INFRASTRUCTURE DETAILS

LINK ID		**2000165049**	**2000791092**	**3000039106_B_A**	**SWL021**	**SWL020**	**2000906324**	**2000419379**	**2000219530**	**2000546806**	**2000831760**	**2000936573**	**2000351293**	**SWL017**	**SWL013**	**SWL012**	**SWL-100**	**SWL016**	**SWL015**	**SWL002_1**	**SWL003_1**	**SWL010**	**SWL014**	**SWL004_1**	**SWL011_1S**	**WLTNK-JOAL3_100**	**SWL003**	**SWL009**
DWG PLAN		DWG1404	DWG1404	DWG1404	DWG1405	DWG1405	DWG1404	DWG1404	DWG1404	DWG1404	DWG1404	DWG1404	DWG1404	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1404	DWG1405	DWG1404	DWG1404	DWG1404	DWG1405
DWG LONGSECTION		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STATUS		IN	IN	IN	PROPOSED	PROPOSED	IN	IN	IN	IN	IN	IN	IN	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED
OWNER		PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PRIVATE	PRIVATE	PUBLIC
UPSTREAM NODE ID		2000706549	EXSWN002	SWN022	SWN021	SWN020	2000954446	2000423549	2000680033	2000139881	2000658185	2000154157	2000679424	SWN017	SWN013	SWN012	3000039100	SWN016	SWN015	SWN002	SWN003	SWN010	SWN014	SWN004	SWN0011	TNK-JOAL3_100	SWD003	SWN009
DOWNSTREAM NODE ID		2000935108	2000706549	3000039107	SWN022	SWN021	EXSWN001	2000723884	2000423549	2000680033	2000139881	2000658185	2000154157	SWN020	SWN017	SWN013	SWN012	SWN020	SWN016	SWN015	SWN002	3000039100	SWN013	SWN003	SWN010	SWN014	TNK-JOAL3_100	3000039100
UPSTREAM GROUND LEVEL	RL	36.40	35.19	43.39	44.97	47.11	50.41	51.75	51.76	52.33	58.11	61.86	62.84	47.04	49.91	50.90	52.38	47.39	47.36	50.50	50.99	52.72	49.76	51.70	52.60	50.37	50.62	56.90
UPSTREAM INVERT LEVEL	RL	34.90	35.18	39.04	41.80	43.85	49.41	50.75	51.00	51.33	55.91	60.96	61.84	44.50	46.75	47.95	49.43	44.20	44.45	46.60	48.15	49.72	47.65	49.35	50.75	47.80	48.46	53.90
DOWNSTREAM GROUND LEVEL	RL	33.10	36.40	37.52	43.39	44.97	36.07	50.45	51.75	51.76	52.33	58.11	61.86	47.11	47.04	49.91	50.90	47.11	47.39	47.36	50.50	52.38	49.91	50.99	52.72	49.76	50.44	52.38
DOWNSTREAM INVERT LEVEL	RL	31.50	35.00	36.81	39.11	41.85	35.07	49.50	50.75	51.00	51.33	55.96	61.04	43.95	44.65	46.90	48.10	43.90	44.25	44.51	46.70	49.51	46.90	48.30	49.77	47.70	47.90	50.43
PIPE TYPE		PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE
PIPE SLOPE	**m/m**	**6.41%**	**2.45%**	**9.48%**	**8.70%**	**6.78%**	**22.73%**	**6.63%**	**1.28%**	**1.70%**	**9.06%**	**15.85%**	**3.47%**	**7.87%**	**7.63%**	**6.85%**	**6.73%**	**5.07%**	**4.35%**	**6.89%**	**6.84%**	**1.18%**	**1.49%**	**4.23%**	**1.35%**	**0.96%**	**25.20%**	**8.38%**
PIPE LENGTH	**m**	**53.0**	**7.4**	**23.5**	**30.9**	**29.5**	**63.1**	**18.8**	**19.6**	**19.4**	**50.6**	**31.5**	**23.1**	**7.0**	**27.5**	**15.3**	**19.8**	**5.9**	**4.6**	**30.3**	**21.2**	**17.8**	**50.2**	**24.8**	**72.7**	**10.4**	**2.2**	**41.4**
PIPE BARRELS		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PIPE INTERNAL DIAMETER	**m**	**0.525**	**0.525**	**0.525**	**0.450**	**0.450**	**0.300**	**0.300**	**0.300**	**0.300**	**0.300**	**0.300**	**0.225**	**0.375**	**0.375**	**0.375**	**0.375**	**0.450**	**0.450**	**0.450**	**0.375**	**0.225**	**0.225**	**0.225**	**0.225**	**0.225**	**0.150**	**0.225**
PIPE MATERIAL		RC	RC	RC	RC CLASS 4	RC CLASS 4	RC	RC	RC	RC	RC	RC	RC	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 4	uPVC SN16	uPVC SN16	RC CLASS 4

CATCHMENT DETAILS

PERVIOUS AREA	m²	4,972	4,972	4,972	4,972	4,972	4,664	4,664	4,664	4,664	4,664	4,664	4,664	3,244	2,755	1,886	1,832	1,728	1,606	1,606	1,103	876	836	779	634	609	609	542
IMPERVIOUS AREA	m²	11,600	11,600	11,600	11,600	11,600	10,883	10,883	10,883	10,883	10,883	10,883	10,883	7,569	6,429	4,401	4,274	4,031	3,747	3,747	2,573	2,044	1,952	1,817	1,479	1,421	1,421	1,264
TOTAL AREA	m²	16,572	16,572	16,572	16,572	16,572	15,547	15,547	15,547	15,547	15,547	15,547	15,547	10,813	9,184	6,287	6,106	5,758	5,352	5,352	3,675	2,920	2,788	2,596	2,113	2,031	2,031	1,805
IMPERVIOUS %	%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
EQUAL AREA SLOPE	m/m	0.60%	0.61%	0.73%	0.82%	0.92%	5.94%	6.44%	6.73%	7.05%	8.06%	8.84%	9.52%	0.94%	1.07%	1.15%	1.28%	2.48%	2.55%	3.14%	3.74%	1.43%	3.96%	4.84%	2.66%	4.57%	4.73%	2.63%
CATCHMENT LENGTH	m	376	368	304	274	244	482	445	425	406	355	324	301	237	210	194	174	166	161	131	110	157	78	85	84	68	65	99

TP108 CALCULATIONS

EVENT RETURN PERIOD		10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y
RAINFALL DEPTH (INCL. CC)	mm	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8
INITIAL ABSTRACTION	mm	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
PERMEABLE CURVE NUMBER		74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
POTENTIAL MAXIMUM RETENTION	mm	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4
RUNOFF DEPTH	mm	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4
RUNOFF VOLUME	m³	2,094	2,094	2,094	2,094	2,094	1,965	1,965	1,965	1,965	1,965	1,965	1,965	1,366	1,161	794	772	728	676	676	464	369	352	328	267	257	257	228
CHANNELISATION FACTOR	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
TIME OF CONCENTRATION	hr	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
PEAK FLOW (TP108)	**L/s**	**367.3**	**367.3**	**367.3**	**367.3**	**367.3**	**344.6**	**344.6**	**344.6**	**344.6**	**344.6**	**344.6**	**344.6**	**239.7**	**203.5**	**139.3**	**135.3**	**127.6**	**118.6**	**118.6**	**81.5**	**64.7**	**61.8**	**57.5**	**46.8**	**45.0**	**45.0**	**40.0**

COLEBROOKE WHITE PIPE FULL ANALYSIS AT TARGET FLOW

TARGET FLOW TYPE		10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR
TARGET FLOW	L/s	367.3	367.3	367.3	367.3	367.3	344.6	344.6	344.6	344.6	344.6	344.6	344.6	239.7	203.5	139.3	135.3	127.6	118.6	118.6	81.5	64.7	61.8	57.5	46.8	45.0	45.0	40.0
PIPE ROUGHNESS	mm	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
VELOCITY	m/s	1.70	1.70	1.70	2.31	2.31	4.88	4.87	4.87	4.87	4.87	4.88	8.67	2.17	1.84	1.26	1.23	0.80	0.75	0.75	0.74	1.63	1.55	1.45	1.18	1.13	2.55	1.01
HGL GRADE	%	0.65%	0.65%	0.65%	1.46%	1.46%	10.91%	10.89%	10.88%	10.88%	10.89%	10.90%	50.03%	1.62%	1.17%	0.55%	0.52%	0.18%	0.15%	0.15%	0.19%	1.76%	1.60%	1.39%	0.92%	0.85%	7.33%	0.67%
HEADLOSS PIPE	m	0.34	0.05	0.15	0.45	0.43	6.88	2.05	2.13	2.11	5.51	3.44	11.55	0.11	0.32	0.08	0.10	0.01	0.01	0.05	0.04	0.31	0.80	0.34	0.67	0.09	0.16	0.28

COLEBROOKE WHITE PIPE FULL ANALYSIS HGL AT GRADE

VELOCITY	m/s	5.34	3.30	6.49	5.64	4.98	7.04	3.80	1.67	1.93	4.45	5.88	2.29	4.78	4.71	4.46	4.42	4.31	3.99	5.02	4.46	1.34	1.50	2.52	1.43	1.20	4.72	3.55
PIPE CAPACITY	**L/s**	**1,156.6**	**714.5**	**1,405.6**	**897.6**	**792.3**	**497.4**	**268.9**	**118.0**	**136.2**	**314.3**	**415.5**	**90.9**	**528.0**	**519.9**	**492.7**	**488.1**	**685.5**	**635.1**	**799.1**	**492.1**	**53.1**	**59.7**	**100.4**	**56.7**	**47.8**	**83.5**	**141.2**
IS PIPE FULL AT TARGET FLOW?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**YES**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**YES**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**

MANNINGS ANALYSIS

DEPTH	m	0.21	0.28	0.19	0.21	0.22	0.19	-	-	-	-	0.22	-	0.18	0.17	0.14	0.14	0.14	0.14	0.12	0.11	-	-	0.13	0.17	-	0.09	0.09
AREA	m²	0.081	0.116	0.070	0.072	0.079	0.048	-	-	-	-	0.056	-	0.054	0.049	0.038	0.038	0.041	0.041	0.034	0.026	-	-	0.023	0.032	-	0.011	0.014
WETTED PERIMETER	m	0.72	0.85	0.68	0.67	0.70	0.56	-	-	-	-	0.62	-	0.58	0.55	0.50	0.49	0.52	0.52	0.49	0.42	-	-	0.39	0.47	-	0.26	0.30
HYDRAULIC RADIUS	m	0.112	0.136	0.104	0.107	0.112	0.086	-	-	-	-	0.090	-	0.093	0.088	0.077	0.076	0.077	0.078	0.070	0.061	-	-	0.061	0.068	-	0.041	0.046
MANNIGS N		0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	0.01	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-	0.01	0.01	-	0.01	0.01
VELOCITY	m/s	4.54	3.17	5.23	5.11	4.65	7.15	-	-	-	-	6.16	-	4.43	4.20	3.64	3.59	3.15	2.92	3.44	3.13	-	-	2.45	1.48	-	4.25	2.88

HYDRAULIC GRADE LINE RESULTS

VELOCITY	m	4.54	3.17	5.23	5.11	4.65	7.15	4.87	4.87	4.87	4.87	6.16	8.67	4.43	4.20	3.64	3.59	3.15	2.92	3.44	3.13	1.63	1.55	2.45	1.48	False	4.25	2.88
DOWNSTREAM HGL LEVEL	RL	32.03	35.28	37.34	39.42	42.45	35.37	49.80	51.75	51.76	52.33	58.08	61.86	44.42	44.99	47.18	48.24	44.37	44.54	44.71	46.92	49.73	47.12	48.43	50.05	47.96	48.05	50.52
UPSTREAM HGL LEVEL	RL	35.11	35.46	39.23	42.01	44.07	49.60	51.85	53.88	53.87	57.84	61.52	73.41	44.68	46.92	48.09	49.57	44.38	44.59	46.72	48.26	50.05	47.93	49.48	50.92	48.05	48.55	53.99
UPSTREAM FREEBOARD	**m**	**1.29**	**-0.27**	**4.16**	**2.96**	**3.04**	**0.81**	**-0.10**	**-2.12**	**-1.54**	**0.27**	**0.34**	**-10.57**	**2.36**	**2.99**	**2.81**	**2.81**	**3.01**	**2.77**	**3.78**	**2.73**	**2.67**	**1.83**	**2.22**	**1.68**	**2.33**	**2.07**	**2.91**
IS US NODE SURCHARGING?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
IS US NODE OVERFLOWING?		**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

REVISION	AMENDMENT	BY

DESIGNED: HM
DRAWN: SG
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORMWATER CAPACITY TABLES

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1451
SCALE & SIZE: NTS A3
REV: 13/04/2022

INFRASTRUCTURE DETAILS

LINK ID		**SWL007**	**SWL018**	**SWL141**	**SWL005_1**	**3000039103**	**SWL008**	**SWL19B**	**SWL001_1**	**SWLTNK-JOAL1_100**	**SWL001**	**SWL151**	**SWL19A**	**SWL200**	**SWLTNK-JOAL4_100**	**SWL004**	**SWL161**	**SWLN_A**	**SWLTNK-JOAL2_100**	**SWL002**	**SWL157**	**SWLTNK-JOAL5_100**	**SWL005**	**SWL153**	**SWL006_1**	**SWL011**	**SWL160**	**SWL154**
DWG PLAN		DWG1405	DWG1404	DWG1404	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1404	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1405	DWG1404
DWG LONGSECTION		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STATUS		PROPOSED	PROPOSED	PROPOSED	PROPOSED	IN	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED	PROPOSED
OWNER		PUBLIC	PUBLIC	PRIVATE	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PUBLIC	PRIVATE	PRIVATE	PRIVATE	PUBLIC	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PUBLIC	PRIVATE	PRIVATE	PRIVATE
UPSTREAM NODE ID		SWN007	SWN018	SWN141	SWN005	2000148353	SWN008	SWN019B	SWN001	TNK-JOAL1_100	SWD001	SWN151	SWN019A		TNK-JOAL4_100	SWD004	SWN161	SWN_A	TNK-JOAL2_100	SWD002	SWN157	TNK-JOAL5_100	SWD005	SWN153	SWN006	SWN011	SWN160	SWN154
DOWNSTREAM NODE ID		SWN009	SWN017	SWN018	SWN004	3000039100	SWN007	SWN008	SWN002	SWN005	TNK-JOAL1_100	SWD001	SWN019B	SWN002	SWL200	TNK-JOAL4_100	SWD004	SWL151	SWN010	TNK-JOAL2_100	SWD002	SWN001	TNK-JOAL5_100	SWD005	SWN007	SWLN_A	SWL161	SWD003
UPSTREAM GROUND LEVEL	RL	58.41	47.16	47.10	51.96	53.22	60.80	61.90	49.86	52.11	52.61	53.79	62.40	50.52	50.58	50.93	50.57	56.91	52.78	52.65	52.65	49.88	49.76	49.67	57.92	57.63	50.70	49.70
UPSTREAM INVERT LEVEL	RL	56.20	46.40	46.55	49.60	51.60	57.80	59.62	47.40	49.84	51.14	51.54	61.48	47.36	48.08	48.94	49.42	55.74	50.30	50.98	51.52	47.48	48.12	48.24	57.15	56.48	49.54	48.54
DOWNSTREAM GROUND LEVEL	RL	56.90	47.04	47.16	51.70	52.38	58.41	60.80	50.50	51.96	52.24	52.61	61.90	50.50	50.52	50.74	50.93	53.81	52.72	52.80	52.65	49.86	49.82	49.76	58.41	56.86	50.96	50.62
DOWNSTREAM INVERT LEVEL	RL	54.90	45.00	46.47	49.40	49.48	57.20	58.44	47.08	49.65	49.94	51.20	60.62	46.82	47.57	48.18	49.00	51.71	50.20	50.40	51.04	47.45	47.58	48.18	56.30	55.65	49.18	48.52
PIPE TYPE		PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE	PIPE
PIPE SLOPE	**m/m**	**6.98%**	**3.73%**	**1.01%**	**1.87%**	**27.87%**	**4.20%**	**6.92%**	**1.07%**	**4.17%**	**58.10%**	**4.14%**	**14.26%**	**6.92%**	**21.33%**	**26.89%**	**2.83%**	**14.59%**	**2.78%**	**8.27%**	**5.76%**	**0.54%**	**15.97%**	**1.07%**	**5.08%**	**6.61%**	**2.72%**	**1.24%**
PIPE LENGTH	**m**	**18.6**	**37.6**	**7.9**	**10.7**	**7.6**	**14.3**	**17.0**	**30.0**	**4.6**	**2.1**	**8.2**	**6.0**	**7.8**	**2.4**	**2.8**	**14.9**	**27.6**	**3.6**	**7.0**	**8.3**	**5.6**	**3.4**	**5.6**	**16.7**	**12.6**	**13.2**	**1.6**
PIPE BARRELS		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PIPE INTERNAL DIAMETER	**m**	**0.225**	**0.225**	**0.150**	**0.225**	**0.375**	**0.225**	**0.225**	**0.225**	**0.225**	**0.225**	**0.225**	**0.150**	**0.225**	**0.225**	**0.150**	**0.150**	**0.150**	**0.225**	**0.150**	**0.150**	**0.225**	**0.150**	**0.150**	**0.225**	**0.150**	**0.150**	**0.150**
PIPE MATERIAL		RC CLASS 4	RC CLASS 4	uPVC SN16	RC CLASS 4	RC	RC CLASS 4	RC CLASS 4	RC CLASS 4	RC CLASS 2	uPVC SN16	uPVC SN16	uPVC SN16	uPVC SN16	uPVC SN16	uPVC SN16	uPVC SN16	uPVC SN16	RC CLASS 4	uPVC SN16	uPVC SN16	RC CLASS 4	uPVC SN16	uPVC SN16	RC CLASS 4	uPVC SN16	uPVC SN16	uPVC SN16

