SERVICING DESIGN BRIEF
AND
STORMWATER MANAGEMENT REPORT

1420 EARL ARMSTRONG ROAD

TOWN SQUARE CENTRE

RIVERSIDE SOUTH

MORGUARD INVESTMENTS LIMITED

SITE PLAN APPLICATION
FILE No. DO7-12-14-0067

CITY OF OTTAWA
ONTARIO

FILE NO. 12007.330
APRIL 9, 2014
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7050 Weston Road, Suite 705 Woodbridge. Ontario L4L 8G7
Telephone (905) 856-0629 Fax: (905) 856-0698
uel@urbanecosystems.com

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CITY OF OTTAWA COMMENTS

In April of 2014, a Site Plan Control Approval Application was submitted to the City of Ottawa with respect to 1420 Earl Armstrong Road. The Application was reviewed by City of Ottawa, Planning and Infrastructure, and comments dated April 28, 2014 were provided on the Application, including the Servicing Design Brief and Stormwater Management Report.

In response to the comments by the City of Ottawa, the Servicing Design Brief and Stormwater Management Report was revised and dated August 13, 2014.

In August of 2014, the Site Plan Control Approval Application was resubmitted to the City of Ottawa. Additional detailed comments on the Application was provided by the City in November and December 2014.

The City of Ottawa provided additional comments dated June 24, 2016. The following summarizes the comments by the City of Ottawa on the original, as well as the revised, Servicing Design Brief and Stormwater Management Report and how the comments have been addressed.

TECHNICAL COMMENTS – APRIL 28 2014

General. For all Engineering Drawings: remove City of Ottawa in title block & indicate who the Client/Owner is on the drawings. This will be required on any future drawing submissions and/or revisions.

Response: ***The title block has been revised as noted on all engineering drawings***

1. Composite Utility Plan (10 copies)

Response: ***A preliminary Composite Utility Plan, Drawing No. 7 of 8, has been prepared and is included in the rear pocket of this report***

2. Stormwater Management Report – Tributary #14 Drainage Area & Supporting calculations are missing from the Report – need to updated Report (6 Copies)

Response: ***Paragraph 3.4, Tributary No. 14 and the Hydraulic Evaluation Report have been revised and Appendix 'C', Tributary No. 14 Calculations have been added***

3. Hydraulic Water main Analysis – for both on site and off site missing (6 copies)

Response: ***Paragraph 5.2, Proposed Water Distribution System, has been revised and Appendix 'D', Hydraulic Watermain Analysis has been added***

4. Site Servicing Brief – Storm & Sanitary Calculation Sheets are missing from Report – need to update submitted Report (6 copies)

Response: ***Sanitary sewer servicing demand and capacity calculations are included in Paragraph 2.2, Proposed Sanitary Servicing***

Paragraph 3.2 Proposed Stormwater Servicing has been revised and storm sewer design sheets have been added

5. Erosion and Sediment Control Plan – missing Off Site Works and no off site protection shown (6 copies)

Response: ***The Erosion & Sediment Control Plan, Drawing No. 4 of 8, has been updated to also include off-site work areas***

6. Site Servicing Plan – Servicing & Grading Information for Collector 'D' is missing (55 copies)

Response: ***The current design information for Collector Road 'D' has been up-dated on the site grading and servicing plans***

7. Engineering Drawings – Drainage Area Plan indicates Ponding Stages (i.e. 1:2, 1:5 & 1:100 ??). Show on plan what storm event(s) & what maximum ponding level is for each ponding area.

Response: ***The SWM Drainage Plan, Drawing No. 3 of 8, has been re-named and revised***

In addition to the above noted revisions, the Servicing Design Brief and Stormwater Management Report incorporated changes to the Site Plan, revised driveway access off Limebank Road, as well as modifications to proposed Collector Road D.

TECHNICAL COMMENTS – NOV 2014 – DEC 2014

GENERAL COMMENTS

1. With such a large complex, I would encourage the developer to consider having at least one "public washroom" combined with a Para-Transpo drop-off/pick-up area.

Response: ***See Applicant's response***

2. Riverside South Phase 6 Subdivision review has not started as Master Servicing Memo for Riverside South – Phase 6, 8 & 13 is not yet approved. Watermain looping and servicing yet to be finalized.

Response: ***Acknowledged. Discussions with City staff and Developer's Consultants are ongoing***

3. This site needs is depending on Riverside South Phase 6 for Collector 'D' – Phase 6 to access and service the site.

Response: ***Acknowledged. Discussions with City staff and Developer's Consultants are ongoing***

4. Developer may be required to also build the north segment of the east-west Transit Street to access the site.

Response: ***That is not required at this time***

5. The preliminary draft 4M-plan shows a 0.3m reserve along west edge of Collector 'D' (Block 13). If the 0.3m reserve stays in place and is registered, a 'Lifting of 30 cm reserve' application will be required and the reserve lifted and dedicated as 'Collector D' prior to Site Plan Approval.

Response: ***This has been addressed with the Developer. The 0.3m reserve will be discontinuous across the driveways***

SITE PLAN

6. Please include a note stating where property boundary information was derived from.

Response: ***Note has been Shown on the drawings***

7. Check the following building setbacks –

    a. Building F, south facade

Response: ***See Architect's response***

b. Building K, east facade

Response: ***See Architect's response***

c. Building I, west facade

Response: ***See Architect's response***

d. Building H, west facade

Response: ***See Architect's response***

8. Please check that the Minimum Width of Landscaped Area (3 metres) is satisfied abutting all four (4) streets. Please note that drive-throughs, pylon signs, is not permitted within the landscaped area.

Response: ***See Architect's response***

9. The GM28 subzone did not deal with the above noted Landscape Area requirement even though the GM28 zone speaks to buildings within 3 metres if a lot line abutting the Transit Street

Response: ***See Architect's response***

10. The outdoor commercial patio proposed for Buildings F and K are within 30 metres of a residential zone (to the south).

Response: ***See Architect's response***

11. Please use a Minimum Parking Rate of 3.6 per 100 m^2.

Response: ***See Architect's response***

12. Handicap Parking pavement marking and signage note missing form spaces in front of Building B. How can these spaces be provided in area with narrow sidewalk?

Response: ***See Architect's response***

13. Two-way minimum aisle width requirement not met at the back of Building A (shown as 6.10 metres).

Response: ***See Architect's response***

14. Parking located in a corner side yard:

a. Parking Lots north of Buildings D and L

Response: ***See Architect's response***

b. East-facing parking for Building G

Response: ***See Architect's response***

15. Please provide bike rack detail.

Response: ***See Architect's response***

16. Please show required stacking spaces for drive-throughs at Buildings B and G.

Response: ***See Architect's response***

17. Loading Spaces need locations and dimensions identified on plan.

Response: ***See Architect's response***

CASH-IN-LIEU OF PARKLAND

18. 2% cash in lieu of parkland should be taken with 100% of the CIL to be directed towards the Riverside South Ward 22 district parks account.

Response: ***See Applicant's response***

LANDSCAPE PLAN

19. Identify cycling routes throughout the site plan and provide strong pedestrian connections to the existing and future sidewalk network in surrounding areas.

Response: ***See Architect's response***

20. Provide a pedestrian sidewalk along Limebank Rd.

Response: ***Shown on drawings***

21. Confirm that the sidewalk along Earl Armstrong links up with the pedestrian crossing at the Earl Armstrong and Limebank intersection. Currently plans do not show how pedestrians will cross intersection – sidewalk appears to end at proposed bus shelter location.

Response: ***Shown on drawings***

22. Provide sidewalk connections from the retail center to the Earl Armstrong and Limebank sidewalks, providing pedestrians with multiple access routes in to the site.

Response: ***Shown on drawings***

23. Increase overall site landscaping, including:

    a. Add street trees along Earl Armstrong and Limebank Rd to enhance boulevard planting and provide improved pedestrian environment. Double row of street trees will provide physical separation for pedestrians from vehicles on Limebank and Earl Armstrong.

Response: ***See Landscape Architect's response***

b. Add trees along both sides of internal roadways to enhance pedestrian environment (refer to attached sketch for enhanced tree locations – boulevards will need to be widened in some areas to accommodate tree planting)

Response: ***See Landscape Architect's response***

c. Add tree pits for large canopy trees at the terminus of parking rows.

Response: ***See Landscape Architect's response***

24. Request elevation of the proposed gateway feature at Limebank and Earl Armstrong

Response: ***See Landscape Architect's response***

25. Coordinate landscape plans with master site plan. Plans currently show inconsistent placement of site furnishings making it difficult to understand bike rack/site furnishing locations on the landscape plan. Provide bike racks near the supermarket entrance.

Response: ***See Landscape Architect's response***

26. By providing an integrated pathway network connecting pedestrians from surrounding neighbourhoods to the retail center and adjacent land uses, alternative modes of transportation will be encouraged and the vehicle dependence in suburban neighbourhoods reduced.

Response: ***See Landscape Architect's response***

DESIGN

Layout

The comments below are based on the site plan and start at the corner of Limebank and Earl Armstrong and continue in a clockwise direction around the perimeter and then towards the interior. The layout comments are illustrated on Attachment 1.

27. Put more effort into creating an interesting pattern of pavers that serve to link the central feature at the corner with the public sidewalk and the internal sidewalks. This comment applies to all three open corners and a suggestion is illustrated in Attachment 2.

Response: ***See Architect's and Landscape Architect's response***

28. Pedestrian lights mounted on short poles have been added to Limebank Road north of Earl Armstrong Road. It is therefore a recommendation that the same lights be installed in the boulevard along Limebank and Earl Armstrong Roads at the red-dot locations shown on Attachment 1.

Response: ***See Architect's and Landscape Architect's response***

29. Being in a Design Priority Area, it is important to treat the streetscapes in the right way. Adding pedestrian lights as mentioned above is part of the solution. Another factor is the requirement to provide a row of trees between the sidewalk and the buildings. To this end, it is recommended that a line of new trees be installed just behind the sidewalk 8.0 m apart between the Limebank/Earl Armstrong corner and the first vehicular passageway east of the corner. The trees should not be planted in front of the sign at the entry to the vehicular passageway.

Response: ***See Landscape Architect's response***

30. To provide some articulation to Buildings C, E, J and F, it is recommended that the small portion of each building used for garbage storage be setback from the front line of the buildings approximately 2.0 m as illustrated in Attachment 1

Response: ***See Architect's response***

31. While it is unclear what is planned for the SWM Easement, based on the site plan information, it is recommended that a line of trees be installed approximately 7 m south of the property line between the vehicular entry and Collector Road D. Seeing as the trees will interfere with the drive-through aisle in front of Buildings B and G, it is recommended that the buildings remain generally where they are and that the aisles be re-routed so that they do not traverse around the front of the buildings, particularly Building G at the corner.

Response: ***See Architect's and Landscape Architect's response***

32. It is recommended that the Gas Metre for Buildings G and H be re-located as shown in Attachment 1.

Response: ***Shown on drawings***

33. Due to the great extent of asphalt surface shown on the site plan, it is recommended that 10 additional locations for greenspace be added in place of parking as shown on Attachment 1. The location of the 10 areas has been selected so as to use the least desirable parking spaces and to add landscaping at strategic locations such as along the main vehicular passageways, at corners and where the parking is located in front of a building.

Response: ***See Architect's and Landscape Architect's response***

34. Two 6.0m sections of post and rail fence should be added in the green island that separates the loading area for Building A from the sidewalk along Collector Road D.

Response: ***See Landscape Architect's response***

35. Building K should be setback so that there are 5.0 metres between the sidewalk along Collector Road D and the building.

Response: ***See Architect's response***

36. Add a walkway at the mouth of the parking lot just north of Building K and a landscaped strip abutting the sidewalk on the south side of the vehicular passageway nearest Collector Road D. To accommodate the landscaped strip, consider the narrow concrete walkway abutting the north side of Building K to be part of the overhang for the parking spaces.

Response: ***See Architect's response***

37. It is recognized that there is uncertainty over the desired setback between the light rail line and Buildings E, J and F. However, based on the proposal as submitted, first, I like the arrangement in that the buildings are around 3.5 m from the sidewalk and there are multiple entries and pathways that link those entries to the sidewalk. One point is that I think a more hard-surfaced treatment is appropriate. What is needed is the application of a pattern of unit pavers behind the sidewalk which would serve to widen the pedestrian area from 2.5 m to something more than 2.5 but something less than 6.0 m. It is expected that the pavers and the pattern selected should be shared with Urbandale and that this same pattern and pavers be used elsewhere along the transit corridor and the Mainstreet. Pedestrian lights should also be installed along this frontage.

Response: ***See Architect's response***

38. The saw-toothed pattern of Buildings I, D, L and H along Limebank Road is acceptable however it is suggested that more discipline be applied to the building setback. As a result, it is recommended that a 5.0 m building setback be applied which will have the following affects:

    a. Step the northern half of Building I, 2.0 m back from its present location

Response: ***See Architect's response***

    b. Add a wing to the front of Building L that is approximately 5.0 m back from the Limebank property line

Response: ***See Architect's response***

    c. Step the northern portion of Building H 3.0 m back from the Limebank property line

Response: ***See Architect's response***

    d. Add a row of trees approximately 2.0 m back from the Limebank property line using an 8.0 m spacing

Response: ***See Landscape Architect's response***

39. Add a pedestrian crosswalk along the eastern side of the intersection of the vehicular passage way that leads off Earl Armstrong Road with the most northerly east-west vehicular passageway.

Response: ***See Architect's response***

40. Regarding the proposed cul-de-sac at the terminus of Collector Road D, modify the shape of the cul-de-sac so that the western edge is a straight line that would represent its final disposition with the collector road intersecting and continuing through the transit Road. This will allow for a more permanent landscaped treatment.

Response: ***Shown on drawings***

41. Add trees at the north edge of Building A continuing north along the east side of the drive aisle to Limebank Road.

Response: ***See Landscape Architect's response***

Zoning

42. The following zoning provisions are recommended:

    a. Apply a maximum 9-storey building height to the entire property

Response: ***See Architect's response***

    b. Apply the following building setbacks:

        i. From the Transit Road, a minimum of 3.0 m except that up to 15% of the aggregate of the linear distance of the front building walls facing the Transit Road may be 1.5 m and a maximum of 6.0 m

Response: ***See Architect's response***

        ii. From Limebank Road, a minimum of 3.5 m and a maximum of 6.0 m except that where the building is not parallel to the Limebank property line (give or take 10^0, a maximum of 16 m as long as one point of the building complies with the regular minimum.

Response: ***See Architect's response***

        iii. From Earl Armstrong Road, a minimum of 5.0 m except that up to 15% of the aggregate of the linear distance of the building wall facing Earl Armstrong Road may be 3.5 m and a maximum of 10 m

Response: ***See Architect's response***

iv. From Collector Road D, a minimum of 3.0 m except that up to 15% of the aggregate of the linear distance of the front building walls facing Collector Road D may be 1.5 m and a maximum of 6.0 m except that one building with a footprint greater than 5,000 m2 may be a maximum of 25 m and any such building shall be deemed to be within 6.m of the property line in relation to the minimum percentage of building facade

Response: ***See Architect's response***

ELEVATIONS

43. Building A – This building is a standard design using Sobey's corporate imagery. There are mainly four materials used: a reddish-brown brick veneer on the front, light beige stucco-like EIFS panels used also on the front and both sides, medium grey vertical metal siding on the rear elevation and silver aluminium panels as accents around the front entry and the two sides near the front. At the Pre-consultation meeting, it was agreed that from a design perspective, the Transit Road, Limebank and Earl Armstrong are the priority frontages. While Collector D is also in the Core and will someday be an important walking street to the transit station, the station will not be built anytime soon and for the time being Collector Road D will serve as the back door to this development. Hence, it is reluctantly accepted that the building orientation is probably the best for the overall site. In spite of this, the design approach (or lack thereof) to the rear and sides is disappointing. It is felt that more can be done to add at least a level of interest particularly around the two back corners. Hence it is suggested that the architect be requested to come up with something more visually interesting or at least something less boring and dark for the back. As a suggestion, Attachment 3 illustrates a random pattern of different colours for the metal siding at both ends. Or alternately the roof edge can be highlighted in some way or different shapes added. In all cases however, it is recommended that upper windows be added which will help brighten up the rear elevation at night.

Response: ***See Architect's response***

44. Building C - Consider setting back the loading bay 3.0 metres from the Limebank elevation.

Response: ***See Architect's response***

45. Building E – From an urban design perspective, and for a one-storey building, this building with its newer colour palette, black window edging and glazing facing the street is excellent!

It is recommended that the colour of the brick and the upper panels vary a little more. While a good effort has been made to break this long building into smaller bays, the pattern is so long that it gets repetitive.

Setback the loading portion of the building 3.0 metres so as to provide depth and shadows onto the elevation.

Stepback the Limebank Road elevation as shown in Attachment 1.

Response: ***See Architect's response***

46. Building H – From an urban design perspective, and for a one-storey building, this building with its newer colour palette and glazing facing the street is excellent! It will be important to follow-through with this design by including the elevations in the Development Agreement.

Response: ***See Architect's response***

47. Buildings B, D, F, G, I, J, K and L – No elevations received.

Response: ***See Architect's response***

ENGINEERING

NOTE: These comments are preliminary as I await Stantec's input on external SWM flow inputs & JL Richards completion of the Phase 6 Collector Road "D" design. This missing detail has been acknowledged by UEL urban Ecosystem Ltd in their servicing brief

I have completed a review of Submission # 1 and offer the following comments on the application:

General Comments

48. There are some external stormwater management challenges on this site that need to be discussed with the applicant to come up with a solution. Specifically, (a) there is approximately 1700 l/sec flow from Tributary # 14 that must be diverted around the developed shopping centre via ditches & temporary connection to Collect D storm sewer (b) there is a major storm event ditch which presently exists on the south side of Earl Armstrong & east side on Limebank Road. We are presently waiting for additional design/modelling information from Stantec in order for the owner to explore piping & partially ditching in a shallow swale. Without a solution an undesirable deep ditch will remain as-is.

Response: ***Proposed engineering design solutions are shown on the drawings and addressed in the Design Brief***

49. The bus rapid transit corridor (BRT) will be impacted both short term with temporary ditches to intercept Trib # 14 and long term with the proposed finish grades of buildings E, F and J abutting the south property line. Asad Yousfani and the BRT design team should review/approve the proposed design.

Response: ***Proposed engineering design solutions are shown on the drawings and addressed in the Design Brief***

50. The ownership of Parts 5,6 and 7 Plan 4R-25540 need to be confirmed (i.e. Does the City have a easement or ownership of these parts?)

Response: ***The City has an easement over part 5, 6 and 7 for storm drainage purposes***

Servicing Design Brief and SWM Report revised August 13, 2014

51. Section 2.1- the last paragraph states that J.L Richards is still working on Collector D design update this section when JLR design is approved.

Response: ***Discussions with Developer's Consultants are ongoing***

52. Section 2.2- the last paragraph states the twin collector sewer are designed at 0.50%, there is not adequate frost cover (0.7m to 0.90m) at the upper end of both sanitary sewers and the live load on the sewer upstream/downstream of MH 15A in the main entrance could be a issue. The designer should review adding additional fill to the site and/or flattening the mainline sewer slope per city guidelines.

Response: ***Grades have been revised and insulation has been proposed as shown on the drawings***

53. Section 3.3 shall be re-written once it has been determined what "hybrid" major SWM system is acceptable.

Response: ***Section 3.3 has been revised***

54. Section 3.2 and 3.3 please add a note referencing the SWM report (rev. August 13, 2014) is under separate cover.

Response: ***Note is added***

55. Section 3.4 – this section will have to be re-written to explain the temporary & longer term solution for the existing rural flow in Tributary# 14. (i.e. 100 flow calculations, confirm 2-DICB's can capture 1000 l/sec, x-section & calculations of ditch flow, how flow splitting works and confirmation Collector D can take 700 l/sec (etc)

Response: ***Section 3.4 has been revised***

Stormwater Management Report

56. Section 4.2.3 - add a note to clarify where the available surface volume @ 2490 m3 has been established (ie table on Stormwater Drainage Plan Dwg # 3 of 8)

Response: ***Note is added***

57. See comments above on Stormwater Design Brief.

Response: ***Noted***

Grading Plan (Drawing 1 of 8)

58. Provide existing /proposed grades on Limebank Road & Earl Armstrong (edge of pavement, top of curb etc in order that the sidewalk & major overland flow route can be designed.

Response: ***Grades have been added***

59. Redesign grading at the rear loading area to Building 'A' ponding area is too deep in the parking area/access lane raise the parking lot. Loading area will need catch basins & possibly retaining walls to maintain depressed ramp.

Response: ***Grading design revised as shown on the drawings***

60. Review servicing comment regarding lack of cover over the upper end of sanitary sewer system.

Response: ***Grades have been revised and insulation added as shown on the drawings***

61. Asad Yousfani & OC Transpo staff to review and confirm temporary ditch & finished grades at south property line / BRT corridor are acceptable.

Response: ***Acknowledged***

62. Entrances exceed 2% slope please review with Asad Yousfani and revise as required.

Response: ***Grades have been revised as shown on the drawings***

63. Major overland flow routes are to be protected and/or boulevards redesigned and regraded along Limebank & Earl Armstrong Road to the satisfaction of the City.

Response: ***Proposed engineering design solutions are shown on the drawings and addressed in the Design Brief***

64. Provide depressed curbs across the Collector 'D' per city Dwg. SC7.1

Response: ***Shown on drawings***

65. Coordinate the entrance & boulevard finished grades along the Collector 'D' with the final J.L Richards design.

Response: ***Drawings revised to reflect the design of Ceremonial Road***

Servicing Plan (Drawing 2 of 8)

66. Indicate water meter (M)& remote meter (RM) location, typical for all buildings

Response: ***Shown on drawings***

67. Building I, D and L are lacking hydrants for the sprinkler system coverage, add 1 to 2 hydrants as needed.

Response: ***Hydrants have been added***

68. Revise all watermains from 90° bends to 2-45° bends or combination less than 90°

Response: ***Watermains have been revised***

69. Show location of Siamese connection for Building "B"

Response: ***Siamese connection is added***

70. Add a note the two water service connections to property line "by others"

Response: ***As shown on drawings***

71. Building "A" loading dock area appears to need 2 catch basins

Response: ***Revised as shown on drawings***

72. Capacity of 900ø storm sewer in Earl Armstrong Rd to be reviewed and possibly a hybrid sewer/ditch combination could be considered. MOE ECA application will likely be required.

Response: ***Section 3.4 of Servicing Design Brief has been revised***

73. Per Paterson Group's recommendation, add clay dykes to the servicing plan.

Response: ***Notes added to drawings 2 of 8 and 5 of 8***

74. Temporary Q-flow to 750ø storm sewer in collector "D" to be confirmed by JL Richards design.

Response: ***Design revised***

75. Can the two existing DICB's in Limebank Road ditchline take 1000 l/sec? Please confirm.

Response: ***Design revised***

76. Review 200ø sanitary design, upper end of system does not have adequate cover (Building C,H,L,D,I,E and J) plus if insulation is required provide a typical section on Dwg 5 of 8. Designer may have to review flatter grades on the mainline sewers.

Response: ***Grades have been revised and insulation added as shown on the drawings***

SWM Drainage Plan (Drawing 3 of 8)

77. Please reference the surface ponding depth volume table on this plan in the SWM report.

Response: ***Noted***

78. Revise the ponding area at the rear of Building "A".

Response: ***Drawings has been revised***

Erosion and Sediment Control Plan (Drawing 4 of 8)

79. If this plan is to be used for off-site ditching it should be re-titled "Off Site Ditching and Erosion Sediment Control Plan.

Response: ***Drawing no. 8 of 8 has been re-named***

80. Written permission from the abutting owners will be required for proposed ditch works.

Response: ***Approval from the City of Ottawa required for any work on Town Square Boulevard.***

81. Provide a minimum of 3 cross-sections of the ditch indicating the 100 year water levels; the SWM report to have supporting calculations on the ditch size/water level.

Response: ***The design addressing off site drainage has been revised***

Notes and Details (Drawing 5 of 8)

82. General Note #21 please add; "Refer to Servicing drawing 2 of 8 for the number and model# of Zurn control devices required per building."

Response: ***Note has been revised***

83. Add new General Note #24; " All service trenches to have clay dykes at 60m min. interval per City of Ottawa Drawing #S8

Response: ***Special note no. 1 has been added to drawings 2 of 8 and 5 of 8***

84. Surface Works Note #2 please add; "all site entrances shall conform to City of Ottawa Standard drawing # SC 7.1

Response: ***Note has been revised***

85. Watermain and Appurtences please add; shall be PVC CL-150 DR18 conforming to .....

Response: ***Note has been revised***

86. Provide cross-section of sanitary sewer insulation detail c/w insulation thickness (if req'd)

Response: ***Cross sections have been added to drawing 5 of 8***

Storm Drainage Area Plan (Drawing 6 of 8)

87. No comments.

Response: ***Acknowledged***

Composite Utility Plan (Drawing 7 of 8)

88. Show high voltage hydro pole line fronting the site on Limebank & Earl Armstrong Road

Response: ***Utility poles have been shown on the drawing***

89. Additional details of existing off-site utilities will be required and municipal consent circulation required if there is extensive off-site works

Response: ***Utility companies have been requested to provide details***

90. Proposed transformer at rear of Building "A" may be in ponding area and should be reviewed

Response: ***Grading design and transformer location has been revised***

91. Watermain servicing Building "D" goes under the site pylon sign at Limebank Rd entrance this should be avoided if possible.

Response: ***Pylon sign has been relocated***

External Storm Drainage Area Plan (Drawing 8 of 8)

92. See comment on Dwg 4 of 8 regarding identifying which drawing to be used for off-site ditch construction detail

Response: ***Noted***

Master Site Plan (SP-100)

93. The final width and location of concrete sidewalk along the Limebank & Earl Armstrong Road frontage shall be determined after the stormwater management review is complete. Other factors affecting the s/w location is how much & how deep is the ditch that must remain, turn lanes, and location of existing hydro pole line and bus stops.

Response: ***2.0 metre wide sidewalk currently shown***

94. Non-signalized entrances on collector "D" to have depressed curb & sidewalk per city drawing# SC7.1

Response: ***Shown on drawings***

95. The Architect's drawing must cross-reference the number of Zurn roof drains specified on UEL's servicing drawing # 2 of 8 to ensure engineer incorporates Zurn drains on the mechanical drawings.

Response: ***Shown on Site plan***

Site Details (SP-101)

96. Revise the cross-section of light/heavy duty asphalt to match Paterson Group's recommendation.

Response: ***Drawings has been revised***

Landscaping Plan (L-01)

97. The proposed landscaping within existing Limebank Road & Earl Armstrong Road right of way cannot be finalized until the location of the sidewalk, major overland flow swale, storm sewer and existing street furniture (i.e. hydro pole line) has been determined.

Response: ***Acknowledged***

FIRE PROTECTION SERVICES

98. Hydrant of Building D, I, and L is over 45 m away, show within 45 m.

Response: ***Drawings has been revised***

99. Please confirm that Building B will be the only building without a Siamese connection. All the other buildings will have Siamese connections.

