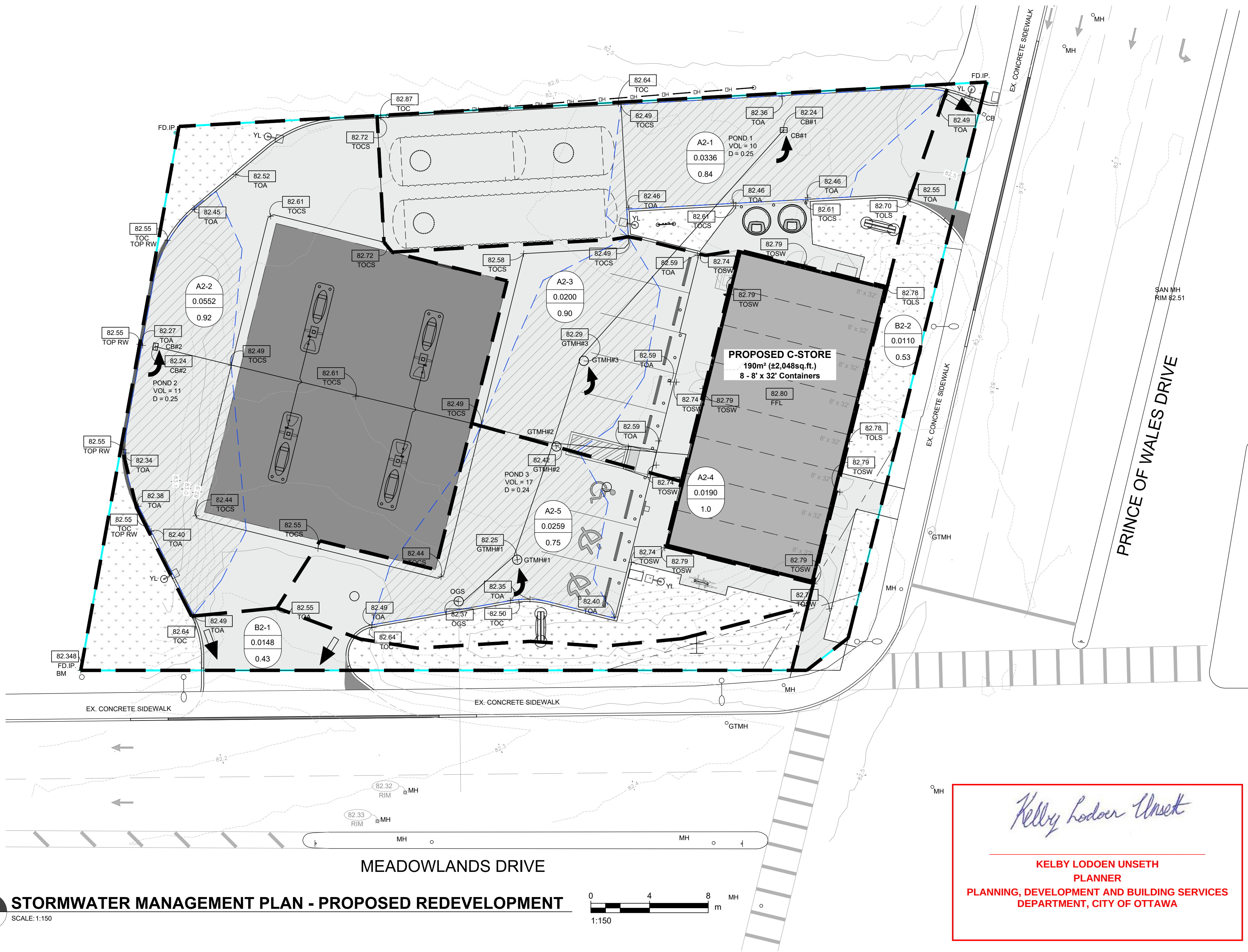




# 1 STORMWATER MANAGEMENT PLAN - PROPOSED REDEVELOPMENT

## STORMWATER CALCULATIONS

| STORM SEWER DESIGN - COMPUTATION FORM |         |        |                    |                            |                 |                          |                          |              |              |                   |                               |                                   |                       |                |                            |                                           |                     |                 |                     |                            |                    |                           |                     |                       |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
|---------------------------------------|---------|--------|--------------------|----------------------------|-----------------|--------------------------|--------------------------|--------------|--------------|-------------------|-------------------------------|-----------------------------------|-----------------------|----------------|----------------------------|-------------------------------------------|---------------------|-----------------|---------------------|----------------------------|--------------------|---------------------------|---------------------|-----------------------|--|--|--|-----------------|--|--|--|----|--|--|--|----------|--|--|--|---------------------|--|--|--|--|--|--|--|--|
| Project Name: Prince of Wales, Shell  |         |        |                    | 1:5 year intensity (mm/hr) |                 |                          |                          | 100.90       |              |                   |                               | Use PVC Pipe for sizes less than: |                       |                |                            | Use Concrete Pipe for sizes greater than: |                     |                 |                     | Friction Coefficients: (n) |                    |                           |                     | Computed By: Yvonne   |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
| Job No: 2024072                       |         |        |                    | ST CI                      |                 |                          |                          | 2018         |              |                   |                               |                                   |                       |                |                            |                                           |                     |                 |                     | 0.011                      |                    |                           |                     | 0.013                 |  |  |  | Date: 6/26/2024 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
| Date Created: 6/26/2024               |         |        |                    | storm event                |                 |                          |                          | constant     |              |                   |                               | tc                                |                       |                |                            | constant                                  |                     |                 |                     | intensity                  |                    |                           |                     | 450                   |  |  |  | 450             |  |  |  | UR |  |  |  | Concrete |  |  |  | Revised: 11/27/2024 |  |  |  |  |  |  |  |  |
|                                       |         |        |                    | 1:5                        |                 |                          |                          | 2018         |              |                   |                               | 10.00                             |                       |                |                            | 10.00                                     |                     |                 |                     | 100.90                     |                    |                           |                     |                       |  |  |  |                 |  |  |  |    |  |  |  | PVC      |  |  |  | 0.90<v<3.0          |  |  |  |  |  |  |  |  |
| Catchment Area Design                 |         |        |                    |                            |                 |                          |                          |              |              |                   |                               |                                   | Pipe Design           |                |                            |                                           |                     |                 |                     |                            |                    |                           | Capacity Check      |                       |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
