-6') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.		6 ▼		
6			6-7	0.8	(6'-7') Tan, wet, loose, sand-silt mixtures.				
7			NR	NR	(7'-10') No recovery.				
10	10-15	48	10-12	2.1	(10'-12') Tan, wet, loose, sand-silt mixtures.				Filter Pack
12			12-14	1.6	(12'-14') Gray, wet, dense, organic silts and organic silty clays of low plasticity.				
14			NR	NR	(14'-15') No recovery.				
15	15-17	36	15-16.5	NS	(15'-16.5') Liner jammed in soil barrel could not sample.				
16			16.5-17	2.6	(16.5'-17') Gray, wet, dense, organic silts and organic silty clays of low plasticity.				
17	17-20	0	NR	NR	(17'-20') Not sampled. Casing drove to 20' to set well. End of boring at 20' BSG.				
20									

COMMENTS:
THIS BORE LOG IS INTENDED FOR ENVIRONMENTAL NOT GEOTECHNICAL PURPOSES.
NS: Not Sampled; NR: No Recovery; BSG: Below Surface Grade

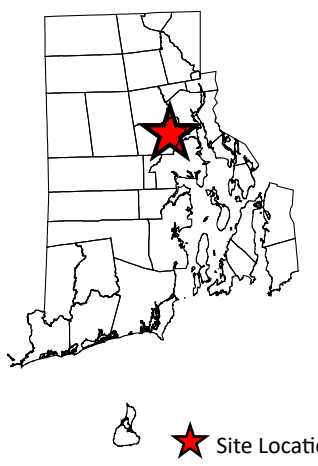
Appendix B

Red/Yellow/Green Map, 530 Wellington Ave., Cranston, Rhode Island

prepared by Sage Environmental, dated November 2024



IMPORTANT DISCLOSURE: This plan is for illustrative purposes only. It may not be relied upon for any purpose. Neither SAGE Environmental, Inc. nor its agents or representatives makes any representations or warranties as to the accuracy, suitability or completeness of the information on the plan or whether the plan complies with any laws. This plan does not address specific site conditions. It has not been reviewed or approved by, without limitation, any engineering, legal or building or zoning officials. SAGE Environmental, Inc. disclaims any and all liability with respect to this plan and the contents thereof.



Red/Yellow/Green Map

530 Wellington Avenue
Cranston, Rhode Island

Figure

Date: 11/21/2024

Job #: S4504

Created By: ALM

Legend

- Approximate Site Boundary
- Building
- Green: All RISDISM BMPs Allowed.
- Red: Hard Cap - No Water on the Soil - Lined BMPs Only.
- Approximate Location of SAGE Soil Boring
- Approximate Location of SAGE Monitoring Well (Groundwater Elevation (Feet))
- Approximate Location of Existing Monitoring Well
- Sample Location with Applicable RIDEM Method 1 GB-GWO and/or GB-LC Exceedance(s)

Data Provided by RIGIS
Orthoimagery provided by nearmap.com

SAGE ENVIRONMENTAL
A Terracon Company

Appendix C

Existing Condition Watershed Map

LEGEND

- WATERSHED BOUNDARY LINE
- TIME OF CONCENTRATION LINE
- UNDERGROUND TIME OF CONCENTRATION LINE

JOHNSTON CONTROLS / TYCO FIRE PROTECTION PRODUCTS

EXISTING 4'x4' BOX CULVERT CONTINUES EAST THROUGH JOHNSTON CONTROLS PROPERTY AND ELMWOOD AVE., ULTIMATELY DISCHARGING TO FENNER POND

AMTRAK RAIL LINES

TIME OF CONCENTRATION LINE (TYP.)

EXISTING 21" VCP DISCHARGING THROUGH ADJACENT PROPERTY TO EXISTING 4'x4' CITY OF CRANSTON BOX CULVERT

DP1

WATERSHED 1
AREA = 174,413 SF
TC = 6.0 MIN.
CN = 93

EXISTING DRAINAGE NETWORK WITHIN SITE

PROPERTY LINE (TYP.)

OVERALL WATERSHED AREA: 237,013 SF

EXISTING 4'x4' BOX CULVERT; OWNED AND MAINTAINED BY THE CITY OF CRANSTON

JIRA REALTY INC
530-532 WELLINGTON AVE

CLARENCE STREET

WELLINGTON AVE

DP2

WATERSHED 2
AREA = 62,600 SF
TC = 6.0 MIN.
CN = 98

EXISTING CITY OF CRANSTON DRAINAGE INLETS WITHIN WELLINGTON AVENUE

ROUTE 95 NORTHBOUND

ROUTE 95 SOUTHBOUND

LAURENS STREET

SCALE (FEET)
0 50 100 200 400
1 INCH =100 FT

JCE
JOE CASALI ENGINEERING, INC.
CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WATER SUPPLY · WASTEWATER
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM

PROPOSED SELF-STORAGE BUILDING
530-532 WELLINGTON STREET
CRANSTON, RHODE ISLAND
AP 3, LOT 107

REVISIONS:

NO.	DATE.	DESCRIPTION
1	12/2024	RIDEM RTC

DESIGNED BY:	SD
DRAWN BY:	SD
CHECKED BY:	JAC
DATE:	SEPT. 2024
PROJECT NO:	24-25

STORMWATER REPORT

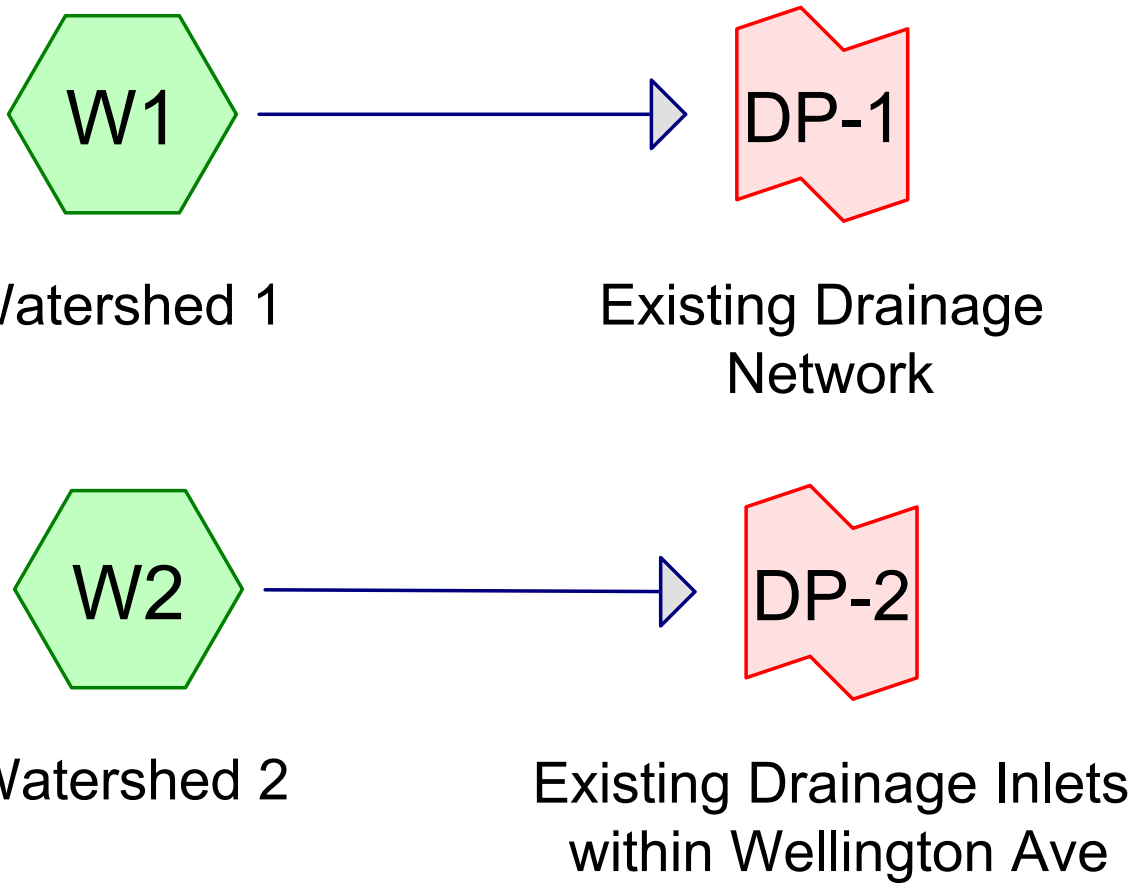
EXISTING CONDITIONS WATERSHED MAP

SHEET 1 OF 1

Q:\24-25 Mike Jobb\Drainage\Watershed Maps\Wellington Ave Self-Storage [Watershed Maps] R1.dwg Dec. 05, 2024 9:54am

Appendix D

Existing Condition HydroCAD Calculations



Subcat Reach Pond Link

Routing Diagram for Wellington Ave - Existing
Prepared by Joe Casali Engineering, Inc, Printed 9/3/2024

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
5,140	61	>75% Grass cover, Good, HSG B (W1, W2)
10,752	48	Brush, Good, HSG B (W1)
11,984	82	Dirt , HSG B (W1)
87,754	98	Paved parking, HSG B (W1, W2)
121,383	98	Roofs, HSG B (W1, W2)
237,013	**94**	**TOTAL AREA**

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1: Watershed 1 Runoff Area=174,413 sf 84.38% Impervious Runoff Depth=1.97"
Flow Length=817' Tc=6.0 min CN=93 Runoff=8.84 cfs 28,609 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 98.98% Impervious Runoff Depth=2.47"
Tc=6.0 min CN=98 Runoff=3.66 cfs 12,883 cf

Link DP-1: Existing Drainage Network Inflow=8.84 cfs 28,609 cf
Primary=8.84 cfs 28,609 cf

Link DP-2: Existing Drainage Inlets within Wellington Ave Inflow=3.66 cfs 12,883 cf
Primary=3.66 cfs 12,883 cf

Total Runoff Area = 237,013 sf Runoff Volume = 41,492 cf Average Runoff Depth = 2.10"
11.76% Pervious = 27,876 sf 88.24% Impervious = 209,137 sf

Summary for Subcatchment W1: Watershed 1

Runoff = 8.84 cfs @ 12.09 hrs, Volume= 28,609 cf, Depth= 1.97"
Routed to Link DP-1 : Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
74,440	98	Roofs, HSG B
72,735	98	Paved parking, HSG B
10,752	48	Brush, Good, HSG B
11,984	82	Dirt , HSG B
4,502	61	>75% Grass cover, Good, HSG B
174,413	93	Weighted Average
27,238	65	15.62% Pervious Area
147,175	98	84.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
2.1	296	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
1.7	466	0.0100	4.54	3.56	**Pipe Channel, Pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, bends & connections
4.3	817	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 3.66 cfs @ 12.09 hrs, Volume= 12,883 cf, Depth= 2.47"
Routed to Link DP-2 : Existing Drainage Inlets within Wellington Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
46,943	98	Roofs, HSG B
15,019	98	Paved parking, HSG B
638	61	>75% Grass cover, Good, HSG B
62,600	98	Weighted Average
638	61	1.02% Pervious Area
61,962	98	98.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Link DP-1: Existing Drainage Network

Inflow Area = 174,413 sf, 84.38% Impervious, Inflow Depth = 1.97" for 1-Year event
Inflow = 8.84 cfs @ 12.09 hrs, Volume= 28,609 cf
Primary = 8.84 cfs @ 12.09 hrs, Volume= 28,609 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Existing Drainage Inlets within Wellington Ave

Inflow Area = 62,600 sf, 98.98% Impervious, Inflow Depth = 2.47" for 1-Year event
Inflow = 3.66 cfs @ 12.09 hrs, Volume= 12,883 cf
Primary = 3.66 cfs @ 12.09 hrs, Volume= 12,883 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1: Watershed 1 Runoff Area=174,413 sf 84.38% Impervious Runoff Depth=4.10"
Flow Length=817' Tc=6.0 min CN=93 Runoff=17.70 cfs 59,587 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 98.98% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=6.73 cfs 24,327 cf

Link DP-1: Existing Drainage Network Inflow=17.70 cfs 59,587 cf
Primary=17.70 cfs 59,587 cf

Link DP-2: Existing Drainage Inlets within Wellington Ave Inflow=6.73 cfs 24,327 cf
Primary=6.73 cfs 24,327 cf

Total Runoff Area = 237,013 sf Runoff Volume = 83,914 cf Average Runoff Depth = 4.25"
11.76% Pervious = 27,876 sf 88.24% Impervious = 209,137 sf

Summary for Subcatchment W1: Watershed 1

Runoff = 17.70 cfs @ 12.09 hrs, Volume= 59,587 cf, Depth= 4.10"
Routed to Link DP-1 : Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
74,440	98	Roofs, HSG B
72,735	98	Paved parking, HSG B
10,752	48	Brush, Good, HSG B
11,984	82	Dirt , HSG B
4,502	61	>75% Grass cover, Good, HSG B
174,413	93	Weighted Average
27,238	65	15.62% Pervious Area
147,175	98	84.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
2.1	296	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
1.7	466	0.0100	4.54	3.56	**Pipe Channel, Pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, bends & connections
4.3	817	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 6.73 cfs @ 12.09 hrs, Volume= 24,327 cf, Depth= 4.66"
Routed to Link DP-2 : Existing Drainage Inlets within Wellington Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
46,943	98	Roofs, HSG B
15,019	98	Paved parking, HSG B
638	61	>75% Grass cover, Good, HSG B
62,600	98	Weighted Average
638	61	1.02% Pervious Area
61,962	98	98.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Link DP-1: Existing Drainage Network

Inflow Area = 174,413 sf, 84.38% Impervious, Inflow Depth = 4.10" for 10-Year event
Inflow = 17.70 cfs @ 12.09 hrs, Volume= 59,587 cf
Primary = 17.70 cfs @ 12.09 hrs, Volume= 59,587 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Existing Drainage Inlets within Wellington Ave

Inflow Area = 62,600 sf, 98.98% Impervious, Inflow Depth = 4.66" for 10-Year event
Inflow = 6.73 cfs @ 12.09 hrs, Volume= 24,327 cf
Primary = 6.73 cfs @ 12.09 hrs, Volume= 24,327 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1: Watershed 1 Runoff Area=174,413 sf 84.38% Impervious Runoff Depth=7.86"
Flow Length=817' Tc=6.0 min CN=93 Runoff=32.69 cfs 114,207 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 98.98% Impervious Runoff Depth=8.46"
Tc=6.0 min CN=98 Runoff=11.99 cfs 44,132 cf

Link DP-1: Existing Drainage Network Inflow=32.69 cfs 114,207 cf
Primary=32.69 cfs 114,207 cf

Link DP-2: Existing Drainage Inlets within Wellington Ave Inflow=11.99 cfs 44,132 cf
Primary=11.99 cfs 44,132 cf

Total Runoff Area = 237,013 sf Runoff Volume = 158,339 cf Average Runoff Depth = 8.02"
11.76% Pervious = 27,876 sf 88.24% Impervious = 209,137 sf

Summary for Subcatchment W1: Watershed 1

Runoff = 32.69 cfs @ 12.09 hrs, Volume= 114,207 cf, Depth= 7.86"
Routed to Link DP-1 : Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
74,440	98	Roofs, HSG B
72,735	98	Paved parking, HSG B
10,752	48	Brush, Good, HSG B
11,984	82	Dirt , HSG B
4,502	61	>75% Grass cover, Good, HSG B
174,413	93	Weighted Average
27,238	65	15.62% Pervious Area
147,175	98	84.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
2.1	296	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
1.7	466	0.0100	4.54	3.56	**Pipe Channel, Pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, bends & connections
4.3	817	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 11.99 cfs @ 12.09 hrs, Volume= 44,132 cf, Depth= 8.46"
Routed to Link DP-2 : Existing Drainage Inlets within Wellington Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
46,943	98	Roofs, HSG B
15,019	98	Paved parking, HSG B
638	61	>75% Grass cover, Good, HSG B
62,600	98	Weighted Average
638	61	1.02% Pervious Area
61,962	98	98.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Link DP-1: Existing Drainage Network

Inflow Area = 174,413 sf, 84.38% Impervious, Inflow Depth = 7.86" for 100-Year event
Inflow = 32.69 cfs @ 12.09 hrs, Volume= 114,207 cf
Primary = 32.69 cfs @ 12.09 hrs, Volume= 114,207 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Existing Drainage Inlets within Wellington Ave

Inflow Area = 62,600 sf, 98.98% Impervious, Inflow Depth = 8.46" for 100-Year event
Inflow = 11.99 cfs @ 12.09 hrs, Volume= 44,132 cf
Primary = 11.99 cfs @ 12.09 hrs, Volume= 44,132 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Appendix E

Proposed Watershed Map

LEGEND

- WATERSHED BOUNDARY LINE
- TIME OF CONCENTRATION LINE
- UNDERGROUND TIME OF CONCENTRATION LINE

PROPOSED BIORETENTION FILTER BASIN #1

WATERSHED 1A
AREA = 11,579 SF
TC = 6.0 MIN.
CN = 79

WATERSHED 1B
AREA = 162,834 SF
TC = 6.0 MIN.
CN = 90

TIME OF CONCENTRATION LINE (TYP.)

PROPOSED LINED & SUBDRAINED SEDIMENT FOREBAY

PROPOSED LINED & SUBDRAINED SAND FILTER

PROPOSED OUTLET CONTROL STRUCTURE (TYP.)

EXISTING 21" VCP DISCHARGING THROUGH ADJACENT PROPERTY TO EXISTING 4'x4' CITY OF CRANSTON BOX CULVERT

DP1

EXISTING DRAINAGE NETWORK WITHIN SITE

PROPERTY LINE (TYP.)

OVERALL WATERSHED AREA: 237,013 SF

JOHNSTON CONTROLS / TYCO FIRE PROTECTION PRODUCTS

AMTRAK RAIL LINES

EXISTING 4'x4' BOX CULVERT CONTINUES EAST THROUGH JOHNSTON CONTROLS PROPERTY AND ELMWOOD AVE., ULTIMATELY DISCHARGING TO FENNER POND

EXISTING 4'x4' BOX CULVERT; OWNED AND MAINTAINED BY THE CITY OF CRANSTON

EXISTING CITY OF CRANSTON DRAINAGE INLETS WITHIN WELLINGTON AVENUE

JIRA REALTY INC
530-532 WELLINGTON AVE

CLARENCE STREET

WELLINGTON AVE

LAURENS STREET

ROUTE 95 NORTHBOUND

ROUTE 95 SOUTHBOUND

WATERSHED 2
AREA = 62,600 SF
TC = 6.0 MIN.
CN = 94

DP2

SCALE (FEET)
0 50 100 200 400
1 INCH =100 FT

JCE
JOE CASALI ENGINEERING, INC.
CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WATER SUPPLY · WASTEWATER
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM

PROPOSED SELF-STORAGE BUILDING

530-532 WELLINGTON STREET
CRANSTON, RHODE ISLAND
AP 3, LOT 107

REVISIONS:

NO.	DATE.	DESCRIPTION
1	12/2024	RIDEM RTC

DESIGNED BY:	SD
DRAWN BY:	SD
CHECKED BY:	JAC
DATE:	SEPT. 2024
PROJECT NO:	24-25

STORMWATER REPORT

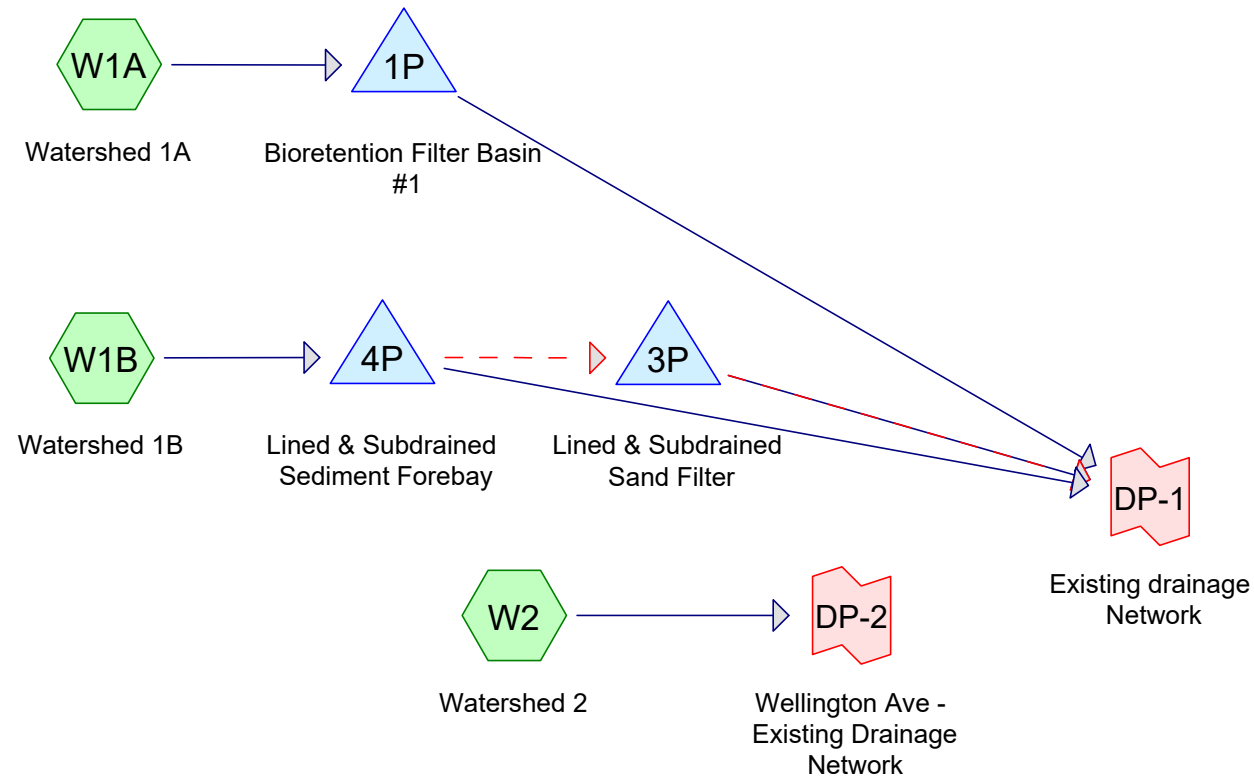
PROPOSED CONDITIONS WATERSHED MAP

SHEET 1 OF 1

Q:\24-25 Mike Jobb\Drainage\Watershed Maps\Wellington Ave Self-Storage [Watershed Maps] R1.dwg Dec. 05, 2024 9:54am

Appendix F

Proposed Condition HydroCAD Calculations



Subcat Reach Pond Link

Routing Diagram for Wellington Ave - Proposed R1
Prepared by Joe Casali Engineering, Inc, Printed 12/5/2024
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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
45,774	61	>75% Grass cover, Good, HSG B (W1A, W1B, W2)
26,145	96	Compacted Aggegate , HSG B (W1B)
5,326	82	Dirt , HSG B (W1A)
56,433	98	Paved parking, HSG B (W1A, W1B, W2)
103,335	98	Roofs, HSG B (W1B, W2)
237,013	**90**	**TOTAL AREA**

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1A: Watershed 1A Runoff Area=11,579 sf 22.64% Impervious Runoff Depth=0.97"
Flow Length=115' Tc=6.0 min CN=79 Runoff=0.29 cfs 940 cf

SubcatchmentW1B: Watershed 1B Runoff Area=162,834 sf 62.68% Impervious Runoff Depth=1.71"
Flow Length=628' Tc=6.0 min CN=90 Runoff=7.31 cfs 23,213 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 87.99% Impervious Runoff Depth=2.06"
Tc=6.0 min CN=94 Runoff=3.29 cfs 10,751 cf

Pond 1P: Bioretention Filter Basin #1 Peak Elev=48.16' Storage=319 cf Inflow=0.29 cfs 940 cf
Discarded=0.05 cfs 939 cf Primary=0.00 cfs 0 cf Outflow=0.05 cfs 939 cf

Pond 3P: Lined & Subdrained Sand Filter Peak Elev=43.59' Storage=5,674 cf Inflow=7.01 cfs 16,205 cf
Primary=0.07 cfs 3,877 cf Secondary=3.94 cfs 8,667 cf Outflow=4.01 cfs 12,545 cf

Pond 4P: Lined & Subdrained Sediment Peak Elev=43.71' Storage=3,956 cf Inflow=7.31 cfs 23,213 cf
Primary=0.07 cfs 4,505 cf Secondary=7.01 cfs 16,205 cf Outflow=7.08 cfs 20,710 cf

Link DP-1: Existing drainage Network Inflow=4.08 cfs 17,050 cf
Primary=4.08 cfs 17,050 cf

Link DP-2: Wellington Ave - Existing Drainage Network Inflow=3.29 cfs 10,751 cf
Primary=3.29 cfs 10,751 cf

Total Runoff Area = 237,013 sf Runoff Volume = 34,904 cf Average Runoff Depth = 1.77"
32.59% Pervious = 77,245 sf 67.41% Impervious = 159,768 sf

Summary for Subcatchment W1A: Watershed 1A

Runoff = 0.29 cfs @ 12.10 hrs, Volume= 940 cf, Depth= 0.97"
Routed to Pond 1P : Bioretention Filter Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
2,621	98	Paved parking, HSG B
5,326	82	Dirt , HSG B
3,632	61	>75% Grass cover, Good, HSG B
11,579	79	Weighted Average
8,958	73	77.36% Pervious Area
2,621	98	22.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
0.4	60	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
0.9	115	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W1B: Watershed 1B

Runoff = 7.31 cfs @ 12.09 hrs, Volume= 23,213 cf, Depth= 1.71"
Routed to Pond 4P : Lined & Subdrained Sediment Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

	Area (sf)	CN	Description
	58,354	98	Roofs, HSG B
	43,709	98	Paved parking, HSG B
*	26,145	96	Compacted Aggegate , HSG B
	34,626	61	>75% Grass cover, Good, HSG B
	162,834	90	Weighted Average
	60,771	76	37.32% Pervious Area
	102,063	98	62.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	55	0.0130	1.04		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
4.0	573	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
4.9	628	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 3.29 cfs @ 12.09 hrs, Volume= 10,751 cf, Depth= 2.06"
Routed to Link DP-2 : Wellington Ave - Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
44,981	98	Roofs, HSG B
10,103	98	Paved parking, HSG B
7,516	61	>75% Grass cover, Good, HSG B
62,600	94	Weighted Average
7,516	61	12.01% Pervious Area
55,084	98	87.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond 1P: Bioretention Filter Basin #1

Inflow Area = 11,579 sf, 22.64% Impervious, Inflow Depth = 0.97" for 1-Year event
Inflow = 0.29 cfs @ 12.10 hrs, Volume= 940 cf
Outflow = 0.05 cfs @ 12.67 hrs, Volume= 939 cf, Atten= 84%, Lag= 34.3 min
Discarded = 0.05 cfs @ 12.67 hrs, Volume= 939 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 48.16' @ 12.67 hrs Surf.Area= 842 sf Storage= 319 cf

Plug-Flow detention time= 104.2 min calculated for 939 cf (100% of inflow)
Center-of-Mass det. time= 103.6 min (959.0 - 855.4)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	256 cf	**100% Voids (Conic)** Listed below (Recalc)
#2	46.00'	252 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 764 cf Overall x 33.0% Voids
		508 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.00	382	0	0	382
48.50	653	256	256	656

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	382	0	0
48.00	382	764	764

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	48.30'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.67 hrs HW=48.16' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=46.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: Lined & Subdrained Sand Filter

Inflow = 7.01 cfs @ 12.10 hrs, Volume= 16,205 cf
Outflow = 4.01 cfs @ 12.27 hrs, Volume= 12,545 cf, Atten= 43%, Lag= 9.8 min
Primary = 0.07 cfs @ 12.27 hrs, Volume= 3,877 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 3.94 cfs @ 12.27 hrs, Volume= 8,667 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.59' @ 12.27 hrs Storage= 5,674 cf

Plug-Flow detention time= 174.4 min calculated for 12,545 cf (77% of inflow)
Center-of-Mass det. time= 115.6 min (921.5 - 805.9)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	5,064 cf	**100% Voids (Conic)** Listed below (Recalc) -Impervious
#2	40.67'	1,706 cf	**Sand Filter (Prismatic)** Listed below (Recalc) -Impervious 5,170 cf Overall x 33.0% Voids
#3	40.17'	466 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) -Impervious 1,413 cf Overall x 33.0% Voids
		7,236 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	2,825	0	0	2,825
43.00	3,181	1,501	1,501	3,194
44.00	3,960	3,563	5,064	4,001

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	2,825	0	0
42.50	2,825	5,170	5,170

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	2,825	0	0
40.67	2,825	1,413	1,413

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.45'	**30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.27 hrs HW=43.58' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 8.83 fps)

Secondary OutFlow Max=3.67 cfs @ 12.27 hrs HW=43.58' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 3.67 cfs @ 1.18 fps)

Summary for Pond 4P: Lined & Subdrained Sediment Forebay

Inflow Area = 162,834 sf, 62.68% Impervious, Inflow Depth = 1.71" for 1-Year event
Inflow = 7.31 cfs @ 12.09 hrs, Volume= 23,213 cf
Outflow = 7.08 cfs @ 12.10 hrs, Volume= 20,710 cf, Atten= 3%, Lag= 0.8 min
Primary = 0.07 cfs @ 12.10 hrs, Volume= 4,505 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 7.01 cfs @ 12.10 hrs, Volume= 16,205 cf
Routed to Pond 3P : Lined & Subdrained Sand Filter

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.71' @ 12.10 hrs Surf.Area= 6,278 sf Storage= 3,956 cf

Plug-Flow detention time= 113.2 min calculated for 20,710 cf (89% of inflow)
Center-of-Mass det. time= 61.9 min (875.5 - 813.6)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	3,500 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
#2	40.67'	1,044 cf	**Sand Filter Layer (Prismatic)** Listed below (Recalc) 3,162 cf Overall x 33.0% Voids
#3	40.17'	285 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) 864 cf Overall x 33.0% Voids
		4,829 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	1,728	0	0	1,728
43.00	1,987	928	928	1,998
44.00	3,205	2,572	3,500	3,229

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	1,728	0	0
42.50	1,728	3,162	3,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	1,728	0	0
40.67	1,728	864	864

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.52'	**30.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.10 hrs HW=43.71' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 8.99 fps)

Secondary OutFlow Max=6.91 cfs @ 12.10 hrs HW=43.71' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 6.91 cfs @ 1.22 fps)

Summary for Link DP-1: Existing drainage Network

Inflow Area = 174,413 sf, 60.02% Impervious, Inflow Depth > 1.17" for 1-Year event
Inflow = 4.08 cfs @ 12.27 hrs, Volume= 17,050 cf
Primary = 4.08 cfs @ 12.27 hrs, Volume= 17,050 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wellington Ave - Existing Drainage Network

Inflow Area = 62,600 sf, 87.99% Impervious, Inflow Depth = 2.06" for 1-Year event
Inflow = 3.29 cfs @ 12.09 hrs, Volume= 10,751 cf
Primary = 3.29 cfs @ 12.09 hrs, Volume= 10,751 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1A: Watershed 1A Runoff Area=11,579 sf 22.64% Impervious Runoff Depth=2.72"
Flow Length=115' Tc=6.0 min CN=79 Runoff=0.83 cfs 2,620 cf

SubcatchmentW1B: Watershed 1B Runoff Area=162,834 sf 62.68% Impervious Runoff Depth=3.78"
Flow Length=628' Tc=6.0 min CN=90 Runoff=15.64 cfs 51,292 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 87.99% Impervious Runoff Depth=4.21"
Tc=6.0 min CN=94 Runoff=6.45 cfs 21,959 cf

Pond 1P: Bioretention Filter Basin #1 Peak Elev=48.41' Storage=452 cf Inflow=0.83 cfs 2,620 cf
Discarded=0.05 cfs 1,723 cf Primary=0.75 cfs 904 cf Outflow=0.81 cfs 2,627 cf

Pond 3P: Lined & Subdrained Sand Filter Peak Elev=43.78' Storage=6,383 cf Inflow=15.19 cfs 43,685 cf
Primary=0.07 cfs 4,211 cf Secondary=14.58 cfs 35,235 cf Outflow=14.65 cfs 39,446 cf

Pond 4P: Lined & Subdrained Sediment Peak Elev=43.83' Storage=4,316 cf Inflow=15.64 cfs 51,292 cf
Primary=0.07 cfs 5,097 cf Secondary=15.19 cfs 43,685 cf Outflow=15.27 cfs 48,782 cf

Link DP-1: Existing drainage Network Inflow=15.48 cfs 45,447 cf
Primary=15.48 cfs 45,447 cf

Link DP-2: Wellington Ave - Existing Drainage Network Inflow=6.45 cfs 21,959 cf
Primary=6.45 cfs 21,959 cf

Total Runoff Area = 237,013 sf Runoff Volume = 75,871 cf Average Runoff Depth = 3.84"
32.59% Pervious = 77,245 sf 67.41% Impervious = 159,768 sf

Summary for Subcatchment W1A: Watershed 1A

Runoff = 0.83 cfs @ 12.09 hrs, Volume= 2,620 cf, Depth= 2.72"
Routed to Pond 1P : Bioretention Filter Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
2,621	98	Paved parking, HSG B
5,326	82	Dirt , HSG B
3,632	61	>75% Grass cover, Good, HSG B
11,579	79	Weighted Average
8,958	73	77.36% Pervious Area
2,621	98	22.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
0.4	60	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
0.9	115	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W1B: Watershed 1B

Runoff = 15.64 cfs @ 12.09 hrs, Volume= 51,292 cf, Depth= 3.78"
Routed to Pond 4P : Lined & Subdrained Sediment Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
	58,354	98	Roofs, HSG B
	43,709	98	Paved parking, HSG B
*	26,145	96	Compacted Aggegate , HSG B
	34,626	61	>75% Grass cover, Good, HSG B
	162,834	90	Weighted Average
	60,771	76	37.32% Pervious Area
	102,063	98	62.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	55	0.0130	1.04		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
4.0	573	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
4.9	628	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 6.45 cfs @ 12.09 hrs, Volume= 21,959 cf, Depth= 4.21"
Routed to Link DP-2 : Wellington Ave - Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
44,981	98	Roofs, HSG B
10,103	98	Paved parking, HSG B
7,516	61	>75% Grass cover, Good, HSG B
62,600	94	Weighted Average
7,516	61	12.01% Pervious Area
55,084	98	87.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond 1P: Bioretention Filter Basin #1

Inflow Area = 11,579 sf, 22.64% Impervious, Inflow Depth = 2.72" for 10-Year event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 2,620 cf
Outflow = 0.81 cfs @ 12.11 hrs, Volume= 2,627 cf, Atten= 3%, Lag= 1.3 min
Discarded = 0.05 cfs @ 12.12 hrs, Volume= 1,723 cf
Primary = 0.75 cfs @ 12.11 hrs, Volume= 904 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 48.41' @ 12.12 hrs Surf.Area= 981 sf Storage= 452 cf

Plug-Flow detention time= 73.5 min calculated for 2,617 cf (100% of inflow)
Center-of-Mass det. time= 74.9 min (900.2 - 825.4)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	256 cf	**100% Voids (Conic)** Listed below (Recalc)
#2	46.00'	252 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 764 cf Overall x 33.0% Voids
		508 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.00	382	0	0	382
48.50	653	256	256	656

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	382	0	0
48.00	382	764	764

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	48.30'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.12 hrs HW=48.41' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.71 cfs @ 12.11 hrs HW=48.41' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.71 cfs @ 1.07 fps)

Summary for Pond 3P: Lined & Subdrained Sand Filter

Inflow = 15.19 cfs @ 12.10 hrs, Volume= 43,685 cf
Outflow = 14.65 cfs @ 12.11 hrs, Volume= 39,446 cf, Atten= 4%, Lag= 0.9 min
Primary = 0.07 cfs @ 12.11 hrs, Volume= 4,211 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 14.58 cfs @ 12.11 hrs, Volume= 35,235 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.78' @ 12.11 hrs Storage= 6,383 cf

Plug-Flow detention time= 77.9 min calculated for 39,376 cf (90% of inflow)
Center-of-Mass det. time= 37.0 min (836.4 - 799.4)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	5,064 cf	**100% Voids (Conic)** Listed below (Recalc) -Impervious
#2	40.67'	1,706 cf	**Sand Filter (Prismatic)** Listed below (Recalc) -Impervious 5,170 cf Overall x 33.0% Voids
#3	40.17'	466 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) -Impervious 1,413 cf Overall x 33.0% Voids
		7,236 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	2,825	0	0	2,825
43.00	3,181	1,501	1,501	3,194
44.00	3,960	3,563	5,064	4,001

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	2,825	0	0
42.50	2,825	5,170	5,170

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	2,825	0	0
40.67	2,825	1,413	1,413

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.45'	**30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.11 hrs HW=43.77' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.08 fps)

Secondary OutFlow Max=14.22 cfs @ 12.11 hrs HW=43.77' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 14.22 cfs @ 1.86 fps)

Summary for Pond 4P: Lined & Subdrained Sediment Forebay

Inflow Area = 162,834 sf, 62.68% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 15.64 cfs @ 12.09 hrs, Volume= 51,292 cf
Outflow = 15.27 cfs @ 12.10 hrs, Volume= 48,782 cf, Atten= 2%, Lag= 0.6 min
Primary = 0.07 cfs @ 12.10 hrs, Volume= 5,097 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 15.19 cfs @ 12.10 hrs, Volume= 43,685 cf
Routed to Pond 3P : Lined & Subdrained Sand Filter

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.83' @ 12.10 hrs Surf.Area= 6,439 sf Storage= 4,316 cf

Plug-Flow detention time= 62.2 min calculated for 48,782 cf (95% of inflow)
Center-of-Mass det. time= 34.7 min (826.1 - 791.4)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	3,500 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
#2	40.67'	1,044 cf	**Sand Filter Layer (Prismatic)** Listed below (Recalc) 3,162 cf Overall x 33.0% Voids
#3	40.17'	285 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) 864 cf Overall x 33.0% Voids
		4,829 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	1,728	0	0	1,728
43.00	1,987	928	928	1,998
44.00	3,205	2,572	3,500	3,229

