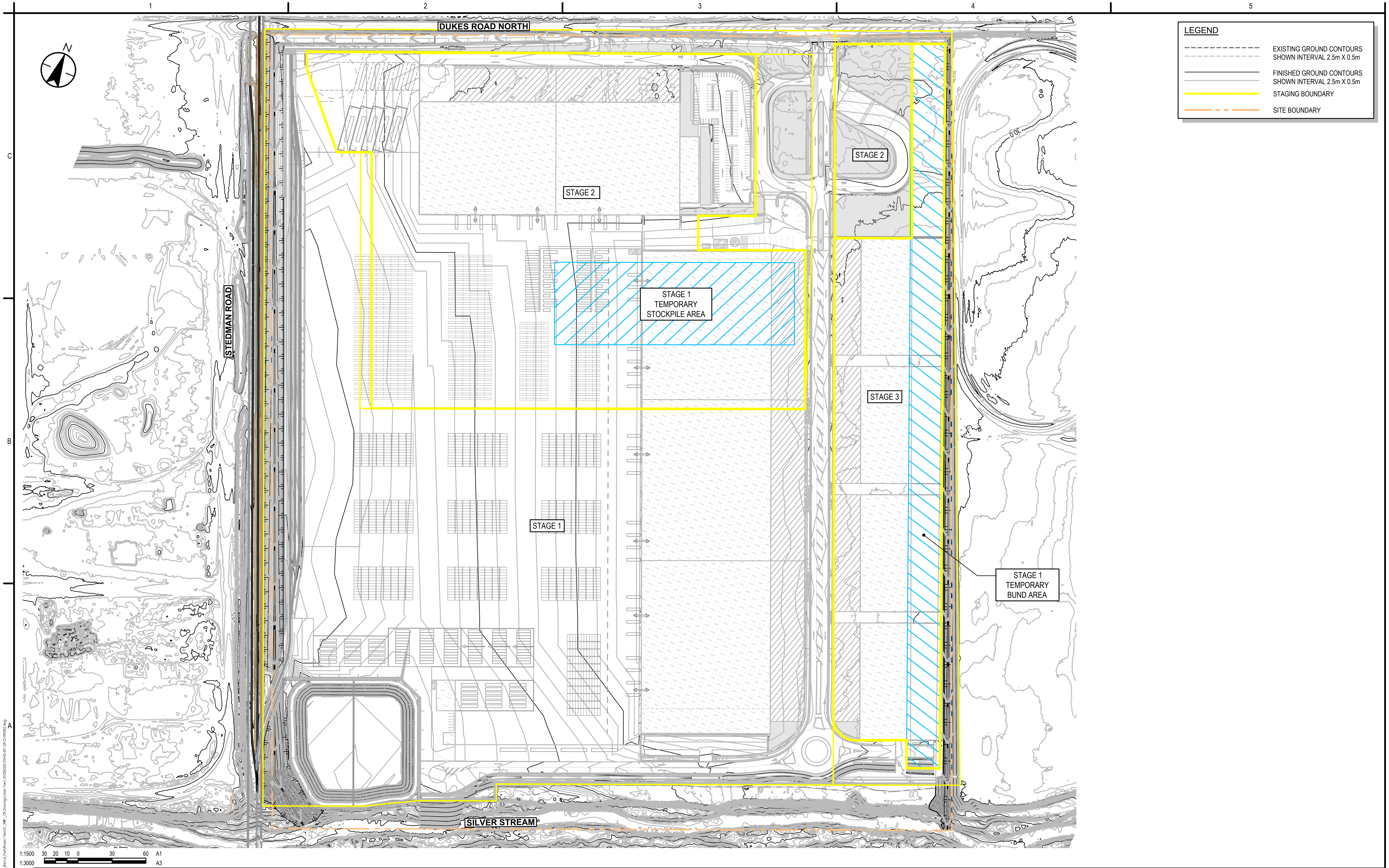

Issued/Revision	By	Appd	YYYY.MM.DD
C ISSUED FOR CONSENT	BG	SL	26.02.20
B ISSUED FOR CONCEPT DESIGN	BG	SL	26.02.05
A ISSUED FOR CONCEPT DESIGN	MS	FZ	25.12.19

Issue Status

A1

AUTHORISED FOR CONSENT

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Coordinate System
NZGD North Taieri Circuit 2000
Datum
NZVD 2016

Colour Disclaimer

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Stantec

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Client/Project Logo

Southern Link LOGISTICS PARK

Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Drawn	Designed	Reviewed	Approved	YYYY.MM.DD
Maninder Singh	Reuben Orange	Andrew Quigley	Sarah Lloyd	2026.02.20

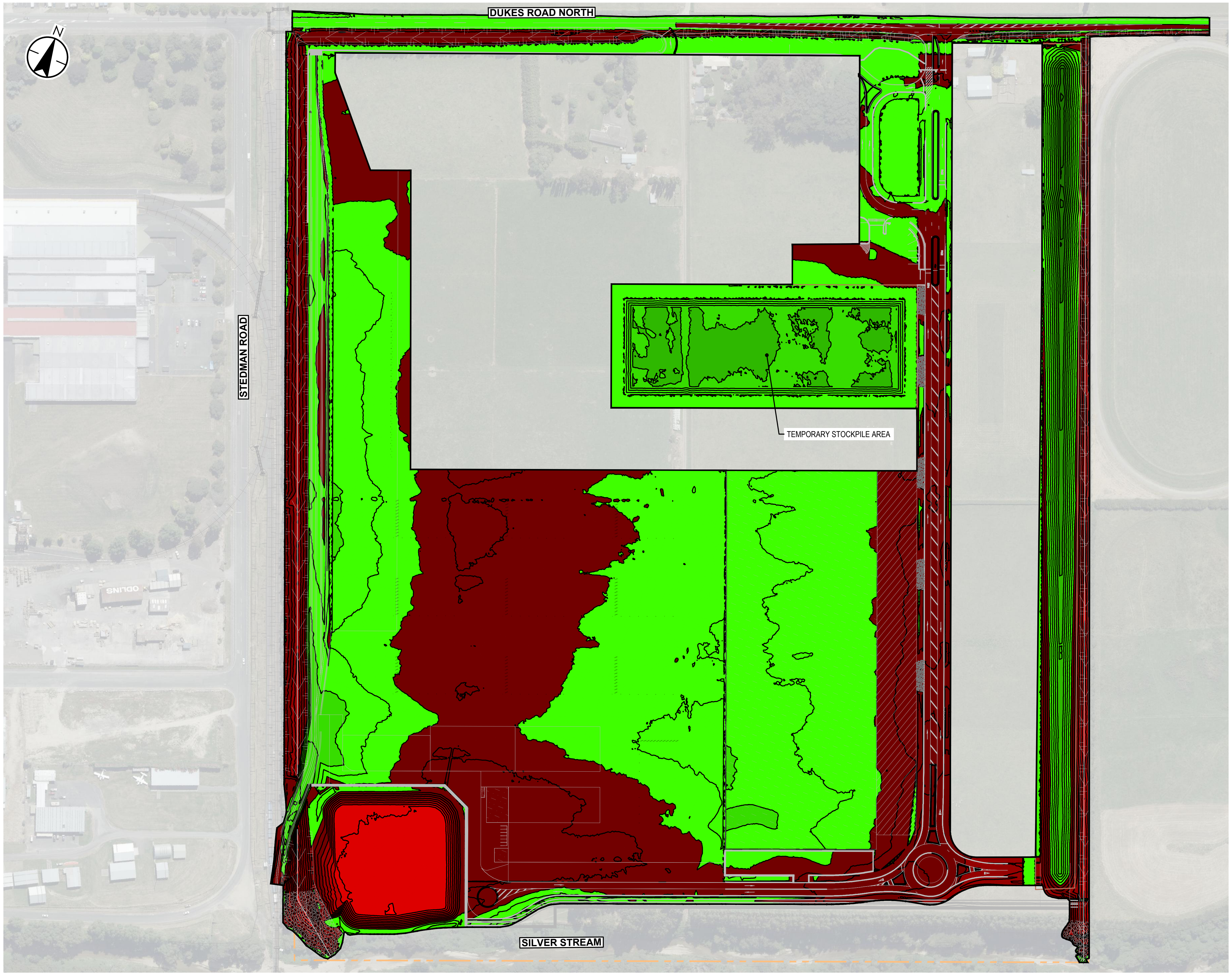
Title EARTHWORKS PLAN
SUBGRADE SURFACE

Project No. 310206525

Scale at A1 1:1500

Revision C

Drawing No. **310206525-STN-00-501-DR-CI-090002**



1:1500 30 20 10 0 30 60 A1
1:3000 A3

CUT/FILL DEPTHS TABLE

NUMBER	COLOUR	MINIMUM DEPTH	MAXIMUM DEPTH	RANGE VOLUME
1		-5.50	-5.00	0
2		-5.00	-4.50	5
3		-4.50	-4.00	1443
4		-4.00	-3.50	3442
5		-3.50	-3.00	3960
6		-3.00	-2.50	4679
7		-2.50	-2.00	5682
8		-2.00	-1.50	7634
9		-1.50	-1.00	10847
10		-1.00	-0.50	19032
11		-0.50	0.00	45342
12		0.00	0.50	50095
13		0.50	1.00	20224
14		1.00	1.50	12066
15		1.50	2.00	9784
16		2.00	2.50	3013
17		2.50	3.00	1854
18		3.00	3.50	1195
19		3.50	4.00	680
20		4.00	4.50	332
21		4.50	5.00	69
22		5.00	5.50	1

CUT/FILL REPORT - EARTHWORKS STAGE 1

AREA (m^2)	CUT (m^3)	TOPSOIL STRIP (m^3)	FILL (m^3)	NET (m^3)
284,300	102,100	85,300 <CUT>	99,400	88,000 <CUT>

NOTE

1. DEPTHS ARE SHOWN FROM EXISTING STRIPPED SURFACE TO SUBGRADE SURFACE. (SURFACE STRIP DEPTH 300mm).

Rev	Issued/Revision	By	Appd	YYYY.MM.DD
C	ISSUED FOR CONSENT	BG	SL	26.02.20
B	ISSUED FOR CONCEPT DESIGN	BG	SL	26.02.05
A	ISSUED FOR CONCEPT DESIGN	MS	FZ	25.12.19

Issue Status
A1
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Coordinate System
NZGD North Taieri Circuit 2000
Datum
NZVD 2016

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Stantec

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Client/Project Logo
Southern Link LOGISTICS PARK

Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Maninder Singh	Reuben Orange	Andrew Quigley	Sarah Lloyd	2026.02.20
Drawn	Designed	Reviewed	Approved	YYYY.MM.DD

Title
EARTHWORKS PLAN STAGE 1

Project No. 310206525
Scale at A1 1:1500
Revision C
Drawing No. 310206525-STN-00-501-DR-CI-090301

1:1500 30 20 10 0 30 60 A1
1:3000 A3

CUT/FILL DEPTHS TABLE

NUMBER	COLOUR	MINIMUM DEPTH	MAXIMUM DEPTH	RANGE VOLUME
1		-2.50	-2.00	62
2		-2.00	-1.50	1661
3		-1.50	-1.00	6006
4		-1.00	-0.50	7624
5		-0.50	0.00	16461
6		0.00	0.50	20754
7		0.50	1.00	5375
8		1.00	1.50	583

CUT/FILL REPORT - EARTHWORKS STAGE 2

AREA (m^2)	CUT (m^3)	TOPSOIL STRIP (m^3)	FILL (m^3)	NET (m^3)
128,300	31,900	32,000 <CUT>	26,800	37,100 <CUT>

NOTE

1. DEPTHS ARE SHOWN FROM EXISTING STRIPPED SURFACE TO SUBGRADE SURFACE. (SURFACE STRIP DEPTH 300mm).

C	ISSUED FOR CONSENT	BG	SL	26.02.20
B	ISSUED FOR CONCEPT DESIGN	BG	SL	26.02.05
A	ISSUED FOR CONCEPT DESIGN	MS	FZ	25.12.19
Issued/Revision		By	Appd	YYYY.MM.DD

Issue Status
A1
AUTHORISED FOR CONSENT

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Coordinate System
NZGD North Taieri Circuit 2000
Datum
NZVD 2016

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Client/Project Logo

Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Maninder Singh	Reuben Orange	Andrew Quigley	Sarah Lloyd	2026.02.20
Drawn	Designed	Reviewed	Approved	YYYY.MM.DD

Title EARTHWORKS PLAN
STAGE 2

Project No. 310206525
Scale at A1 1:1500
Revision C
Drawing No. **310206525-STN-00-501-DR-CI-090302**

CUT/FILL DEPTHS TABLE

NUMBER	COLOUR	MINIMUM DEPTH	MAXIMUM DEPTH	RANGE VOLUME
1		-5.50	-5.00	1
2		-5.00	-4.50	72
3		-4.50	-4.00	378
4		-4.00	-3.50	905
5		-3.50	-3.00	1694
6		-3.00	-2.50	2677
7		-2.50	-2.00	3616
8		-2.00	-1.50	4569
9		-1.50	-1.00	5541
10		-1.00	-0.50	8232
11		-0.50	0.00	12842
12		0.00	0.50	728
13		0.50	1.00	238
14		1.00	1.50	51
15		1.50	2.00	6
16		2.00	2.50	0

CUT/FILL REPORT - EARTHWORKS STAGE 3

AREA (m^2)	CUT (m^3)	TOPSOIL STRIP (m^3)	FILL (m^3)	NET (m^3)
48,400	40,600	8,900 <CUT>	1,100	48,400 <CUT>

NOTE

1. DEPTHS ARE SHOWN FROM EXISTING STRIPPED SURFACE TO SUBGRADE SURFACE. (SURFACE STRIP DEPTH 300mm).

Issued/Revision		By	Appd	YYYY.MM.DD
C	ISSUED FOR CONSENT	BG	SL	26.02.20
B	ISSUED FOR CONCEPT DESIGN	BG	SL	26.02.05
A	ISSUED FOR CONCEPT DESIGN	MS	FZ	25.12.19

Issue Status
A1
AUTHORISED FOR CONSENT

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Coordinate System
NZGD North Taieri Circuit 2000
Datum
NZVD 2016

