Additional modelling downstream of the Claymore site was undertaken as requested by Council. The additional area modelled includes the downstream watercourse reach from the Claymore site extents to the Hume Highway culverts. Modelling of this area was undertaken to observe the effects the development may have on downstream flooding, however as discussed in section 5.3, the proposed flow rates from the Claymore site are less than the pre-redevelopment flow rates generally improving the downstream conditions against the Hume Highway.

Resistance to flow is a function of the surface roughness in the channel and overbank areas, and is affected by vegetation, development etc. Roughness was represented by Manning's 'n' values. Guides for the estimations of roughness parameters are given in several standard publications such as Australian Rainfall and Runoff (1987), HEC-RAS Hydraulic Reference Manual (2003), and Councils Engineering Design Guide for Development (2009). Values of Manning's 'n' were chosen on the basis of field inspection. Here 0.035 was used for grassed areas, 0.06 for concentrated areas of trees and 0.013 for roads and / or pathways.

Along the existing river alignment, there are a number of buildings that may impact on the effectiveness of overland flow. These buildings were incorporated into the HEC-RAS model as "obstructions" and include amenity buildings, dwellings, etc.

The existing network includes a series of detention basins (4) and a large underpass beneath Gould Rd. Each of the existing detention basins are formed via an earth embankment mound. The staged storage relationship on each of the basins was assessed in Section 5.0 and includes a low level piped outlet (typically 1650dia pipe) as well as a high level spillway (formed by the top of the embankment).

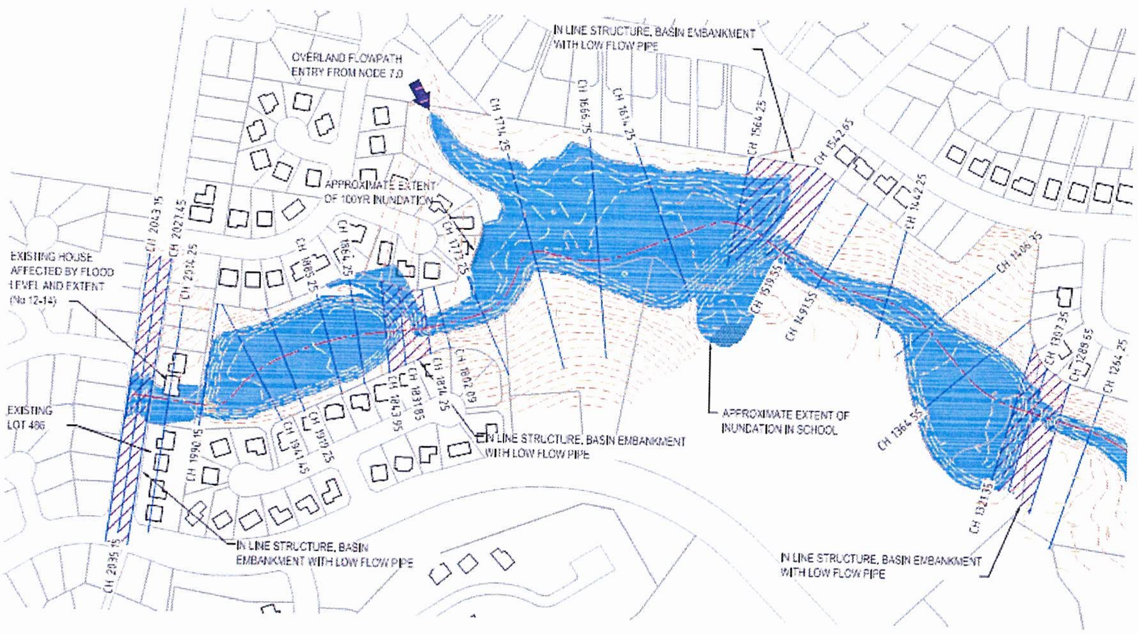

Figure 6.1 – Western Portion of Existing HEC-RAS

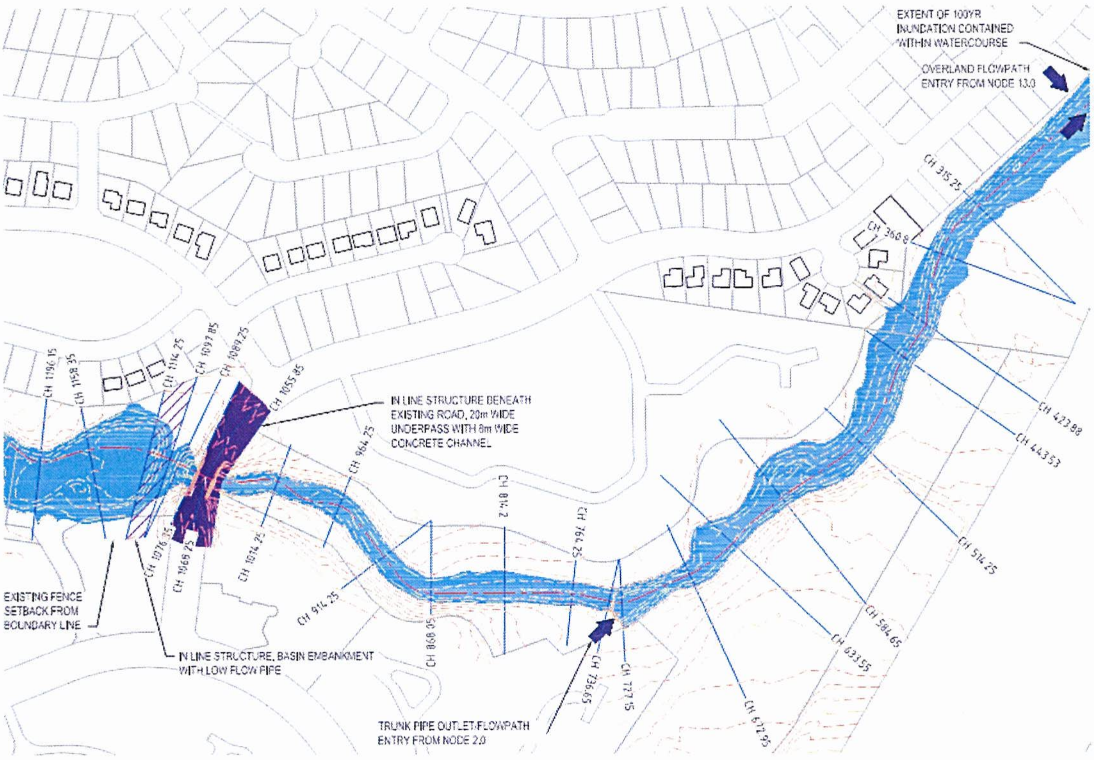

Figure 6.2 –Central Portion of Existing HEC-RAS

Figure 6.3 –Eastern Portion of Existing HEC-RAS

Detention Basins were modelled within HEC-RAS as "inline structures" in accordance with the HEC-RAS user manual. Ineffective areas were then assigned for each of the sections through the detention basins which may be affected by the downstream embankment. Flowrates from Section 5.0 were then assigned at the downstream section to represent the overland flows in excess of the piped system as well as flows from surrounding areas. Refer to Table 5.6.