| Drainage Area Label                   | Manhole |        | Drainage Area (ha) | Sum Area (ha)              | Runoff Factor C | Equivalent Area (ha) AxC | Cumulative Area (ha) AxC | U/S Tc (min) | D/S Tc (min) | Intensity (mm/hr) | Incremental Design Flow (L/s) | Design Flow (L/s)                 | Restricted Flow (L/s) | Pipe Slope (%) | Nominal Pipe Diameter (mm) | Pipe Material                             | Friction Coeff. (n) | Pipe Length (m) | Pipe Capacity (L/s) | Velocity (m/s)             | Time of Flow (min) | Actual Pipe Diameter (mm) | Design / Cap. Ratio | Pipe OK or SURCHARGED |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
|                                       | U/S     | D/S    |                    |                            |                 |                          |                          |              |              |                   |                               |                                   |                       |                |                            |                                           |                     |                 |                     |                            |                    |                           |                     |                       |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
| A2-1                                  | CB#1    | GTMH#3 | 0.0336             | 0.0336                     | 0.84            | 0.028                    | 0.028                    | 10.00        | 10.34        | 100.90            | 7.9                           | 7.9                               | 7.9                   | 0.360%         | 300                        | PVC                                       | 0.011               | 19.523          | 68.2                | 0.97                       | 0.34               | 299.4                     | 0.12                | OK                    |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
| A2-3                                  | GTMH#3  | GTMH#2 | 0.0200             | 0.0536                     | 0.90            | 0.018                    | 0.046                    | 10.34        | 10.44        | 99.23             | 5.0                           | 12.7                              | 12.7                  | 0.350%         | 300                        | PVC                                       | 0.011               | 5.739           | 67.2                | 0.96                       | 0.10               | 299.4                     | 0.19                | OK                    |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
| A2-2                                  | CB#2    | GTMH#2 | 0.0552             | 0.0552                     | 0.92            | 0.051                    | 0.051                    | 10.00        | 10.46        | 100.90            | 14.3                          | 14.3                              | 14.3                  | 0.340%         | 300                        | PVC                                       | 0.011               | 26.133          | 66.3                | 0.94                       | 0.46               | 299.4                     | 0.22                | OK                    |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
| A2-4                                  | GTMH#2  | GTMH#1 | 0.0190             | 0.1278                     | 1.00            | 0.019                    | 0.116                    | 10.46        | 10.57        | 98.62             | 5.2                           | 31.8                              | 31.8                  | 0.520%         | 300                        | PVC                                       | 0.011               | 7.655           | 81.9                | 1.16                       | 0.11               | 299.4                     | 0.39                | OK                    |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
| A2-5                                  | GTMH#1  | OGS    | 0.0259             | 0.1537                     | 0.75            | 0.019                    | 0.135                    | 10.57        | 10.65        | 98.09             | 5.3                           | 36.9                              | 18.0                  | 0.460%         | 250                        | PVC                                       | 0.011               | 4.360           | 48.4                | 0.97                       | 0.07               | 251.5                     | 0.37                | OK                    |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |
|                                       | OGS     | EX MH  | 0.0000             | 0.1537                     | 0.88            | 0.000                    | 0.135                    | 10.65        | 10.75        | 97.74             | 0.0                           | 36.8                              | 18.0                  | 1.920%         | 250                        | PVC                                       | 0.011               | 12.474          | 98.9                | 1.99                       | 0.10               | 251.5                     | 0.18                | OK                    |  |  |  |                 |  |  |  |    |  |  |  |          |  |  |  |                     |  |  |  |  |  |  |  |  |

