

December 5, 2024

Norfolk County Community Development - Planning Department Robinson Administration Building 185 Robinson Street, Suite 200 Simcoe, ON N3Y 5L6

Attention: Supervisor of Development Planning

Reference: 750 Old Highway 24 – Site Plan Application – Phase 2 Submission 2

Verlinda Homes, Waterford, Norfolk County

Our Project 20-128

G. Douglas Vallee Limited is the agent acting on behalf of Verlinda Homes regarding a site plan application with Norfolk County. Please accept this package as our formal second site plan application for the residential development located at 750 Old Highway 24 in Waterford.

Please note, this site plan application only relates to the southern portion of the property which was severed as part of application BNPL2023254.

Included as part of this package are the following documents:

- 1. Engineering drawing set prepared by G. Douglas Vallee Limited, including the following:
 - a. Servicing Plan
 - b. Grading Plan
 - c. Erosion And Sediment Control Plan
 - d. Services Plan and Profile
 - e. General Notes
 - f. Sanitary Drainage Areas
 - g. Storm Drainage Areas
- 2. Architectural site plan drawing set prepared by G. Douglas Vallee Limited (and others), including the following:
 - a. Cover Sheet
 - b. Site Plan Notes Zoning
 - c. General Site Plan Notes
 - d. Site Plan Drawing
 - e. Site Plan Details
 - f. Earth Bin Details
 - g. OPSD Details
 - h. Topographical Survey
 - i. Site Plan Demolishment Details
- 3. Functional Servicing Report, prepared by G. Douglas Vallee Limited.

- 4. Stormwater Management Report, prepared by G. Douglas Vallee Limited.
- 5. Securities Estimate for work to be completed, prepared by G. Douglas Vallee Limited.
- 6. Species at Risk and Significant Wildlife Habitat Assessment, prepared by GeoProcess Research Associates.
- 7. Landscape drawing set, prepared by Adesso Design Inc.
 - a. Landscape Plan
 - b. Details
- 8. Photometric (Lighting) drawing set, prepared by SEI Electrical Engineering.
 - a. Electrical General Notes, Legends and Schedules
 - b. Electrical Site Plan Photometric Calculations
- 9. Email Correspondence with Soil Mat Engineers & Consultants Ltd. regarding post-development site infiltration.
- 10. Phase 2 Comment Tracking Sheet (Excel & PDF Versions)

We trust that the information in this letter will satisfy the requirements of a complete application. We look forward to continuously working with Norfolk County on this project, and should any questions arise, please feel free to contact me.

Yours truly,

John lezzi, P.Eng

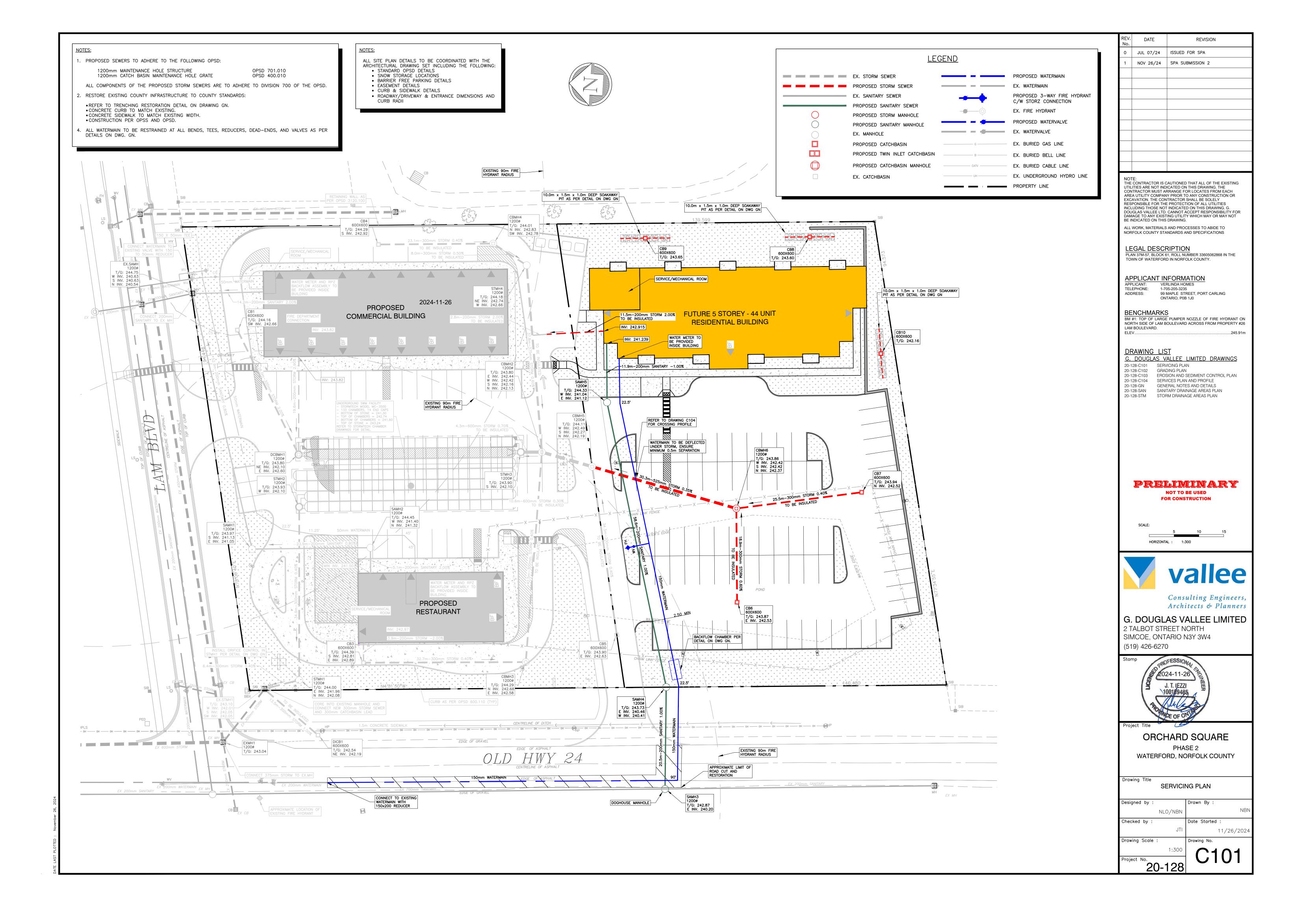
G. DOUGLAS VALLEE LIMITED

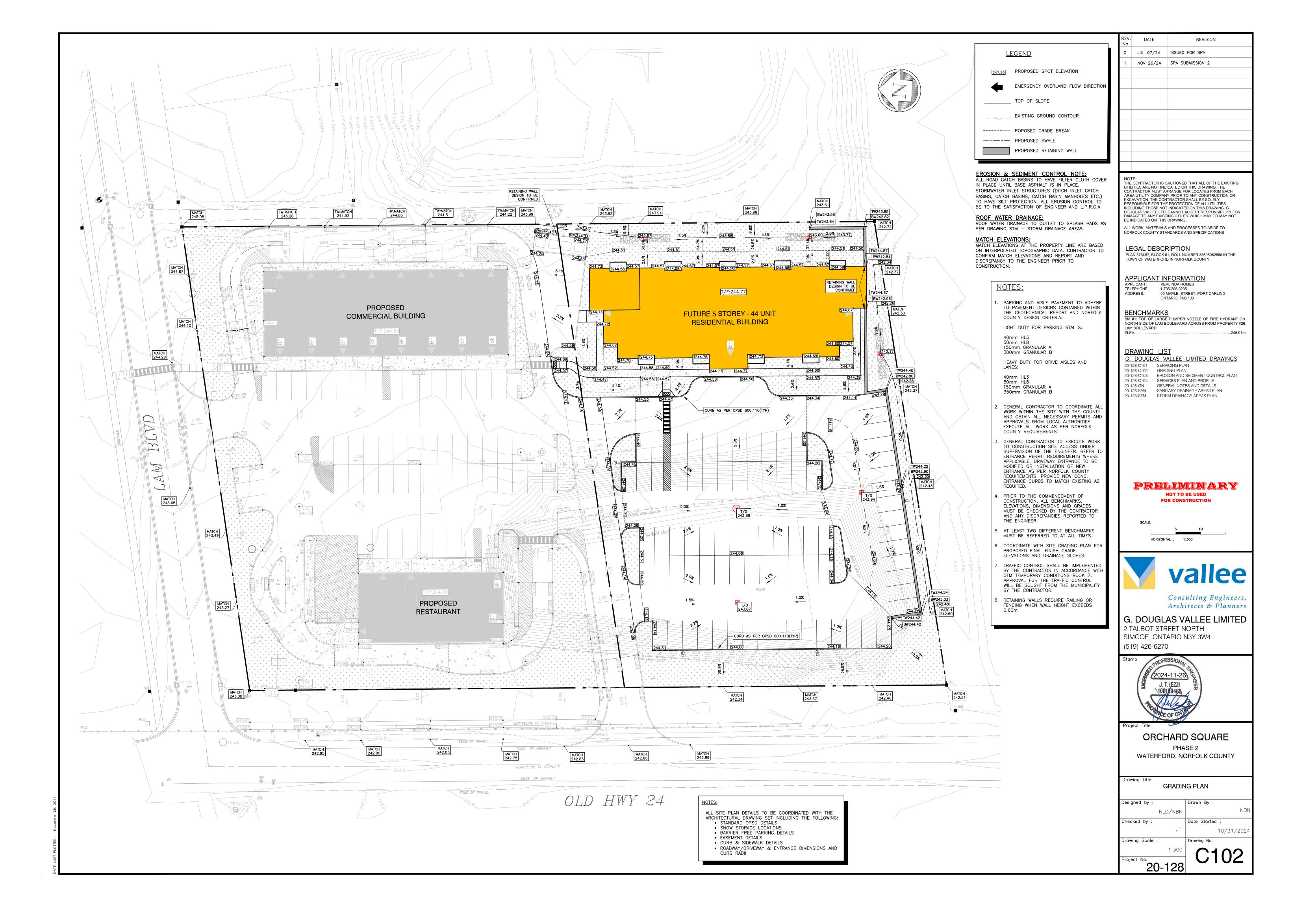
Consulting Engineers, Architects & Planners

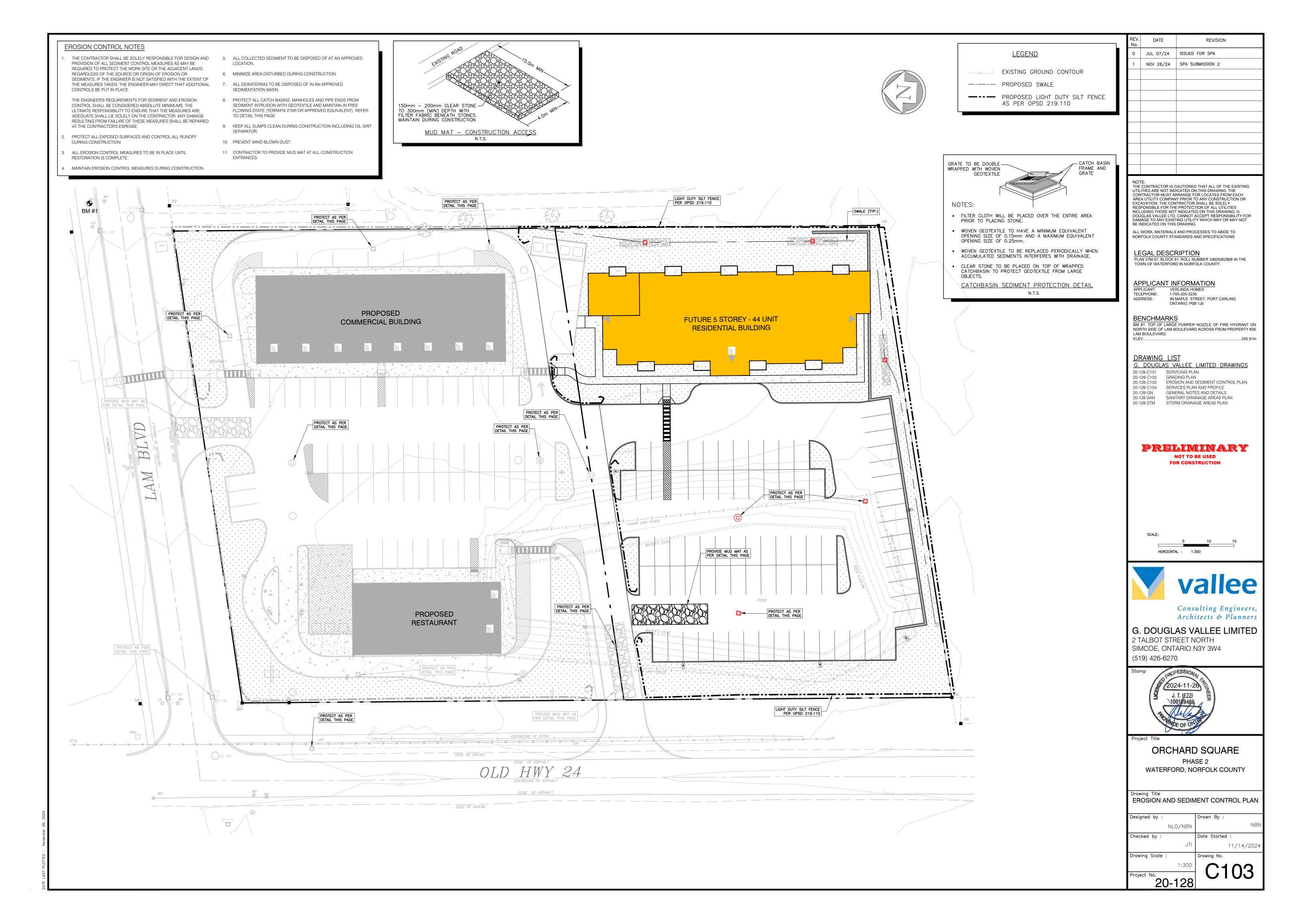
H:\Projects\2020\20-128 Orchard Square\Agency\Submissions\2024.08.22 - Phase 1 - Site Plan - 2nd Submission\Phase 1 Submission 2 Cover Letter.docx

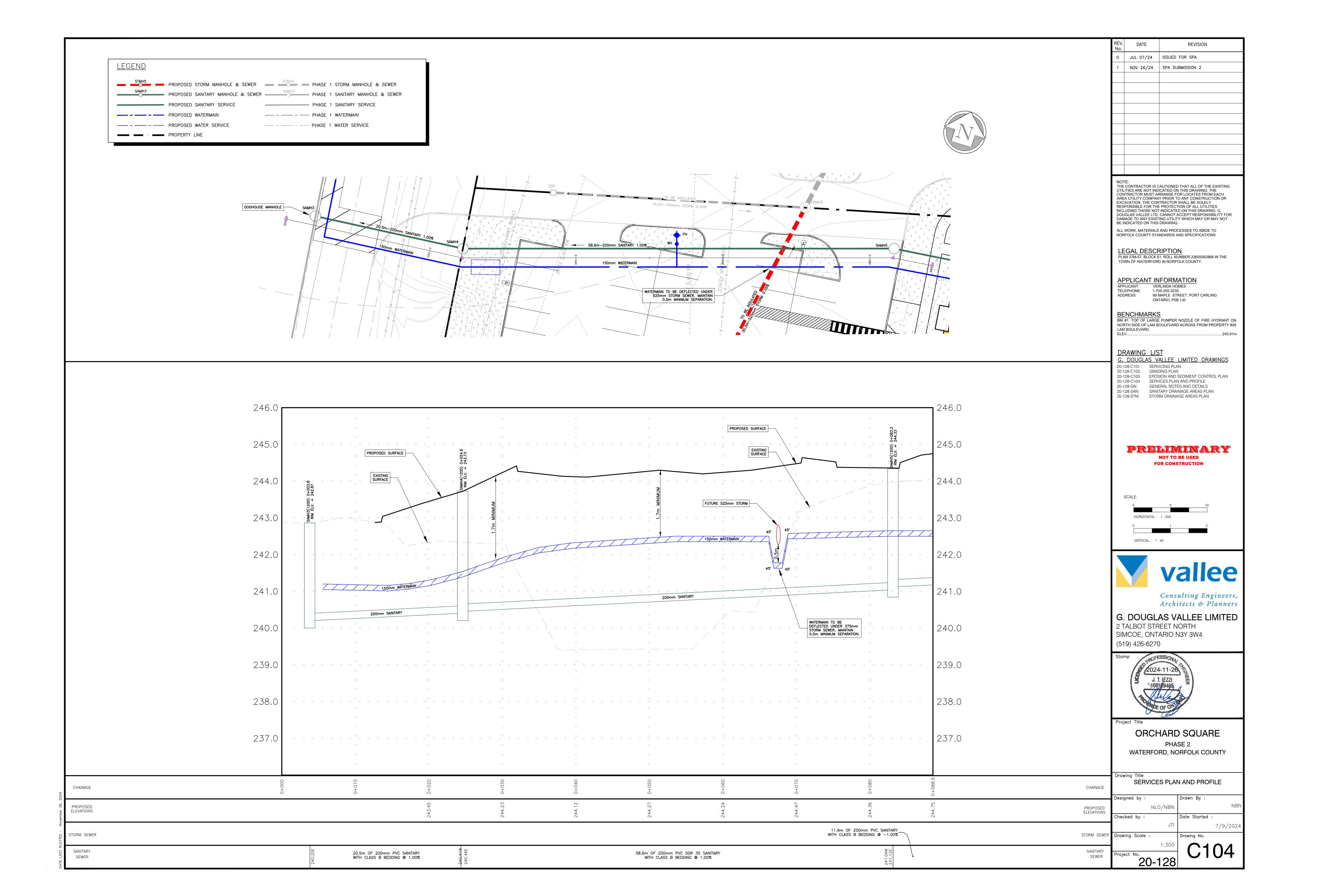












GENERAL NOTES

- 1. ALL PLANS TO BE REVIEWED IN CONJUCTION WITH THE ARCHITECTURAL DRAWING SET A100 A112.
- 2. PRIOR TO CLOSING ANY STREET, THE CONTRACTOR SHALL OBTAIN CLEARANCE BY FILLING 1. OUT THE COUNTY'S NOTICE OF ROAD CLOSURE FORM AND NOTIFY SCHOOL BUS OPERATORS OF STREETS USED FOR DETOUR AND THE DURATION OF THE DETOUR. THE CONTRACTOR MUST SUPPLY AND MAINTAIN ADEQUATE LOCAL DETOUR SIGNS AND
- 3. THE CONTRACTOR MUST MAINTAIN MAXIMUM ACCESS TO ALL PROPERTIES AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY MEASURES TO CONTROL SILT 2. ENTERING THE STORM DRAINAGE SYSTEM TO THE SPECIFICATIONS OUTLINED IN THE GUIDELINES ON EROSION AND SEDIMENT CONTROL FOR URBAN CONSTRUCTION SITES PREPARED BY THE MINISTRY OF NATURAL RESOURCES. THESE MEASURES ARE TO BE INSTALLED PRIOR TO COMMENCING ANY CONSTRUCTION FOR THIS STREET AND ARE TO REMAIN IN PLACE UNTIL CONSTRUCTION HAS BEEN COMPLETED TO THE SPECIFICATIONS OF THE ENGINEER. THE CONTRACTOR IS TO MEET ALL THE REQUIREMENTS OF THE OWNERS OF THE UTILITIES.
- 4. ON THIS PLAN, AND MUST MAKE SATISFACTORY ARRANGEMENTS WITH THE UTILITY COMPANIES FOR CROSSING THEIR INSTALLATIONS AND FOR PROVIDING ADEQUATE PROTECTION DURING CONSTRUCTION. PRIOR TO COMMENCING ANY CONSTRUCTION, ALL EXISTING UNDERGROUND UTILITIES SHALL BE.
- 5. LOCATED AND MARKED. ANY UTILITIES DAMAGED OR DISTURBED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER AT THE CONTRACTORS EXPENSE. ALL ORGANIC, SUITABLE OR UNSUITABLE MATERIALS BENEATH THE ROAD ALLOWANCES MUST BE.
- 6. REMOVED AND THESE AREAS BACKFILLED WITH AN APPROVED FILL MATERIAL, ALL TO THE SATISFACTION OF THE
- 7. PRIOR TO COMMENCING ANY CONSTRUCTION, ALL EXISTING SEWER OUTLET INFORMATION, BENCHMARKS, DIMENSIONS, ELEVATIONS AND GRADES MUST BE CHECKED AND VERIFIED AND ANY DISCREPANCIES REPORTED TO THE ENGINEER
- IMMEDIATELY. 8. ALL CATCH BASIN LEADS FOR SINGLE CATCH BASINS SHALL BE 250mm Ø PVC SDR35 WITH CLASS 'B' BEDDING. ALL CATCH BASIN LEADS FOR TWIN INLET CATCH BASINS SHALL BE 300mm Ø PVC SDR35 WITH CLASS 'B' BEDDING.
- 9. ALL PVC WATERMAIN SHALL HAVE TWU 10 COPPER TRACING WIRE LAID ALONG ENTIRE LENGTH. WATERMAIN SHALL HAVE 1.7m TO 1.9m COVER WITH CLASS 'B' BEDDING.
- 10. ALL 50mm WATER SERVICE TO BE BLUE904 SDR9 PEX AND ALL 150mm WATERMAIN TO BE PVC DR18 BLUE BRUTE WITH MANUFACTURED FITTINGS.
- 11. WATERMAIN FITTINGS SHALL BE MECHANICAL JOINT OR PUSH-ON JOINT INSTALLED WITH APPROVED MECHANICAL THRUST RESTRAINTS.
- 12. ALL MECHANICAL THRUST RESTRAINTS SHALL CONFORM TO CONTRACT DOCUMENT SPECIFICATIONS.
- 13. WHERE A WATERMAIN OR WATER SERVICE CROSSES ABOVE A STORM OR SANITARY SEWER, A MINIMUM VERTICAL CLEARANCE OF 0.50m SHALL BE PROVIDED. WHERE THE WATERMAIN OR WATER SERVICE IS UNABLE TO CROSS ABOVE THE SEWER, IT SHALL CROSS UNDERNEATH WHILE PROVIDING A MINIMUM SEPARATION OF 0.5m BETWEEN THE SEWER INVERT AND THE CROWN OF THE WATERMAIN OR WATER SERVICE, WHERE A STORM OR SANITARY SEWER CROSSES ANOTHER STORM OR SANITARY SEWER, A MINIMUM VERTICAL CLEARANCE BETWEEN PIPE BARRELS OF 0.50m SHALL
- 14. PROPOSED SEWERS TO ADHERE TO THE FOLLOWING OPSD:
 - MAINTENANCE HOLE STRUCTURES SINGLE CATCH BASIN STRUCTURE 600mm X 600mm OPSD 705.010 1200mm MAINTENANCE HOLE GRATE 1200mm CATCH BASIN MAINTENANCE HOLE GRATE OPSD 400.020
- SINGLE CATCH BASIN GRATE 600mm X 600mm OPSD 400.020 ALL COMPONENTS OF THE PROPOSED SEWERS ARE TO ADHERE TO DIVISION 700 OF THE OPSD.
- 15. ALL STORM SEWERS TO BE PVC DR35 WITH CLASS B BEDDING.
- 16. PROPOSED SANITARY TO BE PVC DR35 WITH CLASS 'B' BEDDING.

EX. STORM SEWER

PROPOSED STORM SEWER

EX. SANITARY SEWER

EX. MANHOLE

EX. CATCHBASIN

SUBDRAIN PLAN DETAIL

N.T.S.

PROPOSED SANITARY SEWER

PROPOSED CATCHBASIN

PROPOSED STORM MANHOLE

PROPOSED SANITARY MANHOLE

PROPOSED TWIN INLET CATCHBASIN

_100mm PERFORATED P.E.

CATCH BASIN MANHOLE

PIPE WITH FILTER SOCK

PROPOSED CATCHBASIN MANHOLE

- 17. FIRE HYDRANTS TO BE AWWA C502 COMPLIANT, NON-DRAINING, OPEN LEFT.
- 18. MUNICIPALITY WATERMAIN PROCEDURES TO BE ADHERED TO FOR INSTALLATION OF WATERMAINS OR SERVICES
- 19. WATERMAINS AND WATER SERVICES SHALL MAINTAIN A MINIMUM COVER OF 1.7m. 20. PROVIDE 2.5m MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PROPOSED WATERMAIN AND ANY STORM OR SANITARY
- SEWERS OR MAINTENANCE HOLES.

PROPOSED WATERMAIN

PROPOSED WATERVALVE

PROPOSED 3-WAY FIRE HYDRANT

C/W STORZ CONNECTION

EX. FIRE HYDRANT

EX. BURIED GAS LINE

EX. BURIED BELL LINE

EX. BURIED CABLE LINE

EX. UNDERGROUND HYDRO LINE

CATCH BASIN OR

CATCH BASIN MANHOLE

EX. WATERMAIN

EX. WATERVALVE

SUBDRAIN SECTION DETAIL

N.T.S.

21. ALL SITE PLAN DETAILS TO BE COORDINATED WITH THE ARCHITECTURAL DRAWING SET INCLUDING STANDARD OPSD DETAILS. SNOW STORAGE LOCATIONS, BARRIER FREE PARKING DETAILS, EASEMENT DETAILS, CURB & SIDEWALK DETAILS, ROADWAY/DRIVEWAY & ENTRANCE DIMENSIONS AND CURB RADII.

THE PAVEMENT ii. BOULEVARDS SHALL BE RESTORED WITH SOD OVER

100mm TOPSOIL (min) UNLESS OTHERWISE NOTED iii. ASPHALT DRIVEWAYS SHALL BE RESTORED WITH 150mm OF GRANULAR "A" (100% SPMDD) WITH 50mm OF HL3A

GENERAL

SEDIMENT CONTROL MEASURES

1. PROTECT ALL EXPOSED SURFACES AND CONTROL ALL RUNOFF

2. ALL EROSION CONTROL MEASURES TO BE IN PLACE BEFORE STARTING CONSTRUCTION AND REMAIN IN PLACE UNTIL

3. MAINTAIN EROSION CONTROL MEASURES DURING CONSTRUCTION

7. PROTECT ALL CATCHBASINS, MANHOLES AND PIPE ENDS FROM

SEDIMENT INTRUSION WITH GEOTEXTILE (TERRAFIX 270R OR

10. STRAW BALES TO BE USED IN LOCALIZED AREAS AS SHOWN AND AND AS DIRECTED BY THE ENGINEER DURING CONSTRUCTION

ROAD & BOULEVARD RESTORATION

i. ALL ROAD CUTS SHALL BE RESTORED WITH

ALL DISTURBED AREAS SHALL BE RESTORED AS FOLLOWS:

-40mm HL3 SURFACE ASPHALT (97% MARSHALL)

-50mm HL8 BASE ASPHALT (97% MARSHALL)
-150mm GRANULAR "A" BASE (100% SPMDD)
-300mm GRANULAR "B" TYPE 2 SUBBASE (100% SPMDD)

GRANULAR "B" TO BE EXTENDED 0.3m BEHIND EDGE OF

5. MINIMIZE AREA DISTURBED DURING CONSTRUCTION

8. KEEP ALL SUMPS CLEAN DURING CONSTRUCTION

6. ALL DEWATERING TO BE DISPOSED OF IN AN APPROVED

4. ALL COLLECTED SEDIMENT TO BE DISPOSED OF AT AN APPROVED

DURING CONSTRUCTION

SEDIMENTATION BASIN

APPROVED EQUIVALENT)

9. PREVENT WIND-BLOWN DUST

LOCATION

RESTORATION IS COMPLETE

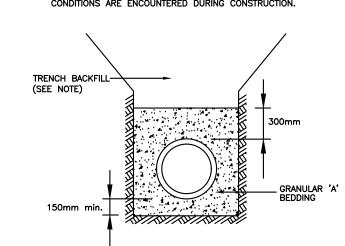
- ASPHALT (97% MARSHALL) iv. GRAVEL DRIVEWAYS SHALL BE RESTORED WITH 150mm OF GRANULAR "A" (100% SPMDD)
- v. CONCRETE DRIVEWAYS SHALL BE RESTORED WITH 150mm OF GRANULAR "A" (100% SPMDD) WITH 150mm OF CONCRETE (OPSS MIX. 30MPa MINIMUM)

—PAVEMENT STRUCTURE

-19mm CLEAR STONE 100mm Ø PERFORATED P.E. PIPE WITH FILTER SOCK ___19mm CLEAR STONE

-STORM PIPE

GRAN 'A' 100mm PERFORATED P.E. PIPE WITH FILTER SOCK CONCRETE FLAT CAP FRAME & GRATE OPSD 400.100 50mm MIN 150 150 SUBDRAIN DETAIL CLEAR STONE GEOTEXTILE -TRENCH BACKFILL (SEE NOTE) CSP WITH 16mm DIAMETER HOLES 300mm CENTRES 19mm CLEAR STONE 10.0 STONE BEDDING SOAKAWAY DETAIL N.T.S. 19mm CLEAR STONE STONE BEDDING SHALL BE USED IN PLACE OF THE STANDARD BEDDING WHERE HIGH HYDRAULIC GRADIENT CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION.



CLASS B BEDDING

- PIPE BEDDING AS SPECIFIED ON PLAN AND PROFILE DRAWINGS COMPACTED TO 95% SPMDD IN LAYERS NOT EXCEEDING 150mm, TO 300mm ABOVE TOP OF PIPE.
- TRENCH BACKFILL FROM TOP OF PIPE BEDDING TO UNDERSIDE OF GRANULAR "B" SUBBASE SHALL CONSIST OF APPROVED NATIVE MATERIALS COMPACTED TO 95% SPMDD IN LAYERS NOT EXCEEDING 300mm.
- 3. PRIOR TO PLACING THE GRANULAR SUBBASE MATERIAL, ALL TOPSOIL, SOFT OR OTHERWISE COMPRESSIBLE MATERIAL MUST BE REMOVED FROM THE SUBGRADE AREA, AND THE SUBGRADE SHALL BE PROOF-ROLLED TO COMPACT ANY LOOSE SURFACE ZONES. ALL EXCAVATED AREAS MUST BE BACKFILLED WITH APPROVED ON—SITE NATIVE MATERIALS OR IMPORTED

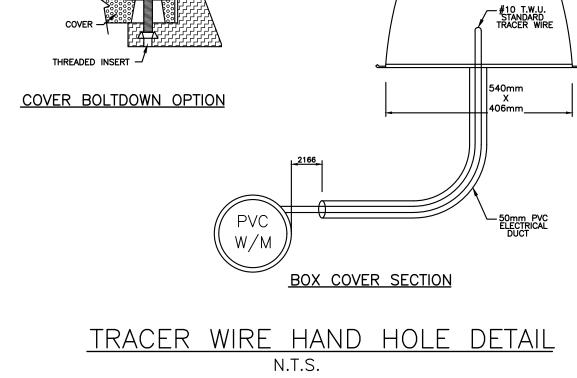
TRENCH BACKFILL

AS SPECIFIED

FOAM INSULATION PER

OPSD 1109.030 (MINIMUM -

THICKNESS TO BE 50mm)



470mm

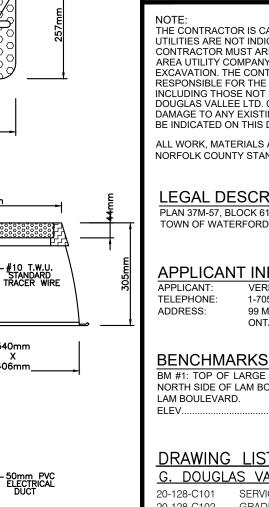
END VIEW

WATERMAIN

-□(HYD)=

LOCATION

STAINLESS STEEL CAPTIVE BOLT



395mm

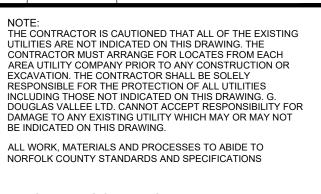
-SKID RESISTANT SURFACE

PLAN VIEW

BOX COVER

COVER BOLTDOWN OPTION -

LITE DUTY ADJUSTABLE
TRACER WIRE BOX
SNAKE PIT LD14TP-ADJ
(BLUE) BY COPPERHEAD



LEGAL DESCRIPTION

PLAN 37M-57, BLOCK 61, ROLL NUMBER 33605062868 IN THE

DATE

JUL 07/24 | ISSUED FOR SPA

NOV 26/24 | SPA SUBMISSION 2

TOWN OF WATERFORD IN NORFOLK COUNTY.

APPLICANT INFORMATION APPLICANT: VERLINDA HOMES

TELEPHONE: 1-705-205-3235 99 MAPLE STREET, PORT CARLING ADDRESS: ONTARIO, P0B 1J0

BM #1: TOP OF LARGE PUMPER NOZZI E OF FIRE HYDRANT ON NORTH SIDE OF LAM BOULEVARD ACROSS FROM PROPERTY #26 LAM BOULEVARD.

..245.91m

<u>DRAWING LIST</u>

G. DOUGLAS VALLEE LIMITED DRAWINGS

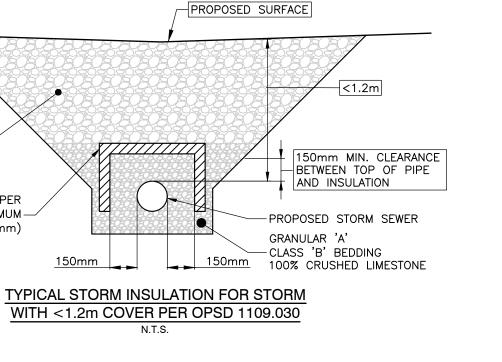
20-128-C101 SERVICING PLAN

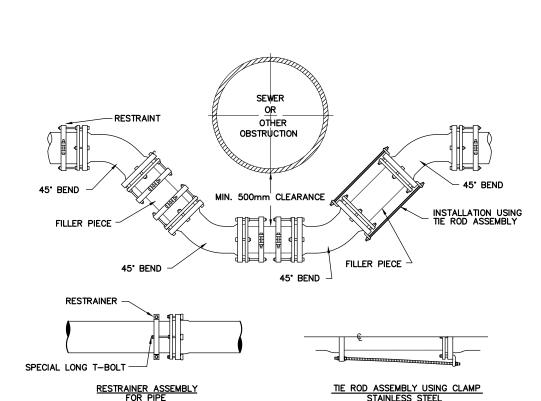
20-128-C102 GRADING PLAN

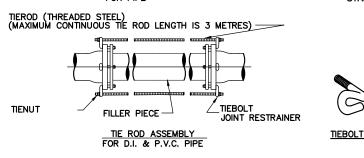
20-128-C103 EROSION AND SEDIMENT CONTROL PLAN 20-128-C104 SERVICES PLAN AND PROFILE

20-128-GN GENERAL NOTES AND DETAILS SANITARY DRAINAGE AREAS PLAN 20-128-SAN

20-128-STM STORM DRAINAGE AREAS PLAN









WATERMAIN DEFLECTION DETAIL

	WATERMAIN RESTRAINTS TABLE					
DIAMETER (mm)	MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTINGS (m)					
	11-1/4*	22-1/2*	45°	90° BENDS AND TEES	REDUCER (IN DIRECTION OF LARGER PIPE)	DEAD END AND VALVES
150		2		9	N/A	12

NOTES;

- 1. ALL JOINTS WITHIN DISTANCES SHOWN SHALL BE RESTRAINED WITH A MEG-A-LUG JOINT RESTRAINT.
- 2. ALL TEES SHALL HAVE A MINIMUM OF 1.0m SOLID PIPE OUT EACH SIDE OF THE MAIN RUN OF THE TEE.
- 3. ALL DISTANCES TO BE CONFIRMED TO THE MANUFACTURERS STANDARDS FOR ALTERNATE RESTRAINTS TO MEGALUG.

NOT TO BE USED FOR CONSTRUCTION



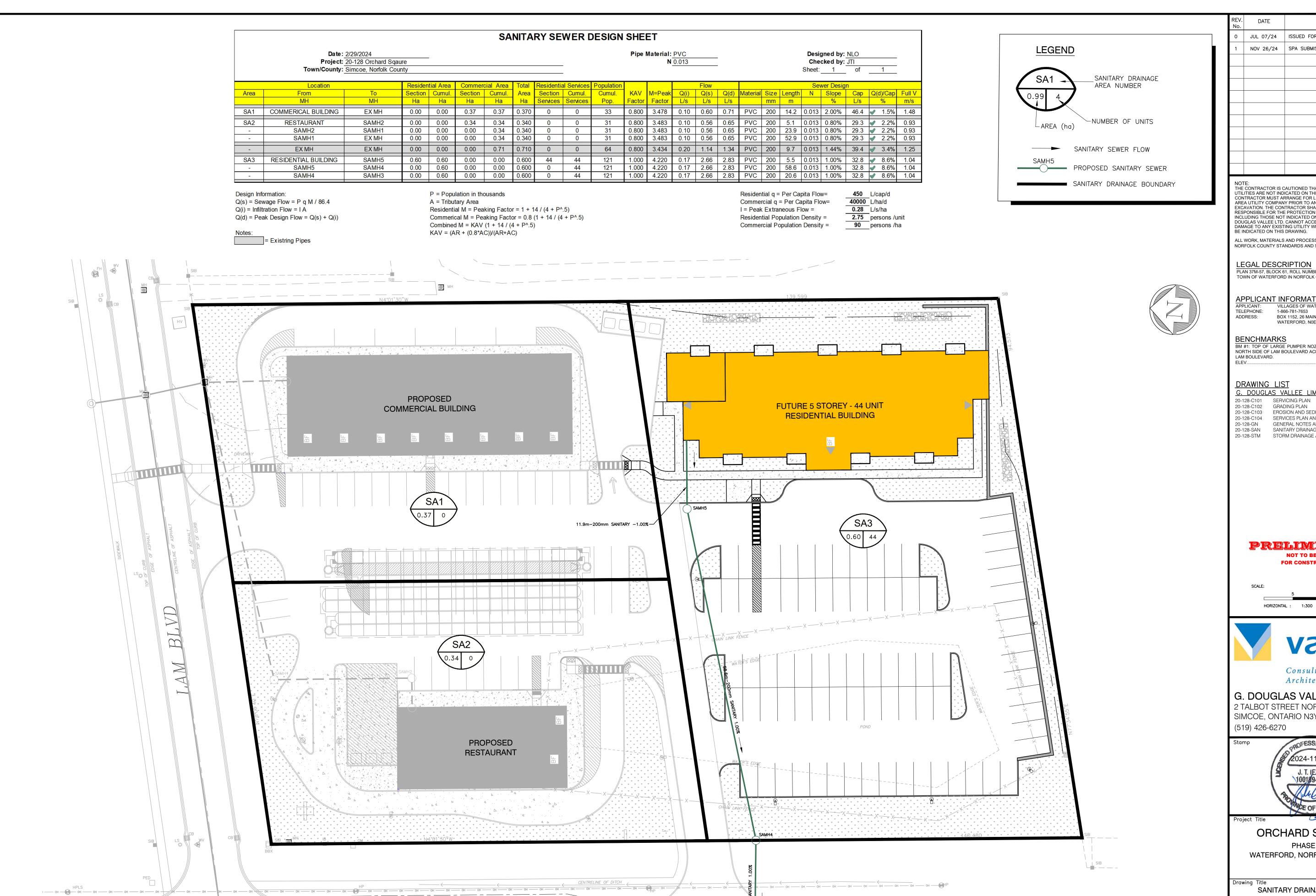
Architects & Planners G. DOUGLAS VALLEE LIMITED 2 TALBOT STREET NORTH SIMCOE, ONTARIO N3Y 3W4



ORCHARD SQUARE PHASE 2 WATERFORD, NORFOLK COUNTY

rawing Title GENERA	AL NOTES
esigned by :	Drawn By :
NLO/NBN	N
necked by :	Date Started :
JTI	11/19/20
awing Scale :	Drawing No.
AS NOTED	

20-128



CENTRELINE OF ASPHALT

EDGE OF ASPHALT

REVISION JUL 07/24 ISSUED FOR SPA NOV 26/24 | SPA SUBMISSION 2

> THE CONTRACTOR IS CAUTIONED THAT ALL OF THE EXISTING UTILITIES ARE NOT INDICATED ON THIS DRAWING. THE CONTRACTOR MUST ARRANGE FOR LOCATES FROM EACH AREA UTILITY COMPANY PRIOR TO ANY CONSTRUCTION OR EXCAVATION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES INCLUDING THOSE NOT INDICATED ON THIS DRAWING. G.
> DOUGLAS VALLEE LTD. CANNOT ACCEPT RESPONSIBILITY FOR
> DAMAGE TO ANY EXISTING UTILITY WHICH MAY OR MAY NOT BE INDICATED ON THIS DRAWING.

ALL WORK, MATERIALS AND PROCESSES TO ABIDE TO NORFOLK COUNTY STANDARDS AND SPECIFICATIONS

LEGAL DESCRIPTION

PLAN 37M-57, BLOCK 61, ROLL NUMBER 33605062868 IN THE TOWN OF WATERFORD IN NORFOLK COUNTY.

APPLICANT INFORMATION VILLAGES OF WATERFORD

TELEPHONE: 1-866-781-7653 BOX 1152, 26 MAIN STREET, WATERFORD, N0E 1Y0

BENCHMARKS

BM #1: TOP OF LARGE PUMPER NOZZLE OF FIRE HYDRANT ON NORTH SIDE OF LAM BOULEVARD ACROSS FROM PROPERTY #26 LAM BOULEVARD.

DRAWING LIST

G. DOUGLAS VALLEE LIMITED DRAWINGS

20-128-C102 GRADING PLAN

20-128-C102 GRADING FLAN
20-128-C103 EROSION AND SEDIMENT CONTROL PLAN
20-128-C104 SERVICES PLAN AND PROFILE
20-128-GN GENERAL NOTES AND DETAILS

SANITARY DRAINAGE AREAS PLAN

20-128-STM STORM DRAINAGE AREAS PLAN

PRELIMINARY

NOT TO BE USED

FOR CONSTRUCTION



Consulting Engineers, Architects & Planners

G. DOUGLAS VALLEE LIMITED 2 TALBOT STREET NORTH

SIMCOE, ONTARIO N3Y 3W4 (519) 426-6270



ORCHARD SQUARE WATERFORD, NORFOLK COUNTY

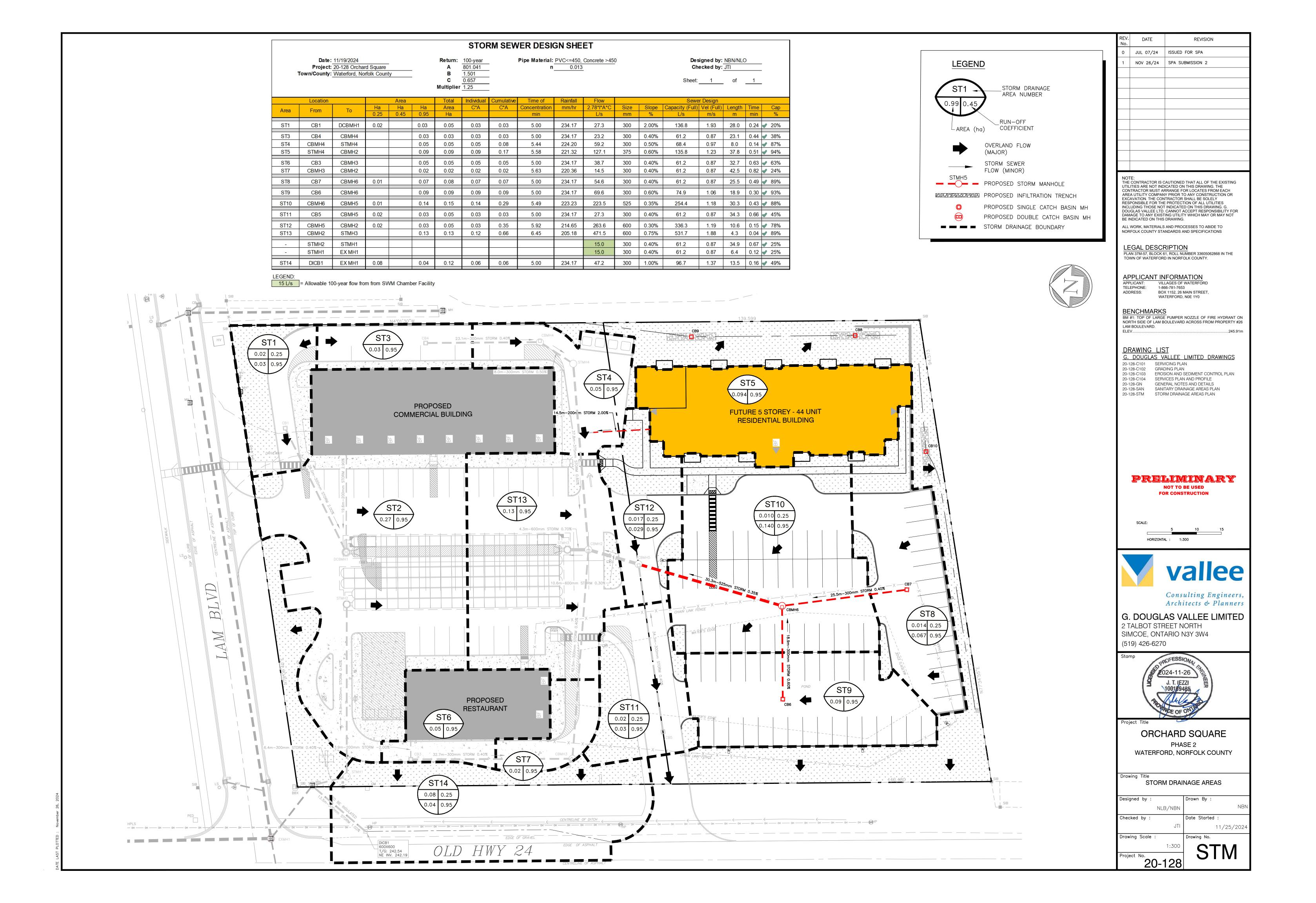
Drawing Title

CANITARY DRAINAGE AREAS

SANITARY DRA	AINAGE AREAS
Designed by :	Drawn By :

Checked by : Date Started : 11/25/2024

20-128



A101A SITE PLAN NOTES A101B SITE PLAN SITE PLAN DETAILS A102 SITE PLAN DETAILS A102A A102B SITE PLAN DETAILS A104 EARTHBIN A104A EARTHBIN A105 OPSD DETAILS A105A OPSD DETAILS

EXISTING SITE SURVEY D100 SITE PLAN DEMO ARCHITECTURAL PRESENTATION PRESENTATION ELEVATIONS PRESENTATION ELEVATIONS

CIVIL C101 SERVICING PLAN GRADING PLAN EROSION & SEDIMENT CONTROL PLAN

P303

L-2

SERVICES PLAN AND PROFILE C104 GENERAL NOTES & DETAILS GN SANITARY DRAINAGE AREAS PLAN STM STORM DRAINAGE AREAS PLAN

PRESENTATION ELEVATIONS

ELECTRICAL EPOO1 ELECTRICAL GENERAL NOTES, LEGENDS AND SCHEDULES EP100 ELECTRICAL SITE PLAN PHOTOMETRIC CALCULATIONS

LANDSCAPE LANDSCAPE PLAN

DETAILS

ABBREVIATIONS & SHORT FORMS

CJ - CONTROL JOINT

CONT. - CONTINUOUS

CONN. - CONNECTION

CP - CONTROL PANEL

CU - CONDENSING UNIT

CV - CONTROL VALVE

C/W - COMPLETE WITH

DC - DROPPED CURB

DM - DISH MASHER

DWG. - DRAWING

E.F. - EACH FACE

ENG - ENGINEER

E.M. - EACH MAY

EXP. - EXPOSED

FB - FIRE BLOCK

FD - FLOOR DRAIN

FLEX. - FLEXIBLE FLR. - FLOOR

FRE - FREEZER

FS - FIRE STOP

FTG.'S - FOOTINGS

F/V - FIELD VERIFY

GAZ. - GAZEBO

GL - GRID LINE

HB - HOSE BIB

GM - GAS METER

HD - HAND DRYER

H/D - HEAVY DUTY

HO - HOLD OPEN

KP - KEY PAD

MAX. - MAXIMUM MECH. - MECHANICAL

MIN. - MINIMUM

MS - MOP SINK

NO. - NUMBER

MTD. - MOUNTED

MM - MICRONAVE

NTS - NOT TO SCALE

O/H - OVERHEAD

O/W - ONE WAY

O/D - OUTSIDE DIAMETER

M / MIRR - MIRROR

L - LOCK

FM - FOUNDATION MALL GALV. - GALVANIZED

GB & GB# - GRAB BAR

GD - GARBAGE DISPOSAL GEN. - GENERATOR

HMH - HOT MATER HEATER INSUL. - INSULATION

ICB - INTEGRAL COVE BASE

MANUF. - MANUFACTURED

M/O/L & MOL - MINISTRY OF LABOUR

N/I/C & NIC - NOT IN CONTRACT

OBC - ONTARIO BUILDING CODE

PDO - POWER DOOR OPERATOR

POS - PROTECTION OF SOFFITS

P/I/P & PIP - POURED IN PLACE

P/T - PRESERVATIVE TREATED

RCH - RECESSED CABINET HEATER

RCP - REFLECTED CEILING PLAN

PRE-FIN. - PRE-FINISHED

REQ.'D - REQUIRED

REIN. - REINFORCED

REF. - REFERENCE

REL. - RELOCATED

RD - ROOF DRAIN

RM. - ROOM

SC - SAW CUT

SHF - SHELF

REINF.'G - REINFORCING

REF - REFRIDGERATOR

R/O - ROUGH OPENING

SA - SMOKE ALARM

SCH.'S - SCHEDULES

SD - SCUPPER DRAIN

SH - SOAP HOLDER

SD - SOAP DISPENSER

SD - SOAP DISPENSER

SP - SUMP PUMP SPEC.'D - SPECIFIED

SR - SHOWER ROD ST. - STOVE

TB - TACK BOARD

TH. - THERMOSTAT

THERM. - THERMAL

TYP. - TYPICAL

TM - TILTED MIRROR TOB - TOWEL BAR

STRUCT. - STRUCTURAL

TBD - TO BE DETERMINED

TC - TEACHER'S CABINET/CLOSET

TPD - TOILET PAPER DISPENSER TWF - THRU WALL FLASHING

RML - RAIN WATER LEADER

SCD - TOILET SEAT COVER DISPENSER

SND - SANITARY NAPKIN DISPOSAL

S/O/G & SOG - SLAB ON GRADE

SHH - SHOWER HEAD & MIXING VALVE / WAND

SNV - SANITARY NAPKIN VENDING DISPENSER

SPMDD - STD. PROCTOR MAX. DRY DENSITY

M/O/T & MOT - MINISTRY OF TRANSPORTATION

PER.'S - PERIMETER / PERIMETERS PER.('S)

PTD/D - PAPER TOWEL DISPENSER/DISPOSAL

PB - POWER OPERATOR PUSH BUTTON

PDC - POWER DOOR CONTROL BUTTON

PROF. ENG. - PROFESSIONAL ENGINEER

NADG - NORFOLK ACCESSIBILITY DESIGN GUIDELINES

FLRING. - FLOORING FR - REFRIDGERATOR

FDTN. - FOUNDATION

FE - FIRE EXTINGUISHER FDG - FOLD DOWN GRAB BAR

EX. - EXISTING

ELEV. - ELEVATION

ENG.'D - ENGINEERED

EM - EYE MASH STATION

EA.- EACH

DIST. - DISTANCE

DF - DRINKING FOUNTAIN

DISP. - DISPLAY CASE

CVP - CENTRAL VAC PORT

CV - CENTRAL VAC

DBL. - DOUBLE

CH - COAT HOOK

CM - CONTROL MODULE

CMD - CARBON MONOXIDE DETECTOR

COMP. - COMPRESSIBLE / COMPRESSOR

DSR - DESIGNATED SUBSTANCE REPORT

ECS - EMERGENCY CALL SWITCH

EPB - EMERGENCY PUSH BUTTON

FEC - FIRE EXTINGUISHER CABINET

FSS - FOLD DOWN SHOWER SEAT

F/R/R & FRR - FIRE RESISTANCE RATING

GENERAL ABBREVIATIONS ULC - UNDERWRITERS LABORATORIES OF CANADA A/F/F & AFF - ABOVE FINISHED FLOOR U/C - UNDER CUT AF - ABOVE FINISHED U/S - UNDER SIDE ADJ. - ADJUSTABLE U/N/O - UNO - UNLESS NOTED OTHERWISE ALT. - ALTERNATE VAP. - VAPOUR APP. - APPLICATION VAR. - VARIES ARCH. - ARCHITECTURAL VERT. - VERTICAL AODA - ACCESSIBILITY FOR ONTARIANS W/ DISABILITIES ACT M/ - MITH BD - BOARD MB - WHITE BOARD/MARKER BOARD BF - BARRIER FREE MC - MATER COOLER BFP - BACK FLOW PREVENTER MM - MATER METER B/N/C & BNC - BULL NOSE CORNER MR - WASTE RECEPTACLE BOL. - BOLLARD MS - WATER SOFTENER BP - BEARING POCKET % - PERCENT BPP - BEARING PLATE POCKET BR - BICYCLE RACK O/C - ON CENTER CANT. - CANTILEVERED CBS - CALL BUTTON STATION CCJ - COMPARTMENT CONTROL JOINT MATERIAL ABBREVIATIONS CHB - CHALK BOARD AB - ARCHITECTURAL BLOCK CH.TBL. - CHANGE TABLE CI - CONTINUOUS INSULATION

ACT - ACOUSTIC CEILING TILE ASPH. - ASPHALT AMP - ACOUSTIC MALL PANEL AT - ACOUSTIC TILE AL - ALUMINUM AN - ANODIZED AN(C) - ANODIZED COLOURED B - BRICK B&B - BOARD & BATTEN BPG - BACK PTD. GLASS CAR - CARPET CPT - CARPET TILE CB - CONCRETE BLOCK CEM - CEMENT BOARD CET / CT - CERAMIC TILE

CONC - CONCRETE C(H) - CONC. HARDENED & SEALED C(S) - CONC. SEALED C(P) - CONC. HARDENED, SEALED & POLISHED EM - EXPANDED METAL EP - EPOXY PAINT & PRIMER ESF - EPOXY SEALED FLOORING ET - EPOXY TERRAZZO F - FIRELITE GLAZING FG - FIBREGLASS FT - FLOCKED TILE (CARPETING) GB / GBD. / GYP.BD. - GYPSUM BOARD GLB - GLASS BLOCK GLBL - GLAZED BLOCK GL - GLAZING / GLASS

GMG - GEORGIAN MIRE GLAZING GM - GYM MAT GMT - GLASS MOSAIC TILE HM - HOLLOW METAL HARDND. - HARDNOOD H/D/G - HDG - HOT DIPPED GALV. IMP - INSULATED METAL PANELS LCC - LEAD COATED COPPER LINO - LINOLEUM LSG - LAMINATED SAFETY GLAZING LVT - LUXURY VINYL TILE LVP - LUXURY VINYL PLANK LXG - LEXAN GLAZING MAR - MARMOLEUM MAS - MASONITE MS - METAL SIDING MTL - METAL MW - MOVEABLE WALL SYSTEM NAT. - NATURAL PB - PARTICLE BOARD PC - PRECAST CONC. P / PTD. - PAINTED PF / PRE.FIN. - PREFINISHED PL - PLASTER

PLAM - PLASTIC LAMINATE PLYMD. - PLYMOOD PMP - PREFORMED METAL PANEL PSP - PIERCED STEEL PLANKING PT - PORCELAIN TILE PQF - PARQUET FLOORING QT - QUARRY TILE RB - RUBBER BASE RSF - RESILIENT SHEET FLOORING S - STONE SAFF - SAFETY FLOORING SC - SPECIAL COATING SF - SPORTS FLOORING SG - LAMINATED SAFETY GLASS

SGL - SPANDREL GLAZING SHY - SHEET VINYL FLOORING S.S. - SOLID SURFACE ST - STUCCO ST / STL - STEEL S/S - STAINLESS STEEL S&V - STAINED & VARNISHED SMC - SOLID MOOD CORE T - TEMPERED GLAZING / GLASS TDG - TEMPERED DOUBLE GLAZING / GLASS TBB - TILE BACKER BOARD TECTUM - TECTUM ACOUSTIC PANEL TERR - TERRAZZO T.S. - TOP SOIL TURF - ARTIFICIAL TURF U - POLYURETHANE

VCGB - VINYL COATED GYPSUM BOARD VCP - VENEER CORE PLYMOOD VCT - VINYL COMPOSITE TILE VPF - VINYL PLANK FLOORING VR - VENTED RUBBER BASE VQT - VINYL QUARTZ TILE MD. - MOOD MP - MATER PROOFING

RM. NAMES AL. - AIR LOCK CL. - CLOSET CLASSRM. - CLASSROOM COMM. - COMMUNICATION CONF. - CONFERENCE CORR. - CORRIDOR ELEC. - ELECTRICAL ELEV. - ELEVATOR INST. - INSTRUCTOR LAB - LABORATORY LAUND. - LAUNDRY PR. - POWDER ROOM PRINC. - PRINCIPAL REC. - RECEPTION RECEIV. - RECEIVING RM. - ROOM SHMR. - SHOMER STOR. - STORAGE ST. - STATION SUR. - SURGERY YEST. - YESTIBULE

VP - VICE PRINCIPAL

MR. - MASHROOM

CONSULTANT LIST

ARCHITECTURAL / STRUCTURAL / CIVIL DESIGN

Consulting Engineers, Architects & Planners CONTACTS:

ARCHITECTURE: MELISSA STICKL, OAA, MRAIC JULIAN STEWART, BARCHSC. <u>CIVIL ENGINEERING</u> JOHN IEZZI, P.ENG.

ELECTRICAL

CONTACTS:



12 ARGYLE ST. N., CALEDONIA, ON N3W 1B6 TEL. (289)284-0954

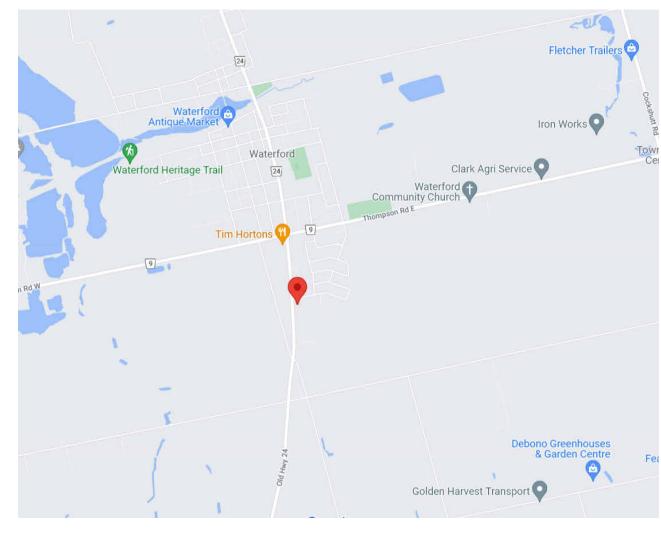
KEITH SEGUIN, P. ENG., LEED@ AP JAKUB RUDY, B.A LANDSCAPE ARCHITECT



ADESSO DESIGN INC. 218 LOCKE STREET SOUTH. HAMILTON, ON LSP 4B4 TEL.: (905) 526-8876 EXT.203

CONTACT:

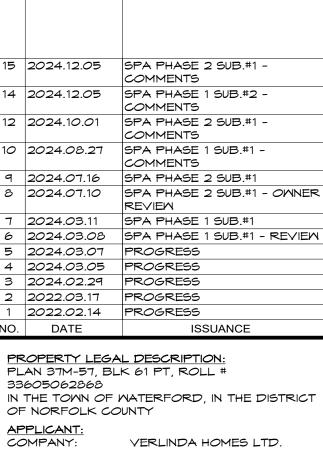
SCOTT HENDERSON, OALA, CLSA



KEY MAP SCALE



SCALE 1:100



ISSUANCE

DATE

TOM O'HARA APPLICANT: ADDRESS: 26 MAIN STREET S. BOX 1152

MATERFORD, ON.,

TELEPHONE NO.: 1.705.205.3235

Consulting Engineers, Architects & Planners G. DOUGLAS VALLEE LIMITED 2 TALBOT STREET NORTH

DO NOT SCALE DRAWINGS, CALL FOR ANY

CLARIFICATIONS THAT ARE REQUIRED, FIELD

ALL DWG.'S ARE TO BE READ IN COLOUR

ORIGINAL PAGE SIZE ARCH 'D' - 24" x 36"

ORCHARD

SQUARE —

VERIFY AT ALL BUILT CONDITIONS

SIMCOE ONTARIO N3Y 3W4 (519) 426-6270 STAMP ARCH. STAMP STRUCT.



PROJECT TITLE: ORCHARD SQUARE

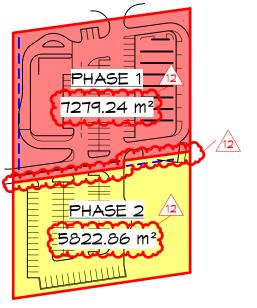
OLD HWY 24 / NORFOLK COUNTY RD. 24 & LAM BLVD. WATERFORD, ONTARIO, CANADA, N0E 1Y0

DRAWING TITLE: COVER SHEET SPA

DRAWN BY: CHECKED BY:

As indicated ROJECT NO.: 20-128

GROSS SITE



2 SITE PHASING PLAN (A100) SCALE 1:2000

A100 SCALE 1:2000

GR055

6033.31 m²

GR055 ---

7068.79 m²

DRAWING SCALE: DRAWING NO.:

N INL ION	OF MATERIORD, IN THE DISTRICT OF NO	DRI OLK COUNTI			IIN
ZONING:					zc
	ANCE TO ZONING BY-LAW 1-Z-2014 NORFO	OLK COUNTY -			IN.
	CONSOLIDATION	JEN GOOKI I			וטב
	I			ļ 1	
PROVISION	LAND USE: EXISTING				PR
5. <u>5</u>	URBAN RESIDENTIAL TYPE 5 ZONE (R5) (BLDG.#3)			6.3
5.5. <u>1</u>	PERMITTED USES	no chall be used ove	sout in		6.3
	In an R5 Zone, no land, building or structulaccordance with the following uses:	re stiall be used exc	sept in		
	a) dwelling, apartment				
	b) home occupation				
	c) retirement home.				
14.845	In lieu of the corresponding provisions in	the R5 zone, the fo	ollowing shall		
SPECIAL	apply:	•	J		
<u>PROVISION</u>	a) minimum <i>front yard</i> – 60 metre;				
	b) maximum number of dwelling units - fort In lieu of the corresponding provisions of		allowing shall		
	lapply:	56011011 4.0, the 10	Showing Shall		
	a) minimum number of visitor parking space	es – eleven (11);			
	b) parking spaces shall be permitted in th	e front yard.			
) 	
PROVISION	SETBACKS (m - METERS):	REQUIRED (m)	PROVIDED (m)		
5.5.2a)	MIN. LOT FRONTAGE:	30	64.4		
5.5.2b)	MIN. FRONT YARD:	3/60	TBD >60		
<u> </u>	·		· ·		
5.5.20)	MIN. EXTERIOR SIDE YARD:	3	N/A		
5.5.2d)	MIN. INTERIOR SIDE YARD	3	TBD >3		
5.5.2e)	MIN. REAR YARD:	9	TBD >9		
5.5.2f)	MAX. BLDG. HEIGHT	5 STOREYS	5 STOREYS		
5.6.2g)	MAX. FLOOR AREA RATIO:		****	^	
5,	i) 4 STOREY BLDG.	0.72	N/A	₹	
	ii) 5 STOREY BLDG.	0.79	MAX. 945.25m ² x (5)	3	
		Ç	FLOORS = 4,726.25m ²	3	
		Ş	4,726.25m ² / 6,033.31m ² = 0.78	3	
				رر	
	"FLOOR AREA RATIO" shall mean the rat			\	
	lot, determined by the calculation of: floor	r area ratio = usabl	e floor area / lot	\	
	area.			\	
00RD. W/	ZONING BY-LAW FOR ALL OTHER ZONING	REQ.'S		λ	
				/12\	
					<u>14.</u>
					SP
					PR
					99
					PR
					6.3
					6.3
					0.5
					6.3
					-
					6.3
					6.3
					6.3
					6.3
					6.3
					6.3
					ر. د ا

SITE STATISTIC & ZONING REQ.'S - PHASE 2

PLAN 37M-57, BLK 61 PT, ROLL # 33605062868 IN THE TOWN OF WATERFORD, IN THE DISTRICT OF NORFOLK COUNTY

PROPERTY LEGAL DESCRIPTION:

SITE S	STATISTIC & ZONING REQ.'S - PHASE 1
PROPERT	Y LEGAL DESCRIPTION:
	-57, BLK 61 PT, ROLL # 33605062868 NN OF WATERFORD, IN THE DISTRICT OF NORFOLK COUNTY
ZONING:	
	DANCE TO ZONING BY-LAW 1-Z-2014 NORFOLK COUNTY - D-CONSOLIDATION
PROVISION	LAND USE: EXISTING
6.3 6.3.1	SERVICE COMMERCIAL ZONE (C5) (BLDG.#1 & 2) PERMITTED USES Permitted Uses In a C5 Zone, no land, building or structure shall be used except in accordance with the following uses: a) ambulance service b) animal hospital, provided the entire operation is carried on within an enclosed building c) any non-residential use permitted in the Neighbourhood Institutional Zone (IN), subject to the provisions of that Zone d) auction centre e) automobile gas station f) automobile service and repair station g) automobile washing establishment h) automotive parts shop i) bar or night club j) clinic or doctors' offices k) commercial greenhouse, tree and plant nursery l) community centre m) contractor supply and service shop o) convenience store p) day care nursery q) dry cleaning distribution station r) dry cleaning establishment s) dwelling, single detached or dwelling unit in a non-residential building - maximum one (1) [8-2-2020] t) equipment rental establishment u) farm implement sales and service establishment v) financial institution w) fire hall x) florist shop y) fruit and vegetable outlet z) funeral home aa) garden supply centre bb) home occupation

<u>043</u> ECIAL DVISION	gg) merchandise service shop hh) miniature golf, golf driving range and lii) outdoor storage accessory to permitt jj) parking lot or structure kk) personal service shop ll) place of assembly mm) place of sports and recreation nn) place of worship oo) police station pp) private club qq) restaurant rr) restaurant, fast-food ss) restaurant, take-out tt) sheet metal, plumbing, heating, electric similar activity uu) swimming pool sales and service estal vv) training and rehabilitation centre ww) vehicle sales or rental establishment xx) video store yy) wholesale outlets. to permit a retail use of 810m² of useable commercial (CS) zone.	cal or woodworking	•		
] 1	
OVISION	SETBACKS (M - METERS):	REQUIRED (m)	PROVIDED (m)	І г	3.11
2a)	MIN. LOT AREA: i) INTERIOR LOT ii) CORNER LOT	450m² 495m²	PROPOSED 7069m²		5 .11

<u>PROVISION</u>	SETBACKS (M - METERS):	REQUIRED (m)	PROVIDED (m)
6.3.2a)	MIN. LOT AREA: i) INTERIOR LOT ii) CORNER LOT	450m² 495m²	PROPOSED 1069m
6.3.2b)	MIN. LOT FRONTAGE: i) INTERIOR LOT ii) CORNER LOT	15 16.5	PROPOSED 15
6.3.2c)	MIN. FRONT YARD:	3	9.4
6.3.2d)	MIN. EXTERIOR SIDE YARD:	3	12.6
6.3.2e)	MIN. INTERIOR SIDE YARD	3	11.1
6.3.2f)	MIN. REAR YARD:	9	9
6.3.2g)	MIN. USABLE FLOOR AREA: FOR A DWELLING UNIT IN A NON-RESIDENTIAL BLDG.	40m²	N/A
6.3.2h)	MAX. BLDG. HEIGHT	11	~9.14 RESTAURANT ~6.25 COMMERCIAL
6.3.2i)	MAX. LOT COVERAGE	35%	~17.8
6.3.2j)	MAX. USABLE FLOOR AREA: OF A FRUIT AND VEGETABLE OUTLET	200m²	N/A
6.3.2k)	OUTDOOR STORAGE	PROHIBITED IN A FRONT YARD & WITHIN 3M OF ANY LOT LINE ADJOINING A RESIDENTIAL ZONE	PROHIBITED IN A FROM YARD & WITHIN 3M OF A LOT LINE ADJOINING A RESIDENTIAL ZONE
6.3.3	Outdoor Display of Goods Outdoor display of vehicles on paved areas shall be permitted in the front yard subject to Subsection 6.3.5. Outdoor display of other non-vehicular items shall be permitted within a front yard provided such display is located on a grassed or landscaped area without surrounding fences and subject to Subsection 6.3.5.		
6.3.4	Landscaped Strip All buildings, parking lots and parking spaces and display areas shall be setback 3 metres from the front lot line. This area shall be landscaped which may include patio pavers.		
6.3.5	Zone Provision for Convenience Store The usable floor area of a convenience store shall not exceed 280 square metres.		
6.3.6	Zone Provisions for <u>Dwellings</u> Notwithstanding the provisions in Subsection 6.3.2, all <u>single detached</u> dwellings shall conform to the Urban Residential Type 3 (R3) <u>Zone</u> provisions in Subsection 5.3. [8-Z-2020] [27-Z-2020]		

COORD. W/ ZONING BY-LAW FOR ALL OTHER ZONING REQ.'S

2.0 DEFINITION	ONS
2.170	"USABLE FLOOR AREA" shall mean the total area of all floors of a building, outdoor patio or cafe, or dwelling unit including: a) a hallway, aisle, stairway and corridor within a suite or unit; b) an internal wall and partition within a suite or unit; c) a storage room and storage area within a suite or unit; d) a boatslip in the case of a boathouse; e) a habitable room or area in the basement of a dwelling. But excluding: a) an area occupied by a common area in a multi-tenant building including but not limited to a public stairwell, public or shared corridor and lobby; b) a mechanical shaft; c) an entry vestibule not within a dwelling unit; d) a garage attached to a building; e) an unfinished basement in a dwelling used for storage or laundry.
	The usable floor area for a dwelling is measured from the outside face of exterior walls or to the centre-line of party or common walls. The usable floor area for all other buildings shall be measured from the

2.81	"LANDSCAPE AREA" shall mean an area of land comprised of trees, shrubs, flowers, grass or other horticultural elements. Landscaping may include
	pervious paths, patios, walkways, or elements designed to enhance the visual amenity of a property but does not include open storage display areas, parking or loading areas, or areas covered by <i>driveways</i> . [5-Z-2018]

inside face of exterior walls, interior common walls and firewalls.

3.0 GENERAL PROVISIONS

<u> </u>			
3.8.	Exemptions from Height Provisions The height provisions of this By-Law shall not apply to the following uses: a) belfry, steeple, spire, clock or bell tower, dome, cupola, or flag pole; b) chimney or stack; c) radio, television or telecommunication antennae; d) aids to navigation; e) electrical transmission tower or pylon; f) water storage structure; g) barn, silo, drying elevator or tower, fire training tower, kiln, windmill, graielevator;		
	h) elevator enclosure or mechanical penthouse occupying not more than 10		

elevator; h) elevator enclosure or mechanical penth percent of the area of the roof of a buila i) machinery for the moving of industrial a	<i>ling</i> on which it is located	d ;
frames and <i>structures</i> for such machinery j) hospital.	J ;	

.10.	Exemptions from Yard Provisions
	Except as otherwise provided herein, every part of any required yard shall be open and unobstructed by any building, structure, fuel-storage tanks, heating or air conditioner units, and generators except:
	a) sills, belt courses, cornices, chimneys, bay windows, pilasters, hydro meters or gas meters may project into any required yard or setback area a distance of not more than 0.65 metres:
	b) eaves or gutters may project into any required yard or setback area a distance of not more than 0.65 metres;
	c) canopies or awnings may project into any required rear yard, required front yard or required exterior side yard area a distance of not more than 1.5 metres;
	d) balconies may project into any required rear yard, required front yard or required exterior side yard area a distance of not more than 1.5 metres provided they are no closer than 3 metres from an interior lot line and 6 metres from a rear lot line;
	e) barrier-free access ramps may project into any required rear yard, required front yard or required exterior side yard area a distance of 3 metres:
	f) steps may project into any required rear yard, required front yard or required exterior side yard area a distance or not more than 1.5 metres; and steps may project into any required interior side yard area a distance of 1 metre.
	g) Public utilities may project into any required rear yard, required front yard, required interior side yard area or required exterior side yard area. [66-Z-2018]
	h) Air conditioner units, provided the encroachment is no closer than 0.6 metres to the side lot line. [27-Z-2020]

3.11.	Frontage on a Street
	3.11.1 No building or structure shall be erected, altered or enlarged on any
	land which does not have the minimum required lot frontage on an open,
	constructed and year-round, improved street.
	3.11.2 For the purposes of this Subsection, a private condominium road
	servicing a condominium development shall be deemed to be an open,
	constructed and year-round improved street.
	<u> </u>

	REQ.'D: RESIDENTIAL		
PROVISIO	ON NUMBER OF PARKING SPACES	<u>REQUIRED</u>	PROVIDED
4.9b)	APARTMENT DWELLING [8-Z-2017]: 1.5 SPACES / DWELLING UNIT 1.5 SPACES × 44 DWELLING UNITS = 66	<i>66</i> SPACE(S)	<i>66</i> SPACE(S)
PARKING	REQ.D RESIDENTIAL - VISITOR:	<u>DD</u> DI AOL(D)	<u>22</u> 31 AOL(3)
4.9f)	VISITOR PARKING: 1 SPACE / 3 DWELLING UNITS 1 SPACE × (44 / 3) = 15	<u>15</u> SPACE(S)	<u>15</u> SPACE(S)
PARKING	REQ.'D TOTAL:		
	TOTAL	<u>81</u> SPACE(S)	<u>81</u> SPACE(S)
PARKING	REQ.D - BARRIER FREE: (PART OF REQ.D)	VISITOR PARKING)	
4.3.3	BARRIER FREE PARKING REQ.'D: 1-25 (VISITOR) PARKING SPACES =		
	TYPE 'A' (3.4m MIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m MIDE) PLUS 1.5m AISLE		<u>2</u> SPACE(S) <u>2</u> SPACE(S)

4.9KK)	RESTUARANT, FAST FOOD WITH DRIVE THROUGH: 1 SPACE / 10m² 1 SPACE x (364 / 10m²) = 36.4	<u>37</u> 5PACE(5)	<u>41</u> SPACE(S)			
4.9uu)	OTHER NON-RESIDENTIAL USES: (COMMERCIAL) 1 SPACE / 35m ² 1 SPACE x (811.5 / 35m ²) = 23.2	<u>24</u> SPACE(S)	<u>25</u> SPACE(S)			
PARKING REQ'D TOTAL:						

PARKING RE	Q.D TOTAL:		
	TOTAL	<u>61 S</u> PACE(S)	<u>66</u> SPACE(S)

PARKING REQ.'D - BARRIER FREE: (PART OF REQ.'D PARKING)						
4.3.3	4.3.3 BARRIER FREE PARKING REQ.'D: 51-75 PARKING SPACES =					
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE	<u>1</u> SPACE(S) <u>2</u> SPACE(S)	<u>2</u> SPACE(S) <u>2</u> SPACE(S)			

4.0 OFF STRE PARKING SPA

FARRING	FARRING SPACE DIMENSIONS				
4.1 4.1.3a)	PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ.	3 MIN. 3.3 MIN.	3 3.3		
4.1.3b)	DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING	5.8 MIN. 7 MIN.	5.8 7		
4.1.4 4.1.4b)	PARKING AISLE REQ.'S TWO-WAY TRAFFIC	7.3 MIN.	7.3 MIN.		

4.2 LOCATION

4.2.1	All parking spaces shall be wholly provided on the lot occupied by the building, structure or use for which the parking spaces are required except where a lot has both residential and non-residential Zones in which case any parking spaces for non-residential use shall not be permitted on any portion of the lot Zoned residential

4.2.2	No parking area shall be located in any sight triangle.
4.2.4 14.845 SPECIAL PROVISION	4.2.4 Other Provisions a) For tri-plex dwellings, duplex dwellings, four-plex dwellings, street townhouses, stacked townhouses, and boarding or lodging houses, required parking spaces shall be prohibited within the required front yard or required exterior side yard; except where a dwelling unit has a private garage in which case the driveway leading to the private garage may be used as a parking space subject to the size requirements herein; b) for group townhouses and apartment dwellings, no parking lot shall be located closer than 3 metres from any dwelling on the lot or of any interior lot line abutting another residential Zone; c) for group townhouses and apartment dwellings, no parking lot or parking space shall be located between a dwelling and the street line, except for individual or tandem parking spaces leading directly to each townhouse dwelling unit; d) for commercial or industrial properties, no parking lot shall be located closer than 4.5 metres from any interior lot line abutting a residential Zone; e) for accessory residential dwelling units, notwithstanding the foregoing, one (1) parking space dedicated for the use of the accessory residential dwelling unit, may be permitted in the front yard provided a minimum of 50 percent of the required front yard shall be maintained as landscaped open space notwithstanding such dedicated parking space.
4.6	4.6 Parking for Multiple Uses When a building, structure or lot accommodates more than one (1) type of use, the parking space requirement for such building, structure or lot shall be the sum of the requirements for the separate uses thereof.

PARRING REG. D - LOADING SPACES					
	4.7	LOADING SPACES: 3m WIDTH x 10m DEPTH	<u>N/A</u>	<u>1</u>	

PARKING NOT REQ.'D - PICK UP PULL FORWARD SPACES (DRIVE THRU) PICK UP PULL FORWARD SPACES:

Ē	O.D: RESIDENTIAL NUMBER OF PARKING SPACES	REQUIRED	PR 0: //DTD
	APARTMENT DWELLING [8-Z-2017]:	REQUIRED	<u>PROVIDED</u>
	1.5 SPACES / DWELLING UNIT		
	1.5 SPACES X 44 DWELLING UNITS = 66	66 SPACE(S)	66 SPACE(S)
	VISITOR RARVING.	1 5 GPA (E (G)	15 CDACE(G)
	VISITOR PARKING: 1SPACE / 3 DWELLING UNITS	<u>15</u> SPACE(S)	<u>15</u> SPACE(S)
	<u>1</u> SPACE x (<u>44</u> / <u>3)</u> = <u>15</u>		
Ξ	G.'D TOTAL:		
	TOTAL	<u>81</u> SPACE(S)	<u>81</u> SPACE(S)
Ε	Q.'D - BARRIER FREE: (PART OF REQ.'D)	VISITOR PARKING)	
	BARRIER FREE PARKING REQ.'D: 1-25 (VISITOR) PARKING SPACES =		
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE	1SPACE(S)	2 SPACE(S)
	TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE *Where an uneven number of accessible	<u>C</u> SPACE(S)	<u>2</u> SPACE(S)
	parking spacesare required, the extra		
	type B space may be changed to a type A space.		
	<u> </u>		
Ξ	EQ.'D: NON-RESIDENTIAL		
ĺ	RESTUARANT, FAST FOOD WITH DRIVE THROUGH:	<u>37</u> SPACE(S)	<u>41</u> SPACE(S)
	1SPACE / 10m ² 1SPACE x (364 / 10m ²) = 36.4		
	OTHER NON-RESIDENTIAL USES: (COMMERCIAL)	24 SPACE(S)	25 SPACE(S)
	1_SPACE / 35m ²		<u></u>
	<u>1</u> SPACE × (<u>811.5</u> / 35m ²) = 23.2		
Ξ	EQ.'D TOTAL:		
	TOTAL	61 SPACE(S)	<u>66</u> SPACE(S)
Ε	G.'D - BARRIER FREE: (PART OF REQ.'D F	PARKING)	
ĺ			·
	BARRIER FREE PARKING REQ.'D:		
	51-75 PARKING SPACES =		
	51-75 PARKING SPACES = TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE		
	51-75 PARKING SPACES = TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE		
	51-75 PARKING SPACES = TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING		
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING RACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE:		
	51-75 PARKING SPACES = TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS	2SPACE(S)	2SPACE(S)
	51-75 PARKING SPACES = TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE:	3 MIN. 3.3 MIN.	2 SPACE(S) 3 3.3
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ.	2 SPACE(S) 3 MIN.	2 SPACE(S)
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN.	3 3.3 5.8 7
	51-75 PARKING SPACES = TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING	3 MIN. 3.3 MIN. 5.8 MIN.	2 SPACE(S) 3 3.3
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN.	3 3.3 5.8 7
	51-75 PARKING SPACES = TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provided.	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN.	3 3.3 5.8 7 7.3 MIN.
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC AII PARKING ON A LOT AII PARKING SPACES SHAII be wholly provide building, structure or use for which the parking spaces of the structure of th	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN.	3 3.3 5.8 7 7.3 MIN.
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC AII parking spaces shall be wholly provide building, structure or use for which the put where a lot has both residential and non-parking spaces for non-residential use si	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. ed on the lot occuparking spaces are residential Zones in	3 3.3 5.8 7 7.3 MIN.
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC AII parking spaces shall be wholly provide building, structure or use for which the pumber a lot has both residential and non-	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. ed on the lot occuparking spaces are residential Zones in	3 3.3 5.8 7 7.3 MIN.
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC AII parking spaces shall be wholly provide building, structure or use for which the put where a lot has both residential and non-parking spaces for non-residential use si	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 2.3 MIN. 7.3 MIN.	3 3.3 5.8 7 7.3 MIN.
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the puhere a lot has both residential and non-parking spaces for non-residential use slof the lot Zoned residential. No parking area shall be located in any significant structure and significant shall be located in any significant shall	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 2.3 MIN. 7.3 MIN.	3 3.3 5.8 7 7.3 MIN.
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use sloft the lot Zoned residential. No parking area shall be located in any silence.	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. ed on the lot occuparking spaces are residential Zones in hall not be permitted ight triangle.	3 3.3 5.8 7 7.3 MIN. ied by the required except which case any ed on any portion
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use slof the lot Zoned residential. No parking area shall be located in any side of the lot Zoned residential. No parking area shall be located in any side of the lot Zoned residential. A.2.4 Other Provisions a) For tri-plex dwellings, duplex dwellings townhouses, stacked townhouses, and both controls to the located townhouses.	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 4.3 MIN. 6.4 on the lot occuparking spaces are residential Zones in hall not be permitted by the permitted of the lot occupary in the lot occupany in the lot occupary in the lot occupany in the lot occupany in the lot occupary in the lo	3 3.3 5.8 7 7.3 MIN. ied by the required except a which case any ed on any portion gs, street houses, required
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use slof the lot Zoned residential. No parking area shall be located in any side of the lot Zoned residential. No parking area shall be located in any side of the lot Zoned residential. A.2.4 Other Provisions a) For tri-plex dwellings, duplex dwellings townhouses, stacked townhouses, and be parking spaces shall be prohibited within	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 6 on the lot occuparking spaces are residential zones in hall not be permitted by the required front the required f	3 3.3 5.8 7 7.3 MIN. ied by the required except a which case any ed on any portion gs, street houses, required yard or
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use slof the lot Zoned residential. No parking area shall be located in any side of the lot Zoned residential. No parking area shall be prohibited within required exterior side yard; except when garage in which case the driveway leading grage in which case the driveway leading	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 2.4 on the lot occuparking spaces are residential Zones in hall not be permitted and the required front the required front re a dwelling unit hall to the private gaing to the private gaing to the private gains and the private gains are selected.	3 3.3 5.8 7 7.3 MIN. ied by the required except a which case any ed on any portion gs, street rouses, required a yard or as a private rage may be used
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use slof the lot Zoned residential. No parking area shall be located in any side townhouses, stacked townhouses, and be parking spaces shall be prohibited within required exterior side yard; except when	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 2.4 on the lot occuparking spaces are residential Zones in hall not be permitted and the required front the required front re a dwelling unit has to the private gas equirements herein	3 3.3 5.8 7 7.3 MIN. ied by the required except which case any ed on any portion gs, street houses, required yard or as a private rage may be used
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use slof the lot Zoned residential. No parking area shall be located in any side of the lot Zoned residential. No parking area shall be prohibited within required exterior side yard; except when garage in which case the driveway leading as a parking space subject to the size relocated closer than 3 metres from any displacement of the parking space shall so parking space shall be prohibited within required exterior side yard; except when garage in which case the driveway leading as a parking space subject to the size relocated closer than 3 metres from any displacement of the parking space shall so parking space shall be prohibited within required exterior side yard; except when garage in which case the driveway leading as a parking space subject to the size relocated closer than 3 metres from any displacement.	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 6.4 on the lot occuparking spaces are residential zones in hall not be permitted and the required front the required front re a dwelling unit has to the private gave equirements herein dwellings, no parking welling on the lot or	3 3.3 5.8 7 7.3 MIN. ied by the required except which case any ed on any portion as, street nouses, required yard or as a private rage may be used; g lot shall be
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING ACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use sloof the lot Zoned residential. No parking area shall be located in any side townhouses, stacked townhouses, and be parking spaces shall be prohibited within required exterior side yard; except when garage in which case the driveway leading as a parking space subject to the size report of the space of the located closer than 3 metres from any displaced clos	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 7.3 MIN. 6d on the lot occup parking spaces are residential Zones in hall not be permitted front the required front the required front the private garding or lodging his the required front the private garding on the lot on dwellings, no parking wellings, no parking wellings, no parking wellings, no parking dwellings, no pa	3 3.3 5.8 7 7.3 MIN. ied by the required except which case any portion gs, street houses, required a yard or as a private rage may be used; glot shall be of any interior glot or parking
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING ACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use sloof the lot Zoned residential. No parking area shall be located in any side townhouses, stacked townhouses, and be parking spaces shall be prohibited within required exterior side yard; except when as a parking space subject to the size reb) for group townhouses and apartment of the parking space shall be located between a dwelling space shall b	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 7.3 MIN. 6.6 on the lot occuppoarking spaces are residential Zones in hall not be permitted and the required front re a dwelling unit have got to the private gas equirements herein dwellings, no parking and the street ling and the stree	3 3.3 5.8 7 7.3 MIN. ied by the required except in which case any portion gs, street incuses, required as a private rage may be used in graph or any portion in the region of any interior in the recept for the recep
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING ACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use slof the lot Zoned residential. No parking area shall be located in any side townhouses, stacked townhouses, and be parking spaces shall be prohibited within required exterior side yard; except when garage in which case the driveway leading as a parking space subject to the size relative to the size relati	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 6 on the lot occup parking spaces are residential Zones in hall not be permitted ight triangle. 6, four-plex dwelling or lodging he the required front re a dwelling unit has gequirements herein dwellings, no parking wellings, no parking and the street ling directly to each	3 3.3 5.8 7 7.3 MIN. ied by the required except in which case any portion gs, street nouses, required a yard or as a private rage may be used; glot shall be of any interior glot or parking a, except for townhouse
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the puhere a lot has both residential and non-parking spaces for non-residential use slof the lot Zoned residential. No parking area shall be located in any side townhouses, stacked townhouses, and be parking spaces shall be prohibited within required exterior side yard; except when garage in which case the driveway leading as a parking space subject to the size reb for group townhouses and apartment of located closer than 3 metres from any did lot line abutting another residential Zone; c) for group townhouses and apartment of space shall be located between a dwelling individual or tandem parking spaces leading dwelling unit; d) for commercial or industrial properties and dwelling unit; d) for commercial or industrial properties	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 7.3 MIN. 7.4 MIN. 7.5 MIN. 7.5 MIN. 7.5 MIN. 7.6 MIN. 7.7 MIN. 7.7 MIN. 7.8 MIN. 7.9 MIN.	3 3.3 5.8 7 7.3 MIN. ied by the required except in which case any portion gs, street nouses, required a yard or as a private rage may be used; glot shall be of any interior glot or parking e, except for townhouse nall be located
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use slof the lot zoned residential. No parking area shall be located in any side townhouses, stacked townhouses, and be parking spaces shall be prohibited within required exterior side yard; except when garage in which case the driveway leading as a parking space subject to the size reb) for group townhouses and apartment of located closer than 3 metres from any did lot line abutting another residential zone; c) for group townhouses and apartment of space shall be located between a dwelling unit. d) for commercial or industrial propertic closer than 4.5 metres from any interiore) for accessory residential dwelling unit closer than 4.5 metres from any interiore) for accessory residential dwelling unit.	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 7.3 MIN. 7.3 MIN. 7.4 MIN. 7.5 MIN. 7.5 MIN. 7.5 MIN. 7.6 MIN. 7.7 MIN. 7.8 MIN. 7.9 MIN.	3 3.3 5.8 7 7.3 MIN. ied by the required except which case any portion gs, street nouses, required ayard or as a private rage may be used; glot shall be of any interior glot or parking except for townhouse all be located residential zone; the foregoing,
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE REET PARKING PACE DIMENSIONS PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ. DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING PARKING AISLE REQ.'S TWO-WAY TRAFFIC ON OF PARKING ON A LOT All parking spaces shall be wholly provide building, structure or use for which the pumbere a lot has both residential and non-parking spaces for non-residential use slof the lot Zoned residential. No parking area shall be located in any side townhouses, stacked townhouses, and be parking spaces shall be prohibited within required exterior side yard; except when garage in which case the driveway leading as a parking space subject to the size reb) for group townhouses and apartment of the lot ine abutting another residential zone; c) for group townhouses and apartment of space shall be located between a dwelling individual or tandem parking spaces leading unit; d) for commercial or industrial propertic closer than 4.5 metres from any interior	3 MIN. 3.3 MIN. 5.8 MIN. 7 MIN. 7 MIN. 7.3 MIN. 7.3 MIN. 7.3 MIN. 7.3 MIN. 7.3 MIN. 7.3 MIN. 7.4 MIN. 7.5 MIN. 7.5 MIN. 7.5 MIN. 7.6 MIN. 7.7 MIN. 7.7 MIN. 7.8 MIN. 7.9 MIN.	3 3.3 5.8 7 7.3 MIN. ied by the required except which case any ed on any portion gs, street nouses, required yard or as a private rage may be used go for any interior glot or parking e, except for townhouse all be located esidential zone; the foregoing, bry residential minimum of 50

O R C H A R D SQUARE —

DO NOT SCALE DRAWINGS, CALL FOR ANY CLARIFICATIONS THAT ARE REQUIRED, FIELD VERIFY AT ALL BUILT CONDITIONS ALL DWG.'S ARE TO BE READ IN COLOUR ORIGINAL PAGE SIZE ARCH 'D' - 24" x 36"



Consulting Engineers,



NO. DATE

ISSUANCE

15 2024.12.05 SPA PHASE 2 SUB.#1 -

14 2024.12.05 SPA PHASE 1 SUB.#2 -

10 2024.08.27 SPA PHASE 1 SUB.#1 -

5 2024.03.07 PROGRESS 4 2024.03.05 PROGRESS

3 2024.02.29 PROGRESS 2 2022.03.17 PROGRESS

33605062868

APPLICANT: COMPANY:

APPLICANT:

ADDRESS:

OF NORFOLK COUNTY

1 2022.02.14 PROGRESS
NO. DATE ISSUANCE

PROPERTY LEGAL DESCRIPTION: PLAN 37M-57, BLK 61 PT, ROLL #

TELEPHONE NO.: 1.705.205.3235

COMMENTS

COMMENTS

COMMENTS 9 2024.07.16 SPA PHASE 2 SUB.#1 8 2024.07.10 SPA PHASE 2 SUB.#1 - OWNER

7 2024.03.11 SPA PHASE 1 SUB.#1 6 2024.03.08 SPA PHASE 1 SUB.#1 - REVIEW

IN THE TOWN OF WATERFORD, IN THE DISTRICT

TOM O'HARA

MATERFORD, ON.,

VERLINDA HOMES LTD.

26 MAIN STREET S. BOX 1152

LICENCE

ORCHARD SQUARE OLD HWY 24 / NORFOLK COUNTY RD. 24 & LAM BLVD. WATERFORD, ONTARIO, CANADA, N0E 1Y0

DRAWING TITLE: SITE PLAN NOTES - ZONING

CHECKED BY:	DRAWN BY:

DRAWING SCALE: DRAWING NO.: 1:100

PROJECT NO.:

ALL EXISTING SITE INFORMATION WAS PROVIDED BY JEWITT & DIXON

LTD. ONTARIO LAND SURVEYORS IN THE FORM OF AN ELECTRONIC FILE PLAN FILE No. 21-3143-TOPO DATED 2021.10.18 CONSISTING OF THE LEGAL SURVEY PLAN & TOPOGRAPHY (COORD. W/ A106 DWG.)

REFERENCE NOTE:

FOR OTHER SITE CONDITIONS, EXISTING TO REMAIN OR NEW TO BE PROVIDED, THIS DWG. IS TO BE READ IN CONJUNCTION W/ ALL OTHER DWG.'S LISTED ON A100 DWG. LIST

LIGHTING MUST BE DIRECTED ON SITE AND MUST NOT SPILL OVER TO / ONTO ADJACENT PROPERTIES OR STREETS. PROVIDE "HOUSE SHIELDS" WHERE NEEDED, TO COMPLETELY ELIMINATE SPILL / GLARE TO ADJACENT PROPERTIES, DARK SKY COMPLIANT (COORD. W/ ELEC. PHOTOMETRIC SITE PLAN)

BEFORE STARTING WORK

- THE <u>AUTHORITY HAVING JURISDICTION</u> IS NORFOLK COUNTY
- THE CONTRACTOR SHALL NOTIFY THE AUTHORITY HAVING <u>JURISDICTION</u>, ARCHITECT & CONSULTANTS AT LEAST 48 HOURS PRIOR TO COMMENCING ANY CONST. OR DEMOLITION.
- THE POSITION OF THE POLE LINES, CONDUITS, WATER MAINS, SEMERS, & OTHER UTILITIES & STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DWG.'S. WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES & STRUCTURES IS NOT GUARANTEED & ARE TO BE VERFIED ON SITE.
- ALL POSITIONS OF THE EX. UNDERGROUND UTILITIES WITHIN THE LIMITS OF CONST. SHALL BE LOCATED, MARKED & PROTECTED BY THE CONTRACTOR. ANY UTILITIES DAMAGED OR DISTURBED DURING CONST. SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE ENGINEER, AT THE CONTRACTOR'S EXPENSE.
- PRIOR TO THE COMMENCEMENT OF CONST., ALL BENCHMARKS, ELEVATIONS, DIMENSIONS, & GRADES MUST BE CHECKED BY THE CONTRACTOR & ANY DISCREPANCIES REPORTED TO THE ENGINEER /

BENCHMARKS TWO DIFFERENT BENCHMARKS MUST BE REFERRED TO @ ALL TIMES; ELEVATIONS ARE REFERRED TO GEODETIC BENCHMARKS BM #1: TOP OF LARGE PUMPER NOZZLE OF FIRE HYDRANT ON NORTH SIDE OF LAM BOULEVARD ACROSS FROM PROPERTY #26 LAM

BOULEVARD, HAVING AN ELEVATION = 245.91m (GEODETIC DATUM)

SITE PLAN NOTES

- ALL WORK INVOLVED IN THE CONST., RELOCATION, REPAIR OF MUNICIPAL SERVICES FOR THE PROJECT SHALL BE TO THE SATISFACTION OF THE <u>AUTHORITY HAVING JURISDICTION</u>
- FIRE ROUTE SIGNS & 3-WAY FIRE HYDRANTS SHALL BE ESTABLISHED TO THE SATISFACTION OF THE LOCAL FIRE DEPARTMENT & AT THE EXPENSE OF THE OWNER.
- ALL DRIVEWAYS FROM PROPERTY LINES FOR THE FIRST 7.5m SHALL BE WITHIN 5% MAX. GRADE, THEREAFTER, ALL DRIVEWAYS SHALL BE WITHIN 10% MAX. GRADES.
- OBC 3.2.5.6.(d) ALL DRIVEWAYS FROM PROPERTY LINES SHALL HAVE A CHANGE OF GRADIENT NOT MORE THAN 1 IN 12.5 (8%) OVER A
- THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE CONTRACTOR FROM THE REQ.'S TO OBTAIN THE VARIOUS PERMITS/APPROVALS AS MAY BE REQUIRED, SUCH AS, BUT NOT LIMITED TO:
- BUILDING PERMIT • SANITARY / STORM & WATER PERMITS • ROAD CUT PERMITS
- RELOCATION OF SERVICES

MINIMUM DISTANCE OF 15m

- APPROACH APPROVAL PERMITS • ENCROACHMENT AGREEMENTS (IF REQ.'D)
- COMMITTEE OF ADJUSTMENT • ROAD OCCUPANCY PERMIT SITE ALTERATION
- ABANDONED ACCESSES MUST BE REMOVED & THE CURB & BOULEVARD RESTORED W/ SOD AT THE OWNER'S EXPENSE TO THE SATISFACTION OF THE TRAFFIC ENGINEERING SECTION & PUBLIC WORKS DEPARTMENT.

GENERAL NOTES:

- FIRE ACCESS ROUTE TO BE POSTED & DESIGNATED UNDER MUNICIPAL BY-LAW (FIRE ACCESS ROUTE TO BE MIN. 6 m MIDE W/ A MIN. 12 m
- CENTER LINE TURNING RADIUS & MAX. 6% SLOPE) • COORD. W/ MECH. & ELEC. SITE PLANS FOR ALL EX. & NEW LOCATIONS OF SERVICES & ENTRY OF SERVICES INTO THE BLDG. ENVELOPE. (ALL MECH. & ELEC. INFORMATION INDICATED ON ARCH. SITE DWG. A101 IS
- FOR GENERAL REFERENCE & COORD. ONLY) • COORD. W/ SITE GRADING PLAN FOR PROPOSED FINAL FINISH GRADE ELEV.'S & DRAINAGE SLOPES
 - SODDING, PLANTING & PAVING & OTHER HARD SURFACING. COORD. M/ ARCH. SITE PLAN • TYP. DRIVEWAY & PARKING LOT CONC. CURBS AS INDICATED ON
 - DRAWING. COORD. W/ OPSD DETAILS & SPEC'S. FOR TYPICAL CURB

• COORD. W/ LANDSCAPE SITE PLAN FOR LOCATIONS OF SEEDING,

- THE SUB-GRADE SOILS EXPOSED AFTER EXCAVATION SHALL BE INSPECTED & CERTIFIED BY A QUALIFIED REGISTERED PROFESSIONAL SOILS ENGINEER & A COPY OF THE REPORT SHALL BE FORWARDED TO THE <u>AUTHORITY HAVING JURISDICTION</u> BUILDING DIVISION. WHERE THE FOOTING WILL BE SITUATED ON FILL MATERIAL, THE FOOTINGS SHALL BE DESIGNED & APPROVED BY QUALIFIED REGISTERED PROFESSIONAL ENGINEER
- ALL FILL PLACED ON THE SITE SHALL BE COMPACTED TO A MIN.OF 98% STANDARD PROCTOR DENSITY. A SUFFICIENT NUMBER OF TESTS SHALL BE TAKEN AT VARIOUS LEVELS SATISFACTORY TO THE ENGINEER. TEST RESULTS SHALL BE SENT TO THE AUTHORITY HAVING <u>JURISDICTION</u> W/ A LETTER, SIGNED & STAMPED BY THE SOILS
- ENGINEER. STATING THAT A SUFFICIENT NUMBER OF TESTS HAVE BEEN TAKEN & THE MIN. COMPACTION HAS BEEN REACHED • APPROVAL OF THIS DWG. IS FOR MATERIAL ACCEPTABILITY & COMPLIANCE W/ MUNICIPAL & PROVINCIAL SPEC.'S & STANDARDS ONLY. APPROVAL & INSPECTION BY THE MUNICIPALITY OF THE WORKS DOES NOT CERTIFY THE LINE & GRADE OF THE WORKS & IT IS THE
- OWNER'S RESPONSIBILITY TO HAVE THEIR ENGINEER CERTIFY THIS ACCORDINGLY • SILTATION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO WORKS COMMENCING ON THE SITE & SHALL BE MAINTAINED FOR THE DURATION OF CONST., TO THE SATISFACTION OF THE AUTHORITY
- HAVING JURISDICTION (COORD. W OPSD 219.11, 219.130, 219.191)
- (SUBMIT SHOP DWG.'S FOR LOCATIONS & EXTENTS) • PROVIDE CONST. GATES / FENCES / BOUNDARIES AS SHOWN / REQ.'D TO THE <u>AUTHORITY HAVING JURISDICTION</u> REQ.'S. (SUBMIT SHOP DWG.'S FOR LOCATIONS & EXTENTS).
- A 1.8m HIGH CHAIN LINK FENCE (ALTERNATE MODU-LOC OR SIMILAR CONSTRUCTION FENCING) C/W SUPPORTS AS REQ.'D, @ WORK BOUNDARIES TO BE ERECTED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF THE DEMOLITION PROCESS & SHALL REMAIN & BE MAINTAINED IN POSITION INDEFINITELY UNTIL COMPLETION OF NEW CONST. WORK
- PROVIDE HEAVY DUTY (H/D) ASPHALT @ ALL DRIVEWAYS AS NOTED PROVIDE MEDIUM DUTY (M/D) ASPHALT @ ALL PARKING SPACES AS NOTED. PROVIDE LIGHT DUTY (L/D) ASPHALT @ ALL PLAYGROUND & MALKWAY AREAS ONLY (UNO)
- CONTRACTOR IS RESPONSIBLE FOR PLANTINGS, SOD, WATERING & MAINTENANCE UNTIL SUBSTANTIAL PERFORMANCE IS ACHIEVED. THE WARRANTY PERIOD WILL COMMENCE UPON SUBSTANTIAL PERFORMANCE OF THIS WORK

GENERAL NOTES:

- (A) GENERAL CONTRACTOR TO COORDINATE ALL WORK WITHIN THE BOULEVARD W/ THE <u>AUTHORITY HAVING JURISDICTION</u> & OBTAIN ALL NECESSARY PERMITS & APPROVALS FROM LOCAL AUTHORITIES. EXECUTE ALL WORK AS PER THE MUNICIPAL REQUIREMENTS.
- (B) GENERAL CONTRACTOR TO EXECUTE MORK TO DRIVEWAY ENTRANCE UNDER SUPERVISION OF THE AUTHORITY HAVING JURISDICTION . REFER TO ENTRANCE PERMIT REQUIREMENTS WHERE EXIST. DRIVEWAY ENTRANCE TO BE MODIFIED OR INSTALLATION OF NEW ENTRANCE AS PER MUNICIPAL REQUIREMENTS. PROVIDE NEW CONC. ENTRANCE CURBS TO MATCH EXISTING WHERE INDICATED.
- (L) PLANTING BEDS, TREE PLANTINGS, LANDSCAPE FEATURES & SODDED
- (BR) BIKE RACK 1. Model No. EP 5980, Equiparc Tango Bike Rack, manufactured by Equiparc. (ADDESSO) - to review an get product data and complete 1. Capacity: Rated at 2 bikes single side each unit.
- 2. Materials: Aluminum 3. Mounting: Surface mounting, with anchor assembly for flush mount to concrete surface. 4. Finish: Painted - Meteor Gray Semi-gloss (FINISH TO MATCH COMMERCIAL BLDG. ALUM. COMP. PANEL CLADDING TYP. - TO BE
- 5. Location to be confirmed on site with Owner and Architect. Coordinate with Architectural Site Plan.

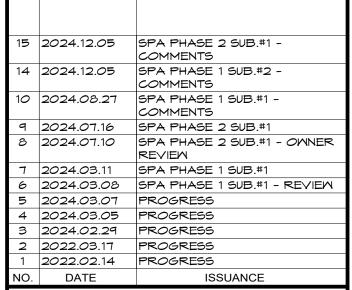
- 1. Model Name Backed Bench model EP 1630-IPE/MOA/JAT-A with backrest and armrests - Collection Plaza by Equiparc. (WD. FINISH TO MATCH COMMERCIAL BLDG. MD. GRAIN ALUM. CLADDING TYP. - TO BE CONFIRMED)
- 1. <u>Length:</u> 1505mm x 559 depth x 851 height 2. Mounting: Surface mounting, QAV drop in anchors with stainless steel theft proof bolts. Coordinate with manufacturers installation 3.<u>Colour:</u> - BLK.
- 4. Location to be confirmed on site with Owner and Architect. Coordinate with Architectural Site Plan.
- (SA) SLOPED SITE ACCESS (COORD. W/ <u>OPSD-350.010)</u>
- ⟨CC⟩ CONCRETE CURB
- ′ (COORD. W/ <u>OPSD-600.110</u>) (SM) CONCRETE SIDEMALK
- (COORD. W/ <u>OPSD-310.010, 310.020, 310.033, 310.039, 310.040 &</u> CONC. CURBS)
- (DC) CONCRETE SIDEMALK DROP CURB (COORD. W/ OPSD-310.010, 310.020, 310.033, 310.039, 310.040 & CONC. CURBS)
- (GE) GARBAGE & RECYCLE ENCLOSURES (COORD. W/ EARTHBIN A103A & 103B)
- PROVIDE MUD-MATT ENT. TO <u>AUTHORITY HAVING JURISDICTION</u> REQ.'S (COORD. W/ 9/A102)
- (EC) ELECTRIC VEHICLE CHARGING STATION (CONDUIT TO BE INSTALLED FOR FUTURE CHARGING STATION)
- SP1 SIGN PYLON 1
- (COORD. W/ 1\$2/A102A) (INSTALL CONDUIT FROM BLDG.#2)
- SP2 SIGN PYLON 2 (COORD. W/ 3\$4/A102A)
- (INSTALL CONDUIT FROM BLDG.#3)
- SP3 SIGN PYLON (ENTRANCE) (COORD. W/ FOOD CONSULTANT FOR ACTUAL SIGN) (INSTALL CONDUIT FROM BLDG.#1)
- SP4 SIGN PYLON (ENTRANCE) (COORD. W/ FOOD CONSULTANT FOR ACTUAL SIGN)
- (INSTALL CONDUIT FROM BLDG.#1)
- SP5 DIGITAL PRE-SELL BOARDS (COORD. W/ FOOD CONSULTANT FOR ACTUAL SIGN) (INSTALL CONDUIT FROM BLDG.#1)
- SP6 DIGITAL MENU BOARDS W/ COD & DETECTOR LOOP
- (COORD. W/ FOOD CONSULTANT FOR ACTUAL SIGN) (INSTALL CONDUIT FROM BLDG.#1)
- (CP) CANADA POST (COORD. W/ <u>A103)</u>
- (RM) RETAINING MALL (COORD. W/<u>OPSD 3120.100, 3121.150, 3190.10</u>)

SIGN LEGEND

- (A) STOP SIGN
- (B) ONE WAY DO NOT ENTER (F) NO PARKING - FIRE ROUTE
- (L) NO PARKING, BY PERMIT ONLY, BARRIER-FREE PARKING, VAN ACCESSIBLE-TYPE 'A'
- (SUPPLIED & INSTALLED BY PATTISON SIGN GROUP FOR FOOD CONSULTANT) (M) NO PARKING, BY PERMIT ONLY, BARRIER-FREE PARKING - TYPE 'B'
- (SUPPLIED & INSTALLED BY PATTISON SIGN GROUP FOR FOOD CONSULTANT) (O) VISITOR PARKING ONLY
- (P) ELECTRIC VEHICLE PARKING
- Y) MOBILE ORDER (BY FOOD CONSULTANT)
- (SUPPLIED & INSTALLED BY PATTISON SIGN GROUP) (Z) PULL FORWARD SIGN (BY FOOD CONSULTANT)
- (SUPPLIED & INSTALLED BY PATTISON SIGN GROUP) (AA) THANK YOU / DO NOT ENTER SIGN (BY FOOD CONSULTANT)
- (SUPPLIED & INSTALLED BY PATTISON SIGN GROUP)

IBBI ANY LANE ANY TIME (BY FOOD CONSULTANT)

- CONFIRM LOCATIONS & CONTENT OF ALL SIGNAGE W/ THE OWNER & AUTHORITY HAVING JURISDICTION PRIOR TO FABRICATION & ERECTION. PROPOSED SITE SIGNAGE TO COMPLY W/ SIGNAGE BY-
- ALL SIGNS TO BE CENTERED ON POSTS TYP.



ISSUANCE

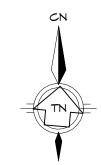
PROPERTY LEGAL DESCRIPTION: PLAN 37M-57, BLK 61 PT, ROLL # 33605062868 IN THE TOWN OF WATERFORD, IN THE DISTRICT

OF NORFOLK COUNTY APPLICANT: COMPANY:

DATE

VERLINDA HOMES LTD. APPLICANT: TOM O'HARA 26 MAIN STREET S. BOX 1152 ADDRESS: MATERFORD, ON.,

TELEPHONE NO.: 1.705.205.3235



DO NOT SCALE DRAWINGS, CALL FOR ANY CLARIFICATIONS THAT ARE REQUIRED, FIELD VERIFY AT ALL BUILT CONDITIONS ALL DWG.'S ARE TO BE READ IN COLOUR ORIGINAL PAGE SIZE ARCH 'D' - 24" x 36"



SQUARE —



G. DOUGLAS VALLEE LIMITED 2 TALBOT STREET NORTH SIMCOE ONTARIO N3Y 3W4 (519) 426-6270



Architects & Planners

PROJECT TITLE: ORCHARD SQUARE OLD HWY 24 / NORFOLK COUNTY

WATERFORD, ONTARIO, CANADA,

DRAWING TITLE: SITE PLAN NOTES

N0E 1Y0

RD. 24 & LAM BLVD.