The bridge crossing (under Gould Road) was modelled as a "bridge culvert" in accordance with the HEC-RAS user manual. This involved interpolation of cross sections just upstream and downstream, ineffective areas applied at 45deg from opening, decks extending for the surveyed width and level, and contraction and expansion losses applied as recommended. The decks (road above) were input from 12d sections.

2.2.2.5. Proposed

The proposed HEC-RAS network was extended to incorporate all proposed works adjacent to the central channel / basin system. Additional Cross Sections were also added at critical positions in order to model new proposed basins, new roads and the like. Cross Sections were also modified for the regraded portion of Creek between approx Ch727.15-Ch504.25.

The proposed detention basin (at Ch514.25 – Ch435.08) was modelled as a "storage area" in accordance with the HEC-RAS user manual, while a "lateral structure" was modelled to simulate the volume of flow which is directed into the proposed basin for attenuation.

An embankment across the channel is required in order to direct a portion of surface flows into the "offline" detention basin. The size of the embankment and low flow box culverts were determined by iteration in Section 5.0 and modelled as a "bridge culvert" in accordance with the HEC-RAS user manual.

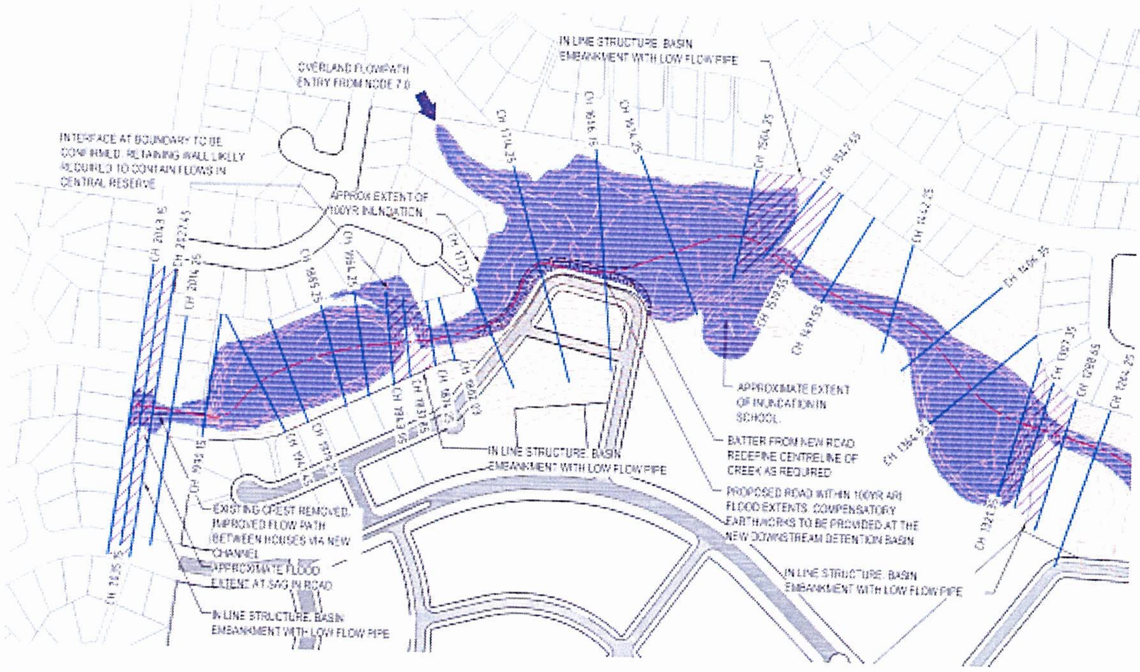

Figure 6.4 – Western Portion of Proposed HEC-RAS

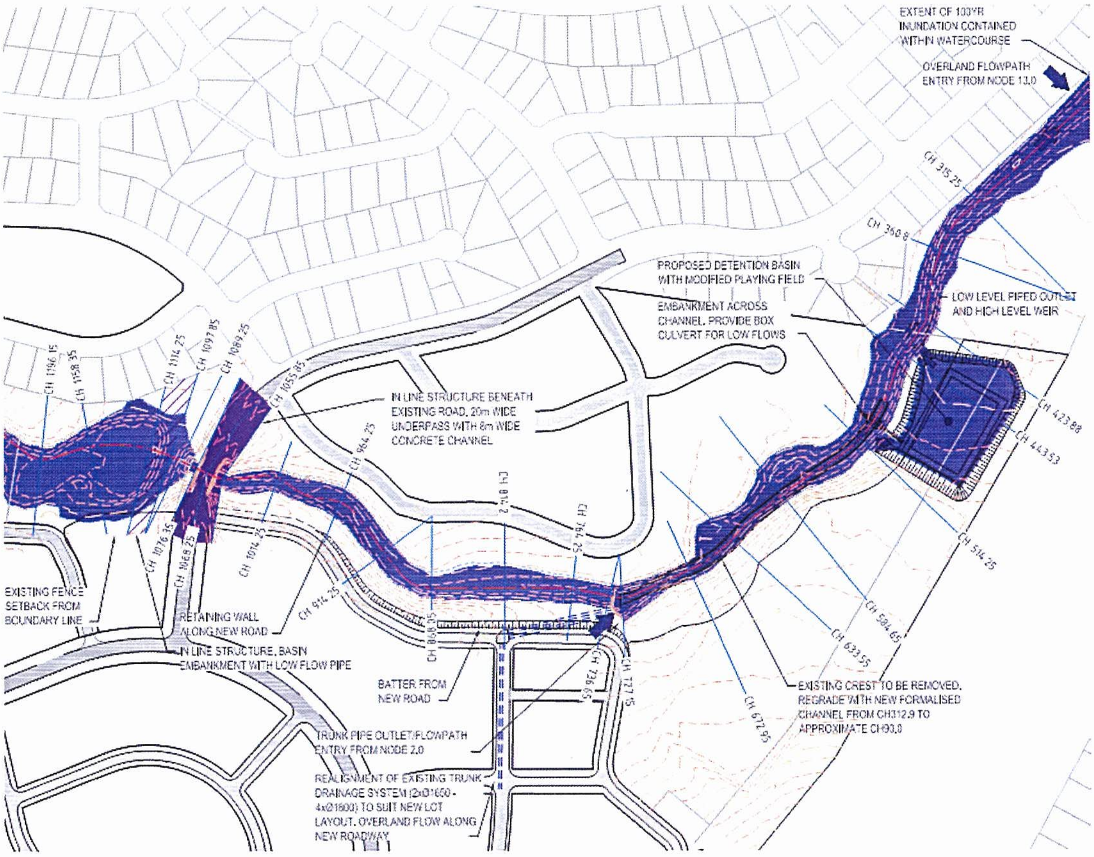

Figure 6.5 – Central Portion of Proposed HEC-RAS

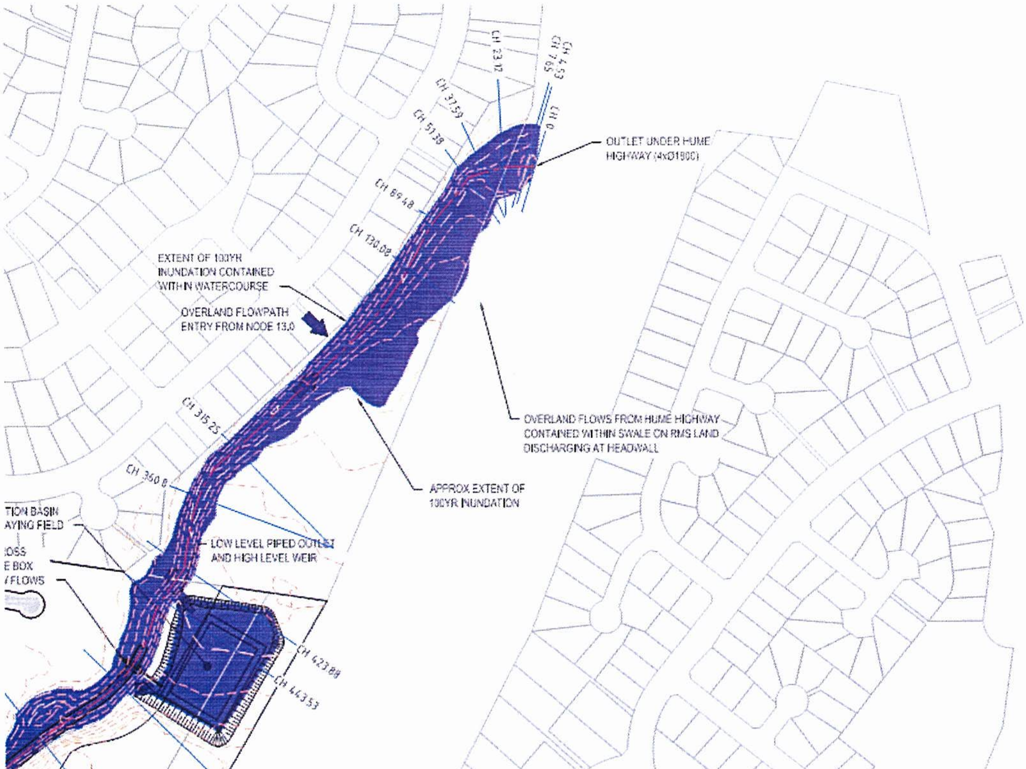

Figure 6.6 – Eastern Portion of Proposed HEC-RAS

6.2.2. Boundary Conditions

Discharges calculated from hydrologic modelling in Sections 5 were incorporated into the model as per Table 5.6. These were inserted at upstream locations as well as additional inflows along the branches at cross-sections corresponding to the hydrologic model nodes that were considered critical. Normal depth was used as the upstream boundary condition (measured as 1%). while a known water surface was used for the downstream boundary. The downstream boundary condition was conservatively assumed as having a top water level equal to the obverts of the 4 x 1800dia pipes at Jackson park. It should be noted that this culvert is under inlet control and this assumption will not affect the results.