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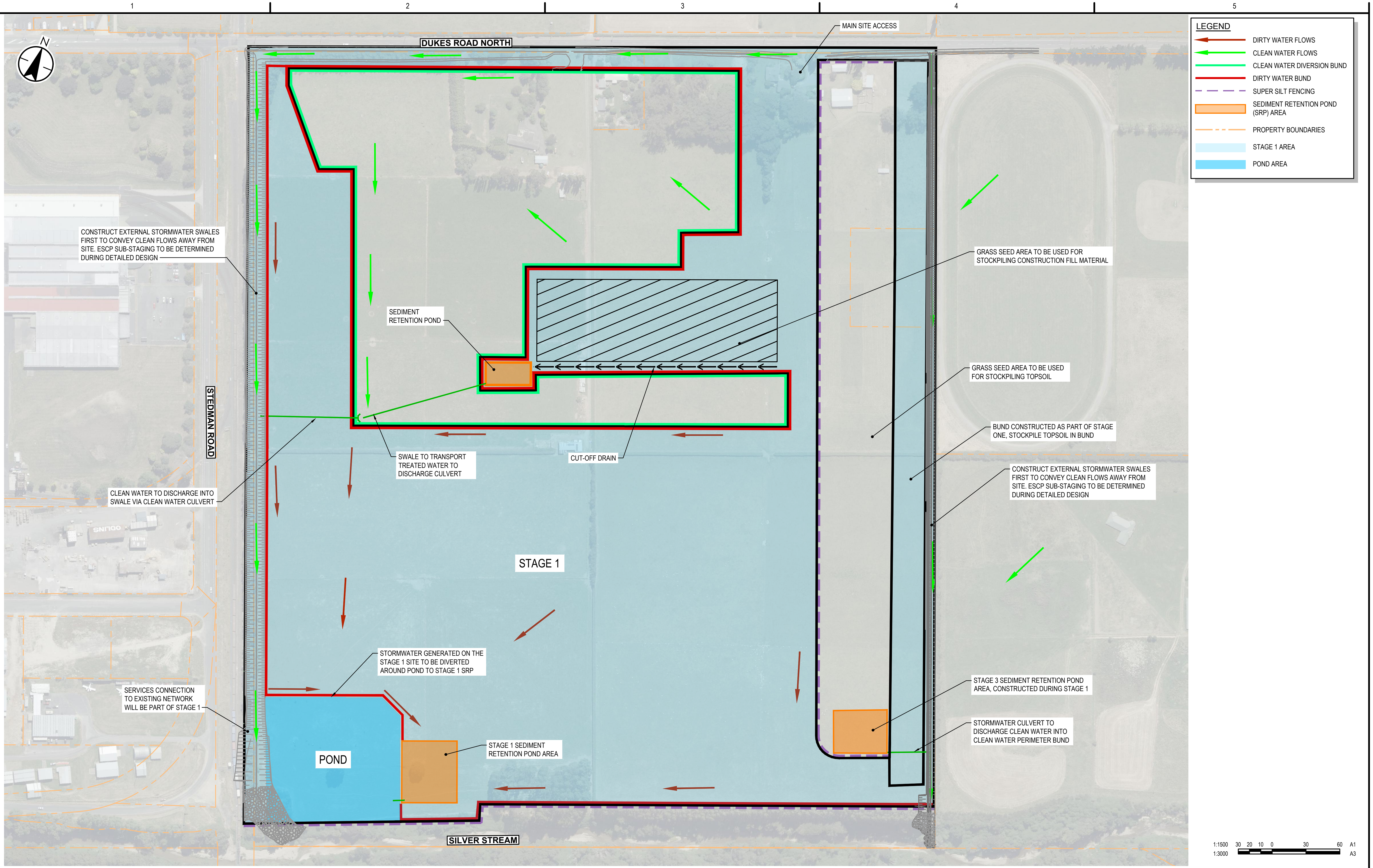
Client/Project Logo
Southern Link LOGISTICS PARK

Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Drawn	Designed	Reviewed	Approved	YYYY.MM.DD
Maninder Singh	Reuben Orange	Andrew Quigley	Sarah Lloyd	2026.02.20

Title EARTHWORKS PLAN
STAGE 3

Project No. 310206525
Scale at A1 1:1500
Revision C
Drawing No. 310206525-STN-00-501-DR-CI-090303



C ISSUED FOR CONSENT	BG	SL	26.02.20
B ISSUED FOR CONCEPT DESIGN	BG	SL	26.02.05
A ISSUED FOR CONCEPT DESIGN	MS	FZ	25.12.19
Issued/Revision	By	Appd	YYYY.MM.DD

Issue Status

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NZGD North Taieri Circuit 2000
Datum
NZVD 2016

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Client/Project Logo

Southern Link LOGISTICS PARK

Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Maninder Singh	Matt Barber	Andrew Craig	Sarah Lloyd	2026.02.20
Drawn	Designed	Reviewed	Approved	YYYY.MM.DD

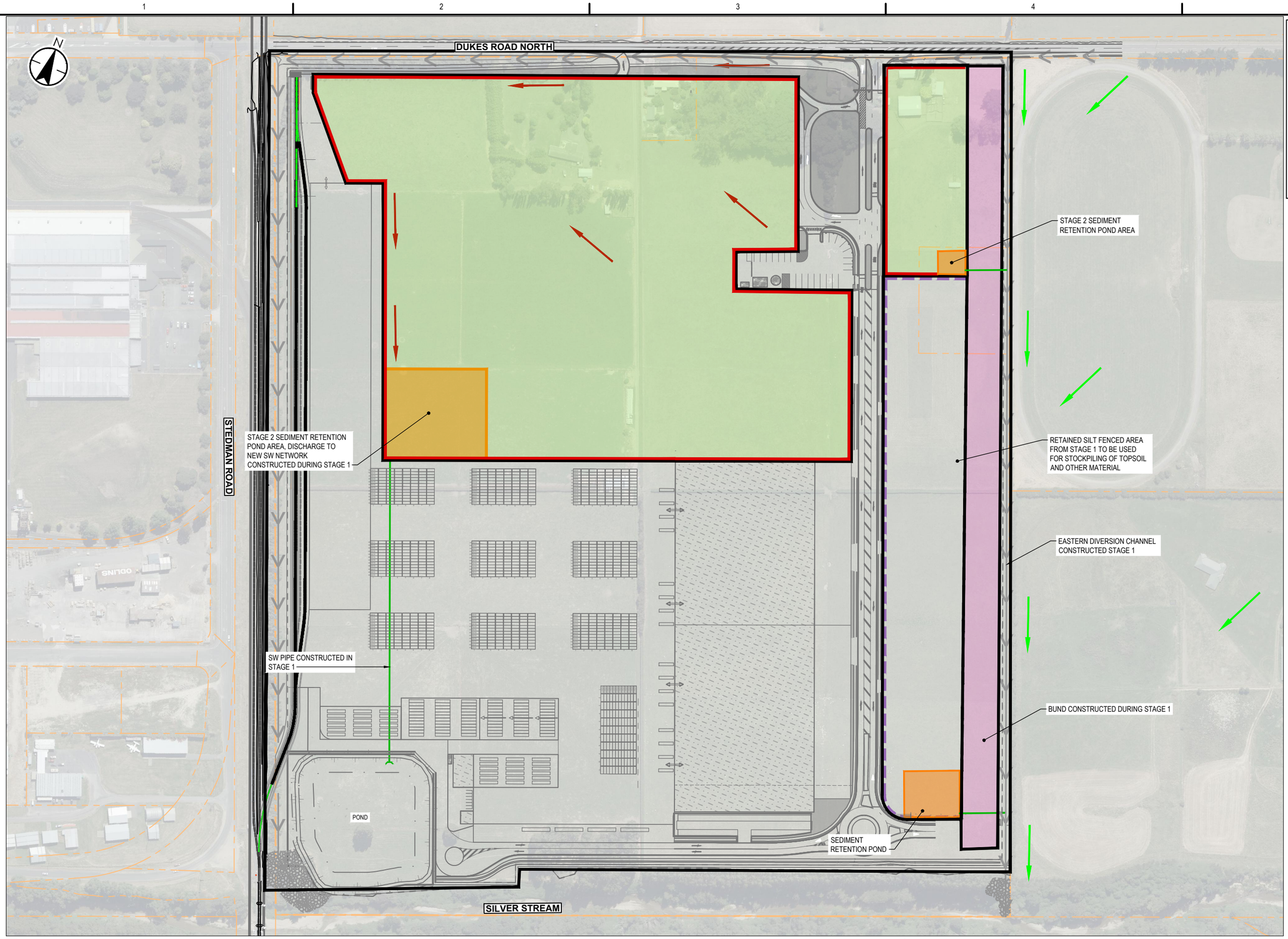
Title
EROSION & SEDIMENTATION CONTROL PLAN STAGE 1

Project No. 310206525

Scale at A1 1:1500

Revision C

Drawing No. 310206525-STN-00-501-DR-CI-090402



1:1500 30 20 10 0 30 60 A1
1:3000 A3

C	ISSUED FOR CONSENT	BG	SL	26.02.20
B	ISSUED FOR CONCEPT DESIGN	BG	SL	26.02.05
A	ISSUED FOR CONCEPT DESIGN	MS	FZ	25.12.19
Issued/Revision		By	Appd	YYYY.MM.DD

Issue Status
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Coordinate System
NZGD North Taieri Circuit 2000
Datum
NZVD 2016

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Client/Project Logo
Southern Link
LOGISTICS PARK

Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Maninder Singh	Matt Barber	Andrew Craig	Sarah Lloyd	2026.02.20
Drawn	Designed	Reviewed	Approved	YYYY.MM.DD

Title
EROSION & SEDIMENTATION CONTROL PLAN
STAGE 2

Project No.
310206525

Scale at A1
1:1500

Revision
C

Drawing No.
310206525-STN-00-501-DR-CI-090403

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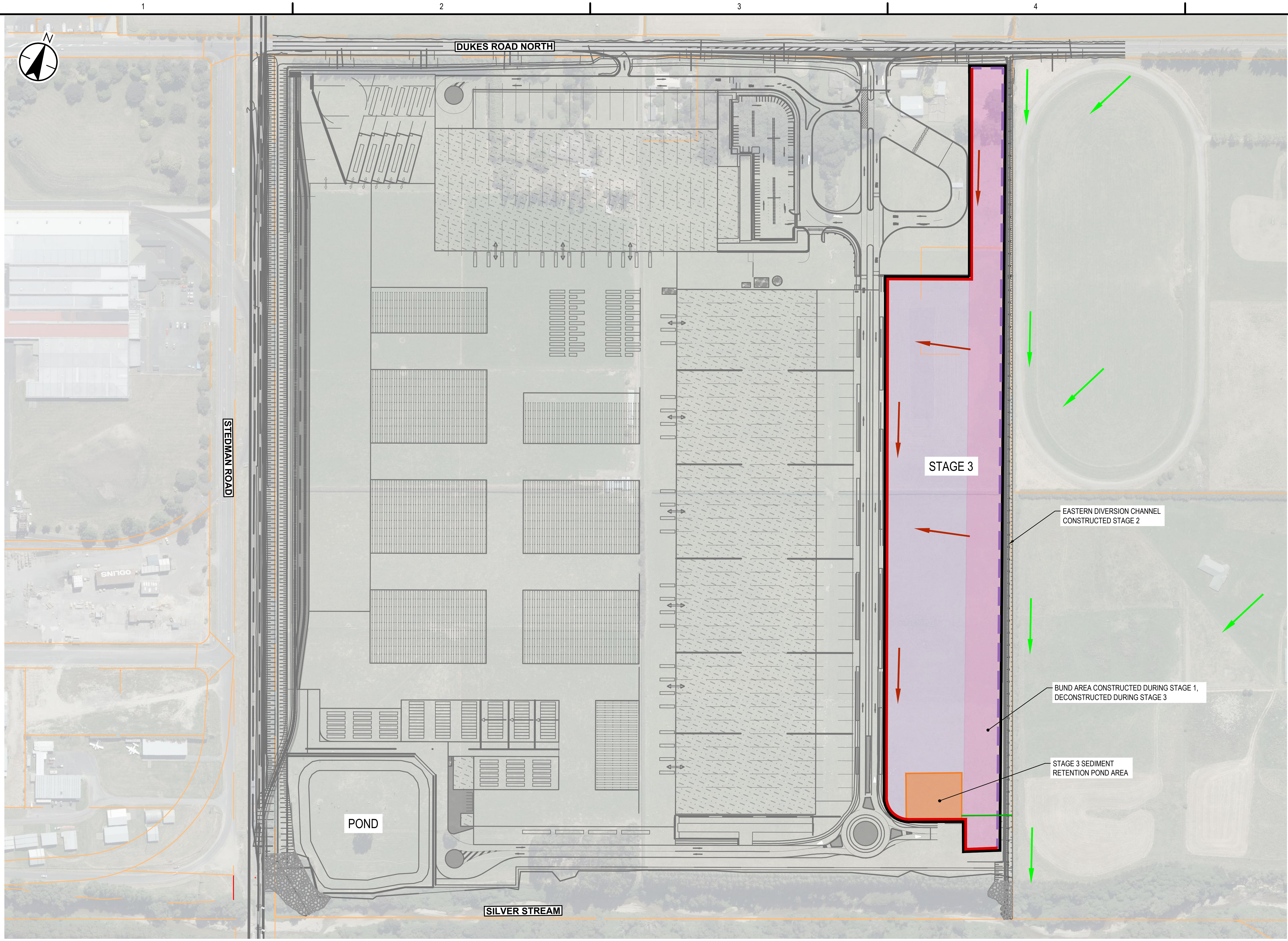

LEGEND

- DIRTY WATER FLOWS
- CLEAN WATER FLOWS
- CLEAN WATER DIVERSION BUND
- DIRTY WATER BUND
- SUPER SILT FENCING
- SEDIMENT RETENTION POND (SRP) AREA
- PROPERTY BOUNDARIES
- STAGE 3 AREA
- BUND AREA

1:1500 30 20 10 0 30 60 A1
1:3000 A3

	Issued/Revision	By	Appd	YYYY.MM.DD
C	ISSUED FOR CONSENT	BG	SL	26.02.20
B	ISSUED FOR CONCEPT DESIGN	BG	SL	26.02.05
A	ISSUED FOR CONCEPT DESIGN	MS	FZ	25.12.19

Issue Status

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NZGD North Taieri Circuit 2000
Datum
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Client/Project Logo

Southern Link LOGISTICS PARK

Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Maninder Singh	Matt Barber	Andrew Craig	Sarah Lloyd	2026.02.20
Drawn	Designed	Reviewed	Approved	YYYY.MM.DD

