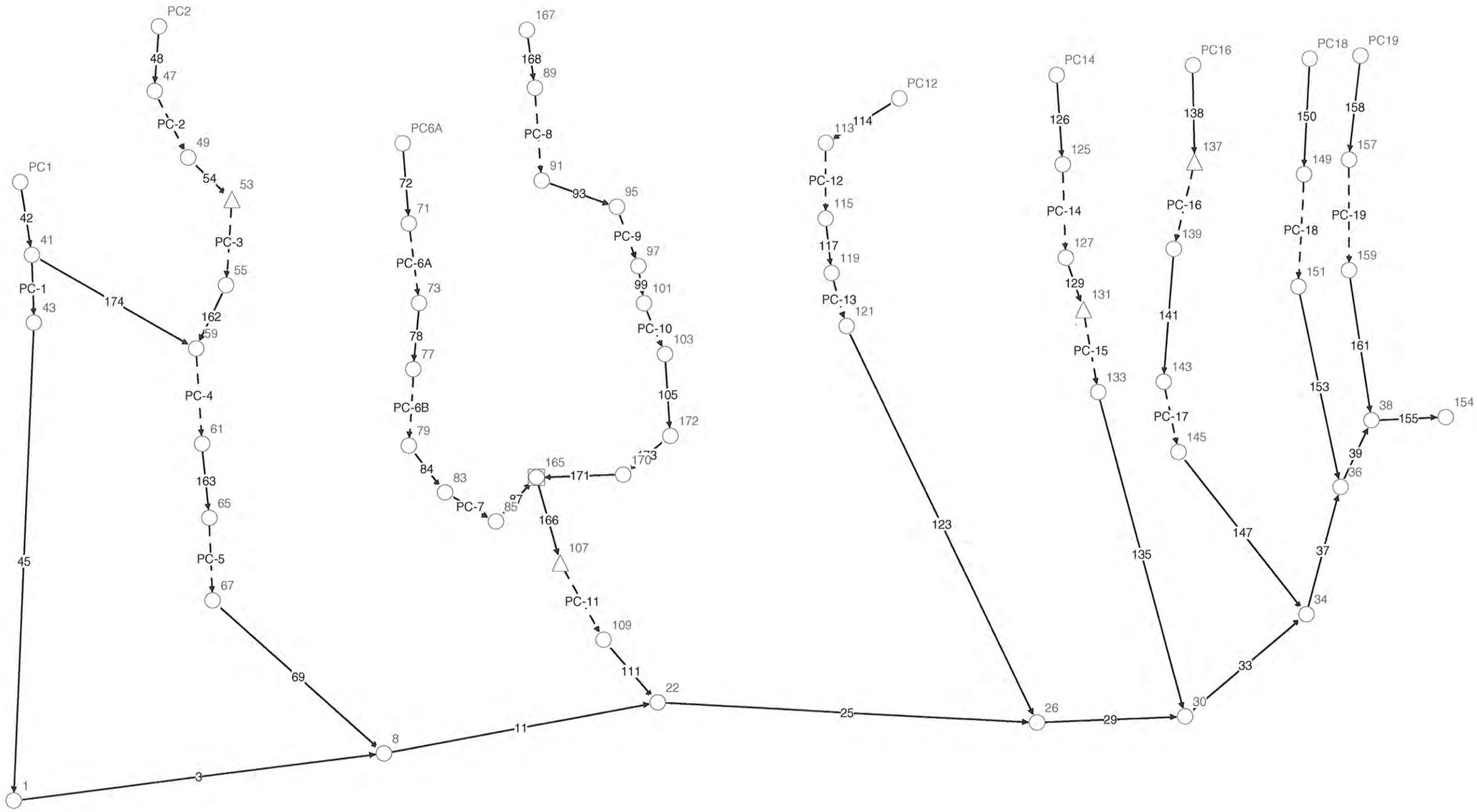
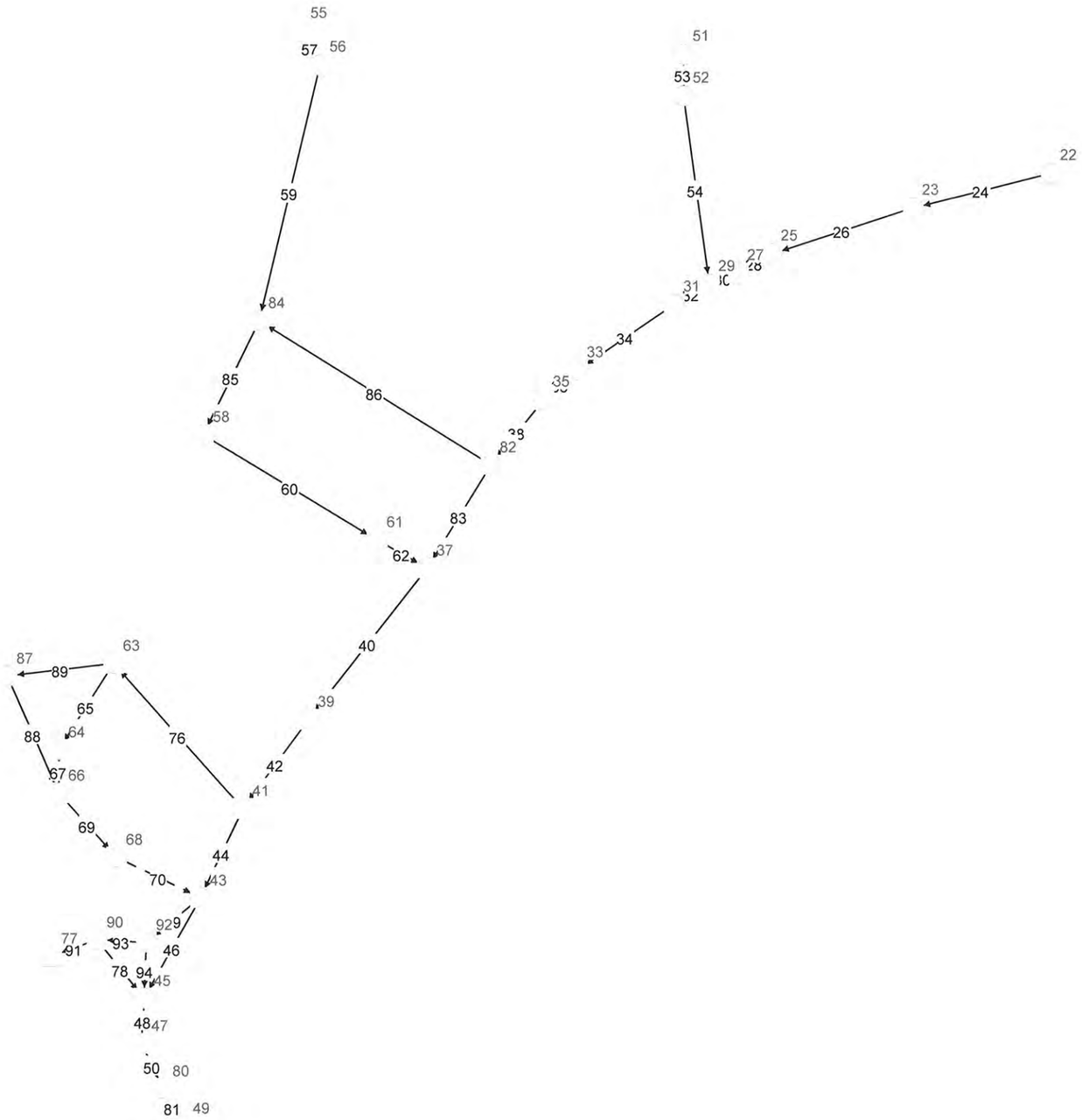
Appendix 4