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	1,728	0	0
42.50	1,728	3,162	3,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	1,728	0	0
40.67	1,728	864	864

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.52'	**30.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.10 hrs HW=43.83' (Free Discharge)
↑└**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.15 fps)

Secondary OutFlow Max=15.11 cfs @ 12.10 hrs HW=43.83' (Free Discharge)
↑└**1=Broad-Crested Rectangular Weir** (Weir Controls 15.11 cfs @ 1.61 fps)

Summary for Link DP-1: Existing drainage Network

Inflow Area = 174,413 sf, 60.02% Impervious, Inflow Depth > 3.13" for 10-Year event
Inflow = 15.48 cfs @ 12.11 hrs, Volume= 45,447 cf
Primary = 15.48 cfs @ 12.11 hrs, Volume= 45,447 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wellington Ave - Existing Drainage Network

Inflow Area = 62,600 sf, 87.99% Impervious, Inflow Depth = 4.21" for 10-Year event
Inflow = 6.45 cfs @ 12.09 hrs, Volume= 21,959 cf
Primary = 6.45 cfs @ 12.09 hrs, Volume= 21,959 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1A: Watershed 1A Runoff Area=11,579 sf 22.64% Impervious Runoff Depth=6.16"
Flow Length=115' Tc=6.0 min CN=79 Runoff=1.85 cfs 5,947 cf

SubcatchmentW1B: Watershed 1B Runoff Area=162,834 sf 62.68% Impervious Runoff Depth=7.50"
Flow Length=628' Tc=6.0 min CN=90 Runoff=29.83 cfs 101,709 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 87.99% Impervious Runoff Depth=7.98"
Tc=6.0 min CN=94 Runoff=11.81 cfs 41,620 cf

Pond 1P: Bioretention Filter Basin #1 Peak Elev=48.49' Storage=503 cf Inflow=1.85 cfs 5,947 cf
Discarded=0.06 cfs 2,524 cf Primary=1.74 cfs 3,421 cf Outflow=1.79 cfs 5,945 cf

Pond 3P: Lined & Subdrained Sand Filter Peak Elev=43.96' Storage=7,087 cf Inflow=29.17 cfs 93,505 cf
Primary=0.07 cfs 4,755 cf Secondary=28.25 cfs 84,479 cf Outflow=28.32 cfs 89,234 cf

Pond 4P: Lined & Subdrained Sediment Peak Elev=43.99' Storage=4,809 cf Inflow=29.83 cfs 101,709 cf
Primary=0.07 cfs 5,693 cf Secondary=29.17 cfs 93,505 cf Outflow=29.24 cfs 99,199 cf

Link DP-1: Existing drainage Network Inflow=30.13 cfs 98,348 cf
Primary=30.13 cfs 98,348 cf

Link DP-2: Wellington Ave - Existing Drainage Network Inflow=11.81 cfs 41,620 cf
Primary=11.81 cfs 41,620 cf

Total Runoff Area = 237,013 sf Runoff Volume = 149,276 cf Average Runoff Depth = 7.56"
32.59% Pervious = 77,245 sf 67.41% Impervious = 159,768 sf

Summary for Subcatchment W1A: Watershed 1A

Runoff = 1.85 cfs @ 12.09 hrs, Volume= 5,947 cf, Depth= 6.16"
Routed to Pond 1P : Bioretention Filter Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
2,621	98	Paved parking, HSG B
5,326	82	Dirt , HSG B
3,632	61	>75% Grass cover, Good, HSG B
11,579	79	Weighted Average
8,958	73	77.36% Pervious Area
2,621	98	22.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
0.4	60	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
0.9	115	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W1B: Watershed 1B

Runoff = 29.83 cfs @ 12.09 hrs, Volume= 101,709 cf, Depth= 7.50"
Routed to Pond 4P : Lined & Subdrained Sediment Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

	Area (sf)	CN	Description
	58,354	98	Roofs, HSG B
	43,709	98	Paved parking, HSG B
*	26,145	96	Compacted Aggegate , HSG B
	34,626	61	>75% Grass cover, Good, HSG B
	162,834	90	Weighted Average
	60,771	76	37.32% Pervious Area
	102,063	98	62.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	55	0.0130	1.04		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
4.0	573	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
4.9	628	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 11.81 cfs @ 12.09 hrs, Volume= 41,620 cf, Depth= 7.98"
Routed to Link DP-2 : Wellington Ave - Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
44,981	98	Roofs, HSG B
10,103	98	Paved parking, HSG B
7,516	61	>75% Grass cover, Good, HSG B
62,600	94	Weighted Average
7,516	61	12.01% Pervious Area
55,084	98	87.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond 1P: Bioretention Filter Basin #1

Inflow Area = 11,579 sf, 22.64% Impervious, Inflow Depth = 6.16" for 100-Year event
Inflow = 1.85 cfs @ 12.09 hrs, Volume= 5,947 cf
Outflow = 1.79 cfs @ 12.10 hrs, Volume= 5,945 cf, Atten= 3%, Lag= 0.7 min
Discarded = 0.06 cfs @ 12.10 hrs, Volume= 2,524 cf
Primary = 1.74 cfs @ 12.10 hrs, Volume= 3,421 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 48.49' @ 12.10 hrs Surf.Area= 1,030 sf Storage= 503 cf

Plug-Flow detention time= 50.9 min calculated for 5,945 cf (100% of inflow)
Center-of-Mass det. time= 50.7 min (852.7 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	256 cf	**100% Voids (Conic)** Listed below (Recalc)
#2	46.00'	252 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 764 cf Overall x 33.0% Voids
		508 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.00	382	0	0	382
48.50	653	256	256	656

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	382	0	0
48.00	382	764	764

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	48.30'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.10 hrs HW=48.49' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=1.73 cfs @ 12.10 hrs HW=48.49' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 1.73 cfs @ 1.43 fps)

Summary for Pond 3P: Lined & Subdrained Sand Filter

Inflow = 29.17 cfs @ 12.10 hrs, Volume= 93,505 cf
Outflow = 28.32 cfs @ 12.11 hrs, Volume= 89,234 cf, Atten= 3%, Lag= 0.7 min
Primary = 0.07 cfs @ 12.11 hrs, Volume= 4,755 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 28.25 cfs @ 12.11 hrs, Volume= 84,479 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.96' @ 12.11 hrs Storage= 7,087 cf

Plug-Flow detention time= 48.7 min calculated for 89,234 cf (95% of inflow)
Center-of-Mass det. time= 23.6 min (807.8 - 784.2)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	5,064 cf	**100% Voids (Conic)** Listed below (Recalc) -Impervious
#2	40.67'	1,706 cf	**Sand Filter (Prismatic)** Listed below (Recalc) -Impervious 5,170 cf Overall x 33.0% Voids
#3	40.17'	466 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) -Impervious 1,413 cf Overall x 33.0% Voids
		7,236 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	2,825	0	0	2,825
43.00	3,181	1,501	1,501	3,194
44.00	3,960	3,563	5,064	4,001

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	2,825	0	0
42.50	2,825	5,170	5,170

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	2,825	0	0
40.67	2,825	1,413	1,413

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.45'	**30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.11 hrs HW=43.96' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.31 fps)

Secondary OutFlow Max=27.81 cfs @ 12.11 hrs HW=43.96' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 27.81 cfs @ 2.33 fps)

Summary for Pond 4P: Lined & Subdrained Sediment Forebay

Inflow Area = 162,834 sf, 62.68% Impervious, Inflow Depth = 7.50" for 100-Year event
Inflow = 29.83 cfs @ 12.09 hrs, Volume= 101,709 cf
Outflow = 29.24 cfs @ 12.10 hrs, Volume= 99,199 cf, Atten= 2%, Lag= 0.5 min
Primary = 0.07 cfs @ 12.10 hrs, Volume= 5,693 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 29.17 cfs @ 12.10 hrs, Volume= 93,505 cf
Routed to Pond 3P : Lined & Subdrained Sand Filter

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.99' @ 12.10 hrs Surf.Area= 6,653 sf Storage= 4,809 cf

Plug-Flow detention time= 36.9 min calculated for 99,022 cf (97% of inflow)
Center-of-Mass det. time= 22.2 min (795.7 - 773.5)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	3,500 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
#2	40.67'	1,044 cf	**Sand Filter Layer (Prismatic)** Listed below (Recalc) 3,162 cf Overall x 33.0% Voids
#3	40.17'	285 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) 864 cf Overall x 33.0% Voids
		4,829 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	1,728	0	0	1,728
43.00	1,987	928	928	1,998
44.00	3,205	2,572	3,500	3,229

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	1,728	0	0
42.50	1,728	3,162	3,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	1,728	0	0
40.67	1,728	864	864

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.52'	**30.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.10 hrs HW=43.99' (Free Discharge)
↑└**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.35 fps)

Secondary OutFlow Max=28.81 cfs @ 12.10 hrs HW=43.99' (Free Discharge)
↑└**1=Broad-Crested Rectangular Weir** (Weir Controls 28.81 cfs @ 2.04 fps)

Summary for Link DP-1: Existing drainage Network

Inflow Area = 174,413 sf, 60.02% Impervious, Inflow Depth > 6.77" for 100-Year event
Inflow = 30.13 cfs @ 12.11 hrs, Volume= 98,348 cf
Primary = 30.13 cfs @ 12.11 hrs, Volume= 98,348 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wellington Ave - Existing Drainage Network

Inflow Area = 62,600 sf, 87.99% Impervious, Inflow Depth = 7.98" for 100-Year event
Inflow = 11.81 cfs @ 12.09 hrs, Volume= 41,620 cf
Primary = 11.81 cfs @ 12.09 hrs, Volume= 41,620 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Appendix G

Water Quality Calculations

Version: 4/2015

Project Name: Wellington Ave. Self-Storage

Date: December 2024

Water Quality Volume Calculation WorkSheet

This worksheet is designed to assist the project engineer with a determination of the required water quality treatment area. The worksheet leads the designer through redevelopment applicability first and then receiving water requirements. This tool is intended to compliment to the Redevelopment Criteria Guidance and the Water Quality Guidance and assist both the designer and the permit application reviewer towards consistent results. Enter information into only the YELLOW Boxes.

Redevelopment Criteria Guidance

Water Quality Goals "Stormwater Compensation Method"

Step 1 - Determine which office in OWR you are applying to: Application Guidance

Step 2 - Site Information		value/calculation	units
Total Site Area (total area of project parcels)	TSA	5.44	acres
Total Jurisdictional Wetlands and/or floodplain within the above TSA	JW1	0.00	acres
Existing impervious also within the Jurisdictonal Wetlands	-JW2	0.00	acres
Conservation Land within the TSA	CL	0.00	acres
Site Size = (TSA)-(JW1-JW2)-CL	**SS=**	**5.44**	acres

Step 3 - Redevelopment Applicability

Total Impervious Area (pre-construction)	TIA=	4.80	acres
% Impervious (if ≥40% - redevelopment standard 3.2.6 applies)		**0.88**	

REPEAT IF NECESSARY Steps 4, 5 and 6 for EACH Waterbody ID (RIVER-ID as found in the GIS Map Server)

Step 4 - Receiving waterbody information

Waterbody ID or RIVER ID from GIS Map Server	RI0006017L-08
Waterbody Name from GIS Map Server	Fenner Pond
Name the sub-watersheds (design-points) contributing to this Waterbody ID	DP-1
Is this Waterbody Impaired/TMDL for any Phosphorus, Metals or Bacteria?	YES
Is this Waterbody Impaired for Nitrogen?	NO

Step 5 - Pre-Post Construction Conditions to the Waterbody

Total Pre-Construction Impervious Surface to this Waterbody ID	3.38	acres
Total Disturbed Existing Impervious (DI)	1.77	acres
Total Post-Construction Impervious to this Waterbody ID	3.84	acres
Net Increased Impervious (NII)	0.46	acres

Step 6 - Infiltration and BMP information - Note: Increasing infiltration will likely decrease stormwater treatment area for Metals, Bacteria and Phosporus

I am proposing to infiltrate this percentage WQv to this WBID	29%	%
I am proposing this number of BMP's	2	#

RESULTS - Select the Larger Number of the 2 numbers provided

Applicable Condition	Min Water Quality Treatment Area	Min Treatment w/o WQ consideration
No Impairement or TMDL - New Development		
No Impairment or TMDL - Redevelopment		
Only Phosphorus, Metals or Bacteria Impairment - New Development		
Only Phosphorus, Metals or Bacteria Impairment - Redevelopment	0.79	1.34
Nitrogen Impairment - New Development		
Nitrogen Impairment - Redevelopment		
REQUIRED STORMWATER TREATMENT AREA	**1.3** acres	

* Enter the name of the STP (both type and label) which has been designed to treat this particular Rev or Rea.

Version: 4/2015

Project Name: Wellington Ave. Self-Storage

Date: December 2024

Water Quality Volume Calculation WorkSheet

This worksheet is designed to assist the project engineer with a determination of the required water quality treatment area. The worksheet leads the designer through redevelopment applicability first and then receiving water requirements. This tool is intended to compliment to the Redevelopment Criteria Guidance and the Water Quality Guidance and assist both the designer and the permit application reviewer towards consistent results. Enter information into only the YELLOW Boxes.

Redevelopment Criteria Guidance

Water Quality Goals "Stormwater Compensation Method"

Step 1 - Determine which office in OWR you are applying to: Application Guidance

Step 2 - Site Information

		value/calculation	units
Total Site Area (total area of project parcels)	TSA	5.44	acres
Total Jurisdictional Wetlands and/or floodplain within the above TSA	JW1	0.00	acres
Existing impervious also within the Jurisdictonal Wetlands	-JW2	0.00	acres
Conservation Land within the TSA	CL	0.00	acres
Site Size = (TSA)-(JW1-JW2)-CL	**SS=**	**5.44**	acres

Step 3 - Redevelopment Applicability

Total Impervious Area (pre-construction)	TIA=	4.80	acres
% Impervious (if ≥40% - redevelopment standard 3.2.6 applies)		**0.88**	

REPEAT IF NECESSARY Steps 4, 5 and 6 for EACH Waterbody ID (RIVER-ID as found in the GIS Map Server)

Step 4 - Receiving waterbody information

Waterbody ID or RIVER ID from GIS Map Server	RI0006017L-08
Waterbody Name from GIS Map Server	Fenner Pond
Name the sub-watersheds (design-points) contributing to this Waterbody ID	DP-2
Is this Waterbody Impaired/TMDL for any Phosphorus, Metals or Bacteria?	YES
Is this Waterbody Impaired for Nitrogen?	NO

Step 5 - Pre-Post Construction Conditions to the Waterbody

Total Pre-Construction Impervious Surface to this Waterbody ID	1.42	acres
Total Disturbed Existing Impervious (DI)	0.29	acres
Total Post-Construction Impervious to this Waterbody ID	1.30	acres
Net Increased Impervious (NII)	-0.12	acres

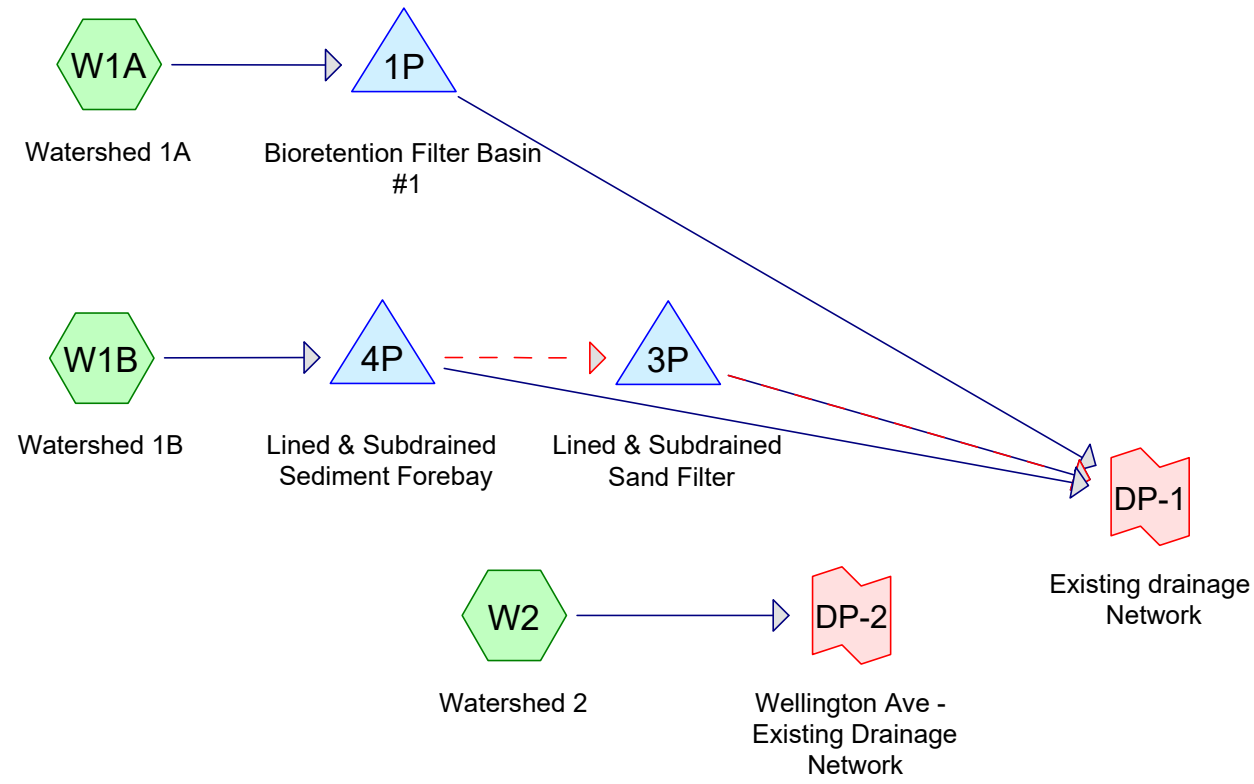
Step 6 - Infiltration and BMP information - Note: Increasing infiltration will likely decrease stormwater treatment area for Metals, Bacteria and Phosporus

I am proposing to infiltrate this percentage WQv to this WBID	0%	%
I am proposing this number of BMP's	0	#

RESULTS - Select the Larger Number of the 2 numbers provided

Applicable Condition	Min Water Quality Treatment Area	Min Treatment w/o WQ consideration
No Impairement or TMDL - New Development		
No Impairment or TMDL - Redevelopment		
Only Phosphorus, Metals or Bacteria Impairment - New Development		
Only Phosphorus, Metals or Bacteria Impairment - Redevelopment	-0.24	0.02
Nitrogen Impairment - New Development		
Nitrogen Impairment - Redevelopment		
REQUIRED STORMWATER TREATMENT AREA	**0.0**	acres

* Enter the name of the STP (both type and label) which has been designed to treat this particular Rev or Rea.



Subcat Reach Pond Link

Routing Diagram for Wellington Ave - Proposed R1 WQv
Prepared by Joe Casali Engineering, Inc, Printed 12/5/2024

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
45,774	61	>75% Grass cover, Good, HSG B (W1A, W1B, W2)
26,145	96	Compacted Aggegate , HSG B (W1B)
5,326	82	Dirt , HSG B (W1A)
56,433	98	Paved parking, HSG B (W1A, W1B, W2)
103,335	98	Roofs, HSG B (W1B, W2)
237,013	**90**	**TOTAL AREA**

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1A: Watershed 1A Runoff Area=11,579 sf 22.64% Impervious Runoff Depth=0.26"
Flow Length=115' Tc=6.0 min CN=73/98 Runoff=0.06 cfs 253 cf

SubcatchmentW1B: Watershed 1B Runoff Area=162,834 sf 62.68% Impervious Runoff Depth=0.65"
Flow Length=628' Tc=6.0 min CN=76/98 Runoff=2.51 cfs 8,822 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 87.99% Impervious Runoff Depth=0.87"
Tc=6.0 min CN=61/98 Runoff=1.35 cfs 4,524 cf

Pond 1P: Bioretention Filter Basin #1 Peak Elev=46.28' Storage=35 cf Inflow=0.06 cfs 253 cf
Discarded=0.02 cfs 253 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 253 cf

Pond 3P: Lined & Subdrained Sand Filter Peak Elev=42.16' Storage=1,856 cf Inflow=1.22 cfs 2,493 cf
Primary=0.05 cfs 2,211 cf Secondary=0.00 cfs 0 cf Outflow=0.05 cfs 2,211 cf

Pond 4P: Lined & Subdrained Sediment Peak Elev=43.58' Storage=3,598 cf Inflow=2.51 cfs 8,822 cf
Primary=0.07 cfs 4,457 cf Secondary=1.22 cfs 2,493 cf Outflow=1.29 cfs 6,950 cf

Link DP-1: Existing drainage Network Inflow=0.12 cfs 6,667 cf
Primary=0.12 cfs 6,667 cf

Link DP-2: Wellington Ave - Existing Drainage Network Inflow=1.35 cfs 4,524 cf
Primary=1.35 cfs 4,524 cf

Total Runoff Area = 237,013 sf Runoff Volume = 13,600 cf Average Runoff Depth = 0.69"
32.59% Pervious = 77,245 sf 67.41% Impervious = 159,768 sf

Summary for Subcatchment W1A: Watershed 1A

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 253 cf, Depth= 0.26"
Routed to Pond 1P : Bioretention Filter Basin #1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
2,621	98	Paved parking, HSG B
5,326	82	Dirt , HSG B
3,632	61	>75% Grass cover, Good, HSG B
11,579	79	Weighted Average
8,958	73	77.36% Pervious Area
2,621	98	22.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
0.4	60	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
0.9	115	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W1B: Watershed 1B

Runoff = 2.51 cfs @ 12.09 hrs, Volume= 8,822 cf, Depth= 0.65"
Routed to Pond 4P : Lined & Subdrained Sediment Forebay

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

	Area (sf)	CN	Description
	58,354	98	Roofs, HSG B
	43,709	98	Paved parking, HSG B
*	26,145	96	Compacted Aggegate , HSG B
	34,626	61	>75% Grass cover, Good, HSG B
	162,834	90	Weighted Average
	60,771	76	37.32% Pervious Area
	102,063	98	62.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	55	0.0130	1.04		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
4.0	573	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
4.9	628	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 1.35 cfs @ 12.09 hrs, Volume= 4,524 cf, Depth= 0.87"
Routed to Link DP-2 : Wellington Ave - Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
44,981	98	Roofs, HSG B
10,103	98	Paved parking, HSG B
7,516	61	>75% Grass cover, Good, HSG B
62,600	94	Weighted Average
7,516	61	12.01% Pervious Area
55,084	98	87.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond 1P: Bioretention Filter Basin #1

Inflow Area = 11,579 sf, 22.64% Impervious, Inflow Depth = 0.26" for WQV event
Inflow = 0.06 cfs @ 12.09 hrs, Volume= 253 cf
Outflow = 0.02 cfs @ 11.90 hrs, Volume= 253 cf, Atten= 67%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.90 hrs, Volume= 253 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 46.28' @ 12.41 hrs Surf.Area= 382 sf Storage= 35 cf

Plug-Flow detention time= 8.2 min calculated for 253 cf (100% of inflow)
Center-of-Mass det. time= 8.2 min (823.7 - 815.5)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	256 cf	**100% Voids (Conic)** Listed below (Recalc)
#2	46.00'	252 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 764 cf Overall x 33.0% Voids
		508 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.00	382	0	0	382
48.50	653	256	256	656

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	382	0	0
48.00	382	764	764

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	48.30'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.90 hrs HW=46.03' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=46.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: Lined & Subdrained Sand Filter

Inflow = 1.22 cfs @ 12.26 hrs, Volume= 2,493 cf
Outflow = 0.05 cfs @ 15.01 hrs, Volume= 2,211 cf, Atten= 96%, Lag= 164.9 min
Primary = 0.05 cfs @ 15.01 hrs, Volume= 2,211 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 42.16' @ 15.01 hrs Storage= 1,856 cf

Plug-Flow detention time= 373.8 min calculated for 2,207 cf (89% of inflow)
Center-of-Mass det. time= 358.1 min (1,140.1 - 782.0)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	5,064 cf	**100% Voids (Conic)** Listed below (Recalc) -Impervious
#2	40.67'	1,706 cf	**Sand Filter (Prismatic)** Listed below (Recalc) -Impervious 5,170 cf Overall x 33.0% Voids
#3	40.17'	466 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) -Impervious 1,413 cf Overall x 33.0% Voids
		7,236 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	2,825	0	0	2,825
43.00	3,181	1,501	1,501	3,194
44.00	3,960	3,563	5,064	4,001

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	2,825	0	0
42.50	2,825	5,170	5,170

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	2,825	0	0
40.67	2,825	1,413	1,413

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.45'	**30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 15.01 hrs HW=42.16' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 6.71 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=40.17' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 4P: Lined & Subdrained Sediment Forebay

Inflow Area = 162,834 sf, 62.68% Impervious, Inflow Depth = 0.65" for WQV event
Inflow = 2.51 cfs @ 12.09 hrs, Volume= 8,822 cf
Outflow = 1.29 cfs @ 12.26 hrs, Volume= 6,950 cf, Atten= 49%, Lag= 10.1 min
Primary = 0.07 cfs @ 12.26 hrs, Volume= 4,457 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 1.22 cfs @ 12.26 hrs, Volume= 2,493 cf
Routed to Pond 3P : Lined & Subdrained Sand Filter

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.58' @ 12.26 hrs Surf.Area= 6,113 sf Storage= 3,598 cf

Plug-Flow detention time= 282.1 min calculated for 6,937 cf (79% of inflow)
Center-of-Mass det. time= 202.2 min (993.2 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	3,500 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
#2	40.67'	1,044 cf	**Sand Filter Layer (Prismatic)** Listed below (Recalc) 3,162 cf Overall x 33.0% Voids
#3	40.17'	285 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) 864 cf Overall x 33.0% Voids
		4,829 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	1,728	0	0	1,728
43.00	1,987	928	928	1,998
44.00	3,205	2,572	3,500	3,229

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	1,728	0	0
42.50	1,728	3,162	3,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	1,728	0	0
40.67	1,728	864	864

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.52'	**30.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.26 hrs HW=43.58' (Free Discharge)
↑└**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 8.82 fps)

Secondary OutFlow Max=1.19 cfs @ 12.26 hrs HW=43.58' (Free Discharge)
↑└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.19 cfs @ 0.68 fps)

Summary for Link DP-1: Existing drainage Network

Inflow Area = 174,413 sf, 60.02% Impervious, Inflow Depth > 0.46" for WQV event
Inflow = 0.12 cfs @ 14.99 hrs, Volume= 6,667 cf
Primary = 0.12 cfs @ 14.99 hrs, Volume= 6,667 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wellington Ave - Existing Drainage Network

Inflow Area = 62,600 sf, 87.99% Impervious, Inflow Depth = 0.87" for WQV event
Inflow = 1.35 cfs @ 12.09 hrs, Volume= 4,524 cf
Primary = 1.35 cfs @ 12.09 hrs, Volume= 4,524 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

GENERAL NOTES

1. ALL CONSTRUCTION WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND ORDINANCES OR AGENCIES HAVING JURISDICTION OVER THIS PROJECT.
2. ESTABLISH AND MAINTAIN PROJECT SAFETY DURING CONSTRUCTION TO PROTECT PERSONNEL, TENANTS, AND BUILDING OCCUPANTS. REQUIREMENTS INCLUDE, BUT SHALL NOT BE LIMITED TO OSHA PART 1926 LATEST EDITION.
3. THE GENERAL CONTRACTOR SHALL ARRANGE ALL INSPECTIONS AND TESTS AS SPECIFIED OR REQUIRED BY THE BUILDING DEPARTMENT AND SHALL PAY ALL COSTS AND FEES FOR SAME. THE CONTRACTOR SHALL SECURE ALL BUILDING PERMITS AND UPON COMPLETION OF THE PROJECT (PRIOR TO FINAL PAYMENT) DELIVER TO THE OWNER A CERTIFICATE OF OCCUPANCY OR USE FROM THE BUILDING DEPARTMENT.
4. ALL PLUMBING AND ELECTRICAL WORK SHALL BE PERFORMED BY STATE LICENSED CONTRACTORS. CONTRACTORS SHALL SUBMIT ALL REQUIRED PERMITS, CERTIFICATES, AND SIGN-OFFS TO OWNER AND DESIGNER FOR THEIR RECORDS.
5. THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS, BE FAMILIAR WITH THE EXISTING CONDITIONS, AND BRING ANY DISCREPANCIES TO THE ATTENTION OF THE DESIGNER PRIOR TO SUBMISSION OF CONSTRUCTION PROPOSAL AND BEFORE COMMENCEMENT OF THE WORK. THE DRAWINGS REFLECT CONDITIONS REASONABLY INFERRED FROM THE EXISTING VISIBLE CONDITIONS BUT CANNOT GUARANTEED BY THE DESIGNER DRAWINGS MAY BE SCALED FOR ESTIMATING PURPOSES AND FOR GENERAL REFERENCE ONLY. FOR ALL OTHER DIMENSIONS OR LOCATIONS CONSULT THE DESIGNER OR REFER TO DIMENSIONS ON DRAWINGS. VERIFY ALL DIMENSIONS IN THE FIELD.
6. CONTRACTOR SHALL FIELD VERIFY ALL MEASUREMENTS, LOCATIONS, AND CHARACTERISTICS OF ALL WORK AND EQUIPMENT (WHETHER SUPPLIED BY THE OWNER OR OTHERS) WITH THE SUPPLIER OR MANUFACTURER PRIOR TO THE START OF RELATED WORK.
7. THE GENERAL CONTRACTOR SHALL LAY OUT ALL WORK AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS FOR TRADES SUCH AS ELECTRICAL, PLUMBING, ETC.
8. THE GENERAL CONTRACTOR/CONSTRUCTION MANAGER SHALL PROVIDE AND MAINTAIN ACCESS TO THE PREMISES AT ALL TIMES.
9. THE GENERAL CONTRACTOR SHALL KEEP THE CONSTRUCTION SITE FREE AND CLEAR OF ALL DEBRIS AND KEEP OUT ALL UNAUTHORIZED PERSONS. UPON COMPLETION OF WORK, THE ENTIRE CONSTRUCTION AREA IS TO BE THOROUGHLY CLEANED AND PREPARED FOR OCCUPANCY BY OWNER. ALL MATERIALS AND DEBRIS RESULTING FROM THE CONTRACTOR'S WORK SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY. CARE SHALL BE TAKEN DURING CONSTRUCTION THAT NO DEBRIS OR MATERIALS ARE DEPOSITED IN ANY RIGHT OF WAY AREA.
10. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW CONDITIONS AND MATERIALS ON THE SITE. ANY DAMAGE CAUSED BY OR DURING THE EXECUTION OF THE WORK IS THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE.
11. ANY VARIATIONS FROM INDICATED DIMENSIONS OR CONDITIONS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGNER.
12. NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGNER.
13. NO CUTTING OR DAMAGE TO BUILDING STRUCTURAL COMPONENTS WILL BE ALLOWED WITHOUT WRITTEN AUTHORIZATION FROM THE DESIGNER.
14. PROVIDE BRACING, BLOCKING, AND/OR STRUCTURE AS REQUIRED TO FACILITATE INSTALLATION OF ALL WALL AND MILLWORK MOUNTED EQUIPMENT, IN NEW AND EXISTING WALLS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE SUPPORT REQUIRED TO MAINTAIN THE INTEGRITY OF THE WALLS AND THE SECURITY OF THE EQUIPMENT.
15. ALL WOOD BLOCKING SHALL BE FIRE RETARDANT TREATED. PROVIDE WOOD BLOCKING IN ALL STUD WALLS AT MILLWORK AND SPECIAL ITEM ANCHORING POINTS. WOOD BLOCKING SHALL BE MOISTURE TREATED IF LOCATED IN DAMP LOCATIONS OR ADJACENT TO CONCRETE OR MASONRY CONSTRUCTION. IF WOOD BLOCKING IS NOT PERMITTED BY CODE, THEN METAL STRIPS SHALL BE USED.
16. THE CONTRACTOR IS RESPONSIBLE FOR FIELD DIMENSIONS OF ALL MILLWORK, GLASS, DOOR OPENINGS, AND OTHER STRUCTURES PRIOR TO COMMENCEMENT OF FABRICATION.
17. ALL WORK SHALL CONFORM IN QUALITY TO ACCEPTED INDUSTRY STANDARDS. ALL MILLWORK SHALL CONFORM TO A.W.I. PREMIUM GRADE STANDARDS, UNLESS OTHERWISE NOTED.
18. THE MATERIALS USED FOR CONSTRUCTION OF SPACE SHALL NOT CONTAIN ASBESTOS, P.C.B, OR ANY OTHER HAZARDOUS MATERIALS OF ANY TYPE. MANUFACTURERS' NAMES AND TRADEMARKS SHALL NOT BE PROMINENTLY VISIBLE TO THE PUBLIC.
19. ALL WALLS TO BE LAID OUT AT 90-DEGREE ANGLES UNLESS OTHERWISE NOTED.
20. THE SCOPE OF WORK OF ALL TRADES IS TO INCLUDE ALL MATERIALS AND LABOR REQUIRED TO TOTALLY COMPLETE THE PROJECT AND BE FUNCTIONALLY CONSISTENT WITH THE DESIGN INTENT AS EXPRESSED IN THE CONSTRUCTION DOCUMENTS.
21. ALL UTILITIES SHALL BE CONNECTED TO PROVIDE GAS, ELECTRIC, AND WATER TO ALL EQUIPMENT WHETHER SAID EQUIPMENT IS IN CONTRACT OR NOT. EQUIPMENT SHALL BE GUARANTEED TO FUNCTION PROPERLY UPON COMPLETION.
22. MANUFACTURER'S STANDARD SPECIFICATIONS AND MATERIALS APPROVED FOR PROJECT USE ARE HEREBY MADE PART OF THESE NOTES WITH SAME FORCE AND EFFECT AS IF WRITTEN OUT IN FULL HEREIN. ALL APPLIANCES, FIXTURES, EQUIPMENT, HARDWARE, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND PROCEDURES.
23. THERMOSTATS SHALL NOT BE LOCATED IN THE CENTER OF A WALL, ON AN ACCENT/SPECIALTY WALL, OR IN A LOCATION WHICH CONFLICTS WITH FURNISHINGS WITHOUT THE ARCHITECT'S APPROVAL.
24. WRITTEN WORDS TAKE PRECEDENCE OVER DRAWN LINES. LARGE-SCALE DETAILS AND PLANS TAKE PRECEDENCE OVER SMALLER DETAILS AND PLANS. SHOULD A CONFLICT ARRIVE BETWEEN THE SPECIFICATIONS AND DRAWINGS, THE REQUIREMENTS DEEMED MOST STRINGENT SHALL BE USED.
25. MINOR DETAILS NOT USUALLY SHOWN OR SPECIFIED BUT NECESSARY FOR PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION, OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE DESIGNER SHALL BE INCLUDED IN THE WORK AS IF IT WERE SPECIFIED OR INDICATED ON THE DRAWINGS.
26. ALL DRAWINGS AND CONSTRUCTION NOTES ARE COMPLIMENTARY. WHAT IS INDICATED AND CALLED FOR BY ONE SHALL BE BINDING AS THOUGH CALLED FOR BY ALL. NO DEVIATION FROM THE DRAWINGS OR SPECIFICATIONS OR INTENT OF SAME SHALL BE MADE WITHOUT THE DESINERS WRITTEN AUTHORIZATION.
27. ALL WORK SHALL BE GUARANTEED FOR ONE YEAR AFTER FINAL APPROVAL. THE GENERAL CONTRACTOR SHALL SIGN THE WRITTEN GUARANTEE AS PROVIDED BY THE OWNER. THE GUARANTEE SHALL COVER ALL GENERAL AND SUBCONTRACTOR WORK. ALL DEFECTS DISCOVERED DURING THIS PERIOD SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE.
28. ALL DIMENSIONS ARE TO FACE OF STUD OR CENTERLINE OF STRUCTURE UNLESS OTHERWISE NOTED.
29. DOOR AND WINDOW DETAILS ARE INDICATED ON THE DOOR AND WINDOW SCHEDULES. DOOR AND WINDOW DIMENSIONS ARE TO CENTERLINES OF UNITS UNLESS OTHERWISE NOTED.

SYMBOL LEGEND

- A — Wall Type (see wall type schedule)
- 101 — Door Type (see door schedule)
- A — Window Type (see window schedule)
- A / A3.0 — Building Section
- 1 / A4.0 — Wall Section
- X / A.X — Detail Number
- 1 / A4.0 — Elevation (without line)
- 3 A5.5 2 — Interior Elevation Mark
- +8'-0" — Elevation Mark
- ROOM 110 — Room Name / Number
- A.8 — Column Line
- ℄ — Centerline
- 1 — Revision Tag

SYMBOL LEGEND

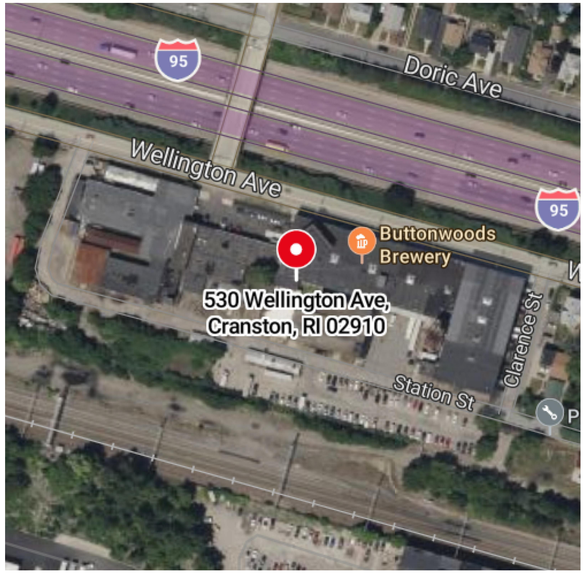
A.C.I.	AMERICAN CONCRETE INSTITUTE
BLDG.	BUILDING
CONC.	CONCRETE
C.J.	CONTROL JOINT
COL.	COLUMN
DET.	DETAIL
DIA.	DIAMETER
DN.	DOWN
EL/ELEV.	ELEVATION
ELEC.	ELECTRICAL
EQ.	EQUAL
FIN.	FINISH
FLR.	FLOOR
GALV.	GALVANIZED
GYP.	GYPSUM
I.D.	INSIDE DIAMETER
JT.	JOINT
MECH.	MECHANICAL
MIN.	MINIMUM
N.T.S.	NOT TO SCALE
NO.	NUMBER
O.C.	ON CENTER
OPG.	OPENING
O.D	OUTSIDE DIAMETER
U.N.O.	UNLESS NOTED OTHERWISE
REF.	REFERENCE
R.	RISER
R.O.	ROUGH OPENING
RM.	ROOM
S/STL.	STAINLESS STEEL
STRUCT.	STRUCTURAL
SPEC.	SPECIFICATIONS
T.O.	TOP OF (...)
T.O.CONC.	TOP OF CONCRETE
T.O.F.	TOP OF FRAMING
T.O.STL.	TOP OF STEEL
T.O.W.	TOP OF WALL
T.	TREAD
TYP.	TYPICAL
@	AT
+	AND
BD.	BOARD
A.F.F.	ABOVE FINISHED FLOOR
U.O.N.	UNLESS OTHERWISE NOTED
V.I.F.	VERIFY IN FIELD

SCOPE OF WORK

PROPOSED EGRESS STAIRS AT
EXISTING MILL BUILDING.