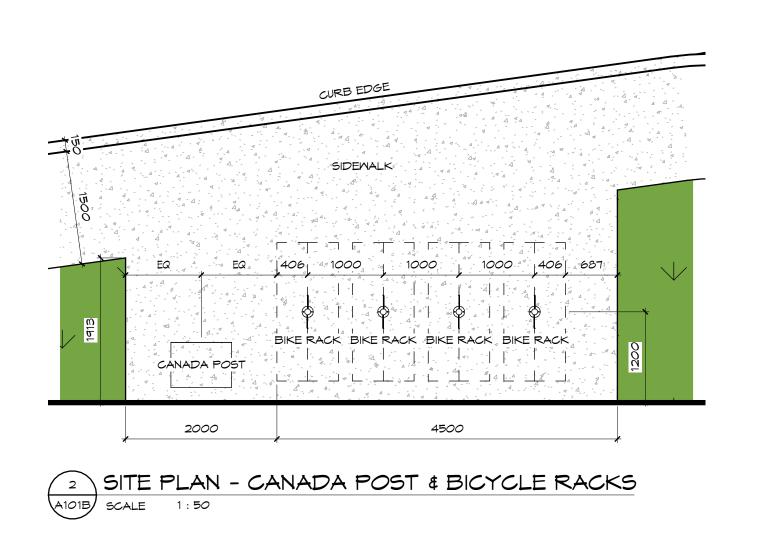
DRAWN BY:

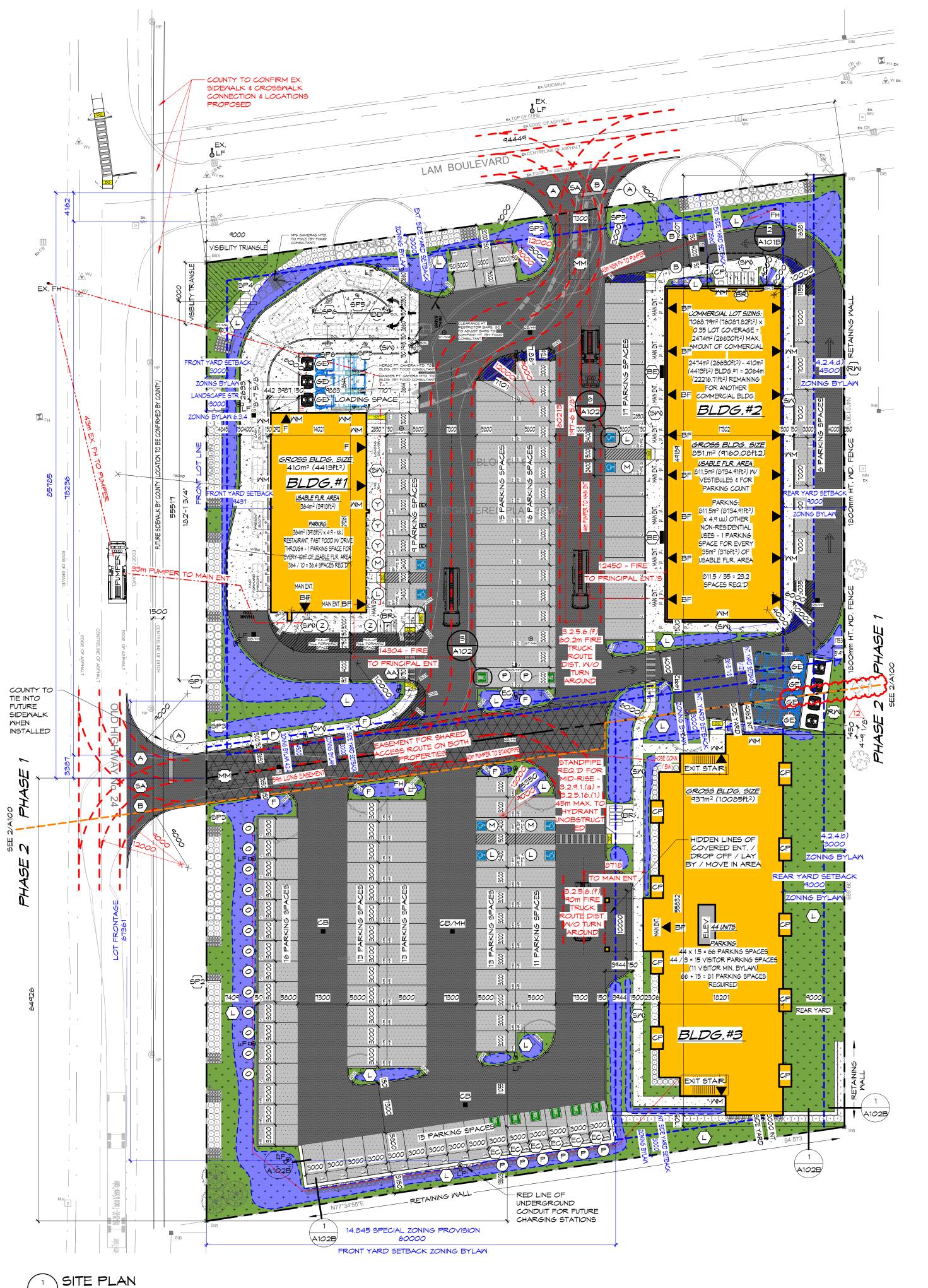
DRAWING SCALE: DRAWING NO.:

20-128

CHECKED BY:

l : 100 PROJECT NO.:





A101B SCALE 1:350

SITE PLAN LEGEND MAIN / PRINCIPAL ENTRANCE / EXIT DOOR MAIN ENT. ENTRANCE / EXIT DOOR ENTRANCE / EXIT DOOR ENTRANCE / EXIT DOOR (BARRIER FREE OPERATOR) ENTRANCE / EXIT DOOR (OVERHEAD DOOR) DATUM / GRADE (RELATIVE TO A/F/F NEW BLDG.) PROPERTY BOUNDARY LINE(S) SETBACKS MD. FENCE (1800mm HT. PRIVACY) SNOW STORAGE (ALL ADDITIONAL SNOW TO BE TAKEN AWAY BY OWNER) FIRE ROUTE (6m WIDE / 12m CENTER RADIUS) COVERED ENTRANCE COVERED PATIO (ON GRADE) PAINTED GRAPHICS ON ASPHALT / CONC .: (COORD. W/ THE CITY / TOWN HAVING JURISDICTION GUIDELINES) • ELECTRIC VEHICLE CHARGING SIGN ON ASPHALT / CONC. (WHITE & GREEN COLOUR) • ACCESSIBLE SIGN ON ASPHALT / CONC. (WHITE & BLUE COLOUR) • DIRECTIONAL SIGNS ON ASPHALT / CONC (MHITE COLOUR) · CROSSWALK / CROSSING (MHITE COLOUR) • VEHICULAR STALL MARKINGS & DESCRIPTIONS DESCRIPTION (YELLOW COLOUR) V - VISITOR V BF - VISITOR BARRIER FREE BF - BARRIER FREE MR - MID-RISE MR BF - MID-RISE BARRIER FREE FF BF - FAST FOOD BARRIER FREE C BF - COMMERCIAL BARRIER FREE FF - FAST FOOD FF MP - FAST FOOD MOBILE PICK-UP PARKING C - COMMERCIAL PARKING • DIAGONAL MARKINGS (YELLOW COLOUR) • STOP SIGN VEHICULAR MARKINGS (MHITE COLOUR) DRIVE THRU • DRIVE THRU - THANK YOU (WHITE COLOUR) THANK YOU (REDUCED HT. BOLLARD W/ SURESIGN COVER @ FAST FOOD DRIVE THRU) (COORD. W/ SIGN LEGEND) DROP CURB (OPSD & NADG COMBINED MOST STRINGENT OF BOTH STD.'S) PERENNIAL DROUGHT RESISTANT GRASSES NEW CONIFEROUS TREE NEW DECIDUOUS TREE VISIBILITY TRIANGLES / SIGHT / DAYLIGHT TO BE MAINTAINED (REMAIN CLEAR) @ BOTH SIDES OF ALL LANEWAY / DRIVEWAYS \$ INTERSECTIONS. THE MAX. HEIGHT OF ANY OBJECT OR MATURE VEGETATION WITHIN THE VISIBILITY TRIANGLE IS NOT TO EXCEED REQ.'D HEIGHT ABOVE THE CENTRELINE OF THE CORRESPONDING ADJACENT STREET NORFOLK COUNTY 9m X 9m INTERSECTION / STREET LINES 1m HEIGHT NO PARKING ALLOWED CATCH BASIN □ CB EX. CATCH BASIN □ EX. CB CB/MH CATCH BASIN / MAN HOLE © EX. CB/MH EX. CATCH BASIN / MAN HOLE SANITARY MAN HOLE O SA/MH STORM MAN HOLE ST/MH O EX. SA/MH EX. SANITARY MAN HOLE EX. STORM MAN HOLE ♦ FH FIRE HYDRANT EX. FH EX. FIRE HYDRANT LIGHT STD. □-EX. LF EX. LIGHT STD. SOFFIT LIGHT (CAN / POT LIGHT) EX. HYDRO VAULT/TRANSFORMER ON CONC. PAD WALL MTD. LIGHT FIXTURE GAS METERS TACTILE WARNING SURFACE INDICATORS (600mm×LENGTH - TILE) (FOR SITE CONDITIONS ONLY) (COORD. W/ OPSD 310.39) ON SITE & MUNICIPAL SIDEMALK LOCATIONS • KINESIK ADVANTAGE CAST IRON CAST IN PLACE IN NEW SURFACES (UNCOATED NATURAL PATINA) (COLOUR TO BE VERIFIED BY ARCHITECT) HATCH IDENTIFICATION LEGEND AREA OF LIGHT DUTY ASPHALT (COORD. W/ CIVIL DWG.'S & GEOTECH REPORT) AREA OF HEAVY DUTY ASPHALT (COORD. W/ CIVIL DWG.'S & GEOTECH REPORT) CONC. SIDEMALK / PAD / CROSSMALK / SIDEMALK / LANEWAY / STAIRS / ETC. REIN. CONC. ON 100mm RIGID INSUL. C/W IN SLAB HEATING & CUT LINES AREA OF NEW SOD ON 150mm TOPSOIL (COORD. W/ CONST. FOR EXTENTS) MUD MAT NEW BLDG. / ADDITION (XXX)EASEMENT $\times \times \times \times$ GENERAL NOTES: • SHOP DWG.'S ARE TO BE DIMENSIONED IN METRIC UNITS (IMPERIAL & METRIC BOTH SHOWN IS ACCEPTABLE) • COORD. W/ EX. SURVEY DWG. FOR LINE WEIGHTS & TYPES AS REVIT IS NOT COMPATIBLE WITH AUTOCAD LINE WEIGHTS & TYPES \bullet ALL EX. ITEMS WILL BE LABELLED W/ 'EX' (OR GRAY SCALE ON EX. SURVEY DWG.) & ARE TO REMAIN U/N/O OR SHOWN & NOTED IN DEMO • PATCH & REPAIR ALL EX. ITEMS WHERE DISTURBED / DAMAGED BY CONST. / DEMO; PROVIDE CLEAN TRANSITIONS TYP. (PROVIDE SOD @ ALL GRASSED AREAS)

DATE ISSUANCE 15 2024.12.05 SPA PHASE 2 SUB.#1 -COMMENTS 4 2024.12.05 SPA PHASE 1 SUB.#2 -COMMENTS FOOD SUB-CONSULTANT LIGH STD. LOCATIONS SPA PHASE 2 SUB.#1 COMMENTS SPA PHASE 2 SUB.#1 PHOTOMETRICS SPA PHASE 1 SUB.#1 -1 2024.07.16 | SPA PHASE 2 SUB.#1 8 2024.07.10 | SPA PHASE 2 SUB.#1 - OWNER 2024.03.11 SPA PHASE 1 SUB.#1 2024.03.08 SPA PHASE 1 SUB.#1 - REVIEW 2024.03.07 PROGRESS 1 2024.03.05 PROGRESS 3 2024.02.29 PROGRESS 2 2022.03.17 PROGRESS 2022.02.14 PROGRESS NO. DATE PROPERTY LEGAL DESCRIPTION: PLAN 37M-57, BLK 61 PT, ROLL # 33605062868 IN THE TOWN OF WATERFORD, IN THE DISTRICT OF NORFOLK COUNTY APPLICANT: COMPANY: VERLINDA HOMES LTD. TOM O'HARA APPLICANT: 26 MAIN STREET S. BOX 1152 ADDRESS: MATERFORD, ON., TELEPHONE NO.: 1.705.205.3235 DO NOT SCALE DRAWINGS, CALL FOR ANY CLARIFICATIONS THAT ARE REQUIRED, FIELD VERIFY AT ALL BUILT CONDITIONS ALL DWG.'S ARE TO BE READ IN COLOUR ORIGINAL PAGE SIZE ARCH 'D' - 24" x 36" ORCHARD SQUARE — Consulting Engineers, Architects & Planners G. DOUGLAS VALLEE LIMITED 2 TALBOT STREET NORTH SIMCOE ONTARIO N3Y 3W4 (519) 426-6270 STAMP STRUCT. O ARCHITECTS LICENCE PROJECT TITLE: ORCHARD SQUARE OLD HWY 24 / NORFOLK COUNTY RD. 24 & LAM BLVD. WATERFORD, ONTARIO, CANADA, N0E 1Y0 DRAWING TITLE: SITE PLAN

CHECKED BY: DRAWN BY:

MS JS

DRAWING SCALE:

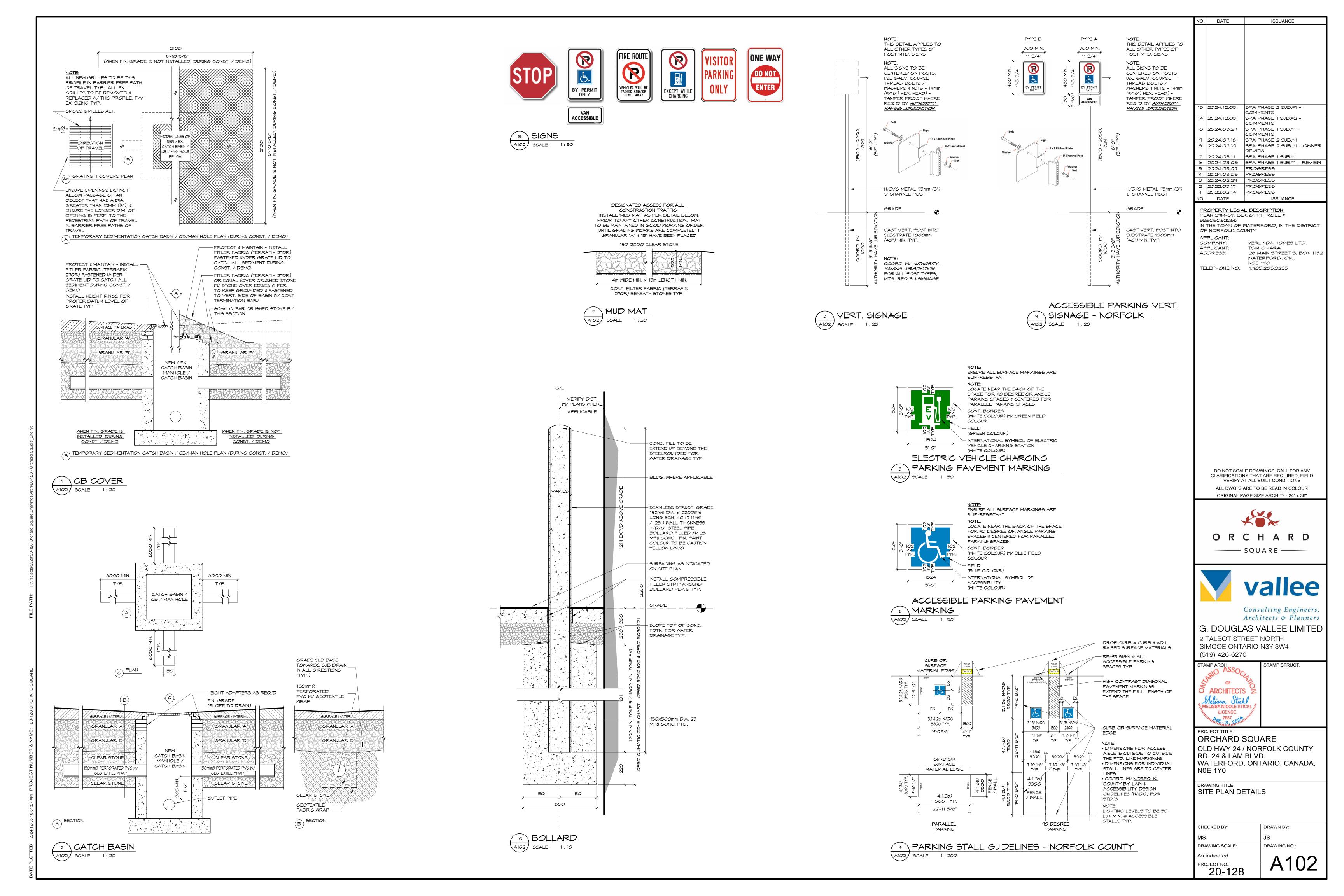
As indicated

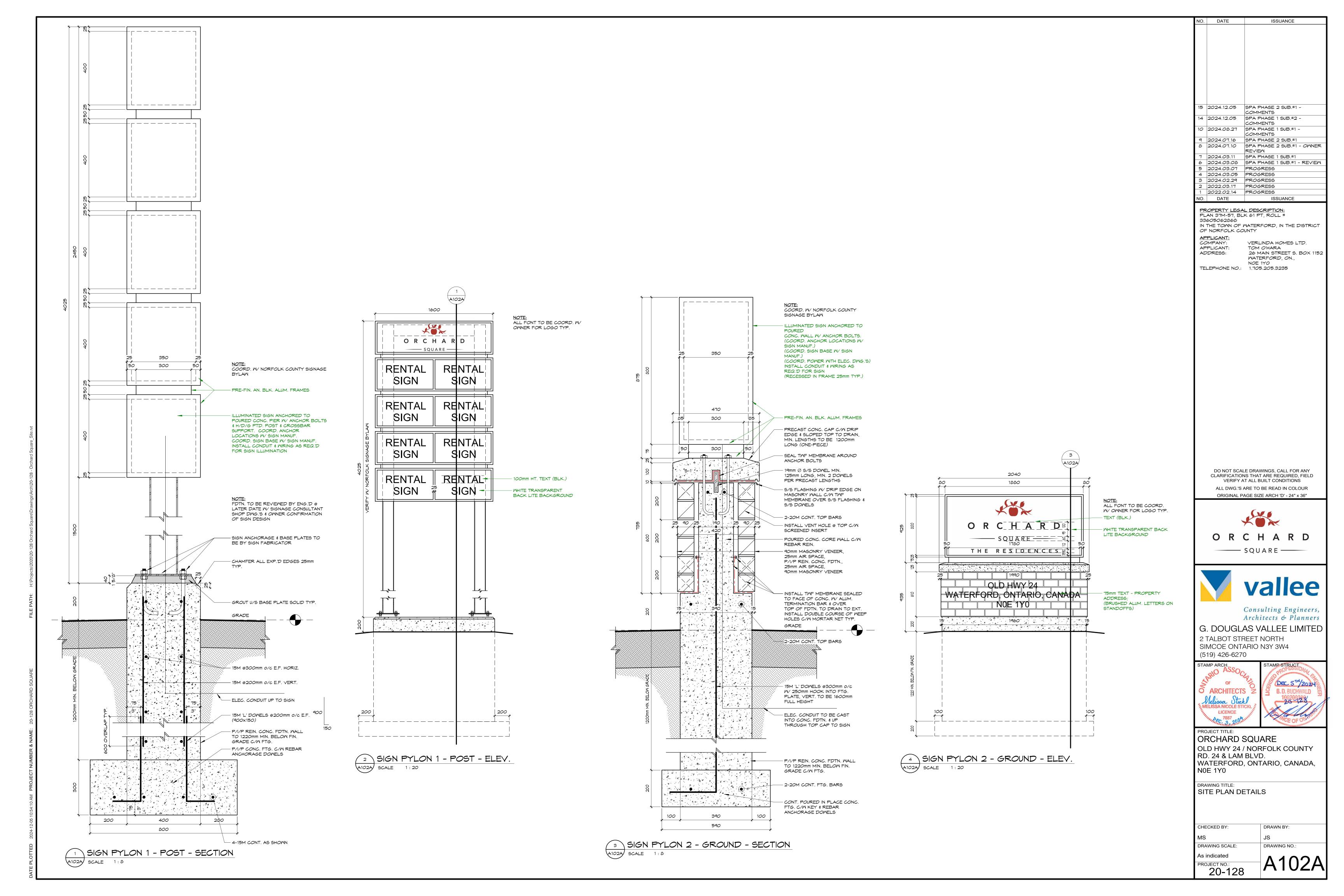
PROJECT NO.:

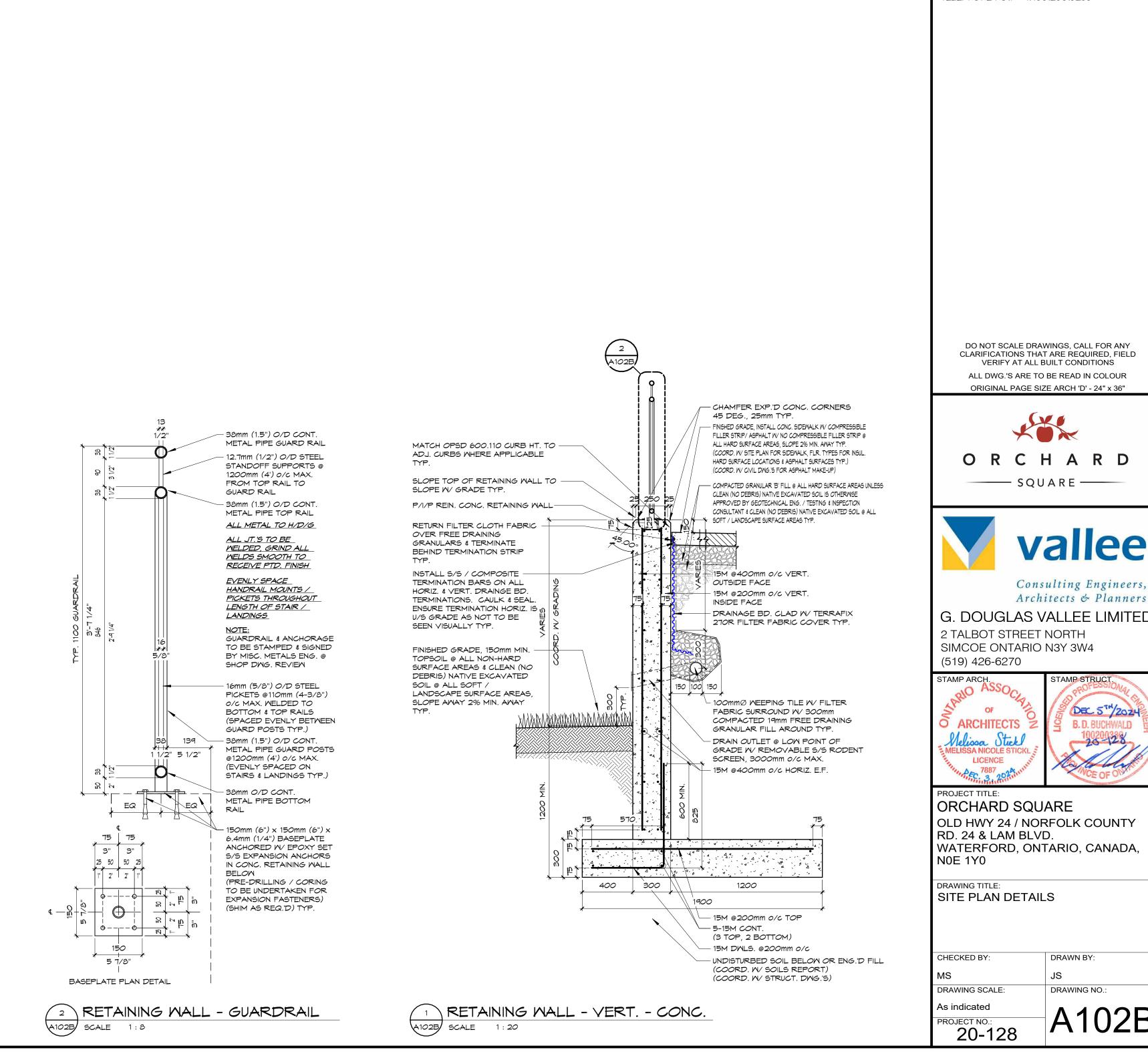
20-128

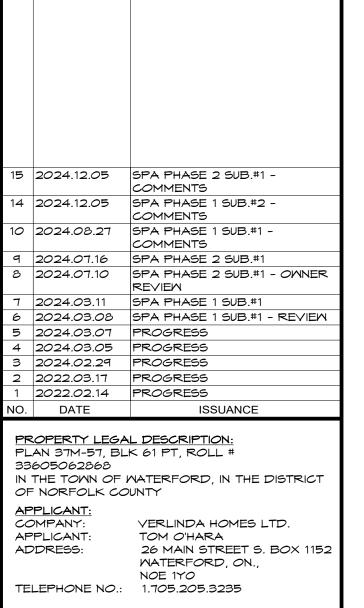
A101

DRAWING NO.:









ISSUANCE

NO. DATE

DO NOT SCALE DRAWINGS, CALL FOR ANY CLARIFICATIONS THAT ARE REQUIRED, FIELD VERIFY AT ALL BUILT CONDITIONS ALL DWG.'S ARE TO BE READ IN COLOUR ORIGINAL PAGE SIZE ARCH 'D' - 24" x 36"





G. DOUGLAS VALLEE LIMITED 2 TALBOT STREET NORTH SIMCOE ONTARIO N3Y 3W4

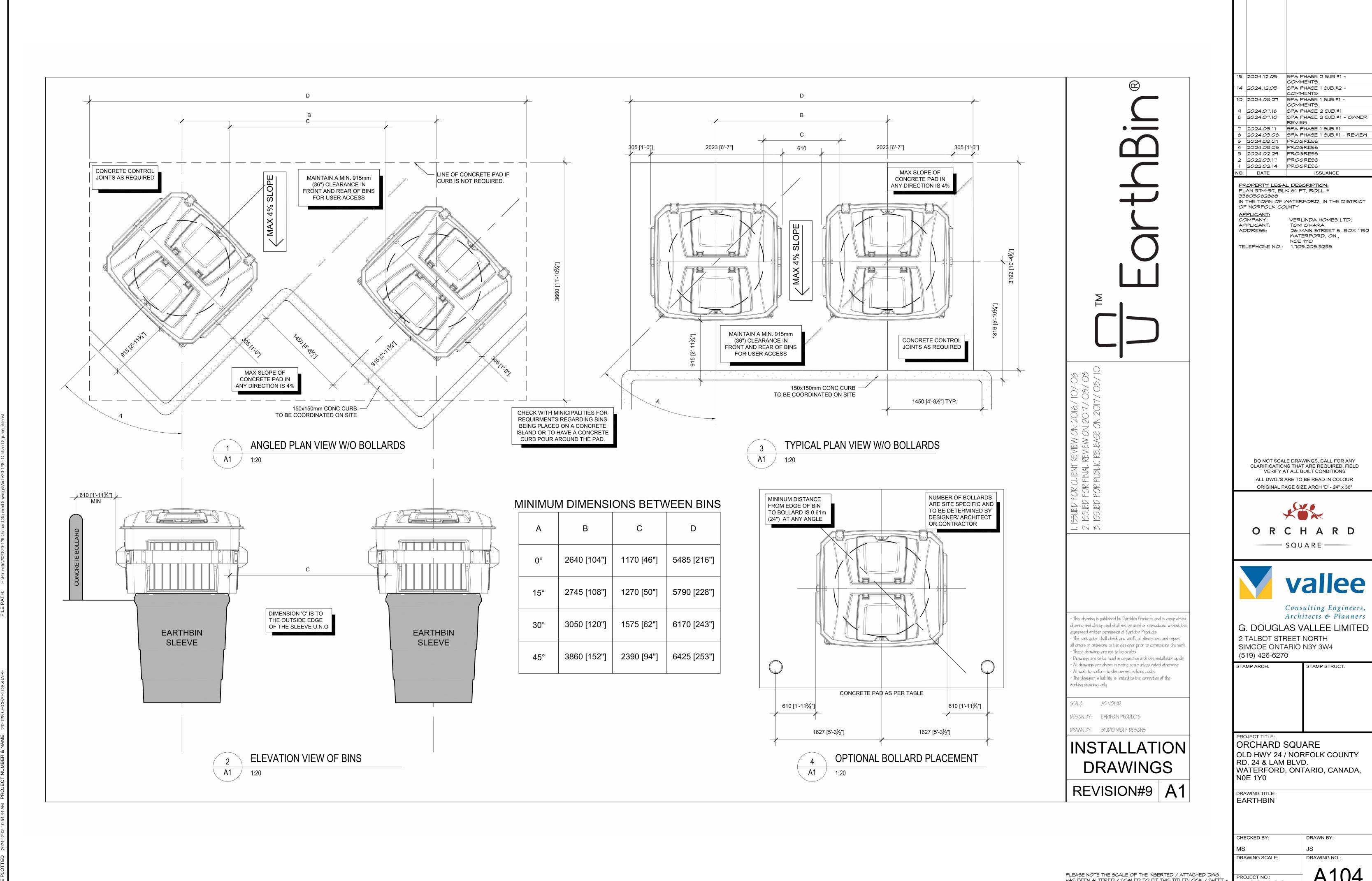




ORCHARD SQUARE OLD HWY 24 / NORFOLK COUNTY RD. 24 & LAM BLVD.

DRAWN BY:

DRAWING NO.:

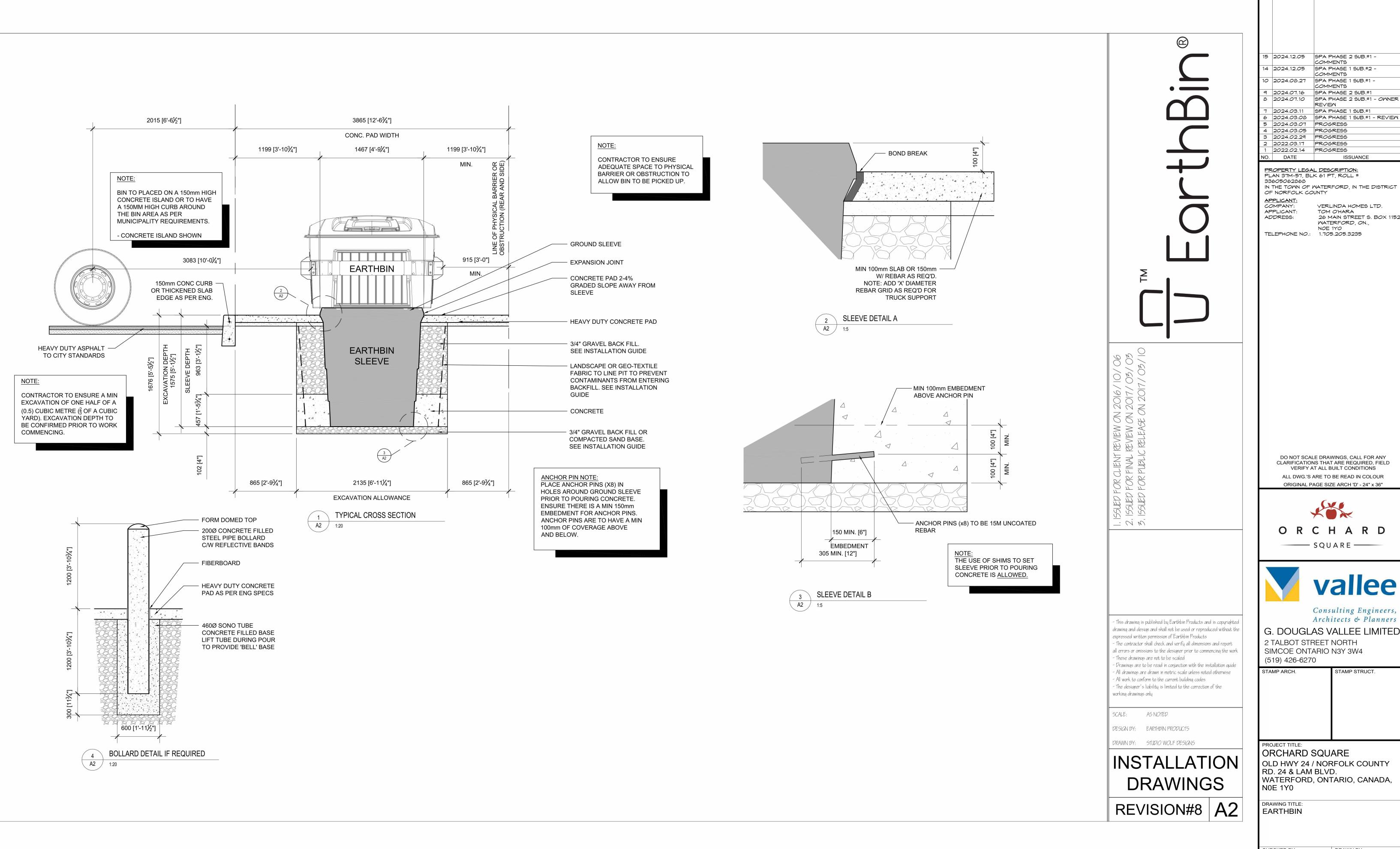


26 MAIN STREET S. BOX 1152 A104 20-128

NO. DATE

ISSUANCE

HAS BEEN ALTERED / SCALED TO FIT THIS TITLEBLOCK / SHEET -DO NOT SCALE DWG.



NO. DATE

ISSUANCE

VERLINDA HOMES LTD.

MATERFORD, ON.,

26 MAIN STREET S. BOX 1152

SQUARE —

Consulting Engineers, Architects & Planners G. DOUGLAS VALLEE LIMITED

2 TALBOT STREET NORTH SIMCOE ONTARIO N3Y 3W4 (519) 426-6270

STAMP STRUCT.

ORCHARD SQUARE

OLD HWY 24 / NORFOLK COUNTY RD. 24 & LAM BLVD. WATERFORD, ONTARIO, CANADA,

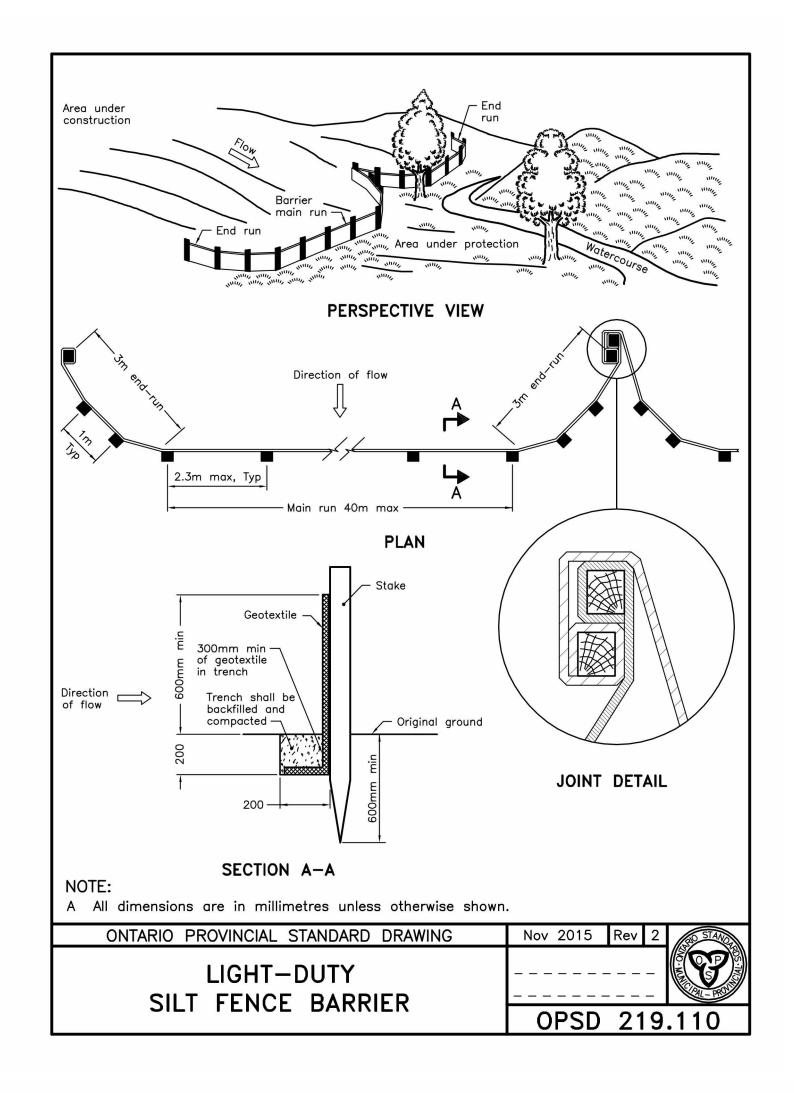
DRAWN BY: CHECKED BY:

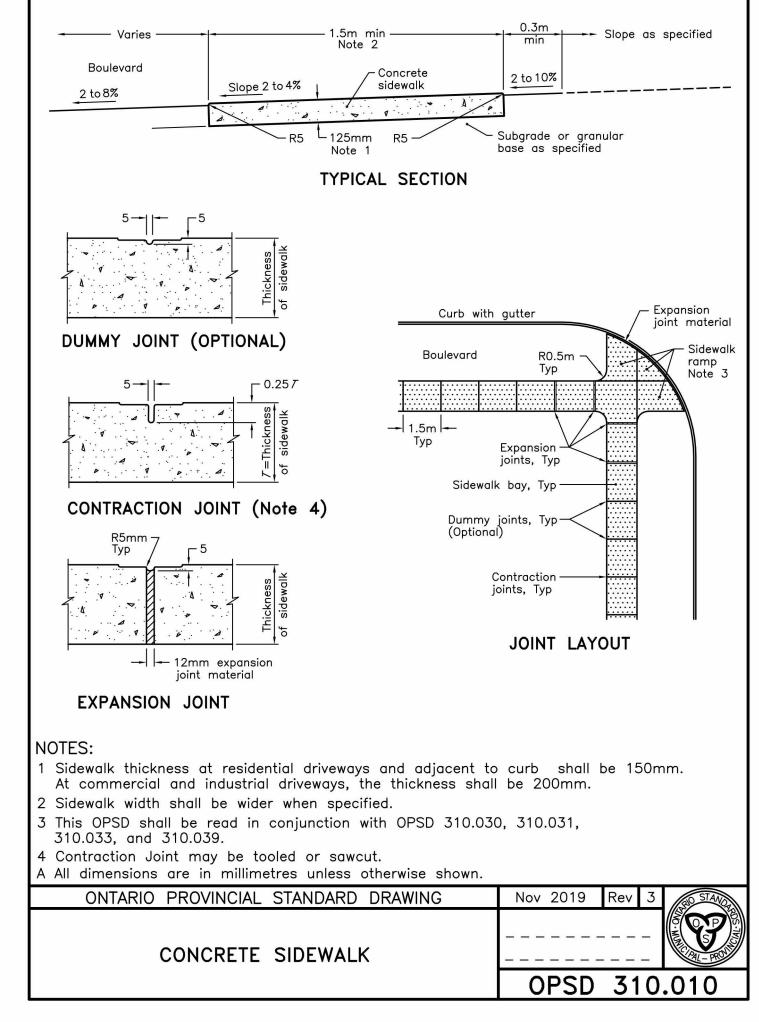
DRAWING NO.:

ROJECT NO.: 20-128

DRAWING SCALE:

PLEASE NOTE THE SCALE OF THE INSERTED / ATTACHED DWG. HAS BEEN ALTERED / SCALED TO FIT THIS TITLEBLOCK / SHEET -DO NOT SCALE DWG.





Length Varies

Note 2

KOXOXOXOXOXOXOXOXOXOXO

ELEVATION

_ _ _ _ _ _ _ _ _ _

OPSD 310.039

TRUNCATED DOMES PLAN

2 Length of plate may be increased to suit the curb depression width.

3 Material of plate shall be as specified in Contract Documents.

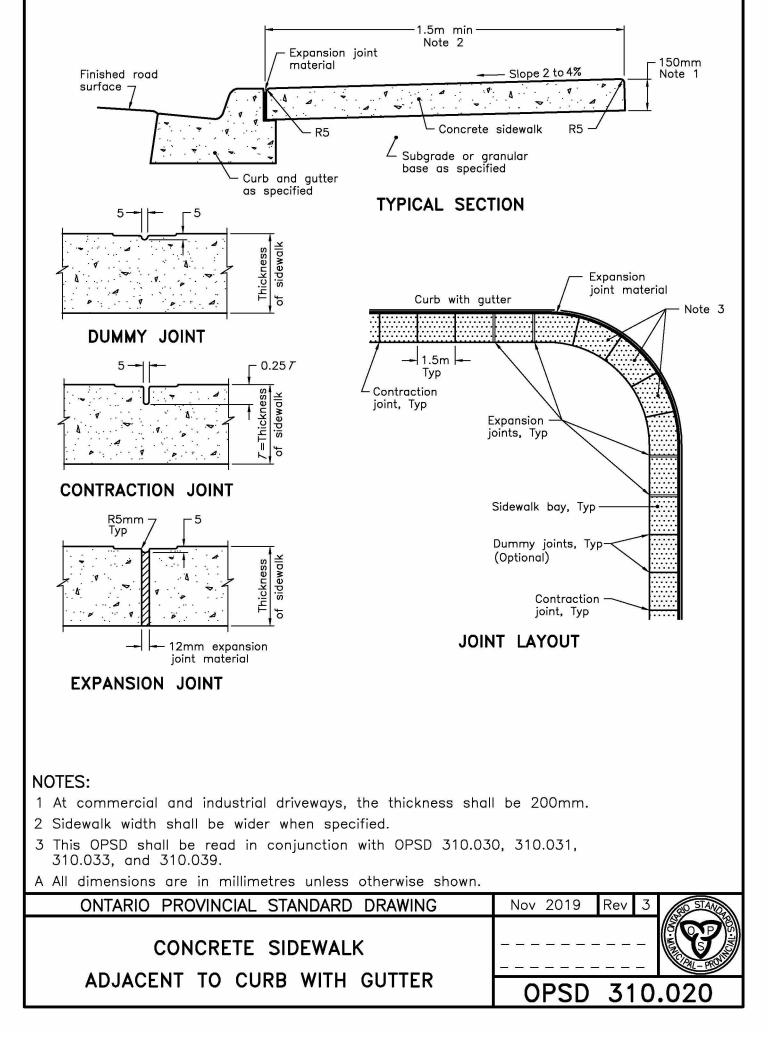
3 All dimensions are in millimetres unless otherwise shown. ONTARIO PROVINCIAL STANDARD DRAWING

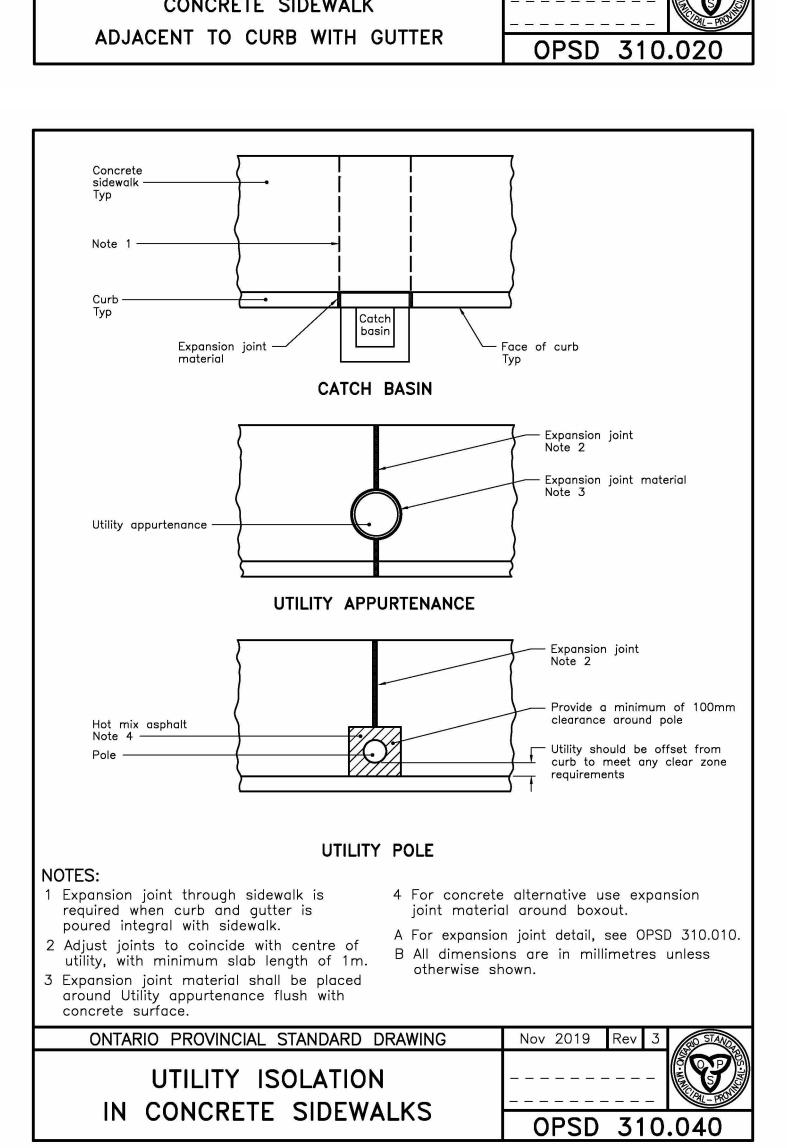
CONCRETE SIDEWALK RAMPS TACTILE

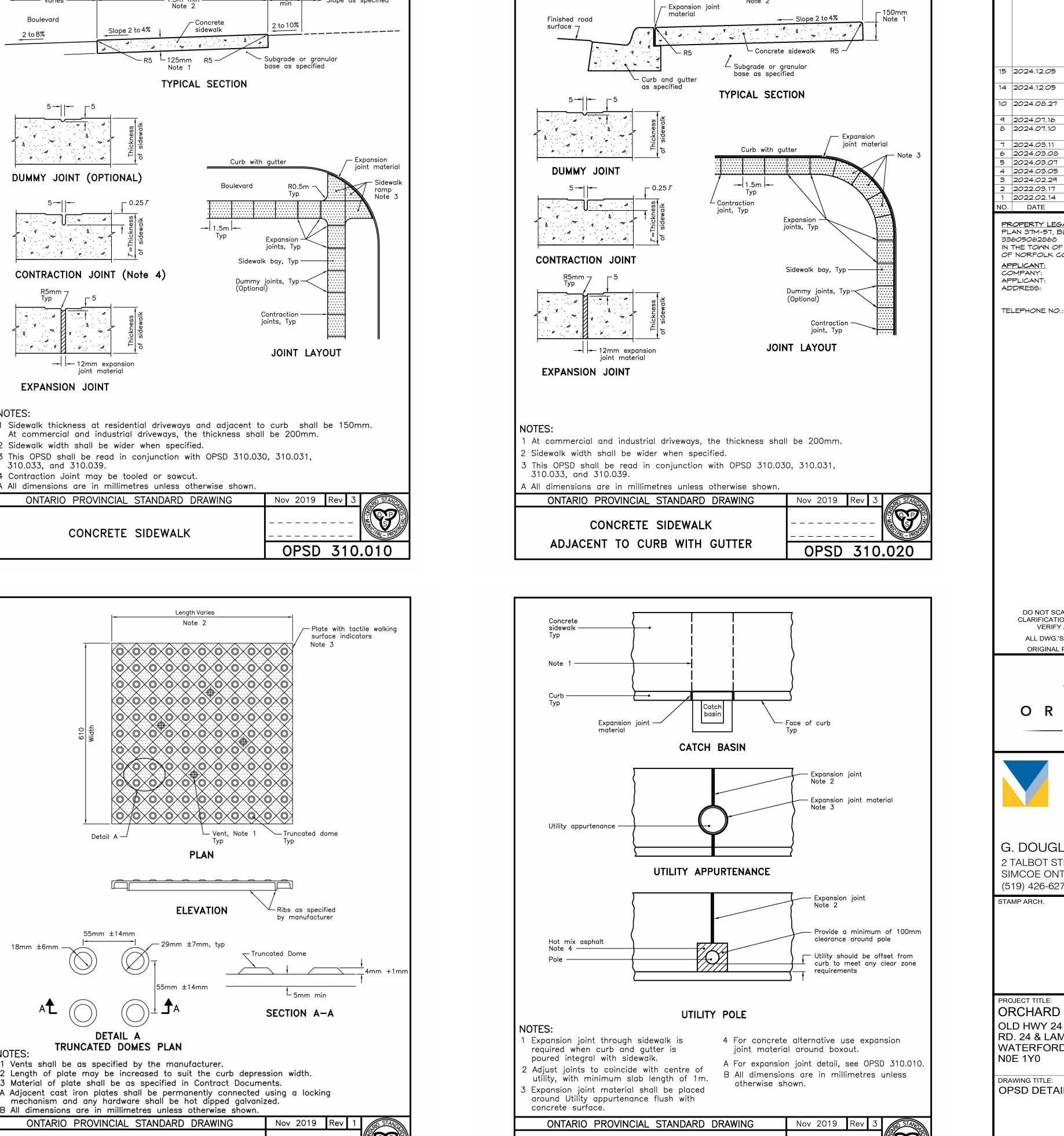
WALKING SURFACE INDICATORS

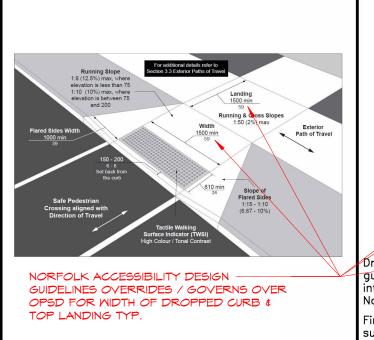
COMPONENT

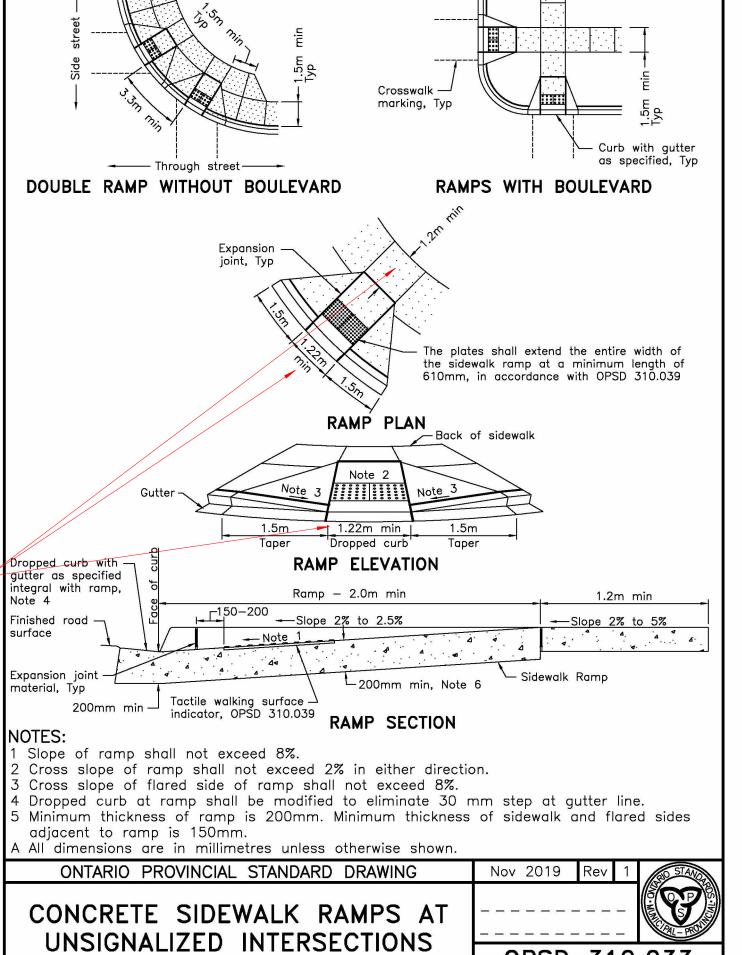
Vents shall be as specified by the manufacturer.



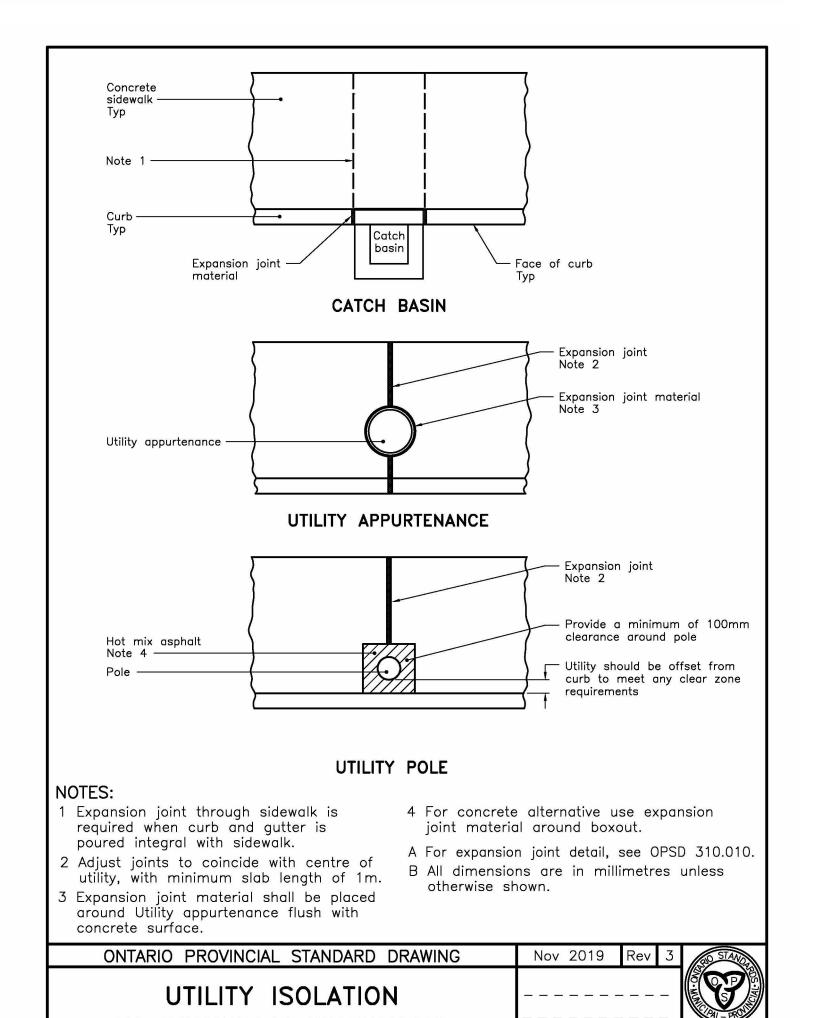


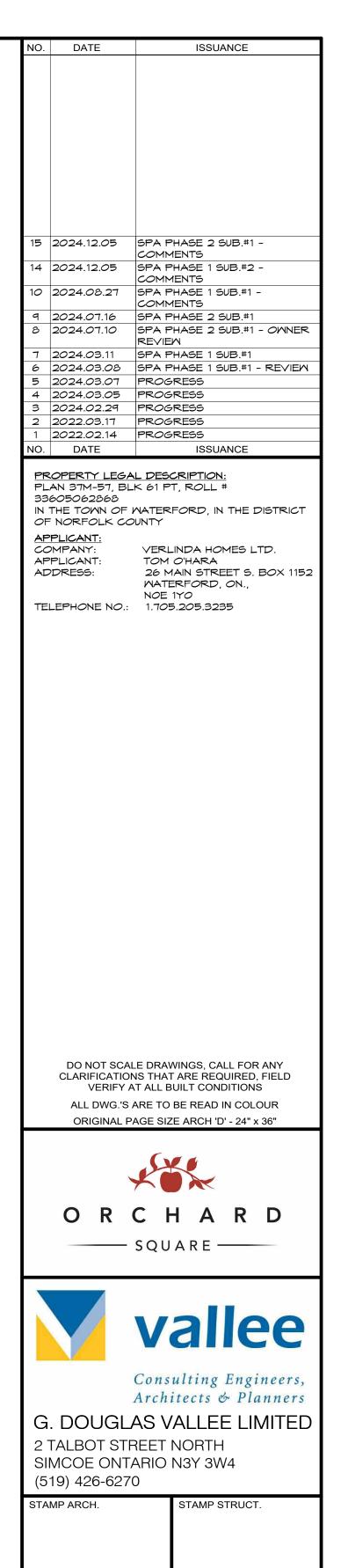






OPSD 310.033





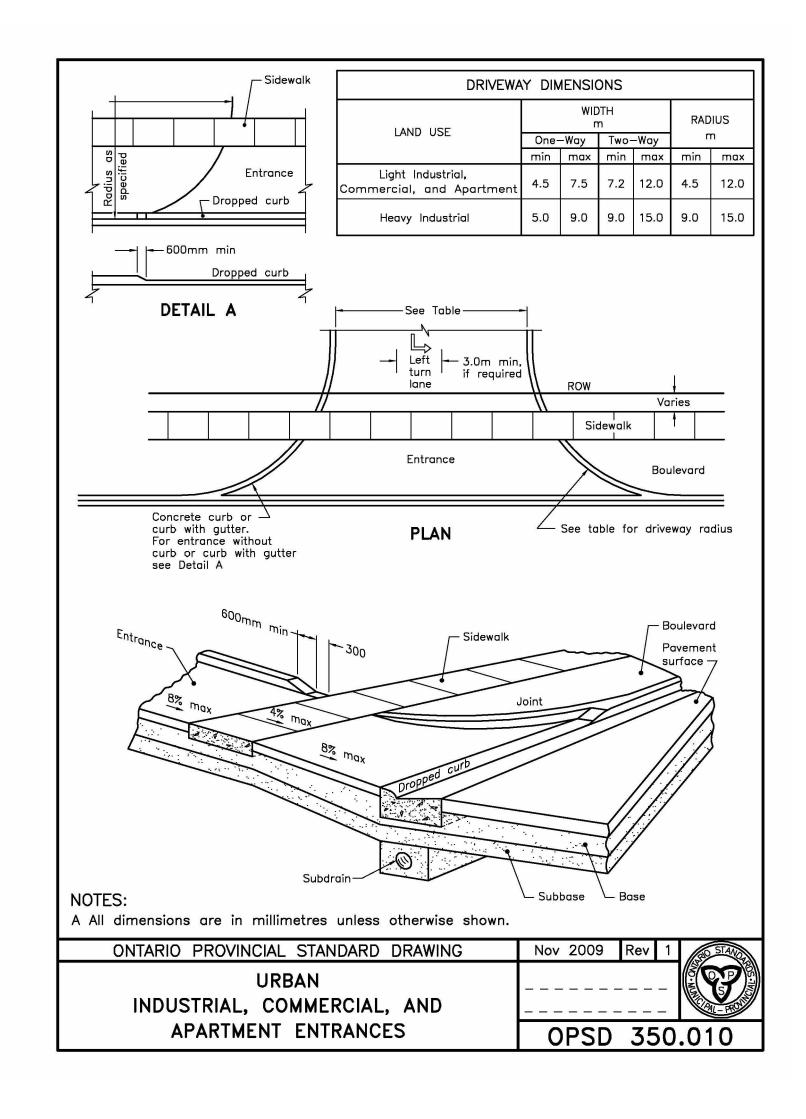
ORCHARD SQUARE OLD HWY 24 / NORFOLK COUNTY

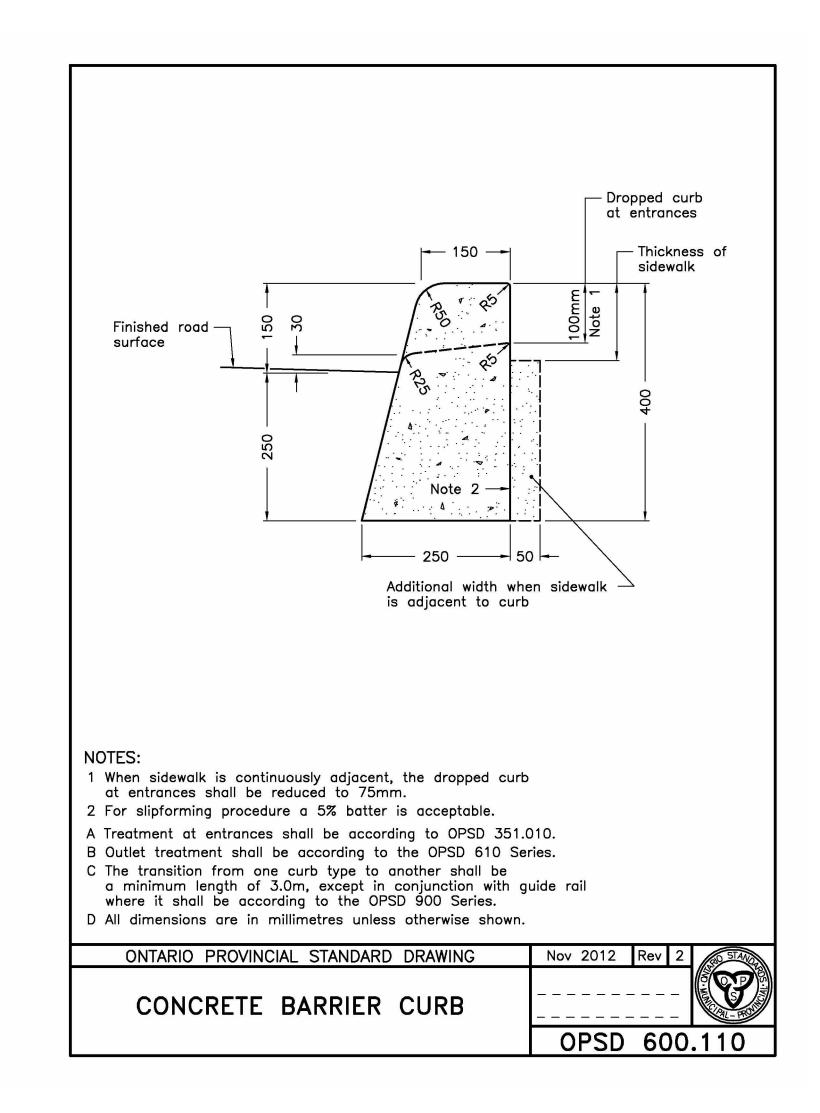
RD. 24 & LAM BLVD. WATERFORD, ONTARIO, CANADA,

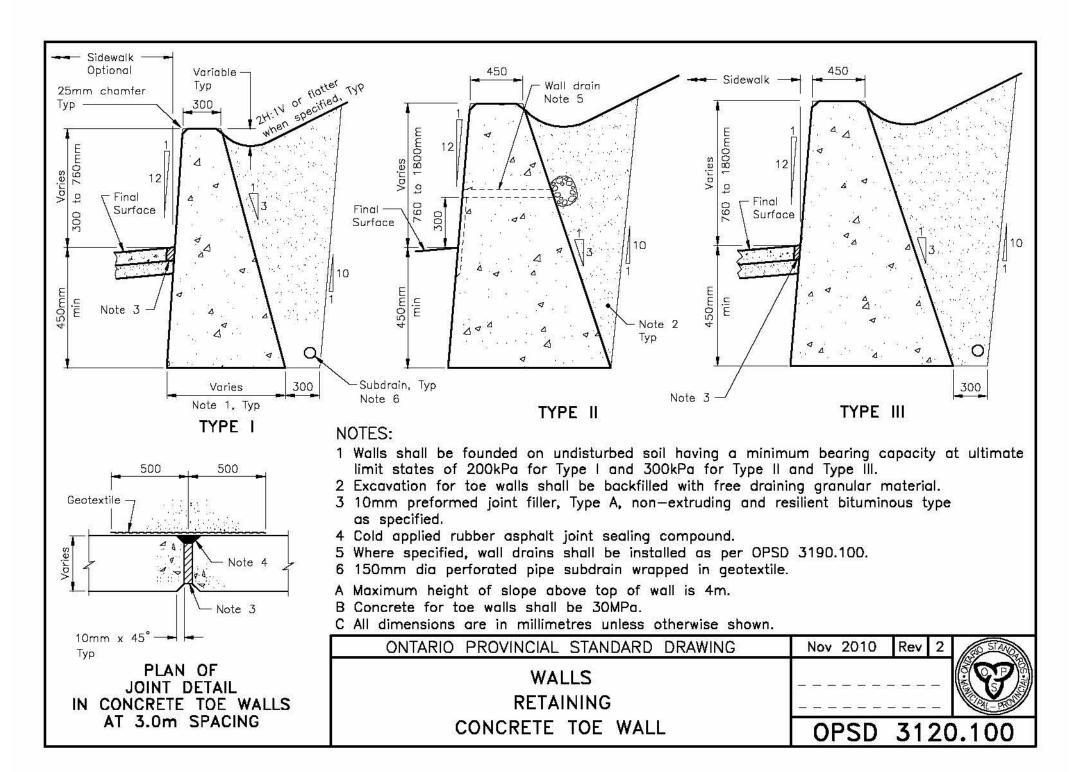
OPSD DETAILS

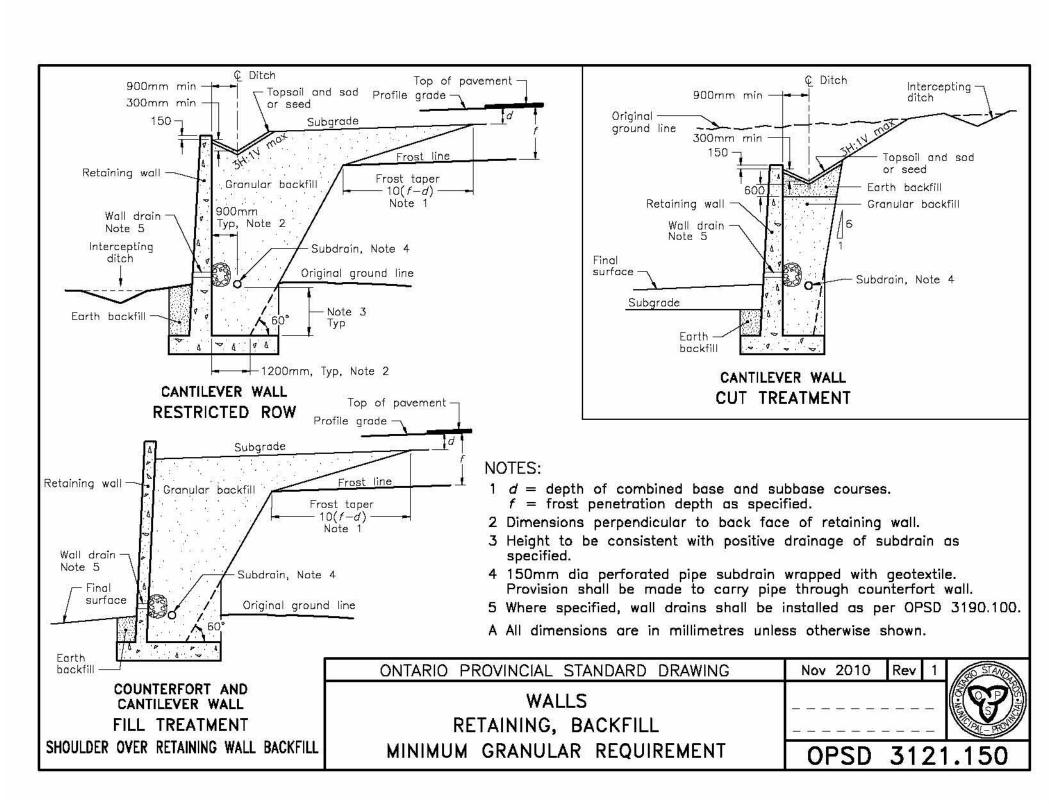
CHECKED BY: DRAWN BY: DRAWING SCALE: DRAWING NO.:

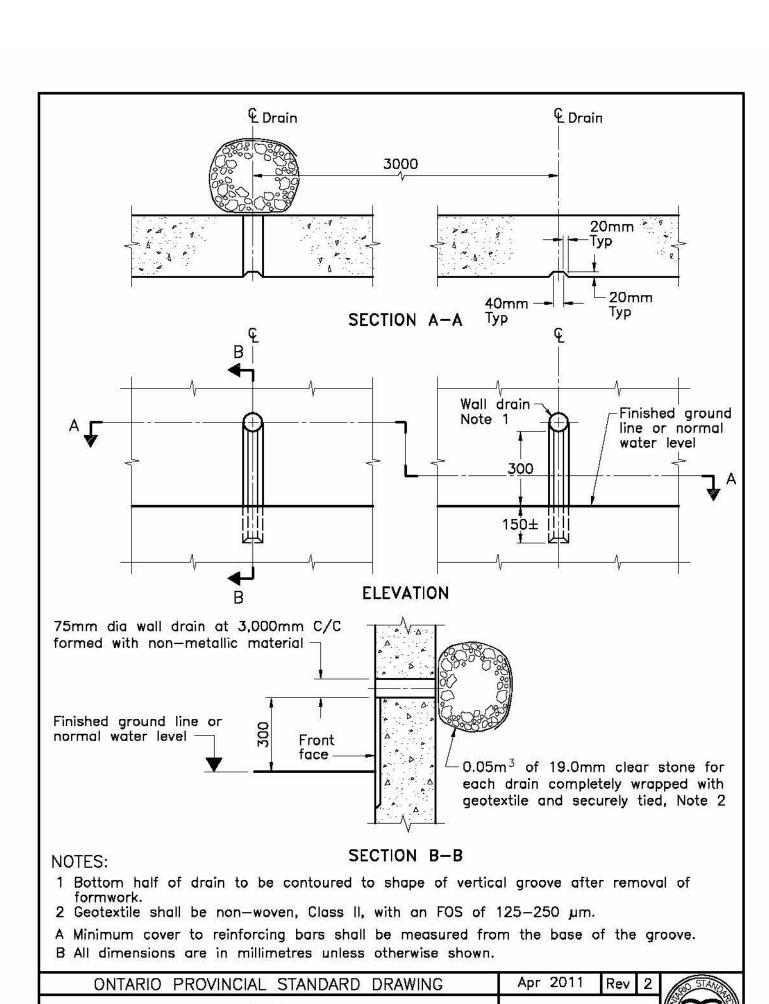
A105 PROJECT NO.: 20-128



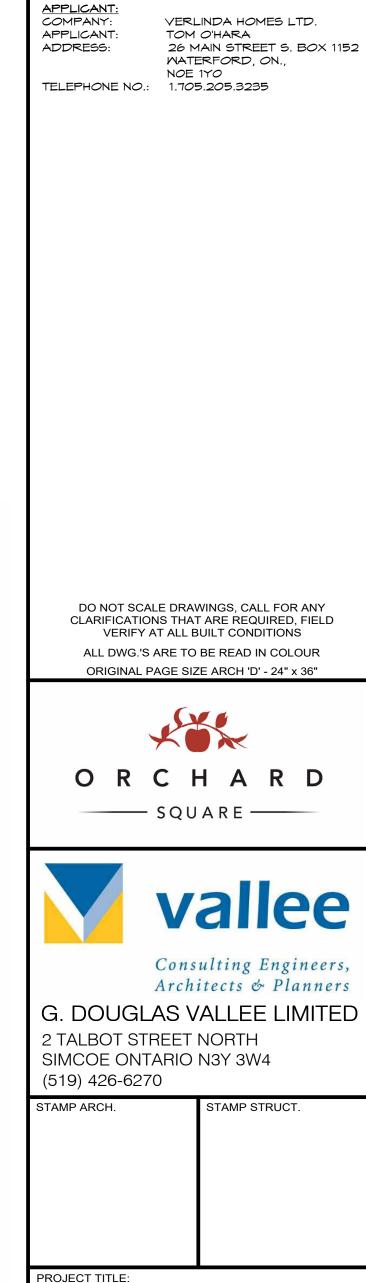








WALLS
RETAINING AND ABUTMENT
WALL DRAIN



ORCHARD SQUARE

RD. 24 & LAM BLVD.

N0E 1Y0

OPSD 3190.100

DRAWING TITLE:
OPSD DETAILS

CHECKED BY:

DRAWING SCALE:

20-128

PROJECT NO.:

OLD HWY 24 / NORFOLK COUNTY

WATERFORD, ONTARIO, CANADA,

DRAWN BY:

DRAWING NO.:

DATE

5 2024.12.05 SPA PHASE 2 SUB.#1

4 2024.12.05 SPA PHASE 1 SUB.#2 -

0 2024.08.27 SPA PHASE 1 SUB.#1 -

1 2024.07.16 SPA PHASE 2 SUB.#1

2024.03.11 SPA PHASE 1 SUB.#1

5 2024.03.07 PROGRESS

1 2024.03.05 PROGRESS

3 2024.02.29 PROGRESS

2 2022.03.17 PROGRESS 1 2022.02.14 PROGRESS

PROPERTY LEGAL DESCRIPTION: PLAN 37M-57, BLK 61 PT, ROLL #

NO. DATE

33605062868

OF NORFOLK COUNTY

COMMENTS

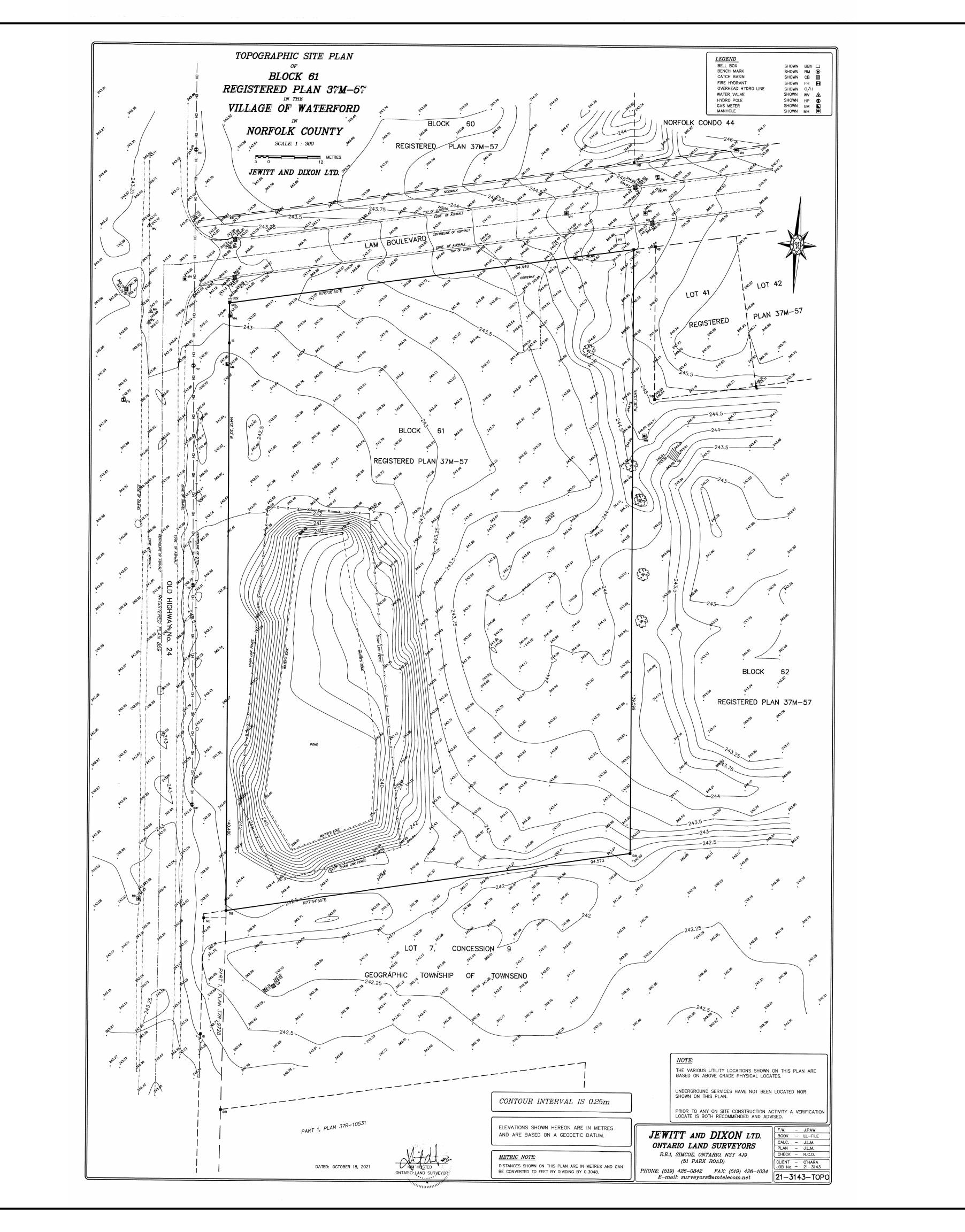
COMMENTS

8 | 2024.07.10 | SPA PHASE 2 SUB.#1 - OWNER

5 2024.03.08 SPA PHASE 1 SUB.#1 - REVIEW

IN THE TOWN OF WATERFORD, IN THE DISTRICT

ISSUANCE



NO. DATE ISSUANCE 15 2024.12.05 SPA PHASE 2 SUB.#1 -COMMENTS 14 | 2024.12.05 | SPA PHASE 1 SUB.#2 -COMMENTS 10 2024.08.27 | SPA PHASE 1 SUB.#1 -9 2024.07.16 SPA PHASE 2 SUB.#1 8 2024.07.10 SPA PHASE 2 SUB.#1 - OWNER 1 2024.03.11 SPA PHASE 1 SUB.#1 6 2024.03.08 SPA PHASE 1 SUB.#1 - REVIEW 5 2024.03.07 PROGRESS 4 2024.03.05 PROGRESS 3 2024.02.29 PROGRESS 2 2022.03.17 PROGRESS 1 2022.02.14 PROGRESS NO. DATE PROPERTY LEGAL DESCRIPTION: PLAN 37M-57, BLK 61 PT, ROLL # 33605062868 IN THE TOWN OF WATERFORD, IN THE DISTRICT OF NORFOLK COUNTY APPLICANT: COMPANY: VERLINDA HOMES LTD. TOM O'HARA APPLICANT: 26 MAIN STREET S. BOX 1152 ADDRESS: MATERFORD, ON., TELEPHONE NO.: 1.705.205.3235 DO NOT SCALE DRAWINGS, CALL FOR ANY CLARIFICATIONS THAT ARE REQUIRED, FIELD VERIFY AT ALL BUILT CONDITIONS ALL DWG.'S ARE TO BE READ IN COLOUR ORIGINAL PAGE SIZE ARCH 'D' - 24" x 36" ORCHARD S Q U A R E -----Consulting Engineers, Architects & Planners

G. DOUGLAS VALLEE LIMITED
2 TALBOT STREET NORTH
SIMCOE ONTARIO N3Y 3W4
(519) 426-6270

STAMP ARCH. STAMP STRUCT.

PROJECT TITLE:
ORCHARD SQUARE
OLD HWY 24 / NORFOLK COUNTY
RD. 24 & LAM BLVD.
WATERFORD, ONTARIO, CANADA,

DRAWING TITLE:
EXISTING SITE SURVEY

N0E 1Y0

CHECKED BY:

MS

DRAWN BY:

JS

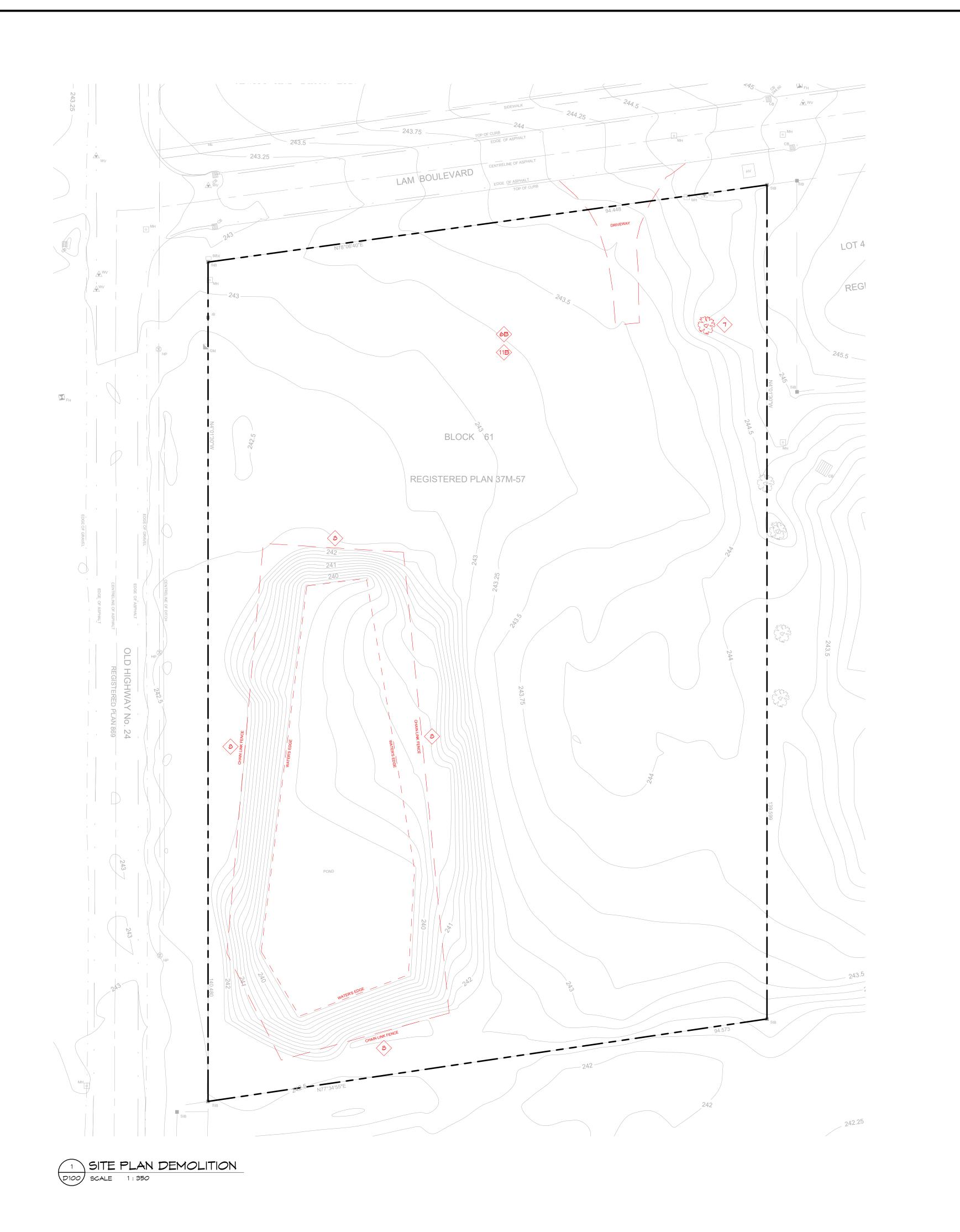
DRAWING SCALE:

DRAWING NO.:

PROJECT NO.:

PLEASE NOTE THE SCALE OF THE INSERTED / ATTACHED DWG.
HAS BEEN ALTERED / SCALED TO FIT THIS TITLEBLOCK / SHEET DO NOT SCALE DWG.

CT NO.: 20-128



SITE SPECIFIC

GENERAL NOTES:

VERIFY CONDITIONS:

• CONTRACTOR TO VERIFY ALL CONDITIONS ON SITE TO DETERMINE COMPLETE SCOPE OF WORK (COORD. W/ EX. SITE SURVEY & ALL OTHER DWG.'S)

• CONTRACTOR TO VERIFY EXISTENCE & OBTAIN LOCATES FOR ALL EX. UNDERGROUND & O/H SERVICES ON BOTH EXT. & INT. OF PROPERTY / BOUNDARY / SCOPE OF WORK LINES PRIOR TO COMMENCEMENT OF WORK / ANY DIGGING / EXCAVATION (COORD. W/ SITE SERVICE & EX. SITE SURVEY DWG.'S)

ACCESS / CONST. FENCE / SECURE SITE:

• CONTRACTOR TO SECURE THE WORK SITE DURING DEMO & CONST. & HOARD OFF THE WORK AREA TO PREVENT ACCESS FOR ANYONE NOT ENGAGED IN THE WORK OF THIS DEMOLITION / CONST. SCOPE • PROVIDE CONST. GATES / FENCES / BOUNDARIES AS SHOWN / REQ.'D TO THE <u>AUTHORITY HAVING JURISDICTION</u> REQ.'S.

(SUBMIT SHOP DWG.'S FOR LOCATIONS & EXTENTS).

A 1.8m HIGH CHAIN LINK FENCE (ALTERNATE MODU-LOC OR SIMILAR CONSTRUCTION FENCING) C/W SUPPORTS AS REQ.'D, @ WORK BOUNDARIES TO BE ERECTED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF THE DEMOLITION PROCESS & SHALL REMAIN & BE MAINTAINED IN POSITION INDEFINITELY UNTIL COMPLETION OF NEW CONST. WORK

• MAINTAIN SAFE EMPLOYEE / SAFE PUBLIC ACCESS TO THE BLDG. DURING OPERATING HOURS & MAINTAIN FULL EMERGENCY ACCESS & EXITING @ ALL TIMES TO & FROM THE BLDG. THROUGH OUT CONST. & DEMO. PROVIDE PROTECTION TO ALL PERSONEL FROM FALLING DEBRIS & CONST. TRAFFIC; POST SIGNAGE & CONSTRUCT HOARDING / PROTECTED PEDESTRIAN WALKWAYS AS REQ.'D.

SILTATION / MUD MATT:

• SILTATION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO WORKS COMMENCING ON THE SITE FOR DEMOLITION / CONST. SCOPE AND SHALL BE MAINTAINED IN POSITION UNTIL COMPLETION OF DEMO WORK / UNTIL COMPLETION OF NEW CONST. WORK, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION BY THE DEMO CONTRACTOR

(COORD. W/ OPSD 219.11, 219.130)
• PROVIDE SILTATION GEOTECH FABRIC CONTROL ON EX. CATCH

BASINS, MAN HOLES, ETC. ON ADJ. COUNTY ROADWAYS TYP.

• PROVIDE MUD-MATT ENT. TO CITY/TOWN HAVING JURISDICTION REQ.'S
(COORD. W/ 9/A102)

PROTECTION:

DO NOT DISTURB ANY ITEMS BEYOND THIS BOUNDARY OR ONTO MUNICIPAL PROPERTY OR THAT ARE NOT INDICATED (REPAIR & MAKE GOOD WHERE REQ.'D, PROVIDE CLEAN TRANSITIONS TYP.)

PROTECT ALL SIGNIFICANT AREAS / ELEMENTS DURING DEMOLITION
TYP

• CONTRACTOR TO PROTECT ALL EXPOSED PORTIONS OF THE EX. BLDG. TO REMAIN. MAKE GOOD ALL DISTURBED SURFACES & ADJACENT SYSTEMS / REPLACE & REPAIR ANY DAMAGE CAUSED BY INSUFFICIENT PROTECTION OF SURFACES / MATERIALS THAT ARE TO REMAIN, PROVIDE CLEAN TRANSITIONS TYP.

REMOVAL / DISPOSAL:

 CONTRACTOR TO INCLUDE REMOVAL AND TERMINATION OF ANY EX.
 SERVICES CONNECTED TO THE EXISTING BUILDING / LOCATED IN SCOPE OF WORK TO BE DEMOLISHED / OR RELOCATED INCLUDING ANY NECESSARY PERMITS OR UTILITY FEES.

• CONTRACTOR IS RESPONSIBLE FOR REMOVAL & DISPOSAL OF ALL MATERIALS THAT ARE DEMOLISHED & THAT ARE NOT INDICATED FOR RE-USE / RECLAIMING / SALVAGING OR AS OTHERWISE INDICATED BY THE OWNER. ALL COSTS ARE PART OF BASE BID SUBMISSION IN ACCORDANCE W/ BEST CONSTRUCTION PRACTICE, OBC, MUNICIPAL & PROVINCIAL LEGISLATURE REGARDING DEMOLITION & DISPOSAL METHODS (RECYCLE ALL MATERIALS WHERE ABLE).

• NO RUBBLE OF ANY NATURE TO BE LEFT IN PLACE OR BE USED AS BACKFILL. THIS INCLUDES ALL REBAR, STEEL, SCRAP METAL, MOOD & OTHER DEBOTAGE MATERIALS RESULTING FROM ABATEMENT AND DEMOLITION PROCESSES.

• ALL DISTURBED AREAS & HOLES CREATED BY EXCAVATION DURING DEMOLITION TO BE BACKFILLED TO FINISHED GRADE W/ GRANULAR 'B' & COMPACTED TO 100% STANDARD PROCTOR (@ HARD SURFACE AREAS, SOFT AREAS USE EXCAVATED / NATIVE DIRT MATERIALS). ALL BACK SLOPES TO BLEND INTO EX. TO A MAX. SLOPE OF 1:2 TO PREVENT PONDING. INSTALL 150mm MIN. TOPSOIL AT ALL VEGETATION AREAS; ANY AREAS OF BARE TOPSOIL TO BE GRADED

LEVEL & COVERED W/ SOD

MAKE GOOD:

MAKE GOOD ALL EXISTING SURFACES / SUBSTRATES / OPENINGS TO RECEIVE NEW FINISHES. INFILL AFTER DEMOLITION IS COMPLETE.

RECEIVE NEW FINISHES. INFILL AFTER DEMOLITION IS COMPLETE, ENSURE VOIDS ARE CLEAN & FREE FROM OBSTRUCTIONS SO NEW WORK IS NOT ADVERSELY AFFECTED.

SALVAGING:

ALL SALVAGED / REUSED MATERIALS ARE TO BE REMOVED W/

GREAT CARE, KEPT IN DRY PLACE, PLACED ON SKIDS, COVERED & PROTECTED FROM DAMAGE FOR FUTURE USE & IMPLEMENTATION.
TAG / NOTE WHERE MATERIALS ARE ORIG. FROM IN THE BLDG. ALL PLANTINGS TO BE PLANTED IN LARGE POTS & WATERED THROUGHOUT DURATIONS OF PROJECT. LOCATION TO BE DETERMINED ON SITE W/OWNER TYP.

DISCLAIMER:

ALL EXISTING SITE INFORMATION WAS PROVIDED BY JEWITT & DIXON LTD. ONTARIO LAND SURVEYORS IN THE FORM OF AN ELECTRONIC FILE PLAN FILE No. 21-3143-TOPO DATED 2021.10.18 CONSISTING OF THE LEGAL SURVEY PLAN & TOPOGRAPHY (COORD. W/ A106 DWG.)

SPECIFIC SITE DEMO. NOTES:

SURFACES:

REMOVE EX. TOPSOIL @ NEW LANEWAY / BLDG. / CONST. LOCATIONS WHERE APPLICABLE - STOCK PILE WHERE AVAILABLE ON SITE W/ LOCATION AS COORD.'D W/ CIVIL & DIRECTED BY OWNER - EXTENTS TO BE VERIFIED BY CONTRACTOR

GENERAL NOTE:

CUT & REMOVE EX. SURFACES & SUB-BASES AS REQ.'D TO REMOVE ANY

EX. WORK OR INSTALL ANY NEW WORK FOR ANY TRADE - COORD.

DEMO WORK FOR NEW CONST. AS REQ.'D IN THE SURFACES TO FINISH

THE WORK.

INSTALL NEW SURFACES TO MATCH EX. MATERIALS, PROVIDE CLEAN

TRANSITIONS, MAKE GOOD WHERE DAMAGED / DISTURBED TYP.

LANDSCAPE:

REMOVE ALL EX. SITE LANDSCAPE ELEMENTS INCLUDING BUT NOT LIMITED TO TREES / SHRUBS / BUSHES / ROOTS / VEGETATION / PLANTING BOXES / GARDENS / RAISED GARDEN BEDS / URNS / ROCKS / VEGETATION IN CONFLICT W/ NEW PROPOSED LAYOUTS / DEMOLITION AREA / AS NOTED
(NOTE: REMOVE ONLY THAT PORTION OF TREE ROOT SYSTEMS WHICE

(NOTE: REMOVE ONLY THAT PORTION OF TREE ROOT SYSTEMS WHICH ARE FOUND WITHIN THE PROPERTY LIMITS - DO NOT UNDERCUT PERIMETER FENCING / HOARDING)

FENCING:

REMOVE FENCING & GATES W/ ASSOCIATED FTG.'S OR PIER SYSTEMS.
SALVAGE WHAT IS GOOD; BOTH FULL HEIGHT AND HALF HEIGHT. REINSTALL AS TEMPORARY DEMOLITION PER. FENCE OR RE-INSTALL FOR
PERMANENT NEW PER. FENCE IF REQ.'D.

TERMINATIONS / ETC. & CONST. TYP.

TERMINATIONS / ETC. & CONST. TYP.

UTILITIES: COORD. W/ CIVIL FOR ANY ASSOCIATED DEMO / REMOVAL / CAPPING /

GENERAL NOTE:
COORD. W/ CIVIL FOR ANY ASSOCIATED DEMO / REMOVAL / CAPPING /

DO NOT SCALE DRAWINGS, CALL FOR ANY

CLARIFICATIONS THAT ARE REQUIRED, FIELD

VERIFY AT ALL BUILT CONDITIONS

NO. DATE

ISSUANCE

5 2024.12.05 SPA PHASE 2 SUB.#1 -

4 2024.12.05 SPA PHASE 1 SUB.#2 -

0 2024.08.27 | SPA PHASE 1 SUB.#1 -

1 2024.07.16 SPA PHASE 2 SUB.#1

2024.03.11 SPA PHASE 1 SUB.#1

5 2024.03.07 PROGRESS

4 2024.03.05 PROGRESS

PROPERTY LEGAL DESCRIPTION:

PLAN 37M-57, BLK 61 PT, ROLL #

TELEPHONE NO.: 1.705.205.3235

NO. DATE

33605062868

APPLICANT: COMPANY:

APPLICANT:

ADDRESS:

OF NORFOLK COUNTY

COMMENTS

COMMENTS

COMMENTS

8 2024.07.10 SPA PHASE 2 SUB.#1 - OWNER REVIEW

6 2024.03.08 SPA PHASE 1 SUB.#1 - REVIEW

IN THE TOWN OF WATERFORD, IN THE DISTRICT

TOM O'HARA

MATERFORD, ON.,

VERLINDA HOMES LTD.

26 MAIN STREET S. BOX 1152







G. DOUGLAS VALLEE LIMITED
2 TALBOT STREET NORTH
SIMCOE ONTARIO N3Y 3W4
(519) 426-6270



PROJECT TITLE:

ORCHARD SQUARE

OLD HWY 24 / NORFOLK COUNTY RD. 24 & LAM BLVD. WATERFORD, ONTARIO, CANADA, NOE 1Y0

DRAWING TITLE:
SITE PLAN DEMO

CHECKED BY: DRAWN BY:

MS JS

DRAWING SCALE: DRAWING NO.:

DRAWING SCALE:
As indicated
PROJECT NO.:

20-128

- D100







G. DOUGLAS VALLEE LIMITED

2 TALBOT STREET NORTH SIMCOE ONTARIO N3Y 4W3 (519) 426-6270



ORCHARD SQUARE MID-RISE

OLD HWY 24 / NORFOLK COUNTY RD. 24 & LAM BLVD. WATERFORD, ONTARIO, CANADA, N0E 1Y0

PROJECT No. 20-128

Drawing Title

PRESENTATION ELEVATIONS

Drawing No.





G. DOUGLAS VALLEE LIMITED

2 TALBOT STREET NORTH SIMCOE ONTARIO N3Y 4W3 (519) 426-6270



ORCHARD SQUARE MID-RISE

OLD HWY 24 / NORFOLK COUNTY RD. 24 & LAM BLVD. WATERFORD, ONTARIO, CANADA, N0E 1Y0

PROJECT No. 20-128

Drawing Title

PRESENTATION ELEVATIONS





2 SOUTH PRESENTATION P303 SCALE 1: 100



G. DOUGLAS VALLEE LIMITED

2 TALBOT STREET NORTH SIMCOE ONTARIO N3Y 4W3 (519) 426-6270



Project Title

ORCHARD SQUARE MID-RISE

OLD HWY 24 / NORFOLK COUNTY RD. 24 & LAM BLVD. WATERFORD, ONTARIO, CANADA, NOE 1Y0 PROJECT No. **20-128**

Drawing Title

PRESENTATION ELEVATIONS

Drawing No.



November 22, 2024

Verlinda Homes 26 Main Street South PO Box 1152 Waterford, ON N0E 1Y0

Attention: Mr. Tom O'Hara

Reference: Functional Servicing Report

Orchard Square Development Waterford, Norfolk County

Our Project # 20-128

Introduction

This functional servicing report has been prepared on behalf of Verlinda Homes, in support of the site plan application for the proposed Orchard Square Development located at municipal address 750 Old Highway 24, on the southeast corner of Old Hwy 24 and Lam Boulevard in Waterford - Norfolk County. The proposed development site has been severed into two properties, and will be constructed in two phases, with Phase 1 including a four-unit commercial building, and a fast-food restaurant and Phase 2 includes a 5-storey, 44-unit residential mid-rise building. This report presents the functional servicing for the proposed development, including sanitary, storm and domestic and fire water servicing.

The 1.31 ha development site is vacant land which features open grassed area and an irrigation pond. The sites are bound by Lam Boulevard to the north, old Highway 24 to the west, an existing subdivision and stormwater management pond to the east and agricultural land to the south. Refer to Figure 1 below.

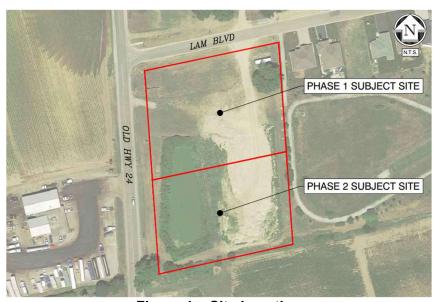


Figure 1 – Site Location

Land Use and Design Assumptions

The development site currently features an open landscaped area and a pond and is zoned as Hamlet Residential Type 5 – R5(H) and Hamlet Service Commercial – CS(H). The proposed development will consist of the following construction:

Phase 1:

- 1 4-unit commercial building
- 1 fast food restaurant
- Parking lot
- Storm, sanitary and watermain infrastructure to support the proposed construction, including a stormwater management facility
- Curbs, sidewalks and other miscellaneous items to support the proposed construction

Phase 2:

- 1 5-storey residential mid-rise building with 44 dwelling units
- Parking lot
- Storm, sanitary and watermain infrastructure to support the proposed construction
- Curbs, sidewalks and other miscellaneous items to support the proposed construction

The following table outlines the mix of land use and calculates the anticipated population based on a residential dwelling density of 2.75 people per unit (ppu) and a commercial density of 90 people per hectare as utilized in the 2019 Norfolk County Design Criteria.

	Suk	oject Lands	Table 1 – Estimate of	Population	
Phase Land Use		Area	Number of Units	Density	Population
Phase 1	Commercial Area	0.71 ha	-	0.71 ha @ 90 pph	64 people
Phase 2	44 Apartment Units	0.60 ha	44	44 units @ 2.75 ppu	121 people
	185 people				

Sanitary Servicing

Norfolk County record drawings from Vallee Project No. 10-034 – Yin Subdivision Phase 5 indicate a 200mm diameter PVC sanitary sewer along Lam Boulevard, and a 200mm diameter AC sanitary sewer along Old Highway 24. As part of this project, a sanitary manhole was installed at the northeast corner of the subject site for future development. Sanitary flows from Phase 1 of the proposed development will be conveyed to this existing sanitary manhole and ultimately the Lam Boulevard sanitary sewer; and sanitary flows from Phase 2 of the proposed development will be conveyed to the existing sanitary sewer along Old Highway 24 via 2 via two separate internal sanitary sewer networks. Refer to drawing 20-128 C100 – Servicing Plan.





Sanitary design flows for the proposed development were calculated using the 2019 Norfolk County Design Criteria. Table 2 presents the flow information associated with each of the proposed development zones. In summary, the proposed development is anticipated to generate an additional sanitary flow of approximately 1.33 L/s to the existing sanitary sewer on Lam Boulevard after the construction of Phase 1, and an additional sanitary flow of approximately 2.83 L/s to the existing sanitary sewer on Old Highway 24 after the construction of Phase 2. Ultimately, an additional sanitary flow of approximately 4.15 L/s is anticipated at the intersection of Lam Boulevard and Old Highway 24. Refer to detailed calculations in Appendix A.

Table 2 Sanitary Design Flows									
	Phase 1 Commercial	Phase 2 Residential							
Development Area (ha)	0.71 ha	0.60 ha							
Population	64	121							
Per Capita Flow	40000 L/ha/day	450 L/person/day							
Peak Extraneous Flow	0.28 L/sec/ha								
Infiltration Flow	0.20 L/s	0.17 L/s							
Sewage Flow	0.33 L/s	0.63 L/s							
Peaking Factor	3.43	4.22							
Peak Design Flow	1.33 L/s	2.83 L/s							
Total Peak Design Flow	4.15 L/s								

As part of the Yin Subdivision Phase 5 Project (Vallee Project No. 10-034), a sanitary drainage area plan and design sheet were created for the sanitary sewer system which discharges to the sanitary main along Lam Boulevard and Old Hwy 24, as shown in Appendix A. The subject site was included in the drainage area plan, and a total estimated sanitary flow of 3.16 L/s was calculated. As calculated above, the total sanitary flow of 4.15 L/s from the proposed development is only a minor increase from the estimated flow from the Yin Subdivision Phase 5 Project. Therefore, the existing sanitary sewers along Lam Boulevard and Old Highway 24 are anticipated to have adequate capacity to support the proposed development.

Sanitary Network Review

R. V. Anderson Associates (RVA) Limited was retained by Norfolk County to determine the impact of the proposed Orchard Square development on the conveyance capacity of the existing sanitary sewer sewers and pumping stations along the route to the Waterford Wastewater Treatment Plant (WWTP).

In July 2023, a request was made to Norfolk County to have the previous development layout and anticipated sanitary flow reviewed by the County's external sanitary modelling consultant. At this time, no sanitary modelling report has been received. In the Comments received from County staff on the first submission of this report, it was indicated that "The R. V. Anderson Associates (RVA) report noted that there are existing downstream capacity issues – however the unit sewage rate (450 Lpcd) and the modelling software (InfoSewer) may generate overly conservative results. The proposed development is only contributing marginally to the overall downstream sewer capacity – increased risk to surcharging of the existing downstream sewer system from the proposed development is minimal.". On the strength of this comment, we anticipate that the County has no sanitary capacity concerns with this development proceeding.





In November 2024, updated sanitary modelling by RVA was provided and the following conclusions resulted:

- The existing sanitary collection system (with all committed/pending developments) will exceed
 capacity in two sections of sewer, which includes the 250mm sewer upstream of the Blueline Road
 sanitary pumping station, and the 450mm sewer along Deer Park Road (which is already at capacity
 without the proposed development).
- The peak inflow to the Blueline Road sanitary pumping station (with all committed/pending developments) is greater than the firm capacity of 34 L/s.

Refer to Appendix C for complete details of the sanitary servicing review completed by R.V. Anderson Associates. Norfolk County has confirmed that they are currently updating their design standards regarding unit sewage rates, therefore, any required infrastructure upgrades will only be considered after the design standards have been confirmed, and RVA has updated their modelling accordingly. However, from discussions with County staff, we understand that the County is not anticipating any sanitary capacity concerns that would prevent this development from proceeding.

Water Servicing

As-constructed drawings and the Norfolk County ISMP indicate an existing 200mm diameter watermain along Lam Boulevard and at the intersection of Lam Boulevard and Old Highway 24. As part of the Yin Subdivision Phase 5 Project (Vallee Project No. 10-034), a 150mm diameter water service was installed at the northeast corner of the subject site, which will be used to service Phase 1 of the proposed development. As there is currently no watermain along the western frontage of Phase 2, a 150mm diameter watermain extension from the intersection of Lam Boulevard and Old Highway 24 will be installed the watermain along Old Highway 24 to service Phase 2. Refer to drawing 20-128 C100 – Servicing Plan.

Norfolk County's design criteria stipulate the following requirements for system pressures, and the system shall be designed to meet the greater of either of the following requirements;

- Fire flow conditions

 not less than 140 kPa
- Normal operating conditions not less than 280 kPa

Domestic Water Demand

Table 3 presents the domestic water flow information for the proposed development:

Table 3 Domestic Water Demands											
	Phase 1 Commercial	Phase 2 Residential									
Population	64	121									
Average Daily Demand	450 L/person/day										
Maximum Day Demand Factor	2.	2.25									
Maximum Day Demand	0.75 L/s	1.42 L/s									
Peak Hourly Demand Factor	2	4									
Peak Hourly Demand	0.67 L/s	2.52 L/s									





In summary, the proposed development is anticipated to have a total maximum daily demand of 2.08 L/s and a maximum hourly demand of 3.19 L/s. Refer to Appendix B for detailed calculations.

According to the County GIS online mapping, there are two existing fire hydrants located in proximity to the proposed development. One is on the west side of Old Hwy 24, at the intersection of Old Hwy 24 and Lam Boulevard, and the second is located on the north side of Lam Boulevard, at the northeast corner of the subject property. It is proposed that one new hydrant will be installed at the northeast corner of the site during Phase 1, and one will be installed at the center of the development during Phase 2.

Required Fire Flow per Fire Underwriters Survey

Typically, available fire flow during the maximum day demand is the critical criterion when evaluating a watermain distribution system's ability to service a residential subdivision. The estimated fire flow requirement for the development has been determined using the Fire Underwriters Survey – 2020 (FUS). Using the FUS recommendations, the minimum required fire flow was determined to be 67 L/s for Phase 1 and 100 L/s for Phase 2. The proposed commercial building in Phase 1 will feature an automatic sprinkler system and will be non-combustible construction. The proposed fast-food restaurant in Phase 1 will have no sprinkler system and will be ordinary construction. It is assumed that the mid-rise residential building in Phase 2 will feature fully automatic sprinkler systems and will be non-combustible construction. Supporting calculations are detailed in Appendix B.

Water Network Review

R. V. Anderson Associates Limited (RVA) was retained by Norfolk County to determine the impact of the proposed Orchard Square on the existing distribution system and evaluate the proposed watermains ability to deliver sufficient water flow per the 2019 Norfolk County Design Criteria.

In November 2024, updated water modelling by RVA was provided and the following conclusions resulted:

- The pressures during the PHD were found to be between 55 to 56 psi, greater than the required pressure of 40 psi.
- The available fire flow during the MDD was found to be 91 to 92 L/s.

It is noted that Norfolk County is currently revising their fire flow criteria and has indicated that the required fire flow for a multi-unit residential building will be 90 L/s. Therefore, it can be concluded that the proposed servicing approach provides sufficient fire flow to service both Phase 1 and Phase 2 of development. Refer to Appendix C for complete details of the hydraulic modelling completed by R.V. Anderson Associates.

Stormwater Management

Under pre-development conditions, the subject property is vacant land that features an open grassed area and an irrigation pond. Stormwater runoff from the subject property drains uncontrolled, overland in a southwesterly direction towards Old Highway 24. As part of the Yin's Subdivision - Phase 5 Project (Vallee Project No. 10-034), a peak flow allowance of 0.015 m³/s was allocated for the subject site as part of the storm sewer design along Old Highway 24.





Page 6

The overall stormwater management (SWM) strategy is to utilize site grading and an internal storm sewer system to convey flows from the 2-year through the 100-year storm events from Phase 1 and Phase 2 to a shared underground stormwater management chamber facility located in Phase 1 of the development. Ultimately, runoff from the SWM facility will be released to the existing storm sewer on Old Highway 24. Given the subject site has been severed into two properties, storm easements will be made across the two properties to allow both properties to share the proposed stormwater detention system. The proposed SWM system will have two primary functions:

- 1. Reduce and/or control all post-development peak flow rates from the site to levels that do not exceed the 0.015 m³/s flow allowance, for all storm events up to and including the 100-year storm event.
- 2. Treat stormwater to a Normal Protection Level as defined in the Ministry of the Environment's Stormwater Management Practices Planning and Design Manual (March 2003).

Complete details of the SWM design are provided in the Orchard Square Development Stormwater Management Report dated November 22, 2024.

Conclusions and Recommendations

The functional servicing design for the proposed development can be summarized as follows:

- A peak sanitary design flow of approximately 4.15 L/s is anticipated from Phase 1 and Phase 2 of the proposed development.
- Sanitary capacity in the existing infrastructure will be re-evaluated once the updated design standards by Norfolk County have been confirmed.
- From discussions with County staff, we understand that the County is not anticipating any sanitary capacity concerns that would prevent this development from proceeding,
- The domestic maximum day demand and peak hourly demand for Phase 1 and 2 of the proposed development were found to be 2.08 L/s and 3.19 L/s, respectively.
- Using the FUS criteria, the required fire flow demand for Phase 1 and Phase 2 of the proposed development were found to be 67 L/s and 100 L/s, respectively.
- Norfolk County has indicated that the required fire flow for a multi-unit residential building will be 90 L/s.
- RVA watermain modelling found that the pressures during the PHD were found to be between 55 to 56 psi, greater than the required pressure of 40 psi and the available fire flow during the MDD was found to be 91 to 92 L/s.
- The proposed water servicing approach provides sufficient fire flow to service Phase 1 and Phase 2 of development.
- Overland flow and internal storm sewers will convey stormwater to the proposed underground SWM facility, which will ultimately be released to the existing storm sewer on Old Highway 24.
- Under all storm events, peak flows associated with the post-development site are controlled to less than or equal to the allowable flow rate of 0.015 m³/s under all storm events.
- Stormwater will be treated to a normal level of water quality protection.





It is recommended that this report be provided to Norfolk County in support of the site plan application proposed development.

We trust that this information is complete and sufficient for submission. Should you have any questions or require further information please do not hesitate to contact us.



Natalie Ongena, P.Eng.

G. DOUGLAS VALLEE LIMITED

Consulting Engineers, Architects and Planners

Appendix A

- DWG 10-034 SA1 Sanitary Sewer Drainage Areas
- 10-034 Sanitary Design Sheet
- 20-128 Sanitary Flow Calculations

Appendix B

- 20-128 Domestic Water Demand Calculations
- 20-128 FUS Fire Flow Calculations
- 20-128 Fire Flow Calculation Distances

Appendix C

- Sanitary Sewer Hydraulic Capacity Assessment Report (R.V. Anderson Associates Limited, July 5, 2024)
- Water Modelling Report (R.V. Anderson Associates Limited, July 5, 2024)



APPENDIX A

DWG 10-034 SA1 – Sanitary Sewer Drainage Areas 10-034 Sanitary Design Sheet 20-128 Sanitary Flow Calculations



SANITARY SEWER DESIGN SHEET

Pipe Material PVC Project: Yin's Subdivision Phase 6

 Date
 1-Feb-15

 Designed by
 TGS

 Checked by
 JDV

Job No. <u>14123</u>

Sheet of: 1 of 1

Location				Area						Flow			Sewer Design							
Area	Street	From	То	Section	Cumul.	Section	Cumul	Total	M=Peak	Q(i)	Q(s)	Q(d)	Material	Size	Length	N	Slope	Cap	Full V	
		MH	MH	Ha	На	Units	Units	Pop.	Factor	L/s	L/s	L/s		mm	m		%	L/s	m/s	
10-18	Lam Blvd	10	18	0.3	0.30	2	2	6	4.4363	0.084	0.1271	0.211	PVC	200	42	0.013	0.70%	27.4	0.87	
19-18	Tan Ave	19	18	0.25	0.55	2	4	11	4.4106	0.154	0.2527	0.407	PVC	200	40	0.013	1.00%	32.8	1.04	
18-17	Tan Ave	18	17	0.93	1.48	10	14	39	4.3363	0.4144	0.8695	1.284	PVC	200	105.3	0.013	0.50%	23.2	0.74	
17-16	Tan Ave	17	16	1.06	2.54	10	24	66	4.2888	0.7112	1.4743	2.185	PVC	200	105.3	0.013	0.80%	29.3	0.93	
16-15	Tan Ave	16	15	0.62	3.16	6	30	83	4.2655	0.8848	1.8328	2.718	PVC	200	61.8	0.013	2.10%	47.5	1.51	
15-14	Tan Ave	15	14	0.51	3.67	5	35	96	4.2481	1.0276	2.1296	3.157	PVC	200	62.2	0.013	1.00%	32.8	1.04	
14A-14	Block 1 - TWNHSE	14A	14	0.67	0.67	12	12	33	4.348	0.1876	0.7473	0.935	PVC	200	10	0.013	0.50%	23.2	0.74	
14-4	Yu Blvd	14	4	0.17	4.51	0	47	129	4.2114	1.2628	2.835	4.098	PVC	200	94	0.013	1.00%	32.8	1.04	
													->/-							
10-9	Lam Blvd	10	9	0.34	0.34	2	2	6	4.4363			0.222	PVC	200	46.8	0.013	2.00%	46.4	1.48	
9-8	Lam Blvd	9	8	0.35	0.69	2	4	11	4.4106		0.2527	0.446	PVC	200	11.3	0.013	1.70%	42.8	1.36	
8-7	Lam Blvd	8	7	0.92	1.61	8	12	33	4.348	0.4508	0.7473	1.198	PVC	200	98.5	0.013	1.40%	38.8	1.24	
40.7	T : 01 DI	40		4.00	4.00	40	40	00	4.0007	0.00	0.0040	0.005	D) (O	000	70	0.040	0.500/	00.0	0.74	
13-7	Tai Shan Place	13	7	1.00	1.00	10	10	28	4.3607	0.28	0.6246	0.905	PVC	200	70	0.013	0.50%	23.2	0.74	
7.0	Laws Divel	7	_	0.05	2.20	7		00	4.0000	0.0400	4 7700	2.000	D)/C	200	04.5	0.042	0.500/	22.2	0.74	
7-6 6-5	Lam Blvd	7 6	6 5	0.65 0.34	3.26 3.60	3	29 32	80 88	4.2692	0.9128 1.008	1.7733	2.686 2.96	PVC PVC	200	84.5 50.5	0.013	0.50%	23.2	0.74 0.74	
0-0	Lam Blvd	О	5	0.34	3.00	3	32	88	4.2584	1.008	1.9517	2.96	PVC	200	50.5	0.013	0.50%	23.2	0.74	
12-11	Jong St	12	11	0.48	0.48	5	5	14	4.4003	0.1344	0.3151	0.45	PVC	200	67.5	0.013	0.70%	27.4	0.87	
11-5	Jong St	11	5	0.48	0.48	4	9	25	4.3676		0.563	0.43	PVC	200	67.3	0.013	0.70%	23.2	0.87	
11-5	Jong St		<u> </u>	0.55	0.01	-	3	25	4.5070	0.2430	0.303	0.007	1 00	200	07.3	0.013	0.5070	20.2	0.74	
5-4	Lam Blvd	5	4	0.37	4.84	4	45	124	4.2171	1.3552	2.718	4.073	PVC	200	54.9	0.013	0.50%	23.2	0.74	
4-3	Lam Blvd	4	3	0.28	9.63	3	95	261	4.1034	2.6964	5.5835	8.28	PVC	200	48	0.013	0.50%	23.2	0.74	
70	Edili Biva	-		0.20	0.00	0	- 00	201	4.1004	2.000+	0.0000	0.20	1 00	200	70	0.010	0.0070	20.2	0.74	
3A-3	Block 2 Aptmnts.	3A	3	0.73	0.73	60	60	165	4.1773	0.2044	3.5899	3.794	PVC	200	10	0.013	0.50%	23.2	0.74	
0,10	Blook 27 (parinto.	O/ t		0.70	0.70	- 00	- 00	100	1.1770	0.2011	0.0000	0.701	1 10	200		0.010	0.0070	20.2	0.7 1	
3-2	Lam Blvd	3	2	0.22	10.58	2	157	432	4.0062	2.9624	9.0087	11.97	PVC	200	60	0.013	0.50%	23.2	0.74	
					77700															
2A-2	Block 3 Commercial	2A	2	0.75	0.75	25	25	67	4.2867	0.21	1.5043	1.714	PVC	200	10	0.013	0.50%	23.2	0.74	
2B-2	Block 2 Aptmnts.	2B	2	1.4	1.40	46	46	126	4.2148	0.392	2.7648	3.157	PVC	200	10	0.013	0.50%	23.2	0.74	
2-1	Lam Blvd	2	1	0.09	12.07	0	227	625	3.9224	3.3796	12.77	16.15	PVC	200	99.8	0.013	0.50%	23.2	0.74	

Design Information:

Q(s) = Sewage Flow = P q M / 86.4

Q(i) = Infiltration Flow = IA

Q(d) = Peak Design Flow = Q(s) + Q(i)

P = Population in thousands

 $M = Peaking Factor = 1 + 14 / (4 + P^{.5})$

A = Tributary Area

 q = Per Capita Flow=
 450
 L/cap d

 I = Peak Extraneous Flow =
 0.28
 L/s/ha

 Population Density
 2.75
 persons /unit

Existing Sewer



Subject: Orchard Square Phase

Date: 2/28/2024
Project #: 20-128

Description: Phase 1 - Commercial

By: NLO Page: 1

Norfolk County Design Criteria Section 9.2 - Sanitary Sewage Flow

9.2.01 Tributary Population

Commercial:

Commercial Development: 90 persons/ha

Site Area: 0.71 ha

Number of Persons: 64 persons

9.2.02 Sewage Flow

Per Capita Flow: 40 m³/hectare/day

Average Sewage Flow: 0.329 L/s

9.2.03 Peak Sanitary Flow Factor

Commerical Peaking Factor Formula:

 $M = 0.8(1+(14/(4+(Pe^0.5))))$

P = 0.0639 M = 3.434

9.2.04 Infiltration Allowance

Infiltration Allowance: 0.28 L/s/ha Infiltration Allowance: 0.199 L/s

9.2.05 Design Flow

Design Flow:

Design Flow = (Average Sewage Flow * Peak Sanitary Flow Factor) + Infil. Allowance

Design Flow = 1.33 L/s



Subject: **Orchard Square**

Date: 2/28/2024

20-128 Phase 2 - Residential Description:

NLO By: 2 Page:

Norfolk County Design Criteria Section 9.2 - Sanitary Sewage Flow

Project #:

9.2.01 Tributary Population

Residential:

Residential Development: 2.75 persons/unit

Units: 44 Units 121 persons Number of Persons: Site Area: 0.60 ha

9.2.02 Sewage Flow

Per Capita Flow: 0.45 m³/person/day

0.630 L/s Average Sewage Flow:

9.2.03 Peak Sanitary Flow Factor

Residential Peaking Factor Formula:

 $M = 1+(14/(4+(Pe^0.5)))$

P = 0.121 M =4.220

9.2.04 Infiltration Allowance

Infiltration Allowance: 0.28 L/s/ha Infiltration Allowance: 0.168 L/s

9.2.05 Design Flow

Design Flow:

Design Flow = (Average Sewage Flow * Peak Sanitary Flow Factor) + Infil. Allowance

Design Flow = 2.83 L/s



Subject: Date:

Project #:

Orchard Square

2/28/2024 20-128

By: NLO

Page: 3

Summary of Design Flows

Phase 1: 1.33 L/s

2.83 L/s Phase 2:

> 4.15 L/s **Total Design Flow:**

APPENDIX B

20-128 Domestic Water Demand Calculations20-128 FUS Fire Flow Calculations20-128 Fire Flow Calculation Distances



Subject: **Orchard Square**

Date: 2/28/2024

20-128 Project #:

Phase 1

By: NLO 1 Page:

Maximum Daily Demand

0.71 ha Area

Description:

Zoning of Land Commercial **Equiv. Population Density** 90 ppl/ha

Equiv. Population 64

Av. Daily Demand Per Capita 0.45 m³/capita/day

Maximum Daily Demand Peaking Factor 2.25

64.80 m³/day Maximum Daily Demand

0.75 l/s

Maximum Hourly Demand

0.71 ha Area

Zoning of Land Commercial

Equiv. Population Density 90 ppl/ha

Equiv. Population 64

Av. Daily Demand Per Capita

0.45 m³/capita/day Maximum Hourly Demand Peaking Factor

2.40 m³/hour **Maximum Hourly Demand** 0.67 l/s



Subject: Orchard Square

Date: 2/28/2024

Project #: 20-128

Description: Phase 2

By:

Page:

NLO

2

Maximum Daily Demand

Total Number of Units 44 units

Zoning of Land Residential

Equiv. Population Density 2.75 ppl/unit

Equiv. Population 121

Av. Daily Demand Per Capita 0.45 m³/capita/day

Maximum Daily Demand Peaking Factor 2.25

Maximum Daily Demand 122.51 m³/day

1.42 l/s

Maximum Hourly Demand

Total Number of Units 44 units

Zoning of Land Residential

Equiv. Population Density 2.75 ppl/ha

Equiv. Population 121

Av. Daily Demand Per Capita 0.45 m³/capita/day

Maximum Hourly Demand Peaking Factor 4

Maximum Hourly Demand 9.08 m³/hour 2.52 l/s



Subject: Orchard Square

Date: Feb-24

By: NLO
Page: 3

Project #:

20-128 Page: _

Summary of Maximum Daily Demand

Phase 1: 0.67 L/s

Phase 2: 1.42 L/s

Total Maximum Daily Demand: 2.08 L/s

Summary of Maximum Hourly Demand

Phase 1: 0.67 L/s

Phase 2: 2.52 L/s

Total Maximum Hourly Demand: 3.19 L/s



Subject:
Date:
Project #:

Orchard Sqaure 7/25/2024

7/25/2024 20-128 By: NLO Page: 1

PHASE 1 COMMERCIAL BUILDING

1) <u>Fire Flow Requirement</u>

 $F_1 = 220C(A^{1/2})$ (L/min)

C= 0.8 Construction coefficient for non-combustible construction

A= $849 \text{ Floor Area m}^2 = \text{Main Floor Area}$

F₁= 5128 L/min

 F_1 = 5000 L/min (Round to the nearest 1,000 l/min)

2) Occupancy

Occupancy Type: Mercentile Occupancy - Limited Combustible Contents

Reduction: 15% Surcharge: 0%

 $F_2=F_1+(F_1*Reduction/Surcharge)$ (L/min)

F₂= 4250 L/min

3) Sprinkler System

Sprinkler System:

Applicable

- Assumes the building is protected by a complete automatic sprinkler system, $% \left(1\right) =\left(1\right) \left(1\right) \left($

conforming to NFPA 13 and other standards

- Assumes water supply is standard for both the system and fire department hose lines

Reduction: 40%

 $F_3 = F_2 * Reduction$ (L/min)

F₃= 1700 L/min

4) <u>Seperation</u>

<u>Direction</u>	Distance (m) Surc	charge_	Separation Surcharges	
North	> 30m	0%	0 to 3m	25%
East	16.6	15%	3.1m to 10m	20%
West	> 30m	0%	10.1m to 20m	15%
South	16.5	15%	20.1 to 30m	10%
	Total:	30%	Greater than 30m	0%

F4=(TOTAL)*F2 (L/min)
F₄= 1275 L/min

Total Fire Flow

 $F=F_2-F_3+F_4$ = 3825 L/min = 4000 L/min (Round to the nearest 1,000 l/min) = 66.7 L/s

Notes: 1) All calculations and factors from Part 2 "Water Supply for Public Fire Protection" by the Fire

Underwriters Survey, 2020



Subject:
Date:
Project #:

Orchard Sqaure

7/25/2024 20-128 By: NLO Page: 2

PHASE 1 FAST FOOD RESTAURANT

1) <u>Fire Flow Requirement</u>

 $F_1 = 220C(A^{1/2})$ (L/min)

C= 1.0 Construction coefficient for ordinary construction

(Steel frame exterior with wood infills and metal interior)

A= 410 Floor Area m² = Main Floor Area

F₁= 4455 L/min

 F_1 = 4000 L/min (Round to the nearest 1,000 l/min)

2) <u>Occupancy</u>

Occupancy Type: Mercentile Occupancy - Limited to Combustable Contents

Reduction: 0% Surcharge: 0%

 $F_2=F_1+(F_1*Reduction/Surcharge)$ (L/min)

F₂= 4000 L/min

Sprinkler System

Sprinkler System: No sprinkler system provided.

