Technical design note

Project name	Nestle Block B		
Design note title	Flood Risk response to LLFA		
Document reference	C-01669_TN-C-0100		
Author	GJ		
Revision	P01		
Date	18 October 2023	Approved	☐

1. Introduction

The purpose of this technical note is to provide clear responses and supporting information for Hillingdon Planning and Regeneration in regards to flood risk queries from the LLFA concerning Nestle Block B.

The following correspondence has been received by Boyer Planning: -

a) Review Summary

This application has not sufficiently demonstrated the use of the London Plan's drainage hierarchy and is proposing the following key items:

- *Type of development: Major*
- *Flood risk: Low risk*
- *Types of conveyance / attenuation features: Blue roofs and green roofs (within Block B).*
- *Runoff rate restriction (l/s): 60 (to the canal) and 11.3 (to the Thames Water sewer network) – for the whole site.*
- *Runoff attenuation volume (m3): 500m3 (within Block B – podium attenuation).*
- *Maintenance plan: Provided, however does not include the tasks and frequencies for the green and blue roofs in Block B.*

b) Recommendation and Requests

We object to the application for the following reasons:

- *The applicant has not confirmed the total site area for Block B, and the existing and proposed impermeable areas for Block B.*
- *The applicant has re-submitted the Flood Risk Assessment and Drainage Strategy from May 2017. It is unclear whether anything is changing from the original strategy, as the Revised Drainage Strategy Statement (15/02/2018) has also not been re-submitted which had changes in drainage features and runoff rates in particular.*
- *The Drainage Layout Sheets do not include all drainage features such as the green and blue roofs.*
- *The following documents have not been supplied or evidence provided as to how the proposals are in accordance with the following as part of the condition: C151867/C/100 P2 Existing Catchment Areas; C151867/C/101 P10 Proposed Drainage Catchment Area to TW; C151867/C/104 P6 Proposed Drainage Catchment Area to Canal; C151867/C/109 P3 Sections; C151867/C/110 P1 Exceedence Flood Water Storage Locations; C151867/C/111 P1 Ingress and Egress and Flood Water Comments from Hydrock Sergo Meeting (6 February 2018) with Hydrock Response (15 February 2018); C151867/R-001 Drainage Strategy Statement; C151867/R-002 Methodology for the Control of Surface Water During the Construction Phase; Drainage Calculations; TW Letter (13 July 2016); TW SW Correspondence (20 February 2018)*
- *It is unclear which surface water network Block B is included under within the Micro-Drainage calculations. The applicant should confirm the drainage features and total storage volume provided for Block B.*

• The maintenance schedule does not include tasks and frequencies for all drainage features included within Block B, including the green and blue roofs. Additional features have also been included within the maintenance schedule that have not been identified as being proposed within Block B.

• The applicant has not provided details for Block B on: how this phase connects to the approved site wide strategy; the interim drainage solutions to ensure that surface water runoff will not increase the risk of flooding to or from the development; how Block B will contribute to the efficient use of water through a scheme for the collection, storage and reuse of rainwater. There are no plans showing the methods for collection and storage, which should set out the arrangements in place for the reuse of the stored water.

To address the above, please can the applicant submit information which:

• Confirms the total site area for Block B, including the existing and proposed impermeable area.

• Confirms whether the drainage strategy for Block B is changing from the Flood Risk Assessment and Drainage Strategy from May 2017, and confirms/re-submits the Revised Drainage Strategy Statement (15/02/2018) to make it clear which is being adhered to.

• Includes the blue and green roofs in the Drainage Layout Sheets for Block B.

• Supplies or submits evidence to demonstrate that the following approved documents are being adhered to as part of the condition: C151867/C/100 P2 Existing Catchment Areas; C151867/C/101 P10 Proposed Drainage Catchment Area to TW; C151867/C/104 P6 Proposed Drainage Catchment Area to Canal; C151867/C/109 P3 Sections; C151867/C/110 P1 Exceedence Flood Water Storage Locations; C151867/C/111 P1 Ingress and Egress and Flood Water Comments from Hydrock Sergo Meeting (6 February 2018) with Hydrock Response (15 February 2018); C151867/R-001 Drainage Strategy Statement; C151867/R-002 Methodology for the Control of Surface Water During the Construction Phase; Drainage Calculations; TW Letter (13 July 2016); TW SW Correspondence (20 February 2018)

• Shows where the surface water network for Block B is included within the Micro-Drainage calculations, and confirms the drainage features and total storage volume provided for Block B.

• Demonstrates that all proposed drainage features have been included in the maintenance schedule, including the blue and green roofs.

• Provides details for Block B on: how this phase connects to the approved site wide strategy; the interim drainage solutions to ensure that surface water runoff will not increase the risk of flooding to or from the development; how Block B will contribute to the efficient use of water through a scheme for the collection, storage and reuse of rainwater. There are no plans showing the methods for collection and storage, which should set out the arrangements in place for the reuse of the stored water.

2. Responses

2.1 Block B Catchment Areas

Confirm the total site area for Block B, including the existing and proposed impermeable area.

- The total existing impermeable catchment area within Block B site area is shown on drawing FNF-C-B-HYD-SK-01-902. Refer to Appendix B.
    - Hard standing area = 9,367m^2
    - Building Area = 5,910m^2
    - Total impermeable area = 15,277m^2
- The total proposed impermeable catchment area within Block B site area is shown on drawing FNF-C-B-HYD-SK-01-901. Refer to Appendix A.
    - Hard standing area = 9,800m^2
    - Building Area = 7,960m^2
    - Total impermeable area = 17,760m^2

2.2 Block B Microdrainage calculations

Show where the surface water network for Block B is included within the Micro-Drainage calculations, and confirms the drainage features and total storage volume provided for Block B.

- The MicroDrainage calculations in Appendix C has been annotated to show the total catchment area, drainage features and total storage provided below ground.
- Refer to Page 7 of the Microdrainage calculations to show a total external catchment area of 0.795 ha. This matches the Hard standing figure shown in Section 2,1 of this report, totalling 7,960m^2.
- The above ground drainage blue roof system has been designed by Alumasc. The restricted discharge rates for each outlet from the blue roof system designed by Alumasc has been entered into the microdrainage calculations under the Base Flow (l/s) column. Refer to page 7 reference and highlighted figures in the Microdrainage calculations.
    - Refer to Appendix D for Blue roof area layout
    - Refer to Appendix E for Blue roof restricted discharge rates. The figures for each outlet is shown in the Microdrainage calculations and is noted on the drainage layout. Refer to Appendix G.
    - Refer to Appendix f for Blue roof system specification
- The MicroDrainage calculations in Appendix C allow for drainage features and include permeable paving (porous car park page 24 to 27), rain gardens (filter drains page 24 to 27), and restricted control devices (hydrobrake and reduced orifices on page 21 to 23). The blue roof system was introduced as base flows. Refer to Drainage layout which shows the location of these below ground SuDs features.

2.3 Block B blue roof maintenance

Demonstrates that all proposed drainage features have been included in the maintenance schedule, including the blue and green roofs.

Alumasc blue roof system maintenance guidelines are found in Appendix H. As this does not conform to below ground or external systems it has been kept separate to the drainage operations and maintenance schedule and forms part of the building maintenance instead,

2.4 Block B blue roof locations

Includes the blue and green roofs in the Drainage Layout Sheets for Block B.