Title
EROSION & SEDIMENTATION CONTROL PLAN STAGE 3

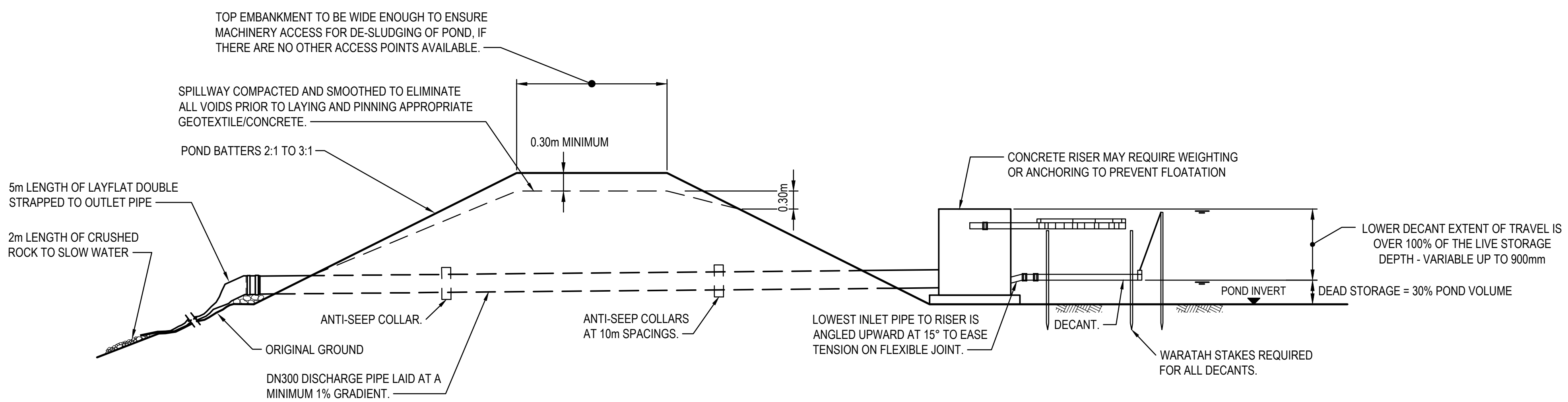
Project No.
310206525

Scale at A1
1:1500

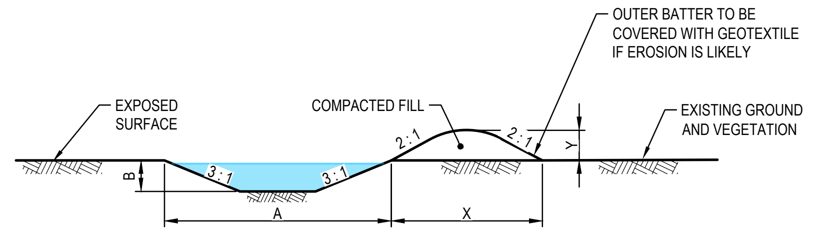
Revision
C

Drawing No.
310206525-STN-00-501-DR-CI-090404

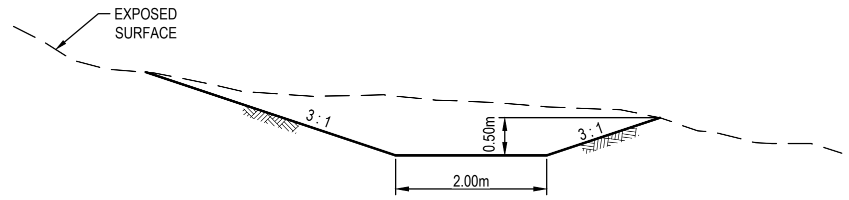
NOTES
1. DIMENSIONS TO BE CONFIRMED AT DETAILED DESIGN STAGE



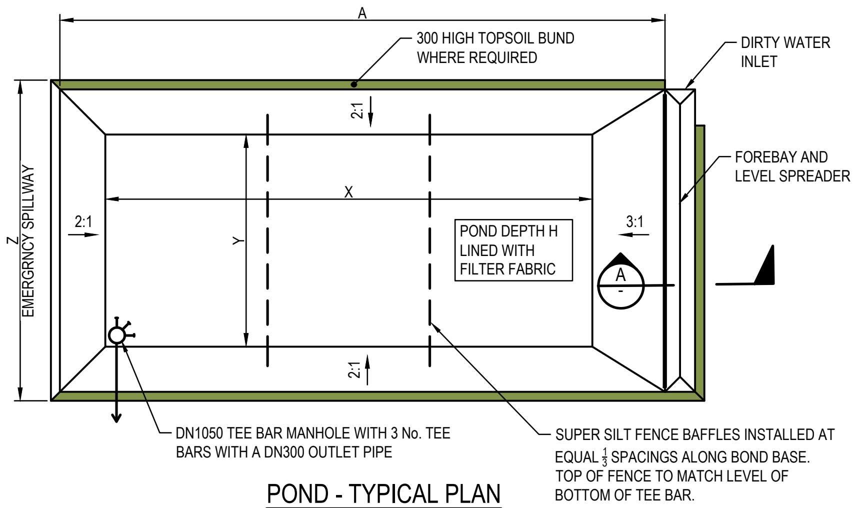
TYPICAL POND OUTLET DETAIL
SCALE 1 : 50



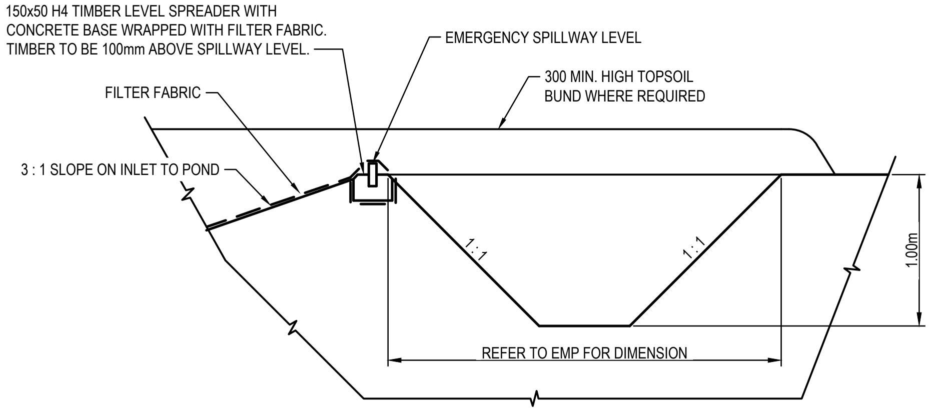
DIRTY WATER CHANNEL
SCALE 1 : 50



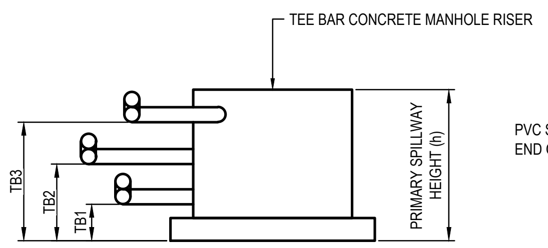
TYPICAL CUT-OFF DRAIN
SCALE 1 : 50
LONGITUDINAL FALL GREATER THAN 2% REQUIRES GEOTEXTILE LINING



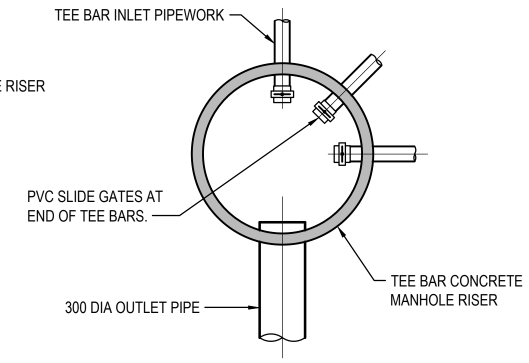
POND - TYPICAL PLAN
SCALE 1 : 250



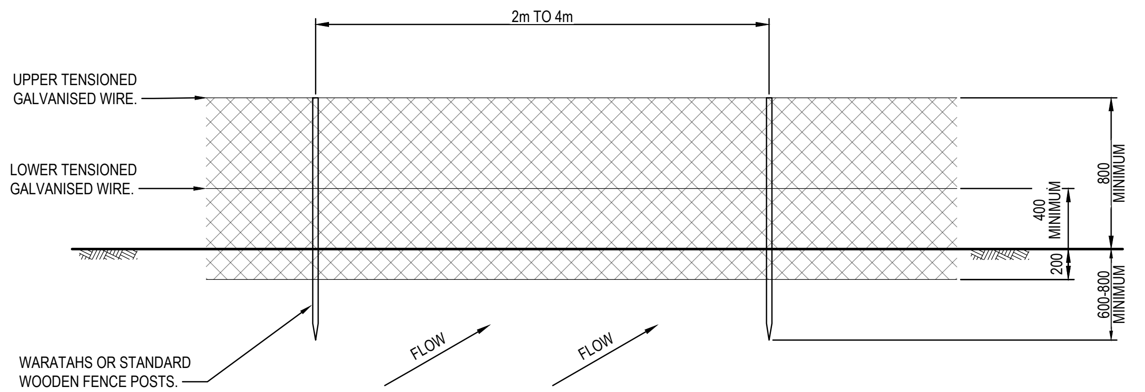
SECTION A -
SCALE 1 : 25



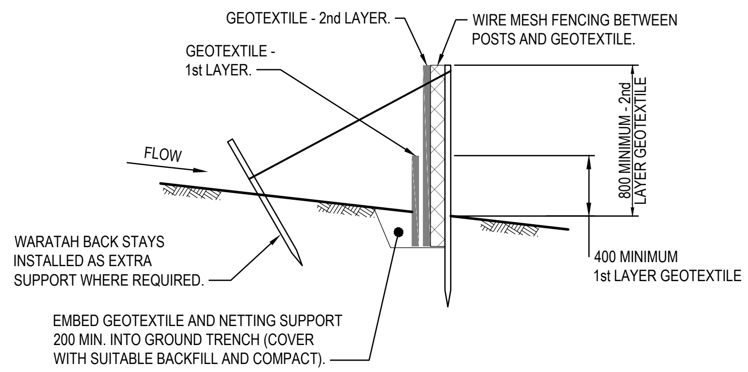
POND TEE BAR HEIGHTS
SCALE 1 : 25



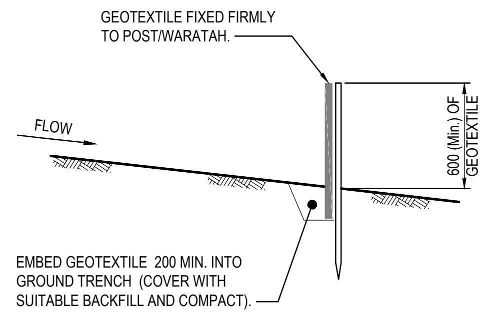
TEE BAR MANHOLE - PLAN
SCALE 1 : 25



SUPER SILT FENCE - ELEVATION
SCALE 1 : 25



SUPER SILT FENCE - SECTION
SCALE 1 : 25



STANDARD SILT FENCE - SECTION
SCALE 1 : 25

1:100 1:200 — 1 0 1 2 3 4 5 — A1 A3
1:50 1:100 — 1 0.5 0 1 2 — A1 A3
1:25 1:50 — 0.25 0 0.25 0.5 0.75 1.0 1.25 — A1 A3
1:10 1:20 — 0.1 0 0.1 0.2 0.3 0.4 0.5 — A1 A3

Rev	Issued/Revision	By	Appd	YYYY.MM.DD
C	ISSUED FOR CONSENT	BG	SL	26.02.20
B	ISSUED FOR CONCEPT DESIGN	BG	SL	26.02.05
A	ISSUED FOR CONCEPT DESIGN	MS	FZ	25.12.19

Issue Status
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Coordinate System
NZGD North Taieri Circuit 2000
Datum
NZVD 2016

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Stantec

Client/Project Logo
Southern Link LOGISTICS PARK

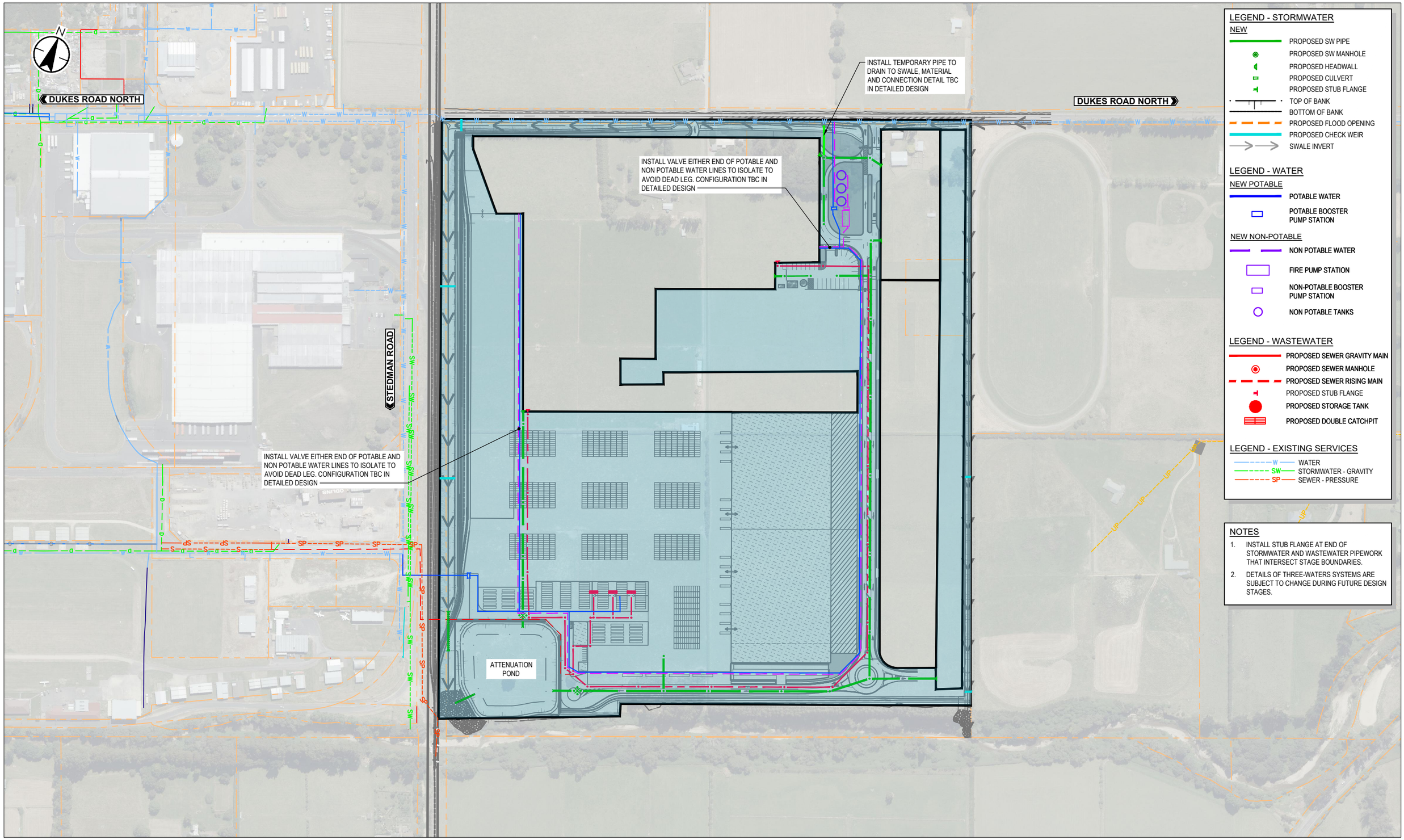
Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Maninder Singh	Matt Barber	Andrew Craig	Sarah Lloyd	2026.02.20
Drawn	Designed	Reviewed	Approved	YYYY.MM.DD

Title
EROSION & SEDIMENTATION CONTROL PLAN
TYPICAL DETAILS

Project No.
310206525
Scale at A1
AS SHOWN
Revision
C
Drawing No.
310206525-STN-00-501-DR-CI-090405