Model Layout Plan



XP-SWMM2000 Version 7.50 Copyright (c) XP Software	**Ngunguru Culverts** Licenced To: GHD [42-750-0051]	01/19/02 Page 1/1



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Appendix 5

Water Quality Data

NORTHLAND REGIONAL COUNCIL

Storm Water Discharges to Ngungururu Estuary

SITE ID	SITE NAME	DATE	TIME	SAMPLE ID	F C N/100ML
1294	U T Ngunguru River	30-Jan-90	8:44:00 AM	19900411	2
	Culvert	30-Jan-90	9:20:00 AM	19900417	< 2
		30-Jan-90	12:39:00 PM	19900423	> 2000
		30-Jan-90	1:06:00 PM	19900429	> 2000
		30-Jan-90	1:24:00 PM	19900435	> 2000
		02-Feb-90	7:26:00 AM	19900508	970
		02-Feb-90	7:52:00 AM	19900515	930
		02-Feb-90	8:22:00 AM	19900522	1010
		02-Feb-90	8:57:00 AM	19900529	1000
		02-Feb-90	9:39:00 AM	19900536	50
		27-Mar-95	11:50:00 AM	19951777	1100
1295	Ngunguru UT	30-Jan-90	8:41:00 AM	19900410	500
	Cnr Te Maika & Matapouri Road	30-Jan-90	9:13:00 AM	19900416	1400
		30-Jan-90	12:37:00 PM	19900422	< 100
		30-Jan-90	1:04:00 PM	19900428	100
		30-Jan-90	1:22:00 PM	19900434	< 100
		02-Feb-90	7:21:00 AM	19900507	200
		02-Feb-90	7:49:00 AM	19900514	200
		02-Feb-90	8:19:00 AM	19900521	100
		02-Feb-90	8:55:00 AM	19900528	< 100
		02-Feb-90	9:25:00 AM	19900535	200
1296	Ngunguru UT	30-Jan-90	8:37:00 AM	19900409	518
	End of Shoebridge Cres	30-Jan-90	9:11:00 AM	19900415	32
		30-Jan-90	12:35:00 PM	19900421	150
		30-Jan-90	1:02:00 PM	19900427	220
		30-Jan-90	1:20:00 PM	19900433	50

			02-Feb-90	7:17:00 AM	19900506	280
			02-Feb-90	7:47:00 AM	19900513	480
			02-Feb-90	8:16:00 AM	19900520	410
			02-Feb-90	8:53:00 AM	19900527	630
			02-Feb-90	9:20:00 AM	19900534	720
1300	Ngunguru River		30-Jan-90	8:32:00 AM	19900408	212
		Boat Ramp	30-Jan-90	9:09:00 AM	19900414	46
			30-Jan-90	12:33:00 PM	19900420	102
			30-Jan-90	1:00:00 PM	19900426	76
			30-Jan-90	1:18:00 PM	19900432	114
			02-Feb-90	7:15:00 AM	19900505	3900
			02-Feb-90	7:45:00 AM	19900512	5500
			02-Feb-90	8:14:00 AM	19900519	100
			02-Feb-90	8:50:00 AM	19900526	300
			02-Feb-90	9:17:00 AM	19900533	300
3274	Storm water Ngunguru Village	S/W discharge point	07-Mar-96	8:35:00 AM	19960957	350
5263	Ngunguru Harbour UT		27-Mar-95	11:54:00 AM	19951778	220
		Stream above beach	27-Mar-95	11:58:00 AM	19951779	2400
			23-Jan-96	1:56:00 PM	19960396	2060

Methods Used: Standard Methods for the Examination of Water and Wastewater.
APHA. AWWA. WEF 1998 20th Edition.