The blue roof locations have been detailed on Chapman Taylor Architects drawings. Refer to layouts NFH-CTA-B-27-X-01-DR-A-27101 to 27112. The blue roof system extents are across the majority of available roof space. Refer to appendix D

2.5 Site Wide Drainage

Provide details for Block B on: how this phase connects to the approved site wide strategy; the interim drainage solutions to ensure that surface water runoff will not increase the risk of flooding to or from the development; how Block B will contribute to the efficient use of water through a scheme for the collection, storage and reuse of rainwater. There are no plans showing the methods for collection and storage, which should set out the arrangements in place for the reuse of the stored water.

- The roof and impermeable hardstanding areas from Block B storm water system is part of a greater storm network associated with Block E (to the west) and Block F2 and F3 (to the east). The combined catchment area from these developments discharge to the canal to the north of the site at a restricted discharge of 45 l/s. Refer to drainage layout drawing FNF-C-B-HYD-DR-01-0200 to 0202. The remainder of the site is split into an additional 2 catchment areas, discharging to the canal (remaining Block F and adjacent parking area) and to Thames water sewer to the southern boundary in Nestle avenue to serve block D, C, H and G.
- Each catchment area restricts discharge of storm water and is attenuated for 1 in 100 year storm event, plus climate change. There is a **significant** reduction in the rate compared to the previous development as outlined in the previous planning submission. Block B new drainage system will greatly reduce the risk of flooding compared to the previous system using an array of SuDS features and attenuation which will slow down the time strom water takes to enter to piped system and store storm water. The SuDS features includes blue roofs, permeable paving. filter drains, rain gardens, interception tanks, and controlled discharge chambers.
- Block B storm water drainage combines with Block E system prior to out falling into the canal. There is a rain water harvesting tank that fills with storm water prior to overflowing and discharging into the canal. This water tank is used for irrigation of the Viveash gardens. Refer to Landscape Architect's drawing in Appendix I.

2.6 Site Wide Drainage

Confirms whether the drainage strategy for Block B is changing from the Flood Risk Assessment and Drainage Strategy from May 2017, and confirms/re-submits the Revised Drainage Strategy Statement (15/02/2018) to make it clear which is being adhered to.

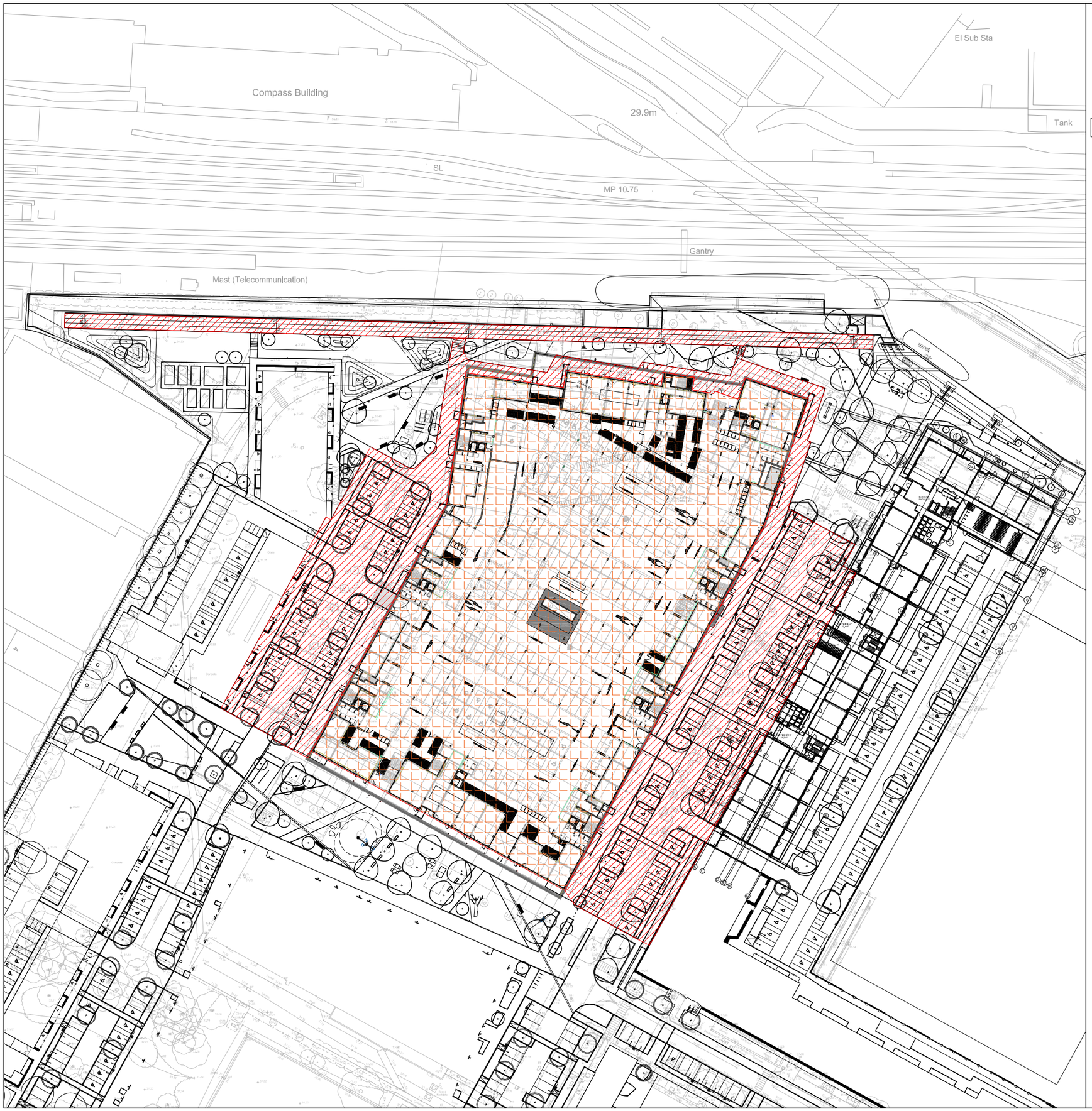
The drainage strategy for Block B will not change from the strategy outlined in the Flood Risk Assessment and Drainage Strategy from May 2017. There has been some nominal changes during the detailed design stage. These revisions are shown on the latest layouts in Appendix G.

2.7 Documents

The following documents have not been supplied or evidence provided as to how the proposals are in accordance with the following as part of the condition: C151867/C/100 P2 Existing Catchment Areas; C151867/C/101 P10 Proposed Drainage Catchment Area to TW; C151867/C/104 P6 Proposed Drainage Catchment Area to Canal; C151867/C/109 P3 Sections; C151867/C/110 P1 Exceedence Flood Water Storage Locations; C151867/C/111 P1 Ingress and Egress and Flood Water Comments from Hydrock Sergo Meeting (6 February 2018) with Hydrock Response (15 February 2018); C151867/R-001 Drainage Strategy Statement; C151867/R-002 Methodology for the Control of Surface Water During the Construction Phase; Drainage Calculations; TW Letter (13 July 2016); TW SW Correspondence (20 February 2018)

A number of the documents listed above have been superseded in the 7 years since issued. Please refer to latest documentation in the attached appendices.

3. Appendix A – Proposed Catchment Areas



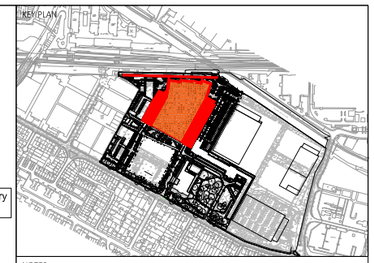
KEY

Proposed Building Catchment Area = 9,800m²

Propsed External Catchment Area = 7,960m²

Total proposed catchment area positively drained within Block B site boundary = 17,760m²

KEY PLAN



NOTES

1. This drawing is to be read in conjunction with relevant Architects, Engineers and specialist manufacturers drawings, reports and specifications.
2. All levels are shown in metres above Ordnance Datum (m AOD) unless otherwise shown.
3. Any ambiguities or discrepancies within this drawing and any other information given elsewhere must be reported to Hydrock for clarification.
4. All dimensions to be checked on site and any discrepancies reported to Hydrock before pricing / works commence.
5. Do not scale from this drawing for construction purposes.