CATCHMENT DETAILS

PERVIOUS AREA	m²	542	489	489	419	390	387	387	325	296	296	296	286	178	178	178	178	169	157	157	157	129	129	129	114	106	87	81
IMPERVIOUS AREA	m²	1,264	1,141	1,141	977	909	902	902	758	690	690	690	667	416	416	416	416	394	367	367	367	300	300	300	265	248	204	189
TOTAL AREA	m²	1,805	1,630	1,630	1,395	1,299	1,288	1,288	1,082	986	986	986	952	595	595	595	595	562	525	525	525	429	429	429	379	355	291	271
IMPERVIOUS %	%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
EQUAL AREA SLOPE	m/m	3.24%	1.49%	1.66%	5.54%	15.76%	3.95%	5.33%	0.87%	5.90%	6.08%	6.92%	6.09%	2.24%	2.30%	2.37%	2.83%	12.95%	1.37%	1.52%	1.76%	0.98%	1.05%	1.20%	4.25%	21.45%	3.42%	4.85%
CATCHMENT LENGTH	m	80	79	71	74	44	66	49	54	70	68	59	43	97	94	91	76	32	69	62	54	48	45	39	23	19	63	64

TP108 CALCULATIONS

EVENT RETURN PERIOD		10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y	10Y
RAINFALL DEPTH (INCL. CC)	mm	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8	147.8
INITIAL ABSTRACTION	mm	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
PERMEABLE CURVE NUMBER		74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
POTENTIAL MAXIMUM RETENTION	mm	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4
RUNOFF DEPTH	mm	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4	126.4
RUNOFF VOLUME	m³	228	206	206	176	164	163	163	137	125	125	125	120	75	75	75	75	71	66	66	66	54	54	54	48	45	37	34
CHANNELISATION FACTOR	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
TIME OF CONCENTRATION	hr	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
PEAK FLOW (TP108)	**L/s**	**40.0**	**36.1**	**36.1**	**30.9**	**28.8**	**28.6**	**28.6**	**24.0**	**21.9**	**21.9**	**21.9**	**21.1**	**13.2**	**13.2**	**13.2**	**13.2**	**12.5**	**11.6**	**11.6**	**11.6**	**9.5**	**9.5**	**9.5**	**8.4**	**7.9**	**6.5**	**6.0**

COLEBROOKE WHITE PIPE FULL ANALYSIS AT TARGET FLOW

TARGET FLOW TYPE		10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR	10YR, 24HR
TARGET FLOW	L/s	40.0	36.1	36.1	30.9	28.8	28.6	28.6	24.0	21.9	21.9	21.9	21.1	13.2	13.2	13.2	13.2	12.5	11.6	11.6	11.6	9.5	9.5	9.5	8.4	7.9	6.5	6.0
PIPE ROUGHNESS	mm	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
VELOCITY	m/s	1.01	0.91	2.04	0.78	0.26	0.72	0.72	0.60	0.55	0.55	0.55	1.20	0.33	0.33	0.75	0.75	0.71	0.29	0.66	0.66	0.24	0.54	0.54	0.21	0.45	0.37	0.34
HGL GRADE	%	0.67%	0.55%	4.71%	0.40%	0.02%	0.34%	0.34%	0.24%	0.20%	0.20%	0.20%	1.61%	0.07%	0.07%	0.63%	0.63%	0.56%	0.06%	0.49%	0.49%	0.04%	0.33%	0.33%	0.03%	0.22%	0.15%	0.13%
HEADLOSS PIPE	m	0.12	0.21	0.37	0.04	0.00	0.05	0.06	0.07	0.01	0.00	0.02	0.10	0.01	0.00	0.02	0.09	0.15	0.00	0.03	0.04	0.00	0.01	0.02	0.01	0.03	0.02	0.00

COLEBROOKE WHITE PIPE FULL ANALYSIS HGL AT GRADE

VELOCITY	m/s	3.24	2.37	0.95	1.68	8.99	2.51	3.23	1.27	2.51	9.34	2.50	3.55	3.23	5.66	4.88	1.58	3.60	2.05	2.71	2.26	0.90	3.76	0.98	2.77	2.42	1.55	1.05
PIPE CAPACITY	**L/s**	**128.9**	**94.2**	**16.7**	**66.8**	**992.4**	**99.9**	**128.4**	**50.4**	**99.6**	**371.2**	**99.3**	**62.8**	**128.3**	**225.2**	**86.2**	**28.0**	**63.5**	**81.4**	**47.8**	**39.9**	**35.8**	**66.5**	**17.3**	**110.0**	**42.8**	**27.5**	**18.5**
IS PIPE FULL AT TARGET FLOW?		**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

MANNINGS ANALYSIS

DEPTH	m	0.09	0.10	-	0.11	0.05	0.09	0.08	0.11	0.07	0.04	0.08	0.07	0.05	0.04	0.04	0.08	0.05	0.06	0.05	0.06	0.08	0.04	0.09	0.04	0.05	0.05	0.06
AREA	m²	0.015	0.017	-	0.020	0.008	0.014	0.012	0.020	0.012	0.005	0.012	0.007	0.007	0.005	0.004	0.010	0.005	0.008	0.006	0.007	0.013	0.004	0.011	0.005	0.005	0.006	0.007
WETTED PERIMETER	m	0.31	0.33	-	0.35	0.27	0.30	0.28	0.36	0.28	0.20	0.28	0.22	0.23	0.20	0.17	0.25	0.18	0.24	0.19	0.21	0.29	0.17	0.26	0.21	0.18	0.19	0.21
HYDRAULIC RADIUS	m	0.048	0.052	-	0.056	0.029	0.047	0.042	0.057	0.042	0.024	0.043	0.034	0.031	0.024	0.025	0.039	0.027	0.035	0.030	0.032	0.045	0.024	0.041	0.027	0.027	0.030	0.034
MANNIGS N		0.01	0.01	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
VELOCITY	m/s	2.69	2.08	-	1.55	3.79	2.04	2.45	1.18	1.89	4.58	1.79	2.85	1.86	2.77	3.14	1.38	2.48	1.37	1.99	1.74	0.72	2.38	0.88	1.54	1.64	1.13	0.83

HYDRAULIC GRADE LINE RESULTS

VELOCITY	m	2.69	2.08	2.04	1.55	3.79	2.04	2.45	1.18	1.89	4.58	1.79	2.85	1.86	2.77	3.14	1.38	2.48	1.37	1.99	1.74	0.72	2.38	0.88	1.54	1.64	1.13	0.83
DOWNSTREAM HGL LEVEL	RL	54.99	45.10	46.62	49.52	49.59	57.29	58.52	47.19	49.73	49.98	51.28	60.69	46.87	47.61	48.22	49.08	51.76	50.26	50.45	51.10	47.53	47.62	48.27	56.37	55.79	49.50	48.58
UPSTREAM HGL LEVEL	RL	56.29	46.50	46.99	49.71	51.65	57.89	59.70	47.51	49.91	51.18	51.62	61.55	47.41	48.12	48.98	49.50	55.79	50.36	51.03	51.58	47.56	48.16	48.33	57.19	56.53	49.59	48.60
UPSTREAM FREEBOARD	**m**	**2.12**	**0.66**	**0.11**	**2.25**	**1.57**	**2.91**	**2.20**	**2.35**	**2.20**	**1.43**	**2.17**	**0.85**	**3.11**	**2.46**	**1.95**	**1.07**	**1.12**	**2.42**	**1.62**	**1.07**	**2.31**	**1.60**	**1.34**	**0.73**	**1.10**	**1.11**	**1.10**
IS US NODE SURCHARGING?		**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
IS US NODE OVERFLOWING?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

REVISION	AMENDMENT	BY

DESIGNED: HM
DRAWN: SG
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORMWATER CAPACITY TABLES

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1452
SCALE & SIZE: NTS A3
REV: 13/04/2022

SMAF RETENTION CALCULATIONS

ITEM	UNITS	SMAF
RAINFALL DEPTH	mm	5
TOTAL CATCHMENT AREA	m²	9278
SITE RETENTION VOLUME	m³	46.39
TANK CATCHMENT AREA	m²	75
% OF CATCHMENT MITIGATING	%	1.1
TANK RETENTION VOLUME	m³	0.51

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	9278
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	78.35
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	301.08
SITE VOLUME FOR MITIGATION	m³	222.73
TANK CATCHMENT AREA	m²	75
% OF SITE MITIGATED BY TANK	%	1.1
TANK RET. + DET. VOLUME	m³	2.45
TANK SMAF DETENTION VOLUME	m³	1.94

ORIFICE SUMMARY

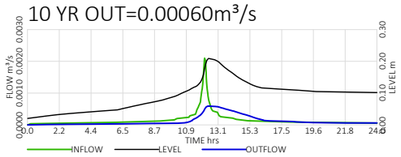
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	10	28	
HEIGHT	m	0.021	0.099	
NO. OF ORF.		1	1	
EDV HEAD	m	0.078	0.000	
EDV FLOW	m³/s	0.0001	-	0.0001
10 YR HEAD	m	0.190	0.112	
10 YR FLOW	m³/s	0.0001	0.0005	0.0006

PEAK FLOW MITIGATION CALCULATIONS

CATCHMENT	UNITS	EXISTING	NON-MIT	LOT 1 & 2
STORM		10 YR	10 YR	10 YR
PERMEABLE AREA[1]	m²	12032	8979	0
IMPERMEABLE AREA[1]	m²	6225	6424	75
TOTAL AREA	m²	18257	15402	75
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	52.0	0.0
RUNOFF DEPTH	mm	124.4	128.8	162.3
RUNOFF VOLUME	m³	2,271.22	1,983.53	12.18
CHANNELISATION FACTOR		1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0.013
CATCHMENT SLOPE	m/m	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4134	0.3578	0.0021
PEAK RUNOFF RATE	mm/hr	81.5	83.6	99.8
FLOW TARGET FOR ALL SITES	m³/s			0.41340
FLOW BYPASSING TANKS	m³/s			0.35780
FLOW TARGET FOR ALL TANKS	m³/s			0.05560
CATCHMENT PORTION FOR THIS TANK	%			1.1%
FLOW TARGET FOR THIS TANK	m³/s			0.00061

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.00060m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
RETENTION	m³	0.51	0.51
EXTENDED DETENTION	m³	1.94	2.45
10 YR STORAGE	m³	2.77	5.22
TOTAL VOLUME REQUIRED	m³	-	5.22
TOTAL VOLUME PROVIDED	m³	-	5.25

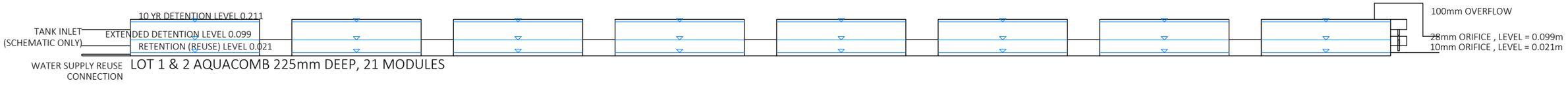
SITEWIDE SUMMARY

STORM	SYSTEM COUNT	TOT. VOL.	RET. VOL.	DET. VOL.	10 YR
UNITS	-	m³	m³	m³	m³/s
BYPASS	-	-	-	-	0.35780
LOT 1 & 2	2	10.51	1.02	3.88	0.00120
LOT 3 - 10	8	30.02	2.97	11.29	0.00320
LOT 11 - LOT 16	5	16.26	1.62	6.17	0.00176
LOT 17 - LOT 20	3	16.51	1.67	6.35	0.00198
LOT 21-24, LOT 32 -	12	4245.03	4.45	16.93	0.00486
LOT 25 - LOT 34	20	55.04	5.57	21.16	0.00597
LOT 43 - LOT 59	7	24.52	2.27	8.64	0.00216
TOTAL	57	197.89	19.57	74.42	0.37893
TARGET	-		46.39	222.73	0.41340
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Retention, SMAF Detention and 10 Year Peak Flow Control to address downstream network capacity issues.

1. The retention volume has been calculated in the SMAF Retention Calculations table. The volume required is 0.51m³.
2. The retention volume requires a storage depth of 0.021m.
3. The retention volume is required to be reused within the property within 72 hours. Sufficient non-potable devices must be connected to the reuse system to ensure sufficient reuse capacity. The volume capacity utilised by non-potable devices is Laundry:0.44m³, Toilet:0.32m³. Please connect enough of these devices to reuse the required volume of 0.51m³. Please note that while garden taps can be connected, no credit is given for this as their reuse of water in Winter is unlikely to occur.
4. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 1.94m³.
5. The base orifice invert is 0.021m
6. To drain the detention volume over 24hrs would require an orifice smaller than the minimum allowable size, therefore the minimum orifice size of 0.010m has been used.
7. The detention volume requires a storage depth of 0.099m in the tank(s).
8. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
9. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
10. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41340 m³/s.
11. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.35780 m³/s.
12. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41340 m³/s - 0.35780 m³/s = 0.05560 m³/s.
13. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 1.1% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 1.1% X 0.05560 m³/s = 0.00061 m³/s.
14. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.00060 m³/s which meets the design requirements as it is less than the target flow of 0.00061 m³/s. The peak water level reached in the 10 YR simulation was 0.211m.
15. In conclusion, the analysis shows the tank design meets all requirements.



