Our File: 2211-47572-00

City File: TBD

SITE SERVICING REPORT – ARDEN GARDENS PHASE ONE AND TWO

To	From
City of Courtenay, Development Services **Attn: Rich Feucht, P. Eng.**	Riley Shambrook, EIT 2211 - Courtenay / Engineering
Re	**Date**
Arden Gardens Multi-Family Development – Phase One and Two Site Servicing Plan	July 9, 2021

McElhanney has prepared the following site servicing report on behalf of Simba Investments Ltd., in support of a Development Permit application. This report has been provided along with the latest design drawings dated July 9, 2021.

This servicing report provides details on municipal storm drainage, sanitary sewer, potable water and fire flow requirements. In addition, commentary is provided relative to proposed offsite road works. Third party utility servicing (BC Hydro, Shaw Cable, FortisBC and Telus) designs are by others, but commentary is provided herein regarding availability of third-party services.

This report presents both the estimated development loads as well as the servicing methodology, with the intent of confirming the suitability of the subject parcel for proposed development. The results herein will represent the preliminary engineering design that is reflected in McElhanney's current engineering design drawings. Refer to McElhanney design drawings in **Appendix A**.

1. General

The subject property is legally identified as *Lot 1, Plan 2963, Except That Part In Plan 20420, Part Of That Part Of Lot 2, Plan 2963 Lying To The North West Of A Boundary Parallel To And Perpendicularly Distant 132 Feet From The South Easterly Boundary Of Said Lot 2, And That Part Of Lot 2, Plan 2963 Lying To The South East Of A Boundary Parallel To And Perpendicularly Distant 132 Feet From The South Easterly Boundary Of Said Lot 2, All Of District Lot 96, Comox District*.

The development site consists of three consolidated properties, three wetland areas, and an existing on-site dry pond constructed in approximately 2011. The civic address for the consolidated site has not been

determined. The development site is located on the north-east side of Arden Road and to the south-east of Tarling Park. The property is currently zoned CD-19a, CD-19b, and CD-19c.

Phase One of the development proposes to construct 61 townhouse units and a 20-unit micro-unit apartment building on the site. Phase Two proposes to construct 30 townhouse units. The development is proposed to take place in two phases.

Phase Two includes four – 4-unit townhouse buildings, one 2-unit townhouse building, and two 6-unit townhouse buildings.

Please see the Architectural plans for details on floor plans and unit configurations.

McElhanney Drawing C0-101 – Overall Site Plan and Truck Movements in **Appendix A** illustrates the proposed site layout, parking configuration, and access.

The existing development site generally slopes at approximately 4-6% from west to east and consists of grass land, three wetland areas, an existing dry pond, three existing buildings; each with their own driveway access, and small groups of trees scattered across the property. The south-west most building is proposed to be removed with Phase 1, and the remaining two buildings are proposed to be removed with Phase 2. **Figure 1** below shows the existing development site.

Figure 1 - Existing Development Site

2. Storm Drainage and Storm Water Management

2.1. EXISTING STORM DRAINAGE SYSTEM

The development property contains three separate existing wetland areas, four significant existing drainage ditches adjacent to the property, and an existing “constructed wetland cell” at the north corner of the property. Refer to **ML Drawing C0-100 – Existing Site Plan and Removals** in **Appendix A** for details on the existing state of the development site.

Runoff from the south-west side of Arden Road and the properties above flow underneath Arden Road in a culvert at the west corner of the development property. Runoff flows from the culvert at the west corner of the property, and the western-most wetland, into an existing ditch parallel to the north-west property line until it converges with a larger ditch carrying water from Tarling Park and the adjacent property to the north-west at the stub end of 13th Street. At this location, water from both ditches enter a 450mm diameter culvert across 13th Street and discharge into the existing constructed wetland cell on the development property. The constructed wetland cell does not currently contain any control/attenuation structures and flows directly into a storm pipe crossing back over 13th Street and into City drainage manhole 14-0346, and down 13th Street. Of note, the development property, which formally receives municipal storm water into the existing constructed wetland cell, does not contain a statutory right-of-way allowing for the discharge or conveyance of municipal storm water.

Our understanding of historical drainage in the area is as follows: water flowing into the 13th Street storm main from the constructed wetland cell was historically conveyed into the Tributary 10 wetland, and the diversion to the 13th Street storm main was a temporary measure until the remainder of a shared development Storm Water Management Plan (by previous developers) was constructed with the remainder of the development in the area. Our understanding of the City’s preference is that water entering the existing constructed wetland cell is conveyed to its historical catchment, the Tributary 10 wetland.

Refer to **Appendix B** for the shared development **Storm Water Management Plan (SWMP-4 Rev. 0)** for details related to construction of the existing constructed wetland cell.

Runoff from the other parts of the development site which do not flow into the western-most wetland drain directly into the other two wetlands located on the development property. Each of these wetlands contain a drainage ditch running through the berm created by the installation of the sanitary main between City sanitary manholes 2-620 and 2-623. The record drawings for the sanitary main installation show a 300mm diameter culvert placed at the low point, but recent investigation shows that the culverts no longer exist, and have been replaced by rip-rap armoured channels crossing the backfill berm. Once storm water crosses the sanitary main via the armoured channels, it flows through the Tributary 10 wetland and is eventually directed across Cumberland Road and into Piercy Creek.

Figure 2 – Rip-rap armoured channel crossing the sanitary backfill berm between sanitary manholes 2-620 and 2-621. Photo looking along the berm to the south-west.

Please refer to **Drawing C0-100 - Existing Site Plan and Removals** in **Appendix A** for details of the existing site plan and storm system.

2.2. PRE- AND POST-DEVELOPMENT RUNOFF FOR DEVELOPABLE PORTION OF SUBJECT PROPERTY

A hydraulic model was created for the developable portion of the subject property using SWMM software, enabling analysis of existing and post-development site response to a variety of design rainfall events. Simulations were completed for the City of Courtenay 2018 Bylaw 2919, 24-hour storm, 2, 5, 10, 25 and 100 Year rainfall events. Design rainfall events were derived from the City of Courtenay's Subdivision and Development Servicing Bylaw 2919. The existing site was separated into Phase 1 and Phase 2, with Phase 2 routed onto Phase 1 to accurately model the site. Model input parameters based on existing site conditions are summarized in **Table 1**.

Table 1 - SWMM Model Parameters: Existing Site

Model Parameters	Phase 1 Pre-Development	Phase 2 Pre-Development
Area (ha)	1.81	0.61
Width (m)	200	120
Slope (%)	4.8	6.1
% Impervious	25	25
N Imperv	0.015	0.015
N Perv	0.15	0.15
Dstore Imperv (mm)	2	2
Dstore Perv (mm)	6	6
Zero % imperv	0	0
Outlet Routing	Pervious	Outlet (To Phase 1)
SCS Infiltration Values		
SCS Curve Number	79	79
Drying Time	7	7

2.3. ONSITE STORMWATER MANAGEMENT AND BMP'S

The following Best Management Practices (BMP's) will to be implemented for this project to limit peak runoff rates to existing rates up to the 100-year rainfall event and provide qualitative treatment of runoff. The following BMP's are proposed for the site:

- Retain/re-establish native vegetation within the developed area.
- Place a minimum of 300mm of amended topsoil in any landscaped (pervious) areas.
- Runoff from select areas will be conveyed through raingardens to provide attenuation and bio-treatment before discharging into the on-site storm system.
- Install an oil water separator/ treatment facility to improve runoff water quality.
- Construct a Dry Pond within the north-eastern-most wetland area with a minimum bottom area of 330m^2 and 3:1 side slopes.
- The development proposes to mitigate all City Bylaw 2919 design storms up to and including the 1-in-100 year storm.
- Minor onsite system infrastructure will be designed to convey the post-development 100-year storm event.

See **Drawing C0-102 – Site Servicing Plan** in **Appendix A** for details on the proposed storm works.

2.3.1. Constructed Wetland Cell and the 100 Year Flow Path

To control peak outflows, a constructed wetland cell (dry pond) will be installed in the northern-most wetland area to attenuate peak runoff rates to pre-development rates for all storms up to and including the 1-in-100 year event. To ensure that all runoff from the 100 year storm event is conveyed into the constructed wetland cell, on-site storm pipes will be sized to convey the 100 year storm.

An orifice and weir control manhole will be utilized to attenuate peak runoff rates to pre-development levels for all Bylaw 2919 storm events up to and including the 100-year event. We note that the constructed wetland cell is sized to attenuate flows from both Phase 1 and Phase 2. Additional stormwater attenuation measures are not required to be constructed in Phase 2.

The constructed wetland cell will contain an emergency overflow in the case the control manhole becomes clogged during a major storm event; however, proper maintenance and cleaning will greatly reduce the likelihood of blockages (see Section 2.7).

Design and construction of the constructed wetland cell will be completed in consultation with the project biologist to ensure that the quality of the habitat generated in this area is acceptable.

After leaving the control manhole, the attenuated major storm water is discharged into an existing ditch leading to the Tributary 10 wetland. Since the development proposes to mitigate all storms up to and including the 100 year storm event, hydraulic analysis beyond the discharge point into the existing ditch is outside of the scope of this development.

2.4. POST-DEVELOPMENT RUNOFF

The post-development site was modeled using SWMM software. Simulations were completed for the 24-hour 2, 5, 10, 25, and 100-Year Modified Chicago Distribution rainfall events based on the City of Courtenay's Bylaw 2919. Pre and Post-development model input parameters for the subject property are summarized in **Table 2**. The model includes mitigation measures described above. The post-development site considers that both Phase 1 and 2 buildings have been constructed, and the pond is designed to attenuate runoff from both phases.

Table 2 – Pre-development and post-development SWMM model parameters.

Model Parameters	Phase 1 Pre-Development	Phase 2 Pre-Development	Phase 1 Post-Development	Phase 2 Post-Development
Area (ha)	1.81	0.61	1.81	0.61
Width (m)	200	120	50	120
Slope (%)	4.8	6.1	2	3
% Impervious	25	25	53.8	62.7
N Imperv	0.015	0.015	0.012	0.012
N Perv	0.15	0.15	0.2	0.2
Dstore Imperv (mm)	2	2	2	2
Dstore Perv (mm)	6	6	15	15
Zero % imperv	0	0	0	0
Outlet Routing	Pervious	Outlet (To Phase 1)	Outlet	Outlet
SCS Infiltration Values				
SCS Curve Number	79	79	85	90
Drying Time	7	7	7	7

Table 3 compares existing runoff to post-development runoff for all phases of the proposed development. The table indicates that the stormwater management requirements described in **Section 2.3** can attenuate post-development runoff rates to pre-development levels up to and including the 1 in 100-year Bylaw 2919 storm event. **Figure 3 – Figure 7** show the pre and post-development runoff hydrographs for each of the Bylaw 2919 storm events.

Table 3 – SWMM model output for pre and post-development runoff rates for both phases of the development.

24 Hour Rainfall Distribution	Total Rainfall (mm)	Pre-Development Runoff		Post-Development Runoff	
		Peak Rate (lps)	Total Volume (m3)	Peak Rate (lps)	Total Volume (m3)
CoC Bylaw 2919 2-Year	89.0	58.9	1297.4	45.2	1568.3
CoC Bylaw 2919 5-Year	114.8	125.6	1843.3	94.6	2161.0
CoC Bylaw 2919 10-Year	132.7	177.1	2233.3	138.9	2575.7
CoC Bylaw 2919 25-Year	154.2	245.8	2711.9	195.8	3078.4
CoC Bylaw 2919 100-Year	187.0	360.5	3453.5	287.1	3848.0