SCHEDULES

DRAWING LIST



LOCUS

530 WELLINGTON AVE

PAUL V. SATAS
No. 2469
REGISTERED
ARCHITECT

LICENSED: RI #2469, MA #10470, NJ #AI14727, IL #001-010503, CT. #9929

ARCHITECTS

PAUL V. SATAS, AIA
ARCHITECT
1467 CENTERVILLE RD
WARWICK, RI 02886

E: ARCHITECTURAINCMAIL@GMAIL.COM
P: 401-714-2130

No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT
3	11-21-24	ISSUED FOR PERMIT

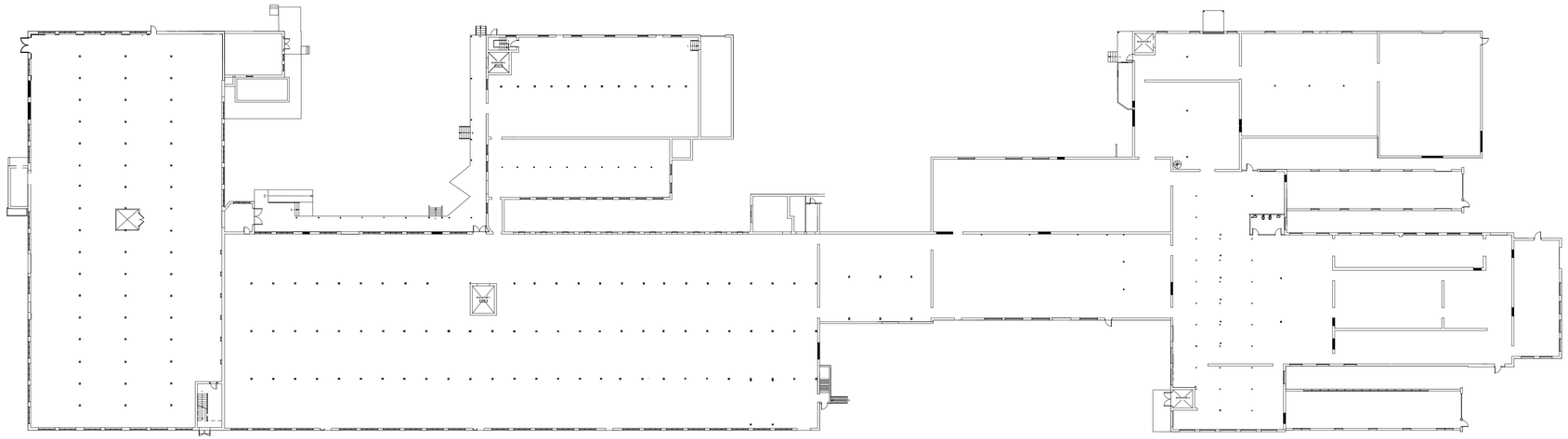
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

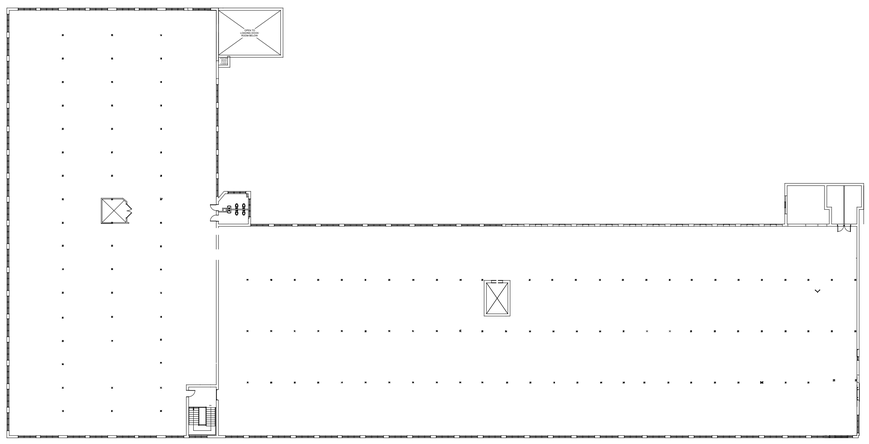
DEMOLITION PLANS
ENLARGED
DEMOLITION PLANS

A101

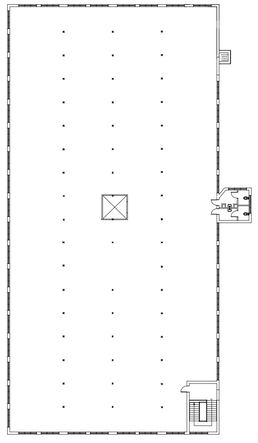
SCALE: AS NOTED



1 / A102 EXISTING FIRST FLOOR PLAN
Scale: 1/16"=1'-0"



2 / A102 EXISTING SECOND FLOOR PLAN
Scale: 1/16"=1'-0"



3 / A102 THIRD FLOOR PLAN
Scale: 1/16"=1'-0"

B. CONSTRUCTION TYPES & SEPARATION REQUIREMENTS -CHAPTER 5

NON-SEPARATED MIXED USE IF SPRINKLERED, 0 HR RATING BETWEEN USES REQUIRED PER IBC TABLE 508.3.3

CONSTRUCTION TYPE: IIIB* (IBC TABLE 503) III NFPA 220

C. ALLOWABLE AREA AND HEIGHT

1. AREA IBC TABLE 503 FOR IIIB CONSTRUCTION
   OCCUPANCY S-1 = 52,500 SF/FLOOR

2. HEIGHT IBC TABLE 503 FOR IIIB CONSTRUCTION
   OCCUPANCY S-1 = 3 STORIES/75 FEET ABOVE GRADE

3. AREA AND HEIGHT CALCULATIONS

BASEMENT LEVEL	41,065GSF
FIRST LEVEL -S-1 STORAGE	91,644GSF
FIRST LEVEL -MERCANTILE	1,465GSF
SECOND LEVEL	59,362GSF
THIRD LEVEL	24,504GSF

BASIC ALLOWABLE	2 STORIES, 55 FEET
AUTOMATIC SPRINKLER SYSTEMS	+ 1 STORY, 20 FEET
ALLOWABLE BUILDING HEIGHT	= 3 STORIES, 75 FEET

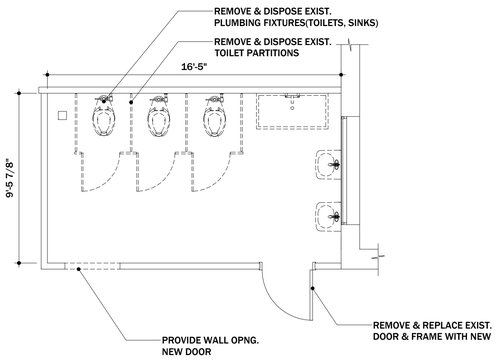
3. BUILDING AREA MODIFICATIONS

FRONTAGE CALCS
F = 2,675 ft
P = 2819 ft
W = 30 (ALL ALLOWABLE FRONTAGE EXCEEDS 30 ft)

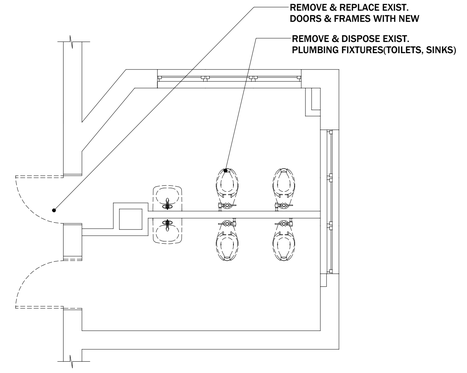
AREA FACTOR INCREASE
If= [F/P -0.25]W/30
If= [2,675 ft / 2819 ft -0.25]30/30 = 0.7

S-1 ALLOWABLE AREA
Aa= [At+ (NS x If)]
Aa= [52,500 sf + (17,500 sf x 0.7] = 64,750 PER STORY*

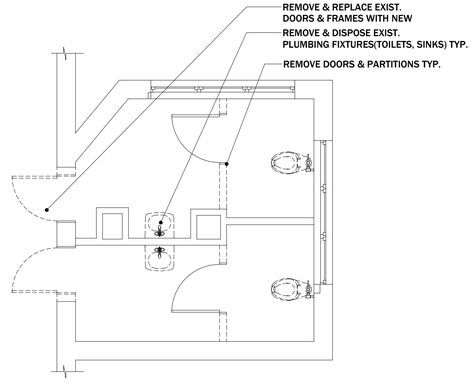
*PER RISRC-1 2002 702.4.2 -WHERE OCCUPANCY CHANGES TO EQUAL HAZARD VALUE, THE HEIGHT AND AREA OF EXISTING BUILDING SHALL BE DEEMED ACCEPTABLE.



4 / 2 FIRST FLOOR RR. DEMO PLAN
Scale: 1/4=1'-0"



5 / 2 SECOND FLOOR RR. DEMO PLAN
Scale: 1/4=1'-0"



6 / 2 THIRD FLOOR RR. DEMO PLAN
Scale: 1/4=1'-0"

530 WELLINGTON AVE

LICENSED: RI #2469, MA #10470, NJ #AI14727, IL #001-010503, CT. #9929

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No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT
2	11-18-24	CODE REVIEW
3	11-21-24	ISSUED FOR PERMIT

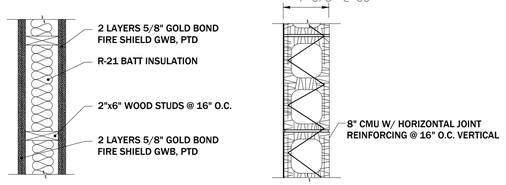
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

DEMOLITION PLANS ENLARGED DEMOLITION PLANS

A102

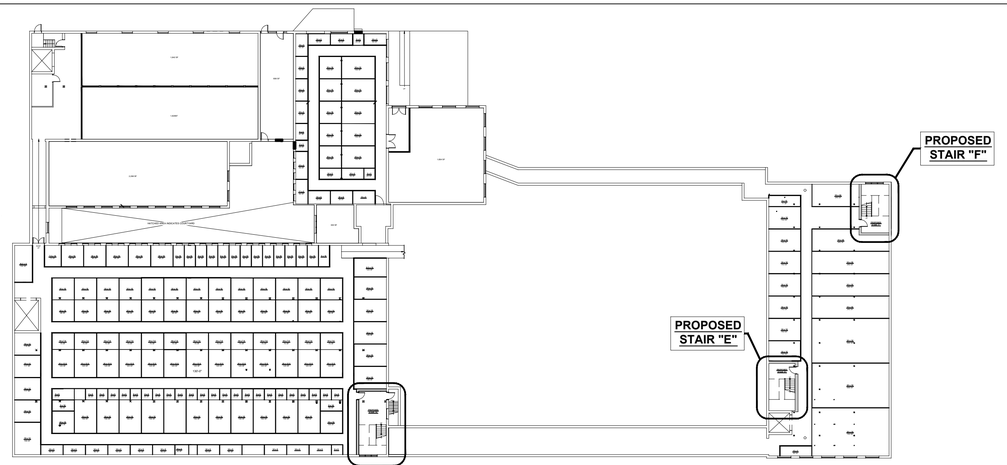
SCALE: AS NOTED



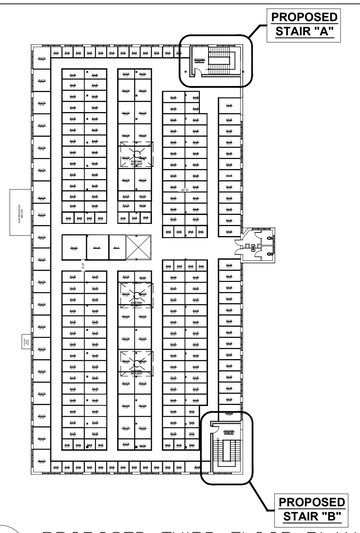
A — 2 HOUR WOOD STUD WALL
UL# DES: U301

C8 — 8" CMU BLOCK
2 HR FIRE RATED
UL# DES U906

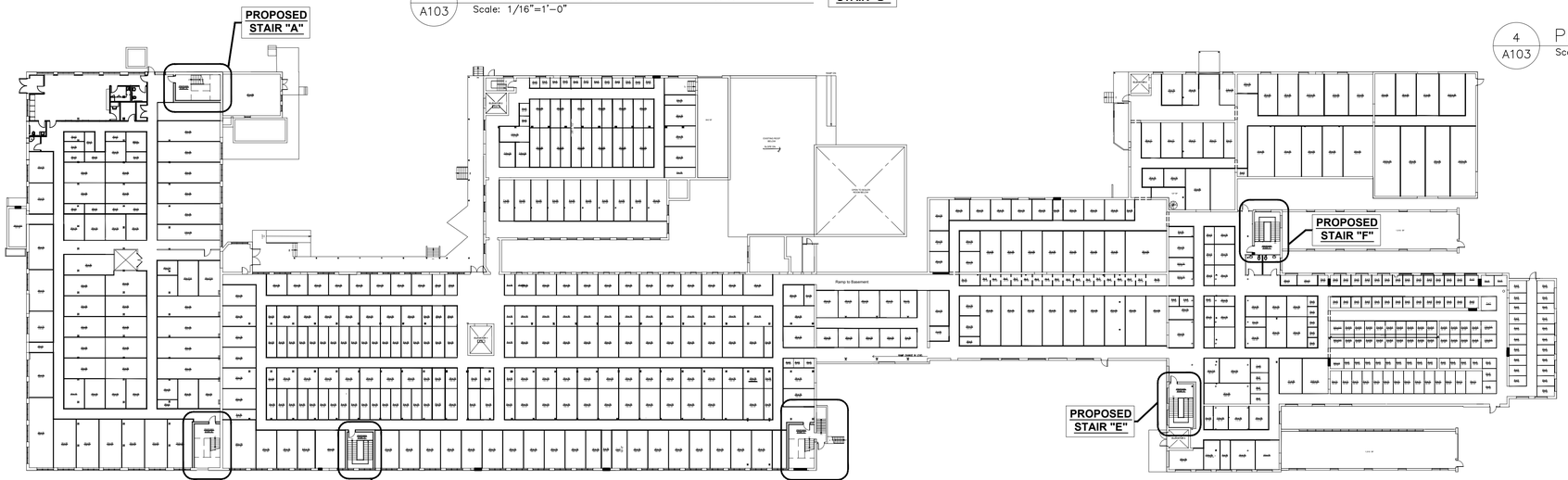
6 / A103 WALL TYPE
Scale: 1"=1'-0"



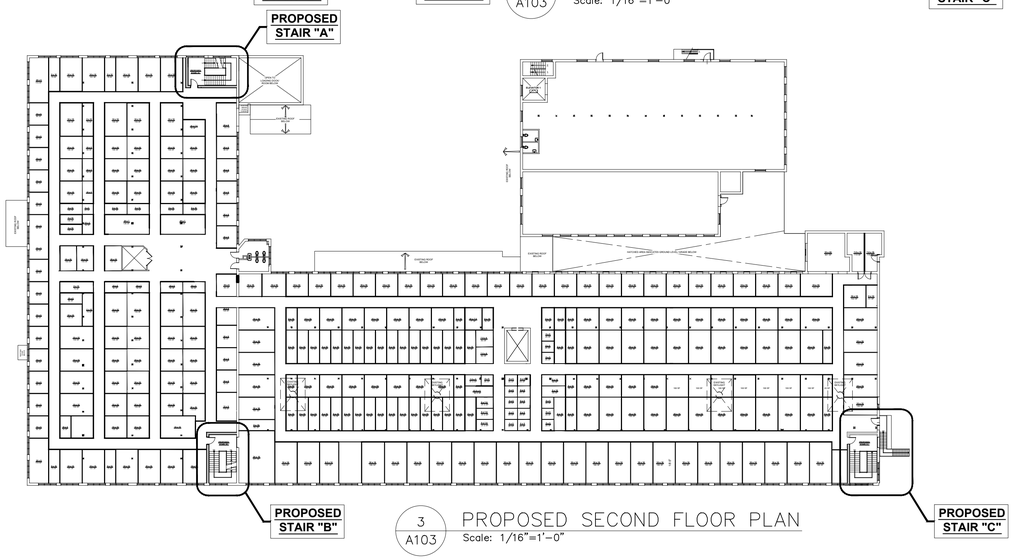
1 / A103 PROPOSED BASEMENT FLOOR PLAN
Scale: 1/16"=1'-0"



4 / A103 PROPOSED THIRD FLOOR PLAN
Scale: 1/16"=1'-0"



2 / A103 PROPOSED FIRST FLOOR PLAN
Scale: 1/16"=1'-0"



3 / A103 PROPOSED SECOND FLOOR PLAN
Scale: 1/16"=1'-0"

530 WELLINGTON AVE

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No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT
3	11-21-24	ISSUED FOR PERMIT
4	11-27-24	WALL TYPES

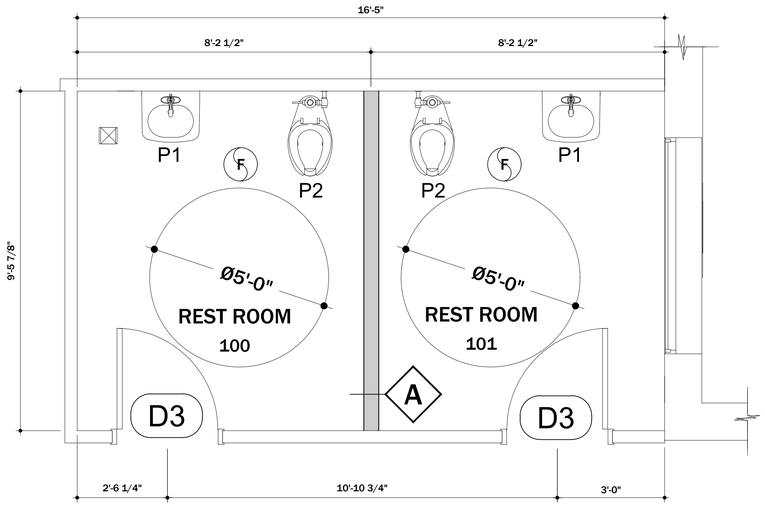
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

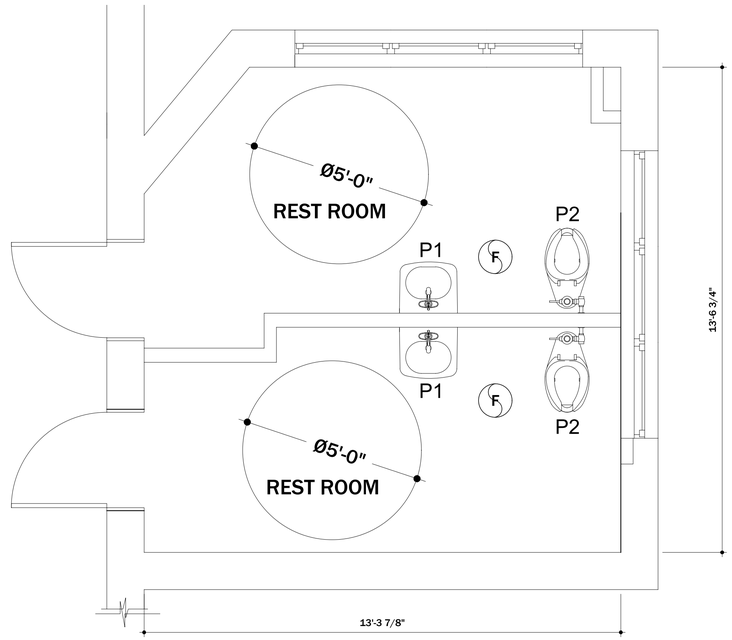
PROPOSED FLOOR PLANS

A103

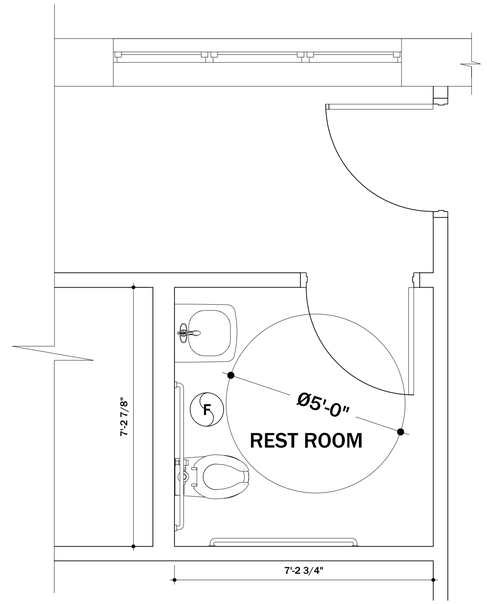
SCALE: AS NOTED



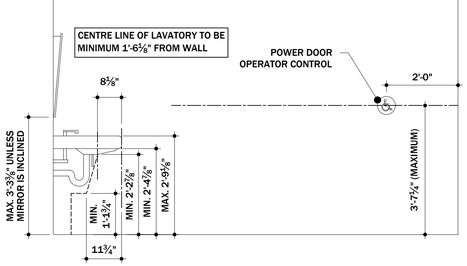
1/4 ENLARGED PROPOSED R.R. FIRST FLOOR PLAN
Scale: 1/2=1'-0"

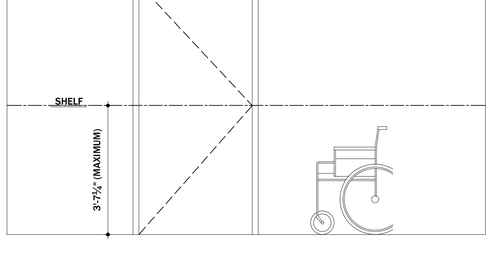


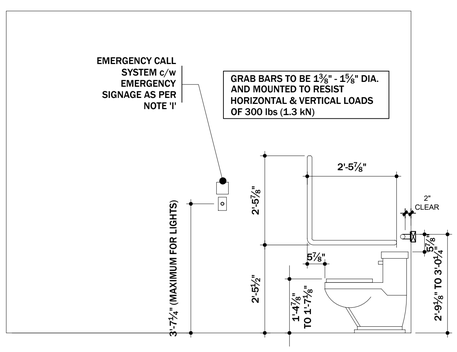
2/4 ENLARGED PROPOSED R.R. @ SECOND & THIRD FLOOR PLAN
Scale: 1/2=1'-0"

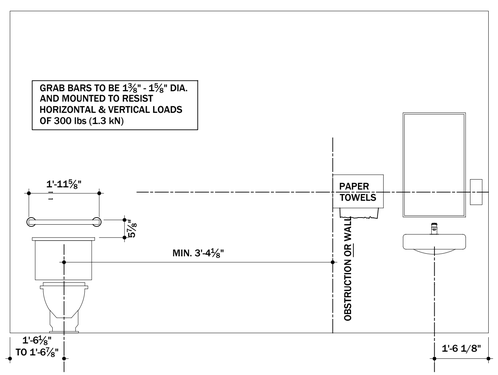


3/4 ENLARGED PROPOSED RR. @ STAFF AREA
Scale: 1/2=1'-0"









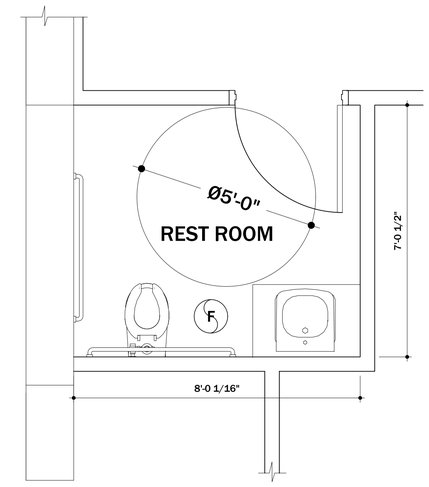
4/4 TYP. MOUNTING HEIGHTS HC. REST ROOMS
Scale: 1/2=1'-0"

BARRIER-FREE WASHROOM DESIGN REQUIREMENTS:

BARRIER-FREE ACCESSIBILITY NOTES:

1. WORK AND ACCESSORIES REQUIRED TO "ACCESSIBLE" WASHROOM:
   - A) PROVIDE ONE TILT MIRROR DESIGNATED AS "ACCESSIBLE".
   - B) INSULATE WASTE AND HOT WATER SUPPLY PIPING AT U/S OF LAVATORY.
   - C) WALL HUNG LAVATORY SHALL BE EQUIPPED WITH APPROVED "WING-HANDLED" TRIM.
   - D) MOUNT ALL FIXTURES AND ACCESSORIES AT 3'-11¼" A.F.F.
   - E) DOOR TO BE CAPABLE OF LOCKING FROM THE INSIDE AND RELEASED FROM THE OUTSIDE IN CASE OF EMERGENCY.
   - F) PROVIDE COAT HOOK AND SHELF AT 3'-11¼" A.F.F.
   - G) PROVIDE SOAP DISPENSER (ONE-HAND OPERABLE) AT 3'-11½" A.F.F.
   - H) PROVIDE TOWEL DISPENSER (ONE-HAND OPERABLE) OR HAND-DRYING EQUIPMENT AT 3'-11¼" A.F.F.
   - I) UNIVERSAL WASHROOMS ARE TO BE EQUIPPED WITH AN EMERGENCY CALL SYSTEM THAT CONSISTS OF AUDIBLE AND VISUAL DEVICES INSIDE AND OUTSIDE OF THE WASHROOM THAT ARE ACTIVATED BY A CONTROL DEVICE INSIDE THE WASHROOM. ALSO PROVIDE AN EMERGENCY SIGN THAT CONTAINS THE WORDS "IN THE EVENT OF AN EMERGENCY PUSH EMERGENCY BUTTON AND AUDIBLE AND VISUAL SIGNAL WILL ACTIVATE" IN LETTERS AT LEAST 1" HIGH WITH A 3/16" STROKE AND POSTED ABOVE THE EMERGENCY BUTTON.
   - J) WHERE A WASHROOM IS REQUIRED TO ACCOMMODATE PERSONS WITH DISABILITIES, PROVIDE AN ACCESSIBILITY SIGN CONSISTING OF THE "INTERNATIONAL SYMBOL OF ACCESS"

2. CLEARANCE REQUIREMENTS:
   - A) WATER CLOSETS LOCATED IN A BARRIER-FREE WATER CLOSET STALL AND UNIVERSAL WASHROOMS SHALL BE PROVIDED WITH A CLEAR TRANSFER SPACE OF AT LEAST 2'-11¾" WIDE AND 4'-11" DEEP ADJACENT TO THE WATER CLOSET.
   - B) LAVATORIES LOCATED IN A WASHROOM REQUIRED TO BE BARRIER-FREE SHALL BE PROVIDED WITH A CLEAR SPACE IN FRONT OF THE LAVATORY OF 3'-0½" WIDE AND 4'-5⅞" DEEP FLOOR SPACE TO ALLOW FOR A FORWARD APPROACH. A MAXIMUM OF 1'-7⅜" CAN BE LOCATED UNDER THE LAVATORY.
   - C) A CLEAR SPACE NOT LESS THAN 2'-7⅞" WIDE AND 6'-0" LONG SHALL BE PROVIDED FOR AN ADULT-SIZE CHANGE TABLE, IF APPLICABLE.
   - D) MINIMUM TURNING RADIUS SIZE:
     - 5'-6⅞" FOR UNIVERSAL WASHROOMS
     - 4'-11" FOR BARRIER-FREE WATER CLOSET STALLS.
   - E) ENSURE MINIMUM 1'-11⅞" CLEAR SPACE ON LATCH SIDE OF DOOR AT IN-SWING SIDE.
   - F) ENSURE MINIMUM 11¾" CLEAR SPACE ON LATCH SIDE OF DOOR AT OUT-SWING SIDE.



5/4 ENLARGED PROPOSED RR. @ OFFICE/SALES
Scale: 1/2=1'-0"

PLUMBING SCHEDULE			
No.	SIZE	TYPE	REMARKS
P1		HAND SINK	BY OWNER
P2		TOILET	BY OWNER

530 WELLINGTON AVE

PAUL V. SATAS No. 2469 REGISTERED ARCHITECT

LICENSED: RI #2469, MA #10470, NJ #AI14727, IL #001-010503, CT. #9929

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No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT

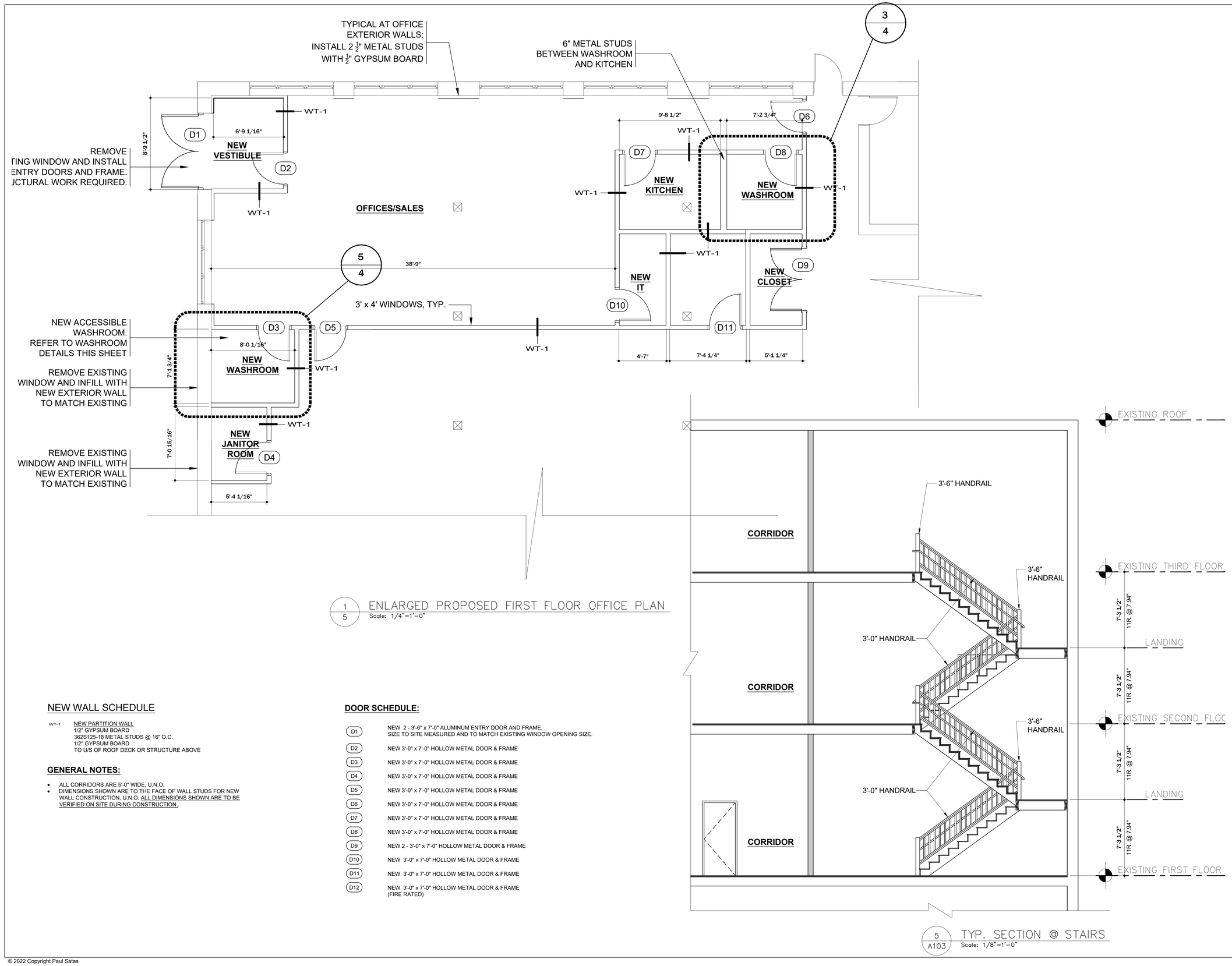
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

PROPOSED RR. PLANS
DETAILS
NOTES

A104

SCALE: AS NOTED



1/5 ENLARGED PROPOSED FIRST FLOOR OFFICE PLAN
Scale: 1/4"=1'-0"

5/A103 TYP. SECTION @ STAIRS
Scale: 1/8"=1'-0"

NEW WALL SCHEDULE

WT-1 NEW PARTITION WALL
1/2" GYPSUM BOARD
362S125-18 METAL STUDS @ 16" O.C.
1/2" GYPSUM BOARD
TO U/S OF ROOF DECK OR STRUCTURE ABOVE

GENERAL NOTES:

- ALL CORRIDORS ARE 5'-0" WIDE, U.N.O.
- DIMENSIONS SHOWN ARE TO THE FACE OF WALL STUDS FOR NEW WALL CONSTRUCTION, U.N.O. ALL DIMENSIONS SHOWN ARE TO BE VERIFIED ON SITE DURING CONSTRUCTION..