Response: ***Siamese connection to Building B has been added***

TRANSPORTATION

TRANSIT

100. Transit service is currently not provided in the area of the site. The nearest transit service is located beyond 800m or a 10 minute walk from the site, which is beyond OC Transpo's walking distance guidelines for all-day service.

Response: ***Acknowledged***

101. Transit Services have no plans to introduce service to this area in the near future. It is however anticipated that transit service will operate along Earl Armstrong Rd and/or Limebank Rd adjacent to the site at such a time as the development in the vicinity of the site can support transit service.

Response: ***Acknowledged***

102. Transit Services would consider implementing early transit service to the site – however this would be dependent on the developer funding the service until such a time that the service would become financially sustainable for the City to take over.

Response: ***Acknowledged***

103. It is acknowledged that the cost of early service may be funded in part by other parties who will benefit from the bus route extension. The sharing of the funding is to be determined through private agreements between the owner and other parties. Prior to such agreement(s) being available the owner agrees to fund all the cost of the bus route extension. The City agrees to include similar transit service conditions on development approvals for other parties who will benefit from the route extension.

Response: ***Acknowledged***

104. The developer should provide pedestrian facilities oriented towards the adjacent road network and future Transit Network to facilitate future access to transit. Well maintained connections should be installed to both Limebank Rd and Earl Armstrong Rd in anticipation of future transit provision.

Response: ***Site plan has been revised showing sidewalk connections***

105. The site should be able to accommodate temporary turning arrangements for any potential transit service, and the developer should demonstrate how such an arrangement can be achieved.

Response: ***See Architect's response***

106. A future Transitway LRT corridor has been identified on the south side of the site and a future transit station will be located in the vicinity of Limebank and Earl Armsrtong intersection.

Response: ***Acknowledged***

107. The developer agrees and acknowledges that future rapid transit stations will be located in the vicinity of the proposed Transitway LRT corridor and Spratt Rd and at the Riverview Park and Ride lot. Future owners should be advised of locations of these future rapid transit stations and the rapid transit corridor.

Response: ***Acknowledged***

ENVIRONMENTAL IMPACT STATEMENT

108. Table 2 indicates that the Bank Swallow is not currently protected under the ESA. Please explain. .

Response: ***See Environmental Consultant's response***

109. The EIS indicates that the landscape plan will be completed using native tree species however the landscape plan includes mostly non-native species and several invasive species. Please have the invasive species removed from the landscape plan.

Response: ***See Landscape Architect's response***

110. Please include the Reg 242/08 registration for bobolink. This is needed prior to site plan control approval.

Response: ***See Environmental Consultant's response***

BUILDING CODE SERVICES

111. Please note that all buildings, except for building "B", are shown with Siamese (Fire Department Connection. (F.D.C.)) connection. As the use of the buildings are unknown, it is difficult to determine if the buildings will actually require a F.D.C. This being stated the following may or may not apply depending on the final use of the building(s).

Response: ***Siamese connection has been added to Building B***

112. The maximum distance a fire hydrant is permitted to be from the building's fire department connection is 45 metres, and shall be along an unobstructed path of travel, as per Article 3.2.5.16. via 3.2.5.5., of the Ontario Building Code.

Response: ***Acknowledged***

113. Building "A,C,H,I and L" fall into the category above of not being within 45m of a Hydrant.

Response: ***Drawings have been revised***

114. Additional information pertaining to Hydrant location, as it may apply.

a. Please be aware that a fire hydrant is required to be within 90 metres (along an unobstructed path of travel) of the building's principal entrance(s), as per Sentences 3.2.5.5.(2),(3) & (4), of the Ontario Building Code. Additional criteria for the location of the fire hydrant are: (a) as stipulated in Sentence 3.2.5.7.(2), hydrants shall be located within 90 metres horizontally of any portion of a building perimeter that is required to face a street in Subsection 3.2.2. and (b) fire hydrants are to be no closer than 12.2 metres to a building, as per NFPA 24, via Sentence 7.2.11.1.(1) of the O.B.C.

Response: ***Drawings have been revised***

115. Again, the above statements may or may not be an issue, but it will be at the discretion of their designer.

Response: ***Acknowledged***

RIDEAU VALLEY CONSERVATION AUTHORITY COMMENTS

The Conservation Partners Planning and Development Review Team has completed a review of the above noted application for Site Plan Control to develop a commercial/retail plaza and associated parking area on municipal services on the subject lands. Revised plans included in our review include:

- "Master Site Plan" Drawing No. SP-100 dated September 16, 2011 revision #, dated August 11, 2014 prepared by Petroff Partnership Architects;
- "Servicing Plan" Dwg No. 12007, revision #5 dated August 12, 2014 prepared by Urban Ecosystems Ltd.;
- "Stormwater Management Report, Riverside South Retail Centre (Buildings A to K; 1420 Earl Armstrong Road" (file #12007.11) – revision dated, August 13, 2014) prepared by Urban Ecosystems Ltd.;
- "Servicing Design Brief and Stormwater Management Report: 1420 Earl Armstrong Road, Riverside South Retail Centre" (file #12007.330 – revision dated August 13, 2014) prepared by Urban Ecosystems Ltd.

We have undertaken our review within the context of Section 2.1 Natural Heritage, 2.2 Water Quality and Quantity and 3.1 Natural Hazards of the Provincial Policy Statement under Section 3 of the Planning Act. The following comments are offered for your consideration:

Water Quality and Quantity: Stormwater Management

116. The stormwater management design described in the stormwater management report indicates that the design is in keeping with the accepted 2012 J.L. Richards report for Phase 6 of the RSS community. Stormwater is collected in the municipal sewers on Limebank Road and Early Armstrong Road, both of which discharge to the RSS Pond 2 which provides appropriate quality controls for the receiver, Mosquito Creek. We defer review of the quality controls to the City of Ottawa.

Response: ***Acknowledged***

117. A watercourse, known as Tributary 14 currently bisects the site and is ultimately expected to be closed as part of the RSS development. Compensation for the loss of fish habitat was undertaken through the Chapman Mills compensation project. The application proposes to divert the watercourse around the site into a local stormsewer system and ultimately through the municipal sewers on Limebank Road. This interim condition, until adjacent development takes place, is acceptable to RVCA.

Response: ***Acknowledged***

118. The watercourse, Tributary 14, is subject to the "Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation (Ontario Regulation 174/06 under Section 28 of the Conservation Authorities Act), as administered by the Rideau Valley Conservation Authority. The works to divert (relocate) the watercourse requires a permit under O.Reg 174/06 as administered by the RVCA prior to undertaking any work on the bed or banks. No application has been submitted to the RVCA at this time.

Response:

Conclusion

119. The Conservation Partners have no objection to the proposed Site Plan proposal. We recommend that the following clause be included in the Site Plan Agreement:

    a. A permit shall be received from the Rideau Valley Conservation Authority under O.Reg 174/06 prior to undertaking works to alter the watercourse known as Tributary 14.

Response: ***Acknowledged***

MTS ALLSTREAM

120. We do not have any plant within 2 m of proposed install. Allstream has no existing plant in the area indicated in your submission. No mark-up or no objection.

Response: ***Acknowledged***

BELL CANADA

121. A detailed review of the Site Plan has been completed.

The following paragraphs are to be included as Conditions of Site Plan Approval:

The Developer is hereby advised that prior to commencing any work within the Plan, the Developer must confirm that sufficient wire-line communications/telecommunication infrastructure is currently available within the proposed development. In the event that such infrastructure is not available, the Developer is hereby advised that the Developer may be required to pay for the connection to and/or extension of the existing communication/telecommunication infrastructure. If the Developer elects not to pay for such connection to and /or extension of the existing communication/telecommunication infrastructure, the Developer shall be required to demonstrate to the municipality that sufficient alternative proposed development to enable, at minimum, the effective delivery of communication/telecommunication services for emergency management services (i.e. 911 Emergency Services).

The Owner shall agree in the Agreement, in words satisfactory to Bell Canada, to grant to Bell Canada any easement that may be required for telecommunication services. Easements may be required subject to final servicing decisions. In the event of any conflict with existing Bell Canada facilities or easements, the owner/developer shall be responsible for the relocation of such facilities or easements.

Bell Canada requires one or more conduit or conduits of sufficient size from each unit to the room(s) in which the telecommunication facilities are situated and one or more conduits from the room(s)in which the telecommunication facilities are located to the street line.

A blanket easement will be required.

If there are any conflicts with existing Bell Canada facilities or easements, the Owner/Developer shall be responsible for re-arrangements or relocations.

Please provide the undersigned with the notice of decision and/or conditions of approval pertaining to this matter.

Response: ***Acknowledged***

GROUP TELECOM

122. GT has no Plant within 2 m of proposed work – no conflict.

Response: ***Acknowledged***

TELUS COMMUNICATION

123. TELUS has no infrastructure between Pavement Centreline & ROW line on the same side as the proposal.

Response: ***Acknowledged***

ROGERS

124. Rogers Communications Partnership has no concerns or objections in regards to the attached circulation. Please contact Mike Pick at 613-759-8689 or e-mail at mike.pick@rci.rogers.com for Rogers Site Servicing if approved.

Response: ***Acknowledged***

For all other inquiries please email RogersOttawa.SPEInq@rci.rogers.com

HYDRO OTTAWA

Below are Hydro Ottawa's conditions and comments on the above noted proposal.

125. The Owner is advised that there are medium voltage overhead lines, poles, and guying on the North and West perimeters of the property.

Response: ***Acknowledged***

126. The Owner shall ensure that no personnel or equipment encroaches within three meters (3.0m) of the Hydro Ottawa overhead medium voltage distribution lines, unless approved by Hydro Ottawa. The Owner shall contact Hydro Ottawa prior to commencing work when proposing to work within 3.0m of the Hydro Ottawa distribution lines as noted above. No such work shall commence without approval of Hydro Ottawa.

Response: ***Acknowledged***

127. The Owner shall ensure that no permanent structures are located within the "restricted zone" defined by Hydro Ottawa's standard OLS0002, which can be found at http://www.hydroottawa.com/residential/renovating/guide/clearances/. The "restricted zone" surrounds poles and overhead lines, and extends five metres (5.0m) in all directions of the conductor. The "restricted zone" extends a further two-metre (2.0m) outward from a vertical line drawn straight down from the conductor to ground level. The "restricted zone" is defined along the full length of the overhead line. This standard complies with the requirements of the Ministry of Labour's Occupational Health & Safety Act, the Building Code, and the Ontario Electrical Safety Code.

Response: ***Acknowledged***

128. The Owner shall ensure that any landscaping or surface finishing does not encroach into existing or proposed Hydro Ottawa overhead or underground assets or easement. When proposing to plant in proximity of existing power lines, the Owner shall refer to Hydro Ottawa's free publication "Tree Planting Advice". The shrub or tree location and expected growth must be considered. If any Hydro Ottawa related activity requires the trimming, cutting or removal of vegetation, or removal of other landscaping or surface finishing, the activity and the re-instatement shall be at the owner's expense.

Response: ***Acknowledged***

129. The Owner shall convey, at their cost, all required easements as determined by Hydro Ottawa.

Response: ***Acknowledged***

130. The Owner shall be responsible for servicing the buildings within the property. Only one service entrance per property shall be permitted.

Response: ***Acknowledged***

131. The Owner may be required to enter into an Electrical Servicing Agreement with Hydro Ottawa Limited, to the satisfaction of Hydro Ottawa.

Response: ***Acknowledged***

132. Hydro Ottawa reserves the right to raise conditions throughout the development of this proposal should the revisions contain non-conformances with, for example, Hydro Ottawa's Conditions of Service or Standards. To ensure the best outcome, Hydro Ottawa welcomes an early discussion on the proposal.

Response: ***Acknowledged***

133. The Owner shall comply with Hydro Ottawa's Conditions of Service and thus should be consulted for the servicing terms. The document, including referenced standards, guidelines and drawings, may be found at http://www.hydroottawa.com/residential/rates-and-conditions/conditions-of-service/. The Owner should consult Hydro Ottawa prior to commencing engineering designs to ensure compliance with these documents.

Response: ***Acknowledged***

134. For details on electrical servicing, you may contact Mr. Tony Stinziano, Supervisor Distribution Design East, at (613) 738-5499 ext. 7232.

Response: ***Acknowledged***

OTTAWA INTERNATIONAL AIRPORT AUTHORITY

Thank you for notifying the Airport Authority regarding the site plan proposal affecting the property at 1420 Earl Armstrong Road. We have had an opportunity to review the application and have the following comments to offer.

135. Noise: We have no concerns.

Response: ***Acknowledged***

136. Airport Zoning Regulations:

a. Height: The property is located in an area that is governed by the Airport Zoning Regulation (AZR), in the outer surface. However, the height of the proposal for one and two-storey buildings, as described in the application summary dated September 17, 2014, does not seem to present any operational concerns for the Airport Authority. For temporary construction equipment, the following condition must still be imposed as part of the site plan approval:

"The developer must be aware that the AZR applies to temporary construction equipment, such as cranes, and that if a crane is intended for use on the site, Transport Canada in Toronto must be notified a minimum of 90 days in advance to determine if it will cause a safety hazard to pilots manoeuvring in the area"

Response: ***Acknowledged***

b. Bird Hazard: The site falls within the Airport's Bird Hazard Zone. The developer should be prepared to provide improved maintenance, disposal procedures and garbage containers as shown in detail on the site and landscape plans. As such, the following condition ought to be imposed as part of any site plan approval:

"*It is imperative that there not be any present or future action, nor development undertaken that results in any bird attraction conditions and therefore a hazard to aircraft flying in the area. It is imperative that the site be maintained in a clean state and that any litter on the property is removed expeditiously. The developer must also provide enclosed garbage areas and covered containers where these are proposed/required on site"*

Response: ***See Architect's response***

and,

"*With respect to any landscaping proposed, the developer should be sure that plant/vegetation species are not attractive as a food source for birds. If bird activity increases as a result of this development, the developer should be prepared to implement mitigation measure to address this operational hazard*".

Response: ***See Landscape Architect's response***

137. Airport Navigational and Communication Aids: We have no concerns.

Response: ***Acknowledged***

TRANSPORTATION/TRANSPORTATION PLANNING/DESIGN REVIEW AND IMPLEMENTATION COMMENTS

138. While reviewing the TIS and the Site Plan and associated functional plans of road modifications, we note that a noise and vibration study for this development is required, because the subject site is surrounded by two existing arterial roadways. Limebank Road to the west and Earl Armstrong Road to the north, and a future planned transit corridor (either BRT or LRT) immediately to the south of the property. Though no formal discussion on the above requirement was undertaken at the time of pre-consultation meeting, the required study is necessary to be completed prior to the approval of the site plan control. Thus, the above requirement was overlooked by the staff, development review-transportation, for which staff apologizes for this inconvenience. The above requirement is in line with the Council approved Official Plan and the Environmental Noise Control Guidelines (ENCG). Please refer to table and sub-section 4.8.7 within Section 4.8 Protection of Health and Safety-City of Ottawa Official Pan, and also table 1.6 on page # 10 of the ENCG. The required noise and vibration study can be completed considering various options and these options can be discussed with the city staff.

Response: ***Acknowledged***

139. The Environmental Assessment (EA) for the future transit corridor, has determined the right of way criteria for either BRT or LRT facility, therefore the above required noise and vibration study will be completed taking into account the worst case scenario. For further direction on the completion of required noise and vibration study, please have your acoustic consultant refer to Transport Canada Guidelines or alternatively, contact the City. Therefore, either phase 2 of the development be removed from the site plan or, phase 2 can be shown on the site plan as future development/ or conceptual only, to which approval will not be granted until such time the above requirement is fulfilled. There will be a series of related conditions of site plan control approval to support this approach.

Response: ***Acknowledged***

140. As per the City's Transportation Impact Assessment Guidelines, two horizon periods for analysis must be considered: buildout/full occupancy of development and buildout/full occupancy + 5 years. The Transportation Impact Study (TIS) for the above noted development needs to consider the buildout/full occupancy + 5 years time horizon. Given that the TIS identifies completion of Phase 2 in 2021, the future time horizon of 2021 + 5 years needs to be considered for the total future traffic volumes.

Response: ***See Traffic Engineer's response***

141. This development consists of retail shopping, where a significant generator of traffic occurs during the weekends. This TIS needs to include the site trip generation estimates for the Saturday ITE land use code.

Response: ***See Traffic Engineer's response***

142. The spacing of the unsignalized site access on Limebank Road, between approximately 200 metres south of the signalized intersection at Earl Armstrong Road and 100 metres north of a proposed future traffic signal is not sufficient for proper traffic flow and poses safety concerns, according to the Transportation Association of Canada Guidelines. We recommend a right-in right-out site access only.

Response: ***See Traffic Engineer's response***

143. The proposed full-turning movement access (unsignalized T-intersection) on Limebank Road is only temporary in nature and this access will be restricted to the right-in right-out only in the future. The T-intersection will be removed at the City's discretion, which may be due to safety concerns, operational concerns or at such time as the future transit road and its intersection at Limebank Road are constructed to the south. The developer will be responsible for all required road modifications at that time, such as providing a continuous median along the frontage of the property, etc. The TIS, on pages 30/37 under sections 6.2/8.0, does not document in full this access arrangement, which was discussed and agreed upon earlier in a series of meetings.

Response: ***See Traffic Engineer's response***

144. It is reiterated that this is a temporary access arrangement (unsignalized T-Intersection) described above and the city will ask the developer to restrict this full-turning movement access to right-in right-out only at sometime in the future. The 100% cost of the road modifications at this time will be borne by the developer.

Response: ***See Traffic Engineer's response***

145. At the T-intersection on Limebank Road, provide one (1) westbound left turn lane and one (1) westbound Right turn lane at the access. Show proper arrows.

Response: ***See Traffic Engineer's response***

146. A concrete sidewalk is required on Limebank Road along the entire site frontage. All concrete sidewalks should be continuous and depressed through the unsignalized accesses. Undivided accesses cannot exceed 9m in width at the property line.

Response: ***Sidewalk is shown on the drawing***

147. Ideally, internal roads shouldn't have any unnecessary offsets or skews. The internal intersection with the triangular median is a poor design for an all way stop controlled intersection.

Response: ***See Architect's response***

148. Please note for future resubmissions, the Ideal Flow Rate / Saturated Flow Rate value in the digital Synchro files shall be set to 1800 vphpl - as per the TIA Guidelines.

Response: ***See Traffic Engineer's response***

149. Auxiliary lane tapers should be increased to 75m to accommodate the 80 kph posted speed limits. Heavy vehicle manoeuvres must be verified at the new intersection of Earl Armstrong Road/Collector D.

Response: ***See Traffic Engineer's response***

150. Consider changing cycle lanes on Earl Armstrong Road to cycle tracks behind the curbs. This may reduce road works and provide a safer environmental for cyclists.

Response: ***Not sufficient boulevard width***

151. It is unclear how many bike racks are available. Please ensure bike parking adheres to the Zoning By-Law.

Response: ***See Architect's response***

152. Confirm modal share for this area.

Response: ***See Traffic Engineer's response***

153. Consider channelizing the eastbound right-turn lane on Earl Armstrong Road at Collector Road B.

Response: ***See Traffic Engineer's response***

TRAFFIC SIGNALS COMMENTS

154. In case of any proposed changes in the existing roadway geometry at intersection(s), the City of Ottawa Traffic Operations Unit is required to complete a traffic signal plant design.

Response: ***See Traffic Engineer's response***

155. If the proposed traffic signals are warranted/approved for installation and RMA approved please forward an approved geometric detail design drawings (dwg digital format) including approved pavement markings drawing for detail traffic plant design lay out. Please send all digital (CADD) design files to Keith.Ouellette@ottawa.ca 613-580-2424 extension 28722.

Response: ***See Traffic Engineer's response***

156. The proponent will be responsible for all costs including putting new signal on line, i.e. Bell com, in case the signal is not warranted.

Response: ***See Traffic Engineer's response***

157. Before excavating please contact Ontario One Call for underground locates.

Response: ***Acknowledged***

STREET LIGHTING

158. No comments with initial TIS for this circulation. Street Lighting reserves the right to make future comments based on subsequent submissions.

Response: ***Acknowledged***

159. Future considerations are as follows:

If there are any proposed changes to the existing roadway geometry, the City of Ottawa Streetlight Asset Management Group is required to provide a full streetlight design. Upon completion of proposed roadway geometry design changes, please submit digital Micro Station drawings with proposed roadway geometry changes to the Street Lighting Department, so that we may proceed with the detailed streetlight design and coordination with the Streetlight maintenance provider and all necessary parties. Be advised that the applicant will be 100% responsible for all costs associated with any Streetlight design as a result of the roadway geometry change.

Alterations and/or repairs are required where the existing streetlight plant is directly, indirectly or adversely affected by the scope of work under this circulation, due to the proposed road reconstruction process. All streetlight plant alterations and/or repairs must be performed by the City of Ottawa's Streetlight maintenance provider. .

Response: ***Acknowledged***

160. Be advised that the applicant will be 100% responsible for all costs associated with any relocations/modifications to the existing streetlight plant.

Response: ***Acknowledged***

Technical Comments – June 24, 2016 **(Please note that New Comments are shown in Italic.)**

GENERAL COMMENTS

1. There are some external stormwater management challenges on this site that need to be discussed with the applicant to come up with…

Response: ***addressed in Item 48 above***

The proposed piping system will require municipal consent and an ECA from the Ministry of Environment and Climate Change.

Response: ***Noted***

2. The bus rapid transit corridor (BRT) will be impacted both short term with temporary…

Response: ***addressed in Item 49 above***

Urbandale is addressing the stormwater drainage with a temporary ditch on the lands South of the road/transit corridor. Provide a legal plan clearly showing the location of the temporary ditch to drain the lands from the commercial site. You will need to discuss with Urbandale to determine how the temporary ditch will be constructed, maintained and decommissioned since it is proposed on their lands. MOECC ECA required for this temporary ditch.

Response: ***The Diversion of Tributary 14, south of Town Square Blvd., has been completed by Urbandale.***

3. The ownership of Parts 5,6 and 7 Plan 4R-25540 need to be confirm (ie does the city have a easement or ownership of these parts?

Response: ***addressed in Item 50 above***

yes the City owns theses parts. What about 4R-21491and 4R-20449?

Response: ***The City of Ottawa has a storm drainage easement over parts 5, 6 and 7, Plan 4R-25540. Plan 4R-21491 is an overall plan of Urbandale lands and Plan 4R-20449 is a Plan describing lands conveyed to the City for future Town Square Blvd.***

SERVICING DESIGN BRIEF AND STORMWATER MANAGEMENT

4. Section 2.1- the last paragraph states that J.L Richards is still working on Collector D design update…

Response: ***addressed in Item 51 above***

The plan and profile for Ceremonial Road is complete and approved. Prior to issuing commence work or notification, the in-service memo for this road will have to be issued. Please correspond with Urbandale to obtain the approved plans for the design

Response: ***We have received the approved engineering drawings of Ceremonial Road and coordinated our design accordingly***

5. Section 2.2- the last paragraph states the twin collector sewer are designed at 0.50%, there is not adequate…

Response: ***addressed in Item 52 above***

provide a sanitary design sheet for the site works

Response: ***Sanitary sewer flow calculations are provided in Section 2.2, Proposed Sanitary Servicing, Table 2***

6. Section 3.3 shall be re-written once it has been determined what "hybrid" major SWM system is acceptable.

Response: ***addressed in Item 53 above***

The proposed piping system will require municipal consent and an ECA from the Ministry of Environment and Climate Change. For clarification purposes, provide the storm sewer deign sheet in the Stormwater Management Report

Response: ***Application for Municipal consent and an ECA will be pursued***

7. Section 3.2 and 3.3 please add a note referencing the SWM report (rev. August 13, 2014) is under separate cover.

Response: ***addressed in Item 54 above***

8. Section 3.4 – this section will have to be re-written to explain the temporary & longer term solution for the…

Response: ***addressed in Item 55 above***

9. Section 4.2.3 - add a note to clarify where the available surface volume @ 2490 m3 has been established (ie table on Stormwater Drainage Plan Dwg # 3 of 8)

Response: ***addressed in Item 56 above***

- partially addressed. Provide a breakdown by catchment areas for the surface storage.

Response: ***A detailed surface ponding volume table is shown on Drawing 3 of 8, SWM Drainage Plan***

10. See comments above on Stormwater Design Brief.

- *The runoff coefficient shall be calculated as per section 5.4.5.2.1 in the City of Ottawa Sewer Design Guidelines.*

Response: ***We have revised the runoff coefficient used in the SWM Report to 1.0 for the 1 in 100 year storm event***

- *You are only required to show one example of detailed calculations, but you must provide the storage tables for each catchment area including the roof tops and surface storage. This is required to determine the storm sewer design sheet.*

Response: ***The storm sewer design sheet does not take storage into account. It assumes that the flows are uncontrolled, except the roof flows that are shown as "plug flows" based on the number of weirs. It is a conservative illustration to show that the storm sewer have sufficient capacity to carry the 1 in 5 year storm. The surface and roof storage is shown on drawing 3 of 8, SWM Drainage Plan***

- *The uncontrolled area in the report is not matching the uncontrolled area on the Stormwater Drainage Plan, Drawing No. 3 of 8 (Area I is uncontrolled or controlled?).*

Response: ***The areas have been corrected***

- *The proposed works for the storm pipe to connect to the culvert under Earl Armstrong and discharging into Mosquito Creek will require an MOECC ECA. River Valley Conservation Authority (RVCA) will have to be consulted for the new pipe system. Provide correspondence and comments from RVCA and the MOECC Ottawa District Office. Municipal Approval is required for this pipe. Provide design to Marina Down at marina.down@ottawa.ca. Any pipe section on private land will require an easement for the City if it hasn't been conveyed already..*

Response: ***Application for Municipal consent and an ECA, including approval by RVCA will be pursued***

11. provide existing /proposed grade ….

Response: ***addressed in item 58 above***

12. Redesign grading at the rear loading ….

Response: ***addressed in item 59 above***

13. Review servicing comment regarding …

Response: ***addressed in item 60 above.***

14. Asad Yousfani & OC Transpo staff to review and confirm temporary ditch & finished grades at south property line / BRT corridor are acceptable. -pending..

Response: ***Pending***

15. Entrances exceed 2% slope …

Response: ***addressed in item 62 above.***

16. Major overland flow routes are …

Response: ***addressed in item 63 above.***

17. Provide depressed curbs across the …

Response: ***addressed in item 64 above***

18. Coordinate the entrance & boulevard finished grades along the Collector 'D' with the final J.L Richards design.

Response: ***addressed in Item 65 above***

- partially addressed. Which version,of the plans are used?

Response: ***The City approved Engineering Drawings***

19. further review for the grading plans will be done, once the stormwater management is addressed.

Response: ***Pending***

20. Indicate water meter (M)& remote meter (RM) location, typical …

Response: ***addressed in item 66 above***

21. Building l, D and L are lacking hydrants for the …

Response: ***addressed in item 67 above.***

22. Revise all watermains from 90 bends to 2-45 ….

Response: ***addressed in item 68 above***

23. show location of siamese connection for Building "B".

Response: ***addressed in item 69 above***

24. a note the two water service connections to property line "by others".