| LEGEND                       |       |
|------------------------------|-------|
| CATCH BASIN                  | CB    |
| GRATED TOP MANHOLE           | GTMH  |
| STORM MANHOLE                | STMH  |
| MANHOLE                      | MH    |
| STORM CATCHMENT INLET        |       |
| OVERLAND ESCAPE ROUTE        |       |
| ROOF LAND USE                |       |
| ASPHALT OR CONCRETE PAVEMENT |       |
| LANDSCAPED LAND USE          |       |
| EXTENT OF PONDING            |       |
| EXTENT OF FULL SUPPLY LEVEL  |       |
| STORM CATCHMENT BOUNDARY     |       |
| STORM CATCHMENT LABEL        | A2    |
| AREA (ha)                    | 0.500 |
| RUNOFF COEFFICIENT           | 0.65  |

## STORMWATER CALCULATIONS

| STORMWATER MANAGEMENT CALCULATIONS                    |                          |                   |                                 |
|-------------------------------------------------------|--------------------------|-------------------|---------------------------------|
| Rainfall Intensity =                                  | 76.4 mm/hr (1:2 Year)    |                   |                                 |
|                                                       | 100.9 mm/hr (1:5 Year)   |                   |                                 |
|                                                       | 161.9 mm/hr (1:100 Year) |                   |                                 |
| POST-DEVELOPMENT SITE CONDITIONS                      |                          |                   |                                 |
| CATCHMENT B2-1 - UNCONTROLLED TO MEADOWLANDS DRIVE    |                          |                   |                                 |
| SURFACE                                               | AREA (m²)                | C FACTOR          |                                 |
| BUILDING                                              | 0                        | 1.00              |                                 |
| PAVEMENT                                              | 33                       | 0.90              |                                 |
| LANDSCAPE                                             | 115                      | 0.30              | add 25% to c value for 100 year |
| TOTAL                                                 | 148                      | 0.43              |                                 |
| Q <sub>B2</sub> =                                     | 2.78 C i A               |                   |                                 |
| 1:2 Year                                              | 1.100 Year               | Stress Test (20%) |                                 |
| 1.4                                                   | 3.3                      | 3.9               | L/s                             |
| CATCHMENT B2-2 - UNCONTROLLED TO PRINCE OF WALES DR   |                          |                   |                                 |
| SURFACE                                               | AREA (m²)                | C FACTOR          |                                 |
| BUILDING                                              | 0                        | 1.00              |                                 |
| PAVEMENT                                              | 43                       | 0.90              |                                 |
| LANDSCAPE                                             | 67                       | 0.30              | add 25% to c value for 100 year |
| TOTAL                                                 | 110                      | 0.53              |                                 |
| Q <sub>B2</sub> =                                     | 2.78 C i A               |                   |                                 |
| 1:2 Year                                              | 1.100 Year               | Stress Test (20%) |                                 |
| 1.2                                                   | 2.9                      | 3.4               | L/s                             |
| CATCHMENT A2 - CONTROLLED                             |                          |                   |                                 |
| SURFACE                                               | AREA (m²)                | C FACTOR          |                                 |
| BUILDING/ROOF                                         | 479                      | 1.00              |                                 |
| PAVEMENT                                              | 929                      | 0.90              |                                 |
| GRAVEL                                                | 0                        | 0.65              |                                 |