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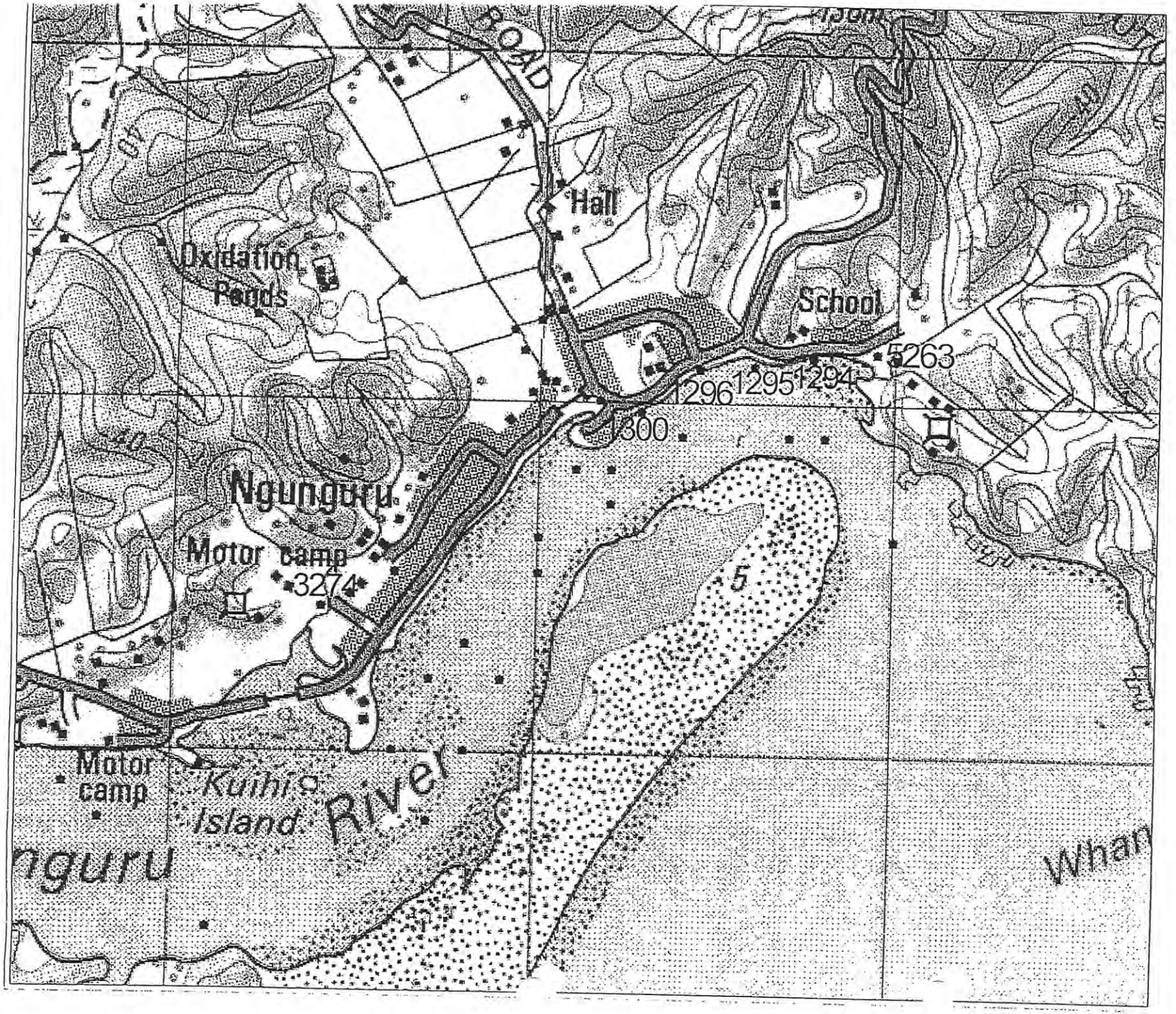
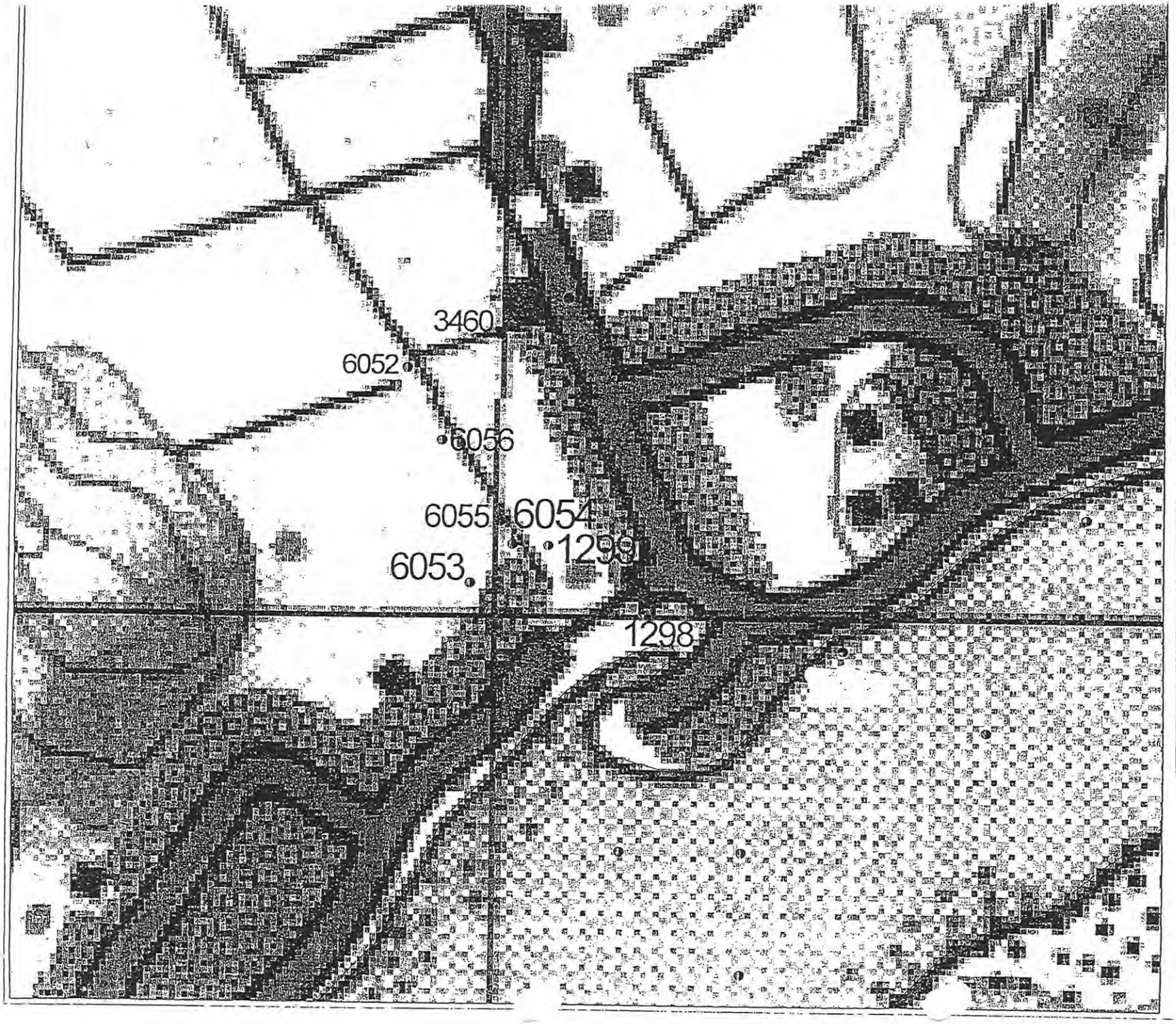
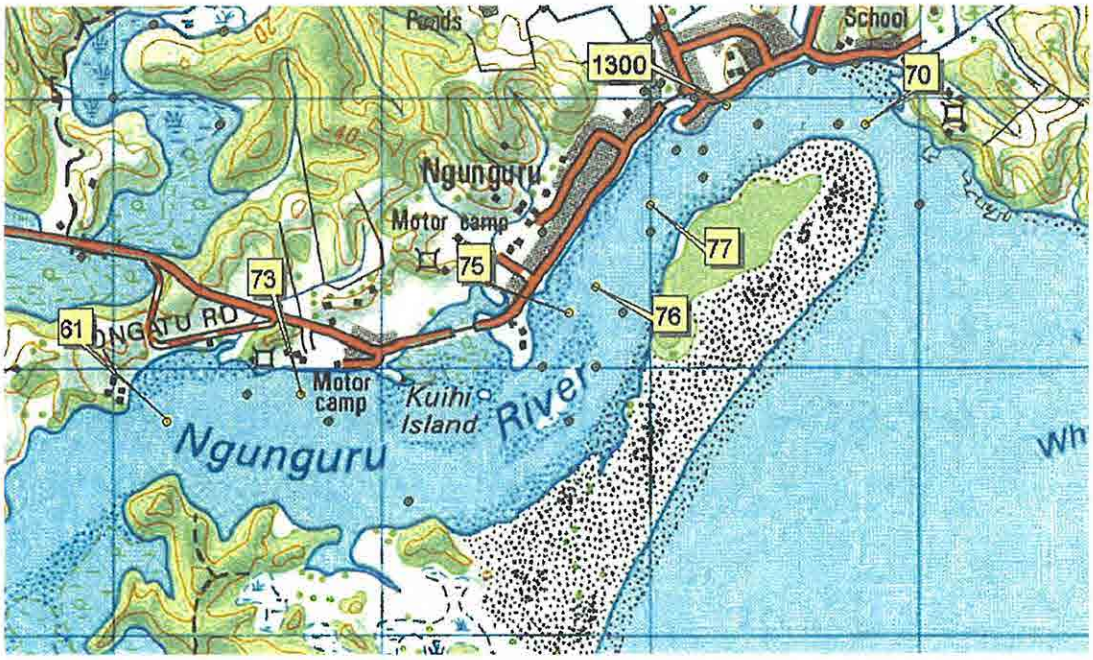