DOOR SCHEDULE:

D1	NEW 2 - 3'-6" x 7'-0" ALUMINUM ENTRY DOOR AND FRAME. SIZE TO SITE MEASURED AND TO MATCH EXISTING WINDOW OPENING SIZE.
D2	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D3	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D4	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D5	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D6	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D7	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D8	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D9	NEW 2 - 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D10	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D11	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME
D12	NEW 3'-0" x 7'-0" HOLLOW METAL DOOR & FRAME (FIRE RATED)

530 WELLINGTON AVE

PAUL V. SATAS
No. 2469
REGISTERED ARCHITECT

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No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT

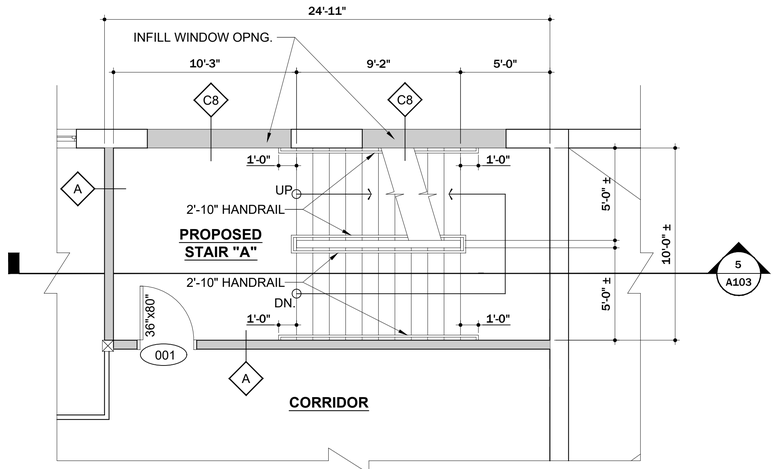
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

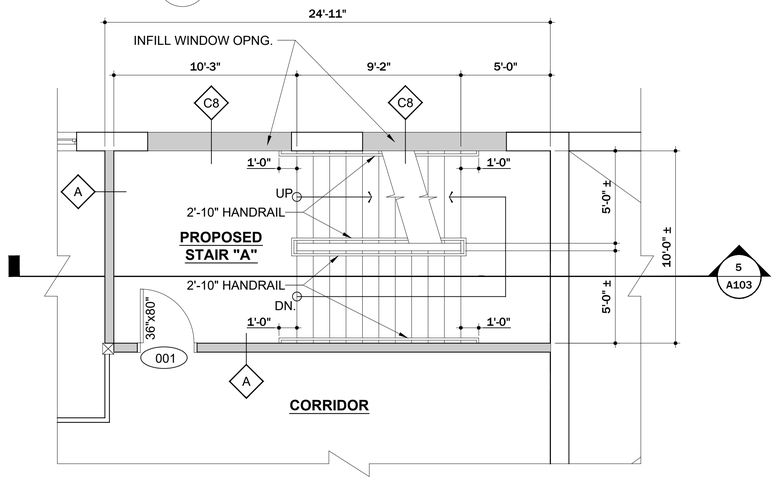
PROPOSED 0FFICE FLOOR PLAN SCHEDULES NOTES

A105

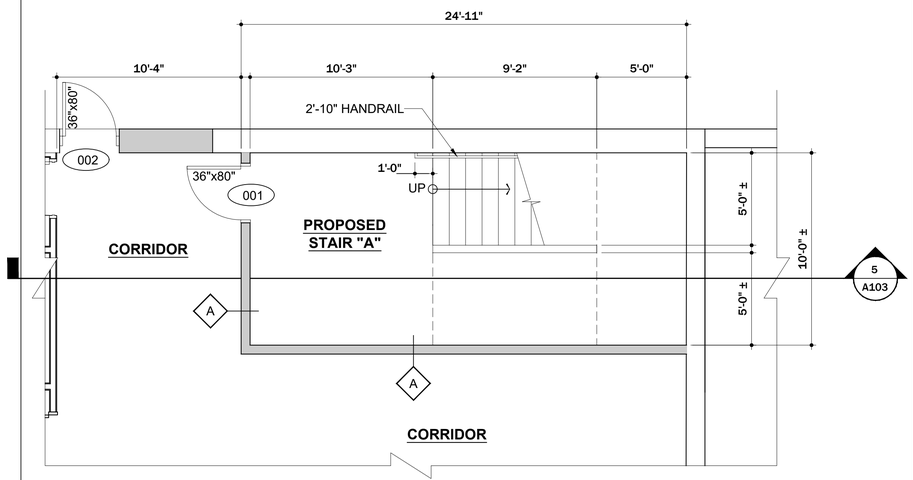
SCALE: AS NOTED



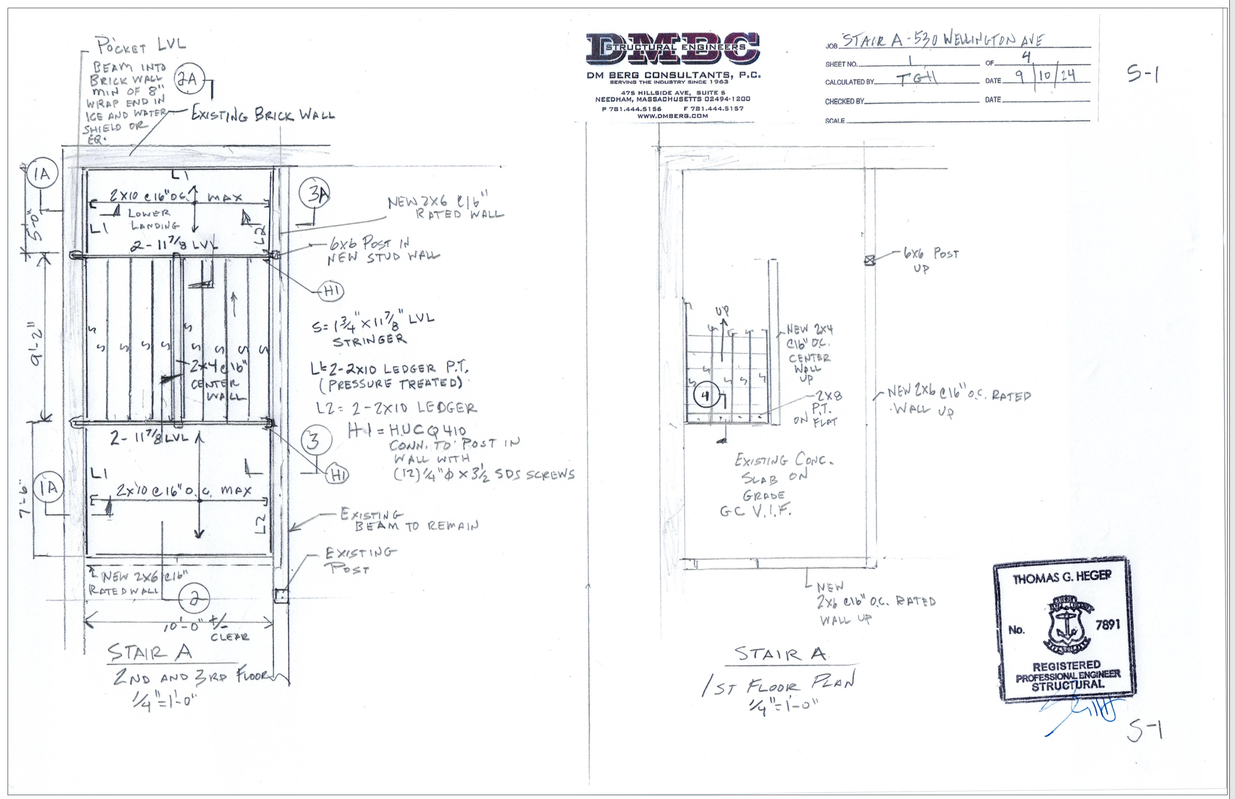
3 / A104 STAIR A @ THIRD FLOOR
Scale: 1/8"=1'-0"



2 / A104 STAIR A @ SECOND FLOOR
Scale: 1/8"=1'-0"



1 / A104 STAIR A @ FIRST FLOOR
Scale: 1/8"=1'-0"



530 WELLINGTON AVE

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No.	Date	Description
1	10-28-24	ISSUED FOR PERMIT
3	11-21-24	ISSUED FOR PERMIT
4	11-27-24	WALL FIRE RATING

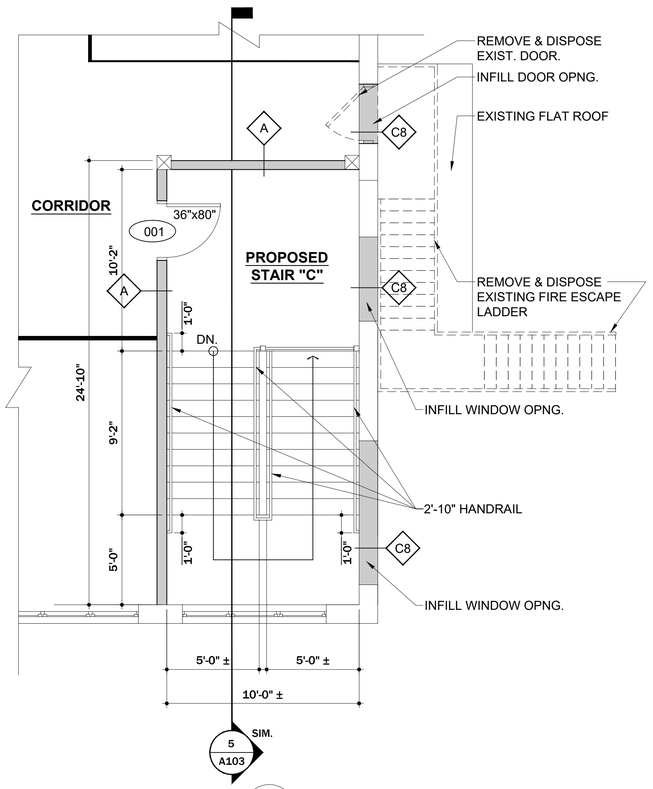
INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

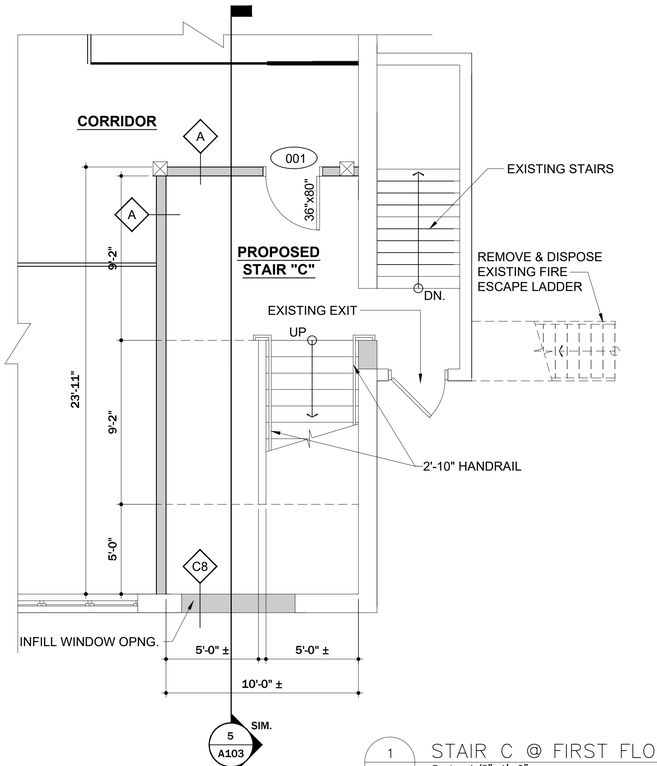
STAIR A FLOOR PLAN
STRUCTURAL FLR. PLANS

A106

SCALE: AS NOTED



2 / A105 STAIR C @ SECOND FLOOR
Scale: 1/8"=1'-0"



1 / A105 STAIR C @ FIRST FLOOR
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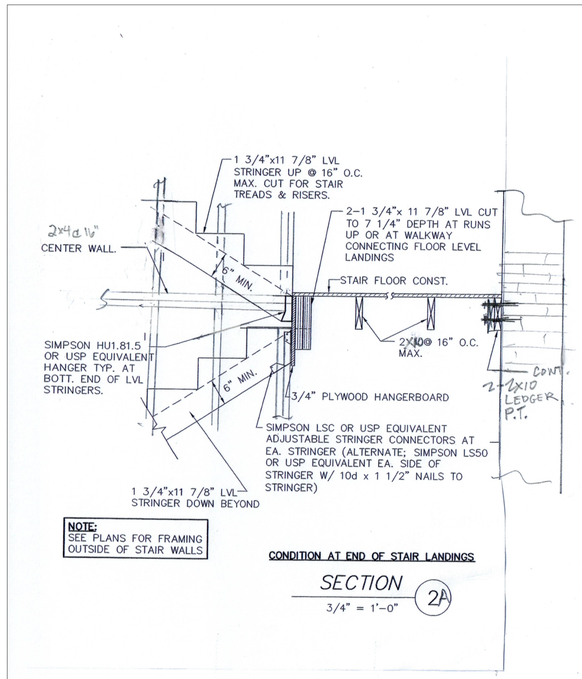

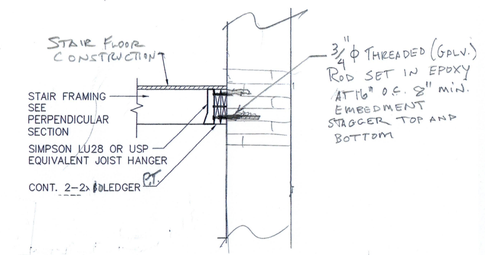

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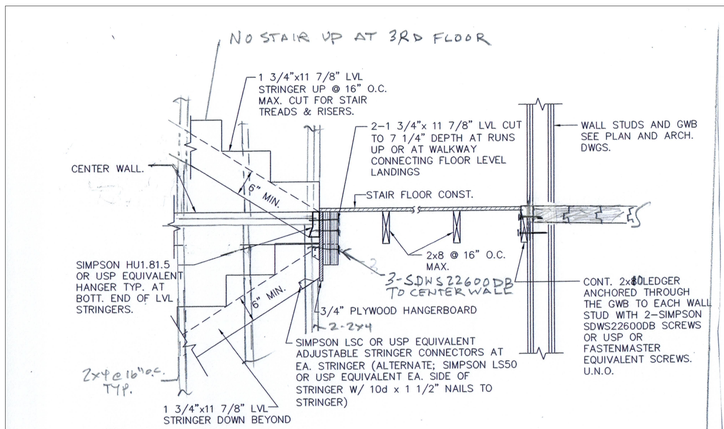
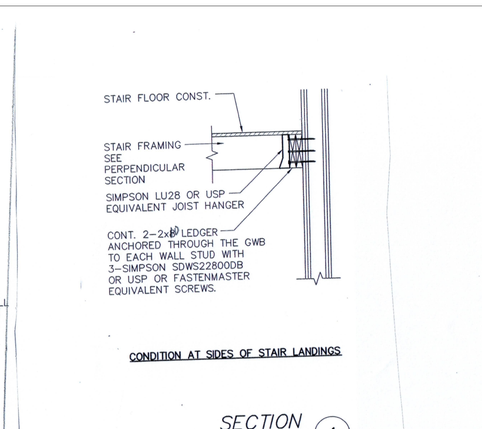
WWW.DMBERG.COM

JOB 530 WELLINGTON AVE
SHEET NO. 3 OF 4
CALCULATED BY TGH DATE 9/10/2024
CHECKED BY DATE
S-3





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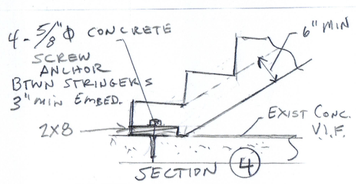

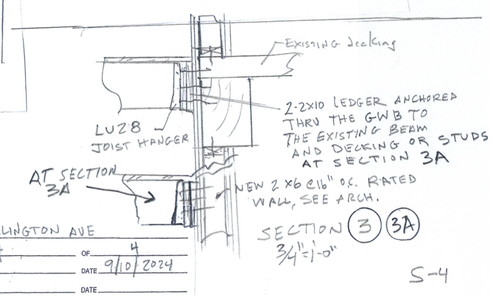

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JOB 530 WELLINGTON AVE
SHEET NO. 4 OF 4
CALCULATED BY DATE 9/10/2024
CHECKED BY DATE
S-4

530 WELLINGTON AVE

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4	11-27-24	WALL FIRE RATING

INTERIOR RENOVATION

530 WELLINGTON AVE
CRANSTON, RI 02910

STAIR C FLOOR PLAN
STRUCTURAL DETAILS

A107

SCALE: AS NOTED

530 Wellington Ave 100' Radius Plat 3 Lot 107

4/25/2024, 9:41:50 AM

Selected Parcels in Buffer	Parcels	A80	B2	M1
SelectedParcels	Buildings	A20	C1	M2
Parcels In Buffer	Zoning Dimensions	A12	C2	EI
Parcel ID Labels	Historic Overlay District	A8	C3	MPD
Streets Names	**Zoning**	A6	C4	S1
Cranston Boundary	none	B1	C5	Other

1:3,729

0 0.045 0.09 0.18 mi

0 0.05 0.1 0.2 km

City of Cranston

Web User
City of Cranston |

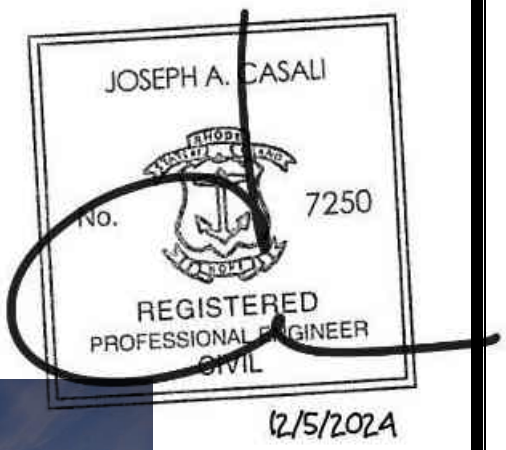
Project Narrative and Stormwater Management Report

For a Proposed Redevelopment Project

Self-Storage Facility

Located at

530-532 Wellington Avenue
Cranston, Rhode Island
AP 3, Lot 107



Prepared for:
CANAM RI LLC
c/o Mr. Mike Jobb
530 Wellington Avenue
Cranston, RI 02910-2950

Submission Date:
September 2024; Revised December 2024

Submitted by:

JCE
JOE CASALI ENGINEERING, INC.
CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WETLANDS · ISDS · TRAFFIC · FLOODPLAIN
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401)944-1313 FAX WWW.JOECASALI.COM

TABLE OF CONTENTS

APPENDICES

1 INTRODUCTION

On behalf of our client, CANAM RI LLC, Joe Casali Engineering, Inc. (JCE) has prepared the following Project Narrative and Stormwater Management Report to identify existing conditions and proposed site improvements associated with the proposed redevelopment of a mill complex. The scope includes the redevelopment of the existing mill complex located at 530-532 Wellington Avenue, in Cranston, Rhode Island to a self-storage facility containing approximately 1,191 storage units or various sizes. The subject property can also be identified as Tax Assessor's Plat Map (AP) 3, Lot 107, and has frontage on Wellington Avenue in the City of Cranston.

2 SITE LOCATION AND PHYSICAL DESCRIPTION

According to a July 2023 Class I Property Line Survey performed by Holland E. Shaw, PLS, the total area of the subject property is 237,000 sq. ft. (5.441 acres). The parcel is currently occupied by a mill complex consisting of a series of buildings internally subdivided with multiple varied uses, parking areas, and outdoor storage areas. The majority of the varied uses within the facility have been vacated as of the date of this report. The parcel is accessed via existing curb cuts on Wellington Avenue and Station Street. The subject parcel is bound by multi-family residential properties to the north, an Amtrak Corridor to the east, a vacant lot to the south, and Wellington Avenue and Interstate 95 to the west, as shown below in Figure 1 – Locus Map.

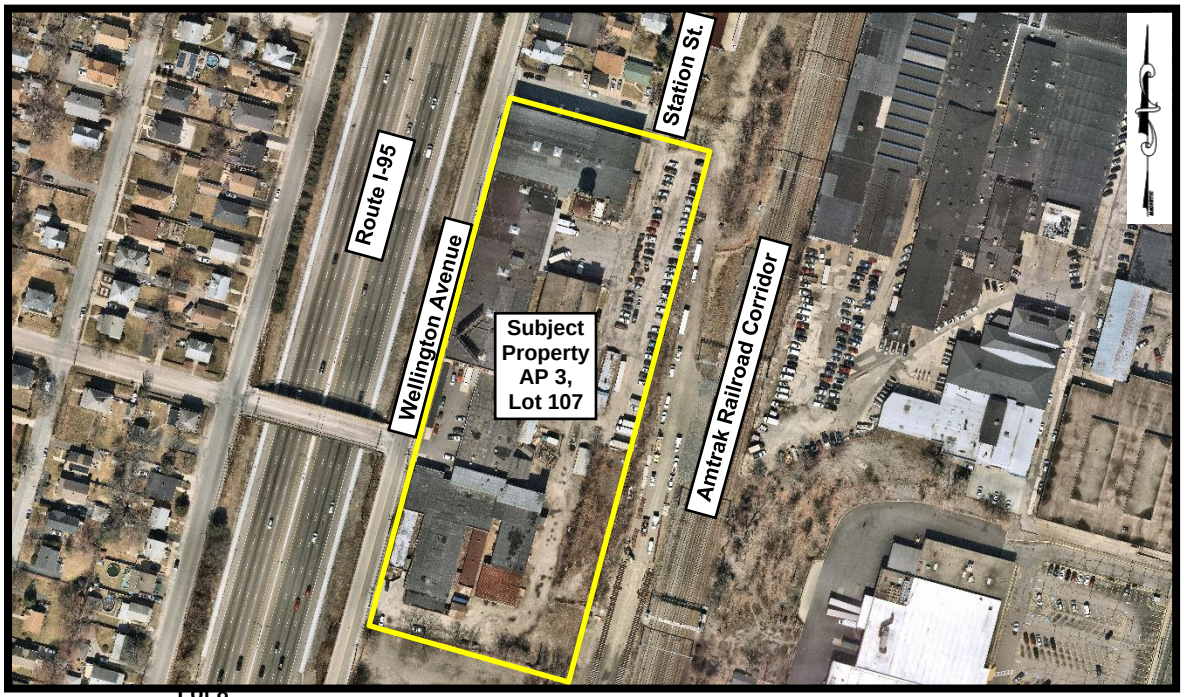


Figure 1 – Locus Map

NOT TO SCALE

2.1 Soil Classification

According to the *Web Soil Survey (WSS)* operated by the US Department of Agriculture Natural Resources Conservation Service (NRCS), produced by the National Cooperative Soil Survey, the soils on the site consist of Udorthents-Urban land complex (UD) and Merrimac-Urban land complex, 0 to 8 percent slopes (MU). UD soils consist of human transported material. These soils have a very low runoff class and belong to hydrologic soil group A. MU soils consist of loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss. These soils are somewhat excessively drained, have a very low runoff class and belong to Hydrologic Soil Group A.

Figure 2 – Soils Map

NOT TO SCALE

Soil evaluations were observed and documented by JCE in July 2024 to determine the depth to the seasonal high groundwater table (SHGWT) and to estimate infiltration capacity of existing in-situ soil for design of stormwater mitigation measures. Three (3) soil evaluation test pits were excavated, to 108-inches below the ground surface. In general, the SHGWT ranged from about 44-inches to 54-inches below the existing ground surface when encountered. Ledge was not encountered. A Soil Evaluation Test Pit Location Plan and Soil Evaluation Test Hole Logs are included in Appendix A.

In addition, multiple groundwater observation wells have been installed throughout the site by various environmental consultants over the course of the last few years. Data from the installation of these wells has also been assessed and incorporated into the design. Groundwater observation well locations are included on the Site Plan prepared by Sage Environmental in Appendix B; logs are included in Appendix A.

2.2 Environmental Considerations

SAGE Environmental (Sage) completed a conducted an American Society for Testing and Materials (ASTM) Phase I Environmental Site Assessment (ESA) in April 2023. Results of the Phase I ESA identified Recognized Environmental Conditions (RECs), which are explained in more detail in the Phase I ESA (can be provided under separate cover) but are generally summarized below.

- REC #1 - Historic and Current Usage of the Site for Manufacturing and Associated Infrastructure: Building occupants have engaged in manufacturing operations, including but not limited to, vinyl coated products, a rubber heel factory, plastics manufacturing, cabinet manufacturing, jewelry manufacturing, upholstery manufacturing, knife manufacturing, a veterinary laboratory, chemical manufacturers (including resin, algaecides, germicidal detergents, deodorants, sanitizers, and disinfectants), assayers and refiners of precious metals, electroplating operations, spray coating/spray painting/screen-printing, metal and plastic grinding/sharpening, a brewery, appliance repair, sewing, exercise related businesses, real estate businesses, material rental businesses, storage businesses, educational businesses, janitorial services, electricians, an elevator company, and retail businesses, since the early 1900's. In addition to the former property use, several observations of associated infrastructure and potential for releases of oil and/or hazardous materials (OHM) from these past operations were made during the Phase I. These included potentially leaking electrical transformers, stained soil, drains, sumps, pits, hydraulic equipment, and OHM storage containers.
- REC #2 - Historic Environmental Investigations and Known Release Conditions [Underground Storage Tank (UST)-15319, Leaking Underground Storage Tank (LUST) 0713-LS, State Hazardous Waste Site (SHWS SR-07-1035), and SEMS Archive:
    - UST Summary (RIDEM File Number UST-15319: In general, the Site has had at least 25 underground storage tanks (USTs), ranging in capacity from 500-gallons to 10,000-gallons, and utilized for the storage of gasoline, #6

oil, unspecified fuel oil, mineral oil, aromatic solvents, and plasticizers (converted to water storage in circa 1960). On March 16, 1987, RIDEM issued a Certificate of Closure which stated that all regulated tanks "which existed from May 8, 1985", "have either been removed or filled in accordance with State UST Regs". Please note that additional vent pipes were observed, indicating that additional tanks may exist which were previously unidentified.

- LUST Summary (RIDEM Case Number 0713-LS): Two (2) of the USTs, historically utilized for the storage of gasoline and aromatic solvents (i.e., USTs 1 and 9), are documented to have resulted in a release condition to soil and groundwater on the southwest portion of the Site, extending into the municipal right-of-way identified as Wellington Avenue. Contaminants of Concern (COCs) identified in soil and groundwater, at concentrations in excess of the applicable RIDEM criteria, include benzene, toluene, ethylbenzene, and xylenes, and Light Non-aqueous Phase Liquid (LNAPL) (i.e., identified as consisting of a petroleum distillate/paint thinner and/or petroleum with a carbon range of C7 through C18.). The most recent groundwater monitoring event occurred in September 2020. At that time, no LNAPL was detected; however, a sheen was noted on groundwater in each of the four (4) groundwater monitoring wells. According to McPhail Associates, LLC, the plume is/was stable. No groundwater monitoring data from 2022 or 2023 was reported within the RIDEM file and a Letter of Compliance or No Further Action deeming that the release is closed were identified in the RIDEM files. Therefore, the Site may be out of compliance with the RIDEM Regulations.
- State Hazardous Waste Site (SHWS) (SR-07-1035)012/Superfund Enterprise Management System (SEMS)-Archive (RID01201771): In 1986, Rizzo Associates, Inc. conducted a limited subsurface assessment on the Site which identified the following COCs at concentrations in excess of the applicable RIDEM soil and/or groundwater criteria, select polynuclear aromatic hydrocarbons (PAHs). Remediation reportedly included soil excavation and the importation of fill (source of fill material not provided); In circa 1990, the US EPA identified the Site as a potentially hazardous waste site due to activities conducted by Gannon & Scott (RID01201771), a reclaimer of precious metals from plating and stripping solutions from the 1950s through the 1980s. The Site was subsequently investigated on behalf

of the US EPA as part of the Superfund Site Assessment and Removal program which identified the following COCs at concentrations in excess of the applicable RIDEM soil and/or groundwater criteria: select chlorinated VOCs (CVOCs), select PAHS, and toluene. In 2002, the USEPA archived (i.e., removed) from the CERCLIS database and was not a candidate for inclusion on the National Priorities List (NPL) because there was not a drinking water well located in proximity to the Site. As a result, the Site was assigned the status of No Further Remedial Actions Planned (i.e., NFRAP). A NFRAP designation means that no further Federal Superfund Remedial Action was anticipated, under the jurisdiction of CERCLA. Please note that this is not meant to imply compliance with the RIDEM regulations; therefore, the lack of additional assessment and/or remediation due to the above exceedances may represent non-compliance with the RIDEM Remediation Regulations.

- REC #3: Adjoining Land Usage: Based on information provided in the Sanborn Maps, two (2) parcels of land located immediately north of the Site (i.e., 388 and 433 Station Street) were historically utilized for jewelry manufacturing (i.e., 433 Station Street) from circa 1950 through 1972, and a repair shop in circa 1900 (i.e., 388 Station Street which was owned by the New York, New Haven, and Hartford railroad in 1900). No additional information regarding these businesses was obtained during the course of this assessment; however, usage of these properties for jewelry manufacturing and repairs associated with railroad machinery represents a REC.

These locations and conditions are summarized in the Red/Yellow/Green Map, 530 Wellington Ave., Cranston, Rhode Island, prepared by Sage, dated November 21, 2024, included in Appendix B. A Site Investigation Report was filed with RIDEM in August 2024; the development of a Remedial Action Work Plan (RAWP) is in progress.

Based on correspondence between the RI Department of Environmental Management (RIDEM) Office of Water Resources (OWR) and the RIDEM Office of Land Revitalization and Sustainable Materials Management (OLRSMM) in November/December 2024, given the presence of several underground storage tanks on the Southern side of the site along with the existing contamination on the site located to the South (groundwater generally appears to flow towards that site), we understand that the OLRSSM has concerns primarily about the infiltration in the Southeast corner of the site.

Because there is such an extensive history of contamination in this area, it was recommended that the stormwater management design omit infiltration on the Southern end of the site. It is important to note that this will affect the ability to meet groundwater recharge requirements, and a waiver from this requirement is being sought. Details are further discussed in Section 5 below.

2.3 Flood Zone Classification

The site is located on the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) for the City of Cranston, Map Number 44007C0318H, effective date October 2, 2015, as depicted below on Figure 3. The property lies completely within FEMA Flood Zone X, which is defined as areas outside of the 0.2% annual chance floodplain.

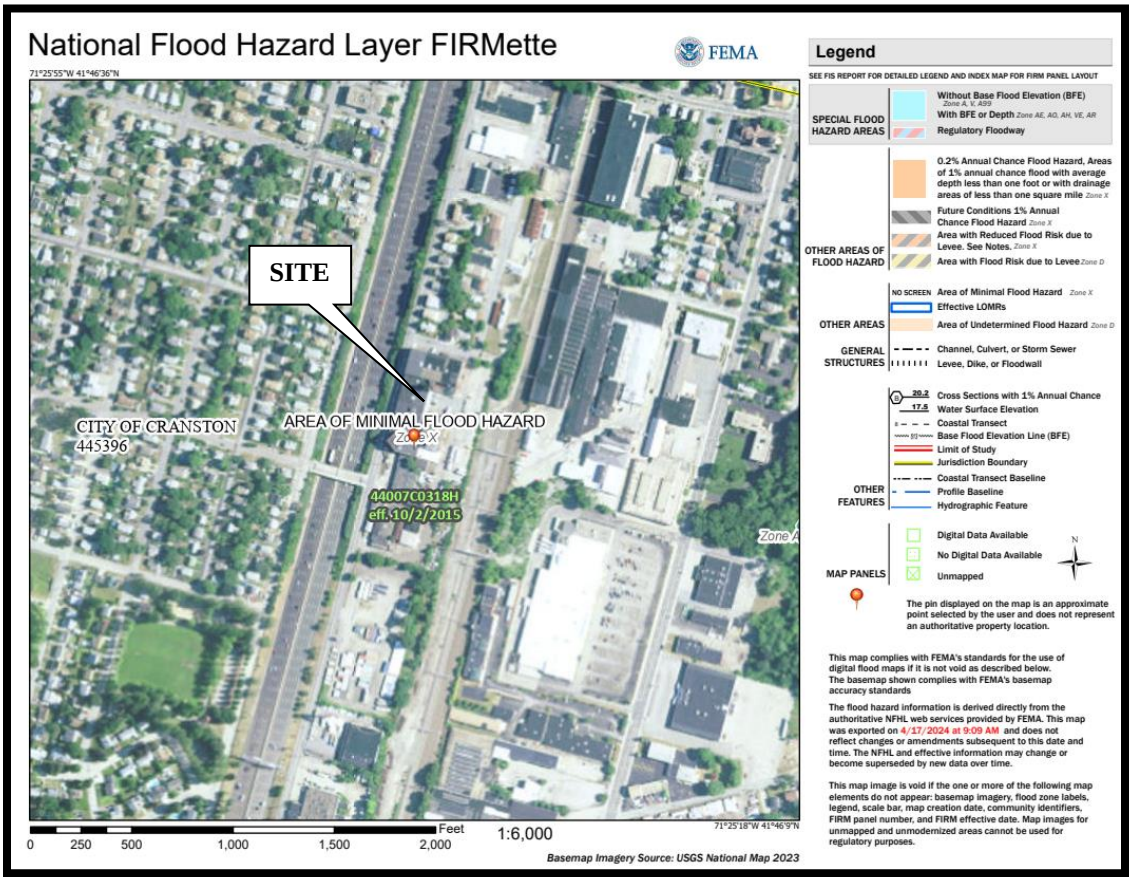


Figure 3 – FEMA Flood Insurance Rate Map
NOT TO SCALE

2.4 Natural Resources

According to the RIDEM Environmental Resource Map, the site is located within the Pawtuxet River Watershed (ID No. 010900040609). Stormwater runoff from the site is

ultimately directed to Fenner Pond (RI0006017L-08) via a buried stream, which ultimately discharges to the Pawtuxet River. Fenner Pond is located on the State of Rhode Island 2022 Impaired Water Report List. The cause of impairment within Fenner Pond is due to the phosphorus levels. There are no total maximum daily loads (TMDL) established at this time. The site is not within any State-designated natural heritage area, unfragmented forest tracts, state, regional, or community greenways and green space priorities. The site does not contain any land in active agricultural use.

2.5 Zoning

The subject property is located within the City of Cranston's General Industry District (M-2). The following are the dimensional requirements for the M-2 zone, along with existing conditions associated with the existing mill complex:

Zoning Criteria	M-2 Requirement	Existing
Min. Lot Area	60,000 SF	237,000 SF
Min. Frontage & Lot Width	200 feet	249 feet
Min. Front Yard Depth	40 feet	0 feet(1)
Min. Side Yard Depth	25 feet	42.6 feet
Min. Rear Yard Depth	30 feet	NA
Maximum Building Coverage	60%	43.8%
Max. Building Height	35 feet	45.1 feet(1)

1. Pre-existing, non-conforming condition.

2.6 Easements

According to a July 2023 Class I Property Line Survey performed by Holland E. Shaw, PLS. Multiple easements exist on site. Two communications easements exist on the northern portion of the site. These easements are referenced in Deed Book 3293, Page's 2 & 19, and Deed Book 5302, Page 54. Also, three sewer easements exist traveling south down the eastern side of the subject property and turning towards Wellington Avenue. These easements are referenced in Deed Book 220, Pages 37 & 38.

2.7 Existing Utilities

Water: Based on a review of existing conditions information obtained from the Providence Water Supply Board (PWSB), a 12-inch asbestos concrete (AC) water main exists within Wellington Avenue, and a 6-inch AC water main exists within Clarence Street. Based on a field review of existing conditions performed by JCE in April 2024, domestic water appears to be provided to the site via a 4-inch cast iron (CI) service from Clarance Street,

and via a 4-inch CI service from Wellington Ave. In addition, fire protection water service appears to be provided to the site via a 6-inch CI service from Clarance Street, and via a 6-inch CI service from Wellington Ave.

Sewer: Based on a review of existing conditions information obtained from the City of Cranston, a 24-inch reinforced concrete sewer main exists within Wellington Avenue and an 8-inch vitrified clay (VCP) sewer main exists within Clarence Street. Based on field investigations performed by JCE in April 2024, it appears that two (2) 6-inch sewer services exist from the existing building(s). An 8-inch VCP conveys effluent from the northern portion of the development to the existing main within Clarence Street; and an 8-inch VCP conveys effluent from the southern portion of the development to the existing main within Wellington Ave.

Gas: Based on a review of existing conditions information from Rhode Island Energy, gas mains exist within Clarence Street and Wellington Avenue. Based on field investigations by JCE in April 2024, it appears that a gas service enters the site from Clarence Street, with multiple meters on the existing building servicing the former tenants.

Electric/Telecommunications: Existing overhead electrical and telecommunication services are provided to the site via the overhead lines along Wellington Avenue, Station Street, and Clarence Street.

Stormwater: Based on field investigations performed by JCE in April 2024, multiple drywells appear to exist throughout the site, particularly within the open space at the eastern portion of the property. Many of these existing structures are deteriorated, filled with debris/sediment, and are likely non-functional. It appears that a series of catch basins are located within the rear portion of the site, which are tied into a 21-inch vitrified clay pipe, which is routed through the property located to the south, ultimately tying into a 4’x4’ box culvert (owned by the City of Cranston). Ultimately, the box culvert crosses through the adjacent Johnston Controls property, continuing to the east across Elmwood Avenue, discharging into Fenner Pond.

3 PROPOSED DEVELOPMENT

The Applicant, CANAM RI LLC, is proposing a complete redevelopment of the site to accommodate a self-storage facility. The scope of improvements to the site includes demolition of multiple existing free-standing accessory structures and demolition of portions of the existing main building on the site. The existing main building is proposed to undergo complete interior and exterior renovation, including a small main office at the northeastern corner of the existing complex. The remainder of the facility is proposed to consist of approximately 1,191 variably sized self-storage units.

The main office is proposed to be accessed from Clarence Street / Station Street with a small 3-stall parking area for potential clients. The remainder of the site is fenced off with key card access for self-storage customers. A 3-stall parking lot is proposed adjacent to the entrance from Station Street, which includes one (2) handicap accessible space. This parking area is located outside the perimeter fence line, and its purpose is for potential customers to park and access to the self-storage main office located at the northeast corner of the existing building. Within the site, multiple parking areas are proposed for customer access to loading areas, loading docks, etc. Overall, a total of 56 parking spaces are proposed throughout the site, including two (2) handicap accessible spaces, in accordance with the Americans with Disabilities Act (ADA).

According to the City of Cranston's Zoning Ordinance, there is no specific use within Chapter 17.64 "Off Street Parking" fitting the definition of self-storage facilities. As such, JCE referenced the Institute of Transportation Engineers (ITE) Parking Generation Manual, 5th edition, dated January 2019. The ITE Manual identifies self-storage as "mini-warehouse", land use code 151. Based on the ITE Manual, peak parking demand per 100 storage units ranges from a minimum of 1.05 to a maximum of 2.38. Based on the 1,191 self-storage units proposed, this equates to a parking requirement ranging from 13 to 29 spaces. The currently proposed 56 spaces exceeds the anticipated peak parking demand per the ITE Manual.

Additional site improvements include perimeter fencing, loading dock canopy, a compacted gravel outdoor storage area for RVs, boats, etc., perimeter paved access road for customers and Fire Department access, landscape improvements, and stormwater management improvements.

3.1 Zoning

As previously noted, the subject property is located within the City of Cranston's General Industry District (M-2). The proposed use, self-storage, is allowed by right in the M-2 zone. However, due to the pre-existing non-conformities associated with the existing building, dimensional variances will be required, as summarized in the following table: conditions associated with the existing mill complex:

Zoning Criteria	M-2 Requirement	Existing	Proposed
Min. Lot Area	60,000 SF	237,000 SF	237,000 SF
Min. Frontage & Lot Width	200 feet	249 feet	249 feet
Min. Front Yard Depth	40 feet	0 feet(1)	0 feet(1)
Min. Side Yard Depth	25 feet	42.6 feet	42.6 feet
Min. Rear Yard Depth	30 feet	NA	NA
Maximum Building Coverage	60%	43.8%	42.6%
Max. Building Height	35 feet	45.1 feet(1)	45.1 feet(1)

1. Pre-existing, non-conforming condition.

3.2 Proposed Utilities

Water: Modifications to the domestic and fire protection water services to the development are not anticipated. However, due to the change in use and resulting change in demand, review and approval from the Providence Water Supply Board will be required.

Sewer: Modifications to the existing sewer services are not anticipated. However, due to the change in use and resulting change in flow, review and approval from Veolia Water / Cranston Department of Public Works will be required.

Gas/Electric/Telecommunications: Major modifications to the site's gas and telecommunications services are not anticipated. However, due to the change in use, review and approval from Rhode Island Energy – Gas will likely be required. The proposed development will likely necessitate a new transformer, which will require coordination with Rhode Island Energy – Electric.

Stormwater: The proposed development includes a reduction in impervious area of approximately 2.7-percent, or about 6,500 square feet. In addition, beautification of the site, including placement of new loam and seed as well as landscape plantings, will assist

in providing natural groundwater infiltration and water quality. Environmental assessments have been completed and identify areas on the site where groundwater infiltration is recommended; refer to "heat map" within Appendix B for additional details. The site's stormwater management system has been designed in accordance with all applicable State and local Standards, improving water quality, groundwater recharge, and reducing peak stormwater runoff rates and total stormwater runoff volumes to the maximum extent practicable.