REVISIONS

REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P01	First issue					
	G.JONES	20.11.2023	JW	20.11.2023	JW	20.11.2023

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CLIENT

BARRATT LONDON

PROJECT

FORMER NESTLE SITE
HAYES

TITLE

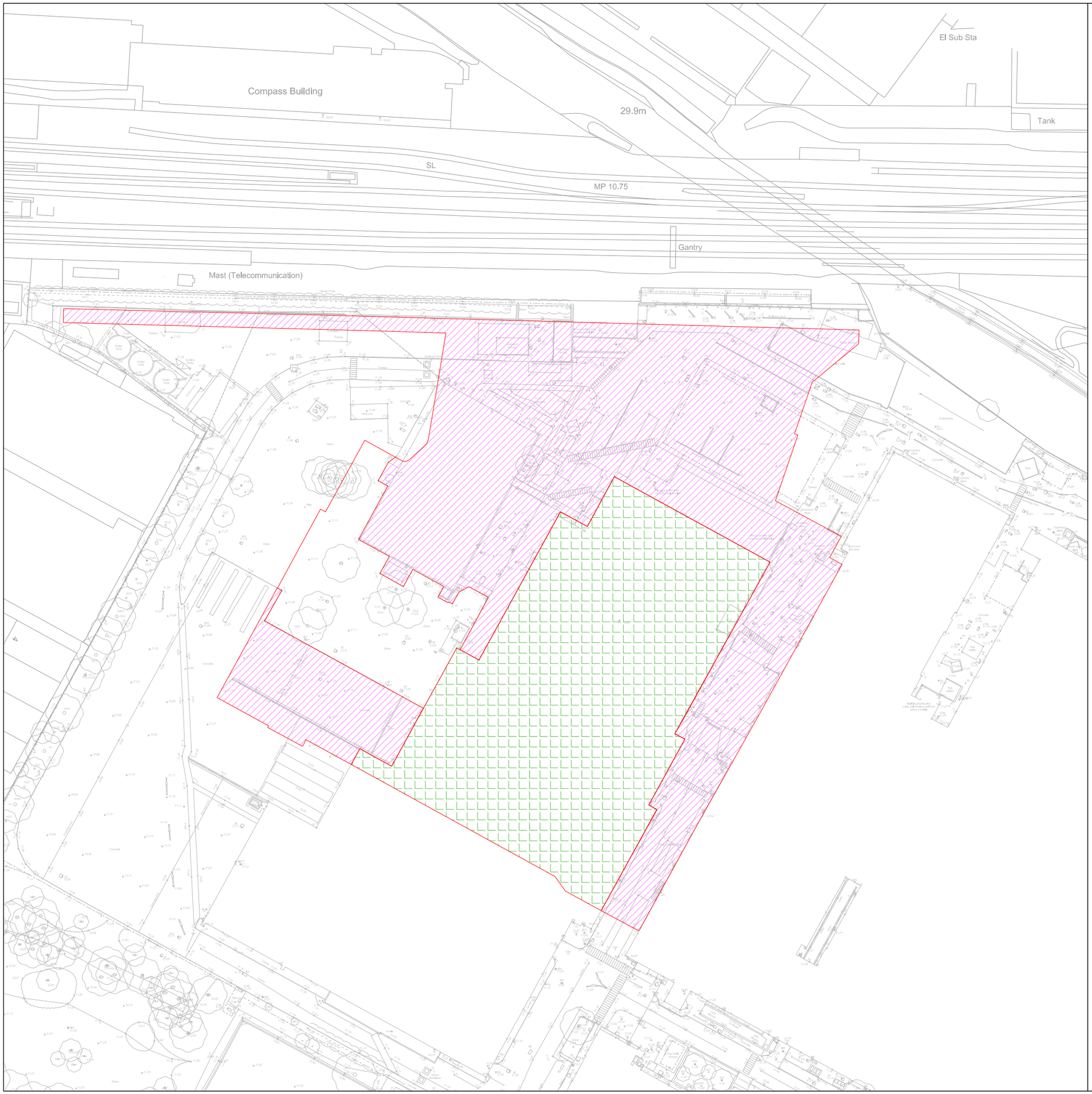
BLOCK B
PROPOSED CATCHMENT AREA

HYDROCK PROJECT NO.	SCALE @ A1
C-01669	1:500

STATUS DESCRIPTION	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
FNF-C-B-HYD-SK-01-901	P01

4. Appendix B – Existing Catchment Areas



KEY

Existing Building Building Catchment Area
= 5,910m²

External Catchment Area
= 9,367m²

Total existing catchment area positively drained within Block B site boundary
= 15,277m²

KEY PLAN

NOTES

1. This drawing is to be read in conjunction with relevant Architects, Engineers and specialist manufacturers drawings, reports and specifications.
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REVISIONS

P01	First issue					
	G.JONES	20.11.2023	JW	20.11.2023	JW	20.11.2023
REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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PROJECT
FORMER NESTLE SITE
HAYES

TITLE
BLOCK B
EXISTING SITE AREAS

HYDROCK PROJECT NO.	SCALE @ A1
C-01669	1:500

STATUS DESCRIPTION	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
FNF-C-B-GHY-SK-01-902	P01

5. Appendix C – Microdrainage Calculations

Hydrock Consultants Ltd		Page 1
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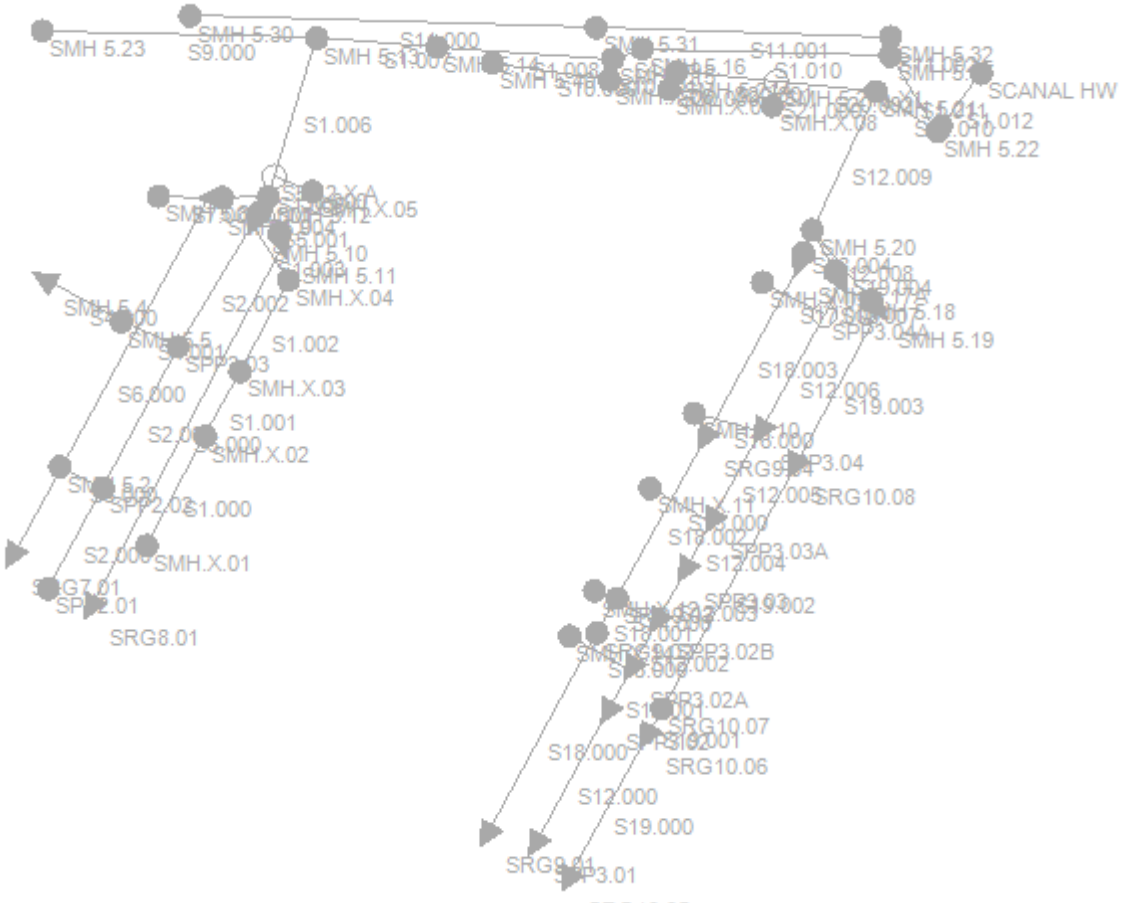
Date 19/01/2022 13:07 File C-01669 BLOCK B STORM DRAINAGE [FULL MODE...	Designed by garethjones Checked by	
Innovyze	Network 2020.1.3	



STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.405	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.250	4-8	0.503	8-12	0.044

Total Area Contributing (ha) = 0.796

Total Pipe Volume (m³) = 44.281

Network Design Table for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	22.929	0.115	199.4	0.017	5.00	1.9	0.600	o	225	Pipe/Conduit	
S1.001	13.605	0.068	200.1	0.017	0.00	1.9	0.600	o	225	Pipe/Conduit	
S1.002	19.201	0.097	197.9	0.017	0.00	1.9	0.600	o	225	Pipe/Conduit	
S1.003	12.269	0.060	204.5	0.017	0.00	1.9	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.41	30.910	0.017	1.9	0.0	0.0	0.92	36.7	4.2
S1.001	50.00	5.66	30.795	0.034	3.8	0.0	0.0	0.92	36.6	8.4
S1.002	50.00	6.01	30.727	0.051	5.7	0.0	0.0	0.93	36.8	12.6
S1.003	50.00	6.23	30.630	0.068	7.6	0.0	0.0	0.91	36.2	16.8

Network Design Table for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.000	21.208	0.077	275.4	0.027	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	8.980	0.391	23.0	0.000	5.00	0.4	0.600	o	150	Pipe/Conduit	
S2.001	29.685	0.107	277.4	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.000	16.552	0.160	103.5	0.000	5.00	1.0	0.600	o	150	Pipe/Conduit	
S4.001	11.498	0.379	30.3	0.021	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.002	26.572	0.026	1022.0	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	5.779	0.050	115.6	0.027	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	76.001	0.510	149.0	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	9.535	0.105	90.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.000	75.973	0.507	149.8	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
S7.000	9.465	0.060	157.8	0.000	5.00	0.2	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.000	50.00	5.59	30.925	0.027	0.0	0.0	0.0	0.60	10.6	3.7
S3.000	50.00	5.07	31.210	0.000	0.4	0.0	0.0	2.11	37.3	0.4
S2.001	50.00	6.42	30.819	0.054	0.4	0.0	0.0	0.60	10.6	7.7
S4.000	50.00	5.28	31.210	0.000	1.0	0.0	0.0	0.99	17.5	1.0
S4.001	50.00	5.38	31.050	0.021	1.0	0.0	0.0	1.83	32.4	3.8
S2.002	50.00	7.86	30.671	0.102	1.4	0.0	0.0	0.31	5.4«	15.2
S1.004	50.00	7.94	30.570	0.197	9.0	0.0	0.0	1.22	48.3	35.7
S5.000	50.00	6.54	31.210	0.000	0.0	0.0	0.0	0.82	14.5	0.0
S5.001	50.00	6.69	30.700	0.000	0.0	0.0	0.0	1.06	18.6	0.0
S6.000	50.00	6.55	31.192	0.000	0.0	0.0	0.0	0.82	14.5	0.0
S7.000	50.00	5.15	30.670	0.000	0.2	0.0	0.0	1.04	41.3	0.2

Network Design Table for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.001	10.910	0.090	121.2	0.018	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.005	3.964	0.052	76.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.000	7.552	0.557	13.6	0.017	5.00	1.9	0.600	o	150	Pipe/Conduit	
S1.006	26.820	0.393	68.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S9.000	51.108	0.260	196.6	0.019	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.007	22.354	0.095	235.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	32.806	0.135	243.0	0.029	0.00	1.5	0.600	o	300	Pipe/Conduit	
S10.000	22.004	0.150	146.7	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
S10.001	3.976	0.840	4.7	0.017	0.00	0.4	0.600	o	150	Pipe/Conduit	
S1.009	5.771	0.020	288.6	0.012	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.010	46.087	0.155	297.3	0.012	0.00	0.0	0.600	o	300	Pipe/Conduit	
S11.000	75.493	0.380	198.7	0.012	5.00	0.0	0.600	o	225	Pipe/Conduit	
S11.001	54.842	0.275	199.4	0.029	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.001	50.00	6.70	30.610	0.018	0.2	0.0	0.0	1.19	47.2	2.6
S1.005	50.00	7.98	30.520	0.215	9.2	0.0	0.0	1.50	59.7	38.3
S8.000	50.00	5.05	31.100	0.017	1.9	0.0	0.0	2.75	48.6	4.2
S1.006	50.00	8.27	30.468	0.232	11.1	0.0	0.0	1.59	63.0	42.5
S9.000	50.00	5.76	30.260	0.019	0.0	0.0	0.0	1.12	79.0	2.6
S1.007	50.00	8.63	30.000	0.251	11.1	0.0	0.0	1.02	72.1	45.1
S1.008	50.00	9.17	29.905	0.280	12.6	0.0	0.0	1.00	71.0	50.5
S10.000	50.00	5.44	30.910	0.000	0.0	0.0	0.0	0.83	14.6	0.0
S10.001	50.00	5.46	30.760	0.017	0.4	0.0	0.0	4.66	82.4	2.7
S1.009	50.00	9.28	29.770	0.309	13.0	0.0	0.0	0.92	65.1	54.8
S1.010	50.00	10.13	29.750	0.321	13.0	0.0	0.0	0.91	64.1	56.5
S11.000	50.00	6.36	30.345	0.012	0.0	0.0	0.0	0.92	36.7	1.6
S11.001	50.00	7.35	29.965	0.041	0.0	0.0	0.0	0.92	36.7	5.6