| LANDSCAPE                                             | 129                      | 0.30              | add 25% to c value for 100 year |
| TOTAL                                                 | 1537                     | 0.88              |                                 |
| Q <sub>A2</sub> =                                     | 2.78 C i A               |                   |                                 |
| 1:2 Year                                              | 1.100 Year               | Stress Test (20%) |                                 |
| 29                                                    | 61.4                     | 74                | L/s                             |
| ORIFICE CONTROL IN PR. GTMH#1                         |                          |                   |                                 |
| R =                                                   | 1:2 Year                 | 1:100 Year        | Stress Test (20%)               |
| A <sub>0</sub> =                                      | 38                       | 38                | 38 mm                           |
| Head Calculation                                      | 0.00454                  | 0.00454           | 0.00454 m²                      |
| Top of Pond =                                         | 81.300                   | 82.380            | 82.450 m                        |
| Pipe Invert =                                         | 80.030                   | 80.030            | 80.030 m                        |
| Water depth in outgoing pipe (if orifice submerged) = | 0.092                    | 0.110             | 0.110 m                         |
| H <sub>0</sub> =                                      | 1.178                    | 2.282             | 2.352 m/m                       |
| Q <sub>A2</sub> =                                     | 13.1                     | 18.2              | 18.5 L/s                        |
| STORAGE VOLUME REQUIRED (RATIONAL METHOD MODEL)       |                          |                   |                                 |
| VOLUME <sub>REQ</sub> =                               | 9.4                      | 27.3              | 36.5 m³                         |
| ELEVATION REACHED =                                   | 81.30                    | 82.38             | 82.45 m                         |
| STORAGE VOLUME PROVIDED                               |                          |                   |                                 |
| Storage Volume Available in Surface                   |                          |                   | 39.1 m³                         |
| Ponding =                                             |                          |                   | 82.49 m                         |
| SPILL ELEVATION =                                     |                          |                   | 14.0 m³                         |
| Underground Pipe & Barrel Storage                     |                          |                   | 53.1 m³                         |
| Total Storage                                         |                          |                   |                                 |
| TOTAL FREE FLOW + CONTROLLED FLOW =                   | 1:2 Year                 | 1:100 Year        | Stress Test (20%)               |
| Q <sub>B2</sub> + Q <sub>A2</sub> =                   | 15.7                     | 24.4              | 25.9 L/s                        |
| Q <sub>PR</sub> < Q <sub>ALL</sub>                    |                          |                   |                                 |
| VOL <sub>REQ</sub> < VOL <sub>AVL</sub>               |                          |                   |                                 |



### PROJECT

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### REGISTRATION



### ISSUE/REVISION

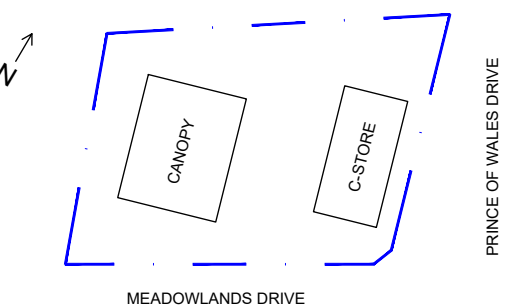
| DATE         | DESCRIPTION                              |
|--------------|------------------------------------------|
| D 2025-08-11 | RE-ISSUED FOR SPC-PHASE 3 (SPC COMMENTS) |
| C 2025-05-01 | RE-ISSUED FOR SPC-PHASE 3 (SPC COMMENTS) |
| B 2024-12-03 | RE-ISSUED FOR SPC-PHASE 3 (SPC COMMENTS) |
| B 2024-11-27 | ISSUED FOR CLIENT REVIEW (SPC COMMENTS)  |
| A 2024-08-01 | ISSUED FOR SPC - PHASE 3                 |
| 1/R          | DATE DESCRIPTION                         |

### DRAWN BY

### SCALE

### ED

### KEY PLAN



### GLOBAL PROJECT ID NUMBER

CAN00650

### SHEET TITLE

STORMWATER MANAGEMENT PLAN  
PROPOSED REDEVELOPMENT

### CTM DESIGN FILE NAME

2024072\_C104.0

### SHEET NUMBER

FILE NUMBER:  
D07-12-24-0166  
PLAN NUMBER:  
19243

C104.0