ROAD
Hall
Oxidation Ponds
School
5263
1296
1295
1294
1300
Ngunguru
Motor camp
3274
5
Motor camp
Kuihia Island
River
nguru
Whan

NORTHLAND REGIONAL COUNCIL

STORM WATER DISCH IN THE WAIOTOI Rd AREA

SITE ID	SITE NAME	DATE	TIME	SAMPLE ID	F C	PH	SAL	SS
					n/100	pH	g/m3	g/m3
1298	Waiotoi Rd Catchment drain	30-Jan-90	8:26:00 AM	19900407	26	*	*	*
	Footbridge	30-Jan-90	9:07:00 AM	19900413	26	*	*	*
		30-Jan-90	12:31:00 PM	19900419	2680	*	*	*
		30-Jan-90	12:58:00 PM	19900425	2420	*	*	*
		30-Jan-90	1:16:00 PM	19900431	1540	*	*	*
		02-Feb-90	7:12:00 AM	19900504	300	*	*	*
		02-Feb-90	7:43:00 AM	19900511	600	*	*	*
		02-Feb-90	8:12:00 AM	19900518	< 100	*	*	*
		02-Feb-90	8:45:00 AM	19900525	200	*	*	*
		02-Feb-90	9:14:00 AM	19900532	3800	*	*	*
		16-Jul-99	12:10:00 PM	19992249	*	*	1	22
1299	Waiotoi Rd Catchment drain	02-Feb-90	7:10:00 AM	19900509	640	*	*	*
	Drain Between Houses	02-Feb-90	7:54:00 AM	19900516	640	*	*	*
		02-Feb-90	8:10:00 AM	19900523	700	*	*	*
		02-Feb-90	8:42:00 AM	19900530	720	*	*	*
		02-Feb-90	9:12:00 AM	19900537	950	*	*	*


3460
6052
6056
6055
6054
1299
6053
1298


Ponds
School
1300
70
Ngunguru
Motor camp
75
77
73
76
61
NGATU RD
Motor camp
Kuihi Island
River
Ngunguru

Site Ngunguru	Date	ENT-2 n/100ml	FC-1 n/100ml
61	3/12/01	**179**	**504**
70	3/12/01	**20**	**234**
73	3/12/01	**146**	**> 600**
75	3/12/01	**206**	**104**
76	3/12/01	**1145**	**> 600**
77	3/12/01	**216**	**> 600**
1300	3/12/01	**161**	**160**

Site Ngunguru	Date	ENT-2 n/100ml	FC-1 n/100ml
61	4/12/01	**158**	**1170**
70	4/12/01	**10**	**< 10**
73	4/12/01	**31**	**240**
75	4/12/01	**10**	**170**
76	4/12/01	**10**	**210**
77	4/12/01	**< 10**	**50**
1300	4/12/01	**31**	**130**