REVISION	AMENDMENT	BY
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DESIGNED: HM
DRAWN: HM
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1460
SCALE & SIZE: - A3
REV:
21/03/2022

SMAF RETENTION CALCULATIONS

ITEM	UNITS	SMAF
RAINFALL DEPTH	mm	5
TOTAL CATCHMENT AREA	m²	9278
SITE RETENTION VOLUME	m³	46.39
TANK CATCHMENT AREA	m²	53
% OF CATCHMENT MITIGATING	%	0.8
TANK RETENTION VOLUME	m³	0.37

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	9278
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	78.35
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	301.08
SITE VOLUME FOR MITIGATION	m³	222.73
TANK CATCHMENT AREA	m²	53
% OF SITE MITIGATED BY TANK	%	0.8
TANK RET. + DET. VOLUME	m³	1.78
TANK SMAF DETENTION VOLUME	m³	1.41

ORIFICE SUMMARY

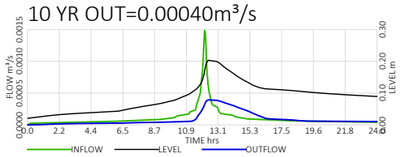
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	10	22	
HEIGHT	m	0.021	0.101	
NO. OF ORF.		1	1	
EDV HEAD	m	0.080	0.000	
EDV FLOW	m³/s	0.0001	-	0.0001
10 YR HEAD	m	0.185	0.106	
10 YR FLOW	m³/s	0.0001	0.0003	0.0004

PEAK FLOW MITIGATION CALCULATIONS

CATCHMENT	UNITS	EXISTING	NON-MIT	LOT 3 - 10
STORM		10 YR	10 YR	10 YR
PERMEABLE AREA[1]	m²	12032	8979	0
IMPERMEABLE AREA[1]	m²	6225	6424	53
TOTAL AREA	m²	18257	15402	53
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	52.0	0.0
RUNOFF DEPTH	mm	124.4	128.8	162.3
RUNOFF VOLUME	m³	2,271.22	1,983.53	8.54
CHANNELISATION FACTOR		1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0.01
CATCHMENT SLOPE	m/m	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4134	0.3578	0.0015
PEAK RUNOFF RATE	mm/hr	81.5	83.6	99.8
FLOW TARGET FOR ALL SITES	m³/s			0.41340
FLOW BYPASSING TANKS	m³/s			0.35780
FLOW TARGET FOR ALL TANKS	m³/s			0.05560
CATCHMENT PORTION FOR THIS TANK	%			0.8%
FLOW TARGET FOR THIS TANK	m³/s			0.00044

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.00040m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
RETENTION	m³	0.37	0.37
EXTENDED DETENTION	m³	1.41	1.78
10 YR STORAGE	m³	1.87	3.65
TOTAL VOLUME REQUIRED	m³	-	3.65
TOTAL VOLUME PROVIDED	m³	-	3.75

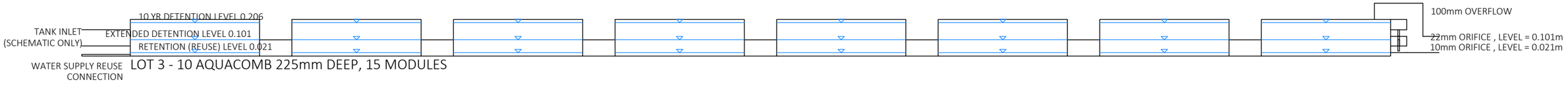
SITEWIDE SUMMARY

STORM	SYSTEM COUNT	TOT. VOL.	RET. VOL.	DET. VOL.	10 YR
UNITS	-	m³	m³	m³	m³/s
BYPASS	-	-	-	-	0.35780
LOT 1 & 2	2	10.51	1.02	3.88	0.00120
LOT 3 - 10	8	30.02	2.97	11.29	0.00320
LOT 11 - LOT 16	5	16.26	1.62	6.17	0.00176
LOT 17 - LOT 20	3	16.51	1.67	6.35	0.00198
LOT 21-24, LOT 32 -	12	4245.03	4.45	16.93	0.00486
LOT 25 - LOT 34	20	55.04	5.57	21.16	0.00597
LOT 43 - LOT 59	7	24.52	2.27	8.64	0.00216
TOTAL	57	197.89	19.57	74.42	0.37893
TARGET	-		46.39	222.73	0.41340
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Retention, SMAF Detention and 10 Year Peak Flow Control to address downstream network capacity issues.

1. The retention volume has been calculated in the SMAF Retention Calculations table. The volume required is 0.37m³.
2. The retention volume requires a storage depth of 0.021m.
3. The retention volume is required to be reused within the property within 72 hours. Sufficient non-potable devices must be connected to the reuse system to ensure sufficient reuse capacity. The volume capacity utilised by non-potable devices is Laundry:0.44m³, Toilet:0.32m³. Please connect enough of these devices to reuse the required volume of 0.37m³. Please note that while garden taps can be connected, no credit is given for this as their reuse of water in Winter is unlikely to occur.
4. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 1.41m³.
5. The base orifice invert is 0.021m
6. To drain the detention volume over 24hrs would require an orifice smaller than the minimum allowable size, therefore the minimum orifice size of 0.010m has been used.
7. The detention volume requires a storage depth of 0.101m in the tank(s).
8. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
9. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
10. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41340 m³/s.
11. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.35780 m³/s.
12. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41340 m³/s - 0.35780 m³/s = 0.05560 m³/s.
13. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 0.8% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 0.8% X 0.05560 m³/s = 0.00044 m³/s.
14. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.00040 m³/s which meets the design requirements as it is less than the target flow of 0.00044 m³/s. The peak water level reached in the 10 YR simulation was 0.206m.
15. In conclusion, the analysis shows the tank design meets all requirements.



REVISION	AMENDMENT	BY
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DESIGNED: HM
DRAWN: HM
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1461
SCALE & SIZE: - A3
REV: 21/03/2022

SMAF RETENTION CALCULATIONS

ITEM	UNITS	SMAF
RAINFALL DEPTH	mm	5
TOTAL CATCHMENT AREA	m²	9278
SITE RETENTION VOLUME	m³	46.39
TANK CATCHMENT AREA	m²	48
% OF CATCHMENT MITIGATING	%	0.7
TANK RETENTION VOLUME	m³	0.32

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	9278
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	78.35
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	301.08
SITE VOLUME FOR MITIGATION	m³	222.73
TANK CATCHMENT AREA	m²	48
% OF SITE MITIGATED BY TANK	%	0.7
TANK RET. + DET. VOLUME	m³	1.56
TANK SMAF DETENTION VOLUME	m³	1.24

ORIFICE SUMMARY

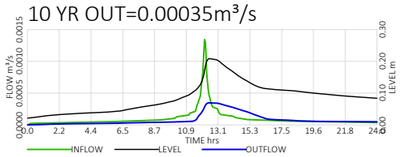
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	10	20	
HEIGHT	m	0.021	0.102	
NO. OF ORF.		1	1	
EDV HEAD	m	0.080	0.000	
EDV FLOW	m³/s	0.0001	-	0.0001
10 YR HEAD	m	0.190	0.109	
10 YR FLOW	m³/s	0.0001	0.0003	0.0004

PEAK FLOW MITIGATION CALCULATIONS

CATCHMENT	UNITS	EXISTING	NON-MIT	LOT 11 - LOT 16
STORM		10 YR	10 YR	10 YR
PERMEABLE AREA[1]	m²	12032	8979	0
IMPERMEABLE AREA[1]	m²	6225	6424	48
TOTAL AREA	m²	18257	15402	48
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	52.0	0.0
RUNOFF DEPTH	mm	124.4	128.8	162.3
RUNOFF VOLUME	m³	2,271.22	1,983.53	7.74
CHANNELISATION FACTOR		1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0.011
CATCHMENT SLOPE	m/m	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4134	0.3578	0.0013
PEAK RUNOFF RATE	mm/hr	81.5	83.6	99.8
FLOW TARGET FOR ALL SITES	m³/s			0.41340
FLOW BYPASSING TANKS	m³/s			0.35780
FLOW TARGET FOR ALL TANKS	m³/s			0.05560
CATCHMENT PORTION FOR THIS TANK	%			0.7%
FLOW TARGET FOR THIS TANK	m³/s			0.00039

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.00035m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
RETENTION	m³	0.32	0.32
EXTENDED DETENTION	m³	1.23	1.56
10 YR STORAGE	m³	1.68	3.24
TOTAL VOLUME REQUIRED	m³	-	3.24
TOTAL VOLUME PROVIDED	m³	-	3.25

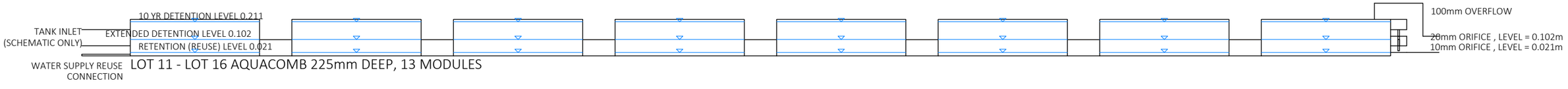
SITEWIDE SUMMARY

STORM	SYSTEM COUNT	TOT. VOL.	RET. VOL.	DET. VOL.	10 YR
UNITS	-	m³	m³	m³	m³/s
BYPASS	-	-	-	-	0.35780
LOT 1 & 2	2	10.51	1.02	3.88	0.00120
LOT 3 - 10	8	30.02	2.97	11.29	0.00320
LOT 11 - LOT 16	5	16.26	1.62	6.17	0.00176
LOT 17 - LOT 20	3	16.51	1.67	6.35	0.00198
LOT 21-24, LOT 32 -	4	245.03	4.45	16.93	0.00486
LOT 25 - LOT 34	20	55.04	5.57	21.16	0.00597
LOT 43 - LOT 59	7	24.52	2.27	8.64	0.00216
TOTAL	57	197.89	19.57	74.42	0.37893
TARGET	-		46.39	222.73	0.41340
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Retention, SMAF Detention and 10 Year Peak Flow Control to address downstream network capacity issues.

1. The retention volume has been calculated in the SMAF Retention Calculations table. The volume required is 0.32m³.
2. The retention volume requires a storage depth of 0.021m.
3. The retention volume is required to be reused within the property within 72 hours. Sufficient non-potable devices must be connected to the reuse system to ensure sufficient reuse capacity. The volume capacity utilised by non-potable devices is Laundry:0.44m³, Toilet:0.32m³. Please connect enough of these devices to reuse the required volume of 0.32m³. Please note that while garden taps can be connected, no credit is given for this as their reuse of water in Winter is unlikely to occur.
4. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 1.23m³.
5. The base orifice invert is 0.021m
6. To drain the detention volume over 24hrs would require an orifice smaller than the minimum allowable size, therefore the minimum orifice size of 0.010m has been used.
7. The detention volume requires a storage depth of 0.102m in the tank(s).
8. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
9. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
10. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41340 m³/s.
11. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.35780 m³/s.
12. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41340 m³/s - 0.35780 m³/s = 0.05560 m³/s.
13. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 0.7% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 0.7% X 0.05560 m³/s = 0.00039 m³/s.
14. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.00035 m³/s which meets the design requirements as it is less than the target flow of 0.00039 m³/s. The peak water level reached in the 10 YR simulation was 0.211m.
15. In conclusion, the analysis shows the tank design meets all requirements.



REVISION	AMENDMENT	BY
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DESIGNED: HM
DRAWN: HM
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1462
SCALE & SIZE: - A3
REV: 21/03/2022

SMAF RETENTION CALCULATIONS

ITEM	UNITS	SMAF
RAINFALL DEPTH	mm	5
TOTAL CATCHMENT AREA	m²	9278
SITE RETENTION VOLUME	m³	46.39
TANK CATCHMENT AREA	m²	78
% OF CATCHMENT MITIGATING	%	1.2
TANK RETENTION VOLUME	m³	0.56

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	9278
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	78.35
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	301.08
SITE VOLUME FOR MITIGATION	m³	222.73
TANK CATCHMENT AREA	m²	78
% OF SITE MITIGATED BY TANK	%	1.2
TANK RET. + DET. VOLUME	m³	2.67
TANK SMAF DETENTION VOLUME	m³	2.11

ORIFICE SUMMARY

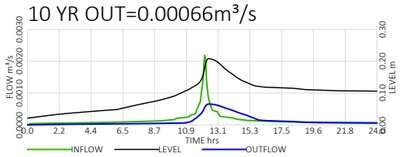
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	10	30	
HEIGHT	m	0.021	0.103	
NO. OF ORF.		1	1	
EDV HEAD	m	0.082	0.000	
EDV FLOW	m³/s	0.0001	-	0.0001
10 YR HEAD	m	0.189	0.108	
10 YR FLOW	m³/s	0.0001	0.0006	0.0007

PEAK FLOW MITIGATION CALCULATIONS

CATCHMENT	UNITS	EXISTING	NON-MIT	LOT 17 - LOT 20
STORM		10 YR	10 YR	10 YR
PERMEABLE AREA[1]	m²	12032	8979	0
IMPERMEABLE AREA[1]	m²	6225	6424	78
TOTAL AREA	m²	18257	15402	78
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	52.0	0.0
RUNOFF DEPTH	mm	124.4	128.8	162.3
RUNOFF VOLUME	m³	2,271.22	1,983.53	12.63
CHANNELISATION FACTOR		1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0.012
CATCHMENT SLOPE	m/m	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4134	0.3578	0.0022
PEAK RUNOFF RATE	mm/hr	81.5	83.6	99.8
FLOW TARGET FOR ALL SITES	m³/s			0.41340
FLOW BYPASSING TANKS	m³/s			0.35780
FLOW TARGET FOR ALL TANKS	m³/s			0.05560
CATCHMENT PORTION FOR THIS TANK	%			1.2%
FLOW TARGET FOR THIS TANK	m³/s			0.00067

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.00066m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
RETENTION	m³	0.56	0.56
EXTENDED DETENTION	m³	2.12	2.67
10 YR STORAGE	m³	2.79	5.46
TOTAL VOLUME REQUIRED	m³	-	5.46
TOTAL VOLUME PROVIDED	m³	-	5.50

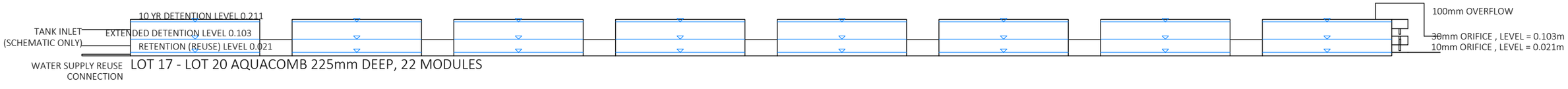
SITEWIDE SUMMARY

STORM	SYSTEM COUNT	TOT. VOL.	RET. VOL.	DET. VOL.	10 YR
UNITS	-	m³	m³	m³	m³/s
BYPASS	-	-	-	-	0.35780
LOT 1 & 2	2	10.51	1.02	3.88	0.00120
LOT 3 - 10	8	30.02	2.97	11.29	0.00320
LOT 11 - LOT 16	5	16.26	1.62	6.17	0.00176
LOT 17 - LOT 20	3	16.51	1.67	6.35	0.00198
LOT 21-24, LOT 32 - 42	45.03	4.45	16.93	0.00486	
LOT 25 - LOT 34	20	55.04	5.57	21.16	0.00597
LOT 43 - LOT 59	7	24.52	2.27	8.64	0.00216
TOTAL	57	197.89	19.57	74.42	0.37893
TARGET	-		46.39	222.73	0.41340
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Retention, SMAF Detention and 10 Year Peak Flow Control to address downstream network capacity issues.

1. The retention volume has been calculated in the SMAF Retention Calculations table. The volume required is 0.56m³.
2. The retention volume requires a storage depth of 0.021m.
3. The retention volume is required to be reused within the property within 72 hours. Sufficient non-potable devices must be connected to the reuse system to ensure sufficient reuse capacity. The volume capacity utilised by non-potable devices is Laundry:0.44m³, Toilet:0.32m³. Please connect enough of these devices to reuse the required volume of 0.56m³. Please note that while garden taps can be connected, no credit is given for this as their reuse of water in Winter is unlikely to occur.
4. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 2.12m³.
5. The base orifice invert is 0.021m
6. To drain the detention volume over 24hrs would require an orifice smaller than the minimum allowable size, therefore the minimum orifice size of 0.010m has been used.
7. The detention volume requires a storage depth of 0.103m in the tank(s).
8. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
9. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
10. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41340 m³/s.
11. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.35780 m³/s.
12. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41340 m³/s - 0.35780 m³/s = 0.05560 m³/s.
13. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 1.2% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 1.2% X 0.05560 m³/s = 0.00067 m³/s.
14. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.00066 m³/s which meets the design requirements as it is less than the target flow of 0.00067 m³/s. The peak water level reached in the 10 YR simulation was 0.211m.
15. In conclusion, the analysis shows the tank design meets all requirements.