ORIGINAL SHEET - ISO A1



1:2000 20 0 20 40 60 80 100 A1
1:4000 A3

3 WATERS PLAN

SCALE - 1:2000

A	ISSUED FOR CONSENT	BG	SL	26.02.20
Issued/Revision		By	Appd	YYYY.MM.DD

Issue Status
A1
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Datum
NZVD 2016

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Client/Project Logo
Southern Link LOGISTICS PARK

Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Ben Martin	Ben Martin	Matt Barber	Sarah Lloyd	2026.02.20
Drawn	Designed	Reviewed	Approved	YYYY.MM.DD

Title
3 WATERS PLAN
STAGE 1

Project No.
310206525

Scale at A1
1:2000

Revision
A

Drawing No.
310206525-STN-01-400-DR-CI-511002

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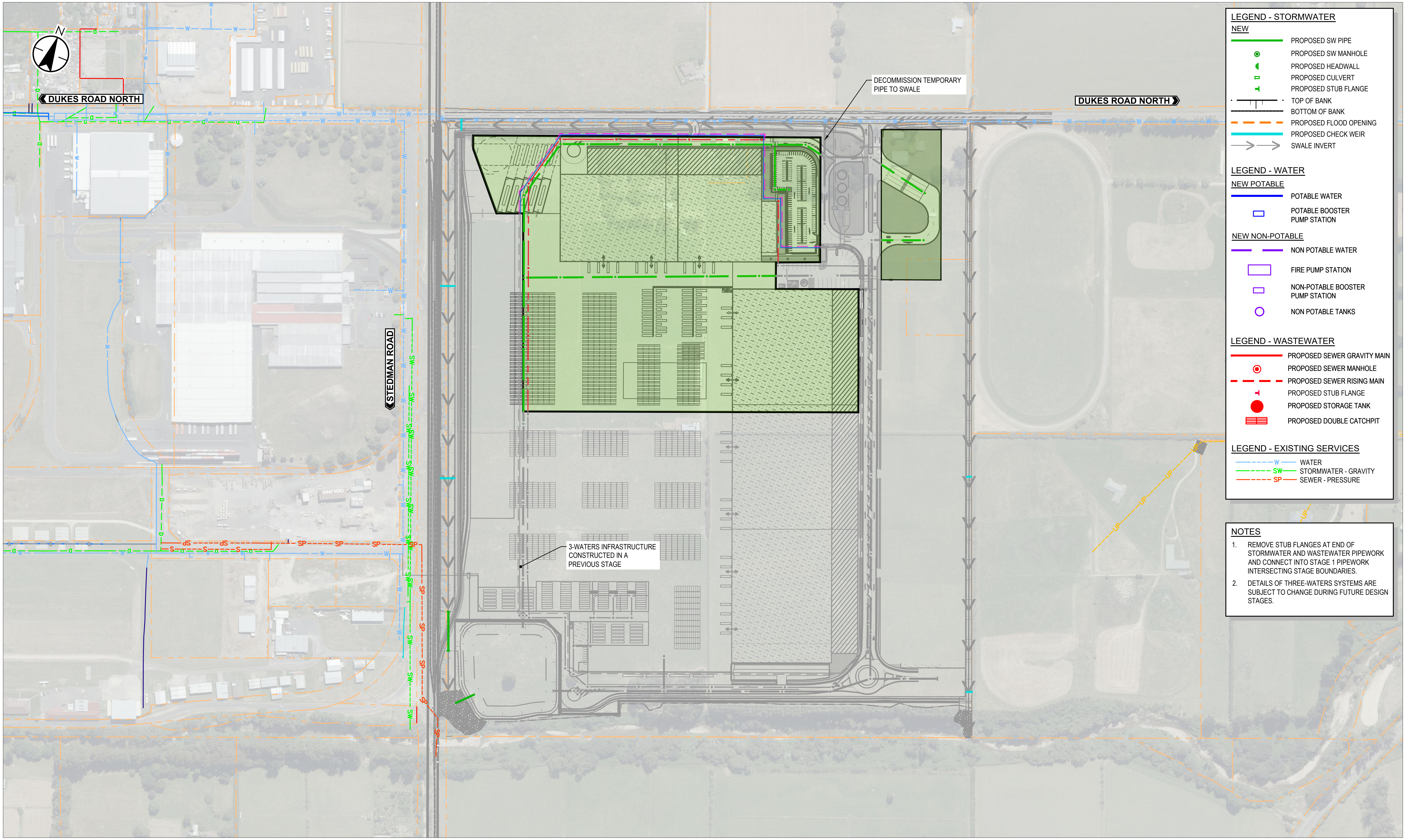
Plotted: 26 Feb 2026 - 11:41 pm

ORIGINAL SHEET - ISO A1



1:2000 20 0 20 40 60 80 100 A1
1:4000 A3

3 WATERS PLAN

SCALE - 1:2000

Rev	Description	By	Appd	Date
A	ISSUED FOR CONSENT	BG	SL	26.02.20
Issued/Revision		By	Appd	YYYY.MM.DD

Issue Status

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Datum
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Client/Project Logo

Southern Link LOGISTICS PARK

Client/Project
SOUTHERN LINK PROPERTY Ltd

SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

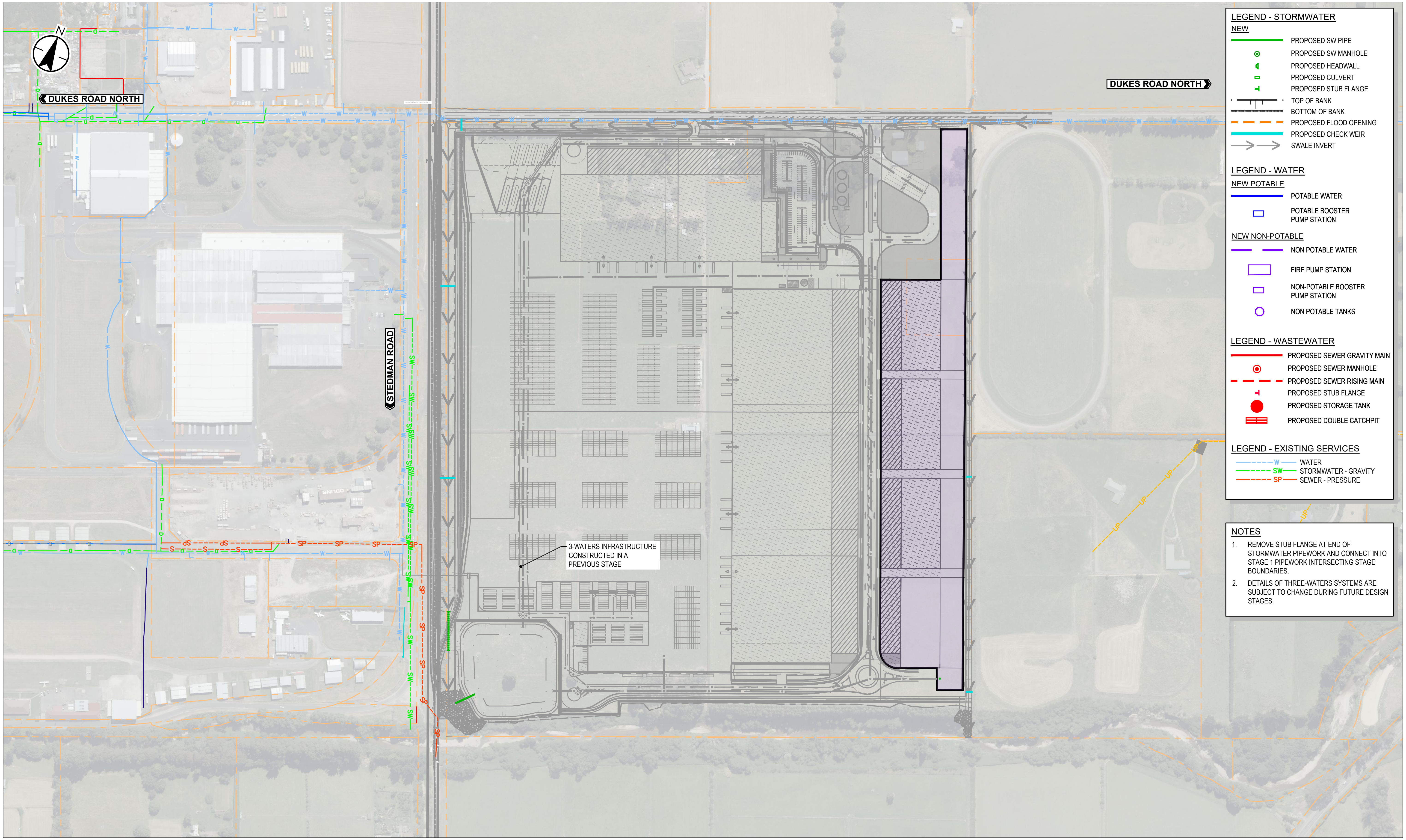
Ben Martin	Ben Martin	Matt Barber	Sarah Lloyd	2026.02.20
Drawn	Designed	Reviewed	Approved	YYYY.MM.DD

Title 3 WATERS PLAN
STAGE 2

Project No. 310206525
Scale at A1 1:2000

Revision A
Drawing No. 310206525-STN-02-400-DR-CI-511003

ORIGINAL SHEET - ISO A1



NOTES

1. REMOVE STUB FLANGE AT END OF STORMWATER PIPEWORK AND CONNECT INTO STAGE 1 PIPEWORK INTERSECTING STAGE BOUNDARIES.
2. DETAILS OF THREE-WATERS SYSTEMS ARE SUBJECT TO CHANGE DURING FUTURE DESIGN STAGES.

1:2000 20 0 20 40 60 80 100 A1
1:4000 A3

3 WATERS PLAN

SCALE - 1:2000

Issued/Revision	By	Appd	YYYY.MM.DD
A ISSUED FOR CONSENT	BG	SL	26.02.20

Issue Status
A1
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Coordinate System
NZGD North Taieri Circuit 2000
Datum
NZVD 2016

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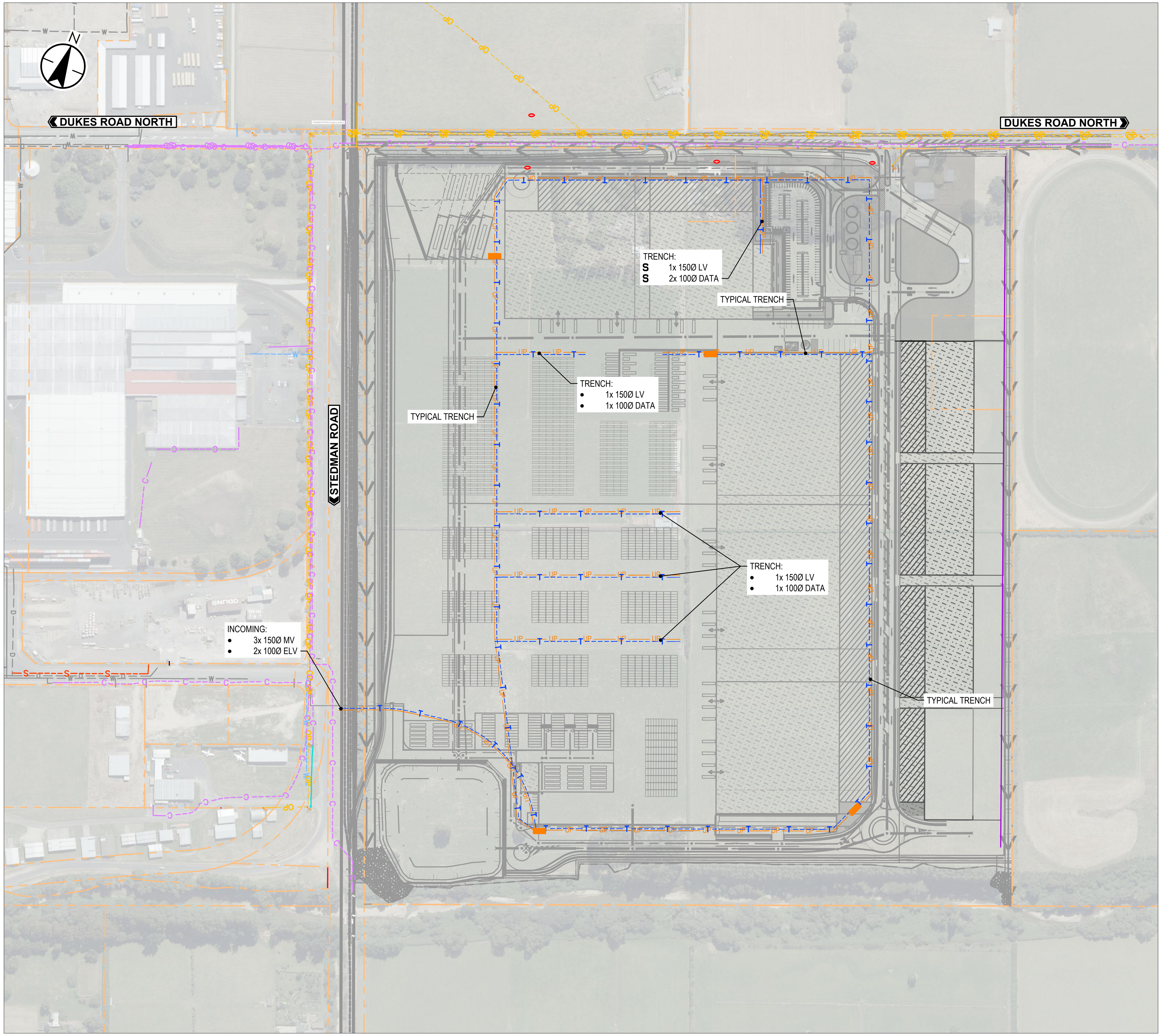
Client/Project Logo

Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Drawn	Designed	Reviewed	Approved	YYYY.MM.DD
Ben Martin	Ben Martin	Matt Barber	Sarah Lloyd	2026.02.20

Title 3 WATERS PLAN
STAGE 3

Project No. 310206525
Scale at A1 1:2000
Revision A
Drawing No. 310206525-STN-03-400-DR-CI-511004



1:2000 20 0 20 40 60 80 100 A1
1:4000 A3

POWER & COMMUNICATIONS PLAN

SCALE - 1:2000

NEW SERVICES LEGEND

- UP — POWER - U/G
- T — TELECOM
- SUB STATION

EXISTING SERVICES LEGEND

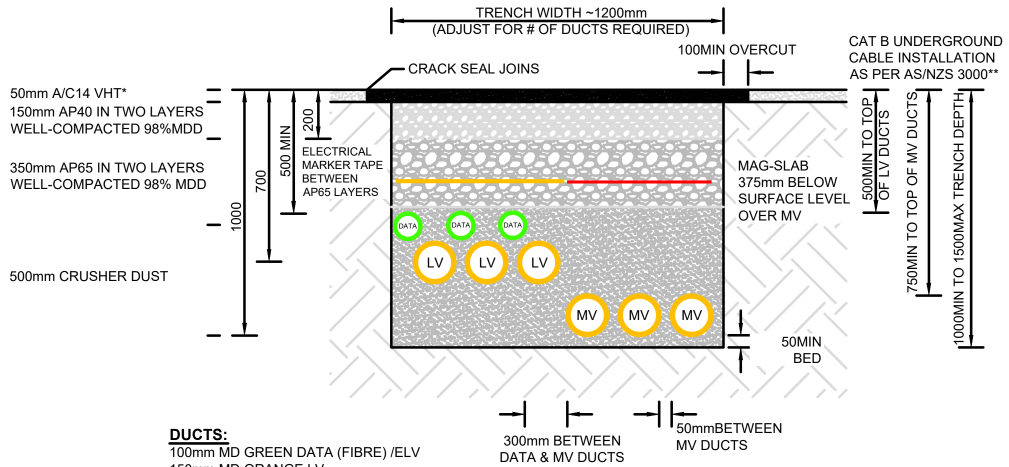
- UP — POWER - O/H
- OP — POWER - U/G
- C — CONDUIT

NOTES

DESIGN PROVIDED BY PORT OTAGO.