Site Ngunguru	Date	ENT-2 n/100ml	FC-1 n/100ml
61	6/12/01	**< 10**	**18**
70	6/12/01	**< 10**	**30**
73	6/12/01	**< 10**	**10**
75	6/12/01	**10**	**20**
76	6/12/01	**10**	**10**
77	6/12/01	**30**	**22**
1300	6/12/01	**< 10**	**14**

Site Ngunguru	Date	ENT-2 n/100ml	FC-1 n/100ml
61	12/19/01	**495**	**40**
70	12/19/01	**98**	**220**
73	12/19/01	**20**	**40**
75	12/19/01	**20**	**2**
76	12/19/01	**1187**	**390**
77	12/19/01	**31**	**62**
1300	12/19/01	**41**	**20**

Site Ngunguru	Date	ENT-2 n/100ml	FC-1 n/100ml
61	1/14/02	1187	410
70	1/14/02	697	570
73	1/14/02	148	40
75	1/14/02	128	50
76	1/14/02	428	200
77	1/14/02	122	100
1300	1/14/02	323	10

Site Ngunguru	Date	ENT-2 n/100ml	FC-1 n/100ml
61	1/15/02	910	84
70	1/15/02	488	2
73	1/15/02	521	18
75	1/15/02	231	8
76	1/15/02	187	34
77	1/15/02	520	18
1300	1/15/02	884	<2

		16-Jul-99	12:30:00 PM	19992250	*	*	2	38
3460	Waiotoi Rd Catchment drain	02-Sep-93	2:30:00 PM	19934289	1570000	7.12	*	*
	Pipe discharge (Waiotoi Rd)	06-Sep-93	12:07:00 PM	19934317	43000	*	*	*
		06-Sep-93	12:30:00 PM	19934318	2000	*	*	*
		06-Sep-93	1:00:00 PM	19934319	4000	*	*	*
		06-Sep-93	1:30:00 PM	19934320	76000	*	*	*
		15-Nov-93	12:00:00 AM	19935646	100	*	*	*
6052	Waiotoi Rd Catchment drain	16-Jul-99	1:05:00 PM	19992255	*	*	< 1	39
	Foot Brdg over stream							
6053	Waiotoi Rd Catchment Drain	16-Jul-99	12:45:00 PM	19992251	*	*	< 1	17
	Caretakers Cottage Drain							
6054	Waiotoi Rd Catchment drain	16-Jul-99	12:50:00 PM	19992252	*	*	< 1	2
	Conctere pipe behind Bowling G							
6055	Waiotoi Rd Catchment drain	16-Jul-99	12:55:00 PM	19992253	*	*	< 1	60
	SW Pipe btwnTennis & Bwl Grn							
6056	Waiotoi Rd Catchment drain	16-Jul-99	1:00:00 PM	19992254	*	*	< 1	42
	Footpath Causeway							

Methods Used: Standard Methods for the Examination of Water and Wastewater.
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Appendix 6

Public Submission Summary

No.	Address	Issues
1	P & B Trewbella, Unit 7, Tutukaka Motor Lodge	No problems to report. Supports planned work.
2	W.R. Manson, 48 Ngunguru Heights	No specific problems identified.
3	S. Bowker, 17 Ewen Street	No issues related to the CMP identified.
4	M. Stevens, 1845 Ngunguru Rd	Comments on rates increase and footpath damage due to Item (7) of the Public Information Document.
5	P. Reynolds, 12 Shoebridge Crescent	Generally supports recommendations.
6	A. Young, 2003 Ngunguru Road	Raises concerns over recommendations to increase height of stopbanks. Opposes issues downstream of Ngunguru Road not raised or addressed in the Ngunguru CMP.
7	Auski Trust (B. & D. Self), 28 Kakariki Rd	Supports Item 3, but raises issue on mangroves – unchecked growth of mangroves inhibiting flow.
8	H. S. Newman, 1811 Ngunguru Rd	Comments on extent of flood hazard areas –includes some areas that "never flood" and recommends more cooperation between roads and stormwater departments.
9	P. Budgen, 11 Waiotoi Rd	Supports recommendation in CMP (Item 1)
10	Dianne Power, 1901 Ngunguru Rd	Item 1 Similar problems in Kaipara District – Ruawai area Item 8 Flooding from Ngunguru Road at 1901. Item 1 & 11 Recommends clearing of mangroves.
11	Simon Deroles, 5 Kopipi Crescent	Item 5 Asks whether line 0 can be extended upstream to Nos 3 & 5 Erosion of Beaches – comments on whether alternative options for erosion of beaches from stormwater discharges is possible – as per Bryce Blackhalls comments.
12	Rosemary Johnston, 38 Pine Rd	Item 3 Proposes a bridge rather than culvert under Kakariki Road Has started planting on banks of open channel between Chloe Place and Kakariki Rd
13	L.B.B Blackhall, 23/25 Waiotoi Rd	Bryce Blackhall – For Items 5 & 9 recommends diverting flows to Line F behind foredune to avoid erosion of beach. Items 19 & 20 – Divert flows to drain adjacent to Sports Club rather than beach to avoid erosion of beach.

		Items 12 & 13 – Recommends not upgrading Line X and directing flow to PC17.
14	Louise Reynolds, 1807 Ngunguru Rd	Item 6 – Asks how reduction of runoff will be addressed for this catchment as there has been a gradual increase in the flooded area – may need to add a comment to the CMP to the effect that the CMP cannot address planning issues, which are likely to affect the amount of runoff in low lying areas and reclaimed land.
15	Brett Ewen, Kakariki Rd	Supports recommended work – Item 4.
16	Mrs. J. Attwell, 1911b Ngunguru Rd	Asks if the proposed works will address the flooding at 1911B Ngunguru Rd (flooding from main Rd).
17	D.C. Andrews, No. 8 Ngunguru Retirement Village	Retirement Village Resident – supports upgrade of Kakariki Rd culvert – this resident would probably support culverting of this drain.
18	Gabrielle McVeigh	Supports works proposed under Items 3, 4 & 8.