Response: ***addressed in item 70 above.***

25. Building "A" loading dock area appears to need 2 catch basins

Response: ***addressed in item 71 above***

26. Capacity of 900 diam. storm sewer in Earl Armstrong Rd to be reviewed and possibly a hybrid sewer/ditch combination could be considered. Provide flow from the proposed catchbasins located on the north side of the site at the new entrance (for 100 year if uncontrolled flow). MOE ECA application will likely be required. Please correspond with Ottawa MOECC office and provide comments to the City: Emily Diamond at 613-3450 extension 238 or emily.diamond@ontario.ca..

Response: ***Application for Municipal consent and an ECA will be pursued. The100 year flow from the proposed catchbasin at the north entrance has been shown on the storm sewer design sheet***

27. *Relocate the proposed storm manhole at the corner of Town Square and Limebank further out onto the ROW and away from the sidewalk..*

Response: ***The Engineering Drawings have been revised***

28. Per Paterson Group's recommendation, add clay …

Response: ***addressed in item 73 above***

29. Temporary Q-flow ….

Response: ***addressed in item 74 above***

30. Can the two existing DICB's in Limebank Road ditchline ….

Response: ***addressed in item 75 above***

31. Review 200 sanitary design, upper end of system does not have adequate...

Response: ***addressed in Item 76 above***

- add note on drawing to provide for adequate insulation

Response: ***Table provided on Drawing 2 of 8, Servicing Plan***

32. *The culvert under the entrance on the South side of the site necessary since the road will not be opened for some while. The temporary ditch will be removed during the construction of Town Square Blvd..*

Response: ***Culvert will note be required. The south entrance will remain closed until Town Square Blvd is constructed***

33. Please reference the surface ponding depth volume table ...

Response: ***addressed in Item 77 above***

– Provide the ponding depth with each catchment area.

Response: ***Ponding depth is shown in Table of Surface Ponding Volumes on Drawing 3 of 8, SWM Drainage Plan***

34. Revise the ponding area at the rear of Building "A"….

Response: ***addressed in Item 78 above***

If flow control is required for the depressed area, provide the maximum ponding for the 100 year event. Depending on the changes of the design for the sire, flow control might be required. Otherwise addressed..

Response: ***Ponding depth is shown in Table of Surface Ponding Volumes on Drawing 3 of 8, SWM Drainage Plan***

35. If this plan is to be used for off-site …

Response: ***addressed in Item 35 above***

36. *Written permission from the abutting owners will be required for proposed ditch works. – See comment 3 in the General Comments section*

Response: ***Written permission is provided***

37. Provide a minimum of 3 cross-sections of the ditch ….

Response: ***addressed in item 81 above***

38. General Note #21 please add; "Refer to Servicing …

Response: ***addressed in item 82 above***

39. Add new General Note#24; " All service trenches to have …

Response: ***addressed in item 83 above***

40. Surface Works Note #2 please add; "all site entrances shall ….

Response: ***addressed in item 84 above***

41. Watermain and Appurtences please add; shall be PVC CL-150 DR18 conforming ….

Response: ***addressed in item 85 above***

42. Provide x-section of sanitary sewer insulation detail ….

Response: ***addressed in item 86 above***

43. No comments

44. *Show high voltage hydro pole line fronting the site on Limebank & Earl Armstrong Road. Some of the poles are close to the proposed 900 mm diameter concrete storm sewer. Please discuss with Hydro for relocation of the hydro lines and provide correspondence to the City including Marina Down (Municipal Approval.).*

Response: ***Hydro pole lines are shown on Drawing 2 of 8, Servicing Plan. The 900 mm diam. storm sewer can be construction without relocating the hydro pole***

45. *Additional details of existing off-site utilities will be required and municipal consent circulation required if there is extensive offsite works. Provide response when available. Please note it could hold up approval and commence work notification.*

Response: ***Additional details will be provide when available***

46. Proposed transformer at rear of Building "A" maybe ....

Response: ***addressed in item 90 above***

47. Watermain servicing servicing Building "D" goes under the ...

Response: ***addressed in item 91 above***

48. See comment on Dwg 4 of 8 regarding identifying ...

Response: ***addressed in item 92 above***

49. *The final width and location of concrete sidewalk along the Limebank & Earl Armstrong Road frontage shall be determined after the stormwater management review is complete. Other factors affecting the s/w location is how much & how deep is the ditch that must remain, turn lanes, and location of existing hydro poleline and bus stops..*

Response: ***Pending***

50. Non-signalized entrances on collector "D" to have depressed curb & sidewalk ...

Response: ***addressed in item 94 above***

Grading Plan (Drawing 1 of 8)

51. Architect's drawing must cross-reference the ....

Response: ***addressed in item 95 above***

52. Revise x-section of light/heavy duty asphalt to match ...

Response: ***addressed in item 96 above***

53. *the proposed landscaping within existing Limebank Road & Earl Armstrong Road right of way cannot be finalized until the location of the sidewalk, major overland flow swale, storm sewer and existing street furniture (ie. hydro pole line) has been determined.*

Response: ***Pending***

54. Hydrant of Building D, I, and L is over 45 m away, show …

Response: ***addressed in item 98 above***

55. Please confirm that Building B will be the only building …

Response: ***addressed in item 99 above***

56. The maximum distance a fire hydrant is permitted to be from the …

Response: ***addressed in item 112 above***

57. Building "A,C,H,I and L" fall into the category above of not being …

Response: ***addressed in item 113 above***

58. Please be aware that a fire hydrant is required to be …

Response: ***addressed in item 114 above***

1.0 INTRODUCTION

1.1 Background

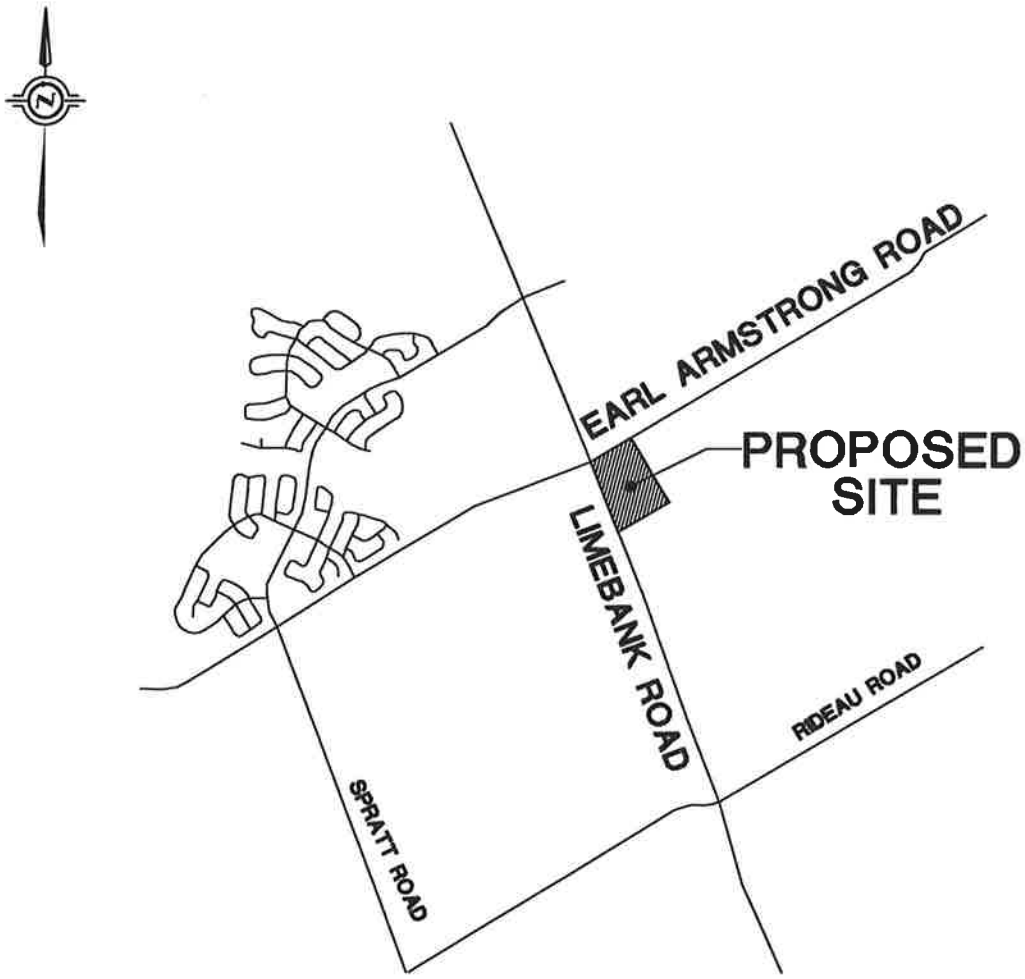
The Property, being the subject of this Design Brief, is a vacant parcel of land having a municipal address of 1420 Earl Armstrong Road, Ottawa, Ontario (the Subject Property). The site location is shown on **Figure No. 1**. The legal description of the Property is described as Parts 4, 5 and 6, Plan 4R-25540, depicted on **Figure No. 2**.

Morguard Investments Limited has filed a Site Plan Control Approval Application with the City of Ottawa for development of the Subject Property as a multiple building commercial retail centre. For illustration purposes, a current Site Plan is included on **Figure No. 3**. A copy of the full scale Site Plan is also included in the rear pocket of this Report. A detailed description of the proposed development is included in the following sections of this Design Brief.

1.2 Site Description

The Subject Property is bounded by Limebank Road to the west, Earl Armstrong Road to the north, Ceremonial Road (under construction) to the east and future Town Square Boulevard to the south. The land is roughly square in shape and is encompassing approximately 6.536 ha. The Property is relatively flat however, an intermittent watercourse, generally known as Tributary No. 14, is draining north across the Property.

The site is currently vacant and relatively clear of significant vegetation except for a limited number of trees, generally located along Tributary No. 14. A Geotechnical Investigation Report by the Paterson Group, dated January 28, 2013, indicates that the sub-surface conditions consist of approximately 0.3 m of top soil overlying silty clay. A copy of a topographic survey, also showing site features, is illustrated on **Figure No. 4**.



Morguard
Investments Limited
AGENT FOR
PENSION FUND REALTY LIMITED
55 City Centre Drive, Suite 800 Mississauga ON L5B 1M3
Telephone: (905) 281-3800 Fax: (905) 281-1800

KEY PLAN

URBAN ECOSYSTEMS LIMITED
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
uel@urbanecosystems.com
t. (905)856-0629
f. (905)856-0698

DATE	PROJECT No.	FIGURE No.
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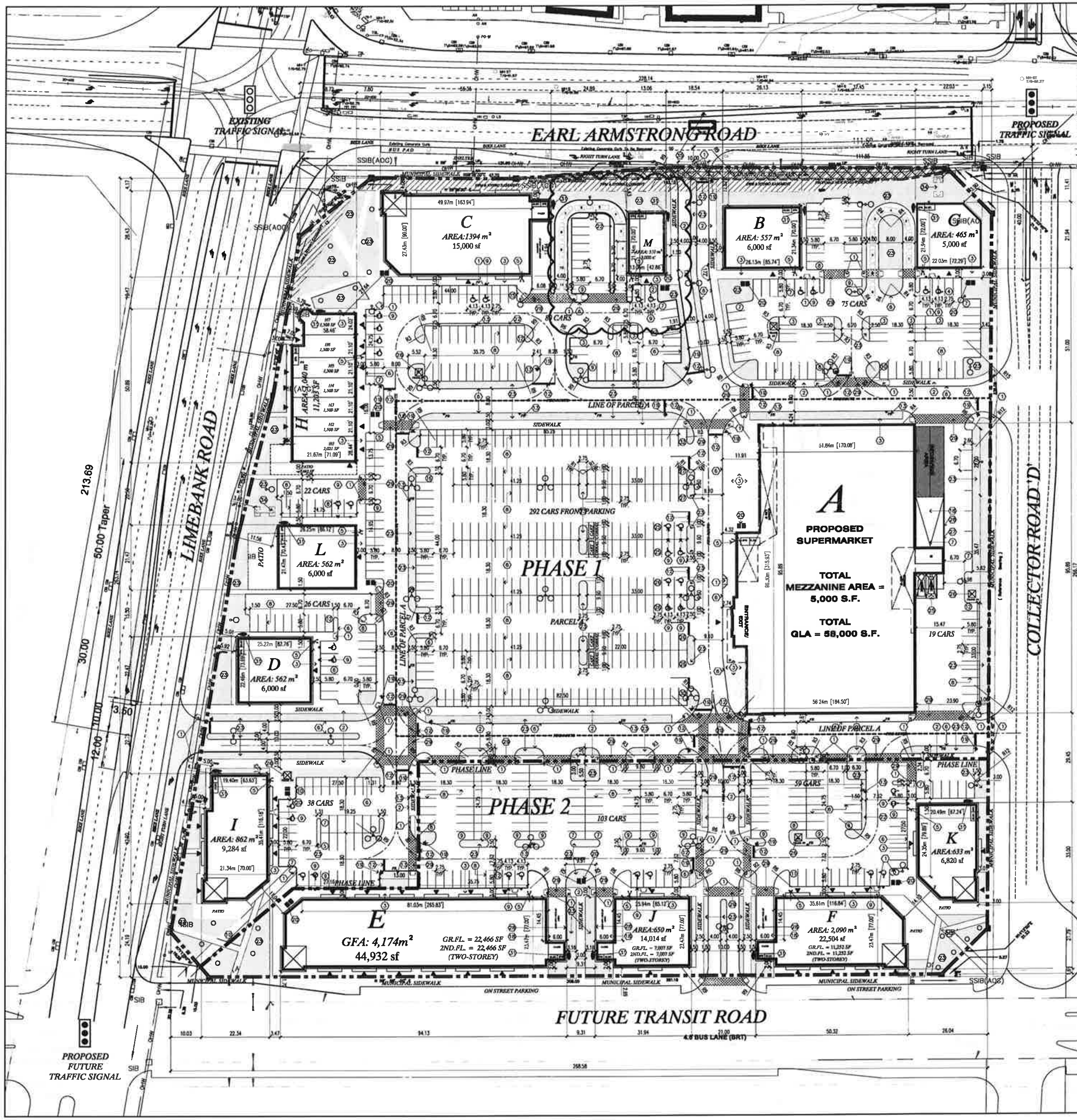

PLAN OF SURVEY OF
PART OF LOT 21
CONCESSION 2 (RIDEAU FRONT)
Geographic Township of Gloucester
CITY OF OTTAWA
Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

GENERAL NOTES:

1. DEPRESSED CURB AND RAMP
2. CONCRETE SIDEWALK 3.0 M WIDE (UNLESS NOTED OTHERWISE)
3. CONCRETE SIDEWALK AT BUILDING SHALL BE CONSTRUCTED BY BUILDING CONTRACTOR REFER TO ARCH. DWGS. FOR EXTENT
4. GUARDRAIL AS REQUIRED BY OBC
5. SIAMESE CONNECTION
6. CONCRETE CURB
7. HEAVY DUTY CONCRETE PAVING
8. 90° PARKING STRIPING (TYP.)
9. HANDICAP PAVEMENT MARKING AND SIGN (RC-6 TYP.)
10. LANDSCAPE FEATURE (REFER TO LANDSCAPE DWGS)
11. EDGE OF BUILDING SLAB FLUSH WITH ASPHALT
12. STOP BAR
13. FIRE LANE SIGN
14. PLANTERS
15. DO NOT ENTER SIGN
16. BOLLARD PAINTED YELLOW
17. LANDSCAPE AREA
18. NO PARKING LOADING ZONE
19. STOP SIGN (RA-1)
20. BIKE RACKS
21. ORNAMENTAL & MASONRY FENCE
22. CONCRETE ISLAND/AREA (TYP.)
23. LANDSCAPED ISLAND/AREA (TYP.)
24. PAINTED ISLAND (TYP.)
25. CONCRETE TRASH COMPACTOR PAD
26. TRANSFORMER PAD (SEE ARCH. DWGS.)
27. RETAINING WALLS AT TRUCK WELLS (SEE ARCH. DWGS.)
28. SCREEN WALL
29. TEXTURED PEDESTRIAN CROSSWALK
30. PAINTED TRAFFIC FLOW ARROWS
31. GAS METER
32. WALL-MOUNTED FIRE LANE SIGN
33. FIRE HYDRANT
34. PYLON SIGN
35. ONE-WAY SIGN (RB-21)
36. YIELD SIGN

LEGEND:

- LANDSCAPE AREA
- TEXTURED WALKWAY
- FIRE ROUTE
- GAS METER LOCATION
- EXISTING EASEMENT
- PHASE LINE
- PYLON SIGN
- DEPRESSED CURB AND RAMP
- BICYCLE RACK
- PROPOSED NEW ROAD WIDENING
- PROPOSED NEW LIGHT STANDARDS

SITE STATISTICS

OVERALL SITE:
TOTAL SITE AREA = 703,582.72 SF (16.15 ACRES) (6.53 HA.)
TOTAL GR. FL. RETAIL AREA = 167,032 SF (15,517.78 SM)
TOTAL 2ND FL. OFFICE AREA = 45,725 SF (4,247.99 SM)
TOTAL GLA = 212,757 SF (19,765.77 SM)

TOTAL PARKING REQ. @ 3.6/100 SM = 712 CARS
TOTAL PARKING PROVIDED = 714 CARS

PHASE 1 STATS:
PHASE 1 AREA = 544,733.13 SF (12.51 ACRES) (5.07 HA.)
TOTAL GLA = 124,487 SF (11,565.22 SM)

TOTAL RETAIL PARKING REQUIRED @ 3.6/100 SM = 423 CARS
TOTAL PARKING PROVIDED = 552 CARS

PHASE 1 BUILDING AREAS:

	[illegible]	[illegible]
BIG BOX RETAIL STORE A	58,000 SF	5,000 SF
BUILDING B	6,000 SF	-
BUILDING C	15,000 SF	-
BUILDING D	6,000 SF	-
BUILDING G	5,000 SF	-
BUILDING H	11,203 SF	-
BUILDING I	9,284 SF	-
BUILDING L	6,000 SF	-
BUILDING M	3,000 SF	-
TOTAL	*119,487 SF*	*5,000 SF*

PHASE 2 STATS:
PHASE 2 AREA = 158,909.02 SF (3.64 ACRES) (1.46 HA.)
TOTAL GLA = 88,270 SF (8,200.55 SM)

TOTAL PARKING REQ. @ 3.6/100 SM = 295 CARS
TOTAL PARKING PROVIDED = 162 CARS

PHASE 2 BUILDING AREAS:

	[illegible]	[illegible]
BUILDING E	22,466 SF	22,466 SF
BUILDING F	11,252 SF	11,252 SF
BUILDING J	7,007 SF	7,007 SF
BUILDING K	6,820 SF	-
TOTAL	*47,545 SF*	*40,725 SF*

SP-100

DATE ISSUED: 16-11-30

CITY FILE NO.:

No.	REVISIONS [illegible]	YY/MM/DD	BY
22.	LIGHT STANDARDS ADDED	[illegible]	AU
21.	BUILDING 'I' DRIVE-THRU AND SIZE	[illegible]	AU
20.	TRANSIT ROAD DETAILS REMOVED	[illegible]	AU
19.	OHW ADDED, 'I' MOVED, SIDEWALK TO 'I', CART CORRALS FOR 'A'	[illegible]	AU
18.	NORTH-WEST CORNER SIDE WALK REVISED	[illegible]	AU
17.	PROPERTY BEARINGS ADDED	[illegible]	AU
16.	L.S. AREA + SIDEWALKS ADDED TO BLDG. H, I, D, J, K	[illegible]	AU
15.	REVISED LANDSCAPING AREAS	[illegible]	AU
14.	PROPOSED NEW ROAD WIDENING	[illegible]	AU
13.	MUNICIPAL SIDEWALK AND LANDSCAPE REVISED	[illegible]	AU
12.	TRANSFORMER 'B' ADDED	[illegible]	AU
11.	REVISED AS PER LANDSCAPE COMMENTS	[illegible]	AU
10.	REVISED AS PER CITY COMMENTS	[illegible]	AU
9.	LIMEBANK ENTRANCE	[illegible]	AU
8.	RIGHT TURN LANES REVISED	[illegible]	AU
7.	BLDG. A SHELL PLAN REVISED	[illegible]	AU
6.	RIGHT TURN LANES ADDED	[illegible]	AU
5.	COLLECTOR ROAD D REVISED	[illegible]	AU
4.	SUPT. & HYDRO EASEMENT NOTES	[illegible]	AU
3.	REVISED MEDIANS AND PROPOSED ROAD	[illegible]	AU
2.	ADDITIONAL EASEMENT INFORMATION	[illegible]	AU
1.	ISSUED FOR SITE PLAN APPROVAL	[illegible]	AU

Contractor must check and verify all dimensions on the job and report any discrepancies to the Architect before proceeding with the work.

Do not scale the drawing.

This drawing must be read in the context of all the other drawings which constitute the document.

MASTER SITE PLAN

SCALE: 1:500

LIMEBANK & EARL ARMSTRONG
LIMEBANK ROAD & EARL ARMSTRONG ROAD
OTTAWA, ONTARIO
FOR: OWNER

PETROFF PARTNERSHIP ARCHITECTS
PETROFF
260 TOWN CENTRE BLVD. SUITE 300
MARKHAM ONTARIO CANADA L3R 8H8
TEL. 905.470.7000 FAX. 905.470.2500

DRAWN BY	RY
CHECKED BY	A.U.
DATE	SEPT. 16, 2011
ISSUED	

PROJECT No. 11159.00
DWG. No. SP-100

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT

DATE: Aug 23/14

EDWARD M. LANCASTER
ONTARIO LAND SURVEYOR

PLAN 4R-28540

RECEIVED AND DEPOSITED

DATE: JULY 28/11

LAND REGISTRAR FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4

SCHEDULE

PART	PART OF LOT	CONCESSION	ALL OF PIN
1	21	2 (RIDEAU FRONT) (GLOUCESTER)	04305-0238

Part 2: Subject to easement Inst. CE 41783

PLAN OF SURVEY OF

PART OF LOT 21
CONCESSION 2 (RIDEAU FRONT)
Geographic Township of Gloucester
CITY OF OTTAWA
Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 1000

Metric
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

Surveyor's Certificate

I CERTIFY THAT:

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act, the Land Titles Act and the regulations made under them.
2. The survey was completed on the 3rd day of August, 2011

Aug 23/14 — Edward M. Lancaster
Date — Edward M. Lancaster, Ontario Land Surveyor

Notes & Legend

—○—	Denotes	Survey Monument Planted	
—⊕—	-	Survey Monument Found	
SIB	-	Standard Iron Bar	
SSIB	-	Short Standard Iron Bar	
IB	-	Iron Bar	
(MT)	-	Witness	
(AOG)	-	Annis, O'Sullivan, Vollebekk Ltd.	
Meas.	-	Measured	
(P1)	-	Plan 4R-24385	
(P2)	-	Plan 4R-21461	
(P3)	-	Plan 4R-1928	
(P4)	-	(AOG) Plan, October 14, 2010	
(P5)	-	Plan 4R-20448	

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.99994.

Bearings are derived from simultaneous GPS observations on survey instruments A to B, shown hereon, having a grid bearing of N 30°32'40" W and are referred to the Ontario Coordinate System, MTM NAD 83 (original) Zone 9.

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

- Point A Northing 5018663.64 Easting 370434.15
- Point B Northing 5018856.89 Easting 370374.14

Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundary as shown on this plan.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone (613) 727-0850 Fax (613) 727-1079
Land Surveyors

DATE	PROJECT No.	FIGURE No.
APRIL 2014	12007.330	2

TOPOGRAPHICAL PLAN OF

PART OF LOT 21
CONCESSION 2 (RIDEAU FRONT)
Geographic Township of Gloucester
CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebekk Ltd.

Plan amended March 14, 2014 to add Ditch Inlet (39 at south end of site on the east side of Limebank Road.

Scale 1 : 500

0 5 10 15 20 25 Metres

Metric
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Date — Y. Andare (Prof) O.L.S.

Notes & Legend

Denotes
- Overhead Wires
- Catch Basin
- Catch Basin/Inlet
- Maintenance Hole (Storm Sewer)
- Maintenance Hole (Sanitary)
- Maintenance Hole (Hydro)
- Maintenance Hole (Telbo)
- Maintenance Hole (Unidentified)
- Valve Chamber (Wastewater)
- Corrugated Steel Pipe
- Concrete Pipe
- Traffic Light
- Utility Pole
- Anchor
- Light Standard
- Unidentified Terminal Box
- Traffic Signal Post
- Sign
- Deciduous Tree
- Coniferous Tree
- Fire Hydrant
- Water Valve
- Manhole
- Location of Elevation
- Top of Concrete Curb Elevation
- Centreline
- Property Line
- Hedgerow
- Guard Rail
- Post and Wire
- Depressed Curb

Bearings are grid.

SITE AREA = 8.536 Hectares

BOUNDARY INFORMATION COMPILED FROM OFFICE RECORDS & PLANS.

ELEVATION NOTES

1. Elevations shown are referred to geodetic datum.
2. It is the responsibility of the user of this information to verify that the bench mark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, posting, excavating etc.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
Ottawa, Ontario
Phone: (613) 727-0850 Fax: (613) 727-1079

DATE	PROJECT No.	FIGURE No.
APRIL 2014	12007.330	4

1.3 Purpose of Design Brief

Urban Ecosystems Limited has been retained by Morguard Investments Limited to analyze the feasibility of providing municipal services to support the proposed development and to prepare detailed engineering design of site grading, servicing, stormwater management and related works.

It is the intent that the Servicing Design Brief, Stormwater Management Report and accompanying engineering drawings, together with other reports and documents will assist the City of Ottawa and other Agencies to evaluate the current Site Plan Control Approval Application.

The following significant drawings and documents have been considered in preparation of this Design Brief and the engineering design of site grading, servicing, stormwater management and related works in connection with the proposed development.

- Site Plan prepared by Petroff Partnership Architects, revision 22, dated November 30, 2016
- Landscape Plans by FOTENN, revision 7, dated November 18, 2016
- Topographic Survey by Annis, O'Sullivan, Vollebekk Ltd., O.L.S.
- Geotechnical Investigation by The Paterson Group
- Technical Memorandum by Stantec regarding existing storm flow rates at the Earl Armstrong culvert
- Design Report by J.L. Richards & Associates Ltd. regarding Riverside South Community, Phase 6
- Limebank Road and Earl Armstrong Road Engineering Drawings
- City of Ottawa Guidelines for Design of Sewers and Watermains

1.4 Proposed Development

As shown on the Site Plan, the proposed development, which is the subject of the current Site Plan Control Approval Application, will be developed in two phases. Phase 1 will include a proposed supermarket having a ground floor area of approximately 5,388 m^2, together with a total of eight free standing buildings with floor areas ranging from approximately 279 m^2 to approximately 1,394 m^2. The total building ground floor area within Phase 1 is approximately 11,109 m^2.

Phase 2 of the development will include a total of three free standing 2-storey buildings and one single-storey building. The ground floor areas will range from approximately 650 m^2 to approximately 2,087 m^2. The total building floor area, including the second stories, is approximately 8,197 m^2. A copy of Site Plan, SP- 100, by Petroff Partnership Architects, revised on November 30, 2016 is included in the rear pocket of this report. The Site Plan provides a detailed summary of all relevant development statistics.