6.3. Results

Full HEC-RAS results are included in Appendix D.

The following table shows the difference in 1 in 100 year ARI flood levels between the existing and proposed scenarios, while the extent of inundation is shown on drawings W08 to W013. The quoted proposed results have incorporated the attenuation measures created by the new detention basin as well as the improved overland flowpaths.

Table 6.1 – 1 in 100 year ARI flood levels (existing versus proposed)

HECRAS CH	Existing W.S	Proposed W.S	Difference (m)
2043.15	73.52	73.29	-0.23
2027.45	73.52	73.28	-0.24
2014.25	73.47	73.25	-0.22
1990.15	73.01	73	-0.01
1941.45	71.75	71.75	0
1919.25	71.75	71.75	0
1885.25	71.75	71.75	0
1864.25	71.75	71.75	0
1843.95	71.75	71.75	0
1814.25	69.06	69.08	0.02
1802.09	69.07	69.09	0.02
1773.25	69.06	69.07	0.01
1714.25	69.06	69.07	0.01
1666.75	69.06	69.07	0.01
1614.25	69.06	69.07	0.01
1564.25	69.05	69.06	0.01
1519.55	65.65	65.68	0.03
1491.55	65.22	65.25	0.03
1442.25	64.84	64.95	0.11
1406.35	64.83	64.92	0.09
1364.55	64.83	64.93	0.1
1321.35	64.83	64.93	0.1
1288.65	62.45	62.5	0.05
1264.25	62	62.05	0.05
1196.15	62.05	62.09	0.04
1158.35	62.05	62.09	0.04
1114.25	62.05	62.09	0.04
1089.25	61.7	61.7	0
1076.35	59.59	59.66	0.07
1055.85	59.51	59.57	0.06
1014.25	59.21	59.31	0.1
964.25	58.89	59.01	0.12
914.25	58.54	58.6	0.06
868.05	58.18	58.23	0.05
814.25	57.96	58.01	0.05
764.25	57.56	57.61	0.05
736.65	57.25	57.3	0.05
727.15	57.28	57.04	-0.24
672.95	57	56.61	-0.39
633.55	56.49	56.46	-0.03
584.65	56.46	56.45	-0.01
514.25	56.22	56.15	-0.07
502.6	-	56.17	-
492.62	-	56.02	-
443.55	55.74	55.86	0.12
435.08	-	55.67	-
423.88	55.65	55.58	-0.07
360.8	55.14	55.12	-0.02
315.25	54.63	54.57	-0.06
130.08	53.42	53.4	-0.02
89.48	52.96	52.86	-0.1
51.38	52.72	52.53	-0.19
37.59	52.73	52.42	-0.31
23.12	52.73	52.42	-0.31
7.65	52.73	52.43	-0.3
4.53	52.75	52.45	-0.3
0.02	52.66	52.36	-0.3
0	50.68	50.68	0