FOR TYPICAL TRENCHES, INSTALL PITS AT:

- CHANGE OF CABLE DIRECTION FOR MV CABLES
- 150m CENTRES FOR LV AND DATA CABLES



DUCTS:
100mm MD GREEN DATA (FIBRE) /ELV
150mm MD ORANGE LV
150mm HD ORANGE MV

* IN AREAS WITH STRADDLE TRAFFIC INCREASE TO 110mm.
** WHERE MINIMUM COVER CANNOT BE ACHIEVED, ADD MAG-SLAB OR REINFORCED CONCRETE FOR PROTECTION.

TYPICAL CABLE TRENCH FOR MV, LV, & DATA CABLES

N.T.S

Rev	Issued/Revision	By	Appd	YYYY.MM.DD
C	ISSUED FOR CONSENT	BG	SL	26.02.20
B	ISSUED FOR CONCEPT DESIGN	BG	SL	26.02.05
A	ISSUED FOR CONCEPT DESIGN	SP	FZ	25.12.19

Issue Status
A1
AUTHORISED FOR CONSENT

This document is suitable only for the purpose noted above. Use of this document for any other purpose is not permitted.

Coordinate System
NZGD North Taieri Circuit 2000
Datum
NZVD 2016

Colour Disclaimer
This drawing has been documented in colour. This drawing is required to be printed in colour. Failure to do so may result in loss of information. Black and white printing may be used if specific black and white documents have been obtained from Stantec.

Stantec

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.

Client/Project Logo
Southern Link LOGISTICS PARK

Client/Project
SOUTHERN LINK PROPERTY Ltd
SOUTHERN LINK INLAND PORT
DEVELOPED CONCEPT DESIGN

Drawn	Designed	Reviewed	Approved	YYYY.MM.DD
Ben Martin	Port Otago	Matt Barber	Sarah Lloyd	2026.02.20

Title POWER & COMMUNICATIONS PLAN
ULTIMATE DESIGN

Project No. 310206525
Scale at A1 1:2000
Revision C
Drawing No. 310206525-STN-03-000-DR-CI-511005

Appendix E Calculations

Client:	*Southern Link Property Limited*				**Sheet:**	1	**of**	8
Project:	*Southern Link Logistics Park*				**Date:**		*11.12.2025*	
Description:	*Pre-development historic rainfall stormwater analysis*	**Reviewed By:**	NK	-	**Job No:**		*310206525*	
		Chkd By:	MB	-	**By:**		*Ben Martin*	

Introduction

Scheme:

Pre- and post-development stormwater analysis for the Southern Link Logistics Park site
Calculations for 10 Year and 100 Year ARI Storm Events using historic rainfall

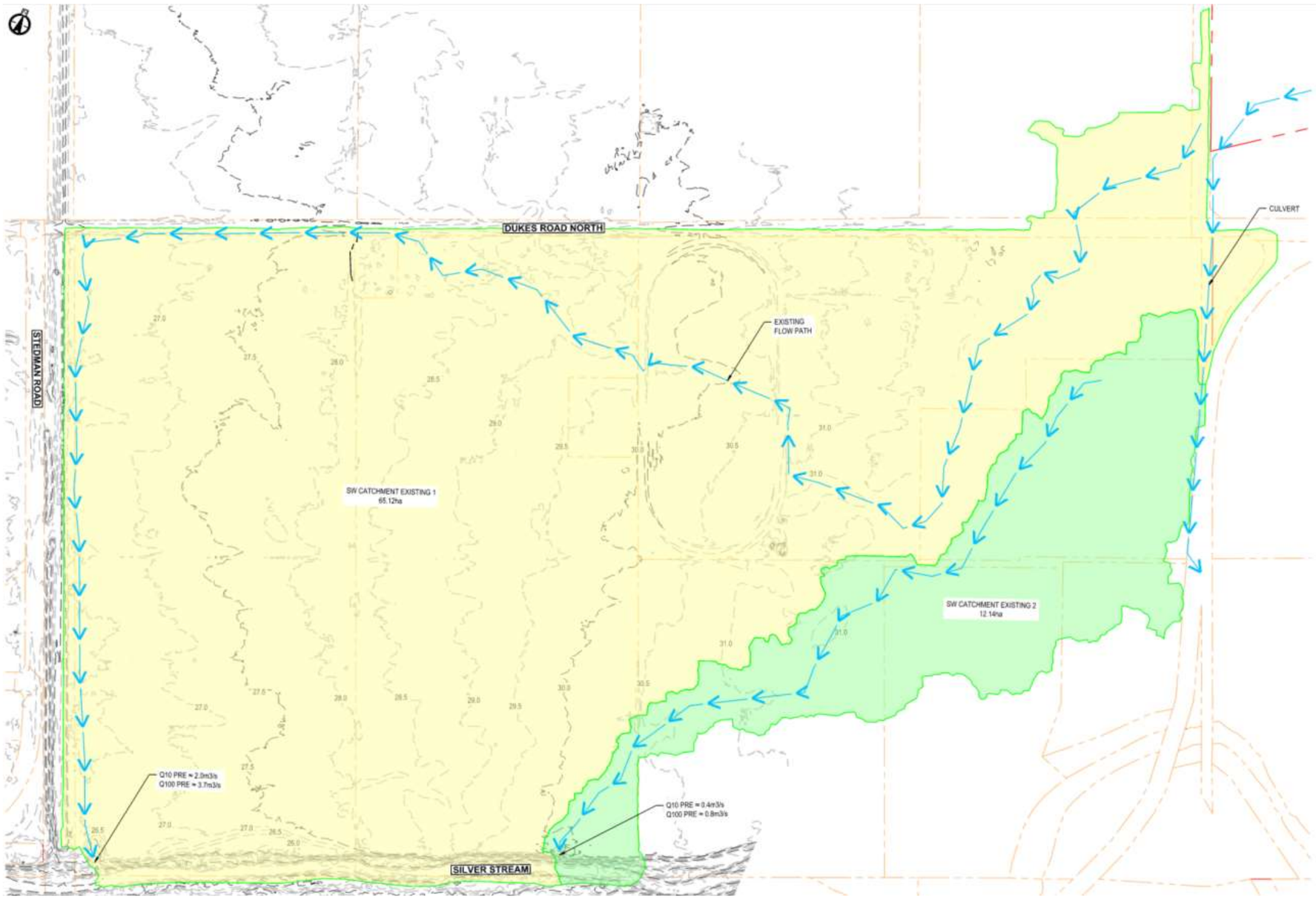
Project Assumptions:

1. The basis of these calculations is set to NZ Building Code E1 Stormwater, NZTA Stormwater Treatment Standard for State Highway Infrastructure, May 2010 and DCC Code of Subdivision and Development, 2010
2. Catchment areas have been developed using areas from Civil 3d (topo surface/design surface), proposed development plans, roading long section and functional layout plans to identify high and low points on the surface.
3. Rainfall has been calculated using HIRDS v4, Historical Data
4. Runoff coefficients from NZ Building Code E1 Stormwater

Client:	*Southern Link Property Limited*				**Sheet:**	2	of	8
Project:	*Southern Link Logistics Park*				**Date:**		*11.12.2025*	
Description:	*Pre-development historic rainfall stormwater analysis*	**Reviewed By:**	NK	-	**Job No:**		*310206525*	
		Chkd By:	MB	-	**By:**		*Ben Martin*	

Stormwater Catchment Plan

PRIMARY



Stantec

Client:	*Southern Link Property Limited*				3	**of**	8
Project:	*Southern Link Logistics Park*					*11.12.2025*	
Description:	*Pre-development historic rainfall stormwater analysis*	**Reviewed By:**	NK			*310206525*	
		Chkd By:	MB			*Ben Martin*	

Primary Stormwater Catchment Flows

Catchment Information					Time of Concentration (ToC)					Peak Runoff		
Name	Area total (m²)	0.9 Hardstand (m²)	0.66 Calculated Residential (m²)	0.35 Rural / Reserves (m²)	Primary Event ToC (minutes) applies overland flow paths: Length of overland flow path (m)	Slope (%)	Manning's n	Primary Event ToC (minutes) applies overland flow paths	Subcatchment ToC	Intensity for below yearly return period (mm/hr) 10	Indicative Peak Design Flow from catchment (l/s)	Indicative Peak Design Flow from catchment (m³/s)
SW CATCHMENT EXISTING 1	651300			651300	2600	3.5	0.0350	36.49	36.00	24.04	1522.2	1.522
SW CATCHMENT EXISTING 2	121360			121360	1020	3.9	0.0350	26.22	26.00	27.8	328.2	0.328

Stantec

Client:	*Southern Link Property Limited*			4	**of**	8
Project:	*Southern Link Logistics Park*				*11.12.2025*	
Description:	*Pre-development historic rainfall stormwater analysis*	**Reviewed By:**	NK		*310206525*	
		Chkd By:	MB		*Ben Martin*	

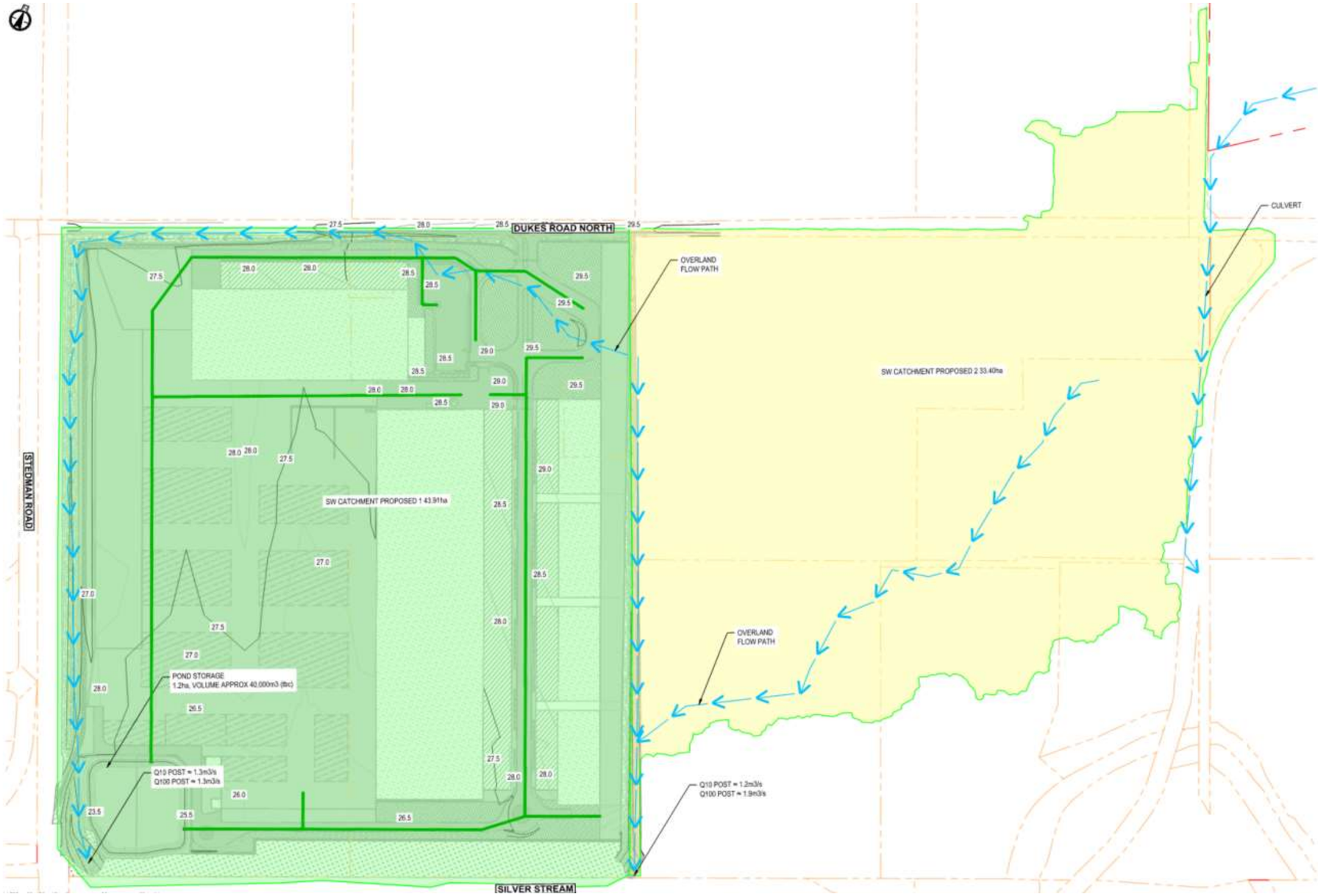
Secondary Stormwater Catchment Flows

Catchment Information					Time of Concentration					Peak Runoff		
Name	Area total (m^2)	0.9 Hardstand (m^2)	0.66 Residential (m^2)	0.35 Rural / Reserves (m^2)	Secondary Event ToC (minutes) applies overland flow paths: Length of overland flow path (m)	Slope (%)	Manning's n	Secondary Event ToC (minutes) applies overland flow paths	Subcatchment ToC	Intensity for below yearly return period (mm/hr) 100	Indicative Peak Design Flow from catchment (l/s)	Indicative Peak Design Flow from catchment (m^3/s)
SW CATCHMENT EXISTING 1	651300	0	0	651300	2600	3.50	0.0350	36.49	36.00	43.32	2743.1	2.743
SW CATCHMENT EXISTING 2	121360	0	0	121360	1020	3.90	0.0350	26.22	26.00	50.28	593.2	0.593

Client:	*Southern Link Property Limited*				**Sheet:**	5 of	8
Project:	*Southern Link Logistics Park*				**Date:**	*11.12.2025*	
Description:	*Post-development historic rainfall stormwater analysis*	**Reviewed By:**	NK	-	**Job No:**	*310206525*	
		Chkd By:	MB	-	**By:**	*Ben Martin*	