Network Design Table for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S11.002	3.536	0.018	196.4	0.023	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.011	16.465	0.050	329.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S12.000	27.904	0.130	214.6	0.098	5.00	0.0	0.600	o	225	Pipe/Conduit	
S12.001	9.169	0.046	199.3	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.000	12.921	0.551	23.5	0.017	5.00	1.8	0.600	o	150	Pipe/Conduit	
S12.002	10.049	0.050	201.0	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S14.000	12.929	0.581	22.3	0.017	5.00	1.5	0.600	o	150	Pipe/Conduit	
S12.003	10.776	0.054	199.6	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.004	10.347	0.052	199.0	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.000	12.997	0.707	18.4	0.017	5.00	0.9	0.600	o	150	Pipe/Conduit	
S12.005	18.972	0.098	193.6	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S16.000	12.728	0.680	18.7	0.017	5.00	0.8	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S11.002	50.00	7.44	29.690	0.064	0.0	0.0	0.0	0.71	12.6	8.7
S1.011	49.37	10.45	29.595	0.385	13.0	0.0	0.0	0.86	60.9«	64.5
S12.000	50.00	5.52	30.650	0.098	0.0	0.0	0.0	0.89	35.3	13.3
S12.001	50.00	5.69	30.520	0.119	0.0	0.0	0.0	0.92	36.7	16.1
S13.000	50.00	5.10	31.100	0.017	1.8	0.0	0.0	2.09	36.9	4.1
S12.002	50.00	5.87	30.474	0.157	1.8	0.0	0.0	0.92	36.5	23.1
S14.000	50.00	5.10	31.080	0.017	1.5	0.0	0.0	2.14	37.9	3.8
S12.003	50.00	6.07	30.424	0.195	3.3	0.0	0.0	0.92	36.7	29.7
S12.004	50.00	6.25	30.370	0.216	3.3	0.0	0.0	0.92	36.7	32.5
S15.000	50.00	5.09	31.100	0.017	0.9	0.0	0.0	2.36	41.7	3.2
S12.005	50.00	6.59	30.318	0.254	4.2	0.0	0.0	0.94	37.2«	38.6
S16.000	50.00	5.07	30.900	0.017	0.8	0.0	0.0	3.04	120.8	3.1

Network Design Table for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S12.006	24.864	0.124	200.5	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S17.000	13.009	0.734	17.7	0.017	5.00	0.9	0.600	o	225	Pipe/Conduit	
S12.007	6.616	0.036	183.8	0.021	0.00	1.0	0.600	o	225	Pipe/Conduit	
S12.008	11.265	0.150	75.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S18.000	42.836	0.286	149.8	0.001	5.00	0.0	0.600	o	150	Pipe/Conduit	
S18.001	7.452	0.050	149.0	0.001	0.00	0.0	0.600	o	150	Pipe/Conduit	
S18.002	33.607	0.224	150.0	0.001	0.00	0.0	0.600	o	150	Pipe/Conduit	
S18.003	36.605	0.245	149.4	0.001	0.00	0.0	0.600	o	150	Pipe/Conduit	
S18.004	7.087	0.365	19.4	0.001	0.00	0.0	0.600	o	150	Pipe/Conduit	
S19.000	30.340	0.202	150.2	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit	
S19.001	6.039	0.040	151.0	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
S19.002	51.058	0.340	150.2	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
S19.003	33.061	0.220	150.3	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
S19.004	19.441	0.213	91.3	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
S12.009	28.233	0.190	148.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S12.006	50.00	7.04	30.220	0.292	5.0	0.0	0.0	0.92	36.6«	44.5
S17.000	50.00	5.07	30.830	0.017	0.9	0.0	0.0	3.12	124.2	3.2
S12.007	50.00	7.16	30.096	0.330	6.9	0.0	0.0	0.96	38.2«	51.6
S12.008	50.00	7.28	30.060	0.330	6.9	0.0	0.0	1.51	60.1	51.6
S18.000	50.00	5.87	31.155	0.001	0.0	0.0	0.0	0.82	14.5	0.1
S18.001	50.00	6.02	30.869	0.002	0.0	0.0	0.0	0.82	14.5	0.3
S18.002	50.00	6.71	30.819	0.003	0.0	0.0	0.0	0.82	14.5	0.4
S18.003	50.00	7.45	30.595	0.004	0.0	0.0	0.0	0.82	14.5	0.5
S18.004	50.00	7.50	30.350	0.005	0.0	0.0	0.0	2.30	40.6	0.7
S19.000	50.00	5.62	31.000	0.006	0.0	0.0	0.0	0.82	14.4	0.8
S19.001	50.00	5.74	30.798	0.012	0.0	0.0	0.0	0.82	14.4	1.6
S19.002	50.00	6.78	30.758	0.018	0.0	0.0	0.0	0.82	14.5	2.4
S19.003	50.00	7.46	30.418	0.024	0.0	0.0	0.0	0.82	14.4	3.2
S19.004	50.00	7.76	30.198	0.030	0.0	0.0	0.0	1.05	18.6	4.1
S12.009	50.00	8.20	29.910	0.365	6.9	0.0	0.0	1.07	42.6«	56.3

Network Design Table for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S20.000	3.471	0.875	4.0	0.017	5.00	1.5	0.600	o	150	Pipe/Conduit	
S20.001	18.575	0.141	131.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S21.000	4.547	0.416	10.9	0.017	5.00	0.8	0.600	o	150	Pipe/Conduit	
S20.002	18.575	0.139	133.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.010	13.646	0.100	136.5	0.012	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.012	13.399	0.015	893.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S20.000	50.00	5.01	30.950	0.017	1.5	0.0	0.0	5.10	90.1	3.8
S20.001	50.00	5.28	30.000	0.017	1.5	0.0	0.0	1.14	45.2	3.8
S21.000	50.00	5.02	30.350	0.017	0.8	0.0	0.0	3.06	54.2	3.1
S20.002	50.00	5.56	29.859	0.034	2.3	0.0	0.0	1.13	44.9	6.9
S12.010	50.00	8.37	29.645	0.411	9.2	0.0	0.0	1.34	95.0	64.9
S1.012	48.30	10.88	29.545	0.796	22.2	0.0	0.0	0.52	36.6«	126.3

TOTAL EXTERNAL CATCHMENT AREA ASSOCIATED WITH BLOCK B PROPOSED DRAINAGE

BASE FLOW QUANTITIES SHOW CONTROLLED DISCHARGE RATES FROM BLUE ROOF SYSTEM ENTERING THE BELOW GROUND DRAINAGE

Manhole Schedules for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Back (m
SMH.X.01	31.870	0.960	Open Manhole	1200	S1.000	30.910	225				
SMH.X.02	31.870	1.075	Open Manhole	450	S1.001	30.795	225	S1.000	30.795	225	
SMH.X.03	31.870	1.143	Open Manhole	450	S1.002	30.727	225	S1.001	30.727	225	
SMH.X.04	31.870	1.240	Open Manhole	450	S1.003	30.630	225	S1.002	30.630	225	
SPP2.01	31.826	0.901	Open Manhole	150	S2.000	30.925	150				
SMH 5.2	31.870	0.660	Open Manhole	450	S3.000	31.210	150				
SPP2.02	31.646	0.827	Open Manhole	150	S2.001	30.819	150	S2.000	30.848	150	
								S3.000	30.819	150	
SMH.5.4	31.960	0.750	Open Manhole	1200	S4.000	31.210	150				
SMH 5.5	31.950	0.900	Open Manhole	1200	S4.001	31.050	150	S4.000	31.050	150	
SPP2.03	31.728	1.057	Open Manhole	150	S2.002	30.671	150	S2.001	30.712	150	
								S4.001	30.671	150	
SMH 5.10	31.700	1.130	Open Manhole	1500	S1.004	30.570	225	S1.003	30.570	225	
								S2.002	30.645	150	
SRG8.01	31.718	0.508	Open Manhole	1200	S5.000	31.210	150				
SMH 5.11	31.750	1.050	Open Manhole	1200	S5.001	30.700	150	S5.000	30.700	150	
SRG7.01	31.826	0.634	Open Manhole	450	S6.000	31.192	150				
SMH 5.8	31.950	1.280	Open Manhole	1200	S7.000	30.670	225				
SMH 5.9	31.700	1.090	Open Manhole	1200	S6.001	30.610	225	S6.000	30.685	150	
								S7.000	30.610	225	
SMH 5.12	31.805	1.285	Open Manhole	1200	S1.005	30.520	225	S1.004	30.520	225	
								S5.001	30.595	150	
								S6.001	30.520	225	
SMH.X.05	31.870	0.770	Open Manhole	450	S8.000	31.100	150				
S5.12.X.A	31.805	1.337	Junction		S1.006	30.468	225	S1.005	30.468	225	
								S8.000	30.543	150	
SMH 5.23	31.200	0.940	Open Manhole	1200	S9.000	30.260	300				
SMH 5.13	31.200	1.200	Open Manhole	1200	S1.007	30.000	300	S1.006	30.075	225	
								S9.000	30.000	300	
SMH 5.14	31.200	1.295	Open Manhole	1200	S1.008	29.905	300	S1.007	29.905	300	
SMH 5.40	31.790	0.880	Open Manhole	450	S10.000	30.910	150				
SMH.X.06	31.500	0.740	Open Manhole	450	S10.001	30.760	150	S10.000	30.760	150	
SMH 5.15	31.500	1.730	Open Manhole	1200	S1.009	29.770	300	S1.008	29.770	300	
								S10.001	29.920	150	
SMH 5.16	31.200	1.450	Open Manhole	1200	S1.010	29.750	300	S1.009	29.750	300	
SMH 5.30	31.150	0.805	Open Manhole	1200	S11.000	30.345	225				
SMH 5.31	31.150	1.185	Open Manhole	1200	S11.001	29.965	225	S11.000	29.965	225	