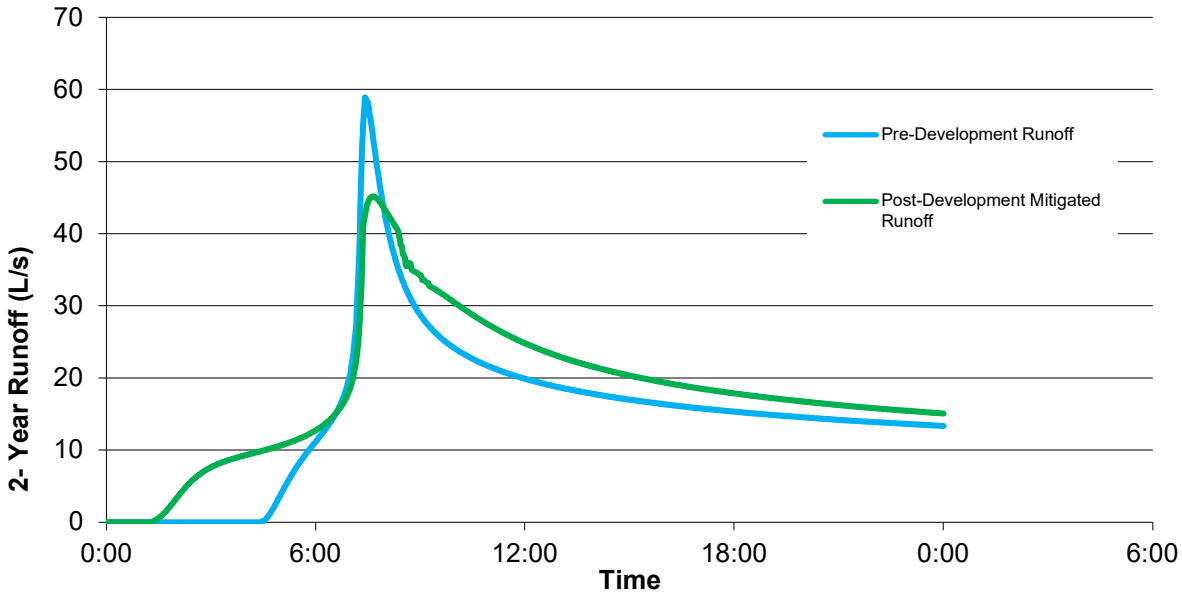


Figure 3 – 1 in 2-Year Rainfall Event Hydrograph

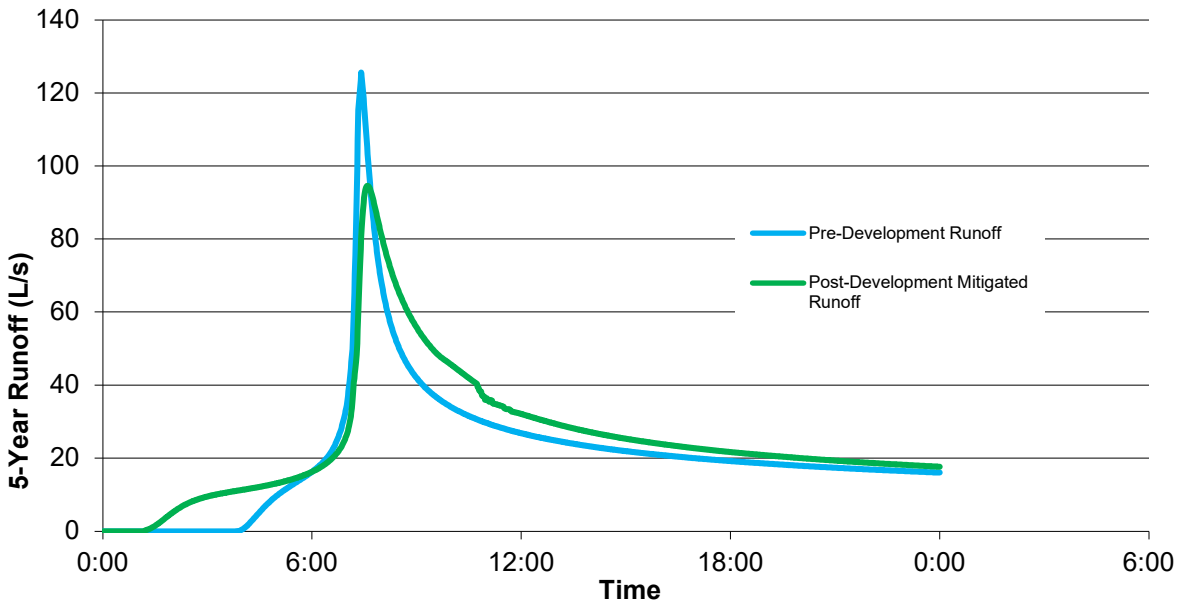


Figure 4 - 1 in 5 Year Rainfall Event Hydrograph

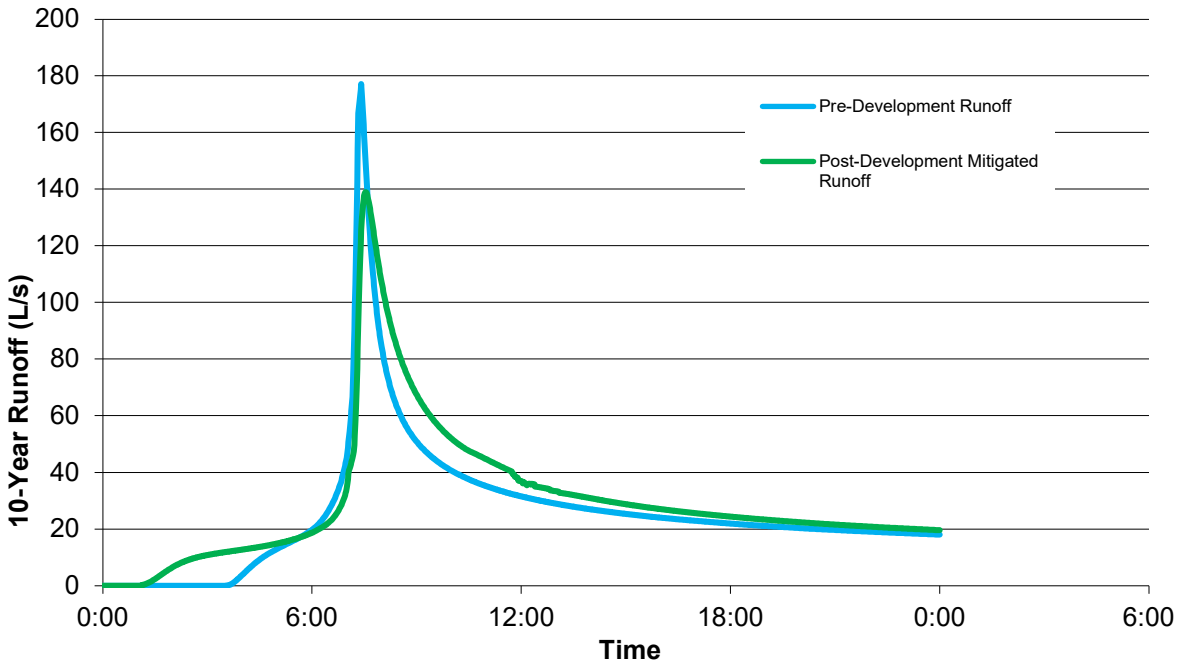


Figure 5 - 1 in 10 Year Event Runoff Hydrograph

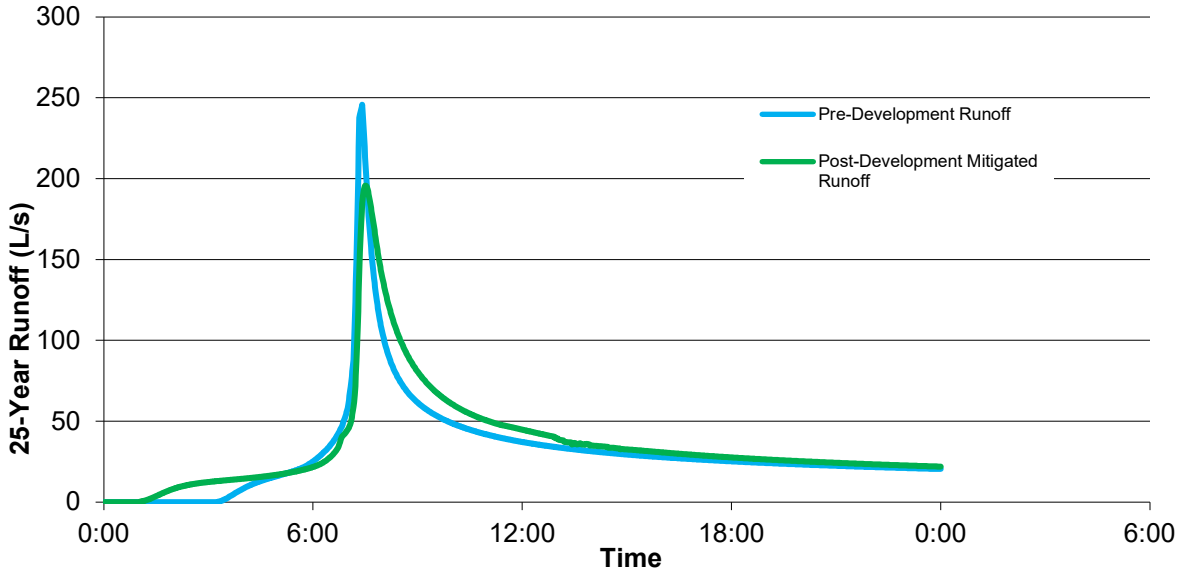


Figure 6 – 1 in 25-Year Event Runoff Hydrograph

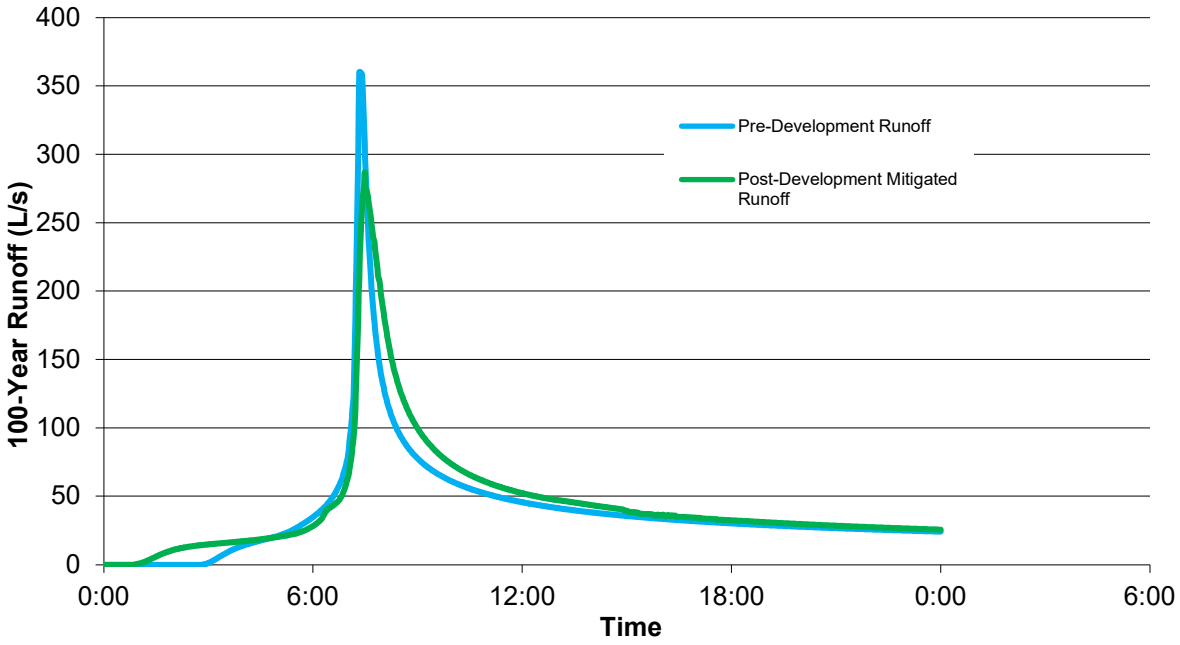


Figure 7 – 1 in 100-Year Event Runoff Hydrograph

2.5. OFFSITE PIPE NETWORK CONVEYANCE CAPACITY

The development proposes to attenuate all storm events up to and including the 100-year Bylaw 2919 storm event to pre-development runoff rates. Due to this, development hydraulic analysis ends at the outlet to the Tributary 10 wetland, near the control manhole.

2.6. QUALITY

All runoff from paved areas will be routed through catchbasins with grit sumps in the on-site roads. Runoff from select areas will be routed through rain gardens to provide additional attenuation and bio-treatment before discharging into the on-site storm system. Before runoff enters the constructed wetland cell, flows will be directed through a Stormceptor EFO model oil-grit separator that will provide water polishing to meet City Bylaw 2919 requirements. A technical memo determining the size of the EFO model will be provided with the Building Permit application, forming a part of the detailed design.

Further bio-treatment of the stormwater runoff will take place within the constructed wetland cell, before flowing through the control manhole and into the Tributary 10 wetland.

2.7. MAINTENANCE

Maintenance of the onsite storm system is required. An Operation and Maintenance document will be provided for the on-site storm system with the Building Permit application to be registered on title as a maintenance covenant.

3. Sanitary Sewers

3.1. EXISTING SANITARY SEWER SYSTEM

The development backs on to the existing stub end of 13th Street, which contains an existing 375mm sanitary main stubbed out of sanitary manhole 2-571 to the south-west and is capped at the end of the road right-of-way. There is another branch out of manhole 2-571 to the north-west, which appears to be capped just inside Tarling Park.

The existing 375mm sanitary sewer in the 13th Street right-of-way flows north-east towards the Willemar Avenue sanitary main, and then flowing to the south-east, before entering the 21st Street system.