The table below is a summary of the proposed building

Table 1 Building Statistics

Building	No. of Stories	Ground Floor (m^2)	G.F.A. (m^2)
A	1	5,388	5,388
B	1	557	557
C	1	1,394	1,394
D	1	562	562
E	2	2,087	4,174
F	2	1,045	2,090
G	1	465	465
H	1	1,040	1,040
I	1	862	862
J	2	650	1,300
K	1	633	633
L	1	562	562
M	1	279	279
Total		15,524	19,306

2.0 SANITARY SEWERAGE

2.1 Existing Sanitary Sewerage

There is an existing 600 mm diameter sanitary sewer in front of the Subject Property on Limebank Road, flowing north, and a 375 mm diameter sanitary sewer flowing west along Earl Armstrong Road.

A 375 mm diameter sanitary sewer has been installed on Ceremonial Road from Earl Armstrong Road to Town Square Blvd., to service the Riverside South Community, Phase 6. Two 200mm diam. sanitary sewer connections have been installed on Ceremonial Road to service the Subject Property

At the time of up-dating this report, the detailed engineering design by J.L. Richards & Associates Ltd. for Ceremonial Road has been approved by the City of Ottawa. The road has been constructed up to and including base asphalt, and installation of utilities is pending. The approved engineering design of Ceremonial Road has been reflected on the current Site Plan and site engineering drawings.

2.2 Proposed Sanitary Servicing

The sanitary flows from the Subject Property have been accounted for in the design of the 375 mm diameter sanitary sewers on Ceremonial Road. Based on a contributing drainage area of 6.536 ha, generating wastewater flows at a rate of 50,000 l/ha/d, and using a peaking factor of 1.5, the wastewater flow from the subject Property is estimated at 5.67 l/s. Adding extraneous flows of 0.28 l/s/ha or 1.83 l/s, the total peak wastewater flow from the Subject Property is estimated at 7.50 l/s. Taking into account that the shopping centre is typically operating for 12 hours per day, the peak flow will be 15.0 l/s.

The project mechanical engineers have estimated the fixture units and sanitary sewer discharge loads from the shopping centre. Conservatively, they have estimated a total of 1740 fixture units that will result in a peak flow of approximately 18.5 l/s or 20.3 l/s, including extraneous flow.

2.2 Proposed Sanitary Servicing (cont'd)

Due to depth constraints, it is proposed that the Subject Property will be serviced with two, 200 mm diameter sanitary sewer systems, connected to the 375 mm diameter sanitary sewer on Ceremonial Road.

The two collector sewer systems will be 200 mm diameter at a minimum grade of 0.5%, having a full flow capacity of 24.2 l/s. Table 2, Sanitary Sewer Flow Calculations, is based on a total estimated peak flow, including extraneous flow, of 20.3 l/s. The flow distribution is based on the finished floor area of the contributing buildings as a percentage of the total gross floor area on the site. The calculations demonstrate that the sanitary sewers will have sufficient capacity to adequately service the proposed retail centre.

Table 2 Sanitary Sewer Flow Calculations

Contrib. Building	Contrib. Area (%)	From M.M	To M.M	Peak Flow (l/s)	Pipe Length (m)	Pipe Diam. mm	Pipe Slope	Pipe CAP. l/s
North System								
L	2.88	7A	8A	0.59	28.0	200	0.50	24.2
L&M	8.20	6A	7A	1.66	49.0	200	0.50	24.2
C	7.14	6A	12A	1.45	30.0	200	1.00	34.2
L, H & C	15.34	5A	6A	3.11	27.0	200	0.50	24.2
M	2.61	5A	11A	0.58	30.0	200	1.00	34.2
L, H, C & M	17.95	4A	5A	3.64	49.5	200	0.50	24.2
B	2.85	4A	10A	0.58	30.0	200	1.50	42.0
L, H, C, M & B	20.80	3A	4A	4.22	22.0	200	0.50	24.2
L,H,C, M, B & A	48.38	2A	3A	9.82	40.5	200	0.50	24.2
G	2.38	2A	9A	0.48	29.5	200	1.50	42.0
L, H, C, M, B, A & G	50.76	1A	2A	10.30	10.5	200	0.50	24.2
South System								
E & I	25.78	17A	18A	5.23	41.0	200	0.50	24.2
E, I & D	28.65	16A	17A	5.82	63.0	200	0.50	24.2
E, I & D	28.65	15A	16A	5.82	60.0	200	0.50	24.2
J	6.65	15A	20A	1.35	37.5	200	1.00	34.2
E, I, D & J	35.30	14A	15A	7.17	54.0	200	0.50	24.2
F & K	13.94	14A	19A	2.83	43.5	200	0.50	24.2
E, I, D J, F & K	49.24	13A	14A	10.00	47.0	200	0.50	24.2

2.0 SANITARY SEWERAGE

2.2 Proposed Sanitary Servicing (cont'd)

As specified by the project mechanical engineers, each of the thirteen proposed commercial buildings will be serviced with 150 mm diameter connections at a grade of no less than 1.0%, except the service connection to the proposed supermarket, Building A, will be 200 mm diameter.

Due to the relatively shallow sanitary sewer on Ceremonial Road and the elevations of the existing and proposed roads surrounding the Property, several sections of the proposed sanitary system will have to be insulated as shown in Thermal Pipe Insulation Table on drawing 2 of 8 Servicing Plan.

3.0 STORM DRAINAGE

3.1 Existing Stormwater Sewerage

There is an existing 2,700 mm diameter storm sewer in front of the Subject Property on Limebank Road draining to the north. This storm sewer discharges to Riverside South Stormwater Management Pond No. 2, located north of Earl Armstrong Road on the west side of Limebank Road. There is also a 2,250 mm diameter storm sewer on Earl Armstrong Road in front of the property draining west. This storm sewer connects to the Limebank Road 2,700 mm diameter storm sewer which discharges to Riverside South Stormwater Management Pond No. 2.

An 1,800 mm diameter storm sewer has been installed on Ceremonial Road from Earl Armstrong Road to Town Square Blvd., to service the Riverside South Community, Phase 6. A 750mm diam. storm sewer connection has been installed on Ceremonial Road to service the Subject Property

3.2 Proposed Stormwater Servicing

At the time of up-dating this report, the detailed engineering design by J.L. Richards & Associates Ltd. for Ceremonial Road has been approved by the City of Ottawa. The road has been constructed up to and including base asphalt, and installation of utilities is pending. The approved engineering design of Ceremonial Road has been reflected on the current Site Plan and site engineering drawings.

Controlled storm runoff from the Subject Property has been accounted for in the design of the 1,800 mm diameter storm sewers on Ceremonial Road. The maximum discharge rate was established through the Riverside South Community Master Drainage Plan Update, Final Report by Stantec, Dated September 30, 2008. The Master Drainage Plan specify that the storm discharge rate from the Subject Property shall not exceed 203 l/s/ha for all storms, up to and including the 1 in 100 year event. Based on a total site area of 6.536 ha, the total storm discharge from the Subject Property shall not exceed 1,326 l/s.

The Subject Property will be serviced with a 750 mm diameter connection to the proposed 1,800 mm diameter storm sewer on Ceremonial Road. As illustrated in the Hydrologic Evaluation Calculations, attached in Appendix 'A', the site discharge will be controlled through a 450 mm diameter orifice installed in a manhole to be constructed on the property line. A copy of the Servicing Plan has been included in the rear pocket of this report.

To control storm run-off from the roofs, the Buildings will be equipped with Zurn Control Flow Drains, Model Z-105-5 or approved equal, except Building A that will be uncontrolled. The total number of control flow drains will be 33 with one weir per drain.

3.2 Proposed Stormwater Servicing (cont'd)

Each Building will be serviced with a 200 mm diameter storm connection at a grade of no less than 1.0%, except Building A will have a 300 mm diameter service. It is acknowledged that the capacity of the storm service connections are significantly greater than the expected roof discharge Flows.

The main storm sewers on site are generally designed to covey the 1 in 5 year storm using an entry time of 10 mins. The majority of the storm sewers however are oversized, particularly the larger, downstream pipe segments. This is to provide sufficient underground storage to eliminate any surface ponding during more frequent storms, less than the 1 in 5 year event. A Stormwater Management Report revised January 20, 2016, is included in Appendix 'A' and is also submitted under separate cover.

The following figures, 5a through 5g, Storm Sewer Design Sheets, are based on the 1 in 5 year storm event and shows that all sewer segments have sufficient capacity.

CITY OF OTTAWA

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URBAN ECOSYSTEMS
LIMITED
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
TELEPHONE: (905)856-0629
FAX: (905)856-0698

Project / Subdivision **RIVERSIDE - MORGUARD**

Consulting Engineer **Urban Ecosystems Limited**

Project No.: **12007**

Design Parameters (5 Year Storm)

A = drainage area (ha)	T_{init}= 10 min
C = runoff coefficient	A= 998.071
T_c = time of concentration	B= 6.053
	C= 0.814

Design Equations

$$I = \frac{A}{(t + B)^C}$$

$$Q = 2.78 \times A \times C \times I$$

Prepared by: _____

Checked by: _____

Last Revised: _____

STREET NAME	From MH	Invert (m)	To MH	Invert (m)	Area increment Road/Other ha.	Coef.	BLDG No of Drains	Sewer AC Leg	Cumul.	Intensity I - 5yr (mm/hr)	I - 25yr (mm/hr)	I -100yr (mm/hr)	Flow - Q Road (l/s)	BLDG (l/s)	Total (l/s)	PROPOSED SEWER Length (m)	Grade (%)	Dia (mm)	Capac. (l/s)	Veloc. (m/s)	Time (minutes) Leg	elapsed
STORM SEWER LEG	13		12		0.12	0.90		0.108	0.108	104.2			31.2		**31.2**							10.00
BUILDINGS I & E							9							13.9	**13.9**							
													31.2	13.9	**45.1**	**18.5**	**0.40**	**300**	**63.8**	0.87	0.35	10.35
STORM SEWER LEG	12		11		0.14	0.90		0.126	0.234	102.4			66.5		**66.5**							10.35
														0.0	**0.0**							
													66.5	13.9	**80.4**	**50.5**	**0.40**	**450**	**188.1**	1.15	0.73	11.09
STORM SEWER LEG	11		10		0.11	0.90		0.099	0.333	98.8			91.3		**91.3**							11.09
BUILDING D							2							3.0	**3.0**							
													91.3	16.9	**108.2**	**7.0**	**0.40**	**525**	**283.8**	1.27	0.09	11.18
STORM SEWER LEG	10		9		0.24	0.90		0.216	0.549	98.4			149.9		**149.9**							11.18
BUILDING L							2							3.0	**3.0**							
													149.9	19.9	**169.8**	**40.0**	**0.40**	**675**	**554.6**	1.50	0.44	11.62
STORM SEWER LEG	9		7		0.24	0.90		0.216	0.765	96.3			204.7		**204.7**							11.62
BUILDING H							3							4.7	**4.7**							
													204.7	24.6	**229.3**	**57.0**	**0.40**	**675**	**554.6**	1.50	0.63	12.26
STORM SEWER LEG	26		7		0.28	0.90		0.252	0.252	104.2			72.9		**72.9**							10.00
BUILDING C							4							6.1	**6.1**							
													72.9	6.1	**79.0**	**15.5**	**1.00**	**375**	**182.9**	1.60	0.16	10.16
STORM SEWER LEG	7		6		0.05	0.90		0.045	1.062	93.6			276.1		**276.1**							12.26
														0.0	**0.0**							
													276.1	30.7	**306.8**	**51.5**	**0.40**	**750**	**734.5**	1.61	0.53	12.79
STORM SEWER LEG	6		5		0.04	0.90		0.036	1.098	91.5			278.9		**278.9**							12.79
														0.0	**0.0**							

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URBAN ECOSYSTEMS
LIMITED
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
TELEPHONE: (905)856-0629
FAX: (905)856-0698

Project / Subdivision **RIVERSIDE - MORGUARD**

Consulting Engineer **Urban Ecosystems Limited**

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Design Parameters (5 Year Storm)

A = drainage area (ha)	T_{int}= 10 min
C = runoff coefficient	A= 998.071
T_c = time of concentration	B= 6.053
	C= 0.814

Design Equations

$$I = \frac{A}{(t+B)^C}$$

$$Q = 2.78 \times A \times C \times I$$

Prepared by: _____

Checked by: _____

Last Revised: _____

STREET NAME	From MH	Invert (m)	To MH	Invert (m)	Area increment Road/Other ha.	Coef.	BLDG No of Drains	Sewer AC Leg	Cumul.	Intensity I - 5yr (mm/hr)	I - 25yr (mm/hr)	I -100yr (mm/hr)	Flow - Q Road (l/s)	BLDG (l/s)	Total (l/s)	PROPOSED SEWER Length (m)	Grade (%)	Dia (mm)	Capac. (l/s)	Veloc. (m/s)	Time (minutes) Leg	elapsed
													278.9	30.7	**309.6**	**36.0**	**0.40**	**750**	**734.5**	1.61	0.37	13.16
STORM SEWER LEG BUILDING M	25		5		0.19	0.90	2	0.171	0.171	104.2			49.5	3.0	**49.5** **3.0**							10.00
													49.5	3.0	**52.5**	**31.5**	**2.00**	**300**	**142.7**	1.96	0.27	10.27
STORM SEWER LEG	27		5		0.83	0.90		0.747	0.747	104.2			216.1	0.0	**216.1** **0.0**							10.00
													216.1	0.0	**216.1**	**99.5**	**0.50**	**525**	**317.2**	1.42	1.17	11.17
STORM SEWER LEG	5		4		0.05	0.90		0.045	2.061	90.0			515.2	0.0	**515.2** **0.0**							13.16
													515.2	33.7	**548.9**	**35.5**	**0.40**	**900**	**1194.4**	1.82	0.33	13.49
STORM SEWER LEG	24		23		0.05	0.90		0.045	0.045	104.2			13.0	0.0	**13.0** **0.0**							10.00
													13.0	0.0	**13.0**	**24.0**	**1.00**	**300**	**100.9**	1.38	0.29	10.29
STORM SEWER LEG BUILDING B	23		4		0.13	0.90	2	0.117	0.162	102.7			46.2	3.0	**46.2** **3.0**							10.29
													46.2	3.0	**49.2**	**23.5**	**1.00**	**450**	**297.4**	1.81	0.22	10.51
STORM SEWER LEG	4		3		0.03	0.90		0.027	2.250	88.8			554.8	0.0	**554.8** **0.0**							13.49
													554.8	36.7	**591.5**	**24.0**	**0.40**	**900**	**1194.4**	1.82	0.22	13.71

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URBAN ECOSYSTEMS
LIMITED
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
TELEPHONE: (905)856-0629
FAX: (905)856-0698

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C = runoff coefficient	A= 998.071
T_c = time of concentration	B= 6.053
	C= 0.814

Design Equations

$$I = \frac{A}{(t+B)^C}$$

$$Q = 2.78 \times A \times C \times I$$

Prepared by: _____

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Last Revised: _____

STREET NAME	From MH	Invert (m)	To MH	Invert (m)	Area increment Road/Other ha.	Coef.	BLDG No of Drains	Sewer AC Leg	Cumul.	Intensity I - 5yr (mm/hr)	I - 25yr (mm/hr)	I -100yr (mm/hr)	Flow - Q Road (l/s)	BLDG (l/s)	Total (l/s)	PROPOSED SEWER Length (m)	Grade (%)	Dia (mm)	Capac. (l/s)	Veloc. (m/s)	Time (minutes) Leg	elapsed
STORM SEWER LEG	CB		22		0.05	0.90		0.045	0.045	104.2			13.0		**13.0**							10.00
														0.0	**0.0**							
													13.0	0.0	**13.0**	**38.5**	**4.00**	**300**	**201.8**	2.77	0.23	10.23
STORM SEWER LEG	22		3		0.10	0.90		0.090	0.135	103.0			38.6		**38.6**							10.23
														0.0	**0.0**							
													38.6	0.0	**38.6**	**19.5**	**2.00**	**450**	**420.6**	2.56	0.13	10.36
STORM SEWER LEG BUILDING A Uncontrolled	plug		3		0.54	0.90		0.486	0.486	104.2			140.6		**140.6**							10.00
														0.0	**0.0**							
													140.6	0.0	**140.6**	**8.0**	**5.00**	**300**	**225.6**	3.09	0.04	10.04
STORM SEWER LEG	3		2		0.03	0.90		0.027	2.898	88.0			708.1		**708.1**							13.71
														0.0	**0.0**							
													708.1	36.7	**744.8**	**21.5**	**0.40**	**900**	**1194.4**	1.82	0.20	13.90
STORM SEWER LEG	CB		20		0.14	0.90		0.126	0.126	104.2			36.5		**36.5**							10.00
														0.0	**0.0**							
													36.5	0.0	**36.5**	**18.5**	**0.50**	**300**	**71.3**	0.98	0.32	10.32
STORM SEWER LEG	20		19		0.08	0.90		0.072	0.198	102.6			56.4		**56.4**							10.32
														0.0	**0.0**							
													56.4	0.0	**56.4**	**25.0**	**0.50**	**300**	**71.3**	0.98	0.43	10.74
STORM SEWER LEG	19		18		0.11	0.90		0.099	0.423	100.4			118.0		**118.0**							10.74
														0.0	**0.0**							
													118.0	0.0	**118.0**	**18.5**	**0.40**	**450**	**188.1**	1.15	0.27	11.01

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URBAN ECOSYSTEMS
LIMITED
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
TELEPHONE (905)856-0629
FAX: (905)856-0698

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A = drainage area (ha)	T_{int}= 10 min
C = runoff coefficient	A= 998.071
T_c = time of concentration	B= 6.053
	C= 0.814

Design Equations

$$I = \frac{A}{(t + B)^C}$$

$$Q = 2.78 \times A \times C \times I$$

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STREET NAME	From MH	Invert (m)	To MH	Invert (m)	Area increment Road/Other ha.	Coef.	BLDG No of Drains	Sewer AC Leg	Cumul.	Intensity I - 5yr (mm/hr)	I - 25yr (mm/hr)	I -100yr (mm/hr)	Flow - Q Road (l/s)	BLDG (l/s)	Total (l/s)	PROPOSED SEWER Length (m)	Grade (%)	Dia (mm)	Capac. (l/s)	Veloc. (m/s)	Time (minutes) Leg	elapsed
STORM SEWER LEG	32		31		0.21	0.90		0.189	0.189	104.2			54.7		**54.7**							10.00
														0.0	**0.0**							
													54.7	0.0	**54.7**	**18.5**	**0.50**	**300**	**71.3**	0.98	0.32	10.32
STORM SEWER LEG BUILDING J	31		18		0.09	0.90	2	0.081	0.270	102.6			76.9		**76.9**							10.32
														3.0	**3.0**							
													76.9	3.0	**79.9**	**22.0**	**0.50**	**375**	**129.3**	1.13	0.32	10.64
STORM SEWER LEG	18		17		0.11	0.90		0.099	0.792	99.1			218.0		**218.0**							11.01
														0.0	**0.0**							
													218.0	3.0	**221.0**	**43.5**	**0.40**	**525**	**283.8**	1.27	0.57	11.58
STORM SEWER LEG	29		17		0.18	0.90		0.162	0.162	104.2			46.9		**46.9**							10.00
														0.0	**0.0**							
													46.9	0.0	**46.9**	**24.0**	**1.00**	**300**	**100.9**	1.38	0.29	10.29
STORM SEWER LEG	17		16		0.03	0.90		0.027	0.981	96.5			262.9		**262.9**							11.58
														0.0	**0.0**							
													262.9	3.0	**265.9**	**24.0**	**0.40**	**525**	**283.8**	1.27	0.32	11.90
STORM SEWER LEG BUILDINGS F & K	28		16		0.20	0.90	5	0.180	0.180	104.2			52.1		**52.1**							10.00
														7.6	**7.6**							
													52.1	7.6	**59.7**	**28.5**	**0.50**	**300**	**71.3**	0.98	0.49	10.49
STORM SEWER LEG	16		15		0.03	0.90		0.027	1.188	95.1			313.9		**313.9**							11.90
														0.0	**0.0**							

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TELEPHONE: (905)856-0629
FAX: (905)856-0698

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C = runoff coefficient	A= 998.071
T_c = time of concentration	B= 6.053
	C= 0.814

Design Equations

$$I = \frac{A}{(t+B)^C}$$

$$Q = 2.78 \times A \times C \times I$$

STREET NAME	From MH	Invert (m)	To MH	Invert (m)	Area increment Road/Other ha.	Coef.	BLDG No of Drains	Sewer AC Leg	Cumul.	Intensity I - 5yr (mm/hr)	I - 25yr (mm/hr)	I -100yr (mm/hr)	Flow - Q Road (l/s)	BLDG (l/s)	Total (l/s)	PROPOSED SEWER Length (m)	Grade (%)	Dia (mm)	Capac. (l/s)	Veloc. (m/s)	Time (minutes) Leg	elapsed
STORM SEWER LEG	15		2		0.24	0.90		0.216	1.404	93.9			313.9	10.6	**324.5**	**24.0**	**0.40**	**600**	**405.1**	1.39	0.29	12.18
													366.2		**366.2**							12.18
														0.0	**0.0**							
													366.2	10.6	**376.8**	**111.0**	**0.40**	**600**	**405.1**	1.39	1.33	13.52
STORM SEWER LEG BUILDING G	21		2		0.14	0.90	2	0.126	0.126	104.2			36.5		**36.5**							10.00
														3.0	**3.0**							
													36.5	3.0	**39.5**	**25.0**	**2.00**	**450**	**420.6**	2.56	0.16	10.16
STORM SEWER LEG	2		1		0.02	0.90		0.018	4.446	87.3			1077.6		**1077.6**							13.90
														0.0	**0.0**							
													1077.6	50.3	**1127.9**	**12.5**	**0.40**	**1050**	**1801.7**	2.02	0.10	14.01
SEE EXTERNAL STORM DRAINAGE AREA AND OFFSITE DITCHING PLAN DWG 8 of 8										10 yr. intens.		100 yr. intens.	10 yr. flow	100 yr. flow	overland NET							10.00
LIMEBANK AREA # 1	FUT.		FUT.		0.52	0.70		0.364	0.364	122.1		174.1	123.5	176.0	**52.5**	**120.0**	**0.30**	**450**	**162.9**	0.99	2.02	10.00
LIMEBANK AREA # 2	FUT.		FUT.		0.52	0.70		0.364	0.728	110.9		158.1	224.2	319.7	**95.6**	**120.0**	**0.30**	**600**	**350.8**	1.20	1.66	12.02
LIMEBANK AREA # 3	FUT.		FUT.		0.52	0.70		0.364	1.092	103.2		147.3	312.9	446.6	**133.7**	**120.0**	**0.30**	**675**	**480.3**	1.30	1.54	13.68
LIMEBANK AREA # 4	FUT.		FUT.		0.52	0.70		0.364	1.456	97.0		138.6	392.3	560.4	**168.1**	**120.0**	**0.30**	**675**	**480.3**	1.30	1.54	15.22
LIMEBANK AREA # 5	FUT.		FUT.		0.52	0.70		0.364	1.820	91.7		131.0	463.2	662.3	**199.1**	**120.0**	**0.30**	**750**	**636.1**	1.39	1.43	16.76
LIMEBANK AREA # 6	FUT.		FUT.		0.52	0.70		0.364	2.184	87.2		124.8	528.8	756.8	**227.9**	**120.0**	**0.30**	**750**	**636.1**	1.39	1.43	18.19
LIMEBANK AREA # 7	FUT.		FUT.		0.52	0.70		0.364	2.548	83.2		119.2	588.7	843.2	**254.5**	**120.0**	**0.30**	**825**	**820.2**	1.49	1.35	19.62
LIMEBANK AREA # 8	FUT.		FUT.		0.52	0.70		0.364	2.912	79.8		114.4	645.3	925.1	**279.8**	**120.0**	**0.30**	**825**	**820.2**	1.49	1.35	20.97

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LIMITED
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T_c = time of concentration	B= 6.053
	C= 0.814

Design Equations

$$I = \frac{A}{(t + B)^C}$$

$$Q = 2.78 \times A \times C \times I$$

Prepared by: _____

Checked by: _____

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STREET NAME	From MH	Invert (m)	To MH	Invert (m)	Area increment Road/Other ha.	Coef.	BLDG No of Drains	Sewer AC Leg	Cumul.	Intensity I - 5yr (mm/hr)	I - 25yr (mm/hr)	I -100yr (mm/hr)	Flow - Q Road (l/s)	BLDG (l/s)	Total (l/s)	PROPOSED SEWER Length (m)	Grade (%)	Dia (mm)	Capac. (l/s)	Veloc. (m/s)	Time (minutes) Leg	elapsed
LIMEBANK AREA # 9	FUT.		FUT.		0.52	0.70		0.364	3.276	76.7		110.0	697.7	1001.1	**303.4**	**120.0**	**0.30**	**825**	**820.2**	1.49	1.35	22.31
LIMEBANK AREA # 10	FUT.		FUT.		0.52	0.70		0.364	3.640	73.8		106.1	746.4	1072.0	**325.6**	**120.0**	**0.30**	**900**	**1034.4**	1.58	1.27	23.66
LIMEBANK AREA # 11	FUT.		FUT.		0.52	0.70		0.364	4.004	71.4		102.6	793.4	1140.5	**347.1**	**120.0**	**0.30**	**900**	**1034.4**	1.58	1.27	24.93
LIMEBANK AREA # 12	FUT.		FUT.		0.52	0.70		0.364	4.368	69.1		99.3	837.6	1205.1	**367.5**	**120.0**	**0.30**	**900**	**1034.4**	1.58	1.27	26.20
LIMEBANK AREA # 13	FUT.		FUT.		0.35	0.70		0.245	4.613	66.9		96.3	857.1	1234.2	**377.1**	**75.0**	**0.30**	**900**	**1034.4**	1.58	0.79	27.47
LIMEBANK AREA # 14	FUT.		FUT.		0.35	0.70		0.245	4.858	65.6		94.6	885.6	1275.8	**390.3**	**75.0**	**0.30**	**900**	**1034.4**	1.58	0.79	28.26
TOWN SQUARE BLVD. AREA # 15	FUT.		FUT.		1.40	0.75		1.050	1.050	122.1		174.1	356.1	507.7	**151.5**	**287.0**	**0.30**	**675**	**480.3**	1.30	3.68	10.00 10.00
LIMEBANK AREA # 16	FUT.		FUT.		0.35	0.70		0.245	6.153	64.4		92.9	1100.9	1586.9	**486.0**	**75.0**	**0.30**	**975**	**1280.5**	1.66	0.75	29.06
LIMEBANK AREA # 17	FUT.		FUT.		0.52	0.70		0.364	6.517	63.3		91.3	1146.0	1652.7	**506.7**	**120.0**	**0.30**	**1050**	**1560.3**	1.75	1.15	29.81
LIMEBANK AREA # 18	FUT.		FUT.		0.49	0.70		0.343	6.860	61.7		89.1	1175.7	1696.9	**521.2**	**120.0**	**0.30**	**1050**	**1560.3**	1.75	1.15	30.95
										10 yr. intens.												
intersection E.A.-Limebank (add 200 l/s)	DICB		36		0.03	0.50		0.015	0.015	271.6			11.3	**721.2**	11.3 721.2							
													11.3	**721.2**	**732.5**	**3.0**	**2.00**	**675**	**1240.2**	3.36	0.01	10.00
intersection E.A.-Limebank at Ex. Culvert	36		35		0.00	0.75		0.001	0.016	271.6			11.9	**721.2**	11.9 721.2							
													11.9	**721.2**	**733.0**	**31.0**	**0.18**	**900**	**801.3**	1.22	0.42	10.01
intersection E.A.-Limebank at Ex. Culvert	35		34		0.00	0.75		0.001	0.017	271.6			12.4	**721.2**	12.4 721.2							

CITY OF OTTAWA

STORM SEWER DESIGN SHEET

URBAN ECOSYSTEMS
L I M I T E D
7050 WESTON ROAD, SUITE 705
WOODBRIDGE , ONTARIO L4L 8G7
TELEPHONE: (905)856-0629
FAX: (905)856-0698

Project / Subdivision **RIVERSIDE - MORGUARD**

Consulting Engineer **Urban Ecosystems Limited**

Project No.: **12007**

Design Parameters (5 Year Storm)

A = drainage area (ha)	T_{ini} = 10 min
C = runoff coefficient	A= 998.071
T_c = time of concentration	B= 6.053
	C= 0.814

Design Equations

$$i = \frac{A}{(t + B)^C}$$

$$Q = 2.78 \times A \times C \times I$$

Prepared by: _____

Checked by: _____

Last Revised: _____

STREET NAME	From MH	Invert (m)	To MH	Invert (m)	Area increment Road/Other ha.	Coef.	BLDG No of Drains	Sewer AC Leg	Cumul.	Intensity I - 5yr (mm/hr)	I - 25yr (mm/hr)	I -100yr (mm/hr)	Flow - Q Road (l/s)	BLDG (l/s)	Total (l/s)	PROPOSED SEWER Length (m)	Grade (%)	Dia (mm)	Capac. (l/s)	Veloc. (m/s)	Time (minutes) Leg	elapsed
													12.4	721.2	733.6	96.0	0.18	900	801.3	1.22	1.31	10.44
Intersection E.A.-Limebank at Ex. Culvert	34		38		0.03	0.95		0.029	0.045	271.6			33.9		33.9							
														721.2	721.2							
													33.9	721.2	755.1	76.0	0.18	900	801.3	1.22	1.04	11.75
Ex. 1200 diameter across E.A.	MH.		MH.		0.00	0.75		0.001	0.046	271.6			34.5		34.5							
														721.2	721.2							
													34.5	721.2	755.7	55.0	0.20	1200	1819.0	1.56	0.59	12.79

3.3 Major Stormwater Conveyance From The Site

All storms, up to and including the 1 in 100 year event, will be controlled on site, to limit the storm discharge to a rate, not to exceed 203 l/s/ha or a total maximum of 1,326 l/s.