Reduction: 0%

 $F_3 = F_2 * Reduction$ (L/min)

 $F_3 = 0 L/min$

4) <u>Seperation</u>

Direction Distance (m) Separation Surcharges **Surcharge** South > 30m 0% 0 to 3m 25% > 30m 3.1m to 10m 20% East 0% 10.1m to 20m West > 30m 0% 15% North > 30m 0% 20.1 to 30m 10% Greater than 30m Total: 0% 0%

F4=(TOTAL)*F2 (L/min)
F₄= **0 L/min**

Total Fire Flow

 $F=F_2-F_3+F_4 = 4000 L/min$

= 4000 L/min (Round to the nearest 1,000 l/min)
= 66.7 L/s

Notes: 1) All calculations and factors from Part 2 "Water Supply for Public Fire Protection" by the Fire

Underwriters Survey, 2020



Subject: Date: Project #: Orchard Sqaure

7/25/2024 20-128 By: NLO Page: 3

PHASE 2 - 5-STOREY MID-RISE RESIDENTIAL BUILDING

1) <u>Fire Flow Requirement</u>

 $F_1 = 220C(A^{1/2})$ (L/min)

C= 0.8 Non Combustible Construction

Af= 945 m^2 = main floor area 945 m^2 = second floor area

A= 3308 Fire Area m² = two adjoining floor areas plus 50% of all floors

immediately above them

F₁= 10122 L/min

 F_1 = 10000 L/min (Round to the nearest 1,000 l/min)

2) Occupancy

Occupancy Type: Residential Occupancy

Reduction: 15% Surcharge: 0%

 $F_2=F_1+(F_1*Reduction/Surcharge)$ (L/min)

F₂= 8500 L/min

3) Sprinkler System

Sprinkler System:

Applicable

- Assumes the building is protected by a complete automatic sprinkler system, conforming to NFPA 13 and other standards

- Assumes water supply is standard for both the system and fire department hose lines

Reduction: 40%

 $F_3=F_2*Reduction$ (L/min)

F₃= 3400 L/min

4) <u>Seperation</u>

<u>Direction</u>	<u> Distance (m)</u> <u>Surcharge</u>		Separation Surcharges	
North	16.5	15%	0 to 3m	25%
East	> 30m	0%	3.1m to 10m	20%
West	> 30m	0%	10.1m to 20m	15%
South	> 30m	0%	20.1 to 30m	10%
	Total:	15%	Greater than 30m	0%

F4=(TOTAL)*F2 (L/min)
F₄= 1275 L/min

Total Fire Flow

 $F=F_2-F_3+F_4$ = 6375 L/min = 6000 L/min (Round to the nearest 1,000 l/min) = 100.0 L/s

Notes: 1) All calculations and factors from Part 2 "Water Supply for Public Fire Protection" by the Fire

Underwriters Survey, 2020

Water Supply for Public Fire Protection - Fire Underwriters Survey 2020 Tables & Figures

Method for Determining Required Fire Flows

Fire Underwriters Survey defines Required Fire Flow as the amount and rate of water application required in firefighting to confine and control the fires possible in a building or group of buildings which comprise essentially the same fire area by virtue of immediate exposure. This may include as much as a city block.

To determine the estimated amount of water required to confine and control a fire in a building or group of buildings, Fire Underwriters Survey uses the following base formula

$$RFF = 220C\sqrt{A}$$

Where:

RFF = the Required Fire Flow in litres per minutes (LPM)

the Construction Coefficient is related to the type of construction of the building

A = the Total Effective Floor Area (effective building area) in square metres of the building

Construction Coefficient (C)

Note that the construction typology used by the insurance industry and public fire protection differs from the terms of reference in the National Building Code of Canada (NBC).

The following Construction Types and Coefficients are used in the required fire flow formula:

1.5 for Type V Wood Frame Construction

- 0.8 for Type IV-A Mass Timber Construction 0.9 for Type IV-B Mass Timber Construction
- 1.0 for Type IV-C Mass Timber Construction 1.5 for Type IV-D Mass Timber Construction
- 1.0 for Type III Ordinary Construction 0.8 for Type II Noncombustible Construction
- 0.6 for Type I Fire Resistive Construction

		72.00 cm		
Table 3 Recommended	Occupancy/Content	s Charges by Ma	ior Occupancy Example	es1

Group	Division	Description of Major Occupancies	Occupancy and Contents	Adjustmen Factor
Α	1	Assembly occupancies intended for the production and viewing of the performing arts	Combustible	096
А	2	Assembly occupancies not elsewhere classified in Group A	Limited to Combustible	-15% to 09
A	3	Assembly occupancies of the arena type	Limited to Combustible	-15% to 0%
Α	4	Assembly occupancies in which occupants are gathered in the open air	Limited to Combustible	-15% to 09
В	1	Detention occupancies	Noncombustible to Limited	-25% to
В	2	Care and treatment occupancies	Noncombustible to Limited	-25% to -15%
В	3	Care occupancies	Limited	-15%
С		Residential occupancies	Limited	-15%
D		Business and personal services occupancies		
D	-	 Police stations without detention quarters 	Non-combustible	-20%
D	<u></u>	 Banks, Barber and hairdressing shops, Beauty parlours, Dental offices, Laundries (self-service), Medical offices, Offices, Radio stations 	Limited	-15%
D	1122	 Dry cleaning establishments (self- service, not using flammable or explosive solvents or cleaners), Small tool and appliance rental and service establishments 	Combustible	0%
E	7070	Mercantile occupancies		
E		Exhibition halls	Limited	-15%
E	777	Supermarkets	Limited	-15%
E		Shops/Stores	Limited to Combustible	-15% to 09
E	***	Markets	Combustible	0
E		Department stores	Free Burning	15%
F	1	High hazard industrial occupancies	Rapid Burning	+25%
F	2	Medium hazard industrial occupancies		
F	2	 Television studios not admitting a viewing audience 	Limited	-15%
F	2	Cold storage plants	Combustible	096
F	2	Electrical substations	Combustible	0%
F	2	 Helicopter landing areas on roofs 	Limited	-15%

[†] The values presented in this table are intended as a guideline and the occupancy/contents adjustment should be based on the actual severity of conditions within the risk structure.

Exposure Adjustment Charge

A percentage of water for the exposures should be added to the required fire flow for the subject building to provide adequate flow rates for hose streams used to reduce the spreading of fire from the subject building to exposed risks (ex. structures, stored materials, forest, etc.). The required fire flow of a subject building may be increased depending on the severity of exposed risks to the subject building and the distance between the exposed risks and the subject building. This charge considers the usage of water supplies to prevent exposed risks from igniting or being damaged during a major fire incident in the subject building.

The maximum Exposure Adjustment Charge to be applied to a subject building is 75% when summing the percentages for all sides of the building. Table 5 outlines the maximum Exposure Adjustment Charge to apply for any one side of the subject building based on the following separation distances between the subject building and the exposed risk (aka. exposure):

Table 5 Exposure Charges

Separation Distance	Maximum Exposure Adjustment Charge
0 m to 3 m	25%
3.1 m to 10 m	20%
10.1 m to 20 m	15%
20.1 m to 30 m	10%
Greater than 30	0%

Occupancy and Contents Adjustment Factor

The required fire flow may be reduced by as much as -25% for occupancies having contents with a very low fire hazard or may be increased by up to 25% for occupancies having contents with a high fire hazard. The Occupancy and Contents Adjustment Factor should not be made at greater than 25% or less than

- Noncombustible Contents
 - Includes merchandise or materials, including stock, or equipment, which in permissible quantities does not in themselves constitute an active fuel for the spread of fire.
 - May include limited or controlled amounts of compustible material, not exceeding 5% of the Total Effective Area of the occupancy. Combustible components of construction (ex. interior walls, finishes, etc.) should be included in the limit on combustible materials.
- Limited Combustible Contents -15%
 - o Includes merchandise or materials, including furniture, stock, or equipment, of low combustibility, with limited concentrations of combustible materials.
 - Combustible Contents 0% no adjustment
 - o Includes merchandise or materials, including furniture, stock, or equipment, of moderate combustibility.
 - Free Burning Contents +15%
 - Includes merchandise or materials, including furniture, stock, or equipment, which burn 0 freely, constituting an active fuel.
 - Rapid Burning Contents +25%
 - Includes merchandise or materials, including furniture, stock, or equipment, which either
 - . Burn with great intensity
 - spontaneously ignite and are difficult to extinguish
 - give off flammable or explosive vapors at ordinary temperatures

 - as a result of an industrial processing, produce large quantities of dust or other finely divided debris subject to flash fire or explosion

Total Effective Area (A)

To determine a required fire flow for an individual building, the Total Effective Area that would be affected during the design fire must be determined. The Total Effective Area is the largest Floor Area (in square metres) plus the following percentages of the total area of the other floors:

- For a building classified with a Construction Coefficient from 1.0 to 1.5:
 a) 100% of all Floor Areas are considered in determining the Total Effective Area to be used in the
- 2) For a building classified with a Construction Coefficient below 1.0:
 - a) if any vertical openings in the building (ex. interconnected floor spaces, atria, elevators, escalators, etc.) are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight; or
 - b) if all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.

Automatic Sprinkler Protection

The required fire flow may be reduced by up to 50 percent for complete Automatic Sprinkler Protection depending upon adequacy of the system. Where only part of a building is protected by Automatic Sprinkler Protection, credit should be interpolated by determining the percentage of the Total Floor Area being protected by the automatic sprinkler system.

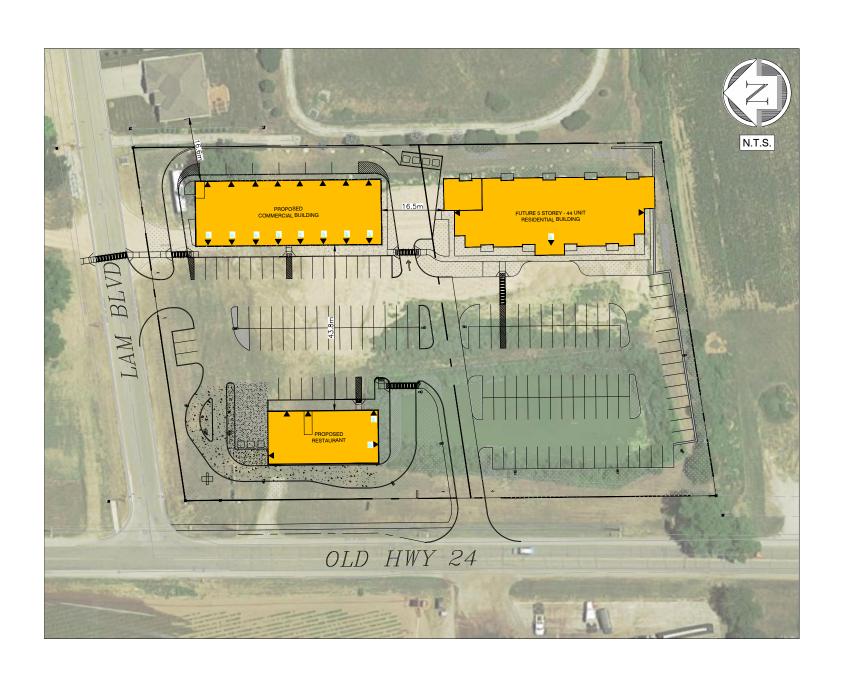
To be able to apply the full 50 percent reduction, the following areas should be reviewed to determine the appropriate level of credit for having Automatic Sprinkler Protection as per the table below

Table 4 Sprinkler Credits

Automatic Sprinkler System Design	Credit			
	With complete building coverage	With partial building coverage of X%		
Automatic sprinkler protection designed and installed in accordance with NFPA 13	30%	30% × Percentage of Total Floor Area Serviced by Sprinkler System		
Water supply is standard for both the system and Fire Department hose lines	10%	10% × Percentage of Total Floor Area Serviced by Sprinkler System		
Fully supervised system	10%	10% × Percentage of Total Floor Area Serviced by Sprinkler System		

Table 6 Exposure Adjustment Charges for Subject Building considering Construction type of Exposed Building

Distance (m) to the Exposure	Length-height factor of exposing building face	Type V	Type III-IV ²	Type III-IV ³	Type I-II ²	Type I-II
	0-20	20%	15%	5%	10%	0%
	21-40	21%	16%	6%	11%	1%
0 to 3	41-60	22%	17%	7%	12%	2%
U to 3	61-80	23%	18%	8%	13%	3%
	81-100	24%	19%	9%	14%	4%
	Over 100	25%	20%	10%	15%	5%
	0-20	15%	10%	3%	6%	0%
	21-40	16%	11%	4%	7%	0%
3.1 to 10	41-60	17%	12%	5%	8%	1%
3.1 to 10	61-80	18%	13%	6%	9%	2%
	81-100	19%	14%	7%	10%	3%
	Over 100	20%	15%	8%	11%	4%
	0-20	10%	5%	0%	3%	0%
	21-40	11%	6%	1%	4%	0%
10.1 to 20	41-60	12%	7%	2%	5%	0%
10.1 to 20	61-80	13%	8%	3%	6%	1%
	81-100	14%	9%	4%	7%	2%
	Over 100	15%	10%	5%	8%	3%
	0-20	0%	0%	0%	0%	0%
	21-40	2%	1%	0%	0%	0%
20.1 to 30	41-60	4%	2%	0%	1%	0%
20.1 to 30	61-80	6%	3%	1%	2%	0%
	81-100	8%	4%	2%	3%	0%
	Over 100	10%	5%	3%	4%	0%
Over 30 m	all sizes	0%	0%	0%	0%	0%



APPENDIX C

Sanitary Sewer Hydraulic Capacity Assessment Report (R.V. Anderson Associates Limited, July 5, 2024)

Water Modelling Report (R.V. Anderson Associates Limited, July 5, 2024)

R.V. Anderson Associates Limited 557 Southdale Road East, Suite 200 London ON N6E 1A2 Canada T 519 681 9916 F 855 833 4022 rvanderson.com



TECHNICAL MEMORANDUM

To: Stephen Gradish RVA: 215718.75

From: Mukesh Choudhary, P.Eng., PMP

Date: July 5, 2024

Subject: Waterford – Orchard Park Project – Sanitary Sewer Hydraulic Capacity

Assessment Report

1.0 Introduction

Norfolk County (County) requested that R.V. Anderson Associates Limited (RVA) conduct an analysis of the existing sanitary sewer system downstream of the proposed Orchard Square Development on the southeast corner of Old Hwy 24 and Lam Boulevard located in the Town of Waterford. The purpose of the analysis was to determine the impact of the proposed development on the downstream sanitary sewer system.

The objective of this report is to summarize the impact of the proposed development on the wastewater collection system which involves reviewing the capacity of the downstream sewers which ultimately convey wastewater flows to the Waterford Wastewater Treatment Plant (WWTP).

2.0 Background

The subject property has an approximate area of 1.31 ha and contains a four-unit commercial building, a fast-food restaurant and a 5-storey residential building. The site is bound by Old Highway 24 to the west and Lam Boulevard to the north. The wastewater generated from the proposed development is planned to be discharged to the existing sewer on Old Highway 24 and Lam Boulevard, which will be pumped via the Blueline sewage pumping station, and then flow to the Waterford WWTP.

The County provided RVA with the following reports (including drawings and appendices) to complete the analysis:



- Functional Servicing Report Orchard Square Development, March 2024, prepared by G. Douglas Vallee Limited
- Servicing Plan March 2024, prepared by G. Douglas Vallee Limited

Table 1 below presents the estimated equivalent populations, and peak wastewater discharges. Figure 1 displays the limits of the development and Figure 2 shows the sanitary flow route from the proposed development to WWTP.

Table 1 – Development Design Flows

	Apartment	Commercial
Unit/Area [a]	44 units	0.71 ha
Population Density (persons per unit/ha) ¹ [b]	2.75 per unit	90 persons/ha
Population [c]=[a]*[b]	121	64
Unit Sewage Rate ¹ [d]	450 L/cap/day	450 L/cap/day
Average Daily Flow [e]=[d]*[c]	0.63 L/s	0.33 L/s
Peaking Factor ² [f]	3.95	5
Peak base Flow [i]=[f]*[e]	3.80 L/s	
Service Area [j]	1.31 ha	
Infiltration Allowance 1 [k]	0.28 L/s/ha	
Infiltration Flow [I]=[j]*[k]	0.37 L/s	
Peak Design Flow ³ [m]=[i]+[l]	4.17 L/s	

Note:

- 1. Norfolk County Design Criteria, Figure 4-54 in Norfolk County Integrated Sustainable Master Plan (ISMP)
- 2. Residential Harmon peak factor 4.22 and commercial modified Harmon peak factor 3.43. Weighted arithmetic mean of the Harmon peak factor is 3.95. [(4.22x121+3.43x64)/(121+64)=3.95]
- 3. The displayed sum may not be exact due to rounding.

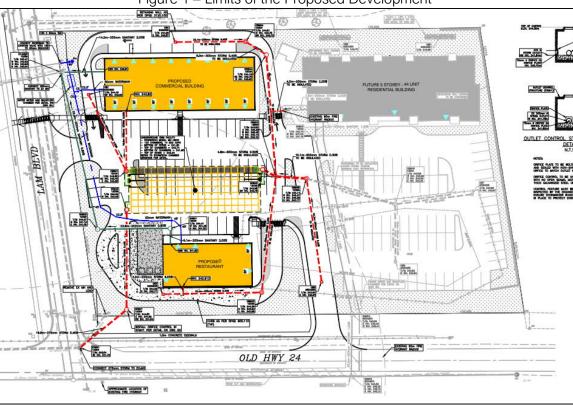


Figure 1 – Limits of the Proposed Development



Figure 2 – Sanitary Flow Route from the proposed development to WWTP

3.0 Summary of the Sanitary Sewer Hydraulic Modelling

An InfoSewer sanitary model of the Waterford wastewater treatment plant service area was calibrated in 2024 and was utilized for this study. The InfoSewer model was reviewed and updated to include estimated flows from the proposed development.

The following points summarize the modelling that was performed:

- The existing manholes, sewers and pumps extracted from the County's shape files
 were reviewed to ensure the flow path from the proposed development to the
 Waterford WWTP was represented accurately.
- Simulations were performed to assess the capacity to convey existing and proposed flows in the sewers between the location of the proposed development and the WWTP.
- Sewer conveyance capacity in the sanitary system was reviewed under peak wet
 weather flow, which includes the peak dry weather flow, and the inflow and
 infiltration during a storm event based on Norfolk County's 5-year Intensity-DurationFrequency (IDF) curve.
- The following proposed wastewater system upgrades are not yet completed; however, they were modeled as completed with the understanding these have been approved by the County and as such, included in the Master Wastewater Model:
 - Mayberry Homes;
 - 136 Mechanic Street West Subdivision;
 - Lam Blvd Stacked Townhouse Development;
 - 208 Nicole Street Development;
 - Wellington Street Reconstruction;
 - 180-218 Mechanic Street Development;
 - Charles Street Subdivision;
 - Cottonwood Condos Development;
 - Silos Waterford Development;
 - 65 Norfolk Street Development;
 - Thompson Farm Subdivision;
 - 42 Thompson Road West Development; and
 - Warehouse Old Hwy 24 Development.

It is important to note these upgrades and developments have a significant impact on the result noted in this memorandum. If any of these developments are likely not to occur, the result may vary significantly.

4.0 Result of the Hydraulic Analysis

Table 2 summarizes the conveyance capacity usage during peak wet weather flow along the flow path from the proposed development to the WWTP in the existing and proposed conditions. Enclosed Figures A1 to A3 show the conveyance capacity of the downstream gravity sewers with the proposed development.

Pipe Fraction of Conveyance Capacity Used Sewer Sections Diam. (mm) Prior to Development Post Development 0.29 0.51 Old Highway 24 200 ROW to Blueline Rd 200 0.63 0.82 Blueline Road (Influent 250 0.89 1.07 sewer to the Wet Well) St James Street S 300 0.56 0.59 ROW to Main Street 450 0.92 0.93 450 ROW to Deer Park Rd 1.17 1.18 450 Deer Park Rd 0.49 0.49

Table 2 – Conveyance Capacity Usage for the Proposed Site

5.0 Conclusion

The proposed Orchard Park development on Old Highway 24 is expected to discharge a total peak wastewater flow of 4.17 L/s.

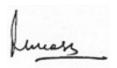
Hydraulic modelling indicates that the existing sanitary collection system with all committed/pending developments in service will exceed its conveyance capacity at two sections of the sewer with the proposed development, and therefore need to be upsized.

- Section 1: 250mm diameter sewer on Blueline Road from MH#218 to Blueline Road SPS. (approximate length of 82m).
- Section 2: 450mm diameter sewer at the ROW to Deer Park Road from MH#4 to MH#2 (approximate length of 164m). This sewer indicates capacity constrain under the pre-development conditions as well.

Furthermore, the modeling indicates that peak inflow to the Blueline Road SPS with other approved/pending developments (without the proposed Orchard Park development) will be greater than its firm capacity of 34 L/s. The additional flow from the proposed Orchard Park Development would further impact its performance. Therefore, it is recommended to evaluate the current performance of the Blueline Road SPS including the storage capacity, and determine the improvements required to handle total peak flows generated from the approved as well as proposed Orchard Park development. Should the pumping capacity of the SPS be increased, the impact of increased flow from the SPS on the downstream sewers needs to be reinvestigated to confirm their adequacy to convey flows.

Yours very truly,

R.V. ANDERSON ASSOCIATES LIMITED



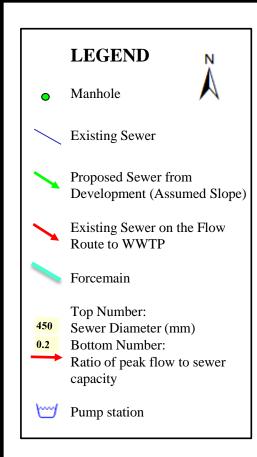
Mukesh Choudhary, P.Eng., PMP

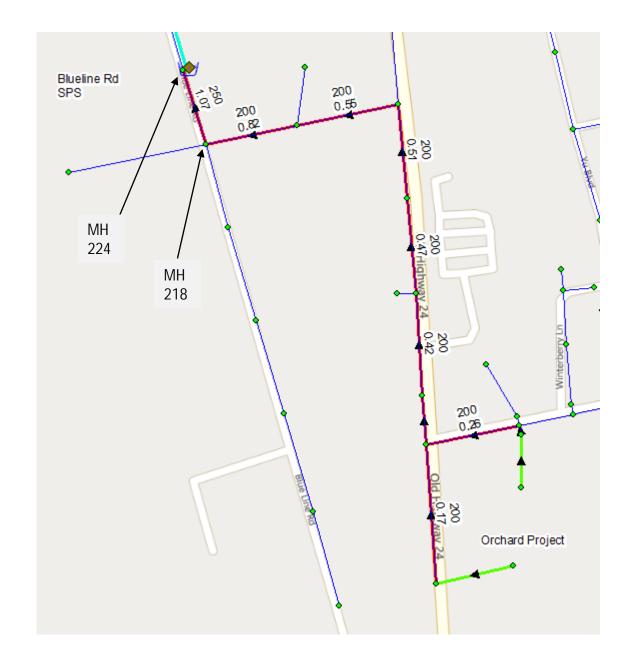
Manager, Hydraulic Modeling

Enclosures:

- 1. Figure A1 Capacity Usage Plan Proposed Development to Blueline Rd SPS
- 2. Figure A2 Capacity Usage Plan Blueline Rd SPS to Alice Street
- 3. Figure A2 Capacity Usage Plan Alice Street to WWTP

REVISIONS AND PUBLICATION REGISTER			
Revision #	Date	Details	Distribution
00	July 5, 2024	Tech Memo Issued via email	Stephen Gradish - Norfolk County

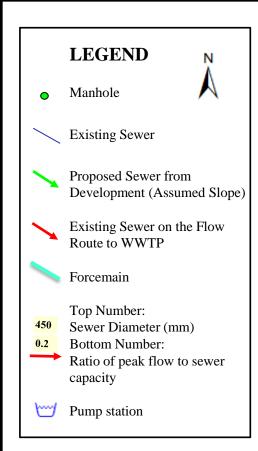


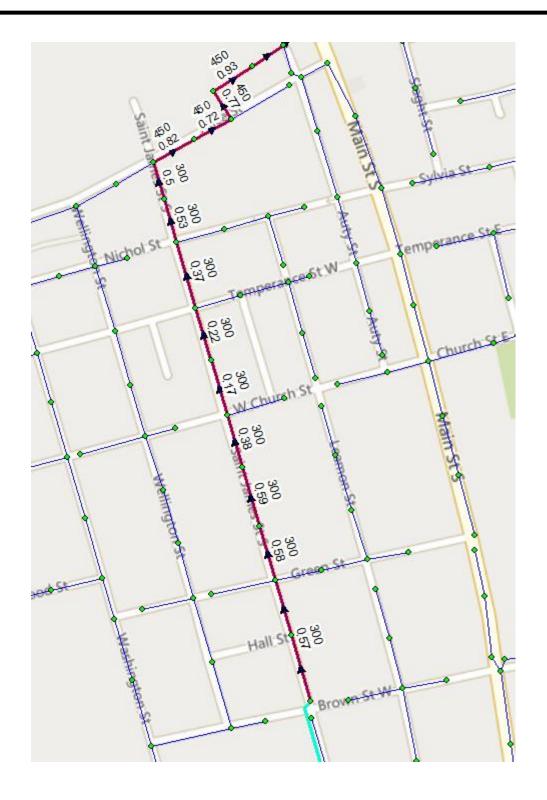


Waterford Orchard Park
Downstream Sanitary Sewer Capacity Review

Date:	Scale:
2024-06	NTS
Project No. 215718.75	Figure: A1







Waterford Orchard Park
Downstream Sanitary Sewer Capacity Review

Date: 2024-06	Scale: NTS
Project No. 215718.75	Figure: A1





Waterford Orchard Park				
Downstream Sanitary Sewer Capacity Review				

Date:	Scale:	
2024-06	NTS	
Project No. 215718.75	Figure: A1	



R.V. Anderson Associates Limited 557 Southdale Road East, Suite 200 London ON N6E 1A2 Canada T 519 681 9916 F 855 833 4022 rvanderson.com



TECHNICAL MEMORANDUM

To: Stephen Gradish RVA: 215718.75

From: Mukesh Choudhary, P.Eng., PMP

Date: July 5, 2024

Subject: Waterford - Orchard Park Project – Water Modelling Report

1.0 Introduction

R.V. Anderson Associates Limited (RVA) was retained by Norfolk County (County) to perform a water system hydraulic assessment for the proposed Orchard Square Development on the southeast corner of Old Hwy 24 and Lam Boulevard. The proposed development will be serviced by the Waterford water distribution network.

The purpose of the analysis was to assess the minimum system pressure and fire flow availability, as well as to determine the impact of the proposed development on the Waterford water distribution system.

2.0 Background

The subject property has an approximate area of 1.31 ha and contains a four-unit commercial building, a fast-food restaurant and a 5-storey residential building. The site is bound by Old Highway 24 to the west and Lam Boulevard to the north.

This report evaluates the adequacy of the existing network to supply the required fire flow to the proposed development under the Maximum Daily Demand (MDD) condition and provides adequate pressure to the system under a Peak Hour Demand (PHD) condition. The report further determines the impact of the proposed development on the existing water distribution system.

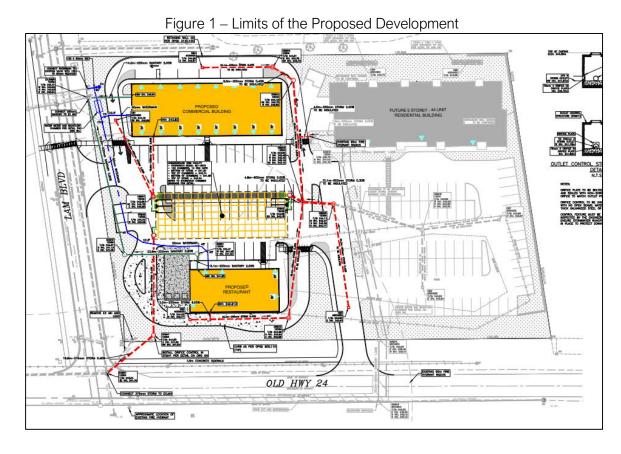


3.0 Data Review

The County provided RVA with the following reports (including drawings and appendices) to complete the analysis:

- Functional Servicing Report Orchard Square Development, March 2024, prepared by G. Douglas Vallee Limited
- Servicing Plan March 2024, prepared by G. Douglas Vallee Limited

Figure 1 below shows the location of the proposed development.



4.0 Summary of the Water Distribution Hydraulic Modelling

RVA used the Waterford Water Distribution Model calibrated in 2022 to evaluate the adequacy of the Waterford water distribution system to meet the desired level of service at the proposed development as well as to review the impact of the proposed development on the water distribution system.

The following points summarize the assumptions and analysis that were completed:

 Based on the Norfolk County Design Criteria, the water demand is calculated in Table 1.

Table 1 – Dev	elopment Design Flo	ows

	Residential	Commercial	
Unit/Area [a]	44 units	0.71 ha	
Population Density (persons per unit/ha) ¹ [b]	2.75 per unit	90 persons/ha	
Population [c]=[a]*[b]	121	64	
Per Capita Demand ¹ [d]	450 L/cap/day	450 L/cap/day	
Average Daily Demand [e]=[d]*[c]	0.63 L/s	0.33 L/s	
Max. Daily Factor ¹ [f]	2.25	2.25	
Max. Daily Demand [g]=[f]*[e]	1.42 L/s	0.75 L/s	
Peak hourly Factor ² [h]	4	4	
Peak Hourly Demand ³ [i]=[h]*[e]	2.52 L/s	1.33 L/s	

Note:

- 1. Norfolk County Design Criteria for new development.
- 2. Commercial peak hourly factor is 2, however, its maximum daily factor is 2.25 based on Norfolk County Design Criteria. To be conservative, peak hourly factor of 4 is to be used.
- 3. The displayed sum may not be exact due to rounding.

- In the overall distribution system model, a peak hour demand (PHD) factor of 3.0 was used, per the Norfolk County Integrated Sustainable Master Plan (ISMP). The maximum day demand (MDD) factor of 1.61 was used, per the Norfolk ISMP update TM in 2022.
- The proposed development includes new nodes, pipe segments, average daily demand, max. daily demand and peak hourly demand were added to the water model. Node elevation data were obtained from the Ontario Digital Terrain Model.
- Simulations were completed to estimate the pressure in the system during PHD and available FF during MDD. The simulations were completed using the scenarios in the existing Waterford Water Distribution Model.
- MECP recommended a minimum system pressure of 40 psi to be maintained under Peak Hour Demand (PHD).
- MECP recommended a minimum residual pressure of 20 psi to be maintained under Max Day Demand (MDD) + Fire Flow (FF).
- According to the FUS fire flow calculation provided, the required FF is estimated to be 117 L/s for the residential building and 83 L/s for commercial area.
- The following proposed water distribution system upgrades are not yet completed;
 however, they were modeled as completed with the understanding these have been approved by the County and as such, included in the Master Water Model:
 - Mayberry Homes;
 - 136 Mechanic Street West Subdivision:
 - Lam Blvd Stacked Townhouse Development;
 - Charles Street Development;
 - 208 Nicole Street Development;
 - Wellington Street Reconstruction;
 - 180-218 Mechanic Street;
 - Charles Street Subdivision;
 - Cottonwood Condo Development;
 - Looping from Nichol St W to Feed Line Extension;
 - Silos Waterford Development;
 - 65 Norfolk Street Development;
 - Thompson Farm Subdivision;
 - 42 Thompson Road West Development;
 - Warehouse Old Hwy 24 Development; and

It is important to note these developments and upgrades have a significant impact on the result noted in this memorandum. If any of these developments are likely not to occur, the result may vary significantly.

5.0 Results of the Hydraulic Analysis

The following points summarize the results of the analysis completed by RVA.

5.1 Existing Conditions

- Figure A-1 shows the resulting system pressures under the existing PHD condition.
 The model results indicated that the pressures in the vicinity of the proposed development are 56 ~ 57 psi on Old Highway 24 and Lam Blvd, which is higher than the MECP recommended minimum operating pressure of 40 psi.
- Figure A-2 shows the resulting available FF under the existing MDD plus fire condition. The available FFs during MDD are 111 ~ 118 L/s in the vicinity of the proposed development.

5.2 Proposed Conditions

The commercial development would receive water service from the existing 200mm diameter watermain on Lam Blvd, whereas the residential building would be served by the proposed 200mm watermain extension from the intersection of Lam Blvd and Old Hwy 21 along Old Hwy 24.

- Figure B-1 shows the resulting system pressures with build-out under the PHD condition. The model results indicated that the pressures are 55 ~ 56 psi for the commercial development and 55 psi for the residential building. Both of are higher than the MECP recommended minimum operating pressure of 40 psi. The pressure as a result of the proposed development would be 1 psi lower in the vicinity of the proposed development.
- Figure B-2 shows the resulting available FF with built-out under the MDD plus fire condition. The available FFs during MDD for the commercial development are 91 ~ 92 L/s which meets the required FF plus MDD of 83.8 L/s. The available FFs during MDD for the residential phrase are 91 L/s which fails to meet the required FF plus MDD of 118.4 L/s. The model further indicated that the development would reduce approximately 2 L/s on the FFs in the vicinity.

6.0 Conclusion

The existing water distribution system of Waterford is adequate to provide the minimum required pressure to the entire development. On the fire flow, the system is capable of

providing the required FF to the commercial development but fails to provide the required flow to the proposed residential building.

Furthermore, the additional demand from the proposed development would reduce the available fire flow by 2 L/s and reduce the pressure by 1 psi to the vicinity of the proposed development.

Yours very truly,

R.V. ANDERSON ASSOCIATES LIMITED



Mukesh Choudhary, P.Eng., PMP

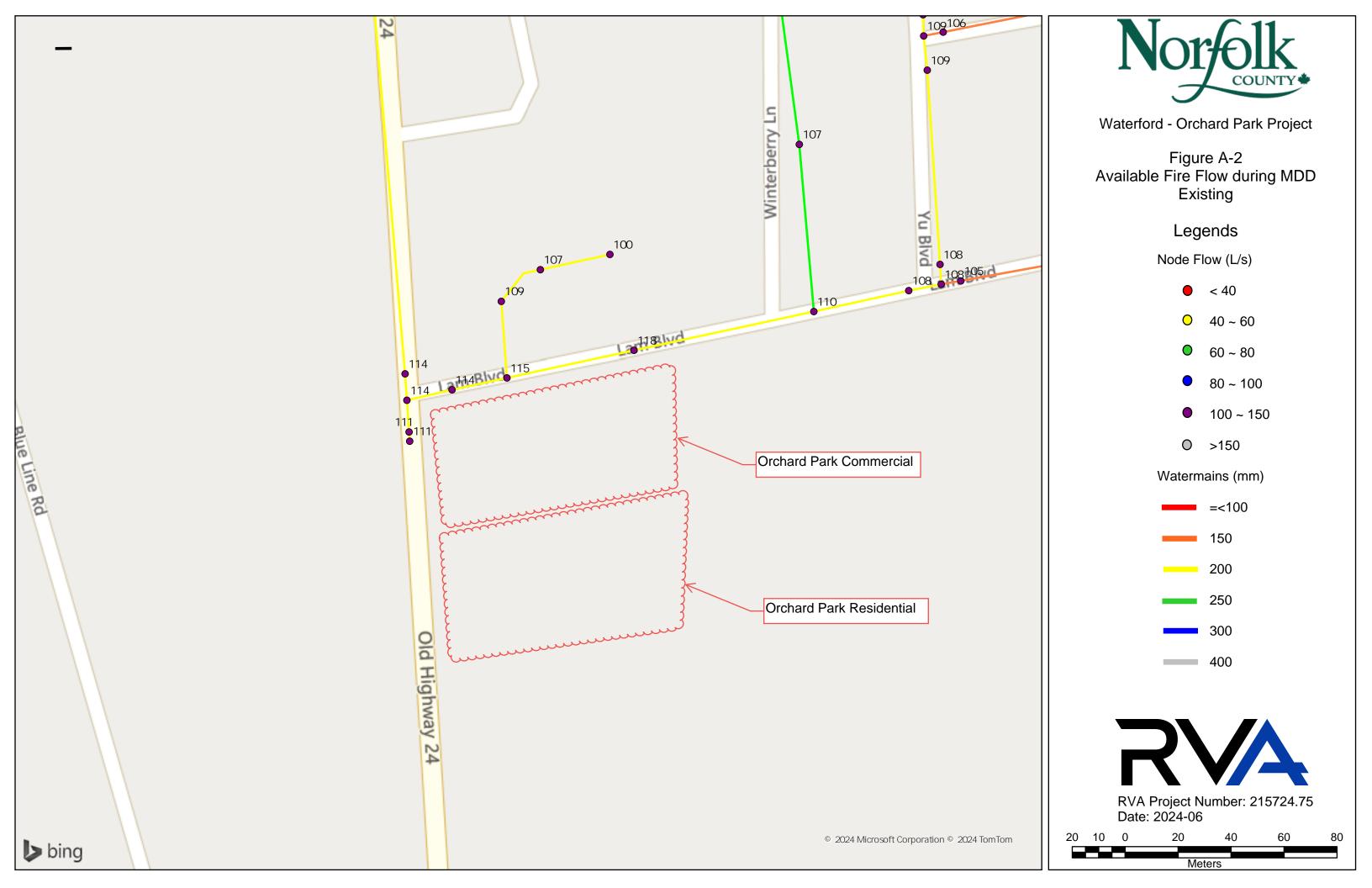
Manager, Hydraulic Modeling

Enclosures:

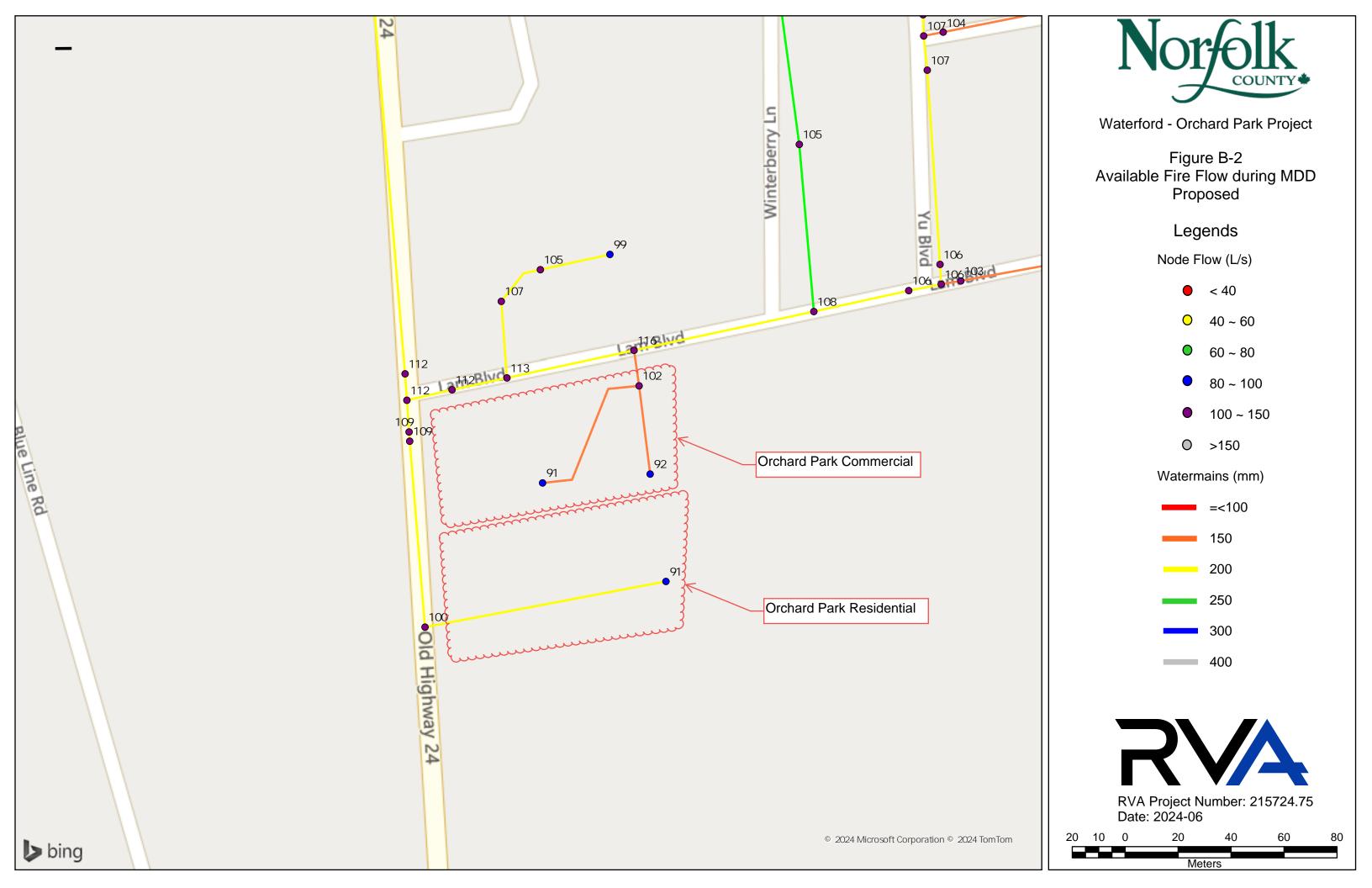
- 1. Figure A-1 Existing: Pressure During Peak Hour Demand
- 2. Figure A-2 Existing: Available Fire Flow During Max Day Demand + Fire Flow
- 3. Figure B-1 Proposed: Pressures During Peak Hour Demand
- 4. Figure B-2 Proposed: Available Fire Flow During Max Day Demand + Fire Flow

REVISIONS AND PUBLICATION REGISTER					
Revision #	Date	Distribution			
00	July 5, 2024	Tech Memo Issued via email	Stephen Gradish – Norfolk County		











November 22, 2024

Verlinda Homes 26 Main Street South PO Box 1152 Waterford, ON N0E 1Y0

Attention: Mr. Tom O'Hara

Reference: Stormwater Management Report

Orchard Square Development Waterford, Norfolk County

Our Project # 20-128

Introduction

This Stormwater Management (SWM) Report has been prepared on behalf of Verlinda Homes, in support of the site plan application for the proposed Orchard Square Development located at municipal address 750 Old Highway 24, on the southeast corner of Old Hwy 24 and Lam Boulevard in Waterford - Norfolk County. The proposed development site has been severed into two properties, and will be constructed in two phases, with Phase 1 including a four-unit commercial building, and a fast-food restaurant and Phase 2 includes a 5-storey, 44-unit residential mid-rise building. The following SWM strategy is a comprehensive plan for both parcels. It is the intention to submit this report to Norfolk County for review and approval of the proposed site plan.

The 1.31 ha development site is vacant land which features open grassed area and an irrigation pond. The sites are bound by Lam Boulevard to the north, old Highway 24 to the west, an existing subdivision and stormwater management pond to the east and agricultural land to the south. Refer to Figure 1 below.



Figure 1 - Site Location

Stormwater Management Design Criteria

Under pre-development conditions, the subject property is vacant land which features open grassed area and an irrigation pond. Stormwater runoff from the subject property drains uncontrolled, overland in a southwesterly direction towards Old Hwy 24.

As part of the Yin's Subdivision - Phase 5 Project (Vallee Project No. 10-034), a peak flow allowance of 0.015 m³/s was allocated for the subject site as part of the storm sewer design along Old Highway 24. Refer to the 10-034 Yin's Subdivision - Phase 5 Stormwater Management Report in Appendix F for details.

Consequently, the design criteria for the proposed development are as follows:

- Quantity Control: Reduce or control the total post-development peak flow rates from the site to levels that do not exceed the 0.015 m³/s flow allowance, for all storm events up to and including the 100-year storm event.
- Quality Control: Stormwater is to be treated to a Normal Protection Level as defined in the MOECC Ministry of Environment and Climate Change Design Manual - March 2003.

A Visual Otthymo computer model has been used to simulate the drainage areas under post-development conditions. The simulations were conducted using the 4-hour Chicago Distribution design storm of the 2-year, 5-year, 10-year, 25-year, 50-year and 100-year storm events. Norfolk County has confirmed that a 4-hour storm duration is acceptable. The Norfolk County rainfall IDF curve data has been used for the storm analysis using the parameters in Table 1 below.

Table 1 Norfolk County Rainfall IDF Parameters					
Event A B C					
2-year	529.711	4.501	0.745		
5-year	583.017	3.007	0.703		
10-year	670.324	3.007	0.698		
25-year	721.533	2.253	0.679		
50-year	766.038	1.898	0.668		
100-year	801.041	1.501	0.657		

Post Development Condition

The overall stormwater management quantity control strategy is to reduce the total post-development peak flow rates from the site to less than or equal to the allowable release rate of 0.015 m³/s. To meet this objective, runoff from the proposed development will be detained in an underground storage facility, and released at a rate such that the peak flow allowance is not exceeded. Infiltration beneath the chamber facility will be utilized to decrease the required storage volume and promote groundwater infiltration. Minor and major storm events (2-year to 100-year storm) will be conveyed to the proposed SWM storage facility through a storm sewer network. Runoff released from the storage facility will be directed to the existing municipal 600mm diameter storm sewer along Old Highway 24 via an existing 300mm storm sewer. In addition, soakaway pits will be utilized to capture and infiltrate runoff from a small portion of the development on the east side of the property that can't be conveyed to the SWM facility.

G. DOUGLAS VALLEE LIMITED Consulting Engineers, Architects & Planners





The post-development drainage areas are shown in Drawing SWM – Stormwater Management Drainage Areas in Appendix A, and can generally be described as follows:

- Area A1: Approximately 1.11 ha of the development site. This area encompasses the majority of the development site. Flows from this area are conveyed to the underground SWM chamber facility via the proposed storm sewer network.
- Area A2: Approximately 0.05 ha of the development site. This area encompasses a portion of the site
 on the east side of the proposed Phase 2 mid-rise residential building. Runoff from this area will be
 completely infiltrated by two proposed infiltration trenches.
- Area A3: Approximately 0.12 ha of the development site. This area encompasses the frontage along Old Highway 24 and a portion of the frontage along Lam Boulevard. Flows from this area will flow uncontrolled, overland towards Lam Boulevard and Old Highway 24 as they do under pre-development conditions, where it will be collected and conveyed to the existing storm sewer along Old Hwy 24.
- Area A4: Approximately 0.03 ha of the development site. This area encompasses a portion of the site
 on the south side of the proposed Phase 2 mid-rise residential building. Runoff from this area will be
 completely infiltrated by a proposed infiltration trench.

Table 2 summarizes the site soil parameters and the post-development catchment input parameters for the Visual OTTHYMO computer model with complete details included in Appendix B and E. The model uses a modified SCS procedure to estimate losses that occur naturally during a rainfall event such as evaporation and infiltration.

Table 2 Visual Otthymo Model Input – Post-Development					
Parameter	A 1	A2	A3	A4	
Area	1.11 ha	0.05 ha	0.12 ha	0.03 ha	
Soil Type		Sandy Textures	over Gravelly San	d & Loamy Sand	
Hydrologic Soil Group			Α		
SCS Curve Number		Pasture & Other Improved Land - 58			
Initial Abstraction		16.5 mm (IA/S _{0.05} = 0.05, with S _{0.05} = 1.33 * S _{0.20} ^1.15 in inches and S _{0.20} = 1000/CN-10 in inches)			
Longest Flow Path	N/A	5m	5m	5m	
Average Slope	N/A	4%	20%	4%	
Runoff Coefficient	N/A	0.25	0.30	0.25	
Time to Peak	N/A	0.04 hr	0.02 hr	0.04 hr	
Impervious Percentage	93%	N/A	N/A	N/A	
Directly Connected Impervious Percentage	93%	N/A	N/A	N/A	

G. DOUGLAS VALLEE LIMITED Consulting Engineers, Architects & Planners





Infiltration Trenches

Three infiltration trenches/soakaway pits will be installed behind the mid-rise residential building in Phase 2 to capture and infiltrate runoff that cannot be conveyed to the underground SWM chamber facility. Infiltration basins provide not only water quantity benefits such as a reduced runoff volume, but also provide water quality benefits by promoting natural groundwater recharge. The depth of an infiltration basin is governed by the native soil infiltration rate, the porosity of the aggregate material used in the stone reservoir and the targeted time period to achieve complete drainage between storm events.

As presented in the Geotechnical Investigation completed by Soil -Mat Engineers & Consultants Limited (refer to Appendix C), the recommended native soil infiltration rate was determined to be 30 mm/hr. Applying a safety factor of 2.5, the design infiltration rate was taken as 12mm/hr. Therefore, the maximum allowable stone depth was determined to be 2.88m based on the design infiltration rate of 12 mm/hr, a void ratio of 0.4 and a drainage time of 96 hours, as defined in the Norfolk County Design Criteria (2012). Corresponding calculations are detailed in Appendix B. Using Visual OTTHYMO, the infiltration trenches in catchment area A2 and A4 were sized to infiltrate 100% of the runoff captured under all storm events up to and including the 100-year event. Table 3 outlines the storage capacity and drawdown time during the 100-year storm event for each proposed infiltration trench.

Table 3 Infiltration Trench Sizing & Drawdown					
Soakaway Pit Length (m) Width (m) Depth (m) Storage Volume (m³) Drawdov Time (h					
Soakaway #1	10.0	1.5	1.0	6.0	13.3
Soakaway #2	10.0	1.5	1.0	6.0	13.3
Soakaway #3	10.0	1.5	1.0	6.0	16.6

Stormwater Management Chamber Facility

An underground chamber system is proposed to provide stormwater storage, control post-development peak flow rates, and promote further infiltration. To determine the storage volume required in the proposed system, the relationship between the storage volume and the discharge is defined by a rating curve. This rating curve is determined by calculating the expected discharge from the facility based on the water level in the system and the proposed outlet control configuration.

Generally, orifices or weirs can control discharge from SWM facilities. Each of these control methods can be used by the singular control or they can be used in combination depending on the discharge characteristics desired. For this facility both a single orifice is proposed with the following equation used to estimate discharge:

Sharp-Crested Circular Orifice

$$Q = C * A * \sqrt{2 * g * h}$$

where: Q = Discharge in cms

C = constant. 0.63

A = orifice area in m²

g = gravitational constant, 9.81 m/s²

h = height above orifice, m

G. DOUGLAS VALLEE LIMITED Consulting Engineers, Architects & Planners





The proposed underground chamber system utilizes 133 StormTech MC-3500 chambers, with 14 end caps, a 500mm stone reservoir above the chambers and a 300mm stone reservoir below, resulting in a total storage volume of 777 m³. Drawings and specifications for the proposed StormTech chamber facility are located in Appendix D. To control the release rate from the proposed facility, a single 75mm orifice at an elevation of 242.10m, will be installed in the outlet control structure. The complete discharge-to-storage rating curve is appended to this report as part of Appendix B.

Table 4 summarizes the total peak post-development runoff rates from the entire subject site found using Visual OTTHYMO and compares them to the allowable release rate for each storm event up to and including the 100-year storm event. The utilized storage volumes in the StormTech chamber facility and corresponding ponding elevations and drawdown times for each storm event are also presented in Table 4.

Table 4 Post-Development Flow Rates, Storage Volumes, Ponding Elevations & Drawdown							
Event Allowable Release Rate (cm/s) Post-Development (cm/s) Net Change (cm/s) Volume (cm) Ponding Elevation Time							
2-year		0.000	-0.015	324	242.01	39.5	
5-year		0.005	-0.010	443	242.24	49.7	
10-year	0.015	0.007	-0.008	514	242.39	52.2	
25-year	0.015	0.009	-0.006	611	242.63	54.8	
50-year		0.011	-0.004	688	242.90	56.6	
100-year		0.013	-0.002	764	243.18	58.1	

As presented above, the total peak post-development flow rates from the entire site have been attenuated to less than or equal to the allowable release rate of 0.015 m³/s, for all storm events up to and including the 100-year storm event. In addition, the drawdown time for each storm event is less than the maximum drawdown time of 96 hours specified in the Norfolk County Design Criteria. All corresponding calculations completed during the development of the Visual OTTHYMO model can be found in Appendix B and the results from the Visual OTTHYMO analysis are detailed in Appendix E.

Storm Sewer Design & Inlet Capacity

The proposed storm sewer network has been designed to convey minor and major storm events (2-year through 100-year storm flows) to the proposed underground SWM chamber facility. Refer to the storm design sheet and Drawing STM – Storm Drainage Areas. As requested by Norfolk County, a sub-area catchment analysis was completed to demonstrate that each catch basin can adequately capture the 100-year flow from each associated drainage area. Refer to the detailed calculations in Appendix B. Overall, it was concluded that each proposed catch basin or double catch basin has adequate inlet capacity for the 100-year storm event.





Water Balance

As requested by Norfolk County, G. Douglas Vallee Ltd. has completed a water balance investigation for the pre-development and post-development site. A water balance is used to describe the hydrological cycle, and provides an accounting of water across the system's boundaries over a specified time period. Any differences between inflows and outflows of the system must attempt to be balanced using storage systems.

A continuous Visual OTTHYMO simulation was used to model the pre-development and post-development water balance for the subject site over a six-year period. Historical climate data for Simcoe, Ontario for the years 1981-1986 was obtained from the Government of Canada. This data includes daily precipitation (rainfall and/or snowfall) and daily minimum and maximum temperatures. In addition, Table 5 presents the average monthly evapotranspiration for Buffalo, New York, utilized in the OTTHYMO model.

Table 5 Average Monthly Evapotranspiration					
Month	(mm)				
January	6.1				
February	10.2				
March	25.1				
April	48.8				
May	82.8				
June	95.0				
July	102.9				
August	87.1				
September	56.6				
October	30.0				
November	11.9				
December	6.1				

Table 6 presents the total average annual volume of precipitation (rainfall and/or snowfall), evapotranspiration, infiltration and runoff from the pre-development and post-development catchment areas found using Visual OTTHYMO. Note that the post-development infiltration value listed in Table 6 does not include the infiltration achieved by the proposed infiltration basins and underground stormwater chamber facility.

Table 6 Average Annual Water Balance Volumes (without LID)							
Hydrologic Cycle Pre-Development Post-Development Δ Volume (m³) (m³) (%)							
Precipitation	13179	13380	2%				
Evapotranspiration	5554	1776	-68%				
Infiltration	7218	1634	-77%				
Runoff	2424	10430	330%				





As previously mentioned, the proposed infiltration basins, and underground stormwater chamber facility within the development site are utilized to reduce the required storage volume, but are also used to increase the volume of post-development infiltration. Table 7 summarizes the average annual volume of infiltration under pre-development conditions, the total post-development site infiltration with the infiltration systems and total difference in infiltration from pre- to post-development.

Table 10 Pre to Post-Development Infiltration Volumes				
Pre-Development Site Infiltration	7218 m ³			
Total Post-Development Site Infiltration (with LID) 11660 m ³				
Δ Infiltration Volume (Pre to Post)	62%			

As described above, with the addition of the proposed infiltration basins and underground stormwater chamber facility, there is a 62% increase in infiltration from the pre-development to post-development condition.

Quality Control

Chamber Facility Quality Control

The selection of the level of water quality treatment is based on the proposed outlet for a SWM facility. For this site, the proposed outlet is the Old Highway 24 storm sewer, therefore a normal level of protection has been selected. The Ministry of the Environment Stormwater Management Planning and Design Manual defines a normal level of protection as the removal of 70% of the total suspended solids (TSS).

Quality control will be provided by the StormTech Isolator PLUS Row, which is a row of standard StormTech chambers surrounded by filter fabric. The isolator row creates a detention basin that allows water to egress through the surrounding filter fabric while sediment is trapped within. In addition, a flared end ramp is attached to the inlet pipe inside of the chamber end cap to provide a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance over time by distributing sediment and debris that would otherwise collect at the inlet.

Each MC-3500 isolator row chamber has an ETV-verified treated flow rate of 11.19 L/s corresponding to greater than 81% TSS removal. The proposed chamber facility features 19 isolator row chambers, which allows for a total treated inlet flow rate of approximately 213 L/s. Using Visual OTTHYMO, the maximum flow rate entering the chambers during the 25mm storm event (quality control event) was determined to be 143 L/s. Consequently, it can be concluded that the proposed chamber facility provides more than sufficient capacity to provide a normal level of water quality protection, corresponding to 70% TSS removal. The StormTech Isolator Row Sizing Chart can be found in Appendix B.

Inspection and maintenance are fundamental to the long-term performance of any stormwater quality treatment device. StormTech recommends that the chamber system be inspected annually at a minimum, and every six months for the first year of operation to determine the sediment accumulation rate. In subsequent years inspections can be based on observations or local requirements. The unit should be inspected immediately after an oil, fuel or chemical spill, and a licensed waste management company should remove oil and sediment for proper disposal.





Page 8

Minimum Orifice Size

A minimum orifice of 75mm is recommended as per the MOE guidelines. For this facility, a 75m orifice is proposed.

Erosion and Sediment Control

During construction, the contractor is required to protect the worksite and all adjacent lands from sediment and erosion regardless of the source, to the satisfaction of all applicable parties. The measures installed by the contractor are to remain in place until such time as there is no further threat of damage and all vegetation is established. Measures that are to be put into place as an absolute minimum include silt fences, mud mats, and filter cloths over catch basins onsite.

Conclusions and Recommendations

Based on the review presented by this Stormwater Management Report, the comprehensive stormwater management design for the proposed development can be summarized as follows:

- Storm sewers will convey stormwater from the subject site to the proposed underground SWM chamber facility located in Phase 1 of the development.
- Runoff released from the SWM facility will be conveyed to the existing municipal 600mm diameter storm sewer along Old Highway 2 via an existing 300mm storm sewer.
- Three infiltration trenches in Phase 2 and infiltration beneath the chamber facility are used to reduce the required stormwater storage volume and promote groundwater infiltration.
- The underground storage chamber facility uses 133 StormTech MC-3500 chambers and has a total storage volume of 777 m³.
- The required storage volume in the chamber facility ranges between 324 m³ to 764 m³ for the 2-year and 100-year storm events, respectively.
- Discharge from the chamber facility is controlled by a 75mm orifice at an elevation of 242.10m.
- The proposed stormwater management facility has sufficient volume to detain runoff such that discharge from the total post-development site is controlled to less than or equal to the allowable release rate of 0.015 m³/s for all storm events up to and including the 100-year storm event.
- During events greater than the 100-year storm, runoff from the site will surcharge the SWM facility, and flow overland towards Old Highway 24 as it does under pre-development conditions.
- The proposed StormTech Isolator PLUS Row shall be utilized to achieve a normal level of water quality protection, corresponding to 70% TSS removal.



It is recommended that this report be provided to Norfolk County in support of the application for site plan approval of the proposed development.

We trust that this information is complete and sufficient for submission. Should you have any questions or require further information please do not hesitate to contact us.

Respectfully submitted,

PROFESSIONA 2024-12-04 N. L. ONGENA 100553190

Natalie Ongena, P.Eng

G. DOUGLAS VALLEE LIMITED

Consulting Engineers, Architects and Planners

H:\Projects\2020\20-128 Orchard Square\Design\Storm\SWM Report\2024.11.13 20128 SWM Report.docx

G. DOUGLAS VALLEE LIMITED Consulting Engineers, Architects & Planners Ontario Association

of Architects

Authorized by the Association of Professional Engineers of Ontario

to offer professional engineering services



Appendix A

- 20-128 DWG SWM - Stormwater Management Drainage Areas

Appendix B

- Soil Parameter Calculations
- Post-Development Parameters
- Rating Curve
- Post-Development Flows & Storage
- Quality Control
- Soakaway Sizing
- Water Balance
- 15% Infiltration Surplus Storage
- Overland Flow Capacity
- Storm Sewer Design Sheet Inlet Capacity

Appendix C

- Soil Parameters
- Geotechnical Investigation Orchard Square (Soil-Mat Engineers & Consultants Limited, December 20, 2021)

Appendix D

- ADS StormTech Chamber Drawings & Specifications

Appendix E

- Visual OTTHYMO Summary Outputs

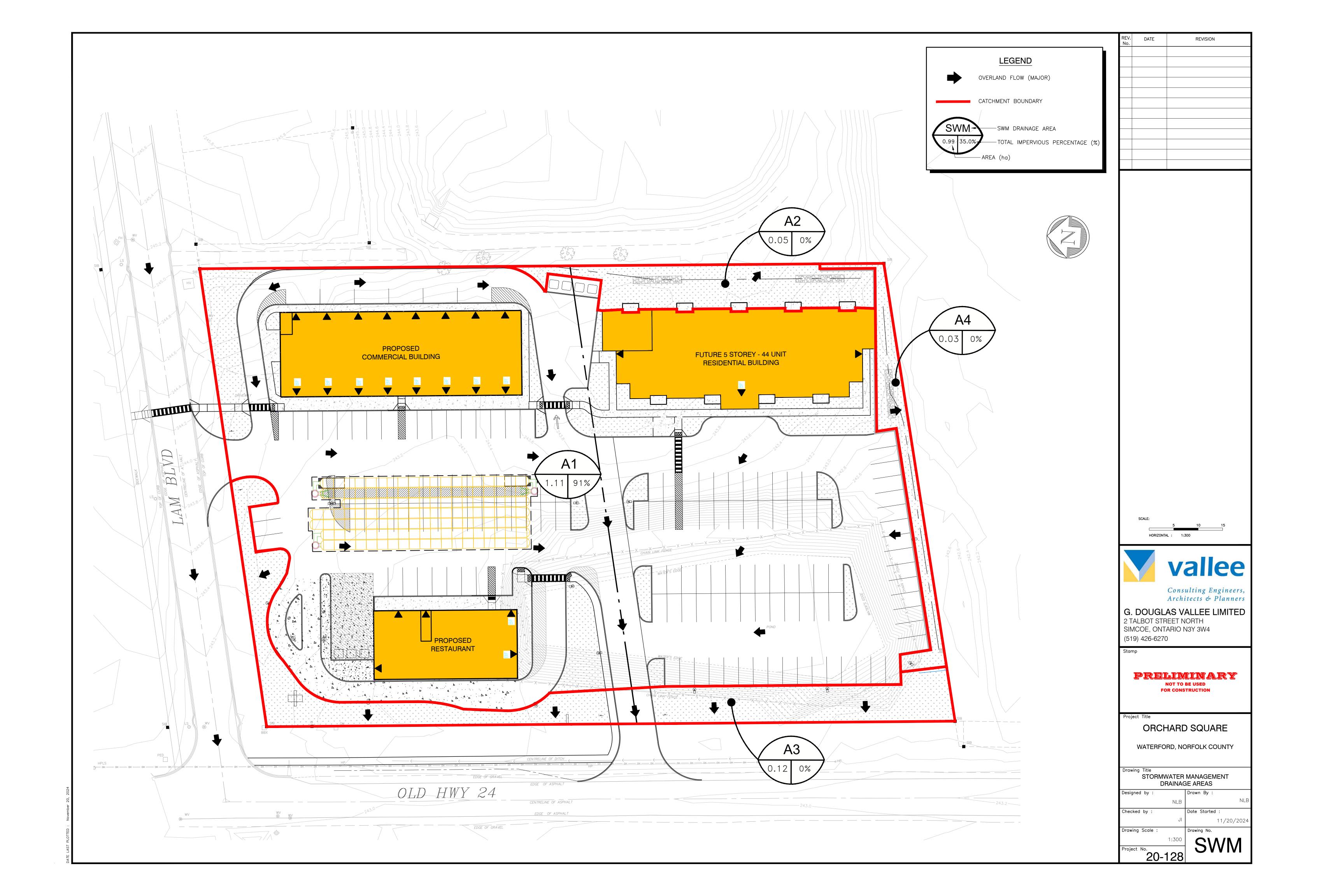
Appendix F

10-034 Yin's Subdivision - Phase 5 Stormwater Management Report
 (G. Douglas Vallee Engineering Limited, December 10, 2010)



APPENDIX A

20-128 DWG SWM – Stormwater Management Drainage Areas



APPENDIX B

Soil Parameter Calculations
Post-Development Parameters
Rating Curve
Post-Development Flows & Storage
Quality Control
Soakaway Sizing
Water Balance
15% Infiltration Surplus Storage
Overland Flow Capacity
Storm Sewer Design Sheet - Inlet Capacity



Subject: Soil Parameters

Date: Project #: Aug-24 By: 20-128 Page

NLO

SOIL PARAMETERS

Soil Type Sandy textures over gravelly sand & loamy sand

Soil Group A

CN 58 Pasture & Other Improved Land

Initial Abstraction 16.5 mm

INFILTRATION PARAMETERS

Infiltration Rate (i) 30 mm/hr *Soil-Mat Engineers & Consultants Ltd. Geotechnical Safety Factor 2.5 Investigation dated December 20th 2021

Design Infiltration Rate

Design Infiltration Rate

12 mm/hr

Design Infiltration Rate

0.012 m/hr

Void Ratio (Vr)

Drainage Time (ts)

Max allowable stone depth (drmax)

2.88 m

BMP Sizing

The depth of the soakaway or infiltration trench is dependent on the native soil infiltration rate, porosity (void space ratio) of the gravel storage layer media (i.e., aggregate material used in the stone reservoir) and the targeted time period to achieve complete drainage between storm events. The maximum allowable depth of the stone reservoir for designs without an underdrain can be calculated using the following equation:

$$d_{r max} = i * t_s / V_r$$

Where:

d_{r max} = Maximum stone reservoir depth (mm) i = Infiltration rate for native soils (mm/hr)

V_r = Void space ratio for aggregate used (typically 0.4 for 50 mm clear stone)

t_s = Time to drain (design for 48 hour time to drain is recommended)



Subject: Date: Project #: Drainage Area Parameters

Aug-24 20-128 - By: Page NLO 2

PRE-DEVELOPMENT AREA PARAMETERS:

Drainage Area	Total Area (ha)	Runoff Coeff.	Drainage Length (m)	Slope (%)	Time of Concentration (min)	Time to Peak (0.6*tc) (hr)
PRE	1.31	0.25	70.00	0.0	84.30	0.84

POST-DEVELOPMENT AREA PARAMETERS:

Area Description	Area (ha)
Grass	0.28
Buildings	0.22
Roads/Parking/Sidewalks	0.81
Total Site	1.31

<u>Airport Formula</u>						
Tc = 3.26 * (1.1 - C) * L^0.5 /\$w^0.33						

Tc = Time of Concentration (minutes)
C = Runoff Coefficient (dimensionless)
L = Watershed Length (metres)
Sw = Watershed Slope % (m/m)

Drainage Area	Control?	Total Area (ha)	Impervious Area (ha)	TIMP (%)	Dir. Conn. Imperv. Area (ha)	XIMP (%)
A1	SWM Chambers	1.11	1.03	93%	1.03	93%

Drainage Area	Control?	Total Area (ha)	Runoff Coeff.	Drainage Length (m)	Slope (%)	Time of Concentration (min)	Time to Peak (0.6*tc) (hr)
A2	Infiltration Basin	0.05	0.25	5.00	4.0	3.92	0.04
A3	Uncontrolled	0.12	0.30	5.00	20.0	2.17	0.02
A4	Infiltration Basin	0.03	0.25	5.00	4.0	3.92	0.04



Subject:

Rating Curve

Aug-24 20-128 NLO 3

By:

Page

 $Q = CA\sqrt{2gh}$

C = 0.63

Date: Project #:

CHAMBERS PARAMETERS
Model

ORIFICE PARAMETERS

MC-3500 Diameter 0.075 m **Number of Chambers** Area 0.0044 m2 133 Number of End Caps 14 Inv. Elev. 242.10 m Depth of Stone Above Chamber CL Elev. 242.14 m 500 mm Depth 0.80 m

Depth of Stone Below Chambers 300 mm Base of Stone Elev. 241.30 m Base of Chamber Elev. 241.60 m Height of Chambers 1143 mm Top of Chamber Elv. 242.74 m Top of Stone Elev. 243.24 m

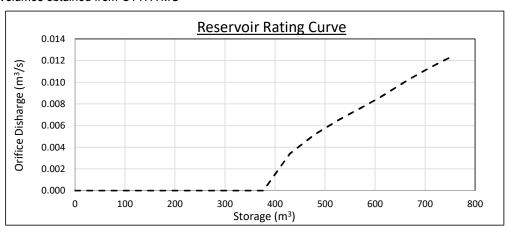
Min. Cover (For Vehicles) 0.54 m *300mm Gran B, 150mm Gran A, 50mm base, 40mm surface

Min Surface Elev. 243.78 m System Footprint 679.72 m2

STAGE-STORAGE-DISCHARGE

Description	Elevation (m)	Stage (mm)	Stage (m)	Volume (m3)	Height Above Invert (m)	Q (m3/s) Orifice 1
Base of Stone Storage	241.30	0	0.00	0	0.00	0.0000
	241.40	102	0.10	28	0.00	0.0000
	241.50	203	0.20	55	0.00	0.0000
Base of Chambers	241.61	305	0.31	91	0.00	0.0000
	241.71	406	0.41	150	0.00	0.0000
	241.81	508	0.51	209	0.00	0.0000
	241.91	610	0.61	266	0.00	0.0000
	242.01	711	0.71	322	0.00	0.0000
Orifice 1 (242.10m)	242.11	813	0.81	377	0.00	0.0000
	242.21	914	0.91	430	0.08	0.0034
	242.32	1016	1.02	480	0.18	0.0052
	242.42	1118	1.12	528	0.28	0.0065
	242.52	1219	1.22	571	0.38	0.0076
	242.62	1321	1.32	609	0.48	0.0086
Top of Chambers	242.72	1422	1.42	639	0.58	0.0094
	242.82	1524	1.52	666	0.69	0.0102
	242.93	1626	1.63	694	0.79	0.0109
	243.03	1727	1.73	722	0.89	0.0116
	243.13	1829	1.83	749	0.99	0.0123
Top of Stone Storage	243.23	1930	1.93	777	1.09	0.0129

^{*}Storage volumes obtained from OTTHYMO





Subject: Date:

Project #:

Post-Development Flows & Storage
Aug-24 By: NLO

Aug-24 By: 20-128 Page

NLO 4

PRE TO POST FLOWS

Return Period		Q (m3/s)				
Return Period	Allowable Total Post		Net			
2		0.000	-0.015	✓		
5		0.005	-0.010	✓		
10	0.015	0.007	-0.008	✓		
25	0.015	0.009	-0.006	✓		
50		0.011	-0.004	✓		
100		0.013	-0.002	~		

STAGE-STORAGE-DISCHARGE

Description	Elevation (m)	Depth (m)	Volume (m³)	Q (m3/s)
Base of Stone Storage	241.30	0.00	0	0.000
	241.40	0.10	28	0.000
	241.50	0.20	55	0.000
Base of Chambers	241.61	0.31	91	0.000
	241.71	0.41	150	0.000
	241.81	0.51	209	0.000
	241.91	0.61	266	0.000
	242.01	0.71	322	0.000
Orifice 1 (242.10m)	242.11	0.81	377	0.000
	242.21	0.91	430	0.003
	242.32	1.02	480	0.005
	242.42	1.12	528	0.007
	242.52	1.22	571	0.008
	242.62	1.32	609	0.009
Top of Chambers	242.72	1.42	639	0.009
	242.82	1.52	666	0.010
	242.93	1.63	694	0.011
	243.03	1.73	722	0.012
	243.13	1.83	749	0.012
Top of Stone Storage	243.23	1.93	777	0.013

^{*}Storage volumes obtained from OTTHYMO

APPROXIMATE STORAGE & PONDING DEPTHS

Return Period	Storage	Ponding	Elev. (m)	Drawdown	
Return Period	(m)	Depth (m)	Liev. (III)	Time (hr)	
2	324	0.71	242.01	39.5	
5	443	0.94	242.24	49.7	
10	514	1.09	242.39	52.2	
25	611	1.33	242.63	54.8	
50	688	1.60	242.90	56.6	
100	764	1.88	243.18	58.1	

^{*}Storage volumes obtained from OTTHYMO



Subject: **Quality Control**

Date:

8/8/2024 By: Project #: 20-128 Page **NLO**

5

Water Quality Control Provided by Stormtech Isolator Row

Inflow to Chambers During 25mm Quality Storm Event $0.143 \text{ m}^3/\text{s}$

143 L/s

Chamber Type MC-3500

Treated Flowrate / Isolator Row Chamber 11.19 L/s

Required Number of Isolator Row Chambers 13

Provided Number of Isolator Row Chambers 19

Provided Treated Flowrate 213 L/s



StormTech Isolator Row Sizing Chart

StormTech Isolator Row - Water Quality Flowrate for >81% TSS Removal											
	SC-160	SC-310	SC-740	DC-780	MC-3500	MC-4500	MC-7200				
Chamber Bottom Area (m²)	1.06	1.64	2.58	2.58	3.99	2.80	4.65				
Treated Flowrate / Chamber (L/s)	2.97	4.62	7.25	7.25	11.19	7.84	12.74				

Notes:

- · Results per ETV verified results, independently verifed by VerifiGlobal: https://www.verffiglobal.com/media/knubjbej/verifiglobal-verification-statement-for-stormtech-isolator-row-plus-final-2020-10-27-for-posting.pdf
- ETV verified treated flowrate = 4.13 GPM/ft² (2.80 L/s/m²)
- Above rates based on 81.2% removal of ETV/NJDEP particle size distribution.



Subject:
Date:
Project #:

Soakaway Sizing 8/8/2024 By:

0.03 ha

11.683 mm 3.50 m³

0.4 m

1.5 m

10 m 6 m³

6 m³

16.6 hr

1 m

20-128

Page

NLB 6

< 96 hr OK.

Soakaway Sizing for Area 2

Drawdown Time

Soakaway Sizing for Area 4

Contributing Area	0.05 ha	Contributing Area
Runoff from VO (100-YR)	11.683 mm	Runoff from VO (100-YR)
Volume Required	5.84 m ³	Volume Required
Soakaway Pit #1		Soakaway Pit #1
Void Ratio	0.4 m	Void Ratio
Soakaway Depth	1 m	Soakaway Depth
Soakaway Width	1.5 m	Soakaway Width
Soakaway Length	1.5 m	Soakaway Length
, ,		, ,
Volume	6 m ³	Volume
Soakaway Pit #2		Total Provided Volume
Void Ratio	0.4 m	Drawdown Time
Soakaway Depth	1 m	
Soakaway Width	1.5 m	
Soakaway Length	10 m	
Volume	6 m ³	
Total Provided Volume	12 m³ ✓	

13.3 hr

< 96 hr OK.



Subject: Water Balance

Date: 8/8/2024 Project #: 20-128

By:
Page

NLO 7

Average Annual Pre-Development Water Balance Volumes

	Area (ha.)	Vol. (mm)	Vol. (m3)
Precipatation		1006	13179
Evapotranspiration	1.31	424	5554
Infiltration	1.51	551	7218
Runoff		185	2424

<u>Average Annual Post-Development Water Balance Volumes (Without LID Features)</u>

		A 1		A2			
	Area (ha.)	Vol. (mm)	Vol. (m3)	Area (ha.)	Vol. (mm)	Vol. (m3)	
Precipatation		1006	11167		1006	503	
Evapotranspiration	1.11	76	844	0.05	424	212	
Infiltration	'.''	38	422	0.05	551	276	
Runoff		903	10023		185	93	

		A3		A4			
	Area (ha.)	Vol. (mm)	Vol. (m3)	Area (ha.)	Vol. (mm)	Vol. (m3)	
Precipatation		1006	1207		1006	503	
Evapotranspiration	0.12	424	509	0.00	424	212	
Infiltration	0.12	551	661	0.03	551	276	
Runoff		185	222		185	93	

Average Annual Pre to Post-Development Water Balance Volumes (Without LID Features)

	PRE	POST	Δ Vol.	Δ Vol.
	Vol. (m3)	Vol. (m3)	(m3)	(%)
Precipatation	13179	13380	201	2%
Evapotranspiration	5554	1776	-3778	-68%
Infiltration	7218	1634	-5584	-77%
Runoff	2424	10430	8007	330%

Average Annual LID Infiltration Volumes

Infiltration Area	LID Inflow (m3)	LID Infiltration (m3)	LID Overflow (m3)
A1 Chambers	10018	9881	137
A2 Infiltration Trench	93	91	2
A4 Infiltration Trench	56	54	2
Total	10167	10026	141

Average Annual Post Development Infiltration with LID Features

Pre-Development Site Infiltration7218 $\,\mathrm{m}^3$ Total Post-Development Site Infiltration11660 $\,\mathrm{m}^3$ Δ Infiltration (Pre to Post)4442 $\,\mathrm{m}^3$ Δ Infiltration (%)62%



Subject: Date:

15% Infiltration Surplus Storage
11/22/2024 By: NLO

8

Project #: Page 20-128

25mm Runoff Volume Infiltration

	A1	A2	A4	7
Catchment Area (ha)	1.11	0.05	0.03	
25mm Runoff Volume In (mm)	22.344	0.223	0.001	*From Visual Otthymo
25mm Runoff Volume In (m³)	248.02	0.11	0.00	
25mm Runoff Volume Out (mm)	0	0	0	*From Visual Otthymo
25mm Runoff Volume Out (m³)	0.00	0.00	0.00	
Infiltrated 25mm Runoff Volume (m³)	248.02	0.11	0.00	
25mm Volume Reduction Rate	100%	100%	100%	
Infiltrated 25mm Runoff Volume + 15% (m ³)	285.22	0.13	0.00	
Extra 15% Volume Required (m ³)	37.20	0.02	0.00	
Total Storage (m ³)	776.77	12.00	6.00	
Surplus Storage (m3)	√ 491.55	11.87	√ 6.00	Surplus Storage > Extra 15% Volume Required



Subject: Overland Flow Capacity

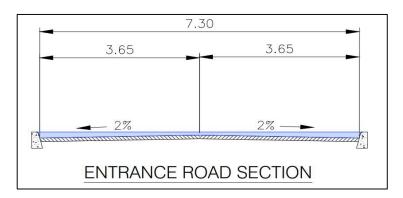
Date: 11/22/2024 By: Project #: 20-128 Pag

Page

NLO 9

West Driveway Entrance (Emergency Overland Route)	Maximum Capacity
Depth (m) at Road Centreline to	_
Top of Curb	0.077
Area (m2)	0.836
Wetted Perimeter (m)	7.657
Hydraulic Radius (m)	0.109
Slope (%)	6.00
Manning Coeff. (Asphalt Smooth)	0.013
Flow, Q (m3/s)	3.601
Velocity, V (m/s)	4.31

$$Q = \frac{1}{n} A \left(\frac{A}{P}\right)^{\frac{2}{3}} \sqrt{S}$$



Capacity Check	A1
100-year flow rate (m3/s)	0.465
Check Flow < Road Cross	✓
Section Capacity	•

STORM SEWER DESIGN SHEET - INLET CAPACITY

Date: 10/31/2024
Project: 20-128 Orchard Square
Town/County: Waterford, Norfolk County

 Return:
 100-year

 A
 801.041

 B
 1.501

 C
 0.657

 Multiplier
 1.25

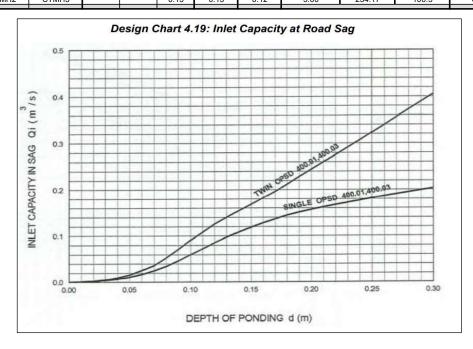
 Inlet Type
 Capacity (L/s)

 Single
 120

 Double
 170

Designed by: NLO
Checked by: JTI

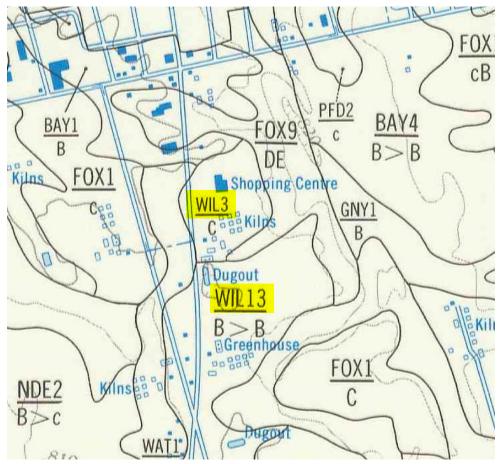
L	ocation			Area		Total	Individual	Time of	Rainfall	Flow Inlet Capacity at 0.15m Ponding De			ling Depth
Area	From	То	Ha	Ha	Ha	Area	C*A	Concentration	mm/hr	2.78*I*A*C	Single or Double	Inlet Capacity	Check
Aica	110111	10	0.25	0.45	0.95	Ha		min		L/s	Inlet?	(L/s)	Capacity > Flow
ST1	CB1	DCBMH1	0.02		0.03	0.05	0.03	5.00	234.17	27.3	Single	120	~
ST2 (LESS ROOF AREA)	DCBMH1	CHAMBERS			0.19	0.19	0.18	5.00	234.17	143.0	Double	170	~
ST3	CB4	CBMH4			0.03	0.03	0.03	5.00	234.17	23.2	Single	120	~
ST4	CBMH4	STMH4			0.05	0.05	0.05	5.00	234.17	38.7	Single	120	✓
ST6 (LESS ROOF AREA)	CB3	СВМНЗ			0.01	0.01	0.01	5.00	234.17	7.7	Single	120	~
ST7	CBMH3	CBMH2			0.02	0.02	0.02	5.00	234.17	15.5	Single	120	✓
ST8	CB7	СВМН6	0.01		0.07	0.08	0.07	5.00	234.17	54.6	Single	120	✓
ST9	CB6	СВМН6			0.09	0.09	0.09	5.00	234.17	69.6	Single	120	✓
ST10	СВМН6	CBMH5	0.01		0.14	0.15	0.14	5.00	234.17	110.3	Single	120	~
ST11	CB5	CBMH5	0.02		0.03	0.05	0.03	5.00	234.17	27.3	Single	120	~
ST12	CBMH5	CBMH2	0.02		0.03	0.05	0.03	5.00	234.17	25.9	Single	120	~
ST13	CBMH2	STMH3			0.13	0.13	0.12	5.00	234.17	100.5	Sinale	120	✓



APPENDIX C

Soil Parameters Geotechnical Investigation Orchard Square (Soil-Mat Engineers & Consultants Limited, December 20, 2021)

20-128 Soil Parameters



WIL	1	WIL	None	Mainly gravelly sandy till		Rapid to well	
WIL	3	WIL.C	None	15-40 cm sandy textures over gravelly sandy till		Rapid to well	
WIL	5	WIL	WIL.C	see WIL 1	see WIL 3	Rapid to well	Rapid to well
WIL	9	WIL.L	WIL	15-40 cm loamy textures over gravelly sandy till	see WIL 1	Rapid to well	Rapid to well
WIL	10	WIL.L	BRT	see WIL 9	see BRT 1	Rapid to well	Well
WIL	11	WIL.C	WIL	see WIL 3	see WIL 1	Rapid to well	Rapid to well
WIL	12	WIL.C	STD	see WIL 3	see STD 1	Rapid to well	Rapid to well
WIL	13	WIL.C	NDE	see WIL 3	see NDE 1	Rapid to well	Imperfect

NDE - Normandale								
NDE 1 NDE None		None	Mainly loamy fine sand and fine sandy loam	Imperfect				

CHART C2-2

CHART C2-2 - HYDROLOGIC SOIL GROUPS FOR GENERAL SOIL TYPES

Sands, sandy loams, and gravels						
 overlying sand, gravel or limestone bedrock, very well drained 						
- ditto, imperfectly drained						
- Shallow, overlying precambrian bedrock or clay subsoil						
Coarse loams						
- overlying sand, gravel or limestone, well drained	АВ					
- shallow, overlying precambrian bedrock or clay subsoil	В					
Medium textured loams						
- shallow, overlying limestone bedrock						
- overlying medium textured subsoil	ВС					
Silt loams, some loams	-					
- with good internal drainage	вс					
- with slow internal drainage and good external drainage	С					
Clays, clay loams, silty clay loams						
- with good internal drainage	С					
- with imperfect or poor external drainage	С					
- with slow internal drainage and good external drainage	D					

Note: Soils are classified on the basis of bare soil having maximum swelling at the end of a long storm whose rainl exceeds infiltration into soil. Classifications wn are subject to modification as experience dictates.

Classifications are based on S.C.S. definitions (9) modified to suit Ontario conditions.

CHART C2-8 - SOIL/LAND USE CURVE NUMBERS

Total III-a	Hydrologic Soil Group							
Land Use	A	AB	В	BC	С	CD	D	
Fallow (special cases only)	77	82	86	89	91	93	94	
Crop and other improved land	66*	70	74	78	82	84	86	
Pasture & other unimproved land		62*	65	71	76	79	81	
Woodlots and forest	50*	54*	58	65	71	74	77	
Impervious areas (paved) Bare rock draining directly to stread Bare rock draining indirectly to str Water surfaces	98 98 70 100	(use :	in spea	cial c	ases c	nly)		

Notes

- 1. Figures are based on average antecedent moisture condition (AMC II) except those marked *, which are initially wet (AMC III) or an intermediate condition. For definition of AMC's see Chart C2-10.
- 2. Table is not applicable to frozen soils or to periods in which snowmelt contributes to runoff.
- 3. For detailed values in urban areas see Table 2.2 of ref. 14.
- 4. Source: SCS Handbook of Hydrology, Chapter 9 (9), with modifications.

CHART C2-9 - PERCENT IMPERVIOUSNESS OF URBAN AREAS

Urban Land Use	% Imperviousness
Business - Commercial Industrial - Light Industrial - Heavy Residential - Low density Residential - Medium density Residential - High density	40 - 90 45 - 65 50 - 70 20 - 30 25 - 35 30 - 40

Source: SCS Handbook of Hydrology, Chapter 15 (9)

Soil-Mat Engineers & Consultants Ltd.

www.soil-mat.ca info@soil-mat.ca TF: 800.243.1922

Hamilton: 130 Lancing Drive L8W 3A1 T: 905.318.7440 F: 905.318.7455

Milton: PO Box 40012 Derry Heights PO L9T 7W4 T: 800.243.1922



December 20, 2021

2525228 ONTARIO LTD. c/o Thomas O'Hara Box 1152, 26 Main Street South Waterford, Ontario N0E1Y0

PROJECT No.: SM 302104-G

Attention: Thomas O'Hara

GEOTECHNICAL INVESTIGATION
ORCHARD SQUARE
OLD HIGHWAY 24 AND LAM BOULEVARD
WATERFORD, ONTARIO

Dear Mr. O'Hara

Further to your authorisation, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has completed the fieldwork, and report preparation in connection with the above noted project. The scope of work was completed in general accordance with our proposal P302104, dated August 17, 2021. Our comments and recommendations based on our findings at the six [6] borehole locations are presented in the following paragraphs.

1. Introduction

We understand that the project will involve the construction of a residential development located at the southeast corner of Old Highway 24 and Lam Boulevard in Waterford, Ontario. The development will consist of townhouses including the installation of underground municipal services, along asphalt paved roadways. It is understood that the stormwater management is likely to involve the use of an underground storage chamber system. The purpose of this geotechnical investigation work was to assess the subsurface soil and groundwater conditions, and to provide our comments and recommendations with respect to the design and construction of the proposed development, from a geotechnical point of view.

This report is based on the above summarised project description, and on the assumption that the design and construction will be performed in accordance with applicable codes and standards. Any significant deviations from the proposed project design may void the recommendations given in this report. If significant changes are made to the proposed design, this office must be consulted to review the new design with respect to the results of this investigation.





2. PROCEDURE

PROJECT No.: SM 302104-G

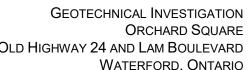
A total of six [6] sampled boreholes were advanced at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment on November 3, 2021 under the direction of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD., to termination at depths of between approximately 3.7 and 6.7 metres below the existing ground surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings. Selected samples were also subjected to laboratory grain size analyses.

Groundwater observations were made during the drilling operations. Upon completion of drilling, groundwater monitoring wells were installed at two [2] of the borehole locations. The monitoring wells consisted of 50-millimetre diameter PVC pipe, screened in the lower 1.5 metres. The monitoring wells were encased in well filter sand up to approximately 0.3 metres above the screened portion, then fitted with protective steel 'stick up' casings. The remaining boreholes were backfilled in general accordance with Ontario Regulation 903, and the ground surface was reinstated even with the existing grade.

Additionally, a total of three [3] selected samples of the subsurface soils recovered from the boreholes were submitted to AGAT Laboratories, an independent Canadian accredited analytical laboratory for background environmental testing. These samples were submitted for a standard panel of metal parameters, pH, and petroleum hydrocarbons [PHCs]. The purpose of this testing was to assess the background environmental characteristics of the subsurface soils for comparison to the relevant Standards under Ontario Regulation 406/19 [as amended] and provide preliminary comment regarding off-site disposal of surplus soil from the project. The results of this background analytical testing have been appended to the end of this report.

The boreholes were located in the field by representatives of SOIL-MAT ENGINEERS, based on accessibility over the site and clearance of underground utilities. The ground surface elevation at the borehole locations has been referenced to a site-specific temporary benchmark, described as the manhole cover at the southeast corner of the intersection of Old Highway 24 and Lam Boulevard, at the northwest corner of the





property, as illustrated in the attached Drawing No. 1, Borehole Location Plan. This benchmark has been assigned an elevation of 100.0 metres for convenience.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Borehole Nos. 1 to 6, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed at the exact depths of geological change.

3. SITE DESCRIPTION AND SUBSURFACE CONDITIONS

PROJECT No.: SM 302104-G

The subject site is located at the southeast corner of the intersection of Old Highway 24 and Lam Boulevard in Waterford, Ontario, and is currently occupied by a pond, a dirt driveway and parking area. The site is bound to the west by Old Highway 24, to the north Lam Boulevard, to the south by a single family dwelling and an agricultural field, and to the east by a walking trail and a residential development. The site is relatively flat, roughly level with Old Highway 24, with an overall topographic relief of approximately 1 metre based on the borehole elevations.

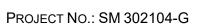
The subsurface conditions encountered at the borehole locations are summarised as follows:

Topsoil

A surficial veneer of topsoil approximately 250 to 350 millimetres in thickness was encountered at all borehole locations. It is noted that the depth of topsoil may vary across the site and from the depths encountered at the borehole locations, and a conservative approach should be taken in estimating topsoil quantities across the site. It is also noted that the term 'topsoil' has been used from a geotechnical point of view, and does not necessarily reflect its nutrient content or ability to support plant life.

Sand Fill

Sand fill was encountered beneath the topsoil at Borehole Nos. 1, 2, and 3. The sand fill soils were brown in colour with organic staining in the upper levels, contained trace clay, trace to some silt with occasional cobbles, and were generally in a loose condition. The sand fill was proven to depths of approximately 1.8 in Borehole No. 3, and to





approximately 4.1 metres in Borehole Nos. 1 and 2, however greater depths of fill material may be present across the site.

Sand

Native sand was encountered beneath the topsoil and/or the fill deposits at all borehole locations. The native fine grained soils were brown in colour, contained trace to some silt, clay and gravel. The soils were generally in a compact condition, and 'wet' between approximately 3.5 to 4.5 metres. The native sand was proven to terminations at depths between 3.7 to 6.7 metres below the existing ground surface at all borehole locations.

It is noted that due to the granular nature of the fill and native soils encountered, the transition from sand fill to native sand is somewhat indistinct. As such, some material identified as fill may in fact be loose or disturbed native soils. Conversely, some material identified as native soils may in fact be well compact fill.

Grain Size Analyses

Grain size analyses were conducted on four [4] selected samples of the native soils recovered from the boreholes. The results of this grain size testing can be found appended to the end of this report, and are summarized as follows:

						Hydraulic	Estimated
Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Conductivity, k	Infiltration
						[cm/s]	Rate, [mm/hr]
BH1 SS4	2.3 m	8	11	81	0	10 ⁻⁵	30 to 40
BH1 SS6	4.6 m	3	11	80	6	10-4	50 to 75
BH5 SS5	3.0 m	2	6	70	22	10 ⁻³	100 to 150
BH7 SS3	1.5 m	3	9	88	0	10 ⁻³	50 to 75

The results of the lab testing indicate the soils to consist predominately of sand, with trace clay, and trace to some silt and gravel. These soils are relatively permeable, with hydraulic conductivities on the order of 10⁻³ to 10⁻⁵ cm/sec. According to the Unified Soil Classification System (USCS), the soils are classified as S.M. – sand silt mixtures to S.P. – poorly graded sands or S.W. – well graded sands, gravelly sands little or no fines, or S.W. – well graded sands. These results of consistent with our observations of the soils during drilling and visual assessment of the recovered samples. These soils would generally be considered suitable for low impact development (LID) stormwater management systems. As in-situ infiltration rates vary with compaction, silt, and clay content, it is recommended that a conservative approach be taken for preliminary design of such LID stormwater management systems such as infiltration galleries/trenches,



WATERFORD, ONTARIO

considering a design of 30 mm/hr across the site. If the use of greater infiltration rates would be beneficial to the project, in-situ testing may be conducted at specific locations and depths of proposed galleries/trenches.

A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to consist of coarse-textured glaciolacustrine deposits of sand, gravel, with minor silt and clay. These conditions are consistent with our observations during drilling and experience in the area, encountering predominately fine grained granular soils with trace silt and clay.

Groundwater Observations

PROJECT No.: SM 302104-G

Borehole Nos. 1, 2, 3, 4, and 5 were noted to be open and 'wet' at a depths between 3.5 to 4.6 metres, while Borehole No. 6 was open and 'dry' upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes. As noted above, Borehole Nos. 1, and 2 were fitted with monitoring wells to allow for future measurements of the groundwater level. Measurements of the water level at the monitoring well locations were taken at two separate occasions, summarised as follows:

Darahala	Ground Surface	Novembe	r 25, 2021	December 2, 2021		
Borehole		Groundwater	Groundwater	Groundwater	Groundwater	
No.	Elevation (m)	Depth (m)	Elevation (m)	Depth (m)	Elevation (m)	
BH1/MW1	100.02	3.40	96.62	3.40	96.62	
BH2/MW2	100.85	4.09	96.76	4.09	96.76	

It is noted that the elevations noted above are based on reference to a temporary benchmark with an assumed elevation of 100.00 metres. These elevations may be corrected once the geodetic elevation of the benchmark has been established.

Based on the measurements at the monitoring well locations, the groundwater level is estimated at depths of 3.5 to 4 metres, at an elevation of roughly 96.5 to 97.0 metres below the ground surface, and would be expected to fluctuate seasonally. Based on the time of year of the groundwater measurements, this may be more indicative of a seasonal 'high'.



4. EXCAVATIONS

PROJECT No.: SM 302104-G

Excavations for the installation of foundations and underground services are anticipated to extend to depths of up to approximately 2 to 4 metres below the existing grade. Excavations through the fill materials and native sand would be expected to remain stable at inclinations of up to 45 degrees to the horizontal. Where wet sand seams are encountered, during periods of extended precipitation, or where excavations extend below the static groundwater level, the sides of excavations should be expected to 'slough in' to as flat as 3 horizontal to 1 vertical, or flatter. Where excavations extend below the ground water level or during the 'wet' times of the year, greater dewatering efforts should be anticipated, as well as increased excavation instability, and the contractor should expect to work in the 'wet'. Nevertheless, all excavations must comply with the current Occupational Health and Safety Act and Regulations for Construction Projects. The native sand soils encountered would be considered a Type 3 soil, as outlined in the Ontario Health and Safety Act III – Excavation. Excavation slopes steeper than those required in the Safety Act must be supported and a senior geotechnical engineer from this office should monitor the work.

As noted above the groundwater level is estimated at depths of approximately 3.5 to 4 metres, generally below the anticipated depths of construction, however some deeper excavations may extend near to below this level. Nevertheless, above the groundwater level, some infiltration of water from more permeable seams and surface runoff into the open excavations should be anticipated, however should be readily controlled using typical construction dewatering techniques for excavations above the groundwater level. Where excavations extend below the static groundwater level, increased excavation instability and groundwater infiltration should be expected. Significant infiltration of water should be expected for excavations extending below depths of about 4 metres, and as noted above, the contractor should be prepared to work in the 'wet'. It may be prudent to advance a series of test excavations in any areas of proposed deep excavations to assess first hand how groundwater levels may affect excavations operations. Surface water should be directed away from the excavations.

The base of the excavations in the native fine grained granular soils encountered in the boreholes should generally remain firm and stable above the groundwater level. Where excavations extend near to below the static groundwater level, during the 'wet' times of the year, or where left exposed to elements for extended periods of time, stabilisation of excavation bases may be required. Such stabilisation efforts may include sub-excavation of unsuitable materials, additional bedding, or 'punching' in coarse granular material or 'rip rap'. Stabilised where required, standard pipe bedding material as specified by the Ontario Provincial Standard Specification [OPSS] or Norfolk County should be satisfactory. The bedding should be well compacted to provide sufficient



support to the pipes and components (i.e. valve chambers, manholes etc.), and to minimize settlements of the roadway above the service trenches. Special attention

We recommend that the invert elevations of any storm sewer pipes for rear yard catch basins be located above the proposed underside of footing elevations of adjacent residential structures, or that the trench excavations should be filled with 5 MPa 'lean mix' concrete product to the proposed underside of footing level where the excavations extend below an imaginary 10 horizontal to 7 vertical line extending outwards and down from a point 0.3 metres beyond the proposed townhouse foundations.

Any utility poles, light poles, etc. located within 3 metres of the top of an excavation slope should be braced to ensure their stability. Likewise, temporary support might be required for other existing above and below ground structures, including existing underground services, roadways, etc. depending on their proximity to the trench excavations.

5. BACKFILL CONSIDERATIONS

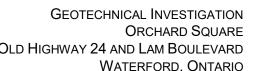
PROJECT No.: SM 302104-G

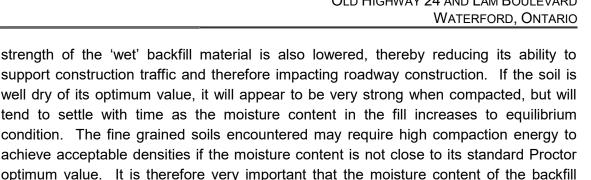
should be paid to compaction under the pipe haunches.

The excavated material will consist predominately of the fill and native sand soils encountered in the boreholes as described above. These soils are generally considered suitable for use as engineered fill, trench backfill, etc., provided that they are free of organics, construction debris, or other deleterious material, and that its moisture content can be controlled to within 3 per cent of its standard Proctor optimum moisture content.

It is noted that while moderately free draining, the on-site sandy soils encountered should not considered to be free draining and should not be used where this characteristic is necessary without additional assessment and testing. It is also noted that these fine grained soils will present difficulties in achieving effective compaction where access with compaction equipment is restricted. The on-site soils encountered are generally considered to be near to slightly 'dry' of their standard Proctor optimum moisture content. Some moisture conditioning may be required depending upon the weather conditions at the time of construction. It is noted that these soils will become nearly impossible to compact when wet of its optimum moisture content. Any material that becomes wet to saturated should be spread out to allow to dry, or removed and discarded, or utilised in non-settlement sensitive areas.

We note that where backfill material is placed near or slightly above its optimum moisture content, the potential for long term settlements due to the ingress of groundwater and collapse of the fill structure is reduced. Correspondingly, the shear





A representative of SOIL-MAT should be present on-site during the backfilling and compaction operations to confirm the uniform compaction of the backfill material to project specification requirements. Close supervision is prudent in areas that are not readily accessible to compaction equipment, for instance near the end of compaction 'runs'. In the event that site grading activities result in the placement of engineered fill below founding level, all structural fill should be compacted to 100 per cent of its standard Proctor maximum dry density [SPMDD]. Backfill within service trenches, areas to be paved, etc., should be placed in loose lifts not exceeding 300 millimetres in thickness and compacted to a minimum of 98 per cent of its SPMDD. The appropriate compaction equipment should be employed based on soil type, i.e. pad-toe for cohesive soils and smooth drum/vibratory plate for granular soils. A method should be developed to assess compaction efficiency employing the on-site compaction equipment and backfill materials during construction.

soils be within 3 per cent of its standard Proctor optimum moisture content during placement and compaction to minimise long term subsidence [settlement] of the fill mass. Any imported fill required in service trenches or to raise the subgrade elevation should have its moisture content within 3 per cent of its optimum moisture content and

PROJECT No.: SM 302104-G

meet the necessary environmental guidelines.

It is understood that the existing pond at the southwest corner of the property will be filled as part of site development. Care will be required to ensure that all saturated, organic, or otherwise unsuitable soils are removed from the base of the pond and the based assessed by a representative of SOIL-MAT ENGINEERS prior to placement of engineered fill. Depending on the depth of the pond, the contractor may encounter difficulties completely removing all of the water from the pond. If feasible, draining of the pond and placement of engineered fill in this area should be conducted during the dry summer months. The pond should be filled with a quality engineered fill compacted in accordance with the requirements noted above with monitoring and testing by a representative of SOIL-MAT ENGINEERS on a full time basis. It is understood it is proposed to make used of a crushed concrete product as engineered fill to fill the pond. This material should be crushed down into a well graded granular material and assessed by our office prior to its acceptance and use as engineered fill.



6. MANHOLES, CATCH BASINS AND THRUST BLOCKS

PROJECT No.: SM 302104-G

Properly prepared bearing surfaces for manholes, valve chambers, etc. in the native competent soils or engineered fill, stabilised where required, will be practically non-yielding under the anticipated loads. Proper preparation of the founding soils will tend to accentuate the protrusion of these structures above the pavement surface if compaction of the fill around these structures is not adequate, causing settlement of the surrounding paved surfaces. Conversely, the pavement surfaces may rise above the valve chambers and around manholes under frost action. To alleviate the potential for these types of differential movements, free-draining, non-frost susceptible material should be employed as backfill around the structures located within the paved roadway limits, and compacted to 100 per cent of its standard Proctor maximum dry density.

The thrust blocks in the native soils or quality engineered fill may be conservatively sized as recommended by the applicable Ontario Provincial Standard Specification conservatively using a horizontal allowable bearing pressure of up to 150 kPa [~3,000 psf]. Any backfill required behind the blocks should be a well-graded granular product and should be compacted to 100 per cent of its standard Proctor maximum dry density.

7. PAVEMENT STRUCTURE DESIGN CONSIDERATIONS

All areas to be paved must be cleared of all organic and otherwise unsuitable materials, and the exposed subgrade proof rolled with 3 to 4 passes of a loaded tandem-axle truck in the presence of a representative of SOIL-MAT ENGINEERS & CONSULTANTS LTD., immediately prior to the placement of the sub-base material. Any areas of distress revealed by this or other means should be subexcavated and replaced with suitable backfill material. Where the subgrade condition is poorer it may be necessary to implement more aggressive stabilisation methods, such as the use of coarse aggregate [50-millimetre clear stone, 'rip rap', etc.] 'punched' into the soft areas.

Good drainage provisions will optimise the long-term performance of the pavement structure. The subgrade must be properly crowned and shaped to promote drainage to the subdrain system. Subdrains should be installed to intercept excess subsurface water and to prevent softening of the subgrade material. Surface water should not be allowed to pond adjacent to the outer limits of the paved areas.

The most severe loading conditions on the subgrade typically occur during the course of construction, therefore precautionary measures may have to be taken to ensure that the subgrade is not unduly disturbed by construction traffic. Soil-Mat should be given the

GEOTECHNICAL INVESTIGATION
ORCHARD SQUARE
OLD HIGHWAY 24 AND LAM BOULEVARD
WATERFORD, ONTARIO



opportunity to review the final pavement structure design and subdrain scheme prior to construction to ensure that they are consistent with the recommendations of this report.

PROJECT No.: SM 302104-G

If construction is conducted under adverse weather conditions, additional subgrade preparation may be required. During wet weather conditions, such as during the fall and spring months, it should be anticipated that additional subgrade preparation will be required, such as additional depth of Ontario Provincial Standard Specification [OPSS] Granular 'B', Type II (crushed bedrock) sub-base material. It is also important that the sub-base and base granular layers of the pavement structure be placed as soon as possible after exposure, preparation and approval of the subgrade level.

The proposed roadways through the residential subdivision would be required to adequately support cars, trucks and intermittent delivery and garbage trucks. Where roadways are to be assumed by Norfolk County, they should conform to Norfolk County's pavement design requirements, understood to consist of 300 millimetres of OPSS Granular 'B', Type II (crushed bedrock) sub-base course, 150 millimetres of OPSS Granular 'A' base course, 50 millimetres of HL8 binder course asphaltic concrete, and 40 millimetres of HL3 surface course asphaltic concrete for local roads. This is considered a suitable pavement structure for the proposed development, provided the subgrade is good and firm prior to the placement of granular sub-base layers. If the subgrade is soft, remedial measures as discussed above may have to be implemented and/or the sub-base thickness may have to be increased. It is noted that a pit run sand and gravel Granular B Type I may be considered based on local availability. This would be considered an acceptable, cost effective alternative to a fully crushed Granular B Type II (crushed bedrock), however if utilised, the depth of Granular B Type I should be increased to a minimum of 400 millimetres. The granular sub-base and base courses and asphaltic concrete layers should be compacted to OPSS or Norfolk County requirements. A program of in-place density testing must be carried out to monitor that compaction requirements are being met. We note that this pavement structure is not to be considered as a construction roadway design.

To minimise segregation of the finished asphalt mat, the asphalt temperature must be maintained uniform throughout the mat during placement and compaction. All too often, significant temperature gradients exist in the delivered and placed asphalt with the cooler portions of the mat resisting compaction and presenting a honeycomb surface. As the spreader moves forward, a responsible member of the paving crew should monitor the pavement surface, to ensure a smooth uniform surface. The contractor can mitigate the surface segregation by 'back-casting' or scattering shovels of the full mix material over the segregated areas and raking out the coarse particles during compaction operations. Of course, the above assumes that the asphalt mix is sufficiently hot to allow the 'back-casting' to be performed.



Asphalt paving of driveways should be consistent with the general recommendations provided above. Proper preparation of the subgrade soils is essential to good long-term performance of the pavement. Likewise, sufficient depth and compaction of granular base materials and adequate drainage will be important in achieving good long-term performance, i.e. preventing/limiting premature cracking, subgrade failure, rutting, etc. It is understood that the Norfolk County standards indicate residential driveways to consist of a minimum of 150 millimetres of OPSS Granular 'A' base course, compacted to 100 percent standard Proctor maximum dry density, followed by a minimum of 50 millimetres of HL3 or HL3F asphaltic concrete, compacted to a minimum of 92 per cent of their Marshall maximum relative density [MRD].

8. HOUSE AND TOWNHOUSE CONSTRUCTION

PROJECT No.: SM 302104-G

The native soils encountered at the borehole locations are considered capable of supporting the loads associated with typical residential dwelling and townhouse structures on conventional spread footings, below any fill, organic, or otherwise unsuitable materials. This typically considers a nominal design bearing pressure of 75 kPa [~1,500 psf], however bearing pressures of up to 150 kPa [~3,000 psf] SLS and 225 kPa [~4,500 psf] ULS may be considered in the competent native soils, however it is not anticipated that such higher bearing values are required for the proposed development. The founding surfaces must be hand cleaned of any loose or disturbed material, along with any ponded water, immediately prior to placement of foundation concrete. Depending on the condition of the soil present at the founding level at the time of construction, depth of fill materials encountered, etc., some sub-excavation of unsuitable soils may be required.

In the event that site grading works or the remediation of existing unsuitable fill deposits require the placement of engineered fill below the founding elevations of the proposed structures, the general recommendations presented in the Backfill Considerations above should be strictly adhered to, with compaction to 100 per cent of its SPMDD, verified by monitoring and testing by a representative of SOIL-MAT ENGINEERS present on a full time basis. If there is a short fall in the volume of fill required, then the source of imported fill should be reviewed for gradation, Proctor value, compatibility with existing fill, environmental characteristics and be approved by this office prior to use. On a preliminary basis the design bearing capacity for footings within the engineered fill should be limited to 100 kPa [~2,000 psf] SLS and 150 kPa [~3,000 psf] ULS, pending confirmation based on monitoring and testing of the engineered fill works.

GEOTECHNICAL INVESTIGATION ORCHARD SQUARE OLD HIGHWAY 24 AND LAM BOULEVARD WATERFORD, ONTARIO



The support conditions afforded by the native soils and/or engineered fill are generally not uniform across the building footprint, nor are the loads on the various foundation elements. As such it is recommended that consideration be given to the provision of nominal reinforcement in the footings and foundation walls to account for variable support and loading conditions. The use of nominal reinforcement is considered good construction practice as it will act to reduce the potential for cracking in the foundation walls due to minor settlements, heaving, shrinkage, etc. and will assist in resisting the pressures generated against the foundation walls by the backfill. Such nominal reinforcement is an economical approach to the reduction and prevention of costly foundation repairs after completion and later in the life of the buildings. reinforcement would typically consist of two continuous 15M steel bars placed in the footings [directly below the foundation wall], and similarly two steel bars placed approximately 300 millimeters from the top of the foundation walls at a minimum, depending on ground conditions exposed during construction. These reinforcement bars would be bent to reinforce all corners and under basement windows, and be provided with sufficient overlap at staggered splice locations. At 'steps' in the foundations and at window locations, the reinforcing steel should transition diagonally, rather than at 90 degrees, to maintain the continuous tensile capacity of the reinforcement. footings are founded on, or partially on, engineered fill the above provision for nominal reinforcement would be required.