3.2. PROPOSED SANITARY SEWER FLOW ESTIMATES

Estimated sanitary sewer flows for the proposed development have been calculated based on MMCD Design Guidelines 2014 and City Bylaw 2919 and are presented below in **Table 4**. The number of units below represents the total for Phases 1 and 2.

Table 4 – Sanitary Loading Calculation

PEAK SANITARY SEWER DEMAND		UNITS
Average Dry Weather Flow (City Bylaw 2919)	360	l/c/day
Site Area	1.92	ha
Total Equivalent Population (average 2.18 people/ unit used)	242	people
Total Number of Units	111	
Infiltration Rate (New Pipe)	0.06	l/s/ha
Peaking factor (Pf)	3.2	
Inflow and Infiltration	0.12	l/s
Average Dry Weather Sewer Flow (ADWF)	1.01	l/s
Design Flow Q = ADWF x Pf + Infiltration	**3.34**	**l/s**

The development proposes a new 150mm diameter sewer service that will discharge into the existing sanitary manhole SMH 2-571 located at the end of 13th Street. Refer to **ML Drawing C0-102 – Site Servicing Plan** located in **Appendix A** for details of the new onsite and offsite sanitary sewer system. All existing onsite sanitary infrastructure will be removed and existing services at property line will be capped and abandoned by City Forces at the developer's expense. Refer to the calculations in **Appendix D** for confirmation that the 150mm diameter PVC service is adequately sized for the proposed development.

3.3. OFFSITE SANITARY MAIN DEFICIENCIES

The sanitary model analysis in the **GeoAdvice Technical Memo** located in **Appendix C**, states that the sanitary loading from this development adds three new deficiencies to the City's sanitary system. The following pipes are listed in **Table 2.5** of the **Technical Memo** as requiring upgrading to 300mm diameter:

- SMAIN-2-0121 (39.5m length)
- SMAIN-2-0122 (72.2m length)
- SMAIN-2-0123 (78.2m length)

The total length of sanitary main requiring upgrading from 200mm diameter to 300mm diameter, according to the Technical Memo, is 189.9m. Further, sanitary main 2-0122 is located below the traffic circle at the intersection of Willemar Avenue and Cumberland Road. The extensive offsite sanitary upgrades required as a part of this development are a temporary measure, until the deficiencies are addressed through the Arden Central Trunk Main project, which is listed in the City's budget for the year 2022 - 2023 in **Attachment 2** of the City's **2020-2024 Sewer Fund Financial Plan**, located in **Appendix F**.

The Technical Memo by GeoAdvice shows in the pipe capacity modeling results that SMAIN-2-0122 and SMAIN- 2-0121 are at capacity ratios of 0.90 and 0.98 d/D in the existing condition with the addition of development loading. Considering this, it is not clear why these pipes are flagged in the report as requiring upgrades. Further, sanitary mains SMAIN-2-0123 and SMAIN-2-0124 are noted as over capacity in the existing condition without the development loading in the pipe capacity modelling results.

Due to this, it is not clear why SMAIN-2-0123 is flagged as requiring upgrading by the development. Further clarification from the City is required.

The developer wishes to further discuss options which do not involve extensive upgrades to solve the temporary sanitary deficiencies.

4. Domestic Water Demand and Fire Flow

4.1. EXISTING WATER SYSTEM

The development is fronted by an existing City 200mm PVC watermain stubbed at the end 13th Street and an existing 150mm AC watermain along Arden Road. There are two existing fire hydrants adjacent to the development property located at the end of the 13th Street dead end and near the West corner of the proposed development. There are existing services to the existing single-family homes on the properties along Arden Road, which are proposed to be removed. The development is proposed to be serviced from the water main in 13th Street.

4.2. DOMESTIC WATER DEMANDS AND PROPOSED ONSITE SYSTEM

Domestic water demands for the purpose of sizing the water meter were calculated using AWWA M22 and the fixture value method, and domestic water Average Day Demand (ADD), Maximum Day Demand (MDD), and Peak Hour Demand (PHD) were calculated using Bylaw 2919. Calculations confirming the water meter sizing can be found in **Appendix E**, and the Bylaw 2919 domestic water demand calculations can be found in **Table 5.**

Table 2 – City of Courtenay Bylaw 2919 domestic water demand calculation.

Estimated Development Population			
	Phase 1	Phase 2 Estimated	Development Total
Total Multifamily Units	61	30	91
People Per Multifamily Unit	2.4	2.4	2.4
Total Micro Units	20	0	20
People Per Micro Unit	1.2	1.2	1.2
Total Equivalent Population	170	72	242
Domestic Demand for Metered Development per Bylaw 2919 (lps)			
Average Day Demand (635 L/c/d)	1.249	0.529	1.779
Maximum Day Demand (2100 L/c/d)	4.132	1.750	5.882
Peak Hour Demand (3000 L/c/d)	5.903	2.500	8.403

GeoAdvice Technical Memo dated May 15, 2020, located in **Appendix C**, states that the City's water distribution network will have a pressure of 67.6 psi remaining at the PHD requested in the model under existing conditions, and 71.8 psi under future conditions.

The PHD calculated in **Table 5** exceeds the PHD value used in GeoAdvice's Technical Memo (5.76 l/s), and the City may need to run the model again to confirm availability of the increased PHD, although there

seems to be ample pressure available in the municipal system to provide the additional PHD compared to the Technical Memo. Further clarification from the City is required.

4.3. FIRE FLOW

Preliminary fire flow estimates have been estimated based on MMCD Design Guidelines 2014. Per Table 2.5 Minimum Fire Flow Requirements, the minimum fire flow for apartment and townhouse and apartment developments is **90 l/s**.

To meet fire protection specifications, two hydrants are proposed be installed. One hydrant is near the middle of the development, and another across the driveway from the apartment building. With the addition of the on-site hydrants, all buildings are within 90m of a hydrant, and the apartment building fire connection is within 45m of an on-site hydrant. See **Drawing C0-102 – General Servicing Plan** in **Appendix A** for details on fire hydrant coverage.

The GeoAdvice Technical Memo states that the City's system has capacity to provide fire flow rates to the property line of 270 lps under existing conditions, and 291 lps under future conditions, which exceeds the development's required flow rate.

The fire flow rate required for on-site fire suppression systems will be calculated using NFPA-13 during detailed design, and confirmation of the adequacy of the 150mm combined water service to convey the combined on-site flow rate requirement will be provided with the Building Permit application.

4.4. TOTAL DEVELOPMENT DEMAND

The total development demand, based on the Bylaw 2919 MDD calculation and the MMCD Minimum Fire Flow (MDD+Fire Flow) value is **95.9 l/s**.

The GeoAdvice Technical Memo confirms there is 270 l/s available in the existing condition, meaning that there is adequate water available to service the development. As mentioned above, the on-site fire flow requirement will be determined during detailed design, and confirmation of the adequacy of the combined 150mm water service will be provided with the Building Permit application.

4.5. ONSITE SERVICING AND METERING

The proposed on-site water distribution system will tie into the existing 200mm diameter PVC watermain stub on 13th Street near the northern corner of the development. The water service will be a 150mm diameter configuration per City of Courtenay CSSD W2e. The on-site pipes will be 150mm diameter PVC C900 up to the fire hydrant, and 100mm diameter PVC C900 thereafter.

See **Drawing C0-102 – General Servicing Plan** in **Appendix A** for details on on-site water servicing.

5. Road Works

5.1. ROAD FRONTAGES

The proposed development is fronted by Arden Road to the south-west and the end of 13th street to the north. There are three existing gravel driveways adjacent to Arden road on the Southwest of the site that are to be removed.

Arden Road is classified as an industrial/commercial collector road, and 13th Street is classified as a local road.

The development driveway will be accessed off Arden Road and the gravel pedestrian path connecting to 13th Street at the north end of the property. Arden Road currently exists as a two lane road with gravel shoulders and has a paved width of approximately 6.15m. 13th Street has an approximately 10.0m wide Right-of-Way (ROW) and another 10m wide SRW, with an approximate paved width of 9.3m with roll curb and an approximately 1.5m wide sidewalk along the North of the road.

5.2. OFFSITE UPGRADES

It is assumed the development will be completing the following offsite works on Arden Road:

- Install a new driveway entrance off Arden road. Complete with a curb return along the south (6m radius) and an edge of asphalt return along the North of the entrance (6m radius).
- Remove and reinstall roadway to centerline per City detail CSSD CRu – Collector Road Section – Rural along frontage of the proposed development.

It is assumed that no upgrades will be required to the 13th Street stub end due to recent upgrades in the area.

6. Closure

We trust the information provided herein is sufficient to process the Development Permit application. Should there be any questions or concerns please contact the undersigned.

Yours truly,

MCELHANNEY LTD.

Riley Shambrook, EIT
Civil Engineer
rshambrook@mcelhanney.com

Reviewed By:

2021-07-14

Neil Penner, P. Eng.
Civil Engineer
npenner@mcelhanney.com

RS/njg

REVISION HISTORY

Date	Status	Revision	Author
2021-07-09	Final	0	Riley Shambrook, EIT

LIMITATION

This report has been prepared for the exclusive use of the City of Courtenay and Simba Investments Ltd. The material in it reflects the best judgement of the Consultant in light of the information available to the Consultant at the time of preparation. As such, McElhanney, its employees, sub-consultants and agents will not be liable for any losses or other consequences resulting from the use or reliance on the report by any third party.

APPENDIX A

McElhanney Design Drawings C1-100 through C1-201

McElhanney Cover A1 - 2017-04-17

CLIENT

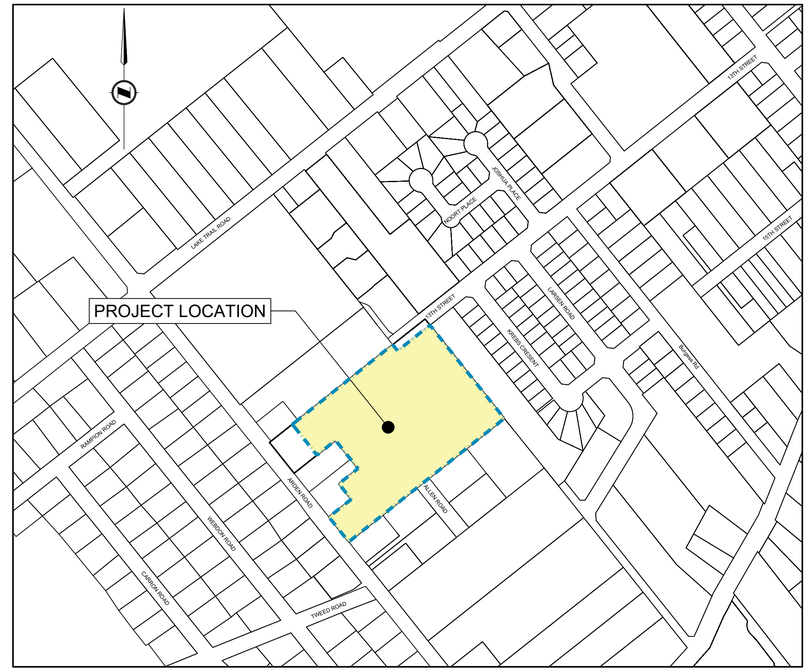
SIMBA INVESTMENTS LTD.