Appendix 7

Northern Ngunguru Modelling Study

Proposed Remedial Works (Section 6.2)

Option 1 (Drawing 15840/00/06):

Item	Description	Cost ($)
1	Preliminary & General (includes traffic control)	40,000
2	Relocation of Services	10,000
6	Remove existing 1200-mm diameter culvert (PC16).	3,000
	Remove existing 900-mm diameter culvert (PC17).	6,000
	Supply to site pre-cast concrete box culvert unit (2.0 m wide x 1.5m high) – 26 units @ 1.5 m ea.	57,200
7	Install 18 m of new 2.0-m wide x 1.5-m high box culvert and construct inlet structure (includes aprons and wing walls) under the Cemetery Access Rd (PC16).	39,600
7	Install 20 m of new 2.0-m wide x 1.5-m high box culvert and construct inlet structure (includes aprons and wing walls) under Ngunguru Rd (PC17).	61,600
8	Silt Control / Flow Diversion / Temporary Works	15,000
	Subtotal	232,400
9	Design fees (20%)	46,480
10	Contingencies (20%)	46,480
	Total	**$325,360**

```
Input File : S:\51\19028\XPS\50 yr Existing v 23-09-02.XP
Current Directory:   S:\
Executable Name:     C:\XPS\XP-SWM~1\swmmengw.exe
Read      0 line(s) and found    0 items(s) from your cfg file.
         *================================================*
         |                    XP-SWMM2000                 |
         |            Storm Water Management Model        |
         |                   Version 7.51                 |
         |================================================|
         |                 Developed by                   |
         |================================================|
         |                                                |
         |            XP Software Inc. and Pty. Ltd.      |
         |                                                |
         |               Based on the U.S. EPA            |
         |   Storm Water Management Model Version 4.40    |
         |                                                |
         |             Originally Developed by            |
         |              Metcalf & Eddy, Inc.              |
         |             University of Florida              |
         |           Camp Dresser & McKee Inc.            |
         |               September 1970                   |
         |                                                |
         |             EPA-SWMM is maintained by          |
         |             Oregon State University            |
         |             Camp Dresser & McKee Inc.          |
         |================================================|
         |     XP Software      October, 2000             |
         |       Data File Version --->     9.0            |
         *================================================*
```

```
*=====================================================*
|        Table E10 - CONDUIT SUMMARY STATISTICS       |
| Note: The peak flow may be less than the design flow |
| and the conduit may still surcharge because of the  |
| downstream boundary conditions.                     |
*=====================================================*
```