PROJECT No.: SM 302104-G

All basement foundation walls should be suitably damp proofed, including the provision of a 'dimple board' type drainage product, and provided with a perimeter drainage tile system outlet to a gravity sewer connection or positive sump pit a minimum of 150 millimetres below the basement floor slab. The clear stone material surrounding the weeping tile should be encased with a geotextile material to prevent the migration of fines from the foundation wall backfill into the clear stone product. In the event that sump pit systems are required we would recommend that the sump pump system should be constructed with an 'oversized' reservoir and a 'back-flow' prevention valve so that the sump pump will not cycle repeatedly within short time periods.

All footings exposed to the environment must be provided with a minimum of 1.2 meters of earth or equivalent insulation to protect against frost penetration. This frost protection would also be required if construction were undertaken during the winter months. All footings must be proportioned to satisfy the requirements of the Ontario Provincial Building Code.

It is imperative that a soils engineer be retained from this office to provide geotechnical engineering services during the excavation and foundation construction phases of the project. This is to observe compliance with the design concepts and recommendations



outlined in this report, and to allow changes to be made in the event that subsurface conditions differ from the conditions identified at the borehole locations.

9. ENVIRONMENTAL CONSIDERATIONS

PROJECT No.: SM 302104-G

As noted above, selected samples of the subsurface soils recovered from the boreholes were submitted to AGAT Laboratories, an independent Canadian accredited analytical laboratory for background analytical testing. Three [3] selected samples of the samples recovered from the boreholes [identified as BH1 SS3, BH3 SS1, and BH4 SS3] were submitted for background analytical testing consisting of a standard panel of metal and inorganics, and petroleum hydrocarbons [PHCs]. The purpose of this testing was to provide preliminary comments with respect to the off-site disposal of surplus soil during construction. The results of this testing are presented in the attached AGAT Certificates of Analysis [21T825888]. The results of this analytical testing has been appended to the end of this report.

The laboratory test results received in our office were compared to the applicable standard from the <u>Soil, Ground Water and Sediment Standards</u> for Use Under Part XV.1 of the *Environmental Protection Act*, as follows:

- Table 1: Full Depth Background Site Condition Standards.
- Table 2.1: Full Depth Excess Soil Quality Standards in a Potable Ground Water Condition for a Residential/ Parkland/ Institutional property use, [RPI], as well as for an Industrial/ Commercial/ Community [ICC] property use.
- Table 3.1: Full Depth Excess Soil Quality Standards in a Non-Potable Ground Water Condition for a Residential/ Parkland/ Institutional property use, [RPI], as well as for an Industrial/ Commercial/ Community [ICC] property use.

Based on SOIL-MAT ENGINEERS' field observations and the analytical test results from AGAT, SOIL-MAT ENGINEERS has the following comments to offer:

- 1. The sampled material was found to meet the Table 1 [RPI/ICC] Standards for all parameters tested.
- 2. The submitted samples were found to meet the Table 2.1 and 3.1 [RPI] Standards for the tested parameters.
- 3. The submitted samples were found to meet the Table 2.1 and 3.1 [ICC] Standards for the tested parameters.

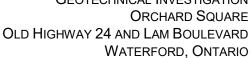


4. The samples secured for analytical testing are believed to be representative of the soil conditions at the borehole locations only. If any significant changes are noted, i.e., odours, staining etc., SOIL-MAT should be contacted to reassess the environmental characteristics of the soil.

Given the above test results the following disposal options are applicable under Regulation 406/19, as amended:

- As the tested material has been shown to meet the Table 1 [RPI/ICC] Standards, surplus material may reasonably be accepted at an off-site Table 1 property, including a property subject to a Record of Site Condition or MECP Certificate of Authorisation, subject to approval of the receiving property owner or designated Qualified Person [QP].
- As the test results for the submitted sample was found to meet the Table 2.1 and 3.1
 [RPI] Standards, surplus materials may reasonably be accepted at an off site RPI
 property in a potable or non-potable groundwater conditions, subject to approval of
 the receiving property owner/QP;
- As the sampled material was found to meet the Table 2.1 and 3.1 [ICC] Standards, surplus material may reasonably be accepted at an off-site ICC property in a potable or non-potable groundwater condition, subject to approval of the receiving property owner/QP.
- Depending on the volume of surplus soil to be handled, as well as the environmental requirements of the receiving site, additional testing may be required.
- Excavated soil may be reused on site.

PROJECT No.: SM 302104-G





PROJECT No.: SM 302104-G

It is anticipated that the proposed development will require import of some volume of soil as part of grading activities, filling the existing pond with engineered fill, etc. Ontario Regulation has recently come into effect, which governs the management of excess soils during construction. Where soil import is required, the import operations would require strict monitoring and control via the implementation of a Fill Management Plan. including pre-screening of potential source sites.

In the event that site development requires export of some volume of surplus soil from the site as part of grading activities, foundation construction etc. the management of excess soils requires the developer to conduct an assessment of the subject site, along with rigorous sampling and analysis based, based on volume of surplus soil generated, to support acceptance at an off-site location. Such testing can be conducted once development details have been finalised, based on volume of surplus soils to be generated, as well as the results of the Assessment of Past Uses, or a Phase One ESA, if available. Regardless of import or export volumes, SOIL-MAT ENGINEERS may be retained to provide such services, to ensure the operations are conducted in accordance with Ontario Regulation 406/19.





11. GENERAL COMMENTS

PROJECT No.: SM 302104-G

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly, SOIL-MAT ENGINEERS & CONSULTANTS LTD.

Evan Chambers, B.Eng., EIT.

Kyle Richardson, P. Eng. **Project Engineer**

Drawing No. 1, Borehole Location Plan Enclosures:

Log of Borehole Nos. 1 to 6, inclusive

Drawing No. 2, Recommended Design Requirements for Basement Construction

AGAT Certificate of Analyses [21T825888]

Distribution: 2525228 Ontario Ltd [1, plus pdf]



LEGEND



Borehole Location



Temporary Benchmark

Top of manhole cover. Assigned Elevation of 100.00 metres

NOTES

- 1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 302104-G.
- 2. Proposed Borehole locations are approximate and Subject to change.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Proposed Townhouse Development Old Highway 24 & Lam Boulevard Waterford, Ontario

Proposed Borehole Location Plan

Project No. SM 302104-G

Date: November 2021

Drawn: NS

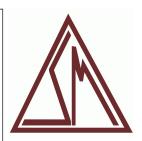
SM 302104-G Borehole Location Plan

Drawing No. 1

Project No: SM 302104-GProject Manager: Ian Shaw, P.EngProject: Proposed Townhouse DevelopmentBorehole Location: See Drawing No.1

Location: Old Hwy 24 and Lam Blvd, Waterford UTM Coordinates - N: 4752173

Client: 2525228 Ontario Ltd. E: 558186



								SAMF	PLE				Moisture Content
	Depth	Elevation (m)	Symbol	Description	Well Data	Туре	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	A W% A 10 20 30 40 Standard Penetration Test • blows/300mm • 20 40 60 80
ft	m	100.02		Ground Surface									
1 2		99.70	$= \frac{1}{2}$	Topsoil Approximately 300 millimetres of topsoil.		SS	1	3,3,4,5	7				
3 4 4	_ _ 1			Sand Fill Brown, some organic staining in the upper levels, trace silt, trace clay, very		SS	2	2,1,1,2	2				
6	2			loose to loose.		ss	3	2,2,4,3	6				
9						ss	4	2,1,1,1	2				
10 = 11 = 12 = 12 = 1					<u> </u>	ss	5	1,1,1,1	2				
13 14	_ _ 4	95.90		Sand									
15 1 16 1 17 -	_ 5			Brown, wet below this depth, trace gravel, trace silt, trace clay, very loose to compact.		ss	6	6,11,11,12	22				
18													
20	٥ 	93.30				SS	7	4,5,6,9	11				1
23	- - - 7			End of Borehole									
24 - 25 - 26 - 27 -	8	99.70 95.90 93.30		NOTES: 1. Borehole was advanced using hollow stem auger equipment on November 3, 2021 to termination at a depth of 6.7 metres.									
28 29	- - - - - - - 9			Borehole was recorded as open and 'wet' at a depth of 4.6 metres upon completion and backfilled as per Ontario Regulation 903.									
31				Soil samples will be discarded after 3 months unless otherwise directed by our client.									
33	10			 A monitoring well was installed. The following free groundwater level readings have been measured: 									
35 36	_ _ _ _ 11			November 25: 3.40 metres below ground surface.									

Drill Method: Hollow Stem Augers

Drill Date: November 3, 2021 **Hole Size:** 200 Millimetres

Drilling Contractor: Elements Geo

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Temporary Benchmark

Field Logged by: NS

Checked by: IS Sheet: 1 of 1

Project No: SM 302104-GProject Manager: Ian Shaw, P.EngProject: Proposed Townhouse DevelopmentBorehole Location: See Drawing No.1

Location: Old Hwy 24 and Lam Blvd, Waterford UTM Coordinates - N: 4752096
Client: 2525228 Ontario Ltd. E: 558262



									SAME	PLE				Moisture Content
Depth		Elevation (m)	Symbol	Description	Well Data		Туре	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	10 20 30 40 Standard Penetration Test blows/300mm 20 40 60 80
ft ı	m_	100.85		Ground Surface										
1 2	U	100.50		Topsoil Approximately 300 millimetres of topsoil.			SS	1	3,1,1,1	2				
3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	- 1			Sand Fill Brown, some organic staining in the upper levels, trace silt, trace clay, trace			ss	2	50/1"	100				
6 7	- 2			cobbles, very loose.			SS	3	3,3,2,2	5				
8 9 10	- 3						ss	4	1,1,1,1	2				
11 12							ss	5	1,1,1,1	2				
13	- 4	96.70		Sand	<u>¥</u> ∷									
15 16 17	- 5			Brown, wet below this depth, trace silt, trace clay, trace gravel, loose to compact.			ss	6	9,10,12,11	22				
18	- 6													
20 1		94.10				4	ss	7	4,11,14,14	25				1
23	7			End of Borehole										
25	- 8			NOTES: 1. Borehole was advanced using hollow stem auger equipment on November 3, 2021 to										
ft 0 1 2 3 4 5 6 7 8 9 10 11 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 30 31 32				termination at a depth of 6.7 metres. 2. Borehole was recorded as open and 'wet' at a depth of 3.5 metres upon completion and backfilled as per Ontario Regulation 903.										
30	- 9			 Soil samples will be discarded after 3 months unless otherwise directed by our client. 										
32 33 34 35	- 10			 A monitoring well was installed. The following free groundwater level readings have been measured: 										
35	- 11			November 25: 4.09 metres below ground surface. December 2: 4.09 metres below ground										

Drill Method: Hollow Stem Augers

Drill Date: November 3, 2021 **Hole Size:** 200 Millimetres

Drilling Contractor: Elements Geo

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Temporary Benchmark

Field Logged by: NS

Checked by: IS Sheet: 1 of 1

Project No:SM 302104-GProject Manager:Ian Shaw, P.EngProject:Project:Project Manager:Borehole Location:See Drawing No.1

Location: Old Hwy 24 and Lam Blvd, Waterford UTM Coordinates - N: 4752116

Client: 2525228 Ontario Ltd. E: 558247



							SAMF	PLE				Moisture Content
Depth	Elevation (m)	Symbol	Description	Well Data	Туре	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	A W% A 10 20 30 40 Standard Penetration Test • blows/300mm • 20 40 60 80
ft m	100.85		Ground Surface									
1 2	100.55		Topsoil Approximately 300 millimetres of topsoil.		SS	1	4,11,12,12	23				T
3 1 4 1 5 1			Sand Brown, some organic staining in upper levels, trace silt, clay and gravel,		SS	2	8,10,10,8	20				
6 2			compact.		SS	3	5,5,5,8	10				
9 10 3					SS	4	5,9,12,14	21				
11 12					ss	5	8,12,14,13	26				
13 ¥ 4 14 ¥ 15 ¥												
16 5 17 5	95.60				SS	6	10,10,10,10	20				1
ft 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 20 21 14 15 16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33 34 35 36 36 36 36 36 36 36 36 36 36 36 36 36			NOTES: 1. Borehole was advanced using hollow stem auger equipment on November 3, 2021 to termination at a depth of 5.2 metres. 2. Borehole was recorded as open and 'wet' at a depth of 3.5 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.									

Drill Method: Hollow Stem Augers

Drill Date: November 3, 2021 **Hole Size:** 200 Millimetres

Drilling Contractor: Elements Geo

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Temporary Benchmark

Field Logged by: NS

Checked by: IS

Project No: SM 302104-GProject Manager: Ian Shaw, P.EngProject: Proposed Townhouse DevelopmentBorehole Location: See Drawing No.1

Location: Old Hwy 24 and Lam Blvd, Waterford UTM Coordinates - N: 4752147 Client: 2525228 Ontario Ltd.



							SAMF	PLE				Moisture Content
Depth	Elevation (m)	Symbol	Description	Well Data	Туре	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	N
ft m	100.14		Ground Surface									
1 2 2	99.90	$=$ $=$ $^{?}$	Topsoil Approximately 200 millimetres of topsoil.		SS	1	4,5,5,4	10				
3 1			Silty Sand/Sand Brown, reworked in the upper levels, trace silt, trace clay, wet in the lower		SS	2	7,8,12,13	20				
6 2			levels, loose to compact.		SS	3	10,10,13,14	23				
9					SS	4	7,7,8,7	15				
11 12	96.50		5.175		SS	5	5,5,6,7	11				
13 4			End of Borehole									
14 * 15 *			NOTES:									
16 <u>5</u> 17 <u>18</u>			Borehole was advanced using solid stem auger equipment on November 3, 2021 to termination at a depth of 3.7 metres.									
19 6 20 6			Borehole was recorded as open and 'wet' at a depth of 3.5 metres upon completion and backfilled as per Ontario Regulation 903.									
ft 0 1 2 3 4 5 6 7 8 9 10 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 20 21 22 23 24 25 26 27 28 29 20 21 22 23 24 25 26 27 28 29 20 21 22 23 24 25 26 27 28 29 20 21 21 22 23 44 45			Soil samples will be discarded after 3 months unless otherwise directed by our client.									
25 26 8												
27												
29 9												
29 30 31 32 33 33 33 34 35 35 35 35 36 36 36 36 36 36 36 36 36 36 36 36 36	4											
34												
36 1	1											

Drill Method: Solid Stem AugersDrill Date: November 3, 2021Hole Size: 150 Millimetres

Drilling Contractor: Elements Geo

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1 T: 905.318.7440 F: 905.318.7455

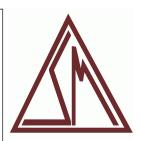
E: info@soil-mat.ca

Datum: Temporary Benchmark

Field Logged by: NS Checked by: IS

Project No:SM 302104-GProject Manager:Ian Shaw, P.EngProject:Project:Project Manager:Borehole Location:See Drawing No.1

Location: Old Hwy 24 and Lam Blvd, Waterford UTM Coordinates - N: 4752147 Client: 2525228 Ontario Ltd.



							SAMF	PLE				Moisture Content
Depth	Elevation (m)	Symbol	Description	Well Data	Туре	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	10 20 30 40 Standard Penetration Test ■ blows/300mm 20 40 60 80
ft m	99.64	~ .	Ground Surface									
1 2 2	99.40	== {\}	Topsoil Approximately 200 millimetres of topsoil.		SS	1	3,5,6,6	11				
3 1			Sand Brown, reworked in the upper levels,		SS	2	6,8,9,13	17				
6 2			trace silt, trace clay, wet in the lower levels, compact.		SS	3	9,14,14,16	28				
8 9 2					SS	4	5,5,6,8	11				
10 3	96.00				ss	5	6,12,17,13	29				
13 4			End of Borehole									
14 15			NOTES:									
16 <u>5</u> 17 <u>18</u>			Borehole was advanced using solid stem auger equipment on November 3, 2021 to termination at a depth of 3.7 metres.									
ft m 0 1 1 2 3 4 5 6 7 8 9 10 12 13 14 15 16 17 18 19 2 24 2 24 2 24 2 26 2 28 2 28			Borehole was recorded as open and 'wet' at a depth of 3.5 metres upon completion and backfilled as per Ontario Regulation 903.									
22 7			Soil samples will be discarded after 3 months unless otherwise directed by our client.									
25 26 8												
≢-												
29 30 31 32 33 33 34 35 35												
32 1												
34												
35 36 1												

Drill Method: Solid Stem AugersDrill Date: November 3, 2021Hole Size: 150 Millimetres

Drilling Contractor: Elements Geo

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1 T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Temporary Benchmark

Field Logged by: NS Checked by: IS

Project No:SM 302104-GProject Manager:Ian Shaw, P.EngProject:Project:Project Manager:Borehole Location:See Drawing No.1

Location: Old Hwy 24 and Lam Blvd, Waterford UTM Coordinates - N: 4752161 Client: 2525228 Ontario Ltd.



							SAMF	PLE				Moisture Content
Depth	Elevation (m)	Symbol	Description	Well Data	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	N
ft m	99.69	\sim	Ground Surface									
1 2 2		$\widetilde{\mathbb{R}}$	Topsoil Approximately 200 millimetres of topsoil.		SS	1	5,5,7,6	12				
3 1 4 1 5 1			Sand Brown, reworked in the upper levels, trace silt, trace clay, compact.		SS	2	10,10,14,16	24				
6 2			,, _/ , _/		SS	3	11,12,13,14	25				
9 3					SS	4	7,8,8,9	16				
11 12	96.00				ss	5	2,5,9,12	14				
13 4			End of Borehole									
14 <u>1</u>			NOTES:									
## 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 13 14 15 16 21 22 23 24 25 26 27 28 28 27 28 28 27 28 28 27 28 28 27 28 28 28 27 28 28 28 27 28 28 28 28 28 28 28 28 28 28 28 28 28			Borehole was advanced using solid stem auger equipment on November 3, 2021 to termination at a depth of 3.7 metres.									
18 19 6 20 6			Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.									
21 22 7			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.									
24 - 7 25 - 7												
26 8 27												
29 9												
29 30 31 32 33 34 35 36 36 1												
33 1												
35 <u>1</u>												

Drill Method: Solid Stem AugersDrill Date: November 3, 2021Hole Size: 150 Millimetres

Drilling Contractor: Elements Geo

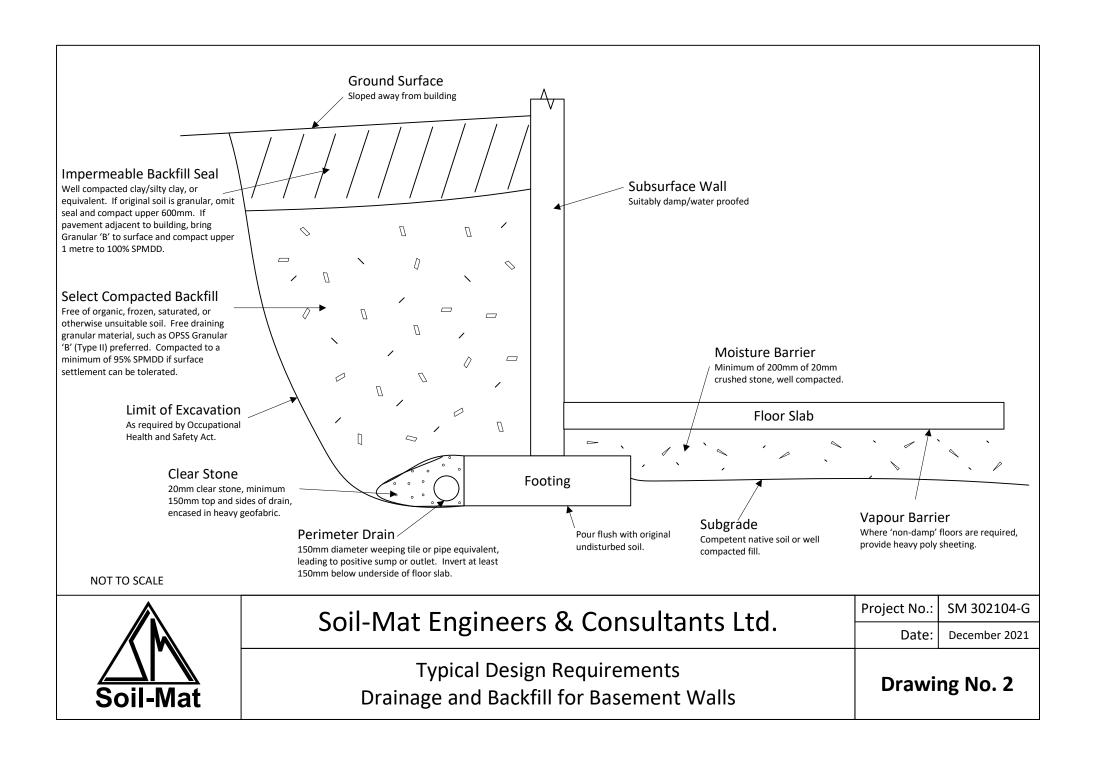
Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1 T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Temporary Benchmark

Field Logged by: NS Checked by: IS





CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT 130 LANCING DRIVE HAMILTON, ON L8W3A1 (905) 318-7440

FO: Malcolm Crain

ATTENTION TO: Malcolm Craig PROJECT: 302104

AGAT WORK ORDER: 21T825888

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Nov 10, 2021

PAGES (INCLUDING COVER): 10 VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes	

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may
 incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may
 be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other
 third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the
 services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of
 merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines
 contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories (V1)

Page 1 of 10

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Western Enviro-Agricultural Laboratory Association (WEALA) Environmental Services Association of Alberta (ESAA) AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.



Certificate of Analysis

AGAT WORK ORDER: 21T825888

PROJECT: 302104

ATTENTION TO: Malcolm Craig

SAMPLED BY:

5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT SAMPLING SITE:

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2021-11-04							DATE REPORTED: 2021-11-10
Parameter	Unit		CRIPTION: PLE TYPE: SAMPLED: RDL	BH1SS3 Soil 2021-11-03 3170855	BH3SS1 Soil 2021-11-03 3170859	BH4SS3 Soil 2021-11-03 3170861	
Antimony	μg/g	1.3	0.8	<0.8	<0.8	<0.8	
Arsenic	μg/g	18	1	2	3	2	
Barium	μg/g	220	2.0	21.4	29.0	13.2	
Beryllium	μg/g	2.5	0.4	<0.4	<0.4	<0.4	
Boron	μg/g	36	5	<5	<5	<5	
Boron (Hot Water Soluble)	μg/g	NA	0.10	<0.10	0.22	<0.10	
Cadmium	μg/g	1.2	0.5	<0.5	<0.5	<0.5	
Chromium	μg/g	70	5	12	10	<5	
Cobalt	μg/g	21	0.5	3.2	3.3	1.6	
Copper	μg/g	92	1.0	6.0	10.7	5.9	
Lead	μg/g	120	1	5	10	3	
Molybdenum	μg/g	2	0.5	<0.5	<0.5	<0.5	
Nickel	μg/g	82	1	7	8	4	
Selenium	μg/g	1.5	0.8	<0.8	<0.8	<0.8	
Silver	μg/g	0.5	0.5	<0.5	<0.5	<0.5	
Thallium	μg/g	1	0.5	<0.5	<0.5	<0.5	
Uranium	μg/g	2.5	0.50	< 0.50	< 0.50	< 0.50	
Vanadium	μg/g	86	0.4	32.1	17.3	7.0	
Zinc	μg/g	290	5	25	43	18	
Chromium, Hexavalent	μg/g	0.66	0.2	<0.2	<0.2	<0.2	
Cyanide, Free	μg/g	0.051	0.040	< 0.040	<0.040	<0.040	
Mercury	μg/g	0.27	0.10	<0.10	<0.10	<0.10	
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.062	0.147	0.068	
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.123	0.166	0.088	
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.20	7.60	7.86	





CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

Certificate of Analysis

AGAT WORK ORDER: 21T825888

PROJECT: 302104

MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

5835 COOPERS AVENUE

ATTENTION TO: Malcolm Craig

SAMPLED BY:

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2021-11-04 **DATE REPORTED: 2021-11-10**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil -

Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3170855-3170861 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. SAR is a calculated parameter.

SAMPLING SITE:

Analysis performed at AGAT Toronto (unless marked by *)

NIVINE BASILY CHEMIST



CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T825888

PROJECT: 302104

ATTENTION TO: Malcolm Craig

SAMPLED BY:

5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

O Pag 153(511) - PHCs F1 - F4 (Soil)

DATE RECEIVED: 2021-11-04							DATE REPORTED: 2021-11-10
	S	SAMPLE DESC	CRIPTION:	BH1SS3	BH3SS1	BH4SS3	
		SAMF	PLE TYPE:	Soil	Soil	Soil	
		DATE S	SAMPLED:	2021-11-03	2021-11-03	2021-11-03	
Parameter	Unit	G/S	RDL	3170855	3170859	3170861	
Benzene	μg/g	0.02	0.02	<0.02	<0.02	<0.02	
Toluene	μg/g	0.2	0.05	< 0.05	< 0.05	< 0.05	
Ethylbenzene	μg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	
m & p-Xylene	μg/g		0.05	<0.05	< 0.05	< 0.05	
o-Xylene	μg/g		0.05	<0.05	< 0.05	< 0.05	
Xylenes (Total)	μg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	
F1 (C6 - C10)	μg/g	25	5	<5	<5	<5	
F1 (C6 to C10) minus BTEX	μg/g	25	5	<5	<5	<5	
F2 (C10 to C16)	μg/g	10	10	<10	<10	<10	
F3 (C16 to C34)	μg/g	240	50	<50	<50	<50	
F4 (C34 to C50)	μg/g	120	50	<50	<50	<50	
Gravimetric Heavy Hydrocarbons	μg/g	120	50	NA	NA	NA	
Moisture Content	%		0.1	17.2	9.6	4.1	
Surrogate	Unit	Acceptabl	e Limits				
Toluene-d8	% Recovery	60-1	40	90	88	105	<u> </u>
Terphenyl	%	60-1	40	70	94	69	





Certificate of Analysis

AGAT WORK ORDER: 21T825888

PROJECT: 302104

ATTENTION TO: Malcolm Craig

SAMPLED BY:

TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

5835 COOPERS AVENUE

MISSISSAUGA, ONTARIO CANADA L4Z 1Y2

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

SAMPLING SITE:

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

DATE RECEIVED: 2021-11-04 DATE REPORTED: 2021-11-10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3170855-3170861 Results are based on sample dry weight.

The C6-C10 fraction is calculated using Toluene response factor.

Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.

The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

The chromatogram has returned to baseline by the retention time of nC50.

Total C6 - C50 results are corrected for BTEX contribution.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Quality Control Data is available upon request.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

NPoprikolof



Quality Assurance

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 21T825888

PROJECT: 302104

ATTENTION TO: Malcolm Craig

SAMPLING SITE: SAMPLED BY:

			Soi	l Ana	alysis	6								
RPT Date: Nov 10, 2021			DUPLICATI	<u> </u>		REFERE	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		eptable mits	Recovery	Lie	ptable nits	Recovery	Lie	ptable nits
	Batch Id		'			Value	Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inor	ganics (Soil)													
Antimony	3166927	<0.8	<0.8	NA	< 0.8	104%	70%	130%	110%	80%	120%	111%	70%	130%
Arsenic	3166927	<1	1	NA	< 1	100%	70%	130%	108%	80%	120%	109%	70%	130%
Barium	3166927	7.1	7.2	NA	< 2.0	105%	70%	130%	105%	80%	120%	111%	70%	130%
Beryllium	3166927	<0.4	< 0.4	NA	< 0.4	101%	70%	130%	112%	80%	120%	111%	70%	130%
Boron	3166927	<5	<5	NA	< 5	93%	70%	130%	98%	80%	120%	87%	70%	130%
Boron (Hot Water Soluble)	3173737	0.19	0.18	NA	< 0.10	93%	60%	140%	108%	70%	130%	96%	60%	140%
Cadmium	3166927	<0.5	< 0.5	NA	< 0.5	124%	70%	130%	107%	80%	120%	110%	70%	130%
Chromium	3166927	<5	<5	NA	< 5	104%	70%	130%	96%	80%	120%	93%	70%	130%
Cobalt	3166927	1.0	1.1	NA	< 0.5	106%	70%	130%	96%	80%	120%	94%	70%	130%
Copper	3166927	1.9	1.8	NA	< 1.0	99%	70%	130%	97%	80%	120%	94%	70%	130%
Lead	3166927	2	2	NA	< 1	95%	70%	130%	89%	80%	120%	90%	70%	130%
Molybdenum	3166927	<0.5	< 0.5	NA	< 0.5	100%	70%	130%	101%	80%	120%	105%	70%	130%
Nickel	3166927	2	2	NA	< 1	103%	70%	130%	106%	80%	120%	103%	70%	130%
Selenium	3166927	<0.8	<0.8	NA	< 0.8	96%	70%	130%	96%	80%	120%	101%	70%	130%
Silver	3166927	<0.5	<0.5	NA	< 0.5	109%	70%	130%	109%	80%	120%	112%	70%	130%
Thallium	3166927	<0.5	<0.5	NA	< 0.5	93%	70%	130%	110%	80%	120%	110%	70%	130%
Uranium	3166927	0.59	0.70	NA	< 0.50	97%	70%	130%	110%	80%	120%	109%	70%	130%
Vanadium	3166927	4.7	4.9	3.8%	< 0.4	110%	70%	130%	90%	80%	120%	92%	70%	130%
Zinc	3166927	9	8	NA	< 5	108%	70%	130%	111%	80%	120%	108%	70%	130%
Chromium, Hexavalent	3168179	<0.2	<0.2	NA	< 0.2	92%	70%	130%	87%	80%	120%	73%	70%	130%
Cyanide, Free	3175392	<0.040	<0.040	NA	< 0.040	98%	70%	130%	110%	80%	120%	101%	70%	130%
Mercury	3166927	<0.10	<0.10	NA	< 0.10	125%	70%	130%	116%	80%	120%	118%	70%	130%
Electrical Conductivity (2:1)	3173737	0.137	0.136	0.8%	< 0.005	108%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	3173961	10.1	10.8	6.1%	NA									
pH, 2:1 CaCl2 Extraction	3170861 3170861	7.86	7.84	0.3%	NA	101%	80%	120%						

Comments: NA signifies Not Applicable.

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Duplicate NA: results are under 5X the RDL and will not be calculated.





Quality Assurance

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 21T825888

PROJECT: 302104

ATTENTION TO: Malcolm Craig

SAMPLING SITE: SAMPLED BY:

			Trac	e Or	gani	cs Ar	alysi	is							
RPT Date: Nov 10, 2021			С	UPLICAT	E		REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value		ptable nits	Recovery	منا ا	ptable nits	Recovery	1 1 1 1 1	ptable nits
		la la	·				value	Lower	Upper	•	l .	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (5	Soil)														
Benzene	3170969		< 0.02	< 0.02	NA	< 0.02	95%	60%	140%	82%	60%	140%	98%	60%	140%
Toluene	3170969		< 0.05	< 0.05	NA	< 0.05	80%	60%	140%	95%	60%	140%	96%	60%	140%
Ethylbenzene	3170969		< 0.05	< 0.05	NA	< 0.05	99%	60%	140%	89%	60%	140%	82%	60%	140%
m & p-Xylene	3170969		< 0.05	< 0.05	NA	< 0.05	90%	60%	140%	96%	60%	140%	99%	60%	140%
o-Xylene	3170969		< 0.05	< 0.05	NA	< 0.05	91%	60%	140%	83%	60%	140%	93%	60%	140%
F1 (C6 - C10)	3170969		< 5	< 5	NA	< 5	100%	60%	140%	103%	60%	140%	80%	60%	140%
F2 (C10 to C16)	3170861	3170861	< 10	< 10	NA	< 10	117%	60%	140%	114%	60%	140%	113%	60%	140%
F3 (C16 to C34)	3170861	3170861	< 50	< 50	NA	< 50	133%	60%	140%	79%	60%	140%	71%	60%	140%
F4 (C34 to C50)	3170861	3170861	< 50	< 50	NA	< 50	106%	60%	140%	121%	60%	140%	62%	60%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).



Method Summary

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 21T825888
PROJECT: 302104

ATTENTION TO: Malcolm Craig

SAMPLING SITE: SAMPLED BY:

Or time Entro Office		O/ (IVII EED D1.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, Free	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6036	modified from MSA PART 3, CH 14 and SM 2510 B	EC METER
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER



Method Summary

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 21T825888
PROJECT: 302104

ATTENTION TO: Malcolm Craig

SAMPLING SITE: SAMPLED BY:

	OAMI LLD DT.	
AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
	·	
VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
VOL-91-5009	CCME Tier 1 Method	BALANCE
VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
	VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009 VOL-91-5009	AGAT S.O.P LITERATURE REFERENCE VOL-91-5009 WOL-91-5009 WOL-91-500



Mississauga, Ontario L4Z 1Y2 Ph: 905.712.5100 Fax: 905.712.5122

_aboratory	Use Only	
Nork Order #:	21782	5888.

Chain of Custody Recor					CS king Water Chain of Custody Form (potab	ele water c	_	ebearth a	-	s com		oler Qua	antity: nperatu	ires:		(シ ₁	7.5
Report Information: Company:	1-Mat			Reg (Please	gulatory Requirements:						11	stody Setes:	eal Inta	ct:	□Yes O.	□No	□N/A
Contact: Address: Phone:	Fax: olm Craig Shaw			Tat	Excess Soils R4	- 3 [Si	Region V. Water ectives (I	PWQO)	n	Reg	gular 1 sh TAT 3 E Dag	(Rush Sui Business ys	ost Analys ircharges		7 Business	ext Busines ay
Project Information: Project: Site Location: Sampled By: NS	2104 ter foré, 0	44		Red	s this submission for a cord of Site Condition? Yes No	Cer		Guidel te of A		ls		*TA For 'San	T is exci	lusive o	de prior notificatio of weekends and usis, please conta	statutory h	nolidays
AGAT ID #: Please note: If quotation number Invoice Information: Company: Contact: Address: Email:		be billed full price for at		Sam B GW O P S SD SW	nple Matrix Legend Biota Ground Water Oil Paint Soil Sediment Surface Water	Field Filtered - Metals, Hg, CrVI, DOC	& Inorganics	Is - □ CrVI, □ Hg, □ HWSB BaB 123 F1-F4 PHCs	ze F4G if required □ Yes □ No	Total PCBs	Landfill Disposal Characterization TCLP: 0.0	s SPLP Rainwater Leach	aracteriza				union de anadane ar High Cancentration (Y/N)
Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Metals	Metals - BTEX, F1	Analyze I PAHs	Total	Land	Exces	Excess pH, ICP	Salt			9
BAISS3	Nou3	AM PM	3	S			×	7	K								
BH 3SSI		AM PM					X	i	<				100				
BH4553		AM PM	-4-				x	7						\square			
		AM PM															
		AM PM												+			
		AM PM AM					11/5					-					
		AM PM AM PM															
		AM PM															
		AM PM					-									1 -	
	-	AM PM										İ					
Samples Relinquished By Print Rumo and Sign		Date: 42	Trms	; 43pn	Samples Received By (Print Name and Sign):	1	M			Date Date	21	Time	124	5			
Samples Relinquished By (Print Name and Sign):	R-	list of	Time	Lin	Samples Received By (Print Name and Sign):	' <				Date		Time			Page	of	
Samples Relinquished By (Print Name and Sign):		Dote 4 10	Time	1./0	Samples Received By (Print Name and Sign):					Date		Time			Nº: T 1 2 3	376	2

APPENDIX D

ADS StormTech Chamber Drawings & Specifications

PROJEC	T INFORMATION
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	







2024.11.18 20128 ORCHARD SQUARE REV0

WATERFORD, ON, CANADA

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH MC-3500.
- 2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS
- CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
- 4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- 5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- 6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.</p>
- 7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- 8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- 9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
- 10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- 11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

- 1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- 2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- 3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- 4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- 5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- 6. MAINTAIN MINIMUM 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
- INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
- 8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
- 9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
- 10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- 11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

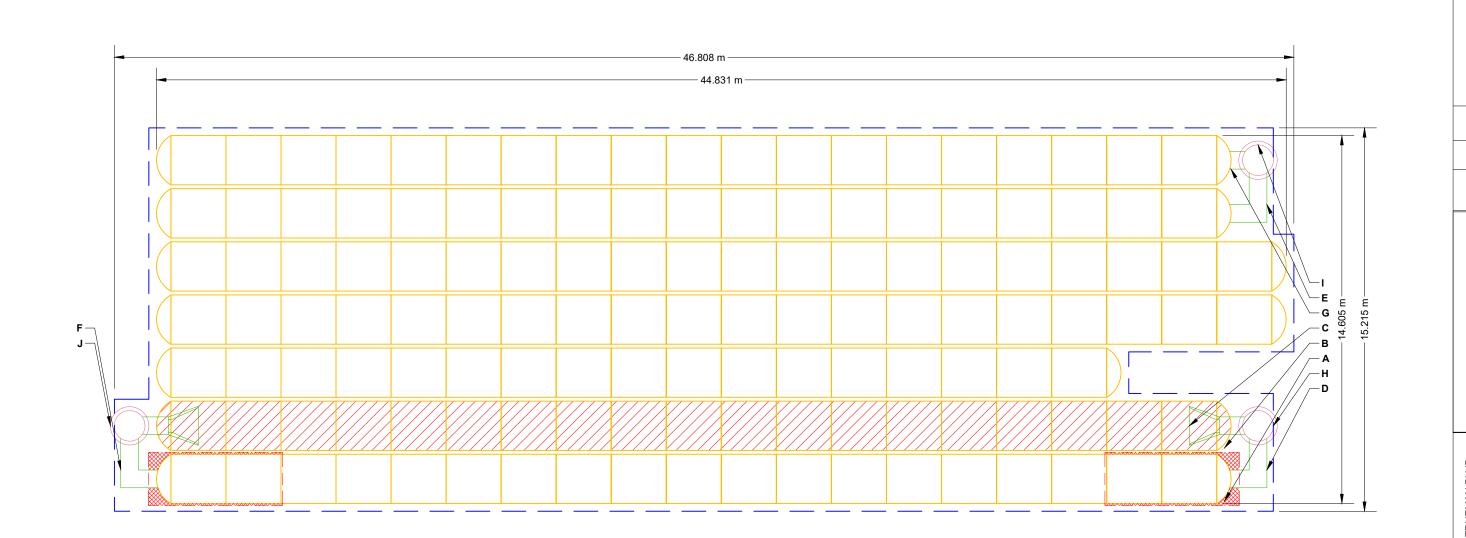
NOTES FOR CONSTRUCTION EQUIPMENT

- 1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- 2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- 3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

	PROPOSED LAYOUT	CONCEPTUAL ELEVATIONS:				ABOVE BAS	E OF CHAMBER		NO.
133	STORMTECH MC-3500 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	3.881 PART TYPE	ITEM O		INVERT*	MAX FLOW	2	UCTI
14 500		MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC): TOP OF STONE:	2.053 1.943 PREFABRICATED END CAP	А	600 mm TOP PRE-CORED END CAP, PART#: MC3500IEPP24TC / TYP OF ALL 600 mm TOP CONNECTIONS	368 mm] \(\frac{1}{4}\)	/A
300 40	STONE BELOW (mm) STONE VOID	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC): MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT): MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.900 1.900 PREFABRICATED END CAP	В	600 mm BOTTOM PRE-CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	1 52 mm		ORCF EVO	NAL: NO ED: N
783.5	INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED)	TOP OF MC-3500 CHAMBER:	1.900 1.443 FLAMP 0.668 MANIFOLD	C	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: MCFLAMP (TYP 2 PLACES) 600 mm x 600 mm TOP MANIFOLD. ADS N-12	368 mm		_ ~/	AWN ECKI
	(BASE STONE INCLUDED)	600 mm x 600 mm TOP MANIFOLD INVERT: 600 mm x 600 mm TOP MANIFOLD INVERT:	0.668 MANIFOLD 0.352 MANIFOLD	E	600 mm x 600 mm BOTTOM MANIFOLD, ADS N-12 600 mm x 600 mm TOP MANIFOLD. ADS N-12	52 mm 368 mm		1128 3E F	P P P
	4 SYSTEM AREA (m²) 5 SYSTEM PERIMETER (m)	600 mm x 600 mm BOTTOM MANIFOLD INVERT: 600 mm ISOLATOR ROW PLUS INVERT:	0.352 PIPE CONNECTION	G	600 mm BOTTOM CONNECTION	52 mm		7 20 H	D FOR
		600 mm ISOLATOR ROW PLUS INVERT: 600 mm BOTTOM CONNECTION INVERT:	0.352 CONCRETE STRUCTURE 0.352 CONCRETE STRUCTURE	H I	(DESIGN BY ENGINEER / PROVIDED BY OTHERS) OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		241 L/s IN 396 L/s OUT	1.18 SQL	TENDE
		BOTTOM OF MC-3500 CHAMBER: BOTTOM OF STONE:	0.300 CONCRETE STRUCTURE 0.000	J	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		241 L/s IN] [,]	WA 19/20 #:
								305	ECT
								(7)	AROJ



ISOLATOR ROW PLUS (SEE DETAIL)

BED LIMITS

PLACE MINIMUM 5.334 m OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

NOTES

THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.

NOT FOR CONSTRUCTION: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

StormTechChamber System 4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473 : 150 Ш SCALE

SHEET

2 OF 5

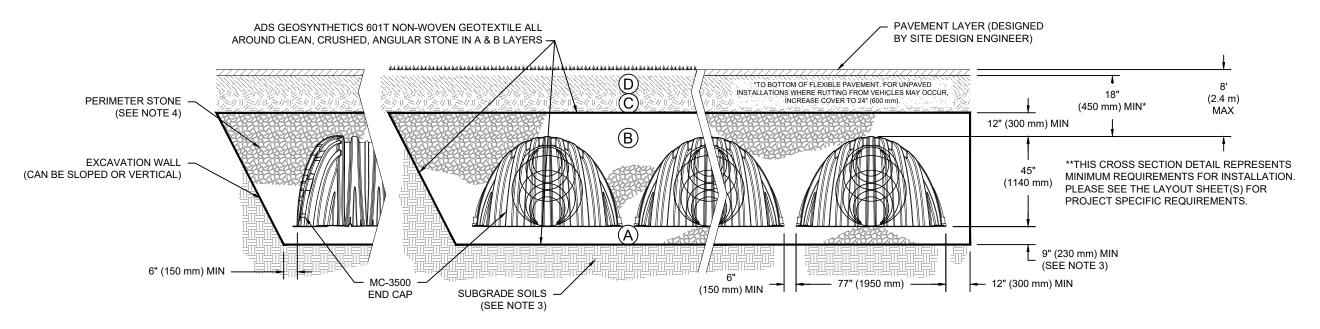
DRW 3 OF RECC

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
С	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 ¹ A-1, A-2-4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
В	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE⁵	AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
А	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE⁵	AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

PLEASE NOTE:

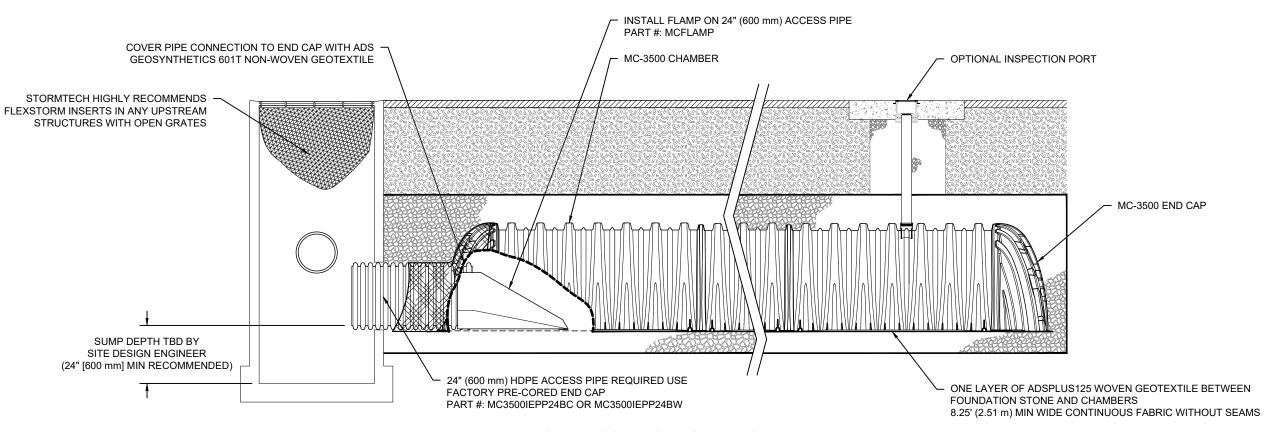
- 1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
- 2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
- 3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS
- 4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
- 5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

- 1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
- 2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- 3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
- 4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- 5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.





MC-3500 ISOLATOR ROW PLUS DETAIL

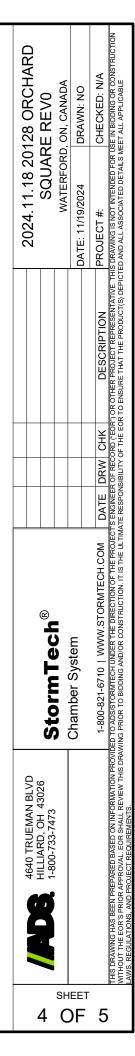
INSPECTION & MAINTENANCE

- INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
 - A. INSPECTION PORTS (IF PRESENT)
 - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
 - REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
 - USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)

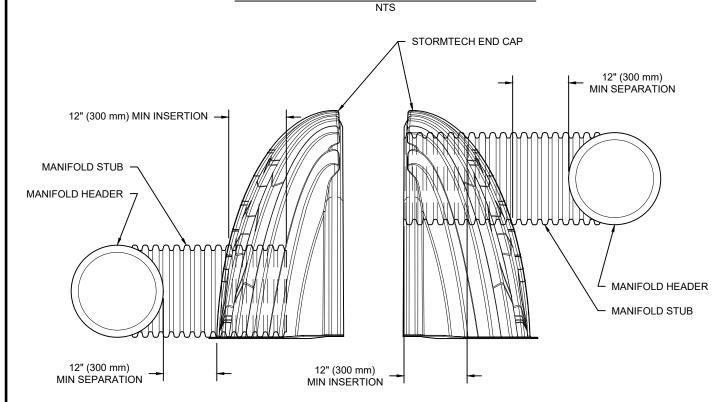
 - IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2, IF NOT, PROCEED TO STEP 3.
 - B. ALL ISOLATOR PLUS ROWS
 - REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
 - USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
 - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
 - A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
 - APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - C. VACUUM STRUCTURE SUMP AS REQUIRED
- REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM. STEP 4)

NOTES

- INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
- 2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

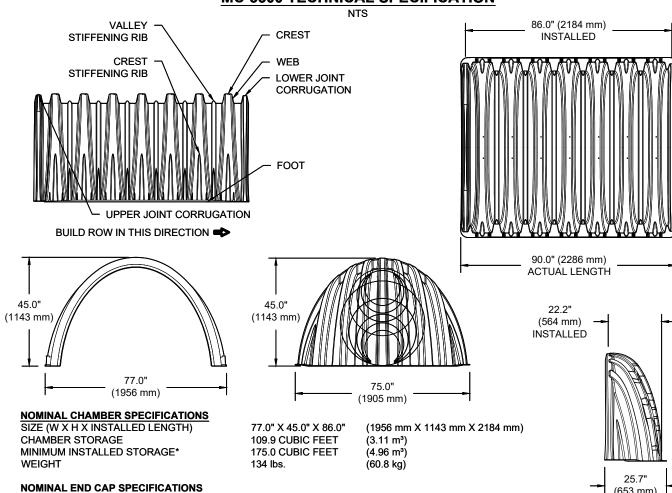


MC-SERIES END CAP INSERTION DETAIL



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-3500 TECHNICAL SPECIFICATION



(1905 mm X 1143 mm X 564 mm)

(0.42 m³)

(1.28 m³) (22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" SPACING BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

49 lbs.

75.0" X 45.0" X 22.2"

14.9 CUBIC FEET

45.1 CUBIC FEET

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B" STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T" END CAPS WITH A WELDED CROWN PLATE END WITH "C"

PART#	STUB	В	C		
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)			
MC3500IEPP06B	0 (150 11111)		0.66" (17 mm)		
MC3500IEPP08T	0" (200 mm)	31.16" (791 mm)			
MC3500IEPP08B	8" (200 mm)		0.81" (21 mm)		
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)			
MC3500IEPP10B	10 (250 11111)		0.93" (24 mm)		
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)			
MC3500IEPP12B	12 (300 11111)		1.35" (34 mm)		
MC3500IEPP15T	15" (275 mm)	23.39" (594 mm)			
MC3500IEPP15B	15" (375 mm)		1.50" (38 mm)		
MC3500IEPP18TC		20.03" (509 mm)			
MC3500IEPP18TW	18" (450 mm)	20.03 (309 11111)			
MC3500IEPP18BC	16 (450 11111)		1 77" (45 mm)		
MC3500IEPP18BW		_	1.77" (45 mm)		
MC3500IEPP24TC		14.48" (368 mm)			
MC3500IEPP24TW	24" (600 mm)	14.40 (300 11111)			
MC3500IEPP24BC	24 (000 111111)		0.00" (50)		
MC3500IEPP24BW			2.06" (52 mm)		
MC3500IEPP30BC	30" (750 mm)	2.75" (70 mm)			

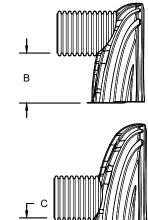
NOTE: ALL DIMENSIONS ARE NOMINAL

SIZE (W X H X INSTALLED LENGTH)

MINIMUM INSTALLED STORAGE*

END CAP STORAGE

WEIGHT



(653 mm)

CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM **INVERT LOCATIONS ON THE MC-3500** END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

				700 07 77 7000	00010000
4640 TRUEMAN BLVD				2024.11.18 20128 ORCHARD	ZO URCHARD
1-800-733-7473	Storm Tech®			SQUARE REV0	E REVO
				WATERFORD,	WATERFORD, ON, CANADA
	Chamber System			DATE: 11/10/2021	DBAMANI NO
					DNAWIN. INC
	1-800-821-6710 WWW.STORMTECH.COM	DATE DRW CHK	DESCRIPTION	PROJECT #:	CHECKED: N/A
AAS BEEN BBEBABED BASED ON INFORMATION BROW	AS BEEN DEPENDED BASED ON INCOMMENDATION DEPONITION DEPONITION DEPONITION DEPONITION DE PROPRIÉTIES DE PROPRIÉTIES EN DEPONITION DE PROPRIÉTIES DE PROPRIÉTI	TENGINEER OF BECORD ("EOB.")	OF OTHER PROJECT REPRESENTATIVE TH	S DE AMAIN E IN TENDED FOR	E IN BIDDING OB CONSTBILITION
OBIS DELINETATION FOR SHALL BEYING THIS DBA	DE BELLY THE PACE OF THE PROPERTY OF THE PROPE	AATE BESBONSIBII ITX OF THE FOB.	TO ENSUINE THAT THE BRODUCT(S) DEBICT	CONTROL SINCE INTERPEDIATE OF SECONDARY OF S	E IN DIDDING ON CONSTRUCTION

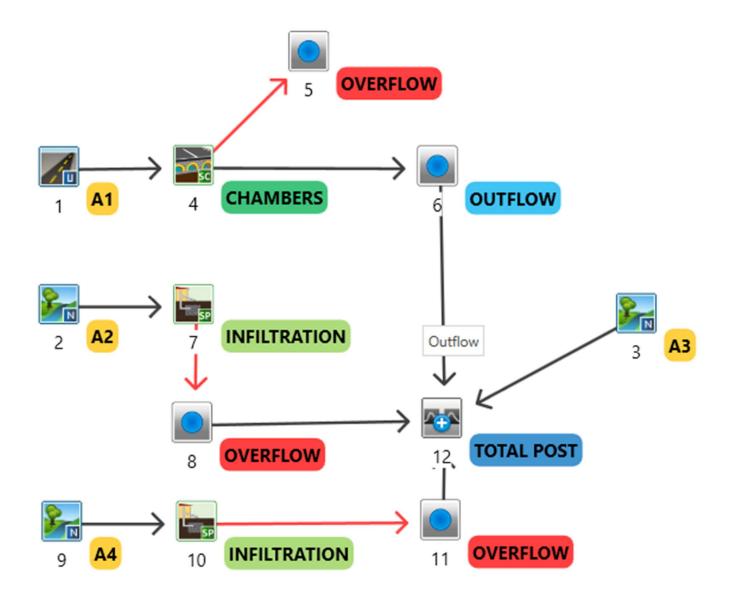
SHEET

5 OF 5

APPENDIX E

Visual OTTHYMO Summary Outputs

20-128 ORCHARD SQUARE POST-DEVELEPMENT OTTHYMO MODEL



CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

THAN THE STORAGE COEFFICIENT.

(Above)

Unit Hyd Qpeak (cms) = 0.048

```
PEAK FLOW (cms)= 0.000 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 1.030
TOTAL RAINFALL (mm)= 35.210
                                                                                                                                                                                                Unit Hyd Opeak (cms) = 0.029
                                                                                                                                                                                                 TIME TO PEAK
RUNOFF VOLUME
TOTAL RAINFALL
                                                                                                                                                                                                                                     (hrs) = 1.500
(mm) = 1.030
          RUNOFF COEFFICIENT = 0.029
                                                                                                                                                                                                                                   (hrs) =
          (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
                                                                                                                                                                                                                                     (mm) = 35.210
                                                                                                                                                                                                 RUNOFF COEFFICIENT =
|SOAKAWAY( 0007)| UNDERDRAIN: OFF
|IN= 2--> OUT= 3 |
|DT= 5.0 MIN |
                                        STORAGE LAYER:
                                         | March | Marc
                                                                                                        |SOAKAWAY( 0010)| UNDERDRAIN: OFF
|IN= 2--> OUT= 3 |
|DT= 5.0 MIN | STORAGE LAYER:
                                                                                                        Available Storage (cu.m.)= 24.00
                                          Max. Drawdown (hr) = 33.33
                                          NATIVE SOIL LAYER:
                                          Infiltration (m/hr) = 0.0120
                                               AREA
                                                                         OPEAK
                                                                                                              TPEAK
                                                                                                                                          R.V.
                                                                                                                                                                                                                                 NATIVE SOIL LAYER:
        (mm)
                                                                                                                 4.08
                                                                                                                                            1.80
                                                                                                                                                                                                                                                                 ODEAK
                              Volume Reduction Rate((RVin-RVout)/RVin)(%):
                               Volume Reduction Rate[(KVln-xvout)/xviii](v).

If RVout= (Overflow )=
Time to reach Max storage (Hr)=
Volume of water for drawdown in LID (cu.m.)=
Volume of maximum water storage (cu.m.)=
Calculated Drawdown Time (Hr)=
                                                                                                                                        100.00
                                                                                                                                        4.17
0.29
                                                                                                                 (Hr) =
                               Calculated Drawdown Time
    | Junction Command(0008) |
                                                        AREA
                                                                         OPEAK TPEAK
                                                                                                                R.V.
                                                                                                                                                                                           | Junction Command(0011) |
                                                                         (cms)
                                                                                              (hrs)
   INFLOW: ID= 3( 0007) 0.00
OUTFLOW: ID= 2( 0008) 0.00
                                                                        0.00
                                                                                           0.00
                                                                                                                0.00
                                                                                                                                                                                                                                               AREA
                                                                                                                                                                                                                                               (ha)
0.00
                                                                                                                                                                                                                                                                  (cms)
                                                                                                                                                                                          INFLOW: ID= 3( 0010) 0.00
OUTFLOW: ID= 2( 0011) 0.00
                                                                                                                                                                                                                                                                   0.00
| ADD HYD ( 0012)|
| 1 + 2 = 3 |
                  NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
                                                                                                                                                                                                                                                    (ha)
                                                                                                                                                                                                                                                                     (cms)
                                                                 --- TRANSFORMED HYETOGRAPH ----
                                                   RAIN | TIME RAIN | TIME RAIN | TIME mm/hr | hrs mm/hr | hrs mm/hr | hrs
                                                                                                                                                           RAIN
                                                              | hrs
                                                                                                                      mm/hr |
5.90 |
                                                                                                                                                        mm/hr
3.14
                                     hrs
                                                 mm/hr l
                                 0.083
                                                                                                   2.083
                                                                                                                                       3.08
                                                                                                                                                                                                   ID = 3 ( 0012):
                                                                                    17.69 | 2.167
                                 0.167
                                                    2.68 |
                                                                  1.167
                                                                                                                       5.90 I
                                                                                                                                        3.17
                                                                                                                                                         3.14
                                                                                                                                                                                                                                                  0.11 0.000
                                 0.250
                                                    3.04 I
                                                                  1.250
                                                                                    72.24 | 2.250
                                                                                                                       5.09 I
                                                                                                                                                         2.94
                                                                  1.333
                                                                                    72.24
                                                    3.53 | 1.417
3.53 | 1.500
4.26 | 1.583
                                                                                   22.78 | 2.417
22.78 | 2.500
12.62 | 2.583
                                 0.417
                                                                                                                       4.50 I
                                                                                                                                       3.42
                                                                                                                                                         2.76
                                 0.500
                                                                                                                       4.50
                                 0.583
                                                    4.26 | 1.667
5.49 | 1.750
5.49 | 1.833
                                                                                                                                       3.67
3.75
                                                                                                                                                                                      | ADD HYD ( 0012)|
| 3 + 2 = 1 |
                                 0.667
                                                                                   12.62 | 2.667
                                                                                                                       4.04 |
                                                                                                                                                         2.60
                                                                                      8.98
                                                                                                                                                                                                                                              AREA QPEAK
                                 0.833
                                                                                    8.98 | 2.833
                                                                                                                                        3.83
                                                                                                                       3.68 |
                                 0.917
                                                    8.02 | 1.917
                                                                                      7.08 | 2.917
                                                                                                                       3.39 I
                                                                                                                                        3.92
                                                                                                                                                         2.35
                                                 8.02 | 2.000
          Unit Hyd Qpeak (cms) = 0.210

        PEAK FLOW
        (cms)=
        0.000 (i)

        TIME TO PEAK
        (hrs)=
        1.500

        RUNOFF VOLUME
        (mm)=
        0.100

        TOTAL RAINFALL
        (mm)=
        3.5210

        RUNOFF COEFFICIENT
        0.003

                                                                                                                                                                                       | ADD HYD ( 0012)|
| 1 + 2 = 3 |
           (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
                                                                                                                                                                                                                                         AREA QPEAK
                                                                                                                                                                                                                                                    (ha)
                                                                                                                                                                                                                                                                     (cms)
    | Junction Command(0006) |
                                                     AREA
                                                                         OPEAK TPEAK
                                                                                                                R.V.
   INFLOW: ID= 1 ( 0004) 0.00
OUTFLOW: ID= 2 ( 0006) 0.00
                                                                         (cms)
0.00
                                                                                             (hrs)
                                                                                                                 (mm)
0.00
                                                                       0.00
                                                                                          0.00
                                                                                                                0.00
NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
                                                                        - TRANSFORMED HYETOGRAPH -
                                                    RAIN | TIME
                                                                                   RAIN | TIME RAIN |
mm/hr | hrs mm/hr |
                                  TIME
                                                                                                                        RAIN | TIME
                                     hrs
                                                 mm/hr |
                                                                      hrs
                                                                                                                                           hrs
                                                                                                                                                        mm/hr
                                                                                                   2.083
                                 0.083
                                                                                                                        5.90 |
                                 0.167
                                                    2.68 |
                                                                  1.167
                                                                                    17.69 | 2.167
                                                                                                                       5.90 |
                                                                                                                                        3.17
                                                                                                                                                         3.14
                                 0.250
                                                    3.04 I
                                                                  1.250
                                                                                   72.24 | 2.250
                                                                                                                       5.09 I
                                                                                                                                       3.25
                                                                                                                                                         2.94
                                                                                   72.24
                                 0.417
                                                     3.53
                                                                                                                       4.50 |
                                                                  1.417
                                                                                                    2.417
                                 0.500
                                                    3 53 1
                                                                  1 500
                                                                                   22 78
                                                                                                    2 500
                                                                                                                       4 50
                                                                                                                                        3 50
```

0.583

0.667

0.750

0.833 0.917

1.583

1.667

1.917

4.26

4.26 |

8.02

5.49 | 1.750 5.49 | 1.833

2.583

2.667

8.98 | 2.750 8.98 | 2.833

7.08 | 2.917

4.04

3.68 I

3.68 |

3.39

3.67

3.75

3.92

2.60

2 47

2.35

12.62

12.62 |

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. Min. Drawdown (hr) = Available Storage (cu.m.) = Max. Drawdown (hr) = 33.33 Infiltration (m/hr) = 0.0120TPEAK D 17
 (ha)
 (cms)
 (hrs)

 INFLOW:ID= 2
 0.03
 0.001
 4.08

 OVERFLOW:ID= 3
 0.00
 0.000
 0.00
 (mm) 2.31 Volume Reduction Rate[(RVin-RVout)/RVin](%): 4.17 0.34 1.83 OPEAK TPEAK R.V. 0.00 0.00 0.00 0.00 AREA QPEAK TPEAK (hrs) (mm) 0.00 0.10 1.50 0.10 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. TPEAK *** W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003 = 1.50 RY.

*** W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003 = HYDROGRAPH 0003 = 1.50 0.11 0.000 1.50 0.11 D1= 3 (0012): 0.11 0.000 0.000 0.00 0.00 0.00 (mm) 0 00 ID = 1 (0012): 0.11 0.000 1.50 0.10 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. (hrs) (mm) *** W A R N I N G : HYDROGRAPH 0008 <ID= / IS DRY.

*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001

ID1= 1 (0012): 0.11 0.000 1.50 0.

+ ID2= 2 (0008): 0.00 0.000 0.000 0.00 0.10 ID = 3 (0012): 0.11 0.000 1.50 0.10 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