Manhole Schedules for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Ba
SMH 5.32	31.150	1.460	Open Manhole	1200	S11.002	29.690	150	S11.001	29.690	225	
SMH 5.17	31.200	1.605	Open Manhole	1200	S1.011	29.595	300	S1.010	29.595	300	
								S11.002	29.672	150	
SPP3.01	31.500	0.850	Open Manhole	1200	S12.000	30.650	225				
SPP3.02	31.500	0.980	Open Manhole	1200	S12.001	30.520	225	S12.000	30.520	225	
SMH.X.14	31.870	0.770	Open Manhole	450	S13.000	31.100	150				
SPP3.02A	31.561	1.087	Sealed Manhole	225	S12.002	30.474	225	S12.001	30.474	225	
								S13.000	30.549	150	
SMH.X.12	31.870	0.790	Open Manhole	450	S14.000	31.080	150				
SPP3.02B	30.850	0.426	Sealed Manhole	225	S12.003	30.424	225	S12.002	30.424	225	
								S14.000	30.499	150	
SPP3.03	31.500	1.130	Open Manhole	450	S12.004	30.370	225	S12.003	30.370	225	
SMH.X.11	31.870	0.770	Open Manhole	450	S15.000	31.100	150				
SPP3.03A	31.561	1.243	Sealed Manhole	225	S12.005	30.318	225	S12.004	30.318	225	
								S15.000	30.393	150	
SMH.X.10	31.870	0.970	Open Manhole	1200	S16.000	30.900	225				
SPP3.04	31.500	1.280	Open Manhole	450	S12.006	30.220	225	S12.005	30.220	225	
								S16.000	30.220	225	
SMH.X.09	31.870	1.040	Open Manhole	1200	S17.000	30.830	225				
SPP3.04A	31.611	1.515	Junction		S12.007	30.096	225	S12.006	30.096	225	
								S17.000	30.096	225	
SMH 5.18	31.675	1.615	Open Manhole	1200	S12.008	30.060	225	S12.007	30.060	225	
SRG9.01	31.830	0.675	Open Manhole	450	S18.000	31.155	150				
SRG9.02	31.611	0.742	Open Manhole	450	S18.001	30.869	150	S18.000	30.869	150	
SRG9.03	31.850	1.031	Open Manhole	450	S18.002	30.819	150	S18.001	30.819	150	
SRG9.04	31.825	1.230	Open Manhole	450	S18.003	30.595	150	S18.002	30.595	150	
SMH 5.17A	31.825	1.475	Open Manhole	1200	S18.004	30.350	150	S18.003	30.350	150	
SRG10.05	31.240	0.240	Open Manhole	450	S19.000	31.000	150				
SRG10.06	31.300	0.502	Open Manhole	450	S19.001	30.798	150	S19.000	30.798	150	
SRG10.07	31.300	0.542	Open Manhole	450	S19.002	30.758	150	S19.001	30.758	150	
SRG10.08	31.300	0.882	Open Manhole	450	S19.003	30.418	150	S19.002	30.418	150	
SMH 5.19	31.230	1.032	Open Manhole	1200	S19.004	30.198	150	S19.003	30.198	150	
SMH 5.20	31.825	1.915	Open Manhole	1200	S12.009	29.910	225	S12.008	29.910	225	
								S18.004	29.985	150	
								S19.004	29.985	150	
SMH.X.07	31.850	0.900	Open Manhole	450	S20.000	30.950	150				
SMH 5.21A	31.650	1.650	Open Manhole	1200	S20.001	30.000	225	S20.000	30.075	150	

Manhole Schedules for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)
SMH.X.08	31.850	1.500	Open Manhole	450	S21.000	30.350	150			
SMH 5.21a.X1	31.800	1.941	Junction		S20.002	29.859	225	S20.001	29.859	225
								S21.000	29.934	150
SMH 5.21	31.300	1.655	Open Manhole	1200	S12.010	29.645	300	S12.009	29.720	225
								S20.002	29.720	225
SMH 5.22	31.275	1.730	Open Manhole	2400	S1.012	29.545	300	S1.011	29.545	300
								S12.010	29.545	300
SCANAL HW	29.950	0.420	Open Manhole	600		OUTFALL		S1.012	29.530	300

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SMH.X.01	509964.627	179273.884	509964.627	179273.884	Required	
SMH.X.02	509975.466	179294.089	509975.466	179294.089	Required	
SMH.X.03	509981.897	179306.078	509981.897	179306.078	Required	
SMH.X.04	509990.959	179323.007	509990.959	179323.007	Required	
SPP2.01	509946.298	179265.876	509946.298	179265.876	Required	
SMH 5.2	509948.439	179288.486	509948.439	179288.486	Required	
SPP2.02	509956.476	179284.481	509956.476	179284.481	Required	
SMH.5.4	509945.348	179323.293	509945.348	179323.293	Required	
SMH 5.5	509959.856	179315.324	509959.856	179315.324	Required	
SPP2.03	509970.386	179310.706	509970.386	179310.706	Required	

Manhole Schedules for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SMH 5.10	509984.326	179333.328	509984.326	179333.328	Required	
SRG8.01	509954.064	179262.252	509954.064	179262.252	Required	
SMH 5.11	509989.918	179329.264	509989.918	179329.264	Required	
SRG7.01	509939.484	179271.734	509939.484	179271.734	Required	
SMH 5.8	509966.760	179338.553	509966.760	179338.553	Required	
SMH 5.9	509976.220	179338.235	509976.220	179338.235	Required	
SMH 5.12	509987.129	179338.381	509987.129	179338.381	Required	
SMH.X.05	509995.337	179339.414	509995.337	179339.414	Required	
S5.12.X.A	509988.304	179342.167			No Entry	
SMH 5.23	509945.157	179369.159	509945.157	179369.159	Required	
SMH 5.13	509996.246	179367.784	509996.246	179367.784	Required	
SMH 5.14	510018.541	179366.161	510018.541	179366.161	Required	
SMH 5.40	510028.866	179363.145	510028.866	179363.145	Required	
SMH.X.06	510050.650	179360.044	510050.650	179360.044	Required	
SMH 5.15	510051.274	179363.970	510051.274	179363.970	Required	