REVISION	AMENDMENT	BY
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DESIGNED: HM
DRAWN: HM
RELEASED: SB

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PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1463
SCALE & SIZE: - A3
REV: 21/03/2022

SMAF RETENTION CALCULATIONS

ITEM	UNITS	SMAF
RAINFALL DEPTH	mm	5
TOTAL CATCHMENT AREA	m²	9278
SITE RETENTION VOLUME	m³	46.39
TANK CATCHMENT AREA	m²	54
% OF CATCHMENT MITIGATING	%	0.8
TANK RETENTION VOLUME	m³	0.37

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	9278
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	78.35
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	301.08
SITE VOLUME FOR MITIGATION	m³	222.73
TANK CATCHMENT AREA	m²	54
% OF SITE MITIGATED BY TANK	%	0.8
TANK RET. + DET. VOLUME	m³	1.78
TANK SMAF DETENTION VOLUME	m³	1.41

ORIFICE SUMMARY

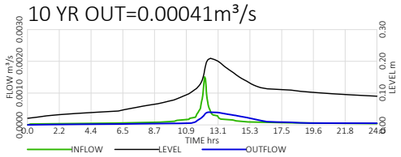
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	10	22	
HEIGHT	m	0.021	0.101	
NO. OF ORF.		1	1	
EDV HEAD	m	0.080	0.000	
EDV FLOW	m³/s	0.0001	-	0.0001
10 YR HEAD	m	0.188	0.109	
10 YR FLOW	m³/s	0.0001	0.0003	0.0004

PEAK FLOW MITIGATION CALCULATIONS

CATCHMENT	UNITS	EXISTING	NON-MIT	LOT 21-24, LOT 35 - 42
STORM		10 YR	10 YR	10 YR
PERMEABLE AREA[1]	m²	12032	8979	0
IMPERMEABLE AREA[1]	m²	6225	6424	54
TOTAL AREA	m²	18257	15402	54
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	52.0	0.0
RUNOFF DEPTH	mm	124.4	128.8	162.3
RUNOFF VOLUME	m³	2,271.22	1,983.53	8.78
CHANNELISATION FACTOR		1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0.011
CATCHMENT SLOPE	m/m	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4134	0.3578	0.0015
PEAK RUNOFF RATE	mm/hr	81.5	83.6	99.8
FLOW TARGET FOR ALL SITES	m³/s			0.41340
FLOW BYPASSING TANKS	m³/s			0.35780
FLOW TARGET FOR ALL TANKS	m³/s			0.05560
CATCHMENT PORTION FOR THIS TANK	%			0.8%
FLOW TARGET FOR THIS TANK	m³/s			0.00044

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.00041m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
RETENTION	m³	0.37	0.37
EXTENDED DETENTION	m³	1.41	1.78
10 YR STORAGE	m³	1.93	3.71
TOTAL VOLUME REQUIRED	m³	-	3.71
TOTAL VOLUME PROVIDED	m³	-	3.75

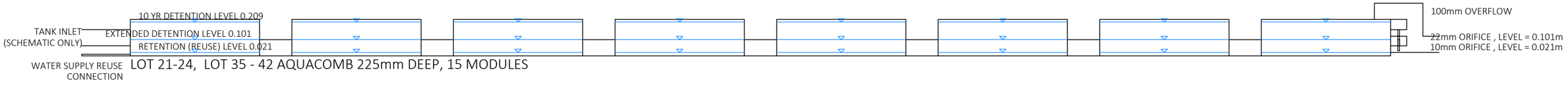
SITEWIDE SUMMARY

STORM	SYSTEM COUNT	TOT. VOL.	RET. VOL.	DET. VOL.	10 YR
UNITS	-	m³	m³	m³	m³/s
BYPASS	-	-	-	-	0.35780
LOT 1 & 2	2	10.51	1.02	3.88	0.00120
LOT 3 - 10	8	30.02	2.97	11.29	0.00320
LOT 11 - LOT 16	5	16.26	1.62	6.17	0.00176
LOT 17 - LOT 20	3	16.51	1.67	6.35	0.00198
LOT 21-24, LOT 35 - 42	12	45.03	4.45	16.93	0.00486
LOT 25 - LOT 34	20	55.04	5.57	21.16	0.00597
LOT 43 - LOT 59	7	24.52	2.27	8.64	0.00216
TOTAL	57	197.89	19.57	74.42	0.37893
TARGET	-		46.39	222.73	0.41340
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Retention, SMAF Detention and 10 Year Peak Flow Control to address downstream network capacity issues.

1. The retention volume has been calculated in the SMAF Retention Calculations table. The volume required is 0.37m³.
2. The retention volume requires a storage depth of 0.021m.
3. The retention volume is required to be reused within the property within 72 hours. Sufficient non-potable devices must be connected to the reuse system to ensure sufficient reuse capacity. The volume capacity utilised by non-potable devices is Laundry:0.44m³, Toilet:0.32m³. Please connect enough of these devices to reuse the required volume of 0.37m³. Please note that while garden taps can be connected, no credit is given for this as their reuse of water in Winter is unlikely to occur.
4. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 1.41m³.
5. The base orifice invert is 0.021m
6. To drain the detention volume over 24hrs would require an orifice smaller than the minimum allowable size, therefore the minimum orifice size of 0.010m has been used.
7. The detention volume requires a storage depth of 0.101m in the tank(s).
8. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
9. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
10. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41340 m³/s.
11. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.35780 m³/s.
12. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41340 m³/s - 0.35780 m³/s = 0.05560 m³/s.
13. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 0.8% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 0.8% X 0.05560 m³/s = 0.00044 m³/s.
14. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.00041 m³/s which meets the design requirements as it is less than the target flow of 0.00044 m³/s. The peak water level reached in the 10 YR simulation was 0.209m.
15. In conclusion, the analysis shows the tank design meets all requirements.



LOT 21-24, LOT 35 - 42 AQUACOMB 225mm DEEP, 15 MODULES

REVISION	AMENDMENT	BY
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DESIGNED: HM
DRAWN: HM
RELEASED: SB

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1464
SCALE & SIZE: - A3
REV: 21/03/2022

SMAF RETENTION CALCULATIONS

ITEM	UNITS	SMAF
RAINFALL DEPTH	mm	5
TOTAL CATCHMENT AREA	m²	9278
SITE RETENTION VOLUME	m³	46.39
TANK CATCHMENT AREA	m²	41
% OF CATCHMENT MITIGATING	%	0.6
TANK RETENTION VOLUME	m³	0.28

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	9278
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	78.35
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	301.08
SITE VOLUME FOR MITIGATION	m³	222.73
TANK CATCHMENT AREA	m²	41
% OF SITE MITIGATED BY TANK	%	0.6
TANK RET. + DET. VOLUME	m³	1.34
TANK SMAF DETENTION VOLUME	m³	1.06

ORIFICE SUMMARY

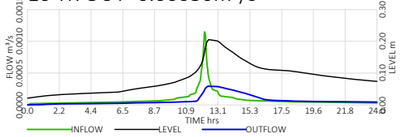
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	10	18	
HEIGHT	m	0.021	0.103	
NO. OF ORF.		1	1	
EDV HEAD	m	0.082	0.000	
EDV FLOW	m³/s	0.0001	-	0.0001
10 YR HEAD	m	0.186	0.105	
10 YR FLOW	m³/s	0.0001	0.0002	0.0003

PEAK FLOW MITIGATION CALCULATIONS

CATCHMENT	UNITS	EXISTING	NON-MIT	LOT 25 - LOT 34
STORM		10 YR	10 YR	10 YR
PERMEABLE AREA[1]	m²	12032	8979	0
IMPERMEABLE AREA[1]	m²	6225	6424	41
TOTAL AREA	m²	18257	15402	41
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	52.0	0.0
RUNOFF DEPTH	mm	124.4	128.8	162.3
RUNOFF VOLUME	m³	2,271.22	1,983.53	6.66
CHANNELISATION FACTOR		1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0.012
CATCHMENT SLOPE	m/m	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4134	0.3578	0.0011
PEAK RUNOFF RATE	mm/hr	81.5	83.6	99.8
FLOW TARGET FOR ALL SITES	m³/s			0.41340
FLOW BYPASSING TANKS	m³/s			0.35780
FLOW TARGET FOR ALL TANKS	m³/s			0.05560
CATCHMENT PORTION FOR THIS TANK	%			0.6%
FLOW TARGET FOR THIS TANK	m³/s			0.00033

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.00030m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
RETENTION	m³	0.28	0.28
EXTENDED DETENTION	m³	1.06	1.34
10 YR STORAGE	m³	1.36	2.70
TOTAL VOLUME REQUIRED	m³	-	2.70
TOTAL VOLUME PROVIDED	m³	-	2.75

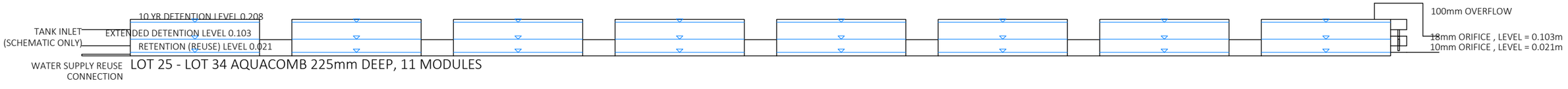
SITEWIDE SUMMARY

STORM	SYSTEM COUNT	TOT. VOL.	RET. VOL.	DET. VOL.	10 YR
UNITS	-	m³	m³	m³	m³/s
BYPASS	-	-	-	-	0.35780
LOT 1 & 2	2	10.51	1.02	3.88	0.00120
LOT 3 - 10	8	30.02	2.97	11.29	0.00320
LOT 11 - LOT 16	5	16.26	1.62	6.17	0.00176
LOT 17 - LOT 20	3	16.51	1.67	6.35	0.00198
LOT 21-24, LOT 32 - 42	12	45.03	4.45	16.93	0.00486
LOT 25 - LOT 34	20	55.04	5.57	21.16	0.00597
LOT 43 - LOT 59	7	24.52	2.27	8.64	0.00216
TOTAL	57	197.89	19.57	74.42	0.37893
TARGET	-		46.39	222.73	0.41340
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Retention, SMAF Detention and 10 Year Peak Flow Control to address downstream network capacity issues.

1. The retention volume has been calculated in the SMAF Retention Calculations table. The volume required is 0.28m³.
2. The retention volume requires a storage depth of 0.021m.
3. The retention volume is required to be reused within the property within 72 hours. Sufficient non-potable devices must be connected to the reuse system to ensure sufficient reuse capacity. The volume capacity utilised by non-potable devices is Laundry:0.44m³, Toilet:0.32m³. Please connect enough of these devices to reuse the required volume of 0.28m³. Please note that while garden taps can be connected, no credit is given for this as their reuse of water in Winter is unlikely to occur.
4. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 1.06m³.
5. The base orifice invert is 0.021m
6. To drain the detention volume over 24hrs would require an orifice smaller than the minimum allowable size, therefore the minimum orifice size of 0.010m has been used.
7. The detention volume requires a storage depth of 0.103m in the tank(s).
8. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
9. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
10. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41340 m³/s.
11. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.35780 m³/s.
12. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41340 m³/s - 0.35780 m³/s = 0.05560 m³/s.
13. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 0.6% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 0.6% X 0.05560 m³/s = 0.00033 m³/s.
14. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.00030 m³/s which meets the design requirements as it is less than the target flow of 0.00033 m³/s. The peak water level reached in the 10 YR simulation was 0.208m.
15. In conclusion, the analysis shows the tank design meets all requirements.



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DESIGNED: HM
DRAWN: HM
RELEASED: SB

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1465
SCALE & SIZE: - A3
REV: 21/03/2022

SMAF RETENTION CALCULATIONS

ITEM	UNITS	SMAF
RAINFALL DEPTH	mm	5
TOTAL CATCHMENT AREA	m²	9278
SITE RETENTION VOLUME	m³	46.39
TANK CATCHMENT AREA	m²	49
% OF CATCHMENT MITIGATING	%	0.7
TANK RETENTION VOLUME	m³	0.32

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	9278
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	78.35
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	301.08
SITE VOLUME FOR MITIGATION	m³	222.73
TANK CATCHMENT AREA	m²	49
% OF SITE MITIGATED BY TANK	%	0.7
TANK RET. + DET. VOLUME	m³	1.56
TANK SMAF DETENTION VOLUME	m³	1.24

ORIFICE SUMMARY

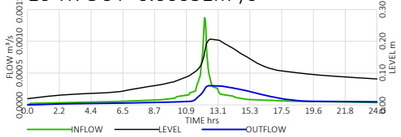
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	10	18	
HEIGHT	m	0.020	0.094	
NO. OF ORF.		1	1	
EDV HEAD	m	0.075	0.000	
EDV FLOW	m³/s	0.0001	-	0.0001
10 YR HEAD	m	0.189	0.114	
10 YR FLOW	m³/s	0.0001	0.0002	0.0003

PEAK FLOW MITIGATION CALCULATIONS

CATCHMENT	UNITS	EXISTING	NON-MIT	LOT 43 - LOT 59
STORM		10 YR	10 YR	10 YR
PERMEABLE AREA[1]	m²	12032	8979	0
IMPERMEABLE AREA[1]	m²	6225	6424	49
TOTAL AREA	m²	18257	15402	49
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	52.0	0.0
RUNOFF DEPTH	mm	124.4	128.8	162.3
RUNOFF VOLUME	m³	2,271.22	1,983.53	7.95
CHANNELISATION FACTOR		1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0.012
CATCHMENT SLOPE	m/m	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4134	0.3578	0.0014
PEAK RUNOFF RATE	mm/hr	81.5	83.6	99.8
FLOW TARGET FOR ALL SITES	m³/s			0.41340
FLOW BYPASSING TANKS	m³/s			0.35780
FLOW TARGET FOR ALL TANKS	m³/s			0.05560
CATCHMENT PORTION FOR THIS TANK	%			0.7%
FLOW TARGET FOR THIS TANK	m³/s			0.00039

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.00031m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
RETENTION	m³	0.32	0.32
EXTENDED DETENTION	m³	1.23	1.56
10 YR STORAGE	m³	1.88	3.44
TOTAL VOLUME REQUIRED	m³	-	3.44
TOTAL VOLUME PROVIDED	m³	-	3.50

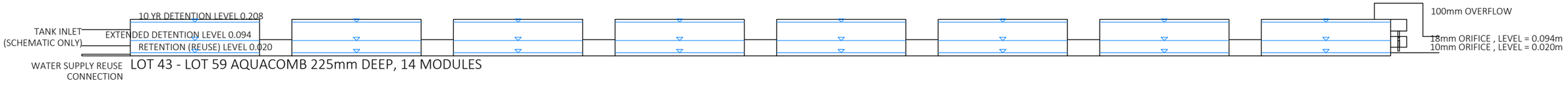
SITEWIDE SUMMARY

STORM	SYSTEM COUNT	TOT. VOL.	RET. VOL.	DET. VOL.	10 YR
UNITS	-	m³	m³	m³	m³/s
BYPASS	-	-	-	-	0.35780
LOT 1 & 2	2	10.51	1.02	3.88	0.00120
LOT 3 - 10	8	30.02	2.97	11.29	0.00320
LOT 11 - LOT 16	5	16.26	1.62	6.17	0.00176
LOT 17 - LOT 20	3	16.51	1.67	6.35	0.00198
LOT 21-24, LOT 32 -	12	4245.03	4.45	16.93	0.00486
LOT 25 - LOT 34	20	55.04	5.57	21.16	0.00597
LOT 43 - LOT 59	7	24.52	2.27	8.64	0.00216
TOTAL	57	197.89	19.57	74.42	0.37893
TARGET	-		46.39	222.73	0.41340
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Retention, SMAF Detention and 10 Year Peak Flow Control to address downstream network capacity issues.