During severe storms, exceeding the 1 in 100 year event, or in the occurrence of a catastrophic storm sewer system failure, overland flow routes will be provided from the Subject Property following the drive aisles. The overland flow will be routed to Earl Armstrong Road and Ceremonial Road, ultimately discharging to Mosquito Creek.

As discussed in the Design Report for Riverside South Community, Phase 6, by J.L. Richards & Associates Ltd., Limebank Road and Earl Armstrong Road have been designed with roadside ditches to convey overland flow. It is the intention that, this system will be replaced with storm sewers.

It is proposed that the existing road side ditches along Limebank Road and Earl Armstrong Road will be eliminated. All drainage east of Limebank Road, south of Town Square Boulevard, has been diverted to the storm sewers on Ceremonial Road. Drainage from the Town Square Boulevard right of way will be diverted to a temporary ditch inlet catchbasin connected to the Limebank Road storm sewer system.

As the urbanization of Limebank Road will continue, the storm sewer system will be extended to the south. The storm sewers will be designed to carry the 1 in 10 storm. Excess flows, up to and including the 1 in 100 year storm will be conveyed overland along the road.

3.3 Major Stormwater Conveyance From The Site (cont'd)

We have calculated the excess flow from Limebank Road at the intersection with Earl Armstrong Road to be approximately 512/sec. This is a conservative estimate as it does not take into account surface ponding. Furthermore, this flow will be split between the east and west side of Limebank Road.

It is proposed that the excess flow will be diverted off Limebank Road at a low point located approximately 80m south of Earl Armstrong Road and flow overland to a proposed ditch inlet catchbasin approximately 40m south of the intersection.

The excess flow from Limebank Road, together with approximately 200 l/s from the culvert crossing Limebank Road, will be conveyed through a 900 mm diameter storm sewers to the existing 1200 mm diameter culvert crossing Earl Armstrong Road. As shown on the Storm Sewer Design sheets, the total estimated flow is 721.2 l/s and the capacity of the 900 mm diameter storm sewer is 801.3 l/s.

It should also be noted that, due to the relatively shallow storm culvert crossing Earl Armstrong Road, the proposed storm sewers will have to be insulated as shown in Thermal Pipe Insulation Table on drawing 2 of 8, Servicing Plan.

3. 4 Tributary No. 14

Approximately 68.38 ha of upstream lands to the south, were draining through the Subject Property via Tributary No. 14. Ultimately, the storm runoff from this area will be controlled as established through the Riverside South Community Master Drainage Area Plan. The storm drainage will be collected in local storm sewers and conveyed to the sewers on Limebank Road, ultimately discharging to Riverside South Stormwater Management Pond No. 2.

3. 4 Tributary No. 14 (cont'd)

The peak flows from the upstream 68.38 ha of undeveloped lands, based on pasture lands and an estimated time to peak of 1.73 hours, were calculated to be 1.719 m^3/s. It is noted that this flow is significantly higher than what was reported in the Riverside South Community Master Drainage Plan, primarily due to a shorter time to peak.

Copies of the Site Grading Plan, Drawing 1 of 8 and the External Storm Drainage Area Plan, Drawing 8 of 8, are included in the rear pocket of this Report. The outputs of the time to peak and peak flow calculations are attached in Appendix 'C'.

In the interim, a temporary interceptor swale has been constructed immediately south of future Town Square Boulevard. The swale is conveying all storm flows from the undeveloped upstream lands, discharging to the storm sewers on Ceremonial Road.

Drainage from the Town Square Boulevard right of way, will be intercepted by a temporary swale, located immediately south of the Subject Property. The swale will flow westerly, discharging to a temporary inlet catchbaisn to be located on the east side of Limebank Road and connected to the Limebank Road storm sewer systems.

Rideau Valley Conservation Authority has confirmed that Tributary no. 14 is approved to be enclosed. Prior to commencing any construction on the Subject Property, including grading or any site alteration works, Morguard Investments Limited will file an application under Ontario Regulation 174/06 Section 28 with Rideau Valley Conservation Authority, for a Permit to enclose/alter Tributary No. 14.

4.0 STORMWATER MANAGEMENT

4.1 Water Quantity

Development of the Subject Property will require onsite stormwater runoff control for all storms up to and including the 1 in 100 year event. Target discharge rates for lands contributing to Riverside South Stormwater Management Pond No. 2 were identified in the Riverside South Community Master Drainage Plan Update, by Stantec, dated September 2008. The Design Report for Riverside South Community, Phase 6 by J.L. Richards & Associates Limited, dated January 2012, specified that the discharge rate from the Subject Property shall not exceed 203 l/s/ha during all storms up to and including the 1 in 100 year event. All excess runoff shall be detained on site.

As illustrated in the Hydrologic Evaluation Calculations for the proposed development, attached in Appendix A, the water quantity targets will be achieved. The storm discharge from the site will be controlled using a 450 mm diameter orifice in Control Manhole No. 01. During a 1 in 100 year storm event, onsite detention will be achieved through roof top storage of 702 m^3, parking lot storage of 1,643 m^3 and underground storage of 361 m^3, as summarized on Drawing 3 of 8, SWM Drainage Plan.

The Hydrologic Evaluation also show that during more frequent storms, up to and including the 1 in 5 year event, no surface storage will be required, save and accept local ponding in the loading dock area of Building A.

4.2 Water Quality

Storm runoff from the Subject Property will be directed to the 1800 mm dia. storm sewer on Ceremonial Road. This storm sewer connects to the storm sewers on Earl Armstrong Road and Limebank Road, discharging to Stormwater Management Pond No. 2, which provides for water quality controls. The Riverside South retail centre development is therefore not required to include onsite stormwater quality features.

5.0 WATER SUPPLY

5.1 Existing Water Distribution System

There are existing 600 mm.dia. watermains on Limebank Road and Earl Armstrong Road in front of the Subject Property. A 200 mm diameter watermain has been installed on Ceremonial Road from Earl Armstrong Road to Town Square Blvd., to service the Riverside South Community, Phase 6. Two 200mm diam. watermain connections have been installed on Ceremonial Road to service the Subject Property

At the time of up-dating this report, the detailed engineering design by J.L. Richards & Associates Ltd. for Ceremonial Road has been approved by the City of Ottawa. The road has been constructed up to and including base asphalt, and installation of utilities is pending. The approved engineering design of Ceremonial Road has been reflected on the current Site Plan and site engineering drawings.

The Design Report for the Riverside South Community, Phase 6 by J.L. Richards & Associates Ltd., dated January 2012 includes a Hydrological Analysis based on preliminary hydrologic boundary conditions provided by the City of Ottawa. The analysis demonstrate that during all water demand conditions, i.e. peek hourly demand, fire flow during maximum day demand and maximum pressure under zero demand, the water distribution system will meet the City of Ottawa and the Ministry of Environment Design Guidelines for a water distribution system.

5.2 Proposed Water Distribution System

The water demand for the Subject Property was considered in the Hydrological Analysis for Riverside South Community Phase 6. All commercial buildings within the Town Square Retail Centre will be sprinkled. **Table 3**, Water Demand is a preliminary summary of the domestic and sprinkler water demand.

5.2 Proposed Water Distribution System (cont'd)

It is proposed that the Subject Property will be serviced with two 200 mm.dia connections to the proposed 200 mm dia. watermain on Ceremonial Road. The watermain will be looped through the site and individual connections will be provided to each of the proposed buildings. A copy of the Servicing Plan has been included in rear pocket of this report.

Table 3 Water Demand

Building	Gross Floor Area (m^2)	Sprinkler Water Demand (l/s)	Domestic Water Demand (l/s)
A	5,388	65	10
B	557	36	4
C	1394	47	6
D	562	36	4
E	4,174	36	9
F	2,090	36	6
G	465	36	4
H	1,040	36	4
I	862	47	5
J	1,300	36	6
K	633	36	4
L	562	36	4
M	510	36	4

Using current boundary conditions provided by the City of Ottawa, a Hydrologic Analysis was performed on the watermain within the Riverside South Retail Centre site. The analysis show that during all water demand conditions, the water distribution system will meet the City of Ottawa design guidelines, The Hydrologic Analysis Model outputs are included in Appendix 'D'.

A Hydrological Water Analysis was also performed by J.L. Richards & Associates Ltd., in connection with the design of Ceremonial Road. That analysis confirmed that the water distribution system will meet the City of Ottawa design guidelines.

6.0 GRADING AND EROSION AND SEDIMENT CONTROL

6.1 Grading

The Subject Property is relatively flat, bisected by an intermittent water course, generally known by Tributary No. 14, draining to the north to a 1200 mm.dia culvert crossing Earl Armstrong Road. The Geotechnical Investigation Report did not identify an unusual or extraordinary soil or ground water conditions.

It is anticipated that the site will be rough graded and that underground services and utilities will be installed using conventional construction methods. **Table 4**, Pavement Structure is a summary of the recommendations provided in the Geotechnical Investigation Report.

Table 4 Pavement Structure

Material	Heavy Duty Pavement (mm)	Light Duty Pavement (mm)
HL-3 Asphalt	40	50
Hl-8 Asphalt	50	---
Granular A	150	150
Granular B	450	400

A copy of the Grading Plan has been included in the rear pocket of this report.

6.2 Erosion and Sediment Control

Appropriate erosion and sediment control measures will be installed prior to commencing any construction on site. The erosion and sediment control features will include silt control fencing, site access mud mat, check dams and other erosion and sediment features as required. During construction the silt and erosion control features will be inspected frequently and additional measure will be implemented as appropriate. A copy of the Erosion and Sediment Control Plan is included the rear pocket of this report.

7.0 SUMMARY AND CONCLUSIONS

The servicing Design Brief and Stormwater Management Report, including the ac companying engineering drawings, have been prepared to illustrate how Riverside South Retail Centre, having a municipal address of 1420 Earl Armstrong Road, will be provided with municipal services. The report and engineering drawings conform to higher level studies and reports, including the Riverside South Community Master Drainage Plan Update, Final Report, by Stantec dated September 30, 2008 and a Design Report for Riverside South Community, Phase 6 by J.L. Richards & Associates Ltd, dated January 2012.

The Servicing Design Brief confirms that the existing municipal infrastructural surrounding the Subject Property can adequately support the proposed development with sanitary sewerage, storm drainage and water supply. The Servicing Design Brief also confirm how the post development storm runoff from the Subject Property will be controlled to the maximum allowable release rate as established through the Riverside South Community Master Drainage Plan by Stantec and the Design Report for Riverside South Community, Phase 6 by J.L. Richards & Associates Ltd.

A copy of the City of Ottawa Development Servicing Study Checklist is included in Appendix B.

Respectfully Submitted,

Orjan B. Carlson

Rosario Sacco, P.Eng.

Appendix ‘A’

Urban Ecosystems Limited

7050 WESTON ROAD, SUITE 705

WOODBRIDGE, ONTARIO L4L 8G7

uel@urbanecosystems.com

t. (905)856-0629

f. (905)856-0698

STORMWATER MANAGEMENT REPORT

TOWN SQUARE CENTRE (BLDGS A TO K)
RIVERSIDE SOUTH

1420 EARL ARMSTRONG ROAD

CITY OF OTTAWA

File No: 12007.100

DATE: APRIL 9,2014
revised JULY 20, 2014
revised JULY 20, 2014
revised January, 2016
revised November 30, 2016

DATE: APRIL 9,2014
revised July 20,2014
revised November 30, 2016

Urban Ecosystems Limited
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
uel@urbanecosystems.com
t. (905)856-0629
f. (905)856-0698

STORMWATER MANAGEMENT REPORT

TOWN SQUARE CENTRE (BLDGS A TO K)
RIVERSIDE SOUTH
1420 EARL ARMSTRONG ROAD
CITY OF OTTAWA
File No: 12007.100

1.0 INTRODUCTION

The purpose of this report is to provide recommended grading and drainage proposals, with the objective to control storm runoff from the above proposed commercial development. The report provides an analysis of the overall site bounded by Earl Armstrong Road to the north, Limebank Road to the west, Ceremonial Road to the east and future Town Square Blvd. to the south. The property is located within in the Riverside South Community, Phase 6, City of Ottawa. The Report also addresses Tributary No. 14, an external drainage area south of the subject property. Details are included in Appendix B to this Report.

In September 2008, Stantec prepared a report entitled, Riverside South Community Master Drainage Plan Update, Final Report. That study established the overall storm drainage strategy for the Riverside South Community and determined parameters for future developments within the community plan.

In January 2012, J.L. Richards & Associates Limited prepared a Design Report for Riverside South Community, Phase 6. That study provided further details and design parameters with respect to storm drainage of future developments within the study area.

The Stantec and the J.L. Richards studies established maximum allowable runoff from development blocks within the Riverside South Community area, inlcuding for the Subject Property. On site detention of excess runoff from the Subject Property will be required in order not to exceed the allowable site release rate.

The intent of this hydrologic evaluation is to outline the proposed stormwater management necessary to satisfy the site storage requirements produced by the occurance of the 100 year return frequency design storm.

The maximum volume of storm runoff for the site was determined using the modified rational method MRM, as outlined in the American Public Works Association Publication title Practice in Detention of Urban Stormwater Runoff.

Copies of the Proposed Site Plan, Site Grading Plan, Servicing Plan and the SWM Drainage Plan are included in the rear pockets of this Report. The rainfall intensities are derived from the City of Ottawa IDF curves.

2.0 ALLOWABLE SITE RUNOFF

The Master Drainage Study by Stantec and the Design Report by J.L. Richards established that the maximum allowable post development storm runoff from the subject property shall not exceed 203 L/s/ha for all storms up to and including the 1:100 year event.

All excess runoff shall be detained on site through surface, roof and underground storage.

ALLOWABLE RELEASE RATE

Site Area = 6.54 ha. x 203 L/s/ha = 1327 L/s

3.0 POST-DEVELOPMENT SITE CONDITION

	unit	Total	System A
Total Site Area	(m^2)	65367	65367
Pavement Area	(m^2)	48861	48861
Landscaped Area	(m^2)	0	0
Building Area	(m^2)	10136	10136
Uncontrolled Pavement Area	(m^2)	413	413
Uncontrolled Landscape Area	(m^2)	5957	5957

Urban Ecosystems Limited
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
uel@urbanecosystems.com
t. (905)856-0629
f. (905)856-0698

4.0 EVALUATION OF SITE RUNOFF - SYSTEM A

4.1 Roof Top Storage

Proposed roofs to be equipped with control flow drains.

Model ID: Zurn Control Flo Z-105-5
Weir Rating 6 USGPM per inch head (0.15 L/s/cm head)
Quantity: One weir per hopper. Based on manufacturers table, one hopper drains a maximum roof area of 465m^2 with a maximum head of 10.16 cm

For this building 33 weirs

Total roof outflow is calculated as:

Q_{roof} = 33 x 0.15 L/s/cm hd. x 10 cm head
= 49.5 L/s

From Appendix - Table 1 maximum storage volumes:

required = 404.9 m^3
available = 686.5 m^3

As shown, the available storage volume for the roof can easily contain the respective required maximum roof storage volumes.

Note: Peak rate of runoff, eg: Q = Rain (L/s)
= 0.95 x 1.0136 x mm/hr x 2.778

4.2 Parking Lot Storage and Release Rate

Note: 100 year runoff coefficients:

pavements - C_{100} = 1.00
landscaped - C_{100} = 0.25 x 0.5 + 0.5 = 0.625

4.2.1 The composite runoff coefficients for the site, excluding building, are calculated as follows:

$$C_c = \frac{48861 \times 1.0 + 0 \times 0.625}{48861 + 0}$$

C_c = 1.00

Urban Ecosystems Limited
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
uel@urbanecosystems.com
t. (905)856-0629
f. (905)856-0698

4.2.2 Release rate calculations are based on orifice flow formula:

$Q = C \times A \times (2gH)^{1/2}$
where,
Q = discharge in m^3/s
C = shape coefficient, 0.62 for orifice plate, dimensionless
A = area of orifice in m^2
g = acceleration due to gravity in m/s^2
H = head from centre of orifice to ponding level in m

Orifice Plate at Existing Storm Manhole

max. ponding level	(m)	92.5
invert of orifice	(m)	88.15
head	(m)	4.125
diameter of orifice	(mm)	450
Q, orifice discharge	(l/s)	887.1

4.2.3 Using the Modified Rational Method, the maximum storage volume required on the parking lot was calculated. As shown in Appendix A, Table 2 and dwg 3 of 8,SWM drainage Plan, Urban Ecosystems Limited Project No. 12007.100 The required pond volume was calculated to b 993 m^3

Available site storage:

			Surface Pavement Storage=	1643.0	m^3
12.5	m -	1050	dia. stm =	10.8	m^3
81	m -	900	dia. stm =	51.5	m^3
87.5	m -	750	dia. stm =	38.7	m^3
91	m -	675	dia. stm =	32.6	m^3
135	m -	600	dia. stm =	38.2	m^3
174	m -	525	dia. stm =	37.7	m^3
137	m -	450	dia. stm =	21.8	m^3
37.5	m -	375	dia. stm =	4.1	m^3
299.5	m -	300	dia. stm =	21.2	m^3
113.5	m -	250	dia. stm =	5.6	m^3
0	m -	200	dia. stm =	0.0	m^3
2		2400 mm dia mh(@	2 m avg depth) =	18.1	m^3
2		1800 mm dia mh(@	2 m avg depth) =	10.2	m^3
8		1500 mm dia mh(@	2 m avg depth) =	28.3	m^3
19		1200 mm dia mh(@	2 m avg depth) =	43.0	m^3
			Manhole / Pipe Storage=	361.6	m^3

Total site storage = 2004.6 m^3

Required Storage	m^3	993
Available Storage	m^3	2005

Therefore, there is sufficient storage in the parking lot to self contain the drainage and control the 100 year runoff to the allowable rate within the site.

Note:Peak runoff rate, Q = R A I N + Qroof
1.00 x 4.8861 x I x 2.778 + 50

Note:
Table 3 indicates that the uncontrolled runoff will total 205.2 l/s
(Landscape = 5957 m^2 and pavement = 413 m^2)

Urban Ecosystems Limited
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
uel@urbanecosystems.com
t. (905)856-0629
f. (905)856-0698

3.0 WATER QUALITY CONTROL

Storm runoff from the subject property will be directed to a proposed 1800 mm dia storm sewer to be constructed on Collector Road 'D'. This storm sewer connects to the existing storm sewers on Earl Armstrong Road and Limebank Road discharging to Riverside South Stormwater Management Pond No. 2, which provides for water quality controls. The Riverside South retail centre development is therefore not required to include onsite stormwater quality features.

7.0 SUMMARY

The following table summarizes the results presented in this report.

SYSTEM		100 YR STM	5 YR STM
orifice size	mm	450	450
total site release rate	L/s	1092.3	908.1
allowable site release rate	L/s	1327.0	1327.0
maximum ponding elevation	m	92.5	92.2
catchbasin elevation	m	92.2	92.2
ponding depth	m	0.3	0
required storage	m^3	993	281
available storage	m^3	2005	362

Respectfully submitted,

Urban Ecosystems Limited

Rosario Sacco, P. Eng. DATED revised November 30, 2016

Urban Ecosystems Limited
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
uel@urbanecosystems.com
t. (905)856-0629
f. (905)856-0698

APPENDIX A

PROJECT: TOWN SQUARE CENTRE (BLDGS A TO K)
RIVERSIDE SOUTH
MUNICIPALITY: CITY OF OTTAWA
FILE NO.: 12007.100
Date: revised November 30, 2016
LOCATION: 1420 EARL ARMSTRONG ROAD

Urban Ecosystems Limited
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
uei@urbanecosystems.com
t. (905)856-0629
f. (905)856-0698

SITE STORM WATER MANAGEMENT

SUMMARY

	Total	
Site area (sq.m) :	65367	65367
Controlled Pavement area (sq.m) :	48861	48861
Controlled Landscaped area (sq.m) :	0	0
BLDGs B,C,D,E,F,G,H,I,J,K Roof area (sq.m) :	10136	10136
Uncontrolled Pavement area (sq.m.) :	413	413
Uncontrolled Landscape area (sq.m.) :	5957	5957

Includes Building A

SYSTEM A

CONTROLLED	Orifice release rate (l/sec) :	887.1
UNCONTROLLED	Site release rate (l/sec) :	205.2
TOTAL	Site release rate (l/sec) :	1092.3
ALLOWABLE	Site release rate (l/sec) :	1327.0

PROJECT: RIVERSIDE SOUTH
MUNICIPALITY: CITY OF OTTAWA
JOB NO.: 12007.100
DATE: revised November 30, 2016
LOCATION: 1420 EARL ARMSTRONG ROAD

URBAN ECOSYSTEMS LIMITED

SYSTEM A 100 YR STORM

SITE STORM WATER MANAGEMENT

SITE PLAN CHARACTERISTICS - S Y S T E M S A

Site area (sq.m) :	65367	Pavement coefficient :	1.0
Controlled Pavement area (sq.m) :	48861	Landscape coefficient :	0.625
Controlled Landscaped area (sq.m) :	0	Roof area coefficient :	0.95
Proposed Roof area (sq.m) :	10136	Rainfall intensity (mm/hr) :	
		I 2yr =	732.951/(6.199+t)^.810
Uncontrolled Pavement area (sq.m.) :	413	I 5yr =	998.071/(6.053+t)^.814
Uncontrolled Landscaped area (sq.m.) :	5957	I 100yr =	1735.688/(6.014+t)^.820

ROOF DRAINAGE CHARACTERISTICS

Total roof area (sq. m) :	10136	Weir rating (l/sec) :	0.15
Total number of roof hoppers :	33	Weir area rating (sq. m.) :	465
Total number of weirs :	33	Maximum head (cm) :	10.16
Max. sloped roof depth (mm) :	50.8	Peak roof outflow rate (l/sec) :	50.3
Max. sloped roof storage (cu.m) :	171.64		
Max. parapit roof storage (cu.m) :	514.91	33 hoppers @ 1 weir =	33
		hoppers @ 2 weir =	0
		Total 33 hoppers	33 weir

TABLE 1 - ROOF DRAINAGE SYSTEM

	1st ITERATION					2nd ITERATION						3rd ITERATION			
Time (min.)	Rainfall Intensity I (mm/hr)	Peak rate of runoff Q (l/sec)	Peak Runoff volume (cu.m.)	Peak roof outflow volume (cu.m)	Required storage volume (cu.m)	Volume in sloped roof areas (cu.m)	Volume contained by roof parapit (cu.m)	Total head on roof hoppers (cm)	Roof outflow rate (l/sec)	Roof outflow volume (cu.m)	Required storage volume (cu.m)	Total head on roof hoppers (cm)	Roof outflow volume (cu.m)	Required storage volume (cu.m)	
5	242.70	649.23	194.77	15.09	179.68	171.64	8.05	5.16	25.54	7.66	187.11	5.23	7.77	187.00	
10	178.56	477.64	286.59	30.18	256.41	171.64	84.77	5.92	29.29	17.57	269.01	6.04	17.94	268.65	
15	142.89	382.24	344.02	45.26	298.75	171.64	127.12	6.33	31.35	28.22	315.80	6.50	28.97	315.05	
20	119.95	320.87	385.04	60.35	324.69	171.64	153.05	6.59	32.62	39.14	345.90	6.80	40.39	344.65	
25	103.85	277.79	416.69	75.44	341.25	171.64	169.61	6.75	33.43	50.14	366.54	7.00	52.00	364.69	
30	91.87	245.75	442.34	90.53	351.82	171.64	180.18	6.86	33.95	61.10	381.24	7.15	63.69	378.66	
35	82.58	220.90	463.88	105.61	358.27	171.64	186.63	6.92	34.26	71.95	391.94	7.25	75.40	388.48	
40	75.15	201.01	482.43	120.70	361.73	171.64	190.09	6.96	34.43	82.63	399.80	7.33	87.09	395.34	
45	69.05	184.71	498.72	135.79	362.93	171.64	191.29	6.97	34.49	93.12	405.60	7.39	98.74	399.97	
50	63.95	171.08	513.23	150.88	362.35	171.64	190.72	6.96	34.46	103.38	409.85	7.43	110.34	402.89	
55	59.62	159.49	526.33	165.96	360.36	171.64	188.73	6.94	34.36	113.40	412.93	7.46	121.87	404.46	
60	55.89	149.52	538.26	181.05	357.21	171.64	185.58	6.91	34.21	123.15	415.11	7.48	133.33	404.93	<------
65	52.65	140.83	549.23	196.14	353.09	171.64	181.46	6.87	34.01	132.63	416.60	7.50	144.73	404.51	
70	49.79	133.19	559.38	211.23	348.16	171.64	176.52	6.82	33.77	141.82	417.57	7.51	156.06	403.33	
75	47.26	126.41	568.84	226.31	342.52	171.64	170.89	6.77	33.49	150.71	418.13	7.51	167.33	401.51	
80	44.99	120.35	577.68	241.40	336.28	171.64	164.64	6.70	33.19	159.30	418.39	7.51	178.54	399.14	
85	42.95	114.90	586.00	256.49	329.51	171.64	157.87	6.64	32.86	167.56	418.43	7.51	189.71	396.28	
90	41.11	109.97	593.85	271.58	322.27	171.64	150.63	6.57	32.50	175.51	418.33	7.51	200.85	393.00	
95	39.43	105.49	601.28	286.66	314.61	171.64	142.98	6.49	32.13	183.13	418.15	7.51	211.95	389.33	
100	37.90	101.39	608.34	301.75	306.59	171.64	134.95	6.41	31.74	190.42	417.92	7.51	223.04	385.30	
105	36.50	97.63	615.07	316.84	298.23	171.64	126.59	6.33	31.33	197.37	417.70	7.51	234.13	380.94	
110	35.20	94.17	621.50	331.93	289.57	171.64	117.93	6.24	30.91	203.98	417.52	7.51	245.22	376.28	
115	34.01	90.96	627.65	347.01	280.64	171.64	109.00	6.16	30.47	210.24	417.41	7.50	256.33	371.32	
120	32.89	87.99	633.55	362.10	271.45	171.64	99.81	6.06	30.02	216.15	417.41	7.50	267.47	366.09	
125	31.86	85.23	639.23	377.19	262.04	171.64	90.40	5.97	29.56	221.71	417.52	7.51	278.65	360.57	
130	30.90	82.65	644.69	392.28	252.41	171.64	80.77	5.88	29.09	226.91	417.78	7.51	289.90	354.79	

Qroof= R A I N
= 2.675 x I (l / sec)

Peak roof outflow rate =
no. of hoppers x weir rating x max. head
= 50.3 l/sec

Peak roof outflow volume =
= 50.3 x time x 60/1000 cu. m.