4 PERMIT REQUIREMENTS

4.1 Local Permit Requirements

4.1.1 City of Cranston Plan Commission

The project team met with the City for a pre-application review of the project in March 2024. The project is considered a Major Land Development, requiring three (3) stages of review, Master Plan, Preliminary Plan and Final Plan with the City Plan Commission. The project received Master Plan approval at the June 6, 2024 City Plan Commission meeting.

4.1.2 Providence Water Supply Board

Due to the change in use and resulting change in demand, review and approval from the Providence Water Supply Board will be required.

4.1.3 Veolia Water/ Cranston Dept. of Public Works

Due to the change in use and resulting change in flow, review and approval from Veolia Water / Cranston Department of Public Works will be required.

4.2 State Permit Requirements

4.2.1 RI Department of Environmental Management

Given the overall area of disturbance associated with development of this site, a submission to the Rhode Island Department of Environmental Management (RIDEM) Office of Water Resources/Stormwater Program is required for a Construction Stormwater Application (CSA). In addition, review and approval will be required by the DEM's Office of Waste Management for review and approval of the site's Remedial Action Work Plan (RAWP), Soils Management Plan (SMP), and Environmental Land Usage Restriction (ELUR).

5 STORMWATER MANAGEMENT PLAN

5.1 General

The proposed development is subject to the requirements of the Rhode Island Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8), a recodification of the regulatory portions of the Stormwater Manual implemented by both the Rhode Island Department of Environmental Management (RIDEM) and the Rhode Island Coastal Resources Management Council (CRMC). In general, all stormwater runoff from the eastern portion of the site sheet flows to existing drywells within the site, which conveys stormwater in a southerly direction, routed to existing drainage network to the property to the south. Stormwater from the western portion of the site sheet flows to a series of catch basins located further down Wellington Avenue. Stormwater runoff from the site is ultimately directed to Fenner Pond via a large box culvert.

The site's proposed stormwater management system has been designed to generally mimic existing conditions. The stormwater management design adheres to all State (RIDEM) and local (City of Cranston) standards of attenuation of peak stormwater runoff rates for the 1-, 2-, 10-, 25-, and 100-year storm event, reduction in stormwater volumes leaving the site while promoting groundwater recharge and improving the quality of the stormwater leaving the site.

In addition, the proposed Stormwater Management Plan takes into account that Fenner Pond is listed as impaired for total phosphorus. Overall water quality of the stormwater leaving the site is improved by implementing the use of a pea gravel diaphragm and sediment forebay for pre-treatment of the stormwater and a new sand filter basin to treat for water quality. As previously noted, due to widespread contamination throughout the site, due to the concerns of the RIDEM OWR and OLRSMM, the sand filter basin located at the Southern end of the site is proposed to be lined and under-drained to aid in mitigation of the conveyance of potential contaminants off site.

5.2 Standard 1: LID Planning and Design Strategies

Low Impact Development (LID) site planning and design strategies must be used to the maximum extent practicable.

Standard Waived – However, Standard Met

LID practices, which include installation of structural stormwater management systems including a bioretention basin and a lined and under-drained sand filter basin, have been

included in the design. The proposed system will provide the necessary water quality treatment and groundwater recharge to the maximum extent practicable. In addition, the proposed drainage patterns closely mimic that of the existing conditions.

5.3 Standard 2: Groundwater Recharge

Stormwater must be recharged within the same sub-watershed to maintain base flow at pre-development recharge levels to the maximum extent practicable.

Standard Not Met – Waiver Requested

Groundwater recharge will be provided on site through a bioretention basin at the northern end of the site. A sand filter basin is proposed at the southern end of the site which is proposed to be lined and under-drained due to subsurface contaminants in this area of the site. A waiver is being requested from the groundwater recharge requirement due to the extensive subsurface contamination around the site. The groundwater recharge standard has been met to the maximum extent practicable via the implementation of the infiltrating bioretention basin. Natural groundwater recharge is also achieved via the reduction in overall impervious areas throughout the site. As such, the Applicant is respectfully requesting a waiver from this requirement. All calculations were completed in accordance with Section 8.8 of the Stormwater Rules using the following formula:

$Re_v = (1") (F) (I) / 12$

Based on the results of the soil evaluation test pits, a recharge factor of 0.35 was used, associated with Hydrologic Soil Group B.

Table 5.1: Recharge Requirements

Subwatershed	**1A**	**1B**
Treatment System	Bioretention Basin #1	Infiltration Basin #1
Impervious Area (SF)	2,621	43,709
Recharge factor (in)	0.35	0.35
Required Recharge Volume (CF)	76	1,275
Required Recharge Volume @ 50% (CF)	38	637
Provided Recharge Volume (CF)	389	0
Recharge Requirement Met?	Yes	No[(4)]

Notes: 1. Refer to Proposed Watershed Map located in Appendix E for BMP locations.
2. Based on Routing Analysis of WQ_v, the entire water quality volume is infiltrated.
3. Recharge Volumes are calculated as the Static Storage Volume.
4. Waiver from groundwater recharge requirement requested due to subsurface contamination.

5.4 Standard 3: Water Quality

The stormwater runoff from the site must be treated prior to discharge.

Standard Met

Based on the Stormwater Rules, the site is considered a redevelopment as more than 10,000 sq. ft. of existing impervious area is being improved and 40% or more existing impervious surface coverage exists within the subject parcel. Therefore only 50% of all disturbed impervious areas must be treated for water quality. Stormwater runoff associated with the pavement are treated by the bioretention basin and lined and under-drained sand filter basin. Calculations were completed in accordance with Section 8.9 of the Stormwater Rules.

Tables 2 and 3 below provide sizing calculations for the Water Quality Volume (WQ_V) of the pretreatment area and the treatment area, respectively. The rooftop area is exempt from pre-treatment requirements. Water quality calculations for impervious surfaces are included in Appendix F.

Table 5.2: Pretreatment Requirements

Subwatershed	**1A**	**1B**
Treatment System	Crushed Stone Diaphragm	Sediment Forebay #1
Impervious Area (SF)	2,621	43,709
Water Quality Factor (in)	1.00	1.00
Required Water Quality Volume @50% (CF)	109	1,821
Required Static Volume for Pretreatment (25% of WQv)	27	455
Provided Static Storage Volume for Infiltration System (CF)	36	3,314
Pretreatment Requirement Met?	Yes	Yes

Table 5.3: Treatment Requirements		
Subwatershed	**1A**	**1B**
Treatment Type	Bioretention Basin #1	Sand Filter Basin #1
Impervious Area (sf)	2,621	43,709
Water Quality Factor (in)	1.00	1.00
Required Water Quality Volume (CF) @50%	109	1,821
Required Static Volume for Treatment	82	1,366
Provided Static Storage Volume for Treatment (CF)	389	4,901
Treatment Requirement Met	Yes	Yes

Notes:

1. Static Storage Volume = Storage volume of system below outlet (for infiltrating practices) or storage volume within basin and sand filter void space (prior to discharge to underdrain).

As shown in Tables 5.1 through 5.3 above, the site's proposed stormwater management system exceeds the requirements of groundwater recharge volume, water quality pre-treatment volume and water quality volume. This is in accordance with the Stormwater Rules and the City of Cranston's standards, and ultimately reduces any instances of untreated stormwater flow towards Fenner Pond.

5.5 Standard 4: Conveyance and Natural Channel Protection

This standard is designed to prevent erosive flow within natural channels and drainage ways.

Standard Waived – However, Standard Met

The proposed site improvements fall under the redevelopment standard, which does not require peak flow mitigation. However, the large reduction in impervious areas throughout the site coupled with the proposed stormwater management BMPs results in reductions in peak stormwater runoff rates and total runoff volumes to all design points through the 100-year design storm. Calculations are provided in Appendices E and G.

5.6 Standard 5: Overbank Flood Protection

Downstream overbank flood protection must be provided by attenuating the post-development peak discharge rate to the pre-development levels for the 1–, 10-, and 100-year, Type III design storm events.

Standard Waived – However, Standard Met

The proposed project is eligible from this requirement because it is a redevelopment. However, the large reduction in impervious areas throughout the site coupled with the proposed stormwater management BMPs results in reductions in peak stormwater runoff rates and total runoff volumes to all design points through the 100-year design storm. Calculations are provided in Appendices E and G.

5.7 Standard 6: Redevelopment and Infill Projects

For redevelopment sites with 40% or more existing impervious surface coverage and infill sites, only Standards 2, 3, and 7-11 must be addressed.

Standard Met

As shown below, the proposed site improvements are not considered a redevelopment:

Existing Site Area	Existing Impervious Area	Percent Impervious	Redevelopment?
237,000 sf	209,137 sf	88.2%	Yes

5.8 Standard 7: Pollution Prevention

All development sites require the use of source control and pollution prevention measures to minimize the impact that the land use may have on stormwater runoff quality.

Standard Met

Soil erosion and pollution control measures including a crushed stone construction access, compost sock and catch basin silt sacks are proposed to be used during construction. A Soil Erosion and Sediment Control Plan (SESCP), has been prepared in accordance with the Manual and has been submitted separately. A long-term Operation and Maintenance Plan (O&M) has been prepared in accordance with the Manual and has been submitted separately.

5.9 Standard 8: Land Uses with Higher Potential Pollutant Loads

Stormwater discharges from land uses with higher potential pollutant loads (LUHPPLs) require the use of specific source control and pollution prevention measures and the specific stormwater BMPs approved for such use.

A stormwater LUHPPL is defined by the following land uses and activities:

1. Areas within an industrial site (as defined in RIPDES Rule 31(b)(15)) that are the location of activities subject to the RIPDES Multi-Sector General Permit (except

where a No Exposure Certification for Exclusion from RIPDES Stormwater Permitting has been executed);
2. Auto fueling facilities (i.e., gas stations);
3. Exterior vehicle service, maintenance and equipment cleaning areas;
4. Road salt storage and loading areas (if exposed to rainfall); and
5. Outdoor storage and loading/unloading of hazardous substances.

Standard Not Applicable

The subject site does not meet the definition of a LUHPPL, as it does not maintain or require a RIPDES Multi-Sector General Permit.

5.10 Standard 9: Illicit Discharges

All illicit discharges to stormwater management systems are prohibited, including discharges from OWTS, and sub-drains and French drains near OWTSs that do not meet the State's OWTS Rules.

Standard Met

There are no known existing illicit discharges at the site nor are any proposed as part of this project.

5.11 Standard 10: Construction and Erosion Sedimentation Control

Erosion and sedimentation control (ESC) practices must be utilized during the construction phase as well as during any land disturbing activities

Standard Met

Erosion control practices have been employed to avoid and minimize impacts to abutting properties. Detailed notes have been included in the plans to ensure effective implementation of erosion and sedimentation controls, which include a straw wattle/silt fence around the perimeter of the site, Siltsack sediment traps within all catch basins within and adjacent to the site, and a crushed stone construction access at the entrances to the site. The soil erosion and sedimentation control measures will be installed prior to the initiation of construction activities and maintained throughout construction. Once established, these measures will be monitored daily until construction activities are complete. The straw wattle/silt fence line will serve as the strict limits of disturbance for the project. No alterations, including vegetative clearing or surface disturbance, will occur beyond this line. The limits of clearing, grading, and disturbance will be kept to a minimum within the

proposed area of construction. All areas outside of these limits, as depicted on the project site plans, will remain undisturbed, in a completely natural condition.

5.12 Standard 11: Stormwater Management System Operation and Maintenance

The stormwater management system, including all structural stormwater controls and conveyances, must have an Operation and Maintenance Plan to ensure that it continues to function as designed.

Standard Met

A long-term Stormwater Operation and Maintenance Plan has been prepared for the development in accordance with the Manual and is provided under separate cover.

6 DRAINAGE ANALYSIS

6.1 Methodology

The comparative pre- versus post-development hydrologic analysis was performed using the Soil Conservation Service, Technical Release 20 and 55 (TR-20 and TR-55) methodology. The 1-, 2-, 10-, 25-, and 100-year storm events were modeled for a 24-hour, Type III storm utilizing HydroCAD version 10.00. HydroCAD modeling reports for the existing and proposed conditions can be found in Appendices F and H, respectively.

6.2 Existing Conditions

The existing site consists of two (2) watersheds discharging to two (2) off-site design points further described as the existing drainage network (DP1) and the existing drainage inlets within Wellington Avenue (DP2). In general, all stormwater runoff from the eastern portion of the site sheet flows to existing drywells and catch basins within the site, which convey stormwater in a southerly direction to an existing drainage network (DP1). This drainage line is routed through the property to the south, tying into an existing 4’x4’ box culvert, owned and maintained by the City of Cranston. Stormwater from the western portion of the site sheet flows to a series of catch basins located further down Wellington Avenue (DP2). These catch basins are also tied into the existing 4’x4’ box culvert, owned and maintained by the City of Cranston. This box culvert continues to the east, through the adjacent Johnston Controls property, under Elmwood Avenue, ultimately discharging to Fenner Pond. An Existing Conditions Watershed Map is included in Appendix C.

Design Point 1 – Existing Drainage Network

Watershed 1: Consists of 174,413 sq. ft. of paved parking areas and roofs associated with the eastern portion of the parcel. This watershed area consists mostly of impervious area and has a minimum T_C of 6.0 minutes and a composite CN Runoff Number of 93. Stormwater runoff from this area is collected via a closed drainage system that conveys stormwater runoff in a southerly direction, routed to an existing drainage network to the property to the south, Design Point 1.

Design Point 2 – Existing Drainage Inlets within Wellington Avenue

Watershed 2: Consists of 62,600 sq. ft. of the western portion of the project site. This watershed area consists mostly of impervious areas (pavement and rooftop areas) and has a T_C of 6.0 minutes and a composite CN Runoff Number of 98. Runoff from this area sheet flows towards the existing drainage inlets within Wellington Avenue (Design Point 2).

6.3 Proposed Conditions

In general, the proposed drainage patterns mimic existing conditions, discharging to the same design points as under existing conditions. Water quality is achieved by means of infiltration practices. Stormwater runoff from the eastern portion of the project area is conveyed through proposed drainage infrastructure prior to discharging to the existing drainage network, while the remainder of the western portion of the site will continue to sheet flow to the existing catch basins within Wellington Avenue. These conditions are shown in detail on the Proposed Conditions Watershed Map included in Appendix E.

Design Point 1 – Existing Drainage Network

Under proposed conditions, Watershed 1 is subdivided into two (2) subwatersheds.

Subwatershed 1A: Subwatershed 1A consists of 11,579 sq. ft. of mostly pervious areas. This subwatershed area has a minimum T_C of 6.0 minutes and a composite CN Runoff Number of 79. Stormwater runoff from the parking area sheet flows to a crushed stone diaphragm for pre-treatment and then Bioretention Basin #1 for water quality and groundwater recharge. Excess treated stormwater runoff from this area is collected via an outlet control structure that ties into the existing drainage network that conveys stormwater to the property to the south, Design Point 1.

Subwatershed 1B: Consists of 162,834 sq. ft. of mostly pavement areas and roof areas associated with the project site. This subwatershed a T_C of 6.0 minutes and a composite CN Runoff Number of 90. Stormwater runoff from this area sheet flows to Sediment Forebay #1 for pre-treatment and Sand Filter Basin #2 for water quality treatment. Excess treated stormwater runoff from this area is collected via an underdrain system and outlet control structure that ties into the existing drainage network that conveys stormwater to the property to the south, Design Point 1.

Design Point 2 – Existing Drainage Inlets within Wellington Avenue

Subwatershed 2: Consists of 62,600 sq. ft. of the western portion of the project site. This watershed area remains mostly unchanged; however, elimination of some smaller rooftop areas and paved areas are being converted to grassed/landscaped area are proposed. As such, this watershed area consists mostly of impervious areas (pavement and rooftop areas) and therefore has been assigned a T_C of 6.0 minutes and a composite CN Runoff Number of 94. Runoff from this area sheet flows towards the existing drainage inlets within Wellington Avenue (Design Point 2).

6.4 Results

A runoff analysis of the pre- and post-construction conditions was completed using the TR-20 methodology and is summarized in Table 3 below. Supporting calculations for the pre- and post-construction conditions are included in Appendices F and H respectively.

Table 6.1: Watershed Data

	Area (SF)	CN	Tc (min.)
Exist. Watershed 1	174,413	93	6.0
Exist. Watershed 2	62,600	98	6.0
Existing Totals	**237,013**	**94**	--
Prop. Subwatershed 1A	11,579	79	6.0
Prop. Subwatershed 1B	162,834	90	6.0
Watershed 2	62,600	94	6.0
Proposed Totals	**237,013**	**91**	**--**
Delta (Δ)	**0**	**-3**	**--**

Note: Minimum Tc = 6 minutes; Average CN is a weighted average.

As shown in Table 6.1 above, the overall watershed area remains unchanged when comparing existing to proposed conditions. However, due to the decrease in impervious

areas associated with the proposed development, the CN value has been decreased by 3 when comparing existing to proposed conditions.

Table 6.2.1: Peak Discharge (cfs) to Design Point 1

	WQ	1-YR	10-YR	100-YR
Existing Condition	3.62	8.84	17.70	32.69
Proposed Condition	0.12	4.08	15.48	30.13
Delta (Δ)	***-3.50***	***-4.76***	***-2.22***	***-2.56***

Table 6.2.2: Peak Discharge (cfs) to Design Point 2

	WQ	1-YR	10-YR	100-YR
Existing Condition	1.52	3.66	6.73	11.99
Proposed Condition	1.35	3.29	6.45	11.81
Delta (Δ)	***-0.17***	***-0.37***	***-0.28***	***-0.18***

As shown in Tables 6.2.1 and 6.2.2 above, the peak stormwater runoff rates realized at Design Point 1 (Existing Drainage Network) and Design Point 2 (existing catch basins within Wellington Avenue) have decreased for all design storm events. This will result in significantly less stress on the public drainage system, specifically the existing 4'x4' box culvert.

Table 6.2.3: Total Runoff Volume (cf) to Design Point 1

	WQ	1-YR	10-YR	100-YR
Existing Condition	8,883	28,609	59,587	114,207
Proposed Condition	6,667	17,050	45,447	98,348
Delta (Δ)	***-2,216***	***-11,559***	***-14,140***	***-15,859***

Table 6.2.4: Total Runoff Volume (cf) to Design Point 2

	WQ	1-YR	10-YR	100-YR
Existing Condition	5,142	12,883	24,327	44,132
Proposed Condition	3,507	10,751	21,959	41,620
Delta (Δ)	***-1,635***	***-2,132***	***-2,368***	***-2,512***

As shown in Tables 6.2.3 and 6.2.4 above, the total stormwater runoff volumes realized at Design Point 1 (Existing Drainage Network) and Design Point 2 (existing catch basins within Wellington Avenue) have decreased for all design storm events. This will result in

significantly less stress on the public drainage system, specifically the existing 4'x4' box culvert.

7 CONCLUSIONS

As shown in Sections 4, 5 and 6 above, the proposed improvements have been designed to minimize impacts of the proposed site development by reducing peak stormwater runoff rates for the 1, 10, and 100-year design storm vents while treating for water quality by the installation of BMP's including a bioretention basin and a lined and under-drained sand filter basin.

Due to the addition of the bioretention basin and the lined and under-drained sand filter basin, which infiltrate (bioretention only) and detain stormwater, both Design Points experiences reduction in peak stormwater runoff rates and provides water quality for the runoff leaving the watershed. The proposed stormwater management system has been designed to be in compliance with the rules and regulations stipulated in the Stormwater Rules. The stormwater management system as designed will not have any negative impacts to the existing drainage system within the subject property and within Wellington Avenue. In addition, as shown within this report, the WQv design storm is completely infiltrated on-site thereby improving current water quality conditions. Lastly, the proposed Stormwater Management Plan considers the existing TMDL for Fenner Pond by improving the overall water quality through infiltration practices.

Appendix A

Soil Evaluation Test Pit Location Plan and Soil Evaluation Test Pit Logs

prepared by Joe Casali Engineering, dated August 2024

TEST HOLE LOCATION: See Test Hole Location Plan

GROUND SURFACE EL. / DATUM: 836.96' / NAVD88

EXCAVATOR TYPE: Mini Excavator

OPERATOR: Jim - Dubon Masonry

DATE START/FINISH: July 5, 2024

WEATHER: Sunny, 90 Deg. F

EXCAVATOR REACH: Approx. 12-ft

JCE REPRESENTATIVE: D. DeCesaris, PE (RI 10162)

TH-1

DEPTH (FT)	SAMPLE TYPE/NO.	LAYER	REMARKS/ NOTES	SOIL / ROCK DESCRIPTION	EST. HYDRAULIC CONDUCTIVITY
1		FILL	Pockets of iron oxide staining/mottling observed at 54-inches.	(0-2") ASPHALT (2-12") SILTY SAND (SM); Brown, dry, 60% fine to coarse sand, 35% nonplastic fines, 5% fine to coarse gravel. (12-14") ASPHALT (14-24") SILTY SAND (SM); Light brown, dry, 65% fine to coarse sand, 20% fine to coarse gravel, 15% nonplastic fines. *USDA Class: Loamy Sand.*	N/A
2		GLACIAL DEPOSITS		(24-60") SILTY SAND (SM); Brown, dry, 70% fine to coarse sand, 20% nonplastic fines, 10% fine to coarse gravel. *USDA Class: Loamy Sand.*	HSG B 2.41 in/hr
5				(60-108") POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); Light brown, dry to moist, 75% fine to coarse sand, 15% fine to coarse gravel, 10% nonplastic fines. *USDA Class: Loamy Sand.*	HSG B 8.27 in/hr
9				Bottom of test hole at 108-inches; excavation backfilled with previously excavated material upon completion.	
10					
11					
12					
13					

NOTES:

SHGWT: 54-inches

IMPERVIOUS / LIMITING LAYER: Not encountered

PROJECT NAME: 530 Wellington Ave, Cranston

PROJECT NUMBER: 24-25

JCE
JOE CASALI ENGINEERING, INC.
CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WETLANDS · ISDS · TRAFFIC · FLOODPLAIN
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM

TEST HOLE LOCATION: See Test Hole Location Plan

GROUND SURFACE EL. / DATUM: 836.96' / NAVD88

EXCAVATOR TYPE: Mini Excavator

OPERATOR: Jim - Dubon Masonry

DATE START/FINISH: July 5, 2024

WEATHER: Sunny, 90 Deg. F

EXCAVATOR REACH: Approx. 12-ft

JCE REPRESENTATIVE: D. DeCesaris, PE (RI 10162)

TH-2

DEPTH (FT)	SAMPLE TYPE/NO.	LAYER	REMARKS/ NOTES	SOIL / ROCK DESCRIPTION	EST. HYDRAULIC CONDUCTIVITY
1		FILL	Pockets of iron oxide staining/mottling observed at 48-inches.	(0-2") ASPHALT (2-32") SILTY SAND (SM); Brown, dry, 65% fine to coarse sand, 35% nonplastic fines, 5% fine to coarse gravel.	N/A
2					
3		GLACIAL DEPOSITS		(32-60") SILTY SAND (SM); Brown, dry, 70% fine to coarse sand, 20% nonplastic fines, 10% fine to coarse gravel. *USDA Class: Loamy Sand.*	HSG B 2.41 in/hr
4					
5				(60-108") POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); Light brown, dry to moist, 75% fine to coarse sand, 15% fine to coarse gravel, 10% nonplastic fines. *USDA Class: Loamy Sand.*	
6					
7					HSG B 8.27 in/hr
8					
9				Bottom of test hole at 108-inches; excavation backfilled with previously excavated material upon completion.	
10					
11					
12					
13					

NOTES:

SHGWT: 48-inches

IMPERVIOUS / LIMITING LAYER: Not Encountered

PROJECT NAME: 530 Wellington Ave, Cranston

PROJECT NUMBER: 24-25

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300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM

TEST HOLE LOCATION: See Test Hole Location Plan

GROUND SURFACE EL. / DATUM: 836.96' / NAVD88

EXCAVATOR TYPE: Mini Excavator

OPERATOR: Jim - Dubon Masonry

DATE START/FINISH: July 5, 2024

WEATHER: Sunny, 90 Deg. F

EXCAVATOR REACH: Approx. 12-ft

JCE REPRESENTATIVE: D. DeCesaris, PE (RI 10162)

TH-3

DEPTH (FT)	SAMPLE TYPE/NO.	LAYER	REMARKS/ NOTES	SOIL / ROCK DESCRIPTION	EST. HYDRAULIC CONDUCTIVITY
1		FILL		(0-16") ASPHALT MILLINGS	
2				(16-44") SILTY SAND (SM); Light brown, dry, 70% fine to coarse sand, 15% nonplastic fines, 15% fine to coarse gravel.	N/A
3					
4		GLACIAL DEPOSITS	Pockets of iron oxide staining/mottling observed at 44-inches.	(44-120") SILTY SAND (SM); Dark brown, dry to wet, 70% fine to coarse sand, 25% nonplastic fines, 5% fine to coarse gravel. *USDA Class: Loamy Sand.*	
5					
6			Pockets silt observed within excavation from 44- to 120 inches.		HSG B 2.41 in/hr
7					
8			Groundwater penetration observed at 118-inches.		
9				Bottom of test hole at 108-inches; excavation backfilled with previously excavated material upon completion.	
10					
11					
12					
13					

NOTES:

SHGWT: 44-inches

IMPERVIOUS / LIMITING LAYER: Not encountered

PROJECT NAME: 530 Wellington Ave, Cranston

PROJECT NUMBER: 24-25

JCE
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DRAINAGE · WETLANDS · ISDS · TRAFFIC · FLOODPLAIN
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(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM

SOIL BORING/MONITORING WELL LOG: SE-101(MW)

PROJECT NUMBER: S4504

DRILLING DATE: 5/4/23

LOGGED BY: Matthew Gallup

DRILLED BY: SAGE Envirotech Drilling Services, Inc.

WEATHER CONDITIONS: Cloudy, 50s

SCREENING EQUIPMENT: PID

DRILLING RIG:3100 GT Truck Rig

DRILL METHOD: Direct Push

SAMPLE METHOD: 5' Macrocore

BORING TOTAL DEPTH: 15'

BORING REFUSAL: No

BORING/MW DIAMETER: 1"

LENGTH OF RISER: 5

LENGTH OF SCREEN: 10

DEPTH (FEET BSG)	DRIVE INTERVAL (FEET BSG)	INCHES RECOVERY	SAMPLE INTERVAL (FEET BSG)	PID (PPMV)	MATERIAL DESCRIPTION (MOISTURE CONTENT, COLOR, DENSITY, CLASSIFICATION, NOTES)	LITHOLOGY GRAPHIC LOG	DTW (FEET BSG)	WELL CONSTRUCTION (VISUAL)	WELL CONSTRUCTION (DEPTH INTERVALS (BSG))
0	0-5	36	0-3	0.1	(0'-3') Light brown, dry, loose, poorly graded, gravelly sands, little or no fines. Top 1' consisted of crushed asphalt.				Filter Pack
3			NR	NR	(3'-5') No recovery.				Bentonite
5	5-10	36	5-8	0.3	(5'-8') Light brown, dry, loose, poorly graded, gravelly sands, little or no fines.		8' ▼		
8			NR	NR	(8'-10') No recovery.				Filter Pack
10	10-15	60	10-15	2.0	(10'-15') Tan, dense, wet, poorly graded, gravelly sands, little or no fines. End of boring and well installed 15' bsg.				
15									

COMMENTS:
THIS BORE LOG IS INTENDED FOR ENVIRONMENTAL NOT GEOTECHNICAL PURPOSES.
NS: Not Sampled; NR: No Recovery; BSG: Below Surface Grade

SOIL BORING/MONITORING WELL LOG: SE-221(MW)

SAGE ENVIRONMENTAL

PROJECT NUMBER: S4504
DRILLING DATE: 03/13/2024
LOGGED BY: Matthew Gallup
DRILLED BY: SAGE EnviroTech Drilling Services, Inc.
WEATHER CONDITIONS: 50F Sunny
SCREENING EQUIPMENT: PID
DRILLING RIG: 7822 DT Track Rig

DRILL METHOD: Direct Push
SAMPLE METHOD: 5' Macrocore
BORING TOTAL DEPTH: 15
BORING REFUSAL: No
BORING/MW DIAMETER: 2"
LENGTH OF RISER: 5'
LENGTH OF SCREEN: 10'

DEPTH (FEET BSG)	DRIVE INTERVAL (FEET BSG)	INCHES RECOVERY	SAMPLE INTERVAL (FEET BSG)	PID (PPMV)	MATERIAL DESCRIPTION (MOISTURE CONTENT, COLOR, DENSITY, CLASSIFICATION, NOTES)	LITHOLOGY GRAPHIC LOG	DTW (FEET BSG)	WELL CONSTRUCTION (VISUAL)	WELL CONSTRUCTION (DEPTH INTERVALS (BSG))
0	0-2	24	0-2	0.2	(0'-2') Brown, dry, loose, well graded, gravelly sands, little or no fines, with urban fill material consisting of asphalt.				Filter Pack
2	2-5	24	2-4	0.2	(2'-4') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				Bentonite
4			NR	NR	(4'-5') No recovery.				
5	5-10	36	NS	NS	(5'-6') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				
6			6-8	0.6	(6'-8') Tan/gray, wet, dense, sand-silt mixtures.		6 ▼		
8			NR	NR	(8'-10') No recovery.				Filter Pack
10	10-15	48	10-13	1.3	(10'-13') Gray, wet, dense, organic silts and organic silty clays of low plasticity.				
13			13-14	0.7	(13'-14') Gray, wet, dense, organic silts and organic silty clays of low plasticity.				
14			NR	NR	(14'-15') No recovery. End of boring at 15' BSG.				
15									

COMMENTS:
THIS BORE LOG IS INTENDED FOR ENVIRONMENTAL NOT GEOTECHNICAL PURPOSES.
NS: Not Sampled; NR: No Recovery; BSG: Below Surface Grade

SOIL BORING/MONITORING WELL LOG: SE-222(MW)

PROJECT NUMBER: S4504
DRILLING DATE: 03/13/2024
LOGGED BY: Matthew Gallup
DRILLED BY: SAGE EnviroTech Drilling Services, Inc.
WEATHER CONDITIONS: 50F Sunny
SCREENING EQUIPMENT: PID
DRILLING RIG: 7822 DT Track Rig

DRILL METHOD: Direct Push
SAMPLE METHOD: 5' Macrocore
BORING TOTAL DEPTH: 15
BORING REFUSAL: No
BORING/MW DIAMETER: 2"
LENGTH OF RISER: 5'
LENGTH OF SCREEN: 10'

DEPTH (FEET BSG)	DRIVE INTERVAL (FEET BSG)	INCHES RECOVERY	SAMPLE INTERVAL (FEET BSG)	PID (PPMV)	MATERIAL DESCRIPTION (MOISTURE CONTENT, COLOR, DENSITY, CLASSIFICATION, NOTES)	LITHOLOGY GRAPHIC LOG	DTW (FEET BSG)	WELL CONSTRUCTION (VISUAL)	WELL CONSTRUCTION (DEPTH INTERVALS (BSG))
0	0-2	24	0-2	0.2	(0'-2') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				Filter Pack
2	2-5	24	2-4	0.2	(2'-4') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				Bentonite
4			NR	NR	(4'-5') No recovery.				
5	5-10	36	NS	NS	(5'-6') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.		6 ▼		
6			6-8	0.7	(6'-8') Gray, wet, loose, sand-silt mixtures.				
8			NR	NR	(8'-10') No recovery.				Filter Pack
10	10-15	48	10-12	1.4	(10'-12') Gray, wet, loose, sand-silt mixtures.				
12			12-14	3.6	(12'-14') Gray, wet, dense, organic silts and organic silty clays of low plasticity.				
14			NR	NR	(14'-15') No recovery. End of boring at 15' BSG.				
15									

COMMENTS:
THIS BORE LOG IS INTENDED FOR ENVIRONMENTAL NOT GEOTECHNICAL PURPOSES.
NS: Not Sampled; NR: No Recovery; BSG: Below Surface Grade

SOIL BORING/MONITORING WELL LOG: SE-223(MW)

PROJECT NUMBER: S4504
DRILLING DATE: 03/13/2024
LOGGED BY: Matthew Gallup
DRILLED BY: SAGE EnviroTech Drilling Services, Inc.
WEATHER CONDITIONS: 50F Sunny
SCREENING EQUIPMENT: PID
DRILLING RIG: 7822 DT Track Rig

DRILL METHOD: Direct Push
SAMPLE METHOD: 5' Macrocore
BORING TOTAL DEPTH: 20
BORING REFUSAL: No
BORING/MW DIAMETER: 2"
LENGTH OF RISER: 5'
LENGTH OF SCREEN: 10'

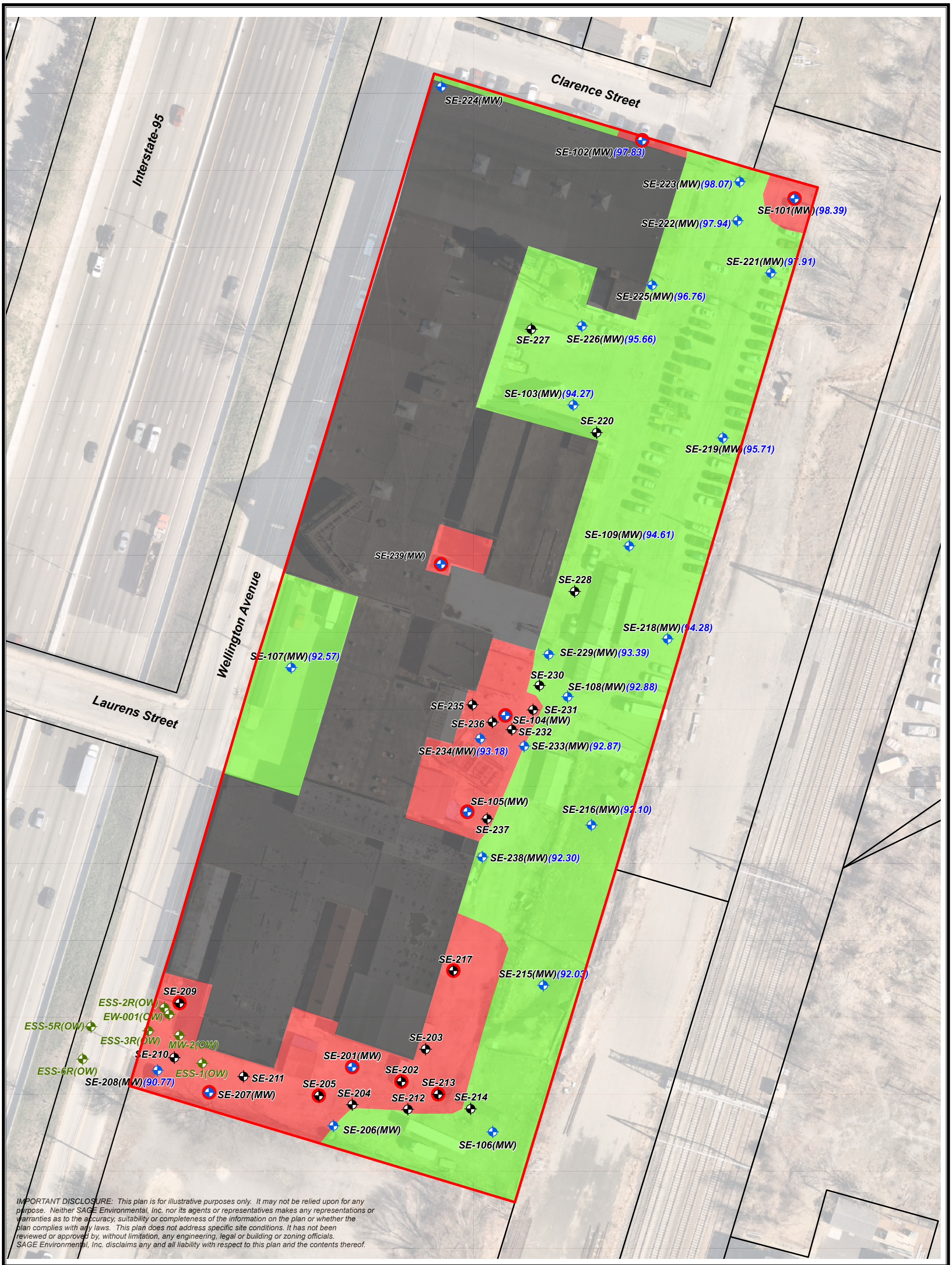
DEPTH (FEET BSG)	DRIVE INTERVAL (FEET BSG)	INCHES RECOVERY	SAMPLE INTERVAL (FEET BSG)	PID (PPMV)	MATERIAL DESCRIPTION (MOISTURE CONTENT, COLOR, DENSITY, CLASSIFICATION, NOTES)	LITHOLOGY GRAPHIC LOG	DTW (FEET BSG)	WELL CONSTRUCTION (VISUAL)	WELL CONSTRUCTION (DEPTH INTERVALS (BSG))
0	0-2	24	0-2	0	(0'-2') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				Filter Pack
2	2-5	24	2-4	0	(2'-4') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.				Bentonite
4			NR	NR	(4'-5') No recovery.				
5	5-10	24	5-6	0	(5'-6') Tan, dry, loose, poorly graded, gravelly sands, little or no fines.		6 ▼		
6			6-7	0.8	(6'-7') Tan, wet, loose, sand-silt mixtures.				
7			NR	NR	(7'-10') No recovery.				
10	10-15	48	10-12	2.1	(10'-12') Tan, wet, loose, sand-silt mixtures.				Filter Pack
12			12-14	1.6	(12'-14') Gray, wet, dense, organic silts and organic silty clays of low plasticity.				
14			NR	NR	(14'-15') No recovery.				
15	15-17	36	15-16.5	NS	(15'-16.5') Liner jammed in soil barrel could not sample.				
16			16.5-17	2.6	(16.5'-17') Gray, wet, dense, organic silts and organic silty clays of low plasticity.				
17	17-20	0	NR	NR	(17'-20') Not sampled. Casing drove to 20' to set well. End of boring at 20' BSG.				
20									

COMMENTS:
THIS BORE LOG IS INTENDED FOR ENVIRONMENTAL NOT GEOTECHNICAL PURPOSES.
NS: Not Sampled; NR: No Recovery; BSG: Below Surface Grade

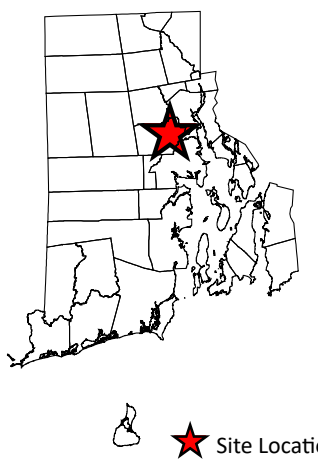
Appendix B

Red/Yellow/Green Map, 530 Wellington Ave., Cranston, Rhode Island

prepared by Sage Environmental, dated November 2024



IMPORTANT DISCLOSURE: This plan is for illustrative purposes only. It may not be relied upon for any purpose. Neither SAGE Environmental, Inc. nor its agents or representatives makes any representations or warranties as to the accuracy, suitability or completeness of the information on the plan or whether the plan complies with any laws. This plan does not address specific site conditions. It has not been reviewed or approved by, without limitation, any engineering, legal or building or zoning officials. SAGE Environmental, Inc. disclaims any and all liability with respect to this plan and the contents thereof.