PROJECT NAME

ARDEN GARDENS - PHASE ONE

DESCRIPTION

MULTIFAMLITY RESIDENTIAL DEVELOPMENT
CIVIL SERVICING
LOT 1, PLAN 2963, LOT 2, PLAN 2963, LOT A, PLAN 20420,
DISTRICT LOT 96, COMOX DISTRICT



LOCATION PLAN
NTS

McELHANNEY PROJECT 2211-47572-00

CITY PROJECT ----

STATUS ISSUED FOR DEVELOPMENT PERMIT

McElhanney

1211 Ryan Road
Courtenay BC
Canada V9N 3R6
T 250 338 5495

DRAWING LIST

SHEET #	NAME	REVISIONS						
		PA	PB	PC	0	1	2	3
C1-001	GENERAL NOTES AND LEGEND							
C1-100	EXISTING SITE PLAN AND REMOVALS							
C1-101	OVERALL SITE PLAN AND TRUCK MOVEMENTS							
C1-102	PRELIMINARY SERVICING PLAN							
C1-103	PRELIMINARY GRADING PLAN							
C1-500	SUGGESTED EROSION AND SEDIMENT CONTROL PLAN							

DATE: 2021-07-14, 12:38 FILE: G:\2211 Engineering\47500 - 47599\47572 Simba Arden MF\10.0 Drawings\10.1 Engineering\10.2.1 Sheets\47572-00_000 - COVER.dwg

McElhanney ISO A1 - 2018-12-04

GENERAL

1. ALL MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO SUBDIVISION AND DEVELOPMENT BYLAW 2919, INCLUDING AMENDMENTS AND APPENDICES.
2. THE CONTRACTOR SHALL MAINTAIN AN UP TO DATE SET OF "AS-CONSTRUCTED" REDLINE DRAWINGS FOR THE PROJECT. THESE SHALL BE MADE AVAILABLE TO THE ENGINEER PRIOR TO ISSUING OF SUBSTANTIAL PERFORMANCE FOR THE PROJECT.
3. THE CONTRACTOR IS REQUIRED TO SUBMIT ALL NECESSARY PROJECT INFORMATION TO THE CITY ENGINEERING DEPARTMENT / PUBLIC WORKS DEPARTMENT 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
4. THE CONTRACTOR SHALL OBTAIN SERVICE RECORD CARDS FROM THE CITY PRIOR TO CONSTRUCTION.
5. A PRE-CONSTRUCTION MEETING WITH CITY STAFF IS TO BE HELD PRIOR TO COMMENCEMENT OF CONSTRUCTION OF OFF-SITE WORKS.
6. ANY EXISTING CITY INFRASTRUCTURE NOT REQUIRED AS A RESULT OF THIS PROJECT IS TO BE RETURNED TO THE PUBLIC WORKS YARD. TWO WEEKS NOTICE OF DELIVERY IS REQUIRED.
7. THE CONTRACTOR SHALL INFORM THE ENGINEER OF ANY DISCREPANCIES WITHIN THESE PLANS PRIOR TO CONSTRUCTION.
8. ALL DISTURBED AREAS, STRUCTURES (RETAINING WALLS, FENCES), VEGETATION, HABITAT, ETC. ON PUBLIC OR PRIVATE PROPERTY ARE TO BE RESTORED TO EQUAL OR BETTER CONDITION THAN EXISTING, AND TO THE SATISFACTION OF THE PROPERTY OWNER AND CITY OF COURTENAY.
9. THE CONTRACTOR IS TO ARRANGE WORKS ON OR AROUND EXISTING UTILITY POLES AND GUY WIRES. UPON AWARD OF THE CONTRACT, THE CONTRACTOR MUST CONTACT BC HYDRO, TELUS, FORTIS BC AND SHAW CABLE WITH A CONSTRUCTION SCHEDULE. THE CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY RELOCATIONS AND TEMPORARY MEASURES REQUIRED TO INSTALL WORKS.
10. BOULEVARDS MUST BE GRADED IN ACCORDANCE WITH THE CITY OF COURTENAY SUBDIVISION AND DEVELOPMENT SERVICING BYLAW 2919.
11. ALL REQUESTS FOR FIELD CHANGES ARE TO BE MADE TO THE PROJECT ENGINEER FOR REVIEW AND APPROVAL, PRIOR TO IMPLEMENTING THE DESIGN CHANGE.

TRAFFIC CONTROL / SITE SAFETY

1. THE CONTRACTOR SHALL ASSUME "PRIME CONTRACTOR" STATUS AND WILL BE RESPONSIBLE FOR ALL WORK PLACE SAFETY RESPONSIBILITIES FOR WORKERS IN ACCORDANCE WITH WORKSAFE BC AND OHS REGULATIONS.
2. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN FOR REVIEW BY THE CITY OF COURTENAY AND THE PROJECT ENGINEER PRIOR TO COMMENCEMENT OF CONSTRUCTION.
3. THE CONTRACTOR SHALL DELIVER WRITTEN NOTICE OF CONSTRUCTION TO ALL RESIDENTS AND BUSINESSES WITHIN 1 BLOCK OF THE PROJECT.
4. THE CONTRACTOR SHALL NOTIFY ALL EMERGENCY SERVICE AGENCIES, THE CITY OF COURTENAY, MoTI, SCHOOL BUS, GARBAGE CONTRACTORS AND BC TRANSIT OF THE SUBSEQUENT WORK ZONE AREA, SPEED REDUCTIONS, OR DETOURS WHICH MAY AFFECT TRAFFIC FLOW.
5. THE CONTRACTOR SHALL MAINTAIN VEHICLE AND PEDESTRIAN ACCESS TO ALL RESIDENCES AND BUSINESSES AT ALL TIMES.
6. THE CONTRACTOR SHALL VERIFY THAT SITE SAFETY FOR VEHICLE OPERATORS AND PEDESTRIANS IS MAINTAINED FROM THE END OF EACH WORK DAY, THROUGH THE NIGHT, AND UNTIL THE START OF THE NEXT WORK DAY BY USING FLASHING BEACONS, BARRICADES, SIGNS, DELINEATORS ETC., IN ACCORDANCE WITH CURRENT EDITION OF THE "*TRAFFIC CONTROL MANUAL FOR WORK ON ROADWAYS*" PUBLISHED BY MoTI.
7. THE CONTRACTOR IS TO ERECT ALL APPROPRIATE CONSTRUCTION ZONE SIGNS AND USE CERTIFIED FLAG PERSONNEL TO MAINTAIN SAFE AND EFFICIENT TRAFFIC FLOW ON ROADS ADJACENT THE WORK SITE.
8. ALL TRAFFIC SIGNS ARE TO BE AS PER THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR CANADA (CURRENT EDITION).

PERMITS

1. THE CONTRACTOR SHALL OBTAIN A PERMIT FROM THE CITY OF COURTENAY PUBLIC WORKS DIVISION TO CONSTRUCT WORKS WITHIN A MUNICIPAL ROAD ALLOWANCE, STATUTORY RIGHT-OF-WAY AND/OR MUNICIPAL PROPERTY.
2. THE CONTRACTOR IS REQUIRED TO SUBMIT ALL NECESSARY PERMITS (ROAD EXCAVATION AND E48 PROJECT INFORMATION) TO THE CITY OF COURTENAY PRIOR TO SCHEDULING A PRECONSTRUCTION MEETING.
3. A TREE CUTTING PERMIT IS REQUIRED FROM THE CITY OF COURTENAY PRIOR TO THE REMOVAL OF ANY TREES.
4. A PERMIT IS REQUIRED FROM FORTIS BC GAS WHEN THE SITE WORK OR ACTIVITY INVOLVES:
   - 4.1. WORKING WITHIN TWO (2) METRES OR CROSSING OVER/UNDER AN INTERMEDIATE PRESSURE (IP) GAS PIPELINE (701-2070 kPa / 101.6 - 300 psi)
   - 4.2. CROSSING A TRANSMISSION PRESSURE (TP) GAS PIPELINE (ABOVE 2070 kPa / 300 psi) OR WORKING WITHIN A RIGHT-OF-WAY.

EXCAVATING, TRENCHING AND BACKFILLING

1. ALL DISTURBED AREAS ON PUBLIC OR PRIVATE PROPERTY ARE TO BE RESTORED TO EQUAL OR BETTER CONDITION THAN EXISTING AND TO THE SATISFACTION OF THE MUNICIPAL WORKS INSPECTOR AND PROPERTY OWNER.
2. TRENCHES AND ASPHALT REMOVAL AREAS WITHIN EXISTING HARD SURFACE ROADS, ACCESSES, OR TRAILS ARE TO BE REINSTATED ON A TEMPORARY BASIS, WITH EITHER HOT OR COLD MIX ASPHALT UNTIL THE FINAL ASPHALT IS INSTALLED
3. INFORMATION ON EXISTING UTILITIES MAY NOT BE COMPLETE NOR ACCURATE. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXPOSE LOCATIONS OF ALL EXISTING UTILITIES AND ADVISE THE ENGINEER OF ANY POTENTIAL CONFLICTS.
4. THE CONTRACTOR IS TO ARRANGE FOR OBSERVATION OF ALL KEY UNDERGROUND ASPECTS OF THE WORK BY THE PROJECT ENGINEER PRIOR TO BACKFILL. ALL REQUESTS FOR FIELD CHANGES ARE TO BE MADE TO THE ENGINEER AND CITY FOR REVIEW AND APPROVAL, PRIOR TO IMPLEMENTING THE CHANGE.
5. THE CONTRACTOR IS TO CALL "BC ONE CALL" TO LOCATE EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION.
6. ALL TRENCH BACKFILL IS TO BE IMPORT PIT-RUN OR AS APPROVED BY A GEOTECHNICAL ENGINEER. ALL BEDDING IS TO BE GRANULAR PIPE BEDDING AS PER MMCD SECTION 31 05 17.
7. ALL WATER, SANITARY SEWER AND STORM DRAINAGE TRENCHING IS TO BE AS PER MMCD DWG. G4 UNLESS OTHERWISE NOTED.
8. ALL GRANULAR AGGREGATE MATERIALS ARE TO BE COMPACTED TO 95% MODIFIED PROCTOR DENSITY (ASTM D1557) IN ANY AREAS THAT WILL SUPPORT BUILDINGS, SLABS, ROADS OR PAVEMENT.

ROAD WORKS

1. ALL PIT-RUN GRAVEL SHALL BE IN ACCORDANCE WITH MMCD SECTION 31 05 17 - 2.3
2. ALL GRANULAR BASE SHALL BE IN ACCORDANCE WITH MMCD SECTION 31 05 17 - 2.10
3. ALL HOT MIX ASPHALT SHALL BE IN ACCORDANCE WITH MMCD SECTION 32 12 16
4. ALL CONCRETE SHALL BE IN ACCORDANCE WITH MMCD SECTION 03 30 53
5. ALL ROLLOVER CURB AND BARRIER CURB SHALL BE AS PER MMCD DWG. C4.
6. ALL PAINT LINES AND SIGNS ARE TO BE IN ACCORDANCE WITH "*MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR CANADA*".
7. 4m OF BARRIER CURB WITH 1m TRANSITIONS IS REQUIRED IN FRONT OF ALL LPT'S.

RESTORATION

1. PAVEMENT AREAS: GRIND EDGE OF TRENCH MIN. 500mm BACK OF TRENCH WALL AND 300mm FROM ANY BROKEN OR DAMAGED EDGES. RESTORE ROAD AS PER MMCD STANDARD DRAWING G5 WITH 200mm MIN. LAP-JOINT.
2. BOULEVARD AREAS: RESTORE ALL TOPSOIL, TURF, LANDSCAPING, RETAINING WALLS, DRIVEWAYS, ETC. TO A CONDITION EQUAL TO OR BETTER THAN EXISTED PRIOR TO CONSTRUCTION (UNLESS OTHERWISE SPECIFIED).
3. RESTORE DISTURBED SOFTSCAPE AREAS WITH 300mm OF TOPSOIL AND HYDROSEED GRASS MIX PER MMCD 32 92 19.
4. EXISTING ASPHALT EDGE (AT TIE-IN) IS TO BE SAW CUT IN LONG STRAIGHT LINES PRIOR TO PAVING.

SANITARY SEWERS AND STORM DRAINS

1. PIPE LENGTHS AND SLOPES SHOWN ARE MEASURED FROM CENTRE TO CENTRE OF MANHOLES.
2. ALL 100Ø AND 150Ø SANITARY AND STORM DRAINAGE PIPES SHALL BE PVC SDR28.
3. ALL 200Ø AND 250Ø STORM DRAINAGE PIPES SHALL BE PVC SDR35.
4. ALL 300Ø AND LARGER STORM DRAINAGE PIPES SHALL BE CONCENTRIC RIBBED PVC (SHOWN RPVC ON THESE DRAWINGS) UNLESS OTHERWISE NOTED.
5. SANITARY AND STORM SERVICES TO BUILDINGS ARE TO BE INSTALLED AT A MINIMUM 2% GRADE.
6. THE CONTRACTOR SHALL FOLLOW THE MANUFACTURER'S SPECIFICATIONS WHILE INSTALLING PIPE JOINT DEFLECTIONS; HOWEVER, JOINT DEFLECTIONS ARE NOT TO EXCEED 50% OF THE RECOMMENDED MAXIMUM. PIPE CURVES (BENDING OF BARREL) ARE NOT PERMITTED.
7. USE STANDARD WYE FITTINGS FOR CONNECTIONS TO NEW PVC, RPVC AND HDPE MAINS. ALL WYE CONNECTIONS MUST BE A MINIMUM OF 1.0m DOWNSTREAM FROM MANHOLES.
8. STRAP ON SADDLES AND INSERTABLE TEES ARE PERMITTED FOR CONNECTIONS TO EXISTING PVC AND HDPE MAINS.
9. CORED TEES ARE REQUIRED FOR CONNECTIONS TO NEW OR EXISTING CONCRETE MAINS.
10. THE SERVICING CONNECTION CENTRELINE MUST NOT BE BELOW THE SEWER MAIN CENTRELINE.
11. NO SERVICES SHALL BE DIRECTLY CONNECTED TO MANHOLES.
12. ALL STORM AND SANITARY PIPE (MAINS AND SERVICES) SHALL BE THOROUGHLY FLUSHED AND VIDEO INSPECTED FOLLOWING INSTALLATION. IT IS THE RESPONSIBILITY OF THE CONSULTANT TO REVIEW THE TEST RESULTS AND FORWARD THE SUBMISSION TO THE CITY. COMPLETE WITH RECOMMENDED WORKS OR REPAIRS THAT MAY BE REQUIRED. THE CITY REQUIRES 48 HOURS FROM THE DATE OF SUBMISSION TO REVIEW THE VIDEO AND THE CONSULTANT'S RECOMMENDATIONS. VIDEO INSPECTIONS ARE TO BE COMPLETED, REVIEWED BY THE CONSULTANT AND ACCEPTED PRIOR TO ROAD PAVING.
13. ALL MANHOLES ARE TO BE STANDARD 1050Ø AS PER MMCD PLATINUM EDITION DRAWING S1 UNLESS OTHERWISE NOTED.
14. TWIN CATCH BASINS ARE TO BE INTERCONNECTED WITH 200Ø PVC LEAD.
15. ALL SANITARY INSPECTION CHAMBERS TO BE CONTAINED IN A BROOKS SERIES 37 SERVICE BOX RATED FOR H-20 LOADING, OR AS SHOWN ON CoC CSSD S7, S8, AND S9.
16. ALL LERON PLUGS ARE TO BE REMOVED FROM INSPECTION CHAMBERS BY THE CONTRACTOR.
17. ALL SANITARY MAINS AND SERVICES ARE TO BE LEAKAGE TESTED USING EITHER AN EXFILTRATION TEST OR LOW PRESSURE TEST PER MMCD 33 30 01.