Stormwater Catchment Plan

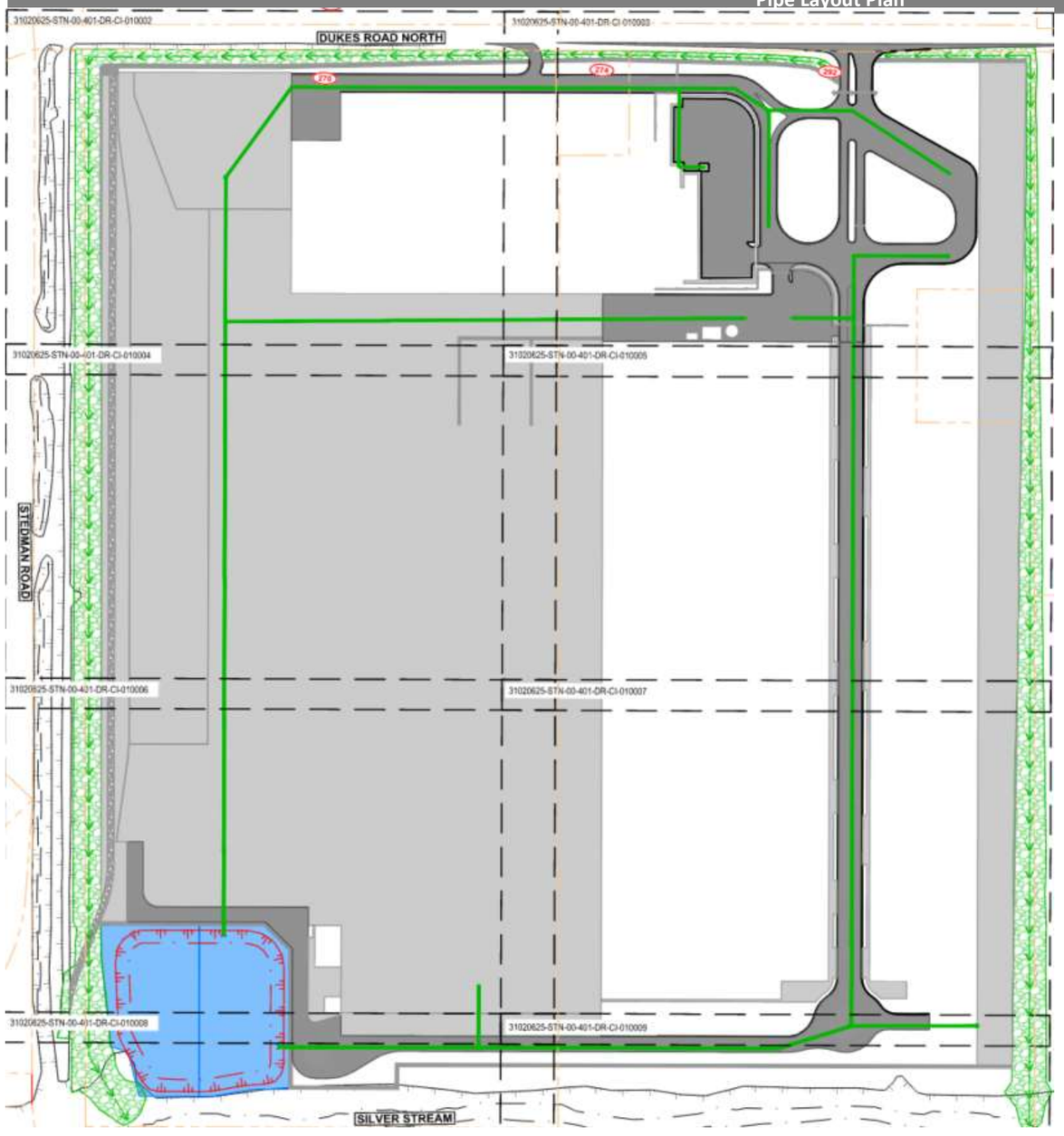
PRIMARY



SECONDARY

Client:	*Southern Link Property Limited*				**Sheet:**	6	of	8
Project:	*Southern Link Logistics Park*				**Date:**		*11.12.2025*	
Description:	*Post-development historic rainfall stormwater analysis*	**Reviewed By:**	NK	-	**Job No:**		*310206525*	
		Chkd By:	MB	-	**By:**		*Ben Martin*	

Pipe Layout Plan



Stantec

Client:	*Southern Link Property Limited*	7	**of**	8
Project:	*Southern Link Logistics Park*	*11.12.2025*		
Description:	*Post-development historic rainfall stormwater analysis*	*310206525*		
		Ben Martin		

Primary Stormwater Catchment Flows

Catchment Information					Time of Concentration (ToC)	Peak Runoff		
Name	Area total (m^2)	0.9 Hardstand (m^2)	0.66 Calculated Residential (m^2)	0.35 Rural / Reserves (m^2)	Subcatchment ToC	Intensity for below yearly return period (mm/hr) 10	Indicative Peak Design Flow from catchment (l/s)	Indicative Peak Design Flow from catchment (m^3/s)
SWC PRI POST 001	202	202			10.00	45.3	2.3	0.002
SWC PRI POST 002	3093	3093			10.00	45.3	35.0	0.035
SWC PRI POST 003	4414	4414			10.00	45.3	50.0	0.050
SWC PRI POST 004	1343	1343			10.00	45.3	15.2	0.015
SWC PRI POST 005	1462	1462			10.00	45.3	16.6	0.017
SWC PRI POST 006	11148	11148			10.00	45.3	126.3	0.126
SWC PRI POST 007	24671	24671			10.00	45.3	279.4	0.279
SWC PRI POST 008	24712	24712			10.00	45.3	279.9	0.280
SWC PRI POST 009	24712	24712			10.00	45.3	279.9	0.280
SWC PRI POST 010	24774	24774			10.00	45.3	280.6	0.281
SWC PRI POST 011	5709	5709			10.00	45.3	64.7	0.065
SWC PRI POST 012	8704	8704			10.00	45.3	98.6	0.099
SWC PRI POST 013	1570	1570			10.00	45.3	17.8	0.018
SWC PRI POST 014	2126	2126			10.00	45.3	24.1	0.024
SWC PRI POST 015	3410	3410			10.00	45.3	38.6	0.039
SWC PRI POST 016	2359	2359			10.00	45.3	26.7	0.027
SWC PRI POST 017	11028	11028			10.00	45.3	124.9	0.125
SWC PRI POST 018	64371	64371			10.00	45.3	729.0	0.729
SWC PRI POST 019	3577	3577			10.00	45.3	40.5	0.041
SWC PRI POST 020	3326	3326			10.00	45.3	37.7	0.038
SWC PRI POST 021	8241	8241			10.00	45.3	93.3	0.093
SWC PRI POST 022	13850	13850			10.00	45.3	156.9	0.157
SWC PRI POST 023	7358	7358			10.00	45.3	83.3	0.083
SWC PRI POST 024	5571	5571			10.00	45.3	63.1	0.063
SWC PRI POST 025	6354	6354			10.00	45.3	72.0	0.072
SWC PRI POST 026	843	843			10.00	45.3	9.5	0.010
SWC PRI POST 027	6150	6150			10.00	45.3	69.6	0.070
SWC PRI POST 028	2380	2380			10.00	45.3	27.0	0.027
SWC PRI POST 029	810	810			10.00	45.3	9.2	0.009
SWC PRI POST 030	851	851			10.00	45.3	9.6	0.010
SWC PRI POST 031	1689	1689			10.00	45.3	19.1	0.019
SWC PRI POST 032	1765	1765			10.00	45.3	20.0	0.020
SWC PRI POST 033	1600	1600			10.00	45.3	18.1	0.018
SWC PRI POST 034	1539	1539			10.00	45.3	17.4	0.017
SWC PRI POST 035	11452	11452			10.00	45.3	129.7	0.130
SWC PRI POST 036	71838	71838			10.00	45.3	813.6	0.814
SWC PRI POST 037	5790	5790			10.00	45.3	65.6	0.066
SWC PRI POST 038	13032	13032			10.00	45.3	147.6	0.148

Client:	*Southern Link Property Limited*				8	**of**	8
Project:	*Southern Link Logistics Park*					*11.12.2025*	
Description:	*Post-development historic rainfall stormwater analysis*	**Reviewed By:**	NK			*310206525*	
		Chkd By:	MB			*Ben Martin*	

Secondary Stormwater Catchment Flows

Catchment Information					Time of Concentration					Peak Runoff		
Name	Area total (m^2)	0.9 Hardstand (m^2)	0.67 Residential (m^2)	0.35 Rural / Reserves (m^2)	Secondary Event ToC (minutes) applies overland flow paths: Length of overland flow path (m)	Slope (%)	Manning's n	Secondary Event ToC (minutes) applies overland flow paths	Subcatchment ToC	Intensity for below yearly return period (mm/hr) 100	Indicative Peak Design Flow from catchment (l/s)	Indicative Peak Design Flow from catchment (m^3/s)
P1	439143	439142.54			1300	0.28	0.0150	20.62	21.00	55.63	6107.4	6.107
P2	333993			333993.223	1732	3.60	0.0350	31.73	32.00	45.11	1464.7	1.465

Client:	*Southern Link Property Limited*					**Sheet:**	1	**of**	8
Project:	*Southern Link Logistics Park*					**Date:**		*11.12.2025*	
Description:	*Pre-development RCP 8.5 2081-2100 rainfall stormwater analysis*	**Reviewed By:**	NK	-		**Job No:**		*310206525*	
		Chkd By:	MB	-		**By:**		*Ben Martin*	

Introduction

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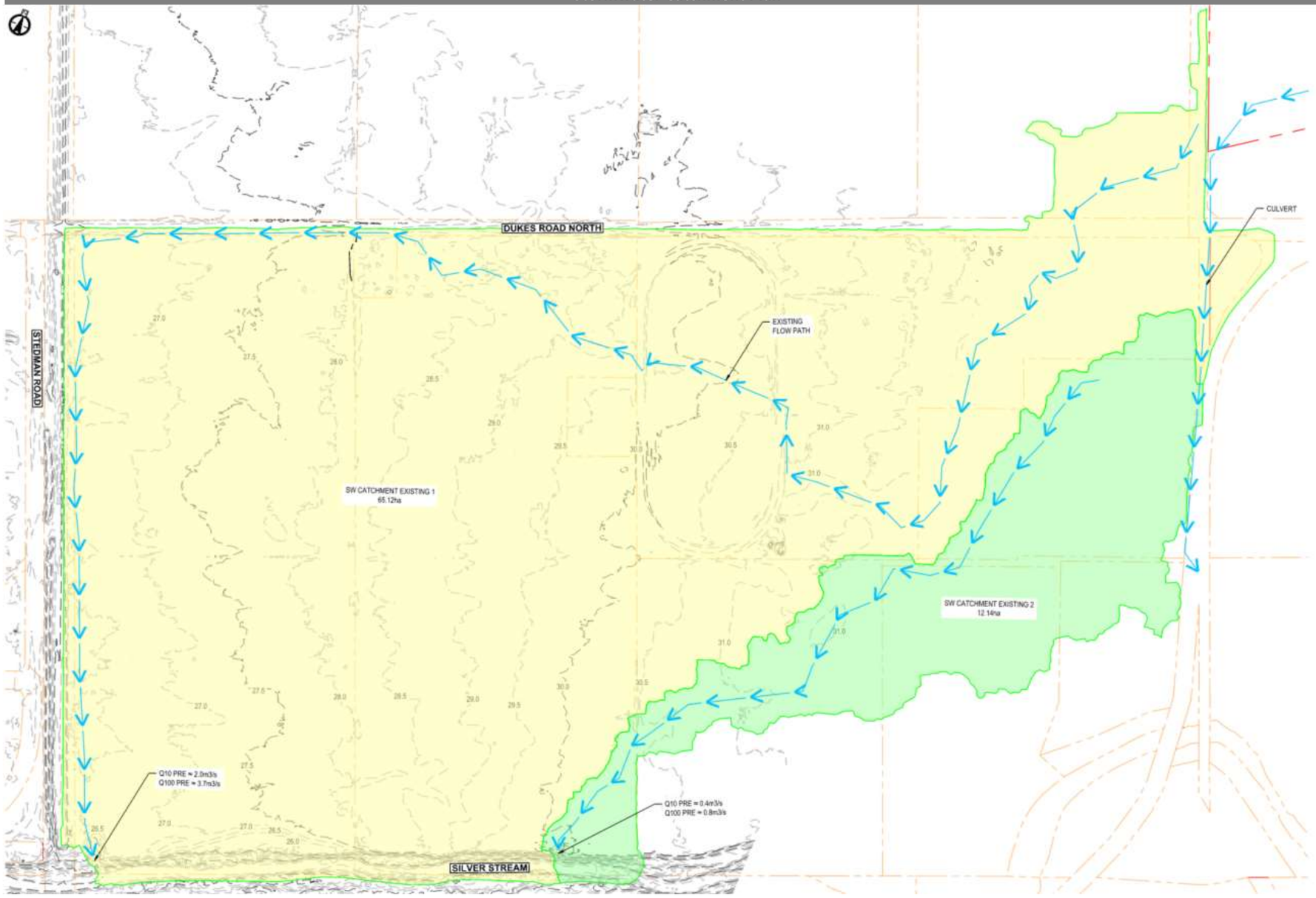
		Chkd By:	MB	-	**By:**		*Ben Martin*	

Stormwater Catchment Plan



Stantec

Client:	*Southern Link Property Limited*				3	**of**	8
Project:	*Southern Link Logistics Park*					*11.12.2025*	
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SW CATCHMENT EXISTING 1	651300			651300	2600	3.5	0.0350	36.49	36.00	32.16	2036.4	2.036
SW CATCHMENT EXISTING 2	121360			121360	1020	3.9	0.0350	26.22	26.00	37.2	438.7	0.439

Client:	*Southern Link Property Limited*				4	**of**	8
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SW CATCHMENT EXISTING 1	651300	0	0	651300	2600	3.50	0.0350	36.49	36.00	58.58	3709.3	3.709
SW CATCHMENT EXISTING 2	121360	0	0	121360	1020	3.90	0.0350	26.22	26.00	67.96	801.9	0.802