Red/Yellow/Green Map

530 Wellington Avenue
Cranston, Rhode Island

Figure

Date: 11/21/2024

Job #: S4504

Created By: ALM

Legend

- Approximate Site Boundary
- Building
- Green: All RISDISM BMPs Allowed.
- Red: Hard Cap - No Water on the Soil - Lined BMPs Only.
- Approximate Location of SAGE Soil Boring
- Approximate Location of SAGE Monitoring Well (Groundwater Elevation (Feet))
- Approximate Location of Existing Monitoring Well
- Sample Location with Applicable RIDEM Method 1 GB-GWO and/or GB-LC Exceedance(s)

Data Provided by RIGIS
Orthoimagery provided by nearmap.com

SAGE ENVIRONMENTAL
A Terracon Company

Appendix C

Existing Condition Watershed Map

LEGEND

- WATERSHED BOUNDARY LINE
- TIME OF CONCENTRATION LINE
- UNDERGROUND TIME OF CONCENTRATION LINE

JOHNSTON CONTROLS / TYCO FIRE PROTECTION PRODUCTS

EXISTING 4'x4' BOX CULVERT CONTINUES EAST THROUGH JOHNSTON CONTROLS PROPERTY AND ELMWOOD AVE., ULTIMATELY DISCHARGING TO FENNER POND

AMTRAK RAIL LINES

TIME OF CONCENTRATION LINE (TYP.)

EXISTING 21" VCP DISCHARGING THROUGH ADJACENT PROPERTY TO EXISTING 4'x4' CITY OF CRANSTON BOX CULVERT

DP1

WATERSHED 1
AREA = 174,413 SF
TC = 6.0 MIN.
CN = 93

EXISTING DRAINAGE NETWORK WITHIN SITE

PROPERTY LINE (TYP.)

OVERALL WATERSHED AREA: 237,013 SF

EXISTING 4'x4' BOX CULVERT; OWNED AND MAINTAINED BY THE CITY OF CRANSTON

JIRA REALTY INC
530-532 WELLINGTON AVE

CLARENCE STREET

WELLINGTON AVE

DP2

WATERSHED 2
AREA = 62,600 SF
TC = 6.0 MIN.
CN = 98

EXISTING CITY OF CRANSTON DRAINAGE INLETS WITHIN WELLINGTON AVENUE

ROUTE 95 NORTHBOUND

ROUTE 95 SOUTHBOUND

LAURENS STREET

SCALE (FEET)
0 50 100 200 400
1 INCH =100 FT

JCE
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CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WATER SUPPLY · WASTEWATER
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM

PROPOSED SELF-STORAGE BUILDING
530-532 WELLINGTON STREET
CRANSTON, RHODE ISLAND
AP 3, LOT 107

REVISIONS:

NO.	DATE.	DESCRIPTION
1	12/2024	RIDEM RTC

DESIGNED BY:	SD
DRAWN BY:	SD
CHECKED BY:	JAC
DATE:	SEPT. 2024
PROJECT NO:	24-25

STORMWATER REPORT

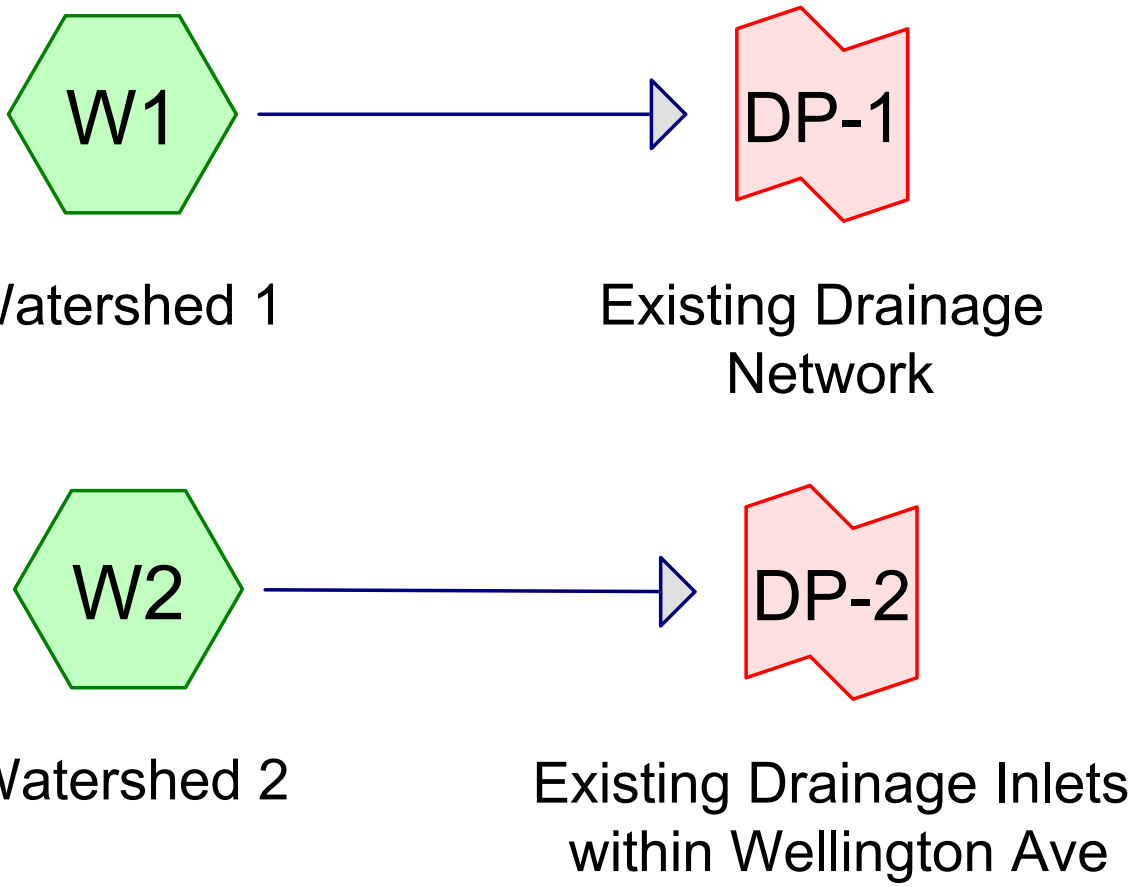
EXISTING CONDITIONS WATERSHED MAP

SHEET 1 OF 1

Q:\24-25 Mike Jobb\Drainage\Watershed Maps\Wellington Ave Self-Storage [Watershed Maps] R1.dwg Dec. 05, 2024 9:54am

Appendix D

Existing Condition HydroCAD Calculations



Subcat Reach Pond Link

Routing Diagram for Wellington Ave - Existing
Prepared by Joe Casali Engineering, Inc, Printed 9/3/2024

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
5,140	61	>75% Grass cover, Good, HSG B (W1, W2)
10,752	48	Brush, Good, HSG B (W1)
11,984	82	Dirt , HSG B (W1)
87,754	98	Paved parking, HSG B (W1, W2)
121,383	98	Roofs, HSG B (W1, W2)
237,013	**94**	**TOTAL AREA**

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1: Watershed 1 Runoff Area=174,413 sf 84.38% Impervious Runoff Depth=1.97"
Flow Length=817' Tc=6.0 min CN=93 Runoff=8.84 cfs 28,609 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 98.98% Impervious Runoff Depth=2.47"
Tc=6.0 min CN=98 Runoff=3.66 cfs 12,883 cf

Link DP-1: Existing Drainage Network Inflow=8.84 cfs 28,609 cf
Primary=8.84 cfs 28,609 cf

Link DP-2: Existing Drainage Inlets within Wellington Ave Inflow=3.66 cfs 12,883 cf
Primary=3.66 cfs 12,883 cf

Total Runoff Area = 237,013 sf Runoff Volume = 41,492 cf Average Runoff Depth = 2.10"
11.76% Pervious = 27,876 sf 88.24% Impervious = 209,137 sf

Summary for Subcatchment W1: Watershed 1

Runoff = 8.84 cfs @ 12.09 hrs, Volume= 28,609 cf, Depth= 1.97"
Routed to Link DP-1 : Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
74,440	98	Roofs, HSG B
72,735	98	Paved parking, HSG B
10,752	48	Brush, Good, HSG B
11,984	82	Dirt , HSG B
4,502	61	>75% Grass cover, Good, HSG B
174,413	93	Weighted Average
27,238	65	15.62% Pervious Area
147,175	98	84.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
2.1	296	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
1.7	466	0.0100	4.54	3.56	**Pipe Channel, Pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, bends & connections
4.3	817	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 3.66 cfs @ 12.09 hrs, Volume= 12,883 cf, Depth= 2.47"
Routed to Link DP-2 : Existing Drainage Inlets within Wellington Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
46,943	98	Roofs, HSG B
15,019	98	Paved parking, HSG B
638	61	>75% Grass cover, Good, HSG B
62,600	98	Weighted Average
638	61	1.02% Pervious Area
61,962	98	98.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Link DP-1: Existing Drainage Network

Inflow Area = 174,413 sf, 84.38% Impervious, Inflow Depth = 1.97" for 1-Year event
Inflow = 8.84 cfs @ 12.09 hrs, Volume= 28,609 cf
Primary = 8.84 cfs @ 12.09 hrs, Volume= 28,609 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Existing Drainage Inlets within Wellington Ave

Inflow Area = 62,600 sf, 98.98% Impervious, Inflow Depth = 2.47" for 1-Year event
Inflow = 3.66 cfs @ 12.09 hrs, Volume= 12,883 cf
Primary = 3.66 cfs @ 12.09 hrs, Volume= 12,883 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1: Watershed 1 Runoff Area=174,413 sf 84.38% Impervious Runoff Depth=4.10"
Flow Length=817' Tc=6.0 min CN=93 Runoff=17.70 cfs 59,587 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 98.98% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=6.73 cfs 24,327 cf

Link DP-1: Existing Drainage Network Inflow=17.70 cfs 59,587 cf
Primary=17.70 cfs 59,587 cf

Link DP-2: Existing Drainage Inlets within Wellington Ave Inflow=6.73 cfs 24,327 cf
Primary=6.73 cfs 24,327 cf

Total Runoff Area = 237,013 sf Runoff Volume = 83,914 cf Average Runoff Depth = 4.25"
11.76% Pervious = 27,876 sf 88.24% Impervious = 209,137 sf

Summary for Subcatchment W1: Watershed 1

Runoff = 17.70 cfs @ 12.09 hrs, Volume= 59,587 cf, Depth= 4.10"
Routed to Link DP-1 : Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
74,440	98	Roofs, HSG B
72,735	98	Paved parking, HSG B
10,752	48	Brush, Good, HSG B
11,984	82	Dirt , HSG B
4,502	61	>75% Grass cover, Good, HSG B
174,413	93	Weighted Average
27,238	65	15.62% Pervious Area
147,175	98	84.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
2.1	296	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
1.7	466	0.0100	4.54	3.56	**Pipe Channel, Pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, bends & connections
4.3	817	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 6.73 cfs @ 12.09 hrs, Volume= 24,327 cf, Depth= 4.66"
Routed to Link DP-2 : Existing Drainage Inlets within Wellington Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
46,943	98	Roofs, HSG B
15,019	98	Paved parking, HSG B
638	61	>75% Grass cover, Good, HSG B
62,600	98	Weighted Average
638	61	1.02% Pervious Area
61,962	98	98.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Link DP-1: Existing Drainage Network

Inflow Area = 174,413 sf, 84.38% Impervious, Inflow Depth = 4.10" for 10-Year event
Inflow = 17.70 cfs @ 12.09 hrs, Volume= 59,587 cf
Primary = 17.70 cfs @ 12.09 hrs, Volume= 59,587 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Existing Drainage Inlets within Wellington Ave

Inflow Area = 62,600 sf, 98.98% Impervious, Inflow Depth = 4.66" for 10-Year event
Inflow = 6.73 cfs @ 12.09 hrs, Volume= 24,327 cf
Primary = 6.73 cfs @ 12.09 hrs, Volume= 24,327 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1: Watershed 1 Runoff Area=174,413 sf 84.38% Impervious Runoff Depth=7.86"
Flow Length=817' Tc=6.0 min CN=93 Runoff=32.69 cfs 114,207 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 98.98% Impervious Runoff Depth=8.46"
Tc=6.0 min CN=98 Runoff=11.99 cfs 44,132 cf

Link DP-1: Existing Drainage Network Inflow=32.69 cfs 114,207 cf
Primary=32.69 cfs 114,207 cf

Link DP-2: Existing Drainage Inlets within Wellington Ave Inflow=11.99 cfs 44,132 cf
Primary=11.99 cfs 44,132 cf

Total Runoff Area = 237,013 sf Runoff Volume = 158,339 cf Average Runoff Depth = 8.02"
11.76% Pervious = 27,876 sf 88.24% Impervious = 209,137 sf

Summary for Subcatchment W1: Watershed 1

Runoff = 32.69 cfs @ 12.09 hrs, Volume= 114,207 cf, Depth= 7.86"
Routed to Link DP-1 : Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
74,440	98	Roofs, HSG B
72,735	98	Paved parking, HSG B
10,752	48	Brush, Good, HSG B
11,984	82	Dirt , HSG B
4,502	61	>75% Grass cover, Good, HSG B
174,413	93	Weighted Average
27,238	65	15.62% Pervious Area
147,175	98	84.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
2.1	296	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
1.7	466	0.0100	4.54	3.56	**Pipe Channel, Pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, bends & connections
4.3	817	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 11.99 cfs @ 12.09 hrs, Volume= 44,132 cf, Depth= 8.46"
Routed to Link DP-2 : Existing Drainage Inlets within Wellington Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
46,943	98	Roofs, HSG B
15,019	98	Paved parking, HSG B
638	61	>75% Grass cover, Good, HSG B
62,600	98	Weighted Average
638	61	1.02% Pervious Area
61,962	98	98.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Link DP-1: Existing Drainage Network

Inflow Area = 174,413 sf, 84.38% Impervious, Inflow Depth = 7.86" for 100-Year event
Inflow = 32.69 cfs @ 12.09 hrs, Volume= 114,207 cf
Primary = 32.69 cfs @ 12.09 hrs, Volume= 114,207 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Existing Drainage Inlets within Wellington Ave

Inflow Area = 62,600 sf, 98.98% Impervious, Inflow Depth = 8.46" for 100-Year event
Inflow = 11.99 cfs @ 12.09 hrs, Volume= 44,132 cf
Primary = 11.99 cfs @ 12.09 hrs, Volume= 44,132 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Appendix E

Proposed Watershed Map

LEGEND

- WATERSHED BOUNDARY LINE
- TIME OF CONCENTRATION LINE
- UNDERGROUND TIME OF CONCENTRATION LINE

PROPOSED BIORETENTION FILTER BASIN #1

WATERSHED 1A
AREA = 11,579 SF
TC = 6.0 MIN.
CN = 79

WATERSHED 1B
AREA = 162,834 SF
TC = 6.0 MIN.
CN = 90

TIME OF CONCENTRATION LINE (TYP.)

PROPOSED LINED & SUBDRAINED SEDIMENT FOREBAY

PROPOSED LINED & SUBDRAINED SAND FILTER

PROPOSED OUTLET CONTROL STRUCTURE (TYP.)

EXISTING 21" VCP DISCHARGING THROUGH ADJACENT PROPERTY TO EXISTING 4'x4' CITY OF CRANSTON BOX CULVERT

DP1

EXISTING DRAINAGE NETWORK WITHIN SITE

PROPERTY LINE (TYP.)

OVERALL WATERSHED AREA: 237,013 SF

JOHNSTON CONTROLS / TYCO FIRE PROTECTION PRODUCTS

AMTRAK RAIL LINES

EXISTING 4'x4' BOX CULVERT CONTINUES EAST THROUGH JOHNSTON CONTROLS PROPERTY AND ELMWOOD AVE., ULTIMATELY DISCHARGING TO FENNER POND

EXISTING 4'x4' BOX CULVERT; OWNED AND MAINTAINED BY THE CITY OF CRANSTON

EXISTING CITY OF CRANSTON DRAINAGE INLETS WITHIN WELLINGTON AVENUE

JIRA REALTY INC
530-532 WELLINGTON AVE

CLARENCE STREET

WELLINGTON AVE

LAURENS STREET

ROUTE 95 NORTHBOUND

ROUTE 95 SOUTHBOUND

WATERSHED 2
AREA = 62,600 SF
TC = 6.0 MIN.
CN = 94

DP2

SCALE (FEET)
0 50 100 200 400
1 INCH =100 FT

JCE
JOE CASALI ENGINEERING, INC.
CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WATER SUPPLY · WASTEWATER
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401) 944-1313 FAX WWW.JOECASALI.COM

PROPOSED SELF-STORAGE BUILDING

530-532 WELLINGTON STREET
CRANSTON, RHODE ISLAND
AP 3, LOT 107

REVISIONS:

NO.	DATE.	DESCRIPTION
1	12/2024	RIDEM RTC

DESIGNED BY:	SD
DRAWN BY:	SD
CHECKED BY:	JAC
DATE:	SEPT. 2024
PROJECT NO:	24-25

STORMWATER REPORT

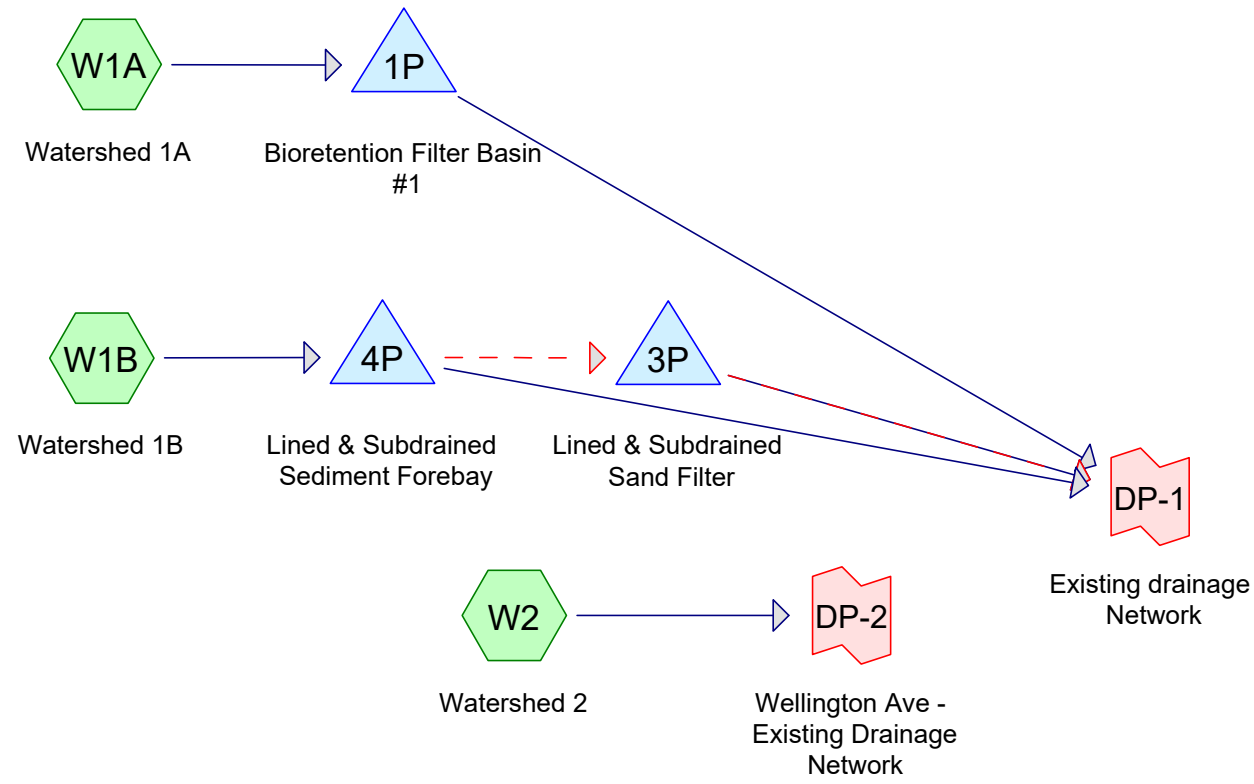
PROPOSED CONDITIONS WATERSHED MAP

SHEET 1 OF 1

Q:\24-25 Mike Jobb\Drainage\Watershed Maps\Wellington Ave Self-Storage [Watershed Maps] R1.dwg Dec. 05, 2024 9:54am

Appendix F

Proposed Condition HydroCAD Calculations



Subcat Reach Pond Link

Routing Diagram for Wellington Ave - Proposed R1
Prepared by Joe Casali Engineering, Inc, Printed 12/5/2024
HydroCAD® 10.20-4c s/n 02468 © 2024 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
45,774	61	>75% Grass cover, Good, HSG B (W1A, W1B, W2)
26,145	96	Compacted Aggegate , HSG B (W1B)
5,326	82	Dirt , HSG B (W1A)
56,433	98	Paved parking, HSG B (W1A, W1B, W2)
103,335	98	Roofs, HSG B (W1B, W2)
237,013	**90**	**TOTAL AREA**

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1A: Watershed 1A Runoff Area=11,579 sf 22.64% Impervious Runoff Depth=0.97"
Flow Length=115' Tc=6.0 min CN=79 Runoff=0.29 cfs 940 cf

SubcatchmentW1B: Watershed 1B Runoff Area=162,834 sf 62.68% Impervious Runoff Depth=1.71"
Flow Length=628' Tc=6.0 min CN=90 Runoff=7.31 cfs 23,213 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 87.99% Impervious Runoff Depth=2.06"
Tc=6.0 min CN=94 Runoff=3.29 cfs 10,751 cf

Pond 1P: Bioretention Filter Basin #1 Peak Elev=48.16' Storage=319 cf Inflow=0.29 cfs 940 cf
Discarded=0.05 cfs 939 cf Primary=0.00 cfs 0 cf Outflow=0.05 cfs 939 cf

Pond 3P: Lined & Subdrained Sand Filter Peak Elev=43.59' Storage=5,674 cf Inflow=7.01 cfs 16,205 cf
Primary=0.07 cfs 3,877 cf Secondary=3.94 cfs 8,667 cf Outflow=4.01 cfs 12,545 cf

Pond 4P: Lined & Subdrained Sediment Peak Elev=43.71' Storage=3,956 cf Inflow=7.31 cfs 23,213 cf
Primary=0.07 cfs 4,505 cf Secondary=7.01 cfs 16,205 cf Outflow=7.08 cfs 20,710 cf

Link DP-1: Existing drainage Network Inflow=4.08 cfs 17,050 cf
Primary=4.08 cfs 17,050 cf

Link DP-2: Wellington Ave - Existing Drainage Network Inflow=3.29 cfs 10,751 cf
Primary=3.29 cfs 10,751 cf

Total Runoff Area = 237,013 sf Runoff Volume = 34,904 cf Average Runoff Depth = 1.77"
32.59% Pervious = 77,245 sf 67.41% Impervious = 159,768 sf

Summary for Subcatchment W1A: Watershed 1A

Runoff = 0.29 cfs @ 12.10 hrs, Volume= 940 cf, Depth= 0.97"
Routed to Pond 1P : Bioretention Filter Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
2,621	98	Paved parking, HSG B
5,326	82	Dirt , HSG B
3,632	61	>75% Grass cover, Good, HSG B
11,579	79	Weighted Average
8,958	73	77.36% Pervious Area
2,621	98	22.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
0.4	60	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
0.9	115	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W1B: Watershed 1B

Runoff = 7.31 cfs @ 12.09 hrs, Volume= 23,213 cf, Depth= 1.71"
Routed to Pond 4P : Lined & Subdrained Sediment Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

	Area (sf)	CN	Description
	58,354	98	Roofs, HSG B
	43,709	98	Paved parking, HSG B
*	26,145	96	Compacted Aggegate , HSG B
	34,626	61	>75% Grass cover, Good, HSG B
	162,834	90	Weighted Average
	60,771	76	37.32% Pervious Area
	102,063	98	62.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	55	0.0130	1.04		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
4.0	573	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
4.9	628	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 3.29 cfs @ 12.09 hrs, Volume= 10,751 cf, Depth= 2.06"
Routed to Link DP-2 : Wellington Ave - Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
44,981	98	Roofs, HSG B
10,103	98	Paved parking, HSG B
7,516	61	>75% Grass cover, Good, HSG B
62,600	94	Weighted Average
7,516	61	12.01% Pervious Area
55,084	98	87.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond 1P: Bioretention Filter Basin #1

Inflow Area = 11,579 sf, 22.64% Impervious, Inflow Depth = 0.97" for 1-Year event
Inflow = 0.29 cfs @ 12.10 hrs, Volume= 940 cf
Outflow = 0.05 cfs @ 12.67 hrs, Volume= 939 cf, Atten= 84%, Lag= 34.3 min
Discarded = 0.05 cfs @ 12.67 hrs, Volume= 939 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 48.16' @ 12.67 hrs Surf.Area= 842 sf Storage= 319 cf

Plug-Flow detention time= 104.2 min calculated for 939 cf (100% of inflow)
Center-of-Mass det. time= 103.6 min (959.0 - 855.4)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	256 cf	**100% Voids (Conic)** Listed below (Recalc)
#2	46.00'	252 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 764 cf Overall x 33.0% Voids
		508 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.00	382	0	0	382
48.50	653	256	256	656

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	382	0	0
48.00	382	764	764

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	48.30'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.67 hrs HW=48.16' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=46.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: Lined & Subdrained Sand Filter

Inflow = 7.01 cfs @ 12.10 hrs, Volume= 16,205 cf
Outflow = 4.01 cfs @ 12.27 hrs, Volume= 12,545 cf, Atten= 43%, Lag= 9.8 min
Primary = 0.07 cfs @ 12.27 hrs, Volume= 3,877 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 3.94 cfs @ 12.27 hrs, Volume= 8,667 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.59' @ 12.27 hrs Storage= 5,674 cf

Plug-Flow detention time= 174.4 min calculated for 12,545 cf (77% of inflow)
Center-of-Mass det. time= 115.6 min (921.5 - 805.9)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	5,064 cf	**100% Voids (Conic)** Listed below (Recalc) -Impervious
#2	40.67'	1,706 cf	**Sand Filter (Prismatic)** Listed below (Recalc) -Impervious 5,170 cf Overall x 33.0% Voids
#3	40.17'	466 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) -Impervious 1,413 cf Overall x 33.0% Voids
		7,236 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	2,825	0	0	2,825
43.00	3,181	1,501	1,501	3,194
44.00	3,960	3,563	5,064	4,001

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	2,825	0	0
42.50	2,825	5,170	5,170

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	2,825	0	0
40.67	2,825	1,413	1,413

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.45'	**30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.27 hrs HW=43.58' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 8.83 fps)

Secondary OutFlow Max=3.67 cfs @ 12.27 hrs HW=43.58' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 3.67 cfs @ 1.18 fps)

Summary for Pond 4P: Lined & Subdrained Sediment Forebay

Inflow Area = 162,834 sf, 62.68% Impervious, Inflow Depth = 1.71" for 1-Year event
Inflow = 7.31 cfs @ 12.09 hrs, Volume= 23,213 cf
Outflow = 7.08 cfs @ 12.10 hrs, Volume= 20,710 cf, Atten= 3%, Lag= 0.8 min
Primary = 0.07 cfs @ 12.10 hrs, Volume= 4,505 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 7.01 cfs @ 12.10 hrs, Volume= 16,205 cf
Routed to Pond 3P : Lined & Subdrained Sand Filter

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.71' @ 12.10 hrs Surf.Area= 6,278 sf Storage= 3,956 cf

Plug-Flow detention time= 113.2 min calculated for 20,710 cf (89% of inflow)
Center-of-Mass det. time= 61.9 min (875.5 - 813.6)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	3,500 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
#2	40.67'	1,044 cf	**Sand Filter Layer (Prismatic)** Listed below (Recalc) 3,162 cf Overall x 33.0% Voids
#3	40.17'	285 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) 864 cf Overall x 33.0% Voids
		4,829 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	1,728	0	0	1,728
43.00	1,987	928	928	1,998
44.00	3,205	2,572	3,500	3,229

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	1,728	0	0
42.50	1,728	3,162	3,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	1,728	0	0
40.67	1,728	864	864

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.52'	**30.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.10 hrs HW=43.71' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 8.99 fps)

Secondary OutFlow Max=6.91 cfs @ 12.10 hrs HW=43.71' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 6.91 cfs @ 1.22 fps)

Summary for Link DP-1: Existing drainage Network

Inflow Area = 174,413 sf, 60.02% Impervious, Inflow Depth > 1.17" for 1-Year event
Inflow = 4.08 cfs @ 12.27 hrs, Volume= 17,050 cf
Primary = 4.08 cfs @ 12.27 hrs, Volume= 17,050 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wellington Ave - Existing Drainage Network

Inflow Area = 62,600 sf, 87.99% Impervious, Inflow Depth = 2.06" for 1-Year event
Inflow = 3.29 cfs @ 12.09 hrs, Volume= 10,751 cf
Primary = 3.29 cfs @ 12.09 hrs, Volume= 10,751 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1A: Watershed 1A Runoff Area=11,579 sf 22.64% Impervious Runoff Depth=2.72"
Flow Length=115' Tc=6.0 min CN=79 Runoff=0.83 cfs 2,620 cf

SubcatchmentW1B: Watershed 1B Runoff Area=162,834 sf 62.68% Impervious Runoff Depth=3.78"
Flow Length=628' Tc=6.0 min CN=90 Runoff=15.64 cfs 51,292 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 87.99% Impervious Runoff Depth=4.21"
Tc=6.0 min CN=94 Runoff=6.45 cfs 21,959 cf

Pond 1P: Bioretention Filter Basin #1 Peak Elev=48.41' Storage=452 cf Inflow=0.83 cfs 2,620 cf
Discarded=0.05 cfs 1,723 cf Primary=0.75 cfs 904 cf Outflow=0.81 cfs 2,627 cf

Pond 3P: Lined & Subdrained Sand Filter Peak Elev=43.78' Storage=6,383 cf Inflow=15.19 cfs 43,685 cf
Primary=0.07 cfs 4,211 cf Secondary=14.58 cfs 35,235 cf Outflow=14.65 cfs 39,446 cf

Pond 4P: Lined & Subdrained Sediment Peak Elev=43.83' Storage=4,316 cf Inflow=15.64 cfs 51,292 cf
Primary=0.07 cfs 5,097 cf Secondary=15.19 cfs 43,685 cf Outflow=15.27 cfs 48,782 cf

Link DP-1: Existing drainage Network Inflow=15.48 cfs 45,447 cf
Primary=15.48 cfs 45,447 cf

Link DP-2: Wellington Ave - Existing Drainage Network Inflow=6.45 cfs 21,959 cf
Primary=6.45 cfs 21,959 cf

Total Runoff Area = 237,013 sf Runoff Volume = 75,871 cf Average Runoff Depth = 3.84"
32.59% Pervious = 77,245 sf 67.41% Impervious = 159,768 sf

Summary for Subcatchment W1A: Watershed 1A

Runoff = 0.83 cfs @ 12.09 hrs, Volume= 2,620 cf, Depth= 2.72"
Routed to Pond 1P : Bioretention Filter Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
2,621	98	Paved parking, HSG B
5,326	82	Dirt , HSG B
3,632	61	>75% Grass cover, Good, HSG B
11,579	79	Weighted Average
8,958	73	77.36% Pervious Area
2,621	98	22.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
0.4	60	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
0.9	115	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W1B: Watershed 1B

Runoff = 15.64 cfs @ 12.09 hrs, Volume= 51,292 cf, Depth= 3.78"
Routed to Pond 4P : Lined & Subdrained Sediment Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
	58,354	98	Roofs, HSG B
	43,709	98	Paved parking, HSG B
*	26,145	96	Compacted Aggegate , HSG B
	34,626	61	>75% Grass cover, Good, HSG B
	162,834	90	Weighted Average
	60,771	76	37.32% Pervious Area
	102,063	98	62.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	55	0.0130	1.04		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
4.0	573	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
4.9	628	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 6.45 cfs @ 12.09 hrs, Volume= 21,959 cf, Depth= 4.21"
Routed to Link DP-2 : Wellington Ave - Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
44,981	98	Roofs, HSG B
10,103	98	Paved parking, HSG B
7,516	61	>75% Grass cover, Good, HSG B
62,600	94	Weighted Average
7,516	61	12.01% Pervious Area
55,084	98	87.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond 1P: Bioretention Filter Basin #1

Inflow Area = 11,579 sf, 22.64% Impervious, Inflow Depth = 2.72" for 10-Year event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 2,620 cf
Outflow = 0.81 cfs @ 12.11 hrs, Volume= 2,627 cf, Atten= 3%, Lag= 1.3 min
Discarded = 0.05 cfs @ 12.12 hrs, Volume= 1,723 cf
Primary = 0.75 cfs @ 12.11 hrs, Volume= 904 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 48.41' @ 12.12 hrs Surf.Area= 981 sf Storage= 452 cf

Plug-Flow detention time= 73.5 min calculated for 2,617 cf (100% of inflow)
Center-of-Mass det. time= 74.9 min (900.2 - 825.4)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	256 cf	**100% Voids (Conic)** Listed below (Recalc)
#2	46.00'	252 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 764 cf Overall x 33.0% Voids
		508 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.00	382	0	0	382
48.50	653	256	256	656

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	382	0	0
48.00	382	764	764

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	48.30'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.12 hrs HW=48.41' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.71 cfs @ 12.11 hrs HW=48.41' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.71 cfs @ 1.07 fps)

Summary for Pond 3P: Lined & Subdrained Sand Filter

Inflow = 15.19 cfs @ 12.10 hrs, Volume= 43,685 cf
Outflow = 14.65 cfs @ 12.11 hrs, Volume= 39,446 cf, Atten= 4%, Lag= 0.9 min
Primary = 0.07 cfs @ 12.11 hrs, Volume= 4,211 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 14.58 cfs @ 12.11 hrs, Volume= 35,235 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.78' @ 12.11 hrs Storage= 6,383 cf

Plug-Flow detention time= 77.9 min calculated for 39,376 cf (90% of inflow)
Center-of-Mass det. time= 37.0 min (836.4 - 799.4)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	5,064 cf	**100% Voids (Conic)** Listed below (Recalc) -Impervious
#2	40.67'	1,706 cf	**Sand Filter (Prismatic)** Listed below (Recalc) -Impervious 5,170 cf Overall x 33.0% Voids
#3	40.17'	466 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) -Impervious 1,413 cf Overall x 33.0% Voids
		7,236 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	2,825	0	0	2,825
43.00	3,181	1,501	1,501	3,194
44.00	3,960	3,563	5,064	4,001

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	2,825	0	0
42.50	2,825	5,170	5,170

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	2,825	0	0
40.67	2,825	1,413	1,413

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.45'	**30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.11 hrs HW=43.77' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.08 fps)

Secondary OutFlow Max=14.22 cfs @ 12.11 hrs HW=43.77' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 14.22 cfs @ 1.86 fps)

Summary for Pond 4P: Lined & Subdrained Sediment Forebay

Inflow Area = 162,834 sf, 62.68% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 15.64 cfs @ 12.09 hrs, Volume= 51,292 cf
Outflow = 15.27 cfs @ 12.10 hrs, Volume= 48,782 cf, Atten= 2%, Lag= 0.6 min
Primary = 0.07 cfs @ 12.10 hrs, Volume= 5,097 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 15.19 cfs @ 12.10 hrs, Volume= 43,685 cf
Routed to Pond 3P : Lined & Subdrained Sand Filter

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.83' @ 12.10 hrs Surf.Area= 6,439 sf Storage= 4,316 cf

Plug-Flow detention time= 62.2 min calculated for 48,782 cf (95% of inflow)
Center-of-Mass det. time= 34.7 min (826.1 - 791.4)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	3,500 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
#2	40.67'	1,044 cf	**Sand Filter Layer (Prismatic)** Listed below (Recalc) 3,162 cf Overall x 33.0% Voids
#3	40.17'	285 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) 864 cf Overall x 33.0% Voids
		4,829 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	1,728	0	0	1,728
43.00	1,987	928	928	1,998
44.00	3,205	2,572	3,500	3,229

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	1,728	0	0
42.50	1,728	3,162	3,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	1,728	0	0
40.67	1,728	864	864

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.52'	**30.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.10 hrs HW=43.83' (Free Discharge)
↑└**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.15 fps)

Secondary OutFlow Max=15.11 cfs @ 12.10 hrs HW=43.83' (Free Discharge)
↑└**1=Broad-Crested Rectangular Weir** (Weir Controls 15.11 cfs @ 1.61 fps)

Summary for Link DP-1: Existing drainage Network

Inflow Area = 174,413 sf, 60.02% Impervious, Inflow Depth > 3.13" for 10-Year event
Inflow = 15.48 cfs @ 12.11 hrs, Volume= 45,447 cf
Primary = 15.48 cfs @ 12.11 hrs, Volume= 45,447 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wellington Ave - Existing Drainage Network