- denotes additional sections in proposed scenario

6.4. Discussion

The following comments are provided:

- As discussed in Section 5.0, a portion of flows within extreme flood events are required to be directed into the new detention basin for attenuation in order to achieve pre-post requirements at the downstream most cross section (i.e. 25.97m^3/s flow split in the 1 in 100 year event). Iterations were subsequently undertaken within HEC-RAS to determine a suitably sized embankment and overflow weir to direct such flows into the basin.
- Results indicate that by introducing a lateral weir approximately 18m long at RL55.1, then 25.97m^3/s is directed into the basin. Refer to detail on drawing W015 and Figures in Appendix D.
- Site investigations and modelling within HEC-RAS indicate that a sag exists at Drysdale St, with ponding occurring prior to flows being directed into the channel / basin system (up to 110mm).

  The sag is currently drained by 5 kerb inlet pits within the roadway into a trunk pipe system (1800dia, 600dia and 1350dia) and onto the headwall outlet. Those flows which are not conveyed via this piped system then travel overland between the houses (No 12-14 and lot 486) through a 20.5m wide reserve. The capacity of the piped system is estimated as being 17.2m^3/s. Hence by incorporating a 50% blockage factor, the remaining flowrate will be 3.6m^3/s.

  Results from the existing HEC-RAS show that the **existing** extent of flood inundation extends into No 12-14 with likely insufficient freeboard to floor level.

  While the proposed development does not extent into the western catchment, an opportunity does exist to improve the current situation prior to handover to Council. Proposed works subsequently incorporates localised regrading of the area from back for kerb to edge of basin. Here modelling has included removal of the crest in the reserve, with a new 13m wide, 0.4m deep channel with 1 in 4 side slopes introduced. Results in the proposed model show that it is likely for flood inundation to be clear of the existing house with freeboard to the existing floor level.
- Proposed flows through the development show a slight increase in flood levels across each of the basins and channels from existing (average 32mm increase from Ch1990.15 to Ch727.15). This includes areas where the water level has reduced (maximum **decrease** of 240mm and maximum **increase** of 120mm). Results do however indicate that the basins will continue to act as per the original design (by others).
- The design approach adopted in the proposed scenario is to accept these increases and maintain the existing basin configurations. The new detention basin will then allow for the overall flow rate to be reduced prior to discharging downstream.
- The extent of flood inundation in the 1 in 100 year ARI event is shown on drawings W08-W013. Generally the flood extent is restricted within the existing boundaries of the central channel / basin system. There are some isolated areas where the flood extent appears to extend into properties both in the existing and proposed situations. These appear at (a) Ch1854.25 – Ch1819.25 (b) Ch1519.55 – Ch1609.25 (c) Ch1109.25 – Ch1169.25. In each of these instances, the interface between the

channel and the existing properties will be confirmed within detailed design. The following is also noted:

(a) Ch1854.25 – Ch1819.25 --> Interface to be confirmed. It is anticipated a retaining wall and localised filling within the lot may likely be required along the property boundary to restrict flows to be wholly within the central reserve;

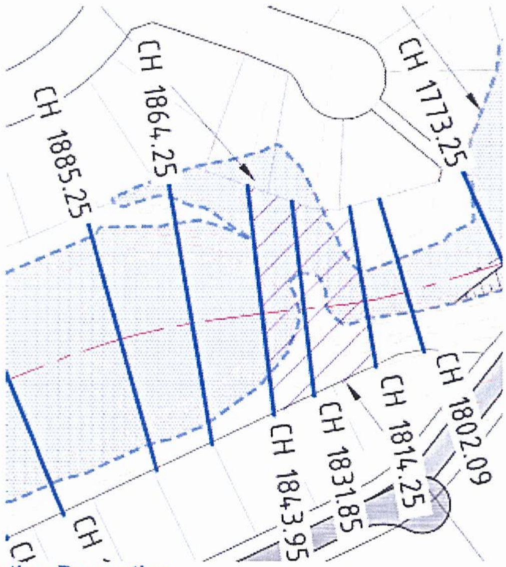

Figure 6.7 – Flood Interface with Existing Properties

(b) Ch1519.55 – Ch1609.25 --> Interface to be confirmed. Flooding appears to extend from the basin into the existing school property but is outside the school fenced area. The boundary needs to be confirmed in this location as it appears that the school has constructed works outside of their property boundary and within the reserve. Flood levels are only increased by 10-30mm at this position – which is considered relatively minimal from existing. Localised filling or regrading may need to be undertaken to restrict flows wholly within the watercourse ; and