V V I SSSSS U U A A L (v 6.2.2017) V V I SS U U AAAA L V V I SS U U AAAAA L V V I SS U U A A L VV I SSSS UUUU A A L LLLLL	CHAMBER (0004) OUTFLOW: ON, UNDERDRAIN: OFF, INFIL: ON IN= 2> OUT= 3 CHAMBER: DT= 5.0 min MAX STO VOL (cu.m.) = 776.77 Bottom Area(m2) = 679.72
OOO TTTTT TTTTT H H Y Y M M OOO TM O O T T H H YY MM MM O O O O T T H H Y Y M M O O OOO T T H H Y Y M M OOO Developed and Distributed by Smart City Water Inc Copyright 2007 - 2022 Smart City Water Inc All rights reserved.	(mm) (cu.m.) (mm) (cu.m.) 0.00 0.00 991.00 467.67 25.00 6.90 1016.00 480.03 51.00 13.81 1041.00 492.21 76.00 20.71 1067.00 504.21 102.00 27.62 1092.00 515.99 127.00 34.52 1118.00 527.56 152.00 41.43 143.00 538.89 178.00 48.33 168.00 549.97
***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\Natalie\AppData\Local\Civica\VH5\f825abd2-5f32-4c68- 9c0f-9f2fb80764f6\5bb580c0-366b-4902-9154-f6d484d1b822\scen Summary filename: C:\Users\Natalie\AppData\Local\Civica\VH5\f825abd2-5f32-4c68- 9c0f-9f2fb80764f6\5bb580c0-366b-4902-9154-f6d484d1b822\scen	203.00 55.23 1194.00 560.77 229.00 62.14 1219.00 571.26 254.00 69.04 1245.00 581.41 279.00 75.95 1270.00 591.17 305.00 90.92 1295.00 600.42 330.00 105.81 1321.00 608.89 356.00 120.66 1346.00 616.72 381.00 135.46 1372.00 624.30 406.00 150.21 1397.00 631.65 432.00 164.91 1422.00 638.68 457.00 179.55 1448.00 645.59
DATE: 07/09/2024 TIME: 03:34:10 USER: COMMENTS:	483.00 194.14 1473.00 652.49 508.00 208.66 1499.00 659.39 533.00 223.12 1524.00 666.30 559.00 237.51 1549.00 673.20 584.00 251.83 1575.00 680.11 610.00 266.08 1600.00 687.01 635.00 280.25 1626.00 693.92 660.00 294.33 1651.00 700.82 686.00 308.33 1676.00 707.72
**************************************	711.00 322.24 1702.00 714.63 737.00 336.05 1727.00 721.53 762.00 349.77 1753.00 728.44 787.00 363.37 1778.00 735.34 813.00 376.87 1803.00 742.25 838.00 390.24 1829.00 749.15 864.00 403.50 1854.00 756.05 889.00 416.62 1880.00 762.96 914.00 429.61 1905.00 769.86
used in: INTENSITY = A / (t + B)^C Duration of storm = 4.00 hrs Storm time step = 10.00 min Time to peak ratio = 0.33	940.00 442.45 1930.00 776.77 965.00 455.14 0.00 0.00 DEPTH DISCHARGE DEPTH DISCHARGE (m) (cms) (m) (cms) 0.000 0.000 0.590 0.009
TIME RAIN TIME RAIN TIME RAIN TIME RAIN hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr 0.00 4.20 1.00 23.22 2.00 8.64 3.00 4.87 0.17 4.72 1.17 96.03 2.17 7.56 3.17 4.58 0.33 5.42 1.33 29.33 2.33 6.76 3.33 4.32 0.50 6.44 1.50 17.13 2.50 6.13 3.50 4.10	0.080 0.003 0.690 0.010 0.180 0.005 0.790 0.011 0.280 0.007 0.890 0.012 0.380 0.008 0.990 0.012 0.480 0.009 1.090 0.013 NATIVE SOIL LAYER:
0.67 8.09 1.67 12.62 2.67 5.63 3.67 3.90	Infiltration (m/hr) = 0.0120 AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) INFLOW:ID= 2 1.11 0.273 1.33 45.01 OUTFLOW:ID= 1 1.11 0.005 4.00 5.49 OVERFLOW:ID= 3 0.00 0.000 0.00 0.00
ID= 1 DT= 5.0 min Total Imp(%) = 93.00	Volume Reduction Rate[(RVin-RVout)/RVin](%)= 87.80 Time to reach Max storage (Hr)= 4.00 Volume of water for drawdown in LID (cu.m.)= 437.81 Volume of maximum water storage (cu.m.)= 443.37 Calculated Drawdown Time (Hr)= 49.67
Mannings n = 0.013 0.250 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. TRANSFORMED HYETOGRAPH TIME RAIN TIME RAIN TIME RAIN TIME RAIN	Junction Command(0005)
hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr 0.083 4.20 1.083 23.22 2.083 8.64 3.08 4.87	CALIB
1.000 11.39 2.000 10.19 3.000 5.22 4.00 3.72 Max.Eff.Inten.(mm/hr) = 96.03 4.65	TIME RAIN TIME RAIN TIME mm/hr hrs m
RUNOFF COEFFICIENT = 0.98 0.10 0.92 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 58.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL	0.917 11.39 1.917 10.19 2.917 5.22 3.92 3.72 1.000 11.39 2.000 10.19 3.000 5.22 4.00 3.72 Unit Hyd Opeak (cms) = 0.048 PEAK FLOW (cms) = 0.000 (i) TIME TO PEAK (hrs) = 1.333

```
RUNOFF VOLUME (mm) = 2.915
TOTAL RAINFALL (mm) = 49.033
     TOTAL RAINFALL (mm) = 49.033
RUNOFF COEFFICIENT = 0.059
      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
|SOAKAWAY( 0007)| UNDERDRAIN: OFF
| IN= 2--> OUT= 3 |
                       |DT= 5.0 MIN
                       NATIVE SOIL LAYER:
                       Infiltration (m/hr) = 0.0120
                                                               TPEAK R.V. (hrs) (mm) 4.08 3.85
                           (ha)
                                           (cms)
      INFLOW: ID= 2
                           0.05
                                           0.001
                        0.00
    OVERFLOW: ID= 3
                                          0.000
                                                                0.00
                 Volume Reduction Rate[(RVin-RVout)/RVin](%):
                 If RVout= (Overflow )=
Time to reach Max storage (Hr)=
                                                                              100.00
                                                                              4.17
0.84
                 Volume of water for drawdown in LID (cu.m.)=
Volume of maximum water storage (cu.m.)=
Calculated Drawdown Time (Hr)=
                                                               (Hr) =
                 Calculated Drawdown Time
                                                                                2.33
  L Junction Command (0008) |
                                AREA
                                          QPEAK TPEAK
                                                                 R V
                                                    (hrs)
                                                                 (mm)
                               (ha)
                                          (cms)
 INFLOW: ID= 3( 0007) 0.00
OUTFLOW: ID= 2( 0008) 0.00
                                            0.00
                                                                 0.00
                                            0.00
                                                      0.00
                                                                 0.00
NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
                                           TRANSFORMED HYETOGRAPH
                            RAIN | TIME
mm/hr | hrs
4.20 | 1.083
                                                RAIN | TIME RAIN | TIME mm/hr | hrs mm/hr | hrs 23.22 | 2.083 | 8.64 | 3.08
                   TIME
                                                                                         RAIN
                                                                                       mm/hr
4.87
                  hrs
0.083
                                                23.22 | 2.167
96.03 | 2.250
                  0.167
                              4.20 |
                                      1.167
                                                                     8.64 i 3.17
                                                                                         4.87
                                      1.250
                                                96.03 | 2.333
29.33 | 2.417
29.33 | 2.500
                  0.333
                              4.72 |
                                      1.333
                                                                     7.56 | 3.33
                                                                                         4.58
                             5.42 | 1.417
5.42 | 1.500
                  0.417
                                                                     6.76
                                                                              3.42
                                                                                         4.32
                                                17.13 |
17.13 |
12.62 |
                  0.583
                             6.44 | 1.583
                                                         2.583
                                                                     6.13 |
                                                                              3.58
                                                                                         4.10
                             6.44 | 1.667
8.09 | 1.750
                                                         2.667
                                                                     5.63
                           8.09 | 1.833
11.39 | 1.917
11.39 | 2.000
                                                12.62 | 2.833
10.19 | 2.917
                  0.833
                                                                     5.63 |
                                                                               3.83
                                                                                         3.90
                                                10.19 | 3.000
                   1.000
                                                                     5.22 |
     Unit Hyd Qpeak (cms) = 0.210
     PEAK FLOW (cms)= 0.000 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 0.340
TOTAL RAINFALL (mm)= 49.033
RUNOFF COEFFICIENT = 0.007
      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

	_	_			_																		
J	u	n	С	t	i	0	n		С	0	m	m	a	n	d	(0	0	0	6)		ĺ
 	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 1(0004) 1.11	0.00	4.00	5.49
OUTFLOW: ID= 2(0006) 1.11	0.00	4.00	5.49

0009) i NASHYD

Area (ha)= 0.03 Curve Number (CN)= 58.0 Ia (mm)= 16.50 # of Linear Res.(N)= 3.00 |ID= 1 DT= 5.0 min | Ia (mm)= 16.50 ----- U.H. Tp(hrs)= 0.04

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

		TD:	ANSFORMED	HVEROCE	ADH		
		IR	AMSLORMED	HILIOGK.	APR		
TIME	RAIN	TIME	RAIN '	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr '	hrs	mm/hr	hrs	mm/hr
0.083	4.20	1.083	23.22	2.083	8.64	3.08	4.87
0.167	4.20	1.167	23.22	2.167	8.64	3.17	4.87
0.250	4.72	1.250	96.03	2.250	7.56	3.25	4.58
0.333	4.72	1.333	96.03	2.333	7.56	3.33	4.58
0.417	5.42	1.417	29.33	2.417	6.76	3.42	4.32
0.500	5.42	1.500	29.33	2.500	6.76	3.50	4.32
0.583	6.44	1.583	17.13	2.583	6.13	3.58	4.10
0.667	6.44	1.667	17.13	2.667	6.13	3.67	4.10
0.750	8.09	1.750	12.62	2.750	5.63	3.75	3.90
0.833	8.09	1.833	12.62	2.833	5.63	3.83	3.90
0.917	11.39	1.917	10.19	2.917	5.22	3.92	3.72
1.000	11.39	2.000	10.19	3.000	5.22	4.00	3.72

Unit Hyd Qpeak (cms) = 0.029

PEAK FLOW (cms)= 0.000 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 2.915 TOTAL RAINFALL (mm) = 49.033 RUNOFF COEFFICIENT = 0.059

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

|SOAKAWAY(0010)| UNDERDRAIN: OFF |IN= 2--> OUT= 3 | |DT= 5.0 MIN | STORAGE LAYER: (m) = 1.00 (m) = 0.00Height (m)= 1.00
Initial Water Level (m)= 0.00
Min. Drawdown (hr)= 24.00 Max. Drawdown (hr)= 33.33 Available Storage (cu.m.)= 6.00NATIVE SOIL LAYER: Infiltration (m/hr) = 0.0120AREA TPEAK (ha)
INFLOW:ID= 2 0.03
OVERFLOW:ID= 3 0.00 (cms) (hrs) (mm) 0.001 0.00 4.17 0.80 0.82 Calculated Drawdown Time (Hr) =

| Junction Command(0011) |

AREA QPEAK TPEAK (hrs) (ha) (cms) (mm) INFLOW : ID= 3 (0010) 0.00 0.00 0.00 OUTFLOW: ID= 2(0011)

| ADD HYD (0012)| | 1 + 2 = 3 | (mm)

ID = 3 (0012): 0.11 0.000 1.33 0.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0012)| | 3 + 2 = 1 | (cms) (ha) 0.11 (hrs) (mm) ID1= 3 (0012): + ID2= 2 (0006): 0.34 4.00 1.11 0.005 ID = 1 (0012):

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0012)| | 1 + 2 = 3 | AREA QPEAK TPEAK 5.03 0.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ID = 3 (0012): 1.22 0.005

10-YEAR STORM

= 679.72
STORAGE (cu.m.)
467.67
480.03 492.21
504.21 515.99
527.56 538.89
549.97
560.77 571.26
581.41 591.17
600.42
608.89 616.72
624.30 631.65
638.68 645.59
652.49
659.39 666.30
673.20 680.11
687.01
693.92 700.82
707.72 714.63
721.53 728.44
735.34 742.25
749.15
756.05 762.96
769.86 776.77
0.00
ISCHARGE
(cms) 0.009
0.010 0.011
0.012
0.012
R.V.
(mm) 53.49
12.13
77.32
4.00
506.86 514.27
52.17
= 58.0
= 58.0 = 3.00
TIME RAIN hrs mm/hr
hrs mm/hr 3.08 5.84
3.17 5.84 3.25 5.49
3.33 5.49
3.42 5.18 3.50 5.18
3.58 4.92 3.67 4.92
3.75 4.68
3.83 4.68 3.92 4.47
4.00 4.47
3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

|SOAKAWAY(0007)| UNDERDRAIN: OFF |IN= 2--> OUT= 3 |DT= 5.0 MIN STORAGE LAYER: Height (m)= 1.00
Initial Water Level (m)= 0.00
Min. Drawdown (hr)= 24.00
Available Storage (cu.m.)= 12.00 Length Max. Drawdown (hr) = 33.33 NATIVE SOIL LAYER: Infiltration (m/hr) = 0.0120AREA QPEAK TPEAK R.V. (ha) (cms) (mm) (hrs) 0.05 INFLOW: ID= 2 0.00 OVERFLOW: ID= 3 0.000 0.00 0.00 Volume Reduction Rate[(RVin-RVout)/RVin](%): 100.00 4.17 1.69 Calculated Drawdown Time | Junction Command(0008) | QPEAK TPEAK (ha) (cms) (hrs) (mm) INFLOW: ID= 3(0007) 0.00 0.00 OUTFLOW: ID= 2(0008) 0.00 0.00 0.00 0 00 0.00 0.00 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. --- TRANSFORMED HYETOGRAPH ----RAIN | TIME RAIN | TIME RAIN | TIME mm/hr | hrs mm/hr | hrs mm/hr | hrs hrs mm/hr 5.04 | 1.083 0.083 27.43 | 27.43 | 1 2.083 10.30 | 10.30 | 3.08 5.84 3.17 0.167 5.04 | 1.167 2.167 5.84 111.84 0.250 1.250 2.250 5.49 5.66 9.03 | 0.333 5.66 I 1.333 111.84 | 2.333 9.03 | 3.33 5.49 0.417 6.49 1.417 34.58 2.417 0.500 6.49 | 1.500 34.58 2.500 8.07 3.50 5.18 7.70 | 1.583 7.70 | 1.667 0.583 20.31 2.583 7.33 i 4.92 7.33 2.667 9.66 | 1.750 9.66 | 1.833 13.55 | 1.917 15.00 | 2.750 15.00 | 2.833 12.13 | 2.917 0.750 6.74 | 3.75 4.68 0.833 6.74 4.68 0.917 1.000 13.55 | 2.000 12.13 | 3.000 4.47 Unit Hyd Qpeak (cms) = 0.210 PEAK FLOW (cms) = 0.000 (i)
TIME TO PEAK (hrs) = 1.333
RUNOFF VOLUME (mm) = 0.531
TOTAL PAINEALL (mm) = 57.945 (mm) = 57.945RUNOFF COEFFICIENT = 0.009 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. | Junction Command(0006) | AREA OPEAK TPEAK (ha) (cms) (hrs) (mm) INFLOW: ID= 1(0004) 1.11 OUTFLOW: ID= 2(0006) 1.11 0.01 4.00 12.13 CALIB NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. TRANSFORMED HYETOGRAPH RAIN | TIME mm/hr | hrs RAIN | TIME mm/hr | hrs TIME RAIN | TIME RATN mm/hr | hrs hrs mm/hr hrs 27.43 | 2.083 27.43 | 2.167 111.84 | 2.250 5.04 | 5.04 | 5.66 | 10.30 | 10.30 | 9.03 | 0.083 1.083 3.08 5.84 0.167 1.167 0.333 5.66 | 1.333 | 111.84 | 2.333 9.03 I 3.33 5.49 0.417 6.49 1.417 34.58 2.417 0.500 6.49 | 1.500 34.58 2.500 8.07 3.50 5.18 7.70 | 1.583 7.70 | 1.667 9.66 | 1.750 0.583 20.31 | 2.583 7.33 I 3.58 4.92

20.31 |

12.13 |

15.00 | 2.833

12.13 | 3.000

9.66 | 1.833

13.55 | 1.917 13.55 | 2.000

(cms) = 0.001 (i)

2.750

2.917

0.750

0 833

1.000

PEAK FLOW

Unit Hyd Opeak (cms) = 0.029

6.74

6 74 I

3.83

4.00

4.68

4 68

4.47

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ |SOAKAWAY(0010)| UNDERDRAIN: OFF |IN= 2--> OUT= 3 | |DT= 5.0 MIN | STORAGE LAYER: Length (m) = 10.00
Porosity = 0.40
Width (m) = 1.50 (m) = 1.00 (m) = 0.00 (hr) = 24.00Height Initial Water Level Min. Drawdown (hr) = Available Storage (cu.m.) = Max. Drawdown (hr) = 33.33 NATIVE SOIL LAYER: Infiltration (m/hr) = 0.0120AREA QPEAK TPEAK R.V. (ha) (cms) (hrs)

INFLOW:ID= 2 0.03 0.001 4.08

OVERFLOW:ID= 3 0.00 0.000 0.000 (mm) 6.20 0.00 Volume Reduction Rate[(RVin-RVout)/RVin](%): Volume Reduction Rate([kvin-kvout)/kvin](8):

If RVout=(Overflow)=

Time to reach Max storage (Hr)=

Volume of water for drawdown in LID (cu.m.)=

Volume of maximum water storage (cu.m.)=

***** After simulation, water volume is not zero. 100.00 | Junction Command(0011) | AREA OPEAK (ha) (cms) (hrs) (mm) 0 00 0 00 OUTFLOW: ID= 2(0011) 0.00 0.00 | ADD HYD (0012)| | 1 + 2 = 3 | AREA QPEAK TPEAK ----- (ha) (cms) (hrs) (hrs) (
*** W A R N I N G : HYDROGRAPH 0011 <ID= 1> IS DRY.
*** W A R N I N G : HYDROGRAPH 0012 = HYDROGRAPH 0003 ID1= 1 (0011): + ID2= 2 (0003): 0.000 0.00 0.11 1.33 0.53 ID = 3 (0012): 0.11 0.000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. | ADD HYD (0012)| | 3 + 2 = 1 | AREA QPEAK TPEAK (ha) (cms) (hrs) 1.33 (mm) 0.53 ID1= 3 (0012): + ID2= 2 (0006): 1.11 0.007 4.00 12.13 ID = 1 (0012): 1.22 0.007 11.09 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. (mm) 0.00 ID = 3 (0012): 1.22 0.007 4.00 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

6.00

TIME TO PEAK (hrs)= 1.333 RUNOFF VOLUME (mm)= 4.543 TOTAL RAINFALL (mm)= 57.945

RUNOFF COEFFICIENT =

25-YEAR STORM

25-YEAR STORM	
V V I SSSS U U A L (v 6.2.2017) V V I SS U U A A L V V I SS U U AAAAA L	CHAMBER (0004) OUTFLOW: ON, UNDERDRAIN: OFF, INFIL: ON IN= 2> OUT= 3 CHAMBER: DT= 5.0 min MAX STO VOL (cu.m.) = 776.77 Bottom Area(m2) = 679.72
V V I SS U U A A L	DEPTH STORAGE DEPTH STORAGE
	(mm) (cu.m.) (mm) (cu.m.) 0.00 0.00 991.00 467.67
OOO TTTTT TTTTT H H Y Y M M OOO TM O O T T H H Y Y MM MM O O	25.00 6.90 1016.00 480.03 51.00 13.81 1041.00 492.21
O O T T H H Y M M O O O O T T H H Y M M OOO	76.00 20.71 1067.00 504.21
eveloped and Distributed by Smart City Water Inc	102.00 27.62 1092.00 515.99 127.00 34.52 1118.00 527.56
opyright 2007 - 2022 Smart City Water Inc	152.00 41.43 1143.00 538.89 178.00 48.33 1168.00 549.97
	203.00 55.23 1194.00 560.77
***** DETAILED OUTPUT *****	229.00 62.14 1219.00 571.26 254.00 69.04 1245.00 581.41
	279.00 75.95 1270.00 591.17 305.00 90.92 1295.00 600.42
<pre>Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\Natalie\AppData\Local\Civica\VH5\f825abd2-5f32-4c68-</pre>	330.00 105.81 1321.00 608.89
:0f-9f2fb80764f6\b41c6750-4b25-4b97-b39b-5ff0b49c2399\scen	356.00 120.66 1346.00 616.72 381.00 135.46 1372.00 624.30
Summary filename: C:\Users\Natalie\AppData\Local\Civica\VH5\f825abd2-5f32-4c68- c0f-9f2fb80764f6\b41c6750-4b25-4b97-b39b-5ff0b49c2399\scen	406.00 150.21 1397.00 631.65 432.00 164.91 1422.00 638.68
	457.00 179.55 1448.00 645.59 483.00 194.14 1473.00 652.49
TIME: 07/09/2024 TIME: 03:34:10	508.00 208.66 1499.00 659.39
ER:	533.00 223.12 1524.00 666.30 559.00 237.51 1549.00 673.20
	584.00 251.83 1575.00 680.11 610.00 266.08 1600.00 687.01
	635.00 280.25 1626.00 693.92
MMMENTS:	660.00 294.33 1651.00 700.82 686.00 308.33 1676.00 707.72
	711.00 322.24 1702.00 714.63 737.00 336.05 1727.00 721.53
**************************************	762.00 349.77 1753.00 728.44
**************************************	813.00 376.87 1803.00 742.25
	838.00 390.24 1829.00 749.15 864.00 403.50 1854.00 756.05
CHICAGO STORM IDF curve parameters: A= 721.533 Ptotal= 69.38 mm B= 2.253	889.00 416.62 1880.00 762.96 914.00 429.61 1905.00 769.86
C= 0.679	940.00 442.45 1930.00 776.77
used in: INTENSITY = A / (t + B)^C	965.00 455.14 0.00 0.00
Duration of storm = 4.00 hrs Storm time step = 10.00 min	DEPTH DISCHARGE DEPTH DISCHARGE (m) (cms) (m) (cms)
Time to peak ratio = 0.33	0.000 0.000 0.580 0.009
TIME RAIN TIME RAIN TIME RAIN TIME RAIN	0.080 0.003 0.690 0.010 0.180 0.005 0.790 0.011
hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr 0.00 6.34 1.00 31.84 2.00 12.58 3.00 7.30	0.280 0.007 0.890 0.012 0.380 0.008 0.990 0.012
0.17 7.08 1.17 131.63 2.17 11.08 3.17 6.87 0.33 8.07 1.33 39.74 2.33 9.96 3.33 6.50	0.480 0.009 1.090 0.013
0.50 9.51 1.50 23.97 2.50 9.08 3.50 6.18	NATIVE SOIL LAYER:
0.67 11.82 1.67 17.98 2.67 8.38 3.67 5.90 0.83 16.33 1.83 14.70 2.83 7.79 3.83 5.64	Infiltration $(m/hr) = 0.0120$
	AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm)
	INFLOW:ID= 2 1.11 0.378 1.33 64.42 OUTFLOW:ID= 1 1.11 0.009 4.00 21.04
CALIB STANDHYD (0001) Area (ha)= 1.11	OVERFLOW:ID= 3 0.00 0.000 0.00 0.00
DE 1 DT= 5.0 min Total Imp(%) = 93.00 Dir. Conn.(%) = 93.00	<pre>Volume Reduction Rate[(RVin-RVout)/RVin](%)= 67.34</pre>
IMPERVIOUS PERVIOUS (i)	Time to reach Max storage $(Hr) = 4.00$ Volume of water for drawdown in LID $(cu.m.) = 601.69$
Surface Area (ha) = 1.03 0.08 Dep. Storage (mm) = 1.00 16.50	Volume of maximum water storage (cu.m.)= 611.19 Calculated Drawdown Time (Hr)= 54.83
Average Slope (%)= 1.00 2.00 Length (m)= 86.02 40.00	
Mannings n = 0.013 0.250	Junction Command(0005)
NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.	
	AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm)
TRANSFORMED HYETOGRAPH TIME RAIN TIME RAIN TIME RAIN TIME RAIN	INFLOW: ID= 3(0004)
hrs mm/hr hrs mm/hr ' hrs mm/hr hrs mm/hr	
0.083	
0.250 7.08 1.250 131.63 2.250 11.08 3.25 6.87 0.333 7.08 1.333 131.63 2.333 11.08 3.33 6.87	CALIB
	ID= 1 DT= 5.0 min Ia (mm)= 16.50 # of Linear Res.(N)= 3.00
0.583 9.51 1.583 23.97 2.583 9.08 3.58 6.18	
0.667 9.51 1.667 23.97 2.667 9.08 3.67 6.18 0.750 11.82 1.750 17.98 2.750 8.38 3.75 5.90	NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
0.833	TRANSFORMED HYETOGRAPH
1.000 16.33 2.000 14.70 3.000 7.79 4.00 5.64	TIME RAIN TIME RAIN TIME RAIN TIME RAIN
Max.Eff.Inten.(mm/hr) = 131.63 13.63 over (min) 5.00 5.00	hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/h 0.083 6.34 1.083 31.84 2.083 12.58 3.08 7.30
Storage Coeff. (min) = 2.09 (ii) 4.34 (ii)	0.167 6.34 1.167 31.84 2.167 12.58 3.17 7.30 0.250 7.08 1.250 131.63 2.250 11.08 3.25 6.87
Unit Hyd. Tpeak (min) = 5.00 5.00 Unit Hyd. peak (cms) = 0.31 0.23	0.333 7.08 1.333 131.63 2.333 11.08 3.33 6.87
	0.417 8.07 1.417 39.74 2.417 9.96 3.42 6.50 0.500 8.07 1.500 39.74 2.500 9.96 3.50 6.50 0.583 9.51 1.583 23.97 2.583 9.08 3.58 6.18
FEAR FLOW (cms)= 0.38 0.00 0.378 (iii) TIME TO PEAK (hrs)= 1.33 1.33 1.33	0.583
PEAK FLOW (cms)= 0.38 0.00 0.378 (iii) TIME TO PEAK (hrs)= 1.33 1.33 1.33 RUNOFF VOLUME (mm)= 68.38 11.81 64.42 TOTAL RAINFALL (mm)= 69.38 69.38 69.38 RUNOFF COEFFICIENT = 0.99 0.17 0.93	0.750 11.82 1.750 17.98 2.750 8.38 3.75 5.90
RUNOFF COEFFICIENT = 0.99 0.17 0.93	0.833
**** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!	1.000 16.33 2.000 14.70 3.000 7.79 4.00 5.64
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:	Unit Hyd Qpeak (cms)= 0.048
CN* = 58.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL	PEAK FLOW (cms)= 0.002 (i) TIME TO PEAK (hrs)= 1.333
THAN THE STORAGE COEFFICIENT.	RUNOFF VOLUME (mm) = 7.046
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.	TOTAL RAINFALL (mm) = 69.379

1.000 Unit Hyd Opeak (cms) = 0.029 PEAK FLOW (cms) = 0.001 (i)

(i) PEAK FLOW	DOES NOT INCLUDE BASEFLOW IF ANY.	
SOAKAWAY(0007) IN= 2> OUT= 3 DT= 5.0 MIN	CHODACE LAVED.	
	width (m)= 1.30 Min. Drawdown Max. Drawdown (hr)= 33.33 Available Storage NATIVE SOIL LAYER: Infiltration (m/hr) = 0.0120	(nr) = 24.00 (cu.m.) = 12.00
INFLOW:ID= 2 OVERFLOW:ID= 3	AREA QPEAK TPEAK R. (ha) (cms) (hrs) (m 0.05 0.002 1.33 7.	nm) 16
Time Volu Volu	me Reduction Rate[(RVin-RVout)/RVin](%): If RVoute (Overflow)= 100. to reach Max storage (Hr)= 4. me of water for drawdown in LID (cu.m.)= 2. me of maximum water storage (cu.m.)= 2. ulated Drawdown Time (Hr)= 6.	00 47 50
Junction Comman	d(0008)	
	AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) 0007) 0.00 0.00 0.00 0.00 0008) 0.00 0.00 0.00 0.00	
CALIB NASHYD (0003) ID= 1 DT= 5.0 min	- Area (ha) = 0.11 Curve Number (CN) = 58 Ia (mm) = 16.50 # of Linear Res.(N) = 3 U.H. Tp(hrs) = 0.02	0.0 00
NOTE: RAI	NFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.	
h 0.0 0.1 0.2 0.3 0.4 0.5 0.5 0.6 0.7 0.8 0.9	TRANSFORMED HYETOGRAPH ME RAIN TIME TAIN TAIN	mm/hr 7.30 7.30 6.87 6.87 6.50
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL	(cms) = 0.210 (cms) = 0.000 (i) (hrs) = 1.333 (mm) = 0.822 (mm) = 69.379 IENT = 0.012	
	DOES NOT INCLUDE BASEFLOW IF ANY.	
Junction Comman		
<pre>INFLOW : ID= 1(OUTFLOW: ID= 2(</pre>	0004) 1.11 0.01 4.00 21.04 0006) 1.11 0.01 4.00 21.04	
CALIB NASHYD (0009) ID= 1 DT= 5.0 min		
h 0.0 0.1 0.2 0.3 0.4 0.5 0.5 0.6 0.7 0.8	50 7.08 1.250 131.63 2.250 11.08 3.25 33 7.08 1.333 131.63 2.333 11.08 3.33	mm/hr 7.30 6.6.87 8.6.887 8.6.50 6.50 6.50 6.518 9.6.18

TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 7.039
TOTAL RAINFALL (mm)= 69.379
RUNOFF COEFFICIENT = 0.101 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. ______ |SOAKAWAY(0010)| UNDERDRAIN: OFF |IN= 2--> OUT= 3 | |DT= 5.0 MIN | STORAGE LAYER: Length (m) = 10.00 Porosity = 0.40 Width (m) = 1.50 Height (m)= 1.00
Initial Water Level (m)= 0.00
Min. Drawdown (hp)= 24.00
Available Storage (cu.m.)= 6.00 Height Max. Drawdown (hr) = 33.33 NATIVE SOIL LAYER: Infiltration (m/hr) = 0.0120AREA QPEAK TPEAK R.V. (ha) (cms)
INFLOW:ID= 2 0.03 0.001
OVERFLOW:ID= 3 0.00 0.000 (hrs) 1.33 (mm) 7.23 0.00 0.00 Volume Reduction Rate[(RVin-RVout)/RVin](%): Volume Reduction Rate[(Rvin-Rvout)/Rvin](%):

If RVout= (Overflow)=

Time to reach Max storage (Hr)=

Volume of water for drawdown in LID (c.u.m.)=

Volume of maximum water storage (cu.m.)=

Calculated Drawdown Time (Hr)= 100.00 4.17 1.62 1.63 | Junction Command(0011) | AREA QPEAK TPEAK (hrs) 0.00 0.00 (ha) (cms) (mm) 0.00 INFLOW: ID= 3(0010) 0.00 OUTFLOW: ID= 2(0011) 0.00 0 00 ADD HYD (0012)| 1 + 2 = 3 | AREA QPEAK TPEAK *** W A R N I N G : HYDROGRAPH 0011 <ID= 1> IS DRY.

*** W A R N I N G : HYDROGRAPH 0012 = HYDROGRAPH 0003 ID1= 1 (0011): + ID2= 2 (0003): 0.00 0.000 0.11 0.000 0.00 1.33 0.82 ID = 3 (0012): 0.11 0.000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. | ADD HYD (0012)| | 3 + 2 = 1 | QPEAK R.V. AREA TPEAK (ha) 0.11 (cms) (hrs) 1.33 (mm) 0.82 ID1= 3 (0012): + ID2= 2 (0006): 1.11 0.009 4.00 21.04 ID = 1 (0012): 1.22 0.009 19.22 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. | ADD HYD (0012) | | AREA QPEAK TPEAK R | | 1 + 2 = 3 | | AREA QPEAK TPEAK R | | (cms) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (h (mm) 0.00 ID = 3 (0012): 1.22 0.009 4.00 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

50-YEAR STORM

50-YEAR STORM	
V V I SSSS U U A L (v 6.2.2017) V V I SS U U A A L V V I SS U U AAAAA L	CHAMBER(0004) OUTFLOW: ON, UNDERDRAIN: OFF, INFIL: ON IN= 2> OUT= 3 CHAMBER: DT= 5.0 min MAX STO VOL (cu.m.) = 776.77 Bottom Area(m2) = 679.72
V V I SS U U A A L VV I SSSS UUUUU A A LLLLL	DEPTH STORAGE DEPTH STORAGE
	(mm) (cu.m.) (mm) (cu.m.) 0.00 0.00 991.00 467.67
OOO TTTTT TTTTT H H Y Y M M OOO TM O O T T H H Y Y MM MM O O	25.00 6.90 1016.00 480.03 51.00 13.81 1041.00 492.21
\circ	76.00 20.71 1067.00 504.21
OOO T T H H Y M M OOO eveloped and Distributed by Smart City Water Inc	102.00 27.62 1092.00 515.99 127.00 34.52 1118.00 527.56
opyright 2007 - 2022 Smart City Water Inc	152.00 41.43 1143.00 538.89
ll rights reserved.	178.00 48.33 1168.00 549.97 203.00 55.23 1194.00 560.77
***** DETAILED OUTPUT *****	229.00 62.14 1219.00 571.26 254.00 69.04 1245.00 581.41
THE DETAILED OUTFOL	279.00 75.95 1270.00 591.17
Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat	305.00 90.92 1295.00 600.42 330.00 105.81 1321.00 608.89
Output filename: C:\Users\Natalie\AppData\Local\Civica\VH5\f825abd2-5f32-4c68-	356.00 120.66 1346.00 616.72
:0f-9f2fb80764f6\c4a8c3a6-c310-4267-a4ca-eb9a4d7c5de2\scen Summary filename: C:\Users\Natalie\AppData\Local\Civica\VH5\f825abd2-5f32-4c68-	381.00 135.46 1372.00 624.30 406.00 150.21 1397.00 631.65
c0f-9f2fb80764f6\c4a8c3a6-c310-4267-a4ca-eb9a4d7c5de2\scen	432.00 164.91 1422.00 638.68
	457.00 179.55 1448.00 645.59 483.00 194.14 1473.00 652.49
ATE: 07/09/2024 TIME: 03:34:10	508.00 208.66 1499.00 659.39
ER:	533.00 223.12 1524.00 666.30 559.00 237.51 1549.00 673.20
	584.00 251.83 1575.00 680.11 610.00 266.08 1600.00 687.01
	635.00 280.25 1626.00 693.92
MMENTS:	660.00 294.33 1651.00 700.82 686.00 308.33 1676.00 707.72
	711.00 322.24 1702.00 714.63
*******	- 737.00 336.05 1727.00 721.53 762.00 349.77 1753.00 728.44
** SIMULATION : 05_50-Year Norfolk	787.00 363.37 1778.00 735.34 813.00 376.87 1803.00 742.25
	838.00 390.24 1829.00 749.15
CHICAGO STORM IDF curve parameters: A= 766.038	864.00 403.50 1854.00 756.05 889.00 416.62 1880.00 762.96
Ptotal= 78.32 mm B= 1.898	914.00 429.61 1905.00 769.86
C= 0.668 used in: INTENSITY = A / (t + B)^C	940.00 442.45 1930.00 776.77 965.00 455.14 0.00 0.00
Duration of storm = 4.00 hrs	DEPTH DISCHARGE DEPTH DISCHARGE
Storm time step = 10.00 min	(m) (cms) (m) (cms)
Time to peak ratio = 0.33	0.000 0.000 0.580 0.009 0.080 0.003 0.690 0.010
TIME RAIN TIME RAIN TIME RAIN TIME RAIN	0.180 0.005 0.790 0.011
hrs mm/hr hrs mm/hr ' hrs mm/hr hrs mm/hr 0.00 7.35 1.00 35.40 2.00 14.38 3.00 8.44	0.280 0.007 0.890 0.012 0.380 0.008 0.990 0.012
0.17 8.19 1.17 146.50 2.17 12.71 3.17 7.96	0.480 0.009 1.090 0.013
0.33	NATIVE SOIL LAYER:
0.67 13.53 1.67 20.36 2.67 9.66 3.67 6.85	Infiltration $(m/hr) = 0.0120$
0.83 18.53 1.83 16.73 2.83 9.00 3.83 6.56	AREA QPEAK TPEAK R.V.
	(ha) (cms) (hrs) (mm) INFLOW:ID= 2 1.11 0.422 1.33 72.99
	OUTFLOW:ID= 1 1.11 0.011 4.00 28.33
CALIB STANDHYD (0001) Area (ha) = 1.11	OVERFLOW:ID= 3 0.00 0.000 0.00 0.00
ID= 1 DT= 5.0 min Total Imp(%)= 93.00 Dir. Conn.(%)= 93.00	Volume Reduction Rate[(RVin-RVout)/RVin](%)= 61.19 Time to reach Max storage (Hr)= 4.00
IMPERVIOUS PERVIOUS (i)	Volume of water for drawdown in LID (cu.m.)= 676.69
Surface Area (ha) = 1.03 0.08 Dep. Storage (mm) = 1.00 16.50	Volume of maximum water storage (cu.m.)= 687.95 Calculated Drawdown Time (Hr)= 56.58
Average Slope (%)= 1.00 2.00	
Length (m) = 86.02 40.00 Mannings n = 0.013 0.250	Junction Command(0005)
NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.	
	AREA QPEAK TPEAK R.V.
TRANSFORMED HYETOGRAPH TIME RAIN TIME RAIN TIME RAIN TIME RAIN hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr	(ha) (cms) (hrs) (mm) INFLOW: ID= 3(0004) 0.00 0.00 0.00 0.00
TIME RAIN TIME RAIN TIME RAIN TIME RAIN	OUTFLOW: ID= 2(0005) 0.00 0.00 0.00 0.00
0.083 7.35 1.083 35.40 2.083 14.38 3.08 8.44	
0.167 7.35 1.167 35.40 2.167 14.38 3.17 8.44 0.250 8.19 1.250 146.50 2.250 12.71 3.25 7.96	CALTR
0.333 8.19 1.333 146.50 2.333 12.71 3.33 7.96	NASHYD (0002) Area (ha) = 0.05 Curve Number (CN) = 58.0
0.417	ID= 1 DT= 5.0 min Ia (mm)= 16.50 # of Linear Res.(N)= 3.00
0.583 10.95 1.583 26.91 2.583 10.46 3.58 7.18	CALIB
0.007 10.35 1.007 20.91 2.007 10.46 3.67 7.18 0.750 13.53 1.750 20.36 2.750 9.66 3.75 6.85	NUTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
0.833 13.53 1.833 20.36 2.833 9.66 3.83 6.85 0.917 18.53 1.917 16.73 2.917 9.00 3.92 6.56	TRANSFORMED HYETOGRAPH
1.000 18.53 2.000 16.73 3.000 9.00 4.00 6.56	TRANSFORMED HYETOGRAPH TIME RAIN TIME RAIN TIME RAIN TIME RAIN
Max.Eff.Inten.(mm/hr) = 146.50 18.29	hrs mm/hr hrs mm/hr ' hrs mm/hr hrs mm/hr 0.083 7.35 1.083 35.40 2.083 14.38 3.08 8.44
over (min) 5.00 5.00	0.167 7.35 1.167 35.40 2.167 14.38 3.17 8.44
Storage Coeff. (min)= 2.00 (ii) 4.16 (ii) Unit Hyd. Tpeak (min)= 5.00 5.00	0.250 8.19 1.250 146.50 2.250 12.71 3.25 7.96 0.333 8.19 1.333 146.50 2.333 12.71 3.33 7.96
Unit Hyd. peak (cms)= 0.31 0.24	0.417 9.32 1.417 43.93 2.417 11.45 3.42 7.55
PEAK FLOW (cms)= 0.42 0.00 0.422 (iii)	0.500 9.32 1.500 43.93 2.500 11.45 3.50 7.55 0.583 10.95 1.583 26.91 2.583 10.46 3.58 7.18
TIME TO PEAK (hrs)= 1.33 1.33 1.33 1.33	0.667 10.95 1.667 26.91 2.667 10.46 3.67 7.18
TOTAL RAINFALL (mm) = 78.32 78.32 78.32	0.750
Max.Eff.Inten.(mm/hr) = 146.50 18.29	0.917 18.53 1.917 16.73 2.917 9.00 3.92 6.56 1.000 18.53 2.000 16.73 3.000 9.00 4.00 6.56
**** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!	
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:	Unit Hyd Qpeak (cms)= 0.048
CN* = 58.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL	PEAK FLOW (cms)= 0.002 (i) TIME TO PEAK (hrs)= 1.333
THAN THE STORAGE COEFFICIENT.	RUNOFF VOLUME (mm) = 9.280
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.	TOTAL RAINFALL (mm) = 78.320

1.000 Unit Hyd Qpeak (cms) = 0.029 PEAK FLOW (cms) = 0.001 (i)

(i) PEAK FLOW	DOES NOT INCLUDE	BASEFLOW IF A	ANY.			
SOAKAWAY(0007) IN= 2> OUT= 3 DT= 5.0 MIN	UNDERDRAIN: OFF					1.00
	Max. Drawdown NATIVE SOIL LAY Infiltration (m	(hr) = 33.33 ER:	Available Sto	rage (c	(nr)=	12.00
INFLOW:ID= 2 OVERFLOW:ID= 3	AREA (ha) 0.05	QPEAK (cms) 0.002 0.000	TPEAK (hrs) 1.33 0.00	R.V. (mm) 9.39 0.00		
Time Volu Volu	me Reduction Rat If RVout= to reach Max st me of water for me of maximum wa ulated Drawdown	(Overflow orage drawdown in L: ter storage) = (Hr) = ID (cu.m.) =	100.00 4.00 3.58 3.62 9.92		
Junction Comman	d(0008)					
INFLOW: ID= 3(OUTFLOW: ID= 2(
CALIB NASHYD (0003) ID= 1 DT= 5.0 min	- Area (ha): Ia (mm):	= 0.11 Cu: = 16.50 # c				
NOTE: RAI	NFALL WAS TRANSF	ORMED TO 5.0) MIN. TIME STE	Ρ.		
h 0.0 0.1 0.2 0.3 0.4 0.5 0.5 0.6 0.7 0.8 0.9	ME RAIN TI rs mm/hr h 83 7.35 1.0 67 7.35 1.1 50 8.19 1.2 33 8.19 1.2 33 8.19 1.3 17 9.32 1.4 00 9.32 1.5 83 10.95 1.5 67 10.95 1.6 50 13.53 1.7 33 13.53 1.8 17 18.53 1.9 00 18.53 2.0	ME RAIN ' rs mm/hr ' 67 35.40 67 35.40 33 146.50 33 146.50 33 26.91 67 26.91 50 20.36 33 20.36 17 16.73 00 16.73	2.417 11.45 2.500 11.45 2.583 10.46 2.667 10.46 2.750 9.66 2.833 9.66	TIME hrs 3.08 3.17 3.25 3.33 3.42 3.50 3.58 3.67 3.75 3.83	mm/hr 8.44 8.44 7.96 7.55 7.55 7.18 7.18 6.85	
	(cms) = 0.210 (cms) = 0.001 (hrs) = 1.333	(i)				
RUNOFF VOLUME TOTAL RAINFALL	(hrs) = 1.333 (mm) = 1.083 (mm) = 78.320 IENT = 0.014					
	DOES NOT INCLUDE					
Junction Comman	 d(0006)					
<pre>INFLOW : ID= 1(OUTFLOW: ID= 2(</pre>		0.01 4.00				
CALIB NASHYD (0009) ID= 1 DT= 5.0 min	- Area (ha):	= 0.03 Cu:	rve Number (C! of Linear Res.(l			
NOTE: RAI	NFALL WAS TRANSF	ORMED TO 5.0) MIN. TIME STE	Ρ.		
h 0.0 0.1 0.2 0.3 0.4 0.5 0.5 0.6 0.7 0.8	ME RAIN TI rs mm/hr h 83 7.35 1.0 67 7.35 1.1	ME RAIN ' rs mm/hr ' 67 35.40 67 35.40 67 35.40 67 446.50 17 43.93 67 26.91 67 26.91 67 26.91 50 20.36 33 20.36 17 16.73	2.083	TIME hrs 3.08 3.17 3.25 3.33 3.42 3.50 3.58 3.67 3.75 3.83 3.92		

TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 9.271
TOTAL RAINFALL (mm)= 78.320
RUNOFF COEFFICIENT = 0.118 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. ______ |SOAKAWAY(0010)| UNDERDRAIN: OFF |IN= 2--> OUT= 3 | |DT= 5.0 MIN | STORAGE LAYER: Length (m) = 10.00 Porosity = 0.40 Width (m) = 1.50 Height (m)= 1.00
Initial Water Level (m)= 0.00
Min. Drawdown (hp)= 24.00
Available Storage (cu.m.)= 6.00 Height Max. Drawdown (hr) = 33.33 NATIVE SOIL LAYER: Infiltration (m/hr) = 0.0120AREA QPEAK TPEAK R.V. (ha) (cms)
INFLOW:ID= 2 0.03 0.001
OVERFLOW:ID= 3 0.00 0.000 (hrs) 1.33 (mm) 9.47 0.00 0.00 Volume Reduction Rate[(RVin-RVout)/RVin](%): Volume Reduction Rate[(Rvin-Rvout)/Rvin](%):

If RVout= (Overflow)=

Time to reach Max storage (Hr)=

Volume of water for drawdown in LID (c.u.m.)=

Volume of maximum water storage (cu.m.)=

Calculated Drawdown Time (Hr)= 100.00 4.17 2.30 | Junction Command(0011) | AREA QPEAK TPEAK (hrs) 0.00 0.00 (ha) (cms) (mm) 0.00 INFLOW: ID= 3(0010) 0.00 OUTFLOW: ID= 2(0011) 0.00 0 00 ADD HYD (0012)| 1 + 2 = 3 | AREA QPEAK TPEAK *** W A R N I N G : HYDROGRAPH 0011 <ID= 1> IS DRY.

*** W A R N I N G : HYDROGRAPH 0012 = HYDROGRAPH 0003 ID1= 1 (0011): + ID2= 2 (0003): 0.00 0.000 0.11 0.001 0.00 ID = 3 (0012): 0.11 0.001 1.33 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. | ADD HYD (0012)| | 3 + 2 = 1 | QPEAK AREA TPEAK (ha) 0.11 (cms) (hrs) 1.33 (mm) 1.08 ID1= 3 (0012): + ID2= 2 (0006): 1.11 0.011 4.00 28.33 ID = 1 (0012): 1.22 0.011 25.87 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. | ADD HYD (0012) | | AREA QPEAK TPEAK R | | 1 + 2 = 3 | | AREA QPEAK TPEAK R | | (cms) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (h (mm) 0.00 ID = 3 (0012): 1.22 0.011 4.00 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

100-YEAR STORM

100-YEAR STORM	
V V I SSSSS U U A L (v 6.2.2017) V V I SS U U AA L V V I SS U U AAAAA L	CHAMBER(0004) OUTFLOW: ON, UNDERDRAIN: OFF, INFIL: ON IN= 2> OUT= 3 CHAMBER: DT= 5.0 min MAX STO VOL (cu.m.) = 776.77 Bottom Area(m2) = 679.72
V V I SS U U AAAAA L V V I SSSS UUUUU A A LLLLL VV I SSSSS UUUUU A A LLLLLL	DEPTH STORAGE DEPTH STORAGE
	(mm) (cu.m.) (mm) (cu.m.) 0.00 0.00 991.00 467.67
O O T T H H Y Y MM MM O O	25.00 6.90 1016.00 480.03 51.00 13.81 1041.00 492.21
O O T T H H Y M M O O O O T T H H Y M M OOO	76.00 20.71 1067.00 504.21 102.00 27.62 1092.00 515.99
Developed and Distributed by Smart City Water Inc Copyright 2007 - 2022 Smart City Water Inc	127.00 34.52 1118.00 527.56 152.00 41.43 1143.00 538.89
All rights reserved.	178.00 48.33 1168.00 549.97 203.00 55.23 1194.00 560.77
***** DETAILED OUTPUT ****	229.00 62.14 1219.00 571.26 254.00 69.04 1245.00 581.41
	279.00 75.95 1270.00 591.17 305.00 90.92 1295.00 600.42
Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat Output filename: C:\Users\Natalie\AppData\Local\Civica\VH5\f825abd2-5f32-4c68-	330.00 105.81 1321.00 608.89 356.00 120.66 1346.00 616.72
9c0f-9f2fb80764f6\4d080023-452c-4ab5-b196-efec8b939418\scen Summary filename: C:\Users\Natalie\AppData\Local\Civica\VH5\f825abd2-5f32-4c68-	381.00 135.46 1372.00 624.30 406.00 150.21 1397.00 631.65
9c0f-9f2fb80764f6\4d080023-452c-4ab5-b196-efec8b939418\scen	432.00 164.91 1422.00 638.68 457.00 179.55 1448.00 645.59
DATE: 07/09/2024 TIME: 03:34:10	483.00 194.14 1473.00 652.49 508.00 208.66 1499.00 659.39
USER:	533.00 223.12 1524.00 666.30 559.00 237.51 1549.00 673.20
	584.00 251.83 1575.00 680.11 610.00 266.08 1600.00 687.01
COMMENTS:	635.00 280.25 1626.00 693.92 660.00 294.33 1651.00 700.82
	686.00 308.33 1676.00 707.72 711.00 322.24 1702.00 714.63
*******	- 737.00 336.05 1727.00 721.53 762.00 349.77 1753.00 728.44
** SIMULATION : 06_100-Year Norfolk	787.00 363.37 1778.00 735.34 813.00 376.87 1803.00 742.25
	838.00 390.24 1829.00 749.15 864.00 403.50 1854.00 756.05
CHICAGO STORM	889.00 416.62 1880.00 762.96 914.00 429.61 1905.00 769.86
C= 0.657 used in: INTENSITY = A / (t + B)^C	940.00 442.45 1930.00 776.77 965.00 455.14 0.00 0.00
Duration of storm = 4.00 hrs	DEPTH DISCHARGE DEPTH DISCHARGE
Storm time step = 10.00 min Time to peak ratio = 0.33	(m) (cms) (m) (cms) 0.000 0.000 0.580 0.009
TIME RAIN TIME RAIN TIME RAIN TIME RAIN	0.080 0.003 0.690 0.010
hrs mm/hr hrs mm/hr ' hrs mm/hr hrs mm/hr 0.00 8.40 1.00 38.70 2.00 16.17 3.00 9.61	0.280 0.007 0.890 0.012
0.17 9.34 1.17 160.97 2.17 14.33 3.17 9.08 0.33 10.59 1.33 47.72 2.33 12.95 3.33 8.61	0.380 0.008 0.990 0.012 0.480 0.009 1.090 0.013
0.50 12.39 1.50 29.71 2.50 11.86 3.50 8.20 0.67 15.24 1.67 22.67 2.67 10.97 3.67 7.84	NATIVE SOIL LAYER:
0.83 20.69 1.83 18.74 2.83 10.24 3.83 7.51	Infiltration (m/hr) = 0.0120
	AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm)
CALIB	INFLOW:ID= 2 1.11 0.465 1.33 81.43 OUTFLOW:ID= 1 1.11 0.013 4.00 35.67
STANDHYD (0001) Area (ha)= 1.11 ID= 1 DT= 5.0 min Total Imp(%)= 93.00 Dir. Conn.(%)= 93.00	OVERFLOW:ID= 3
IMPERVIOUS PERVIOUS (i)	Time to reach Max storage (Hr)= 4.00 Volume of water for drawdown in LID (cu.m.)= 751.35
Surface Area (ha)= 1.03 0.08 Dep. Storage (mm)= 1.00 16.50	Volume of maximum water storage (cu.m.)= 764.27
Average Slope (%) = 1.00 2.00 Length (m) = 86.02 40.00	Calculated Drawdown Time (Hr) = 58.08
Mannings n = 0.013 0.250	Junction Command(0005)
NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.	AREA QPEAK TPEAK R.V.
TRANSFORMED HYETOGRAPH	(ha) (cms) (hrs) (mm)
TRANSFORMED HYETOGRAPH TIME RAIN TIME RAIN TIME RAIN TIME RAIN hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr	OUTFLOW: ID= 2(0005) 0.00 0.00 0.00 0.00
0.083	
0.250 9.34 1.250 160.97 2.250 14.33 3.25 9.08 0.333 9.34 1.333 160.97 2.333 14.33 3.33 9.08	CALIB
	ID= 1 DT= 5.0 min Ia (mm)= 16.50 # of Linear Res.(N)= 3.00
0.583	NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
0.750 15.24 1.750 22.67 2.750 10.97 3.75 7.84 0.833 15.24 1.833 22.67 2.833 10.97 3.83 7.84 0.917 20.69 1.917 18.74 2.917 10.24 3.92 7.51	10121 111111111111111111111111111111111
0.917 20.69 1.917 18.74 2.917 10.24 3.92 7.51 1.000 20.69 2.000 18.74 3.000 10.24 4.00 7.51	TRANSFORMED HYETOGRAPH TIME RAIN TIME RAIN TIME RAIN TIME RAIN
	hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr 0.083 8.40 1.083 38.70 2.083 16.17 3.08 9.61
Max.Eff.Inten.(mm/hr) = 160.97 24.31 over (min) 5.00 5.00 Storage Coeff. (min) = 1.93 (ii) 4.00 (ii) Unit Hyd. Tpeak (min) = 5.00 5.00 Unit Hyd. peak (cms) = 0.31 0.24	0.167 8.40 1.167 38.70 2.167 16.17 3.17 9.61
Unit Hyd. Tpeak (min) = 5.00 5.00 Unit Hyd. peak (cms) = 0.31 0.24	0.333 9.34 1.333 160.97 2.333 14.33 3.33 9.08
PEAK FLOW (cms) = 0.46 0.01 0.465 (iii) TIME TO PEAK (hrs) = 1.33 1.33 1.33 RUNOFF VOLUME (mm) = 86.09 19.58 81.43 TOTAL RAINFALL (mm) = 87.09 87.09 87.09 RUNOFF COEFFICIENT = 0.99 0.22 0.94	0.233 9.34 1.233 160.97 2.233 14.33 3.33 9.08 0.417 10.59 1.417 47.72 2.417 12.95 3.42 8.61 0.500 10.59 1.500 47.72 2.500 12.95 3.50 8.61 0.583 12.39 1.583 29.71 2.583 11.86 3.58 8.20
TIME TO PEAK (hrs)= 1.33 1.33 1.33 RUNOFF VOLUME (mm)= 86.09 19.58 81.43	0.667 12.39 1.667 29.71 2.667 11.86 3.67 8.20 0.750 15.24 1.750 22.67 2.750 10.97 3.75 7.84
TOTAL RAINFALL (mm)= 87.09 87.09 87.09 RUNOFF COEFFICIENT = 0.99 0.22 0.94	0.833 15.24 1.833 22.67 2.833 10.97 3.83 7.84 0.917 20.69 1.917 18.74 2.917 10.24 3.92 7.51
***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!	1.000 20.69 2.000 18.74 3.000 10.24 4.00 7.51
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:	Unit Hyd Qpeak (cms)= 0.048
CN* = 58.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL	PEAK FLOW (cms)= 0.003 (i) TIME TO PEAK (hrs)= 1.333
THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.	RUNOFF VOLUME (mm)= 11.683 TOTAL RAINFALL (mm)= 87.089

0.667 0 833 1.000 Unit Hyd Qpeak (cms) = 0.029 PEAK FLOW (cms) = 0.002 (i)

(i) PEAK FLOW	DOES NOT INCLUDE	BASEFLOW IF A	NY.		
SOAKAWAY(0007) IN= 2> OUT= 3		?			
DT= 5.0 MIN	STORAGE LAYER: Length	(m) = 20.00	Height		(m) = 1.00
	Length Porosity Width	(m) = 0.40 (m) = 1.50	Min. Drawdown	Level	(m) = 0.00 (hr) = 24.00
	Max. Drawdown NATIVE SOIL LAY		Available Stor	age (cu	.m.)= 12.00
	Infiltration (m				
		QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
<pre>INFLOW:ID= 2 OVERFLOW:ID= 3</pre>	0.05	0.003	1.33	11.79	
	me Reduction Rat			0.00	
		(Overflow		100.00 4.17	
Volu	me of water for me of maximum wa	drawdown in LI	D (cu.m.)=	4.78 4.81	
	ulated Drawdown		(Hr) =		
Junction Comman					
INFLOW : ID= 3(OUTFLOW: ID= 2(AREA (ha)	QPEAK TPEAK (cms) (hrs	R.V. (mm)		
INFLOW: ID= 3(OUTFLOW: ID= 2(0.00 0008) 0.00	0.00 0.00 0.00 0.00	0.00		
CALIB	- !				
CALIB NASHYD (0003) ID= 1 DT= 5.0 min	Area (ha) Ia (mm)	= 0.11 Cur = 16.50 # o	ve Number (CN f Linear Res.(N) = 58.0) = 3.00	
NOTE: DAT	- U.H. Tp(hrs) NFALL WAS TRANSF		MIN MINE OFFI		
NOTE: RAI	NFALL WAS TRANSE	TORMED TO 5.0	MIN. TIME STEP	•	
m T	AD DATAL MT	NO DATE I	YETOGRAPH TIME RAIN	mTMP.	RAIN
h	ms mm/hr h 83 8.40 1.0 67 8.40 1.1 50 9.34 1.2 33 9.34 1.3	nrs mm/hr '	hrs mm/hr	hrs	mm/hr
0.1	67 8.40 1.1 50 9.34 1.2	.67 38.70 2	.167 16.17	3.17	9.61
0.3	33 9.34 1.3 17 10.59 1.4	333 160.97 2	.333 14.33	3.33	9.08 8.61
0.5	00 10.59 1.5 83 12.39 1.5	500 47.72 2	.500 12.95	3.50	8.61 8.20
0.6	67 12.39 1.6 50 15.24 1.7	667 29.71 2	.667 11.86	3.67	8.20 7.84
0.8	33 15.24 1.8 17 20.69 1.9	333 22.67 2 917 18.74 2	.833 10.97 .917 10.24	3.83	7.84 7.51
1.0	00 20.69 2.0	18.74 3	.000 10.24	4.00	7.51
	(cms) = 0.210)			
PEAK FLOW TIME TO PEAK RUNOFF VOLUME	(cms) = 0.001 (hrs) = 1.333 (mm) = 1.363	3			
	(mm) = 1.363 (mm) = 87.089 IENT = 0.016				
	DOES NOT INCLUDE		NY.		
Junction Comman					
	AREA	QPEAK TPEAK	R.V.		
INFLOW : ID= 1((ha) 0004) 1.11	QPEAK TPEAK (cms) (hrs 0.01 4.00 0.01 4.00) (mm) 35.67		
OUTFLOW: ID= 2(
	-				
CALIB NASHYD (0009)	 Area (ha)	= 0.03 Cur	ve Number (CN)= 58.0	
NASHYD (0009) ID= 1 DT= 5.0 min	Ia (mm) - U.H. Tp(hrs)	= 16.50 # o = 0.04	f Linear Res.(N)= 3.00	
NOTE: RAI	NFALL WAS TRANSF	FORMED TO 5.0	MIN. TIME STEP		
		EDANCEODMED II	VEROCD A DU		
		ME RAIN '	YETOGRAPH TIME RAIN		
0.0	8.40 1.0	183 38.70 2	.083 16.17 .167 16.17	3.08	9.61
0.2	50 9.34 1.2	250 160.97 2	.250 14.33	3.25	9.08
0.4	17 10.59 1.4	117 47.72 2	.417 12.95	3.42	8.61 8.61
0.5	00 10.59 1.5 83 12.39 1.5 67 12.39 1.6	583 29.71 2 567 29.71 2	.583 11.86	3.58	8.20 8.20
	67 12.39 1.6 50 15.24 1.7 33 15.24 1.8				7.84 7.84
0.9	17 20.69 1.9 00 20.69 2.0	18.74 2	.917 10.24	3.92	7.51 7.51
1.0	20.03 2.0	10./4 3	.000 10.24	4.00	/.J±

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. ______ |SOAKAWAY(0010)| UNDERDRAIN: OFF |IN= 2--> OUT= 3 | |DT= 5.0 MIN | STORAGE LAYER: Length (m) = 10.00 Porosity = 0.40 Width (m) = 1.50 Height (m)= 1.00
Initial Water Level (m)= 0.00
Min. Drawdown (hp)= 24.00
Available Storage (cu.m.)= 6.00 Height Max. Drawdown (hr) = 33.33 NATIVE SOIL LAYER: Infiltration (m/hr) = 0.0120AREA QPEAK TPEAK R.V. (ha) (cms)
INFLOW:ID= 2 0.03 0.002
OVERFLOW:ID= 3 0.00 0.000 (hrs) 1.33 (mm) 11.87 0.00 0.00 Volume Reduction Rate[(RVin-RVout)/RVin](%): Volume Reduction Rate[(Rvin-Rvout)/Rvin](%):

If RVout= (Overflow)=

Time to reach Max storage (Hr)=

Volume of water for drawdown in LID (c.u.m.)=

Volume of maximum water storage (cu.m.)=

Calculated Drawdown Time (Hr)= 100.00 4.17 3.01 | Junction Command(0011) | AREA QPEAK TPEAK (hrs) 0.00 0.00 (ha) (cms) (mm) 0.00 INFLOW: ID= 3(0010) 0.00 OUTFLOW: ID= 2(0011) 0.00 0 00 ADD HYD (0012)| 1 + 2 = 3 | AREA QPEAK TPEAK *** W A R N I N G : HYDROGRAPH 0011 <ID= 1> IS DRY.

*** W A R N I N G : HYDROGRAPH 0012 = HYDROGRAPH 0003 ID1= 1 (0011): + ID2= 2 (0003): 0.00 0.000 0.11 0.001 0.00 ID = 3 (0012): 0.11 0.001 1.33 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. | ADD HYD (0012)| | 3 + 2 = 1 | QPEAK AREA TPEAK (ha) 0.11 (cms) (hrs) 1.33 (mm) 1.36 ID1= 3 (0012): + ID2= 2 (0006): 1.11 0.013 4.00 35.67 ID = 1 (0012): 1.22 0.013 32.58 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. | ADD HYD (0012) | | AREA QPEAK TPEAK R | | 1 + 2 = 3 | | AREA QPEAK TPEAK R | | (cms) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (rs) (hrs) (h (mm) 0.00 ID = 3 (0012): 1.22 0.013 4.00 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 11.683
TOTAL RAINFALL (mm)= 87.089
RUNOFF COEFFICIENT = 0.134

25mm QUALITY	STOR	М					
V V I V V I V V I V V I VV I	SSSSS U SS U SS U SS U SS U SS U	U A U A A U AAAAA U A A	L L A L A L	L	(v 6.2.2	2017)	
OOO TTTTT O O T O O T OOO T Developed and Distrib Copyright 2007 - 2022	T H T H T H outed by Sm	H Y Y H Y H Y art City	MM M M M Water	M 0 0 M 0 0 M 000	TM		
All rights reserved.		,					
**	*** DET	AILE	D O	UTPUT	****		
Input filename: C Output filename: C 9c0f-9f2fb80764f6\357 Summary filename: C 9c0f-9f2fb80764f6\357	::\Users\Na '81785-a6fb ::\Users\Na	talie\App -4e32-95k talie\App	Data\L 02-6436 Data\L	ocal\Civica 175a98e2\so ocal\Civica	a\VH5\f82 cen a\VH5\f82	25abd2-5	E32-4c68-
DATE: 07/09/2024			TIM	E: 03:34:10)		
USER:							
COMMENTS:							
**************************************	mm, 4 hr N	orfolk		* *			
READ STORM	Filenam	e: C:\Use	ers\Nat	alie\AppD			
		ata\Lo 211c29	ocal\Te 0c2-c05	mp\ c-4a63-afb	7-6d12935	55c529\c	2700bce
TIME	D 2 T 2 1	m Than	D 3 T 3 T		RAIN	TIME	RAIN
hrs	mm/hr 0.00	hrs 1.17	mm/hr 12.56	' hrs	mm/hr 3.61	hrs 3.50	mm/hr 1.96
0.17 0.33 0.50	1.90 2.16 2.51	1.33	16.17	2.50	2.87	3.67	1.85
0.67 0.83	3.03	1.83	6.38	hrs 2.33 2.50 2.67 2.83 3.00 3.17 3.33	2.41 2.23	1.00	1.07
1.00			4.19		2.09		
CALIB STANDHYD (0001) ID= 1 DT= 5.0 min	Area Total Im	(ha) = 1 ap(%) = 93	1.11	Dir. Conn.	(%) = 93.	.00	
Surface Area Dep. Storage Average Slope	(ha) = (mm) = (%) =	1.03 1.00 1.00		RVIOUS (i) 0.08 16.50 2.00			
Length Mannings n	(m) = =	86.02 0.013		40.00 0.250			
NOTE: RAINE	ALL WAS TR	ANSFORMEI) TO	5.0 MIN. T	IME STEP.		
TIME	RAIN	TRAN	NSFORME RAIN	D HYETOGRAI	PH RAIN	TIME	RAIN
hrs 0.083	mm/hr 0.00	hrs 1.167	mm/hr 5.69	' hrs 2.250	mm/hr 4.19	hrs 3.33	mm/hr 2.23
0.250 0.333	1.90	1.333	12.56	2.417	3.61	3.50	2.09
0.417 0.500	2.16 2.16	1.500 1.583	51.29 16.17	2.583	3.19 3.19	3.67 3.75	1.96 1.85
0.583 0.667	2.51 2.51	1.667 1.750	16.17 8.96	2.750 2.833	2.87 2.87	3.83 3.92	1.85 1.75
0.750 0.833	3.03 3.03	1.833 1.917	8.96 6.38	2.917 3.000	2.61	4.00	1.75 1.67
0.917 1.000 1.083	3.89 3.90 5.69	2.000 2.083 2.167	6.38 5.03 5.03	TIME hrs 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167 3.250	2.41 2.41 2.23	4.17	1.67
Max.Eff.Inten.(m	m/hr)=	51.29		0.17 10.00			
Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min) = (min) = (cms) =	3.05 5.00 0.27	(ii)	6.32 (ii) 10.00 0.15			
PEAK FLOW	(cms)=	0.14		0.00		13 (iii)	
TIME TO PEAK RUNOFF VOLUME	(hrs) = (mm) =	1.50 24.00		2.58 0.38	1.5	50 34	
RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(mm) = ENT =	25.00 0.96		25.00 0.02	25.0		
***** WARNING: STORAG		S SMALLEF	R THAN	TIME STEP!			
(i) CN PROCEDU CN* = 5	8.0 Ia	D FOR PER	corage	(Above)			

CN* = 58.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SWALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CHAMBER(0004)	OUTFLOW: ON,	UNDERDRAIN: OF	F, INFIL: ON	
IN= 2> OUT= 3	CHAMBER:			
DT= 5.0 min	MAX STO VOL	(cu.m.) = 776.77	Bottom Area (m2)	
	DEDMII	CHOD & CE	I DEDMII	0

= 2> OUT= 3	CHAMBER:			
r= 5.0 min	MAX STO VOL	(cu.m.) = 776.77 STORAGE (cu.m.) 0.00 6.90 13.81 20.71 27.62 34.52 41.43 48.33 55.23 62.14 69.04 75.95 90.92 105.81 120.66 135.46 150.21 164.91 179.55 194.14 208.66 223.12 237.51 251.83 266.08 280.25 294.33 308.33 322.24 336.05 349.77 363.37 376.87 390.24 403.50 416.62 429.61 442.45 455.14 DISCHARGEE (cms)	Bottom Area (m2	2) = 679.
	DEDTH	STODACE	I DEDTH	STOPACE
	DEPTH (mm) 0.00	/ ON MO)	DEFIN	JIORMGE
	(111111)	(Cu.m.)	(111111)	(Cu.III.)
	0.00	0.00	991.00	467.67
	25.00	6.90	1016.00	480.03
	51.00 76.00	13.81	1041.00	492.21
	76.00	20.71	1067.00	504.21
	102.00 127.00 152.00 178.00	27.62	1092.00	515.99
	127.00	34.52	1118.00	527.56
	152.00	41.43	1 1143.00	538.89
	178 00	48 33	1 1168 00	549 97
	203.00	EE 33	1100.00	560 77
	203.00	55.25	1194.00	500.77
	229.00	62.14	1219.00	5/1.26
	254.00	69.04	1245.00	581.41
	279.00	75.95	1270.00	591.17
	305.00	90.92	1295.00	600.42
	330.00	105.81	1321.00	608.89
	356.00	120.66	1 1346.00	616.72
	381 00	135 46	1 1372 00	624 30
	406.00	150.40	1 1307 00	631 65
	305.00 330.00 356.00 381.00 406.00 432.00	164 01	1 1422 00	630 (0
	452.00	104.91	1 1422.00	638.68
	457.00	1/9.55	1448.00	645.59
	483.00 508.00	194.14	1473.00	652.49
	508.00	208.66	1499.00	659.39
	533.00	223.12	1524.00	666.30
	508.00 533.00 559.00 584.00 610.00 635.00 660.00	237.51	1549.00	673.20
	584.00	251.83	1575.00	680.11
	610.00	266.08	1 1600.00	687.01
	635.00	280 25	1 1626 00	693 92
	660.00	200.23	1 1651 00	700.92
	606.00	294.33	1 1676 00	700.02
	686.00	308.33	1 16/6.00	/0/./2
	711.00	322.24	1 1/02.00	/14.63
	737.00	336.05	1727.00	721.53
	762.00	349.77	1753.00	728.44
	787.00	363.37	1778.00	735.34
	813.00	376.87	1803.00	742.25
	838.00	390.24	1829.00	749.15
	864.00	403.50	1 1854.00	756.05
	889 00	416 62	1 1880 00	762 96
	011.00	120.02	1 1000.00	762.50
	889.00 914.00 940.00	429.01	1 1000.00	703.00
	940.00	442.45	1 1930.00	//6.//
	965.00	455.14	0.00	0.00
	DEPTH	DISCHARGE (cms) 0.000 0.003 0.005 0.007 0.008 0.009	DEPTH	DISCHARGE
	(m)	(cms)	(m)	(cms)
	0.000	0.000	0.580	0.009
	0.080	0.003	0.690	0.010
	0.180	0.005	0.790	0.011
	0.100	0.003	1 0.750	0.011
	0.280	0.007	0.030	0.012
	0.380	0.000	1 000	0.012
	0.480	0.009	1.090	0.013
	NATIVE SOIL Infiltration	LAYER: n (m/hr) = 0.0120		
			TPEAK (hrs)	
	AREA	QPEAK	TPEAK	R.V. (mm)
	(ha)	(cms)	(hrs)	(mm)
INFLOW: ID=	2 1.11	0.143	1.50	22.34
OUTFLOW: ID=	1 0.00	0.000	0.00	0.00
OVERFLOW: ID=	(ha) 2 1.11 1 0.00 3 0.00	0.000	(hrs) 1.50 0.00 0.00	0.00
776	olume Reduction	Rate((RVin=RVou+)		100.00
V C	me to reach Max	storage	(Hr)=	4 17
m d	lumo of	or drawdown in tr	D (011 m)=	216 77
Ti		or arawaown in Ll	u (cu.m.)=	210.//
Ti	June of water i			
Ti Vo Vo	clume Reduction me to reach Max clume of water folume of maximum alculated Drawdo	n water storage	(cu.m.)=	218.46

| Junction Command(0005) |

AREA OPEAK TPEAK R.V. (cms) 0.00 0.00 (hrs) 0.00 0.00 (ha) 0.00 (mm) 0.00 INFLOW: ID= 3(0004) 0.00 OUTFLOW: ID= 2(0005) 0.00

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

		TRANSFORMED H	HYETOGRAPH		
TIME	RAIN TIM	E RAIN '	TIME RAII	N TIME	RAIN
hrs	mm/hr hr	s mm/hr '	hrs mm/h	r hrs	mm/hr
0.083	0.00 1.16	7 5.69 2	2.250 4.19	3.33	2.23
0.167	0.00 1.25	12.56 2	2.333 4.19	3.42	2.09
0.250	1.90 1.33	3 12.56 2	2.417 3.61	3.50	2.09
0.333	1.90 1.41	7 51.29 2	2.500 3.61	3.58	1.96
0.417	2.16 1.50	51.29 2	2.583 3.19	3.67	1.96
0.500	2.16 1.58	3 16.17 2	2.667 3.19	3.75	1.85
0.583	2.51 1.66	7 16.17 2	2.750 2.87	3.83	1.85
0.667	2.51 1.75	8.96 2	2.833 2.87	3.92	1.75
0.750	3.03 1.83	3 8.96 2	2.917 2.61	4.00	1.75
0.833	3.03 1.91	7 6.38 3	3.000 2.61	4.08	1.67
0.917	3.89 2.00	0 6.38 3	3.083 2.41	4.17	1.67
1.000	3.90 2.08	3 5.03 3	3.167 2.41	1	
1.083	5.69 2.16	7 5.03 3	3.250 2.23	1	

Unit Hyd Qpeak (cms) = 0.048

PEAK FLOW (cms)= 0.000 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 0.223
TOTAL RAINFALL (mm)= 24.999

RUNOFF COEFFICIENT = 0.009 PEAK FLOW (cms)= 0.000 (i)
TIME TO PEAK (hrs)= 0.000
RUNOFF VOLUME (mm)= 0.000 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. TOTAL RAINFALL (mm) = 24.999RUNOFF COEFFICIENT = |SOAKAWAY(0007)| UNDERDRAIN: OFF |IN= 2--> OUT= 3 |DT= 5.0 MIN (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. STORAGE LAYER: | Mark | Color Height (m)= 1.00
Initial Water Level (m)= 0.00
Min. Drawdown (hr)= 24.00
Available Storage (cu.m.)= 12.00 Length |SOAKAWAY(0010)| UNDERDRAIN: OFF Max. Drawdown (hr) = 33.33 |IN= 2--> OUT= 3 | |DT= 5.0 MIN | STORAGE LAYER. NATIVE SOIL LAYER:

 Height
 (m) = 1.00

 Initial Water Level
 (m) = 0.00

 Min. Drawdown
 (hr) = 24.00

 Infiltration (m/hr) = 0.0120(m) = 0.00QPEAK Max. Drawdown (hr)= 33.33 Available Storage (cu.m.)= AREA TPEAK R.V. 6.00 (ha) (cms) (hrs) (mm) NATIVE SOIL LAYER: 0.05 INFLOW: ID= 2 0.00 Infiltration (m/hr) = 0.0120OVERFLOW: ID= 3 0.000 0.00 0.00 Volume Reduction Rate[(RVin-RVout)/RVin](%): AREA OPEAK Volume Reduction Rate ((Rvin-Rvouc), Normal), ()

If RVout= (Overflow)

Time to reach Max storage (Hr)=
Volume of water for drawdown in LID (cu.m.)=
Volume of maximum water storage (cu.m.)=
(Hr)=
(Hr)= (ha)
INFLOW:ID= 2 0.03
OVERFLOW:ID= 3 0.00 100.00 (cms) (hrs) (mm) 4.33 0.014 0.00 0.28 Calculated Drawdown Time 0.17 4.20 | Junction Command(0008) | 4.51 Calculated Drawdown Time (Hr) = QPEAK TPEAK (ha) (cms) (hrs) (mm) INFLOW: ID= 3(0007) 0.00 OUTFLOW: ID= 2(0008) 0.00 | Junction Command(0011) | 0.00 0.00 0 00 0.00 0.00 0.00 AREA OPEAK (hrs) (ha) (cms) (mm) INFLOW : ID= 3 (0010) 0.00 0.00 0.00 OUTFLOW: ID= 2 (0011) NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. | ADD HYD (0012)| | 1 + 2 = 3 | --- TRANSFORMED HYETOGRAPH ----(ha) (cms) (hrs) (mm) RAIN | TIME mm/hr | hrs *** W A R N I N G : HYDROGRAPH 0011 <ID=1 > IS DRY.
*** W A R N I N G : HYDROGRAPH 0012 = HYDROGRAPH 0003 RAIN | TIME RAIN | TIME mm/hr | hrs mm/hr | hrs TIME hrs mm/hr ID1= 1 (0011): 0.00 0.000 0.000 + ID2= 2 (0003): 0.11 0.000 0.00 0.00 | 1.167 0.083 5.69 | 2.250 4.19 | 3.33 2.23 0.00 0.167 12.56 | 0.00 | 1.250 2.333 4.19 | 3.42 2.09 1.333 1.417 1.90 | 2.417 3.61 | 3.50 2.09 ID = 3 (0012): 0.11 0.000 0.00 51.29 | 51.29 | 0.333 1.90 i 2.500 3.61 i 3.58 1.96 0.00 0.417 1.500 2.583 3.19 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 2.16 | 1.583 3.75 0.500 16.17 | 2.667 16.17 | 2.750 3.19 | 1.85 1.667 0.583 2.51 i 2.51 8.96 3.03 | 1.833 3.03 | 1.917 3.89 | 2.000 8.96 | 2.917 6.38 | 3.000 6.38 | 3.083 0.750 2.61 | 4.00 1.75 0.833 2.61 2.41 0.917 1.67 4.17 *** WARNING: HYDROGRAPH 0006 <ID= 25 IS DRY.

*** WARNING: HYDROGRAPH 0001 = HYDROGRAPH 0003

IDI= 3 (0012): 0.11 0.000 0. 3.90 | 2.083 5.69 | 2.167 1.000 5.03 L 3.167 2.41 (mm) Unit Hyd Qpeak (cms) = 0.210 0.00 PEAK FLOW (cms) = 0.000 (i)TIME TO PEAK (hrs) = 0.000

RUNOFF VOLUME (mm) = 0.000

TOTAL RAINFALL (mm) = 24.999 TIME TO PEAK RUNOFF VOLUME ID = 1 (0012): 0.11 0.000 0.00 0 00 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. RUNOFF COEFFICIENT = 0.000 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. ADD HYD (0012) | 1 + 2 = 3 | ------ (ha) (cms) (hrs) (r** W A R N I N G : HYDROGRAPH 0008 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001 (mm) | Junction Command(0006) | 0.00 ID1= 1 (0012): 0.11 + ID2= 2 (0008): 0.00 0.11 0.000 0.00 0.000 AREA QPEAK TPEAK (ha)
INFLOW: ID= 1(0004) 0.00
OUTFLOW: ID= 2(0006) 0.00 (cms) 0.00 0.00 (hrs) (mm) 0.00 ID = 3 (0012): 0.11 0.000 0.00 0.00 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 0.00 0.00 CALTE In a (ha)= 0.03 Curve Number (CN)= 58.0
In (mm)= 16.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.04 FINISH NASHYD

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

		TR	ANSFORMED HYETOGR	APH	
TIME	RAIN	TIME	RAIN TIME	RAIN TIME	RAIN
hrs	mm/hr	hrs	mm/hr ' hrs	mm/hr hrs	mm/hr
0.083	0.00	1.167	5.69 2.250	4.19 3.33	2.23
0.167	0.00	1.250	12.56 2.333	4.19 3.42	2.09
0.250	1.90	1.333	12.56 2.417	3.61 3.50	2.09
0.333	1.90	1.417	51.29 2.500	3.61 3.58	1.96
0.417	2.16	1.500	51.29 2.583	3.19 3.67	1.96
0.500	2.16	1.583	16.17 2.667	3.19 3.75	1.85
0.583	2.51	1.667	16.17 2.750	2.87 3.83	1.85
0.667	2.51	1.750	8.96 2.833	2.87 3.92	1.75
0.750	3.03	1.833	8.96 2.917	2.61 4.00	1.75
0.833	3.03	1.917	6.38 3.000	2.61 4.08	1.67
0.917	3.89	2.000	6.38 3.083	2.41 4.17	1.67
1.000	3.90	2.083	5.03 3.167	2.41	
1.083	5.69	2.167	5.03 3.250	2.23	

Unit Hyd Qpeak (cms) = 0.029

|ID= 1 DT= 5.0 min |

APPENDIX F

10-034 Yin's Subdivision - Phase 5 Stormwater Management Report (G. Douglas Vallee Engineering Limited, December 10, 2010)



December 10, 2010

Tony Yin 204 McMichael Rd RR#4 Waterford, ON N0E 1Y0

Attention:

Mr. Tony Yin

Dear Sir:

Reference:

Storm Water Management Report

Yin's Subdivision – Phase 5 Waterford – Norfolk County

Our File 10034

1.0 Introduction

This storm water report has been completed to summarize the storm water management design for Phase 5 of the Yin's Subdivision in Waterford, Norfolk County, Ontario. It is the intention to submit this report to the Norfolk County and the Long Point Region Conservation Authority for review and approval.

Yin's Subdivision Phase 5 is a single family residential development located at the southern end of Waterford along Main Street (Old Highway 24). The site is bordered by agricultural lands to the south and west; single-family residences to the north and Main Street to the west. Figure 1 shows the overall development. This report will outline the SWM plan for the overall development.

The SWMHYMO computer model has been used to simulate the sub watershed under pre and post development conditions. The simulations were conducted using the 4-hour Chicago Distribution design storm of the 2-year, 5-year, 10-year, 25-year, 50-year and 100-year storm events.

The receiver for the discharge from the development is the Waterford South Municipal Drain. This municipal drain is a storm sewer system and also includes a dry pond facility at the down stream end of the system. Therefore, a basic level of protection is proposed with respect to water quality enhancement.

2.0 Pre-Development

Typically, it is requirement for development sites to reduce or control the post development runoff from the site to levels that do not exceed pre-development conditions. This is achieved by directing the majority of runoff to a retention area or areas. The release from these areas is controlled by means of orifice plates and/or weirs.

However, in this case the outlet for the proposed SWM facility will be the Waterford South Municipal Drain, which is a storm sewer system. Therefore, the Drain has a finite design capacity and the capacity attributable to the portion of the site within the drainage area of the municipal drain will be the limiting factor for the total discharge from the site, post development. Figure 2 shows the overall development site along with the portion of the site that is within the Waterford South Municipal Drain. Design information for the storm sewer along Main Street is unavailable from Norfolk County. However, this office completed the design of the Waterford South Municipal Drain and it is known the 2-year design storm was used.

The total site area is approximately 14.0 ha and the portion within the Waterford South Municipal drain is approximately 6.0 ha.

The SWMHYMO computer model was used to simulate pre-development conditions the portion of the site within the municipal drain's drainage area. The model uses a modified SCS procedure to estimate losses that occur naturally during a rainfall event such as evaporation and infiltration. For the areas with rural runoff characteristics, Table 1 summarizes the background information and input parameters for the computer model with complete notes included with this report as Appendix A.

Table 1 SWMHYMO Model Input – Pre Development					
Parameters	Value				
Area (ha)	6.0 ha				
Soil Type	Fox – sand and loamy sand				
	Granby – sand and loamy sand				
	Wilsonville – sandy textures over gravelly				
	sand				
Hydrologic Soil Group	Α				
SCS Curve Number	58				
Longest Flow Path (m)	429m				
Average Slope (%)	1.63%				
Runoff Coeff	0.2				
Time to Peak (hrs)	0.52				

The estimated peak pre-development storm water runoff generated from portion of the site within the Waterford South Municipal Drain is 0.064 cms.

3.0 Post-Development

Due the topography of the existing site, specifically the low elevation of Main Street relative to the elevation of the proposed SWM facility, Blocks 3 and 4 as well as small portion of Street B will not be able to drain to the SWM facility. These areas will connect directly to the proposed outlet sewer along Main Street. Therefore to achieve the required reduction in post development discharge to the identified criteria for the site, these two blocks will have a limiting post development discharge of 0.015 cms each. Both Blocks 3 and 4 will be subject to a site plan approval process with Norfolk County and as part of any submissions for these sites a SWM plan will need to be included demonstrating that the limiting discharge is achieved for these sites.



As was indicated previously the total development site is approximately 14 ha. Therefore the contributing area to the proposed SWM facility can be estimated by reducing the total area by the areas of Blocks 3 and 4 as will as the portion of Street A (approximately 2.18 ha). This results in a contributing area to the SWM facility of 11.82 ha.

Post development, impervious land areas will be introduced to each of these areas to differing degrees. For the areas within the development the following assumptions have been made with respect to impervious surfaces introduced post development.

Assumed roof and driveway area per town single family unit

230m²

 Municipal Road (includes sidewalk one side) (Road area considered directly connected to storm sewers) 11m²/m

The impervious land area introduced on the town house block and the apartment block has been assumed to be 75% of the total area of these blocks. Of this impervious area, 50% has been attributed to the parking/drive areas and therefore is considered directly connected.

For the commercial blocks, the impervious land area has assumed to 90% of total block areas with 50% of this impervious area corresponding to the parking/drive areas of the sites.

Table 2 summarizes the anticipated impervious land areas for the development.

Table 2 Post Development Impervious Areas							
Area	Total Area (ha)	Impervious Area (ha)	Directly Connected (ha)				
SFD	9.3	3.47	1.52				
Block 1 – TWNHSE	0.57	0.43	0.21				
Block 2 – Apartments	0.69	0.52	0.26				
Block 3 - Commercial	0.8	0.72	0.36				
Block 4 - Commercial	1.4	1.26	0.63				
Block 5 – SWM	1.26	1.13	0.57				
TOTAL	14.02	3.55	7.53				

Discharge to Storage Relationship

To determine the required level of storage for a storm water detention pond, the post-development conditions were modeled, again using the SWMHYMO computer model. In order for the computer model to determine the storage volume required the relationship between the storage volume of the pond and the discharge must be defined and is referred to as the pond-rating curve. This rating curve is determined by calculating volume of the proposed pond facility up to a proposed contour elevation and then calculating the expected discharge from the facility based on the water level at this contour elevation and the proposed outlet control configuration.

Generally orifices or weirs can control discharge from SWM facilities. Each of these control methods can be used by the singular control or they can be used in combination depending on the discharge characteristics desired. For this facility only an orifice and weir will be used to control with the following equations used to estimate discharge



1. Orifice

$$\bigcirc Q = C * A * \sqrt{2 * g * h}$$

where: Q = Discharge in cms

C = constant, 0.63

A = orifice area in m²

 $g = gravitational constant, 9.81 m/s^2$

h = height above orifice, m

For this facility a 125mm orifice will be used as the outlet control beginning at elevation 243.25. The complete rating curve is appended to this report as Appendix B.

Post Development Model

The post development model developed for this report as included as Appendix C. Table 3 summarizes the post development conditions for the storm events analyzed.

	Table 3 Post Development Di	scharge
Event	Post Development to WSMD (cms)	The Control of the Co
2-Year	0.047	
5-Year	0.050	
10-Year	0.053	0.064
25-Year	0.055	
50-Year	0.057	
100-Year	0.060	

For all storm events the peak post development discharge to the WSMD has been controlled to less than the estimated peak pre development runoff from the contributing area to the WSMD.

4.0 Proposed SWM Facility

The Ministry of the Environment's document titled **Stormwater Management Practices Planning and Design Manual** (March 2003) was used in conjunction with requirements of the Norfolk County to determine the design for the storm water ponds for Yin's Subdivision. The following summarizes the design guidelines presented by the manual along with the corresponding value for the proposed facility. The complete calculations are provided as Appendix D.

a) <u>Storage Sizing:</u> Table 3.2 of the MOE design manual provides levels of storage volume required dependent on the percent impervious land area to provide basic protection. For a dry pond facility based on 54% impervious area of the contributing area to the facility, the required volume of storage is 147m³/ha of contributing area. For the contributing area of 11.82 ha this results in a required storage of 1,738 m³ and compares to the 1,768 m³ provided during the quality storm (2-year event).



- b) <u>Detention Time:</u> During the quality storm the design manual indicates a 24 hr detention time as a minimum requirement for dry pond facilities with 48 hr preferred. For the proposed facility the runoff stored during the quality storm (2-year event) is estimated to be between 26 and 35 hours.
- c) <u>Minimum Orifice Size</u>: A minimum orifice of 75mm is recommended for wet pond facilities and compares to the 125mm provided by this facility.
- d) <u>Active Storage Depth:</u> The MOE guideline recommends a maximum active storage depth of 2.0m. The active storage depth ranges between 0.3m and 0.9m depending on the storm event.
- e) <u>Side Slopes</u>: Average side slopes are recommended to be at 4(h):1(v) or flatter. The exposed side slopes of the proposed facility are proposed to be 5(h):1(v).
- f) <u>Forebay Settling Length:</u> The design manual outlines the calculation of the required length for the forebay to allow a certain size of particle to settle. The calculation is based on the peak flow rate from the pond during the quality storm, the length to width ratio of the forebay and settling velocity of the particle size (0.0003 m/s). The resulting length is 11m and compares to the 50m provided depending on the pond inlet.
- g) <u>Forebay Dispersion Length</u>: The design manual also outlines a calculation to determine the length of forebay required to slow a discharge. This calculation is based on the inlet flow rate during the quality storm (2-year), the depth of the permanent pool in the forebay and the desired velocity in the forebay (0.5 m/s). This results in a target forebay length of 8m and compares to the 38m provided.
- h) <u>Sediment Accumulation</u>: Based on the anticipated sediment loading rates outlined by Table 6.3 of the MOE guidelines, the estimated sediment accumulation can be determined based on the impervious land area within the catchment area along with the target removal efficiency of the proposed facility. For the estimated 54% impervious land of the contributing area, sediment accumulation is estimated to be approximately 130m³ over a 10-year period. This compares to the forebay volume of 444m³.

5.0 Outlet Capacity

The proposed outlet for the SWM facility outlined by this report is the Waterford South Municipal Drain. The main branch of this drain was constructed along Thompson Road in Waterford and was designed based on the 2-year storm event. Following construction of this drain, the former Regional Municipality of Haldimand Norfolk constructed a storm sewer south along Main Street. The purpose of this storm sewer was to provide an outlet to lands identified within the drainage area of the WSMD. It is unclear as to the genesis of this extension, however it appears that drainage report was not completed to bring this extension under the umbrella of the WSMD.

As was noted previously by this report, the design information for the storm sewer extension along Main Street is unavailable. Therefore to determine if the Main Street storm sewer provides sufficient capacity, design calculations were completed based on the contributing drainage area and at the 2-year storm event, the design event for the WSMD. These calculations, which are appended to this report, indicate that the existing system has insufficient capacity to service the existing drainage area.



Furthermore, a review of the existing system profile has indicated that the system would have insufficient depth to service the proposed development site.

Therefore, it is proposed to reconstruct this system beginning at the intersection of Thompson Road and proceeding southerly along Main Street with a new storm system of sufficient depth and capacity to service the existing drainage area and the development site. As the design of the WSMD is based on the 2-year event, the design of this new system is based on the 2-year event as well as the controlled discharges from the development site up to the 100-year event. The complete calculations for this system are appended to this report.

6.0 Emergency Overflow

As part of the outlet structure for the proposed SWM facility, a 1.8m square precast concrete catch basin structure has been placed with its top corresponding to the anticipated water level of the proposed SWM facility during the 100-year storm event (244.09 +/-). In the event that a storm event in excess of the 100-year storm occurs or the primary outlet is blocked, discharge from the facility will begin to occur over the top of this structure prior to overflowing the top of bank surrounding the SWM facility.

7.0 Proposed SWM Facility Summary

The following summarizes the proposed SWM Facility, shown drawings SWM1, for the Phase 5 of the Yin's Subdivision in Waterford.

- A dry pond facility with a permanent pool elevation in the sediment forebay of 243.25, pond bottom of elevation in the sediment forebay of 242.00 and top of slope 244.25.
- Permanent pool depth of 1.25m in the sediment forebay with a volume of 896m³
- Total storage volume provided for the 100-year storm event is 5,0690m³.
- Discharge from the proposed facility controlled by a 125mm diameter orifice at elevation 234.25.
- Outlet from the proposed facility to be provided by an extension of the WSMD along Main Street to the site. The design of this system to based on the 2-year event for the contributing area along Main Street and the controlled discharge from the development site as follows:
 - o SWM Facility 0.03 cms
 - o Block 3 Commercial 0.015 cms
 - o Block 4 Commercial 0.015 cms
- Emergency overflow flow provided by catch basin structure with top of casting elevation placed at the approximate 100-year storage level (244.09 +/-).

8.0 Erosion and Sediment Control

During construction, the contractor is required to protect the work site and all adjacent lands from sediment and erosion regardless of the source to the satisfaction of all applicable parties. The measures installed by the contractor are to remain in place until such time as there is no further threat of damage.



9.0 The Drainage Act

During the draft plan approval stage of this development, County staff recognized that the development site was within the drainage area of the WSMD. Therefore, the following draft plan condition was stipulated:

"5. The applicant covenants and agrees to pay all costs related to the Corporation of Norfolk County hiring and engineer on behalf of the applicant as per Section 4(1) of the Drainage Act for the purpose of constructing an extension to the existing municipal drain or to construct an entirely new municipal drainage system to service the severed property(s)."

To begin this process a formal request needs to provided by the applicant to Norfolk County.

11.0 Conclusions and Recommendations

It is concluded that:

- 1. Post development flows from the development site have been controlled to less then the current discharge of the portion of the site within the drainage area of the WSMD.
- 2. The proposed storm water pond has sufficient capacity and meets the design guidelines outlined by the MOE's document titled **Stormwater Management Practices Planning and Design Manual** (March 2003) for basic protection and requirements Norfolk County.
- 3. The existing storm sewer along Main Street has insufficient capacity during the 2-year event for the current contributing area to this system.

It is recommended that:

- 1. This report is provided to the Norfolk County and the Long Point Region Conservation Authority as part of the engineering approval package for the development.
- Pending approval by the municipality and receipt of the required Ministry of the Environment approvals, the Facility and associated appurtenances be constructed as outlined by this report.
- 3. The applicant formally request of Norfolk County the appointment of an engineer under the Drainage Act to address the extension of the WSMD to the development site.

We trust that this is the information for submission. Should you have any questions or require further information please do not hesitate to call. Thank you.

Yours truly,

T. Gregory Smith, P.Eng.

G. DOUGLAS VALLEE LIMITED

Consulting Engineers, Architects and Planners

H.\Projects\2010\10-034 Yin Phase 5 Design\DESIGN\10034 Stormwater Report November 2010.doc

T. G. SMITH TO NACE OF ONTER



List of Figures

Figure 1: Development Layout Figure 2: WSMD Drainage Area

List of Appendices

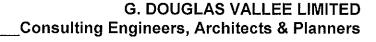
Appendix A: Pre-Development Model Appendix B: Pond Rating Curves Appendix C: Post Development Model

Appendix D: Miscellaneous Pond Design Calculations

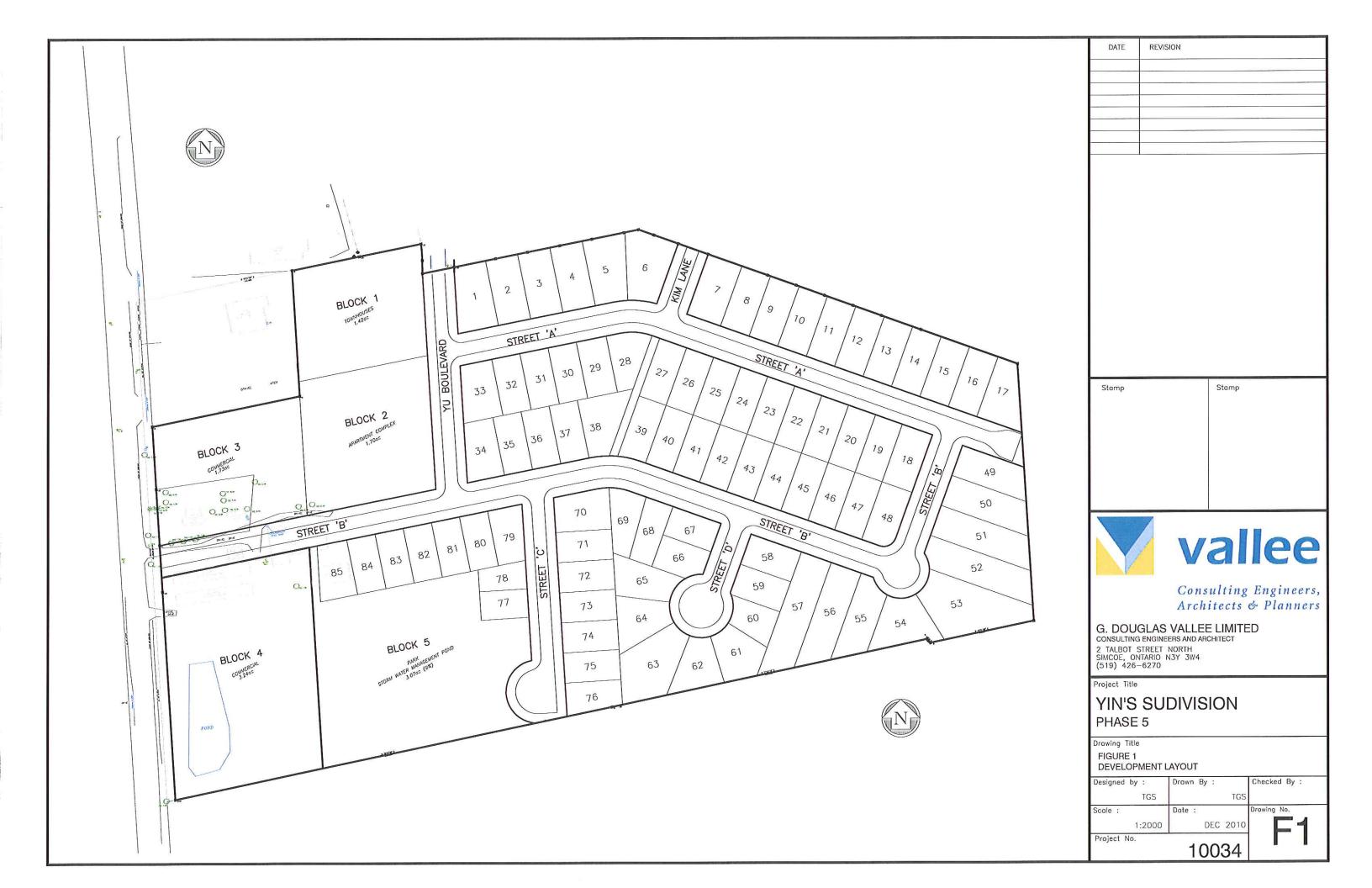
Appendix E: Main Street Storm Sewer Design Calculations (Existing and Proposed)

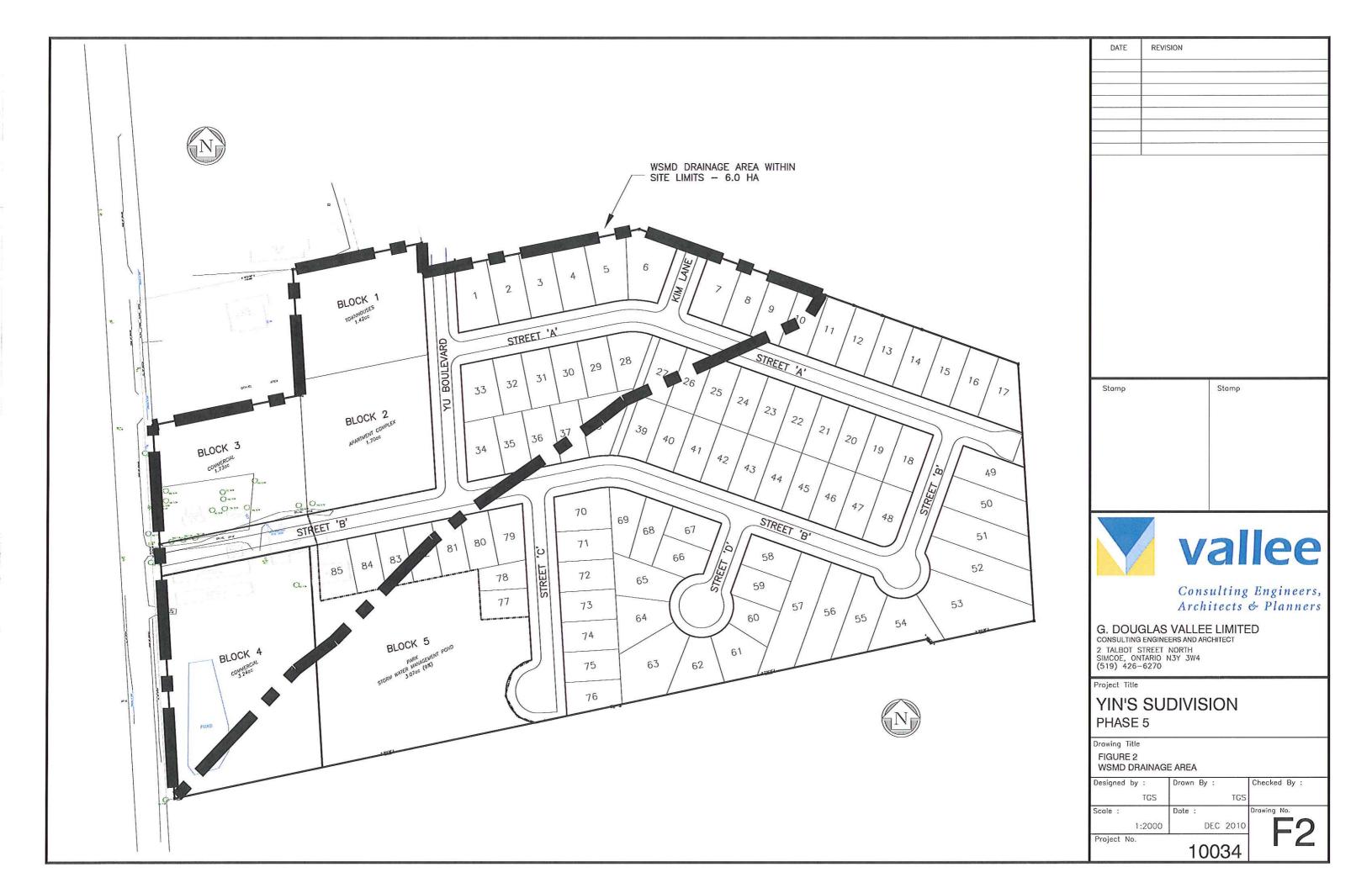
List of Drawings

10034 SWM1 - Plan and Section Details

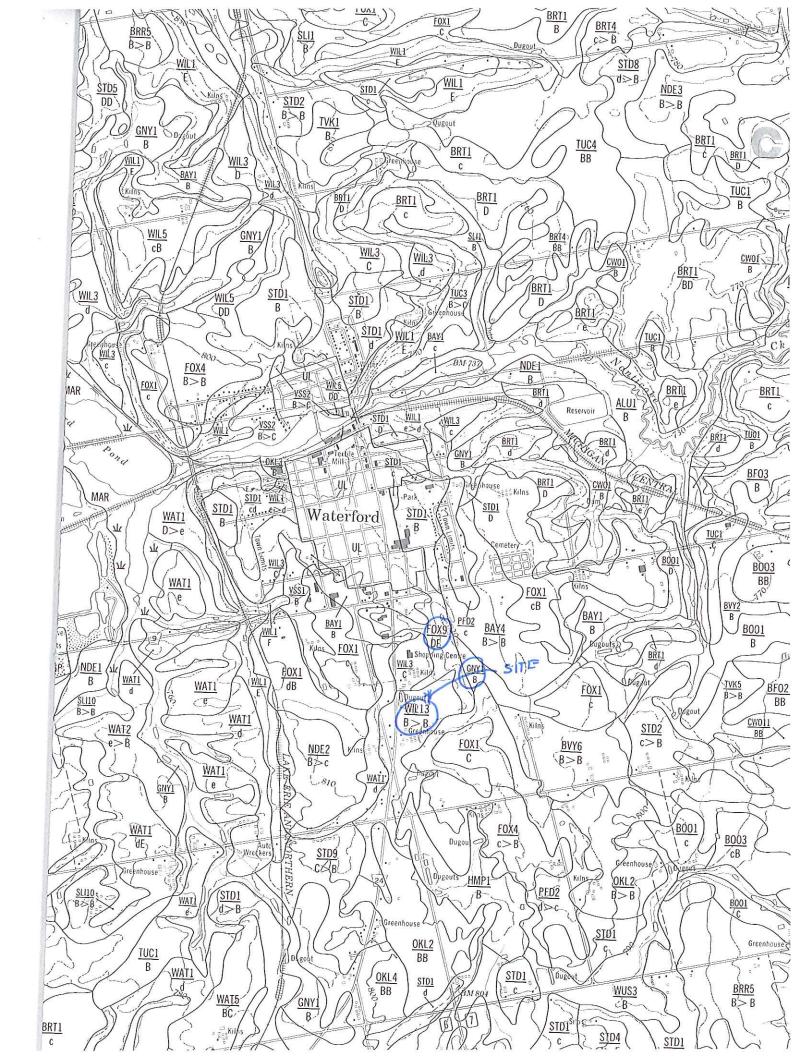








Appendix A: Pre-Development Model



	01110 00	0110 0	DDD	15-40 cm sandy	see BRR 1	Poor	Imperfect
	CWO 20	CWO.C		textures over lacustrine silt loam	SCO DI III		
	CWO 22	CWO.P		15-40 cm organic materials over lacustrine silt loam	see HMP 1	Poor	Very poor
	FOX - Fox						
	FOX 1	FOX	None	Mainly lacustrine sand and loamy sand		Rapid to well	
	FOX 3	FOX	GNY	see FOX 1	see GNY 1	Rapid to well	Poor
	FOX 4	FOX	BAY	see FOX 1	see BAY 1	Rapid to well	Imperfect
	FOX 8	FOX	BRR	see FOX 1	see BRR 1	Rapid to well	Imperfect
(FOX 9	FOX	STD	see FOX 1	see STD 1	Rapid to well	Well
	FOX 10	FOX	OKL	see FOX 1	see OKL 1	Rapid to well	Imperfect
	FOX 13	FOX	cwo	see FOX 1	see CWO 1	Rapid to well	Poor
	FRM - Fa	rmingtor	١				
	FRM 1	FRM	None	Less than 20 cm variable textures over bedrock		Rapid	
	GNY-Gra	anby					
	GNY 1	GNY	None	Mainly lacustrine sand and loamy sand		Poor	
	GNY 3	GNY.P	None	15-40 cm organic materials over lacustrine sand and loamy sand		Very poor	
	GNY 4	GNY	BAY	see GNY 1	see BAY 1	Poor	Imperfect
	GNY 6	GNY	FOX	see GNY 1	see FOX 1	Poor	Rapid to well
	GNY 7	GNY	CWO	see GNY 1	see CWO 1	Poor	Poor
	GNY 11	GNY	GNY.P	see GNY 1	see GNY 3	Poor	Very poor
	GNY 15	GNY	OKL	see GNY 1	see OKL 1	Poor	Imperfect
	GNY 17	GNY	BRR	see GNY 1	see BRR 1	Poor	Imperfect
	GNY 18	GNY.F	TLD.C	see GNY 3	see TLD 2	Very poor	Poor

001-0.	Section 2777	enoM	QTS	τ	QT8
	1		tland	oo8 -	QT8
nilmus Sam till		МЯЭ	ANS	13	AN
			еся	ues -	AN3

RAINAGE IPONENTS No. 2	
Rapid	
Variable	
Rapid	
Rapid to well	
Rapid	
Rapid to well	
Ш	

	MAP UNIT	MAP U		PARENT N	NENTS	DRAIN/ COMPON	IENTS
6	SYMBOL	No. 1	No. 2	No. 1	No. 2	No. 1	No. 2
١	NIL - Wilso	onville				_	1.
١	WIL 1	WIL		Mainly gravelly sandy till		Rapid to well	1
(WIL 3	WIL.C	None	15-40 cm sandy textures over gravelly sandy till		Rapid to well	
,	WIL 5	WIL	WIL.C	see WIL 1	see WIL 3	Rapid to well	Flapid to well
,	WIL 9	WIL.L	WIL	15-40 cm loamy textures over gravelly sandy till	see WIL 1	Rapid to well	Rapid to well
	WIL 10	WIL.L	BRT	see WIL 9	see BRT 1	Rapid to well	V√ell
	WIL 11	WIL.C	WIL	see WIL 3	see WIL 1	Rapid to well	Papid to well
	WIL 12	WIL.C	STD	see WIL 3	see STD 1	Rapid to well	Fapid to well
1	WIL 13	WIL.C	NDE (see WIL 3	see NDE 1	Rapid to well	Imperfect
	WIL 14	WIL.C	OKL	see WIL 3	see OKL 1	Rapid to well	Imperfect
	WSH - Wa	alsher					
	WSH 1	WSH	None	40-100 cm sandy textures over lacustrine silt loam		Well	
	WUS - Wa	auseon					
	WUS 1	wus	None	40-100 cm sandy textures over lacustrine silty clay		Poor	
	WUS 3	WUS.P	None	15-40 cm organic materials over lacustrine silty clay		Very poor	,
	WUS 4	wus	BRR	see WUS 1	see BRR 1	Poor	Imperfect
	WUS 6	wus	TLD.C	see WUS 1	seeTLD 2	Poor	Poor
	WUS 9	wus	SLI	see WUS 1	see SLI 1	Poor	Poor
	WUS 10	wus	TUC.C	see WUS 1	15-40 cm sandy textures over lacustrine silt loam	Poor	Imperfect

I drainages. This informa-

mate proportions, and the

ents in the map unit. The onent refers to the No. 2 tent has been mapped in

the slope symbols appear s, a "greater than" symbol hat occupies at least 80%

Is B, c, C, d, D, e, E, f, F,

tand that many soil boundeveral hectares, of unidencs to a depth of about 100

TVK - Ta TVK 1 TVK 2 TVK 3 TVK 4 TVK 5 TVK 7 TVK 9 VSS - Va VSS 1 VSS 2 WAT-V WAT 1 WAT 2 WAT 3 WAT 4 WAT 5

WAT 8

WAT 1

CHART C2-6 -continued

						V		gar to the Company of the Ast
Soil Series	Soil Type	Hyd. Soil Grp.	Soil Series	Soil Type	Hyd. Soil Grp.	Soil Series	Soil Type	Hyd. Soil Grp.
Crombie "Dack Dalton Darlington "Dawson "Deloro Devlin Dinorwic Dobie Doe "Donald Donnybrook "Dorion Dorking Dumfries "Dumdonald Dunedin Dymond "Eagle Lake Eamer Earlton "Eastport Edenvale Eganville Elderslie "" Eldorado "" Elk Pit Ellwood Elk Pit Ellwood Elmbrook "" Elmira Elmsley Embro "" Emily Emo	sil c sil c s s s s s s s s s s s s s	BECDABBCABBC BCBBBAABCBAABABABABBBCAABBCCABACBCCBBCBC	Englehart Evanturel "Falardeau "Farmington ""Ferndale "Flamboro Floradale Fonthill Fort Forbes Fox " Foxboro Franktown Freeport Galesburg "Gameland Gananoque Gerow Gilford "Gordon Granby "" Grand Grenville "" Grimsby Guelph "" Guerin "Gwillimb. Haileybury "" Haldimand "" Hanbury "" Harkaway ""		BECECABCEBAADABAABBCCBBCBBAABBCCBBCCCBCCDBCCCCDBC	Harriston "Harrow "Havelock Hawkesvi. Haysville Heidelburg Hendrie Henwood Hespeler Hillier Hillsburgh Himsworth Hinchinbr. "Honeywood "Howland "Huron "" Innisville Jeddo "" Kagawong Kars Kemble "" Kenabeek "" Kirkland Kossuth L'Achigan Lambton "" Lanark Lansdowne Leech "" Leitrim Leith Lily	l si 1 s 1 s 1 s 1 s 1 s 1 s 1 s 1 s 1 s	BC BC ABBABBBCABBBCBBCBBCBBCCBBBCCBBBCC

CHART C2-6 - continued

CHART C2-6

Soil Series Soil Hyd. Soil Series Type Soil Grp. Smithville 1
Smithville
Tuscola s l AB BC Wooler si l/f AB BC Woolwich l BC Undiffer'd s l +r AB or B (dep on depth)

CHART C2-8 - SOIL/LAND USE CURVE NUMBERS

7 7		Hyd	rologi	c Soil	Group		
Land Use	A	, AB	В	BC	C	CD	D
Fallow (special cases only)	77	82	86	89	91	93	94
Crop and other improved land	66*	70	74	78	82	84	86
Pasture & other unimproved land	(58*)	62*	65	71	76	79	81
Woodlots and forest	50*	54*	58	65	71	74	77
Impervious areas (paved) Bare rock draining directly to streath Bare rock draining indirectly to streath Water surfaces		98 98 70 100	(use_	in spe	cial c	ases c	only)

Notes

- 1. Figures are based on average antecedent moisture condition (AMC II) except those marked *, which are initially wet (AMC III) or an intermediate condition. For definition of AMC's see Chart C2-10.
- 2. Table is not applicable to frozen soils or to periods in which snowmelt contributes to runoff.
- 3. For detailed values in urban areas see Table 2.2 of ref. 14.
- 4. Source: SCS Handbook of Hydrology, Chapter 9 (9), with modifications.

CHART C2-9 - PERCENT IMPERVIOUSNESS OF URBAN AREAS

Urban Land Use	% Imperviousness
Business - Commercial	40 - 90
Industrial - Light	45 - 65
Industrial - Heavy	50 - 70
Residential - Low density	20 - 30
Residential - Medium density	25 - 35
Residential - High density	30 - 40

Source: SCS Handbook of Hydrology, Chapter 15 (9)



Subject:

Project #:

Yin Phase 5

Date:

Nov 2/10

10 By: 10034 Page

TGS

High Density - predevelopment and current state

to calc for upstream drainage area

 $tc = 3.26*(1.1-C)*L^{(0.5)}/S^{0.333}$

(airport formula)

L as above

429 m

S as above but as percent

1.63 %

C, rational Runoff Coefficient (Pre dev)

0.2

tc =

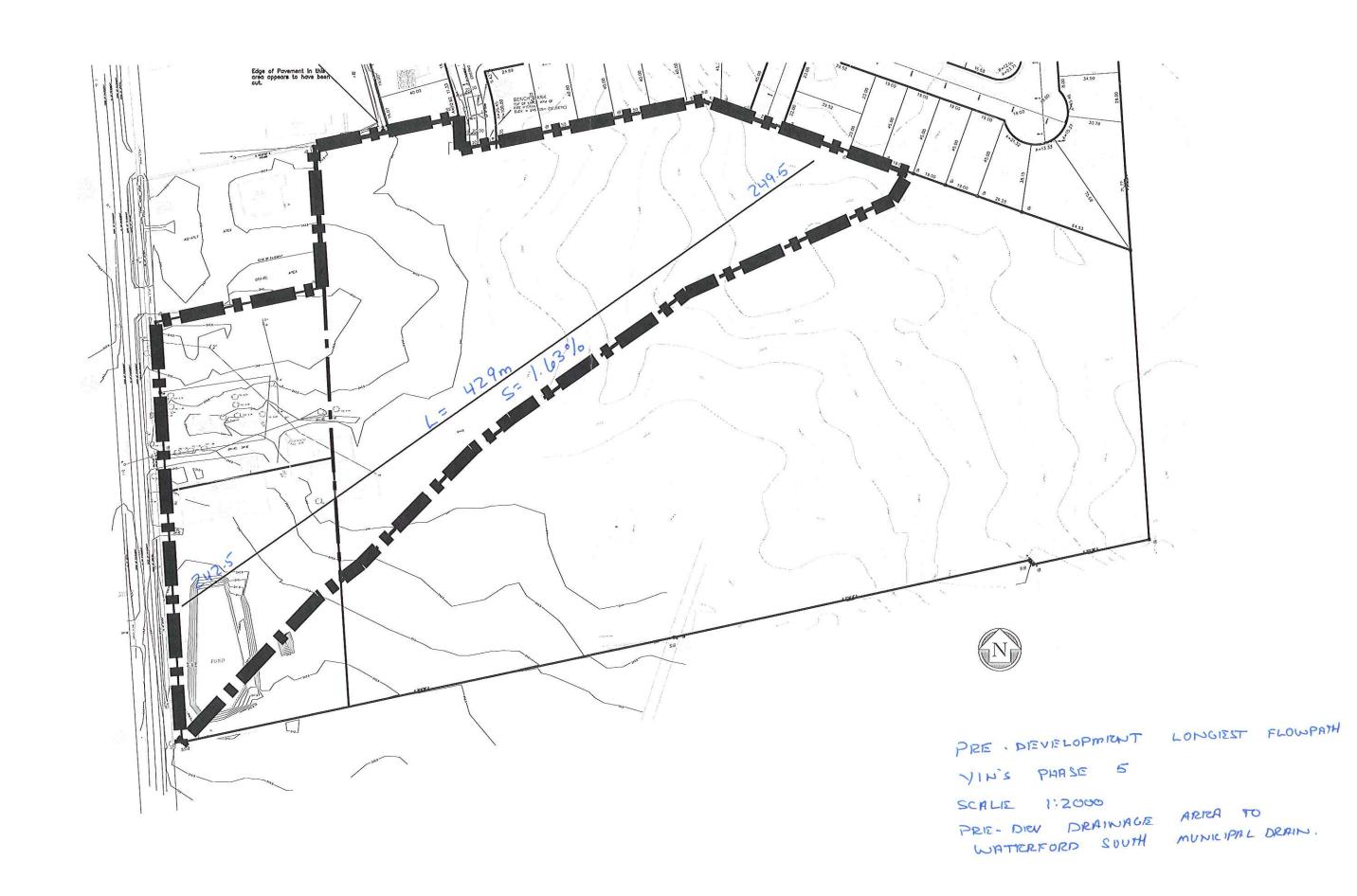
52 min

0.86 hrs

tp = 0.6 *tc

tp =

0.52 hrs



```
StormWater Management HYdrologic Model
                                                                                                                999
   A single event and continuous hydrologic simulation model based on the principles of HYMO and its successors OTTHYMO-83 and OTHYMO-83 and OTHYMO-84.

Distributed by: J.F. Sabourin and Associates Inc. Ottawa, Ontario: (613) 727-5199

Gatineau, Quebec: [819] 243-6858

E-Mail: swchymo@ifsa.Com
   <del>\</del>
  DATE: 2010-11-22 TIME: 14:14:54 RUN COUNTER: 001100
    Input filename: H:\SxXHYM-1\10034Y-1\PREDEV.DAT
Output filename: H:\SxXHYM-1\10034Y-1\PREDEV.out
Surmary filename: H:\SxXHYM-1\10034Y-1\PREDEV.sum
      User comments:
   001:0001------
## Project Name: [YINS PHASE 5] Project Number: [101034]

## Date : 02-11-2010

## Modeller : [163]

## Company : G. Douglas Vallee Limited

## License # : 3568969
      | Project dir.: H:\SKXNYM-1\10034Y-1\
| Project dir.: H:\SKXNYM-1\10034Y-1\
| TZERO = .00 hrs on 0 |
| MSTOUT = 2 (output = METRIC) |
| HRUN = .001 |
| HSTOPM- 1 |
| HSTO
| START
001:0007-----
| READ STORM | Filename: H:\SWMHYM-1\10034Y-1\CHZ.STM | Ptotal= 39.39 rm | Cozzents: 2 YEAR CHICAGO 4 HOUR DESIGN STORM DISTR
                                         PAIR | TIME

rsm/hr | hrs

3.250 | 1.17

3.560 | 1.33

3.960 | 1.67

4.520 | 1.67

5.310 | 1.83

6.550 | 2.00
                                                                                                TIME
hrs
2.17
2.33
2.50
2.67
2.63
3.00
                             TIME
                                                                              DATH I
                                                                                                                 I RIAG
                                                                                                                                    TIME
                                                                                                                                                    RAIN
                                                                          RAIN |
Em/hr |
8.150 |
7.010 |
6.200 |
5.590 |
5.110 |
4.720 |
                                                                                                                                    hrs
3.17
3.33
3.50
3.67
3.83
4.00
                                                                                                                                                  4.390
4.110
3.690
3.680
3.510
3.350
001:0003----
     PRE DEVELOPMENT MODEL - ENTIRE SITE
                              D i Area (ha)= 14.00
= 1.00 i Ia (mm)= 1.500
----- U.H. Tp(hrs)= .670
    DESTGY NASHYD
                                                                                                   Curve Number
                                                                                                                                 (CN)=58.00
                                                                                                   # of Linear Res. (N) = 3.00
          Unit Hyd Opeak (cms)= .798
          PEAK FLOW (CTS)= 1.11 (1)
TIME TO PEAK (hrs)= 2.400
EUNOFF VOLUME (rm)= 6.471
TOTAL RAINFALL (rm)= 39.385
EUNOFF COEFFICIENT = 1.164
          (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
001:0004-----
     PORTION OF SITE THAT DRAINS TO WSMD AND WILL DRAIN TO POND
    DESIGN NASHYD | Area (ha)= 4.12
02:WSMD DT= 1.00 | Ia (rm)= 1.500
U.H. Tp(hrs)= .520
                                                                                                   Curve Number (CN)=58.00 # of Linear Res.(N)= 3.00
                                                                                     4.12
          Unit Hyd Qpeak (cms)=
```

```
.038 {i}
2.167
6.471
39.385
   PEAK FLOW
TIME TO PEAK
RUNOFF VOLUME
TOTAL PAINFALL
                (cms)=
(hrs)=
                 (mm) =
    RUNOFF COEFFICIENT
                         .164
    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
* PRE DEVELOPMENT TO WISHD
Curve Number (CN)=62.00
# of Linear Res.(N)= 3.00
   Unit Hyd Qpeak (cms)= .442
   FEAK FLON (cms)= .064 (1)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mn)= 7.415
TOTAL PAINFALL (cm)= 9,365
RUNOFF COEFFICIENT = .188
    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
001:0006-----
    FINISH
   ***************************
   WAPNINGS / ERRORS / NOTES
  Simulation ended on 2010-11-22 at 14:14:54
```

Appendix B: Pond Rating Curves



Subject: Date: Project #:

Yins Phase 5
Dec-10 By: TGS
10034 Page

Cum. Habove Incr Time Time to Orifice Q Storage to Drain Drain Incr Time Time to Orifice Q Orifice Q Storage to Drain Drain Incr Time Time to O 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Consulting Engineers, Architects & Planners
Habove Cum Vol Orifice Orifice Q Storage to Drain m3 m cms ha*m hr n	
Cum Vol Orifice Orifice Orifice Of Storage Incr Time m o 0 0 530 0.0375 0.006632 0.05303 1081 0.1375 0.012698 0.1081 15.8 1652 0.2375 0.016689 0.165245 10.8 2245 0.3375 0.016689 0.165245 10.8 2857 0.4375 0.019895 0.22455 9.0 2857 0.4375 0.022651 0.28574 8.0 3485 0.5375 0.022651 0.348475 7.3 4128 0.6375 0.022409 0.478645 6.4 4786 0.7375 0.029409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	
Cum Vol Orifice Orifice Orifice Orifice Orifice O O m m cms ha*m hr n 0 0 0 0 530 0.0375 0.006632 0.05303 1081 0.1375 0.012698 0.1081 15.8 1652 0.2375 0.016689 0.165245 10.8 2245 0.2375 0.016689 0.165245 10.8 2245 0.3375 0.019895 0.22455 9.0 2857 0.4375 0.022651 0.28574 8.0 3485 0.6375 0.022651 0.348475 7.3 4128 0.6375 0.022409 0.478645 6.4 5461 0.8375 0.023409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	0.012272 m2
Habove Orifice Q Storage to Drain m cms ha*m hr o 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.63
Cum Vol Orifice Orifice Q Storage to Drain m3 m cms ha*m hr 0 0 0 0 0 530 0.0375 0.006632 0.05303 10.8 1081 0.1375 0.012698 0.1081 15.8 1652 0.2375 0.016689 0.165245 10.8 2245 0.3375 0.019895 0.22455 9.0 2857 0.4375 0.022651 0.28574 8.0 3485 0.6375 0.022651 0.348475 7.3 4128 0.6375 0.027343 0.41277 6.8 4786 0.7375 0.029409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	
m3 m cms. ha*m hr 0 0 0 0 530 0.0375 0.006632 0.05303 1081 0.1375 0.012698 0.1081 15.8 1652 0.2375 0.016689 0.165245 10.8 2245 0.3375 0.019895 0.22455 9.0 2857 0.4375 0.022651 0.28574 8.0 3485 0.5375 0.022651 0.348475 7.3 4128 0.6375 0.027343 0.41277 6.8 4786 0.7375 0.029409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	_
0 0 0 0 530 0.0375 0.006632 0.05303 1081 0.1375 0.012698 0.1081 15.8 1652 0.2375 0.016689 0.165245 10.8 2245 0.3375 0.019895 0.22455 9.0 2857 0.4375 0.022651 0.28574 8.0 3485 0.5375 0.025107 0.348475 7.3 4128 0.6375 0.025409 0.478645 6.4 4786 0.7375 0.029409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	m2
530 0.0375 0.006632 0.05303 1081 0.1375 0.012698 0.1081 15.8 1652 0.2375 0.016689 0.165245 10.8 2245 0.3375 0.019895 0.22455 9.0 2857 0.4375 0.022651 0.28574 8.0 3485 0.5375 0.025107 0.348475 7.3 4128 0.6375 0.027343 0.41277 6.8 4786 0.7375 0.029409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	5202
1081 0.1375 0.012698 0.1081 15.8 1652 0.2375 0.016689 0.165245 10.8 2245 0.3375 0.019895 0.22455 9.0 2857 0.4375 0.022651 0.28574 8.0 3485 0.5375 0.025107 0.348475 7.3 4128 0.6375 0.027343 0.41277 6.8 4786 0.7375 0.029409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	5404
1652 0.2375 0.016689 0.165245 10.8 2245 0.3375 0.019895 0.22455 9.0 2857 0.4375 0.022651 0.28574 8.0 3485 0.5375 0.025107 0.348475 7.3 4128 0.6375 0.027343 0.41277 6.8 4786 0.7375 0.029409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	4769 5610
2245 0.3375 0.019895 0.22455 9.0 2857 0.4375 0.022651 0.28574 8.0 3485 0.5375 0.025107 0.348475 7.3 4128 0.6375 0.027343 0.41277 6.8 4786 0.7375 0.029409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	5819
2857 0.4375 0.022651 0.28574 8.0 3485 0.5375 0.025107 0.348475 7.3 4128 0.6375 0.027343 0.41277 6.8 4786 0.7375 0.029409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	6042
34850.53750.0251070.3484757.341280.63750.0273430.412776.847860.73750.0294090.4786456.454610.83750.031340.5461156.261520.93750.0331580.6151956.0	6196
4128 0.6375 0.027343 0.41277 6.8 4786 0.7375 0.029409 0.478645 6.4 5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	6351
47860.73750.0294090.4786456.454610.83750.031340.5461156.261520.93750.0331580.6151956.0	6508
5461 0.8375 0.03134 0.546115 6.2 6152 0.9375 0.033158 0.615195 6.0	2999
6152 0.9375 0.033158 0.615195 6.0	6827
	6869

244.15 0.5461 244.05 0.4786 244.09 0.5069 Elevation at 100-year storage

Appendix C: Post Development Model



Project #:	Date:	Subject:
10034 Page	NOV 2/10 By:	YIN PHASE 5
	TGS	

IMPERVIOUS AREA ASSUMPTIONS:

ROADWAY AND ONE SIDE SIDEWALK AREA PER METRE LENGTH OF ROAD: AVERAGE DWELLING ROOF AREA: AVERAGE DWELLING DRIVEWAY AREA: TOTAL IMPERVIOUS AREA PER DWELLING: 185 m2 45 m2 230 m2 11 m2 0.0011 ha 0.023 ha

Area	Total	No. of	Dwellling	Street	Street	Dir Conn	Total	imp Area
No.	Area	Dwell	Imp Area	Lenth	imp Area	Ratio	Imp Area	Ratio
i i i i i i i i i i i i i i i i i i i	(ha)		(ha)	(m)	(ha)		(ha)	
SFD	<u>ဖ</u> အ	85	1.96	1380	1.52	0.16	3.47	0.37
BLOCK 1 TOWN HOUSES	0.57				0.21	0.38	0.43	0.75
BLOCK 2 APARTMENTS	0.69				0.26	0.38	0.52	0.75
BLOCK 3 COMMERCIAL	0.8				0.36	0.45	0.72	0.90
BLOCK 4 COMMERCIAL	1.4				0.63	0.45	1.26	0.90
BLOCK 5 SWM	1.26				0.57	0.45	1.13	0.90
	14.02				3.5475	0.25	7.532	0.54

APPLICABLE LAND USE PER NORFOLK COUNTY'S CURRENT DESIGN CRITERIA.
2) FOR DIRECTLY CONNECTED AREAS (IE DRIVES AND PARKING) OF BLOCKS 1 THROUGH 5, 50% OF THE TOTAL 1) IMPERVIOUS AREAS FOR BLOCKS 1 THOUGH 5 HAVE BEEN ASSUMED BASED ON RUNOFF COEFFICIENTS FOR

IMPERVIOUS AREA HAS BEEN ASSUMED.

³⁾ TOTAL AREA DOES NOT EQUAL TOTAL SITE AREA AS APPROXIMATELY 0.2 HA OF STREET B WILL NOT FLOW TO SWM FACILITY.



```
| SSSS | W | W | M | M | H | H | Y | M | M | OOO | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999 | 999
                                                                                                                                                              9 # 3568969
                                                                                                                                      999
                StormWater Management HYdrologic Model
                                                                                                                                                      999
    Distributed by: J.F. Sabourin and Associates Inc.

Ottawa, Ontario: (6131 727-5199 ...

Gatineau, Quebec: (8191 243-6858 ...

E-Mail: swmhymo@jfsa.com
    +++++++ Licensed user: G. Douglas Vallee Lirited +++++++
++++++++ Sircoe SERIAL#:3568969 +++++++
    ###### PROGRAM ARRAY DIMENSIONS #####

****** Maximum value for ID numbers : 10

****** Max. number of rainfall points: 15000

****** Max. number of flow points : 15000
    * DATE: 2010-11-22 TIME: 14:15:43 RUN COUNTER: 001101 *
       Input filename: H:\S\MHYM-1\10034Y-1\PSTDEV.DX
Output filename: H:\S\MHYM-1\10034Y-1\PSTDEV.out
Summary filename: H:\S\MHYM-1\10034Y-1\PSTDEV.sum
User comments:
    * 3:______*
 # Project Name: [YINS PHASE 5] Project Number: [10034]