Stantec

Client:	*Southern Link Property Limited*				**Sheet:**	5 of	8
Project:	*Southern Link Logistics Park*				**Date:**	*11.12.2025*	
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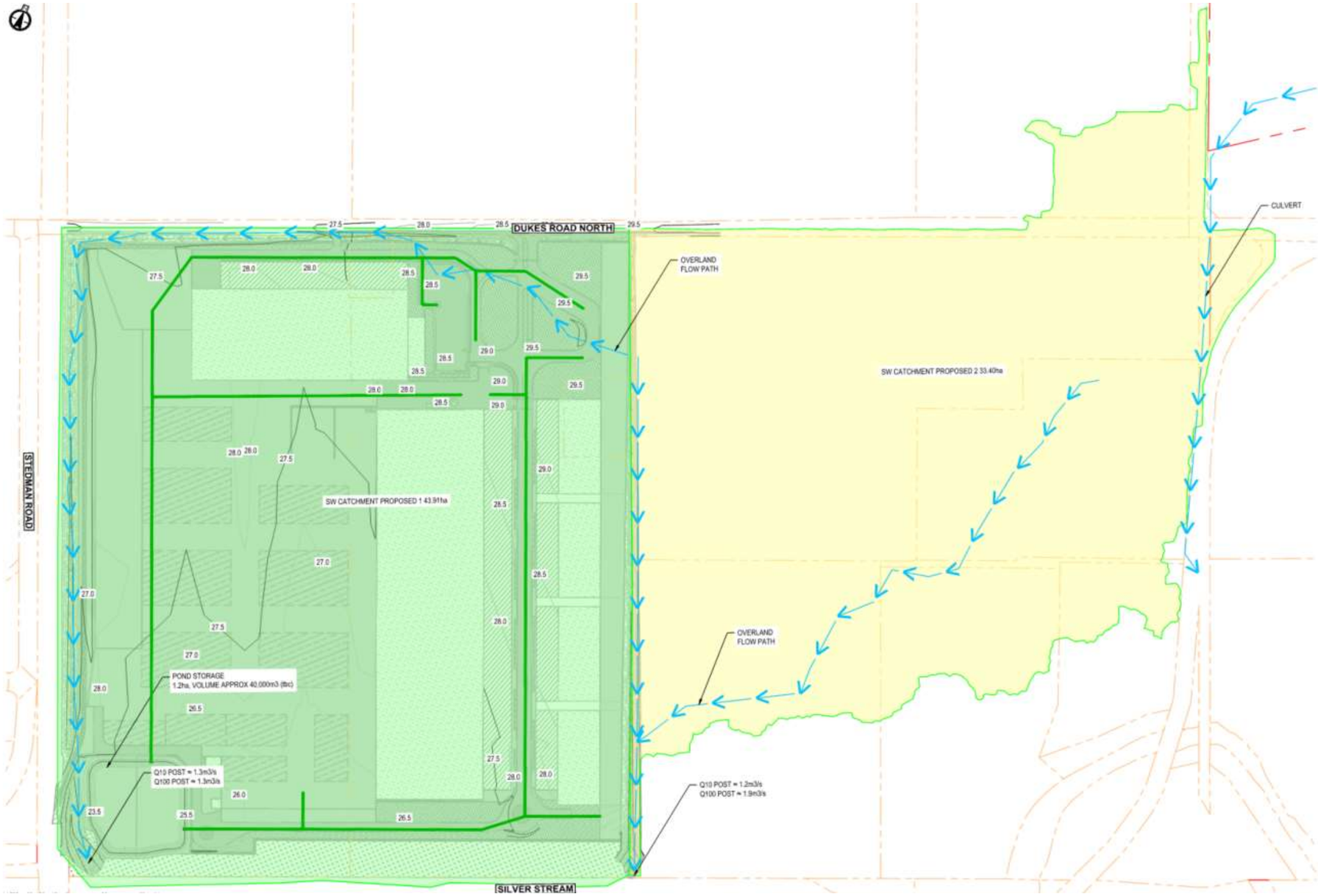
		Chkd By:	MB	-	**By:**	*Ben Martin*	

Stormwater Catchment Plan

PRIMARY



SECONDARY

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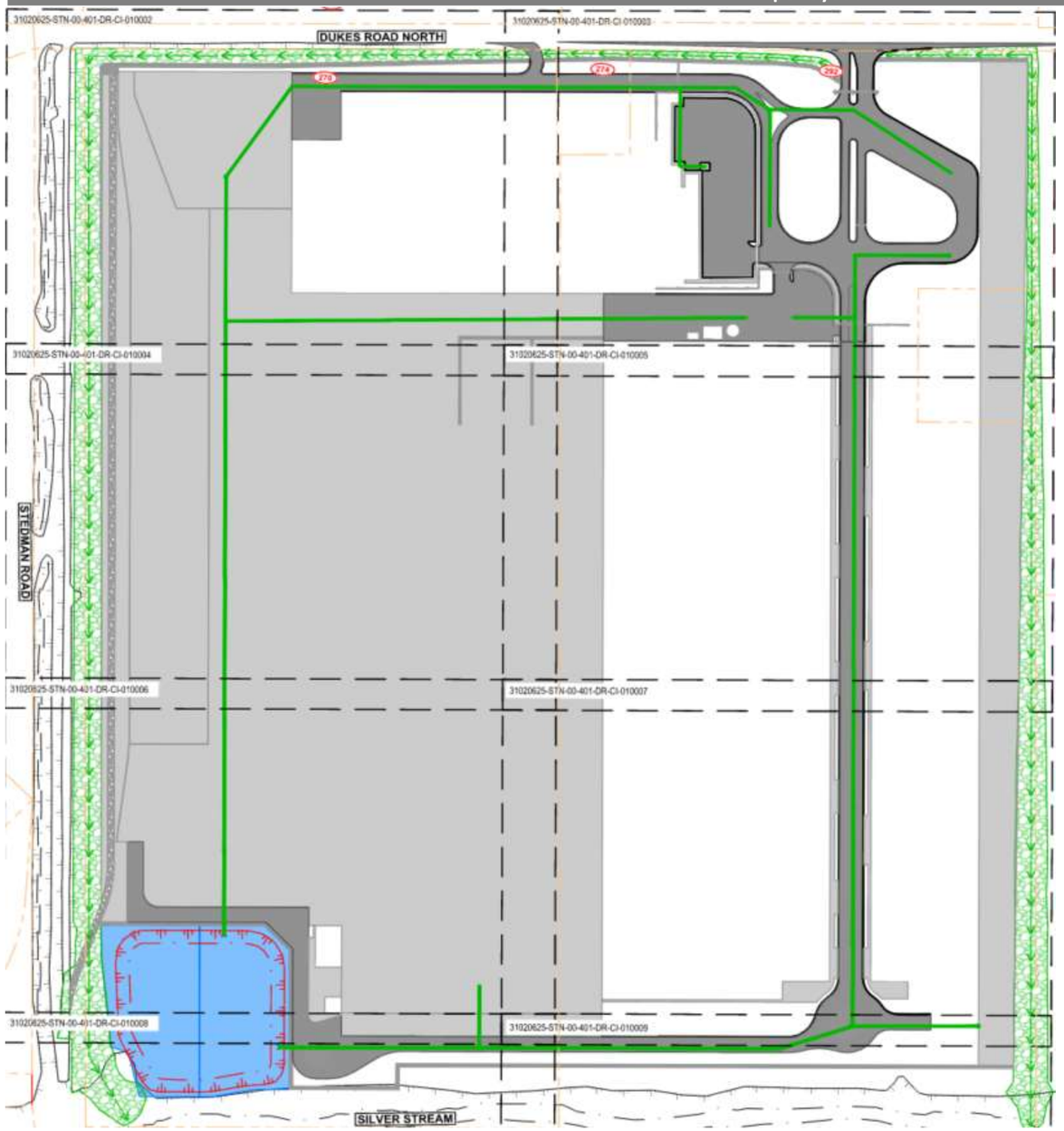
Pipe Layout Plan



Stantec

Client:	*Southern Link Property Limited*	7		**of**	8
Project:	*Southern Link Logistics Park*		*11.12.2025*		
Description:	*Post-development RCP 8.5 2081-2100 rainfall stormwater analysis*		*310206525*		
			Ben Martin		

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Catchment Information					Time of Concentrarion (ToC)	Peak Runoff		
Name	Area total (m^2)	0.9 Hardstand (m^2)	0.66 Calculated Residential (m^2)	0.35 Rural / Reserves (m^2)	Subcatchment ToC	Intensity for below yearly return period (mm/hr) 10	Indicative Peak Design Flow from catchment (l/s)	Indicative Peak Design Flow from catchment (m^3/s)
SWC PRI POST 001	202	202			10.00	60.6	3.1	0.003
SWC PRI POST 002	3093	3093			10.00	60.6	46.9	0.047
SWC PRI POST 003	4414	4414			10.00	60.6	66.9	0.067
SWC PRI POST 004	1343	1343			10.00	60.6	20.3	0.020
SWC PRI POST 005	1462	1462			10.00	60.6	22.1	0.022
SWC PRI POST 006	11148	11148			10.00	60.6	168.9	0.169
SWC PRI POST 007	24671	24671			10.00	60.6	373.8	0.374
SWC PRI POST 008	24712	24712			10.00	60.6	374.4	0.374
SWC PRI POST 009	24712	24712			10.00	60.6	374.4	0.374
SWC PRI POST 010	24774	24774			10.00	60.6	375.3	0.375
SWC PRI POST 011	5709	5709			10.00	60.6	86.5	0.086
SWC PRI POST 012	8704	8704			10.00	60.6	131.9	0.132
SWC PRI POST 013	1570	1570			10.00	60.6	23.8	0.024
SWC PRI POST 014	2126	2126			10.00	60.6	32.2	0.032
SWC PRI POST 015	3410	3410			10.00	60.6	51.7	0.052
SWC PRI POST 016	2359	2359			10.00	60.6	35.7	0.036
SWC PRI POST 017	11028	11028			10.00	60.6	167.1	0.167
SWC PRI POST 018	64371	64371			10.00	60.6	975.2	0.975
SWC PRI POST 019	3577	3577			10.00	60.6	54.2	0.054
SWC PRI POST 020	3326	3326			10.00	60.6	50.4	0.050
SWC PRI POST 021	8241	8241			10.00	60.6	124.9	0.125
SWC PRI POST 022	13850	13850			10.00	60.6	209.8	0.210
SWC PRI POST 023	7358	7358			10.00	60.6	111.5	0.111
SWC PRI POST 024	5571	5571			10.00	60.6	84.4	0.084
SWC PRI POST 025	6354	6354			10.00	60.6	96.3	0.096
SWC PRI POST 026	843	843			10.00	60.6	12.8	0.013
SWC PRI POST 027	6150	6150			10.00	60.6	93.2	0.093
SWC PRI POST 028	2380	2380			10.00	60.6	36.1	0.036
SWC PRI POST 029	810	810			10.00	60.6	12.3	0.012
SWC PRI POST 030	851	851			10.00	60.6	12.9	0.013
SWC PRI POST 031	1689	1689			10.00	60.6	25.6	0.026
SWC PRI POST 032	1765	1765			10.00	60.6	26.7	0.027
SWC PRI POST 033	1600	1600			10.00	60.6	24.2	0.024
SWC PRI POST 034	1539	1539			10.00	60.6	23.3	0.023
SWC PRI POST 035	11452	11452			10.00	60.6	173.5	0.173
SWC PRI POST 036	71838	71838			10.00	60.6	1088.3	1.088
SWC PRI POST 037	5790	5790			10.00	60.6	87.7	0.088
SWC PRI POST 038	13032	13032			10.00	60.6	197.4	0.197

Stantec

Client:	*Southern Link Property Limited*				8	**of**	8
Project:	*Southern Link Logistics Park*					*11.12.2025*	
Description:	*Post-development RCP 8.5 2081-2100 rainfall stormwater analysis*	**Reviewed By:**	NK			*310206525*	
		Chkd By:	MB			*Ben Martin*	

Secondary Stormwater Catchment Flows

Catchment Information					Time of Concentration					Peak Runoff		
		0.9	0.67	0.35	Secondary Event ToC (minutes) applies overland flow paths					Intensity for below yearly return period (mm/hr)	Indicative Peak Design Flow from catchment (l/s)	Indicative Peak Design Flow from catchment (m³/s)
Name	Area total (m²)	Hardstand (m²)	Residential (m²)	Rural / Reserves (m²)	Length of overland flow path (m)	Slope (%)	Manning's n	Secondary Event ToC (minutes) applies overland flow paths	Subcatchment ToC	100		
P1	439143	439142.54			1300	0.28	0.0150	20.62	21.00	75.16	8251.5	8.251
P2	333993			333993.223	1732	3.60	0.0350	31.73	32.00	60.99	1980.5	1.981
	0					1.00		0.00	10.00	112.00	0.0	0.000
	0					1.00		0.00	10.00	112.00	0.0	0.000
	0					1.00		0.00	10.00	112.00	0.0	0.000
	0					1.00		0.00	10.00	112.00	0.0	0.000

Appendix F DCC 2GP Planning Map – Flooding

Natural Hazard Map - Flood

27/01/2026, 14:20:34

1:5,443

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

- Property
- Railway Centreline

Parcel Boundaries

- Parcel
- Road/Rail
- Hydro

Road Names

- Hazard 3 (coastal)
- Hazard 3 (alluvial fan)
- Hazard 3 (flood)
- Hazard 2 (land instability)
- Hazard 2 (flood)
- Hazard 1 (land instability)
- Hazard 1A (flood)
- Hazard 1 (flood)
- Heritage Precinct
- Significant Natural Landscape (SNL)
- Outstanding Natural Landscape (ONL)
- Outstanding Natural Feature (ONF)

Coastal Character

- Natural Coastal Character
- High Natural Coastal Character
- Outstanding Natural Coastal Character
- Industrial Transition
- Harbourside Edge Transition

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Appendix G DCC Memorandum – Standards for Stormwater Management Plans

DUNEDIN CITY COUNCIL | kaunihera a-rohe o Ōtepoti

Memorandum

TO:	Paterson Pitts, Terramark, TL Survey, Fluent Solutions
FROM:	William Clifford, Network Services Manager
DATE:	13 June 2019
SUBJECT:	**STANDARDS FOR STORMWATER MANAGEMENT PLANS**

INTRODUCTION

This memorandum provides guidance on the design of stormwater systems in Dunedin.

PURPOSE

The purpose of this memorandum is to provide clarity to designers on Dunedin City Council's requirements for the management of stormwater. It only relates to stormwater quantity and should be read in conjunction with the Dunedin Code of Subdivision 2010.

This is not a comprehensive document; rather it focusses on key aspects of stormwater design to ensure that designers work to the same standards and assumptions.

This memorandum does not address stormwater quality.

DESIGN OUTCOME

Dunedin City Council expects that designers consider and manage stormwater flows, volumes and velocities to mitigate flooding and erosion associated with new developments.

STORMWATER SETTING

At the outset of the stormwater design process, designers should consider the stormwater setting and obtain confirmation from the Council as to the relevant requirements to be met.

For example, designers should consider whether:

- there are known flooding issues downstream of the site,
- there are storage systems or restrictions upstream of the site,
- the proposed discharge point is to Dunedin City Council infrastructure,
- there are significant road culverts downstream that may affect the design standard,
- detention is required at all (e.g. if the discharge is directly to the harbour),
- the 2GP Plan rules will affect requirements (e.g. density rules),
- there are secondary flow paths available (which will affect %AEP to be used),
- there is an existing Integrated Catchment Management Plan (ICMP)[1]. Existing ICMPs cover Mosgiel plus the areas of urban Dunedin that discharge to the harbour and St Clair/St Kilda areas,
- there are receiving environments that are sensitive to erosion, or other effects outside the scope of this memorandum,

[1] https://www.dunedin.govt.nz/services/stormwater/integrated-catchment-management-plans

- the Otago Regional Council will have a role either due to environmental matters or the discharge is to a scheduled drain or a waterway managed by the Regional Council,
- the size or other aspects of the analysis mean that hydrological or hydrodynamic modelling is required.