Name Conduit Name	Design Flow (cms)	Design Velocity (m/s)	Conduit Vertical Depth (mm)	Maximum Computed Flow (cms)	Time of Occurence Hr.	Min.	Maximum Computed Velocity (m/s)	Time of Occurence Hr.	Min.	Ratio of Max. to Design Flow	Maximum Depth > at Pipe Upstream (m)	Ends Dwnstrm (m)
24	52.388	2.2765	1460.000	-0.0810	12	9	0.4549	13	53	-0.0015	5.5844	5.5842
26	39.665	1.7440	1380.000	-0.4386	12	7	0.1817	13	54	-0.0111	5.5842	5.5839
30	25.150	6.2876	1000.000	0.9616	12	19	0.2404	12	19	0.0382	5.5614	5.5608
34	206.01	2.8001	2000.000	4.8223	12	17	0.5311	18	30	0.0234	4.9415	4.9383
38	304.94	3.8323	3000.000	5.0567	12	18	1.5189	12	10	0.0166	4.3886	4.0538
40	442.26	3.4450	3000.000	7.5249	12	18	1.1153	11	52	0.0170	3.7447	3.3355
42	315.86	3.8001	3000.000	8.6740	12	19	1.2808	11	47	0.0275	3.3355	3.3057
44	49.967	1.8318	2000.000	7.8065	12	19	0.9932	10	8	0.1562	3.3057	3.2522
46	3.296	2.9140	1200.000	3.7063	12	16	3.2645	12	16	1.1246	3.2522	3.1346
48	31.554	1.8768	2220.000	2.7121	12	19	0.7845	23	28	0.0859	3.1346	3.1329
54	60.340	3.3084	1800.000	4.0250	12	15	1.1461	10	8	0.0667	7.1028	5.5608
59	159.32	4.3347	2240.000	1.8384	12	14	1.6064	12	14	0.0115	6.1186	4.1393
60	8.329	0.6669	1200.000	2.3033	12	15	0.7721	12	3	0.2765	3.8546	3.7489
65	24.172	1.1335	1990.000	1.3317	12	20	0.4480	11	57	0.0551	3.3057	3.2564
69	20.570	1.4576	2000.000	1.3448	12	22	0.3435	9	13	0.0654	3.2561	3.2532
76	26.630	1.6644	1000.000	-0.8907	12	20	-0.1633	11	42	-0.0334	3.3057	3.3057
78	72.704	3.3804	1720.000	-3.9566	12	18	-0.4099	12	18	-0.0544	3.0884	3.1346
79	7.325	0.0000	900.0000	6.5661	12	20	0.9764	12	19	0.8964	3.2522	3.1281
81	1512.5	8.7807	6500.000	2.5771	12	21	0.0989	12	21	0.0017	1.0028	1.0000
83	304.94	3.8323	3000.000	5.2155	12	19	1.1126	12	4	0.0171	4.0538	3.7447
85	115.82	3.9343	1990.000	1.4918	12	15	0.3986	6	21	0.0129	4.1393	3.8546
86	0.5285	0.0480	1000.000	0.3318	12	15	0.3353	12	15	0.6279	4.1393	4.0538
88	41.521	3.4679	2000.000	0.0172	12	14	0.2831	6	56	0.0004	3.5016	3.2561
89	0.7846	0.0000	1000.000	-0.3726	12	14	-0.3860	12	14	-0.4748	3.3600	3.5016
91	16.971	1.0775	500.0000	6.4527	12	22	0.8691	12	22	0.3802	3.0884	2.2937
93	167.97	5.0899	1000.000	3.4040	12	22	0.3408	12	20	0.0203	3.1281	3.0884
94	434.33	13.1615	1000.000	4.0535	12	19	0.3440	12	17	0.0093	3.1281	3.1346

```
228.1      0.1376     0.8654 450.0000  -0.5609     12     49  -3.5020     12     50  -4.0756   5.5614   5.5839
Overflow 3 1.569      0.0000 1000.000   0.7880     12     18   0.4735     12     29   0.5022   5.5839   5.5614
232.1       2.997     4.7109 900.0000   2.0350     12     16   3.4671     18     30   0.6790   5.5608   4.9415
Overflow 4 1.569      0.0000 1000.000   2.8138     12     16   1.0047     12     16   1.7932   5.5608   5.5021
236.1      0.7714     2.3247 650.0000   0.9996     12     17   2.9971     12     17   1.2958   4.9383   4.3886
Overflow 5 1.569      0.0000 1000.000   4.0838     12     17   1.0866     12     17   2.6025   4.9383   4.8452
250.1       1.773     2.7263 910.0000   2.5668     12     21   5.9688     12     21   1.4476   3.1329   1.0028
Overflow 9 1.883      0.0000 1000.000   0.0000      0      0   0.0000      0      0   0.0000   1.0028   1.0028
253.1       1.130     3.9968 600.0000   0.7906     12     15   3.2145     11     40   0.6996   7.8354   7.1028
Overflow 290.596      5.6623 1000.000   3.2369     12     15   1.5868     12     15   0.0357   7.8354   7.6341
257.1      0.2806     2.5405 375.0000   0.3250     12     13   3.4758     11     37   1.1582   6.9535   6.1186
Overflow 7 1.569      0.0000 1000.000   1.5088     12     13   0.7707     12     13   0.9615   6.9535   6.8998
262.1      0.4499     2.2911 500.0000   0.3585     11     51   1.8253     20     59   0.7969   3.7489   3.7447
Overflow 6 4.996      0.0000 2000.000   2.1434     12     16   0.5104     12      0   0.4290   3.7489   3.7447
267.1      0.1052     1.4883 300.0000   0.1476     11     46   2.0731     11     46   1.4027   3.2564   3.2561
Overflow 8 3.788      0.0000 2000.000   1.3464     12     22   0.6325     11     49   0.3554   3.2564   3.2561
270.1      0.2083     1.8856 375.0000   0.2909     13     54   2.6103     13     54   1.3967   3.2532   3.2522
Overflow 1 8.233      0.0000 2000.000   1.3545     12     21   0.3578     12      1   0.1645   3.2532   3.2522
FREE # 1     Undefnd Undefnd  Undefnd   2.5771     12     21


##################################################
# Table E22. Numerical Model judgement section    #
##################################################

Your overall error was                          6.2698 percent
Worst nodal error was in node 77         with  36.5590 percent
Of the total inflow this loss was               6.4039 percent
Your overall continuity error was                Fair
                                                Excellent Efficiency
Efficiency of the simulation                     1.82
Most Number of Non Convergences at one Node     433.
Total Number Non Convergences at all Nodes     1919.
Total Number of Nodes with Non Convergences      12.

===> Hydraulic model simulation ended normally.
 ===> SWMM Simulation ended normally.
===> Your input file was named  : S:\51\19028\XPS\50 yr Existing v 23-09-02.DAT
===> Your output file was named : S:\51\19028\XPS\50 yr Existing v 28-09-02

*==============================================================*
|              SWMM Simulation Date and Time Summary            |
*==============================================================*
| Starting Date... September  27, 2002  Time...   11:41:22:95  |
|   Ending Date... September  27, 2002  Time...   12: 4:53:69  |
|  Elapsed Time...   23.51233 minutes or   1410.74000 seconds  |
*==============================================================*
```

```
Input File : S:\51\19028\XPS\50 yr Opt2 v 28-09-02.XP
Current Directory:   S:\
Executable Name:     C:\XPS\XP-SWM~1\swmmengw.exe
Read      0 line(s) and found    0 items(s) from your cfg file.
        *==============================================*
        |                  XP-SWMM2000                 |
        |            Storm Water Management Model      |
        |                  Version 7.51                |
        |==============================================|
        |                 Developed by                 |
        |==============================================|
        |                                              |
        |          XP Software Inc. and Pty. Ltd.      |
        |                                              |
        |             Based on the U.S. EPA            |
        |   Storm Water Management Model Version 4.40  |
        |                                              |
        |           Originally Developed by            |
        |            Metcalf & Eddy, Inc.              |
        |           University of Florida              |
        |         Camp Dresser & McKee Inc.            |
        |             September 1970                   |
        |                                              |
        |           EPA-SWMM is maintained by          |
        |           Oregon State University            |
        |           Camp Dresser & McKee Inc.          |
        |==============================================|
        |     XP Software      October, 2000           |
        |      Data File Version --->     9.0           |
        *==============================================*
```

```
*=====================================================*
|        Table E10 - CONDUIT SUMMARY STATISTICS       |
| Note: The peak flow may be less than the design flow |
| and the conduit may still surcharge because of the  |
| downstream boundary conditions.                     |
*=====================================================*
```