WATER WORKS

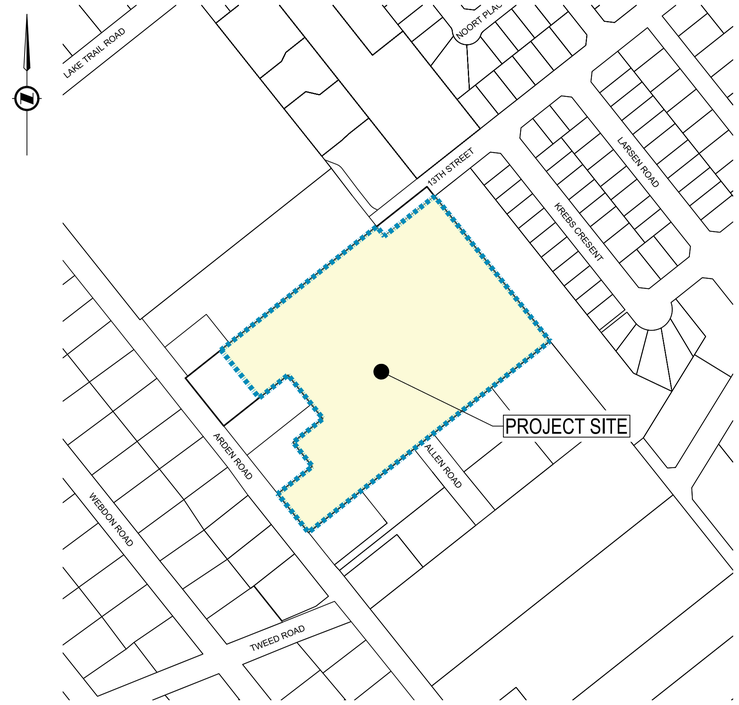
1. ALL WATER PIPES ARE TO BE INSTALLED WITH MINIMUM 1.3m COVER.
2. ALL WATER PIPES ARE TO BE C900 DR18 PVC.
3. THE CONTRACTOR SHALL FOLLOW THE MANUFACTURER'S SPECIFICATIONS WHILE INSTALLING PIPE JOINT DEFLECTIONS; HOWEVER, JOINT DEFLECTIONS ARE NOT TO EXCEED 50% OF THE RECOMMENDED MAXIMUM. PIPE CURVES (BENDING OF BARREL) ARE NOT PERMITTED.
4. ALL WATER FITTINGS ARE TO BE RESTRAINED AS PER MMCD GUIDELINES (STD DWG W1) AND AS NOTED ON THESE DRAWINGS. ALL HORIZONTAL AND VERTICAL BENDS ARE TO BE MECHANICALLY RESTRAINED AS PER THE MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS.
5. METER SETTERS SHALL BE PER CoC BYLAW 2919 APPROVED PRODUCTS LIST. ALL WATER METER SERVICE BOX LIDS MUST BE SET AT FINISHED GRADE.
6. ALL FIRE HYDRANTS ARE TO BE PER CoC BYLAW 2919 APPROVED PRODUCTS LIST. THE CONTRACTOR SHALL MAINTAIN 0.50m MINIMUM VERTICAL CLEARANCE BETWEEN THE WATER MAIN AND SEWERS AT ALL CROSSINGS. IN THE EVENT THAT THIS CANNOT BE ACHIEVED, ALL WATER PIPE JOINTS WITHIN 3.0m OF THE CROSSING ARE TO BE SECURED WITH SHRINK WRAP, PETROLATUM TAPE AND GEL OR EQUIVALENT.
7. CONNECTION OF PROPOSED WATER SERVICE TO EXISTING MAIN IS TO FOLLOW PRESSURE TESTING AND BACTERIOLOGICAL TESTING. THE PROJECT ENGINEER SHALL WITNESS CHLORINATION AND FLUSHING. ALL REPORTS ARE TO BE SUBMITTED TO THE CITY OF COURTENAY PRIOR TO SCHEDULING TIE-IN.
8. TWO WEEKS NOTICE TO PUBLIC WORKS DIVISION IS REQUIRED PRIOR TO CONNECTION TO EXISTING INFRASTRUCTURE.
9. SUBMISSION OF BACTERIAL TEST REPORTS INDICATING NO CONTAMINATION BY FECAL OR TOTAL COLIFORM IS REQUIRED TO THE CITY OF COURTENAY PRIOR TO CONNECTION TO THE EXISTING WATER SYSTEM.
10. THE CONTRACTOR SHALL MAKE HIMSELF AWARE OF ALL APPLICABLE AWWA STANDARDS AND PROCEDURES FOR DISINFECTION OF WATER WORKS. THESE PROCEDURES WILL BE STRICTLY ENFORCED. THE CONTRACTOR SHALL HAVE A REFERENCE COPY OF AWWA PROCEDURES AVAILABLE ON SITE AT ALL TIMES.
11. ALL NEW WATER PIPES SHALL BE TESTED, DISINFECTED AND FLUSHED IN ACCORDANCE WITH MMCD, SECTION 33 11 01, 3.17 - 3.21. ALL REPORTS ARE TO BE PROVIDED TO THE CITY OF COURTENAY. ALL HEAVILY CHLORINATED WATER (USED FOR DISINFECTION PURPOSES) SHALL BE DISPOSED OF ONSITE WITHIN GRAVEL AREAS. DISCHARGE OF CHLORINATED WATER INTO THE CITY'S SANITARY SEWER SYSTEM IS NOT PERMITTED UNLESS APPROVED BY THE CITY ENGINEER. DE-CHLORINATION PUCKS/DIFFUSER OR EQUIVALENT ARE TO BE UTILIZED PRIOR TO / AT TIME OF DISPOSAL.
12. MUNICIPAL WATER MAIN CONNECTION SHALL BE COMPLETED BY THE CITY OF COURTENAY, INCLUDING ALL RESTORATION WORK.
13. DOMESTIC WATER SERVICE AND WATER METER WITHIN ROAD RIGHT-OF-WAY TO BE SUPPLIED AND INSTALLED BY CITY FORCES.
14. CITY PUBLIC WORKS STAFF SHALL OPERATE ALL EXISTING WATER VALVES AND FLUSH NEW SYSTEM FOLLOWING TIE-IN COMPLETION.
15. NOTIFY CITY FOREMAN PRIOR TO FLUSHING AND CHLORINATING WATER MAINS.

ENVIRONMENTAL PROTECTION

1. THE CONTRACTOR SHALL ENSURE THAT ALL ENVIRONMENTAL PROTECTIONS TO ELIMINATE DOWNSTREAM SILT ARE IN PLACE PRIOR TO THE START OF CONSTRUCTION AND REMAIN FOR THE DURATION OF THE CONTRACT. THE CONTRACTOR SHALL OBTAIN A COPY OF, AND FOLLOW THE PROCEDURES CONTAINED IN THE "LAND DEVELOPMENT GUIDELINES FOR THE PROTECTION OF AQUATIC HABITAT". THE CONTRACTOR IS TO PROVIDE AN "EROSION AND SEDIMENT CONTROL PLAN", FOR REVIEW BY THE ENGINEER.

LEGEND

EXISTING	DESCRIPTION	PROPOSED
	DEVELOPMENT BOUNDARY	
60	GROUND CONTOUR	60
	TOP OF SLOPE	
	BOTTOM OF SLOPE	
	DITCH	
	SWALE	
	FENCE (WOOD)	
	FENCE (CHAIN LINK)	
	VEGETATION BOUNDARY	
	SIGN	
	EDGE OF PAVEMENT (WITHOUT CURB)	
S	SANITARY SEWER	S
FM	SANITARY FORCE MAIN	FM
	SANITARY MANHOLE	
IC	INSPECTION CHAMBER	IC
CO	CLEANOUT	CO
D	STORM SEWER	D
	STORM MANHOLE	
	CATCH BASIN	
	LAWN BASIN	
	CATCH BASIN LEAD	
IC	INSPECTION CHAMBER	IC
CO	CLEANOUT	CO
W	WATER MAIN	W
	WATER VALVE	
	HYDRANT ASSEMBLY	
	PERMANENT BLOW-OFF	
	TEMPORARY BLOW-OFF	
	REDUCER	
	AIR VALVE	
M	WATER METER	
	CURB STOP VALVE	
	WATER MANIFOLD	
	SERVICE POINT (ALL SERVICES)	
	SERVICE POINT (SANITARY & STORM)	
	SERVICE POINT (WATER ONLY)	
	UTILITY POLE	
	UTILITY POLE WITH TRANSFORMER	
	UTILITY POLE WITH LIGHT	
	STREET LIGHT (DAVIT POLE)	
	JUNCTION BOX	
	TRANSFORMER (LPT)	
L	STREET LIGHT DUCT	L
E	HYDRO DUCT	E
C	CABLE DUCT	C
T	TELUS DUCT	T
G	GAS DUCT	G
E	OVERHEAD HYDRO	E
	SURVEY CONTROL POINT	
	PLAN / PROFILE SHEET REFERENCE	103



LOCATION PLAN
NTS

PRELIMINARY
NOT FOR
CONSTRUCTION

BC 1 CALL
1-800-474-6886

City Project Number

City Drawing Number
-

Rev	Date	Description	Drawn	Design	App'd
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PC	2021/07/09	ISSUED FOR DEVELOPMENT PERMIT	AP	RS/AP	NP
PB	2021/06/15	ISSUED FOR 95% REVIEW	AP	RS/AP	NP
PA	2021/04/30	ISSUED FOR 75% REVIEW	RS	RS	NP

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NOT TO SCALE (NTS)

ORIGINAL DWG SIZE: A1 (594 x 841mm)

McElhanney
1211 Ryan Road
Courtenay BC
Canada V9N 3R6
Tel 250 338 5495

PROFESSIONAL ENGINEER
A.L. PARKER
43225
PROVINCE OF BRITISH COLUMBIA
2021-07-14
Approved Sealed

SIMBA INVESTMENTS LTD.
COURTENAY, B.C.