Manhole Schedules for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SMH 5.16	510056.753	179365.782	510056.753	179365.782	Required	
SMH 5.30	509972.646	179371.887	509972.646	179371.887	Required	
SMH 5.31	510048.107	179369.704	510048.107	179369.704	Required	
SMH 5.32	510102.924	179368.019	510102.924	179368.019	Required	
SMH 5.17	510102.822	179364.485	510102.822	179364.485	Required	
SPP3.01	510036.699	179218.395	510036.699	179218.395	Required	
SPP3.02	510050.131	179242.854	510050.131	179242.854	Required	
SMH.X.14	510043.220	179257.111	510043.220	179257.111	Required	
SPP3.02A	510054.545	179250.890			No Entry	
SMH.X.12	510047.817	179265.479	510047.817	179265.479	Required	
SPP3.02B	510059.383	179259.698			No Entry	
SPP3.03	510064.570	179269.143	510064.570	179269.143	Required	
SMH.X.11	510058.159	179284.469	510058.159	179284.469	Required	
SPP3.03A	510069.551	179278.212			No Entry	
SMH.X.10	510066.451	179298.359	510066.451	179298.359	Required	

Manhole Schedules for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SPP3.04	510078.684	179294.841	510078.684	179294.841	Required	
SMH.X.09	510079.082	179322.588	510079.082	179322.588	Required	
SPP3.04A	510090.649	179316.636			No Entry	
SMH 5.18	510093.790	179322.459	510093.790	179322.459	Required	
SRG9.01	510027.711	179220.125	510027.711	179220.125	Required	
SRG9.02	510048.332	179257.670	510048.332	179257.670	Required	
SRG9.03	510052.041	179264.133	510052.041	179264.133	Required	
SRG9.04	510068.248	179293.574	510068.248	179293.574	Required	
SMH 5.17A	510085.790	179325.701	510085.790	179325.701	Required	
SRG10.05	510042.836	179211.817	510042.836	179211.817	Required	
SRG10.06	510057.442	179238.410	510057.442	179238.410	Required	
SRG10.07	510060.349	179243.703	510060.349	179243.703	Required	
SRG10.08	510084.928	179288.455	510084.928	179288.455	Required	
SMH 5.19	510100.844	179317.433	510100.844	179317.433	Required	
SMH 5.20	510088.336	179332.316	510088.336	179332.316	Required	

Manhole Schedules for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SMH.X.07	510061.737	179358.328	510061.737	179358.328	Required	
SMH 5.21A	510063.182	179361.483	510063.182	179361.483	Required	
SMH.X.08	510080.892	179355.231	510080.892	179355.231	Required	
SMH 5.21a.X1	510081.672	179359.711			No Entry	
SMH 5.21	510100.163	179357.953	510100.163	179357.953	Required	
SMH 5.22	510111.650	179350.587	510111.650	179350.587	Required	
SCANAL HW	510119.779	179361.239			No Entry	

PIPELINE SCHEDULES for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	SMH.X.01	31.870	30.910	0.735	Open Manhole	1200
S1.001	o	225	SMH.X.02	31.870	30.795	0.850	Open Manhole	450
S1.002	o	225	SMH.X.03	31.870	30.727	0.918	Open Manhole	450
S1.003	o	225	SMH.X.04	31.870	30.630	1.015	Open Manhole	450
S2.000	o	150	SPP2.01	31.826	30.925	0.751	Open Manhole	150
S3.000	o	150	SMH 5.2	31.870	31.210	0.510	Open Manhole	450
S2.001	o	150	SPP2.02	31.646	30.819	0.677	Open Manhole	150
S4.000	o	150	SMH.5.4	31.960	31.210	0.600	Open Manhole	1200
S4.001	o	150	SMH 5.5	31.950	31.050	0.750	Open Manhole	1200
S2.002	o	150	SPP2.03	31.728	30.671	0.907	Open Manhole	150
S1.004	o	225	SMH 5.10	31.700	30.570	0.905	Open Manhole	1500
S5.000	o	150	SRG8.01	31.718	31.210	0.358	Open Manhole	1200
S5.001	o	150	SMH 5.11	31.750	30.700	0.900	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	22.929	199.4	SMH.X.02	31.870	30.795	0.850	Open Manhole	450
S1.001	13.605	200.1	SMH.X.03	31.870	30.727	0.918	Open Manhole	450
S1.002	19.201	197.9	SMH.X.04	31.870	30.630	1.015	Open Manhole	450
S1.003	12.269	204.5	SMH 5.10	31.700	30.570	0.905	Open Manhole	1500
S2.000	21.208	275.4	SPP2.02	31.646	30.848	0.648	Open Manhole	150
S3.000	8.980	23.0	SPP2.02	31.646	30.819	0.677	Open Manhole	150
S2.001	29.685	277.4	SPP2.03	31.728	30.712	0.866	Open Manhole	150
S4.000	16.552	103.5	SMH 5.5	31.950	31.050	0.750	Open Manhole	1200
S4.001	11.498	30.3	SPP2.03	31.728	30.671	0.907	Open Manhole	150
S2.002	26.572	1022.0	SMH 5.10	31.700	30.645	0.905	Open Manhole	1500
S1.004	5.779	115.6	SMH 5.12	31.805	30.520	1.060	Open Manhole	1200
S5.000	76.001	149.0	SMH 5.11	31.750	30.700	0.900	Open Manhole	1200
S5.001	9.535	90.8	SMH 5.12	31.805	30.595	1.060	Open Manhole	1200

PIPELINE SCHEDULES for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S6.000	o	150	SRG7.01	31.826	31.192	0.484	Open Manhole	450
S7.000	o	225	SMH 5.8	31.950	30.670	1.055	Open Manhole	1200
S6.001	o	225	SMH 5.9	31.700	30.610	0.865	Open Manhole	1200
S1.005	o	225	SMH 5.12	31.805	30.520	1.060	Open Manhole	1200
S8.000	o	150	SMH.X.05	31.870	31.100	0.620	Open Manhole	450
S1.006	o	225	S5.12.X.A	31.805	30.468	1.112	Junction	
S9.000	o	300	SMH 5.23	31.200	30.260	0.640	Open Manhole	1200
S1.007	o	300	SMH 5.13	31.200	30.000	0.900	Open Manhole	1200
S1.008	o	300	SMH 5.14	31.200	29.905	0.995	Open Manhole	1200
S10.000	o	150	SMH 5.40	31.790	30.910	0.730	Open Manhole	450
S10.001	o	150	SMH.X.06	31.500	30.760	0.590	Open Manhole	450

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S6.000	75.973	149.8	SMH 5.9	31.700	30.685	0.865	Open Manhole	1200
S7.000	9.465	157.8	SMH 5.9	31.700	30.610	0.865	Open Manhole	1200
S6.001	10.910	121.2	SMH 5.12	31.805	30.520	1.060	Open Manhole	1200
S1.005	3.964	76.0	S5.12.X.A	31.805	30.468	1.112	Junction	
S8.000	7.552	13.6	S5.12.X.A	31.805	30.543	1.112	Junction	
S1.006	26.820	68.2	SMH 5.13	31.200	30.075	0.900	Open Manhole	1200
S9.000	51.108	196.6	SMH 5.13	31.200	30.000	0.900	Open Manhole	1200
S1.007	22.354	235.3	SMH 5.14	31.200	29.905	0.995	Open Manhole	1200
S1.008	32.806	243.0	SMH 5.15	31.500	29.770	1.430	Open Manhole	1200
S10.000	22.004	146.7	SMH.X.06	31.500	30.760	0.590	Open Manhole	450
S10.001	3.976	4.7	SMH 5.15	31.500	29.920	1.430	Open Manhole	1200