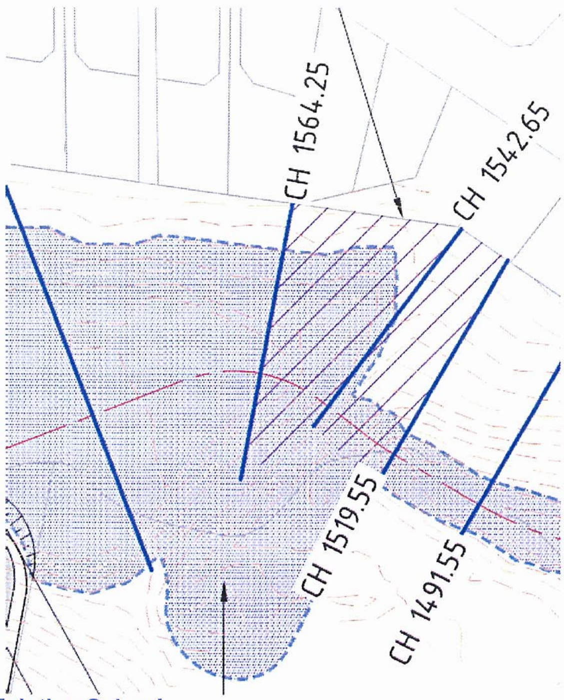

Figure 6.8 – Flood Interface with Existing School

(c) Ch1109.25 – Ch1169.25 --> An existing fence line is offset inside the property boundary. The flood extent is clear of this fence line, consequently any impact does not seem significant. Localised filling or regrading may need to be undertaken to restrict flows wholly within the watercourse

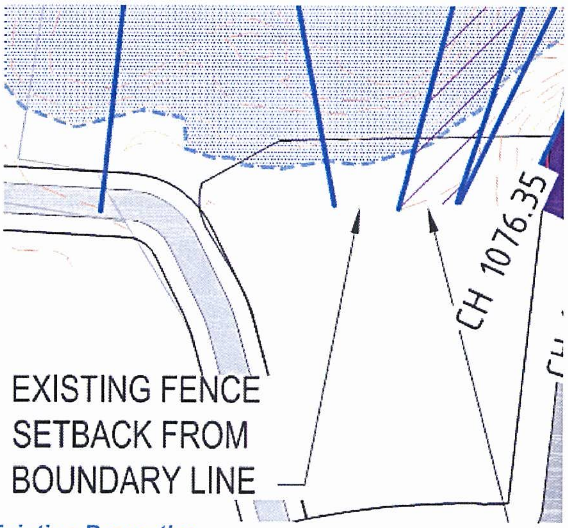

Figure 6.9 – Flood Interface with Existing Properties

- The proposed roadway between Ch1634.25 and Ch1764.25 extends into the existing basin. Preliminary levels undertaken for the master planning have indicated that this roadway will be elevated with a suitable 1 in 4 batter into the basin. The height of the roadway will be at approximately RL69.07m and subsequently be situated above the 100year flood level. Freeboard to nearby houses will be achieved via driveways and the like.
- It is recognised that the basin storage will likely be reduced by the proposed road configuration. As discussed in Section 5, additional storage will consequently be provided via additional volume at the downstream proposed basin.
- Minor regrading will be required in order to re-define the centreline of the flowpath adjacent to the new batter.
- As discussed in Section 5.0, the existing scenario has an area of ponding immediately downstream from the large concrete headwall at Ch727.15 (up to 460mm). From site investigations, this ponding appears to have affected the overall performance of the trunk piped system with evidence of sedimentation occurring in the pipes up to approximately 300mm within the existing 4 x 1800dia. The proposed model has incorporated a new 6m wide channel to grade from Ch727.15 to Ch514.25 at 0.37%. Refer to drawing W06 and W015. For details, long section and extent. From 12d modelling, it appears that this flowpath can be improved while still maintaining the low flow pipe system in place (600dia) and losing only a few existing trees. Site investigations have indicated that these trees which are to be removed are not considered significant, however should be verified by a qualified arborist
- As discussed in section 5.0 the proposed flows in the external downstream reach from Ch 435.08 to Ch 0.0 are generally less than the existing flows improving the flooding conditions in this reach and against the Hume Highway inlet. Water levels over this section are less than the existing by between 0.02-0.3m. It should be noted that no critical flood hazards were observed in the existing scenario for this section.

- A sensitivity analysis was undertaken by applying a 50% blockage factor to the 4 x 1800dia pipes at the outlet to the catchment for the critical 100 year ARI event. This resulted in flood waters ponding at the headwall and rising to a level that allowed them to spill onto the Hume Highway corridor in both the existing and proposed scenarios. In the event of a 50% or greater blockage of the 4 x 1800 pipes the flood ponding would also extend into the local properties around the Hume Inlet.

6.4. PMP/PMF Event Discussion

Consideration for the PMF event has been made in this report in section 5.0. Modelling of the PMF event in HEC-RAS was not undertaken as flows are well in excess of the section capacities and extending sections over the greater floodplain is well outside the available survey data.

The following comments are provided in discussion of the PMF event.

- All existing and proposed detention basins will overtop.
- The capacity of the 4 x 1800mm pipes under the Hume Highway are less than the expected PMF flows, resulting in ponding of stormwater against the Hume highway. Ponded water will extend back into the adjacent properties and will generally affect properties along the watercourse fringe.
- In the event of a PMF event Council's/SES regional evacuation procedures should be implemented. All properties appear have the ability to evacuate or head safely to higher ground in the PMF event.

7. Water Quality Modelling

The stormwater management systems for the site shall comply with Campbelltown City Council's Development Control Plan. Council's policy requires improved water quality of the stormwater flow from the developed site prior to discharge into the authorities drainage system.

To demonstrate compliance with these objectives, treatment removal loads were analysed from pre to post development scenarios using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) software. Model development and results are discussed below.

7.1. Model Parameters

The soil properties for the pervious areas of the catchment were taken from Draft NSW Music Modelling Guidelines (2008).

Table 7.1 - MUSIC Soil Parameters

Soil Properties:	Default Value for Urban Catchments
Impervious threshold (mm)	1.0
Soil storage capacity (mm)	170
Initial storage (% of capacity)	30
Field capacity (mm)	70
Infiltration coefficient 'a'	210
Infiltration coefficient 'b'	4.7
Initial groundwater depth (mm)	10
Daily recharge rate (%)	50
Daily base flow rate (%)	5.0
Daily deep seepage rate (%)	0.0

7.2. MUSIC Methodology

MUSIC software allows the modeller to assess the effectiveness of the water quality devices by measuring against a "base" model (which assumes that no water quality treatment measures are installed). The proposed developed site was compared with and without water quality treatment measures and subsequent pollutant reduction percentages calculated, based on the compared results.

These were then compared with pollutant removal objectives set out by Campbelltown City Council (CCC, 2009). As no other information regarding the watercourse system could be obtained, the following default removal rates were adopted from Council's standards (these rates are also consistent with those specified in Australian Runoff Quality).