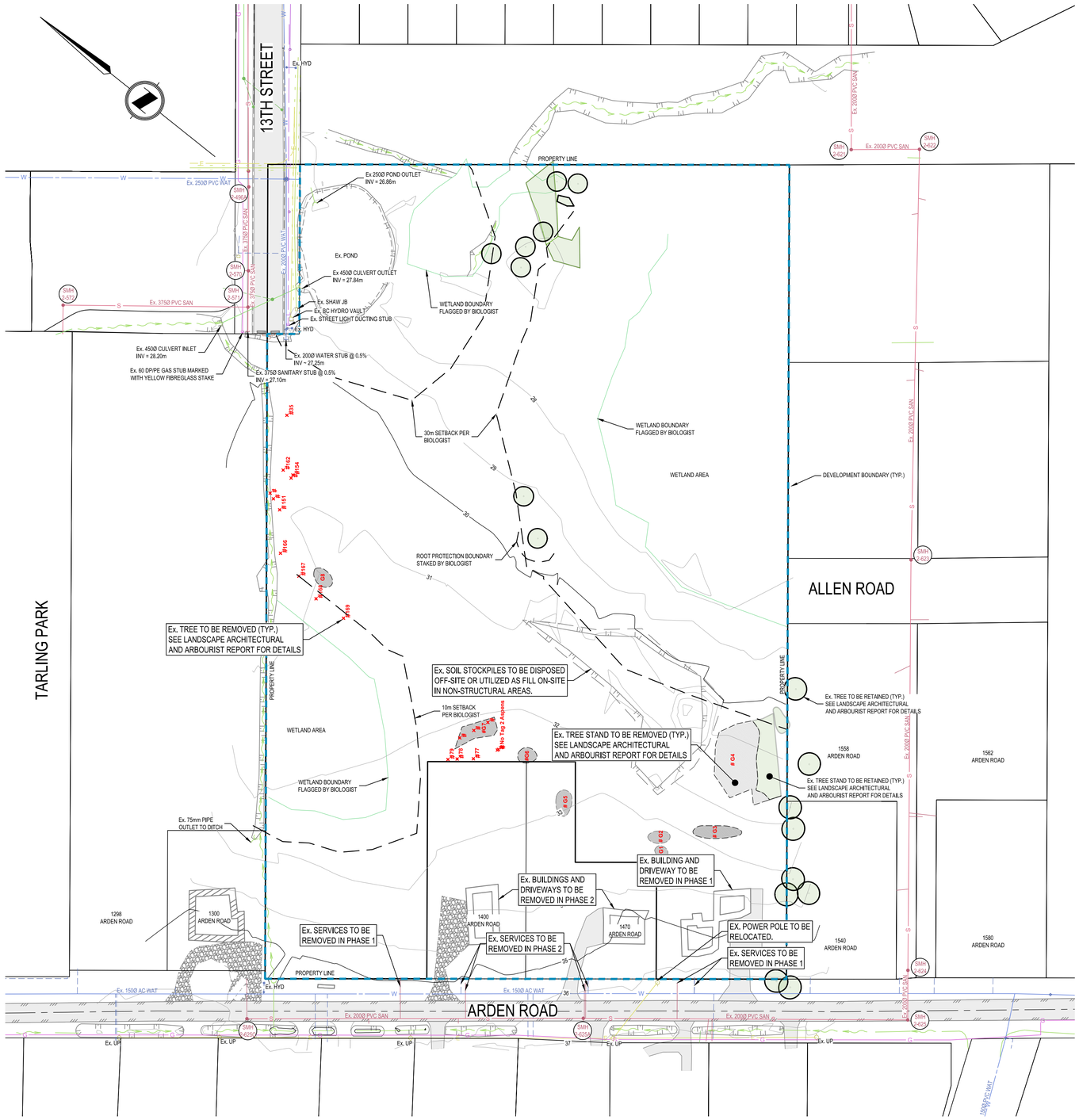
ARDEN GARDENS - PHASE ONE
GENERAL NOTES
AND LEGEND
LOT 1, PLAN 2963, LOT 2, PLAN 2963, LOT A, PLAN 20420, DISTRICT LOT 96, COMOX DISTRICT
COURTENAY, B.C.

Drawing No.
C0-001

Project Number	Rev.
2211-47572-00	PC

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

DATE: 2021-07-14, 12:26 FILE: G:\2211 Engineering\47500 - ATS\90\47572 Simba Arden MF100 Drawings\100.1 Engineering\102.1 Sheets\47572-00_001 - CONSTRUCTION NOTES AND LEGEND.dwg



NOTES:

1. CONTOURS ARE EXISTING CONTOURS SHOWN AT 1.0m INTERVALS.
2. REFER TO TREE REMOVAL PERMIT 4530-20-2006 ISSUED SEPTEMBER 15, 2020.

PRELIMINARY
NOT FOR
CONSTRUCTION

Rev	Date	Description	Drawn	Design	App'd
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PC	2021/07/09	ISSUED FOR DEVELOPMENT PERMIT	AP	RS/AP	NP
PB	2021/06/15	ISSUED FOR 95% REVIEW	AP	RS/AP	NP
PA	2021/04/30	ISSUED FOR 75% REVIEW	RS	RS	NP

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0 1:750 30

ORIGINAL DWG SIZE: A1 (594 x 841mm)

McElhanney
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Courtenay BC
Canada V9N 3R6
T 250 338 5495

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
M.L. PARKER
48529
2021-07-14
Approved Sealed

SIMBA INVESTMENTS LTD.
COURTENAY, B.C.

ARDEN GARDENS - PHASE ONE
EXISTING SITE PLAN
AND REMOVALS
LOT 1, PLAN 2963, LOT 2, PLAN 2963, LOT A, PLAN 20420, DISTRICT LOT 96, COMOX DISTRICT
COURTENAY, B.C.

City Project Number

City Drawing Number
-

Drawing No.
C0-100

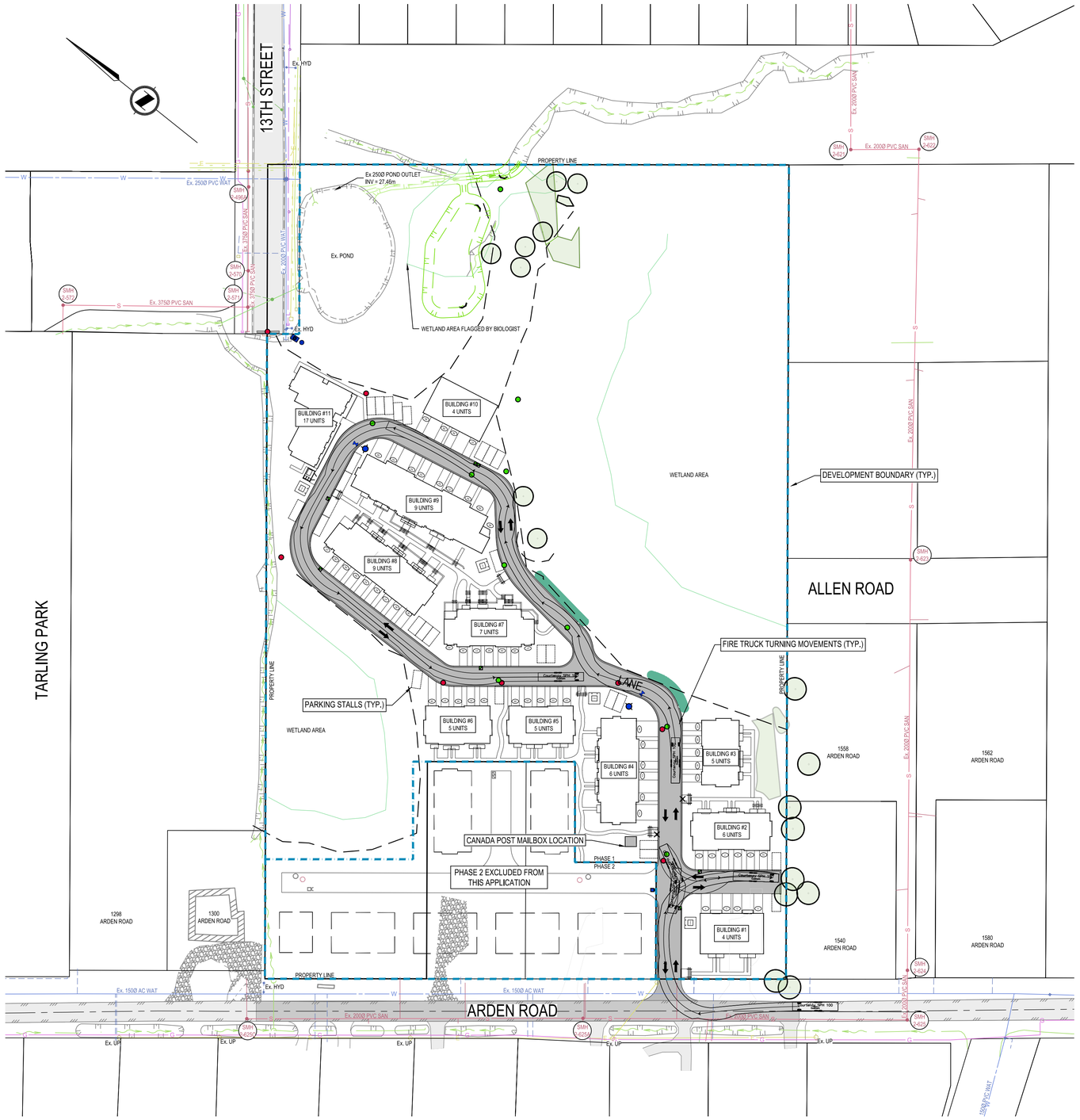
Project Number
2211-47572-00

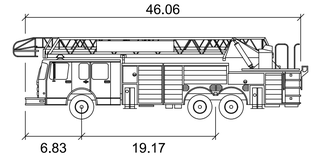
Rev.
PC

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

DATE: 2021-07-14 12:36 FILE: G:\221 Engineering\47500 - 47599\47572 Simba Arden MP\100 Drawings\10.1 Engineering\10.2.1 Sheets\47572-00_100 - EXISTING SITE PLAN.dwg

McElhanney ISO A1 - 2017-05-29





Courtenay SPH 100

	feet
Width	: 8.50
Track	: 9.48
Lock to Lock Time	: 6.0
Steering Angle	: 36.7

PRELIMINARY
NOT FOR
CONSTRUCTION

Rev	Date	Description	Drawn	Design	App'd
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PC	2021/07/09	ISSUED FOR DEVELOPMENT PERMIT	AP	RS/AP	NP
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PA	2021/04/30	ISSUED FOR 75% REVIEW	RS	RS	NP

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0 1:750 30

ORIGINAL DWG SIZE: A1 (594 x 841mm)

McElhanney
1211 Ryan Road
Courtenay BC
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T 250 338 5495

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
ALL PARKER
46929
2021-07-14
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SIMBA INVESTMENTS LTD.
COURTENAY, B.C.

ARDEN GARDENS - PHASE ONE
OVERALL SITE PLAN
AND TRUCK MOVEMENTS
LOT 1, PLAN 2963, LOT 2, PLAN 2963, LOT A, PLAN 20420, DISTRICT LOT 96, COMOX DISTRICT
COURTENAY, B.C.

City Project Number

City Drawing Number
-

Drawing No.
C0-101

Project Number
2211-47572-00

Rev.
PC

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

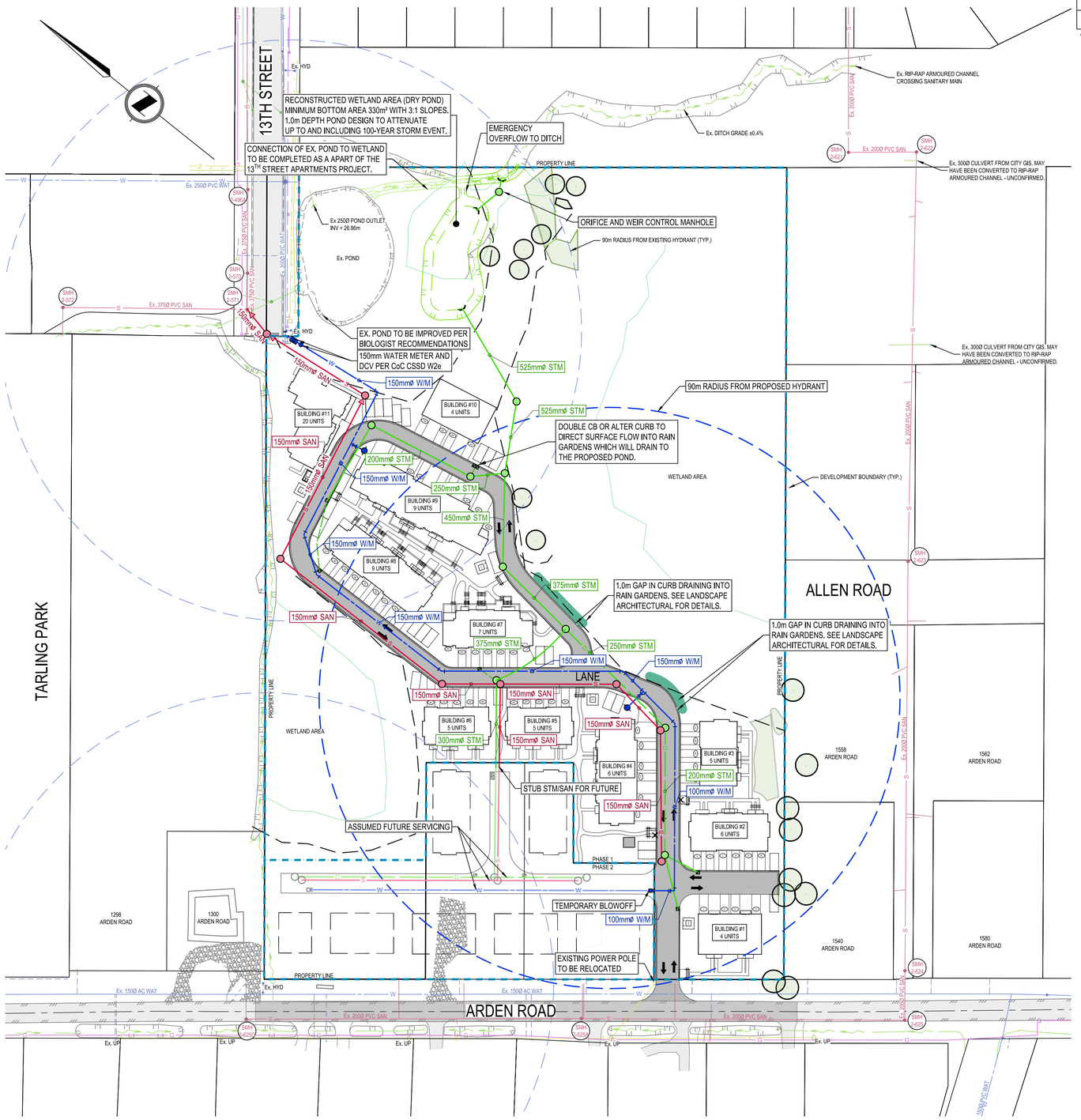
DATE: 2021-07-14, 12:26 FILE: G:\2211 Engineering\47500 - 47999\47572 Simba Arden MF\10.0 Drawings\10.1 Engineering\10.2.1 Sheets\47572-00_101 OVERALL SITE PLAN.dwg

McElhanney ISO A1 - 2017-05-29

MINIMUM WATER MAIN RESTRAINED LENGTH TABLE

PIPE SIZE	90° BEND	45° BEND	22.5° BEND	11.25° BEND	TEE	VALVE / DEAD END
100Ø	3.4	1.5	0.6	0.3	BRANCH ONLY	9.5
150Ø	4.6	2.2	1.0	0.6	BRANCH ONLY	15.0

* PER UNI-FLANGE RECOMMENDED RESTRAINED LENGTHS OF PVC PIPE TABLE



NOTES:

1. CONTOURS ARE EXISTING CONTOURS SHOWN AT 1.0m INTERVALS.
2. REFER TO TREE REMOVAL PERMIT 4530-20-2006 ISSUED SEPTEMBER 15, 2020.