Name Conduit Name	Design Flow (cms)	Design Velocity (m/s)	Conduit Vertical Depth (mm)	Maximum Computed Flow (cms)	Time of Occurence Hr.	Min.	Maximum Computed Velocity (m/s)	Time of Occurence Hr.	Min.	Ratio of Max. to Design Flow	Maximum Depth > at Pipe Upstream (m)	Ends Dwnstrm (m)
24	52.388	2.2765	1460.000	-0.0810	12	8	0.4549	13	53	-0.0015	5.5847	5.5842
26	39.665	1.7440	1380.000	-0.4385	12	7	0.1816	13	54	-0.0111	5.5842	5.5836
30	25.150	6.2876	1000.000	0.9588	12	18	0.2397	12	18	0.0381	5.5613	5.5607
34	206.01	2.8001	2000.000	4.8221	12	17	0.5292	18	30	0.0234	4.9415	4.9383
38	304.94	3.8323	3000.000	5.0560	12	18	1.5191	12	10	0.0166	4.3894	4.0562
40	442.26	3.4450	3000.000	7.8247	12	19	1.1154	11	52	0.0177	3.7629	3.1997
42	315.86	3.8001	3000.000	8.6294	12	18	1.4487	11	54	0.0273	3.1997	3.1367
44	57.819	2.1196	2000.000	7.5707	12	20	1.5131	11	38	0.1309	3.1367	3.0717
46	11.089	3.6962	1500.000	8.4167	12	23	2.7407	12	23	0.7590	3.0717	2.5199
48	31.554	1.8768	2220.000	8.3875	12	25	1.6764	12	4	0.2658	2.5199	2.3863
54	60.340	3.3084	1800.000	4.0250	12	15	1.1464	10	8	0.0667	7.1028	5.5607
59	159.32	4.3347	2240.000	1.8387	12	14	1.6064	12	14	0.0115	6.1185	4.1396
60	8.329	0.6669	1200.000	2.3044	12	15	0.7687	12	3	0.2767	3.8617	3.7669
65	24.172	1.1335	1990.000	1.3444	12	17	0.6733	12	15	0.0556	3.1367	3.0788
69	20.570	1.4576	2000.000	1.2008	12	15	0.4018	12	15	0.0584	3.0778	3.0731
76	26.630	1.6644	1000.000	-0.8073	12	18	0.1491	13	21	-0.0303	3.1367	3.1367
78	72.704	3.3804	1720.000	-0.0912	12	16	0.1134	0	6	-0.0013	2.5202	2.5199
79	7.325	0.0000	900.0000	0.0596	12	23	0.1400	12	23	0.0081	3.0717	3.0340
81	1512.5	8.7807	6500.000	8.4508	12	25	0.3242	12	25	0.0056	1.0040	1.0000
83	304.94	3.8323	3000.000	5.2221	12	19	1.1087	12	4	0.0171	4.0562	3.7629
85	115.82	3.9343	1990.000	1.4902	12	15	0.3986	6	21	0.0129	4.1396	3.8617
86	0.5285	0.0480	1000.000	0.3334	12	15	0.3361	12	15	0.6309	4.1396	4.0562
88	41.521	3.4679	2000.000	0.0173	12	14	0.2831	6	56	0.0004	3.5017	3.0778
89	0.7846	0.0000	1000.000	-0.3727	12	14	-0.3861	12	14	-0.4750	3.3600	3.5017
91	16.971	1.0775	500.0000	0.0000	0	0	0.0000	0	0	0.0000	2.2300	2.2300
93	167.97	5.0899	1000.000	0.0161	12	23	0.1203	12	22	0.0001	3.0340	2.5202
94	434.33	13.1615	1000.000	0.0417	12	23	0.0934	0	0	0.0001	3.0340	2.5199
228.1	0.1376	0.8654	450.0000	-0.5605	12	50	-3.4994	12	50	-4.0724	5.5613	5.5836
Overflow 3	1.569	0.0000	1000.000	0.7897	12	18	0.4882	12	29	0.5033	5.5836	5.5613
232.1	2.997	4.7109	900.0000	2.0349	12	16	3.4566	18	30	0.6790	5.5607	4.9415
Overflow 4	1.569	0.0000	1000.000	2.8132	12	16	1.0046	12	16	1.7928	5.5607	5.5021
236.1	0.7714	2.3247	650.0000	0.9996	12	17	2.9970	12	17	1.2958	4.9383	4.3894
Overflow 5	1.569	0.0000	1000.000	4.0829	12	17	1.0865	12	17	2.6020	4.9383	4.8451
250.1	12.475	4.1585	1500.000	8.4487	12	25	3.6155	12	25	0.6772	2.3863	1.0040

```
Overflow 9 1.883     0.0000 1000.000   0.0000     0     0   0.0000     0     0   0.0000   1.0040   1.0040
253.1       1.130    3.9968 600.0000   0.7906    12    15   3.2144    11    40   0.6996   7.8354   7.1028
Overflow 290.596     5.6623 1000.000   3.2369    12    15   1.5868    12    15   0.0357   7.8354   7.6341
257.1      0.2806    2.5405 375.0000   0.3250    12    13   3.4757    11    37   1.1582   6.9535   6.1185
Overflow 7 1.569     0.0000 1000.000   1.5088    12    13   0.7707    12    13   0.9615   6.9535   6.8998
262.1      0.4499    2.2911 500.0000   0.3585    11    51   1.8255    20    59   0.7969   3.7669   3.7629
Overflow 6 4.996     0.0000 2000.000   2.1767    12    15   0.5030    11    49   0.4357   3.7669   3.7629
267.1      0.1052    1.4883 300.0000   0.1578    11    57   2.2139    11    57   1.4997   3.0788   3.0778
Overflow 8 3.788     0.0000 2000.000   1.2508    12    17   0.9230    11    58   0.3302   3.0788   3.0778
270.1      0.2083    1.8856 375.0000   0.3121    12     9   2.7967    12     9   1.4986   3.0731   3.0717
Overflow 1 8.233     0.0000 2000.000   1.2400    12    29   0.6152    12    14   0.1506   3.0731   3.0717
FREE # 1     Undefnd Undefnd  Undefnd  8.4507    12    25


##################################################
# Table E22. Numerical Model judgement section    #
##################################################

Your overall error was                              0.0497 percent
Worst nodal error was in node 45          with      0.0948 percent
Of the total inflow this loss was                   0.1869 percent
Your overall continuity error was                    Excellent
                                                    Excellent Efficiency
Efficiency of the simulation                         1.76
Most Number of Non Convergences at one Node        446.
Total Number Non Convergences at all Nodes        1907.
Total Number of Nodes with Non Convergences          8.

===> Hydraulic model simulation ended normally.
 ===> SWMM Simulation ended normally.
===> Your input file was named  : S:\51\19028\XPS\50 yr Opt2 v 28-09-02.DAT
===> Your output file was named : S:\51\19028\XPS\50 yr Opt2 v 28-09-02.out

*==============================================================*
|             SWMM Simulation Date and Time Summary            |
*==============================================================*
| Starting Date... September  27, 2002  Time...   13:34:50:99  |
|   Ending Date... September  27, 2002  Time...   13:56: 4:12  |
|  Elapsed Time...   21.21883 minutes or   1273.13000 seconds  |
*==============================================================*
```