Table 7.2 - MUSIC Pollutant Reduction Targets

Pollutant	Minimum Removal Rates
Gross Pollutants (GP)	90%
Suspended Solids (TSS)	80%
Nitrogen (TN)	45%
Phosphorous (TP)	45%

7.2.1. Base Catchment

The RAFTS model developed for detailed analysis and design of the proposed water management system divided the site into approximately 42 sub-catchments. This level of detail is required at the design stage for the site hydrologic and hydraulic analyses. However, this level of detail is not necessary for water quality modelling using MUSIC because the treatment devices capture runoff from large areas and sub-division of sub-catchments smaller than the treatment catchment will not achieve improved results.

The RAFTS sub-catchments were therefore consolidated into 8 sub-catchment areas based on the proposed drainage system layout (refer Figure 7.1 and 7.2).

Catchments were separated into three components for the purposes of the MUSIC model:

- Roof areas;
- pervious areas (including open space); and
- pavement areas (including roads, footpaths, etc.).

Roofed, pervious and impervious areas were measured as a percentage from the master plan documentation.

Claymore Public School has not been included as part of the site and therefore excluded from the water quality modelling.

Table 7.3 - Area Breakdown per MUSIC Sub-Catchment

Sub-Catchment	Impervious Area (Ha)	Pervious Area (Ha)	TOTAL AREA (Ha)
M1	8.01	8.11	16.12
M2	11.38	5.89	17.27
M3	4.46	3.82	8.28
M4	11.26	5.14	16.40
M5	21.34	7.97	29.31
M6	19.08	7.49	26.57
M7	3.73	2.12	5.85
M8	1.22	0.58	1.80
		TOTAL	121.60

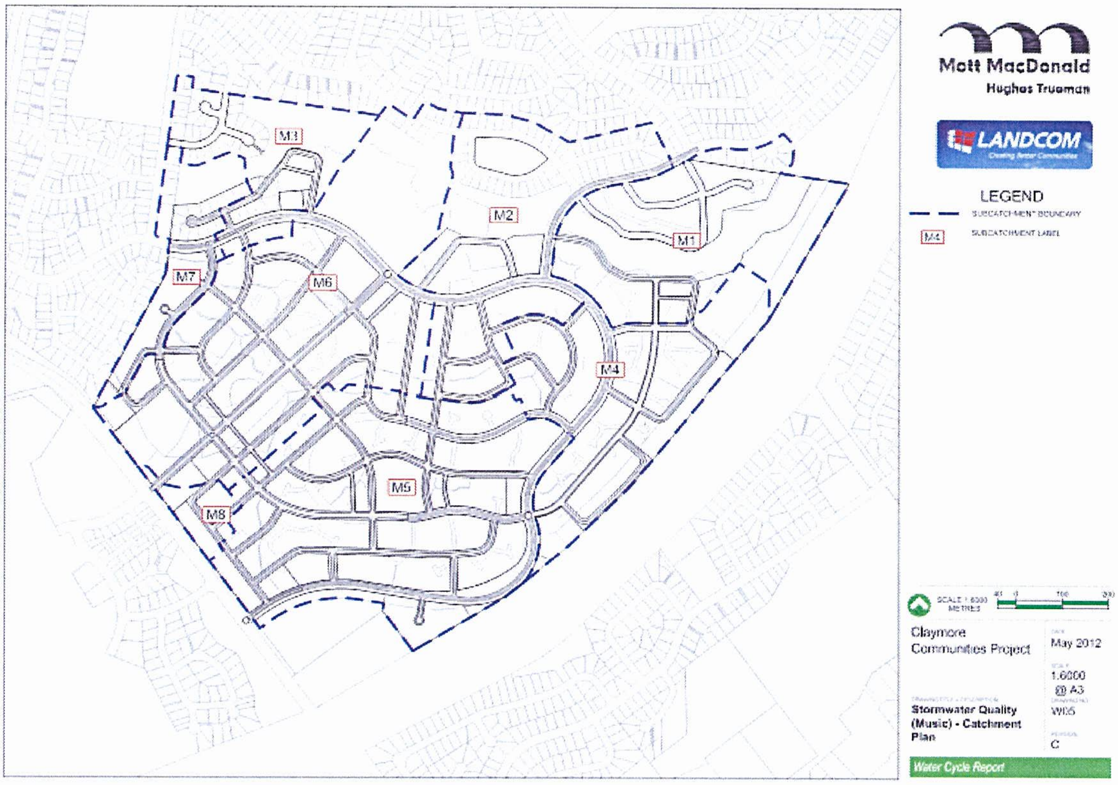

Figure 7.1 – MUSIC Catchment Plan

7.2.2. Proposed Catchment

The proposed catchment model was identical to the base model in terms of catchment area and break-up of roof, paved and pervious areas, but included the water quality management strategies outlined below.

7.3. Management Strategies

Storm runoff generated on the CERP site can be separated into 3 streams:

- Roof or rainwater runoff, which can be captured and reused for toilet flushing or irrigation;
- Road and pavement runoff, which can be treated by grassed swales or bio-retention devices; and
- Pervious surfaces will have reduced runoff due to a portion of infiltration, and water "lost" to groundwater.

The proposed treatment train is as follows:

- Rainwater tanks are to be provided on the proposed dwellings for at source treatment and re-use of roof water;
- Gross pollutant traps and trash racks to capture larger pollutants and sediments before discharge into the watercourse; and
- Native Grass Infiltration swales to provide online treatment for effective removal of fine sediments and nutrients.

The possibility of using the tree bays as an at source stormwater bio-retention device has not been considered as part of this proposal. The deviation of low flows from the road gutters into these tree bays would enable the at source water quality treatment of the low flows. This additional treatment would further improve any water quality results obtained during this modelling. The potential for this would be assessed as part of individual evaluation of each stage depending upon site parameters including road networks and grades.

With the rapidly evolving field of Water Sensitive Urban Design any proposed measures should be reconsidered at the time of construction to ensure they are still industry best practice and suitable for the development however, at a minimum they should meet the requirements specified in this report.

7.3.1. BASIX Requirements/ Rain Water Tanks

A preliminary BASIX application was prepared (refer appendix F) to provide an approximate indication of the water quality and reuse targets required for individual dwellings to achieve a 40 point water saving rating. This has been based on a lot size of 450m^2, with a 270m^2 dwelling.