Roof outflow rate =
head x weir rating x no. of hoppers
= head x 4.95 l/sec

Required max. roof storage (cu. m.) : 404.9
Available roof storage (cu. m.) : 686.5

PROJECT: RIVERSIDE SOUTH
JOB NO.: 12007.100

URBAN ECOSYSTEMS
LIMITED

SYSTEM A 100 YR STORM
SITE STORM WATER MANAGEMENT

SITE CHARACTERISTICS

Controlled Pavement area (sq.m) :	48861
Controlled Landscaped area (sq.m) :	0
Total area - excl. Bldg (sq.m) :	48861
Composite runoff coefficent :	1.00

OUTLET CHARACTERISTICS

Orifice diameter (mm) :	450
Area of orifice (sq.m) :	0.15904
Orifice coefficient :	0.62
Max. ponding elev. :	92.50
Catchbasin elev. :	92.20
Ponding depth. :	0.30
Orifice invert :	88.15
Orifice center line elev. :	88.375
Head (m) :	4.125
Orifice release rate (l/sec) :	887.1

TABLE 2 - System Storage

Time (min.)	Intensity I (mm/hr)	Peak rate of runoff Q (l/sec)	Runoff volume (cu.m)	Orifice Outflow volume (cu.m)	Required storage volume (cu.m.)	
10	178.56	2473.98	1484.39	532.25	952.13	
15	142.89	1989.88	1790.89	798.38	992.51	<<------
20	119.95	1678.45	2014.14	1064.51	949.63	
25	103.85	1459.87	2189.80	1330.64	859.17	

Required site storage (cu. m) : 993
Available site storage (cu. m) : 2005
SEE DRAWING SP-1

Qsite= R A I N + Qroof
= 13.574 x I + 50.3 l/sec

TABLE 3 - Uncontrolled Runoff

Time (min.)	Intensity I (mm/hr)	Peak rate of runoff Q (l/sec)	
10	178.56	205.17	<<------
15	142.89	164.19	
20	119.95	137.82	

Peak runoff (L/sec) : 205.2

UNCONTROLLED SITE CHARACTERISTICS

Uncontrolled Pavement area (sq.m.) :	413
controlled Landscaped area (sq.m.) :	5957
Total area (sq.m) :	6370
Composite runoff coefficent :	0.649

SYSTEM A 100 YR STORM
SITE SUMMARY

Orifice release rate (l/sec) :	887.1
Uncontrolled release rate (l/sec) :	205.2
Total site release rate (l/sec) :	**1092.3**
Allowable site release rate (l/sec) :	**1327.0**

PROJECT: RIVERSIDE SOUTH
MUNICIPALITY: CITY OF OTTAWA
JOB NO.: 12007.100
DATE: revised November 30, 2016
LOCATION: 1420 EARL ARMSTRONG ROAD

URBAN ECOSYSTEMS LIMITED

SYSTEM A 5 YR STORM

SITE STORM WATER MANAGEMENT

SITE PLAN CHARACTERISTICS - S Y S T E M S A

Site area (sq.m) :	65367	Pavement coefficient :	0.9
Controlled Pavement area (sq.m) :	48861	Landscape coefficient :	0.25
Controlled Landscaped area (sq.m) :	0	Roof area coefficient :	0.95
Proposed Roof area (sq.m) :	10136	Rainfall intensity (mm/hr) :	
		I 2yr =	732.951/(6.199+t)^.810
Uncontrolled Pavement area (sq.m.) :	413	I 5yr =	998.071/(6.053+t)^.814
Uncontrolled Landscaped area (sq.m.) :	5957	I 100yr =	1735.688/(6.014+t)^.820

ROOF DRAINAGE CHARACTERISTICS

Total roof area (sq. m) :	10136	Weir rating (l/sec) :	0.15
Total number of roof hoppers :	33	Weir area rating (sq. m.) :	465
Total number of weirs :	33	Maximum head (cm) :	10.16
Max. sloped roof depth (mm) :	50.8	Peak roof outflow rate (l/sec) :	50.3
Max. sloped roof storage (cu.m) :	171.64		
Max. parapit roof storage (cu.m) :	514.91	33 hoppers @ 1 weir =	33
		0 hoppers @ 2 weir =	0
		Total 33 hoppers	33 weir

TABLE 1 - ROOF DRAINAGE SYSTEM

	1st ITERATION					2nd ITERATION						3rd ITERATION			
Time (min.)	Rainfall Intensity I (mm/hr)	Peak rate of runoff Q (l/sec)	Peak Runoff volume (cu.m.)	Peak roof outflow volume (cu.m)	Required storage volume (cu.m)	Volume in sloped roof areas (cu.m)	Volume contained by roof parapit (cu.m)	Total head on roof hoppers (cm)	Roof outflow rate (l/sec)	Roof outflow volume (cu.m)	Required storage volume (cu.m)	Total head on roof hoppers (cm)	Roof outflow volume (cu.m)	Required storage volume (cu.m)	
5	141.18	377.65	113.30	15.09	98.21	98.21	-73.43	2.18	10.80	3.24	110.05	2.65	3.93	109.36	
10	104.19	278.72	167.23	30.18	137.05	137.05	-34.58	3.72	18.39	11.03	156.19	4.47	13.28	153.95	
15	83.56	223.51	201.16	45.26	155.90	155.90	-15.74	4.46	22.07	19.86	181.30	5.18	23.06	178.11	
20	70.25	187.92	225.51	60.35	165.15	165.15	-6.48	4.82	23.88	28.66	196.85	5.33	31.65	193.85	
25	60.90	162.90	244.34	75.44	168.91	168.91	-2.73	4.97	24.61	36.92	207.43	5.43	40.34	204.00	
30	53.93	144.26	259.66	90.53	169.13	169.13	-2.50	4.98	24.66	44.38	215.28	5.51	49.10	210.56	
35	48.52	129.78	272.55	105.61	166.93	166.93	-4.70	4.89	24.23	50.88	221.67	5.57	57.94	214.61	
40	44.18	118.19	283.66	120.70	162.96	162.96	-8.67	4.74	23.45	56.28	227.38	5.63	66.88	216.78	
45	40.63	108.68	293.44	135.79	157.65	157.65	-13.99	4.53	22.41	60.52	232.92	5.68	75.98	217.46	<<-------
50	37.65	100.72	302.17	150.88	151.29	151.29	-20.35	4.28	21.17	63.51	238.65	5.74	85.26	216.91	
55	35.12	93.95	310.05	165.96	144.09	144.09	-27.55	3.99	19.76	65.22	244.83	5.80	94.78	215.27	
60	32.94	88.12	317.24	181.05	136.19	136.19	-35.44	3.68	18.22	65.60	251.64	5.87	104.59	212.65	
65	31.04	83.04	323.86	196.14	127.72	127.72	-43.91	3.35	16.57	64.61	259.25	5.94	114.76	209.11	
70	29.37	78.57	329.99	211.23	118.77	118.77	-52.87	2.99	14.82	62.24	267.76	6.03	125.33	204.66	
75	27.89	74.60	335.71	226.31	109.39	109.39	-62.25	2.62	12.99	58.44	277.26	6.12	136.37	199.34	
80	26.56	71.05	341.06	241.40	99.65	99.65	-71.98	2.24	11.08	53.21	287.85	6.23	147.94	193.11	
85	25.37	67.86	346.09	256.49	89.60	89.60	-82.04	1.84	9.12	46.52	299.57	6.34	160.11	185.98	
90	24.29	64.97	350.84	271.58	79.27	79.27	-92.37	1.43	7.10	38.35	312.49	6.47	172.93	177.91	
95	23.31	62.34	355.35	286.66	68.68	68.68	-102.95	1.02	5.04	28.70	326.65	6.61	186.48	168.87	
100	22.41	59.94	359.63	301.75	57.88	57.88	-113.76	0.59	2.92	17.55	342.09	6.76	200.82	158.81	
105	21.58	57.73	363.72	316.84	46.88	46.88	-124.76	0.16	0.77	4.88	358.83	6.93	216.01	147.70	
110	20.82	55.70	367.62	331.93	35.69	35.69	-135.95	-0.28	-1.41	-9.31	376.92	7.11	232.13	135.49	
115	20.12	53.82	371.36	347.01	24.34	24.34	-147.30	-0.73	-3.63	-25.03	396.38	7.30	249.24	122.12	
120	19.47	52.08	374.94	362.10	12.84	12.84	-158.80	-1.19	-5.87	-42.29	417.23	7.50	267.41	107.54	
125	18.86	50.45	378.39	377.19	1.20	1.20	-170.43	-1.65	-8.15	-61.10	439.50	7.72	286.70	91.69	
130	18.29	48.94	381.72	392.28	-10.56	-10.56	-182.20	-2.11	-10.45	-81.47	463.19	7.96	307.20	74.52	

Qroof= R A I N
= 2.675 x I (l / sec)

Peak roof outflow rate =
no. of hoppers x weir rating x max. head
= 50.3 l/sec

Peak roof outflow volume =
= 50.3 x time x 60/1000 cu. m.

Roof outflow rate =
head x weir rating x no. of hoppers
= head x 4.95 l/sec

Required max. roof storage (cu. m.) : 217.5
Available roof storage (cu. m.) : 686.5

PROJECT: RIVERSIDE SOUTH
JOB NO.: 12007.100

URBAN ECOSYSTEMS
LIMITED

SYSTEM A 5 YR STORM
SITE STORM WATER MANAGEMENT

SITE CHARACTERISTICS

Controlled Pavement area (sq.m) :	48861
Controlled Landscaped area (sq.m) :	0
Total area - excl. Bldg (sq.m) :	48861
Composite runoff coefficent :	0.90

OUTLET CHARACTERISTICS

Orifice diameter (mm) :	450
Area of orifice (sq.m) :	0.15904
Orifice coefficient :	0.62
Max. ponding elev. :	92.20
Catchbasin elev. :	92.20
Ponding depth. :	0.00
Orifice invert :	88.15
Orifice center line elev. :	88.375
Head (m) :	3.825
Orifice release rate (l/sec) :	854.2

NO SURFACE PONDING

TABLE 2 - System Storage

Time (min.)	Intensity I (mm/hr)	Peak rate of runoff Q (l/sec)	Runoff volume (cu.m)	Orifice Outflow volume (cu.m)	Required storage volume (cu.m.)	
10	104.19	1323.14	793.88	512.53	281.35	<------
15	83.56	1071.04	963.94	768.80	195.14	
20	70.25	908.49	1090.19	1025.07	65.12	
25	60.90	794.21	1191.32	1281.34	-90.02	

Required site storage (cu. m) : 281
Available site storage (cu. m) : 362
SEE DRAWING SP-1

Qsite= R A I N + Qroof
= 12.216 x I + 50.3 l/sec

TABLE 3 - Uncontrolled Runoff

Time (min.)	Intensity I (mm/hr)	Peak rate of runoff Q (l/sec)	
10	104.19	53.86	<------
15	83.56	43.20	
20	70.25	36.32	

Peak runoff (L/sec) : 53.9

UNCONTROLLED SITE CHARACTERISTICS

Uncontrolled Pavement area (sq.m.) :	413
Uncontrolled Landscaped area (sq.m.) :	5957
Total area (sq.m) :	6370
Composite runoff coefficent :	0.292

SYSTEM A 5 YR STORM
SITE SUMMARY

Orifice release rate (l/sec) :	854.2
Uncontrolled release rate (l/sec) :	53.9
Total site release rate (l/sec) :	**908.1**
Allowable site release rate (l/sec) :	**1327.0**

Urban Ecosystems Limited
7050 WESTON ROAD, SUITE 705
WOODBRIDGE, ONTARIO L4L 8G7
uel@urbanecosystems.com
t. (905)856-0629
f. (905)856-0698

APPENDIX B

Tributary No. 14

Approximately 68.38 ha of upstream lands to the south, are currently draining through the Subject Property via Tributary No. 14. Ultimately, the storm runoff from this area will be controlled as established through the Riverside South Community Master Drainage Area Plan. The storm drainage will be collected in local storm sewers and conveyed to the sewers on Limebank Road, ultimately discharging to Riverside South Stormwater Management Pond No. 2.

The peak flows from the upstream 68.38 ha of undeveloped lands, based on pasture lands and an estimated time to peak of 1.73 hours, were calculated to be 1.719 m^3/s. It is noted that this flow is significantly higher than what was reported in the Riverside South Community Master Drainage Plan, primarily due to a shorter time to peak. An External Storm Drainage Area Plan, Drawing 8 of 8, is included in the rear pocket.

In the interim, it is proposed that a temporary interceptor swale will be constructed (by others), immediately south of future Town Square Boulevard. The swale will convey all storm flows from the undeveloped upstream lands, discharging to the proposed storm sewers on Ceremonial Road.

The drainage from the Town Square Boulevard right of way, will be intercepted by a temporary swale located immediately south of the Subject Property. The swale will flow westerly, discharging to a temporary inlet catchbaisn to be located on the east side of Limebank Road and connected to the Limebank Road storm sewer systems.