PRELIMINARY
NOT FOR
CONSTRUCTION

Rev	Date	Description	Drawn	Design	App'd
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PC	2021/07/09	ISSUED FOR DEVELOPMENT PERMIT	AP	RS/AP	NP
PB	2021/06/15	ISSUED FOR 95% REVIEW	AP	RS/AP	NP
PA	2021/04/30	ISSUED FOR 75% REVIEW	RS	RS	NP

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0 1:750 30

ORIGINAL DWG SIZE: A1 (594 x 841mm)

McElhanney
1211 Ryan Road
Courtenay BC
Canada V9N 3R6
T 250 338 5495

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA A.L. PORTER # 35929
2021-07-14
Approved Sealed

SIMBA INVESTMENTS LTD.
COURTENAY, B.C.

ARDEN GARDENS - PHASE ONE
PRELIMINARY SERVICING PLAN
LOT 1, PLAN 2963, LOT 2, PLAN 2963, LOT A, PLAN 20420, DISTRICT LOT 96, COMOX DISTRICT
COURTENAY, B.C.

City Project Number: ----
City Drawing Number: -
Drawing No.: C0-102
Project Number: 2211-47572-00
Rev.: PC

DESTROY ALL PRINTS BEARING PREVIOUS REVISION.

DATE: 2021-07-14, 12:26 FILE: G:\2021 Engineering\47500 - 47599\47572 Simba Arden MP\100 Drawings\101 Engineering\102.1 Sheets\47572-00_102 - SITE SERVICING PLAN.dwg

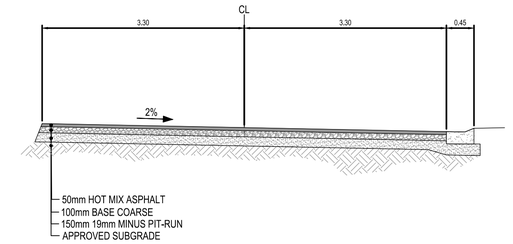
McElhanney ISO A1 - 2017-05-29

LEGEND

- EXISTING GROUND CONTOUR — 60
- EXISTING GROUND SPOT ELEVATION + 31.54
- PROPOSED SPOT ELEVATION + 32.93
- 100 YEAR OVERLAND FLOOD ROUTE
- 100 YEAR IN-PIPE FLOOD ROUTE

NOTES:

1. FOR GENERAL NOTES, LEGEND, AND KEY PLANS SEE DWG C0-001 - GENERAL NOTES.
2. FOR EXITSING BASE PLAN SEE DWG C0-100 - EXISTING SITE PLAN.
3. THIS DRAWING WAS PREPARED IN ACCORDANCE WITH A TOPOGRAPHIC SURVEY CONDUCTED BY _____ DATED XXXX, XX, XXXX.
4. CONTOURS SHOWN AT 1.0m INTERVALS.
5. 300mm DEPTH GROWING MEDIUM IN ALL LANDSCAPE AREAS.



A - ROAD CROSS SECTION (TYP.)
SCALE H 1:50

PRELIMINARY
NOT FOR
CONSTRUCTION

Rev	Date	Description	Drawn	Design	App'd
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PC	2021/07/09	ISSUED FOR DEVELOPMENT PERMIT	AP	RS/AP	NP
PB	2021/06/15	ISSUED FO 75% DESIGN REVIEW	AP	AP/RS	NP
PA	2021/04/30	ISSUED FOR COORDINATION	RS	RS	RS

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0 1:750 30

ORIGINAL DWG SIZE: A1 (594 x 841mm)

McElhanney
1211 Ryan Road
Courtenay BC
Canada V9N 3R6
T 250 338 5495

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M.L. PERRIER — # 46929
2021-07-14
Approved Sealed

SIMBA INVESTMENTS LTD.
COURTENAY, B.C.

ARDEN GARDENS - PHASE ONE PRELIMINARY GRADING PLAN

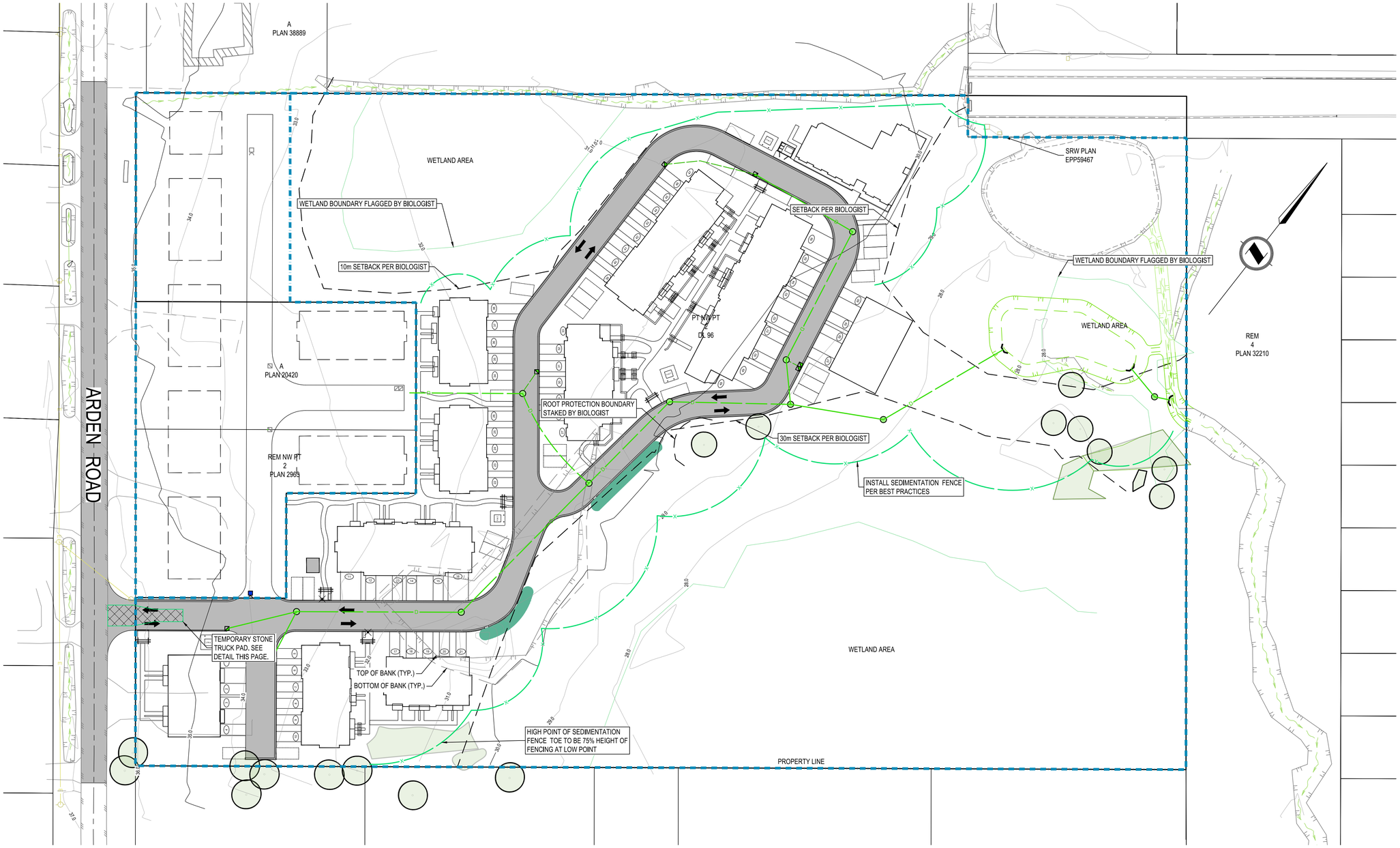
LOT 1, PLAN 2963, LOT 2, PLAN 2963, LOT A, PLAN 20420, DISTRICT LOT 96, COMOX DISTRICT
COURTENAY, B.C.

City Project Number: ----
City Drawing Number: -
Drawing No.: C0-103
Project Number: 2211-47572-00
Rev.: PC

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

DATE: 2021-07-14, 12:36 FILE: G:\221 Engineering\47500 - 47599\47572 Simba Arden MP100\3 Drawings\10.1 Engineering\12.2 Sheets\47572-00_103 - SITE GRADING PLAN.dwg

McElhanney ISO A1 - 2017-05-29



GENERAL SILTATION CONTROL NOTES:

1.1 THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE SITE EROSION AND SEDIMENT CONTROL (ESC) AS NECESSARY TO PREVENT THE RELEASE OF SEDIMENT OR SEDIMENT LADEN WATERS FROM ENTERING THE CITY DRAINAGE SYSTEMS DURING CLEARING AND GRUBBING, AND CIVIL CONSTRUCTION STAGES OF THE SUBDIVISION. EROSION AND SEDIMENT CONTROL DURING THE SUBSEQUENT PROJECT'S MAINTENANCE PERIOD STAGE SHALL BE THE RESPONSIBILITY OF THE DEVELOPER.

1.2 THE CONTRACTOR SHALL DESIGNATE AN ESC MONITOR TO BE RESPONSIBLE FOR THE INSPECTION AND DIRECTION OF REQUIRED MAINTENANCE OF THE IMPLEMENTED ESC MEASURES.

1.3 THE ESC MONITOR SHALL BE RESPONSIBLE TO VISUALLY MONITOR ANY RECEIVING WATERS, INCLUDING WATERCOURSES, DITCHES, SWALES OR BODIES OF WATER UP TO 50 METRES OUTSIDE OF THE CONSTRUCTION AREA;

1.4 THE ESC MONITOR SHALL INSPECT AND MONITOR THE SITE AT LEAST ONCE EVERY 7 DAYS (OR AS CONSTRUCTION ACTIVITIES / WEATHER DICTATES), AND WITHIN 24 HOURS FOLLOWING A SIGNIFICANT RAINFALL EVENT.

1.5 THE ESC MONITOR SHALL COORDINATE HIS OR HER SITE VISITS WITH THE CONTRACTOR, AND THE ENGINEER OF RECORD'S FIELD INSPECTOR, WHERE POSSIBLE, AND SHALL PROVIDE INSTRUCTIONS TO RECTIFY CURRENT OR ANTICIPATED DEFICIENCIES THAT MAY RESULT IN NON-CONFORMANCE WITH THE ESC PLAN.

1.6 THE EROSION AND SEDIMENT CONTROL (ESC) PLANS ARE DEEMED TO BE A MINIMUM LEVEL OF ESC FOR THIS PROJECT.

1.7 THE GENERAL CONTRACTOR IS TO ENSURE THAT APPROPRIATE ESC MEASURES ARE IN PLACE AND OPERATIONAL ALSO ON WEEKENDS, HOLIDAYS, AFTER CONSTRUCTION ACTIVITIES AND UNTIL THE DATE OF PROJECT COMPLETION.