Consideration of the above points will help the designer to identify the scope and method of addressing stormwater management.

HYDROLOGY - FLOW ESTIMATION

Rational Method

The Rational Method can provide a reasonable estimate for peak flow for small catchments but is limited in its applicability and is sensitive to the selection of time of concentration and runoff coefficient. The Rational Method may be used for peak flow estimation when:

- The contributing catchment does not include storage systems or other restrictions upstream
- There is not likely to be a backwater effect at the point of interest
- The runoff is either from
    - Non-hill catchments up to 15 hectares, or
    - Hill catchments up to 5 Ha[2].

The Rational Method typically overestimates rain runoff volume, particularly for mid to long duration events. Therefore, it is expected that it won't be used for events longer than 60 minutes. The method also oversimplifies change in rainfall intensity (and therefore volume stored) and so is not appropriate when there are multiple large storage devices to be sized.

When the Rational Method is not appropriate, the designer shall use a hydrological or hydrodynamic model, the details of which shall be approved by the Council prior to commencement of modelling.

Time of Concentration

Where the Rational Method is used, the time of concentration shall be calculated in accordance with the New Zealand Building Code.

When another method is used (e.g. hydrological modelling using the SCS curve number method) the time of concentration / lag time provided in the method shall be used.

Rainfall & Tides

Rainfall intensity shall be selected from HIRDS version 4 and the RCP 8.5 Scenario shall be used.

The Dunedin City Council Climate Change Predictions Policy (2011)[3] assumes a 2.5 degree increase in temperature by 2090. This closely matches RCP 8.5 Scenario, as can be seen in table 8 of the HIRDSv4 Technical Report:

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[2] Based on requirements of "Waterways, Wetlands and Drainage Guide", Christchurch City Council, December 2011, section 21.1.

[3] https://www.dunedin.govt.nz/__data/assets/pdf_file/0008/225908/Climate-Change-Predictions-Policy-2011.pdf

Table 8: New Zealand land-average temperature increase relative to 1986—2005 for four future emissions scenarios. The three 21st century projections result from the average of six RCM model simulations (driven by different global climate models). The early 22nd century projections are based only on the subset of models that were available and so should be used with caution.

	2031—2050	2056—2075	2081—2100	2101—2120	
RCP 2.6	0.59	0.67	0.59	0.59	(4 model avg)
RCP 4.5	0.74	1.05	1.21	1.44	(5 model avg)
RCP 6.0	0.68	1.16	1.63	2.31	(CESM1-CAM5 only)
RCP 8.5	0.85	1.65	2.58	3.13	(3 model avg)

Figure 1: Extract from HIRDS Version 4 Technical Report. Note a 2.58-degree land-average temperature increase to 2081-2100 under scenario RCP 8.5.

Where consideration of tide levels is required, the designer may refer to "Dunedin Integrated Catchment Management Plans: Rainfall and Tidal Analysis Report" (URS, OPUS, August 2011) for guidance. A copy of this document is available from Dunedin City Council.

Hyetograph

If no suitable rainfall records are available to produce a site-specific hyetograph, the following dimensionless synthetic hyetograph may be used:

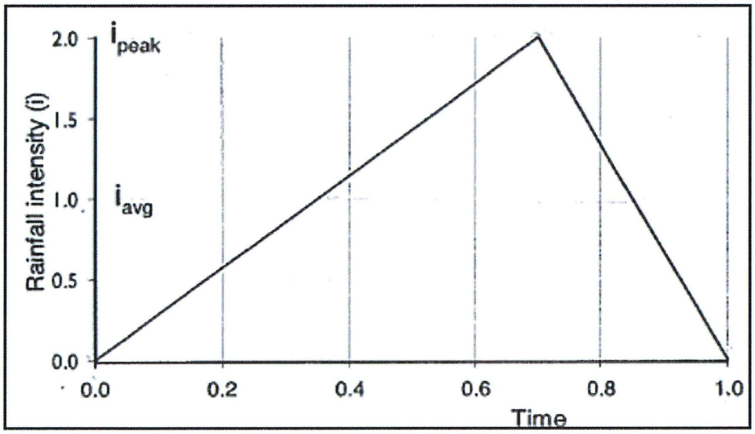

Figure 2: Dimensionless Hyetograph for Rainfall Intensity (Christchurch City Council, 2003)

Rainfall / Run-off Coefficients

For Rational Method calculations, run-off coefficients provided by the New Zealand Building Code may be used when assessing the flow for a duration event equal to the catchment time of concentration.

For other rainfall – runoff calculations, the soil parameters depend on the location and topography of the site. This may be simulated by application of Horton's Equation or other suitable method such as the SCS Curve Number method.

Guidance on the Horton's equation method can be found in section 21 of the Christchurch City Council "Waterways, Wetlands and Drainage Guide". Appropriate soil infiltration factors for the catchment will be required and can preferably be obtained through site investigation. For some locations Otago Regional Council data is available (through the growOTAGO website).

HYDRAULICS

Pipes and Channels

The pipe and channel roughness coefficients to be used shall be those from NZS 4404:2010 Table 4.2. or the New Zealand Building Code, E1.

Culverts

The New Zealand Building Code, E1, may be used in the design of culverts. However, it is important that the designer demonstrates whether the culvert flow is inlet or outlet controlled.

Detention Basins / Tanks

Where there are existing flooding issues downstream of the point of interest and the extent of the issue has not been quantified as part of the design, the post-development peak discharge shall be limited to 80% of the pre-development peak discharge for all flow durations. This is a practice that is used elsewhere, e.g.

- section 6.1.1 of *"Stormwater Treatment Standard for State Highway Infrastructure"* (NZTA, 2009)[4], or
- section 1.5.3 of "Stormwater Ponds" (Manukau City Council)[5], or
- Clause 3.B.5.3 (iii) of "Engineering Quality Standards: Stormwater" (Manukau City Council, February 2007)[6].

The use of tanks to store runoff is permissible. Designers are directed to the Auckland Council document "*Stormwater Management Devices in the Auckland Region: Guideline Document 2017/001*" (GD01) for design guidance on tanks, ponds and other devices. However, the Dunedin City Council preference is for a communal detention facility with a suitable division of responsibilities for operation and maintenance between local landowners and the Council.

Where it can be demonstrated satisfactorily that there is enough capacity in the downstream network or receiving environment for all foreseeable development in the catchment, there will ordinarily be no requirement for detention of flood flows. However, the designer will be required to demonstrate no adverse effects.

Where there are known issues downstream that have been quantified by the designer, then it may be appropriate to limit the post-development peak discharge to 100% of the pre-development peak discharge. However, the additional flow volume will need to be considered, and its effect on increasing the duration of flood on the downstream catchment.

Erosion & Scour Protection / Energy Dissipation

The designer shall assess and manage the risk of erosion and scour both during and after construction. The designer shall undertake specific design where required. Appropriate guidance can be found in:

- "*Hydraulic Design of Energy Dissipators for Culverts and Channels: Hydraulic Engineering Circular Number 14, Third Edition*", Federal Highway Administration of US Department of Transportation, July 2006. Updated October 2012.
- "*Guide to Road Design Part 5B: Drainage-Open Channels, Culverts and Floodways*", Austroads, May 2013.

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[4] https://www.nzta.govt.nz/assets/resources/stormwater-management/docs/20090307-NZTA-stormwater-standard.pdf
[5] https://at.govt.nz/media/imported/4237/MCC%20Stormwater%20Pond.pdf
[6] https://www.drainage.nz/pdf/manukau_engineering_quality_standards.pdf

Soakage Pits

The use of soakage pits is generally not approved unless they can be shown to be an effective long-term solution for the development. Early discussion with the Council is advisable where soakage pits are proposed.

OPERATION & MAINTENANCE CONSIDERATIONS

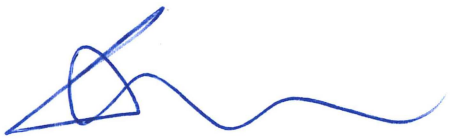
The designer needs to consider operational and maintenance risks as part of the design. This includes:

- Public safety,
- risk of blockage,
- access,
- mowing, vegetation management,
- ease of removal of silt and debris,
- maintenance schedules, timing and reporting.

Prepared by:

William Clifford
NETWORK SERVICES MANAGER

Reviewed by:



Jared Oliver
ENGINEERING SERVICES TEAM LEADER

Appendix H Independent Reviewer Curriculum Vitae's

Nicholas Keenan

Senior Principal Environmental Engineer

Stantec

Nick has over 28 years of experience as a civil engineer, specialising in surface water projects in New Zealand and Australia. He has been the drainage and hydrology lead on a number of hydraulics and floodplain projects including flood protection scheme upgrades, 1D and 2D floodplain model developments, State Highway renewals and improvements, stormwater pipeline designs and developer review assignments for Councils. Nick is currently involved with business case study developments, climate change adaptation design, flooding investigations and coordination of Stantec engineering design teams. Nick's skills include stormwater drainage design, rivers engineering and structures including energy dissipation, rock armouring and bridge scour assessment, culverts and bridges. Nick has expertise in flood mitigation options, flood immunity, freeboard allowance, multi criteria analysis of mitigation options, prioritisation of works, storage areas zoning and developing recommended building levels. Nick uses dynamic open channel modelling programmes, including MIKE11 and HEC RAS programmes, and WaterRIDE presentation and results analysis tool.

EDUCATION AND TRAINING

BE, University of Canterbury/School of Engineering, Christchurch, 1992

Hazards of Confined Spaces, NZ Safety WorkSafe Training, Albany, Auckland, 2014

NZTA TM Inspector, NZTA, Otago, 2023

PROJECT EXPERIENCE

TREC Waikare Gorge Recover Project | NZ Transport Agency Waka Kotahi/KiwiRail | Lead Design Engineer Stormwater | 2023-Present
Nick led a team to design on-network and off-network drainage for 4km of new highway, including 8 major culverts and 6 stormwater treatment facilities.

SH2 College to Silverstream | Central Hawke's Bay/NZ Transport Agency Waka Kotahi | Lead Design Engineer Stormwater | 2020-Present
Nick was responsible for detailed design and resource consent application support for 2km of State Highway 2 upgrade for tender and construction. 10 road culverts, 10 KiwiRail culverts, each with erosion protection/energy dissipation. His role also involved detailed 1D-2D modelling report to support final design of culverts, floodmaps and downstream/upstream effects assessment. He prepared detailed design report for KiwiRail approval.

SH58 Road Safety Improvements | NZ Transport Agency Waka Kotahi | 2020-Present
The project involves road widening safety works over 5.5km between the Hutt Valley and Porirua. Drainage works include culvert extension works to 15 culverts, longitudinal drainage, stormwater treatment, erosion protection, fish passage, design departure and risk assessment documentation, stormwater technical report for resource consent application. The project was a shovel-ready project prepared under a compressed timeframe during and following COVID19 lockdown.

Route 52: Waipukurau – Porangahau Resilience and Strengthening Works | Provincial Growth Fund | Lead Civil Engineer Design | 2020-Present
This role involves catchment hydrology for 97km2 area and hydraulic model investigation using TUFLOW software to determine existing level of service of the Route 52 road crossing. Assess characteristics of the floodplain and bridge configuration, major culvert upgrade, assess levels of investment in upgrade scenarios to improve level of service, provide levels of service versus cost estimate between 2 year and 100 year levels of service for 5km length of road adjacent to wetland. Nick also completes cost estimation and cost/benefit assessment of options as well as preparing feasibility design, technical report including floodmaps, liaising with client and stakeholder consultation.

SH Otaki to North of Levin | NZ Transport Agency Waka Kotahi | Lead Design Engineer Stormwater | 2020-Present
On this project Nick was responsible for stormwater design to support preliminary design 23km of major State Highway 1 expressway for Detailed Business Case stage. 50 culverts, each with fish passage/erosion protection/energy

dissipation, minor diversion channels and stream realignments. 7km long major diversion channel to support a below grade cutting. Longitudinal drainage, swales, attenuation ponds and water quality treatment constructed wetlands.

Lot 1: Drainage Upgrades in the Vaisigano River Coastal Areas, Samoa | United Nations Development Programme | Lead Drainage Design Engineer | 2019-Present
On this project Nick is responsible for investigation and design of 19 separate stormwater drainage projects, tender documentation and MSQA for construction works at 9 priority sites. As well as assessment of the Mulivai River and identification of flood protection weak points and high flood risk location near Vaea Street, and identification of flowpaths using drone aerial survey captured during the project. Five internal site visits made in 2019 to complete key requirements in the programme.

Hokitika Stormwater | Westland District Council | Lead Designer | 2016-Present
Nick's role is lead stormwater engineer. This involves design and reporting for three stormwater upgrades each involving the optimisation of an existing pump station and new pipelines for discharging over the Hokitika River flood bank.

Frankton Flats Stormwater | Queenstown Lakes District Council | Lead Designer | 2015-2019
Nick was responsible for preparation of design hydrology, pipeline hydraulics, USBR energy dissipation structure, surface water catchpits, steep pipe transitions and deep trench assessment. The project involved 800 m of 1200 mm-1800 mm diameter plastic pipeline through brown-fields development areas up to 5m depth. As well as design, specifications, contract drawings, budget cost estimates and implementation support. Nick was also responsible for the second stage Strategy Study for an additional area of Frankton Flats, including Investigation and Scheme Design for 3km of stormwater pipeline between 1050mm-1800mm diameter. On both projects Nick provided technical support during construction.

Transmission Gully Technical Review | NZ Transport Agency Waka Kotahi | Hydraulic Designer | 2015
Nick prepared stormwater technical review summaries for the NZ Transport Agency of open channel works, drainage and stream diversion works aspects of the Wellington Gateway Project design.

Stormwater Separation Studies | Auckland Council | Lead Designer | 2014-2017
Nick was technical lead for the preliminary design of stormwater requirements to separate properties from the combined sewer system. This involved the design of over 50 stormwater systems through public and private land, cost estimation, risk assessment, reporting.

Kilbirnie Stormwater Catchment Analysis | Capacity Infrastructure Services | Lead Designer | 2009-2012
Nick updated the existing catchment management plan with a simplified hydraulic model that analysed the flooding volume and levels in Kilbirnie for a wide range of rainfall events and for a number of piped network upgrade scenarios. The model made use of LiDAR ground model data, trunk outfall diameter data, Civil3D CAD software, DHI MOUSE software and other data to estimate top water levels and flood inundation mapped footprints. The flood levels were converted into flood damage with the use of surveyed floor levels and a damage function used previously by the Client. A benefit-cost ratio assessment was made for the scenarios under existing and future climate conditions.

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Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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