# Date : 02-11-2010

# Modeller : [TGS]

# Company : G. Bouglas Vallee Limited

# License # : 3568969
READ STORM
                                                   Filename: H:\SWMHYM-1\10034Y-1\CH2.STM
Comments: 2 YEAR CHICAGO 4 HOUR DESIGN STORM DISTR
                                  TIME
                                                     PAIN | TIME
                                                                                              PAIN | TIME
                                                                                                                                       PAIN |
                                                                                                                                                             TIME
                                                                                                                                                                                PAIN
                                                                        hrs mm/hr |
1.17 8.940 |
1.33 16.920 |
1.50 78.820 |
1.67 21.890 |
                                                                                                                                   m/hr |
8.150 |
7.010 |
6.200 |
5.590 |
                                    hrs
.17
                                                                                                                  hrs
2.17
2.33
2.50
2.67
                                                                                                                                                             hrs
3.17
3.33
3.50
3.67
                                                                                                                                                                             4.390
4.110
                                                 rm/hr |
3,250 |
                                                   3.560 1
                                      .50
                                                  3.960 i
                                                                                                                                                                              3.890
                                                   4.520 1
                                                                                        9.880
 001:0003-----
 ESIGN STANDHYD | Area (ha)= 9.30
i:SED DT= 1.00 | Total Imp(t)= 37.00 Dir. Conn.(t)= 16.00
 | DESIGN STANDHYD
| Ol:SED DT= 1.
                                                                                                          PERVIOUS (i)
                                                                         IMPERVIOUS
                                                                                  3.44
.80
1.00
                                                                                                               5.86
1.50
1.00
             Surface Area
                                                      (ha)=
            Dep. Storage
Average Slope
Length
Mannings n
                                                      (15) =
(8) =
(115) =
                                                                             249.00
                                                                                 .013
                                                                                                                 .250
                                                                               78.82
5.00
4.86 (ii)
5.00
.23
            Max.eff.Inten.(rm/hr)=
over (min)
Storage Coeff. (min)=
Unit Hyd. Tpeak (min)=
Unit Hyd. peak (cms)=
                                                                                                               11.25
26.00
25.68 (ii)
26.00
.04
                                                                                                                                               *TOTALS*
.301 (iii)
1.517
13.152
39.365
.334
                                                                               .27
1.52
38.58
39.38
                                                                                                             .11
1.92
8.31
39.38
            PEAK FLOW (cms) =
TIME TO PEAK (hrs) =
RUNOFF VOLUME (cms) =
TOTAL PAINFALL (cms) =
RUNOFF COEFFICIENT =
                 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CH+ = 58.0 Ia = Dep. Storage (Above)
(ii) TIME SIDE (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
001:0004-----
```

•		*********	*******	***********	************
. BL	OCK 1 TOWNHOUSES				
••••		*******		******	********
DE	SIGN STANDHYD BLK1 DT= 1.00	Area Total	(ha)= Imp(%)= 75	.57 .00 Dir. Conr	n.(%)= 38,00
			MPERVIOUS	PERVIOUS (i)	
	Surface Area Dep. Storage Average Slope	(mm) = (%) = (m) =	.43 .80 1.00	.14 1.50 1.00	
	Length Mannings n	= (m) =	61.64 .013	40.00 .250	
	Max.eff.Inten.(nm/hr)= (min)	78.82 2.00	48.36 14.00	
	Storage Coeff, Unit Hyd, Tpeak Unit Hyd, peak	(min) =	2.10 (ii) 2.00 .54		
	PEAK FLOW	(cms)=	.05	.01	*TOTALS* .052 (iii)
	RUNOFF VOLUME TOTAL PAINFALL	(hrs)= (gzs)= (gzs)=	1.50 38.58 39.38	1.70 13.32 39.38	1.500 22.918 39.385
	RUNOSE COEFFICI	Fut =	. 30	.34	.582
	(i) CN PROCED CN* = 58 (ii) TIME STEP	ORE SELECTED .0 Ia = 1 (DT) SHOULD	D FOR PERVIO Dep. Storage D BE SMALLER	(Above) OR EQUAL	
	THAN THE (iii) PEAK FLOW	STORAGE COE	FFICIENT.		
001:	0005				

. BL	OCK 2 APARTMENTS				
			,		*******
DE:	SIGN STANDHYD BLK2 DT= 1.00	Area	(ha)=	.69	. 191= 38 NO
		I	IPERVIOUS	PERVIOUS (i)	
	Surface Area Dep. Storage Average Slope Length	(ha)= (nya)= (5)=	.52 .80 1.00	.17 1.50	
	Length Mannings n	(m) =	1.00 67.82 .013	1.00 40.00 .250	
	Max.eff.Inten.(mm/hr)=	78.82	40.36	
	over Storage Coeff. Unit Hyd. Tpeak	(min)= (min)=	2.23 (ii) 2.00	14.00 13.85 (ii) 14.00	
	Unit Hyd. peak PEAK FLOW	(cms)=	.52	.08	*TOTALS* .063 (iii)
	TIME TO PEAK	(cms)= (hrs)= (nm)=	1.50 38.58	1.70 13.32	1.500
	RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(rsp) = ENT =	39.38 .98	39.38 .34	39.365 ,582
	(i) CN PROCEDS CN* = 58	.0 Ia = I	ep. Storage	(Above)	
	(ii) TIME STEP THAN THE : (iii) PEAK FLOW	STORAGE COEL	FICIENT.		
	(111) FEAR TEON				

* BLG	OCK 5 SWM				

06	SIGN STANDHYD BLK5 DT= 1.00				a.(%)= 90.00
	Surface Area Dep. Storage	(ha)= (m)=	PERVIOUS 1.13 .80	PERVIOUS (1) .13 1.50	
	Surface Area Dep. Storage Average Slope Length Mannings n	(8) = (m) =	1.00 91.65	1.00	
				.250 6.11	
	Max.eff.Inten.(r over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min) (min)=	3.00 2.67 (ii)	6.11 29.00 29.24 (ii) 29.00	
		101:57	.10	.04	*TOTALS*
	PEAK FLOW TIME TO PEAK	(cms)= (hrs)=	.24 1.50	.00 1.97 6.47	.241 (iii) 1.500
	PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFICE	(mm)= (mm)=	38.58 39.38	6.47 39.38 .16	35,374 39,385 .898
	(i) CH PROCEDI	DRE SELECTER	FOR PERVIO	US LOSSES:	
	CM* = 58 (ii) TIME STEP	.0 Ia = I (bT) SHOULE STOPAGE COEF	Dep. Storage DES SMALLER	(Above) OR EQUAL	
	(iii) PEAK FLOW	DOES NOT IN	CLUDE BASEF		
001:0	0007				**********
* * * 855	EDMINE INCION A	o Fostn			
•	EPMINE INFLOW TO				

******			******		********
ADD HYD (PSTDEV) II ID1 0: +ID2 0: +ID3 0: +ID4 0:	D: NHYD	AREA QP {ha} (c	ms) (hrs)	(ED) {	CES)
ID1 0:	LISED	9.30 .	301 1.52	13.15	.000
+ID2 02 +ID3 03	3:BLK2	.69 .	063 1.50	22.92	.000
+ID4 00	5: BLK5	1.26 .	241 1.50	35.37	.000
			651 1.50		.000
NOTE: PEAK FLOWS IX	NOT INCLUD	E BASEFLOWS	IF ANY.		
001:0008				*******	*******
•					
* ROUTE THROUGH POND					
•					
****************			*******	*******	********
ROUTE RESERVOIR IN>07:(PSTDEV) OUT<08:(PNEOUT)	Reguested	routing ti	me step = 1	.0 min.	
IN>07: (PSTDEV)	,				_
[OUT<88: (PMDOUT) [OUTFLOW	STORAGE	OUTFLOW (cms) (c	STOPAGE	-
	(cms)	(ha.m.)	(cms)	(ha.m.)	
	.007	.5520E-01	.027	.4178E+00	
	,013	.1118E+00	1 .029	.4837E+00	
	.020	.2296E+00	.033	.6203E+00	
	.023	.2908E+00	1 .000	.0000E+00	
ROUTING RESULTS	AR.	EA QPEA	K TPEAK	R.V.	
INFLOW >07: (PSTD)	5V) 11.	82 .65	1.500	16.562	
POUTING RESULTS INFLOW >07: {PSTDE OUTFLOW<08: {PNDOO OVERFLOW<09: {PNDOO	JT) 11.	82 .01 80 .06	.7 4.533	R.V. (mm) 16.562 16.561 .000	
OVERTEORY (THEO)					
TOT/ CUM	AL NUMBER OF MATIVE TIME	OF OVERFLO	OVERFLOWS = WWS (hours)= WING (%)=	.00	
PERC	ENTAGE OF T	IME OVERFLO	WING (8)=	.00	
PEA	R WOLT S	EDUCTION [Q	out/Qin] (%) = (cin) = (ha.m.) =	2.623	
MAXI	MUM STORAG	E USED	(ha.m.)=	.1768E+00	
001:0009					
, i i	**********	*********	**********	********	**********
* BLOCK 3 COMMERCIAL					
i c					
					,
				********	*******
DESIGN STANDHYD	Area (ha)= .8	10 10		
DESIGN STANDHYD	Area (ha)= .8	10 10		
DESIGN STANDHYD	Area (ha)= .8	10 10		
DESIGN STANDHYD	Area (ha)= .8	10 10		
DESIGN STANDHYD	Area (ha)= .8	10 10		
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n	Area (Total Imp IMPE (ha) = (mm) = (8) = (n) = 7	ha)= ,8 (%)= 90.0 RVIOUS P .72 .80 1.00 3.03	00 Dir. Con ERVIOUS (i) .08 1.50 1.00 40.00 .250		
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n	Area (Total Imp IMPE (ha) = (mm) = (8) = (n) = 7	ha)= ,8 (%)= 90.0 RVIOUS P .72 .80 1.00 3.03	00 Dir. Con ERVIOUS (i) .08 1.50 1.00 40.00 .250		
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n	Area (Total Imp IMPE (ha) = (mm) = (8) = (n) = 7	ha)= ,8 (%)= 90.0 RVIOUS P .72 .80 1.00 3.03	00 Dir. Con ERVIOUS (i) .08 1.50 1.00 40.00 .250		
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n	Area (Total Imp IMPE (ha) = (mm) = (8) = (n) = 7	ha)= ,8 (%)= 90.0 RVIOUS P .72 .80 1.00 3.03	00 Dir. Con ERVIOUS (i) .08 1.50 1.00 40.00 .250		
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(rm. over (r Storage Coeff. (r Unit Ryd. Tpeak (r Unit Ryd. peak (r Unit Ryd. peak (r	Area (Total Imp IMPE (ha) = (5) = (a) = 7 = (a) = 7 ain) = ai	ha)= .8 (%)= 90.0 NOTION P.72 .80 1.00 3.03 .013 8.82 2.00 .51	00 Dir. Con ERVIOUS (i) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13		5.00
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(rm. over (r Storage Coeff. (r Unit Ryd. Tpeak (r Unit Ryd. peak (r Unit Ryd. peak (r	Area (Total Imp IMPE (ha) = (5) = (a) = 7 = (a) = 7 ain) = ai	ha)= .8 (%)= 90.0 NOTION P.72 .80 1.00 3.03 .013 8.82 2.00 .51	00 Dir. Con ERVIOUS (i) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 1.3	*TOTALS*	5.00
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(rm.over (r Storage Coeff. (r Unit Hyd. Tpeak (r Unit Hyd. peak (r Unit Hyd. peak (r	Area (Total Imp IMPE (ha) = (5) = (a) = 7 = (a) = 7 ain) = ai	ha)= .8 (%)= 90.0 NOTION P.72 .80 1.00 3.03 .013 8.82 2.00 .51	00 Dir. Con EERVIOUS (1) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08	*TOTALS* .102 1.500 28.960	5.00
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(rm. over (r Storage Coeff. (r Unit Ryd. Tpeak (r Unit Ryd. peak (r Unit Ryd. peak (r	Area (Total Imp IMPE (ha) = (5) = (a) = 7 = (a) = 7 ain) = ai	ha)= .8 (%)= 90.0 NOTION P.72 .80 1.00 3.03 .013 8.82 2.00 .51	00 Dir. Con 00 Dir. Con 1.08 1.56 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38	*TOTALS* .102 1.500 28.960 39.385	5.00
DESIGN STANDHYD 04:BLK3 DT= 1.00 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n	Area (Total Irp INFE (ma)= (5)= (n)= 7 inin =	ha)= .8 (1)= 90.0 RVIOUS P.72 .80 1.00 3.03 .013 6.82 2.00 2.03 2.13 2.00 2.00 1.50 8.58 9.38 9.38	00 Dir. Con ERVIOUS (i) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 1.3 1.60 21.08 39.38 .54	*TOTALS* .102 1.500 28.960	5.00
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (rr. over (r Storage Coeff. (r Unit Ryd. Tpeak (r Unit Ryd. Tpeak (r TIME TO FEAK (I RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFICIEM; (1) CN PROCEDURU (1) CN PROCEDURU	Area (Total Imp IMPE (ha) = (1) = (7) =	ha)= .8 (9)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 8.82 2.00 2.33 (ii) 2.00 2.33 (ii) 2.00 8.58 9.38	00 Dir. Con EERVIOUS (i) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 54	*TOTALS* .102 1.500 28.960 39.385	5.00
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (rr. over (r Storage Coeff. (r Unit Ryd. Tpeak (r Unit Ryd. Tpeak (r TIME TO FEAK (l RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFICIEN: (1) CN PROCEDURI (r) = 58.0 (ii) TIME STEP (I TIME STEP) (II	Area (Total Imp IMPE (ha) = (1) = (7) =	ha)= .8 (9)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 8.82 2.00 2.33 (ii) 2.00 2.33 (ii) 2.00 9.38 9.38 9.38 9.38 9.38 9.38 9.38 9.58	00 Dir. Con 00 Dir. Con 1.08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 .54 [Above]	*TOTALS* .102 1.500 28.960 39.385	5.00
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n	Area (Total Imp IMPE (ha)= (5)= (n)= 7 ain)= ain)= ain)= Tis)= Tis)= (rm)= 2 SELECTED F Ia Dep Tis DepAGE COEFFI	ha)= .8 (1)= 90.0 RVIOUS P.72 .80 1.00 3.03 .013 6.82 2.00 2.03 (11) 2.00 1.50 6.58 9.38 9.38 .98 .98	00 Dir. Con ERVIOUS (i) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 .54 ! LOSSES: (Above) RR EQUAL	*TOTALS* .102 1.500 28.960 39.385	5.00
DESIGN STANDHYD 04:BLR3 DT= 1.00 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (ED. Control of the	Area (Total Imp IMPE (ma) = (5) = (6) = 7 (m) = 7 (m) = 7 (min) = 3 (ma) = 3 (m	ha)= .8 (*)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 8.82 2.00 2.33 (ii) 2.00 2.33 (ii) 2.00 2.33 (ii) 9.38 9.38 9.38 9.38 9.38 9.38 9.38 9.38	00 Dir. Con EERVIOUS (1) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.00 39.38 .54 1.03SES: (Above) R EQUAL	*TOTALS* .102 1.500 28.960 39.385 .735	5.00 {iii}
DESIGN STANDHYD 04:BLR3 DT= 1.00 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (mm. over it	Area (Total Imp IMPE (ma) = (5) = (m) = 7 (m) = 7 (m) = 7 (min) = ain = ain = min =	ha)= .8 (4)= 90.0 RVIOUS P.72 .80 1.00 3.03 .013 6.82 2.00 2.00 2.00 2.00 2.00 2.00 2.00 2	00 Dir. Con 08 1.50 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 .54 1 LOSSES; (Above) R EQUAL W IF ANY.	*TOTALS* -102 1.500 28.500 39.385 .735	(iii)
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(EEE. Over (E. Storage Coeff. (Int. Hyd. Tpeak (Unit Ryd. peak (CIME TO PEAK (INT. PEAK ILOW) (IN	Area (Total Imp IMPE (ma) = (5) = (m) = 7 (m) = 7 (m) = 7 (min) = ain = ain = min =	ha)= .8 (4)= 90.0 RVIOUS P.72 .80 1.00 3.03 .013 6.82 2.00 2.00 2.00 2.00 2.00 2.00 2.00 2	00 Dir. Con 08 1.50 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 .54 1 LOSSES; (Above) R EQUAL W IF ANY.	*TOTALS* -102 1.500 28.500 39.385 .735	(iii)
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (ED. Over (E. Storage Coeff. (E. Unit Hyd. Tpeak (Unit Hyd. Tpeak (Unit Hyd. Peak (E. Unit Hyd. PROCEDURE (E. E. Storage (E. Unit Hyd. PEAK FLOW (E. Unit Hyd. FEAK FLOW (E. Unit	Area (Total Imp IMPE (mn) = (5) = (nn) = 7 ain) ain) = ain) ain) = ain) = (nn) = 3 (mn) = 5 E SELECTED F Improve Total English = 10 E SELECTED F	ha)= .8 (%)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 .013 .013 2.20 2.33 (ii) 2.00 .51 .08 1.50 8.58 9.38 9.38 9.38 9.38 .Storage SMALLER OCTENT. UNE BASEFLO	00 Dir. Con 00 Dir. Con 1.00 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 .54 1.03SES; (Above) R EQUAL W IF ANY.	*TOTALS* 102 1.500 28.960 39.385 ,735	(iii)
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (ED. Over (E. Storage Coeff. (E. Unit Hyd. Tpeak (E. Unit Hyd. Tpeak (E. Unit Hyd. Tpeak (E. EAN ELOW (E. EAN EL	Area (Total Imp IMPE (mn) = (5) = (nn) = 7 ain) ain) = ain) ain) = ain) = (nn) = 3 (mn) = 5 E SELECTED F Improve Total English = 10 E SELECTED F	ha)= .8 (%)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 .013 .013 2.20 2.33 (ii) 2.00 .51 .08 1.50 8.58 9.38 9.38 9.38 9.38 .Storage SMALLER OCTENT. UNE BASEFLO	00 Dir. Con 00 Dir. Con 1.00 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 .54 1.03SES; (Above) R EQUAL W IF ANY.	*TOTALS* 102 1.500 28.960 39.385 ,735	(iii)
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(mm. over (r Storage Coeff. (r Unit Hyd. Tpeak (r Unit Hyd. Tpeak (r Unit Hyd. Peak (r Experiment) (r) CAL PAINFALL RUNOFF COEFFICIEN: (1) CAL PROCEDURE CAL PAINFALL (r) THE STORAGE (r) (r) THAN THE STORAGE (r) (r) PEAK FLOW K	Area (Total Imp IMPE (mn)= (s)= (m)= 7 (m)= 7 (mn)= 7 (mn)= 3 (mn)= ha)= .8 (*)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 6.82 2.00 2.33 (ii) 2.00 2.33 (ii) 6.58 9.38 9.38 9.38 9.38 Storage E SMALLER O CIENT. UDE BASEFLO	00 Dir. Con ERVIOUS (i) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 54 6 LOSSES: (Above) 0R EQUAL WHIF ANY.	*TOTALS* .102 1.500 39.385 .735	(111)	
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (rr. over (to the storage Coeff. it Unit Ryd. Tpeak (to Unit Ryd. Tpeak (to TIME TO PEAK (to RNORF VOLUME TOTAL PAINFALL RUNOFF COEFFICIEN: (1) CN PROCEDURE CN' = 58.0 (ii) TIME STEP (to TIME TO PEAK FLOW (to TRAN TRE STE (til) PEAK FLOW (to COEFFICIEN: (1) CN PROCEDURE (to TRAN TRE STE (til) PEAK FLOW (to COEFFICIEN: (1) STAND TRE STE (til) PEAK FLOW (to COEFFICIEN: (1) SIMULATE STORAGE ON 15.	Area (Total Imp IMPE (ha) = (1) = (2) = (3) = (4) =	ha)= .8 (4)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 6.82 2.00 2.33 (ii) 2.00 2.33 (ii) 6.85 9.38 9.38 9.38 OR PERVIOUS Storage E SMALLER O CIENT. UDE BASEFLO CIENT. UDE BASEFLO CIENT. ELEASE AT C	00 Dir. Con PERVIOUS (i) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.06 39.38 .54 LOSSES: (Above) W IF ANY.	*TOTALS*	(111)
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (FFF. Over (FFF. O	Area (Total Imp IMPE (mn) = {1} = {1} = {2} = {3} = {4} =	ha)= .8 (*)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 6.82 2.00 2.33 (ii) 2.00 .51 .08 1.50 9.38 9.38 9.38 9.38 OR PERVIOUS .Storage ESMALLER OCIENT. UDE BASEFLO CLEMA AT C.	00 Dir. Con PERVIOUS (i) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 .54 **LOSSES: (Above) RR EQUAL WW IF ANY	*TOTALS* 1.02 1.500 39.385 .735	<pre>{iii}</pre>
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (rr. over (t Storage Coeff. it Unit Hyd. Tpeak (t Unit Hyd. Tpeak (t TIME TO FEAK (t) TIME TO FEAK (t) FEAK FLOW (t) TIME TOTAL PAINFALL RUNOFF COEFFICIEN: (1) CN PROCEDURE (n' = 58.0 (ii) TIME SIFE (t) ITME SIFE (t) (t) THAN THE SITE (t) PEAK FLOW (t) SIMULATE STORAGE ON ISSUMULATE STORAGE ON ISSUMULA	Area (Total Imp IMPE (mn)= (5)= (mn)= 7 (in)= 7 (in)= 7 (in)= 7 (in)= 3 (in)	ha)= .8 (%)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 .013 .013 2.00 .51 .08 1.50 8.58 9.38 9.98 OR PERVIOUS STORAGE E SMALLER O GIENT GIENT CHETASE AT C KOUTIFOW S	00 Dir. Con 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 .54 1.03555; (Above) 08 EQUAL 09 IF ANY	*TOTALS* .102 1.500 28.960 39.385 .735	(iii)
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (FFF. Over (FFF. O	Area (Total Imp IMPE (ha) = (1) = (2) = (3) = (4) = (4) = (7) = (4) = (7) = (4) =	ha)= .8 (4)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 8.82 2.00 2.33 (ii) 2.00 2.33 (ii) 2.00 8.51 .08 1.50 9.38 9.38 9.38 OR PERVIOUS Storage EMALLER OCIENT. UDE BASEFLO CIENT. UDE BASEFLO ELEASE AT C FOUTLOOK STORAGE FOUTLOOK STORAGE FOUTLOOK STORAGE FOUTLOOK STORAGE FOUTLOOK STORAGE STORAGE STORAGE STORAGE	00 Dir. Con PERVIOUS (i) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 1.3 .03 1.60 21.08 39.38 .54 **LOSSES: (Above) R EQUAL W IF ANY	*TOTALS* .102 .1.500 28.960 39.385 .735	(iii)
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (FFF. Over (FFF. O	Area (Total Imp IMPE (ha) = (1) = (2) = (3) = (4) = (4) = (7) = (4) = (7) = (4) =	ha)= .8 (4)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 8.82 2.00 2.33 (ii) 2.00 2.33 (ii) 2.00 8.51 .08 1.50 9.38 9.38 9.38 OR PERVIOUS Storage EMALLER OCIENT. UDE BASEFLO CIENT. UDE BASEFLO ELEASE AT C FOUTLOOK STORAGE FOUTLOOK STORAGE FOUTLOOK STORAGE FOUTLOOK STORAGE FOUTLOOK STORAGE STORAGE STORAGE STORAGE	00 Dir. Con PERVIOUS (i) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 1.3 .03 1.60 21.08 39.38 .54 **LOSSES: (Above) R EQUAL W IF ANY	*TOTALS* .102 .1.500 28.960 39.385 .735	(iii)
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(rr.over(continue)) Max.eff.Inten.(rr.over(continue)) Max.eff.Inten.(rr.over(continue)) PEAK FLOW (continue) PEAK FLOW (continue) FEAK FLOW (continue) (i) Ch PROCEDURG CN* = 58.0 (ii) TIME STEP (iii) PEAK FLOW (continue) (ii) TIME STEP (iii) PEAK FLOW (continue) SIMULATE STORAGE ON 1 ROUTE RESERVOIR 1 INDOI: BASTRE)	Area (Total Imp IMPE (ha)= (sh=)= (sh=)= 7 (hr)= 7 ain) ain)= a	ha)= .8 (%)= 90.0 RVIOUS P.72 .80 1.00 3.03 .013 8.82 2.00 2.33 (ii) 2.05 .51 .08 9.38 9.38 9.38 9.38 9.38 9.38 9.38 7.51 .50 ELEASE AT C.2 FOUTLEOW S. STOPAGE (ha.m.) .0000E+00 .1000E-03	00 Dir. Con 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 1.60 21.08 39.38 .1.60 21.08 39.38 .54 .1.60 21.08 39.38 .54 .1.60 21.08 39.38 .54 .1.60 21.08 39.38 .54 .1.60 21.08 39.38 .54 .1.60 21.08 39.38 .54 .1.60 21.08 39.38 .54 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 .1.60 21.08 .1.60 .1	*TOTALS* 1.02 1.500 28.960 39.385 .735 TE *TOPACE (ha.n.) .10002+10	(iii)
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (mm. over (m	Area (Total Imp IMPE (mn) = (5) = (6) = (7) = 7 dain) ain! = 7 dain! = 7	ha)= .8 (%)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 .013 .013 .013 .013 .01	00 Dir. Con 00 Dir. Con 1.00 1.00 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 1.3 .03 1.60 21.08 39.38 .54 8. (Above) 08 EQUAL WW IF ANY. CONTROLLED PA *TOTALS* .102 1.500 28.960 39.385 ,735	(iii)	
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (rr. over (r. Storage Coeff. it Unit Hyd. Tpeak (r. Unit Hyd. Tpeak (r. Unit Hyd. Tpeak (r. TIME TO PEAK (TONOFF VOLUME TOTAL PAINFALL RUNOFF COEFFICIENT (n. Storage Coeff. it) THEN THE STORAGE ON 111 THEN STEP (f. THAN THE STORAGE ON 112 PEAK FLOW (r. SIMULATE STORAGE ON 113 PEAK FLOW (r. SIMULATE STORAGE ON 114 PEAK FLOW (r. SIMULATE STORAGE ON 115 PEAK FLOW (r. SIM	Area (Total Imp IMPE Imple	ha)= .8 (9)= 90.0 RVIOUS P .72 .80 1.00 2.33 (11) 2.00 2.33 (11) 2.00 8.50 9.38 9.38 9.38 9.38 9.38 9.38 9.38 9.38	00 Dir. Con PERVIOUS (1) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (11) 9.00 8.55 (11) 9.00 21.08 39.38 .160 21.08 39.38 .54 **LOSSES: (Above) RE EQUAL WHIT ANY	*TOTALS* .102 1.500 28.960 39.385 ,735	(iii)
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (rr. over (r. Storage Coeff. it Unit Hyd. Tpeak (r. Unit Hyd. Tpeak (r. Unit Hyd. Tpeak (r. TIME TO PEAK (TONOFF VOLUME TOTAL PAINFALL RUNOFF COEFFICIENT (n. Storage Coeff. it) THEN THE STORAGE ON 111 THEN STEP (f. THAN THE STORAGE ON 112 PEAK FLOW (r. SIMULATE STORAGE ON 113 PEAK FLOW (r. SIMULATE STORAGE ON 114 PEAK FLOW (r. SIMULATE STORAGE ON 115 PEAK FLOW (r. SIM	Area (Total Imp IMPE Imple	ha)= .8 (%)= 90.0 RVIOUS P .72 .80 .1.00 .3.03 .013 .82 .2.00 .2.33 (ii) 2.00 .5180 .1.50 .80 .98 .9.38 .9.38 .9.38 .9.38 .9.38 .9.38 .9.38 .9.38 .5.01 .5.0 .9.38 .5.01 .5.0 .5.0 .5.0 .5.0 .5.0 .5.0 .5.	00 Dir. Con PERVIOUS (1) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 8.55 (iii) 9.00 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 39.38 .1.60 21.08 .1.60 .1.	*TOTALS* 1.02 1.500 28.960 39.385 .735 TE *TOTALS* 1.500 28.960 0.000 8.V. (ra)	(iii)
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (ED. Over (E. Storage Coeff. (E. Unit Hyd. Tpeak (E. Unit Hyd. Tpeak (E. EAK FLOW (E.	Area (Total Imp IMPE (ha)= (sh=)= (sh=)= 7 inh)= 7	ha)= .8 (%)= 90.0 RVIOUS P .72 .80 1.00 3.03 .013 8.82 2.00 2.33 (ii) 2.00 2.51	00 Dir. Con 1.50 1.00 40.00 .250 230.54 9.00 8.55 (ii) 9.00 .13 .03 1.60 21.08 39.38 .54 8 LOSSES; (Above) 8 EQUAL W IF ANY	*TOTALS* 102 1.500 28.960 39.385 .735 TE TE STOPACE (ha.m.) .100026-10 .00002-00 .8.V. (rma) 28.960 .000	(iii)
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (rm. over (r Storage Coeff. (r Unit Ryd. Tpeak (r Unit Ryd. Ppeak (r Hyd. Tpeak) (r Hyd. Tyd. Tyd. Tyd. Tyd. Tyd. Tyd. Tyd. T	Area (Total Imp IMPE (ha)= (sh=)=	ha)= .8 (%)= 90.0 RVIOUS P .72 .80 .1.00 .3.03 .013 .013 .013 .013 .013 .	00 Dir. Con 1.50 1.00 40.00 230.54 9.00 8.55 (ii) 9.00 1.3 .03 1.60 21.08 39.38 54 1.60 21.08 39.38 54 1.60 21.08 39.38 6.54 1.60 21.08 39.38 6.54 1.60 21.08 21.08 21.08 21.08 21.08 21.08 22.10 23.00 20 20 20 20 20 20 20 20 20 20 20 20 2	*TOTALS* -102 -1.500 -28.960 -39.385 -735 TE TE SICPACE (ha.m.) -10002+01 -00092+00 -0.00 -0.00	(iii)
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (rm. over (r Storage Coeff. (r Unit Ryd. Tpeak (r Unit Ryd. Ppeak (r Hyd. Tpeak) (r Hyd. Tyd. Tyd. Tyd. Tyd. Tyd. Tyd. Tyd. T	Area (Total Imp IMPE (ha)= (s)= (s)= (an)= 7 (hr)=	ha)= .8 (%)= 90.0 RVIOUS P .72 .80 .1.00 .3.03 .013 .013 .013 .013 .013 .	00 Dir. Con 1.50 1.00 40.00 230.54 9.00 8.55 (ii) 9.00 1.3 .03 1.60 21.08 39.38 54 1.60 21.08 39.38 54 1.60 21.08 39.38 6.54 1.60 21.08 39.38 6.54 1.60 21.08 21.08 21.08 21.08 21.08 21.08 22.10 23.00 20 20 20 20 20 20 20 20 20 20 20 20 2	*TOTALS* -102 -1.500 -28.960 -39.385 -735 TE TE SICPACE (ha.m.) -10002+01 -00092+00 -0.00 -0.00	(iii)
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (rr. over (r. Storage Coeff. it Unit Hyd. Tpeak (r. Unit Hyd. Tpeak (r. Unit Hyd. Tpeak (r. TIME TO PEAK (T. DESERVOR) (r. TIME TO PEAK FLOW (r.	Area (Total Imp IMPE Impl= {in=} {in=} {in=} 7 inn= inn inn inn inn inn inn	ha)= .8 (9)= 90.0 RVIOUS P .72 .80 .1.00 .3.03 .013 8.82 .2.00 .2.33 (ii) 2.00 .1.00 8.50 .98 .50 .98 .50 .7280 .9.8 .50 .98 .50 .98 .50 .98 .50 .98 .50 .98 .50 .98 .50 .50 .50 .50 .50 .50 .50 .50 .50 .50	00 Dir. Con 00 Dir. Con 00 Dir. Con 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	*TOTALS* .102 1.500 28.960 39.385 .735 TE **TOTALS* .102 1.500 28.960 39.385 .735	(iii)
DESIGN STANDHYD 04:BLK3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (ED. Over (E. Storage Coeff. (E. Unit Hyd. Tpeak (Unit Hyd. Tpeak) (INTENDED COEFFICIENT (INTENDED COEFFICIT) (INTENDED COEFFICIENT (INTENDED COEFFICIENT (INTENDED COEFFICI	Area (Total Imp IMPE (mn) = (5) = (mn) = 7 (mn) = 7 (mn) = 7 (mn) = 3	ha)= .8 (%)= 90.0 RVIOUS P .72 .80 .1.00 3.03 .013 8.82 2.00 .51	00 Dir. Con 00 Dir. Con 00 Dir. Con 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	*TOTALS* .102 1.500 28.960 39.385 .735 TE **TOTALS* .102 1.500 28.960 39.385 .735	(iii)
DESIGN STANDHYD 04:BLR3 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. (rr. over (r. Storage Coeff. it Unit Hyd. Tpeak (r. Unit Ryd. peak	Area (Total Imp IMPE Impl= {in=} {in=} {in=} 7 inn= inn inn inn inn inn inn	ha)= .8 (9)= 90.0 RVIOUS P .72 .80 .1.00 .3.03 .013 8.82 .2.00 .2.33 (ii) 2.00 .8.51 .98 .9.8 9.38 .5torage .5t	00 Dir. Con PERVIOUS (1) .08 1.50 1.00 40.00 .250 230.54 9.00 8.55 (11) 9.00 8.55 (11) 9.00 21.08 39.38 .54 21.08 39.38 39.38 39.38 4 20.03 21.08 39.38 4 21.08 21.08 39.38 4 21.08	*TOTALS* .102 .1.500 .28.960 .99.385 .735 *TOTALS* .102 .1.500 .29.960 .000 .000 .000 .000	(iii)

001:0011							
,							
* BLOCK 4 COMMERCE	IAL						
				******	*******	******	*****
DESIGN STANDHYD 05:BLK4 DT= 1.	.00 Total	(ha)= Imp(%)= :	1.40 90.00 E	ir. Con	n.(%)=	45.00	
		IMPERVIOUS 1.26	PERVIC				
Surface Area Dep. Storage Average Slope	= (mm) = { F }	.80 1.00	1.5	10			
Length Mannings n	= (m) =	96.61 .013	40.0				
Max.eff.Inter		78.62	230.5				
Storage Coefi		3.00 2.75 (i: 3.00		7 (11)			
Unit Hyd. Tpe Unit Hyd. pea	ak (cms)=	.40	. 1		*TOTAL:	3 <i>+</i>	
PEAK PLON TIME TO PEAK	(cms)= (hrs)=	.13 1.50	1.6) 6 50		(iii)	
RUNOFF VOLUME TOTAL RAINFA	E (mm)= LL (mm)=	38.58 39.38	21.0 39.3) B B	28.969 39.38	à	
KUNOFF COEFF	CIENI -	.98	.:	94	.73	>	
CH* = (ii) TIME ST	CEDURE SELECT 58.0 IA = FEP (DT) SHOW HE STORAGE CO LOW DOES NOT	= Dep. Stora JLD BE SMALL DEFFICIENT.	ge (Abov ER OR EQU	re) IAL			
001:0012							
· • • • • • • • • • • • • • • • • • • •	*******		*******	******	******	*******	******
SIMULATE STORAGE	E ON 4 TO RE	LEASE AT CON	ROLLED F	ATE			
				******		******	****
ROUTE RESERVOIR	I Reque	ested routin	g time st	ep = 1	.0 min.		
IN>05: (BLK4) OUT<03: (B4CTRL)	OUTF	OUTLE	3E 1 C				
	(cr	ns) (ha.m 100 .0000E+	1 1	(CE-5)	(ha.m	.)	
					.1000E+		
POUTING PESUI		(ha)	(cms)	TPEAK (hrs)	(E.	a)	
INFLOW >05: OUTFLOW<03: OVERFLOW<04:	(BLK4) (B4CTRL) (4OVR)	1.40 1.40 .00	.174 .015 .000	1.500 1.067 ,000	28.9 28.9	50	
	TOTAL NUMBI	ER OF SIMULA TIME OF OVE OF TIME OVE	TED OVERE	LOWS =	.01	5	
		# REDUCTION OF PEAK FLOW TORAGE USE	V [Qout/G	in](t)= {min}= ha.m.)=	8.61 -26.0 2211E-0	5) L	
01:0013							
		**********	*******	*****	*******	,	*****
TOTAL FOST DEVE	LOPMENT FROM	SITE					

ADD HYD (PSTDEV)	I ID: NHYD	AREA	QPEAK	TPEAK	R.V.	DWF	
	ID1 08:PNDOU	(ha) r 11.82	(cms)	(hrs)	(mm) 16.56	(cms)	
+1 +1	ID2 09:PNDOVI ID3 01:B3CTR	nn. c	. 0.00	. 00	.00	- 000	**DRY**
+1	ID4 02:30VR ID5 03:E4CTR ID6 04:40VR	.00 L 1.40	.000	.00 1.07	28.96 .00 28.96 .00	.000	**DRY**
							DRY
NOTE: PEAK FLO	SUM 05:PSTDE DWS DO NOT TI				18.51	.000	
01:0014	1						
		******	******				
	Protect	dir.: H:\S	кмнүм-1\ I	0034Y~1	\		
SIARI	Rainfal	dir.: H:\S	кинчи-1/1	0034Y~1	\		
		RIC)					
TZERO = .00 METOUT = 2 (NRUN = 002 NSTOPM = 1							
TZERO = .00 METOUT= 2 (c MRUH = 002 NSTOPM= 1 # 1=CR	н5.STM 						
TZERO = .00 METOUT = 2 (c NRUN = .002 NSTOPM = 1 # 1=Cl .002:0002	H5.STM				4)		
TZERO = .00 METOUT = 2 (c NRUN = 002 NSTOFM = 1 # 1=C! 002:0002	(YINS PHASE 02-11-2010 [TGS]	5] Proje	ct Number		4)	. * * * * * * *	

002:0002		*********			
READ STORM					-
Ptotal= 48.48 rm	Filen	ame: H:\SWMHY	K-1\10034Y-1	CH5.STM	
	Conne	TIME PAIL hrs rm/h 1.17 10.19 1.33 21.62 1.50 112.37 1.67 27.76 1.83 15.75	HICAGO 4 HOU	R DESIGN DISTRIB	
hrs	m/hr I	hrs rm/h	r hrs	mm/hr i hrs	rm/br
.33	3.658	1.33 21.62	0 2.33	7.700 1 3.33	4.550 4.220 3.960
.67	4.670	1.67 27.76	0 2.50	5.940 3.67	3.730
.83 1.00	7.110	2.00 11.43	0 2.83	4.930 4.00	3.530 3.350
02:0003					 ********
SFD					
DESIGN STANDHYD 01:SFD DT= 1.00					0
Surface Area	(ha)=	IMPERVIOUS 3.44	PERVIOUS (1)	
Surface Area Dep. Storage Average Slope	= (mm) = (3)	.80 1.00	1.50 1.00		
Length Mannings n	(m) =	249.00 .013	40.00 .250		
Max.eff.Inten.(en/hr)=	112.37	22.33		
over Storage Coeff.	(min) =	4.00 4.22 {ii	20.00) 20.04 (i:	i)	
Unit Hyd. Tpeak Unit Hyd. peak	(min)=	4.00	20.00 .06		
PEAK FLOW	(cms)=	.41	.21	*TOTALS* .475 (ii	1)
TIME TO PEAK	(hrs)=	1.50 47.68	1.80 12.10	1,517 17.793	
TOTAL PAINFALL BUNGEF COEFFICE	(mm) == (mm) ==	48.48	48.48	48.478	
(ii) TIME STEP	.0 Ia : (DT) SHO STOPAGE CO DOES NOT	Dep. Storag: JLD BE SMALLE: DEFFICIENT. INCLUDE BASE	e (Above) R OR EQUAL FLOW IF ANY.		
DESIGN STANDHYD 02:BLK1 DT= 1.00	 Area Tota			Conn.(%)= 38.0	
		IMPERVIOUS	FERVIOUS (:	£)	
Sullace Alea	(mm) =	.43			
Surface Area Dep. Storage		1.00	1.50		
Average Slope Length	(f) = (n) = =	1.00 61.64 .013	1.00 40.00		
Average Slope Length Mannings n	= (E) = (E)	1.00 61.64 .013	1.00 40.00 .250		
Average Slope Length Mannings n Max.eff.Inten.k	(r)= (n)= = = (min)=	1.00 61.64 .013 112.37 2.00	1.00 40.00 .250 93.55 11.00	1 1	
Average Slope Length Mannings n Max.eff.Inten.in over Storage Coeff. Unit Hyd, Tpeak	(t)= (n)= = = (min)= (min)= (min)=	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00	1.00 40.00 .250 93.55 11.00 10.75 (i:	i)	
Average Slope Length Mannings n Max.eff.Inten.to over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(t) = (n) = (min) = (min) = (min) = (cms) =	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59	1.00 40.00 .250 93.55 11.00 10.75 (i:	*TOTALS*	4.
Average Slope Length Mannings n Max.eff.Inten.it over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(t) = (n) = (min) = (min) = (min) = (cms) = (c	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59	1.00 40.00 .250 93.55 11.00 10.75 11.00 .10	*TOTALS* .080 (11	i)
Average Slope Length Mannings n Max.eff.Inten.tover Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak FEAK FLOW TIME TO PEAK RUMOFF VOLUME TOTAL PAINFALL	(t) = (n) = (min) = (m	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59 .07 1.50 47.68 48.48	1.00 40.00 .250 93.55 11.00 10.75 (i: 11.00 .10 .02 1.63 18.78 48.48	*TOTALS* .080 (ii 1.500 29.761 48.478	1)
Average Slope Length Mannings n Max.eff.Inten.it over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak FEAK FLOW TIME TO PEAK RUNOFF VOUNME TOTAL PAINFALL RUNOFF COEFFICI	(t) = (n) = (min) = (m	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59 .07 1.50 47.68 48.48 .98	1.00 40.00 .250 93.55 11.00 10.75 (i: 11.00 .10 .02 1.63 18.78 48.48 .39	*TOTALS* .080 (11 1.500 29.761	i)
Average Slope Length Mannings n Max.eff.Inten.! Over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak FEAK FLOW TIME TO PFAK RUNOFF VOLUME TOTAL RAINFALL BUNOFF COEFFICIL	(f) = (n) = (min) = (min) = (min) = (cms) = (c	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59 .07 1.50 47.68 48.48 .98	1.00 40.00 .250 93.55 11.00 1.0.75 (i: 11.00 .10 .02 1.63 18.78 48.48 .39	*TOTALS* .080 (ii 1.500 29.761 48.478	i)
Average Slope Length Mannings n Max.eff.Inten.ii over Storage Coeff. Unit Ryd. Tpeak Unit Ryd. Tpeak FEAK FLOW TIME TO PEAK PUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICII (1) CN PROCEDI CN = 58 (11) TIME STEP TRAN THE:	(t)= (n)= = (min)= (min)= (min)= (min)= (mn)	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59 .07 1.50 47.68 48.48 .98 IED FOR PERVIE = Dep. Storag ULD BE SYALLE	1.00 40.00 .250 93.55 11.00 10.75 (1: 11.00 .02 1.63 18.78 48.48 .39 OUS LOSSES: (Above) R OR EQUAL	*TOTALS* .080 (ii 1.500 29.761 48.478	í)
Average Slope Length Mannings n Max.eff.Inten.ii over Storage Coeff. Unit Ryd. Tpeak Unit Ryd. Peak FEAK FLOW TIME TO FFAK RUNOFF VOLUME TOTAL RAINFALL EUNOFF COEFFICII (i) CN PROCEDI CN' = 58 (ii) TIME SIEP TRAN THE: (iii) PEAK FLOW	(t) = (n) = (min) = (m	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59 .07 1.50 47.68 48.48 .98 IED FOR PERVIE = Dep. Storag ULD BE SMALLE DEFFICIENT. INCLUDE BASE	1.00 40.00 .250 93.55 11.00 10.75 (1: 11.00 .02 1.63 18.78 48.48 .39 OUS LOSSES: (Above) R OR EQUAL	*TOTALS* .080 (ii 1.500 29.761 48.478	1)
Average Slope Length Mannings n Max.eff.Inten.! Over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak FEAK FLOW TIME TO FFAK FUNOFF VOLUME TOTAL RAINFALL EUNOFF COEFFICI. (i) CN PROCEDI CN' = 58 (ii) TIME SIEP TIMEN THE: (iii) PEAK FLOW	(t)= (n)= (min)= (min)= (min)= (cms)= (cms)= (cms)= (cm)= (c	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59 .07 1.50 47.68 48.48 .98 IED FOR PERVI- = Dep. Storag- ULD BE SYALLE DEFFICIENT- INCLUDE BASE	1.00 40.00 .250 93.55 11.00 10.75 (1: 11.00 .02 1.63 16.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL	*TOTALS* .080 (ii 1.500 29.761 48.478 .614	
Average Slope Length Mannings n Max.eff.Inten.it over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak FEAK FLOW TIME TO PEAK PUIDEF VOLUME TOTAL RAINFALL FUNOFF COEFFICH (i) CN PROCEDI CN' = 58 (ii) TIME SIEP THAN THE: (iii) PEAK FLOW	(t)= (n)= (min)= (min)= (min)= (cms)= (cms)= (cms)= (cm)= (c	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59 .07 1.50 47.68 48.48 .98 IED FOR PERVI- = Dep. Storag- ULD BE SYALLE DEFFICIENT- INCLUDE BASE	1.00 40.00 .250 93.55 11.00 10.75 (1: 11.00 .02 1.63 16.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL	*TOTALS* .080 (ii 1.500 29.761 48.478 .614	
Average Slope Length Mannings n Max.eff.Inten.it over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak FEAK FLOW TIME TO FEAK RUNOFF VOUNNE TOTAL RAINFALL EUNOFF COEFFICIT (i) CN PROCED CN = 58 (ii) TIME SIEP THAN THE: (iii) PEAK FLOW	(t)= (t)= (t)= (min)= (min)= (min)= (cos)= (cos)= (ton)= (cos)= (ton)= (cos)= (ton)= (cos)= (ton)= (1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59 .07 1.50 47.68 48.48 .98 IED FOR PERVI- = Dep. Storag- ULD BE SYALLE DEFFICIENT- INCLUDE BASE	1.00 40.00 .250 93.55 11.00 10.75 (1: 11.00 .02 1.63 16.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL	*TOTALS* .080 (ii 1.500 29.761 48.478 .614	
Average Slope Length Mannings n Max.eff.Inten.it over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak TIME TO FEAK EUNOFF VOLUME TOTAL RAINFALL EUNOFF COEFFICIT (i) CM PROCED THAN THE: (iii) PEAK FLOW 02:0005	(t) = (t) = (t) = (ti)	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59 .07 1.50 47.68 48.48 .98 IED FOR PERVI- DEP SCORAG	1.00 40.00 .250 93.55 11.00 10.75 (i: 11.00 .02 1.63 18.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL	*TOTALS* .080 (ii 1.500 29.76i 48.478 .614	
Average Slope Length Mannings n Max.eff.Inten.it over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak FEAK FLOW TIME TO FEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIT (i) CN PROCED CN = 50 (ii) TIME SIEP THAN THE: (iii) PEAK FLOW BLOCK 2 APARTMENTS	(t)= (n)= (min)= (min)= (min)= (cms)=	1.00 61.64 .013 112.37 2.00 1.82 (11 2.00 .59 .07 1.50 47.68 48.48 .98 IED FOR PERVI	1.00 40.00 .250 93.55 11.00 10.75 (i: 11.00 .02 1.63 18.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL	*TOTALS* .080 (11 1.500 29.761 48.478 .614	
Average Slope Length Mannings n Max.eff.Inten.ii over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak FEAK FLOW TIME TO FFAK EUNOFF VOLUME TOTAL RAINFALL EUNOFF COEFFICII (i) CN PROCEDI CN' = 58 (ii) TIME SIEP TRAN THE: (iii) PEAK FLOW	(t)= (t)= (t)= (t)= (t)= (t)= (t)= (t)=	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 .59 .07 1.50 47.68 48.48 .98 NED FOR PERVI- PERVI- STREET SALE DEFFICIENT. INCLUDE BASE	1.00 40.00 .250 93.55 11.00 10.75 (1: 11.00 .10 .02 1.63 16.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL FLOW IF ANY.	*TOTALS*	
Average Slope Length Mannings n Max.eff.Inten.ic over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. Tpeak FEAK FLOW TIME TO FFAK RUNOFF YOUNME TOTAL RAINFALL RUNOFF COEFTCHI (i) CN PROCEDI CN' = 58 (ii) TIME STEP TRAN THE: (iii) PEAK FLOW 102:0005	(t)= (n)= (min)= (min)= (min)= (cms)=	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 1.768 48.48 .98 IED FOR PERVIOUS EAST OF THE STANDARD OF THE STANDAR	1.00 40.00 .250 93.55 11.00 10.75 (1:10.00 .10 .10 .02 1.63 18.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL FLOW IF ANY.	*TOTALS*	
Average Slope Length Mannings n Max.eff.Inten.is over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak FEAR FLOW TIME TO FEAN EUROFF VOUINE TOTAL PAINTALL EUROFF COEFFICII (1) CN PEOCED (CN = 58 (11) TIME STEP TRAN THE: (111) PEAK FLOW D2:0005	(t)= (m)= (min)= (min)= (min)= (cms)= (cms)= (cms)= (cms)= (cm)= (1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 1.768 48.48 .98 IED FOR PERVIOUS DEFFICIENT. INCLUDE BASE 1 Imp(\$\frac{1}{2}\$) (ha)= 1 Imp(\$\frac{1}{2}\$) IMPERVIOUS .52 .80	1.00 40.00 .250 93.55 11.00 10.75 (i: 11.00 .02 1.63 16.78 48.48 .39 0US LOSSES: e (Above) R OR EQUAL FLOW IF ANY	*TOTALS*	
Average Slope Length Mannings n Max.eff.Inten.is over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak FEAK FLOW TIME TO FEAK RUNOFF NOLUME TOTAL RAINFALL RUNOFF COEFFICI (i) CN PROCEDI CN' = 58 (ii) TIME STEP THAN THE: (iii) PEAK FLOW BLOCK 2 APARIMENTS DESIGN STAILBHYD O3:BLKZ DT= 1.00	(t)= (n)= (min)= (min)= (min)= (cms)=	1.00 61.64 .013 112.37 2.00 1.82 (ii 2.00 1.7 (68 48.48 .98 IED FOR PERVIOUS DEFFICIENT. INCLUDE BASE (ha)= 1 Imp(\$)= 7 IMPERVIOUS .52 .80	1.00 40.00 .250 93.55 11.00 10.75 (i: 11.00 .02 1.63 18.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL FLOW IF ANY.	*TOTALS*	
Average Slope Length Mannings n Max.eff.Inten.ic	(hr) = (min) =	1.00 61.64 .013 112.37 2.00 1.82 (11 2.00 .59 .07 1.50 47.68 48.48 .98 IED FOR PERVI- = Dep. Storag UID BE SAVALE DEFFICIENT. INCLUDE BASE	1.00 40.00 .250 93.55 11.00 10.75 (i: 11.00 .02 1.63 18.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL FLOW IF ANY	*TOTALS*	
Average Slope Length Mannings n Max.eff.Inten.is over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK PUIDOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICE (i) CN PROCEDI CN' = 58 (ii) TIME SIEP THAN THE: (iii) PEAK FLOW D2:0005 BLOCK 2 APARIMENTS DESIGN STANDHYD 03:BLX2 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.is	(t) =	1.00 61.64 .013 112.37 2.00 1.82 (11 2.00 .59 .07 1.50 48.48 48.48 8.78 RED FOR PERVI' P Dep. Storage UID BE SNAIGE UED ERSE FEICIENT. INCLUDE BASE 1 Lep(*)= 7. IMPERVIOUS .52 .80 1.00 67.82 .013 112.37 2.00	1.00 40.00 .250 93.55 11.00 10.75 11.00 .10 .02 1.63 16.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL FLOW IF ANY	*TOTALS*	
Average Slope Length Mannings n Max.eff.Inten.is over Storage Coeff. Unit Hyd. Tpeak Unit Hyd.	(t) = (t)	1.00 61.64 .013 112.37 2.00 1.82 (11 2.00 .59 .07 1.50 48.48 48.48 8.78 RED FOR PERVI' P Dep. Storage UID BE SNAIGE UED ERSE FEICIENT. INCLUDE BASE 1 Lep(*)= 7. IMPERVIOUS .52 .80 1.00 67.82 .013 112.37 2.00	1.00 40.00 .250 93.55 11.00 10.75 (1: 11.00 .02 1.63 18.78 48.48 .39 OUS LOSSES: e (Above) R OR EQUAL FLOW IF ANY	*TOTALS*	

TIME TO PEAK RUNOFF VOLUME TOTAL RAINFAL RUNOFF COEFFI	(hrs)= (rm)= L (rm)= CIENT =	1.50 47.68 48.48 .98	1.6 18.7 48.4 .3	6 8	1.500 29.761 48.478 .614	
{i} CN PROC CN* = (ii) TIME ST	EDURE SELECTI 58.0 Ia = EP (DT) SHOUL E STORAGE COL	Dep. Stora LD BE SMALL EFFICIENT.	ge (Abov ER OR EQU	e) AL		
002:0006	.,.,		******		*******	*********
* BLOCK 5 SWM						
************		********	******	******	*******	*********
DESIGN STANDHYD OG:BLK5 DT= 1.		Imp(%)≃			n.(1)=	90.00
Surface Area		IMPERVIOUS 1.13	.1	3		
Surface Area Dep. Storage Average Slope	(1)=	.80 1.00 91.65	1.5 1.0			
Length Mannings n	(m) = =	91.65 .013	40.0			
Max.eff.Inten	(m)/hrl=		11.8			
ov	er (min)	2.00	23.0			
Storage Coeff Unit Hyd. Tpe	ak (min)=	2.31 (1	23.0	0		
Unit Hyd. pea	k (cms)=	. 51	.0		*TOTALS	
PEAK FLOW TIME TO PEAK	(cms) = (hrs) =	.35 1.50	.0 1.8	5	.350 1.500	(iii)
EUNOFF VOLUME TOTAL PAINFAL EUNOFF COEFFI	(mm) = L (mm) =	47.68 48.48 .98	9.5 48.4 .2	6 8	43.866 48.478 .905	
	EDURE SELECT					
(4) CH PROC	58.0 Ia = EP (DT) SHOU	Dep. Stora	ge (Abov	e)		
THAN TH	E STOPAGE CO	EFFICIENT.				
(iii) PEAK FL	OW DOES NOT	INCLUDE BAS	EFEON IF	ANY.		
002:0007						
*************	**********	********	*******	******	*******	*********
+	FO POND					
* DETERMINE INFLOW	10 FOND					
*************						*********
ADD HYD (PSTDEV)		AREA (ha)	OPEAK	TPEAK	R.V.	DWF
	D1 01:SFD	(ha) 9.30	(cms)	(hrs)	R.V. (mm) 17.79 29.76	(cms) .000
+1	D2 02:BLK1 D3 03:BLK2	.57	.080			.000
+1	D4 06:BLK5	.69 1.26	.350	1.50	29.76 43.87	.000
	UM 07:PSIDEV				21.85	.000
NOTE: PEAK FLO	WS DO NOT IN	CLUDE BASEF	LOWS IF A	MY.		
002:0008	**********	,	******	*****		**********
* ROUTE THROUGH PO	ND					
*						
						·
POUTE RESERVOIR IN>07: (PSTDEV)		sted routin			.0 min.	
OUT<08: (PNDOUT)	OUTFL	==== OUTLF OW STOPA	GE I O		STORAG	
	(cr.	s) (ha.m 00 .0000E+ 07 .5520E-	.)		(ha.m. .3535E+0	
	.0	07 5520E- 13 1118E+	01		.4178E+0	
	.0	17 .1700E+	00	.031	5512E+0	0
	.0:	20 .2296E+ 23 .2908E+	00 00	.033	.6203E+0	10
ROUTING RESUL				TPEAK		
		(ha)	QPEAK (ccs) .995	(hrs)	(EX	1)
INFLOW >07: (OUTFLOW<08: (OVERFLOW<09: (PHDOUT)	11.82	.020	1.500	21.84	.7
OVERFLOW<09: (.00	.000	.000		
	TOTAL NUMBE CUMULATIVE PERCENTAGE	R OF SIMULA TIME OF OVE OF TIME OVE	TED OVERF RELOWS (RELOWING	LOWS = hours)= {%}=	.00)
	PEAK FLOW TIME SHIFT MAXIMUM ST		w	(cin)=	2.034 174.00 2.2367£+00	;
002:0009						
* BLOCK 3 COMMERCI						
	AL					
•						
	*******	,,,,,,,,,,,		******	*******	********
DESIGN STANDHYD 04:BLK3 DT= 1.	Area	(ha)=	.80			

(H:\PSTDEV.c	out)			
Surface Area ()	impervious na)= .72	PERVIOUS (i)		
Surface Area () Dep. Storage (r Average Slope Length Pannings n	an)= .80 Gt)= 1.00	,08 1,50 1,00		
Length	(n) = 73.03	40.00		

Max.eff.Inten.(mm/) over (mi Storage Coeff. (mi Unit Hyd. Tpeak (mi Unit Hyd. peak (cm	ir)= 112.37	389.75 7.00		
Storage Coeff. (mi	in)= 2.02 (i:	i) 7.06 (ii)		
Unit Hyd. Tpeak (mi	.n)= 2.00	7.00 .16		
			TOTALS	
PEAK FLOW (CT	1.50 = .11 1.50 = 1.50 = 47.68 = 48.48	.06 1.57	.160 (111) 1.500	
TIME TO PEAK (hi RUNOFF VOLUME (E TOTAL RAINFALL (E	======================================	28.46 48.48	37.108 48.478	
RUNOFF COEFFICIENT		.59	.765	
	SELECTED FOR PERV	TOUS LOSSES:		
CM, = 28.0	Ia = Dep. Storag	ge (Above)		
(ii) TIME STEP (DI THAN THE STOR	r) should be small! Page coefficient.	ER OR EQUAL		
(iii) FEAK FLOW DOE	es not include basi	EFLOW IF ANY.		
				
002:0010		 		
•				
* * SIMULATE STORAGE ON BI	LOCK 3 TO RELEASE A	AT CONTROLLED RAT	E	
*				

t bourse programman 1	Requested routine	n tira stan = 1	0 min	
IN>04:(BLK3)				
OUT<01:(B3CTRL)	OUTFLOW STORM	ON STORAGE TABLE	STOPAGE	
	OUTFLOW STORAG (cms) (ha.m .000 .0000E+ .015 .1000E-	.) (cms)	(ha.m.)	
	.000 .0000E+	00 .015 03 .000	.1000E+01 .0000E+00	
ROUTING RESULTS	AREA (ha)) .80 L) .80) .00	QPEAK TPEAK (CES) (brs) .160 1.500 .015 1.200	R.V.	
INFLOW >04: (BLK3 OUTFLOW<01: (B3CIR) OVERFLOW<02: (30VR	.80	.160 1.500	37,108 37,108	
OVERFLOW<02: (30VR	, .00	.015 1.200 .000 .000	.000	
TOTAL			0	
CUMUI	L NUMBER OF SIMULA LATIVE TIME OF OVE ENTAGE OF TIME OVE	RFLOWS (hours)=	.00	
PERCE	ENTAGE OF TIME OVE	RETOMING (#1=	.00	
57714		V 10	n 262	
PEAK				
TIME	SHIFT OF PEAK FLOT	(nin)=	-18.00	
TIME MAXIN	FLOW REDUCTION SHIFT OF PEAK FLOW WUM STOPAGE USE	(nin)= (ha.m.)=.	-18.00 1520E-01	
MAXIN	MUM STOPAGE USE	D {ha.m.}=.	-18.00 1520E-01	
MAXIM	MUM STOPAGE USE	D (ha.m.)=.	1520E-01	
MAXII	MUM STOPAGE USE	D (ha.m.)=.	1520E-01	
MAXII	MUM STOPAGE USE	D (ha.m.)=.	1520E-01	
002:0011	MUM STOPAGE USE	D (ha.m.)=.	1520E-01	
MAXIN 002:0011 BLOCK 4 COMMERCIAL	MUM STOPAGE USE	D (ha.m.)=.	1520E-01	
MAXIN 002:0011 BLOCK 4 COMMERCIAL	MUM STOPAGE USE	D (ha.m.)=.	1520R-01	
MAXIN 002:0011 BLOCK 4 COMMERCIAL DESIGN STANDHYD DESIGN STANDHYD OS:BLM DT= 1.00	MUM STOPAGE USE	D (ha.m.)=.	1520R-01	
MAXIN 002:0011	Area (ha)= Total Imp(%)=	D (ha.m.)=.	1520R-01	
MAXIN 002:0011	Area (ha)= Total Imp(%)=	D (ha.m.)=.	1520R-01	
MAXIN 002:0011	Area (ha)= Total Imp(%)=	D (ha.m.)=.	1520R-01	
MAXIN 002:0011	Area (ha)= Total Imp(%)=	D (ha.m.)=.	1520R-01	
MAXIN	Area (hai= Total Imp(%)= IMPERVIOUS ha)= 1.26 mm)= 80 (%)= 1.00 (m)= 96.61 = .013	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250	1520R-01	
DESIGN STANDHYD DESIGN STANDHYD DESIGN STANDHYD O5:BLK4 DT= 1.00 Surface Area Dep. Storage Average Slope Length Man.eff.Inten.	Area (ha)= Total Imp(%)= 1.26 TMPERVIOUS ha)= 1.26 (f)= 1.00 (f)= 96.61 = .013 hr)= 112.37	1.40 90.00 Dir. Conn PERVIOUS (i) 1.50 1.00 40.00 .250 389.75	1520R-01	
DESIGN STANDHYD DESIGN STANDHYD D5:BLK4 DT= 1.00 Surface Area () Dep. Storage () Average Slope Length Hannings n Max.eff.Inten.(Ext/) over (n)	Area (ha)= Total Imp(5)= IMPERVIOUS ha)= 1.26 mn)= .80 (t)= 1.00 (p)= 96.61 p= .013 hr)= 112.37 in) 2.00	1.40 90.00 Dir. Conn PERVIOUS (i) 1.50 1.00 40.00 .250 389.75	1520R-01	
BLOCK 4 COMMERCIAL DESIGN STANDHYD 05:BLK4 DT 1.00 Surface Area Dep. Storage Average Slope Length Hannings Max.eff.Inten. Storage Coeff. Storage Coeff.	Area (ha)= Total Imp(%)= 1.26 mn)= .80 (h)= 96.61 = .013 hr)= 112.37 in) 2.00 in)= 2.39 (ii) in)= 2.39 (ii)	1.40 90.00 pir. Conn PERVIOUS (i) 1.50 1.00 40.00 .250 399.75 7.00 1) 7.43 (ii)	1520R-01	
DESIGN STANDHYD DESIGN STANDHYD O5:BLK4 DT=1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.lnten.(mm) over (and Storage Coeff. intill Hyd. Tpeak intill Unit Hyd. peak (community in the storage Coeff. intill Unit Hyd. peak (community in the storage Coeff. intill Unit Hyd. peak (community in the storage Coeff. intill Unit Hyd. peak (community in the storage Coeff. intill Unit Hyd. peak (community in the storage Coeff. intill Unit Hyd. peak (community in the storage Coeff. intill Unit Hyd. peak (community in the storage Coeff. intill Unit Hyd. peak (community in the storage Coeff. intill Unit Hyd. peak (community in the storage Coeff. intill Unit Hyd. peak (community in the storage Coeff. in the storage Coe	Area (ha)= Total Imp(5)= MPERVIOUS ha)=	1.40 90.00 Dir. Conn PERVIOUS (i) 1.4 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16	1520E-01	
DESIGN STANDHYD DESIGN STANDHYD 05:BLK4 DT= 1.00 Surface Area (!) Dep. Storage (r) Average Slope Length Hannings n Max.eff.Inten.(mm/) over (m) Storage Coeff. (m) Unit Hyd. Tpeak (c) PFAK FLON (c)	Area (ha)= Total Imp(%)= None	1.40 90.00 Dir. Conn PERVIOUS (i) 1.14 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16	'TOTALS* .277 (111)	
DESIGN STANDHYD DESIGN STANDHYD 05:BLK4 DT= 1.00 Surface Area (!) Dep. Storage (r) Average Slope Length Hannings n Max.eff.Inten.(mm/) over (m) Storage Coeff. (m) Unit Hyd. Tpeak (c) PFAK FLON (c)	Area (ha)= Total Imp(%)= None	1.40 90.00 Dir. Conn PERVIOUS (i) 1.14 1.50 1.00 40.00 .250 389.75 7.00 17.43 (ii) 7.00 .16 .10 1.57 28.46	*TOTALS* .277 (111) 1.500 37.108	
DESIGN STANDHYD DESIGN STANDHYD 05:BLK4 DT= 1.00 Surface Area (!) Dep. Storage (r) Average Slope Length Hannings n Max.eff.Inten.(mm/) over (m) Storage Coeff. (m) Unit Hyd. Tpeak (c) PFAK FLON (c)	Area (ha)= Total Imp(%)= None	1.40 90.00 Dir. Conn PERVIOUS (i) 1.14 1.50 1.00 40.00 250 389.75 7.00 1) 7.43 (ii) 7.00 1.16 1.10 1.57 28.46 48.48	**************************************	
DESIGN STANDHYD DESIGN STANDHYD DESIGN STANDHYD O5:BLK4 DT 1.00 Surface Area Dep. Storage In Average Slope Length Mannings Max.eff.Inten.(mm/) to ver (mi Storage Coeff. (mi Unit Hyd. Tpeak (mi Unit To PEAK (mi RUNOFF VOIUME (mi RUNOFF COEFFICIENT	Area (ha)= Total Imp(%)= 1.26 (m)= 96.61 = .00 (m)= 96.61 = .01 = .01 (n)= 2.39 (n)= 2.00 (n)= 2.00 (n)= 48.48 = .98	1.40 90.00 Dir. Conn PERVIOUS (i) 1.14 1.50 1.00 40.00 250 389.75 7.00 10 1.16 1.10 1.57 28.46 48.48 5.59	*TOTALS* .277 (111) 1.500 37.108	
DESIGN STANDHYD ODZ:0011	Area (ha)= Total Imp(\$)= 1.26 Total Imp(\$)= 1.20 To	1.40 90.00 Dir. Conn PERVIOUS (i) 1.14 1.50 1.00 40.00 250 389.75 7.00 17.43 (ii) 7.00 1.57 28.46 48.48 59 1005 LOSSES:	**************************************	
DESIGN STANDHYD DESIGN STANDHYD DESIGN STANDHYD 05:BLK4 DT= 1.00 Surface Area (!) Dep. Storage (r) Average Slope Length Hannings n Max.eff.Inten.(Em/!) tover (m) Storage Coeff. (m) Unit Hyd. Tpeak (c) PEAK FLOW (c) TIME TO PEAM (c) TIME TO PEAM (c) TOTAL PANHFALL (c) TOTAL STANDHYD (c) TIME STER (D) (11) TIME STER (D)	Area (ha)= Total Imp(5)= HPERVIOUS ha)= .26 1.26 2.30 3.01 2.30 112.37 101 2.39 101 2.39 101 2.39 102 3.00 103 3.00 104 3.00 105 3.00 106 3.00 107 3.00 108 3.00	1.40 90.00 Dir. Conn PERVIOUS (i) 1.14 1.50 1.00 40.00 250 389.75 7.00 17.43 (ii) 7.00 1.57 28.46 48.48 59 1005 LOSSES:	**************************************	
BLOCK 4 COMMERCIAL DESIGN STANDHYD 05:BLK4 ET 1.00 Surface Area () Dep. Storage () Average Slope Length Hannings Max.eff.Inten. () Cover (n) Storage Coeff. Unit Hyd. Tpeak (n) Unit Hyd. Tpeak (n) Unit Hyd. Tpeak (n) Unit To FEAK (n) FEAK FLON (c) TIME TO FEAK (h) RUNOFF COEFFICIENT (i) CN PROCEDURE (i) TO RECOEDURE (i) TIME STEE (i) THEN STEE (ii) THEN STEE (iii) THAN THE STEE (iii)	Area (ha)= Total Imp(%)= 1.26 mm)= .80 (h)= 96.61 = .00 (m)= 96.61 = .37 in) 2.00 in)= 2.00 in)= 2.00 in)= 2.00 in)= 47.69 in)= 47.69 in)= 48.48 in]= 48.4	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 .59 10US LOSSES; ge (Above) ER OR EQUAL	**************************************	
DESIGN STANDHYD DESIGN STANDHYD DESIGN STANDHYD D5:BEX4 ET 1.00 Surface Area () Dep. Storage (r Average Slope Length Hannings n Max.eff.Inten.Inx/l Storage Coeff. (m) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) FEAK FLON (r) TIME TO FEAK (h) RUNOFF COEFFICIENT (i) CN PEOCEDUME (i) TIME SIZE (M) THAN THE SIZE (M)	Area (ha)= Total Imp(%)= 1.26 Wm)= .80 (h)= 96.61 = .00 (m)= 96.61 = .013 hr)= 112.37 in) 2.00 in)= 2.39 (in)= 2.39 (in)= 2.39 (in)= 47.69 mm)= 47.69 mm)= 48.48 = .98 SELECTED FOR PERV Ia = Dep. Stora I) SROULD BE SMALL RAGE COEPFICIENT. ES NOT INCLUDE BAS	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 5.59 10US LOSSES: ge {Above} ER OR EQUAL EELOW IF ANY.	*TOTALS* 277 (iii) 1.500 37.108 48.478 .765	
DESIGN STANDHYD DESIGN STANDHYD D5:BLK4 ET 1.00 Surface Area () Dep. Storage (r Average Slope Length Hannings n Max.eff.Inten. km/l Storage Coeff. (m) Unit Hyd. Tpeak (c) Unit Hyd. Tpeak (c) PEAK FLON (c) TIME TO PEAK (h) RUNOFF COEFFICIENT (i) CN PECCENT (ii) THMS SIZE (M) THAN THE SIZE (M)	Area (ha)= Total Imp(%)= 1.26 Wm)= .80 (h)= 96.61 = .00 (m)= 96.61 = .01 a .00 in)= 2.39 (in)= 2.39 (in)= 2.39 (in)= 2.40 as)= .50 as)= .50 sep= .19 rs)= .150 rm)= 47.69 rm)= 48.48 a .98 SELECTED FOR PERV IA = Dep. Stora I) SROULD BE SMALL RAGE COEPFICIENT. ES NOT INCLUDE BAS	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 5.59 IOUS LOSSES: ge {Above} ER OR EQUAL EFLOW IF ANY.	*TOTALS* -277 (iii) 1.500 37.108 48.478 -765	
DESIGN STANDHYD DESIGN STANDHYD DESIGN STANDHYD O5:BLK4 DT 1.00 Surface Area () Dep. Storage () Average Slope Length Hannings n Max.eff.Inten.(mm)' with Hyd. Tpeak () Unit Hyd. Tpeak () TIME TO PEAK () COMPOSEDURE () UNITED STEP () THAN THE STOR () UNITED STEP () U	Area (ha)= Total Imp(%)= 1.26 Wm)= .80 (h)= 96.61 = .00 (m)= 96.61 = .01 a .00 in)= 2.39 (in)= 2.39 (in)= 2.39 (in)= 2.40 as)= .50 as)= .50 sep= .19 rs)= .150 rm)= 47.69 rm)= 48.48 a .98 SELECTED FOR PERV IA = Dep. Stora I) SROULD BE SMALL RAGE COEPFICIENT. ES NOT INCLUDE BAS	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 5.59 IOUS LOSSES: ge {Above} ER OR EQUAL EFLOW IF ANY.	*TOTALS* -277 (iii) 1.500 37.108 48.478 -765	
DESIGN STANDHYD DESIGN STANDHYD D5:BLK4 ET 1.00 Surface Area () Dep. Storage (r Average Slope Length Hannings n Max.eff.Inten. km/l Storage Coeff. (m) Unit Hyd. Tpeak (c) Unit Hyd. Tpeak (c) PEAK FLON (c) TIME TO PEAK (h) RUNOFF COEFFICIENT (i) CN PECCENT (ii) THMS SIZE (M) THAN THE SIZE (M)	Area (ha)= Total Imp(%)= 1.26 Wm)= .80 (h)= 96.61 = .00 (m)= 96.61 = .01 a .00 in)= 2.39 (in)= 2.39 (in)= 2.39 (in)= 2.40 as)= .50 as)= .50 sep= .19 rs)= .150 rm)= 47.69 rm)= 48.48 a .98 SELECTED FOR PERV IA = Dep. Stora I) SROULD BE SMALL RAGE COEPFICIENT. ES NOT INCLUDE BAS	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 5.59 IOUS LOSSES: ge {Above} ER OR EQUAL EFLOW IF ANY.	*TOTALS* -277 (iii) 1.500 37.108 48.478 -765	
DESIGN STANDHYD DESIGN STANDHYD DESIGN STANDHYD O5:BLK4 DT 1.00 Surface Area () Dep. Storage () Average Slope Length Hannings n Max.eff.Inten.(mm)' with Hyd. Tpeak () Unit Hyd. Tpeak () TIME TO PEAK () COMPOSEDURE () UNITED STEP () THAN THE STOR () UNITED STEP () U	Area (ha)= Total Imp(%)= 1.26 ma)= 1.26 ma)= 80 (t)= 1.00 (m)= 96.61 = .01 112.37 (m)= 2.39 (m)= 2.00 (m)= 2.39 (m)= 47.68 (m)= 47.68 (m)= 48.48 (m)= 48.4	1.40 90.00 Dir. Conn PERVIOUS (i) 1.14 1.50 1.00 40.00 .250 389.75 7.00 10 1.57 28.46 48.48 59 10US LOSSES: ge {Above} ER OR EQUAL EFLOW IF ANY.	*TOTALS* -277 (iii) 1.500 37.108 48.478 -765	
BLOCK 4 COMMERCIAL DESIGN STANDHYD 05:BLK4 ET = 1.00 Surface Area () Dep. Storage () Average Slope Length Hannings Max.eff.Inten.(km/) Over (m) Storage Coeff. (in Unit Hyd. Theak (m) Unit Hyd. Theak (m) Unit Hyd. Peak (m) Unit Hyd. Peak (m) COEFFICIENT (i) CN PROCEDURE CN = 58.0 (ii) TIME STEP (M) THAN THE STOR (M) COEFFICIENT Over Coefficien	Area (ha)= Total Imp(%)= 1.26 m)= .80 (t)= 1.00 (m)= 96.61 = .013 hr)= 112.37 in 2.00 in = 2.00 in = 2.00 in = 2.00 in = 47.60 ms)= .50 ms)= .50 ms)= .50 ms)= .50 ms)= .70 ELECTED FOR FERV IA = Eep. Stora I) SROULD BE SMALL RAGE COEFICIENT. ES NOT INCLUDE BAS	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 11 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 .59 10US LOSSES: ge (Above) ER OR EQUAL EFLOW IF ANY.	*TOTALS* .277 (iii) 1.500 37.108 48.478 .765	
DESIGN STANDHYD DESIGN STANDHYD DESIGN STANDHYD O5:BLK4 DT 1.00 Surface Area () Dep. Storage () Average Slope Length Hannings Max.eff.Inten.(nm/) to ver (ni Storage Coeff. (nm/) Unit Hyd. Tpeak (ni TIME TO PEAK (ni RUNOFF COEFFICIENT (i) CH PEOCECUBE (ni CH' = 58.0 (ni) TIME STEP (D' THNI THE STO) (ni) PEAK FLOW DOI O02:0012	Area (ha)= Total Imp(%)= 1.26 m)= .80 (t)= 1.00 (m)= 96.61 = .013 hr)= 112.37 in 2.00 in = 2.00 in = 2.00 in = 2.00 in = 47.60 ms)= .50 ms)= .50 ms)= .50 ms)= .50 ms)= .70 ELECTED FOR FERV IA = Eep. Stora I) SROULD BE SMALL RAGE COEFICIENT. ES NOT INCLUDE BAS	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 11 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 .59 10US LOSSES: ge (Above) ER OR EQUAL EFLOW IF ANY.	*TOTALS* .277 (iii) 1.500 37.108 48.478 .765	
DESIGN STANDHYD DESIGN STANDHYD D5:BEX4 ET 1.00 Surface Area () Dep. Storage (r Average Slope Length Hannings n Max.eff.Inten.[hm/] Storage Coeff. (int) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) EPAK FLON (r) TIME TO FEAK (h) RUNOFF CODEFICIENT (i) CN PROCEDURE (N' = 58.0 (ii) TIME SIZE (M) THAN THE SIZE (M) THAN THE SIZE (M) THAN THE SIZE (M) THAN THE SIZE (M) O02:0012	Area (ha)= Total Imp(%)= 1.26 m)= .80 (t)= 1.00 (m)= 96.61 = .013 hr)= 112.37 in 2.00 in = 2.00 in = 2.09 in = 47.69 ms)= .50 ms)= .50 ms)= .50 ms)= .50 ms)= .50 ms)= .750 ms)=	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 11 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 48.48 .59 10US LOSSES; ge (Above) ER OR EQUAL EFLOW IF ANY.	*TOTALS* .277 (111) 1.500 37.108 48.478 .765	
DESIGN STANDHYD DESIGN STANDHYD D5:BEX4 ET 1.00 Surface Area () Dep. Storage (r Average Slope Length Hannings n Max.eff.Inten.[hm/] Storage Coeff. (int) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) EPAK FLON (r) TIME TO FEAK (h) RUNOFF CODEFICIENT (i) CN PROCEDURE (N' = 58.0 (ii) TIME SIZE (M) THAN THE SIZE (M) THAN THE SIZE (M) THAN THE SIZE (M) THAN THE SIZE (M) O02:0012	Area (ha)= Total Imp(%)= Total Imp(%)= 1.26 Mm)= .80 (k)= 96.61 = .013 hr)= 112.37 in) 2.00 in)= 2.00 in)= 2.00 in)= 2.00 in)= 48.4898 SELECTED FOR PERV IA = Dep. Stora T) SROULD BE SMALL ARGE COEFFICIENT. ES NOT INCLUDE BAS TO RELEASE AT COM	1.40 90.00 pir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 .59 IOUS LOSSES: ge (Above) ER OR EQUAL EFLOW IF ANY.	*TOTALS*	
DESIGN STANDHYD DESIGN STANDHYD D5:BLK4 ET 1.00 Surface Area () Dep. Storage (r Average Slope Length Hannings n Max.eff.Inten. km/1 Storage Coeff. (m) Unit Hyd. Tpeak (c) Unit Hyd. peak (c) PEAK FLON (c) TIME TO PEAK (h) RUNOFF VOLUME (r RUNOFF COEFFICIENT (i) CN PROCEDURE (n) = 58.0 (ii) THM SIZE (D) (iii) PEAK FLON DOI 002:0012	Area (ha)= Total Imp(\$)= 1.26 Tal Imp(\$)= 1.26	1.40 90.00 Dir. Conn PERVIOUS (i) 1.14 1.50 1.00 40.00 250 389.75 7.00 11 7.43 (ii) 7.00 1.57 28.46 48.48 59 10US LOSSES: ge (Above) ge (Above) EFLOW IF ANY. TROLLED PATE g time step = 1. 0W SIOPAGE TABLE GE OUTFLOW	'TOTALS' .277 (iii) 1.500 37.108 48.478 .765	
DESIGN STANDHYD DESIGN STANDHYD D5:BEX4 ET 1.00 Surface Area () Dep. Storage (r Average Slope Length Hannings n Max.eff.Inten.Inx/I Storage Coeff. (m) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) FEAK FLON (r) TIME TO FEAK (h) RUNOFF COEFFICIENT (i) CN FROCEDUME (i) TIME SIZE (M) THAN THE SIZE (M) SIMULATE STOPAGE (M) SIMULATE STOPAGE (M) SIMULATE STOPAGE (M) EOUTE RESERVOIR 10075 184CTRL OUTE OS:IBLYA OUTE OS:IBLY	Area (ha)= Total Imp(%)= 1.26 mm)= .80 (h)= 96.61 = .00 (m)= 96.61 = .03 in)= 2.00 in)= 2.00 in)= 2.00 in)= 2.00 in)= 47.60 mm)= 47.60 mm)= 48.48 mm]= 48.48 TO RELEASE AT CON Requested routin Requested routin	1.40 90.00 Dir. Conn PERVIOUS (i) 1.44 1.50 1.00 40.00 250 389.75 7.00 1.61 1.01 1.57 28.46 48.48 2.59 10US LOSSES: ge (Above) ER OR EQUAL EFLOW IF ANY.	*TOTALS* .217 (iii) 1.500 37.108 40.478 .765	
DESIGN STANDHYD DESIGN STANDHYD D5:BEX4 ET 1.00 Surface Area () Dep. Storage (r Average Slope Length Hannings n Max.eff.Inten.Inx/I Storage Coeff. (m) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) Unit Hyd. Tpeak (r) FEAK FLON (r) TIME TO FEAK (h) RUNOFF COEFFICIENT (i) CN FROCEDUME (i) TIME SIZE (M) THAN THE SIZE (M) SIMULATE STOPAGE (M) SIMULATE STOPAGE (M) SIMULATE STOPAGE (M) EOUTE RESERVOIR 10075 184CTRL OUTE OS:IBLYA OUTE OS:IBLY	Area (ha)= Total Imp(\$)= Name	1.40 90.00 Dir. Conn PERVIOUS (i) 1.44 1.50 1.00 40.00 250 389.75 7.00 1.61 1.01 1.57 28.46 48.48 2.59 10US LOSSES: ge (Above) ER OR EQUAL EFLOW IF ANY.	'TOTALS' .277 (iii) 1.500 37.108 48.478 .765	
BLOCK 4 COMMERCIAL **DESIGN STANDBYD **I DESIGN STANDBYD **OSHERA DT= 1.00 **Surface Area (?) Dep. Storage in Average Slope Length Mannings in Max.eff.Inten.(mm/?) over in Storage Coeff. in Unit Hyd. Tpeak in Unit To FEAK in TIMP TO FEAK in (i) ON PROCEDURE (ii) THE STEP (IV THAN THE STO! (iii) PEAK FLOW DO! **SIMULATE STOPAGE ON 4 **FOUTE RESERVOIR I INDOS: (BLN4) OUTRO3: (B4CTEL)	Area (ha)= Total Imp(%)= 1.26 ms)= .80 (h)= 96.61 = .00 (m)= 96.61 = .013 hr)= 112.37 in) 2.00 in)= 2.39 (in)= 2.39 (in)= 2.39 (in)= 2.40 ms)= .50 ms)= .50 SELECTED FOR PERV IA = Dep. Stora T) SROULD BE SMALL RAGE COEFFICIENT. ES NOT INCLUDE BAS TO RELEASE AT CON Requested routin	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 .59 10US LOSSES: ge (Above) ER OR EQUAL EFLOW IF ANY. TROLLED PATE G time step = 1. OW STOPAGE TABLE GE OUTFLOW 0. (cms) 00 .015 00 .015 00 .015	*TOTALS* -277 (iii) 1.500 37.108 40.478 .765 0 nin	
**BLOCK 4 COMMERCIAL **DESIGN STANDHYD **OSIGN STANDHYD **SURface Area **Over tal **Storage Coeff. (man) **IMAT TPEAK (man) **COUTINE TO PEAK (man) **COUTINE TO PEAK (man) **COUTINE TO PEAK (man) **COUTINE TO PEAK (man) **OUTINE STOPAGE ON 4 **SIMULATE STOPAGE ON	Area (ha)= Total Imp(\$)= 1.26 Total Imp(\$)= 1.27 Total Imp(\$)= 1.29 Total Imp(\$)= 1.50 Total Imp(\$)= 1.50 Total Imp(\$)= 1.50 Total Imp(\$)= Tota	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 .59 10US LOSSES: ge (Above) ER OR EQUAL EFLOW IF ANY. TROLLED PATE G time step = 1. OW STOPAGE TABLE GE OUTFLOW 0. (cms) 00 .015 00 .015 00 .015	*TOTALS* -277 (iii) 1.500 37.108 40.478 .765 0 nin	
**BLOCK 4 COMMERCIAL **BLOCK 4 COMMERCIAL ** **DESIGN STANDBYD ** ** DESIGN STANDBYD ** ** Surface Area (?) ** Dep. Storage in Average Slope Length ** Mannings in ** Max.eff.Inten.(mm/?) ** over in ** Storage Coeff. in ** Unit Hyd. Tpeak in ** IN TO FRAM in ** FLOW ic ** TIME TO FRAM in ** FUNOFF COEFFICIENT (1) ON PROCEDUBE Ch' = 58.0 (11) THM STEP (IV THAN THE STO! (11) PEAK FLOW DO! ** SIMULATE STOPAGE ON 4 ** SIMULATE STOPAGE ON 4 ** FOUTE RESERVOIR ** INN-DOS: (BLIM) ** OUTFIGN RESULTS ** INFLOW >05: (BLIM) ** IN TO STANDBY >05: (BLIM) ** IN TO STANDBY >05:	Area (ha)= Total Imp(S)= IMPERVIOUS ha)= 1.26 IMPERVIOUS ha)= 1.27 IMPERVIOUS ha)= 1.28 IMPERVIOUS ha)= 1.29 IMPERVIOUS ha)= 1.20 IMPERVIOUS HA)	1.40 90.00 Dir. Conn PERVIOUS (i) 1.14 1.50 1.00 40.00 250 389.75 7.00 11 7.43 (ii) 7.00 1.6 1.01 1.57 28.46 48.48 59 10US LOSSES: ge (Above) ge (Above) EFLOW IF ANY. TROLLED PATE OW STOPAGE TABLE GE OUTFLOW .) (cms) 00 03 .000 OPFAK TEPAM (CES) (hrs) .277 1.500	*TOTALS* .277 (iii) 1.500 37.108 48.478 .765 0 min. **TOTALS* .277 (iii) 1.500 37.108 48.478 .765	
**BLOCK 4 COMMERCIAL **DESIGN STANDHYD **OSIGN STANDHYD **SURface Area **Over tal **Storage Coeff. (man) **IMAT TPEAK (man) **COUTINE TO PEAK (man) **COUTINE TO PEAK (man) **COUTINE TO PEAK (man) **COUTINE TO PEAK (man) **OUTINE STOPAGE ON 4 **SIMULATE STOPAGE ON	Area (ha)= Total Imp(S)= IMPERVIOUS ha)= 1.26 IMPERVIOUS ha)= 1.27 IMPERVIOUS ha)= 1.28 IMPERVIOUS ha)= 1.29 IMPERVIOUS ha)= 1.20 IMPERVIOUS HA)	1.40 90.00 Dir. Conn PERVIOUS (i) .14 1.50 1.00 40.00 .250 389.75 7.00 1) 7.43 (ii) 7.00 .16 .10 1.57 28.46 48.48 .59 10US LOSSES: ge (Above) ER OR EQUAL EFLOW IF ANY. TROLLED PATE .10 STOPAGE TABLE GE OUTFLOW .1 (cms) .1 (cms) .0 .015 .3 .000 OPERAK TREAN (cms) (hrs) .277 1.500	*TOTALS* .277 (iii) 1.500 37.108 48.478 .765 0 min. **TOTALS* .277 (iii) 1.500 37.108 48.478 .765	

TOTAL POST DEVELOPMENT FROM SITE ADD HYD (PSTEEN) ID: HYYO APEA QPEAN FREAK R.V. CAF 13.0 13				<u> </u>	<u> </u>			
TIME SHIFT OF BEAK HORS DAVINGW SIGNACE USED (ha.m., 132325-0) 22:0013		CUMULATIVE T	IME OF OVE	RFLOWS	(hours)=		00	
TOTAL FOST DEVELOPMENT FFOM SITE ADD HYD (PSTDENY) I.D. HNYO AREA OFFAX TPEAX R.V. LOFF (12) 000 pst princip (14) (cms) (brs) (cms)		TIME SHIFT O	F PEAK FLO	A	(mîn)=	-29.	00	
TOTAL POST DEVELOPMENT FROM SITE ADD HYD (FSTERN) ID:	02:0013				-			
ADD HTD (PSTGEV) ID: HNYO AREA OPEAN TPEAN R.V. EMF 120 SPHINGOT 11.82 0.00 4.02 2.89 0.00 0.	**************		*******	******		******	******	******
ADD NYD (PSIDEW) ID: NYD AREA QPEAK TPEAK R.V. LOF	TOTAL POST DEVELO	OFMENT FROM S	SITE					
IDL 08:FRINCOYT 11.82	************	.,,,,,,,,,,,,,,	*******	******			******	,
# 112 03:EMECVE		ID: NHYD	(ha)	(525)	TPEAK (hrs)	R.V. (Em)	(cms)	
#ID 02:30VR .00 .000 .00 .00 .00 **** ************	+11	D2 09:FNDOVR	.00	.000	.00	.00	,000	**DRY**
SUM OSISSIDEN 1.02	+ II	04 02:30VR	.00	.000	.00 1.02	.00 37.11	.000	**DRY**
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 22:0014	=			=======			======	
Project dir.: H:\SXMMYM-1\10034Y-1\ TZERO = .00 hrs on								
Project dir.: H:\SXMMYM-1\10034Y-1\ TZERO = .00 hrs on	72:0014	• • • • • • • • • • • • • • • • • • •						
Project dir.: Ri\SKSSYM-1\10034Y-1\ TZERO = .00 hrs on 0 MITOUTP 2 (output = METRIC) MENN = 003 MITOUTP 2 (output = METRIC) MENN = 003 MITOUTP 2 (output = METRIC) MENN = 103 MITOUTP 3 (output = METRIC) Project Name: [YINS PRASE 5] Project Name: [INSWINS NAME	02:0002							· • • • • • • • • • • • • • • • • • • •
TERO = .00 hrs on 0 METOUT = 2 (output = METRIC) NERUN = 003 NSTORM = 1 #						*****		
TEERO = .00 hrs on								
TEERO = .00 hrs on								
TERO = .00 hrs on 0 METOUT = 2 (output = METRIC) NERUN = 003 NSTORM = 1 #								
NEIGH	START	Project Rainfall	dir.: K:\S dir.: K:\S	КМНҮМ~1\ КМНҮМ~1\	10034Y~1 10034Y~1	\ \		
NSIONE 1	TZERO = .00 l METOUT= 2 (or NEUN = 003	ars on utput = METRI	ic)					
Project Name: [YINS PHASE 5]	NSTOPM= 1	10.STM						
# Project Name: [YINS PHASE 5]	02.0002							
# Corpany	# Project Name:	[YINS PHASE 5	il Proje	ct Numbe	r: [1003	4]	*******	*******
######################################	# Date : '	02-11-2010 [TGS]		ad				
### Pain Filename: H:\SWMMYM-I\10034Y-I\CHIO.STM Filename: H:\SWMMYM-I\10034Y-I\CHIO.STM Filename: H:\SWMMYM-I\10034Y-I\CHIO.STM Formats: 10 YEAR CHICAGO 4 HOURS DESIGN DISTRIBUT #### PAIN TIME PAIN TIME PAIN TIME RAIN TIME RAIN TIME RAIN TIME PAIN # License # :	3568969	*******	*****			******		
TIME PAIN TIME P								
TIME FAIN TIME RAIN TIME RAIN TIME RAIN TIME RAIN hrs rm/hr hrs rm/hr hrs rm/hr hrs rm/hr hrs rm/hr 1.17 3.500 1.17 11.510 2.17 10.310 3.17 5.050 33 3.990 1.33 25.320 2.33 8.660 3.33 4.700 50 4.500 1.50 133.600 2.50 7.520 3.50 4.394 67 5.210 1.67 32.000 2.67 6.650 3.67 4.140 83 6.270 1.83 19.730 2.83 5.380 3.83 3.910 1.00 8.000 2.00 12.954 3.00 5.490 4.00 3.652 DESICK STANDHYD Area (ha)= 9.30 01:SFD DT=1.00 Total Imp(t)= 37.00 Dir. Conn.(t)= 16.00 IMPERVIOUS PERVIOUS (i) Surface Area (ha)= 3.44 5.86 Dep. Storage (rm)= .80 1.50 Average Slope (t)= 1.00 1.00 Length (rm)= 249.00 40.00 Mannings n = .013 .250 Max.eff.Inten.(rm/hr)= 133.60 31.29 Over (min) 4.00 18.00 Storage Coeff. (min)= 3.93 (ii) 17.76 (ii) Unit Hyd. Tpeak (min)= 4.00 18.00 Unit Hyd. Tpeak (min)= 4.00 18.00 Unit Hyd. Tpeak (min)= 4.00 18.00 Unit Hyd. Tpeak (min)= 50.03 15.66 21.998 TOTAL BAINHALL (ms)= 50.0 3.50 1.566 21.998 TOTAL BAINHALL (ms)= 56.08 56.08 56.083 RUNOFF COEFFICIENT = .99 .28 .392 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN = 58.0 1a = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SERILED IF ANY.	PEAD STOPM	Filenan	e: H:\SWMH	YM-1\100	34Y-1\CH	110.STM	DISTRI	BUT
1.17 3.580 1.17 11.510 2.17 10.310 3.17 5.050	•							
.50 4.500 1.50 133.600 2.50 7.520 3.50 4.394 .67 5.210 1.67 32.000 2.67 6.650 3.67 4.140 .83 6.270 1.83 19.730 2.83 5.380 3.83 3.910 1.00 8.000 2.00 12.954 3.00 5.490 4.00 3.632 03:0003	.17	3,580	1.17 11.5	10 2	.17 10.	310	3.17	5.050
.83 6.270 1.83 19.730 2.83 5.300 3.83 3.910 1.00 8.000 2.00 12.954 3.00 5.490 4.00 3.632 03:0003	.50	4.500 [1.50 133.6	00 2	.50 7.	520	3.50	4.394
DESIGN STANDHYD Area (ha)= 9.30	.83	6.270 [1.83 19.7	30 I 2	.83 5.	380	3.83	3.910
DESIGN STANDHYD Area {ha}= 9.30								
DESIGN STANDHYD Area (ha)= 9.30 01:SPD DT=1.00 Total Irp(t)= 37.00 Dir. Conn.(t)= 16.00 Surface Area (ha)= 3.44 5.86 Dep. Storage (rm)= .80 1.50 Average Slope (t)= 1.00 1.00 Length (m)= 249.00 40.00 Mannings n = .013 .250 Max.eff.Inten.(rm/hr)= 133.60 31.29 Over (min) 4.00 18.00 Storage Coeff. (rin)= 4.00 18.00 Storage Coeff. (rin)= 4.00 18.00 Unit Hyd. Tpeak (rin)= 4.00 18.00 Unit Hyd. Tpeak (rin)= 4.00 18.00 TIME TO FEAK (cms)= .50 .31 .60 (iii) TIME TO FEAK (hrs)= 1.50 1.77 1.517 RUNOFF VOLUME (ms)= 55.28 15.66 21.998 TOTAL RAINFALL (ms)= 56.08 56.08 56.08 55.083 RUNOFF COEFFICIENT = .99 .28 .392 (i) CH PROCEDURE SELECTED FOR PERVIOUS LOSSES: CI*= 58.0 1 a - Dep. Storage (Above) (ii) TIME STORAGE COEFFICIENT. (iii) PEAK FLOW LOES NOT INCLUDE BASEFLOW 1F ANY.				******	******	,	******	******
DESIGN STANDHYD Area (ha)= 9.30 Olisso DT=1.00 Total Imp(%)= 37.00 Dir. Conn. (%)= 16.00 SURface Area (ha)= 3.44	SFD							
DESIGN STANDHYD								
Ol:SED DT=1.00 Total Imp(t)= 37.00 Dir. Conn.(t)= 16.00 IMPREVIOUS FERVIOUS (i)								
Surface Area (ha)= 3.44 5.86 Dep. Storage (Fr)= .80 1.50 Average Slope (t)= 1.00 1.00 Length (r)= 249.00 40.00 Mannings n = .013 .250 Max.eff.Inten.(rm/hr)= 133.60 31.29 over (min) 4.00 18.00 Storage Coeff. (rin)= 4.00 18.00 Storage Coeff. (rin)= 4.00 18.00 Unit Hyd. Ppeak (min)= 4.00 18.00 Unit Hyd. Ppeak (rin)= 4.00 18.00 FEAK FLOW (cms)= .50 .31 .601 (iii) TIME TO FEAK (hrs)= 1.50 1.77 1.517 RNORF VOLUME (mm)= 55.28 15.66 21.998 TOTAL BATHFALL (mm)= 56.08 56.08 56.08 56.08 KUNOFF COEFFICIENT = .99 .28 .392 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN'= 58.0 1 = Dep. Storage (Above) (ii) TIME STOR (II) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW LOGS NOT INCLUDE BASEFLOW 1F ANY.	01:SFD DT= 1.	00 Total 	Imp (%)=	37.00	Dir. Cor	ın. (f)=	16.00	
Length	Surface Area	(ha)=	3.44	5.	86			
Length (h)= 249.00	Dep. Storage Average Slope	(fen) = (f) =	.80	1.	00			
over (min) 4.00 18.00 Storage Coeff. (min)= 3.93 (ii) 17.76 (ii) Unit Hyd. Tpeak (min)= 4.00 18.00 Unit Hyd. peak (cms)= .29 .06 **TOTALS** PEAK FLOW (cms)= .50 .31 .601 (iii) TIME TO FFAK (hrs)= 1.50 1.77 1.517 RNNOFF VOLUME (mm)= 55.28 15.66 21.998 TOTAL RAINFALL (mm)= 56.08 56.08 56.08 RUNOFF COEFFICIENT = .99 .28 .392 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 58.0 1a = Dep. Storage (Above) (ii) TIME SIEP (LT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW LOSS NOT INCLUDE BASEFLOW IF ANY.	Length	(m) =						
Unit Hyd. Tpaak (min)= 4.00 18.00 Unit Hyd. peak (cms)= .29 .06 *TOTALS* PEAK FILOW (cms)= .50 .31 .601 (iii) TIME TO FFAK (hrs)= 1.50 1.77 1.517 RUNOFF VOLUME (mn)= 55.28 15.66 21.998 TOTAL RAINFALL (mn)= 56.08 56.08 56.08 EUNOFF COEFFICIENT = .99 .28 .392 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:	Max.eff.Inten	.(rm/hr)= er (min)	4.00	18.	00			
PEAK FLOW (cms)= .50 .31 .601 (iii) TIME TO PEAK (hrs)= 1.50 1.77 1.517 RUNOFF VOLUME (mm)= 55.28 15.66 21.998 TOTAL FAINFALL (mm)= 56.08 56.08 56.083 RUNOFF COEFFICIENT = .99 .28 .392 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:	Unit Hyd. Tpe	ak (min)=	4.00	18.	00			
TIME TO PEAK (hrs)= 1.50 1.77 1.517 RUNGTP (VOLUME (mm)= 55.28 15.66 21.998 TOTAL RAINFALL (mm)= 56.08 56.08 56.083 RUNGTF COEFFICIENT = .99 .28 .392 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN' = 58.0 1a = Dep. Storage (Above) (ii) TIME STEP (LT) SHOULD BE SMALLER OR EQUAL THAN THE STOPAGE COEFFICIENT. (iii) PEAK FLOW LOES NOT INCLUDE BASEFLOW IF AMY.	DONE PLOY	(0.1=				*107/	ALS* 501 (111	1
TOTAL PAINFALL (PR)= 56.08 56.08 56.08 8 8 8 1000 1 1 1 1 1 1 1 1 1 1 1 1 1	TIME TO PEAK	(hrs)=	1.50	1.	77	1.5	517	•
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 58.0 Ia = Dep. Storage (Above) (ii) TIME STEP (LT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) FEAK FLOW DOES ROT INCLUDE BASEFLOW IF ANY.	TOTAL RAINFAL	L (EXI)= CIENT =	56.08	56.	08	56.0	183	
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW BOES NOT INCLUDE BASEFLOW IF AMY.	(i) CN PROC	EDURE SELECT	ED FOR PERV	nous Los	SES:			
(iii) FEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.	(ii) TIME ST	EP (DT) SHOU	LD BE SMALI	ige (Abo JER OR EQ	Ve) UAL			
03:0004	(iii) PEAK FL	OW DOES NOT	INCLUDE BAS	EFLOW 1F	ANY.			
	03:0004							·
	******	******		******	******	*****		******

DESIGN STANDHYD		(ha)=				
DESIGN STANDHYD 02:BLK1 DT= 1.00	Total 	Irp(t)=	75.00 Di	r. Conn	.(%)= 38	.00
Surface Area Dep. Storage Average Slope Length	(ha)=	IMPERVIOUS	PERVIOU .14	15 (1)		
Dep. Storage Average Slope	(mm) = = (fr)	.80 1.00	1.50 1.00			
Length Mannings n	(m) =	61.64	40.00)		
manninga n						
Max.eff.Inten.() over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	sm/hr)= (min)	133.60 2.00	136.37	! }		
Storage Coeff.	(min) =	1.70 (i	i) 9,38	(ii)		
Unit Hyd. Ipeak Unit Hyd. peak	(CMS)=	.62	.12			
			.03	1	*TOTALS*	iii)
PEAK FLON TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(hrs)=	1.50	.03 1.60 23.74 56.08		1.500	
RUNOFF VOLUME TOTAL RAINFALL	(122) = (122) =	55.28 56.08	56.08	1	35.727 56.083	
RUNOFF COEFFICE	ena =	.99	. 42	2	. 637	
(1) CN PROCED						
$CN^* = 58$ (ii) TIME STEP		Dep. Stora LD BE SMALL				
	STOPAGE CO	EFFICIENT.				
03:0005						
***************		*********	+++++++++	*******	********	********
BLOCK 2 APARTMENTS						

DESIGN STANDHYD 03:BLK2 DT= 1.00	Area Total	{ha}= irp({})=	.69 75.00 Di	r. Conn	. (%)= 38	.00
Surface Area	(ha)=	IMPERVIOUS	PERVIO	7		
Surface Area Dep. Storage	(mm) =	.52 .80 1.00 67.82	1,50 1,00)		
Average Slope Length	(n)=	67.82	40.00			
Mannings n	=	.013	.250)		
Max.eff.Inten.(nm/hr)=	133.60	131.2	5		
Max.eff.Inten.() over Storage Coeff. Unit Hyd. Tpeak	(min) (min)=	2.00 1.80 (i	i) 9.60) (ii)		
Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min)=	2.00	10.00			
onic nyo. peak	(C (S) -	.00			*TOTALS*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFICI (i) CN PROCED	(cms)=	.10 1.50	.0 1.6 23.7	1	.121 (1.500	111)
RUNOFF VOLUME	(mm) =	55.28	23.7	í	35.727	
TOTAL FAINFALL	(1725) = FNT =	56.08 .99	56.0	3	56.083 .637	
// av 250000	UOD ODZECT	ED FOR REST				
(i) CH PROCED CN* = 58 (ii) TIME STEP	.0 Ia =	Dep. Stora	ige (Abov	2)		
(11) TIME STEP	(DT) SHOU STOPAGE CO	LD BE SMALL EFFICIENT.	ER OR EQUA	AL.		
(111) PEAK FLOW			EFLOW IF	WY.		
103:0006	*******	******	*******		********	*******
•						
BLOCK 5 SWM						
BLOCK 5 SWM						
		******	,			********
DESCH STANDARD		(ha)=	1 26			
DESIGN STANDHYD 06:BLK5 DT= 1.00	Area Total		1 26			
DESIGN STANDHYD 06:BLK5 DT= 1.00	Area Total	(ha)= Imp(t)= IMPERVIOUS	1.26 90.00 D.	ir. Conn JS (i)		
DESIGN STANDHYD 06:BLK5 DT= 1.00 Surface Area	Area Total	(ha)= Imp(t)= IMPERVIOUS 1.13	1.26 90.00 D. PERVIO	ir. Conr JS (i) 3		
DESIGN STANDHYD 06:BLK5 DT= 1.00 Surface Area Den. Storage	Area Total (ha) = (cn) = (t) =	(ha) = Imp(t) = IMPERVIOUS 1.13 .80 1.00	1.26 90.00 D. FERVIOR .1: 1.5: 1.0:	ir. Conn Js (i) 3		
DESIGN STANDHYD 06:BLKS DT= 1.00 Surface Area Dep. Storage Average Slope Length	Area Total (ha) = (m) = (t) = (m) =	(ha)= Imp(t)= IMPERVIOUS 1.13 .80 1.00 91.65	1.26 90.00 D. FERVIOL .1: 1.5: 1.0: 40.0:	ir. Conn JS (i) 3))		
DESIGN STANDHYD 06:BLK5 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n	(ha) = (CD) = (E)	(ha)= Imp(%)= IMPERVIOUS 1.13 .80 1.00 91.65 .013	1.26 90.00 D. FERVIOR 1.5 1.5 40.0 .25	ir. Conn JS (i) 3 0		
DESIGN STANDHYD 06:BLKS UT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n	(ha) = (cn) = (n)	(ha) = Imp(t) = Imp(t) = ImpERVIOUS	1.26 90.00 D. FERVIOL .1: 1.5: 1.0: 40.0:	ir. Conn JS (i) 3 0 0 0 0		
DESIGN STANDHYD 06:BLKS UT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n	(ha) = (cn) = (n)	(ha)= Imp(f)= IMPERVIOUS 1.13 .80 1.00 91.65 .013 133.60 2.00 2.16 (i	1.26 90.00 D. PERVIOI .1: 1.5: 1.0: 40.0: .25: 17.5: 20.0:	ir. Conn JS (i) 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
DESIGN STANDHYD 06:BLK5 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n	(ha) = (tn) = (tn) = (t) = (n) = (nin) = (nin) = (nin) = (nin) =	(ha) = Imp(t) = Imp(t) = Imp(t) = 1.13	1.26 90.00 D. PERVIOL 1.5: 1.0: 40.0: .25: 17.5 20.0:	ir. Conn US (i) 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(%)= 90	
DESIGN STANDHYD O6:BLK5 UT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Intan.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	Area Total Total	(ha) = Imp(i) = Imp(i) = Imp(i) = Impervious 1.13 .00 1.00 91.65 .013 133.60 2.00 2.16 (i 2.00 .53	1.26 90.00 D PERVIOL 1.5 1.0 40.0 .25 17.5 20.0 .0	ir. Conn JS (i) 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.(%)= 90	.00
DESIGN STANDHYD 06:BLKS 07= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Intan.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK	(ha) = (cn) = (nin) = (cnin) =	(ha) = Imp(t) = IMPERVIOUS 1.13 .80 1.00 91.65 .013 133.60 2.00 2.16 (i 2.00 .53 .42 1.50	1.26 90.00 D. PERVIOL.1: 1.50 40.00 .25: 17.5 20.00 ii) 19.5 20.00	ir. Conm US (i) 3 0 0 0 0 3 0 9 (ii) 0 0 0 0 0 0 0 0 0 0 0 0 0	*TOTALS* .417 (1.500	.00
DESIGN STANDHYD 06:BLKS 07= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Intan.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak FEAK FLOW TIME TO FEAK	(ha) = (cn) = (nin) = (cnin) =	(ha) = Imp(i) = IMPERVIOUS 1.13 .00 1.00 91.65 .013 133.60 2.16 (i 2.00 .53 .42	1.26 90.00 D. PERVIOI .1: 1.5: 1.0: 40.0: .25: 17.5: 20.0: .0:	ir. Conm	*TOTALS* -417 (1.500 51.004 56.083	.00
DESIGN STANDHYD O6:BLKS DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Peak	(ha) = (cn) = (ni) = (ni) = (nin) = (n	(ha) = Imp(t) = IMPERVIOUS 1.13 .80 1.00 91.65 .013 133.60 2.16 (i 2.00 .53 .42 1.50 55.28	1.26 90.00 D. FERVIOI .1: 1.5: 1.0: 40.0: .25: 17.5 20.0: .0: .0: .0:	ir. Conn	*TOTALS* -417 (1.500 51.004	.00
DESIGN STANDHYD OFFICE OF THE STANDHYD SUrface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL PAINFALL	(ha) = (cn) = (cin) =	(ha) = Imp(t) = Imp(t	1.26 90.00 D. PERVIOL 1.15:51 1.0:40.00 .25: 17.5 20.0.0 .0 .0 1.8 12.4 56.0 .2	ir. Conr JS (i) 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	*TOTALS* -417 (1.500 51.004 56.083	.00
DESIGN STANDHYD 06:BLKS UT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak TIME TO FEAK RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFICI (1) CN PROCED CN = SR	(ha) = (cm) = (lain) = (lain) = (cin) = (cm)	(ha) = Imp(f) = Imp(f) = Imp(f) = Imp(f) = Imp(r) = Impervious 1.13	1.26 90.00 D. FERVIOR 1.1 1.5: 1.0 40.0 25: 20.0 0 1.8 12.4 56:0 2.0 20.0 20.0 1.8 12.4 56:0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20	ir. Conn US (i) 3 0 0 0 3 0 9 4 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0	*TOTALS* -417 (1.500 51.004 56.083	.00
DESIGN STANDHYD O6:BLK5 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak RUNOFF VOLUME TOTAL MAINFALL RUNOFF VOLUME TOTAL MAINFALL RUNOFF COEFFICI (i) CN PROCED CN' = 58 (ii) THE SIBE	(ha) = (cm) = (cin) =	(ha) = Imp(f) = Imp(f	1.26 90.00 D. PERVIOL 1.1 1.5: 1.0: 40.0: 25: 17.5 20.0. 0.0 1.8 12.4 26.0 27.00 20.	ir. Conn JS (i) 3 0 0 0 0 0 0 0 0 0 0 0 0	*TOTALS* -417 (1.500 51.004 56.083	.00
DESIGN STANDHYD 06/BLKS UT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak TIME TO FEAK RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFICI (i) CN PROCED CN = SR	(ha) = (cm) = (cin) =	(ha) = Imp(f) = Imp(f	1.26 90.00 D. PERVIOL 1.1 1.5: 1.0: 40.0: 25: 17.5 20.0. 0.0 1.8 12.4 26.0 27.00 20.	ir. Conn JS (i) 3 0 0 0 0 0 0 0 0 0 0 0 0	*TOTALS* -417 (1.500 51.004 56.083	.00
DESIGN STANDHYD O6:BLK5 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Hint Hyd. Peak RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI (i) CN PROCED CN' = 58 (ii) TIME STEP THAN THE (iii) PEAK FLOW	(ha)= (cm)= (i)= (n)= (cin)= ((ha)= Imp(f)= IMPERVIOUS 1.13 .80 1.00 91.65 .013 133.60 2.16 (i 2.00 2.15 53 .42 2.150 55.28 56.08 .99 TED FOR FERN TO FOR PERN TO FOR PE	1.26 90.00 D. PERVIOL. 1.1.5:5 1.0:40.0 25: 17.5 20.0 0 0.1.8 20.0 1.8 6.0 2.2.4 2.0.4 2.0.4 2.0.4 2.0.4 2.0.4 2.0.4 2.0.5 2.0.0 2.0.5 2.0.0 2.0.8 2.0.0 2.0.8 2.0.0 2.0	ir. Conr JS (i) 3 0 0 0 0 0 3 0 9 (ii) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	*TOTALS* -417 (-1.500 51.004 56.083 -909	.00
DESIGN STANDHYD GG:BLKS DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.{ over Storage Coeff. Unit Hyd. Theak Unit Hyd. Theak Unit Hyd. Peak PEAK FLOW TIME TO PEAK RUNOFF COEFFICI (i) CN PEOCED CN' = 58 (ii) TIME SIZE THAN THE (iii) PEAK FLOW	(ha) = (cm) = (ti) = (min) = (cini) = (cini) = (cini) = (cini) = (cm) =	(ha) = Imp(f) = Imp(f	1.26 90.00 D. PERVIOL 1.5. 1.0. 40.0. 25: 17.5 20.0. 0. 1.8. 12.4 56.0. 2.2 //IOUS LOSS gge (Abov LER OR EQU. EEFLOW IF .	LI. CONT JS (1) 3 1) 1) 1) 2) 3 3 3 3 4 4 11) 11) 12 13 14 15 16 17 17 18 18 18 18 18 18 18 18 18 18	*TOTALS* -417 t 1.500 51.004 56.083 -909	.00
DESIGN STANDHYD G6:BLKS DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Theak Unit Hyd. Theak Unit Hyd. Peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL PRINTALL RUNOFF COEFFICI (i) CN PROCED CN' = 58 (ii) TIME STEP THAN THE (iii) PEAK FLOW	(ha) = (cm) = (ti) = (min) = (cini) = (cini) = (cini) = (cini) = (cm) =	(ha) = Imp(f) = Imp(f	1.26 90.00 D. PERVIOL 1.5. 1.0. 40.0. 25: 17.5 20.0. 0. 1.8. 12.4 56.0. 2.2 //IOUS LOSS gge (Abov LER OR EQU. EEFLOW IF .	LI. CONT JS (1) 3 1) 1) 1) 2) 3 3 3 3 4 4 11) 11) 12 13 14 15 16 17 17 18 18 18 18 18 18 18 18 18 18	*TOTALS* -417 t 1.500 51.004 56.083 -909	.00
DESIGN STANDHYD 06:BLKS UT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Theak Unit Hyd. Theak Unit Hyd. Peak TIME TO FEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICE (i) CH PROCED CH' = 58 (ii) TIME SIRP LIMAN THE (iii) FEAK FLOW	(ha) = (cm) = (din) = (m) = (m	(ha) = Imp(f) = Imp(f	1.26 90.00 D. PERVIOL 1.5. 1.0. 40.0. 25: 17.5 20.0. 0. 1.8. 12.4 56.0. 2.2 //IOUS LOSS gge (Abov LER OR EQU. EEFLOW IF .	LI. CONT JS (1) 3 1) 1) 1) 2) 3 3 3 3 4 4 11) 11) 12 13 14 15 16 17 17 18 18 18 18 18 18 18 18 18 18	*TOTALS* -417 t 1.500 51.004 56.083 -909	.00
DESIGN STANDHYD 06:BLKS DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. Peak TIME TO FEAK RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFICI (i) CN PROCED CN' = 58 (ii) TIME SIRP LIMAN THE (iii) FEAK FLOW	(ha) = (cm) = (din) = (m) = (m	(ha) = Imp(f) = Imp(f	1.26 90.00 D. PERVIOL 1.5. 1.0. 40.0. 25: 17.5 20.0. 0. 1.8. 12.4 56.0. 2.2 //IOUS LOSS gge (Abov LER OR EQU. EEFLOW IF .	LI. CONT JS (1) 3 1) 1) 1) 2) 3 3 3 3 4 4 11) 11) 12 13 14 15 16 17 17 18 18 18 18 18 18 18 18 18 18	*TOTALS* -417 t 1.500 51.004 56.083 -909	.00
DESIGN STANDHYD 06:BLK5	(ha) = (cm) = (din) =	(ha)= Irp(t)= IMPERVIOUS 1.13 .80 1.00 91.65 .013 133.60 2.16 (i 2.00 .53 .42 1.50 55.28 56.08 .99 TED FOR PERVIOUS LID BE SALUB BESALUBEFFICIENT. INCLUDE BAS	1.26 90.00 D. PERVIOL. 1.55 1.00 40.00 255 17.5 20.00 0.00 1.8 12.4 56.0 2.2 /IOUS LOSS gge (Abov. LER OR EQU. SEPLOW IF .	Er. Conn JS (1) 3 0) 0) 0 3 3 9 (11) 0 6 0 0 0 0 0 0 0 0 0 0 0 0 0	*TOTALS* .417 (1.500 51.004 56.083 .909	.00
DESIGN STANDHYD 06:BLK5 DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(Area Total	(ha)= Irp(f)= IMPERVIOUS 1.13 .80 1.00 91.65 .013 133.60 2.00 2.16 (i 2.00 .53 .42 2.55 6.08 55.28 56.08 SEED FOR FERVIOUS INCLUDE BAS	1.26 90.00 D. PERVIOL. 1.1.5: 1.0: 40.0: 17.5 20.0. 0.0. 1.8 12.4 6.0. 2.2 710US LOSS age (Abov.	EF. Conn US (i) 3 0 0 0 0 0 0 0 0 0 0 0 0 0	'TOTALS' .417 (.500 (51.004 (56.083 , 909	.00
DESIGN STANDHYD 06:BLKS DT= 1.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Theak Unit Hyd. Theak Unit Hyd. Theak Unit TO PEAK RUNOFF VOLUME TOTAL PRINTALL RUNOFF COEFFICI (i) CN PROCED CN' = 58 (ii) TIME STEP THAN THE (iii) PEAK FLOW	Area Total	(ha)= Irp(f)= IMPERVIOUS 1.13 .80 1.00 91.65 .013 133.60 2.00 2.16 (i 2.00 .53 .42 2.55 6.08 55.28 56.08 SEED FOR FERVIOUS INCLUDE BAS	1.26 90.00 D. PERVIOL. 1.55 1.00 40.00 255 17.5 20.00 0.00 1.8 12.4 56.0 2.2 /IOUS LOSS gge (Abov. LER OR EQU. SEPLOW IF .	EF. Conn US (i) 3 0 0 0 0 0 0 0 0 0 0 0 0 0	'TOTALS' -417 (1.500 51.004 56.083 -909	.00

		G. Dougla	s vallee Limi
151 41.	ern 9.30	ens 1.52	22.00 .000
ID1 01: +ID2 02:	BLK1 .57	.601 1.52 .102 1.50 .121 1.50 .417 1.50	35.73 .000
+ID3 03: +ID4 06:	BLK2 .69 BLK5 1.26	.417 1.50	35.73 .000 51.00 .000
		1.231 1.50	
NOTE: PEAK FLOWS DO			
003:0008			·
*		************	**********
*			
* ROUTE THROUGH FOND			
*	***********	,	
f bours prespinate	Remosted routi	ng time step = :	i.0 etn.
ROUTE RESERVOIR IN>07: (PSTDEV) OUT<08: (PNDOUT)	Requested routs	ng time step	
OUT<08: (FNDOUT)	OUTFLOW STOP	FOW STORAGE TABLE AGE OUTFLOW	STOPAGE
	(cms) (ha.	m.) (cms) +00 .025	(ha.m.) .3535E+00
	.007 .5520E	-01 .027	.4178E+00
	.017 .17008	+00 .031	.5512E+00
	.020 .2296E	MSL (cms) +00 .025 -01 .027 +00 .029 +00 .031 +00 .031 +00 .033	.6203E+00 .0000E+00
ROUTING RESULTS			
	- (ha)	QPEAK TPEAK (cms) (hrs) 1.231 1.500 .023 4.367 .000 .000	(mm)
INFLOW >07: (PSTDEV OUTFLOW<08: (PNDOUT OVERFLOW<09: (PNDOVR) 11.82) 11.82	.023 4.367	26.553
OVERFLOW<09: (PNDOVR	.00	.000 .000	.000
TOTAL	NUMBER OF SIMUL	ATED OVERFLOWS	= 0 = .00
CUMUL PERCE	ATIVE TIME OF OV NTAGE OF TIME OV	ERFLOWS (hours): ERFLOWING (%):	= .00
PEAK	FLOW REDUCTI SHIFT OF PEAK FL	ON [Qout/Qin](%): OW (min):	= 1.841 = 172.00
YIME MAXIM	UM STOPAGE US	ED (harm):	=.2900E+00
003:0009			
*			
* BLOCK 3 COMMERCIAL			
+			
	**********	******	*******
DESIGN STANDHYD	Area (ha)=	.80	
DESIGN STANDHYD 04:BLK3 DT= 1.00	Total Imp(%)=	90.00 Dir. Co	nn.(%)= 45.00
Surface Area (h Dep. Storage (r Average Slope (Length (na)= ./2 na)= .80	.08 1.50	
Average Slope (*)= 1.00 m)= 73.03	1.00 40.00	
Max.eff.Inten.(pm/h over (ni Storage Coeff. (ni Unit Hyd. Tpeak (mi Unit Hyd. peak (cm	r)= 133.60	504.85	
over (mi Storage Coeff, (mi	n) 2.00 n)= 1.88 (6.00 (ii) 6.43 (ii)	
Unit Hyd. Tpeak (mi	n)= 2.00	6.00 .18	
			TOTALS
TIME TO PEAK (hr	(s)= .13 (s)= 1.50	.08 1.55	.202 (iii) 1.500
RUNOFF VOLUME (F TOTAL PAINFALL (F	m)= 55.28 m)= 56.08	34.90 56.08	44.072 56.083
RUNOFF COEFFICIENT	= .99	.62	.786
(i) CN PROCEDURE	SELECTED FOR PER	VIOUS LOSSES:	
	Ia = Dep. Stor	:age (Above)	
THAN THE STOP	AGE COEFFICIENT.		
(iii) PEAK FLOW DOE	S NOT INCLUDE EF	SEFLOW IF ANY.	
003:0010			
******************	***********	************	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
:			
* SIMULATE STORAGE ON BI	OCK 3 TO RELEASE	AT CONTROLLED R	ATE
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
ROUTE RESERVOIR IN>04: (BLK3)	Requested routi	ng time step =	1.0 min.
OUT<01: (B3CTRL)	CULTION STO	FOW STOPAGE TABL	E ======= STOPAGE
	(cms) (ha	AGE OUTFLOW	(ha.m.)
	.000 .0000	2+00 .015	.1000E+01 .0000E+00
ROUTING RESULTS	AREA	QPEAK TPEAK	
	- ihal		(mm)
INFLOW >04: (BLK3 OUTFLOW<01: (B3CTRE	.80	(cms) (hrs) ,202 1.500 ,015 1.183 ,000 .000	44.072
OVERFLOW<02: (30VR	.00	,000 .000	
		ATED OVERFLOWS	
CUMUI PERCE	ATIVE TIME OF ON SHINGE OF TIME OF	/ERFLOWS (hours) /ERFLOWING (%)	= .00 = .00
- 34144			
PEAK	FLOW PEDUCTI	ON [Qout/Qin](%)	= 7.411
TIME MAXII	SHIFT OF PEAK FI WM STOPAGE US	ow (min) (ha.n.)	= -19.00 =.1986E-01
003:0011			
********	*******		

BLOCK 4 COMMERCIAL						******
DESIGN STANDHYD 05:BLK4 DT= 1.00			1.40 90.00 i			
	IM	PERVIOUS	PERVI	OUS (i)		
Surface Area Dep. Storage Average Slope	(ha)=	1.26	•	14		
Pep. Storage Average Slope	(EEA) = (2) =	.80 1.00	1.0			
Length	(m) =	1.00 96.61 .013	40.0	00		
Mannings n	(n) = =	.013	. 2	50		
Max.eff.Inten.(rm.	/hr)=	133.60	494.1			
over (min) min)=	2.00 2.23 (i	7.6 6.1	00 81 (11)		
over () Storage Coeff. () Unit Hyd. Tpeak () Unit Hyd. peak ()	min)=	2.00	7.0	00		
Unit Hyd. peak (Cms) =	.52	•	16	*TOTAL	s*
PEAK FLOW (cr_s) =	.23		13	.34	2 (111)
TIME TO PEAK (hrs)=	1.50 55.28	1.1 34.1		1.50 44.07	
RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFICIEN	(EE) =	56.08	56.		56.08	3
RUMOFF COEFFICIEN	ī =	.99		62	.78	6
(1) CN PROCEDURI CN* = 58.0 (11) TIME STEP (1) THAN THE STO	Ia = D DT) SHOULD	ep. Stora BE SMALI	age (Abor	ve)		
(iii) PEAK FLOW D			SEFLOW IF	ANY.		
003:0012						
*	,,,,,,,,,	********	********	,,,,,,,	*******	************
•						
* SIMULATE STORAGE ON	4 TO RELEA	SE AT CO	(TROLLED	PATE		
•						
****************		*******	*******		******	*****
ROUTE RESERVOIR	Request	ed routir	ng time s	tep = 1	.0 min.	
IN>05: (BLK4) OUT<03: (B4CTRL)						
OUT<03:(B4CTRL)	OUTFLOW	== OUILI	FOW STORA	GE TABLE OUTFLOW	STORA	GE
	(cas)	(ha.r	AGE ((CE5)	(ha.m	.)
	.000	.0000E-	100 I -03 I	.015	.1000E+	01
ROUTING RESULTS		AREA	QPEAK (cms)	TPEAK (brs)	R. (E	
INFLOW >05: (BLK4)	1.40	.342	1,500	44.0	72
OUTFLOW<03: (B4CT)	RL)	1.40	.015	,917 ,000	44.0	72
OVERFLOW<04: (40VR	. 1	.00	.000	,000	.0	00
TOT	AL NUMBER ULATIVE TI	OF SIMULA	ATED OVER	FLOWS =		0
CUM PER:	ULATIVE TI CENTAGE OF	ME OF OVE	ERFLOWS ERFLOWING	(nours)=	.0	
III.	OLINAD OF	11115 011	LIG LONE INC	107	• • •	•
prh.	v etos	DEGICTE	N foot /	05n) (%)=	4.38	7
	E SHIFT OF	PEAK FLO		(min)=	-35.0	0
TIM	K FLOW E SHIFT OF IMUM STOP	PEAK FLO	₩.	(min)=	4.38 -35.0 ,4236E-0	0
TIM MAX	E SHIFT OF IMUM STOP	PEAK FLO	OW ED	(min)= (ha.m.)=	-35.0 ,4236E-0	0
TIM MAX	E SHIFT OF IMUM STOP	PEAK FLO	ED	(min)= (ha.m.)=	-35.0 ,4236E-0	0
TIM MAX	E SHIFT OF IMUM STOP	PEAK FLO	ED	(min)= (ha.m.)=	-35.0 ,4236E-0	0
003:0013	E SHIFT OF	PEAK FLO	ED	(min)= (ha.m.)=	-35.0 ,4236E-0	0
TIM MAX	E SHIFT OF	PEAK FLO	ED	(min)= (ha.m.)=	-35.0 ,4236E-0	0
TIM MAX 003:0013 • TOTAL FOST DEVELOPME	E SHIFT OF IMUM STOP	PEAK FLA AGE USI	ED	(min)= (ha.m.)=	-35.0 ,4236E-0	0
003:0013	E SHIFT OF IMUM STOP	PEAK FLA AGE USI	ED	(min) = (ha.m.) =	-35.0 ,4236E-0	0
TIM MAX 003:0013 • TOTAL FOST DEVELOPME	E SHIFT OF	TE	OM ED	(min) = (ha.m.) =	-35.0 ,4236E-0	0
O03:0013	E SHIFT OF IMUM STOP NT FROM SI NT FROM SI	TE AREA (ha)	QPEAK	(min) = (ha.m.) =	-35.0 ,4236E-0	O 1
TIM MAX 003:0013 * TOTAL POST DEVELOPME ADD HYD (PSTDEV) I	E SHIFT OF IMUM STOP	TE AREA (ha) 11.82	QFEAK (CES)	(min) = (ha.m.) =	-35.0 ,4236E-0	0 1 1 EWF (cms) .000
TIM MAX 003:0013 * TOTAL POST DEVELOPMENT ADD HYD (PSTDEV) III ID1 0 +1D2 0 +1D3 0	E SHIFT OF IMUM STOP	TE AREA (ha) 11.82 .00	QFEAK (CES)	(min) = (ha.m.) =	-35.0 ,4236E-0	0 1 1 EWF (cms) .000
TIM MAX 003:0013	E SHIFT OF IMUM STOP	TE AREA (ha) 11.82 .00 .80	QFEAK (CES)	(min) = (ha.m.) =	-35.0 ,4236E-0	0 1 1 EWF (cms) .000
TIM MAX OD3:0013	E SHIFT OF IMUM STOP	TE AREA (ha) 11.82 .00 .80 .00 1.40 .00	QPEAK (CES) .023 .000 .015 .000	(min) = (ha.m.) =	-35.0 ,4236E-0	0 1 1 EWF (cms) .000
TIM MAX 003:0013 * TOTAL POST DEVELOPMENT ADD HYD (PSTDEV) III 1D1 0 +1D2 0 +1D4 00 +1D5 0 +1D6 00 +1D6 00 +1D6 00 +1D6 00 +1D6 00	E SHIFT OF IMUM STOP INT FROM SI B: FNDOUT 9: FNDOVR 1: B3CTRL 2: 30VR 3: B4CTRL 4: 40VR	TE AREA (ha) 11.82 .00 .00 1.40 .00	QPEAK (cms) .003 .000 .015 .000	(min)= (ha.m.)= 	-35.0. .4236E-0	0 1 1
TIM MAX 003:0013	E SHIFT OF IMUM STOP THE FROM SI D: NHYD D: NHYD D: PINDOUT 1:B3C7FL 2:30VR 3:B4C7FL 4:40VR	TE AREA (ha) 11.82 .00 .80 .00 1.40 .00	QPEAK (CES) .023 .000 .015 .000 .0053	(min)= (ha.m.)= 	-35.0. .4236E-0	0 1 1
TIM MAX 003:0013 * TOTAL POST DEVELOPMENT ADD HYD (PSTDEV) III 1D1 0 +1D2 0 +1D4 00 +1D5 0 +1D6 00 +1D6 00 +1D6 00 +1D6 00 +1D6 00	E SHIFT OF IMUM STOP THE FROM SI D: NHYD D: NHYD D: PINDOUT 1:B3C7FL 2:30VR 3:B4C7FL 4:40VR	TE AREA (ha) 11.82 .00 .80 .00 1.40 .00	QPEAK (CES) .023 .000 .015 .000 .0053	(min)= (ha.m.)= 	-35.0. .4236E-0	0 1 1
TIM MAX OD3:0013	E SHIFT OF IMUM STOP THE FROM SI B: NHYD B: PINGOUT 9: PINGOVA 1: B3GTRL 2: 30VR 3: B4GTRL 4: 440VR 5: PSTDEV O NOT INCL	TE AREA (ha) 11.82 .00 .00 .00 1.40 .00 .00 .14.02 .UDE BASEI	QFEAK (CES) .023 .000 .015 .000 .015 .000 .55 FLOWS IF .	(min)= (ha.m.)= TPEAK (hrs) 4.37 .00 1.18 .90 .90 4.37	R.V. {rm} 26.55 .00 44.07 .00 429.30	DWF (CCLS) .000 **DRY** .000 **DRY** .000 .000 .000 .000 .000 .000 .000 .
1 ADD HYD (PSTDEV) I E SHIFT OF IMMM STOP IMM STOP IMMM S	TE USI TE	OFFAK (CTS) .000 .015 .000 .015 .000 .053 FLOWS IF .000	(min)= (ha.m.)= TPEAK (hrs) 4.37 ANY.	R.V. (rm) 26.55 .00 44.07 .00 29.30	EWF (czs) .000 .000 *DRY* .000 .000 *TDRY* .000 .000 .000 .000 .000 .000 .000 .0	