To achieve the 40 point rating the following assumptions have been made as the ideal minimum benchmark to be achieved for each lot. More efficient water saving devices may be implemented for dwellings to achieve a higher rating to encourage more sustainable development.

- Water Fittings
  - Minimum 3 Star Rating for Toilet Flushing Fittings
  - Minimum 3 Star Rating for Shower Heads and Tap Fittings
- Rainwater Tanks: 2500L (includes reuse for toilet flushing and gardening)

Rainwater reuse volumes for residential have been calculated based on the following:

- 86L/day for Toilet flushing, and
- 220L/day for general irrigation.

Refer appendix F for a more detailed breakdown of the BASIX point scheme.

7.3.2. Gross Pollutant Traps

For the purposes of MUSIC modelling on the CERP site, it was assumed that Gross Pollutant Traps (GPTs) would be located at the outflow from each discharge point into the watercourse. Additionally, GPTs are assumed upstream of any proposed water body or bio-retention devices to provide pre-treatment of gross pollutants and suspended solids.

Proposed positions of these Gross Pollutant Traps are shown in drawing W03. Here positioning has taken into consideration proposed catchments as well as both existing and proposed stormwater infrastructure.

MUSIC requires that transfer functions for the reduction in pollutants be entered. The pollutant reductions vary for different types of GPTs, estimates were therefore applied to the average advertised removal rates of the Rocla's "Cleansall", the CDS Unit and Humes' "Humeceptor":

Table 7.4 - GPT Pollutant Reductions

Pollutant	Rocla [1]	CDS [2]	Humes [3]	Adopted Rate
Total Suspended Solids (mg/L)	70%	70%	87%	**70%**
Total Nitrogen (mg/L)	-	23%	45%	**25%**
Total Phosphorus (mg/L)	-	30%	30%	**20%**
Gross Pollutants (kg/ML)	100%	98%	-	**95%**

[1] *Rocla Water Quality – Cleansall Gross Pollutant Trap* (Rocla Pty. Ltd. 2002)

[2] *Removal of Suspended Solids and Associated Pollutants by a CDS Unit* (CRC Catchment Hydrology 1999)

[3] *Humeceptor case study – Seatac, Washington USA* (http://www.humes.com.au/products/StormwaterQuality/humeceptor/seattle.pdf)

Table 7.5 - MUSIC Input - GPT Pollutant Reductions

Pollutant	Input	Output
Total Suspended Solids (mg/L)	1000	300

Total Nitrogen (mg/L)	50	25
Total Phosphorus (mg/L)	5	4.0
Gross Pollutants (kg/ML)	15	0.8

In accordance with statutory requirements, the GPTs will need to treat the maximum flow rate from their upstream catchments for all flows up to and including the 3-month ARI storm event. The following flow rates have been extracted from the RAFTS model.

Table 7.6 - GPT-Treatable Flow Rates

GPT No	Location	Rafts Node	Treatable Flow Rate (m^3/s) – 3 month
1	The Northern side of the watercourse and West of Gould Rd	N3.1	0.238
2	The Southern side of the watercourse and West of Gould Rd	N10.0	0.183
3	The Southern side of the watercourse and West of Gould Rd	N4.0	0.357
4	The North-East Corner of Davis Park	N5.0	2.227
5	The Southern side of the watercourse alongside the Carter Pl extension	N6.0 + 20% of C1.4	0.184

7.3.3. Trash Screens/Racks

At present catchments M5 and M4 discharge into the creek system via four 1800mm dia. culverts. It is desirable to pre-treat these flows to remove gross pollutants before discharging into the infiltration basin, however providing a GPT for these pipes is not desirable due to the size of the required unit and maintenance requirements.

In order to remove gross pollutants a trash screen is proposed at the downstream end of the headwall to filter the larger pollutants for the 3 month ARI flows. Providing a trash rack at this location will allow for easy access and maintenance.

It has been assumed that the trash screen will not remove any nutrients or fine sediments therefore the following removal rates have been adopted.

Table 7.7 - MUSIC Input – Trash Screen Removal Rates

Pollutant	Input	Output	Percent Reduction

Total Suspended Solids (mg/L)	1000	700	30%
Total Nitrogen (mg/L)	50	50	0
Total Phosphorus (mg/L)	5	5	0
Gross Pollutants (kg/ML)	15	0.75	95%

7.3.4. Infiltration Basin

An infiltration basin is proposed to treat runoff from sub-catchments M1, M4 and M5. Upstream flows from each sub-catchment will be directed to GPT's and trash racks to provide pre-treatment of gross pollutants and larger suspended solids prior to entry into the watercourse. The 3 month flows will be conveyed via the 4 x 1800mm dia. Pipes and headwall to the treatment facilities, with larger flows continuing along the stormwater network as bypass.

The following parameters were input into the MUSIC model:

Table 7.8 – Infiltration Basin MUSIC Parameters

Catchment	Swale Surface Area (m^2)	Extended Detention Depth (m)	Filter Area (m^2)	Depth of Infiltration (mm)
M2, M3, M6, M7	3000	0.15	2700	600
M1, M4, M5	2200	0.15	1900	600

7.3.5. SALINITY: WSROC Salinity Code of Practice and CCC Standards

The Western Sydney Salinity Code of Practice: Salinity Map identifies the Claymore site as at risk of high risk of salinity potential.

In accordance with council's guidelines bio-ribbons and wetlands are to be constructed with an impermeable membrane (specific reference is made to clay being unsuitable for use as an impermeable layer). In order to mitigate the effects of salinity a plastic membrane is proposed to provide a barrier reducing the infiltration of additional water into the groundwater system from the bio-retention and infiltration ponds, which if not implemented may potentially increase the groundwater level and subsequently cause saline to rise to the surface.

7.4. Results

7.4.1. Base Model

In accordance with the industry standards and assessment processes the base water quality MUSIC model for the site was developed assuming that no water quality treatment measures would be installed. This model provides the basis for pollutant generation from the site and the measure for pollutant removal under "treated" conditions.

7.4.2. Proposed Model

The "treated" site conditions model was developed incorporating the water quality treatment train as described above. Diagram 7.2 shows the layout of the model in MUSIC.

The results of the model are summarised in Table 7.9 below, and show that including a treatment train as described above, the water quality improvement objectives set out in Council's Campbelltown (Sustainable City) *Development Control Plan 2009, Volume 2, Engineering Design for Development* – June 2009 are achieved.