Inflow Area = 62,600 sf, 87.99% Impervious, Inflow Depth = 4.21" for 10-Year event
Inflow = 6.45 cfs @ 12.09 hrs, Volume= 21,959 cf
Primary = 6.45 cfs @ 12.09 hrs, Volume= 21,959 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1A: Watershed 1A Runoff Area=11,579 sf 22.64% Impervious Runoff Depth=6.16"
Flow Length=115' Tc=6.0 min CN=79 Runoff=1.85 cfs 5,947 cf

SubcatchmentW1B: Watershed 1B Runoff Area=162,834 sf 62.68% Impervious Runoff Depth=7.50"
Flow Length=628' Tc=6.0 min CN=90 Runoff=29.83 cfs 101,709 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 87.99% Impervious Runoff Depth=7.98"
Tc=6.0 min CN=94 Runoff=11.81 cfs 41,620 cf

Pond 1P: Bioretention Filter Basin #1 Peak Elev=48.49' Storage=503 cf Inflow=1.85 cfs 5,947 cf
Discarded=0.06 cfs 2,524 cf Primary=1.74 cfs 3,421 cf Outflow=1.79 cfs 5,945 cf

Pond 3P: Lined & Subdrained Sand Filter Peak Elev=43.96' Storage=7,087 cf Inflow=29.17 cfs 93,505 cf
Primary=0.07 cfs 4,755 cf Secondary=28.25 cfs 84,479 cf Outflow=28.32 cfs 89,234 cf

Pond 4P: Lined & Subdrained Sediment Peak Elev=43.99' Storage=4,809 cf Inflow=29.83 cfs 101,709 cf
Primary=0.07 cfs 5,693 cf Secondary=29.17 cfs 93,505 cf Outflow=29.24 cfs 99,199 cf

Link DP-1: Existing drainage Network Inflow=30.13 cfs 98,348 cf
Primary=30.13 cfs 98,348 cf

Link DP-2: Wellington Ave - Existing Drainage Network Inflow=11.81 cfs 41,620 cf
Primary=11.81 cfs 41,620 cf

Total Runoff Area = 237,013 sf Runoff Volume = 149,276 cf Average Runoff Depth = 7.56"
32.59% Pervious = 77,245 sf 67.41% Impervious = 159,768 sf

Summary for Subcatchment W1A: Watershed 1A

Runoff = 1.85 cfs @ 12.09 hrs, Volume= 5,947 cf, Depth= 6.16"
Routed to Pond 1P : Bioretention Filter Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
2,621	98	Paved parking, HSG B
5,326	82	Dirt , HSG B
3,632	61	>75% Grass cover, Good, HSG B
11,579	79	Weighted Average
8,958	73	77.36% Pervious Area
2,621	98	22.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
0.4	60	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
0.9	115	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W1B: Watershed 1B

Runoff = 29.83 cfs @ 12.09 hrs, Volume= 101,709 cf, Depth= 7.50"
Routed to Pond 4P : Lined & Subdrained Sediment Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

	Area (sf)	CN	Description
	58,354	98	Roofs, HSG B
	43,709	98	Paved parking, HSG B
*	26,145	96	Compacted Aggegate , HSG B
	34,626	61	>75% Grass cover, Good, HSG B
	162,834	90	Weighted Average
	60,771	76	37.32% Pervious Area
	102,063	98	62.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	55	0.0130	1.04		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
4.0	573	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
4.9	628	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 11.81 cfs @ 12.09 hrs, Volume= 41,620 cf, Depth= 7.98"
Routed to Link DP-2 : Wellington Ave - Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
44,981	98	Roofs, HSG B
10,103	98	Paved parking, HSG B
7,516	61	>75% Grass cover, Good, HSG B
62,600	94	Weighted Average
7,516	61	12.01% Pervious Area
55,084	98	87.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond 1P: Bioretention Filter Basin #1

Inflow Area = 11,579 sf, 22.64% Impervious, Inflow Depth = 6.16" for 100-Year event
Inflow = 1.85 cfs @ 12.09 hrs, Volume= 5,947 cf
Outflow = 1.79 cfs @ 12.10 hrs, Volume= 5,945 cf, Atten= 3%, Lag= 0.7 min
Discarded = 0.06 cfs @ 12.10 hrs, Volume= 2,524 cf
Primary = 1.74 cfs @ 12.10 hrs, Volume= 3,421 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 48.49' @ 12.10 hrs Surf.Area= 1,030 sf Storage= 503 cf

Plug-Flow detention time= 50.9 min calculated for 5,945 cf (100% of inflow)
Center-of-Mass det. time= 50.7 min (852.7 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	256 cf	**100% Voids (Conic)** Listed below (Recalc)
#2	46.00'	252 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 764 cf Overall x 33.0% Voids
		508 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.00	382	0	0	382
48.50	653	256	256	656

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	382	0	0
48.00	382	764	764

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	48.30'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.10 hrs HW=48.49' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=1.73 cfs @ 12.10 hrs HW=48.49' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 1.73 cfs @ 1.43 fps)

Summary for Pond 3P: Lined & Subdrained Sand Filter

Inflow = 29.17 cfs @ 12.10 hrs, Volume= 93,505 cf
Outflow = 28.32 cfs @ 12.11 hrs, Volume= 89,234 cf, Atten= 3%, Lag= 0.7 min
Primary = 0.07 cfs @ 12.11 hrs, Volume= 4,755 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 28.25 cfs @ 12.11 hrs, Volume= 84,479 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.96' @ 12.11 hrs Storage= 7,087 cf

Plug-Flow detention time= 48.7 min calculated for 89,234 cf (95% of inflow)
Center-of-Mass det. time= 23.6 min (807.8 - 784.2)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	5,064 cf	**100% Voids (Conic)** Listed below (Recalc) -Impervious
#2	40.67'	1,706 cf	**Sand Filter (Prismatic)** Listed below (Recalc) -Impervious 5,170 cf Overall x 33.0% Voids
#3	40.17'	466 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) -Impervious 1,413 cf Overall x 33.0% Voids
		7,236 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	2,825	0	0	2,825
43.00	3,181	1,501	1,501	3,194
44.00	3,960	3,563	5,064	4,001

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	2,825	0	0
42.50	2,825	5,170	5,170

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	2,825	0	0
40.67	2,825	1,413	1,413

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.45'	**30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.11 hrs HW=43.96' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.31 fps)

Secondary OutFlow Max=27.81 cfs @ 12.11 hrs HW=43.96' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 27.81 cfs @ 2.33 fps)

Summary for Pond 4P: Lined & Subdrained Sediment Forebay

Inflow Area = 162,834 sf, 62.68% Impervious, Inflow Depth = 7.50" for 100-Year event
Inflow = 29.83 cfs @ 12.09 hrs, Volume= 101,709 cf
Outflow = 29.24 cfs @ 12.10 hrs, Volume= 99,199 cf, Atten= 2%, Lag= 0.5 min
Primary = 0.07 cfs @ 12.10 hrs, Volume= 5,693 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 29.17 cfs @ 12.10 hrs, Volume= 93,505 cf
Routed to Pond 3P : Lined & Subdrained Sand Filter

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.99' @ 12.10 hrs Surf.Area= 6,653 sf Storage= 4,809 cf

Plug-Flow detention time= 36.9 min calculated for 99,022 cf (97% of inflow)
Center-of-Mass det. time= 22.2 min (795.7 - 773.5)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	3,500 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
#2	40.67'	1,044 cf	**Sand Filter Layer (Prismatic)** Listed below (Recalc) 3,162 cf Overall x 33.0% Voids
#3	40.17'	285 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) 864 cf Overall x 33.0% Voids
		4,829 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	1,728	0	0	1,728
43.00	1,987	928	928	1,998
44.00	3,205	2,572	3,500	3,229

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	1,728	0	0
42.50	1,728	3,162	3,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	1,728	0	0
40.67	1,728	864	864

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.52'	**30.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.10 hrs HW=43.99' (Free Discharge)
↑└**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.35 fps)

Secondary OutFlow Max=28.81 cfs @ 12.10 hrs HW=43.99' (Free Discharge)
↑└**1=Broad-Crested Rectangular Weir** (Weir Controls 28.81 cfs @ 2.04 fps)

Summary for Link DP-1: Existing drainage Network

Inflow Area = 174,413 sf, 60.02% Impervious, Inflow Depth > 6.77" for 100-Year event
Inflow = 30.13 cfs @ 12.11 hrs, Volume= 98,348 cf
Primary = 30.13 cfs @ 12.11 hrs, Volume= 98,348 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wellington Ave - Existing Drainage Network

Inflow Area = 62,600 sf, 87.99% Impervious, Inflow Depth = 7.98" for 100-Year event
Inflow = 11.81 cfs @ 12.09 hrs, Volume= 41,620 cf
Primary = 11.81 cfs @ 12.09 hrs, Volume= 41,620 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Appendix G

Water Quality Calculations

Version: 4/2015

Project Name: Wellington Ave. Self-Storage

Date: December 2024

Water Quality Volume Calculation WorkSheet

This worksheet is designed to assist the project engineer with a determination of the required water quality treatment area. The worksheet leads the designer through redevelopment applicability first and then receiving water requirements. This tool is intended to compliment to the Redevelopment Criteria Guidance and the Water Quality Guidance and assist both the designer and the permit application reviewer towards consistent results. Enter information into only the YELLOW Boxes.

Redevelopment Criteria Guidance

Water Quality Goals "Stormwater Compensation Method"

Step 1 - Determine which office in OWR you are applying to: Application Guidance

Step 2 - Site Information		value/calculation	units
Total Site Area (total area of project parcels)	TSA	5.44	acres
Total Jurisdictional Wetlands and/or floodplain within the above TSA	JW1	0.00	acres
Existing impervious also within the Jurisdictonal Wetlands	-JW2	0.00	acres
Conservation Land within the TSA	CL	0.00	acres
Site Size = (TSA)-(JW1-JW2)-CL	**SS=**	**5.44**	acres

Step 3 - Redevelopment Applicability

Total Impervious Area (pre-construction)	TIA=	4.80	acres
% Impervious (if ≥40% - redevelopment standard 3.2.6 applies)		**0.88**	

REPEAT IF NECESSARY Steps 4, 5 and 6 for EACH Waterbody ID (RIVER-ID as found in the GIS Map Server)

Step 4 - Receiving waterbody information

Waterbody ID or RIVER ID from GIS Map Server	RI0006017L-08
Waterbody Name from GIS Map Server	Fenner Pond
Name the sub-watersheds (design-points) contributing to this Waterbody ID	DP-1
Is this Waterbody Impaired/TMDL for any Phosphorus, Metals or Bacteria?	YES
Is this Waterbody Impaired for Nitrogen?	NO

Step 5 - Pre-Post Construction Conditions to the Waterbody

Total Pre-Construction Impervious Surface to this Waterbody ID	3.38	acres
Total Disturbed Existing Impervious (DI)	1.77	acres
Total Post-Construction Impervious to this Waterbody ID	3.84	acres
Net Increased Impervious (NII)	0.46	acres

Step 6 - Infiltration and BMP information - Note: Increasing infiltration will likely decrease stormwater treatment area for Metals, Bacteria and Phosporus

I am proposing to infiltrate this percentage WQv to this WBID	29%	%
I am proposing this number of BMP's	2	#

RESULTS - Select the Larger Number of the 2 numbers provided

Applicable Condition	Min Water Quality Treatment Area	Min Treatment w/o WQ consideration
No Impairement or TMDL - New Development		
No Impairment or TMDL - Redevelopment		
Only Phosphorus, Metals or Bacteria Impairment - New Development		
Only Phosphorus, Metals or Bacteria Impairment - Redevelopment	0.79	1.34
Nitrogen Impairment - New Development		
Nitrogen Impairment - Redevelopment		
REQUIRED STORMWATER TREATMENT AREA	**1.3** acres	

* Enter the name of the STP (both type and label) which has been designed to treat this particular Rev or Rea.

Version: 4/2015

Project Name: Wellington Ave. Self-Storage

Date: December 2024

Water Quality Volume Calculation WorkSheet

This worksheet is designed to assist the project engineer with a determination of the required water quality treatment area. The worksheet leads the designer through redevelopment applicability first and then receiving water requirements. This tool is intended to compliment to the Redevelopment Criteria Guidance and the Water Quality Guidance and assist both the designer and the permit application reviewer towards consistent results. Enter information into only the YELLOW Boxes.

Redevelopment Criteria Guidance

Water Quality Goals "Stormwater Compensation Method"

Step 1 - Determine which office in OWR you are applying to: Application Guidance

Step 2 - Site Information

		value/calculation	units
Total Site Area (total area of project parcels)	TSA	5.44	acres
Total Jurisdictional Wetlands and/or floodplain within the above TSA	JW1	0.00	acres
Existing impervious also within the Jurisdictonal Wetlands	-JW2	0.00	acres
Conservation Land within the TSA	CL	0.00	acres
Site Size = (TSA)-(JW1-JW2)-CL	**SS=**	**5.44**	acres

Step 3 - Redevelopment Applicability

Total Impervious Area (pre-construction)	TIA=	4.80	acres
% Impervious (if ≥40% - redevelopment standard 3.2.6 applies)		**0.88**	

REPEAT IF NECESSARY Steps 4, 5 and 6 for EACH Waterbody ID (RIVER-ID as found in the GIS Map Server)

Step 4 - Receiving waterbody information

Waterbody ID or RIVER ID from GIS Map Server	RI0006017L-08
Waterbody Name from GIS Map Server	Fenner Pond
Name the sub-watersheds (design-points) contributing to this Waterbody ID	DP-2
Is this Waterbody Impaired/TMDL for any Phosphorus, Metals or Bacteria?	YES
Is this Waterbody Impaired for Nitrogen?	NO

Step 5 - Pre-Post Construction Conditions to the Waterbody

Total Pre-Construction Impervious Surface to this Waterbody ID	1.42	acres
Total Disturbed Existing Impervious (DI)	0.29	acres
Total Post-Construction Impervious to this Waterbody ID	1.30	acres
Net Increased Impervious (NII)	-0.12	acres

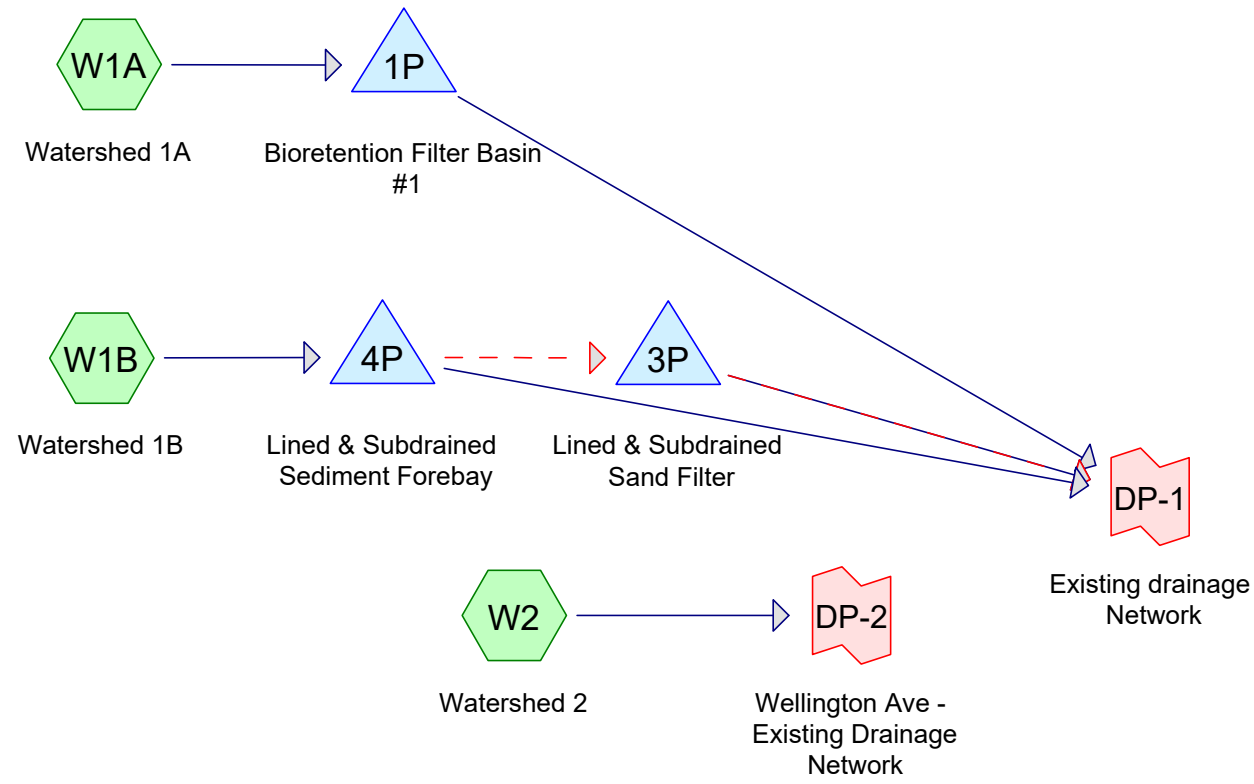
Step 6 - Infiltration and BMP information - Note: Increasing infiltration will likely decrease stormwater treatment area for Metals, Bacteria and Phosporus

I am proposing to infiltrate this percentage WQv to this WBID	0%	%
I am proposing this number of BMP's	0	#

RESULTS - Select the Larger Number of the 2 numbers provided

Applicable Condition	Min Water Quality Treatment Area	Min Treatment w/o WQ consideration
No Impairement or TMDL - New Development		
No Impairment or TMDL - Redevelopment		
Only Phosphorus, Metals or Bacteria Impairment - New Development		
Only Phosphorus, Metals or Bacteria Impairment - Redevelopment	-0.24	0.02
Nitrogen Impairment - New Development		
Nitrogen Impairment - Redevelopment		
REQUIRED STORMWATER TREATMENT AREA	**0.0**	acres

* Enter the name of the STP (both type and label) which has been designed to treat this particular Rev or Rea.



Subcat Reach Pond Link

Routing Diagram for Wellington Ave - Proposed R1 WQv
Prepared by Joe Casali Engineering, Inc, Printed 12/5/2024

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
45,774	61	>75% Grass cover, Good, HSG B (W1A, W1B, W2)
26,145	96	Compacted Aggegate , HSG B (W1B)
5,326	82	Dirt , HSG B (W1A)
56,433	98	Paved parking, HSG B (W1A, W1B, W2)
103,335	98	Roofs, HSG B (W1B, W2)
237,013	**90**	**TOTAL AREA**

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentW1A: Watershed 1A Runoff Area=11,579 sf 22.64% Impervious Runoff Depth=0.26"
Flow Length=115' Tc=6.0 min CN=73/98 Runoff=0.06 cfs 253 cf

SubcatchmentW1B: Watershed 1B Runoff Area=162,834 sf 62.68% Impervious Runoff Depth=0.65"
Flow Length=628' Tc=6.0 min CN=76/98 Runoff=2.51 cfs 8,822 cf

SubcatchmentW2: Watershed 2 Runoff Area=62,600 sf 87.99% Impervious Runoff Depth=0.87"
Tc=6.0 min CN=61/98 Runoff=1.35 cfs 4,524 cf

Pond 1P: Bioretention Filter Basin #1 Peak Elev=46.28' Storage=35 cf Inflow=0.06 cfs 253 cf
Discarded=0.02 cfs 253 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 253 cf

Pond 3P: Lined & Subdrained Sand Filter Peak Elev=42.16' Storage=1,856 cf Inflow=1.22 cfs 2,493 cf
Primary=0.05 cfs 2,211 cf Secondary=0.00 cfs 0 cf Outflow=0.05 cfs 2,211 cf

Pond 4P: Lined & Subdrained Sediment Peak Elev=43.58' Storage=3,598 cf Inflow=2.51 cfs 8,822 cf
Primary=0.07 cfs 4,457 cf Secondary=1.22 cfs 2,493 cf Outflow=1.29 cfs 6,950 cf

Link DP-1: Existing drainage Network Inflow=0.12 cfs 6,667 cf
Primary=0.12 cfs 6,667 cf

Link DP-2: Wellington Ave - Existing Drainage Network Inflow=1.35 cfs 4,524 cf
Primary=1.35 cfs 4,524 cf

Total Runoff Area = 237,013 sf Runoff Volume = 13,600 cf Average Runoff Depth = 0.69"
32.59% Pervious = 77,245 sf 67.41% Impervious = 159,768 sf

Summary for Subcatchment W1A: Watershed 1A

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 253 cf, Depth= 0.26"
Routed to Pond 1P : Bioretention Filter Basin #1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
2,621	98	Paved parking, HSG B
5,326	82	Dirt , HSG B
3,632	61	>75% Grass cover, Good, HSG B
11,579	79	Weighted Average
8,958	73	77.36% Pervious Area
2,621	98	22.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	55	0.0600	1.92		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
0.4	60	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
0.9	115	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W1B: Watershed 1B

Runoff = 2.51 cfs @ 12.09 hrs, Volume= 8,822 cf, Depth= 0.65"
Routed to Pond 4P : Lined & Subdrained Sediment Forebay

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

	Area (sf)	CN	Description
	58,354	98	Roofs, HSG B
	43,709	98	Paved parking, HSG B
*	26,145	96	Compacted Aggegate , HSG B
	34,626	61	>75% Grass cover, Good, HSG B
	162,834	90	Weighted Average
	60,771	76	37.32% Pervious Area
	102,063	98	62.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	55	0.0130	1.04		**Sheet Flow, SEG A** Smooth surfaces n= 0.011 P2= 3.30"
4.0	573	0.0135	2.36		**Shallow Concentrated Flow, SEG B** Paved Kv= 20.3 fps
4.9	628	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment W2: Watershed 2

Runoff = 1.35 cfs @ 12.09 hrs, Volume= 4,524 cf, Depth= 0.87"
Routed to Link DP-2 : Wellington Ave - Existing Drainage Network

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
44,981	98	Roofs, HSG B
10,103	98	Paved parking, HSG B
7,516	61	>75% Grass cover, Good, HSG B
62,600	94	Weighted Average
7,516	61	12.01% Pervious Area
55,084	98	87.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond 1P: Bioretention Filter Basin #1

Inflow Area = 11,579 sf, 22.64% Impervious, Inflow Depth = 0.26" for WQV event
Inflow = 0.06 cfs @ 12.09 hrs, Volume= 253 cf
Outflow = 0.02 cfs @ 11.90 hrs, Volume= 253 cf, Atten= 67%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.90 hrs, Volume= 253 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 46.28' @ 12.41 hrs Surf.Area= 382 sf Storage= 35 cf

Plug-Flow detention time= 8.2 min calculated for 253 cf (100% of inflow)
Center-of-Mass det. time= 8.2 min (823.7 - 815.5)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	256 cf	**100% Voids (Conic)** Listed below (Recalc)
#2	46.00'	252 cf	**Amended Soils (Prismatic)** Listed below (Recalc) 764 cf Overall x 33.0% Voids
		508 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.00	382	0	0	382
48.50	653	256	256	656

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	382	0	0
48.00	382	764	764

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	48.30'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.90 hrs HW=46.03' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=46.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: Lined & Subdrained Sand Filter

Inflow = 1.22 cfs @ 12.26 hrs, Volume= 2,493 cf
Outflow = 0.05 cfs @ 15.01 hrs, Volume= 2,211 cf, Atten= 96%, Lag= 164.9 min
Primary = 0.05 cfs @ 15.01 hrs, Volume= 2,211 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link DP-1 : Existing drainage Network

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 42.16' @ 15.01 hrs Storage= 1,856 cf

Plug-Flow detention time= 373.8 min calculated for 2,207 cf (89% of inflow)
Center-of-Mass det. time= 358.1 min (1,140.1 - 782.0)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	5,064 cf	**100% Voids (Conic)** Listed below (Recalc) -Impervious
#2	40.67'	1,706 cf	**Sand Filter (Prismatic)** Listed below (Recalc) -Impervious 5,170 cf Overall x 33.0% Voids
#3	40.17'	466 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) -Impervious 1,413 cf Overall x 33.0% Voids
		7,236 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	2,825	0	0	2,825
43.00	3,181	1,501	1,501	3,194
44.00	3,960	3,563	5,064	4,001

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	2,825	0	0
42.50	2,825	5,170	5,170

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	2,825	0	0
40.67	2,825	1,413	1,413

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.45'	**30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 15.01 hrs HW=42.16' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 6.71 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=40.17' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 4P: Lined & Subdrained Sediment Forebay

Inflow Area = 162,834 sf, 62.68% Impervious, Inflow Depth = 0.65" for WQV event
Inflow = 2.51 cfs @ 12.09 hrs, Volume= 8,822 cf
Outflow = 1.29 cfs @ 12.26 hrs, Volume= 6,950 cf, Atten= 49%, Lag= 10.1 min
Primary = 0.07 cfs @ 12.26 hrs, Volume= 4,457 cf
Routed to Link DP-1 : Existing drainage Network
Secondary = 1.22 cfs @ 12.26 hrs, Volume= 2,493 cf
Routed to Pond 3P : Lined & Subdrained Sand Filter

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.58' @ 12.26 hrs Surf.Area= 6,113 sf Storage= 3,598 cf

Plug-Flow detention time= 282.1 min calculated for 6,937 cf (79% of inflow)
Center-of-Mass det. time= 202.2 min (993.2 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	3,500 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
#2	40.67'	1,044 cf	**Sand Filter Layer (Prismatic)** Listed below (Recalc) 3,162 cf Overall x 33.0% Voids
#3	40.17'	285 cf	**Crushed Stones Layer (Prismatic)** Listed below (Recalc) 864 cf Overall x 33.0% Voids
		4,829 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.50	1,728	0	0	1,728
43.00	1,987	928	928	1,998
44.00	3,205	2,572	3,500	3,229

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.67	1,728	0	0
42.50	1,728	3,162	3,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
40.17	1,728	0	0
40.67	1,728	864	864

Device	Routing	Invert	Outlet Devices
#1	Secondary	43.52'	**30.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	40.17'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.26 hrs HW=43.58' (Free Discharge)
↑└**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 8.82 fps)

Secondary OutFlow Max=1.19 cfs @ 12.26 hrs HW=43.58' (Free Discharge)
↑└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.19 cfs @ 0.68 fps)

Summary for Link DP-1: Existing drainage Network

Inflow Area = 174,413 sf, 60.02% Impervious, Inflow Depth > 0.46" for WQV event
Inflow = 0.12 cfs @ 14.99 hrs, Volume= 6,667 cf
Primary = 0.12 cfs @ 14.99 hrs, Volume= 6,667 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wellington Ave - Existing Drainage Network

Inflow Area = 62,600 sf, 87.99% Impervious, Inflow Depth = 0.87" for WQV event
Inflow = 1.35 cfs @ 12.09 hrs, Volume= 4,524 cf
Primary = 1.35 cfs @ 12.09 hrs, Volume= 4,524 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
235 Promenade Street, Providence, Rhode Island 02908-5767

January 2, 2025

Canam RI, LLC / Tokimo Inc.
Mr. Julian Mallah
530 Wellington Avenue
Cranston, RI 02910

RE: WQC/STW File No. 24-154; RIPDES File No. RIR 102710
CanAm Self-Storage Facility
Located at 530-532 Wellington Avenue
Cranston, RI 02910
Assessor's Plat 3, Lot 107

Dear Mr. Mallah,

The Rhode Island Department of Environmental Management Office of Water Resources (RIDEM OWR) has reviewed the above-referenced project for compliance with the Rhode Island Pollutant Discharge Elimination System Construction General Permit (CGP). As stated in the application materials, the purpose of the project is to redevelop the existing site by demolishing four existing buildings, removing an existing underground storage tank, demolishing several small portions of the site's main building, and re-purposing the remainder of the site's main building into a self-storage facility that is serviced by public water and sewer in order to construct and maintain a new re-oriented driveway and parking area, compacted gravel outdoor vehicle storage area, and a closed stormwater management system consisting of one pea stone diaphragm, one bioretention basin, one sediment forebay and one lined and underdrained sand filter as is further described in your application and detailed on site plans consisting of 10 sheets as prepared by Joseph A. Casali, P.E. of Joe Casali Engineering, Inc., received by RIDEM-OWR on December 6, 2024.

This letter serves as your permit/authorization to discharge for the above-referenced project, provided that you comply with the application materials, the CGP and the following conditions:

1) You **must** submit the Notice of Start of Construction Form prior to commencement of any permitted site alterations or construction activity. The Start of Construction Form can be found on the Stormwater Construction Permitting website.

2) Prior to construction, you **must** erect or post a sign resistant to the weather and at least twelve (12) inches wide and (eighteen) inches long, which identifies the initials "DEM" and the application number(s) assigned to this permit. The sign must be posted in a conspicuous location near the site access and maintained until the project is complete.

3) A copy of this permit, any inspection records, and a signed and updated SESC Plan, **must** be kept at the site at all times until the project is complete. Copies of this permit must be made available for review by any RIDEM or City/Town representative upon request. Electronic versions of required documents that are readily accessible from the construction site are acceptable.

4) All fill material **shall** be clean and free of matter that could cause pollution of the waters of the State.

5) The stormwater collection and treatment system approved herein is for the discharge of stormwater only. Any other discharge is prohibited.

6) Any alterations, additions or modifications to the stormwater system from that approved herein, including permanent closure, **must** be reviewed and approved by RIDEM OWR prior to implementation.

7) You **must** submit the Notice of Termination Form upon completion of the project and final site stabilization. The Notice of Termination Form can be found on the Stormwater Construction Permitting website.

8) You are responsible for the long-term inspection, cleaning and maintenance of the stormwater collection and treatment system to ensure proper performance of all components until documentation is provided to indicate that this responsibility has been assumed by another entity. Long-term operation and maintenance is to be as described in the Post-Construction Operation and Maintenance Plan entitled "Stormwater Operation, Maintenance and Pollution Prevention Plan for a Proposed Redevelopment Project: Self Storage Facility Located at 530-532 Wellington Avenue – Cranston, Rhode Island – AP 3, Lot 107", dated December 6, 2024, and prepared by: Joe Casali Engineering, Inc.

RIDEM's Rules and Regulations Governing the Establishment of Various Fees require that RIPDES CGP permit holders pay an Annual Fee of $100.00. An invoice will be sent to the owner on record in May/June of each year if the construction was still active as of December 31st of the previous year. The owner will be responsible for the Annual Fee until the construction activity has been completed, the site has been properly stabilized, and a completed Notice of Termination (NOT) has been received.

Your authorization to discharge **expires at midnight, on September 25, 2025.** If construction has not been completed by that date, there will be measures in place for you to reauthorize.

You are required to adhere to all above terms and conditions; and carry out this project in compliance with the CGP at all times. Issuance of this permit does not bar the Rhode Island Department of Environmental Management, or any of its various Divisions, from initiating any investigation and/or enforcement actions that it may deem necessary for violations this permit or of any and all applicable statutes, regulations and/or permits.

This permit has the full force and effect of a permit issued by the Director. This permit does not relieve your obligation to obtain any other applicable local, State, and federal permits prior to commencing construction and does not relieve you of any duties owed to adjacent landowners with respect to changes in drainage. RIDEM assumes no responsibilities for damages resulting from faulty design or construction.

If you have any questions regarding the contents of the permit, you may contact Christopher H. Dill, E.I.T. at Christopher.dill@dem.ri.gov or at (401)-537-4219.

Sincerely,

Nicholas A. Pisani, P.E.

Nicholas A. Pisani, P.E.
Environmental Engineer IV
Stormwater Engineering and 401 Permitting
Office of Water Resources
Rhode Island Department of Environmental Management

ec:
Joseph A. Casali, P.E. – Joe Casali Engineering, Inc.
Ashley Blauvelt, P.E., OLRSMM – Site Remediation Program

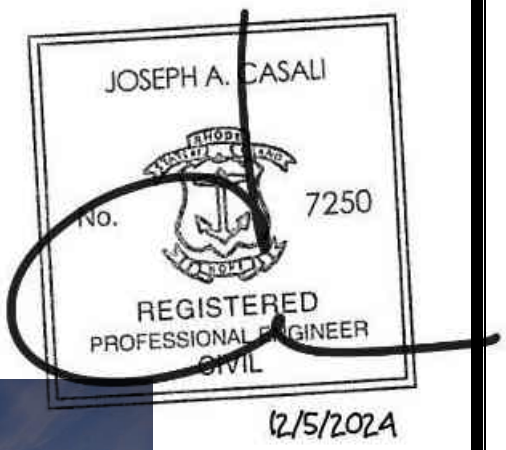
Project Narrative and Stormwater Management Report

For a Proposed Redevelopment Project

Self-Storage Facility

Located at

530-532 Wellington Avenue
Cranston, Rhode Island
AP 3, Lot 107



Prepared for:
CANAM RI LLC
c/o Mr. Mike Jobb
530 Wellington Avenue
Cranston, RI 02910-2950

Submission Date:
September 2024; Revised December 2024

Submitted by:

JCE
JOE CASALI ENGINEERING, INC.
CIVIL · SITE DEVELOPMENT · TRANSPORTATION
DRAINAGE · WETLANDS · ISDS · TRAFFIC · FLOODPLAIN
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401)944-1313 FAX WWW.JOECASALI.COM

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APPENDICES

1 INTRODUCTION

On behalf of our client, CANAM RI LLC, Joe Casali Engineering, Inc. (JCE) has prepared the following Project Narrative and Stormwater Management Report to identify existing conditions and proposed site improvements associated with the proposed redevelopment of a mill complex. The scope includes the redevelopment of the existing mill complex located at 530-532 Wellington Avenue, in Cranston, Rhode Island to a self-storage facility containing approximately 1,191 storage units or various sizes. The subject property can also be identified as Tax Assessor's Plat Map (AP) 3, Lot 107, and has frontage on Wellington Avenue in the City of Cranston.

2 SITE LOCATION AND PHYSICAL DESCRIPTION

According to a July 2023 Class I Property Line Survey performed by Holland E. Shaw, PLS, the total area of the subject property is 237,000 sq. ft. (5.441 acres). The parcel is currently occupied by a mill complex consisting of a series of buildings internally subdivided with multiple varied uses, parking areas, and outdoor storage areas. The majority of the varied uses within the facility have been vacated as of the date of this report. The parcel is accessed via existing curb cuts on Wellington Avenue and Station Street. The subject parcel is bound by multi-family residential properties to the north, an Amtrak Corridor to the east, a vacant lot to the south, and Wellington Avenue and Interstate 95 to the west, as shown below in Figure 1 – Locus Map.

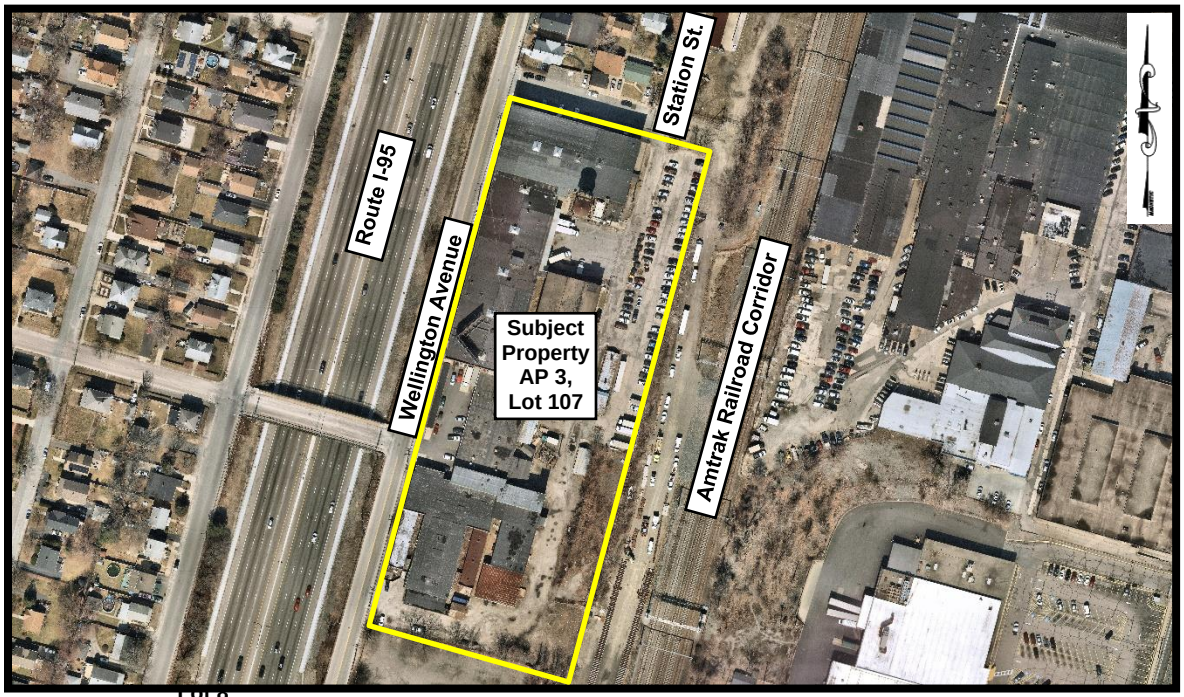

Figure 1 – Locus Map

NOT TO SCALE

2.1 Soil Classification

According to the *Web Soil Survey (WSS)* operated by the US Department of Agriculture Natural Resources Conservation Service (NRCS), produced by the National Cooperative Soil Survey, the soils on the site consist of Udorthents-Urban land complex (UD) and Merrimac-Urban land complex, 0 to 8 percent slopes (MU). UD soils consist of human transported material. These soils have a very low runoff class and belong to hydrologic soil group A. MU soils consist of loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss. These soils are somewhat excessively drained, have a very low runoff class and belong to Hydrologic Soil Group A.