TIM MAX 003:0013	E SHIFT OF IMUM STOP IMUM	TE USI AREA (ha) 11.82 .00 .00 .1.40 .00 .14.02 .00 .00 .00 BASEL	OFEAK (CTS) .000 .015 .000 .053 FLOWS IF .	(min)= (ha.ta.)=	-35.0.4236E-0 -4236E-0	EWF (czs) .000 .000 *DRY* .000 .000 *DRY* .000 .000 .000 *DRY* .000 .000 .000 .000 .000 .000 .000 .0
TIM MAX 003:0013	E SHITT OF IMMM STOP IMMM STOP IMMM STOP IMMM STOP IMMM SERVICE IMMEDIATE SERVICE IMMEDIATE STOP	TE USI TE	QPEAK (cms) .023 .000 .015 .000 .015 .000 .7053 .7054 .7054 .7054 .7054 .7054 .7055	(min)= (ha.m.)= TPEAK (hrs) (.00 1.18 .00 .92 .00 4.37 ANY.	-35.0.4236E-0 -4236E-0	DWF (CC25) .000 .000 .000 .000 .000 .000 .000 .0
1 ADD HYD (PSTDEV) I. ADD HYD (PSTDEV) I	E SHITT OF IMMM STOP IMMM STOP IMMM STOP IMMM STOP IMMM SERVICE IMMEDIATE SERVICE IMMEDIATE STOP	TE USI TE	QPEAK (cms) .023 .000 .015 .000 .015 .000 .7053 .7054 .7054 .7054 .7054 .7054 .7055	(min)= (ha.m.)= TPEAK (hrs) (.00 1.18 .00 .92 .00 4.37 ANY.	-35.0.4236E-0 -4236E-0	DWF (CC25) .000 .000 .000 .000 .000 .000 .000 .0
TIM MAX 003:0013	E SHIFT OF IMMM STOP IMM STOP IMMM S	TE USI	OPEAK (cr.s) .023 .000 .015 .000 .015 .005 .553 FLOWS IF .	(min)= (ha.ta.)=	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
1 ADD HYD (PSTDEV) I. ADD HYD (PSTDEV) I	E SHIFT OF IMMM STOP IMM STOP IMMM S	TE USI	OPEAK (cr.s) .023 .000 .015 .000 .015 .005 .553 FLOWS IF .	(min)= (ha.ta.)=	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
TIM MAX 003:0013	E SHIFT OF IMMM STOP IMM STOP IMMM S	TE USI	OPEAK (cr.s) .023 .000 .015 .000 .015 .005 .553 FLOWS IF .	(min)= (ha.ta.)=	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
TIM MAX 003:0013	E SHIFT OF IMMM STOP IMM STOP IMMM S	TE USI	OPEAK (cr.s) .023 .000 .015 .000 .015 .005 .553 FLOWS IF .	(min)= (ha.ta.)=	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
TIM MAX 003:0013	E SHIFT OF IMMM STOP IMM STOP IMMM S	TE USI	OPEAK (cr.s) .023 .000 .015 .000 .015 .005 .553 FLOWS IF .	(min)= (ha.ta.)=	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
TIM MAX 003:0013	E SHIFT OF IMMM STOP IMMM STOP IMMM STOP IMMM SI PENDOUT 9: FINDOUT 9: FINDOUT 1: BICTAL 2: 304CTAL 4: 40VR 5: FINDOUT 9: FINDOUT	AREA (ha) 11.90 .00 .00 14.02 .UDE BASE	OPEAK (crs) 020 021 020 021 020 021 020 020 021 020 020	(min)= (ha.m.)= TPEAK (hrs1 -00 1.00 2.00 7.37 ANY.	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
TIM MAX 003:0013	E SHITT OF IMMM STOP IMM STOP IMMM S	TE AREA (ha) 11.82 .00 .00 1.40 .00 14.02 .UDE BASEI	QPEAK (cms) .023 .000 .015 .000 .015 .000 .055 .000 .055 .000 .000	(min)= (ha.m.)= TPEAK (hrsi) 4.37 .00 92 .00 ANY.	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
TIM MAX 003:0013	E SHIFT OF IMUM STOP IMUM	TE USI TE	QPEAK (cms) .023 .000 .015 .000 .015 .000 .055 .000 .055 .000 .000	(min)= (ha.m.)= TPEAK (hrsi) 4.37 .00 92 .00 ANY.	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
### MAX 003:0013	E SHIFT OF IMUM STOP IMUM	TE USI TE	QPEAK (cms) .023 .000 .015 .000 .015 .000 .055 .000 .055 .000 .000	(min)= (ha.m.)= TPEAK (hrsi) 4.37 .00 92 .00 ANY.	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
### MAX 003:0013	E SHIFT OF IMUM STOP THE FROM SI SHYD SHYD SHYD SHYD SHOOVE SHO	TE USI AREA (ha) 11.82 .00 .00 .1.40 .00 .00 .00 .00 .00 .00 .00 .00 .00	QPEAK (cms) .023 .000 .015 .000 .015 .000 .055 .000 .055 .000 .000	(min)= (ha.m.)= TPEAK (hrsi) 4.37 4.37 ANY	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
TIME MAX	E SHIFT OF IMUM STOP NT FROM SI B: HHYD B: PHDOUT 9: PHDOVR 1: B3cTRL 2: 30VR 3: B4CTRL 4: 440VR 5: PSTDEV O NOT INCI Project c Rainfall c Rainfall c The Metric	TE AREA (ha) 11.02 .00 1.40 .00 14.02 .UDE BASEI	QPEAK (CES) .023 .003 .015 .000 .015 .000 .553 .FLOWS IF .	(min)= (ha.m.)= TPEAK (hxsi 4.37 .00 9.2 .00 4.37 ANY.	-35.0.4236E-0 -4236E-0	DWF (crzs) .000 .000 .000 .000 .000 .000 .000 .0
TIM MAX 003:0013	E SHIFT OF IMUM STOP INT FROM SI B: NHYD B: NHYD B: PINGOUT 9: PINGOVR 1: B3CTRL 2: 30VR 3: B4CTRL 4: 46VR 5: PSTDEV O ROT INCL Project c Rainfall c on t t = METRIC	TE AREA (ha) 11.82 .00 .00 1.40 .00 14.02 .UDE BASEI	QPEAK (cms) .023 .000 .015 .000 .015 .000 .515 .000 .055 .000 .000	(min)= (ha.m.)=	-35.0.4236E-0 -4236E-0	EWF (CCS) .000 .000 .000 .000 .000 .000 .000 .0
# TIM MAX 003:0013	E SHIFT OF IMUM STOP THE FROM SI B: NHYD B: PHDOUT	TE	OPEAK ((CES) .023 .000 .015 .000 .015 .000 .55 FLOWS IF	(min)= (ha.ta.)= TPEAK (hrsi 4.37 .00 9.2 .00 4.37 ANY.	-35.0.4236E-0 -4236E-0	EWF (CCS) .000 .000 .000 .000 .000 .000 .000 .0
## Project Mare: [YIM	Project c Rainfall c on TH	TE USI TE	QPEAK (cms) .023 .000 .015 .000 .015 .000 .55 .000 .015 .000 .015 .000 .000	(min)= (ha.ta.)= TPEAK (hrsi 4.37 .00 9.2 .00 4.37 ANY.	-35.0.4236E-0 -4236E-0	EWF (CCS) .000 .000 .000 .000 .000 .000 .000 .0
# TIM MAX 003:0013	Project c Rainfall c on TH	TE USI TE	QPEAK (cms) .023 .000 .015 .000 .015 .000 .55 .000 .015 .000 .015 .000 .000	(min)= (ha.ta.)= TPEAK (hrsi 4.37 .00 9.2 .00 4.37 ANY.	-35.0.4236E-0 -4236E-0	EWF (CCS) .000 .000 .000 .000 .000 .000 .000 .0

*# License # : :					
-A PICCUSC &	3568969				
004:0002					
	_				
READ STORM Ptotal= 66.02 rm			ICAGO 4 HOUR I	DESIGN DISTRIBUT	ï
TIME hrs	RAIN rm/hr	TIME PAIN hrs mm/hr	TIME FA	hr hrs h	RAIN m/hr
.17		1.17 13.670		140 ÷ 3.33 5	3.270 3.000
.50 .67	5.613 6.450	1.50 158.850 1.67 35.080	1 2.50 9.1 1 2.67 8.1	144 (3.50 5 150 3.67 5	.840
.83 1.00	7.700 9.700	1.83 20.600 2.00 15.240	2.83 7.3 3.00 6.3	144 { 3.50 5 150 3.67 5 390 3.83 4 780 4.00 4	.900 .650
**					
004:0003		***********			,.,,
*					
* SFD					
			,,		*****
DESIGN STANDHYD		(ha)= 9.	30		
DESIGN STANDHYD 01:SFD DT= 1.0		l Imp(₹)= 37.	00 Dir. Con	n.(+)= 16.00	
Surface Area	(ha)=	2 44	5.86		
Surface Area Dep. Storage Average Slope	(<u>mm</u>) = (1) =	.80 1.00 249.00	1.50		
Length Mannings n	(E) = =	249.00 .013	40.00 .250		
Max.eff.Inten. ove	(cm/hr)=	158.85	44.51		
ove Storage Coeff.	r (min) (min)=	3.67 (ii)	16.00 15.68 (ii)		
Storage Coeff. Unit Hyd, Tpea Unit Hyd, peak	k (min)= (czs)=	4.00	16.00 .07		
		.60	-44	*TOTALS* .775 (iii)	
TIME TO PEAK	(hrs)=	1.50 65.22	1.73 20.76	1.517 27.877	
RUNOFF VOLUME TOTAL PAINFALL PUNOFF COEFFIC	(mm) =	66.02 .99	66.02 .31	66.023 .422	
		TED FOR PERVIOU			
CN* ≃ 5	8.0 Ia:	Dep. Storage JLD BE SMALLER	(Above)		
THAN THE	STOPAGE CO	DEFFICIENT. INCLUDE BASEFI			
(111) FLAN 180					
04:0004					
,	************				
BLOCK 1 TOWNHOUSE	s				

DESIGN STANDHYD 02:BLK1 DT= 1.0	 Area Tota				*****
DESIGN STANDHYD 02:BLK1 DT= 1.0	Area Tota	(ha)= 1 Imp(%)= 75 IMPERVIOUS	.57 .00 Dir. Con PERVIOUS (i)		*****
DESIGN STANDHYD 02:BLK1 DT= 1.0	Area Tota	(ha)= 1 Imp(%)= 75. IMPERVIOUS .43 .80	.57 .00 Dir. Con PERVIOUS (i) .14 1.50		•••••
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length	Area Area Tota 	(ha)= 75. Imp[%]= 75. IMPERVIOUS	57 00 Dir. Con PERVIOUS (i) .14 1.50 1.00 40.00		*****
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n	Area O Tota	(ha)= 1 Imp(%)= 75 1 Impervious -43 -80 1.00 61.64 .013	.57 00 Dir. Con PERVIOUS (i) .14 1.50 1.00 40.00 .250		*****
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.	Area O Tota:	(ha)= 1 Imp(%)= 75 1 Impervious -43 -80 1.00 61.64 .013	.57 .00 Dir. Con PERVIOUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00		•••••
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff.	Area 0 Tota 0 Tota 	(ha)= 1 Imp(8)= 75. IMPERVIOUS	57 00 Dir. Con PERVIOUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00		•••••
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.	Area 0 Tota: (ha)= (rm)= (%)= (nin)= (nin)= (riin)= (rii	(ha)= 1 Imp(%)= 75 IMPERVIOUS .43 .80 1.00 61.64 .013 150.85 2.00	.57 .00 Dir. Con PERVIOUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii)	n.{\text{\tinx}\\ \text{\tinit}}\\ \text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tex{\tex	•••••
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. OStorage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea PEAK FLOW	Area 0 Tota: (ha) = (rm) = (rm/hr) = (rm	(hn)= 75. IMPERVIOUS .43 .80 .1.00 61.64 .013 .159 (ii) 2.00 .64 .159 (ii) 2.00 .64 .10	57 00 Dir. Con PERVIOUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.14	*TOTALS*	•••••
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea Unit Hyd. Tpea Unit Hyd. Tpea TIME TO PEAK	Area 0 Tota: (ha)= (rm)= (f)= (rin)= ((hn)= 75. IMPERVIOUS 43 .80 1.00 61.64 .013 159.85 2.00 .64 .64 .10 1.59 (ii) 2.00 .64 .65 .65 .65 .65 .65 .65 .65 .65 .65 .65	57 00 Dir. Con PERVIOUS (i) 1.50 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.00 .14 .05 1.58 30.66	*TOTALS*	•••••
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. OStorage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea PEAK FLOW	Area	(ha)= 75. IMPERVIOUS .43 .80 .1.00 61.64 .013 158.85 2.00 .64 .01 .64 .10 .15 (ii)	.57 00 Dir. Con PERVICUS (i) .1.50 1.50 1.00 .250 186.82 8.00 8.36 (ii) 8.36 .14	*TOTALS* .130 (iii) 1.500	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea FEAX FLOW TIME TO PEAX ENDOFF VOLUME TOTAL RAINFALL RUNGFF COEFFIC	Area 0 Tota: (ha) = (fm) = (fms) = (fm	(hn)= 75. IMPERVIOUS 43 .80 1.00 61.64 .013 159.85 2.00 1.59 (ii) 2.00 .64 .150 65.22 66.02 .99	57 00 Dir. Con PERVIOUS (i) .14 1.50 1.00 40.00 .250 186.82 6.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 USSES:	*TOTALS* .130 (iii) 1.500 43.793 66.023	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. Ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL PANHALL RUNOFF COEFFICE (i) CN PPOCE CN* = 5 (ii) TIME SIE	Area O Tota:	(hm)= 75. IMPERVIOUS 43 80 1.00 61.64 .013 150.85 2.00 1.59 (ii) 2.00 .64 .10 1.50 65.22 66.02 .99 TED FOR PERVIOUS PORTUGE STATE	57 00 Dir. Con PERVIOUS (i) .14 1.50 1.00 40.00 .250 186.82 6.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 USSES:	*TOTALS* .130 (iii) 1.500 43.793 66.023	
DESIGN STANDHYD 02:BLX1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea Unit Hyd. Peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFIC (i) CN PROCE CN+ = 5 (ii) TIME STE THAN THE	Area 0 Tota:	(hn)= 75. IMPERVIOUS 43 .80 1.00 61.64 .013 159.85 2.00 1.59 (ii) 2.00 .64 .150 65.22 66.02 .99	57 00 Dir. Con PERVIOUS (i) 1.4 1.50 1.00 40.00 .250 186.82 8.00 .14 .05 1.58 30.66 66.02 .46 JS LOSSES: (Above) OR EQUAL	*TOTALS* .130 (iii) 1.500 43.793 66.023	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. Ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea Unit Hyd. Peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICE (i) CN PROCE CN' = 5 (ii) TIME STE TRAN THE (iii) PEAK FLO	Area	(hm)= 75. IMPERVIOUS 43 80 1.00 61.64 .013 156.85 2.00 1.59 (ii) 2.00 64 .64 .015 150 65.22 66.02 .99 TED FOR PERVIOUS 10.00 EPOPD. Storage UDID BE SMALUD BE SALUD BE SAL	57 00 Dir. Con PERVICUS (i) .14 .150 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 JS LOSSES: (Above) OR EQUAL	*TOTALS* .130 (iii) 1.500 43.793 66.023 .663	
Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC (i) CM PEOCE CM = 5 (ii) TIME STE THAN THE (iii) PEAK FLO	Area (ha) = (hm) =	(ha)= 1 Imp(8)= 75. IMPERVIOUS .43 .80 1.00 61.64 .013 158.85 2.00 .64 .10 1.50 65.22 66.02 .99 IED FOR PERVIOUS = Dep. Storage ULD BE SMALLER DEFFICIENT. INCLUDE HASEF	57 00 Dir. Con PERVICUS (i) 1.50 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 US LOSSES: (Above) OR EQUAL LOW IF ANY.	*TOTALS*	=======
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. Peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFIC (i) CN PROCE CN' = 5 (ii) TIME SIE THAN THE (iii) PEAK FLO	Area 0 Tota: (ha) = (fm) = (fi) = (f	(ha)= 1 Imp(8)= 75. IMPERVIOUS .43 .80 1.00 61.64 .013 158.85 2.00 .64 .10 1.50 65.22 66.02 .99 IED FOR PERVIOUS = Dep. Storage ULD BE SMALLER DEFFICIENT. INCLUDE HASEF	57 00 Dir. Con PERVICUS (i) 1.50 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 US LOSSES: (Above) OR EQUAL LOW IF ANY.	*TOTALS*	=======
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL PAINFALL RUNOFF COEFFIC (1) CM PROCE CM' = 5 (11) TIME STE (111) FEAK FLO 104:0005	Area 0 Tota: (ha) = (fm) = (fi) = (f	(ha)= 1 Imp(8)= 75. IMPERVIOUS .43 .80 1.00 61.64 .013 158.85 2.00 .64 .10 1.50 65.22 66.02 .99 IED FOR PERVIOUS = Dep. Storage ULD BE SMALLER DEFFICIENT. INCLUDE HASEF	57 00 Dir. Con PERVICUS (i) 1.50 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 US LOSSES: (Above) OR EQUAL LOW IF ANY.	*TOTALS*	=======
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpee Unit Hyd. Tpee Unit Hyd. Peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC (i) CM PROCE CM * 5 5 (ii) TIME SIE THAN THE (iii) PEAK FLO	Area	(ha)= 1 Imp(8)= 75. IMPERVIOUS 43 80 1.00 61.64 .013 159.85 2.00 1.59 (ii) 2.00 .64 .10 1.50 65.22 66.02 .99 TED FOR PERVIOUS DEPS. STORAGE ULD BE SALLER DEFFICIENT. INCLUDE BASEF	57 00 Dir. Con PERVIOUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 .14 .05 1.58 30.66 66.02 .46 JS LOSSES: (Above) OR EQUAL LOW IF ANY.	*TOTALS* .130 (iii) 1.500 43.793 66.023 .663	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea Unit Hyd. Peak PEAX FLOW TIME TO PEAX RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC (1) CM PROCE (1) CM PROCE (1) TIME SIE (11) TIME SIE (11) THAN THE (11) PEAX FLOW DOI:0005	Area	(ha)= 1 Imp(8)= 75. IMPERVIOUS .43 .80 1.00 61.64 .013 158.85 2.00 .64 .10 1.59 (ii) 2.00 .64 .10 1.50 65.22 66.02 .99 IED FOR PERVIOUS EDEPTICIENT. INCLUDE BASEF	57 00 Dir. Con PERVICUS (i) 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.36 1.58 30.66 66.02 .46 JS LOSSES: (Above) OR EQUAL LOW IF ANY.	*TOTALS*	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea Unit Hyd. Peak PEAX FLOW TIME TO PEAX RUNOFF VOLUME TOTAL RAINFALL FUNOFF COEFFIC (i) CM PROCE (ii) TIME SIE (iii) TIME SIE (iii) FEAX FLO 004:0005	Area 0 Tota:	(ha)= 1 Imp(8)= 75. IMPERVIOUS 43 80 1.00 61.64 .013 159.85 2.00 .64 .10 1.59 (ii) 2.00 65.22 66.02 .99 IND FOR PERVIOUS = Dep. Storage ULD BE SMALLER DEFFICIENT. INCLUDE BASEF.	57 00 Dir. Con PERVICUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.36 1.58 30.66 66.02 46 JS LOSSES: (Above) OR EQUAL LGW IF ANY.	*TOTALS* .130 (iii) 1.500 43.793 66.023 .663	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. OVE Storage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea Unit Hyd. Tpea Unit Hyd. Tpea FAX FLOW TIME TO PEAN KUNOFF COEFFIC (1) CM PROCE CM = 5 (11) TIME STE (111) PEAK FLO 004:0005	Area 0 Tota: (ha)= (hn)= (hn	(ha)= 1 Imp(8)= 75. IMPERVIOUS .43 .80 1.00 61.64 .013 159.85 2.00 .64 .10 1.59 (ii) 2.00 .64 .10 1.50 65.22 66.02 .99 INDER FOR PERVIOUS BMARLER OFFICIENT. INCLUDE BASEF.	57 00 Dir. Con PERVICUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.30 .14 .05 1.58 30.66 66.02 .46 JS LOSSES: (Above) OR EQUAL LGW IF ANY.	*TOTALS*	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Hannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. Tpea Unit Hyd. Tpea Unit Hyd. Tpea FEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC (1) CH PROCE CH = 5 (11) TIME STE THAN THE (iii) FEAK FLO 04:0005 BLOCK 2 APARTMENT DESIGN STANDHYD 03:BLN2 DT= 1.0 Surface Area Dep. Storage Average Slope	Area 0 Tota (ha) = (km) = (k	(ha)= 1 Imp(8)= 75. IMPERVIOUS .43 .80 1.00 61.64 .013 158.85 2.00 .64 .10 1.50 65.22 66.02 .99 ITED FOR PERVIOUS ENTRY INCLUDE BASEF. (ha)= 1 Imp(1)= 75 IMPERVIOUS .10	57 00 Dir. Con PERVICUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.36 1.58 30.66 66.02 .46 JS LOSSES: (Above) OR EQUAL LGW IF ANY.	*TOTALS*	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. Ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNGEF VOLUME TOTAL BAHRALL RUNGFF VOLUME TOTAL BAHRALL RUNGFF COEFFIC (i) CM PROCE CM' = 5 (ii) TIME STE THAN THE (iii) PEAK FLO 04:0005 BLOCK 2 APARTMENT DESIGN STANDHYD 03:BLN2 DT= 1.0 Surface Area Dep. Storage	Area 0 Tota: (ha) = (tra) = (tra	(hm)= 1 Imp(8)= 75. IMPERVIOUS 43 80 1.00 61.64 .013 156.85 2.00 1.59 (ii) 2.00 64 .10 1.50 65.22 66.22 66.22 .99 TED FOR PERVIOUS ESPANCIONE FOR PERVIOUS 1.50 1.50 1.50 1.50 1.50 1.50 1.50 1.50	57 00 Dir. Con PERVICUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 JS LOSSES: (Above) or EQUAL LOW IF ANY.	*TOTALS*	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. OVE Storage Coeff. Unit Hyd. Tpea FAX FLOW TIME TO FEAN ENNOFF VOLUME TOTAL RAINFALL EUNOFF COEFFIC (i) CM PROCE (ii) TIME STE (iii) THAN THE (iii) FEAN FLO D04:0005	Area Area	(hm)= 1 Imp(8)= 75. IMPERVIOUS 43 80 1.00 61.64 .013 156.85 2.00 1.59 (ii) 2.00 64 .10 1.50 65.22 66.02 .99 TED FOR PERVIOUS ESPANCIAL INCLUDE BASSET INCLUDE BASSET 1 Imp(1)= 75 IMPERVIOUS .52 .80 1.00 67.92	57 00 Dir. Con PERVICUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 JS LOSSES: (Above) or EQUAL LOW IF ANY.	*TOTALS*	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. OVE Storage Coeff. Unit Hyd. Tpea FAX FLOW TIME TO FEAN ENNOFF VOLUME TOTAL RAINFALL EUNOFF COEFFIC (i) CM PROCE (ii) TIME STE (iii) THAN THE (iii) FEAN FLO D04:0005	Area Area	(hm)= 1 Imp(8)= 75. IMPERVIOUS 43 80 1.00 61.64 .013 159.85 2.00 1.59 (ii) 2.00 1.50 65.22 66.02 .99 TED FOR PERVIOUS EDEPTICIENT. INCLUDE BASEF INCLUDE BASEF 1 Imp(*)= 75 IMPERVIOUS .52 .60 1.00 67.02 .013 159.85 2.00	57 00 Dir. Con PERVICUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 US LOSSES: (Above) OR EQUAL LOW IF ANY	*TOTALS*	
DESIGN STANDHYD 02:BLK1 DT= 1.0 Surface Area Bep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea ENORF VOLUME TOTAL PAINFALL RUNOFF COEFFIC (i) CN PROCE CN' = 5 (ii) TIME SIE THAN THE (iii) PEAK FLO 04:0005 BLOCK 2 APARTMENT DESIGN STANDHYD 03:BLN2 DT= 1.0 Surface Area Bep. Storage Average Slope Length Mannings n Max.eff.Inten. ove Storage Coeff. Unit Hyd. Tpea	(ha) = (ha) = (ha) = (m) = (im) =	(hm)= 1 Imp(8)= 75. IMPERVIOUS .43 .80 1.00 61.64 .013 159.85 2.00 .64 .10 1.59 (ii) 2.00 .64 .10 1.50 65.22 66.02 .99 TED FOR PERVIOUS EDEPTICIENT. INCLUDE BASEF INCLUDE BASEF 1 Imp(1)= 75 IMPERVIOUS .50 .100 1.00 1.00 1.00 1.00 1.00 1.00	57 00 Dir. Con PERVICUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 US LOSSES: (Above) OR EQUAL LOW IF ANY	*TOTALS* .130 (iii) 1.500 43.793 66.023 .663	
DESIGN STANDHYD OZ:BLK1 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. OVER STANDHYD FRAN FLOW TIME TO PEAK RUNGEF VOLUME TOTAL RAINFALL BURGEF COEFFIC (i) CM PROCE (ii) TIME SIE (iii) THE SIE (iii) PEAK FLO OU4:0005 BLOCK 2 APARTMENT DESIGN STANDHYD O3:BLN2 DT= 1.0 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.	(ha) = (ha) = (ha) = (m) = (im) =	(ha)= 1 Imp(8)= 75. IMPERVIOUS .43 .80 1.00 61.64 .013 158.85 2.00 1.59 (ii) 2.00 .64 .10 1.50 65.22 66.02 .99 IED FOR PERVIOUS EDE FOR PERVIOUS EDE SYMALLER DEFFICIENT. INCLUDE HASEF Impervious 1 Imp(8)= 75 IMPERVIOUS .60 1.00 67.02 .013 158.85 2.00 1.66 (ii)	57 00 Dir. Con PERVICUS (i) .14 1.50 1.00 40.00 .250 186.82 8.00 8.36 (ii) 8.00 .14 .05 1.58 30.66 66.02 .46 US LOSSES: (Above) OR EQUAL LOW IF ANY	*TOTALS*	

CN* = :	EDURE SELECTE 58.0 IA = EP (ET) SHOUL E STOPAGE COE DW DOES NOT I	D FOR PERV Dep. Stora D BE SMALL FFICIENT.	IOUS LOSS ge (Abov ER OR EQU	ES: e) AL		
0006			EFLOW IF	ANY.		
						
		********	,	******	*******	***********
LOCK 5 SWM						
ESIGN STANDHYD StBLK5 DT= 1.0	00 Total	Imp(i)=	90.00 b	ir. Con	n.(%)=	90.00
			PERV10	US (1)		
Dep. Storage	(ha) = (mm) =	.80	1.5	0		
Surface Area Dep. Storage Average Slope Length Mannings n	(12) = (≠) =	91.65	1.9 40.0	0		
			.25			
Max.eff.Inten	(mm/hr)= er (min)	158.85 2.00	25.5 17.0	0		
Storage Coeff. Unit Hyd. Tpe	. (min)= k (min)=	2.01 (i 2.00	17.0			
Unit Hyd. pea.	((CMS)=	-56	.0		*TOTALS	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME	(cms)= (hrs)=	.50 1.50	.0 1.7	1 5	.498 1.500	{iii}
TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALI BUNOFF COEFFIC	(mm) = L (mm) =	65.22 66.02	16.7 66.0	6 2	60.376 66.023	
RUNOFF COEFFIC	CIENT =	.99	. 2	5	.914	
	EDURE SELECTE 58.0 Ia =					
(ii) TIME ST	EP (DT) SHOUL STORAGE COE	D BE SMALL	ER OR EQU	AL		
(iii) PEAK FLA			EFLOW IF	ANY.		
0007						
**********		,,,,,	• • • • • • • • •	******	******	
TEPMINE INFLOW	TO FOND					
. ,		,			******	*******
D HYD (PSTDEV)		AREA	OPEAK	TPEAK	R.V.	DNF
	01:SFD	AREA (ha) 9.30 .57 .69 1.26	(cms)	(hrs)	(cm) 27.88	(cms)
+11	02 02:BLK1	.57	.130	1.50	43.79	.000
+11	03 03:BLK2 04 06:BLK5	1.26	,498	1.50	60.30	.000
	M 07:25TDEV					.000
OTE: PEAK FLO	IS DO NOT INC	LUDE BASEF	LOWS IF A	NY,		
		*******	* * * * * * * * *			*********
OUTE THROUGH PO	iD					
OUTE RESERVOIR	Reques	ted routin	g time st	ep = 1	.0 min.	
IN>07: (PSTDEV) JT<08: (PNDOUT)	1	OUTLF				:= =
	OUTFLO	W STORA } {ha.m	GE 0	UTFLOW (cms)	STOPAG (ha.m.	E)
	0.0	A 0000E+	nn i	025	.3535E+0	10
	.01	3 .1118E+	00	.029	.4837E+0	10
	.02	7 .5520E- 3 .1118E+ 7 .1700E+ 0 .2296E+ 3 .2908E+	00	.033	.6203E+0	0
ROUTING RESUL		i han i	QPEAK (cms)	TPEAK (hrs)	(122	1)
INFLOW >07: () OUTFLOW<08: ()	PHEOUT)	11.82	1.542	1.500 4.383	33.03	6
OVERFLOW<09: (1		.00	.000	.000		
	TOTAL NUMBER CUMULATIVE T	IME OF OVE	RFLOWS (hours)=	.00	
	PERCENTAGE O	F TIME OVE	RFLOWING	(%) =	.00	
	PEAK FLOW	REDUCTIO	N {Qout/0	in](i)=	1.651	
	TIME SHIFT O	F PEAK FLO	Я	(min) =	173.00 .3637E+00	
		036	- '			
:0009			*******	*****		
0009			*******	*****		
LOCK 3 COMMERCIA			********	*****		
	\L	********	*******	*****	******	*********

		3. Dougla	s Vallee	Limited
I TMDE	PVIOUS	PERVIOUS (i)		
Surface Area (ha)= Dep. Storage (mm)= Average Slope (%)= Length (m)= 7: Mannings n =	.72	.08 1.50		
Average Slope (%)=	1.00	1.00		
Length (m)= 73	3.03 .013	40.00 .250		
	. 00			
Max.eff.Inten.(rm/hr)= 15 over (cin) Storage Coeff. (cin)= Unit Hyd. Tpeak (cin)= Unit Hyd. peak (crs)=	2.00	6.00 5.89 (ii)		
Storage Coeff. (nin)=	1.76 (ii) 2.00	5.89 (ii) 6.00		
Unit Hyd. peak (cms)=	.61	.19	*TOTALS*	
PEAK FLOW (CES)=	.16		.251 (iii	1
PEAK FLOW (CES)= TIME TO PEAK (h/s)= RUNGOF VOLUME (ES)= TOTAL PANNFALL (ES)= RUNGOF COEFFICIENT =	.16 1.50 5.22 5.02	.10 1.53 43.58 66.02	1.500 53.321	
TOTAL PAINFALL (Em) = 6	5.02	66.02	66.023	
RUNOFF COEFFICIENT =	.99	.66	.808	
(i) CN PROCEDURE SELECTED FO	OR PERVIOU	S LOSSES: (Above)		
CN* = 58.0 Ia = Dep (ii) TIME STEP (DT) SHOULD BY THAN THE STOPAGE COEFFICE	SMALLER	OR EQUAL		
(iii) PEAK FLOW DOES NOT INCLU		OW IF ANY.		
004:0010				
•				
* SIMULATE STOPAGE ON BLOCK 3 TO RE	ELEASE AT	CONTROLLED RAT	i E	
1:				
***********************		**********	• • • • • • • • • • • • • • • •	******
ROUTE RESERVOIR ! Requested	routing t	ire step = 1	.0 min.	
ROUTE RESERVOIR Requested IN>04:(BLK3) OUT<01:(B3CTRL) =======	OUTLEON	STOPAGE TABLE		
1 OUTFLOW	STOPAGE	LOUTELOW	STOPAGE	
(cr.s)	(ha.m.) 0000E+00	(cms) .015 .000	(na.m.)	
ROUTING RESULTS ARE	EA OPE	AK TPEAK (hrs) 51 1.500 15 1.067 00 .000	R.V. (mm) 53.321	
INFLOW >04: (BLK3)	1) (CE	51 1.500	53.321	
INFLOW >04: (BLK3) OUTFLOW<01: (B3CTRL) OVERFLOW<02: (30VR)	0. 06 0. 06	15 1.067 00 .000	53.321	
TOTAL NUMBER OF CUMULATIVE TIME PERCENTAGE OF T	OF OVERFL	OWS (hours)=	.00	
PERCENTAGE OF T	IME OVERFL	OWING (F)=	.00	
DOME DICK TO	THE TANK	0	E 678	
PEAK FLOW R TIME SHIFT OF P				
MAXIMUM STOPAGE	E USED	(ha.m.)=	.2536E-01	
004:0011			· · · · · · · · · · · · · · · · · · ·	
+++++++++++++++++++++++++++++++++++++++	******	********	• • • • • • • • • • • • • • • • • • • •	******
* BLOCK 4 COMMERCIAL				
* ************************************				******
DESIGN STANDHYD Area () 05:BLK4 DT= 1.00 Total Imp			n.(%)= 45.00	ŀ
		PERVIOUS (i)		
Surface Area (ha)= Dep. Storage (mb)= Average Slope (t)= Length (m)= Pannings n =	1.26	.14		
Dep. Storage (ED)= Average Slope (t)=	.80 1.00	1.50		
Length (m) = 9	5.61	40.00		
		.250		
Max.eff.Inten.(gm/hr)= 15	8.85 2.00	639.53 6.00		
Storage Coeff. (min)=		6.22 (11)		
	2.00 .54	6.00 .18		
PEAK FLOW (cms)=	.28	.17	'TOTALS' ,434 (iii	.)
ETHE EO DENK (beek)	1.50	1.55	1.500	•
TOTAL PAINFALL (FIXE) = 6	5.22 5.02	43.58 66.02	53.321 66.023	
RUNOFF COEFFICIENT =	.99	.66	.808	
(i) CN PROCEDURE SELECTED FO	OR PERVIOU	S LOSSES:		
CN' = 58,0 Ia = Dep (ii) TIME STEP (DT) SHOULD B	E SMALLER	OR EQUAL		
THAN THE STORAGE COEFF1 (iii) PEAK FLOW DOES NOT INCL		ON IF ANY.		
004:0012				
·		***********	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	*******
* * SIMULATE STOPAGE ON 4 TO RELEASE	AT CONTRO	NIED DATE		
*	AI COMING	PDCD TALL		
**************************************				*****
I POUTE RESERVOIR I Pomported	routing t	ime step = 1	.0 min.	
1N>05:(BLK4	-	=		
OUTFLOW	STORAGE	STORAGE TABLE OUTFLOW	STOPAGE	
(cr.s)	(ha.s.) 0000E+00 1000E-03	(c=5)	(ha.m.) .1000E+01 .0000E+00	
.015	1000E-03	.000	.0003000	
ROUTING RESULTS AR		AK TPEAK		
(h	a) (cz	:5) (nrs)	(rm) 53.321	
OUTFLON<03: (B4CTRL) 1.	40 .0	15 .750	53.321	
OVERFLOW-04: (40VR)	0. 00	000.000	.000	
1				

C	UMULATIVE	R OF SIMULAT TIME OF OVER OF TIME OVER	RELOWS (hours)=)	
ī	PEAK FLON TIME SHIFT CAXIMUM ST	REDUCTION OF PEAK FLOW OPAGE USES	1	(min)=	3.459 -45.00 5446E-01)	
04:0013							
**************	*******	*********	*******	,,,,,,,		*****	******
TOTAL POST DEVELOR	MEN'T TOOM	STTP					
TOTAL TOST BUTSES	man mon	0112					
		********	******	,	******	****	*****
AUD HYD (PSTDEV)		AREA	QPEAK	TPEAK	R.V.	DWF	
1b1	. 08:PNDOUT	(ha) 11.82	(cms)	(hrs) 4.38	(mm) 33.04	(cms)	
	09:FNDOVE 01:B3CTRL	.00	.025 .000 .015	1.07	.00 53.32	.000	**DRY*
+1D4	02:30VR 03:84CTRL	.00	.000 .015 .000	1.07	.00 53.32	.000	**DRY*
	94:40VR	.00	.000	.00	.00	.000	* * DRY
SUX	05:PSTDEV		.055				
NOTE: PEAK FLOWS	DO NOT IN	CLUDE BASEFI	OWS IF A	SY.			
04:0014							
04:0002							
4:0002							
4:0002							
END UF RUN :							

START		dir.: H:\S	MHYM~1\1:	0034Y~1\			
77EDO - 00 hr	Rainfall	dir.: H:\S; dir.: H:\S;	MHYM~1\1	0034Y~1\			
TZERO = .00 hr METOUT= 2 (out NRUN = 005 NSTOPM= 1	put = METR	ICI					
# 1=CH50	STM						
D5:0002	TINS PHASE	5] Projec	t Number	: {10034	 1	*****	
Project Name: [Y Date : 02 Modeller : [T Company : G.	INS PHASE -11-2010 GS] Pouglas V	5] Projec	t Number	: {10034	1		
Froject Name: [Y Date : 02 Modeller : [T Company : G. License # : 3	INS PHASE -11-2010 GS] Pouglas V	5] Projec	t Number	: {10034	1		
5:0002	TINS PHASE -11-2010 GS] Pouglas V 5669969	5] Projec	t Number	; {10034			4+34+4
S:0002	Filena Coxxen	5] Project allee Limite	M-1\1003 CHICAGO	: {10034	O.SIM ESIGN DI	STRIB	UTI PAIN
S:0002- Project Name: [Y Date : 02 Modeller : [T] Company : G. License # : 3 D:0002- READ STOFM Ftotal = 72.96 Emi	Filena Corren	allee Limite te: H:\SWMH) ts: 50 YEAR TIME PAI hrs mm/f	M-1/1003 CHICAGO	(10034 4Y-1\CH5 4 HOUR D	O.SIM ESIGN DI	STRIB	UTI PAIN
STOO02 Project Name: [Y Date OZ DATE O	Filena Correl PAIN Filena Correl PAIN Filena Correl PAIN Filena 4.450	allee Limite Lim	M-1\1003 CHICAGO N TIM	4Y~1\CH5 4 HOUR D 4E PA 4x Ext./ 17 12.633 10.3	0.SIM ESIGN DI IN 7 hr 2 20 3	STRIB	PAIN EM/hr 5.790 5.330
Project Name: [Y Date Ozare Oz	Filena Corren PAIN Fall F	5] Project allee Limite Limite Limite H:\SWMH\ ts: 50 YEAR TIME PAI hrs mm/1.17 14.27 1.33 33.9(1.50 186.56 1.67 44.81	M-1\1003 CHICAGO N 1 1 1003 CHICAGO N 2 1 1003 CHICAGO N 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	4Y-1\CH594 HOUR D MY-1\CH594 HOUR D MX EXT 17 12.6 33 10.3 33 10.3 67 7.8	0.SIM ESIGN DI IN 7 hr 20 3 90 3	STRIB FIME hrs 3.17 3.33 3.50 3.67	PAIN mm/hr 5,790 5,330 4,980 4,650
5:0002	Filena Corren PAIN 13,990 4,450 5,090	5] Project allee Limite	M-1\1003 CHICAGO N TIM II h. 0 2. 0 2. 0 2.	4Y~1\CH5 4 HOUR D 4S FEE/ 33 10.3	0.SIM ESIGN DI IN 5 hr 5 90 3 90 3 60 3	STRIB TIME hrs 3,17 3,33	PAIN FM/hr 5.790 5.330 4.980
5:0002	Filena PANE PANE PANE PANE PANE PANE PANE PANE	5] Project allee Limite the H:\SMMH te: H:\SMMH pai hrs mm/t 1.17 14.27 1.50 186.58 1.67 44.81 1.83 23.44 2.00 16.26	M-1\1003 CHICAGO NN TIN III h. 00 2 00 2 00 2 00 2 00 2	4Y~1\CH5 4 HOUR D 4 S 527 17 12.6 33 10.3 50 8.8 67 7.8 83 6.9 00 6.3	0.SIM 0.SIM ESIGN DI IN 1 7 DO 1 3 00 1 3 60 1 3	STRIB FIME hrs 3.17 3.33 3.50 3.67 3.67 3.83	PAIN Em/hr 5.790 5.330 4.980 4.650 4.370 4.140
5:0002	Filena Corren PAIN FASSE Filena Corren Filena Corren PAIN Fright 3,990 4,450 5,990 7,290 9,530 9,530	TIME PAJ hrs mm/1.17 14.27 1.33 33.90 1.50 14.61 1.30 14.21 1.30 14.21 1.31 1.32 1.33 1.30 1.33 1.30 1.33 1.33 1.30 1.33 1.33	M-1\1003 CHICAGO N TH N C D 2 C N 2 C C C N 3 C C C N T T T T N C C C C N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T N T T N	417-1\CH54 4 HOUR D 428 E EM 47-1 12-6 50 8.8 67 7.8 83 6.9 90 6.3	0.SIM 0.SIM ESIGN DI IN 7 hr 7 90 3 90 3 60 3 60 3	STRIB FIME hrs 1.17 1.33 1.50 1.67 1.83 1.00	PAIN FM/hr 5.790 5.330 4.980 4.650 4.140
Froject Name: [Y Date : 02 Modeller : 17 Company : G. License # : 3	Filena Corren PAIN FASSE Filena Corren Filena Corren PAIN Fright 3,990 4,450 5,990 7,290 9,530 9,530	TIME PAJ hrs mm/1.17 14.27 1.33 33.90 1.50 14.61 1.30 14.21 1.30 14.21 1.31 1.32 1.33 1.30 1.33 1.30 1.33 1.33 1.30 1.33 1.33	M-1\1003 CHICAGO N TH N C D 2 C N 2 C C C N 3 C C C N T T T T N C C C C N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T T T N T N T T N	417-1\CH54 4 HOUR D 428 E EM 47-1 12-6 50 8.8 67 7.8 83 6.9 90 6.3	0.SIM 0.SIM ESIGN DI IN 7 hr 7 90 3 90 3 60 3 60 3	STRIB FIME hrs 1.17 1.33 1.50 1.67 1.83 1.00	FAIN FM/hr 5.790 5.330 4.980 4.650 4.140
## Project Name: 14	Filena Corren PAIN Filena Corren PAIN Filena Corren PAIN Filena Corren PAIN Filena PAIN Fi	TIME PAI hrs ms. 1.17 14.27 1.33 33.91 1.50 186.56 1.67 44.81 1.93 12.00 16.26	M-1\1003 CHICAGO N TH	417-1\CH55 417-1\CH55 417-1\CH56 417-1\CH56 417-12-6 33-10-3 350-8-8 66-7 66-7 66-7 66-7 66-7 66-7 66-7	0.5IM ESIGN DI IN 7 hr 20 3 90 3 60 3 60 4	STRIB brs 3.17 3.33 3.67 3.63 3.00	PAIN FM/hr 5.790 4.980 4.980 4.370 4.140
5:0002	Filena Corren Filena Corren Filena Corren Filena Corren PAIN i rri/hr i 3.990 i 4.450 i 5.900 i 5.970 i 7.290 i 9.530 i	TIME PAI hrs mm/1.17 14.27 1.33 33.95.51 1.63 24.81 2.00 16.26	M-1\1003 CHICAGO N TH	417-11-CH55 417-11-CH55 417-11-CH55 417-11-CH55 417-12-6	0.5IM 0.5IM 0.5IM ESIGN DI Thr 7 Thr 7	STRIBE hrs 3.17 1.33 1.50 1.63 1.00	PAIN 5.790 5.330 4.980 4.370 4.140
5:0002	Filena Corren PAIN : FASE : 13.990 ! 4.450 ! 5.990 ! 9.530 !	TIME PAI hrs mm/1.17 14.27 1.33 33.95.51 1.63 24.81 2.00 16.26	M-1\1003 CHICAGO N TH	417-11-CH55 417-11-CH55 417-11-CH55 417-11-CH55 417-12-6	0.5IM 0.5IM 0.5IM ESIGN DI Thr 7 Thr 7	STRIBE hrs 3.17 1.33 1.50 1.63 1.00	PAIN 5.790 5.330 4.980 4.370 4.140
## Project Name: [Y Date	Filena Corren Filena Corren Filena Corren PAIN Fribria 1,990 4,450 5,970 7,290 9,530 9,530 1,200	TIME PAI hrs mm/1 1.7 14.27 1.33 33.90 1.50 16.26 1.60 16.26	M-1\1003 CHICAGO N TIM II b O 2 00 2 00 2 01 2 01 3 02 3 03 3 04 5 05 5 06 5 07 6 08 7 09 7 09 7 09 7 09 7 09 7 09 7 09 7 09 7 09 7 09 7 09 7	4Y-1\CH5 4Y-1\CH5 4Y-1\CH5 4Y-1\CH5 4Y-1\CH5 4Y-1\CH5 4Y-1\CH5 4HOUR D 4R 5 Ext/ 17 12.6 633 10.3 667 7.8 83 6.9 90 6.3	0.5IM 0.5IM 0.5IM ESIGN DI Thr 7 Thr 7	STRIBE hrs 3.17 1.33 1.50 1.63 1.00	PAIN 5.790 5.330 4.980 4.370 4.140
5:0002	Filena Corren Filena Corren Filena Corren PAIN Fribria 1,990 4,450 5,970 7,290 9,530 9,530 1,200	TIME PAI hrs mm/1 1.7 14.27 1.33 33.90 1.50 16.26 1.60 16.26	M-1\1003 CHICAGO N TIN III b 00 2 00 2 00 2 00 2 01 3 07.00 D. PERVIOR 5.6.	4Y-1\CH5 4Y-1\CH5 4Y-1\CH5 4Y-1\CH5 4Y-1\CH5 4Y-1\CH5 4Y-1\CH5 4 HOUR D ME PA 8 Ext/ 17 12.6 6.3 33 10.3 6.9 0 6.3	0.5IM 0.5IM 0.5IM ESIGN DI Thr 7 Thr 7	STRIBE hrs 3.17 1.33 1.50 1.63 1.00	PAIN 5.790 5.330 4.980 4.370 4.140
Froject Name: [Y Date : 02 Modeller : 17 Company : G. License # : 3 Frod : 18 Frod : 1	Filena Corren Filena Filena Corren Filena Fi	TIME PAI hrs mm/1 1.7 14.27 1.33 33.90 1.50 16.26 1.60 16.26	M-1\1003 CHICAGO N TIN III D. O 2 O 2 O 2 O 3 O 3 O 5 O 5 O 5 O 5 O 6 O 7 O	## (10034 ## (10034 ## (10045) ## (10046) ## (10046) ## (10046) ## (10034) ## (1003	0.5IM 0.5IM 0.5IM ESIGN DI Thr 7 Thr 7	STRIBE hrs 3.17 1.33 1.50 1.63 1.00	PAIN 5.790 5.330 4.980 4.370 4.140
### STORM Froject Name: [Y Date OZ Modeller T Company G License # : 3	Filena Corren Filena Corren Filena Corren PAIN Fribria 1,990 4,450 5,970 7,290 9,530 9,530 1,200	TIME PAI hrs mm/1 1.7 14.27 1.33 33.90 1.50 16.26 1.60 16.26	M-l\1003 CHICAGO N TH LL h O 2 O 2 O 2 O 3 O 3 FERVIOR 9.30 PERVIOR 1.51	## (10034 ## (10034 ## (10045) ## (10046) ## (10046) ## (10046) ## (10034) ## (1003	0.5IM 0.5IM 0.5IM ESIGN DI Thr 7 Thr 7	STRIBE hrs 3.17 1.33 1.50 1.63 1.00	PAIN 5.790 5.330 4.980 4.370 4.140
## Project Name: [Y Date	Filena Corren Filena	TIME PAI hrs mm/1 1.7 14.2 1.33 33.90 1.00 16.26 1.7 14.2 1.33 33.90 1.00 16.26 1.7 14.2 1.33 23.90 1.00 16.26 1.7 14.2 1.33 23.90 1.00 1.00 1.30 1.30 1.30 1.30 1.30 1.3	M-1\1003 CHICAGO N TN IF h O 2 O 2 O 2 O 3 FERVIOR PERVIOR 40 .0 40 .0 40 .0 40 .0	4Y-1\CH54 4 HOUR D ME PA 48 EXT/ 17 12.65 50 8.88 83 6.9 900 6.3	0.5IM 0.5IM 0.5IM ESIGN DI Thr 7 Thr 7	STRIBE hrs 3.17 1.33 1.50 1.63 1.00	PAIN 5.790 5.330 4.980 4.370 4.140
## Project Name: [Y Date	Filena Corren Filena	TIME PAI hrs rm/h 1.7 14.27 1.33 33.90 1.00 249.00 .013 186.56 3.00 3.44 (115 186.56 1.00 24.46 (115 186.56 3.00 3.44 (115 186.56 3.44 (115 186.56 3.44 (115 186.56 3.44 (115 186.56 3.44 (115 186.56 3.44 (115 186.56 3.44	M-1\1003 CHICAGO N TH LL h O 2 O 2 O 2 O 3 O 3 O 5 O 6 O 6 O 7 O 6 O 7	ir. Consisting (i) (i) (ii) (ii) (ii) (ii) (ii) (iii) (iiii) (iiii) (iiii) (iiii) (iiii) (iiiii) (iiiiiii) (iiiiiiii	0.5IM 0.5IM 0.5IM ESIGN DI Thr 7 Thr 7	STRIBE hrs 3.17 1.33 1.50 1.63 1.00	PAIN 5.790 5.330 4.980 4.370 4.140
## Project Name: [Y Date	Filena FASE Title FASE Filena FASE Fil	TIME PAI hrs rm/h 1.7 14.27 1.33 33.90 1.00 249.00 .013 186.56 3.00 3.44 (115 186.56 1.00 24.46 (115 186.56 3.00 3.44 (115 186.56 3.44 (115 186.56 3.44 (115 186.56 3.44 (115 186.56 3.44 (115 186.56 3.44 (115 186.56 3.44	M-\\1003 CHICAGO N TH IF h. O 2 O 2 O 2 O 3 O 3 FROM 1 O 2 O 1 O 2 O 2 O 2 O 2 O 2 O 3 O 3 O 3 O 4 O 5 O 61.9 O 14.0 O 13 O 14.0 O 14.0 O 13 O 14.0 O 14.0 O 13	### (10034 ###################################	0.5IM 0.5IM ESIGN DI IN 71 hr 72 0.5IM 0.1 74 0.1	STRIB brs 1.37 1.37 1.30 1.67 1.60 1.60	PAIN 5.790 5.330 4.980 4.370 4.140
# Project Name: [Y	Filena Corren Filena Corren Filena Corren Filena Corren PAIN rn/hr 1,090	TIME PAI hrs rm/1 1.7 14.27 1.33 33.90 1.00 249.00 .013 186.56 3.00 3.44 (13 3.00 3.44	## Number Marker Marker Marker Marker	4Y-1\ch5 4 HOUR D ME PA 4S EXT/ 17 12.65 50 8.88 67 7.88 83 6.9 00 6.3	0.SIM	STRIB First 1,17 1,33 1,60 1,60 1,60 1,60 1,60 1,60 1,60 1,60	PAIN FEM./PE 5.330 4.990 4.590 4.310 4.140
# Project Name: Y# Project Name: Y# Project Name: Y# Project Name: Y# Date	Filena Corren Filena Filena Corren Filena Co	TIME PAI hrs mm/l hrs: 50 YEAR TIME PAI hrs mm/l hrs: 50 YEAR TIME PAI hrs mm/l hrs: 50 YEAR TIME PAI hrs: 50 Y	## Number Mail 1003 CHICAGO Mail 1003 CHICAGO Mail 100 2 Mail 100 3 PERVIOR Mail 100 100 Mail 1	4Y-1\ch5 4 HOUR D ME PA 4S EXT/ 17 12.6 50 8.8 83 6.9 90 6.3 10.3 55 (1) 6 90 6.3	1	STRIB brs i.17 i.33 i.67 i.650 i.67 i.630 i.	UFI PAIN fm/hr 5.330 4.590 4.590 4.140
# Project Name: Y	Filena (Signature) (Filena (Fi	### Project ### Allee Limite ### Allee Limite ### Allee Limite ### PAI ### PAI ### ### ### ### ### ### ### ### ###	## Number Mark 1003 CHICAGO	#Y-1\ch5 4 HOUR D 4 HOUR D 4 HOUR D 4 HOUR D 5 Hour D 6 Hour D	1	STRIB brs 1.17 1.33 1.67 1.600	UFI PAIN fm/hr 5.330 4.590 4.590 4.140
# Project Name: [Y# Date : 102 # Project Name: [Y# Date : 0.2 # Modeller : [T	Filena (Silena (Filena	### Project ### Allee Limite ### Allee Limite ### Allee Limite ### PAI ### PAI ### Ind. ## Ind. ### Ind. ### Ind. ### Ind. ### Ind. ### Ind. ### Ind. ### Ind. ### Ind. ### Ind. ##	## Number Mark 1003 CHICAGO Mark	#Y-1\ch5 4 HOUR D 5 H	0.5IM 0.5IM ESIGN DI IN 7 hr 90 3 90 3 90 3 90 3 90 3 90 4 100 7 100 7	STRIB brs 1.17 1.33 1.67 1.600	PAIN FEM./PE 5.330 4.990 4.590 4.310 4.140
# Project Name: Y # Project Name: Y # Project Name: Y # Date	Filena Corren Fall Fall Filena Corren A.450 Foll A.50 Foll A.50 Foll A.50 Foll A.60	TIME PAI hrs mm/? 1.7 14.21 1.33 33.91 1.60 16.26 1.60 16.26 1.60 24.81 1.83 23.44 2.00 16.26 1.00 24.00 24.00 24.00 24.00 24.00 3.44 1.00 3.44 1.00 3.44 1.00 3.44 1.00 3.44 1.00 2.013	M-1\1003 CHICAGO N TIM LL h O 2 O 2 O 2 O 3 O 3 O 3 O 1 O 2 O 1 O 2 O 1 O 2 O 2 O 2 O 3 O 3 O 3 O 3 O 40.0 O 5 O 61.9 O 14.0 O 6 O 12 O 13 O 14.0 O 14.0 O 17.0 O 14.0 O 17.0 O 1	ir. Connus. (i) 60 60 61 61 62 63 63 63 63 63 64 65 65 65 65 65 65 65 65 65 65 65 65 65	1	STRIB brs 1.17 1.33 1.67 1.600	UFI PAIN fm/hr 5.330 4.590 4.590 4.140
STOOD2	Filena Corren Fall Fall Filena Corren A.450 Foll A.50 Foll A.50 Foll A.50 Foll A.60	TIME PAI hrs mm/h 1.7 14.27 1.33 33.91 1.62 1.62 1.62 1.63 1.63 1.63 1.63 1.63 1.63 1.63 1.63	M-1\1003 CHICAGO N TIM LL h O 2 O 2 O 2 O 3 O 3 O 3 O 1 O 2 O 1 O 2 O 1 O 2 O 2 O 2 O 3 O 3 O 3 O 3 O 40.0 O 5 O 61.9 O 14.0 O 6 O 12 O 13 O 14.0 O 14.0 O 17.0 O 14.0 O 17.0 O 1	ir. Connus. (i) 60 60 61 61 62 63 63 63 63 63 64 65 65 65 65 65 65 65 65 65 65 65 65 65	1	STRIB brs 1.17 1.33 1.67 1.600	UFI PAIN fm/hr 5.330 4.590 4.590 4.140

		. sougaco	
**************************************	, , , , , , , , , , , , , , , , , ,	************	*****
* BLOCK 1 TOWNHOUSES			
******************			*******
DESIGN STANDHYD 02:BLK1 DT= 1.00	Area (ha)= . Total Imp(t)= 75.	57 00 Dir. Conn.(e)= 38.00
Surface Area (h	IMPERVIOUS	FERVIOUS (i)	
Surface Area (h Dep. Storage (r Average Slope (Length (Mannings n	m)= .43 m)= .80 (%)= 1.00	1.50	
Length (Mannings n	(%) = 1.00 (m) = 61.64 = .013	40.00 .250	
Max.eff.Inten.(rm/h	vrl= 186.56	234 31	
		8.00 7.67 (ii)	
over (mi Storage Coeff. (mi Unit Hyd, Tpeak (mi Unit Hyd. peak (cm	in)= 1.00 =5)= .83	8.00 .15	
BENY PLOY	11	.06	TOTALS* .157 (iii)
TIME TO PEAK (he RUNOFF VOLUME (E TOTAL PAINFALL (E	rs)= 1.50 m)= 72.16	1.58 35.73	1.500 49,575
TOTAL PAINFALL (E RUNOFF COEFFICIENT		72.96 .49	72.962 .679
(i) CN PROCEDURE	SELECTED FOR PERVIOU	s Losses:	
CN* = 50.0 (ii) TIME STEP (DT	<pre>1a = Dep. Storage 1) SHOULD BE SMALLER</pre>	(Above) OR EQUAL	
THAN THE STOP	RAGE COEFFICIENT. ES NOT INCLUDE BASEFL		
005:0005			*************
* *			
* BLOCK 2 APARTMENTS *			
* *********			4,,,,,,,,,,,,,,
) DESIGN STANDHYD	Area (ha)= .	69	
03:BLK2 DT= 1.00	Area (ha)= . Total Imp(%)= 75.	00 Dir. Conn. (e)= 38.00
Surface Area (h	IMPERVIOUS	PERVIOUS (1)	
Surface Area (h Dep. Storage (m Average Slope (= .80 = 1.00	1.50	
Length (Hannings n	(t) = 1.00 (z) = 67.82 = .013	40.00	
		234.31	
Max.eff.Inten.(mm/h over (mi Storage Coeff. (mi		B.00	
Unit Hyd. Tpeak (mi Unit Hyd. peak (cm	in)= 2.00	8.00 .14	
		*	TOTALS* .190 (iii)
TIME TO PEAK (br	(s)= 1.50	1.58	1.500 49.575
RUNOFF VOLUME (F TOTAL RAINFALL (F RUNOFF COEFFICIENT	m)= 72.16 m)= 72.96	72.96	72.962
		.49	.679
$CN^{+} = 58.0$	SELECTED FOR PERVIOU Ia = Dep. Storage	(Above)	
THAN THE STOP	N) SHOULD BE SMALLER PAGE COEFFICIENT.		
(111) PEAK PLOW DOE	ES NOT INCLUDE BASEFL		
005:0006			
*	***************************************	************	*************
* BLOCK 5 SWM			
> >			
DESIGN STANDHYD 06:BLK5 DT= 1.00	Area $\{na\}=1$. Total $Imp(\ell)=90$.	26 00 Dir. Conn.(E)= 90.00
Surface Area (h Dep. Storage (m Average Slope (Length (Mannings n	IMPERVIOUS	PERVIOUS (i)	
Surface Area (h Pep. Storage (h	na)= 1.13 mi)= .80	.13 1.50	
Average Stope ((m) = 91.65	1,00 40.00	
Mannings n	= .013	,250	
Max.eff.Inten.(rm/h over (mi Storage Coeff. (mi Unit Hyd. Tpeak (mi Unit Hyd. peak (cm	(n) 2.00	35.64 15.00	
Storage Coeff. (mi Unit Hyd. Tpeak (mi	(n) 2.00 (n)= 1.89 (ii) (n)= 2.00	15.02 (11) 15.00	
Unit Hyd. peak (cr	is)≃ ,58	.00	TOTALS*
PEAK FLOW (cm TIME TO PEAK (hr	ns)= .58 rs)= 1.50	.01 1.72	.587 (111) 1.500
RUNOFF VOLUME (F TOTAL PAINFALL (F	m)= 72.16 m)= 72.96	72.96	66.945 72.962
PEAK FLOW (CT TIME TO PEAK (THE RUNGOFF VOLUME (CT TOTAL PAINFALL (TOTAL PA	= .99	.27	.918
CN+ = 58.0	Ia = Dep. Storage	(Above)	
(ii) TIME STEP (DT THAN THE STOP	r) SHOULD BE SMALLER PAGE COEFFICIENT.	OR EQUAL	
(iii) PEAK FLOW DOE	ES NOT INCLUDE BASEFL		
005:0007			
***************************************		*******	************
. DETERMINE INFLOW TO PO	OND		

ADD HYD (PSIDEV) ID: NHYD	**
ADD HYD (PSTDEV) ID: NHYD	
SUM 07:PSTDEV 11.82 1.905 1.50 37.76 .000	
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.	
005:0008	**
•	
+ POUTE THROUGH FOMD	
+ KOOLE THROUGH FOAD	
	•
POUTE RESERVOIR Requested routing tire step = 1.0 min.	
TN>07: (PSTDEV) CUT<08: (PNDOUT) CUT<08: (PND	
(cms) (ha.m.) (cms) (ha.m.)	
.007 .5520E-01 .027 .4178E+00	
,013 .1118E+00 .029 .4837E+00	
.020 .2296E+00 1 .033 .6203E+00	
(cms) {ha.m.} (cms) {ha.m.} (nms) (ha.m.) (nms) (nms	
ROUTING RESULTS AREA QPEAK TPEAK R.V.	
(ha) (cma) (hrs) (cma)	
INFLOW >07: (PSTDEV) 11.82 1.905 1.500 37.763	
ROUTING RESULTS AREA QPEAK TPEAK R.V.	
TOTAL NUMBER OF SIMULATED OVERFLOWS = 0 COMMLATIVE THIN DO VOERFLOWS (hours) = .00 PERCENTAGE OF THE OVERFLOWING (%) = .00	
PERCENTAGE OF TIME OVERFLOWING (%)= .00	
PEAK FLOW REDUCTION [Qout/Qln](%)= 1.434	
PEAK FLOW REDUCTION [Qout/Qin](8)= 1.434 TIME SHIFT OF PEAK FLOW (min)= 168.00 MANIMUM STOPAGE USED (ha.n.)=.4192E+00	
MAXIMUM STOPAGE USED (ha.m.)=.4182E+00	
005:0009	
•	
•	
* BLOCK 3 COMMERCIAL	
•	

DESIGN STANDRYD Area (ha)= .80	
DESIGN STANDHYD	
DESIGN STANDHYD Area (ha) = .80 04:BLK3 \ \bar{b}(7 = 1.00) Total lrp(f) = 90.00 \text{ Dir. Conn.(f)} = 45.00 \\ IMPERVIOUS FREVIOUS (1) Surface Area (ha) = .72	
DESIGN STANDHYD Area (ha) = .80 04:BLK3 \ \bar{b}(7 = 1.00) Total lrp(f) = 90.00 \text{ Dir. Conn.(f)} = 45.00 \\ IMPERVIOUS FREVIOUS (1) Surface Area (ha) = .72	
DESIGN STANDHYD Area (ha) = .80 04:BLK3 \ \bar{b}(7 = 1.00) Total lrp(f) = 90.00 \text{ Dir. Conn.(f)} = 45.00 \\ IMPERVIOUS FREVIOUS (1) Surface Area (ha) = .72	
DESIGN STAYDHYD	
DESIGN STAYDHYD Area (ha)= .80 0415LK3 DT=1.00 Total lrp(i)= 90.00 Dir. Conn.(i)= 45.00	
DESIGN STANDHYD	
DESIGN STANDHYD Area (ha)= .80 041BLK3	
DESIGN STAYDHYD	
DESIGN STAYDHYD	
DESIGN STANDHYD Area (ha) = .80 141BLK3 DT = 1.00 Total Irp(f) = 90.00 Dir. Conn.(f) = 45.00	
DESIGN STAYDHYD	
DESIGN STAYDHYD	
DESIGN STANDHYD Area (ha) = .80 041BLK3 DT = 1.00 Total lrp(i) = 90.00 Dir. Conn.(i) = 45.00	
DESIGN STANDHYD Area (ha) = .80 041BLK3 DT = 1.00 Total lrp(f) = 90.00 Dir. Conn.(f) = 45.00 MMERRYIOUS PERVIOUS (1) Surface Area (ha) = .72 .08 Dep. Storage (m) = .80 1.50 Average Slope (f) = 1.00 1.00 Length (m) = .73.03 40.00 Mannings n = .013 .250 Max.eff.Inten.(mm/hr) = 186.56 792.82 Over (min)	
DESIGN STANDHYD Area (ha) = .80 041BLK3 DT = 1.00 Total lrp(i) = 90.00 Dir. Conn.(i) = 45.00	• • •
DESIGN STANDHYD Area (ha)= .80 04:BLK3 DT=1.00 Total ltp(t)= 90.00 Dir. Conn.(t)= 45.00 Surface Area (ha)= .72 .08 .08 .08 .08 .09 .00 .0	• • •
DESIGN STAYDHYD	• • •
DESIGN STANDHYD	• • •
DESIGN STANDHYD Area (ha)= .80 04:BLK3 DT=1.00 Total ltp(t)= .90.00 Dir. Conn.(t)= .45.00 Surface Area (ha)= .72 .08 Dep. Storage (cm)= .80 1.50 Average Slope (t)= .1.00 1.00 Length (m)= .73.03 40.00 Mannings n .013 .250 Max.eff.Inton.(rm/hr)= .86.56 792.82 Over (min) 2.00 5.00 Storage Coeff. (min)= 1.65 (ii) 5.44 (ii) Unit Hyd. Tpaak (min)= 2.00 5.00 Unit Hyd. Tpaak (min)= 2.00 5.00 Unit Hyd. Tpaak (min)= 2.00 5.00 Unit Hyd. Peak (cms)= .63 .21 *TOTALS* FEAK FLOM (cms)= .19 .13 .310 (iii) TIME TO PEAK (hrs)= 1.50 1.53 1.500 RUNOFF VOLUME (mn)= .72.16 49.78 59.854 TOTAL RAINFALL (rm)= .72.96 72.96 72.962 EUNOFF COEFFICIENT = .99 .66 .820 (i) Ch PROCEDURE SELECTED FOR PERVIOUS LOSSES: Ch'= .58.0 Ia = Dep. Storage (Above) ITHMS TOFF (hT) Hyd. DES SKOLLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) FEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. ROUTE RESERVOIR Requested routing time step = 1.0 kin. IM-04(1BK3) UNITED STORAGE (UNITED STORAGE (UNITE	• • •
DESIGN STANDHYD Area (ha)= .80 041BLK3 DT=1.00 Total ltp(t)= .90.00 Dir. Conn.(t)= .45.00 Surface Area (ha)= .72 .08 .08 .09 .00 Dep. Storage (cm)= .80 1.50 .00	• • •
DESIGN STANDHYD	• • •
DESIGN STANDHYD	• • •

005:0011		,,,,,,,,,,,,,		******		*****	****
* *							
* BLOCK 4 COMMERCIA	AT.						
*************		*********		*****		*****	*****
DESIGN STANDHYD 05:BLK4 DT= 1.0	Area Total	{ha}= . Imp(8}= 9	1.40 0.60 D	ir, Cons	1.(E)= 4	15.00	
**		THREBUIANIE	PERVIC	US (i)			
Surface Area Dep. Storage Average Slope Length Mannings n	(ha) = (rm) =	1.26	1.5	0			
Average Slope Length	(E) = (m) = =	96.61 .013	1.0 40.0 .25	10			
Mannings n Max.eff.Inten		106 \$6	780.6				
Storage Coaff	(min)=	1 95 /11	6.0 5.7	0 7 (11)			
Unit Hyd. Tpe: Unit Hyd. peal	ak (min)= k (cms)=	2.00 .57	6.0 .1	9			
PEAK FLOW	(CES)=	.32 1.50	1.5	2	'TOTALS' .525 1.500	(iii)	
TIME TO PEAK RUNOFF VOLUME TOTAL PAINFALI	(hrs)= (mm)=	72.16 72.96	49.7 72.9	8	59.854 72.962		
RUNOFF COEFFIC	CIENT =	.99	.6	18	.820		
CN* =	58.0 Ia =	ED FOR PERVI Dep. Storag	e (Abov	re)			
(ii) TIME ST THAN TH (iii) PEAK FLO	E STORAGE CO	LD BE SMALLE EFFICIENT.					
(111) PEAK ELA		INCLUDE BASE	e LON IF				
005:0012		******		******			.,,,,,
•							
* SIMULATE STOPAGE	ON 4 TO REI	EASE AT CONT	FOLLED F	PATE			
****************		********	******	*****		*****	*****
ROUTE RESERVOIR	l Reque	sted routing	time st	ep = 1	.0 mln.		
IN>05: (BLK4) OUT<03: (B4CTRL)	i ==== OUTFI	OW STOPAG	STORAGE C	E TABLE SUTFLOW	STOPAGE	== E	
	(ca	OOTLFO OO STOPAG (ha.m. 000 .0000E+0 015 .1000E-0	0	.015	(ha.m.)	Ĺ	
DOUBTHG DEGIN		015 .1000E-0	3	,000	.0000E+0		
POUTING RESULT		AREA Q (ha) (1.40	cms)	TPEAK (hrs) 1.500	59.85	!	
INFLOW >05: { OUTFLOW<03: { OVERFLOW<04: {-	34CTRL) 4OVR	1.40	.525 .015 .000	.833	50 85:	•	
	CUMULATIVE PERCENTAGE	R OF SIMULAT TIME OF OVER OF TIME OVER	FLOWS (FLOWING	(hours)= (%)=	.00		
	PEAK FLOW	reduction	[Oout/C)ini(t)=	2.859		
	TIME SHIFT MAXIMUM ST	FEDUCTION OF PEAK FLOW OPAGE USED		(min)= (ha.m.)=	-40,00 6394E-01.		
005:0013	*******						
* TOTAL POST DEVEL	OSMENT FROM	SITE					
•							

[ADD HYD (PSIDEV)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (rm) 37.76	DWE (CES)	
+1	D1 08:PNDOUT D2 09:PNDOVE D3 01:B3CTRE	.00	.027 .000 .015	4.30 .00 1.07	.00	.000	**DRY**
+1:	D3 01:B3C1R1 D4 02:30VR D5 03:B4CTR1	.00	.000	.00	.00	.000	**DRY**
+1:	D6 04:40VR		.000	.00	.00	.000	**DRY**
	UM 05:PSTDE				41.23	.000	
NOTE: PEAK FLO							
005:0014							
005:0002							
** END OF RUN :							
************					* * * * * * * * *	• • • • •	******
START	Project	dir.: H:\SW	MHYM~1\1	100347~1	\		
TZERO = .00 METOUT= 2 (o	Mainial: hrs on utout = Mare	l dir.: H:\SW 0 RIC)	anim-1()	1~100001	`		
NETONE 2 (6 NEUN = 006 NETORM= 1	_spac ribil						

(n. \ FBIDEV. OC				
006:0002	*********			*****
+# Project Varar [VING D	UNCE SI Dro	iect Number:		
*# Date : U2-11-2 *# Modeller : [TGS]	:010			
# Date : 02-11-2 ## Modeller : [TGS] ## Company : G. Doug ## License # : 356896	las Vallee Li c	uited		
*#*****************	**********	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	************	* * * * * * * * * * * * * * * * * * * *
006:0002				
	4 \ w-1 er	201204 15 100 24 12	11 cu100 cm	
READ STORM F Ptotal= 83.90 nm C	omments: 100 Y	EAR CHICAGO 4	HOUR DESIGN STO	PM DIS
TIME PAI	N I TIME	BAIN I TIME	RAIN TIM	E PAIN
hrs rm/h	r hrs r	=/hr hrs	PAIN TIME FRANCE TIME FRAN	s cm/hr
.17 4.50	10 1.17 16 10 1.33 41	070 2.17	12.120 3.1	6.100
.50 5.82	0 1.50 205	.920 2.50	10.310 3.50	0 5.660
.83 8.41	0 1.83 29	.170 2.83	8.030 3.8	3 4.980
1.00 11.07	0 2.00 19	1.280 3.00	7,240 4.0	0 4.700
006:0003				
006:0003	***********	**********	.,,,,,,,,,,,,,,,,	*******
:				
* SFD				
* *				
*****************	***********	*********		
	Area (ha)=	9.30		
DESIGN STANDHYD 01:SFD DT= 1.00	Total Imp(%)=	37.00 Dir	. Conn.(1)= 16	.00
	IMPERVIOU		(i)	
Surface Area (ha Dep. Storage (mm	1)= 3.44	5.06 1.50		
Average Slope (t	1) = .80 1) = 1.00 1) = 249.00 = .013	1.00		
Length (r Mannings n	1) = 249.00 = .013	40.00 .250		
	205.02	70 63		
Hax.eff.Inten.(rm/hr over {min Storage Coeff. {min Unit Hyd. Tpeak {min Unit Hyd. peak {crs	i) 3.00	13.00		
Storage Coeff. (min	1)= 3.31	(11) 12.83	(ii)	
Unit Hyd. peak (cms	.)= .35	.09		
PEAK FLOW (cms	.1= .80	.80	101,000	iii)
PEAK ELOW (cms TIME TO PEAK (hrs RUNOFF VOLUME (mm TOTAL PAINFALL (mm RUNOFF COEFFICIENT)= 1.50	.80 1.68 31.04	1.517	,
RUNOFF VOLUME (F::: TOTAL PAINFALL (F:::	n)= 83.10 n)= 83.90	83.90	83.902	
RUNOFF COEFFICIENT	= 99	.37	.469	
(i) ON PROCEDURE S	ELECTED FOR PE	RVIOUS LOSSES	:	
$CM^* = 58.0$	Ia = Dep. Sto	rage (Above)		
/よより totale さつせん (DC)		TIED OF BOUNT		
(ii) TIME STEP (DT) THAN THE STOPA	GE COEFFICIENT	LLER OR EQUAL '.		
	GE COEFFICIENT	LLER OR EQUAL '.	γ.	
THAN THE STOPA (iii) PEAK FLOW DOES	GE COEFFICIENT	LLER OR EQUAL		
THAN THE STOPA (iii) PEAK FLOW DOES	GE COEFFICIENT	LLER OR EQUAL		
THAN THE STOPA (iii) PEAK FLOW DOES	GE COEFFICIENT	LLER OR EQUAL		
THAN THE STOPA (iii) PEAK FLOW DOES	GE COEFFICIENT	LLER OR EQUAL		
THAN THE STOPA (iii) PEAK FLOW DOES 006:0004	GE COEFFICIENT	LLER OR EQUAL		
THAN THE STOPA (1ii) PEAK FLOW DOES 006:0004 BLOCK 1 TOWNHOUSES	GE COEFFICIENT	LLER OR EQUAL	************	
THAN THE STORM (1ii) PEAK FLOW DOES 006:0004 BLOCK 1 TOWNHOUSES	GE COPFICIENT	LLER OR EQUAL		
THAN THE STORM (1ii) PEAK FLOW DOES 006:0004 BLOCK 1 TOWNHOUSES	GE COPFICIENT	LLER OR EQUAL		
THAN THE STORM (1ii) PEAK FLOW DOES 006:0004 BLOCK 1 TOWNHOUSES 1 DESIGN STANDHYD 1 02:BLK1 DT= 1.00	GE COEFFICIENT NOT INCLUDE E Area (ha)= Total Inp(%)=	LLER OR EQUAL: Selection IF AN .57 75.00 Dir	. Conn. (E)= 38	
THAN THE STORM (1ii) PEAK FLOW DOES 006:0004 BLOCK 1 TOWNHOUSES 1 DESIGN STANDHYD 1 02:BLK1 DT= 1.00	GE COEFFICIENT NOT INCLUDE E Area (ha)= Total Inp(%)=	LLER OR EQUAL: Selection IF AN .57 75.00 Dir	. Conn. (E)= 38	
THAN THE STORM (1ii) PEAK FLOW DOES 006:0004 BLOCK 1 TOWNHOUSES 1 DESIGN STANDHYD 1 02:BLK1 DT= 1.00	GE COEFFICIENT NOT INCLUDE E Area (ha)= Total Inp(%)=	LLLER OR EQUAL : 1. CARPELOW IF ANY 57 75.00 Dir 18 PERVIOUS 144	. Conn. (E)= 38	
THAN THE STORM (iii) PEAK FLOW DOES OGG: 0.004 BLOCK 1 TOWNHOUSES DESIGN STANDHYD 02:BEKI DI= 1.00 Surface Area Charles Dep. Storage Current Average Slope Length Creater Length Creater Length Creater	Area (ha)= Total Inp(E)= IMPERVIOU 13 = 1.00 13 = 1.00	LLLER OR EQUAL: 1: LASEFLOW IF ANY .57 75.00 Dir IS PERVIOUS .14 1.50 1.00 40.00	. Conn. (E)= 38	
THAN THE STORM (iii) PEAK FLOW DOES OGG: 0.004	Area (ha)= Total Inp(F)= IMPERVIOU 13 = 1.00 15 = 0.01 10 = 0.01	LLLER OR EQUAL: 1: ASSETLOW IF ANY 57 75.00 Dir IS PERVIOUS 1.00 40.00 .250	. Conn. (E)= 38	
THAN THE STORM (iii) PEAK FLOW DOES 006:0004 BLOCK 1 TOWNHOUSES 1 DESIGN STANDHYD 1 02:BLKI DT= 1.00 Surface Area (har Dep. Storage (manual per storage) Length (mannings n Max.eff.Inten. (mm/hr	Area (ha)= Total Inp(%)= 1MPERVIOL 1	LLER OR EQUAL:	. Conn. (E)= 38	
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Imp(%)= 1,00 1)= 1,00 1)= 1,00 1)= 1,00 1,00 1,00 1,00 1,00 1,00 1,00 1,0	LLLER OR EQUAL:	. Conn.(E)= 38	
THAN THE STORM (iii) PEAK FLOW DOES 006:0004 * BLOCK I TOWNHOUSES 1 DESIGN STANDHYD 102:BLKI DT= 1.00 Surface Area (ha Dep. Storage (mr. Average Slope the Mannings n Max.eff.Inten.(mr/hr over train Storage Coeff. min Storage Coeff. min Storage Coeff. min Unit Hyd. Tpeak (min the Myd. Tpeak	Area (ha)= Total Inp(#)= **MPERVIOU** **MPERVIOU** **J** *	LLLER OR EQUAL: 1: 1ASSEFLOW IF ANY .57 75.00 Dir 1S PERVICUS .14 1.50 1.00 40.00 .250 266.05 7.00 (ii) 7.14	. Conn.(E)= 38	
THAN THE STORM (iii) PEAK FLOW DOES 006:0004 * BLOCK I TOWNHOUSES 1 DESIGN STANDHYD 102:BLKI DI= 1.00 Surface Area (ha Dep. Storage (mr. Average Slope It Mannings n Max.eff.Inten.(mr/hr. over train Storage Coeff. mi. Unit Hyd. Teak inin Unit Hyd. Peak	Area (ha)= Total Imp(N)= 1MPERVIOU 1)= 1.00 1)= 1.01 1 1.01	LLLER OR EQUAL: 1. ASSETLOW IF ANY 5. 775.00 Dir 1. 14 1.50 1.00 40.00 .250 286.05 (ii) 7.14 7.00 .16	. Conn.(§)= 38 (i) (ii) *TOTALS*	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= IMPERVIOL 1 1.00	LLER OR EQUAL:	(ii)	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004 * BLOCK I TOWNHOUSES * DESIGN STANDHYD 102:BLKI DT= 1.00 Surface Area (ha Dep. Storage (mr. Average Slope the Mannings n Max.eff.Inten.(mr/hr over train Storage Coeff. min Unit Hyd. Tpeak inin Unit Hyd. Tpeak inin Unit Hyd. peak (cres PEAK FLOW (cres TIME TO PEAK (hrs	Area (ha)= Total Imp(#)= **MPERVIOU** **J** **J	LLER OR EQUAL :	(ii) 'TOTALS' .185 (.1.500 58.898	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004 * BLOCK I TOWNHOUSES * DESIGN STANDHYD 102:BLKI DT= 1.00 Surface Area (ha Dep. Storage (mr. Average Slope the Mannings n Max.eff.Inten.(mr/hr over train Storage Coeff. min Unit Hyd. Tpeak inin Unit Hyd. Tpeak inin Unit Hyd. peak (cres PEAK FLOW (cres TIME TO PEAK (hrs	Area (ha)= Total Inp(%)= 1MPERVIOU 1)= .00 1)= 1.00 1)= 1.00 1)= 1.00 1)= 1.50 1)= 1.50 1)= 3.10 1)= 3.10 1)= 3.10	LLLER OR EQUAL: 1. ASSETLOW IF ANY 5.7 75.00 Dir 1. 14 1.50 1.00 40.00 .250 286.05 7.00 (ii) 7.14 7.00 .16 .07 1.57	(ii) 'TOTALS' .185 (1500	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Inp(%)= IMPERVIOL 10 1.00 10	LLLER OR EQUAL: ASSETLOW IF ANY 57 75.00 Dir IS PERVIOUS .14 1.50 1.00 40.00 .250 286.05 7.00 (ii) 7.14 7.14 7.16 83.90 .53	(ii) *TOTALS* .185 (.1.500 .58.898 .8.98 .702	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Inp(%)= NPERVIOL 1 1.00 1 205.92 1 1.00 1 1 1 1.00 1 1 1 1.00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	LLER OR EQUAL:	(ii) *TOTALS* .185 (.1.500 .58.898 .8.98 .702	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Inp(*)= IMPERVIOU *** ** ** ** ** ** ** ** ** ** ** ** *	LLER OR EQUAL 1. TABSEFLOW IF AN .57 75.00 Dir IS PERVIOUS .1.4 1.50 1.00 40.00 .250 286.05 286.05 206.01 7.00 1.67 44.06 83.90 ERVIOUS LOSSES rage (Above)	(ii) *TOTALS* .185 (.1.500 .58.898 .8.98 .702	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Inp(%)= MPERVIOL	LLER OR EQUAL: 1. ASSETION IF AN' 57 75.00 Dir 18 PERVIOUS 1.04 1.50 1.00 40.00 .250 286.05 7.00 (ii) 7.14 7.14 4.06 83.90 .53 ERVIOUS LOSSES prage (Above) LLER OR EQUAL:	(ii) 'TOTALS' .185 (.1.500 58.898 83.992 .702	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Inp(%)= MPERVIOL	LLER OR EQUAL	(ii) 'TOTALS' .185 (.1.500 58.898 83.992 .702	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Inp(#)= IMPERVIOU 1)= .00 1)= 1.00 1)= 1.00 1)= 1.43 1)= 1.43 1)= 1.50 1)= 1.50 1)= 3.10 1)= 3.10 1]= 1.50 1]= 1.50 1]= 1.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 6.50	LLER OR EQUAL: ASSETION IF AN 57 75.00 Dir IS PERVIOUS .14 1.50 1.00 40.00 .250 286.05 7.00 (ii) 7.14 7.14 4.06 83.90 .53 ERVIOUS LOSSES brage (Above) LLER OR EQUAL: ASSETION IF AN	(ii) 'TOTALS' .185 (.1.500 58.898 83.992 .702 :	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Inp(#)= IMPERVIOU 1)= .00 1)= 1.00 1)= 1.00 1)= 1.43 1)= 1.43 1)= 1.50 1)= 1.50 1)= 3.10 1)= 3.10 1]= 1.50 1]= 1.50 1]= 1.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 6.50	LLER OR EQUAL: ASSETION IF AN 57 75.00 Dir IS PERVIOUS .14 1.50 1.00 40.00 .250 286.05 7.00 (ii) 7.14 7.14 4.06 83.90 .53 ERVIOUS LOSSES brage (Above) LLER OR EQUAL: ASSETION IF AN	(ii) 'TOTALS' .185 (.1.500 58.898 83.992 .702 :	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Inp(#)= IMPERVIOU 1)= .00 1)= 1.00 1)= 1.00 1)= 1.43 1)= 1.43 1)= 1.50 1)= 1.50 1)= 3.10 1)= 3.10 1]= 1.50 1]= 1.50 1]= 1.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 6.50	LLER OR EQUAL: ASSETION IF AN 57 75.00 Dir IS PERVIOUS .14 1.50 1.00 40.00 .250 286.05 7.00 (ii) 7.14 7.14 4.06 83.90 .53 ERVIOUS LOSSES brage (Above) LLER OR EQUAL: ASSETION IF AN	(ii) 'TOTALS' .185 (.1.500 58.898 83.992 .702 :	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Inp(#)= IMPERVIOU 1)= .00 1)= 1.00 1)= 1.00 1)= 1.43 1)= 1.43 1)= 1.50 1)= 1.50 1)= 3.10 1)= 3.10 1]= 1.50 1]= 1.50 1]= 1.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 5.50 1]= 6.50	LLER OR EQUAL: ASSETION IF AN 57 75.00 Dir IS PERVIOUS .14 1.50 1.00 40.00 .250 286.05 7.00 (ii) 7.14 7.14 4.06 83.90 .53 ERVIOUS LOSSES brage (Above) LLER OR EQUAL: ASSETION IF AN	(ii) 'TOTALS' .185 (.1.500 58.898 83.992 .702 :	.00
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= NOT INCLUDE E NOT INCLUDE (NOT	LLER OR EQUAL LASEFLOW IF AN 75, 70 Dir S PERVIOUS 14 1.50 1.00 40.00 250 286.05 7.00 (11) 7.14 7.00 1.57 44.06 83.90 53 ERVIOUS LOSSES Erage (Above) LLER OR EQUAL LASEFLOW IF AN	(ii) *TOTALS* .185 (.1.500 58.898 83.902 .702 :	.00
THAN THE STORM (iii) PEAK FLOW DOES O06:0004	Area (ha)= Total Ing(%)= IMPERVIOL 1 1.00 1 2.05.92 1 1.00 1 1.43 1 1.43 1 1.43 1 1.43 1 1.43 1 1.43 1 1.43 1 1.50 1 1.43 1 1.50 1 1.5	LLER OR EQUAL: ASSETION IF AN 57 75.00 Dir 18 PERVIOUS 14 1.50 1.00 40.00 .250 286.05 7.00 (ii) 7.14 7.00 .16 .07 1.57 44.06 83.90 .53 ERVIOUS LOSSES PAGE (Above) LLER OR EQUAL: ASSETION IF AN	(ii) 'TOTALS' .185 (.1.500 58.898 83.992 .702 :	
THAN THE STOPM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Ing(%)= IMPERVIOL 1 1.00 1 2.05.92 1 1.00 1 1.43 1 1.43 1 1.43 1 1.43 1 1.43 1 1.43 1 1.43 1 1.50 1 1.43 1 1.50 1 1.5	LLER OR EQUAL: ASSETION IF AN 57 75.00 Dir 18 PERVIOUS 14 1.50 1.00 40.00 .250 286.05 7.00 (ii) 7.14 7.00 .16 .07 1.57 44.06 83.90 .53 ERVIOUS LOSSES PAGE (Above) LLER OR EQUAL: ASSETION IF AN	(ii) 'TOTALS' .185 (.1.500 58.898 83.992 .702 :	
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Ing(i)= IMPERVIOU And (ha)= Total Ing(i)= IMPERVIOU And (ha)= 1.00 Area (ha)= Total Ing(i)=	LLER OR EQUAL: 1. ASSETION IF AN 57 75.00 Dir 18 PERVIOUS 14 1.50 1.00 40.00 .250 286.05 7.00 (ii) 7.14 4.06 83.90 .53 REVIOUS LOSSES PERVIOUS LOSSES PER	(ii) 'TOTALS' .185 (.1.500 .58.898 .3.902 .702 :	
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Ing(%)= MPERVIOL 1	LLER OR EQUAL: 1. ASSETION IF AN' 57 75.00 Dir 1. S PERVIOUS 1. 14 1. 50 1. 00 40.00 .250 286.05 7.00 (ii) 7.14 41.05 286.05 286.05 7.00 LLER OR EQUAL: 1. ASSETION IF AN 1. ASSETION IF	(ii) 'TOTALS' .185 (.1.500 .58.898 .3.902 .702 :	
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Ing(%)= MPERVIOL 1	LLER OR EQUAL 1. LASEFLOW IF AN 7.57 75.00 Dir 18 PERVIOUS 286.05 7.00 40.00 .250 286.05 7.00 (ii) 7.14 .57 44.06 .07 1.57 44.06 .03 .07 1.57 44.06 .10 .10 .10 .10 .10 .10 .10	(ii) 'TOTALS' .185 (.1.500 .58.898 .3.902 .702 :	
THAN THE STORM (iii) PEAK FLOW DOES 006:0004	Area (ha)= Total Ing(%)= MPERVIOL 1	LILER OR EQUAL: 1. ASSEFLOW IF AN' 7.57 75.00 Dir 18 PERVIOUS 286.05 7.00 40.00 .250 286.05 7.00 (ii) 7.14 .57 44.06 .07 1.57 44.06 .07 1.57 44.06 .07 1.57 44.06 .07 1.57 44.06 .07 1.57 44.06 .07 1.57 .00 .00 .00 .00 .00 .00 .00	(ii) 'TOTALS' .185 (.1.500 .58.898 .3.902 .702 :	

Max.eff.Inten						
Storage Coeff Unit Hyd. Tpe Unit Hyd. pea	. (min)=	1.52	(11) 7. 7.	22 (11) 00 16	*TOTALS*	,
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL PAINFAL RUNOFF COEFFI	(cms) = (hrs) = (mn) = L (mn) =	.15 1.50 83.10 83.90	1. 44. 83.	09 57 06 90	.224 1.500 58.898 83.902	
(i) CN PROC CN* = (ii) TIME ST	EDURE SELEC 50.0 Ia EP (DT) SHO E STORAGE C	TED FOR PE = Dep. Sto ULD BE SMA OFFFICIENT	RVIOUS LOS rage (Abo LLER OR EQ	Ve) UAL	. 702	
BLOCK 5 SWH	********	*******	*******	.,,	*******	*********
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					*******	*******
DESIGN STANDHYD 06:BLK5 DT= 1.	00 Tota				n.(%)=	0.00
Surface Area	(ha)=	IMPERVIOU 1.13		13		
Surface Area Dep. Storage Average Slope	(E)=	.80 1.00 91.65 .013	1.	50		
Mannings n	(11)=					
Max.eff.Inten	. (mm/hr)=	205.92	46. 14.	.00		
Max.eff.Inten ov Storage Coeff Unit Hyd. The	. (min)=	1.82 2.00	(ii) 13.	67 (ii)		
Unit Hyd. pea	k (cms)=	.59		.08	*TOTALS	
PEAK FLOW TIME TO PEAK	(cms)= (hrs)=	.65 1.50 83.10	3.	01 70	.650 1.500	
RUNOFF VOLUME TOTAL PAINFAL	(rm)= L (rm)=	83.10 83.90	83.	90	77.341 83.902	
PUNOFF COEFFI	CIENT =	.99		30	, 922	
(111) PEAK FL		INCLUDE B	ASEFLOW IE	ANY.		· · · · · · · · · · · · · · · · · · ·
TRAN TH (iii) FEAK FL 06:0007 DETERMINE INFLOW	OW POES NOT	INCLUDE B	ASEPLOW IE	· ANY.	******	**********
TRAN TH	TO FOND	INCLUDE B	ASEPLOW IF	ANY.	**************************************	DWF
TRAN TH	TO FOND	INCLUDE B	ASEPLOW IF	ANY.	**************************************	DWF
TRAN TH (111) PEAK FL DE: 0007 DETEPMINE INFLOW ADD HYD (PSIDEV) I H I H I H	TO POND I ID: NHYD DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5	AREA (ha) 9.30 .57 .69 1.26	QPEAK (CES) 1.192 .185 .224 .650	TPEAK (hrs) 1.52 1.50 1.50 1.50	R.V. (mn) 39.37 58.90 77.34	DWF (cms) .000 .000 .000 .000
TRAN TH (111) PEAK FL 06:0007 DETERMINE INFLOW ADD HYD (PSTDEV) I HI HI	TO FOND	AREA (ha) 9.30 .57 .69 1.26	QPEAK (cms) 1.192 .185 .224 .650	TPEAK (hrs) 1.52 1.50 1.50 1.50	R.V. (mn) 39.37 58.90 58.90 77.34	DWF (CTLS)
TRAN THE (111) PEAK FL D6:0007 DETERMINE INFLOW ADD HYD (PSTDEV) I HI H H	TO FOND I TO FOND I ID: NHYD DI 01:SEL D3 03:BLK2 D4 06:BLK5 UM 07:FSIDE	AREA (ha) 9.30 .57 .69 1.26	QPEAK (CDS) 1.192 .185 .224 .650 .2221	TPEAR (hrs) 1.52 1.50 1.50 1.50	R.V. (mn) 39.37 58.90 58.90 77.34	DWF (CTLS)
TRAN TH (111) PEAK FL 06:0007	TO FOND I TO FOND I ID: NHYD DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:FSTDE	AREA (ha) 9.30 .57 .69 .1.26	OPEAK (CDS) 1.192 .195 .224 .650 .2.221 EELOWS IF	TPEAR (hrs) 1.50 1.50 1.50 ANY.	R.V. (m) 39.37 58.90 58.90 77.34	LWF (Cms) .090 .090 .000 .000 .000
TRAN TH (111) PEAK FL D6:0007	TO FOND I TO FOND I ID: NHYD DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:FSTDE	AREA (ha) 9.30 .57 .69 .1.26	OPEAK (CDS) 1.192 .195 .224 .650 .2.221 EELOWS IF	TPEAR (hrs) 1.50 1.50 1.50 ANY.	R.V. (m) 39.37 58.90 58.90 77.34	LWF (Cms) .090 .090 .000 .000 .000
TRAN THE (111) PEAK FL 06:0007 DETERMINE INFLOW ADD HYD (PSTDEV) ADD HYD (PSTDEV) FI FI FI S NOTE: PEAK FLO	TO POND I ID: NHYE DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:PSIDE	AREA (ha) 9.30 .57 .69 .1.26	OPEAK (CDS) 1.192 .195 .224 .650 .2.221 EELOWS IF	TPEAR (hrs) 1.50 1.50 1.50 ANY.	R.V. (m) 39.37 58.90 58.90 77.34	LWF (Cms) .090 .090 .000 .000 .000
TRAN TH (111) PEAK FL 06:0007	TO FOND I ID: NHYD I ID: NHYD DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:PSTDE	AREA (ha) 9.30 .57 .69 .1.26	QPEAK (CES) 1.192 .185 .224 .650 2.221 EFLOWS IF	TPEAK (hrs) 1.52 1.50 1.50 1.50 ANY.	R.V. (rm) 39.37 58.90 77.34 45.50	DWF (cms)
TRAN TH (111) PEAK FL DE::0007	TO FOND TO FOND I ID: NHYE DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:FSIDE WS DO NOT I	AREA (ha) 9.30 9.37 6.69 1.26 V 11.82 NCLUDE BAS	QPEAK (CDS) 1.192 1.185 2.224 6.500 2.2221 EFLOWS IF	TPEAK (hrs) 1.52 1.50 1.50 1.50 ANY.	R.V. (rm) 39.37 58.90 58.90 77.34	DWF (cms)
TRAN TR (111) PEAK FL 06:0007 DETERMINE INFLOW ADD HYD (PSTDEV) H H H H H S NOTE: PEAK FLO 06:0008 ROUTE THROUGH PC	TO POND TO POND I ID: NHYE DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:FSTDE WS DO NOT I	AREA (ha) 9.30 57	QPEAK (CDS) 1.192 1.185 2.221 EFLOWS IF	TPEAK (hrs) 1.52 1.50 1.50 ANY.	R.V. (Frn) 39.37 58.90 59.90 77.34 45.50	EWF (CT.S)
TRAN TH (111) PEAK FL 06:0007 DETERMINE INFLOW ADD HYD (PSTDEV) I H I H S NOTE: PEAK FLO 06:0008 POUTE RESERVOIR ROUTE RESERVOIR ROUTE RESERVOIR ROUTE RESERVOIR	TO FOND I ID: NHYD I ID: NHYD DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:FSIDE WS DO NOT I	AREA (ha) 9.30 .57 .69 .26	OPEAK (CES) 1.192 1.185 2.24 6.50 2.221 EFLOWS IF	TPEAK (hrs) 1.52 1.50 1.50 1.50 ANY.	R.V. (rm) 39.37 58.90 77.34 45.50	DWF (Cms)
TRAN TR (111) PEAK FL 06:0007	TO POND I TO POND I ID: NHYE DI 01:SFD D2 02:BLK1 D3 03:BLK5 D4 06:BLK5 UM 07:PSTDE WS DO NOT I Requ OUTE	AREA (ha) 9.30 .57 .69 .26	QPEAK (CDS) 1.192 .185 .224 .650	TPFAR (hrs) 1.52 1.50 1.50 ANY.	R.V. (rr.) (rr.) 39.37 58.90 77.34 45.50	UWF (cms)
TRAN TR (111) PEAK FL 06:0007	TO POND I ID: NHYE I ID: NHYE DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:PSIDE WS DO NOT I	AREA (ha) 9.30 7.7 7.69 7.8 7.69 7.11.62 7.12 7.69 7.12 7.69 7.12 7.69 7.12 7.69 7.12 7.69 7	QPEAK (CES) 1.192	TPEAK (hrs) 1.50 1.50 1.50 ANY.	R.V. (rm) 39.37 58.90 77.34 45.50 min STORAG (ha.n 3535b-0 41795-0 41795-0	DWF (cms)
TRAN TR (111) PEAK FL 06:0007	TO POND I ID: NHYE I ID: NHYE DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:PSIDE WS DO NOT I	AREA (ha) 9.30 7.7 7.69 7.8 7.69 7.11.62 7.12 7.69 7.12 7.69 7.12 7.69 7.12 7.69 7.12 7.69 7	QPEAK (CDS) 1.192 .185 .224 .650 .2.221 .185 .2.24 .650 .2.21 .190 .2.21 .21 .21 .21 .21 .21 .22 .22 .22 .	TANY. TPEAR (hrs) 1.50 1.50 1.50 ANY. Step = 1 GGE TABLE OUTFLON (cms) .025 .027 .029 .031	R.V. (rr.) (rr.) 39.37 58.90 77.34 45.50	DWF (cms)
TRAN TR (111) PEAK FL 06:0007	TO POND I ID: NHYE I ID: NHYE DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:PSIDE WMS DO NOT I	AREA (ha) 9.30 .57 .69 .26 .20 .20 .20 .20 .20 .20 .20 .20 .20 .20	QPEAK (CDS) 1.192 1.185 2.224 6.550 1.192 1.185 2.244 6.500 1.192 1.185 2.24 6.500 1.192 1	TPEAK (hrs) 1.50 1.50 1.50 ANY.	R.V. (rm) 39.37 58.90 77.34 45.50 o min	DWF (cms)
TRAN TRAN (111) PEAK FL 06:0007	I TO FOND I TO FOND I ID: NHYD DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 WM 07:FSTDE	AREA (ha) 9.30 9.30 1.26 W 11.62 RCLUDE BAS	QPEAK (CCS) QP	TPEAK (hrs) 1.50 1.50 ANY. 1.52 1.50 1.50 ANY. 1.52 1.50 2.50 ANY. 1.50 ANY.	R.V. (rm) 39.37 58.90 77.34 45.50	DWF (cms)
TRAN TH (111) PEAK FL 06:0007	TS TO FOND TO FOND I ID: NHYD I ID: NHYD OI:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:PSIDE WS DO NOT I PSIDEVI PSIDEVI PNDOUTI	AREA (ha) 9.30 .57 .69 .26 .20 .20 .20 .20 .20 .20 .20 .20 .20 .20	QPEAK (CDS) 1.192 1.185 2.224 6.500 2.225 1.192 1.192 1.193 1.192 1.193	TPEAR (hrs) 1.50 1.50 1.50 ANY. Step = 1 1.60 TABLE OUTFLOW (cms) .025 .027 .029 .031 .033 .000 TPEAK (hrs)	R.V. (rm) 39.37 58.90 77.34 45.50	DWF (CZS)
TRAN TRANS (111) PEAK FL 06:0007	TO FOND TO FOND TO FOND I ID: NHYD DI 01:SFD D2 02:BLK1 D3 03:BLK2 D4 06:BLK5 UM 07:FSTDE WS DO NOT I PROUT (CO TS TS TS TS TS TOTAL NUMB TOTA	AREA (ha) 9.30 .57 .69 .26	QPEAK (CES) 1.192 1.185 2.221 6.500 EELOWS IF	TPFAR (hrs) 1.50 1.50 1.50 ANY	R.V. (rm) 39.37 58.90 77.34 45.50 min. 3535E+0 4178E+0 6203E+0	DWF (CZS)
TRAN TRANS (111) PEAK FL 06:0007	TS PSTDEVI PNIDUTI PERCENTAGE	AREA (ha) 9.30 3.70	QPEAK (CES) 1.192 1.185 2.221 EFLOWS IF LIFOW STOPPARGE .n.) E+00 E+00 E+00 E+00 E+00 LATED OVERLOWING	TPEAK (hrs) 1.50 1.50 1.50 ANY. ANY. Step = 1 1.50 ANY. TPEAK (hrs) 1.50 1.50 1.50 1.50 1.50 1.50 1.50 1.50	R.V. (rm) 39.37 58.90 77.34 45.50	DWF (CZS)
TRAN TRANS (111) PEAK FL 06:0007	TS PETDEVI PE	AREA (ha) 9.30 7.7 (ha) 11.82	QPEAK (CDS) 1.192	TPEAR (hrs) 1.50 1.50 1.50 ANY. ANY. Step = 1 1.50 ANY. GE TABLE OUTFLOW (cms) .025 .027 .029 .031 .033 .000 TPEAK (hrs) .05 (hours) .000 .000 .000 .000 .000 .000 .000 .0	R.V. (rm) 39.37 58.90 77.34 45.50	DWF (CZS)

(H: \PSIDEV.OUL)	
* BLOCK 3 COMMERCIAL	
*	
DESIGN STANDHYD Area (ha) = 04:BLK3 DT = 1.00 Total Imp(t) = 90	
	PERVIOUS (1)
Dep. Storage (rm)= .80 Average Slope (%)= 1.00	1.50 1.00
Length (m) = 73.03 Mannings n = .013	40.00 .250
Nav eff Inten (r-/hr)= 205 92	
Max.eff.Inten.(rm/hr) = 205.92 over (min) 2.00	5.00 5.18 (ii)
over (min) 2.00 Storage Coeff. (min) 1.58 (ii) Unit Hyd. Tpeak (min) 2.00 Unit Hyd. peak (cms) 64	5.00
	TOTALS
PEAK FLON (cms)= .21 TIME TO PEAK (hrs)= 1.50 RUNOFF VOLUME (cm)= 83.10 TOTAL PAINTALL (cm)= 83.90	.15 .353 (iii) 1.53 1.500
RUNOFF VOLUME (Ext) = 83.10 TOTAL RAINFALL (Ext) = 83.90	59.74 70.253 83.90 83.902
TIME TO PEAK (hrs)= 1.50 RUNOFF VOLUME (rm)= 83.10 TOTAL PAINFALL (rm)= 83.90 RUNOFF COEFFICIENT = .99	.71 .837
(1) CN PROCEDURE SELECTED FOR PERVIOUS CM* = 58.0 Ia = Dep. Storage (11) TIME STEP (DT) SHOULD BE SMALLER (S LOSSES: (Above)
(11) TIME STEP (DT) SHOULD BE SMALLER (THAN THE STORAGE COEFFICIENT.	DR EQUAL
(111) PEAK FLOW DOES NOT INCLUDE BASEFLE	OW IF ANY.
006:0010	

+ criditate cropace on proce 2 to perpage at	CANADALLED DEED
* SIMULATE STORAGE ON BLOCK 3 TO RELEASE AT (CONTROLLED RATE
***************************************	**********
ROUTE RESERVOIR Requested routing to	ime step = 1.0 min.
	STORAGE TABLE
OUTFLOW STORAGE	OUTFLOW STORAGE (cms) (ha.m.)
.000 .0090E+00	(cms) (ha.n.) 1 .015 .1000E+01 1 .000 .0000E+00
	(hrs) (m) 53 1.500 70.253
THELOW > 04: {BLK3 } .80 .33	15 1.033 70.253
TOTAL NUMBER OF SIMULATED CUMULATIVE TIME OF OVERFIC PERCENTAGE OF TIME OVERFIC	OVERFLOWS = 0 OWS (hours) = .00
PERCENTAGE OF TIME OVERFIC	00. (1)= .00
PEAK FLOW REDUCTION IC	Pout/Oin1(3)= 4.253
PEAK FLOW REDUCTION [6 TIME SHIFT OF PEAK FLOW MAXIMUM STOPAGE USED	<pre>Cout/Qin](t) = 4.253 (min) = -28.00 (ha.m.) = .3441E-01</pre>
MAXIMUM STOPAGE USED	<pre>cout/Qin](i) = 4.253</pre>
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01
MAXIMUM STOPAGE USED 006:0011 * * BLOCK 4 COMMERCIAL *	(ha.m.)=.3841E-01
MAXIMUM STOPAGE USED 006:0011	(ha.m.)=.3841E-01
MAXIMUM STOPAGE USED 006:0011	(ha.m.)=.3841E-01
MAXIMUM STOPAGE USED 006:0011	(ha.m.)=.3841E-01
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (ha.m.)=.3841E-01 (lo
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (0 0 Dir. Conn.(t)= 45.00 DERVIOUS (i) 1.14 1.50 1.00 40.00 .250 907.51 5.00 5.47 (ii) 5.00 .21
MAXIMUM STOPAGE USED MAXIMUM STOPAGE MAXIMUM STOPAGE	(ha.m.)=.3841E-01 (i) (i) (i) (i) (i) (ii) (iii) (iii) (iii) (iiii) (iiii)
MAXIMUM STOPAGE USED MAXIMUM STOPAGE MAXIMUM STOPAGE	(ha.m.)=.3841E-01 (i) (i) (i) (i) (i) (ii) (iii) (iii) (iii) (iiii) (iiii)
MAXIMUM STOPAGE USED MAXIMUM STOPAGE MAXIMUM STOPAGE	(ha.m.)=.3841E-01 (ha.m.)=.3841E-01 (lo pir. Conn.(t)= 45.00 PERVIOUS (i) .14 1.50 1.00 40.00 .250 907.51 5.00 5.47 (ii) 5.00 .21 *TOTALS* .27 .610 (iii) 1.53 1.500 59.74 70.253 33.902
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (10 10 10 10 10 10 11 1.50 1.00 40.00 .250 907.51 5.00 5.47 (ii) 5.00 .21 *TOTALS* .27 .610 (iii) 1.53 1.500 59.74 70.253 83.90 83.90 83.90 83.90 83.71 837
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (i0 00 Dir. Conn.(t)= 45.00 PERVICUS (i) .14 1.50 1.00 40.00 .250 907.51 5.00 5.47 (ii) 5.00 .21 *TOTALS* .27 .610 (iii) 1.53 1.500 59.74 70.253 83.90 71 .837 LOSSES: (Above)
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (i) (i) (i) (i) (i) (i) (i) (i) (ii) (ii) (iii)
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (i) (i) (i) (i) (i) (i) (i) (i) (i) (i
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (lo Dir. Conn.(t)= 45.00 DEEVICUS (i) .14 1.50 1.00 40.00 .250 907.51 5.00 5.47 (ii) 5.00 .21 *TOTALS* .27 .610 (iii) 1.53 1.500 59.74 70.253 33.90 31.90 31.90 31.90 31.837 *LOSSES: (Above) R EQUAL W IF ANY.
MAXIMUM STOPAGE USED MAXIMUM STOPAGE USED MAXIMUM STOPAGE USED MAXIMUM STOPAGE USED MAXIMUM STOPAGE MAXIMUM	(ha.m.)=.3841E-01 (lo Dir. Conn.(t)= 45.00 DEEVICUS (i) .14 1.50 1.00 40.00 .250 907.51 5.00 5.47 (ii) 5.00 .21 *TOTALS* .27 .610 (iii) 1.53 1.500 59.74 70.253 33.90 31.90 31.90 31.90 31.837 *LOSSES: (Above) R EQUAL W IF ANY.
MAXIMUM STOPAGE USED 006:0011	(ha.m.)=.3841E-01 (ha.m.)=.3841E-01 (i) (i) (i) (i) (i) (i) (i) (i
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (ha.m.)=.3841E-01 (i) (i) (i) (i) (ii) (ii) (ii) (iii) (ii
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (ha.m.)=.3841E-01 (i) (i) (i) (i) (ii) (ii) (ii) (iii) (ii
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (0 Dir. Conn.(t)= 45.00 DERVIOUS (i) .14 1.50 1.00 40.00 .250 907.51 5.00 .21
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 (n) Dir. Conn.(t)= 45.00 PERVICUS (i) .14 1.50 1.00 40.00 .250 907.51 5.00 5.47 (ii) 5.00 .21
MAXIMUM STOPAGE USED	(ha.m.)=.3841E-01 10 0 Dir. Conn.(t)= 45.00 PERVIOUS (i) .14 1.50 1.00 40.00 .250 907.51 5.00 .21

	.015	.1000E	-03	.000	.0000E+0	00	
ROUTING RESULTS		AREA	QPEAK	TPEAK	R.1		
INFLOW >05: (BL		(ha) 1.40	(cms)	(hrs) 1.500	70.2		
OUTFLOW<03: (B4		1.40	.015	.717	70.2		
OVERFLOW<04: (40		.00	.000	.000	.00		
	OTAL NUMBER UMULATIVE TI						
8	ERCENTAGE OF	TIME OV	ERFLOWING	(nours) =	.00		
P	EAK FLOW	REDUCTI	ON [Qout/	Oin] (1)=	2.45	,	
	IME SHIFT OF				-47.00		
М	AXIMUM STOP	AGE US	ED	(ha.m.)=	.7812E-03		
OG:0013	*********	******					
+++++++++++++	********	*****	* * * * * * * * *	******	* * * * * * * * * *	*****	******
ADD HYD (PSTDEV)	ID: NHYD	AREA	QPEAK			INF	
***	AA DUDAND	(ha)	(cms)	(hrs) 4.30	(mm)	(CMS)	
	08: ENDOUT 09: ENDOVR	11.62	.030	.00	.00	.000	** DRY*
	01:B3CTRL	.80		1.03	70.25	.000	Pitt
+104	02:30VR	.00	.000	.00	.00	.000	**DRY*
	03:B4CTRL	1.40	.015	.72		.000	
	04:40VR	.00	.000		.00		**DRY*
	05:PSTDEV	14.02	.060		49.38	.000	
NOTE: PEAK FLOWS	DO NOT INCL	UDE BASE	FLOWS IF	ANY.			
06:0014							
006:0002							
006:0002							
006:0002 006:0002							
006:0002 006:0002							
006:000Z 006:000Z FINISH WARNINGS / ERRO.	RS / NOTES						
106:0002 106:0002 106:0002 106:0002 FINISH	RS / NOTES	2 at		******		*****	******





Subject:

Yin's Phase 5

Date:

Project #:

Nov 4/10 By: 10034 Page TGS

Water Quality Sizing

35% Impervious

90

55% Impervious

150

54% Impervious

147

Contributing Area

11.82

Volume Req.

1738

1) Forebay Design: Settling

Equation 4.5

Dist= sqrt(r*Qp/Vs)

Dist = forebay length

r = length to width of forebay

Qp = peak flow rate from pond during quality storm Vs= target settling velocity, recommended at 0.0003 m/s

Given

r=

2 0.017 Target 2:1

Qp =Vs=

0.0003

Dist=

11

2) Forebary Design: Dispersion Length

Equation 4.6

Dist = 8*Q/(d*Vf)

Dist = forebay length

Q= inlet flow rate for quality storm

d= depth of perm pool

Vf = desired velocity in forebay (<0.5m/s)

Given

Q=

0.651

SYMHYMO results to pond for 2-year event

d≕

1.25

Vf=

0.5

dist=

8

3) Forebay Design: Bottom Width



Subject:

Yin's Phase 5

Date: Project #: Nov 4/10 By: 10034 Page TGS

Equation 4.7

Width=Dist/8

Given

Dist=

11

width=

1.375

4) Forebay Design: Cleanout Frequency

Table 6.3 of SWM Planning and Design Manual

35% Impervious

0.6 m3/ha, annual sediment loading

55% Impervious

1.9 m3/ha, annual sediment loading

Reference Calculation of Impervious areas spreadsheet for this development==> 39% impervious Therefore extrapolate

54%

1.835 m3/ha

Total site area, including external contributing area

11.82 ha

Sediment Accummulation

Target Removal eff. For basic protection

Anticipate Accumulation

Clean Frequency

Total Anticipated Accumulation

21.6897 m3/year

60%

13.01382 m3/year

10 year

130.1382 m3

Contour	Area	Inc	r V Vo	olume
24	42	73	0	
242.4	45	187	59	59
242.6	35	380	57	115
243.2	25	717	329	444

Appendix E: Main Street Storm Sewer Design Calculations (Existing and Proposed)



Subject:

Yins Phase 5 Main Street Ex Storm

Date: Project #:

By: Dec-10 10034 Page TGS

Existing storm services drainage area from Thompson Road to Area 4-3.

	Area		Runoff C	C*A
1-ex		1.26	0.45	0.567
2-1		1.71	0.45	0.7695
3-2		1.81	0.9	1.629
4-3		2.09	0.9	1.881

4.8465

WSMD Designed for 2-year storm

Norfolk County Design criteria for 2-year storm, I = A/(t+B)^C

529.711 4.501 В 0.745 С

Assume and inlet time of

10 min to account for initial estimate of 5.0min per design criteria

for commercial areas and some transit time in system

1 72.243 mm/hr

Q 973 L/s

Existing storm sewer along Main Street is all 525mm at 0.4%

Dia 0.525 m 0.013 Hyd R 0.13125 m Slope 0.4% C/S A 0.21647537 m2

Q 272 L/s

Therefore insufficient capacity to service drainage area for the 2-year event.



STORM SEWER DESIGN SHEET

Storm 2-year Simcoe 529.71 B= 4.501 C=

0.745

Date Nov 24/10

Pipe Material PVC<=450, Concrete >450

0.013

10034 Yin's Phase 5 - Main Street Storm Project

Designed by TGS Checked by JDV

Town/County Waterford - Norfolk County

Sheet of: 1 of

	Location	on		Area		Cumlative	Time	Rainfall	Flow			Se	ewer De	sign	
Area	From	То			TOTAL	R*A	of		2.78*I*A*R	Size	Slope	Cap	Vel	Length	Time
			На	На	На		Concentration	mm/hr							
			0.45	0.9			min		L/s	mm	%	L/s	m/s	m	min
Pond	Pond	7	0		0.00	0	0.00	N/A	30.0	450	0.30%	156.2	0.982	59.2	1
7-6	7	6	0.37		0.17	0.17	15.00	57.94	56.8	450	0.40%	180.3	1.134	104.5	1.54
6-5	6	5	0		0.00	0.17	16.54	54.75	85.3	600	0.20%	274.6	0.971	114	1.96
5-4	5	4		1.34	1.21	1.37	18.49	51.24	255.5	600	0.20%	274.6	0.971	119	2.04
4-3	4	3		2.09	1.88	3.25	20.53	48.10	495.0	750	0.25%	556.6	1.26	119.4	1.58
3-2	3	2		1.81	1.63	4.88	22.11	45.95	683.7	825	0.25%	717.7	1.343	84	1.04
2-1	2	1	1.71		0.77	5.65	23.16	44.66	761.7	825	0.30%	786.2	1.471	29.9	0.34
1-EX	1	EX	1.26		0.57	6.22	23.50	44.25	825.1	825	0.35%	849.2	1.589	107	1.12

Note:

Peak Discharge from Pond (100-yr storm)

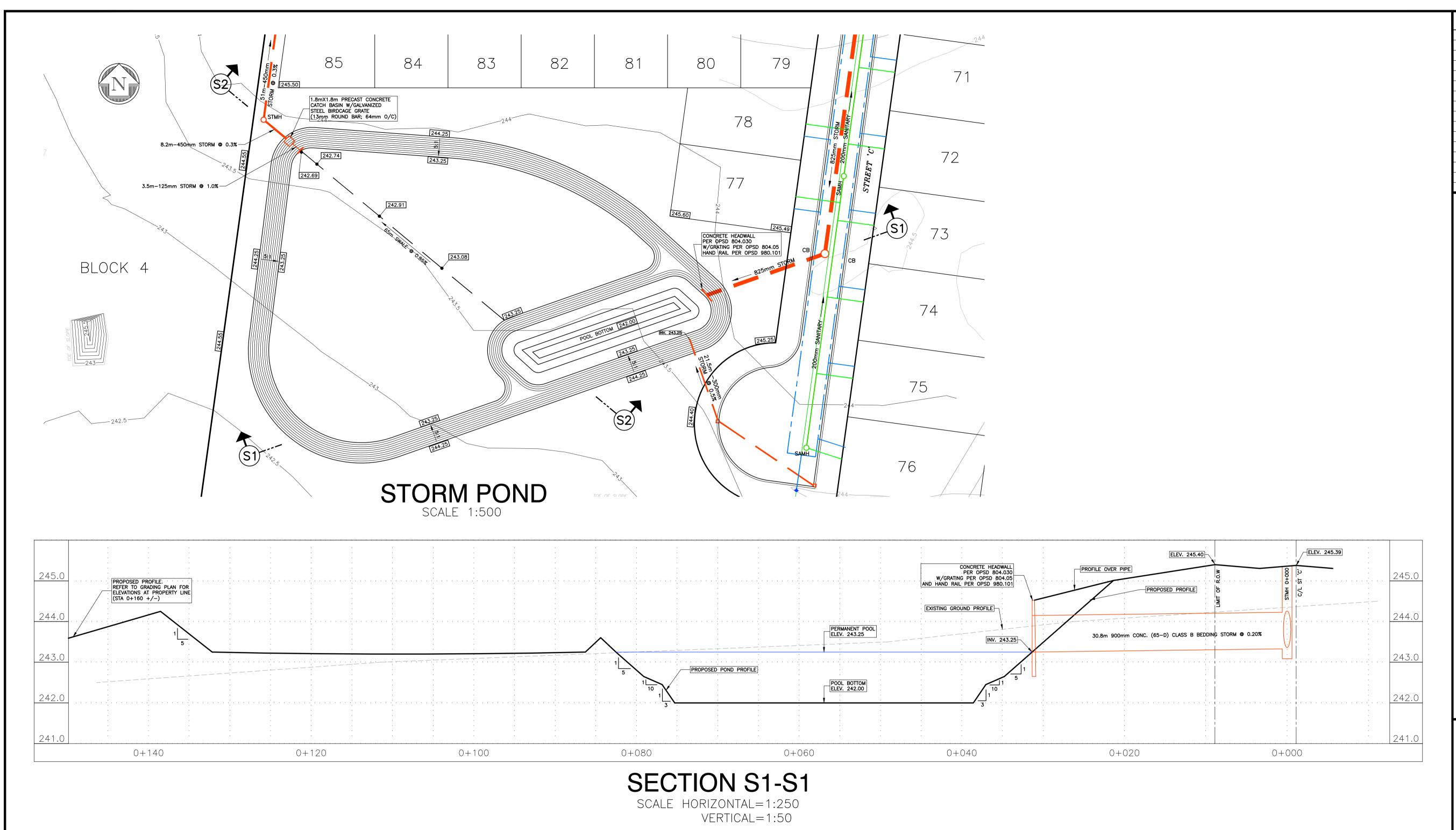
Peak Dischare from Block 3

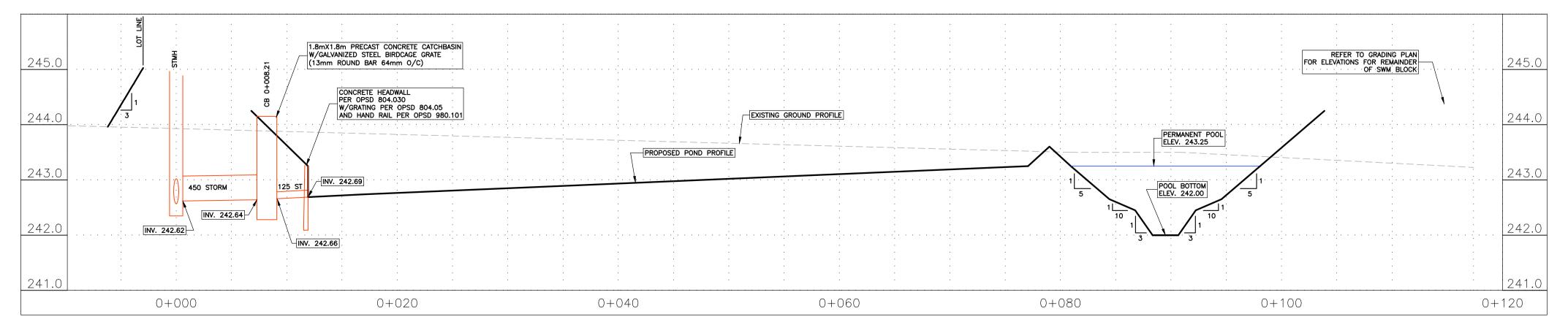
Peak Discharge from Block 4

0.03 Applied at Area POND

0.015 Applied at Area 6-5

0.015 Applied at Area 6-6





SECTION S2-S2

SCALE HORIZONTAL=1:250 VERTICAL=1:50



0 DEC 8/10 SUBMIT TO COUNTY FOR REVIEW

G. DOUGLAS VALLEE LIMITED 2 TALBOT STREET NORTH SIMCOE, ONTARIO N3Y 3W4 (519) 426-6270

PRELIMINARY NOT TO BE USED FOR CONSTRUCTION

YIN PHASE 5

NORFOLK COUNTY - WATERFORD

Drawing Title
PLAN AND SECTION DETAILS

Drawn By : Designed by

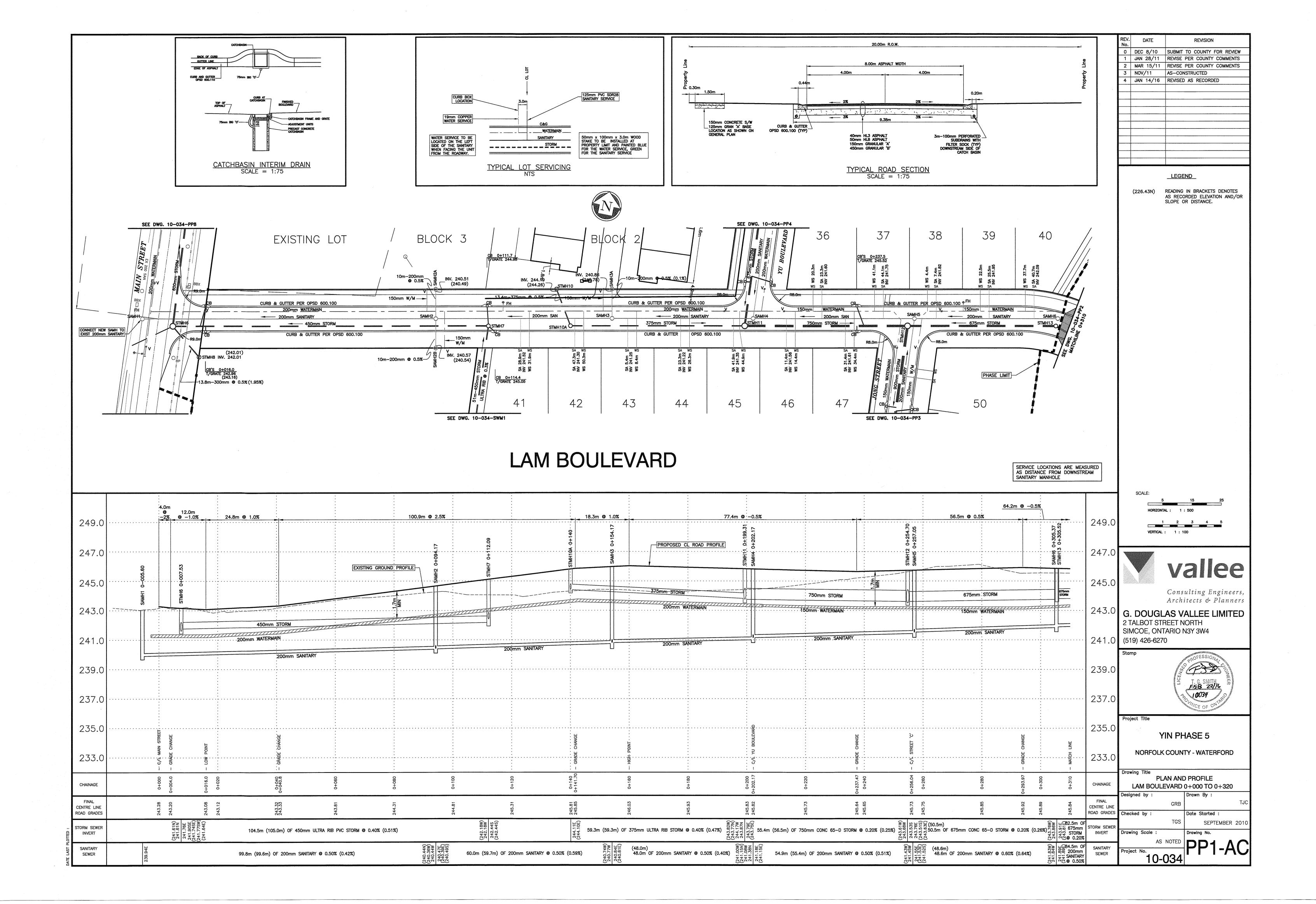
Drawing Scale:

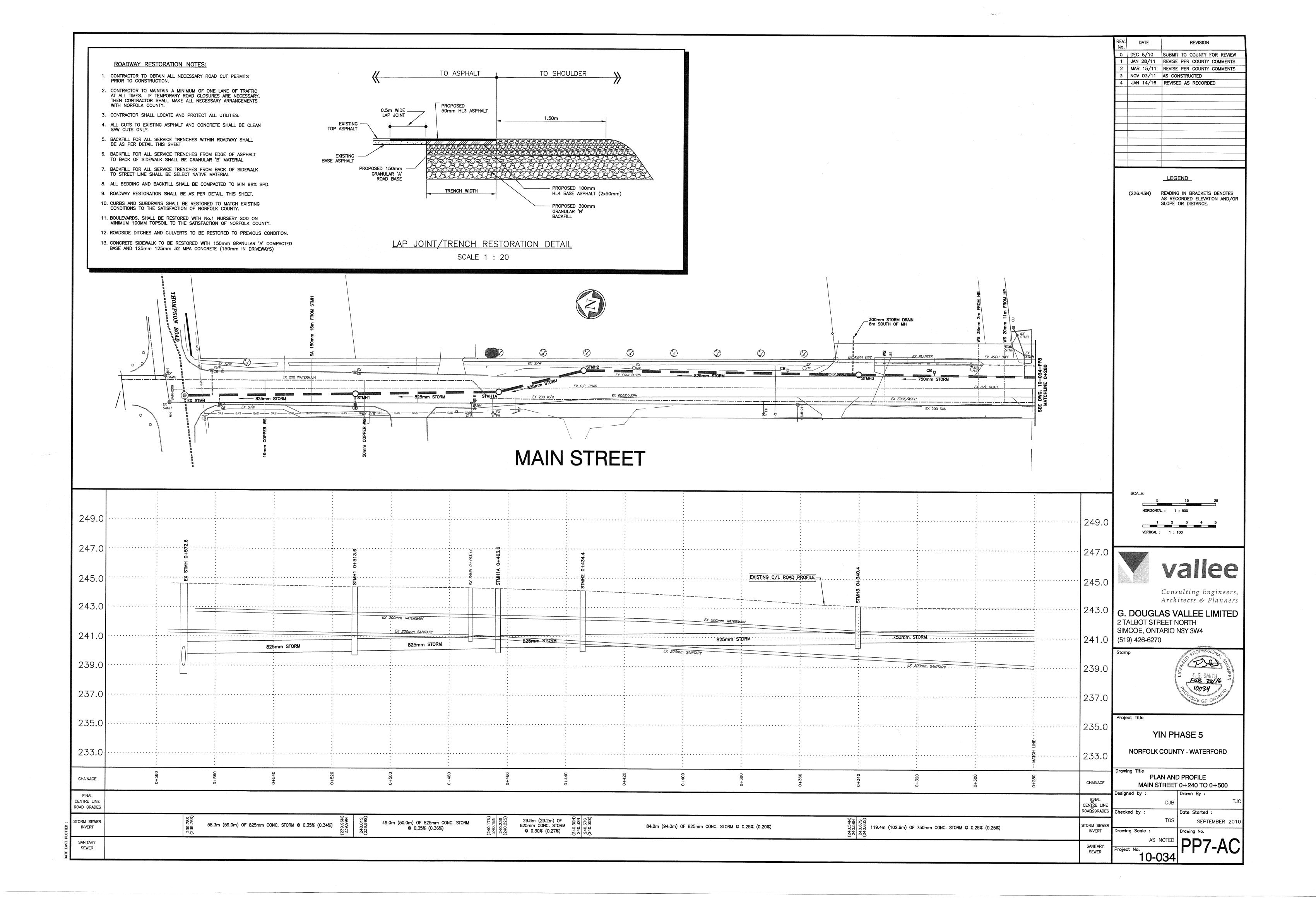
Checked by

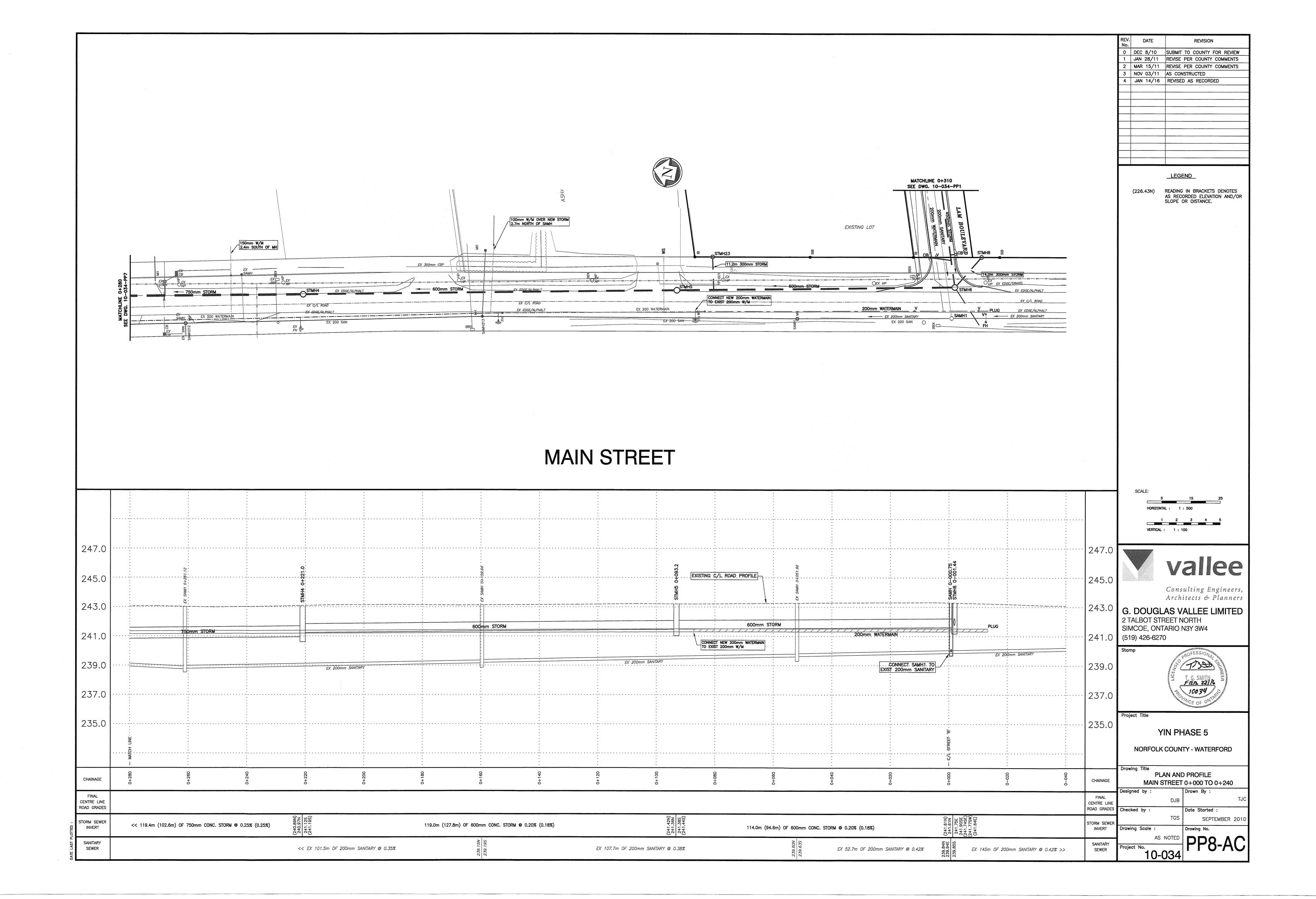
Date Started :

NOVEMBER 2010

10-034







Orchard Square Phase 2 WATERFORD, NORFOLK COUNTY Estimated Cost and Securities

Rev0 - 2024-07-17 Rev1 - 2024-11-25

Rev	1 - 2024-11-25					Pro	ject #20-128
ITEN	DESCRIPTION	UNIT	APPROX.	UNIT	AMOUNT	SECURITY	SECURITY
			QUANTITY	PRICE		%	AMOUNT
	A. SANITARY SEWERS						
1	Connect new sanitary to existing 200mm sanitary along Old HWY 24, including backfill and restoration (Phase 2 Connection).	L.S.	1	\$3,000	\$3,000	100%	\$3,000
2	Supply and install 200mm PVC sanitary sewers. a) SAMH3 To SAMH4 b) SAMH4 To SAMH5 c) SAMH5 To Proposed Residential Building	metre metre metre	20.5 58.6 11.9	\$250.00 \$250.00 \$250.00	\$5,125 \$14,650 \$2,975	100% 10% 10%	\$5,125 \$1,465 \$298
3	Supply and install 1200mm dia. precast concrete maintenance holes complete with benching. a) SAMH3 b) SAMH4 c) SAMH5	L.S. L.S. L.S.	1 1 1	\$10,000 \$10,000 \$10,000	\$10,000 \$10,000 \$10,000	100% 10% 10%	\$10,000 \$1,000 \$1,000
4	Flush and CCTV video sanitary system.	L.S.	1 .	\$1,000	\$1,000	10%	\$100
	TOTAL SANITARY SEWERS				\$56,750		\$21,988
	B. WATERMAINS						
1	Connect new 150mm watermain extension to existing 200mm watermain along Old HWY 24 (Phase 2 Connection).	L.S.	1 .	\$5,000	\$5,000	100%_	\$5,000
2	Supply and install 150mm dia. watermain including all fittings and anodes within development site.	metre	72	\$140.00	\$10,080	10%	\$1,008
3	Supply and install 150mm dia. watermain including all fittings and anodes within County ROW.	metre	90	\$140.00	\$12,600	100%	\$12,600
4	Supply and install fire hydrant set complete with valve within the development site.	each	1 .	\$5,000.00	\$5,000	10%	\$500
5	Supply and install 150mm water chamber within development site.	each	1 .	\$25,000.00	\$25,000	10%	\$2,500
	TOTAL WATERMAIN				\$57,680		\$21,608

ITEN	DESCRIPTION	UNIT	APPROX. QUANTITY	UNIT PRICE	AMOUNT	SECURITY %	SECURITY AMOUNT
	C. STORM SEWERS						
1	Supply and install 200mm dia. storm sewers. a) Stub to Proposed Residential Building	metre	11.5	\$100.00	\$1,150	10%	\$115
2	Supply and install 300mm dia. storm sewers. a) CB7 TO CBMH6 b) CB6 TO CBMH6	metre metre	25.5 18.9	\$130.00 \$130.00	\$3,315 \$2,457	10% 10%	\$332 \$246
3	Supply and install 525mm dia. storm sewers. a) CBMH5 To CBMH6	metre	30.3	\$280.00	\$8,484	10%_	\$848
4	Supply and install 1200mm dia. precast concrete maintenance holes complete with benching. a) CBMH6	L.S.	1	\$7,000	\$7,000	10%	\$700
5	Supply and install 600x600 precast concrete catch basins complete with grate, connections, and subdrains.	each	5	\$2,500	\$12,500	10%_	\$1,250
6	Flush and CCTV video storm system.	L.S.	1	\$1,000.00	\$1,000	10%	\$100
	TOTAL STORM SEWER				\$35,906		\$3,591

SECURITY

			QUANTITY	PRICE		%	AMOUNT
	D. ROAD CONSTRUCTION						
DE	/ELOPMENT SITE						
1	Sub-excavation to a depth of 540mm below finished grade for proposed parking stall asphalt areas and 620mm below finished grade for proposed drive aisle asphalt areas.						
	initioned grade for proposed drive diste deprint dread.	L.S.	1	\$22,500	\$22,500	10%	\$2,250
2	Supply, place and compact 300mm Granular 'B' Type 2 100% crushed limestone for parking stall asphalt areas.	tonne	1230	\$15.00	\$18,450	10%	\$1,845
3	Supply, place and compact 350mm Granular 'B' Type 2 100% crushed limestone for drive aisle asphalt areas.	tonne	1390	\$15.00	\$20,850	10%	\$2,085
4	Supply, place and compact 150mm Granular 'A' 100% crushed limestone for parking stall and drive aisle asphalt areas.	tonne	1120	\$20.00	\$22,400	10%	\$2,240
5	Supply, place and compact 50mm of HL8 base asphalt pavement for parking stall asphalt areas.	tonne	200	\$100.00	\$20,000	10%	\$2,000
6	Supply, place and compact 80mm of HL8 base asphalt pavement for drive aisle asphalt areas.	tonne	310	\$100.00	\$31,000	10%	\$3,100
7	Supply, place and compact 40mm of HL3 top asphalt pavement for all asphalt areas.	tonne	320	\$110.00	\$35,200	10%	\$3,520
8	Construct internal concrete sidewalk.	sqm	160	\$50.00	\$8,000	10%	\$800
9	Construct barrier curb.	m	320	\$40.00	\$12,800	10%	\$1,280
10	Adjust manholes and catch basins to base asphalt.	each	4	\$350.00	\$1,400	10%	\$140
11	Adjust manholes and catch basins to surface asphalt.	each	4	\$350.00	\$1,400	10%	\$140
СО	UNTY ROW						
1	Sub-excavation to a depth of 540mm below finished grade for proposed asphalt areas.	L.S.	1	\$2,000	\$2,000	100%	\$2,000
2	Supply, place and compact 300mm Granular 'B' Type 2 100% crushed limestone for asphalt area.	tonne	180	\$15.00	\$2,700	100%	\$2,700
3	Supply, place and compact 150mm Granular 'A' 100% crushed limestone for asphalt area.	tonne	80	\$20.00	\$1,600	100%	\$1,600
4	Supply, place and compact 50mm of HL8 base asphalt pavement for asphalt area.	tonne	30	\$100.00	\$3,000	100%	\$3,000
5	Supply, place and compact 40mm of HL3 top asphalt pavement for asphalt area.	tonne	30	\$110.00	\$3,300	100%	\$3,300

UNIT

APPROX.

UNIT

AMOUNT

\$206,600

\$32,000

SECURITY

ITEM

DESCRIPTION

TOTAL ROAD CONSTRUCTION

ITEM	DESCRIPTION	UNIT	APPROX. QUANTITY	UNIT PRICE	AMOUNT	SECURITY %	SECURITY AMOUNT
	E. LANDSCAPING						
1	Landscaping Allowance	L.S.	1 _	\$50,000.00	\$50,000	100%	\$50,000
	TOTAL LANDSCAPING				\$50,000		\$50,000
1	F. RECORD DRAWINGS Complete record drawings for development site and work						
	within county ROW.	L.S.	1 _	\$4,000.00	\$4,000	100%	\$4,000
	TOTAL RECORD DRAWINGS				\$4,000		\$4,000
	SECURITY SUMMARY						
A.	SANITARY SEWERS						\$21,988
В.	WATERMAIN						\$21,608
C.	STORM SEWERS						\$3,591
D.	ROAD CONSTRUCTION						\$32,000
E.	LANDSCAPING						\$50,000
F.	RECORD DRAWINGS						\$4,000
				GRAND 1	OTAL	\$	133,186

MEMO

June 6, 2022



Verlinda Homes Ltd. 26 Main Street South Box 1152 Waterford, ON N0E 1Y0

Re: Species at Risk and Significant Wildlife Habitat Assessment Waterford, Ontario

GeoProcess Research Associates Inc. (GRA) has been retained by Verlinda Homes Ltd. to complete a Species at Risk and Significant Wildlife Habitat Assessment for their Subject Property at the corner of Lam Boulevard and Old Highway 24, Waterford, ON (Map 1). Verlinda Homes is planning to redevelop the property for residential housing. It is GRA's understanding that members of the public have raised concerns related to the development, specifically with a pond which is within property. The pond is an anthropogenic feature, likely dug for irrigation. The pond does not have direct connections to a natural water-body (i.e., watercourse) and is enclosed by a perimeter chain-linked fenced. Questions have been asked regarding the wildlife the pond may support and whether any species at risk (SAR) are present. The following memo outlines the work GRA completed to assess the wildlife functionality of the pond.

This memo includes the following summaries:

- MECP Species at Risk Screening
- Significant Wildlife Habitat Screening
- Breeding Amphibian Screening
- Turtle Habitat Screening
- Incidental Wildlife

1. Species at Risk Screening and Assessment

The Endangered Species Act, 2007, S.O. 2007 was passed to protect the biodiversity of Ontario by using the best available scientific, community and aboriginal traditional knowledge and the precautionary principle as its doctrine. The purpose of the Act is to identify species at risk, protect species at risk and their habitats, and to promote the recovery of species at risk and stewardship activities which assist in these goals. The Committee on the Status of Species at Risk in Ontario (COSSARO) functions to maintain an up-to-date database of information pertaining to species in Ontario and their classification. COSSARO advises the Ministry of Northern Development, Mines, Natural Resources and Forestry, who makes and files a regulation that lists all plant and animal species classified by COSSARO as extirpated, endangered, threatened, or of special concern. This regulation is the Species at Risk in Ontario List, O. Reg 230/08. Ontario Regulation 242/08 provides general policies concerning exemptions and habitat specifications for those listed species, Species at Risk (SAR).

1.1. Method

An assessment and screening of potential Species at Risk was conducted for the property based on Federal and Provincial status. Following the MECP (2019) Client's Guide to Preliminary SAR Screening, this screening was based on a review of the following:

- Natural Heritage Information Centre (NHIC) Database, 1 km x 1 km square 17NH5851;
- Atlas of the Breeding Birds of Ontario;
- Ontario Reptile and Amphibian Atlas;
- Ontario Butterfly and Moth Atlas;
- i-Naturalist- NHIC Rare Species of Ontario; and,
- eBird hotspots.

1.2. Result

1.2.1. Natural Heritage Information (NHIC) Database

The NHIC database was queried on March 25^{th} , 2022 to identify records of SAR and/or provincially significant species, natural areas, or wildlife concentration areas. The Subject Property does not fall within a 1 km x 1 km square, however, there is a square south of the Subject Property (17NH5851). The results of the query are presented below in Table 1.

Table 1. Results of the NHIC database query for the Subject Property

Common Name	Scientific Name	SRank ¹	SARO Status	COSEWIC Status
Snapping Turtle	Chelydra serpentina	S4	SC	SC
Northern Pin Oak	Quercus ellipsoidalis			

¹ The NHIC assigns subnational ranks (S-Ranks) for species and plant communities in Ontario using the best information and considering factors such as abundance, distribution, population trends, and threats.

1.2.2. SAR Screening

The SAR screening (Table 2) considers SAR with potential to occur in the Subject Property, in accordance with the additional resources listed in Section 1.1 and detailed in Appendix A.

Table 2. SAR Screening Summary

Scientific Name	Common Name	S_RANK	SARO Status	COSEWIC Status	Potential Habitat in Subject Property		
Reptiles and Amphibians							
Chelydra serpentina	Snapping Turtle	S4	SC	SC	No, basking surveys did not detect Snapping Turtles using the pond		
Graptemys geographica	Northern Map Turtle	S3	SC	SC	No		
Heterodon platirhinos	Eastern Hog-nosed Snake	S3	THR	THR	No		
Birds							
Colinus virginianus	Northern Bobwhite	S1?B	END	END	No		
Protonotaria citrea	Prothonotary Warbler	S1B	END	END	No		
Icteria virens	Yellow-breasted Chat	S1B	END	END	No		
Rallus elegans	King Rail	S1B	END	END	No		
Empidonax virescens	Acadian Flycatcher	S1B	END	END	No		
Melanerpes erythrocephalus	Red-headed Woodpecker	S 3	SC	END	No		
Chaetura pelagica	Chimney Swift	S3B	THR	THR	No		
Chlidonias niger	Black Tern	S3B, S4M	SC	NAR	No		
Haliaeetus leucocephalus	Bald Eagle	S4	SC	NAR	No		
Falco peregrinus	Peregrine Falcon	S4	SC	NAR	No		
Asio flammeus	Short-eared Owl	S4?B, S2S3N	SC	SC	No		
Chordeiles minor	Common Nighthawk	S4B	SC	SC	No		

Consulting

Scientific Name	Common Name	S_RANK	SARO Status	COSEWIC Status	Potential Habitat in Subject Property
Contopus virens	Eastern Wood-Pewee	S4B	SC	SC	No
Riparia riparia	Bank Swallow	S4B	THR	THR	No
Hirundo rustica	Barn Swallow	S4B	THR	THR	Yes. 2-4 individuals were observed foraging in the field. Subject Property does not contain breeding habitat.
Hylocichla mustelina	Wood Thrush	S4B	SC	THR	No
Dolichonyx oryzivorus	Bobolink	S4B	THR	THR	No
Sturnella magna	Eastern Meadowlark	S4B, S3N	THR	THR	No
		ı	Insects		
Danaus plexippus	Monarch	S2N,S4B	SC	END	Yes, Common Milkweed (Asclepias syriaca) was observed growing east of the pond.

2. Significant Wildlife Habitat Screening

2.1. Method

A screening for Significant Wildlife Habitat following the Ministry of Natural Resources and Forestry Significant Wildlife Habitat Technical Guide (2000) and Significant Wildlife Habitat Criteria Schedule for Ecoregion 7E (January 2015) was conducted for the Subject Property. Potential SWH identified was assessed during the complementary field studies.

2.2. Result

Significant wildlife habitat within the Subject Property was assessed based on the Ecoregion 7E Criterion Schedule (OMNRF 2015). The full SWH screening table is found in Appendix B. The habitats within the Subject Property area were screened against the habitat criteria found in MNRF (2015) as well as other criteria (e.g., the presence of indicator species). Identified SWH features were considered candidate unless they were confirmed through direct observations or background review. The five main categories of SWH are considered below:

- 1) Seasonal Concentration Areas of Animals- none of the 16 subcategories of SWH for this category were identified as candidate within the Subject Property:
- 2) Rare Vegetation Communities- none of the seven subcategories of rare vegetation communities were detected within the Subject Property.
- 3) Specialized Habitat for Wildlife- none of the eight subcategories of SWH for this category were found within the Subject Property.
- 4) Habitats for Species of Conservation Concern (not including Endangered or Threatened species)- None of the five subcategories of SWH were identified as candidate within the Subject Property.
- 5) Animal Movement Corridors: No movement corridors were identified within the Subject Property.

3. Breeding Amphibians

3.1. Method

Amphibian surveys were completed following the Marsh Monitoring Program protocol (Bird Studies Canada 2009). This required three visits between mid-April and the end of June when there were light winds and air temperatures of 5°C, 10°C and 17°C respectively. These surveys were completed on April 22, May 12 and June 1, 2022.

3.2. Result

One toad species and three frog species were detected calling from within the pond. Based on the species and numbers identified, the pond habitat does not meet the criteria for Significant Wildlife Habitat- Amphibian Breeding (Aquatic).

Table 3 summarizes the details and findings of the breeding amphibian surveys conducted for the Subject Property. Amphibians were surveyed at one station located centrally along the eastern edge of the pond outside of the metal fence (Map 2). One toad species and three frog species were detected calling from within the pond. Based on the species and numbers identified, the pond habitat does not meet the criteria for Significant Wildlife Habitat- Amphibian Breeding (Aquatic).

Table 3. Breeding Amphibian Summary

S	Start	Air		au- Precip Cover		Species Calling (Call Code-Individuals)		Background Noise (Code – Notes)	Notes
Visit	Time	Temp (°C)	fort)		In Station	Out of Station			
Station A									
1 (>5°C)	21:55	8	1	None	2	Northern Leopard Frog (1- 1)		2-3	Cars driving on Old HWY 26, which is adjacent to pond.
2 (>10°C)	21:40	20	0	None	0	American Toad (1-1),(2-2) and (2-3)		2	Six individuals were heard in total.
3 (>17°C)	22:00	20	1	None	3	Green Frog 3x (1-1) and Bullfrog (1-2)	Gray Tree Frog	2-3	Five individuals were heard in total.

4. Turtle Habitat

4.1. Method

One visual turtle encounter survey was completed on May 24th from 11:30 am-3pm by two surveyors. The air temperature was 18°C and skies were clear to partially cloudy. The air temperature was higher than the water temperature, which is recommended for basking surveys.