1. The retention volume has been calculated in the SMAF Retention Calculations table. The volume required is 0.32m³.
2. The retention volume requires a storage depth of 0.020m.
3. The retention volume is required to be reused within the property within 72 hours. Sufficient non-potable devices must be connected to the reuse system to ensure sufficient reuse capacity. The volume capacity utilised by non-potable devices is Laundry:0.44m³, Toilet:0.32m³. Please connect enough of these devices to reuse the required volume of 0.32m³. Please note that while garden taps can be connected, no credit is given for this as their reuse of water in Winter is unlikely to occur.
4. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 1.23m³.
5. The base orifice invert is 0.020m
6. To drain the detention volume over 24hrs would require an orifice smaller than the minimum allowable size, therefore the minimum orifice size of 0.010m has been used.
7. The detention volume requires a storage depth of 0.094m in the tank(s).
8. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
9. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
10. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41340 m³/s.
11. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.35780 m³/s.
12. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41340 m³/s - 0.35780 m³/s = 0.05560 m³/s.
13. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 0.7% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 0.7% X 0.05560 m³/s = 0.00039 m³/s.
14. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.00031 m³/s which meets the design requirements as it is less than the target flow of 0.00039 m³/s. The peak water level reached in the 10 YR simulation was 0.208m.
15. In conclusion, the analysis shows the tank design meets all requirements.



REVISION	AMENDMENT	BY
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_	_	_
_	_	_

DESIGNED: HM
DRAWN: HM
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1466
SCALE & SIZE: - A3
REV:
21/03/2022

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	7810
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	65.95
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	253.45
SITE VOLUME FOR MITIGATION	m³	187.50
TANK CATCHMENT AREA	m²	622
% OF SITE MITIGATED BY TANK	%	16.8
TANK SMAF DETENTION VOLUME	m³	31.43

ORIFICE SUMMARY

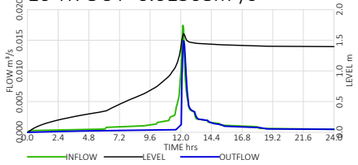
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	14	134	
HEIGHT	m	0.000	1.394	
NO. OF ORF.		1	1	
EDV HEAD	m	1.394	0.000	
EDV FLOW	m³/s	0.0005	-	0.0005
10 YR HEAD	m	1.612	0.218	
10 YR FLOW	m³/s	0.0005	0.0146	0.0151
100 YR HEAD	m	1.866	0.472	
100 YR FLOW	m³/s	0.0006	0.0239	0.0244

PEAK FLOW MITIGATION CALCULATIONS

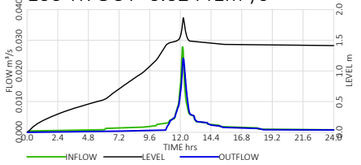
CATCHMENT	UNITS	EXISTING	NON-MIT	JOAL 1	EXISTING	NON-MIT	JOAL 1
STORM		10 YR	10 YR	10 YR	100 YR	100 YR	100 YR
PERMEABLE AREA[1]	m²	12020	10434	0	12020	10434	0
IMPERMEABLE AREA[1]	m²	6225	4099	622	6225	4099	622
TOTAL AREA	m²	18245	14533	622	18245	14533	622
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4	267.6	267.6	267.6
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74	74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	64.1	0.0	58.8	64.1	0.0
RUNOFF DEPTH	mm	124.4	121	162.3	218.7	214.8	262.5
RUNOFF VOLUME	m³	2,269.92	1,758.68	101.00	3,989.98	3,121.13	163.33
CHANNELISATION FACTOR		1.0	1.0	1.0	1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0	0.215	0.215	0
CATCHMENT SLOPE	m/m	0.100	0.100	0.100	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4131	0.3225	0.0173	0.7235	0.5699	0.0277
PEAK RUNOFF RATE	mm/hr	81.5	79.9	99.8	142.8	141.2	160.3
FLOW TARGET FOR ALL SITES	m³/s			0.41310			0.72350
FLOW BYPASSING TANKS	m³/s			0.32250			0.56990
FLOW TARGET FOR ALL TANKS	m³/s			0.09060			0.15360
CATCHMENT PORTION FOR THIS TANK	%			16.8%			16.8%
FLOW TARGET FOR THIS TANK	m³/s			0.01519			0.02575

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.01508m³/s



100 YR OUT=0.02441m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
EXTENDED DETENTION	m³	31.43	31.45
10 YR STORAGE	m³	4.71	36.16
100 YR STORAGE	m³	3.68	39.84
TOTAL VOLUME REQUIRED	m³	-	39.84
TOTAL VOLUME PROVIDED	m³	-	40.00

SITEWIDE SUMMARY

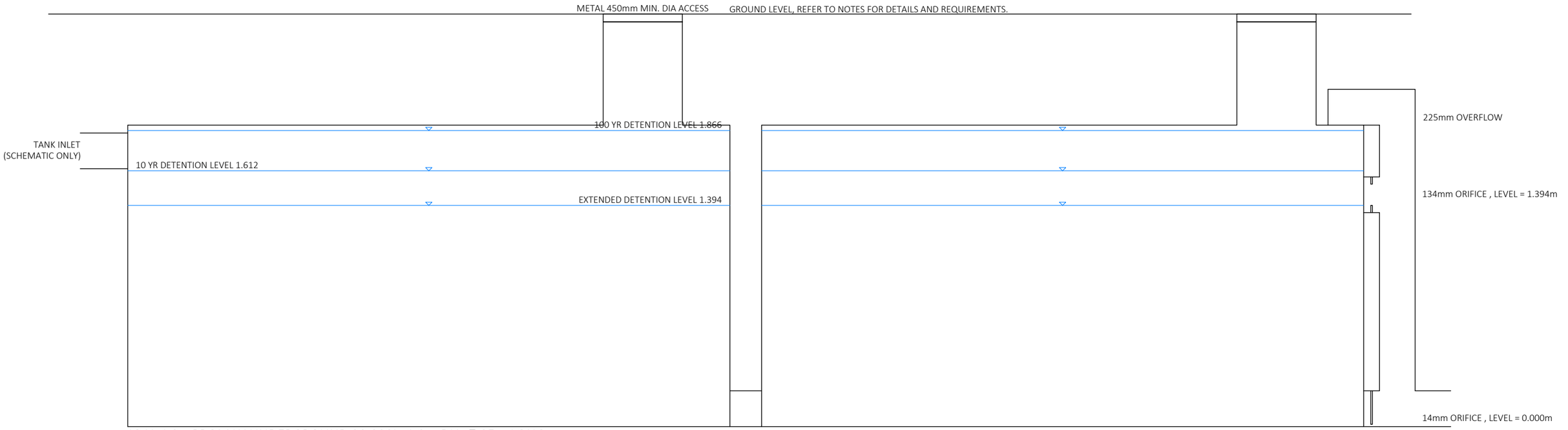
STORM	SYSTEM COUNT	TOT. VOL.	DET. VOL.	10 YR	100 YR
UNITS	-	m³	m³	m³/s	m³/s
BYPASS	-	-	-	0.32250	0.56990
JOAL 1	1	40.00	31.43	0.01508	0.02441
JOAL 2	1	50.00	38.07	0.01719	0.02845
JOAL 3	1	20.00	15.57	0.00719	0.01175
JOAL 4	1	50.00	37.19	0.01640	0.02682
JOAL 5	1	50.00	34.78	0.01351	0.02229
JOAL 6	1	40.00	30.46	0.01375	0.02266
TOTAL	6	250.00	187.50	0.40562	0.70628
TARGET	-		187.50	0.41310	0.72350
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Detention, 10 Year Peak Flow Control to address downstream network capacity issues and 100 Year peak flow control to address downstream flooding.
1. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 31.43m³.
2. The base orifice invert is 0.000m
3. The orifice diameter has been set to 0.014m to drain the detention volume in 24 hrs.
4. The detention volume requires a storage depth of 1.394m in the tank(s).
5. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
6. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
7. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41310 m³/s.
8. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.32250 m³/s.
9. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41310 m³/s - 0.32250 m³/s = 0.09060 m³/s.
10. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 16.8% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 16.8% X 0.09060 m³/s = 0.01519 m³/s.
11. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.01508 m³/s which meets the design requirements as it is less than the target flow of 0.01519 m³/s. The peak water level reached in the 10 YR simulation was 1.612m.
12. The target flow rate for the site in the 100 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.72350 m³/s.
13. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 100 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.56990 m³/s.
14. The target flow for all tanks from the site in the 100 YR event is the target flow minus the bypass flow which is 0.72350 m³/s - 0.56990 m³/s = 0.15360 m³/s.
15. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 16.8% of the total area draining to tanks on site, the target peak flow rate for this tank in the 100 YR event is 16.8% X 0.15360 m³/s = 0.02575 m³/s.
16. The modelling results shown in the adjacent graph for the 100 YR event give a peak flow of 0.02441 m³/s which meets the design requirements as it is less than the target flow of 0.02575 m³/s. The peak water level reached in the 100 YR simulation was 1.866m.
17. In conclusion, the analysis shows the tank design meets all requirements.

NOTES

1. Refer to layout drawings for tank cover, level and location details.
2. Tank and pavement design to support fire truck loadings if located in JOAL area.
3. Tank and pavement design (if under pavement) to follow Manufacturer and Structural Engineer's specifications.



JOAL 1 2 x PROMAX UNDERGROUND 20,000L, 1.9m DIA, 7.05m LONG

REVISION	AMENDMENT	BY
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DESIGNED: HM
DRAWN: HM
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1467
SCALE & SIZE: - A3
REV: 21/03/2022

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	7810
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	65.95
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	253.45
SITE VOLUME FOR MITIGATION	m³	187.50
TANK CATCHMENT AREA	m²	754
% OF SITE MITIGATED BY TANK	%	20.3
TANK SMAF DETENTION VOLUME	m³	38.07

ORIFICE SUMMARY

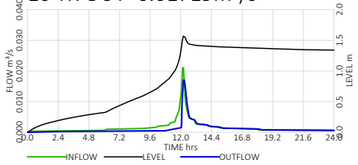
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	16	140	
HEIGHT	m	0.000	1.353	
NO. OF ORF.		1	1	
EDV HEAD	m	1.353	0.000	
EDV FLOW	m³/s	0.0006	-	0.0006
10 YR HEAD	m	1.586	0.233	
10 YR FLOW	m³/s	0.0007	0.0165	0.0172
100 YR HEAD	m	1.882	0.529	
100 YR FLOW	m³/s	0.0007	0.0277	0.0284

PEAK FLOW MITIGATION CALCULATIONS

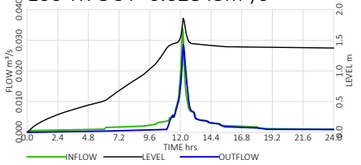
CATCHMENT	UNITS	EXISTING	NON-MIT	JOAL 2	EXISTING	NON-MIT	JOAL 2
STORM		10 YR	10 YR	10 YR	100 YR	100 YR	100 YR
PERMEABLE AREA[1]	m²	12020	10434	0	12020	10434	0
IMPERMEABLE AREA[1]	m²	6225	4099	754	6225	4099	754
TOTAL AREA	m²	18245	14533	754	18245	14533	754
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4	267.6	267.6	267.6
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74	74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	64.1	0.0	58.8	64.1	0.0
RUNOFF DEPTH	mm	124.4	121	162.3	218.7	214.8	262.5
RUNOFF VOLUME	m³	2,269.92	1,758.68	122.32	3,989.98	3,121.13	197.81
CHANNELISATION FACTOR		1.0	1.0	1.0	1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0	0.215	0.215	0
CATCHMENT SLOPE	m/m	0.100	0.100	0.100	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4131	0.3225	0.0209	0.7235	0.5699	0.0335
PEAK RUNOFF RATE	mm/hr	81.5	79.9	99.8	142.8	141.2	160.3
FLOW TARGET FOR ALL SITES	m³/s			0.41310			0.72350
FLOW BYPASSING TANKS	m³/s			0.32250			0.56990
FLOW TARGET FOR ALL TANKS	m³/s			0.09060			0.15360
CATCHMENT PORTION FOR THIS TANK	%			20.3%			20.3%
FLOW TARGET FOR THIS TANK	m³/s			0.01839			0.03118

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.01719m³/s



100 YR OUT=0.02845m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
EXTENDED DETENTION	m³	38.07	38.09
10 YR STORAGE	m³	6.47	44.56
100 YR STORAGE	m³	5.36	49.92
TOTAL VOLUME REQUIRED	m³	-	49.92
TOTAL VOLUME PROVIDED	m³	-	50.00

SITEWIDE SUMMARY

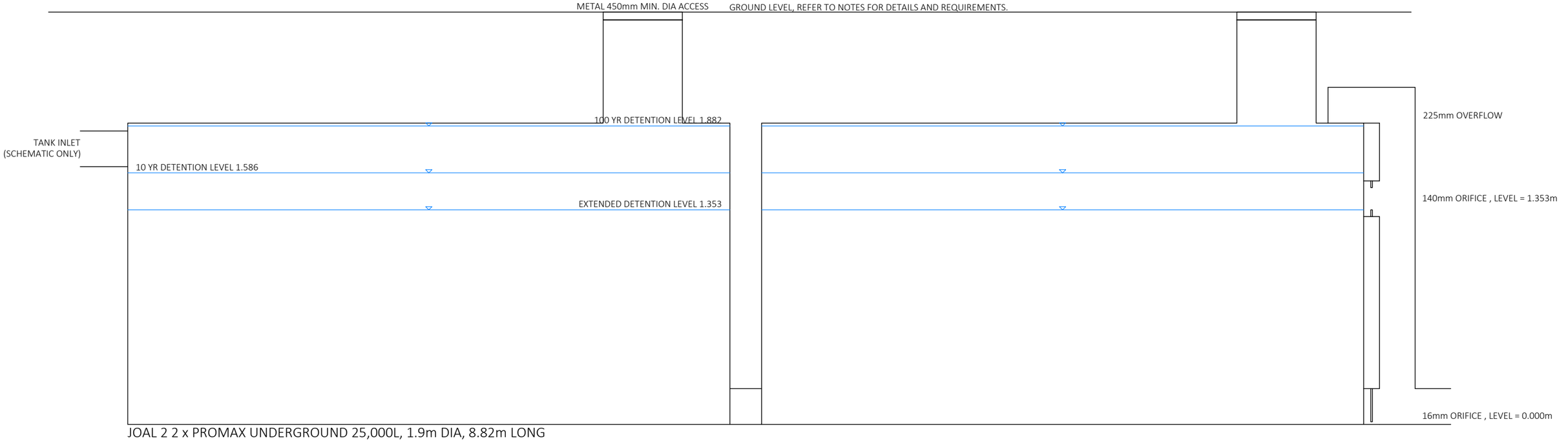
STORM	SYSTEM COUNT	TOT. VOL.	DET. VOL.	10 YR	100 YR
UNITS	-	m³	m³	m³/s	m³/s
BYPASS	-	-	-	0.32250	0.56990
JOAL 1	1	40.00	31.43	0.01508	0.02441
JOAL 2	1	50.00	38.07	0.01719	0.02845
JOAL 3	1	20.00	15.57	0.00719	0.01175
JOAL 4	1	50.00	37.19	0.01640	0.02682
JOAL 5	1	50.00	34.78	0.01351	0.02229
JOAL 6	1	40.00	30.46	0.01375	0.02266
TOTAL	6	250.00	187.50	0.40562	0.70628
TARGET	-		187.50	0.41310	0.72350
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Detention, 10 Year Peak Flow Control to address downstream network capacity issues and 100 Year peak flow control to address downstream flooding.
1. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 38.07m³.
2. The base orifice invert is 0.000m
3. The orifice diameter has been set to 0.016m to drain the detention volume in 24 hrs.
4. The detention volume requires a storage depth of 1.353m in the tank(s).
5. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
6. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
7. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41310 m³/s.
8. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.32250 m³/s.
9. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41310 m³/s - 0.32250 m³/s = 0.09060 m³/s.
10. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 20.3% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 20.3% X 0.09060 m³/s = 0.01839 m³/s.
11. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.01719 m³/s which meets the design requirements as it is less than the target flow of 0.01839 m³/s. The peak water level reached in the 10 YR simulation was 1.586m.
12. The target flow rate for the site in the 100 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.72350 m³/s.
13. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 100 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.56990 m³/s.
14. The target flow for all tanks from the site in the 100 YR event is the target flow minus the bypass flow which is 0.72350 m³/s - 0.56990 m³/s = 0.15360 m³/s.
15. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 20.3% of the total area draining to tanks on site, the target peak flow rate for this tank in the 100 YR event is 20.3% X 0.15360 m³/s = 0.03118 m³/s.
16. The modelling results shown in the adjacent graph for the 100 YR event give a peak flow of 0.02845 m³/s which meets the design requirements as it is less than the target flow of 0.03118 m³/s. The peak water level reached in the 100 YR simulation was 1.882m.
17. In conclusion, the analysis shows the tank design meets all requirements.