Figure 2 – Soils Map

NOT TO SCALE

Soil evaluations were observed and documented by JCE in July 2024 to determine the depth to the seasonal high groundwater table (SHGWT) and to estimate infiltration capacity of existing in-situ soil for design of stormwater mitigation measures. Three (3) soil evaluation test pits were excavated, to 108-inches below the ground surface. In general, the SHGWT ranged from about 44-inches to 54-inches below the existing ground surface when encountered. Ledge was not encountered. A Soil Evaluation Test Pit Location Plan and Soil Evaluation Test Hole Logs are included in Appendix A.

In addition, multiple groundwater observation wells have been installed throughout the site by various environmental consultants over the course of the last few years. Data from the installation of these wells has also been assessed and incorporated into the design. Groundwater observation well locations are included on the Site Plan prepared by Sage Environmental in Appendix B; logs are included in Appendix A.

2.2 Environmental Considerations

SAGE Environmental (Sage) completed a conducted an American Society for Testing and Materials (ASTM) Phase I Environmental Site Assessment (ESA) in April 2023. Results of the Phase I ESA identified Recognized Environmental Conditions (RECs), which are explained in more detail in the Phase I ESA (can be provided under separate cover) but are generally summarized below.

- REC #1 - Historic and Current Usage of the Site for Manufacturing and Associated Infrastructure: Building occupants have engaged in manufacturing operations, including but not limited to, vinyl coated products, a rubber heel factory, plastics manufacturing, cabinet manufacturing, jewelry manufacturing, upholstery manufacturing, knife manufacturing, a veterinary laboratory, chemical manufacturers (including resin, algaecides, germicidal detergents, deodorants, sanitizers, and disinfectants), assayers and refiners of precious metals, electroplating operations, spray coating/spray painting/screen-printing, metal and plastic grinding/sharpening, a brewery, appliance repair, sewing, exercise related businesses, real estate businesses, material rental businesses, storage businesses, educational businesses, janitorial services, electricians, an elevator company, and retail businesses, since the early 1900's. In addition to the former property use, several observations of associated infrastructure and potential for releases of oil and/or hazardous materials (OHM) from these past operations were made during the Phase I. These included potentially leaking electrical transformers, stained soil, drains, sumps, pits, hydraulic equipment, and OHM storage containers.
- REC #2 - Historic Environmental Investigations and Known Release Conditions [Underground Storage Tank (UST)-15319, Leaking Underground Storage Tank (LUST) 0713-LS, State Hazardous Waste Site (SHWS SR-07-1035), and SEMS Archive:
    - UST Summary (RIDEM File Number UST-15319: In general, the Site has had at least 25 underground storage tanks (USTs), ranging in capacity from 500-gallons to 10,000-gallons, and utilized for the storage of gasoline, #6

oil, unspecified fuel oil, mineral oil, aromatic solvents, and plasticizers (converted to water storage in circa 1960). On March 16, 1987, RIDEM issued a Certificate of Closure which stated that all regulated tanks "which existed from May 8, 1985", "have either been removed or filled in accordance with State UST Regs". Please note that additional vent pipes were observed, indicating that additional tanks may exist which were previously unidentified.

- LUST Summary (RIDEM Case Number 0713-LS): Two (2) of the USTs, historically utilized for the storage of gasoline and aromatic solvents (i.e., USTs 1 and 9), are documented to have resulted in a release condition to soil and groundwater on the southwest portion of the Site, extending into the municipal right-of-way identified as Wellington Avenue. Contaminants of Concern (COCs) identified in soil and groundwater, at concentrations in excess of the applicable RIDEM criteria, include benzene, toluene, ethylbenzene, and xylenes, and Light Non-aqueous Phase Liquid (LNAPL) (i.e., identified as consisting of a petroleum distillate/paint thinner and/or petroleum with a carbon range of C7 through C18.). The most recent groundwater monitoring event occurred in September 2020. At that time, no LNAPL was detected; however, a sheen was noted on groundwater in each of the four (4) groundwater monitoring wells. According to McPhail Associates, LLC, the plume is/was stable. No groundwater monitoring data from 2022 or 2023 was reported within the RIDEM file and a Letter of Compliance or No Further Action deeming that the release is closed were identified in the RIDEM files. Therefore, the Site may be out of compliance with the RIDEM Regulations.
- State Hazardous Waste Site (SHWS) (SR-07-1035)012/Superfund Enterprise Management System (SEMS)-Archive (RID01201771): In 1986, Rizzo Associates, Inc. conducted a limited subsurface assessment on the Site which identified the following COCs at concentrations in excess of the applicable RIDEM soil and/or groundwater criteria, select polynuclear aromatic hydrocarbons (PAHs). Remediation reportedly included soil excavation and the importation of fill (source of fill material not provided); In circa 1990, the US EPA identified the Site as a potentially hazardous waste site due to activities conducted by Gannon & Scott (RID01201771), a reclaimer of precious metals from plating and stripping solutions from the 1950s through the 1980s. The Site was subsequently investigated on behalf

of the US EPA as part of the Superfund Site Assessment and Removal program which identified the following COCs at concentrations in excess of the applicable RIDEM soil and/or groundwater criteria: select chlorinated VOCs (CVOCs), select PAHS, and toluene. In 2002, the USEPA archived (i.e., removed) from the CERCLIS database and was not a candidate for inclusion on the National Priorities List (NPL) because there was not a drinking water well located in proximity to the Site. As a result, the Site was assigned the status of No Further Remedial Actions Planned (i.e., NFRAP). A NFRAP designation means that no further Federal Superfund Remedial Action was anticipated, under the jurisdiction of CERCLA. Please note that this is not meant to imply compliance with the RIDEM regulations; therefore, the lack of additional assessment and/or remediation due to the above exceedances may represent non-compliance with the RIDEM Remediation Regulations.

- REC #3: Adjoining Land Usage: Based on information provided in the Sanborn Maps, two (2) parcels of land located immediately north of the Site (i.e., 388 and 433 Station Street) were historically utilized for jewelry manufacturing (i.e., 433 Station Street) from circa 1950 through 1972, and a repair shop in circa 1900 (i.e., 388 Station Street which was owned by the New York, New Haven, and Hartford railroad in 1900). No additional information regarding these businesses was obtained during the course of this assessment; however, usage of these properties for jewelry manufacturing and repairs associated with railroad machinery represents a REC.

These locations and conditions are summarized in the Red/Yellow/Green Map, 530 Wellington Ave., Cranston, Rhode Island, prepared by Sage, dated November 21, 2024, included in Appendix B. A Site Investigation Report was filed with RIDEM in August 2024; the development of a Remedial Action Work Plan (RAWP) is in progress.

Based on correspondence between the RI Department of Environmental Management (RIDEM) Office of Water Resources (OWR) and the RIDEM Office of Land Revitalization and Sustainable Materials Management (OLRSMM) in November/December 2024, given the presence of several underground storage tanks on the Southern side of the site along with the existing contamination on the site located to the South (groundwater generally appears to flow towards that site), we understand that the OLRSSM has concerns primarily about the infiltration in the Southeast corner of the site.

Because there is such an extensive history of contamination in this area, it was recommended that the stormwater management design omit infiltration on the Southern end of the site. It is important to note that this will affect the ability to meet groundwater recharge requirements, and a waiver from this requirement is being sought. Details are further discussed in Section 5 below.

2.3 Flood Zone Classification

The site is located on the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) for the City of Cranston, Map Number 44007C0318H, effective date October 2, 2015, as depicted below on Figure 3. The property lies completely within FEMA Flood Zone X, which is defined as areas outside of the 0.2% annual chance floodplain.

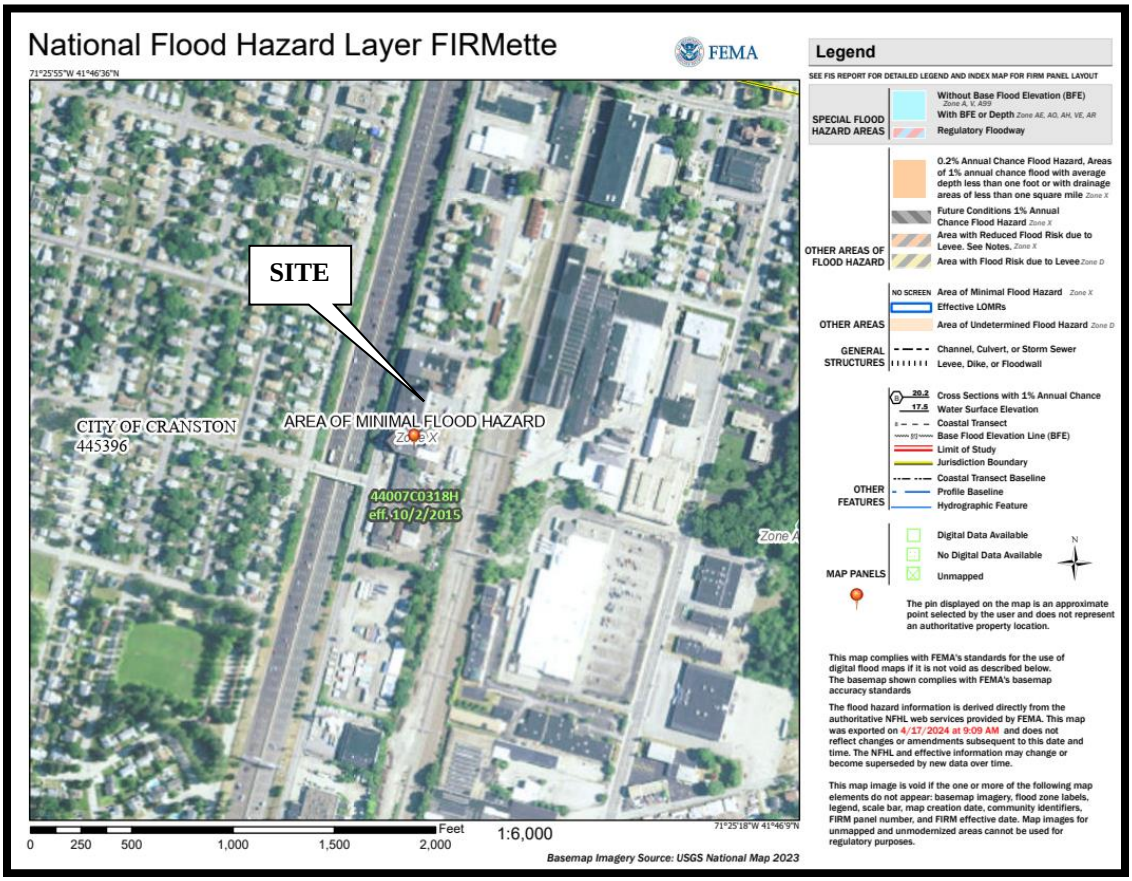

Figure 3 – FEMA Flood Insurance Rate Map
NOT TO SCALE

2.4 Natural Resources

According to the RIDEM Environmental Resource Map, the site is located within the Pawtuxet River Watershed (ID No. 010900040609). Stormwater runoff from the site is

ultimately directed to Fenner Pond (RI0006017L-08) via a buried stream, which ultimately discharges to the Pawtuxet River. Fenner Pond is located on the State of Rhode Island 2022 Impaired Water Report List. The cause of impairment within Fenner Pond is due to the phosphorus levels. There are no total maximum daily loads (TMDL) established at this time. The site is not within any State-designated natural heritage area, unfragmented forest tracts, state, regional, or community greenways and green space priorities. The site does not contain any land in active agricultural use.

2.5 Zoning

The subject property is located within the City of Cranston's General Industry District (M-2). The following are the dimensional requirements for the M-2 zone, along with existing conditions associated with the existing mill complex:

Zoning Criteria	M-2 Requirement	Existing
Min. Lot Area	60,000 SF	237,000 SF
Min. Frontage & Lot Width	200 feet	249 feet
Min. Front Yard Depth	40 feet	0 feet(1)
Min. Side Yard Depth	25 feet	42.6 feet
Min. Rear Yard Depth	30 feet	NA
Maximum Building Coverage	60%	43.8%
Max. Building Height	35 feet	45.1 feet(1)

1. Pre-existing, non-conforming condition.

2.6 Easements

According to a July 2023 Class I Property Line Survey performed by Holland E. Shaw, PLS. Multiple easements exist on site. Two communications easements exist on the northern portion of the site. These easements are referenced in Deed Book 3293, Page's 2 & 19, and Deed Book 5302, Page 54. Also, three sewer easements exist traveling south down the eastern side of the subject property and turning towards Wellington Avenue. These easements are referenced in Deed Book 220, Pages 37 & 38.

2.7 Existing Utilities

Water: Based on a review of existing conditions information obtained from the Providence Water Supply Board (PWSB), a 12-inch asbestos concrete (AC) water main exists within Wellington Avenue, and a 6-inch AC water main exists within Clarence Street. Based on a field review of existing conditions performed by JCE in April 2024, domestic water appears to be provided to the site via a 4-inch cast iron (CI) service from Clarance Street,

and via a 4-inch CI service from Wellington Ave. In addition, fire protection water service appears to be provided to the site via a 6-inch CI service from Clarance Street, and via a 6-inch CI service from Wellington Ave.

Sewer: Based on a review of existing conditions information obtained from the City of Cranston, a 24-inch reinforced concrete sewer main exists within Wellington Avenue and an 8-inch vitrified clay (VCP) sewer main exists within Clarence Street. Based on field investigations performed by JCE in April 2024, it appears that two (2) 6-inch sewer services exist from the existing building(s). An 8-inch VCP conveys effluent from the northern portion of the development to the existing main within Clarence Street; and an 8-inch VCP conveys effluent from the southern portion of the development to the existing main within Wellington Ave.

Gas: Based on a review of existing conditions information from Rhode Island Energy, gas mains exist within Clarence Street and Wellington Avenue. Based on field investigations by JCE in April 2024, it appears that a gas service enters the site from Clarence Street, with multiple meters on the existing building servicing the former tenants.

Electric/Telecommunications: Existing overhead electrical and telecommunication services are provided to the site via the overhead lines along Wellington Avenue, Station Street, and Clarence Street.

Stormwater: Based on field investigations performed by JCE in April 2024, multiple drywells appear to exist throughout the site, particularly within the open space at the eastern portion of the property. Many of these existing structures are deteriorated, filled with debris/sediment, and are likely non-functional. It appears that a series of catch basins are located within the rear portion of the site, which are tied into a 21-inch vitrified clay pipe, which is routed through the property located to the south, ultimately tying into a 4’x4’ box culvert (owned by the City of Cranston). Ultimately, the box culvert crosses through the adjacent Johnston Controls property, continuing to the east across Elmwood Avenue, discharging into Fenner Pond.

3 PROPOSED DEVELOPMENT

The Applicant, CANAM RI LLC, is proposing a complete redevelopment of the site to accommodate a self-storage facility. The scope of improvements to the site includes demolition of multiple existing free-standing accessory structures and demolition of portions of the existing main building on the site. The existing main building is proposed to undergo complete interior and exterior renovation, including a small main office at the northeastern corner of the existing complex. The remainder of the facility is proposed to consist of approximately 1,191 variably sized self-storage units.

The main office is proposed to be accessed from Clarence Street / Station Street with a small 3-stall parking area for potential clients. The remainder of the site is fenced off with key card access for self-storage customers. A 3-stall parking lot is proposed adjacent to the entrance from Station Street, which includes one (2) handicap accessible space. This parking area is located outside the perimeter fence line, and its purpose is for potential customers to park and access to the self-storage main office located at the northeast corner of the existing building. Within the site, multiple parking areas are proposed for customer access to loading areas, loading docks, etc. Overall, a total of 56 parking spaces are proposed throughout the site, including two (2) handicap accessible spaces, in accordance with the Americans with Disabilities Act (ADA).

According to the City of Cranston's Zoning Ordinance, there is no specific use within Chapter 17.64 "Off Street Parking" fitting the definition of self-storage facilities. As such, JCE referenced the Institute of Transportation Engineers (ITE) Parking Generation Manual, 5th edition, dated January 2019. The ITE Manual identifies self-storage as "mini-warehouse", land use code 151. Based on the ITE Manual, peak parking demand per 100 storage units ranges from a minimum of 1.05 to a maximum of 2.38. Based on the 1,191 self-storage units proposed, this equates to a parking requirement ranging from 13 to 29 spaces. The currently proposed 56 spaces exceeds the anticipated peak parking demand per the ITE Manual.

Additional site improvements include perimeter fencing, loading dock canopy, a compacted gravel outdoor storage area for RVs, boats, etc., perimeter paved access road for customers and Fire Department access, landscape improvements, and stormwater management improvements.

3.1 Zoning

As previously noted, the subject property is located within the City of Cranston's General Industry District (M-2). The proposed use, self-storage, is allowed by right in the M-2 zone. However, due to the pre-existing non-conformities associated with the existing building, dimensional variances will be required, as summarized in the following table: conditions associated with the existing mill complex:

Zoning Criteria	M-2 Requirement	Existing	Proposed
Min. Lot Area	60,000 SF	237,000 SF	237,000 SF
Min. Frontage & Lot Width	200 feet	249 feet	249 feet
Min. Front Yard Depth	40 feet	0 feet(1)	0 feet(1)
Min. Side Yard Depth	25 feet	42.6 feet	42.6 feet
Min. Rear Yard Depth	30 feet	NA	NA
Maximum Building Coverage	60%	43.8%	42.6%
Max. Building Height	35 feet	45.1 feet(1)	45.1 feet(1)

1. Pre-existing, non-conforming condition.

3.2 Proposed Utilities

Water: Modifications to the domestic and fire protection water services to the development are not anticipated. However, due to the change in use and resulting change in demand, review and approval from the Providence Water Supply Board will be required.

Sewer: Modifications to the existing sewer services are not anticipated. However, due to the change in use and resulting change in flow, review and approval from Veolia Water / Cranston Department of Public Works will be required.

Gas/Electric/Telecommunications: Major modifications to the site's gas and telecommunications services are not anticipated. However, due to the change in use, review and approval from Rhode Island Energy – Gas will likely be required. The proposed development will likely necessitate a new transformer, which will require coordination with Rhode Island Energy – Electric.

Stormwater: The proposed development includes a reduction in impervious area of approximately 2.7-percent, or about 6,500 square feet. In addition, beautification of the site, including placement of new loam and seed as well as landscape plantings, will assist

in providing natural groundwater infiltration and water quality. Environmental assessments have been completed and identify areas on the site where groundwater infiltration is recommended; refer to "heat map" within Appendix B for additional details. The site's stormwater management system has been designed in accordance with all applicable State and local Standards, improving water quality, groundwater recharge, and reducing peak stormwater runoff rates and total stormwater runoff volumes to the maximum extent practicable.

4 PERMIT REQUIREMENTS

4.1 Local Permit Requirements

4.1.1 City of Cranston Plan Commission

The project team met with the City for a pre-application review of the project in March 2024. The project is considered a Major Land Development, requiring three (3) stages of review, Master Plan, Preliminary Plan and Final Plan with the City Plan Commission. The project received Master Plan approval at the June 6, 2024 City Plan Commission meeting.

4.1.2 Providence Water Supply Board

Due to the change in use and resulting change in demand, review and approval from the Providence Water Supply Board will be required.

4.1.3 Veolia Water/ Cranston Dept. of Public Works

Due to the change in use and resulting change in flow, review and approval from Veolia Water / Cranston Department of Public Works will be required.

4.2 State Permit Requirements

4.2.1 RI Department of Environmental Management

Given the overall area of disturbance associated with development of this site, a submission to the Rhode Island Department of Environmental Management (RIDEM) Office of Water Resources/Stormwater Program is required for a Construction Stormwater Application (CSA). In addition, review and approval will be required by the DEM's Office of Waste Management for review and approval of the site's Remedial Action Work Plan (RAWP), Soils Management Plan (SMP), and Environmental Land Usage Restriction (ELUR).

5 STORMWATER MANAGEMENT PLAN

5.1 General

The proposed development is subject to the requirements of the Rhode Island Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8), a recodification of the regulatory portions of the Stormwater Manual implemented by both the Rhode Island Department of Environmental Management (RIDEM) and the Rhode Island Coastal Resources Management Council (CRMC). In general, all stormwater runoff from the eastern portion of the site sheet flows to existing drywells within the site, which conveys stormwater in a southerly direction, routed to existing drainage network to the property to the south. Stormwater from the western portion of the site sheet flows to a series of catch basins located further down Wellington Avenue. Stormwater runoff from the site is ultimately directed to Fenner Pond via a large box culvert.

The site's proposed stormwater management system has been designed to generally mimic existing conditions. The stormwater management design adheres to all State (RIDEM) and local (City of Cranston) standards of attenuation of peak stormwater runoff rates for the 1-, 2-, 10-, 25-, and 100-year storm event, reduction in stormwater volumes leaving the site while promoting groundwater recharge and improving the quality of the stormwater leaving the site.

In addition, the proposed Stormwater Management Plan takes into account that Fenner Pond is listed as impaired for total phosphorus. Overall water quality of the stormwater leaving the site is improved by implementing the use of a pea gravel diaphragm and sediment forebay for pre-treatment of the stormwater and a new sand filter basin to treat for water quality. As previously noted, due to widespread contamination throughout the site, due to the concerns of the RIDEM OWR and OLRSMM, the sand filter basin located at the Southern end of the site is proposed to be lined and under-drained to aid in mitigation of the conveyance of potential contaminants off site.

5.2 Standard 1: LID Planning and Design Strategies

Low Impact Development (LID) site planning and design strategies must be used to the maximum extent practicable.

Standard Waived – However, Standard Met

LID practices, which include installation of structural stormwater management systems including a bioretention basin and a lined and under-drained sand filter basin, have been

included in the design. The proposed system will provide the necessary water quality treatment and groundwater recharge to the maximum extent practicable. In addition, the proposed drainage patterns closely mimic that of the existing conditions.

5.3 Standard 2: Groundwater Recharge

Stormwater must be recharged within the same sub-watershed to maintain base flow at pre-development recharge levels to the maximum extent practicable.

Standard Not Met – Waiver Requested

Groundwater recharge will be provided on site through a bioretention basin at the northern end of the site. A sand filter basin is proposed at the southern end of the site which is proposed to be lined and under-drained due to subsurface contaminants in this area of the site. A waiver is being requested from the groundwater recharge requirement due to the extensive subsurface contamination around the site. The groundwater recharge standard has been met to the maximum extent practicable via the implementation of the infiltrating bioretention basin. Natural groundwater recharge is also achieved via the reduction in overall impervious areas throughout the site. As such, the Applicant is respectfully requesting a waiver from this requirement. All calculations were completed in accordance with Section 8.8 of the Stormwater Rules using the following formula:

$Re_v = (1") (F) (I) / 12$

Based on the results of the soil evaluation test pits, a recharge factor of 0.35 was used, associated with Hydrologic Soil Group B.

Table 5.1: Recharge Requirements

Subwatershed	**1A**	**1B**
Treatment System	Bioretention Basin #1	Infiltration Basin #1
Impervious Area (SF)	2,621	43,709
Recharge factor (in)	0.35	0.35
Required Recharge Volume (CF)	76	1,275
Required Recharge Volume @ 50% (CF)	38	637
Provided Recharge Volume (CF)	389	0
Recharge Requirement Met?	Yes	No[(4)]

Notes: 1. Refer to Proposed Watershed Map located in Appendix E for BMP locations.
2. Based on Routing Analysis of WQ_v, the entire water quality volume is infiltrated.
3. Recharge Volumes are calculated as the Static Storage Volume.
4. Waiver from groundwater recharge requirement requested due to subsurface contamination.

5.4 Standard 3: Water Quality

The stormwater runoff from the site must be treated prior to discharge.

Standard Met

Based on the Stormwater Rules, the site is considered a redevelopment as more than 10,000 sq. ft. of existing impervious area is being improved and 40% or more existing impervious surface coverage exists within the subject parcel. Therefore only 50% of all disturbed impervious areas must be treated for water quality. Stormwater runoff associated with the pavement are treated by the bioretention basin and lined and under-drained sand filter basin. Calculations were completed in accordance with Section 8.9 of the Stormwater Rules.

Tables 2 and 3 below provide sizing calculations for the Water Quality Volume (WQ_V) of the pretreatment area and the treatment area, respectively. The rooftop area is exempt from pre-treatment requirements. Water quality calculations for impervious surfaces are included in Appendix F.

Table 5.2: Pretreatment Requirements

Subwatershed	**1A**	**1B**
Treatment System	Crushed Stone Diaphragm	Sediment Forebay #1
Impervious Area (SF)	2,621	43,709
Water Quality Factor (in)	1.00	1.00
Required Water Quality Volume @50% (CF)	109	1,821
Required Static Volume for Pretreatment (25% of WQv)	27	455
Provided Static Storage Volume for Infiltration System (CF)	36	3,314
Pretreatment Requirement Met?	Yes	Yes

Table 5.3: Treatment Requirements		
Subwatershed	**1A**	**1B**
Treatment Type	Bioretention Basin #1	Sand Filter Basin #1
Impervious Area (sf)	2,621	43,709
Water Quality Factor (in)	1.00	1.00
Required Water Quality Volume (CF) @50%	109	1,821
Required Static Volume for Treatment	82	1,366
Provided Static Storage Volume for Treatment (CF)	389	4,901
Treatment Requirement Met	Yes	Yes

Notes:

1. Static Storage Volume = Storage volume of system below outlet (for infiltrating practices) or storage volume within basin and sand filter void space (prior to discharge to underdrain).

As shown in Tables 5.1 through 5.3 above, the site's proposed stormwater management system exceeds the requirements of groundwater recharge volume, water quality pre-treatment volume and water quality volume. This is in accordance with the Stormwater Rules and the City of Cranston's standards, and ultimately reduces any instances of untreated stormwater flow towards Fenner Pond.

5.5 Standard 4: Conveyance and Natural Channel Protection

This standard is designed to prevent erosive flow within natural channels and drainage ways.

Standard Waived – However, Standard Met

The proposed site improvements fall under the redevelopment standard, which does not require peak flow mitigation. However, the large reduction in impervious areas throughout the site coupled with the proposed stormwater management BMPs results in reductions in peak stormwater runoff rates and total runoff volumes to all design points through the 100-year design storm. Calculations are provided in Appendices E and G.

5.6 Standard 5: Overbank Flood Protection

Downstream overbank flood protection must be provided by attenuating the post-development peak discharge rate to the pre-development levels for the 1–, 10-, and 100-year, Type III design storm events.

Standard Waived – However, Standard Met

The proposed project is eligible from this requirement because it is a redevelopment. However, the large reduction in impervious areas throughout the site coupled with the proposed stormwater management BMPs results in reductions in peak stormwater runoff rates and total runoff volumes to all design points through the 100-year design storm. Calculations are provided in Appendices E and G.

5.7 Standard 6: Redevelopment and Infill Projects

For redevelopment sites with 40% or more existing impervious surface coverage and infill sites, only Standards 2, 3, and 7-11 must be addressed.

Standard Met

As shown below, the proposed site improvements are not considered a redevelopment:

Existing Site Area	Existing Impervious Area	Percent Impervious	Redevelopment?
237,000 sf	209,137 sf	88.2%	Yes

5.8 Standard 7: Pollution Prevention

All development sites require the use of source control and pollution prevention measures to minimize the impact that the land use may have on stormwater runoff quality.

Standard Met

Soil erosion and pollution control measures including a crushed stone construction access, compost sock and catch basin silt sacks are proposed to be used during construction. A Soil Erosion and Sediment Control Plan (SESCP), has been prepared in accordance with the Manual and has been submitted separately. A long-term Operation and Maintenance Plan (O&M) has been prepared in accordance with the Manual and has been submitted separately.

5.9 Standard 8: Land Uses with Higher Potential Pollutant Loads

Stormwater discharges from land uses with higher potential pollutant loads (LUHPPLs) require the use of specific source control and pollution prevention measures and the specific stormwater BMPs approved for such use.

A stormwater LUHPPL is defined by the following land uses and activities:

1. Areas within an industrial site (as defined in RIPDES Rule 31(b)(15)) that are the location of activities subject to the RIPDES Multi-Sector General Permit (except

where a No Exposure Certification for Exclusion from RIPDES Stormwater Permitting has been executed);
2. Auto fueling facilities (i.e., gas stations);
3. Exterior vehicle service, maintenance and equipment cleaning areas;
4. Road salt storage and loading areas (if exposed to rainfall); and
5. Outdoor storage and loading/unloading of hazardous substances.

Standard Not Applicable

The subject site does not meet the definition of a LUHPPL, as it does not maintain or require a RIPDES Multi-Sector General Permit.

5.10 Standard 9: Illicit Discharges

All illicit discharges to stormwater management systems are prohibited, including discharges from OWTS, and sub-drains and French drains near OWTSs that do not meet the State's OWTS Rules.

Standard Met

There are no known existing illicit discharges at the site nor are any proposed as part of this project.

5.11 Standard 10: Construction and Erosion Sedimentation Control

Erosion and sedimentation control (ESC) practices must be utilized during the construction phase as well as during any land disturbing activities

Standard Met

Erosion control practices have been employed to avoid and minimize impacts to abutting properties. Detailed notes have been included in the plans to ensure effective implementation of erosion and sedimentation controls, which include a straw wattle/silt fence around the perimeter of the site, Siltsack sediment traps within all catch basins within and adjacent to the site, and a crushed stone construction access at the entrances to the site. The soil erosion and sedimentation control measures will be installed prior to the initiation of construction activities and maintained throughout construction. Once established, these measures will be monitored daily until construction activities are complete. The straw wattle/silt fence line will serve as the strict limits of disturbance for the project. No alterations, including vegetative clearing or surface disturbance, will occur beyond this line. The limits of clearing, grading, and disturbance will be kept to a minimum within the

proposed area of construction. All areas outside of these limits, as depicted on the project site plans, will remain undisturbed, in a completely natural condition.

5.12 Standard 11: Stormwater Management System Operation and Maintenance

The stormwater management system, including all structural stormwater controls and conveyances, must have an Operation and Maintenance Plan to ensure that it continues to function as designed.

Standard Met

A long-term Stormwater Operation and Maintenance Plan has been prepared for the development in accordance with the Manual and is provided under separate cover.

6 DRAINAGE ANALYSIS

6.1 Methodology

The comparative pre- versus post-development hydrologic analysis was performed using the Soil Conservation Service, Technical Release 20 and 55 (TR-20 and TR-55) methodology. The 1-, 2-, 10-, 25-, and 100-year storm events were modeled for a 24-hour, Type III storm utilizing HydroCAD version 10.00. HydroCAD modeling reports for the existing and proposed conditions can be found in Appendices F and H, respectively.

6.2 Existing Conditions

The existing site consists of two (2) watersheds discharging to two (2) off-site design points further described as the existing drainage network (DP1) and the existing drainage inlets within Wellington Avenue (DP2). In general, all stormwater runoff from the eastern portion of the site sheet flows to existing drywells and catch basins within the site, which convey stormwater in a southerly direction to an existing drainage network (DP1). This drainage line is routed through the property to the south, tying into an existing 4’x4’ box culvert, owned and maintained by the City of Cranston. Stormwater from the western portion of the site sheet flows to a series of catch basins located further down Wellington Avenue (DP2). These catch basins are also tied into the existing 4’x4’ box culvert, owned and maintained by the City of Cranston. This box culvert continues to the east, through the adjacent Johnston Controls property, under Elmwood Avenue, ultimately discharging to Fenner Pond. An Existing Conditions Watershed Map is included in Appendix C.

Design Point 1 – Existing Drainage Network

Watershed 1: Consists of 174,413 sq. ft. of paved parking areas and roofs associated with the eastern portion of the parcel. This watershed area consists mostly of impervious area and has a minimum T_C of 6.0 minutes and a composite CN Runoff Number of 93. Stormwater runoff from this area is collected via a closed drainage system that conveys stormwater runoff in a southerly direction, routed to an existing drainage network to the property to the south, Design Point 1.

Design Point 2 – Existing Drainage Inlets within Wellington Avenue

Watershed 2: Consists of 62,600 sq. ft. of the western portion of the project site. This watershed area consists mostly of impervious areas (pavement and rooftop areas) and has a T_C of 6.0 minutes and a composite CN Runoff Number of 98. Runoff from this area sheet flows towards the existing drainage inlets within Wellington Avenue (Design Point 2).

6.3 Proposed Conditions

In general, the proposed drainage patterns mimic existing conditions, discharging to the same design points as under existing conditions. Water quality is achieved by means of infiltration practices. Stormwater runoff from the eastern portion of the project area is conveyed through proposed drainage infrastructure prior to discharging to the existing drainage network, while the remainder of the western portion of the site will continue to sheet flow to the existing catch basins within Wellington Avenue. These conditions are shown in detail on the Proposed Conditions Watershed Map included in Appendix E.

Design Point 1 – Existing Drainage Network

Under proposed conditions, Watershed 1 is subdivided into two (2) subwatersheds.

Subwatershed 1A: Subwatershed 1A consists of 11,579 sq. ft. of mostly pervious areas. This subwatershed area has a minimum T_C of 6.0 minutes and a composite CN Runoff Number of 79. Stormwater runoff from the parking area sheet flows to a crushed stone diaphragm for pre-treatment and then Bioretention Basin #1 for water quality and groundwater recharge. Excess treated stormwater runoff from this area is collected via an outlet control structure that ties into the existing drainage network that conveys stormwater to the property to the south, Design Point 1.

Subwatershed 1B: Consists of 162,834 sq. ft. of mostly pavement areas and roof areas associated with the project site. This subwatershed a T_C of 6.0 minutes and a composite CN Runoff Number of 90. Stormwater runoff from this area sheet flows to Sediment Forebay #1 for pre-treatment and Sand Filter Basin #2 for water quality treatment. Excess treated stormwater runoff from this area is collected via an underdrain system and outlet control structure that ties into the existing drainage network that conveys stormwater to the property to the south, Design Point 1.

Design Point 2 – Existing Drainage Inlets within Wellington Avenue

Subwatershed 2: Consists of 62,600 sq. ft. of the western portion of the project site. This watershed area remains mostly unchanged; however, elimination of some smaller rooftop areas and paved areas are being converted to grassed/landscaped area are proposed. As such, this watershed area consists mostly of impervious areas (pavement and rooftop areas) and therefore has been assigned a T_C of 6.0 minutes and a composite CN Runoff Number of 94. Runoff from this area sheet flows towards the existing drainage inlets within Wellington Avenue (Design Point 2).

6.4 Results

A runoff analysis of the pre- and post-construction conditions was completed using the TR-20 methodology and is summarized in Table 3 below. Supporting calculations for the pre- and post-construction conditions are included in Appendices F and H respectively.

Table 6.1: Watershed Data

	Area (SF)	CN	Tc (min.)
Exist. Watershed 1	174,413	93	6.0
Exist. Watershed 2	62,600	98	6.0
Existing Totals	**237,013**	**94**	--
Prop. Subwatershed 1A	11,579	79	6.0
Prop. Subwatershed 1B	162,834	90	6.0
Watershed 2	62,600	94	6.0
Proposed Totals	**237,013**	**91**	**--**
Delta (Δ)	**0**	**-3**	**--**

Note: Minimum Tc = 6 minutes; Average CN is a weighted average.

As shown in Table 6.1 above, the overall watershed area remains unchanged when comparing existing to proposed conditions. However, due to the decrease in impervious

areas associated with the proposed development, the CN value has been decreased by 3 when comparing existing to proposed conditions.

Table 6.2.1: Peak Discharge (cfs) to Design Point 1

	WQ	1-YR	10-YR	100-YR
Existing Condition	3.62	8.84	17.70	32.69
Proposed Condition	0.12	4.08	15.48	30.13
Delta (Δ)	***-3.50***	***-4.76***	***-2.22***	***-2.56***

Table 6.2.2: Peak Discharge (cfs) to Design Point 2

	WQ	1-YR	10-YR	100-YR
Existing Condition	1.52	3.66	6.73	11.99
Proposed Condition	1.35	3.29	6.45	11.81
Delta (Δ)	***-0.17***	***-0.37***	***-0.28***	***-0.18***

As shown in Tables 6.2.1 and 6.2.2 above, the peak stormwater runoff rates realized at Design Point 1 (Existing Drainage Network) and Design Point 2 (existing catch basins within Wellington Avenue) have decreased for all design storm events. This will result in significantly less stress on the public drainage system, specifically the existing 4'x4' box culvert.

Table 6.2.3: Total Runoff Volume (cf) to Design Point 1

	WQ	1-YR	10-YR	100-YR
Existing Condition	8,883	28,609	59,587	114,207
Proposed Condition	6,667	17,050	45,447	98,348
Delta (Δ)	***-2,216***	***-11,559***	***-14,140***	***-15,859***

Table 6.2.4: Total Runoff Volume (cf) to Design Point 2

	WQ	1-YR	10-YR	100-YR
Existing Condition	5,142	12,883	24,327	44,132
Proposed Condition	3,507	10,751	21,959	41,620
Delta (Δ)	***-1,635***	***-2,132***	***-2,368***	***-2,512***

As shown in Tables 6.2.3 and 6.2.4 above, the total stormwater runoff volumes realized at Design Point 1 (Existing Drainage Network) and Design Point 2 (existing catch basins within Wellington Avenue) have decreased for all design storm events. This will result in

significantly less stress on the public drainage system, specifically the existing 4'x4' box culvert.

7 CONCLUSIONS

As shown in Sections 4, 5 and 6 above, the proposed improvements have been designed to minimize impacts of the proposed site development by reducing peak stormwater runoff rates for the 1, 10, and 100-year design storm vents while treating for water quality by the installation of BMP's including a bioretention basin and a lined and under-drained sand filter basin.

Due to the addition of the bioretention basin and the lined and under-drained sand filter basin, which infiltrate (bioretention only) and detain stormwater, both Design Points experiences reduction in peak stormwater runoff rates and provides water quality for the runoff leaving the watershed. The proposed stormwater management system has been designed to be in compliance with the rules and regulations stipulated in the Stormwater Rules. The stormwater management system as designed will not have any negative impacts to the existing drainage system within the subject property and within Wellington Avenue. In addition, as shown within this report, the WQv design storm is completely infiltrated on-site thereby improving current water quality conditions. Lastly, the proposed Stormwater Management Plan considers the existing TMDL for Fenner Pond by improving the overall water quality through infiltration practices.