PIPELINE SCHEDULES for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.009	o	300	SMH 5.15	31.500	29.770	1.430	Open Manhole	1200
S1.010	o	300	SMH 5.16	31.200	29.750	1.150	Open Manhole	1200
S11.000	o	225	SMH 5.30	31.150	30.345	0.580	Open Manhole	1200
S11.001	o	225	SMH 5.31	31.150	29.965	0.960	Open Manhole	1200
S11.002	o	150	SMH 5.32	31.150	29.690	1.310	Open Manhole	1200
S1.011	o	300	SMH 5.17	31.200	29.595	1.305	Open Manhole	1200
S12.000	o	225	SPP3.01	31.500	30.650	0.625	Open Manhole	1200
S12.001	o	225	SPP3.02	31.500	30.520	0.755	Open Manhole	1200
S13.000	o	150	SMH.X.14	31.870	31.100	0.620	Open Manhole	450
S12.002	o	225	SPP3.02A	31.561	30.474	0.862	Sealed Manhole	225
S14.000	o	150	SMH.X.12	31.870	31.080	0.640	Open Manhole	450
S12.003	o	225	SPP3.02B	30.850	30.424	0.201	Sealed Manhole	225

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.009	5.771	288.6	SMH 5.16	31.200	29.750	1.150	Open Manhole	1200
S1.010	46.087	297.3	SMH 5.17	31.200	29.595	1.305	Open Manhole	1200
S11.000	75.493	198.7	SMH 5.31	31.150	29.965	0.960	Open Manhole	1200
S11.001	54.842	199.4	SMH 5.32	31.150	29.690	1.235	Open Manhole	1200
S11.002	3.536	196.4	SMH 5.17	31.200	29.672	1.378	Open Manhole	1200
S1.011	16.465	329.3	SMH 5.22	31.275	29.545	1.430	Open Manhole	2400
S12.000	27.904	214.6	SPP3.02	31.500	30.520	0.755	Open Manhole	1200
S12.001	9.169	199.3	SPP3.02A	31.561	30.474	0.862	Sealed Manhole	225
S13.000	12.921	23.5	SPP3.02A	31.561	30.549	0.862	Sealed Manhole	225
S12.002	10.049	201.0	SPP3.02B	30.850	30.424	0.201	Sealed Manhole	225
S14.000	12.929	22.3	SPP3.02B	30.850	30.499	0.201	Sealed Manhole	225
S12.003	10.776	199.6	SPP3.03	31.500	30.370	0.905	Open Manhole	450

PIPELINE SCHEDULES for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S12.004	o	225	SPP3.03	31.500	30.370	0.905	Open Manhole	450
S15.000	o	150	SMH.X.11	31.870	31.100	0.620	Open Manhole	450
S12.005	o	225	SPP3.03A	31.561	30.318	1.018	Sealed Manhole	225
S16.000	o	225	SMH.X.10	31.870	30.900	0.745	Open Manhole	1200
S12.006	o	225	SPP3.04	31.500	30.220	1.055	Open Manhole	450
S17.000	o	225	SMH.X.09	31.870	30.830	0.815	Open Manhole	1200
S12.007	o	225	SPP3.04A	31.611	30.096	1.290	Junction	
S12.008	o	225	SMH 5.18	31.675	30.060	1.390	Open Manhole	1200
S18.000	o	150	SRG9.01	31.830	31.155	0.525	Open Manhole	450
S18.001	o	150	SRG9.02	31.611	30.869	0.592	Open Manhole	450
S18.002	o	150	SRG9.03	31.850	30.819	0.881	Open Manhole	450
S18.003	o	150	SRG9.04	31.825	30.595	1.080	Open Manhole	450
S18.004	o	150	SMH 5.17A	31.825	30.350	1.325	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S12.004	10.347	199.0	SPP3.03A	31.561	30.318	1.018	Sealed Manhole	225
S15.000	12.997	18.4	SPP3.03A	31.561	30.393	1.018	Sealed Manhole	225
S12.005	18.972	193.6	SPP3.04	31.500	30.220	1.055	Open Manhole	450
S16.000	12.728	18.7	SPP3.04	31.500	30.220	1.055	Open Manhole	450
S12.006	24.864	200.5	SPP3.04A	31.611	30.096	1.290	Junction	
S17.000	13.009	17.7	SPP3.04A	31.611	30.096	1.290	Junction	
S12.007	6.616	183.8	SMH 5.18	31.675	30.060	1.390	Open Manhole	1200
S12.008	11.265	75.1	SMH 5.20	31.825	29.910	1.690	Open Manhole	1200
S18.000	42.836	149.8	SRG9.02	31.611	30.869	0.592	Open Manhole	450
S18.001	7.452	149.0	SRG9.03	31.850	30.819	0.881	Open Manhole	450
S18.002	33.607	150.0	SRG9.04	31.825	30.595	1.080	Open Manhole	450
S18.003	36.605	149.4	SMH 5.17A	31.825	30.350	1.325	Open Manhole	1200
S18.004	7.087	19.4	SMH 5.20	31.825	29.985	1.690	Open Manhole	1200

PIPELINE SCHEDULES for C-01669 BLOCK B STORM DRAINAGE [FULL MODEL] - 10.08.2021.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S19.000	o	150	SRG10.05	31.240	31.000	0.090	Open Manhole	450
S19.001	o	150	SRG10.06	31.300	30.798	0.352	Open Manhole	450
S19.002	o	150	SRG10.07	31.300	30.758	0.392	Open Manhole	450
S19.003	o	150	SRG10.08	31.300	30.418	0.732	Open Manhole	450
S19.004	o	150	SMH 5.19	31.230	30.198	0.882	Open Manhole	1200
S12.009	o	225	SMH 5.20	31.825	29.910	1.690	Open Manhole	1200
S20.000	o	150	SMH.X.07	31.850	30.950	0.750	Open Manhole	450
S20.001	o	225	SMH 5.21A	31.650	30.000	1.425	Open Manhole	1200
S21.000	o	150	SMH.X.08	31.850	30.350	1.350	Open Manhole	450
S20.002	o	225	SMH 5.21a.X1	31.800	29.859	1.716	Junction	
S12.010	o	300	SMH 5.21	31.300	29.645	1.355	Open Manhole	1200
S1.012	o	300	SMH 5.22	31.275	29.545	1.430	Open Manhole	2400

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S19.000	30.340	150.2	SRG10.06	31.300	30.798	0.352	Open Manhole	450
S19.001	6.039	151.0	SRG10.07	31.300	30.758	0.392	Open Manhole	450
S19.002	51.058	150.2	SRG10.08	31.300	30.418	0.732	Open Manhole	450
S19.003	33.061	150.3	SMH 5.19	31.230	30.198	0.882	Open Manhole	1200
S19.004	19.441	91.3	SMH 5.20	31.825	29.985	1.690	Open Manhole	1200
S12.009	28.233	148.6	SMH 5.21	31.300	29.720	1.355	Open Manhole	1200
S20.000	3.471	4.0	SMH 5.21A	31.650	30.075	1.425	Open Manhole	1200
S20.001	18.575	131.7	SMH 5.21a.X1	31.800	29.859	1.716	Junction	
S21.000	4.547	10.9	SMH 5.21a.X1	31.800	29.934	1.716	Junction	
S20.002	18.575	133.6	SMH 5.21	31.300	29.720	1.355	Open Manhole	1200
S12.010	13.646	136.5	SMH 5.22	31.275	29.545	1.430	Open Manhole	2400
S1.012	13.399	893.3	SCANAL HW	29.950	29.530	0.120	Open Manhole	600