NOTES

1. Refer to layout drawings for tank cover, level and location details.
2. Tank and pavement design to support fire truck loadings if located in JOAL area.
3. Tank and pavement design (if under pavement) to follow Manufacturer and Structural Engineer's specifications.



JOAL 2 2 x PROMAX UNDERGROUND 25,000L, 1.9m DIA, 8.82m LONG

REVISION	AMENDMENT	BY
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_	_	_
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DESIGNED: HM
DRAWN: HM
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1468
SCALE & SIZE: - A3
REV: 21/03/2022

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	7810
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	65.95
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	253.45
SITE VOLUME FOR MITIGATION	m³	187.50
TANK CATCHMENT AREA	m²	308
% OF SITE MITIGATED BY TANK	%	8.3
TANK SMAF DETENTION VOLUME	m³	15.57

ORIFICE SUMMARY

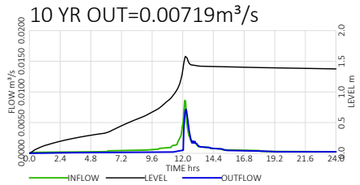
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	10	90	
HEIGHT	m	0.000	1.381	
NO. OF ORF.		1	1	
EDV HEAD	m	1.381	0.000	
EDV FLOW	m³/s	0.0002	-	0.0002
10 YR HEAD	m	1.594	0.213	
10 YR FLOW	m³/s	0.0003	0.0069	0.0072
100 YR HEAD	m	1.886	0.505	
100 YR FLOW	m³/s	0.0003	0.0115	0.0118

PEAK FLOW MITIGATION CALCULATIONS

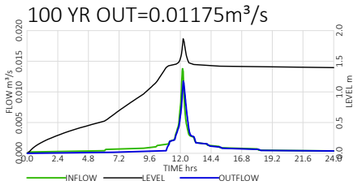
CATCHMENT	UNITS	EXISTING	NON-MIT	JOAL 3	EXISTING	NON-MIT	JOAL 3
STORM		10 YR	10 YR	10 YR	100 YR	100 YR	100 YR
PERMEABLE AREA[1]	m²	12020	10434	0	12020	10434	0
IMPERMEABLE AREA[1]	m²	6225	4099	308	6225	4099	308
TOTAL AREA	m²	18245	14533	308	18245	14533	308
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4	267.6	267.6	267.6
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74	74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	64.1	0.0	58.8	64.1	0.0
RUNOFF DEPTH	mm	124.4	121	162.3	218.7	214.8	262.5
RUNOFF VOLUME	m³	2,269.92	1,758.68	50.03	3,989.98	3,121.13	80.91
CHANNELISATION FACTOR		1.0	1.0	1.0	1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0	0.215	0.215	0
CATCHMENT SLOPE	m/m	0.100	0.100	0.100	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4131	0.3225	0.0085	0.7235	0.5699	0.0137
PEAK RUNOFF RATE	mm/hr	81.5	79.9	99.8	142.8	141.2	160.3
FLOW TARGET FOR ALL SITES	m³/s			0.41310			0.72350
FLOW BYPASSING TANKS	m³/s			0.32250			0.56990
FLOW TARGET FOR ALL TANKS	m³/s			0.09060			0.15360
CATCHMENT PORTION FOR THIS TANK	%			8.3%			8.3%
FLOW TARGET FOR THIS TANK	m³/s			0.00752			0.01276

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.00719m³/s



100 YR OUT=0.01175m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
EXTENDED DETENTION	m³	15.57	15.57
10 YR STORAGE	m³	2.33	17.90
100 YR STORAGE	m³	2.08	19.98
TOTAL VOLUME REQUIRED	m³	-	19.98
TOTAL VOLUME PROVIDED	m³	-	20.00

SITEWIDE SUMMARY

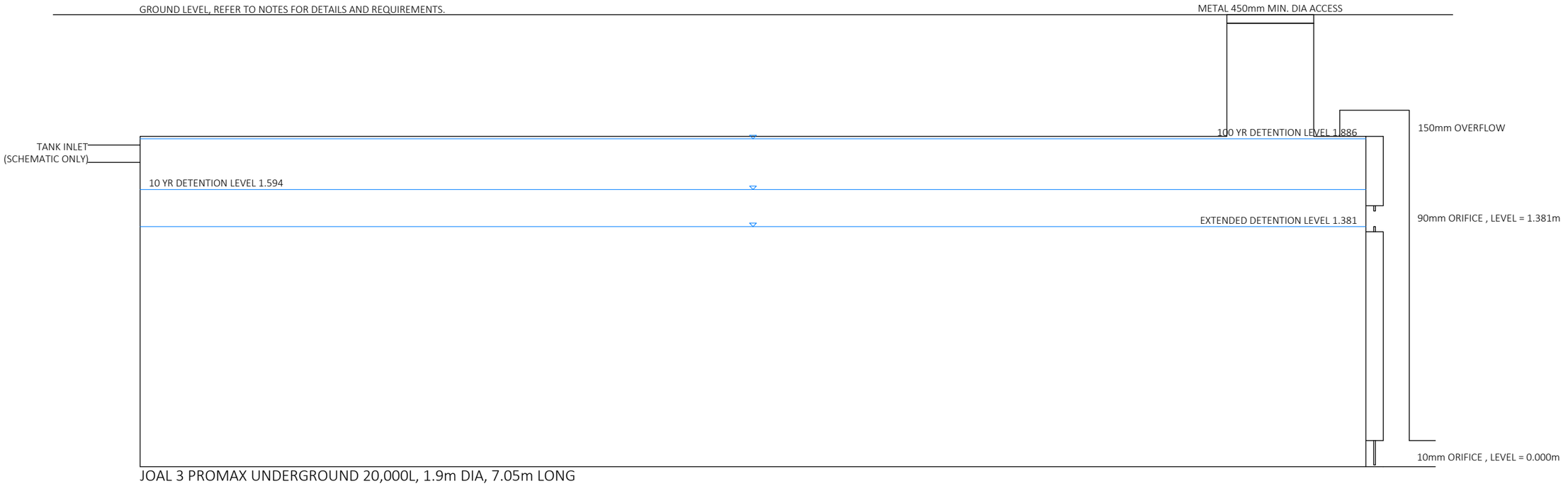
STORM	SYSTEM COUNT	TOT. VOL.	DET. VOL.	10 YR	100 YR
UNITS	-	m³	m³	m³/s	m³/s
BYPASS	-	-	-	0.32250	0.56990
JOAL 1	1	40.00	31.43	0.01508	0.02441
JOAL 2	1	50.00	38.07	0.01719	0.02845
JOAL 3	1	20.00	15.57	0.00719	0.01175
JOAL 4	1	50.00	37.19	0.01640	0.02682
JOAL 5	1	50.00	34.78	0.01351	0.02229
JOAL 6	1	40.00	30.46	0.01375	0.02266
TOTAL	6	250.00	187.50	0.40562	0.70628
TARGET	-		187.50	0.41310	0.72350
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Detention, 10 Year Peak Flow Control to address downstream network capacity issues and 100 Year peak flow control to address downstream flooding.
1. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 15.57m³.
2. The base orifice invert is 0.000m
3. To drain the detention volume over 24hrs would require an orifice smaller than the minimum allowable size, therefore the minimum orifice size of 0.010m has been used.
4. The detention volume requires a storage depth of 1.381m in the tank(s).
5. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
6. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
7. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41310 m³/s.
8. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.32250 m³/s.
9. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41310 m³/s - 0.32250 m³/s = 0.09060 m³/s.
10. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 8.3% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 8.3% X 0.09060 m³/s = 0.00752 m³/s.
11. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.00719 m³/s which meets the design requirements as it is less than the target flow of 0.00752 m³/s. The peak water level reached in the 10 YR simulation was 1.594m.
12. The target flow rate for the site in the 100 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.72350 m³/s.
13. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 100 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.56990 m³/s.
14. The target flow for all tanks from the site in the 100 YR event is the target flow minus the bypass flow which is 0.72350 m³/s - 0.56990 m³/s = 0.15360 m³/s.
15. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 8.3% of the total area draining to tanks on site, the target peak flow rate for this tank in the 100 YR event is 8.3% X 0.15360 m³/s = 0.01276 m³/s.
16. The modelling results shown in the adjacent graph for the 100 YR event give a peak flow of 0.01175 m³/s which meets the design requirements as it is less than the target flow of 0.01276 m³/s. The peak water level reached in the 100 YR simulation was 1.886m.
17. In conclusion, the analysis shows the tank design meets all requirements.

NOTES

1. Refer to layout drawings for tank cover, level and location details.
2. Tank and pavement design to support fire truck loadings if located in JOAL area.
3. Tank and pavement design (if under pavement) to follow Manufacturer and Structural Engineer's specifications.



JOAL 3 PROMAX UNDERGROUND 20,000L, 1.9m DIA, 7.05m LONG

REVISION	AMENDMENT	BY
_	_	_
_	_	_
_	_	_
_	_	_
_	_	_

DESIGNED: HM
DRAWN: HM
RELEASED: SB

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1469
SCALE & SIZE: - A3
REV: 21/03/2022

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	7810
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	65.95
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	253.45
SITE VOLUME FOR MITIGATION	m³	187.50
TANK CATCHMENT AREA	m²	736
% OF SITE MITIGATED BY TANK	%	19.8
TANK SMAF DETENTION VOLUME	m³	37.19

ORIFICE SUMMARY

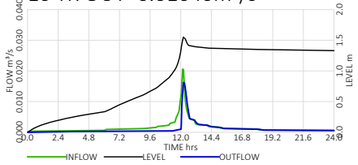
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	15	134	
HEIGHT	m	0.000	1.324	
NO. OF ORF.		1	1	
EDV HEAD	m	1.324	0.000	
EDV FLOW	m³/s	0.0005	-	0.0005
10 YR HEAD	m	1.569	0.245	
10 YR FLOW	m³/s	0.0006	0.0158	0.0164
100 YR HEAD	m	1.879	0.555	
100 YR FLOW	m³/s	0.0006	0.0262	0.0268

PEAK FLOW MITIGATION CALCULATIONS

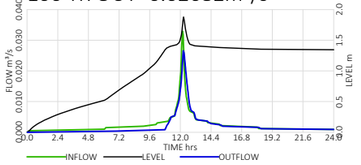
CATCHMENT	UNITS	EXISTING	NON-MIT	JOAL 4	EXISTING	NON-MIT	JOAL 4
STORM		10 YR	10 YR	10 YR	100 YR	100 YR	100 YR
PERMEABLE AREA[1]	m²	12020	10434	0	12020	10434	0
IMPERMEABLE AREA[1]	m²	6225	4099	736	6225	4099	736
TOTAL AREA	m²	18245	14533	736	18245	14533	736
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4	267.6	267.6	267.6
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74	74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	64.1	0.0	58.8	64.1	0.0
RUNOFF DEPTH	mm	124.4	121	162.3	218.7	214.8	262.5
RUNOFF VOLUME	m³	2,269.92	1,758.68	119.51	3,989.98	3,121.13	193.27
CHANNELISATION FACTOR		1.0	1.0	1.0	1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0	0.215	0.215	0
CATCHMENT SLOPE	m/m	0.100	0.100	0.100	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4131	0.3225	0.0204	0.7235	0.5699	0.0328
PEAK RUNOFF RATE	mm/hr	81.5	79.9	99.8	142.8	141.2	160.3
FLOW TARGET FOR ALL SITES	m³/s			0.41310			0.72350
FLOW BYPASSING TANKS	m³/s			0.32250			0.56990
FLOW TARGET FOR ALL TANKS	m³/s			0.09060			0.15360
CATCHMENT PORTION FOR THIS TANK	%			19.8%			19.8%
FLOW TARGET FOR THIS TANK	m³/s			0.01797			0.03047

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.01640m³/s



100 YR OUT=0.02682m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
EXTENDED DETENTION	m³	37.19	37.17
10 YR STORAGE	m³	6.97	44.14
100 YR STORAGE	m³	5.75	49.89
TOTAL VOLUME REQUIRED	m³	-	49.89
TOTAL VOLUME PROVIDED	m³	-	50.00

SITEWIDE SUMMARY

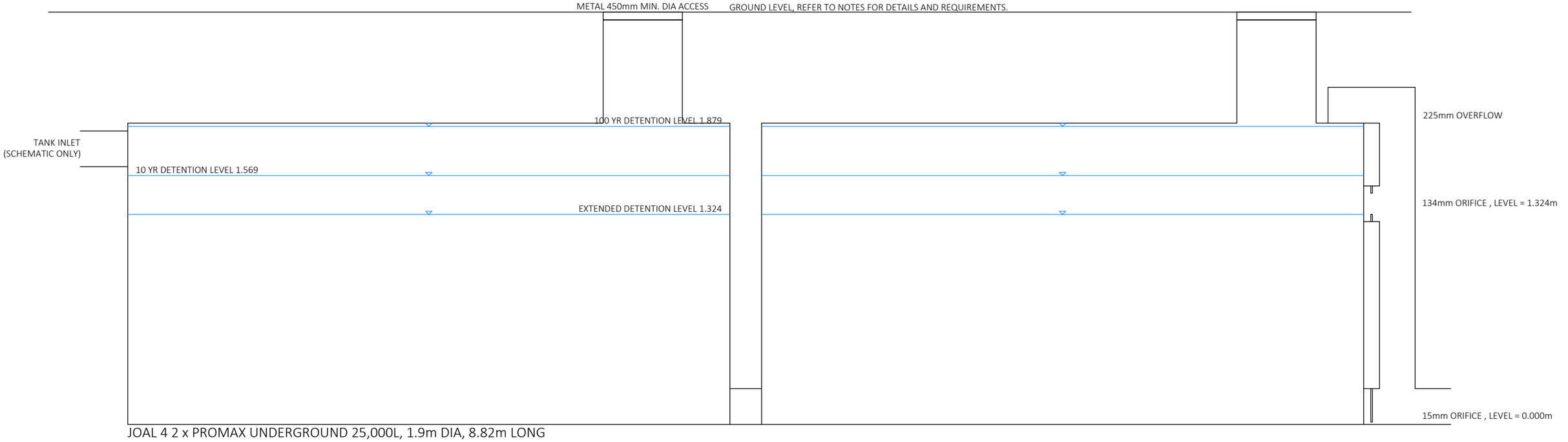
STORM	SYSTEM COUNT	TOT. VOL.	DET. VOL.	10 YR	100 YR
UNITS	-	m³	m³	m³/s	m³/s
BYPASS	-	-	-	0.32250	0.56990
JOAL 1	1	40.00	31.43	0.01508	0.02441
JOAL 2	1	50.00	38.07	0.01719	0.02845
JOAL 3	1	20.00	15.57	0.00719	0.01175
JOAL 4	1	50.00	37.19	0.01640	0.02682
JOAL 5	1	50.00	34.78	0.01351	0.02229
JOAL 6	1	40.00	30.46	0.01375	0.02266
TOTAL	6	250.00	187.50	0.40562	0.70628
TARGET	-		187.50	0.41310	0.72350
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Detention, 10 Year Peak Flow Control to address downstream network capacity issues and 100 Year peak flow control to address downstream flooding.
1. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 37.19m³.
2. The base orifice invert is 0.000m
3. The orifice diameter has been set to 0.015m to drain the detention volume in 24 hrs.
4. The detention volume requires a storage depth of 1.324m in the tank(s).
5. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
6. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
7. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41310 m³/s.
8. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.32250 m³/s.
9. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41310 m³/s - 0.32250 m³/s = 0.09060 m³/s.
10. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 19.8% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 19.8% X 0.09060 m³/s = 0.01797 m³/s.
11. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.01640 m³/s which meets the design requirements as it is less than the target flow of 0.01797 m³/s. The peak water level reached in the 10 YR simulation was 1.569m.
12. The target flow rate for the site in the 100 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.72350 m³/s.
13. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 100 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.56990 m³/s.
14. The target flow for all tanks from the site in the 100 YR event is the target flow minus the bypass flow which is 0.72350 m³/s - 0.56990 m³/s = 0.15360 m³/s.
15. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 19.8% of the total area draining to tanks on site, the target peak flow rate for this tank in the 100 YR event is 19.8% X 0.15360 m³/s = 0.03047 m³/s.
16. The modelling results shown in the adjacent graph for the 100 YR event give a peak flow of 0.02682 m³/s which meets the design requirements as it is less than the target flow of 0.03047 m³/s. The peak water level reached in the 100 YR simulation was 1.879m.
17. In conclusion, the analysis shows the tank design meets all requirements.