Rideau Valley Conservation Authority has confirmed that Tributary no. 14 is approved in principle to be enclosed. Prior to commencing any construction on this Subject Property, including grading or any site alteration works, Morguard Investments Limited will file an application under Ontario Regulation 174/06 Section 28 with Rideau Valley Conservation Authority, for a Permit to enclose/alter Tributary No. 14.

```
   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O      9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO          9      9    =========
                                                       9   9  9   9   # 2637819
         StormWater Management HYdrologic Model         999    999    =========

*******************************************************************************
***************************** SWMHYMO Ver/4.05  *****************************
*********  A single event and continuous hydrologic simulation model  *********
*********     based on the principles of HYMO and its successors      *********
*********               OTTHYMO-83 and OTTHYMO-89.                    *********
*******************************************************************************
********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
*********                  Ottawa,  Ontario: (613) 836-3884           *********
*********                  Gatineau, Quebec: (819) 243-6858           *********
*********                  E-Mail: swmhymo@jfsa.Com                   *********
*******************************************************************************

+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++++ Licensed user: The Sernas Group                             +++++++++
+++++++++                whitby                SERIAL#:2637819       +++++++++
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

*******************************************************************************
*********          ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
*********          Maximum value for ID numbers  :     10            *********
*********          Max. number of rainfall points: 105408            *********
*********          Max. number of flow points    : 105408            *********
*******************************************************************************

***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
*****-------------------------------------------------------------------*****
*****    ID:  Hydrograph IDentification numbers, (1-10).                *****
*****  NHYD:  Hydrograph reference numbers, (6 digits or characters).   *****
*****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.). *****
***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).   *****
***** TpeakDate_hh:mm is the date and time of the peak flow.            *****
*****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).      *****
*****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).      *****
*****     *:  see WARNING or NOTE message printed at end of run.        *****
*****    **:  see  ERROR  message printed at end of run.                *****
*******************************************************************************
*******************************************************************************

:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

*******************************************************************************

**********************   S U M M A R Y   O U T P U T   **********************
*******************************************************************************
*         DATE: 2014-06-10      TIME: 15:29:25      RUN COUNTER: 000270       *
*******************************************************************************
* Input   filename: C:\DDRIVE~1\PreOtt.dat                                    *
* Output  filename: C:\DDRIVE~1\PreOtt.out                                    *
* Summary filename: C:\DDRIVE~1\PreOtt.sum                                    *
* User comments:                                                              *
* 1:_____________________________________________________________________     *
* 2:_____________________________________________________________________     *
* 3:_____________________________________________________________________     *
```

```
**********************************************************************************

#**********************************************************************************
#  Project Name: [Riverside Ottawa]    Project Number: [8811895.400]
#  Date        : 07-22-2004
#  Modeller    : [Ken Chow]
#  Company     : GHD
#  License #   : 2640114
#**********************************************************************************
  ** END OF RUN :   1

**********************************************************************************



 RUN:COMMAND#

)02:0001----------------------------------------------------------------------------

     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   2 ]
      [NRUN  =   2 ]
t**********************************************************************************
t  Project Name: [Riverside Ottawa]    Project Number: [8811895.400]
t  Date        : 07-22-2004
t  Modeller    : [Ken Chow]
t  Company     : GHD
t  License #   : 2640114
t**********************************************************************************

)02:0002----------------------------------------------------------------------------

     MASS STORM
      Filename = C:\D DRIVE\24SCSII.mst
      Comment  = 24 hour SCS II storm mass curve
      [SDT= 2.00:SDUR=  24.00:PTOT= 103.20]

)02:0003--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.

     DESIGN NASHYD      01:200           63.30    2.056 No_date   13:22   51.59
500
      [CN= 72.0: N= 3.00]
      [Tp= 1.37:DT= 2.00]

)02:0004--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.

     PRINT HYD          01:200           63.30    2.056 No_date   13:22   51.59
l/a

)02:0005--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.

     DESIGN NASHYD      01:200           63.30    1.719 No_date   13:48   51.59
500
      [CN= 72.0: N= 3.00]
      [Tp= 1.73:DT= 2.00]

)02:0006--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
```

```
                                                PreOtt
     PRINT HYD           01:200                  63.30     1.719 No_date    13:48    51.59
n/a

)02:0007-------------------------------------------------------------------------------
-
      FINISH
-------------------------------------------------------------------------------------
--
**************************************************************************************
**
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2014-06-10     at 15:29:25
======================================================================================
==
```

```
2     Metric units
*#**************************************************************************
*#  Project Name: [Riverside Ottawa]    Project Number: [8811895.400]
*#  Date        : 07-22-2004
*#  Modeller    : [Ken Chow]
*#  Company     : GHD
*#  License #   : 2640114
*#**************************************************************************
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[2],  NRUN=[2]
*%-----------------|-------------------------------------------------------|
* SCS 24 hours distribution
* Parameters taken from IDF curve parameters provided by City of Ottawa
* Sewer Guidelines October 2012
*%-----------------|-------------------------------------------------------|
*100 year event
*%-----------------|-------------------------------------------------------|
*
MASS STORM           PTOTAL=[103.2](mm), CSDT=[2](min),
                     CURVE_FILENAME=["C:\D DRIVE\24SCSII.mst"]
**********
* EXTERNAL AREAS  based on Row Crops and a Tp of 1.37
*
DESIGN NASHYD        ID=[1], NHYD=["200"], DT=[2]min, AREA=[63.3](ha),
                     DWF=[0](cms), CN/C=[72], TP=[1.37]hrs,
                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*
PRINT HYD            ID=[1],   # OF PCYCLES=[-1]
*
**********
* EXTERNAL AREAS  based on Pasture and a Tp of 1.73
*
DESIGN NASHYD        ID=[1], NHYD=["200"], DT=[2]min, AREA=[63.3](ha),
                     DWF=[0](cms), CN/C=[72], TP=[1.73]hrs,
                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*
PRINT HYD            ID=[1],   # OF PCYCLES=[-1]
*
FINISH
```

```
   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9    =========
                                                        9   9  9   9   # 2637819
         StormWater Management HYdrologic Model          999    999    =========

 ***************************************************************************
 ***************************** SWMHYMO Ver/4.05  ***************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********               OTTHYMO-83 and OTTHYMO-89.                    *********
 ***************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.com                   *********
 ***************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: The Sernas Group                           +++++++++
 +++++++++                whitby                SERIAL#:2637819     +++++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ***************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++           *********
 *********           Maximum value for ID numbers  :     10          *********
 *********           Max. number of rainfall points: 105408          *********
 *********           Max. number of flow points    : 105408          *********
 ***************************************************************************


 ***********************   D E T A I L E D   O U T P U T   ***********************
 ***************************************************************************
 *         DATE: 2014-06-10      TIME: 15:29:25      RUN COUNTER: 000270       *
 ***************************************************************************
 * Input   filename: C:\DDRIVE~1\PreOtt.dat                                    *
 * Output  filename: C:\DDRIVE~1\PreOtt.out                                    *
 * Summary filename: C:\DDRIVE~1\PreOtt.sum                                    *
 * User comments:                                                              *
 * 1:_____________________________________________________________________     *
 * 2:_____________________________________________________________________     *
 * 3:_____________________________________________________________________     *
 ***************************************************************************

-------------------------------------------------------------------------------
--
)01:0001----------------------------------------------------------------------
--
'#***************************************************************************
'#  Project Name: [Riverside Ottawa]    Project Number: [8811895.400]
'#  Date        : 07-22-2004
'#  Modeller    : [Ken Chow]
'#  Company     : GHD
'#  License #   : 2640114
'#***************************************************************************
  ** END OF RUN :   1

'***************************************************************************
```

```
--------------------
| START            |  Project  dir.: C:\DDRIVE~1\
--------------------  Rainfall dir.: C:\DDRIVE~1\

    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 002
    NSTORM=   2
           #  1=-------------------------------------------------------------|
           #  2=ibution
-------------------------------------------------------------------------------
--
)02:0002---------------------------------------------------------------------
--
*#*****************************************************************************
*#  Project Name: [Riverside Ottawa]    Project Number: [8811895.400]
*#  Date        : 07-22-2004
*#  Modeller    : [Ken Chow]
*#  Company     : GHD
*#  License #   : 2640114
*#*****************************************************************************
-------------------------------------------------------------------------------
--
)02:0002---------------------------------------------------------------------
--
* Parameters taken from IDF curve parameters provided by City of Ottawa
* Sewer Guidelines October 2012
*100 year event
*
--------------------
| MASS STORM       |    Filename: C:\D DRIVE\24SCSII.mst
| Ptotal=103.20 mm |    Comments: 24 hour SCS II storm mass curve
--------------------

                       Duration of storm        =   24.00 hrs
                       Mass curve time step     =   12.00 min
                       Selected storm time step =    2.00 min
                       Volume of derived storm  =  103.20 mm
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.03	1.032	6.03	2.064	12.03	20.640	18.03	1.548
.07	1.032	6.07	2.064	12.07	20.640	18.07	1.548
.10	1.032	6.10	2.064	12.10	20.640	18.10	1.548
.13	1.032	6.13	2.064	12.13	20.640	18.13	1.548
.17	1.032	6.17	2.064	12.17	20.640	18.17	1.548
.20	1.032	6.20	2.064	12.20	20.640	18.20	1.548
.23	1.032	6.23	2.064	12.23	12.900	18.23	1.548
.27	1.032	6.27	2.064	12.27	12.900	18.27	1.548
.30	1.032	6.30	2.064	12.30	12.900	18.30	1.548
.33	1.032	6.33	2.064	12.33	12.900	18.33	1.548
.37	1.032	6.37	2.064	12.37	12.900	18.37	1.548
.40	1.032	6.40	2.064	12.40	12.900	18.40	1.548
.43	1.032	6.43	2.064	12.43	9.288	18.43	2.064
.47	1.032	6.47	2.064	12.47	9.288	18.47	2.064
.50	1.032	6.50	2.064	12.50	9.288	18.50	2.064
.53	1.032	6.53	2.064	12.53	9.288	18.53	2.064
.57	1.032	6.57	2.064	12.57	9.288	18.57	2.064
.60	1.032	6.60	2.064	12.60	9.288	18.60	2.064

.63	1.032	6.63	2.064	12.63	8.772	18.63	1.548
.67	1.032	6.67	2.064	12.67	8.772	18.67	1.548
.70	1.032	6.70	2.064	12.70	8.772	18.70	1.548
.73	1.032	6.73	2.064	12.73	8.772	18.73	1.548
.77	1.032	6.77	2.064	12.77	8.772	18.77	1.548
.80	1.032	6.80	2.064	12.80	8.772	18.80	1.548
.83	1.032	6.83	2.064	12.83	6.192	18.83	1.548
.87	1.032	6.87	2.064	12.87	6.192	18.87	1.548
.90	1.032	6.90	2.064	12.90	6.192	18.90	1.548
.93	1.032	6.93	2.064	12.93	6.192	18.93	1.548
.97	1.032	6.97	2.064	12.97	6.192	18.97	1.548
1.00	1.032	7.00	2.064	13.00	6.192	19.00	1.548
1.03	1.032	7.03	2.064	13.03	5.160	19.03	2.064
1.07	1.032	7.07	2.064	13.07	5.160	19.07	2.064
1.10	1.032	7.10	2.064	13.10	5.160	19.10	2.064
1.13	1.032	7.13	2.064	13.13	5.160	19.13	2.064
1.17	1.032	7.17	2.064	13.17	5.160	19.17	2.064
1.20	1.032	7.20	2.064	13.20	5.160	19.20	2.064
1.23	1.032	7.23	2.064	13.23	5.160	19.23	1.548
1.27	1.032	7.27	2.064	13.27	5.160	19.27	1.548
1.30	1.032	7.30	2.064	13.30	5.160	19.30	1.548
1.33	1.032	7.33	2.064	13.33	5.160	19.33	1.548
1.37	1.032	7.37	2.064	13.37	5.160	19.37	1.548
1.40	1.032	7.40	2.064	13.40	5.160	19.40	1.548
1.43	1.032	7.43	2.064	13.43	5.160	19.43	2.064
1.47	1.032	7.47	2.064	13.47	5.160	19.47	2.064
1.50	1.032	7.50	2.064	13.50	5.160	19.50	2.064
1.53	1.032	7.53	2.064	13.53	5.160	19.53	2.064
1.57	1.032	7.57	2.064	13.57	5.160	19.57	2.064
1.60	1.032	7.60	2.064	13.60	5.160	19.60	2.064
1.63	1.032	7.63	2.064	13.63	5.160	19.63	1.548
1.67	1.032	7.67	2.064	13.67	5.160	19.67	1.548
1.70	1.032	7.70	2.064	13.70	5.160	19.70	1.548
1.73	1.032	7.73	2.064	13.73	5.160	19.73	1.548
1.77	1.032	7.77	2.064	13.77	5.160	19.77	1.548
1.80	1.032	7.80	2.064	13.80	5.160	19.80	1.548
1.83	1.032	7.83	2.064	13.83	5.160	19.83	2.064
1.87	1.032	7.87	2.064	13.87	5.160	19.87	2.064
1.90	1.032	7.90	2.064	13.90	5.160	19.90	2.064
1.93	1.032	7.93	2.064	13.93	5.160	19.93	2.064
1.97	1.032	7.97	2.064	13.97	5.160	19.97	2.064
2.00	1.032	8.00	2.064	14.00	5.160	20.00	2.064
2.03	1.032	8.03	3.096	14.03	3.096	20.03	1.548
2.07	1.032	8.07	3.096	14.07	3.096	20.07	1.548
2.10	1.032	8.10	3.096	14.10	3.096	20.10	1.548
2.13	1.032	8.13	3.096	14.13	3.096	20.13	1.548
2.17	1.032	8.17	3.096	14.17	3.096	20.17	1.548
2.20	1.032	8.20	3.096	14.20	3.096	20.20	1.548
2.23	1.032	8.23	3.096	14.23	3.096	20.23	1.548
2.27	1.032	8.27	3.096	14.27	3.096	20.27	1.548
2.30	1.032	8.30	3.096	14.30	3.096	20.30	1.548
2.33	1.032	8.33	3.096	14.33	3.096	20.33	1.548
2.37	1.032	8.37	3.096	14.37	3.096	20.37	1.548
2.40	1.032	8.40	3.096	14.40	3.096	20.40	1.548
2.43	1.032	8.43	3.096	14.43	3.096	20.43	1.032
2.47	1.032	8.47	3.096	14.47	3.096	20.47	1.032
2.50	1.032	8.50	3.096	14.50	3.096	20.50	1.032
2.53	1.032	8.53	3.096	14.53	3.096	20.53	1.032
2.57	1.032	8.57	3.096	14.57	3.096	20.57	1.032
2.60	1.032	8.60	3.096	14.60	3.096	20.60	1.032
2.63	1.032	8.63	3.096	14.63	3.096	20.63	1.548
2.67	1.032	8.67	3.096	14.67	3.096	20.67	1.548
2.70	1.032	8.70	3.096	14.70	3.096	20.70	1.548

2.73	1.032	8.73	3.096	14.73	3.096	20.73	1.548
2.77	1.032	8.77	3.096	14.77	3.096	20.77	1.548
2.80	1.032	8.80	3.096	14.80	3.096	20.80	1.548
2.83	1.032	8.83	3.096	14.83	3.096	20.83	1.548
2.87	1.032	8.87	3.096	14.87	3.096	20.87	1.548
2.90	1.032	8.90	3.096	14.90	3.096	20.90	1.548
2.93	1.032	8.93	3.096	14.93	3.096	20.93	1.548
2.97	1.032	8.97	3.096	14.97	3.096	20.97	1.548
3.00	1.032	9.00	3.096	15.00	3.096	21.00	1.548
3.03	1.032	9.03	3.096	15.03	2.580	21.03	1.032
3.07	1.032	9.07	3.096	15.07	2.580	21.07	1.032
3.10	1.032	9.10	3.096	15.10	2.580	21.10	1.032
3.13	1.032	9.13	3.096	15.13	2.580	21.13	1.032
3.17	1.032	9.17	3.096	15.17	2.580	21.17	1.032
3.20	1.032	9.20	3.096	15.20	2.580	21.20	1.032
3.23	1.032	9.23	3.096	15.23	2.580	21.23	1.548
3.27	1.032	9.27	3.096	15.27	2.580	21.27	1.548
3.30	1.032	9.30	3.096	15.30	2.580	21.30	1.548
3.33	1.032	9.33	3.096	15.33	2.580	21.33	1.548
3.37	1.032	9.37	3.096	15.37	2.580	21.37	1.548
3.40	1.032	9.40	3.096	15.40	2.580	21.40	1.548
3.43	1.032	9.43	3.096	15.43	2.580	21.43	1.032
3.47	1.032	9.47	3.096	15.47	2.580	21.47	1.032
3.50	1.032	9.50	3.096	15.50	2.580	21.50	1.032
3.53	1.032	9.53	3.096	15.53	2.580	21.53	1.032
3.57	1.032	9.57	3.096	15.57	2.580	21.57	1.032
3.60	1.032	9.60	3.096	15.60	2.580	21.60	1.032
3.63	1.032	9.63	3.096	15.63	2.580	21.63	1.548
3.67	1.032	9.67	3.096	15.67	2.580	21.67	1.548
3.70	1.032	9.70	3.096	15.70	2.580	21.70	1.548
3.73	1.032	9.73	3.096	15.73	2.580	21.73	1.548
3.77	1.032	9.77	3.096	15.77	2.580	21.77	1.548
3.80	1.032	9.80	3.096	15.80	2.580	21.80	1.548
3.83	1.032	9.83	3.096	15.83	2.580	21.83	1.032
3.87	1.032	9.87	3.096	15.87	2.580	21.87	1.032
3.90	1.032	9.90	3.096	15.90	2.580	21.90	1.032
3.93	1.032	9.93	3.096	15.93	2.580	21.93	1.032
3.97	1.032	9.97	3.096	15.97	2.580	21.97	1.032
4.00	1.032	10.00	3.096	16.00	2.580	22.00	1.032
4.03	2.064	10.03	5.676	16.03	2.580	22.03	1.032
4.07	2.064	10.07	5.676	16.07	2.580	22.07	1.032
4.10	2.064	10.10	5.676	16.10	2.580	22.10	1.032
4.13	2.064	10.13	5.676	16.13	2.580	22.13	1.032
4.17	2.064	10.17	5.676	16.17	2.580	22.17	1.032
4.20	2.064	10.20	5.676	16.20	2.580	22.20	1.032
4.23	2.064	10.23	5.676	16.23	2.580	22.23	1.548
4.27	2.064	10.27	5.676	16.27	2.580	22.27	1.548
4.30	2.064	10.30	5.676	16.30	2.580	22.30	1.548
4.33	2.064	10.33	5.676	16.33	2.580	22.33	1.548
4.37	2.064	10.37	5.676	16.37	2.580	22.37	1.548
4.40	2.064	10.40	5.676	16.40	2.580	22.40	1.548
4.43	2.064	10.43	5.676	16.43	2.580	22.43	1.032
4.47	2.064	10.47	5.676	16.47	2.580	22.47	1.032
4.50	2.064	10.50	5.676	16.50	2.580	22.50	1.032
4.53	2.064	10.53	5.676	16.53	2.580	22.53	1.032
4.57	2.064	10.57	5.676	16.57	2.580	22.57	1.032
4.60	2.064	10.60	5.676	16.60	2.580	22.60	1.032
4.63	2.064	10.63	5.676	16.63	2.580	22.63	1.548
4.67	2.064	10.67	5.676	16.67	2.580	22.67	1.548
4.70	2.064	10.70	5.676	16.70	2.580	22.70	1.548
4.73	2.064	10.73	5.676	16.73	2.580	22.73	1.548
4.77	2.064	10.77	5.676	16.77	2.580	22.77	1.548
4.80	2.064	10.80	5.676	16.80	2.580	22.80	1.548

4.83	2.064	10.83	5.676	16.83	1.548	22.83	1.032
4.87	2.064	10.87	5.676	16.87	1.548	22.87	1.032
4.90	2.064	10.90	5.676	16.90	1.548	22.90	1.032
4.93	2.064	10.93	5.676	16.93	1.548	22.93	1.032
4.97	2.064	10.97	5.676	16.97	1.548	22.97	1.032
5.00	2.064	11.00	5.676	17.00	1.548	23.00	1.032
5.03	2.064	11.03	7.740	17.03	1.548	23.03	1.032
5.07	2.064	11.07	7.740	17.07	1.548	23.07	1.032
5.10	2.064	11.10	7.740	17.10	1.548	23.10	1.032
5.13	2.064	11.13	7.740	17.13	1.548	23.13	1.032
5.17	2.064	11.17	7.740	17.17	1.548	23.17	1.032
5.20	2.064	11.20	7.740	17.20	1.548	23.20	1.032
5.23	2.064	11.23	11.352	17.23	2.064	23.23	1.032
5.27	2.064	11.27	11.352	17.27	2.064	23.27	1.032
5.30	2.064	11.30	11.352	17.30	2.064	23.30	1.032
5.33	2.064	11.33	11.352	17.33	2.064	23.33	1.032
5.37	2.064	11.37	11.352	17.37	2.064	23.37	1.032
5.40	2.064	11.40	11.352	17.40	2.064	23.40	1.032
5.43	2.064	11.43	27.348	17.43	1.548	23.43	1.548
5.47	2.064	11.47	27.348	17.47	1.548	23.47	1.548
5.50	2.064	11.50	27.348	17.50	1.548	23.50	1.548
5.53	2.064	11.53	27.348	17.53	1.548	23.53	1.548
5.57	2.064	11.57	27.348	17.57	1.548	23.57	1.548
5.60	2.064	11.60	27.348	17.60	1.548	23.60	1.548
5.63	2.064	11.63	56.760	17.63	2.064	23.63	1.032
5.67	2.064	11.67	56.760	17.67	2.064	23.67	1.032
5.70	2.064	11.70	56.760	17.70	2.064	23.70	1.032
5.73	2.064	11.73	56.760	17.73	2.064	23.73	1.032
5.77	2.064	11.77	56.760	17.77	2.064	23.77	1.032
5.80	2.064	11.80	56.760	17.80	2.064	23.80	1.032
5.83	2.064	11.83	116.100	17.83	1.548	23.83	1.032
5.87	2.064	11.87	116.100	17.87	1.548	23.87	1.032
5.90	2.064	11.90	116.100	17.90	1.548	23.90	1.032
5.93	2.064	11.93	116.100	17.93	1.548	23.93	1.032
5.97	2.064	11.97	116.100	17.97	1.548	23.97	1.032
6.00	2.064	12.00	116.100	18.00	1.548	24.00	1.032

02:0003---

****

EXTERNAL AREAS based on Row Crops and a Tp of 1.37

DESIGN NASHYD	Area (ha)=	63.30	Curve Number (CN)=72.00
01:200 DT= 2.00	Ia (mm)=	1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.370	

Unit Hyd Qpeak (cms)= 1.765

PEAK FLOW (cms)= 2.056 (i)
TIME TO PEAK (hrs)= 13.367
RUNOFF VOLUME (mm)= 51.591
TOTAL RAINFALL (mm)= 103.200
RUNOFF COEFFICIENT = .500

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

02:0004---

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*
--------------------
| PRINT HYD        |   AREA       (ha)=   63.300
| ID=01 (200   )   |   QPEAK     (cms)=    2.056 (i)
| DT= 2.00 PCYC=-1 |   TPEAK     (hrs)=   13.367
--------------------   VOLUME      (mm)=   51.591

     (i)  PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
--
002:0005----------------------------------------------------------------------
--
*
******************
* EXTERNAL AREAS  based on Pasture and a Tp of 1.73
*
----------------------
| DESIGN NASHYD      |   Area    (ha)=   63.30   Curve Number   (CN)=72.00
| 01:200    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=   1.730

     Unit Hyd Qpeak  (cms)=    1.398

     PEAK FLOW       (cms)=    1.719 (i)
     TIME TO PEAK    (hrs)=   13.800
     RUNOFF VOLUME    (mm)=   51.591
     TOTAL RAINFALL   (mm)=  103.200
     RUNOFF COEFFICIENT   =     .500

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

--------------------------------------------------------------------------------
--
002:0006----------------------------------------------------------------------
--
*
--------------------
| PRINT HYD        |   AREA       (ha)=   63.300
| ID=01 (200   )   |   QPEAK     (cms)=    1.719 (i)
| DT= 2.00 PCYC=-1 |   TPEAK     (hrs)=   13.800
--------------------   VOLUME      (mm)=   51.591

     (i)  PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
--
002:0007----------------------------------------------------------------------
--
*
      FINISH
--------------------------------------------------------------------------------
--
********************************************************************************
**
     WARNINGS / ERRORS / NOTES
     -------------------------
  Simulation ended on 2014-06-10     at 15:29:25
================================================================================
==
```

Appendix 'B'

City of Ottawa Development Servicing Study Checklist

4.1 General Content

Executive Summary (for larger reports only).

- Not Applicable

Date and revision number of the report.

- Addressed in Servicing Design Brief and Stormwater Management Report

Location map and plan showing municipal address, boundary, and layout of proposed development.

- Addressed in Servicing Design Brief and Stormwater Management Report

Plan showing the site and location of all existing services.

- Addressed on drawing 12007, 2 of 5 in the Servicing Design Brief and Stormwater Management Report

Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.

- Servicing Design and Stormwater Management Report has been undertaken in support of the Site Plan application
- The Servicing Design and proposed Stormwater Management is consistent with the Riverside South Community Master Drainage Plan and the design report for Riverside South Community Phase 6
- Development statistics are included on the site plan

Summary of Pre-consultation Meetings with City and other approval agencies.

- City comments are addressed in Servicing Design Brief and Stormwater Management Report
- A pre-consultation meeting with the City of Ottawa took place on October 1, 2013

Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.

- Riverside South Community Master Drainage Plan Update, Final Report by Stantec dated September 30, 2008
- Design Report for Riverside South Community Phase 6 by JL Richards & Associates Ltd dated January 2012

Statement of objectives and servicing criteria.

- Addressed in section 1.3 of the Servicing Design Brief and Stormwater Management Report

Identification of existing and proposed infrastructure available in the immediate area.

- Addressed on drawing 12007, 2 of 5 and in Servicing Design Brief and Stormwater Management Report

Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).

- Tributary No. 14

Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.

- Addressed on drawing 12007, 1 of 5 of the Servicing Design Brief and Stormwater Management Report

Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.

- Not Applicable

Proposed phasing of the development, if applicable.

- The development will be phased (two phases) as shown on the site plan and engineering drawings

Reference to geotechnical studies and recommendations concerning servicing.

- Separate report submitted to City

All preliminary and formal site plan submissions should have the following information:

- All addressed as required On drawings and in Servicing Design Brief and Stormwater Management Report

4.2 Development Servicing Report: Water

Confirm consistency with Master Servicing Study, if available.

- Servicing Design and Proposed Stormwater management is consistent with the Master Servicing Study

Availability of public infrastructure to service proposed development.

- Addressed in section 5.0 of the Servicing Design Brief and Stormwater Management Report

Identification of system constraints.

- Not Applicable

Identify boundary conditions.

- Will be addressed in subsequent submission

Confirmation of adequate domestic supply and pressure.

- Addressed in Design Report for Riverside South Community Phase 6

Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.

- Addressed in Design Report for Riverside South Community Phase 6

Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.

- Addressed in Design Report for Riverside South Community Phase 6

Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.

- The entire Water Distribution System will be installed in Phase 1

Address reliability requirements such as appropriate location of shut-off valves.

- Not Applicable

Check on the necessity of a pressure zone boundary modification.

- Not Applicable

Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.

- Addressed in Design Report for Riverside South Community Phase 6

Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.

- Addressed on drawing 12007, 2 of 5 of the Servicing Design Brief and Stormwater Management Report

Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.

- Not Applicable

Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.

- Addressed in section 5.0 of the Servicing Design Brief and Stormwater Management Report

Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

- Not Applicable

4.3 Development Servicing Report: Wastewater

Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).

- Addressed in section 2.0 of the Servicing Design Brief and Stormwater Management Report

Confirm consistency with Master Servicing Study and/or justifications for deviations.

- Servicing Design and Proposed Stormwater Management is consistent with the Master Servicing Study

Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.

- Not Applicable

Description of existing sanitary sewer available for discharge of wastewater from proposed development.

- Addressed in section 2.0 and Appendix A of the Servicing Design Brief and Stormwater Management Report

Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable).

- Addressed in Design Report for Riverside South Community Phase 6

Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.

- Not Applicable

Description of proposed sewer network including sewers, pumping stations, and forcemains.

- Not Applicable

Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).

- Not Applicable

Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.

- Not Applicable

Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.

- Not Applicable

Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.

- Not Applicable

Special considerations such as contamination, corrosive environment etc.

- Not Applicable

4.4 Development Servicing Report: Stormwater Checklist

Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property).

- Addressed in Design Report for Riverside South Community Phase 6

Analysis of available capacity in existing public infrastructure.

- Not Applicable

A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

- Addressed on drawing 12007, 2 of 5 of the Servicing Design Brief and Stormwater Management Report

Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period; if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.

- Addressed in Design Report for Riverside South Community Phase 6

Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.

- Addressed in Design Report for Riverside South Community Phase 6

Description of the stormwater management concept with facility locations and descriptions with references and supporting information.

- Addressed in Design Report for Riverside South Community Phase 6

Set-back from private sewage disposal systems.

- Not Applicable

Watercourse and hazard lands setbacks.

- Not Applicable

Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.

- Not Applicable

Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

- Servicing Design for Proposed Stormwater Management is consistent with Master Servicing Study

Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).

- Addressed in Hydrologic Evaluation Calculations in Appendix A

Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.

- Tributary No. 14 is approved to be enclosed

Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.

- Addressed in Hydrologic Evaluation Calculations in Appendix A

Any proposed diversion of drainage catchment areas from one outlet to another.

- Not Applicable

Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.

- Addressed in Servicing Design Brief and Stormwater Management Report

If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.

- Not Applicable

Identification of potential impacts to receiving watercourses.

- Not Applicable

Identification of municipal drains and related approval requirements.

- Not Applicable

Descriptions of how the conveyance and storage capacity will be achieved for the development.

- Addressed in Servicing Design Brief and Stormwater Management Report

100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- Addressed in Servicing Design Brief and Stormwater Management Report

Inclusion of hydraulic analysis including hydraulic grade line elevations.

- Not Applicable

Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.

- Addressed in Servicing Design Brief and Stormwater Management Report

Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.

- Not Applicable

Identification of fill constraints related to floodplain and geotechnical investigation.

- Not Applicable

4.5 Approval and Permit Requirements: Checklist

Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.

- Tributary No. 14 has been approved to be enclosed

Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

- A Certificate of Approval application will be submitted with respect to the proposed Stormwater Management Works

Changes to Municipal Drains.

- Not Applicable

Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

- Not Applicable

4.6 Conclusion Checklist

Clearly stated conclusions and recommendations.

- Addressed in section 7.0 of the Servicing Design Brief and Stormwater Management Report

Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

- Not Applicable (First Submission)

All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.

- Addressed in Servicing Design Brief and Stormwater Management Report

Appendix 'C'

Tributary No. 14 Time to Peak and Flow Calculations

```
SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO          999    999    =========
S      W W W  MM MM  H   H   Y Y   MM MM  O   O       9   9  9   9
SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##   9   9  9   9    Ver  4.05
    S   W W   M   M  H   H    Y    M   M  O   O        9999   9999    Sept 2011
SSSSS   W W   M   M  H   H    Y    M   M   OOO            9      9    =========
                                                      9   9  9   9    # 2637819
      StormWater Management HYdrologic Model           999    999    =========
```

```
*******************************************************************************
***************************** SWMHYMO Ver/4.05  *****************************
*********  A single event and continuous hydrologic simulation model  *********
*********     based on the principles of HYMO and its successors      *********
*********                  OTTHYMO-83 and OTTHYMO-89.                 *********
*******************************************************************************
********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
*********                  Ottawa,  Ontario: (613) 836-3884           *********
*********                  Gatineau, Quebec: (819) 243-6858           *********
*********                  E-Mail: swmhymo@jfsa.Com                   *********
*******************************************************************************

+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++++ Licensed user: The Sernas Group                            +++++++++
+++++++++                whitby                 SERIAL#:2637819      +++++++++
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

*******************************************************************************
*********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++                  *********
*********           Maximum value for ID numbers  :     10                 *********
*********           Max. number of rainfall points: 105408                 *********
*********           Max. number of flow points    : 105408                 *********
*******************************************************************************

***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
*****------------------------------------------------------------------------*****
*****    ID:  Hydrograph IDentification numbers, (1-10).                      *****
*****  NHYD:  Hydrograph reference numbers, (6 digits or characters).         *****
*****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).       *****
***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).         *****
***** TpeakDate_hh:mm is the date and time of the peak flow.                  *****
*****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).            *****
*****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).            *****
*****     *:  see WARNING or NOTE message printed at end of run.              *****
*****    **:  see  ERROR  message printed at end of run.                      *****
*******************************************************************************
*******************************************************************************

:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

*******************************************************************************

************************   S U M M A R Y   O U T P U T   ************************
*******************************************************************************
*          DATE: 2014-06-10      TIME: 15:29:25      RUN COUNTER: 000270       *
*******************************************************************************
* Input   filename: C:\DDRIVE~1\PreOtt.dat                                     *
* Output  filename: C:\DDRIVE~1\PreOtt.out                                     *
* Summary filename: C:\DDRIVE~1\PreOtt.sum                                     *
* User comments:                                                               *
* 1:_____________________________________________________________________      *
* 2:_____________________________________________________________________      *
* 3:_____________________________________________________________________      *
```

```
**********************************************************************************

#**********************************************************************************
#  Project Name: [Riverside Ottawa]    Project Number: [8811895.400]
#  Date        : 07-22-2004
#  Modeller    : [Ken Chow]
#  Company     : GHD
#  License #   : 2640114
#**********************************************************************************
  ** END OF RUN :   1

**********************************************************************************



 RUN:COMMAND#

002:0001----------------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   2 ]
      [NRUN  =   2 ]
#**********************************************************************************
#  Project Name: [Riverside Ottawa]    Project Number: [8811895.400]
#  Date        : 07-22-2004
#  Modeller    : [Ken Chow]
#  Company     : GHD
#  License #   : 2640114
#**********************************************************************************

002:0002----------------------------------------------------------------------------
-
     MASS STORM
      Filename = C:\D DRIVE\24SCSII.mst
      Comment  = 24 hour SCS II storm mass curve
      [SDT= 2.00:SDUR=  24.00:PTOT= 103.20]

002:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD       01:200           63.30    2.056 No_date    13:22    51.59
.500
      [CN= 72.0: N= 3.00]
      [Tp= 1.37:DT= 2.00]

002:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     PRINT HYD           01:200           63.30    2.056 No_date    13:22    51.59
n/a

002:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD       01:200           63.30    1.719 No_date    13:48    51.59
.500
      [CN= 72.0: N= 3.00]
      [Tp= 1.73:DT= 2.00]

002:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
```

```
                                                PreOtt
     PRINT HYD           01:200                   63.30     1.719 No_date    13:48    51.59
n/a

002:0007-------------------------------------------------------------------------------
-
      FINISH
-------------------------------------------------------------------------------------
--
*************************************************************************************
**
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2014-06-10     at 15:29:25
=====================================================================================
==
```

```
2     Metric units
*#*************************************************************************
*#  Project Name: [Riverside Ottawa]    Project Number: [8811895.400]
*#  Date        : 07-22-2004
*#  Modeller    : [Ken Chow]
*#  Company     : GHD
*#  License #   : 2640114
*#*************************************************************************
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[2],  NRUN=[2]
*%-----------------|-------------------------------------------------------|
* SCS 24 hours distribution
* Parameters taken from IDF curve parameters provided by City of Ottawa
* Sewer Guidelines October 2012
*%-----------------|-------------------------------------------------------|
*100 year event
*%-----------------|-------------------------------------------------------|
*
MASS STORM           PTOTAL=[103.2](mm), CSDT=[2](min),
                     CURVE_FILENAME=["C:\D DRIVE\24SCSII.mst"]
*******************
* EXTERNAL AREAS  based on Row Crops and a Tp of 1.37
*
DESIGN NASHYD        ID=[1], NHYD=["200"], DT=[2]min, AREA=[63.3](ha),
                     DWF=[0](cms), CN/C=[72], TP=[1.37]hrs,
                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*
PRINT HYD            ID=[1],   # OF PCYCLES=[-1]
*
*******************
* EXTERNAL AREAS  based on Pasture and a Tp of 1.73
*
DESIGN NASHYD        ID=[1], NHYD=["200"], DT=[2]min, AREA=[63.3](ha),
                     DWF=[0](cms), CN/C=[72], TP=[1.73]hrs,
                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*
PRINT HYD            ID=[1],   # OF PCYCLES=[-1]
*
FINISH
```

```
   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO          999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9    Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999    Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9     =========
                                                        9   9  9   9    # 2637819
         StormWater Management HYdrologic Model          999    999    =========

 ********************************************************************************
 ****************************** SWMHYMO Ver/4.05  ******************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                 OTTHYMO-83 and OTTHYMO-89.                  *********
 ********************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.Com                   *********
 ********************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: The Sernas Group                              +++++++++
 +++++++++                whitby                SERIAL#:2637819        +++++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ********************************************************************************
 *********          ++++++ PROGRAM ARRAY DIMENSIONS ++++++              *********
 *********          Maximum value for ID numbers  :     10             *********
 *********          Max. number of rainfall points: 105408             *********
 *********          Max. number of flow points    : 105408             *********
 ********************************************************************************


 ***********************   D E T A I L E D   O U T P U T   ***********************
 ********************************************************************************
 *         DATE: 2014-06-10     TIME: 15:29:25     RUN COUNTER: 000270          *
 ********************************************************************************
 * Input   filename: C:\DDRIVE~1\PreOtt.dat                                     *
 * Output  filename: C:\DDRIVE~1\PreOtt.out                                     *
 * Summary filename: C:\DDRIVE~1\PreOtt.sum                                     *
 * User comments:                                                               *
 * 1:_____________________________________________________________________      *
 * 2:_____________________________________________________________________      *
 * 3:_____________________________________________________________________      *
 ********************************************************************************

--------------------------------------------------------------------------------
--
001:0001----------------------------------------------------------------------
--
*#*****************************************************************************
*#  Project Name: [Riverside Ottawa]    Project Number: [8811895.400]
*#  Date        : 07-22-2004
*#  Modeller    : [Ken Chow]
*#  Company     : GHD
*#  License #   : 2640114
*#*****************************************************************************
  ** END OF RUN :   1

********************************************************************************
```

```
--------------------
| START            |  Project  dir.: C:\DDRIVE~1\
--------------------  Rainfall dir.: C:\DDRIVE~1\

     TZERO =   .00 hrs on        0
     METOUT=   2 (output = METRIC)
     NRUN  = 002
     NSTORM=   2
            #  1=-----------------------------------------------------------|
            #  2=ibution
-------------------------------------------------------------------------------
--
002:0002----------------------------------------------------------------------
--
*#*****************************************************************************
*#  Project Name: [Riverside Ottawa]    Project Number: [8811895.400]
*#  Date        : 07-22-2004
*#  Modeller    : [Ken Chow]
*#  Company     : GHD
*#  License #   : 2640114
*#*****************************************************************************
-------------------------------------------------------------------------------
--
002:0002----------------------------------------------------------------------
--
* Parameters taken from IDF curve parameters provided by City of Ottawa
* Sewer Guidelines October 2012
*100 year event
*
--------------------
| MASS STORM       |    Filename: C:\D DRIVE\24SCSII.mst
| Ptotal=103.20 mm |    Comments: 24 hour SCS II storm mass curve
--------------------

                         Duration of storm        =   24.00 hrs
                         Mass curve time step     =   12.00 min
                         Selected storm time step =    2.00 min
                         Volume of derived storm  =  103.20 mm

              TIME     RAIN |   TIME     RAIN |   TIME     RAIN |   TIME     RAIN
               hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr
               .03    1.032 |   6.03    2.064 |  12.03   20.640 |  18.03    1.548
               .07    1.032 |   6.07    2.064 |  12.07   20.640 |  18.07    1.548
               .10    1.032 |   6.10    2.064 |  12.10   20.640 |  18.10    1.548
               .13    1.032 |   6.13    2.064 |  12.13   20.640 |  18.13    1.548
               .17    1.032 |   6.17    2.064 |  12.17   20.640 |  18.17    1.548
               .20    1.032 |   6.20    2.064 |  12.20   20.640 |  18.20    1.548
               .23    1.032 |   6.23    2.064 |  12.23   12.900 |  18.23    1.548
               .27    1.032 |   6.27    2.064 |  12.27   12.900 |  18.27    1.548
               .30    1.032 |   6.30    2.064 |  12.30   12.900 |  18.30    1.548
               .33    1.032 |   6.33    2.064 |  12.33   12.900 |  18.33    1.548
               .37    1.032 |   6.37    2.064 |  12.37   12.900 |  18.37    1.548
               .40    1.032 |   6.40    2.064 |  12.40   12.900 |  18.40    1.548
               .43    1.032 |   6.43    2.064 |  12.43    9.288 |  18.43    2.064
               .47    1.032 |   6.47    2.064 |  12.47    9.288 |  18.47    2.064
               .50    1.032 |   6.50    2.064 |  12.50    9.288 |  18.50    2.064
               .53    1.032 |   6.53    2.064 |  12.53    9.288 |  18.53    2.064
               .57    1.032 |   6.57    2.064 |  12.57    9.288 |  18.57    2.064
               .60    1.032 |   6.60    2.064 |  12.60    9.288 |  18.60    2.064
```