4.2. Result

Basking surveys did not detect any turtle species using the pond. The pond is manmade and surrounded by a chain-link fence. There are no suitable basking logs for turtles to use and the banks are steep and heavily vegetated with shrubs such as Staghorn Sumac (*Rhus typhina*). There are no natural heritage features, such as wetlands or swamps within 120 m of the pond, therefore, it is very unlikely the pond would attract SAR turtles.

The chain-link fencing will have a negative influence on ability of the pond to function as usable turtle habitat as it:

- Restrict the ability for turtles to migrate into or out of the pond. The free movement of turtles between
 habitat units is important to their long-term survival as there are no opportunities leave the pond if habitat
 conditions become degraded or there is a loss of foraging opportunities.
- Turtles lay the eggs outside of the pond in dry land. The fence will restrict the opportunities for turtles to find suitable nesting habitats (the steep banks of the pond do not provide good nesting opportunities).

5. Incidental Wildlife Observations

Formal surveys for mammals, reptiles, and insects were not completed, but incidental observations were completed during other survey times. Table 4 summarizes the wildlife observed during field visits.

Table 4. Incidental Wildlife Observations

Scientific Name	Common Name	S_Rank	Evidence	Abundance
Charadrius vociferus	Killdeer	S5	Visual/Audio	2
Turdus migratorius	American Robin	S5	Visual/Audio	5
Agelaius phoeniceus	Red-winged Blackbird	S 5	Visual/ Audio (nest observed)	8
Hirundo rustica	Barn Swallow	S4B	Visual/Audio	2
Petrochelidon pyrrhonota	Cliff Swallow	S4 S5B	Visual	1
Tachycineta bicolor	Tree Swallow	S4 S5B	Visual/Audio	3
Zenaida macroura	Mourning Dove	S5	Visual/Audio	4
Melospiza melodia	Song Sparrow	S5	Audio	1
Cardinalis cardinalis	Northern Cardinal	S5	Audio	1
Passer domesticus	House Sparrow	SNA	Audio	1
Cathartes aura	Turkey Vulture	S5B, S3N	Visual	1
Sturnus vulgaris	European Starling	SNA	Visual/Audio	3
Lithobates catesbeianus	Bullfrog	S4	Audio	1
Lithobates pipiens	Northern Leopard Frog	S5	Visual	2
Lithobates clamitans	Green Frog	S5	Visual/Audio	6
Rhipicephalus sanguineus	Brown Dog Tick	SNA	Visual	10
Colias philodice	Clouded Sulphur	SNA	Visual	3

Members of the public also noted incidental observations of Red Fox (*Vulpes vulpes fulvus*). The entire Subject Property was scouted for potential den locations. There was no evidence of breeding Red Fox or potential den entrances. No Red Fox's were observed during the field investigations.

6. Conclusion

Based on field investigations, one SAR (Barn Swallow - Threatened) was detected foraging within the Subject Property. Although Common Milkweed was detected, it was sparse and would provide limited breeding habitat to the Monarch (Special Concern). The Subject Property does not provide Significant Wildlife Habitat based on the Ecoregion 7E Criterion Schedule. One toad species and three frog species were detected calling from within the pond. The Green Frog and Bullfrog were heard incidentally calling from the pond during basking surveys. Based on the species and numbers identified, the pond habitat does not meet the criteria for Significant Wildlife Habitat - Amphibian Breeding (Aquatic).

The pond is currently providing nesting habitat for Red-winged Blackbird as a female was observed sitting on an active nest. The Red-winged Blackbird is considered secure in Ontario and is one of the most abundant native birds in Ontario. It is a generalist, meaning it has a wide dietary and habitat range. Red-winged Blackbirds fiercely defend their territories and were the only bird species observed using the vegetated banks for perching and nesting.

Overall, the pond provided limited habitat to generalist species that are common and secure in Ontario. Refer to Appendix D for photos of the Subject Property.

The following mitigation measures are recommended:

- Exclusion fencing should be installed around the pond to prevent wildlife from entering the site prior to site construction on pond decommission. Where required, redirect wildlife to areas where they can avoid the potential for incidental take, and still have access to habitats. Exclusionary fencing should be monitored daily throughout construction.
- Clearing of vegetation within the Subject Property as part of site preparation should be conducted in late summer or winter months (September-March) so as not to coincide with breeding bird season. If clearing is to proceed within the breeding bird window, the Subject Property should be screened by a qualified bird biologist to determine if any migratory song birds are nesting within work zone;
- Wildlife is to be safely removed and relocated to another pond or wetland feature during the pond decommissioning stage. Removal of trapped wildlife should be completed by a qualified biologist.
- Integration of Monarch host plant species such as Common Milkweed and Butterfly Milkweed (Asclepias tuberosa) in combination with a "Native Prairie Meadow Seed Mixture (OSC 8135)" (Appendix C) should be considered in the replanting stage to compensate for the minimal habitat loss.

Regards,

GEOPROCESS RESEARCH ASSOCIATES INC

Written By:

Meghan Douglas B.Sc., ERPG Wildlife Ecologist and ISA Certified Arborist

leghan Douglas

Reviewed By:

Ken Glasbergen MSc., ERPG Senior Ecologist, Principal



Maps













Appendix A

Species at Risk Screening Sources

Screening Resource	Description
Natural Heritage Information Center (NHIC)	The Natural Heritage Information Center (NHIC), operated by the Ontario Ministry of Natural Resources and Forestry, collects, reviews, manages and distributes information on Ontario's biodiversity. Data distributed by the NHIC is used in conservation and natural resource management decision making and was a primary resource for this report. Through the NHIC Make-a-Map tool, data on species, plant communities, wildlife concentration areas and natural areas is made accessible to the public and professionals using generalized 1-kilometer grid units to protect sensitive information. The mapping interface provides current and historical occurrences of SAR within the specified grid unit. The database also identifies environmental designations which provide insight into habitat potential including wetland, areas of natural and scientific interests and woodlands.
Breeding Bird Atlas	The atlas divides the province into 10×10 km squares and then birders find as many breeding species as possible in each square. Atlassers who know birds well by song complete 5-minute "Point Counts", 25 of which are required to provide an index of the abundance of each species in a square. Data from every square are mapped to show the distribution of each species. Point count data from each square show how the relative abundance of each species varies across the province.
eBird	eBird data document bird distribution, abundance, habitat use, and trends through checklist data collected within a simple, scientific framework. Birders enter when, where, and how they went birding, and then fill out a checklist of all the birds seen and heard during the outing. eBird's free mobile app allows offline data collection anywhere in the world, and the website provides many ways to explore and summarize your data and other observations from the global eBird community. eBird hotspots that are within 1 km of the Subject Property are selected for species review.
Ontario Moth Atlas	The Ontario Moth Atlas is a project of the Toronto Entomologists' Association. The atlas currently covers about 250 species from 7 of the best-known families. The atlas presently includes 62,000 records. The last update of the atlas was in April 2020. The atlas is updated at least every 3 months. Most atlas data come from iNaturalist records. However, there is some data from Chris Schmidt of Agriculture Canada, the BOLD (Barcode of Life Datasystems) project of the University of Guelph, and from other records submitted directly to the TEA. The atlas uses the same 10×10 km squares at the Breeding Bird Atlas.
Ontario Butterfly Atlas	The Ontario Butterfly Atlas is a project of the Toronto Entomologists' Association (TEA). The TEA has been accumulating records and publishing annual seasonal summaries (Ontario Lepidoptera) for 50 years, with the first edition appearing in 1969. Atlas data comes from eButterfly records, iNaturalist records, BAMONA records, and records submitted directly to the TEA. The atlas uses the same 10×10 km squares at the Breeding Bird Atlas.
i-Naturalist	i-Naturalist is a nature app that helps public identify plants and animals. Using algorithms as well as scientists and taxonomic experts' multiple observations can be identified at a research scale. This data generated by the iNat community can be used in science and conservation. The program actively distributes the data in venues where scientists and land managers can find it. I-Naturalist has a project group for (NHIC) Rare species of Ontario. GRA only records observations with-in 1 km of the Subject Property.
Fisheries and Ocean Aquatic Species at Risk Maps	The DFO has compiled critical habitat and distribution data for aquatic species listed under the Species at Risk Act (SARA). The interactive map is intended to provide an overview of the distribution of aquatic species at risk and the presence of their critical habitat within Canadian waters. The official source of information is the Species at Risk Public Registry. Using this map, a 1 km radius circle is outlined around aquatic features located within the Subject Property.



Appendix B

Significant Wildlife Habitat Full Assessment

(7E)

Table 5. Significant Wildlife Habitat Table for Ecoregion 7E

	Candidate SWH		Potential In		Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
		Seasonal Concentration	Areas of Anima	als	
Waterfowl Stopover and Staging Areas (Terrestrial)	CUM, CUT1 - plus evidence of annual spring flooding within these ecosites *Fields with seasonal flooding and waste grains in certain areas are specific to Tundra Swan	Fields with sheet water during Spring (mid-March to May) •agricultural fields with waste grain are not SWH unless they have spring sheet water available.	No	No habitat features on the Subject Property	 Any mixed species aggregations of 100+ individuals the flooded field plus 100-300m radius, dependant on localized site and adjacent land us Annual Use of Habitat is documented from information sources or field studies Specific evaluation methods required
Waterfowl Stopover and Staging Areas (Aquatic)	MAS1,MAS2,MAS3,SAS1,SAM1,SAF1,S WD1,SWD2,SWD3,SWD4,SWD5,SWD6, SWD7	Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. • Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify.	No	No habitat features on the Subject Property	 Aggregations of 100 + of species listed for 7 days, results in > 700 waterfowl use days. Areas with annual staging for ruddyducks, canvasbacks and redheads. The combined area of the ELC ecosites and a 100m radius area. Wetland area and shorelines associated with sites identified within the SWHTG, Appendix K, are significant wildlife habitat. Annual Use of Habitat is documented from information sources or field studies Specific evaluation methods required
Shorebird Migratory Stopover Area	BBO1,BBO2,BBS1,BBS2,BBT1,BBT2,SDO 1,SDS2,SDT1,MAM1,MAM2,MAM3,MA M4,MAM5	 Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores in May to mid-June and early 	No	No habitat features on the Subject Property	 Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. Whimbrel stop briefly (<24hrs) during spring migration, any site with > 100 Whimbrel used for 3 years or more is significant. The area of significant shorebird habitat



	Candidate SWH		Potential In		Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
		July to October. • No sewage treatment ponds.			includes the mapped ELC shoreline ecosites plus a 100m radius area. •Annual Use of Habitat is documented from information sources or field studies • Specific evaluation methods required
Raptor Wintering Area	Combo of one of each Community Series from Forest (FOD,FOM,FOC) and Upland (CUM,CUT,CUS,CUW). Bald Eagle: Forest on shoreline area adjacent to large rivers and lakes.	A combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Need to be > 20 ha. •Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands. • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water and large trees and snags available for roosting.	No	No habitat features on the Subject Property	•One or more Short-eared Owls or; •One of more Bald Eagles or; • At least 10 individuals and two of the listed hawk/owl species. •To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds. •for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area. • Specific evaluation methods required
Bat Hibernacula	CCR1,CCR2,CCA1,CCA2. * buildings are not to be considered SWH	May be found in caves, mine shafts, underground foundations and Karsts. •Active mine sites are not considered SWH.	No	No habitat features on the Subject Property	 All sites with confirmed hibernating bats are SWH. area includes 200m radius around the entrance of the hibernaculum for most development types and 1000m for wind farms. Studies are to be conducted during the peak swarming period (Aug. – Sept.). Specific survey methods required
Bat Maternity Colonies	All Ecosites in: FOD,FOM,SWD,SWM.	Maternity colonies can be found in tree cavities, vegetation and often in building. *Building are not considered SWH. • Not found in caves or mines in ON. •Located in Mature Deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees. •Prefer snags in early stages of decay (class 1-3 or class 1 or class 2). •Silver-haired Bats prefer older mixed or	No	No habitat features on the Subject Property	•Confirmed use by: >10 Big Brown Bats >5 Adult female Silver Haired Bats. •The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. • Specific evaluation methods required

	Candidate SWH		Potential In		Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
		deciduous forests with at least 21 snags/ha.			
Turtle Wintering Areas	Snapping and Midland Painted: SW,MA,OA,SA and FEO/BOO Series. Northern Map: Open water areas such as deeper rivers or streams and lakes.	Wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. •Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen. •Manmade ponds such as sewage lagoons or storm water ponds should not be considered SWH.	No	No habitat features on the Subject Property	 Presence of 5 over-wintering Midland Painted Turtles is significant, •One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernaculum in the Study Area is within a stream or river, the deep water pool where the turtles are over wintering is the SWH. Search for congregations in Basking Areas in spring and fall.
Reptile Hibernaculum	Any ecosite other that very wet. •Talus, Rock Barren, Crevice, Cave, Alvar may be directly related. •Observations of congregations in spring or fall is good indicator.	Sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH.• Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line. •Wetlands can also be important overwintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover.	No	No habitat features on the Subject Property	•Presence of snake hibernacula used by - a minimum of five individuals of a snake sp. or;-individuals of two or more snake spp •Congregations of -a minimum of five individuals of a snake sp. or; -individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct).• If there are Special Concern Species present, then site is SWH. •The feature in which the hibernacula is located plus a 30 m radius area is the SWH.• Hibernacula are used annually, often by the same individuals (strong site fidelity) and other life processes often take place near by

	Candidate SWH		Potential In		Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
Colonially-Nesting Bird Breeding Habitat (Bank and Cliff)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns. CUM1,CUS1,BLS1,CLO1,CLT1,CUT1,BL O1,BLT1,CLS1.	Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area, *does not include man-made structures or licenced Mineral Aggregate Operation.	No	No habitat features on the Subject Property	 Presence of 1 or more nesting sites with 8 or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. A colony identified as SWH will include a 50m radius habitat area from the peripheral nests. Field surveys to observe and count swallow nests are to be completed during the breeding season. Specific evaluation methods required
Colonially-Nesting Bird Breeding Habitat (Tree/Shrub)	SWM2,SWM3,SWM5,SWM6,SWD1,SW D2,SWD3,SWD4,SWD5,SWD6,SWD7,F ET1	Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. •Most nests in trees are 11 to 15 m from ground, near the top of the tree.	No	No habitat features on the Subject Property	 Presence of 2 or more active nests of Great Blue Heron or other listed species. The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH. Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells.
Colonially-Nesting Bird Breeding Habitat (Ground)	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6; MAS1 – 3; CUM,CUT,CUS	Nesting colonies on islands or peninsulas associated with open water or in marshy areas. Brewers Blackbird colonies found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands.	No	No habitat features on the Subject Property	•Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, > 5 active nests for Common Tern or > 2 active nests for Caspian Tern. •Presence of 5 or more pairs for Brewer's Blackbird. •Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. •The edge of the colony and a minimum 150m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH. •Studies would be done during May/June when actively nesting. • Specfic evaluation methods required

	Candidate SWH		Potential In	5 d - 1	Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
Migratory Butterfly Stopover Areas	Combo of one of each Field (CUM, CUT, CUS) and Forest (FOC, FOD,FOM,CUP).	Minimum 10 ha in size with combo of field and forest located within 5km of Lake Erie or Lake Ontario. •Should not be disturbed. • Field/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat. •Should provide protection from the elements, often spits of land or areas with the shortest distance to cross the Great Lakes.	No	No habitat features on the Subject Property. Field contained patchy and homogeneous plant growth .	 Presence of Monarch Use Days (MUD) during Fall migration (Aug/Oct) Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant.
Landbird Migratory Stopover Areas	All Ecosites within: FOC,FOM,FOD,SWC,SWM,SWD	Woodlots >5ha in size and within 5km of Lake Erie and Lake Ontario. • If woodlands are rare in area, smaller size can be considered. • If multiple woodlands located along shore line, those 2km from shoreline are more significant. • Sites have a variety of habitats; forest, grassland and wetland complexes. •The largest sites are more significant. • Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and located within 5km of Lake Erie and Lake Ontario are Candidate SWH.	No	No habitat features on the Subject Property	 Use of the habitat by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least 5 different survey dates. Studies should be completed during spring (Mar to May) and fall (Aug to Oct) migration using standardized assessment techniques. Specific evaluation methods required

	Candidate SWH		Potential In		Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
Deer Winter Congregation Areas	All forested ecosites within: FOC,FOM,FOD,SWC,SWM,SWD + conifer plantations much smaller than 50 ha may be used.	Woodlots > 100 ha in size or if large woodlots are rare in a planning area woodlots > 50ha. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha. *Woodlots with high densities of deer due to artificial feeding are not significant.	No	No habitat features on the Subject Property	 •Will be mapped by MNRF. • All woodlots exceeding the criteria are significant unless determined to be not by the MNRF. •Studies to be completed during winter when > 20 cm of snow is on the ground, using aerial survey or pellet count.
		Rare Vegetation C	ommunities		
Cliffs and Talus Slopes	Any Ecosite within: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris. Most cliff and talus slopes occur along the Niagara Escarpment.	No	No habitat features on the Subject Property	•Confirm any ELC Vegetation Type for Cliffs or Talus Slopes
Sand Barren	SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicketlike (SBS1), or more closed and treed (SBT1). Tree cover always < 60%	A sand barren area >0.5ha in size. • Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. • Vegetation can vary from patchy and barren to tree covered, but less than 60%.	No	No habitat features on the Subject Property	 Confirm any ELC Vegetation Type for Sand Barrens. Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.

	Candidate SWH		Potential In		Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
Alvar	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2, Five Alvar Indicator Species: 1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema brachiatum	An Alvar site > 0.5 ha in size, only known sites are found in the western islands of Lake Erie. • An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. • Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. • Vegetation cover varies from patchy to barren with a less than 60% tree cover.	No	No habitat features on the Subject Property	 Studies that identify four of the five Alvar Indicator Species at a Candidate Alvar site is Significant. Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses.
Old Growth Forest	FOD FOC FOM SWD SWC SWM	Woodland area is >0.5ha • Characterized by heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	No	No habitat features on the Subject Property	 If dominant trees species of the area are >140 years old, then the area containing these trees is Significant Wildlife Habitat. The forested area containing the old growth characteristics will have experienced no recognizable forestry activities The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH. Determine ELC vegetation types for the forest forest area containing the old growth characteristics

	Candidate SWH		Potential In	- 4	Confirmed Defining Criteria=	
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm	
Savannah	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. • No minimum size to site. • Site must be restored or a natural site. *Remnant sites such as railway right of ways are not considered to be SWH. • Remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario)	No	No habitat features on the Subject Property	•Field studies confirm one or more of the Savannah indicator species found in Appendix N, Ecoregion 7E of the SWHTG, OMNR (2000). •Entire area of the ELC Ecosite is SWH. •Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic species).	
Tallgrass Prairie	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. •An open Tallgrass Prairie habitat has < 25% tree cover. •No minimum size to site. •Site must be restored or a natural site. *Remnant sites such as railway right of ways are not considered to be SWH.	No	No habitat features on the Subject Property	•Field studies confirm one or more of the Prairie indicator species in Appendix N, Ecoregion 7E of The SWHTG, OMNR (2000). •Area of the ELC Ecosite is the SWH. •Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.)	
Other Rare Vegetation Communities	See the Significant Wildlife Habitat Technical Guide (OMNR, 200), Appendix M for Provincially Rare S1,S2 and S3 ELC Vegetation Types.	May include beaches, fens, forest, marsh, barrens, dunes and swamps. See OMNRF/NHIC for up to date list of rare vegetation communities.	No	No habitat features on the Subject Property	•Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG, OMNR (2000). •Area of the ELC Vegetation Type polygon is the SWH.	
Specialized Habitat for Wildlife						

Wildlife Habitat	Candi	idate SWH	Potential In	Rationale	Confirmed Defining Criteria=
wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Kationale	Studies to confirm
Waterfowl Nesting Area	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4. * Note: includes adjacency to Provincially Significant Wetlands	A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a wetland (> 0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. •Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. • Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests.	No	No habitat features on the Subject Property. Pond does not contain wetland features.	 Presence of 3 or more nesting pairs for listed species excluding Mallards OR Presence of 10 or more nesting pairs for listed species including Mallards. Any active nesting site of an American Black Duck is considered significant. Nesting studies should be completed during the spring breeding season (April - June). Specific evaluation methods required A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. *Nests located on man-made objects are not to be included as SWH. Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy.	No	No habitat features on the Subject Property	One or more active Osprey or Bald Eagle nests in an area. •Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. •For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH. *with additional requirements•For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. * with additional requirements•To be significant a site must be used annually. •When found inactive, the site must be known to be inactive for > 3 years or suspected of not being used for >5 years before being considered not significant. •Observational studies to determine nest site use, perching sites and foraging areas need to be done from early March to mid August. • Specific evaluation methods required

	Candidate SWH		Potential In		Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
Woodland Raptor Nesting Habitat	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	All natural or conifer plantation woodland/forest stands >30ha with >4ha of interior habitat. • Interior habitat determined with a 200m buffer. •Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.	No	No habitat features on the Subject Property	Presence of 1 or more active nests from species list is considered significant. •Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha area of habitat is the SWH. (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) •Barred Owl – A 200m radius around the nest is the SWH. •Broad-winged Hawk and Coopers Hawk,– A 100m radius around the nest is the SWH. •Sharp-Shinned Hawk – A 50m radius around the nest is the SWH. • Conduct field investigations from early March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area.
Turtle Nesting Areas	Exposed mineral soil (sand or gravel) areas adjacent (<100m) or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. •For an area to function as a turtle nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. *Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH.• Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	No	No habitat features on the Subject Property. Basking surveys did not detect turtles.	Presence of:- 5 or more nesting Midland Painted Turtles OR - One or more Northern Map Turtle or Snapping Turtle nesting is a SWH. •The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependant on slope, riparian vegetation and adjacent land use is the SWH.• Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100m area of habitat. •Field investigations should be conducted in prime nesting season typically late spring to early summer. •Observational studies observing the turtles nesting is a recommended method.

	Candidate SWH		Potential In		Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
Seeps and Springs	Where ground water comes to the surface. Often they are found within headwater areas within forested habitats. •Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system.	No	No habitat features on the Subject Property	Presence of a site with 2 or more seeps/springs should be considered SWH. •The area of a ELC forest ecosite or an ecoelement within ecosite containing the seeps/springs is the SWH. •The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat.
Amphibian Breeding Habitat (Woodland)	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD •Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	Presence of a wetland, pond or woodland pool (including vernal pools) >500m² (about 25m diameter) within or adjacent (within 120m) to a woodland (no minimum size). • Some small wetlands may not be mapped and may be important breeding pools for amphibians. •Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat.	No	No habitat features on the Subject Property	Presence of breeding population of: - 1 or more of the listed newt/salamander species or - 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) or - 2 or more of the listed frog species with Call Level Codes of 3. •A combo of observational and call count surveys required during the spring (March-June) . •The habitat is the wetland area plus a 230m radius of woodland area. • If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat.
Amphibian Breeding Habitat (Wetlands)	ELC Community Classes SW, MA, FE, BO, OA and SA. •Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	Wetlands > 500m² (about 25m diameter), supporting high species diversity are significant; •some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats. •Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for	No	No habitat features on the Subject Property. Pond does not contain wetland features and breeding amphibian surveys did not confirm habitat quality.	Presence of breeding population of: -1 or more of the listed newt/salamander species or -2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or -2 or more of the listed frog/toad species with Call Level Codes of 3. or; -Wetland with confirmed breeding Bullfrogs are significant. •The ELC ecosite wetland area and the

	Candidate SWH		Potential In	5 // 1	Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
		calling, foraging, escape and concealment from predators.Bullfrogs require permanent water bodies with abundant emergent vegetation.			shoreline are the SWH. •A combo of observational and call count surveys will be required during the spring (March-June). •If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered.
Woodland Area- Sensitive Bird Breeding Habitat	All Ecosites withing: FOC FOM FOD SWC SWM SWD	Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. •Interior forest habitat is at least 200 m from forest edge habitat.	No	No habitat features on the Subject Property	Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. *any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH. • Conduct field investigations in spring and early summer. • Specific evaluation methods required
	Habitat	for Species of Conservation Concern (Not in	ncluding Endan	gered or Threatened Species)	
Marsh Bird Breeding Habitat	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites	Nesting occurs in wetlands. All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. •For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water	No	No habitat features on the Subject Property. One generalist species, the Red-winged Blackbird was observed nesting.	Presence of: - 5 or more nesting pairs of Sedge Wren or Marsh Wren or -breeding by any combination of 4 or more of the listed species. •any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH. •Area of the ELC ecosite is the SWH. •Breeding surveys should be done in May/June. • Specific evaluation methods required



	Candidate SWH		Potential In		Confirmed Defining Criteria=	
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm	
Open Country Bird Breeding Habitat	CUM1 CUM2	Large grassland areas (includes natural and cultural fields and meadows) > 30 ha. •Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years). •Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. •The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.	No	No habitat features on the Subject Property	Presence of nesting or breeding of: -2 or more of the listed species. • A field with 1 or more breeding Short-eared Owls is to be considered SWH. •The area of SWH is the contiguous ELC ecosite field areas. •Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Specific evaluation methods required.	
Shrub/Early Successional Bird Breeding Habitat	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	Large field areas succeeding to shrub and thicket habitats>10ha in size. •Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no rowcropping, haying or livestock pasturing in the last 5 years). •Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. •Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.	No	No habitat features on the Subject Property	Presence of nesting or breeding of - 1 of the indicator species and at least 2 of the common species. •A habitat with breeding Yellowbreasted Chat or Golden-winged Warbler is to be considered as SWH. •The area of the SWH is the contiguous ELC ecosite field/thicket area. •Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Specific evaluation methods required	

	Cand	idate SWH	Potential In		Confirmed Defining Criteria=
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm
Terrestrial Crayfish	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1-with inclusions of above meadow marsh ecosites can be used by terrestrial crayfish.	Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish. •Usually the soil is not too moist so that the tunnel is well formed. •Can often be found far from water.	No	No habitat features on the Subject Property	Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites. • Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. • Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult.
Special Concern and Rare Wildlife Species	All plant and animal element occurrences (EO) within a 1 or 10km grid.	identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites	N/A	See SAR Screening Section	Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. •The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat.
		Animal Movemen	t Corridors		
Amphibian Movement Corridors	Corridors may be found in all ecosites associated with water.	Corridors will be determined based on identifying the significant breeding habitat for these species. Movement corridors between breeding habitat and summer habitat. Movement corridors must be determined when Amphibian breeding	NA	No habitat features on the Subject Property	Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and

	Cand	didate SWH	Potential In		Confirmed Defining Criteria=	
Wildlife Habitat	ELC Ecosite Codes	Habitat Criteria	the Study Area	Rationale	Studies to confirm	
		habitat is confirmed as SWH from this Schedule.			undeveloped areas are most significant. Corridors should have at least 15m of vegetation on both sides of waterway or be up to 200m wide of woodland habitat and with gaps <20m. Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat.	
		Exceptions for Ec	oRegion 7E			
Bat Migratory Stopover Area	No specific ELC types.	Long distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migration may concentrate these species of bats at stopover areas.	No	No habitat features on the Subject Property	Only confirmed site is Long Point. Confirmation criteria and habitat areas are still being determined.	



Appendix C

Native Prairie Meadow Seed Mixture

(OSC 8135)





Native Prairie Meadow Seed Mixture 8135

\$100.80 - \$162.00 / each

Size:	SKU:	Price:	Availability:	Quantity:	Total
500- g	Q- 8135- 500G	\$100.80	In stock	o +	\$0.00
1–kg	Q- 8135- 1KG	\$162.00	In stock	0 +	\$0.00
			ADD TO CART	\$0.0	0
Categor	ies: Dry Me	adow Mixes,	Native Prairie Mixtur	res, Native Seed	

DESCRIPTION

ADDITIONAL INFORMATION

Description

Native Prairie Meadow Seed Mixture 8135. A diverse mix of flowering plants and grasses to create "a field of dreams" that when established, requires very little maintenance. Contains: Black Eyed Susan (Rudbeckia hirta), Early Goldenrod (Solidago juncea), Fowl Bluegrass (Poa palustris), Foxglove/Beardtongue (Penstemon digitalis), Indiangrass (Sorghastum nutans), Little Bluestem (Schizachyrium scoparium), New England Aster (Aster novae-angliae), Showy Tick Trefoil (Desmodium canadense), Switchgrass (Panicum virgatum), White Vervain (Verbena urticifolia), Wild Bergamot (Monarda fistulosa).

How to Grow

Native seed mixes do best when planted in the fall, typically between Oct. 15th and Nov. 15th. A late fall sowing allows the seed to be stratified naturally over the winter and early spring. An early spring sowing in April can work but due to the possibility of unseasonable weather preventing decent seed stratification, there is a greater chance that seed will remain dormant and not germinate until the spring of the following year.

Site Preparation. While there is little you can do to deal with the seeds of undesirable plants that are already in the soil, to help minimize unwanted competition in the seeding area, remove existing weeds by hand or apply an organic non-selective herbicide. Once all unwanted vegetation has been taken care of, loosen soil to 2.5 cm (1") depth with a stiff rake, cultivator or hoe. Prairie flowers and grasses germinate and establish themselves much better when the seed is planted into a bed of loose, well drained soil rather than dense, compacted topsoil. Broadcast the seed evenly and let Mother Nature do the rest. Smaller seed can be mixed with dry sand to improve distribution when sowing. Rain, snow and frost-heaving of the soil will work the seed down into the soil bed. If you do choose to do a spring planting, it is imperative to make sure the seed comes into good contact and with the soil. Irrigate as needed during the first growing season. Be prepared to cut the site at a height of 20 cm (8") twice during the first growing season and possibly once more early in the second season to help keep aggressive weeds in check while the native plants work through their establishment period. Hand removal of pockets of aggressive weeds may be required during the establishment period. Keep in mind that establishing a native planting from seed typically takes three to four years. Sow at 500 g/180 m2 or 25 kgs/ ha

OSC recommends sowing a nurse crop at the same time as the native seed blend. The purpose of a quick germinating nurse crop is to help prevent soil/wind erosion and seed movement, reduce weed competition and provide shelter for the target seed blend during the early establishment period. The nurse crop will die out over the winter after its job is done. For ease of application the nurse crop can be mixed with the native seed blend and applied at the same time. OSC recommends using annual rye or oats at a rate of 22–25 kg/ha (21–23 lb/acre). Note that winter will completely kill annual rye plants and some seed and completely kill **both** oat plants and seed.



Appendix D

Photos



Knowledge



Degraded open field with sparse vegetation cover



Common Milkweed growing sparsely in the southeast corner of field



05/24/2022 71-80

Rockpiles were checked for den habitat and snake hibernacula





Old-field habitat. Barn, Tree and Cliff Swallows were observed foraging over the fields





Eastern pond edge and metal chain-link fence



Western pond edge adjacent to Old Highway 24



Open pond with limited habitat for basking turtles,



Visual observation of Northern Leopard frog

(5) Thuja occidentalis `Emerald`

(22) Juniperus sabina

`Flaming Mound`

(18) Spiraea japonica

(10) Spiraea japonica

(12) Bouteloua gracilis

(14) Juniperus sabina

(10) Spiraea japonica `Flaming Mound`

`Flaming Mound`

- 1. All work to be carried out in accordance with by-laws and codes
- 2. Complete all work to the satisfaction of the Landscape Architect. 3. Report any changes, discrepancies or substitutions to the Landscape Architect for review. Obtain approval from the Landscape Architect
- 4. It is the contractor's responsibility to determine existing service locations.
- 5. Exact locations of plant material will be determined by placement of site services such as hydro vaults, meters, utilities roof rain water
- leaders, driveways, light standards, etc.
- by Landscape Architect prior to installation.
- 9. Supply and place mulch in accordance with Canadian Landscape Standard (Section 10, Mulching). Disturbed soil areas around trees and shrubs are to be covered with shredded conifer bark mulch such as 'Cedar Bark Mulch' by All Treat Farms or 'Classic Cedar Mulch' by Gro-Bark, or approved equivalent. Alternative mulches must be approved by the Landscape Architect.
- 11. Provide planting bed area as noted on the drawing or to
- final acceptance. No extras will be paid to complete this work
- 14. Supply and place sod in accordance with Canadian Landscape Standard (Section 7, Lawns & Grass and Section 8, Turfgrass
- 15. Supply and place seed in accordance with Canadian Landscape Standard (Section 4, Grading & Drainage and Section 6, Growing Medium) unless otherwise specified. All 5:1 or greater slopes to be seeded with tacifier. Contractor to provide necessary erosion control protection as required to ensure soil stabilization and proper seed

- 18. Contractor to provide minimum one (1) year warranty (including trees on municipal property) from date accepted on all work unless
- 19. Any site plan or grading and servicing shown is for information only.
- Landscape Architect.
- Landscape Architect.
- 23. All plant material to be planted a minimum of 1.0m from any swales
- 24. For grading and servicing information refer to the consulting Engineer's drawings.
- 25. For lighting information and power distribution refer to the electrical consultant's drawings.

- irrigate all planting beds shown on plan. Plumbing and electrical work shall conform to the prevailing codes, and unless specified otherwise, the construction of the sprinkler system shall include the furnishing, installing and testing of all irrigation equipment, along with the
- entire system shall be guaranteed to be complete and function perfectly in every detail for a period of one year from the date of its
- 4. All work shall be carried out in accordance with by-laws and codes having jurisdiction over site location.
- location of all underground and overhead utilities and structures before commencing the work.
- 7. The client shall be responsible for provision of 110 VAC power within 1
- 8. The irrigation contractor shall be responsible for the supply and
- installation of a 2" backflow preventer to the local plumbing code inside of the utility room.
- 9. Mechanical Contractor to provide a 2" size water source complete with stub at the point of connection.

PLANT SCHEDULE

QTY	BOTANICAL NAME	COMMON NAME	SIZE	COND.	MATURE HT. (M)	MATURE SPR. (M)	O.C. (M)	<u>REMARKS</u>
TREES								
3	Ginkgo biloba `Princeton Sentry`	Princeton Sentry Maidenhair Tree	50mm Cal.	W.B.	13.0	7.0	As Shown	
2	Nyssa sylvatica	Sour Gum	50mm Cal.	W.B.	12.0	10.0	As Shown	Native to Ontario
5	Ostrya virginiana	Ironwood	50mm Cal.	W.B.	10.0	7.0	As Shown	Native to Ontario
2	Picea pungens `Fat Albert`	Fat Albert Colorado Spruce	200cm Ht.	W.B.	8.0	4.0	As Shown	
	Picea pungens var. `Glauca`	Colorado Blue Spruce	200cm Ht.	W.B.	16.0	5.0	As Shown	
	Quercus alba	White Oak	50mm Cal.	W.B.	18.0	18.0	As Shown	Native to Ontario
2	Quercus rubra	Red Oak	50mm Cal.	W.B.	18.0	17.0	As Shown	Native to Ontario
34	Thuja occidentalis `Emerald`	Emerald Cedar	150cm Ht.	W.B.	5.0	1.0	As Shown	
SHRUB	S							
6	Hydrangea arborescens `Annabelle`	Annabelle Hydrangea	50cm	#3 cont.	1.1	1.0	0.90	
92	Juniperus sabina	Savin Juniper	40cm	#3 cont.	1.0	1.25	1.0	
27	Physocarpus opulifolius `Dart`s Gold`	Yellow Ninebark	40cm	#3 cont.	1.1	1.1	0.90	
75	Spiraea japonica `Flaming Mound`	Flaming Mound Spirea	40cm	#3 cont.	0.70	0.90	0.75	
51	Taxus canadensis	Canadian Yew	40cm	#3 cont.	0.50	0.80	0.70	Native to Ontario
GRASS	ES							
269	Bouteloua gracilis	Blue Grama Grass		#1 cont.	0.50	0.30	0.25	Native to Ontario
58	Calamagrostis x acutiflora `Eldorado`	Eldorado Feather Reed Grass		#1 cont.	1.25	0.50	0.40	
PEREN	NIALS							
31	Hemerocallis x `Stella D`Oro`	Stella D`Oro Daylily		#1 cont.	0.30	0.50	0.40	
GROU	ND COVERS							
0	Cotoneaster dammeri `Coral Beauty`	Coral Beauty Cotoneaster	30cm	#3 cont.	0.40	1.5	1.3	

LANDSCAPE NOTES:

- having jurisdiction over site location.
- before proceeding.
- 6. All plant material locations to be staked or marked out and approved
- 7. Supply all plant material in accordance with the Canadian Standards for Nursery Stock (8th ed.).
- 8. Install plant material according to details shown.
- 10. Contractor to utilize layout dimensions where provided
- accommodate mature size of plant material. 12. All support systems must be removed by the contractor at time of
- 13. Supply and place topsoil in accordance with Canadian Landscape Standard (Section 4, Grading & Drainage and Section 6, Growing Medium) to a minimum depth of 150mm unless otherwise specified.
- Sod)unless otherwise specified.
- germination.
- 16. All dimensions in meters unless otherwise noted.
- 17. If discrepancies arise between plant material count shown on drawing and plant list, the drawing shall be considered correct.
- otherwise specified.
- Refer to approved drawings.
- 20. Not for construction unless stamped, signed and dated by
- 21. Drawings not to be reproduced without written consent from
- 22. Approval of landscape plan to be obtained from municipality.

IRRIGATION NOTES:

point of connection.

- 1. The contractor is to design and install an irrigation system to efficiently
- restoration of the site to its original condition. 2. The design and layout is to be approved by the landscape architect
- and/or contract administrator. 3. The irrigation system will provide complete and appropriate coverage of the turf and planting areas shown on the drawings. Sprinklers are to direct water away from roads, sidewalks, driveways and buildings. The
- acceptance.
- 5. It is the responsibility of the plan user to inform themselves of the exact
- 6. All spray heads shall have pressure regulating devices.
- meter of the irrigation controller location.
- 10. Irrigation design is based on a static water pressure of 65 psi at the

NOT FOR CONSTRUCTION ISSUED FOR REVIEW & COMMENTS ONLY

REVISIONS/ SUBMISSIONS

KEY MAP - N.T.S.

LEGEND

property line

proposed deciduous tree

proposed coniferous tree

proposed shrub

proposed perennial

C.I.P. concrete

proposed elevation

min. 150mm topsoil, fine grade & sod

proposed 1.8m ht. wood privacy fence

WATERFORD

DESCRIPTION 2024-04-01 Issued for review 2 2024-07-16 Issued for submission

STAMP



CLIENT

Verlinda Homes Ltd.

MUNICIPALITY Norfolk County Waterfod

PROJECT Orchard Square Old Hwy 24, Norfolk County Rd. 24 & Lam Blvd. - Waterford

MUNICIPAL FILE NUMBER

Landscape Plan

adesso design inc. landscape architecture



69 John Street South, Suite 250 Hamilton, ON L8N 2B9 t. 905.526.8876 www.adessodesigninc.ca

L-

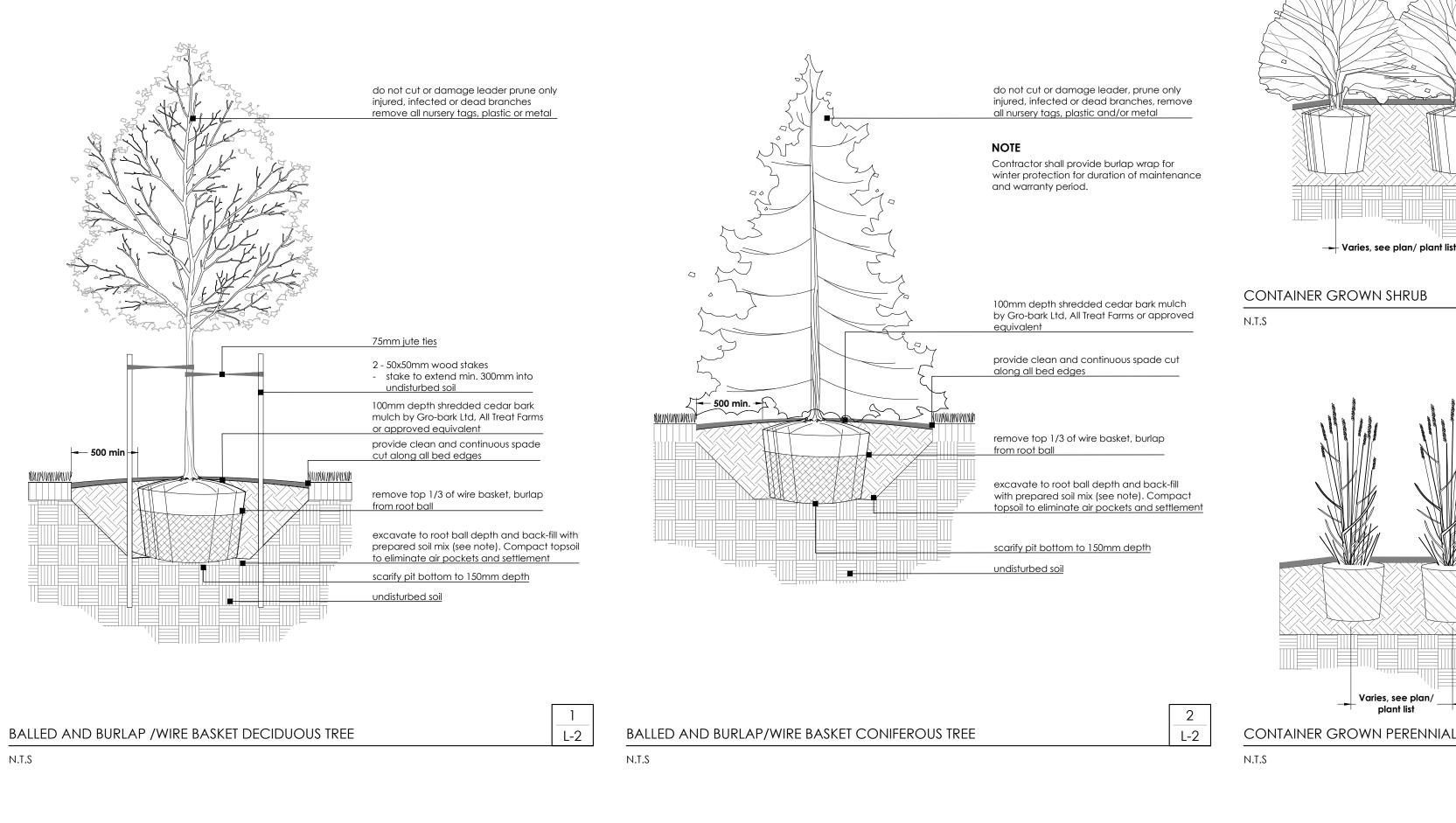


ELEVATION

NOTES:

and local by-laws.

well distributed throughout the site.



SECTION

proposed finished

38 x 140mm cap rail

140x140 post

38 x 89mm nailer, at mid-point of panel (typ.)

19 x 140mm top rail (residential) 38 x 140mm top rail (public)

19 x 140mm fence board (typ.)

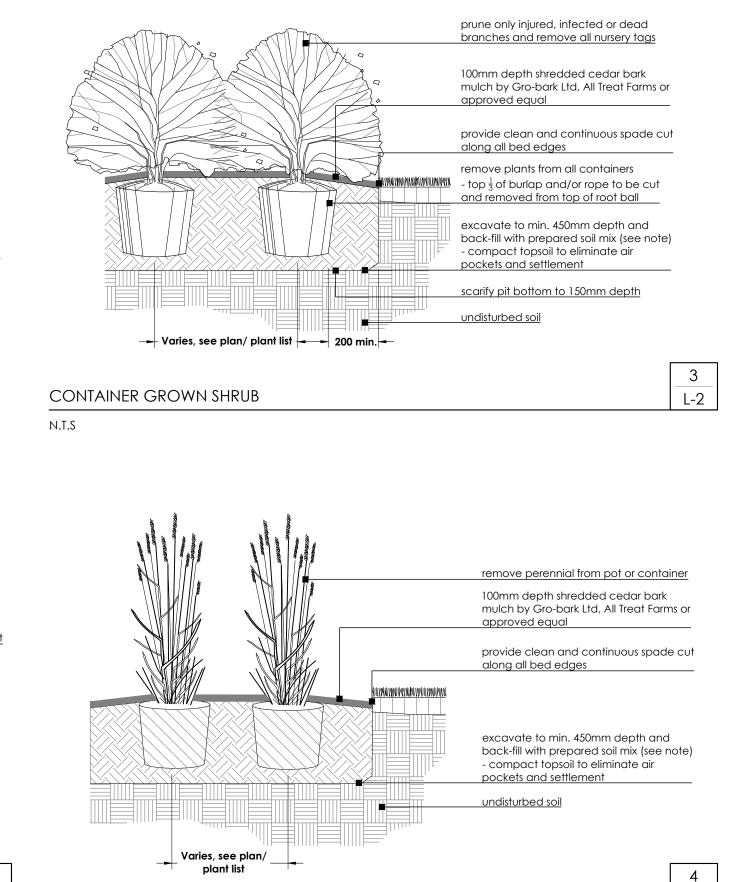
slope top of footing for positive drainage

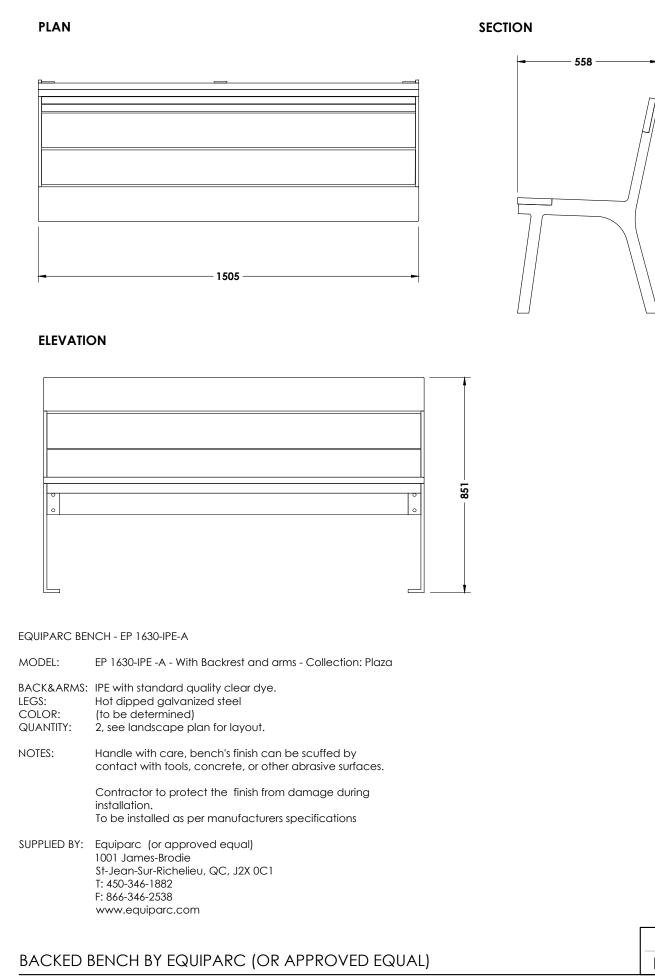
38 x 140mm bottom rail (public side) and 19 x 140mm bottom rail (residential side)

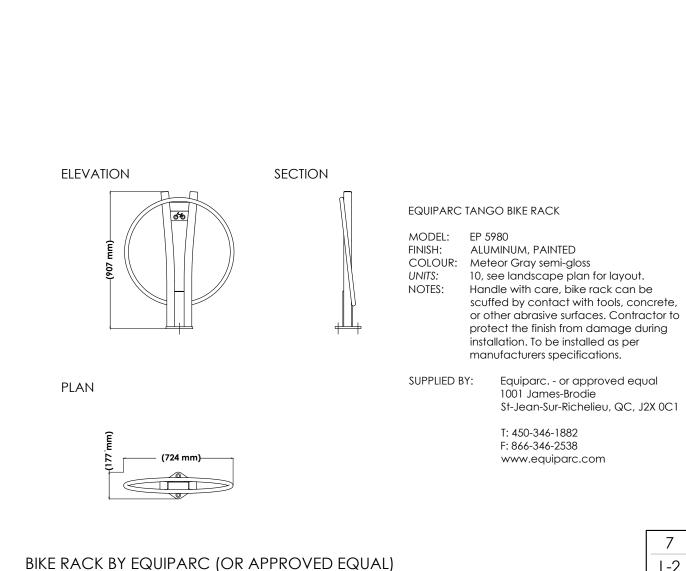
300mm dia. sonotube concrete foundation

N.T.S.

150mm depth 19mm dia. clear crushed







N.T.S.

PLANTING NOTES:

otherwise noted.

4. Staking schedule;

1. Soil mixture: four (4) parts native soil, one (1) part well rotted compost.If existing soil is not suitable provide triple mix topsoil or approved equal.

2. Saucer shall be soaked with water and mulched immediately following

3. Massed shrubs shall be planted in continuous mulched beds unless

< 30mm caliper size/ 2500mm ht. - one stake

> 30mm caliper size/ 2500mm ht. - two stakes

8. The following depths of soil are required for planting;

5. All support systems must be removed once tree is established.

7. Top of root flare shall be positioned 50mm above grade.

6. All trees to be straight and planted vertically regardless of slope.

> 70mm caliper - three stakes

30cm of topsoil for perennials;

 45cm of topsoil for shrubs; 90cm of topsoil for trees

15cm topsoil for sod;

NOT FOR CONSTRUCTION ISSUED FOR REVIEW & COMMENTS ONLY

REVISIONS/ SUBMISSIONS

DESCRIPTION 2024-04-01 Issued for review 2 2024-07-16 Issued for submission

STAMP

Verlinda Homes Ltd.

MUNICIPALITY

Norfolk County Waterfod PROJECT

Orchard Square Old Hwy 24, Norfolk County Rd. 24 & Lam Blvd. - Waterford

MUNICIPAL FILE NUMBER

SHEET Details

adesso design inc. landscape architecture



69 John Street South, Suite 250 Hamilton, ON L8N 2B9 t. 905.526.8876 www.adessodesigninc.ca



min. 100 - 200mm step where required

slope bottom rail where required

1. All materials, components and workmanship to conform to building

2. All wood to be Pressure Treated (Spruce, Pine Fir) selected mainly for

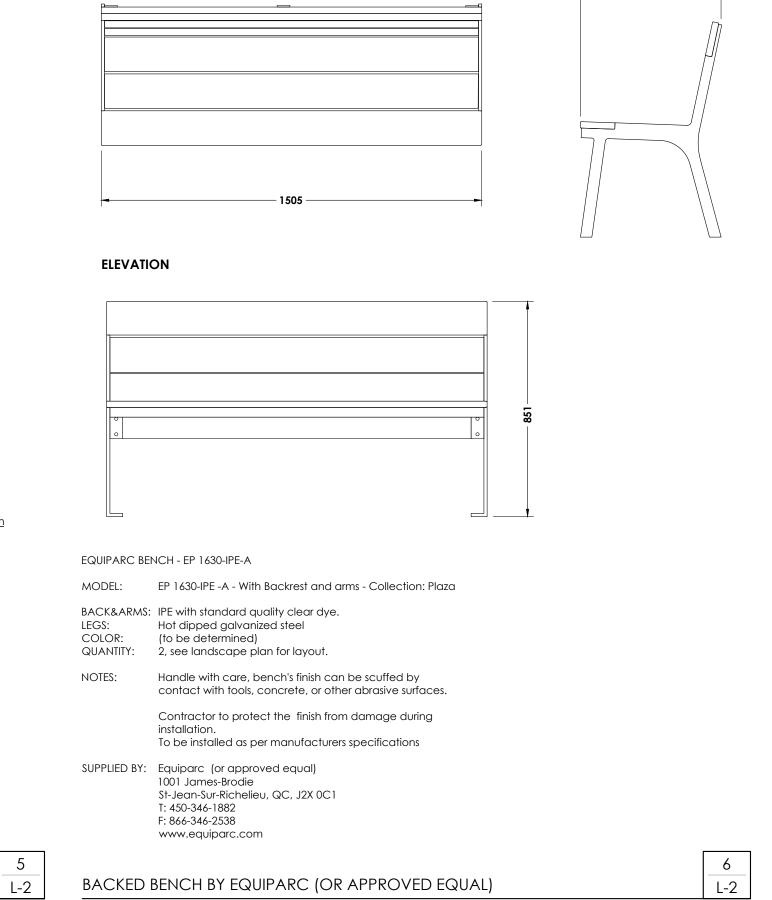
good appearance all members shall be free of wane and bark

planning. Members exhibiting moderate to heavy knots shall be

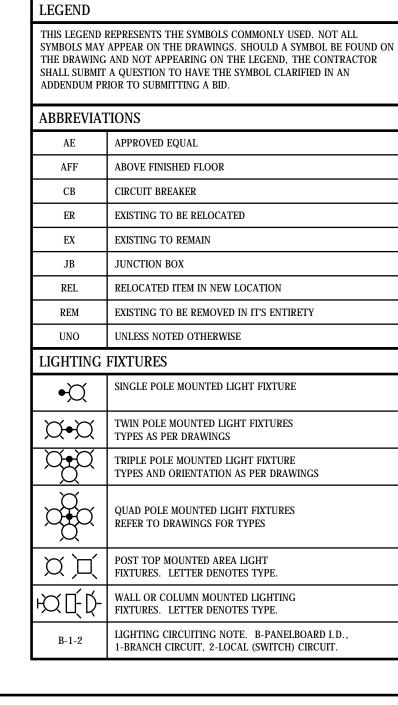
brush-coated with two applications of an end-cut preservative

pockets. All torn grain shall be eliminated by sanding and

3. All cuts and holes that expose untreated wood should be liberally







SITE STA	TISTICS - OV	ERALL			
AVERAGE	MINIMUM	MAXIMUM	MAX/AVG	AVG/MIN	MAX/MIN

SITE STATISTICS - PHASE 2 PARKING							
AVERAGE	MINIMUM	MAXIMUM	MAX/AVG	AVG/MIN	MAX/MIN		
3.69fc	0.9fc	8.3fc	2.25	4.10	9.22		

SITE STATISTICS - PHASE 1 PARKING (CONTRIBUTION FROM PHASE 2)							
AVERAGE	MINIMUM	MAXIMUM	MAX/AVG	AVG/MIN	MAX/MIN		
0.18fc	0.0fc	2.2fc	12.22	N/A	N/A		

THE PHOTOMETRIC DATA USED AS INPUT FOR THESE CALCULATIONS IS BASED ON ESTABLISHED IES PROCEDURES AND PUBLISHED FIXTURE RATINGS. FIELD PERFORMANCE WILL DEPEND ON ACTUAL LAMP, BALLAST, ELECTRICAL AND SITE CHARACTERISTICS.



<u>FULL CUTOFF PERFORMANCE</u> - FULL CUTOFF PERFORMANCE MEANS A LUMINAIRE DISTRIBUTION WHERE ZERO CANDELA INTENSITY OCCURS AT AN ANGLE AT OR ABOVE 90° ABOVE NADIR. ADDITIONALLY, THE CANDELA PER 1000 LAMP LUMENS DOES NOT NUMERICALLY EXCEED 10% (100 LUMENS) AT A VERTICAL ANGLE OF 80° ABOVE NADIR. THIS APPLIES TO ALL LATERAL ANGLES AROUND THE LUMINAIRE.

CUTOFF PERFORMANCE - CUTOFF PERFORMANCE MEANS A LUMINAIRE DISTRIBUTION WHERE THE CANDELA PER 1000 LAMP LUMENS DOES NOT NUMERICALLY EXCEED 2.5% (25 LUMENS) AT AN ANGLE ABOVE 90° ABOVE NADIR, AND 10% (100 LUMENS) AT A VERTICAL ANGLE 80° ABOVE NADIR. THIS APPLIES TO ALL LATERAL ANGLES AROUND THE LUMINAIRE.

DRAWIN	DRAWING LIST						
EP001	GENERAL NOTES, DRAWING LIST, LEGEND AND FIXTURE SCHEDULE						
EP100	ELECTRICAL SITE PLAN LAYOUT - PHOTOMETRIC CALCULATIONS						

SITE L	IGHTING FIXTURE SCHEDULE THE LIGHTING FIXTURES, BALLASTS AND LAN BEEN SPECIFIED TO ENSURE THAT SPECIFIC A				
2.	THE SPECIFIED LIGHTING FIXTURES ARE IDA APPROVED DARK-SKY FRIENDLY FIXTURES AND CONSISTENT WITH LEED GOALS & GREEN GLOBES CRITERIA FOR LIGHT POLLUTION REDUCTION. DIRECT GLARE WILL NOT BE OBSERVABLE (OUTSIDE THE ORIGINATING PROPERTY LIMITS) AT AN ANGLE GREATER THAN 85° FROM NADIR OF THE VERTICAL AXIS OF THE LIGHT SOURCE. ALL ALTERNATE FIXTURES TO THE PROPOSED FIXTURES SHALL HAVE IES				
3.	ALL ALTERNATE FIXTURES TO THE PROPOSEI FILES FOR FIXTURES FROM A REPUTABLE LAE SHOULD A PROPOSED FIXTURE PERFORMANC REQUIREMENTS, THE CONTRACTOR SHALL BI ANY ADDITIONAL EQUIPMENT TO BRING THE REQUIRED VALUES.	B WITH IES LAB CERT E FAIL TO MEET THI E RESPONSIBLE FOR	TIFICATION. E MINIMUM INSTALLING		
4.	INSTALLATION OF LIGHT FIXTURES SHALL BE MANUFACTURER'S RECOMMENDATION AND A REQUIREMENTS.				
5.	POLES LISTED BELOW ARE BASED ON STRESSIBURIED POLES (THE TRADITIONAL - NON-FLU POLES SHALL BE SUBMITTED FOR ENGINEERS STAMP. ALL POLES SHALL BE MOUNTED ON SCHEDULE BELOW.	TED) FOR EXAMPLE REVIEW C/W ENGIN	PURPOSES. IEERS		
ТҮРЕ	DESCRIPTION	LAMP/ WATTAGE	VOLTAGE		
P1-T3- BLC	SINGLE, POLE MOUNTED, FULL CUT-OFF, LED AREA LIGHT, TYPE III C/W BACK LIGHT CONTROL DISTRIBUTION PATTERN OPTICS. 0-10V ELECTRONIC DIMMING DRIVER STANDARD. DRIVER MOUNTED TO DIE-CAST ALUMINUM BACK HOUSING SUITABLE FOR -40°C TO 40°C ENVIRONMENTS. CONSTRUCTED OF HINGED DIE-CAST ALUMINUM. PRECISE OPTICS FOR EFFICIENT LIGHT OUTPUT. FIXTURE TO BE MOUNTED ON 24'-0", 4" SQUARE POLE ON A 36" TALL CONCRETE BASE FOR A TOTAL MOUNTING HEIGHT OF 27'-0" (8.2m) A.F.G. FIXTURE B.U.G. RATING TO BE BO-UO-G5 OR BETTER. BASE OF DESIGN; LITHONIA LIGHTING D-SERIES AREA LUMINARE CAT. No.: DSX2 LED P5 30K 70CRI BLC3 xVOLT PER7 XX OR APPROVED EQUAL	28,000 NOMINAL LUMEN OUTPUT 333W INPUT 3000K	**120V (FIXTURE VOLTAGE TO BE SELECTED DURING BUILDING DESIGN AND SERVICING STAGE)		
P1-T4- BLC	SINGLE, POLE MOUNTED, FULL CUT-OFF, LED AREA LIGHT, TYPE IV C/W BACK LIGHT CONTROL DISTRIBUTION PATTERN OPTICS. 0-10V ELECTRONIC DIMMING DRIVER STANDARD. DRIVER MOUNTED TO DIE-CAST ALUMINUM BACK HOUSING SUITABLE FOR -40°C TO 40°C ENVIRONMENTS. CONSTRUCTED OF HINGED DIE-CAST ALUMINUM. PRECISE OPTICS FOR EFFICIENT LIGHT OUTPUT. FIXTURE TO BE MOUNTED ON 24'-0", 4" SQUARE POLE ON A 36" TALL CONCRETE BASE FOR A TOTAL MOUNTING HEIGHT OF 27'-0" (8.2m) A.F.G. FIXTURE B.U.G. RATING TO BE BO-UO-G5 OR BETTER. BASE OF DESIGN; LITHONIA LIGHTING D-SERIES AREA LUMINARE CAT. No.: DSX2 LED P4 30K 70CRI BLC4 xVOLT PER7 xx OR APPROVED EQUAL	25,000 NOMINAL LUMEN OUTPUT 277W INPUT 3000K	**120V (FIXTURE VOLTAGE TO BE SELECTED DURING BUILDING DESIGN AND SERVICING STAGE)		
P1-T4- P8	SINGLE, POLE MOUNTED, FULL CUT-OFF, LED AREA LIGHT, TYPE IV (MEDIUM) DISTRIBUTION PATTERN OPTICS. 0-10V ELECTRONIC DIMMING DRIVER STANDARD. DRIVER MOUNTED TO DIE-CAST ALUMINUM BACK HOUSING SUITABLE FOR -40°C TO 40°C ENVIRONMENTS. CONSTRUCTED OF HINGED DIE-CAST ALUMINUM. PRECISE OPTICS FOR EFFICIENT LIGHT OUTPUT. FIXTURE TO BE MOUNTED ON 24'-0", 4" SQUARE POLE ON A 36" TALL CONCRETE BASE FOR A TOTAL MOUNTING HEIGHT OF 27'-0" (8.2m) A.F.G. FIXTURE B.U.G. RATING TO BE B4-U0-G5 OR BETTER. BASE OF DESIGN; LITHONIA LIGHTING D-SERIES AREA LUMINARE CAT. No.: DSX2 LED P8 30K 70CRI T4M xVOLT PER7 XX OR APPROVED EQUAL	55,000 NOMINAL LUMEN OUTPUT 466W INPUT 3000K	**120V (FIXTURE VOLTAGE TO BE SELECTED DURING BUILDING DESIGN AND SERVICING STAGE)		
P1-T5- P8	SINGLE, POLE MOUNTED, FULL CUT-OFF, LED AREA LIGHT, TYPE V DISTRIBUTION PATTERN OPTICS. 0-10V ELECTRONIC DIMMING DRIVER STANDARD. DRIVER MOUNTED TO DIE-CAST ALUMINUM BACK HOUSING SUITABLE FOR -40°C TO 40°C ENVIRONMENTS. CONSTRUCTED OF HINGED DIE-CAST ALUMINUM. PRECISE OPTICS FOR EFFICIENT LIGHT OUTPUT. FIXTURE TO BE MOUNTED ON 24'-0", 4" SQUARE POLE ON A 36" TALL CONCRETE BASE FOR A TOTAL MOUNTING HEIGHT OF 27'-0" (8.2m) A.F.G. FIXTURE B.U.G. RATING TO BE B5-U0-G5 OR BETTER. BASE OF DESIGN; LITHONIA LIGHTING D-SERIES AREA LUMINARE CAT. No.: DSX2 LED P8 30K 70CRI T5M xVOLT PER7 XX	55,000 NOMINAL LUMEN OUTPUT 466W INPUT 3000K	**120V (FIXTURE VOLTAGE TO BE SELECTED DURING BUILDING DESIGN AND SERVICING STAGE)		
SA	OR APPROVED EQUAL 6" APERTURE, RECESSED MOUNTED LED DOWNLIGHT FIXTURE C/W MEDIUM BEAM REFLECTOR, WHITE POLYMER TRIM RING AND SPECULAR CLEAR FINISH. 0-10V ELECTRONIC DIMMING DRIVER, 3000K STANDARD GOTHAM LIGHTING CAT. NO.: EVO6 40/10 AR LSS MWD MVOLT GZ10 TRW OR APPROVED EQUAL	1,000 NOMINAL LUMEN OUTPUT 10W INPUT 3000K	**120V (TBC)		
WX	WALL MOUNTED, FULL CUT-OFF, LED AREA LIGHT. 0-10V ELECTRONIC DIMMING DRIVER STANDARD, WIRED FOR 120V, HOUSING MADE OF DIE CAST ALUMINUM PRECISE OPTICS FOR EFFICIENT LIGHT OUTPUT. BASE OF DESIGN; LITHONIA LIGHTING WPX CAT. No.: WPX LED P1 30K MVOLT PE xx OR APPROVED EQUAL	1,500 NOMINAL LUMEN OUTPUT 10W INPUT 3000K	**120V (TBC)		
WB	WALL MOUNTED, FULL CUT-OFF, LED ARCHITECTURAL AREA LIGHT, TYPE II DISTRIBUTION OPTICS. 0-10V ELECTRONIC DIMMING DRIVER STANDARD, WIRED FOR 120V, HOUSING MADE OF DIE CAST ALUMINUM PRECISE OPTICS FOR EFFICIENT LIGHT OUTPUT. FIXTURE B.U.G. RATING TO BE B2-U0-G1 OR BETTER. BASE OF DESIGN; LITHONIA LIGHTING WDGE3 CAT. No.: WDGE3 LED P4 30K 80CRI R2 MVOLT xx OR APPROVED EQUAL	11,500 NOMINAL LUMEN OUTPUT 88W INPUT 3000K	**120V (TBC)		

Copyright Reserved

All designs and drawings are copyrighted and the property of Seguin Engineering Inc. Reproduction or use for any purpose other than that authorized by Seguin Engineering Inc. is forbidden.

The drawing is not to be scaled. The Contractor shall verify and be responsible for all dimensions. Any errors or omissions shall be reported to Seguin Engineering Inc.

© COPYRIGHT 2024 - Seguin Engineering Inc.

Drawn By:

Project No.

Drawing No.

ORIGINAL SHEET - ARCH D

EP001

Designed By: Approved By:

Scale

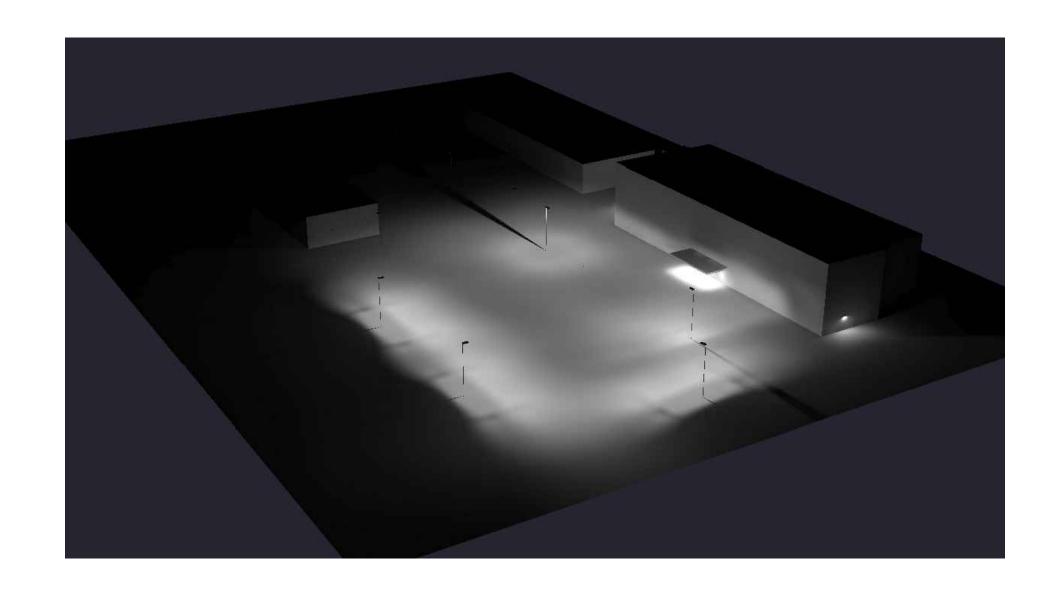
AS NOTED

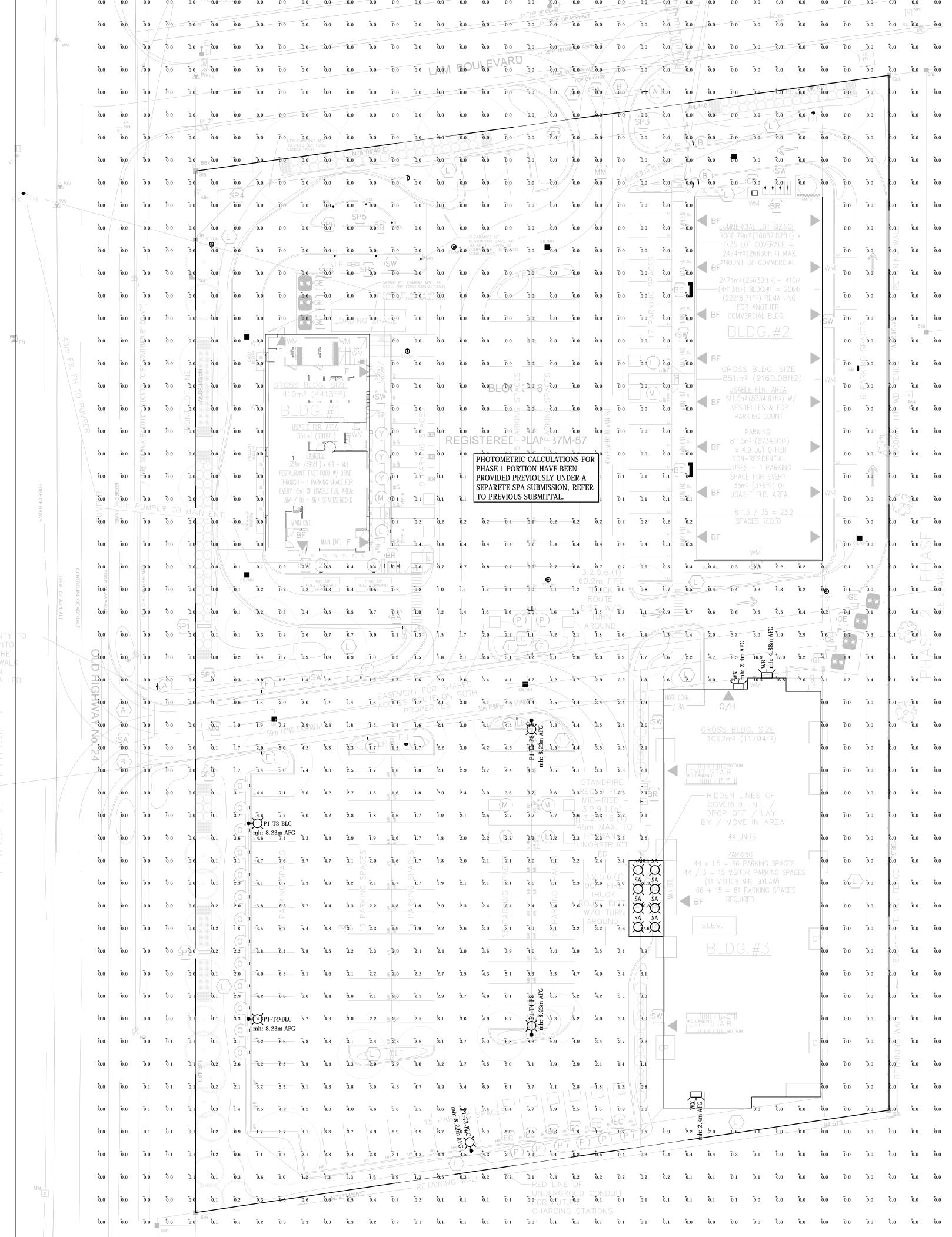
1 ISSUED FOR SITE PLAN APPROVAL No. Revision Electrical Engineering
12 Argyle Street N., Caledonia, ON, N3W 1B6 www.sei-ee.com G. DOUGLAS VALLEE LTD. ORCHARD SQUARE (phase 2)
OLD HWY 24 / NORFOLK COUNTY RD. 24 & LAM BLVD. WATERFORD, ON NOE 1Y0 **ELECTRICAL GENERAL NOTES** LEGENDS AND SCHEDULES

SEPT.. 2024

2024.09.04 K.S.

Date By





ELECTRICAL SITE PLAN - PHOTOMETRIC DRAWING

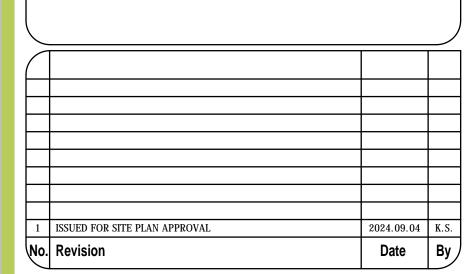
Copyright Reserved

All designs and drawings are copyrighted and the property of Seguin Engineering Inc. Reproduction or use for any purpose other than that authorized by Seguin Engineering Inc. is forbidden.

The drawing is not to be scaled. The Contractor shall verify and be responsible for all dimensions. Any errors or omissions shall be reported to Seguin Engineering Inc.

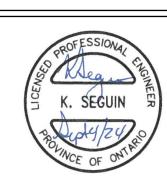
© COPYRIGHT 2024 — Seguin Engineering Inc.

Not





Sea



Project

G. DOUGLAS VALLEE LTD.

ORCHARD SQUARE (phase 2)
OLD HWY 24 / NORFOLK COUNTY

RD. 24 & LAM BLVD.

WATERFORD, ON NOE 1Y0

ELECTRICAL SITE PLAN
PHOTOMETRIC CALCULATIONS

Designed By: J.R.	Approved By: K.S.	Date:	PT 2024
Project No. 24-080			
Drawing No.			Revision
EP100 ORIGINAL SHEET - ARCH D			1
	J.R. 080	J.R. K.S. Scale O80 AS N Sheet	J.R. K.S. SEF Scale O80 AS NOTED Sheet

Natalie Ongena

From: Kyle Richardson < krichardson@soil-mat.ca>
Sent: Wednesday, November 13, 2024 11:02 AM

To: Natalie Ongena
Cc: lan Shaw

Subject: RE: Orchard Square Development, Waterford

Attachments: SM 302104-G Proposed Orchard Square Development - Old Highway 24, Waterford.pdf;

2024.08.22 20128 Phase 1 - Submission 2.pdf; 2024.08.21 20128 SWM Report -

Copy.pdf

Follow Up Flag: Follow up Flag Status: Flagged

Hi Natalie, my apologies for the delay on this. The soils are fairly sandy and would afford good infiltration rates. There may be some minor, localised and temporary, groundwater mounding in the area of the infiltration gallery, but would expect it to stabilise relatively quickly in such soils. We don't have any real concerns with groundwater mounding that would impact existing nearby structures or infrastructure



Kyle Richardson, P.Eng. Project Engineer

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

401 Grays Road, Hamilton, ON L8E 2Z3 T: 905.318.7440 M: 905.537.3104 www.soil-mat.ca

This e-mail, including any attachments, is privileged, confidential and subject to copyright. Any unauthorized use or disclosure is prohibited. If you are not the intended recipient please notify the sender immediately by return e-mail and delete the message and any attachments from your system.

A Please consider the environment before printing this email

From: Natalie Ongena <natalieongena@gdvallee.ca>

Sent: Friday, November 1, 2024 8:50 AM

To: Kyle Richardson krichardson@soil-mat.ca **Subject:** Orchard Square Development, Waterford

Hi Kyle,

I am reaching out regarding the Orchard Square Development in Waterford, Norfolk County for which Soil Mat completed the attached geotechnical investigation in December 2021. The project originally started out as a condo development, but has now evolved into a commercial development on the north side of the property and an apartment building on the south side. See attached Phase 1 civil drawing set for reference.

As shown on the attached drawings, our stormwater management strategy includes an underground Stormtech chamber facility, which relies heavily on infiltration due to the shallow depth of the storm sewer we are discharging to. The bottom of our chamber system is 2.0m above the estimated groundwater level. As part of our design, we completed a water balance assessment which determined that from pre to post-development, our SWM approach resulted in an average annual increase in infiltration of 62%. Norfolk County responded with the following comments:

"As mentioned, POST A-2 will be captured and infiltrated by two infiltration trenches/soakaway pits. Therefore, please provide the groundwater recharge calculation and clarify if this will affect the groundwater Water Surface Elevation Level (WSEL)."

"If the infiltration is drastically increasing by 62% from Pre to Post then please clarify if this increase in filtration won't affect the groundwater level."

Given that we have 2.0m of separation between the bottom of the chamber facility and the groundwater elevation, and approximately 1.5m to 2.8m of separation between the soakaway pit bottoms and the groundwater elevation – do you have any concerns about how the infiltration will affect the existing groundwater level? If so, what can we do to resolve these concerns? If not, could you please provide some guidance on how we can address Norfolk's concern?

Thanks Kyle, please let me know if you have any questions!

Regards,

Natalie Ongena, P. Eng.

G. DOUGLAS VALLEE LIMITED

2 Talbot Street North, Simcoe Ontario, N3Y 3W4 519-426-6270 x128 | www.gdvallee.ca 519-501-6278 (Mobile)



20-128 Orchard Square Phase 2

Comments by: Norfolk County

Development Application: SPPL2024260

Property Address: 750 Old Highway 24, Waterford

Comment On	Department	REF#	Date	Comment	Response	Task/Owner	Status
1st SUBMISSIO	N	•			•		
1st Submission	Planning	1	1-Oct-24	Garbage pickup location required to be shown on site plan for building 2. They must all be located on the phase 2 property boundary.	Garbage pickup location for building #2 is shown on phase 1 and garbage pickup location for building #3 is shown on phase 2, as depicted on A101B	Vallee - Architecture	Complete
1st Submission	Planning	2	1-Oct-24	Fencing to be shown on East side of property.	Fencing is shown on the East side of property to provide screening of the garbage pickup from adjacent property. Fencing has intentionally been left out for the remainder of the site where the adjacent residential property provides their water management area green space and surrounding trails to provide a more cohesive community environment. This has been discussed with and agreed to by the Director of Engineering.	Vallee - Architecture	Complete
1st Submission	Planning	3	1-Oct-24	Vehicular movement diagram to be provided.	Directional signs to be painted on asphalt are provided as shown on A101B. All other driveways and drive aisles are two-way and provide the required 7.3m drive aisle width as shown on A101B.	Vallee - Architecture	Complete
1st Submission	Planning	4	1-Oct-24	Canopy height is an issue for ambulance access (see paramedic services comments below).	Canopy height is not an issue for ambulance access as per the dimensions received from paramedic services comments below and as shown on P301.	Vallee - Architecture	Complete
1st Submission	Planning	5	1-Oct-24	Floor area ratio needs to be taken into consideration at time of site plan. Please provide floor area ratio calculations in the site statistics chart.	Floor area ratio has been taken into consideration at the time of site plan and a worst case scenario can now be found on A101.	Vallee - Architecture	Complete
1st Submission	Planning	6	1-Oct-24	Proper labeling of all accessible parking spaces.	Proper labeling of all accessible parking spaces has been provided. Please coordinate with A101B for accessible parking spaces locations, A101A Sign Legend for accessible parking space types, A101 4.3.3 Barrier Free Parking Req'd (Park of Req'd Visitor Parking) and (Part of Req'd Parking) for number of accessible parking, and 3-A102, 4-A102, 6-A102, and 9-A102 for additional information.	Vallee - Architecture	Complete
1st Submission	Planning	7	1-Oct-24	The accessible parking spaces should be flipped so that the accessible parking spaces for residents are located closer to the building as opposed to having the visitor accessible parking closer to the building.	Please coordinate with A101B, as the parking spaces are already provided in this way.	Vallee - Architecture	Complete
1st Submission	Planning	8	1-Oct-24	Ensure bike racks located on site do not block barrier-free path of travel when bikes are parked at locations	s. Bike racks located on site do not block barrier-free path of travel when bikes are parked at locations as shown on A101B.	Vallee - Architecture	Complete
1st Submission	Planning	9	1-Oct-24	Staff requires that an updated Site Plan identifying the above be provided to the municipality	Please see revised Site Plan.	Vallee - Architecture	Complete
1st Submission	Zoning	4	1-Oct-24	1 type 'A' parking space is required for the visitor parking.	Correct, as per A101 4.3.3 Barrier Free Parking Req'd (Part of Req'd Visitor Parking) and A101B.	Vallee - Architecture	Complete
1st Submission	Zoning	5	1-Oct-24	1 type 'A' and 2 type 'B' parking spaces are required for the apartments.	Correct, as per A101 4.3.3 Barrier Free Parking Req'd (Part of Req'd Parking) and A101B.	Vallee - Architecture	Complete
1st Submission	Zoning	6	1-Oct-24	Floor area ratio needs to be taken into consideration at time of site plan. Please provide floor area ratio calculations in the site statistics chart.	Floor area ratio has been taken into consideration at the time of site plan and a worst case scenario can now be found on A101.	Vallee - Architecture	Complete
1st Submission	Source Water Protection	1	1-Oct-24	No comments.	No response required.	Vallee - Architecture	Complete

				•	· ·
1st Submission	Bell	1	We have reviewed the circulation regarding the above noted application. The following paragraphs are to be included as a condition of approval: Bell Canada Condition(s) of Approval 1) The Owner acknowledges and agrees to convey any easement(s) as deemed necessary by Bell Canada to service this new development. The Owner further agrees and acknowledges to convey such easements at no cost to Bell Canada. 2) The Owner agrees that should any conflict arise with existing Bell Canada facilities where a current and valid easement exists within the subject area, the Owner shall be responsible for the relocation of any such facilities or easements at their own cost. Upon receipt of this comment letter, the Owner is to provide Bell Canada with servicing plans/CUP at their earliest convenience to planninganddevelopment@bell.ca to confirm the provision of communication/telecommunication infrastructure needed to service the development. It shall be noted that it is the responsibility of the Owner to provide entrance/service duct(s) from Bell Canada's existing network infrastructure to service this development. In the event that no such network infrastructure exists, in accordance with the Bell Canada Act, the Owner may be required to pay for the extension of such network infrastructure. If the Owner elects not to pay for the above noted connection, Bell Canada may decide not to provide service to this development. Concluding Remarks: To ensure that we are able to continue to actively participate in the planning process and provide detailed provisioning comments, we note that we would be pleased to receive circulations on all applications received by the Municipality and/or recirculations. If you believe that these comments have been sent to you in error or have questions regarding Bell's protocols for responding to municipal circulations and enquiries, please contact planninganddevelopment@bell.ca directly. We note that WSP operates Bell Canada's development tracking system, which includes the intake and processing of munic		
1st Submission	Hydro One	1	We are in receipt of your Site Plan Application, SPPL2024260 dated September 4th, 2024. We have reviewed the documents concerning the noted Plan and have no comments or concerns at this time. Our preliminary review considers issues affecting Hydro One's 'High Voltage Facilities and Corridor Lands' only. For proposals affecting 'Low Voltage Distribution Facilities' please consult your local area Distribution Supplier. To confirm if Hydro One is your local distributor please follow the following link: Stormcentre (hydroone.com) Please select "Search" and locate address in question by entering the address or by zooming in and out of the map If Hydro One is your local area Distribution Supplier, please contact Customer Service at 1-888-664-9376 or e-mail CustomerCommunications@HydroOne.com to be connected to your Local Operations Centre		
1st Submission	GIS	1	Please contact NorfolkGIS for new civic addresses when building. You can apply for a new civic address here. If a green sign is required in order to issue you an address (generally anywhere outside of an urban area) you will have to call Norfolk County Customer Service after applying to make payment before the address is issued (519-426-5870 or 226-NORFOLK). If you would like to apply for a new Civic Address because you are planning to build on a vacant parcel of land, this is dealt with as part of the building permit process. The building inspector can provide you with a copy of a Civic Address Request Form or it can be downloaded below. On the form there are several areas that need to be filled out with information, and a sketch showing the lot layout of the property for which the Civic Address is being requested. A sample sketch will be included with the form. Reviewed Comments are as follows: For the severy Paramedic Services would like to inform that our contents as shown an P301	Vallee	Complete
1st Submission	Paramedic Services	1	Reviewed. Comments are as follows: For the canopy, Paramedic Services would like to inform that our current ambulance height is 106" plus antenna (approx. 18"). If possible, having the ability to drive under the canopy and load patients under cover would be appreciated. No other comments.	Vallee - Architecture	Complete
1st Submission	Fire	1	1-Oct-24 No comments. No response required.	Vallee - Architecture	Complete
1st Submission	Canada Post	1	Please be advised that Canada Post does not have any further comments on this application or original application (Phase 1 SPPL2024084/ Phase 2 SPPL2024260) indicating that this development will require a mail panel to be installed by the developer / owner for mail delivery inside the lobby of the building.	Vallee - Architecture	Complete
1st Submission	Building	1	1-Oct-24 The Owner shall agree to make application for a Building Permit, and obtain the necessary Building Permits Noted. Prior to commencing construction.	Vallee	Complete
1st Submission	Building	2	AND FURTHR THAT all applicable law approvals as required by the Ontario Building Code and supporting documentation from approval agencies re submitted with a building permit application. [OBC Division A 1.4.1.3] Specifically: Site Plan approval, Removal of holding provision.	Vallee	Complete

							8
1st Submission	Building	3	1-Oct-24	AND FURTHER THAT the Ontario Building Code requires that the project described above be designed and reviewed during construction by an architect, professional engineer or both that are licensed to practice in Ontario; including Site Servicing. NOW THEREFORE the Owner, being the person who intends to construct or have the building constructed hereby warrants that: 1. The undersigned architect and/or professional engineers have been retained to provide general reviews of the construction of the building to determine whether the construction is in general conformity with the plans and other documents that form the basis for the issuance of a building permit, in accordance with the performance standards of the Ontario Association of Architects (OAA) and/or Professional Engineers Ontario (PEO); 2. All general review reports by the architect and/or professional engineers will be forwarded promptly to the Chief Building Official, and 3. Should any retained architect or professional engineer cease to provide general reviews for any reason during construction, the Chief Building Official will be notified in writing immediately, and another architect or engineer will be appointed so that general review continues without interruption during construction.		Vallee	Complete
1st Submission	Building	4	1-Oct-24	AND FURTHER THAT - Backflow prevention is provided on the fire service main and the water service main. in accordance with the Ontario Building Code. OBC considers a multi-unit residential building a moderate hazard for the purpose of selecting a backflow preventor.	Noted.		Complete
1st Submission	Building Occupancy	1	1-Oct-24	AND FURTHER THAT All final letters of general conformity by the architect and/or professional engineers will be forwarded promptly to the Chief Building Official, including site services.	The designers, Architects, Engineers, and Builders of Building #1 and #2 will be responsible and be required to be registered in the province of Ontario.	Vallee	Complete
1st Submission	Agreement Administrator	1	1-Oct-24	As you are aware, a condition of your site plan approval will be to enter into a development agreement with the County. The agreement will be registered on title at the owner's expense. The County will also collect and hold onto performance securities for the infrastructure and landscaping works until the end of the maintenance period. The owner will also be required to secure and keep in force commercial general liability insurance coverage, prior to and during the duration of construction until after a successful site inspection and release of the performance securities. Contact the undersigned when you are ready to start your agreement or if you have any questions. The attached information sheet will assist you with a complete submission.	No response required.	Vallee	Complete
1st Submission	Accessibility Comments	1	1-Oct-24	Ensure bike racks located on site do not block barrier-free path of travel when bikes are parked at locations	Bike racks located on site do not block barrier-free path of travel when bikes are parked at locations as shown on A101B.	Vallee - Architecture	Complete
1st Submission	Ministry of Transportation	1	1-Oct-24	No comments.	No response required.	Vallee	Complete
1st Submission	Overall Comments	1	19-Nov-24	Modelling completed by R. V. Anderson Associates Limited notes that available fire flow in the area of the proposed development maxes out at 125 L/s under Maximum Day Demands – this is sufficient to support the proposed development, however the RVA technical memorandum notes that major system upgrades along Highway 24 will be required to significantly improve available fire flow within the area, and fire flow to both the proposed Lam Boulevard & Old Highway 24 development combined with the Orchard Square development, including internal watermain networks and updated demands is to be reviewed ahead of full approval of the proposed water network.	Noted. The most current water modelling report by RVA has been included in the updated functional servicing report which notes that the available fire flow for Phase 1 and phase 2 of the development is 91 L/s. Which is greater than the required fire flow.	Vallee - Civil	Complete
1st Submission	Overall Comments	2	19-Nov-24	Additional details supporting the Stormwater Management work are required to comprehensively review the design and analysis. The Draft Plan is unlikely to change based on any amendments to the stage-storage discharge relationship associated with the underground SWM tank	No comment.		Complete
1st Submission	General	1a	19-Nov-24	must be submitted for review and approval and all relevant reports and drawings are to be updated based on the full submission (e.g. Engineering drawings and reports, including the SWM Report and drawings showing the below-grade SWM facility are to be updated to reference findings and recommendations of geotechnical investigation)	Noted.		Complete
1st Submission	General	1b	19-Nov-24	Please confirm if an Environmental Impact Study (EIS) was completed. An EIS should be reviewed by GEI as part of the Development Application submission (primarily for reference as part of the review of the stormwater management report and all erosion and sediment control measures)	A Species at Risk and Significant Wildlide Habitat Assessment completed by GeoProcess Research Associates (June 6, 2022) and was included as part of the Phase 1 - Submission 2 package. An environmental impact study was not included as a requirement at the preconsultation meeting. Development Engineering staff have confirmed there is no requirement for an EIS.		Complete
1st Submission	General	1c	19-Nov-24	Please confirm if hydraulic capacity analysis for water and wastewater servicing to the development was completed by the County's consultant, and reports are available for review by GEI.	The most current water and sanitary modelling reports by RVA are included in the updated functional servicing report.		Complete
1st Submission	General	1d	19-Nov-24	Note, all comments throughout this document are not considered mutually exclusive to Phase 2 lands only. Further, the applicant is to review prior comment received for Phase 1 and determine applicability for the	Noted. All comments from Phase 1 are reflected in this submission.		Complete
				Phase 2 lands. The August 22 (Phase 1) report and the July 9 (Phase 2) FSR report are similar, so the comments from Phase			

				rage 4	_	20 120 Orenard Square rina	se 2 Comment Tracking Sneet
1st Submission	Functional Servicing Report	2b	19-Nov-24	For Phase 1, include a backflow preventer within the watermain distribution at the public ROW connection on Lam Blvd. In Phase 2, designate a mechanical room for the meter chamber, which should be separate from the backflow preventer connected at the public ROW on Old Hwy 24.	Phase 1 - Submission 1 comment 16 (July 15th) states "In consultation with Norfolk County Environmental Services department, it has been determined that the Backflow Chamber will not be required for Phase 1 of this development. The water meters and RPZ assemblies will be installed inside the buildings" therefore no backflow chamber is shown for Phase 1. For Phase 2, a backflow preventer chamber is shown at the ROW, and a water meter is noted to be installed inside the residential building. The mechanical room location is shown.		Complete
1st Submission	Functional Servicing Report	2c	19-Nov-24	Insultation requirements on specific storm sewer segments are noted in cases where standard frost protection cannot be achieved however DWG GN reflects an insulated pipe detail that does not reference OPSD 1109.030. Please reference the OPSD or amend detail to demonstrate conformance.	Noted. The detail has been updated with reference to OPSD 1109.030.		Complete
1st Submission	Functional Servicing Report	2d	19-Nov-24	The modelling will be provided for reference as part of the Functional Servicing Report. Norfolk County will be updating their minimum available fire flow requirements (under maximum day demand) to the following for Waterford: •Besidential Dead End – Single: 30 L/s •Besidential – Single: 50 L/s •Besidential – Multi: 90 L/s •Bommercial: 150 L/s •Bistitutional: 150 L/s •Bindustrial: 150 L/s The RVA modelling shows that the existing water network can provide approximately 90 L/s of available fire flow under MDD conditions. There is sufficient available fire flow to service the proposed residential building.	flow requirements.		Complete
1st Submission	Functional Servicing Report	2e	19-Nov-24	The proposed peak Sanitary design flow is 4.15 L/s from Phase 1 and Phase 2 of the proposed development. The RVA report noted that there are existing downstream capacity issues – however the unit sewage rate (450 Lpcd) and the modelling software (InfoSewer) may generate overly conservative results. The proposed development is only contributing marginally to the overall downstream sewer capacity – increased risk to surcharging of the existing downstream sewer system from the proposed development is minimal. The overall downstream network should be reviewed as part of a separate assignment. If there are any questions, please contact Development Engineering.	referenced in the updated FSR. Norfolk County has confirmed that they are currently		Complete
1st Submission	Stormwater Management Report	3a	19-Nov-24	The August 22 (Phase 1) report and the July 9 (Phase 2) FSR report are similar, so the comments from Phase 1 apply directly to Phase 2 due to the similarity in content.	Noted. All comments from Phase 1 are reflected in this submission.		Complete
1st Submission	Stormwater Management Report	3b	19-Nov-24	Industry best practice recommends an 85% utilization rate for storm sewers, which the County will soon adopt as a minimum requirement in its updated Design Criteria. Please adjust the 100-year storm sewer design to ensure no sewer segment exceeds 85% utilization.	Norfolk County standards indicate that pipe capacities should not exceed 95% of full capacity (Section 7.8.07). The storm sewer design has been updated so that all pipes are equal to or less than 95% full.		Complete
1st Submission	Stormwater Management Report	3c	19-Nov-24	There is a seasonal discrepancy in groundwater (GW) observations, potentially impacting consistency across monitoring data. Please account for seasonal variations when interpreting GW levels to ensure accurate	As noted in the Geotechnical report, "the groundwater level was estimated to be 3.5m to 4.0m deep, and would be expected to fluctuate seasonally. Based on the time of year of the ground water measurements, this may be more indicative of a seasonal 'high'". Therefore, it can be concluded that the groundwater levels show account for seasonal variation.		Complete
1st Submission	Stormwater Management Report	3d	19-Nov-24	Groundwater (GW) elevations referenced to an arbitrary 100m datum, rather than MASL, are crucial for accurately assessing separation distances from both the soak-away pit facilities as proposed in the Phase 2 lands. Please ensure GW observations align to support these assessments effectively. Note, it is understood the underground storage tank in the Phase 1 lands includes an impermeable liner.	The 100m datum set in the geotechnical report corresponds to the existing storm manhole lid elevation at the Northwest corner of the development property. The elevation of this lid is 243.10m. Groundwater was estimated to be 3.5m to 4.0m deep, corresponding to an elevation of 239.60m and 239.10m. The underground storage tank in Phase 1 does not include an impermeable liner. The bottom of the chamber facility is at an elevation of 241.30m (1.7m above the high groundwater elevation). The bottom of the soakways in area A2 are at an elevation of 242.50m and 242.45m (2.90m to 2.85m above the high groundwater elevation). The bottom of the soakway in area A4 is at an elevation of 241.01m (1.41m above the high groundwater elevation).		Complete

			Page 5	20-128 Orchard Square Phase 2 Comment Tracking Sheet
1st Submission	Stormwater Management Report	3e	County to confirm with LPRCA if soak-away pit facilities (for A2 and A4) require an overflow pipe and all runoff volume associated with the contributing drainage area to these facilities need to be accounted for in underground stage-storage-discharge requirements. Also, detailed grading to determine overland flow routes from A2 and A4 cannot be determined. The soak-away pit facilities in catchment A2 and A4 are sized to completely contain the 100-year storm event. The two soak-away pits in Area A2 provides more than double the 100-year runoff volume, and the soak-away pit in Area A4 provides 70% more storage than the 100-year runoff volume. Norfolk County has confirmed that an overflow pipe from the soak-away pits is not required.	Complete
1st Submission	Stormwater Management Report	3f	As mentioned, POST A-2 and A-4 will be captured and infiltrated by two infiltration trenches/soakaway pits as well as the underground storage is also applicable for infiltration. Therefore, please provide the groundwater recharge calculation and clarify if this will affect the groundwater Water Surface Elevation Level (WSEL). The geotechnical engineer has reviewed the proposed SWM approach and calcualtions and has confirmed that they have no concerns related to groundwater levels. Refer to the email comments from Soil-Mat Engineers & Consultants Ltd included in this submission.	Complete
1st Submission	Stormwater Management Report	3g	Demonstrate 100-YR capture using a catch-basin area analysis and identify ponding areas (& depth) if 19-Nov-24 required. Vallee has completed an inlet capacity calculation sheet which confirms that each catchbasin has sufficient capacity to capture the 100-year flow from each associated drainage area.	Complete
1st Submission	Stormwater Management Report	3h	Always attach Pre and Post development drawings in the SWM report before appendix, which are missing in both the report for North Parcel 2nd submission and South Parcel 1st submission. There is no pre-development drainage area plan for the development as the allowable release rate for the site was determined as part of the 10-034 Yin's Subdivision - Phase 5 Stormwater Management Report dated December 10, 2010. The post-development drainage area plan is included in Appendix A.	Complete
1st Submission	Stormwater Management Report	3i	Please include Water Balance in the report. A pre to post-development water balance has been completed for the entire site, which details the impacts of the proposed infiltration basin and underground stormwater management facility. Refer to the updated SWM Report for complete details.	Complete
1st Submission	Stormwater Management Report	3j	Ponding depths calculated as per stage-storage-discharge relationship reflects active storage considered below the orifice invert at 242.11m. For instance, the 2-YR operating level is stated at 242.01m which is below the invert elevation. As noted in the SWM Report, there is no outflow from the site during the 2-year storm and the ponding depth is 242.01m, as the entire 2-year storm volume is infiltrated.	Complete
1st Submission	Stormwater Management Report	3k	Confirm if the use of the rational method in place of VO modelling provides a more conservative result with respect to required storage volume. A VO model was utilized for the Phase 5 Yin's Subdivision SWM model (Refer to 10-034 Yin's Subdivision - Phase 5 Stormwater Management Report dated December 10, 2010), which defined the allowable release rate for the proposed development site. Therefore, a VO model was used to coordinate with the preceeding SWM design.	Complete
1st Submission	Stormwater Management Report	31	19-Nov-24 Please add overland flow arrows on the south parcel STM drawings. Noted. Overland flow arrows have been added.	Complete
1st Submission	Stormwater Management Report	3m	In the event of a catastrophic failure of the SWM underground tank, demonstrate an emergency spillway route within the site plan conveys up to the 100-YR flow and allows for a maximum 0.15m ponding depth within the ROW. The emergency overland flow route is shown on Drawing STM - Storm Drainage Area Plan. The emergency overland flow capacity of the road entrance off Old Highway 24 has been determined and was confirmed to be less than the 100-year flow rate upstream of the chamber systems. Refer to detailed calculations in the SWM Report Appendix B.	Complete
1st Submission	Stormwater Management Report	3n	SWM Report does not address or demonstrate if capacity exists in the downstream Waterford South Municipal Drain during controlled or uncontrolled emergency outflows up to the 100-YR storm event external to the site plan. Further, no plans were included in this application to begin consultation on the overall drainage assessment to identify the areas requiring discharge to Waterford South Municipal Drain. At the very least, in support of the severance application, Section 65 of the Drainage Act will be required to re-apportion the future maintenance requirements to all lands requiring drainage as above mentioned. As part of the 10-034 Yin's Subdivision - Phase 5 Stormwater Management Report dated December 10, 2010, and allowable release rate for the subject property was prescribed, which has been accounted for in the design of Waterford South Municipal Drain. The outflows from the property have been reduced to less than this allowable release rate, therefore the WSMD has capacity to accept the proposed post-development flows.	Complete
1st Submission	Transporation Impact Study	4	The Transportation Impact Study considers existing conditions, proposed nearby development (including the proposed Lam Boulevard & Old Highway 24 development located northeast of Old Highway 24 and Lam Boulevard) as well as approved growth rate to the County's Integrated Sustainable Master Plan 2034 planning horizon - and is sufficient to support the proposed development application. Future Transportation Master Plan Updates are to consider the impacts of new development combined with updated growth projections (to 2051 / build-out planning horizon) and make updated recommendations for intersection control across Waterford.	Complete