NOTES

1. Refer to layout drawings for tank cover, level and location details.
2. Tank and pavement design to support fire truck loadings if located in JOAL area.
3. Tank and pavement design (if under pavement) to follow Manufacturer and Structural Engineer's specifications.



JOAL 4 2 x PROMAX UNDERGROUND 25,000L, 1.9m DIA, 8.82m LONG

REVISION	AMENDMENT	BY
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_	_	_
_	_	_

DESIGNED: HM
DRAWN: HM
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1470
SCALE & SIZE: - A3
REV: 21/03/2022

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	7810
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	65.95
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	253.45
SITE VOLUME FOR MITIGATION	m³	187.50
TANK CATCHMENT AREA	m²	688
% OF SITE MITIGATED BY TANK	%	18.5
TANK SMAF DETENTION VOLUME	m³	34.78

ORIFICE SUMMARY

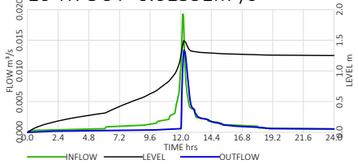
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	15	118	
HEIGHT	m	0.000	1.247	
NO. OF ORF.		1	1	
EDV HEAD	m	1.247	0.000	
EDV FLOW	m³/s	0.0005	-	0.0005
10 YR HEAD	m	1.504	0.257	
10 YR FLOW	m³/s	0.0006	0.0129	0.0135
100 YR HEAD	m	1.861	0.614	
100 YR FLOW	m³/s	0.0006	0.0217	0.0223

PEAK FLOW MITIGATION CALCULATIONS

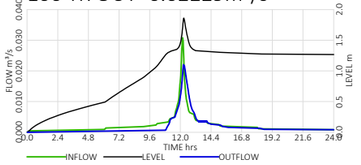
CATCHMENT	UNITS	EXISTING	NON-MIT	JOAL 5	EXISTING	NON-MIT	JOAL 5
STORM		10 YR	10 YR	10 YR	100 YR	100 YR	100 YR
PERMEABLE AREA[1]	m²	12020	10434	0	12020	10434	0
IMPERMEABLE AREA[1]	m²	6225	4099	688	6225	4099	688
TOTAL AREA	m²	18245	14533	688	18245	14533	688
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4	267.6	267.6	267.6
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74	74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	64.1	0.0	58.8	64.1	0.0
RUNOFF DEPTH	mm	124.4	121	162.3	218.7	214.8	262.5
RUNOFF VOLUME	m³	2,269.92	1,758.68	111.76	3,989.98	3,121.13	180.73
CHANNELISATION FACTOR		1.0	1.0	1.0	1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0.016	0.215	0.215	0.016
CATCHMENT SLOPE	m/m	0.100	0.100	0.100	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4131	0.3225	0.0191	0.7235	0.5699	0.0306
PEAK RUNOFF RATE	mm/hr	81.5	79.9	99.8	142.8	141.2	160.3
FLOW TARGET FOR ALL SITES	m³/s			0.41310			0.72350
FLOW BYPASSING TANKS	m³/s			0.32250			0.56990
FLOW TARGET FOR ALL TANKS	m³/s			0.09060			0.15360
CATCHMENT PORTION FOR THIS TANK	%			18.5%			18.5%
FLOW TARGET FOR THIS TANK	m³/s			0.01681			0.02849

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.01351m³/s



100 YR OUT=0.02229m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
EXTENDED DETENTION	m³	34.78	34.75
10 YR STORAGE	m³	7.67	42.42
100 YR STORAGE	m³	7.32	49.74
TOTAL VOLUME REQUIRED	m³	-	49.74
TOTAL VOLUME PROVIDED	m³	-	50.00

SITEWIDE SUMMARY

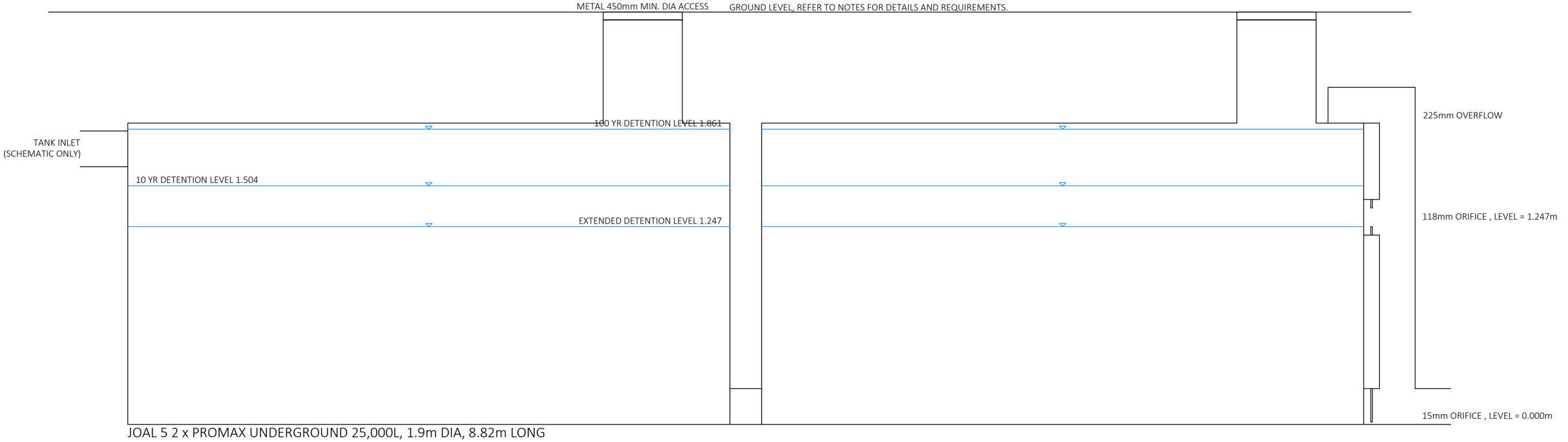
STORM	SYSTEM COUNT	TOT. VOL.	DET. VOL.	10 YR	100 YR
UNITS	-	m³	m³	m³/s	m³/s
BYPASS	-	-	-	0.32250	0.56990
JOAL 1	1	40.00	31.43	0.01508	0.02441
JOAL 2	1	50.00	38.07	0.01719	0.02845
JOAL 3	1	20.00	15.57	0.00719	0.01175
JOAL 4	1	50.00	37.19	0.01640	0.02682
JOAL 5	1	50.00	34.78	0.01351	0.02229
JOAL 6	1	40.00	30.46	0.01375	0.02266
TOTAL	6	250.00	187.50	0.40562	0.70628
TARGET	-		187.50	0.41310	0.72350
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Detention, 10 Year Peak Flow Control to address downstream network capacity issues and 100 Year peak flow control to address downstream flooding.
1. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 34.78m³.
2. The base orifice invert is 0.000m
3. The orifice diameter has been set to 0.015m to drain the detention volume in 24 hrs.
4. The detention volume requires a storage depth of 1.247m in the tank(s).
5. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
6. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
7. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41310 m³/s.
8. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.32250 m³/s.
9. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41310 m³/s - 0.32250 m³/s = 0.09060 m³/s.
10. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 18.5% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 18.5% X 0.09060 m³/s = 0.01681 m³/s.
11. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.01351 m³/s which meets the design requirements as it is less than the target flow of 0.01681 m³/s. The peak water level reached in the 10 YR simulation was 1.504m.
12. The target flow rate for the site in the 100 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.72350 m³/s.
13. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 100 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.56990 m³/s.
14. The target flow for all tanks from the site in the 100 YR event is the target flow minus the bypass flow which is 0.72350 m³/s - 0.56990 m³/s = 0.15360 m³/s.
15. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 18.5% of the total area draining to tanks on site, the target peak flow rate for this tank in the 100 YR event is 18.5% X 0.15360 m³/s = 0.02849 m³/s.
16. The modelling results shown in the adjacent graph for the 100 YR event give a peak flow of 0.02229 m³/s which meets the design requirements as it is less than the target flow of 0.02849 m³/s. The peak water level reached in the 100 YR simulation was 1.861m.
17. In conclusion, the analysis shows the tank design meets all requirements.

NOTES

1. Refer to layout drawings for tank cover, level and location details.
2. Tank and pavement design to support fire truck loadings if located in JOAL area.
3. Tank and pavement design (if under pavement) to follow Manufacturer and Structural Engineer's specifications.



JOAL 5 2 x PROMAX UNDERGROUND 25,000L, 1.9m DIA, 8.82m LONG

REVISION	AMENDMENT	BY
_	_	_
_	_	_
_	_	_
_	_	_
_	_	_

DESIGNED: HM
DRAWN: HM
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1471
SCALE & SIZE: - A3
REV: 21/03/2022

SMAF DETENTION CALCULATIONS

CATCHMENT	UNITS	SMAF
STORM		95th Ptile
TOTAL CATCHMENT AREA	m²	7810
EVENT DEPTH (INCL CC)	mm	37.0
PREDEV INITIAL ABSTRACTION	mm	5.0
PREDEV CURVE NUMBER		74
PREDEV POTENTIAL MAX RETENTION	mm	89.2
PREDEV RUNOFF DEPTH	mm	8.4
PREDEV RUNOFF VOLUME	m³	65.95
POSTDEV RUNOFF DEPTH	mm	32.4
POSTDEV RUNOFF VOLUME	m³	253.45
SITE VOLUME FOR MITIGATION	m³	187.50
TANK CATCHMENT AREA	m²	603
% OF SITE MITIGATED BY TANK	%	16.2
TANK SMAF DETENTION VOLUME	m³	30.46

ORIFICE SUMMARY

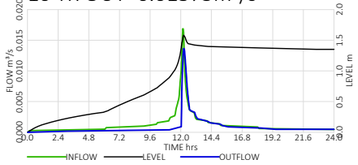
ORIFICE	UNITS	ORF. 1	ORF. 2	TOTAL
DIAMETER	mm	14	124	
HEIGHT	m	0.000	1.353	
NO. OF ORF.		1	1	
EDV HEAD	m	1.353	0.000	
EDV FLOW	m³/s	0.0005	-	0.0005
10 YR HEAD	m	1.585	0.232	
10 YR FLOW	m³/s	0.0005	0.0132	0.0137
100 YR HEAD	m	1.889	0.536	
100 YR FLOW	m³/s	0.0006	0.0221	0.0227

PEAK FLOW MITIGATION CALCULATIONS

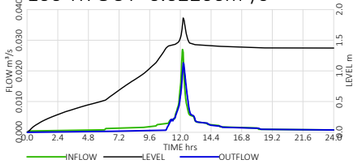
CATCHMENT	UNITS	EXISTING	NON-MIT	JOAL 6	EXISTING	NON-MIT	JOAL 6
STORM		10 YR	10 YR	10 YR	100 YR	100 YR	100 YR
PERMEABLE AREA[1]	m²	12020	10434	0	12020	10434	0
IMPERMEABLE AREA[1]	m²	6225	4099	603	6225	4099	603
TOTAL AREA	m²	18245	14533	603	18245	14533	603
EVENT DEPTH (INCL. CC)	mm	167.4	167.4	167.4	267.6	267.6	267.6
PERMEABLE INITIAL ABSTRACTION	mm	5.0	5.0	5.0	5.0	5.0	5.0
PERMEABLE CURVE NUMBER[2]		74	74	74	74	74	74
POTENTIAL MAXIMUM RETENTION	mm	58.8	64.1	0.0	58.8	64.1	0.0
RUNOFF DEPTH	mm	124.4	121	162.3	218.7	214.8	262.5
RUNOFF VOLUME	m³	2,269.92	1,758.68	97.87	3,989.98	3,121.13	158.27
CHANNELISATION FACTOR		1.0	1.0	1.0	1.0	1.0	1.0
CATCHMENT LENGTH	km	0.215	0.215	0	0.215	0.215	0
CATCHMENT SLOPE	m/m	0.100	0.100	0.100	0.100	0.100	0.100
TIME OF CONCENTRATION	hr	0.17	0.17	0.17	0.17	0.17	0.17
PEAK FLOW	m³/s	0.4131	0.3225	0.0167	0.7235	0.5699	0.0268
PEAK RUNOFF RATE	mm/hr	81.5	79.9	99.8	142.8	141.2	160.3
FLOW TARGET FOR ALL SITES	m³/s			0.41310			0.72350
FLOW BYPASSING TANKS	m³/s			0.32250			0.56990
FLOW TARGET FOR ALL TANKS	m³/s			0.09060			0.15360
CATCHMENT PORTION FOR THIS TANK	%			16.2%			16.2%
FLOW TARGET FOR THIS TANK	m³/s			0.01472			0.02495

[1]PROPOSED AREAS BASED DEVELOPMENT LAYOUT
[2]CURVE NUMBERS BASED ON AUCKLAND COUNCIL INFILTRATION SHAPEFILE

10 YR OUT=0.01375m³/s



100 YR OUT=0.02266m³/s



VOLUME SUMMARY

ITEM	UNITS	DISCR.	CUMUL.
EXTENDED DETENTION	m³	30.46	30.47
10 YR STORAGE	m³	5.18	35.65
100 YR STORAGE	m³	4.32	39.97
TOTAL VOLUME REQUIRED	m³	-	39.97
TOTAL VOLUME PROVIDED	m³	-	40.00