1.8 ALL SURFACE RUN-OFF DURING CONSTRUCTION IS TO BE DIRECTED TO INTERCEPTOR DITCH/SWALES SHOWN ON THE ESC PLAN (OR IN ADDITION TO IT),

1.9 ALL WORK SHALL BE UNDERTAKEN IN ACCORDANCE WITH ENVIRONMENTAL DEVELOPMENT PERMIT AND PHASE 5 EDP (PENDING).

CIVIL CONSTRUCTION:

2.1 THE GENERAL CONTRACTOR WILL BE RESPONSIBLE TO PROVIDE A COPY OF THE ESC PLAN TO THE CIVIL CONTRACTOR.

2.2 CIVIL CONTRACTOR TO ENSURE THAT A WATERPROOF COPY OF THE ESC PLAN IS POSTED ON SITE, IN A LOCATION VISIBLE FROM OUTSIDE THE CONSTRUCTION ZONE.

2.3 ALL ACCESS TO AND FROM SITE TO BE RESTRICTED TO SPECIFIED ENTRY-EXIT POINTS.

2.4 ALL ONSITE STOCK PILES TO BE FULLY COVERED WITH 5 MIL POLYETHYLENE ADEQUATELY WEIGHTED DOWN WITH SILT FENCE SURROUND AT TOE OF SLOPE (UNLESS OTHERWISE APPROVED BY THE ESC MONITOR).

2.5 CATCH/LAWN BASINS COMPLETE WITH PROTECTIVE MEASURES ARE TO BE INSTALLED BY THE CONTRACTOR AT THE FIRST OPPORTUNITY. TEMP SILT PONDS TO BE COMPLETED IMMEDIATELY FOLLOWING CATCH/LAWN BASIN INSTALLATION, AND SILT PONDS TIED IN ACCORDING TO THE ESC PLAN.

2.6 CONTRACTOR TO COORDINATE THE ELIMINATION OF TEMPORARY ESC OPERATIONS WITH THE ESC MONITOR. ADDITIONAL PROTECTIVE MEASURES MAY NEED TO BE INSTALLED AT THE DIRECTION OF THE ESC MONITOR.

2.7 AT FINAL SITE INSPECTION, PRIOR TO THE START OF THE MAINTENANCE PERIOD, CITY STAFF SHALL INSPECT & APPROVE ESC MEASURES.

2.8 THE DEVELOPER IS RESPONSIBLE FOR THE MAINTENANCE OF ESC MEASURES UNTIL 1 YEAR MAINTENANCE PERIOD HAS EXPIRED FOR THE PROJECT.

MAINTENANCE FOR ALL STAGES OF CONSTRUCTION (AS APPLICABLE):

3.1 ALL CATCH BASIN FILTERS ARE TO BE INSPECTED WEEKLY AND FOLLOWING STORM EVENTS.

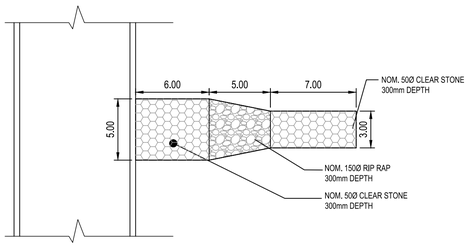
3.2 ACCUMULATED SEDIMENT DEPOSITS AT POND INLETS AND BEHIND CHECK DAMS ARE TO BE REMOVED AT 50% CAPACITY.

3.3 SWEEPING OF EXISTING OFFSITE ACCESS ROADS IS REQUIRED WHEN HAULING MATERIALS FROM THE SITE, AT THE FREQUENCY DETERMINED BY THE ESC MONITOR WHICH SHALL BE DEPENDENT ON WEATHER CONDITIONS.

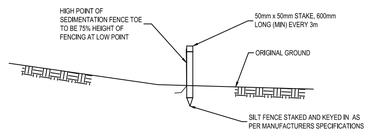
3.4 CONTRACTOR MUST SWEEP AND CLEAN PAVED ON-SITE ROAD SURFACES OF ACCUMULATED SEDIMENTS AT THE END OF EACH WORK DAY. NO SOIL, SAND OR OTHER MATERIAL WITH A HIGH SEDIMENT CONTENT SHALL BE DEPOSITED OR PILED OUTSIDE THE PROPERTY BOUNDARIES, PARTICULARLY ON PAVED ROAD SURFACES. FLUSHING OF ROADWAYS PROHIBITED.

3.5 SILT FENCES AND BARRIERS TO BE INSPECTED AND REPAIRED PRIOR TO EXPECTED RAIN EVENTS AND FOLLOWING ALL SIGNIFICANT RAINFALL EVENTS OR PERIODS OF EXTENDED RAIN.

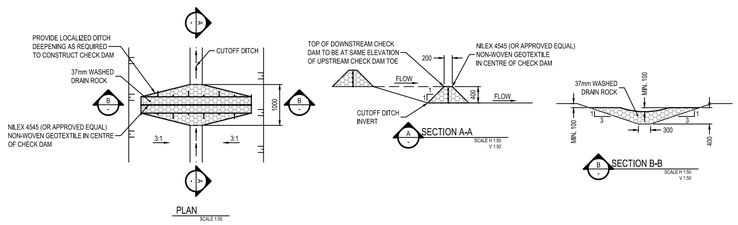
3.6 ALL SEDIMENT REMOVED FROM ESC CONTROL FACILITIES TO BE DISPOSED OF IN A MANNER AS TO NOT COMPOUND OR COMPROMISE THE SEDIMENT LOADING OF OTHER CONTROL MEASURES.



TEMPORARY STONE PAD ENTRANCE
SCALE N.T.S.



TYPICAL SEDIMENTATION FENCE DETAIL
SCALE N.T.S.



CHECK DAM DETAIL (TYP.)
SCALE N.T.S.

PRELIMINARY
NOT FOR
CONSTRUCTION

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PC	2021/07/09	ISSUED FOR DEVELOPMENT PERMIT	AP	RS/AP	NP
PB	2021/06/15	ISSUED FOR 95% REVIEW	AP	RS/AP	NP
PA	2021/04/30	ISSUED FOR 75% REVIEW	RS	RS	NP
Rev	Date	Description	Drawn	Design	App'd

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0 1:500 25

ORIGINAL DWG SIZE: A1 (594 x 841mm)

McElhanney

1211 Ryan Road
Courtenay BC
Canada V9N 3R6
T 250 338 5495

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
M.L. PARKER
48529
2021-07-14
Approved Sealed

SIMBA INVESTMENTS LTD.
COURTENAY, B.C.

ARDEN GARDENS - PHASE ONE SUGGESTED EROSION AND SEDIMENT CONTROL PLAN

LOT 1, PLAN 2963, LOT 2, PLAN 2963, LOT A, PLAN 20420, DISTRICT LOT 96, COMOX DISTRICT
COURTENAY, B.C.

City Project Number

City Drawing Number
-

Drawing No.
C0-500

Project Number
2211-47572-00

Rev.
PC

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

DATE: 2021-07-14 12:37 FILE: G:\221 Engineering\47500 - 47599\47572 Simba Arden MP\100 Drawings\100.1 Engineering\10.2 Sheets\47572-00_500 - ESC PLAN.dwg

APPENDIX B

SWMP-4 General Stormwater Management Plan (2011)

13th STREET

EXISTING INVERT = 27.17m

PROPOSED 450mm ø RPVC

DITCH INVERT = 28.05m

DITCH INVERT OVER PVC PIPE = 27.60m

TOP OF BERM ELEV. 28.05m

INVERT = 27.28m
TOP OF INLET RISER = 27.75

PROPOSED OUTLET INVERT = 26.80

OUTLET INVERT = 27.75m

PROPOSED 450mm CLASS V RPVC

INLET INVERT = 28.20m

CONSTRUCTED WETLAND CELL No 2

DITCH GRADE AT 0.0%

PROPOSED DITCH INVERT = 26.80

POND BASE ELEV. 27.25m

PROPOSED DITCH AT 0.46%

Ex. DITCH INVERT = 27.39m

CONSTRUCTED WETLAND CELL No 3

DITCH GRADE AT 0.0%

PROPOSED DITCH INVERT = 26.80

POND BASE ELEV. 27.25m

PROPOSED 3.0m WIDE ROCK OVERFLOW. INVERT 27.75m

Ex. DITCH INVERT = 27.35m

CONSTRUCTED WETLAND CELL No 4

DITCH GRADE AT 0.0%

PROPOSED DITCH INVERT = 26.80

POND BASE ELEV. 27.25m

TOP OF BERM ELEV. 28.05m

PROPOSED STORM CONTROL STRUCTURE. SEE DRAWING SWMP-4B FOR DETAILS

CONSTRUCTED WETLAND CELL No 5

DITCH GRADE AT 0.0%

PROPOSED DITCH INVERT = 26.80

POND BASE ELEV. 27.25m

PROPOSED 3.0m WIDE ROCK OVERFLOW. INVERT 27.70m

PROPOSED DITCH TO CONNECT TO Ex. DRAINAGE COURSE. Ex. DITCH INVERT 27.00m

Ex. WATERCOURSE

SEE NATURAL ADVANTAGE ENVIRONMENT REPORT (MAY 2011) FOR PLANTING DETAILS

OUTLET INVERT = 27.25m

EXISTING FISH HABITAT TO BE ISOLATED FROM CONSTRUCTED WETLAND

PROPOSED 375mm ø RPVC

INLET INVERT = 29.00m

CONSTRUCTED WETLAND CELL No 1

POND BASE ELEV. 29.00m

OIL / WATER SEPARATOR C/W BYPASS

BLDG 6

RIPARIAN AREA SETBACK (AS DETERMINED BY KERR WOOD LEIDAL & ASSOC.)

EXISTING WETLAND BOUNDARY

ALL AREAS OUTSIDE OF CONSTRUCTED WETLAND TO BE HYDROSEEDE WITH RELAIMATION MIXTURE

PLAN 27022 PT B

FOREST/WETLAND

Pcl A (DD 52974N) Rem SE PT

Ex. WATERCOURSE

28.00 28.25 28.50 29.00 30.00

SECTION A-A
SCALE 1:200

PROPERTY LINE
DITCH ℄
TOP OF BERM 28.50m
TOP OF BERM 28.05m
0.50
2.00
VARIES
2:1
1:1
1.5 – 2.0m

LEGEND

- PROPOSED STORM MAIN
- PROPOSED DRAINAGE
- PROPOSED BIOSWALE
- PROPOSED EXFILTRATION GALLERY
- PROPOSED DITCH
- PROPOSED TOP OF BANK

DRAFT

No.	Date	Revision	Dr.	Chk'd
0	01 JUNE 2011	ISSUED FOR REVIEW	CVL	BH

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McElhanney
McElhanney Consulting Services Ltd.
495 SIXTH STREET
COURTENAY, B.C. V9N 6V4
PH (250) 338-5495
FAX (250) 338-7700

Designed: BH	Checked: BH	Date: JUNE 01/11
Drawn: CVL	Surveyed: SM	

SCALE : 1:250
0 5 10 15 20m
(ALL DIMENSIONS ARE IN METRES)

Approved Sealed

ARDEN DEVELOPMENTS LTD.

STORM WATER MANAGEMENT PLAN
LAKE TRAIL RD. / 13th ST. PROPERTY

REM LOT 3, D.L. 96, COMOX DISTRICT, PLAN 2153, EXCEPT PARCEL A (DD52974N) THEREOF
COURTENAY, BC

Client Project No: —
Client Drawing No: —
MCSL Project No. 2211-46780-0
Drawing No. SWMP-4
Sheet 1 of 1
Revision 0

Destroy all prints bearing previous number

PPlotted: July 21, 2011 - 10:22:46
PFilename: K:\ENG\46780-2\dwg\46780-2.dwg(SWMP-4

APPENDIX C

Geo Advice Technical Memo – Water and Sanitary Modeling

Technical Memorandum

City of Courtenay Sanitary Sewer Collection and Water Distribution System Hydraulic Impact Analysis of the 1360-1480 Arden Road Development

FINAL

Municipality:	City of Courtenay, BC
Project ID:	2020-037-COU
Requested by:	City of Courtenay, BC
Date:	May 15, 2020
Location:	1360-1480 Arden Road Development, Courtenay, BC

1. Introduction

GeoAdvice Engineering Inc. (GeoAdvice) was retained by the City of Courtenay (City) to assess the hydraulic impact of a proposed development (development) located at 1360-1480 Arden Road, on the City sanitary sewer collection and water distribution systems.

This memo describes the assumptions and results of the hydraulic modeling and capacity analysis using InfoSWMM and InfoWater (Innovyze Software). InfoSWMM and InfoWater are GIS-based sewer collection system and water distribution system modeling and management software applications.

2. Sanitary Sewer Collection Analysis

The proposed development will connect to the existing PVC gravity main on 13th Street. Flows from the development will be conveyed by gravity to the City outfall.

Figure 2.1 shows the development location.

Figure 2.1: Proposed Development Site – Sewer Network