.63	1.032	6.63	2.064	12.63	8.772	18.63	1.548
.67	1.032	6.67	2.064	12.67	8.772	18.67	1.548
.70	1.032	6.70	2.064	12.70	8.772	18.70	1.548
.73	1.032	6.73	2.064	12.73	8.772	18.73	1.548
.77	1.032	6.77	2.064	12.77	8.772	18.77	1.548
.80	1.032	6.80	2.064	12.80	8.772	18.80	1.548
.83	1.032	6.83	2.064	12.83	6.192	18.83	1.548
.87	1.032	6.87	2.064	12.87	6.192	18.87	1.548
.90	1.032	6.90	2.064	12.90	6.192	18.90	1.548
.93	1.032	6.93	2.064	12.93	6.192	18.93	1.548
.97	1.032	6.97	2.064	12.97	6.192	18.97	1.548
1.00	1.032	7.00	2.064	13.00	6.192	19.00	1.548
1.03	1.032	7.03	2.064	13.03	5.160	19.03	2.064
1.07	1.032	7.07	2.064	13.07	5.160	19.07	2.064
1.10	1.032	7.10	2.064	13.10	5.160	19.10	2.064
1.13	1.032	7.13	2.064	13.13	5.160	19.13	2.064
1.17	1.032	7.17	2.064	13.17	5.160	19.17	2.064
1.20	1.032	7.20	2.064	13.20	5.160	19.20	2.064
1.23	1.032	7.23	2.064	13.23	5.160	19.23	1.548
1.27	1.032	7.27	2.064	13.27	5.160	19.27	1.548
1.30	1.032	7.30	2.064	13.30	5.160	19.30	1.548
1.33	1.032	7.33	2.064	13.33	5.160	19.33	1.548
1.37	1.032	7.37	2.064	13.37	5.160	19.37	1.548
1.40	1.032	7.40	2.064	13.40	5.160	19.40	1.548
1.43	1.032	7.43	2.064	13.43	5.160	19.43	2.064
1.47	1.032	7.47	2.064	13.47	5.160	19.47	2.064
1.50	1.032	7.50	2.064	13.50	5.160	19.50	2.064
1.53	1.032	7.53	2.064	13.53	5.160	19.53	2.064
1.57	1.032	7.57	2.064	13.57	5.160	19.57	2.064
1.60	1.032	7.60	2.064	13.60	5.160	19.60	2.064
1.63	1.032	7.63	2.064	13.63	5.160	19.63	1.548
1.67	1.032	7.67	2.064	13.67	5.160	19.67	1.548
1.70	1.032	7.70	2.064	13.70	5.160	19.70	1.548
1.73	1.032	7.73	2.064	13.73	5.160	19.73	1.548
1.77	1.032	7.77	2.064	13.77	5.160	19.77	1.548
1.80	1.032	7.80	2.064	13.80	5.160	19.80	1.548
1.83	1.032	7.83	2.064	13.83	5.160	19.83	2.064
1.87	1.032	7.87	2.064	13.87	5.160	19.87	2.064
1.90	1.032	7.90	2.064	13.90	5.160	19.90	2.064
1.93	1.032	7.93	2.064	13.93	5.160	19.93	2.064
1.97	1.032	7.97	2.064	13.97	5.160	19.97	2.064
2.00	1.032	8.00	2.064	14.00	5.160	20.00	2.064
2.03	1.032	8.03	3.096	14.03	3.096	20.03	1.548
2.07	1.032	8.07	3.096	14.07	3.096	20.07	1.548
2.10	1.032	8.10	3.096	14.10	3.096	20.10	1.548
2.13	1.032	8.13	3.096	14.13	3.096	20.13	1.548
2.17	1.032	8.17	3.096	14.17	3.096	20.17	1.548
2.20	1.032	8.20	3.096	14.20	3.096	20.20	1.548
2.23	1.032	8.23	3.096	14.23	3.096	20.23	1.548
2.27	1.032	8.27	3.096	14.27	3.096	20.27	1.548
2.30	1.032	8.30	3.096	14.30	3.096	20.30	1.548
2.33	1.032	8.33	3.096	14.33	3.096	20.33	1.548
2.37	1.032	8.37	3.096	14.37	3.096	20.37	1.548
2.40	1.032	8.40	3.096	14.40	3.096	20.40	1.548
2.43	1.032	8.43	3.096	14.43	3.096	20.43	1.032
2.47	1.032	8.47	3.096	14.47	3.096	20.47	1.032
2.50	1.032	8.50	3.096	14.50	3.096	20.50	1.032
2.53	1.032	8.53	3.096	14.53	3.096	20.53	1.032
2.57	1.032	8.57	3.096	14.57	3.096	20.57	1.032
2.60	1.032	8.60	3.096	14.60	3.096	20.60	1.032
2.63	1.032	8.63	3.096	14.63	3.096	20.63	1.548
2.67	1.032	8.67	3.096	14.67	3.096	20.67	1.548
2.70	1.032	8.70	3.096	14.70	3.096	20.70	1.548

2.73	1.032	8.73	3.096	14.73	3.096	20.73	1.548
2.77	1.032	8.77	3.096	14.77	3.096	20.77	1.548
2.80	1.032	8.80	3.096	14.80	3.096	20.80	1.548
2.83	1.032	8.83	3.096	14.83	3.096	20.83	1.548
2.87	1.032	8.87	3.096	14.87	3.096	20.87	1.548
2.90	1.032	8.90	3.096	14.90	3.096	20.90	1.548
2.93	1.032	8.93	3.096	14.93	3.096	20.93	1.548
2.97	1.032	8.97	3.096	14.97	3.096	20.97	1.548
3.00	1.032	9.00	3.096	15.00	3.096	21.00	1.548
3.03	1.032	9.03	3.096	15.03	2.580	21.03	1.032
3.07	1.032	9.07	3.096	15.07	2.580	21.07	1.032
3.10	1.032	9.10	3.096	15.10	2.580	21.10	1.032
3.13	1.032	9.13	3.096	15.13	2.580	21.13	1.032
3.17	1.032	9.17	3.096	15.17	2.580	21.17	1.032
3.20	1.032	9.20	3.096	15.20	2.580	21.20	1.032
3.23	1.032	9.23	3.096	15.23	2.580	21.23	1.548
3.27	1.032	9.27	3.096	15.27	2.580	21.27	1.548
3.30	1.032	9.30	3.096	15.30	2.580	21.30	1.548
3.33	1.032	9.33	3.096	15.33	2.580	21.33	1.548
3.37	1.032	9.37	3.096	15.37	2.580	21.37	1.548
3.40	1.032	9.40	3.096	15.40	2.580	21.40	1.548
3.43	1.032	9.43	3.096	15.43	2.580	21.43	1.032
3.47	1.032	9.47	3.096	15.47	2.580	21.47	1.032
3.50	1.032	9.50	3.096	15.50	2.580	21.50	1.032
3.53	1.032	9.53	3.096	15.53	2.580	21.53	1.032
3.57	1.032	9.57	3.096	15.57	2.580	21.57	1.032
3.60	1.032	9.60	3.096	15.60	2.580	21.60	1.032
3.63	1.032	9.63	3.096	15.63	2.580	21.63	1.548
3.67	1.032	9.67	3.096	15.67	2.580	21.67	1.548
3.70	1.032	9.70	3.096	15.70	2.580	21.70	1.548
3.73	1.032	9.73	3.096	15.73	2.580	21.73	1.548
3.77	1.032	9.77	3.096	15.77	2.580	21.77	1.548
3.80	1.032	9.80	3.096	15.80	2.580	21.80	1.548
3.83	1.032	9.83	3.096	15.83	2.580	21.83	1.032
3.87	1.032	9.87	3.096	15.87	2.580	21.87	1.032
3.90	1.032	9.90	3.096	15.90	2.580	21.90	1.032
3.93	1.032	9.93	3.096	15.93	2.580	21.93	1.032
3.97	1.032	9.97	3.096	15.97	2.580	21.97	1.032
4.00	1.032	10.00	3.096	16.00	2.580	22.00	1.032
4.03	2.064	10.03	5.676	16.03	2.580	22.03	1.032
4.07	2.064	10.07	5.676	16.07	2.580	22.07	1.032
4.10	2.064	10.10	5.676	16.10	2.580	22.10	1.032
4.13	2.064	10.13	5.676	16.13	2.580	22.13	1.032
4.17	2.064	10.17	5.676	16.17	2.580	22.17	1.032
4.20	2.064	10.20	5.676	16.20	2.580	22.20	1.032
4.23	2.064	10.23	5.676	16.23	2.580	22.23	1.548
4.27	2.064	10.27	5.676	16.27	2.580	22.27	1.548
4.30	2.064	10.30	5.676	16.30	2.580	22.30	1.548
4.33	2.064	10.33	5.676	16.33	2.580	22.33	1.548
4.37	2.064	10.37	5.676	16.37	2.580	22.37	1.548
4.40	2.064	10.40	5.676	16.40	2.580	22.40	1.548
4.43	2.064	10.43	5.676	16.43	2.580	22.43	1.032
4.47	2.064	10.47	5.676	16.47	2.580	22.47	1.032
4.50	2.064	10.50	5.676	16.50	2.580	22.50	1.032
4.53	2.064	10.53	5.676	16.53	2.580	22.53	1.032
4.57	2.064	10.57	5.676	16.57	2.580	22.57	1.032
4.60	2.064	10.60	5.676	16.60	2.580	22.60	1.032
4.63	2.064	10.63	5.676	16.63	2.580	22.63	1.548
4.67	2.064	10.67	5.676	16.67	2.580	22.67	1.548
4.70	2.064	10.70	5.676	16.70	2.580	22.70	1.548
4.73	2.064	10.73	5.676	16.73	2.580	22.73	1.548
4.77	2.064	10.77	5.676	16.77	2.580	22.77	1.548
4.80	2.064	10.80	5.676	16.80	2.580	22.80	1.548

4.83	2.064	10.83	5.676	16.83	1.548	22.83	1.032
4.87	2.064	10.87	5.676	16.87	1.548	22.87	1.032
4.90	2.064	10.90	5.676	16.90	1.548	22.90	1.032
4.93	2.064	10.93	5.676	16.93	1.548	22.93	1.032
4.97	2.064	10.97	5.676	16.97	1.548	22.97	1.032
5.00	2.064	11.00	5.676	17.00	1.548	23.00	1.032
5.03	2.064	11.03	7.740	17.03	1.548	23.03	1.032
5.07	2.064	11.07	7.740	17.07	1.548	23.07	1.032
5.10	2.064	11.10	7.740	17.10	1.548	23.10	1.032
5.13	2.064	11.13	7.740	17.13	1.548	23.13	1.032
5.17	2.064	11.17	7.740	17.17	1.548	23.17	1.032
5.20	2.064	11.20	7.740	17.20	1.548	23.20	1.032
5.23	2.064	11.23	11.352	17.23	2.064	23.23	1.032
5.27	2.064	11.27	11.352	17.27	2.064	23.27	1.032
5.30	2.064	11.30	11.352	17.30	2.064	23.30	1.032
5.33	2.064	11.33	11.352	17.33	2.064	23.33	1.032
5.37	2.064	11.37	11.352	17.37	2.064	23.37	1.032
5.40	2.064	11.40	11.352	17.40	2.064	23.40	1.032
5.43	2.064	11.43	27.348	17.43	1.548	23.43	1.548
5.47	2.064	11.47	27.348	17.47	1.548	23.47	1.548
5.50	2.064	11.50	27.348	17.50	1.548	23.50	1.548
5.53	2.064	11.53	27.348	17.53	1.548	23.53	1.548
5.57	2.064	11.57	27.348	17.57	1.548	23.57	1.548
5.60	2.064	11.60	27.348	17.60	1.548	23.60	1.548
5.63	2.064	11.63	56.760	17.63	2.064	23.63	1.032
5.67	2.064	11.67	56.760	17.67	2.064	23.67	1.032
5.70	2.064	11.70	56.760	17.70	2.064	23.70	1.032
5.73	2.064	11.73	56.760	17.73	2.064	23.73	1.032
5.77	2.064	11.77	56.760	17.77	2.064	23.77	1.032
5.80	2.064	11.80	56.760	17.80	2.064	23.80	1.032
5.83	2.064	11.83	116.100	17.83	1.548	23.83	1.032
5.87	2.064	11.87	116.100	17.87	1.548	23.87	1.032
5.90	2.064	11.90	116.100	17.90	1.548	23.90	1.032
5.93	2.064	11.93	116.100	17.93	1.548	23.93	1.032
5.97	2.064	11.97	116.100	17.97	1.548	23.97	1.032
6.00	2.064	12.00	116.100	18.00	1.548	24.00	1.032

002:0003---

****
* EXTERNAL AREAS based on Row Crops and a Tp of 1.37
*

DESIGN NASHYD	Area (ha)=	63.30	Curve Number (CN)=72.00
01:200 DT= 2.00	Ia (mm)=	1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.370	

Unit Hyd Qpeak (cms)= 1.765

PEAK FLOW (cms)= 2.056 (i)
TIME TO PEAK (hrs)= 13.367
RUNOFF VOLUME (mm)= 51.591
TOTAL RAINFALL (mm)= 103.200
RUNOFF COEFFICIENT = .500

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

002:0004---

```
*
--------------------
| PRINT HYD        |   AREA       (ha)=   63.300
| ID=01 (200    )  |   QPEAK     (cms)=    2.056 (i)
| DT= 2.00 PCYC=-1 |   TPEAK     (hrs)=   13.367
--------------------   VOLUME      (mm)=   51.591

     (i)  PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
--
002:0005----------------------------------------------------------------------
--
*
******************
* EXTERNAL AREAS  based on Pasture and a Tp of 1.73
*
----------------------
| DESIGN NASHYD      |   Area    (ha)=   63.30   Curve Number   (CN)=72.00
| 01:200    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=   1.730

     Unit Hyd Qpeak  (cms)=    1.398

     PEAK FLOW       (cms)=    1.719 (i)
     TIME TO PEAK    (hrs)=   13.800
     RUNOFF VOLUME    (mm)=   51.591
     TOTAL RAINFALL   (mm)=  103.200
     RUNOFF COEFFICIENT   =     .500

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

--------------------------------------------------------------------------------
--
002:0006----------------------------------------------------------------------
--
*
--------------------
| PRINT HYD        |   AREA       (ha)=   63.300
| ID=01 (200    )  |   QPEAK     (cms)=    1.719 (i)
| DT= 2.00 PCYC=-1 |   TPEAK     (hrs)=   13.800
--------------------   VOLUME      (mm)=   51.591

     (i)  PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
--
002:0007----------------------------------------------------------------------
--
*
      FINISH
--------------------------------------------------------------------------------
--
********************************************************************************
**
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2014-06-10     at 15:29:25
================================================================================
==
```

Appendix 'D'

Hydraulic Watermain Analysis

FUS Fire Flow
Smith + Andersen Consulting Engineering
S+A 14-0240 - Info - Field Notes
May 30, 2014

Riverside South Retail Centre											
Building ID	A	B	C	D	E	F	G	H	I	J	K
Type of construction	Non-combustible	Non-combustible	Non-combustible	Non-combustible	Non-combustible	Non-combustible	Non-combustible	Non-combustible	Non-combustible	Non-combustible	Non-combustible
Construction coefficient	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Ground floor area (square metres) A	5,388.0	576.0	1,394.0	622.0	4,303.0	1,962.0	585.0	1,187.0	885.0	1,302.0	650.0
√A	73.4	24.0	37.3	24.9	65.6	44.3	24.2	34.5	29.7	36.1	25.5
Height in stories	1.0	1.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	2.0	1.0
Fire flow F = 220CVA (litres/minute)	12,918.9	4,224.0	6,571.2	4,389.4	11,545.1	7,795.8	4,256.9	6,063.7	5,235.8	6,350.6	4,487.1
Occupancy factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Sprinkler factor - to NFPA 13 (-30%)	Yes	No	Yes	No	Yes	Yes	No	Yes	No	Yes	No
Sprinkler factor - sprinklers plus fire hoses (-10%)	Yes	No	Yes	No	Yes	Yes	No	Yes	No	Yes	No
Sprinkler factor - Fully supervised system (-10%)	Yes	No	Yes	No	Yes	Yes	No	Yes	No	Yes	No
Sprinkler factor - total (-50%)	0.5	1.0	0.5	1.0	0.5	0.5	1.0	0.5	1.0	0.5	1.0
Exposures factor	1.1	1.1	1.1	1.1	1.2	1.2	1.1	1.1	1.2	1.2	1.2
Calculated total fire flow litres/minute	7,105.4	4,646.4	3,614.2	4,828.4	6,927.1	4,482.6	4,682.6	3,335.0	6,021.2	3,810.4	5,160.2
Round off total fire flow to nearest 1,000 l/min	7,000	5,000	4,000	5,000	7,000	4,000	5,000	3,000	6,000	4,000	5,000
Minimum total fire flow 2,000 l/min	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Total fire flow litres/minute	7,000	5,000	4,000	5,000	7,000	4,000	5,000	3,000	6,000	4,000	5,000

ıan Carlson

m: Rogers, Christopher <Christopher.Rogers@ottawa.ca>
ıt: July 3, 2014 1:55 PM
Elliott, Gord
ıject: RE: Riverside South Retail Centre - 12007.330

d,

ındary conditions are as follows, considering both pre and post pressure zone reconfiguration.

IR = 123.9m
DY + Fire (7,000 Lpm) = 123.5m
DY + Fire (3,000 Lpm) = 125.3m
‹ HGL = 147.0m

:laimer: Unless otherwise stated, the boundary condition information is based on current operation of the city water ribution system. The computer model simulation is based on the best information available at the time. The ration of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test ı. The variation in physical watermain properties can therefore alter the results of the computer model ılation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that ır between the watermain and the hydrant that the model cannot take into account.

m: Orjan Carlson [mailto:orjan@urbanecosystems.com]
ıt: 2014/07/03 12:08 PM
Elliott, Gord
Rogers, Christopher
ıject: RE: Riverside South Retail Centre - 12007.330

d afternoon,
se find attached, fire flow demand calculations as prepared by the project mechanical engineers, Smith + Andersen.
st this information is sufficient for you to provide me with the hydraulic boundary conditions for 1420 Earl strong Road.

ards,
n Carlson

ın Ecosystems Ltd.
) Weston Road, Suite 705
ıdbridge, Ontario
05) 856 0629
05) 856 0698

```
*****************************************************************
*                          E P A N E T                          *
*                    Hydraulic and Water Quality                *
*                    Analysis for Pipe Networks                 *
*                          Version 2.0                          *
*****************************************************************
```

Input File: maxdaily.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
101	101	102	250	610
102	102	103	85	200
103	103	104	110	200
104	104	105	110	200
105	105	106	100	200
106	106	107	105	200
107	107	108	90	200
108	108	103	110	200
109	1	101	50	610

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
101	0.00	146.99	55.99	0.00	
102	0.00	146.94	55.24	0.00	
103	0.00	141.87	50.17	0.00	
104	0.00	140.41	48.71	0.00	
105	40.00	138.94	47.24	0.00	
106	17.00	138.93	47.23	0.00	
107	15.00	139.10	47.40	0.00	
108	25.00	139.67	47.97	0.00	
1	-97.00	147.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
101	97.00	0.33	0.19	Open
102	97.00	3.09	59.64	Open
103	43.18	1.37	13.32	Open
104	43.18	1.37	13.32	Open
105	3.18	0.10	0.11	Open
106	-13.82	0.44	1.62	Open
107	-28.82	0.92	6.30	Open

♀

Page 2
Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
108	-53.82	1.71	20.04	Open

		maxdaily		
109	97.00	0.33	0.19	Open

```
*********************************************************************
*                            E P A N E T                            *
*                     Hydraulic and Water Quality                   *
*                     Analysis for Pipe Networks                    *
*                           Version 2.0                             *
*********************************************************************
```

Input File: fireandmax.NET

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
101	101	102	250	610
102	102	103	85	200
103	103	104	110	200
104	104	105	110	200
105	105	106	100	200
106	106	107	105	200
107	107	108	90	200
108	108	103	110	200
109	1	101	50	610

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
101	0.00	146.96	55.96	0.00	
102	0.00	146.75	55.05	0.00	
103	0.00	124.80	33.10	0.00	
104	0.00	116.73	25.03	0.00	
105	157.00	108.66	16.96	0.00	
106	17.00	110.31	18.61	0.00	
107	15.00	113.34	21.64	0.00	
108	25.00	117.14	25.44	0.00	
1	-214.00	147.00	0.00	0.00	Reservoir

Link Results:

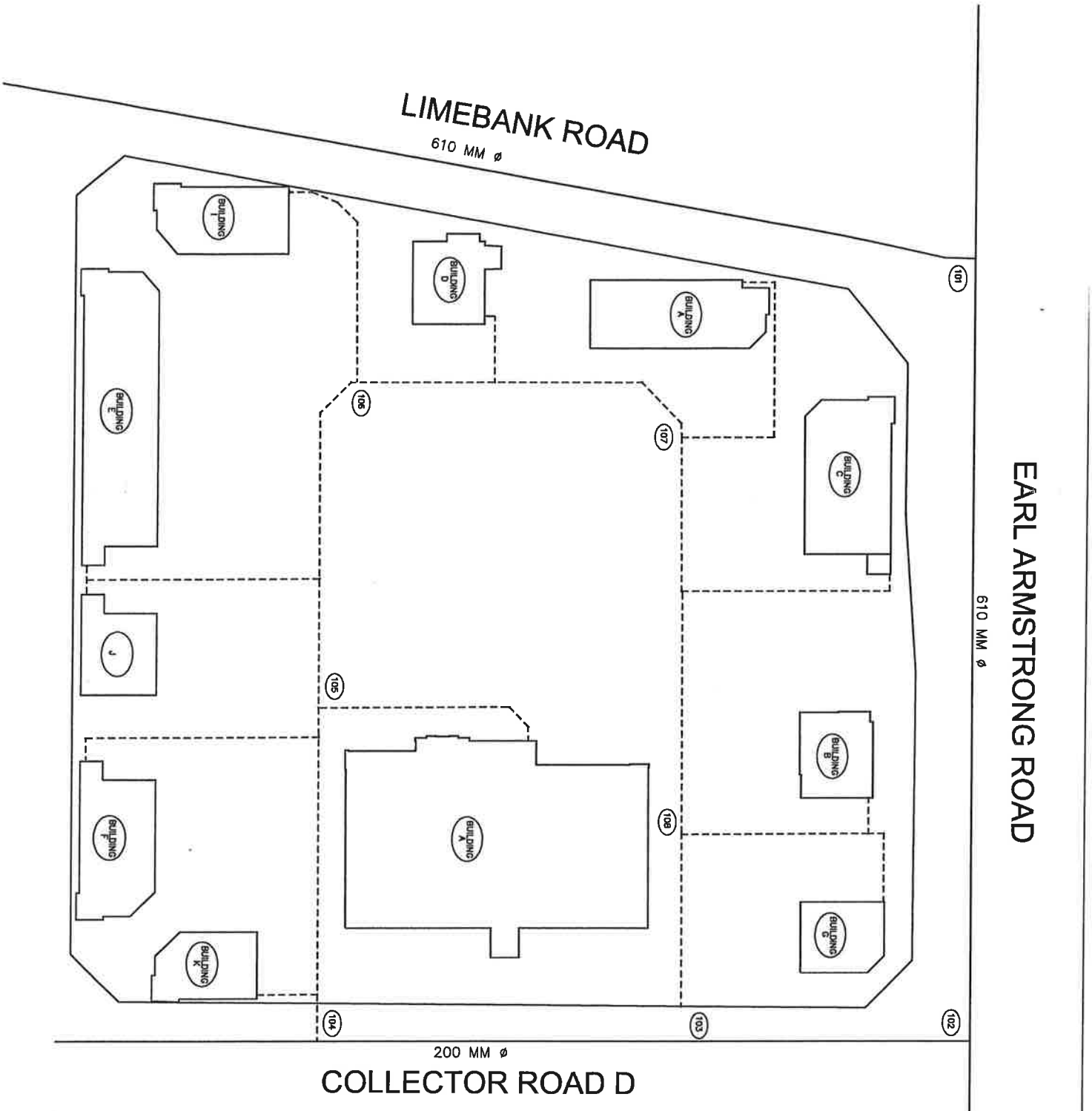
Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
101	214.00	0.73	0.83	Open
102	214.00	6.81	258.21	Open
103	108.50	3.45	73.39	Open
104	108.50	3.45	73.39	Open
105	-48.50	1.54	16.52	Open
106	-65.50	2.09	28.83	Open
107	-80.50	2.56	42.23	Open

♀

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
108	-105.50	3.36	69.69	Open

		fireandmax		
109	214.00	0.73	0.83	Open



LEGEND

——— EXTERNAL WATERMAIN

- - - - INTERNAL WATERMAIN

(104) NODE ID

WATERMAIN SCHEMATIC
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12007.330