SITEWIDE SUMMARY

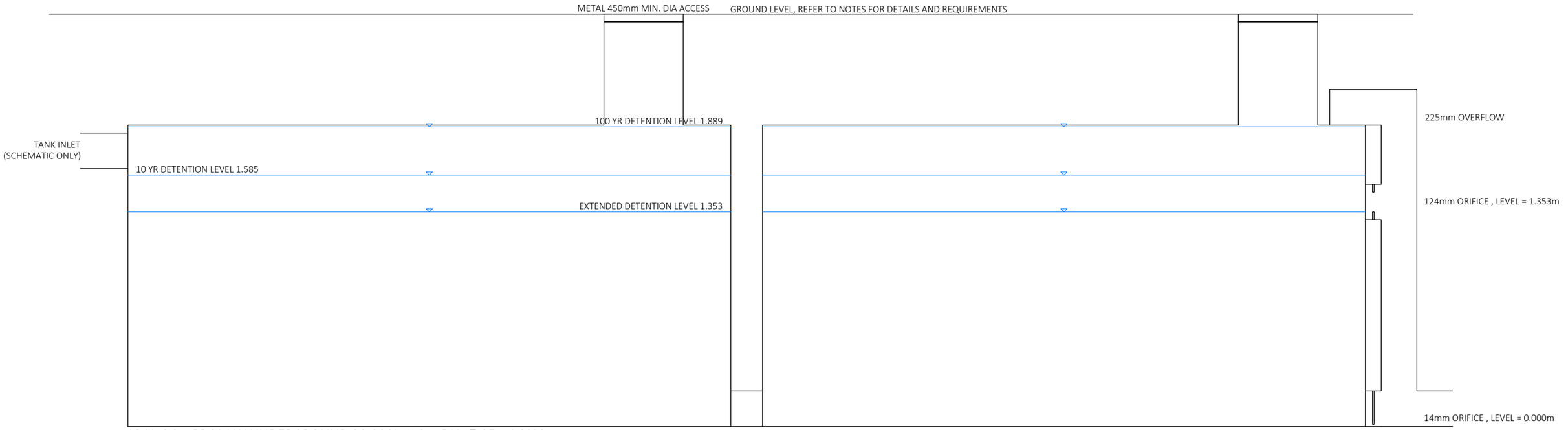
STORM	SYSTEM COUNT	TOT. VOL.	DET. VOL.	10 YR	100 YR
UNITS	-	m³	m³	m³/s	m³/s
BYPASS	-	-	-	0.32250	0.56990
JOAL 1	1	40.00	31.43	0.01508	0.02441
JOAL 2	1	50.00	38.07	0.01719	0.02845
JOAL 3	1	20.00	15.57	0.00719	0.01175
JOAL 4	1	50.00	37.19	0.01640	0.02682
JOAL 5	1	50.00	34.78	0.01351	0.02229
JOAL 6	1	40.00	30.46	0.01375	0.02266
TOTAL	6	250.00	187.50	0.40562	0.70628
TARGET	-		187.50	0.41310	0.72350
OK?	-	-	OK	OK	OK

DESIGN METHODOLOGY

The methodology used for tank design is below. The design is providing SMAF Detention, 10 Year Peak Flow Control to address downstream network capacity issues and 100 Year peak flow control to address downstream flooding.
1. The detention volume has been calculated in the SMAF Detention Calculations table, rainfall depths are from the Unitary Plan maps. The detention volume required is 30.46m³.
2. The base orifice invert is 0.000m
3. The orifice diameter has been set to 0.014m to drain the detention volume in 24 hrs.
4. The detention volume requires a storage depth of 1.353m in the tank(s).
5. The target flow rate is set based on the existing site condition. Rainfall depths are from the TP108 maps and are adjusted for climate change.
6. To determine the appropriate tank design, the target flow was determined using the methods outlined in the following steps. To find a tank and orifice combinations that met all the design targets, a 24hr, 1 minute timestep analysis was completed for each design storm. Inflow into the tank was generated using the SCS Curve method in TP108. The water level in the tank was calculated based on inflow, outflow and the tank geometry. Outflow was determined based orifice geometry and head. Tank sizes and orifice designs were varied iteratively to find the optimal tank design that met all requirements.
7. The target flow rate for the site in the 10 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.41310 m³/s.
8. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 10 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.32250 m³/s.
9. The target flow for all tanks from the site in the 10 YR event is the target flow minus the bypass flow which is 0.41310 m³/s - 0.32250 m³/s = 0.09060 m³/s.
10. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 16.2% of the total area draining to tanks on site, the target peak flow rate for this tank in the 10 YR event is 16.2% X 0.09060 m³/s = 0.01472 m³/s.
11. The modelling results shown in the adjacent graph for the 10 YR event give a peak flow of 0.01375 m³/s which meets the design requirements as it is less than the target flow of 0.01472 m³/s. The peak water level reached in the 10 YR simulation was 1.585m.
12. The target flow rate for the site in the 100 YR event is shown in the Peak Flow Calculations Table for the EXISTING catchment, the analysis found a peak flow rate of 0.72350 m³/s.
13. In the post development scenario, some of the site is not draining through tanks. The bypass catchment anlaysis for the 100 YR event is shown in the Peak Flow Calculations Table for the NON-MIT catchment, this analysis found a peak flow rate of 0.56990 m³/s.
14. The target flow for all tanks from the site in the 100 YR event is the target flow minus the bypass flow which is 0.72350 m³/s - 0.56990 m³/s = 0.15360 m³/s.
15. As there are multiple tanks mitigating the site, each tank needs to discharge only its portion of the total target flow. As this tank is draining 16.2% of the total area draining to tanks on site, the target peak flow rate for this tank in the 100 YR event is 16.2% X 0.15360 m³/s = 0.02495 m³/s.
16. The modelling results shown in the adjacent graph for the 100 YR event give a peak flow of 0.02266 m³/s which meets the design requirements as it is less than the target flow of 0.02495 m³/s. The peak water level reached in the 100 YR simulation was 1.889m.
17. In conclusion, the analysis shows the tank design meets all requirements.

NOTES

1. Refer to layout drawings for tank cover, level and location details.
2. Tank and pavement design to support fire truck loadings if located in JOAL area.
3. Tank and pavement design (if under pavement) to follow Manufacturer and Structural Engineer's specifications.



JOAL 6 2 x PROMAX UNDERGROUND 20,000L, 1.9m DIA, 7.05m LONG

REVISION	AMENDMENT	BY
_	_	_
_	_	_
_	_	_
_	_	_
_	_	_

DESIGNED: HM
DRAWN: HM
RELEASED: SB

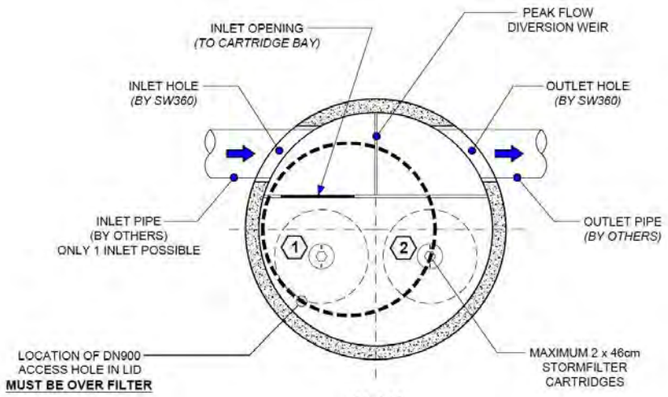
CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORAGE DESIGN DETAILS.

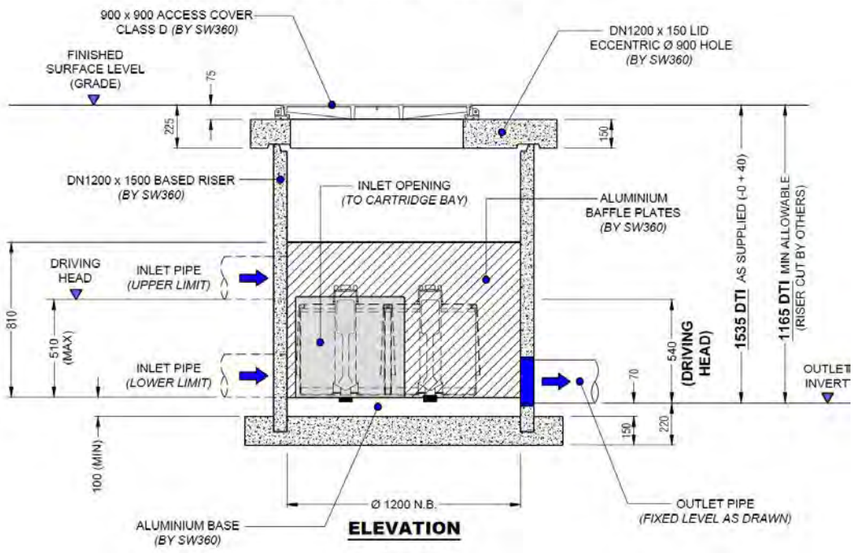
STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1472
SCALE & SIZE: - A3
REV: 21/03/2022

STORMWATER 360 STORMFILTER 460mm CARTRIDGE WITH INTERNAL BYPASS



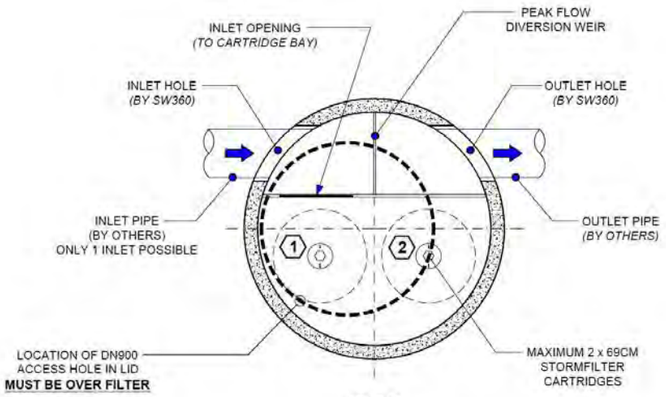
PLAN

(ACCESS COVER AND LID REMOVED)



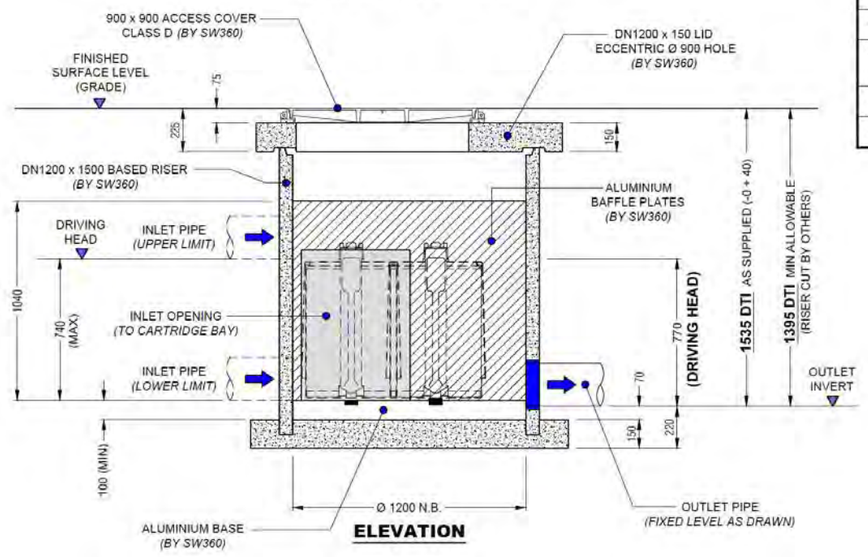
ELEVATION

STORMWATER 360 STORMFILTER 690mm CARTRIDGE WITH INTERNAL BYPASS



PLAN

(ACCESS COVER AND LID REMOVED)



ELEVATION

GENERAL NOTES

TO BE COMPLETED BY CUSTOMER / CONTRACTOR			
COMPANY :		P.O. NUMBER :	
SITE ADDRESS :			
SITE CONTACT & PHONE :			
PREFERRED DELIVERY DATE (TBC SW360) :			
STORMFILTER REFERENCE (IF APPLICABLE) :			
INLET PIPE Ø : *DN225 RCRRJ - MAX DN300 PVC - MAX*	PIPE MATERIAL : *(PVC OR RCRRJ)*	CORE DRILL Ø :	INLET (IL) :
OUTLET PIPE Ø : *DN225 RCRRJ - MAX DN300 PVC - MAX*	PIPE MATERIAL : *(PVC OR RCRRJ)*	CORE DRILL Ø :	OUTLET (IL) :
LID LEVEL (RL) :	DTI :	ORIENTATION : 180° *(AS DRAWN)* / 90° / 135°	
COMPLETED BY :		SIGNED :	DATE :

TO BE COMPLETED BY SW360				
SW360 PRODUCT CODE :				
MEDIA TYPE (CIRCLE ONE) :	PERLITE	ZPG	OTHER :	
CARTRIDGE QTY (STATE) :			PRE-INSTALLATION (Y/N) :	
SP FLOW RATE (CIRCLE ONE) :	FULL (Ø 27.6 ID) BLACK/MUSTARD	3 QTR (Ø 24.0 ID) WHITE/OPAL	HALF (Ø 19.7 ID) GREEN	OTHER :
ACCESS COVER (CIRCLE ONE) :	900 x 900 WEB-FORGE / CLASS D		OTHER :	
COMPLETED BY :	SIGNED :		DATE :	

NOTES

1. MANHOLE UNIT FITTED WITH 2 SWIFTLIFT ANCHOR POINTS. DO NOT EXCEED 60 DEGREE LIFT ANGLE. CONCRETE LID FITTED WITH 4 SWIFTLIFT ANCHOR POINTS.
2. UNIT SUPPLIED WITH INLET & OUTLET CORE DRILLED.
3. SEALING / GROUTING OF MANHOLE COMPONENTS AND PIPES BY CONTRACTOR. ENSURING LOCAL CODES AND REGULATIONS ARE COMPLIED WITH.
4. ANY RISERS REQUIRED TO INCREASE THE DEPTH TO INVERT (DTI) FROM THAT AS DRAWN TO BE SUPPLIED BY THE CONTRACTOR.
5. FOR A DTI EXCEEDING 5m PLEASE CONTACT **0800STORMWATER**.
6. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION RELATED EROSION RUNOFF.
7. BACKFILL, BEDDING AND BUOYANCY DESIGN BY ENGINEER OF RECORD
8. QTY OF CARTRIDGES BY ENGINEER OF RECORD.
9. CONCRETE MANHOLE RISERS ARE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH AS/NZS 4058 : 2007
10. CONCRETE MANHOLE BASES ARE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH NZS 3101 : 2006 & NZS 3109 : 1997
11. CONCRETE LID DESIGNED AND MANUFACTURED TO HN-HO-72
12. FOR REQUIREMENTS OUTSIDE OF DRAWING SPECIFICATIONS PLEASE CONTACT **0800STORMWATER**.

APPROX WEIGHTS

MANHOLE SECTION INCLUDING CARTRIDGES : **2050 Kg**
(AS DELIVERED, BASED ON QTY 2 ZPG CARTS)
LID WEIGHT : **520 Kg**

CIVIX DESIGN CALCULATIONS:

TREATMENT DEVICE ID		**SWD001**	**SWD004**	**SWD005**	**SWD002**	**SWD003**
DEVICE TYPE		STMFILTER 2x690mm CART	STMFILTER 2x690mm CART	STMFILTER 2x690mm CART	STMFILTER 2x690mm CART	STMFILTER 1x690mm CART
MANHOLE DIAMETER	m	1.20	1.20	1.20	1.20	1.20
DEVICE MAX FLOW RATE	**m3/s**	**0.0028**	**0.0028**	**0.0028**	**0.0028**	**0.0014**
WATER QUALITY FLOW INTENSITY	mm/hr	10	10	10	10	10
IMPERVIOUS AREA	m²	1,142	542	628	302	894
RUNOFF COEFFICIENT		0.95	0.95	0.95	0.95	0.95
WATER QUALITY FLOW	**m3/s**	**0.0030**	**0.0014**	**0.0017**	**0.0008**	**0.0024**
DOES DEVICE MEET FLOW REQUIREMENT		**FALSE**	**TRUE**	**TRUE**	**TRUE**	**FALSE**
PROPOSED DIAMETER	m	1.2000	1.2000	1.2000	1.2000	1.2000
REQUIRED DIAMETER (INCL INT. BYPASS)	m	1.2000	1.2000	1.2000	1.2000	1.2000
IS THE DEVICE DIAMETER BIG ENOUGH?		**TRUE**	**TRUE**	**TRUE**	**TRUE**	**TRUE**

REVISION	AMENDMENT	BY

DESIGNED: HM
DRAWN: HM
RELEASED: SB

CIVIX

PROJECT: 20 MELIA PLACE, STANMORE BAY

TITLE: STORMFILTER DESIGN DETAILS

STATUS: FOR RESOURCE CONSENT
DRAWING NO: 1510
SCALE & SIZE: A3
REV: 06/10/2021