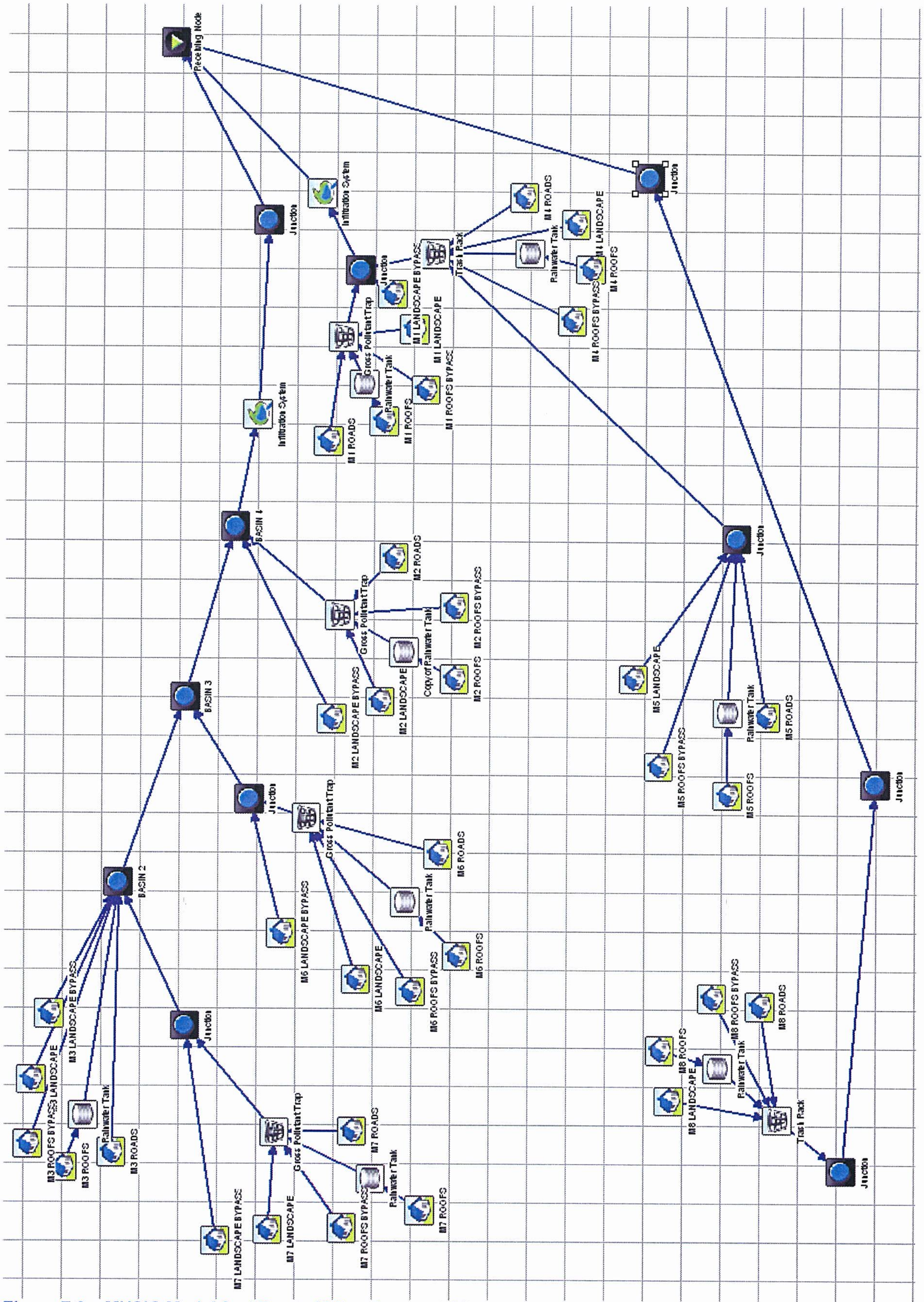

Figure 7.2 – MUSIC Model for "Treated" Development Site

The proposed site discharges comply with the current 2009 CCC DCP. An assessment has been made against the Draft CCC treatment objectives and all contaminants listed above are sufficiently removed with the exception of TSS.

Table 7.9 – MUSIC Model Results vs Objectives

	TSS (kg/yr)	TP (kg/yr)	TN (kg/yr)	GPs (kg/yr)
GENERATION	125000	249	1840	21600
OUTPUT	25000	76.1	552	13.2
REDUCTIONS	80.1%	69.5%	70%	99.9%
OBJECTIVES	80%	45%	45%	90%
CCC Draft Objectives	85%	45%	65%	90%

Conclusions

7.5. Water Quantity

RAFTS models of the proposed Claymore Estate Renewal Project were set up and run using design storms of various ARI's and durations. The model results were compared against the corresponding models used to represent the existing catchment development.

The model included retention of existing detention basins along the central watercourse and adjustments of Basin 3 to incorporate the developed footprint. A 5,600m^3 basin has been proposed at the outlet to the site, incorporated as part of Fullwood Reserve to ensure that downstream flows and flood damage risk would not increase in the 100-year ARI event as a result of the proposed development.

HEC-RAS models were also created to determine both the level and extent of flood inundation for the 100-year ARI event. An assessment identified potential hot spot areas and indicated those regions which require dwellings to sit higher than adjacent road levels. Analysis also showed that there would be no adverse effect on existing houses to be retained in the estate and downstream properties.

An assessment of flow depths and velocities in the 100-year ARI was also undertaken. A number of areas were identified where minor piped drainage system links would need to be designed for an ARI greater than Council prescribed criteria (i.e. 5-year ARI) so that overland flows in a major storm meet the safety criteria.

7.6. Water Quality

The water quality model set up using the MUSIC software provides an indication of the pollutant removal rates expected when applying a treatment train of measures. However, the model is limited to concept analysis and the detailed size and removal rates for the different treatment components should be developed at the detailed design stage of the project.

According to the results of the MUSIC analysis, a treatment train consisting of rainwater reuse, Infiltration facilities and GPTs/ trash racks will provide adequate treatment from the proposed development of the Claymore Estate Renewal Project site to exceed the statutory water quality objectives.

8. References

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Appendix A: Drawings

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LEGEND

SITE BOUNDARY

SCALE 1:7500
METRES
150 75 0 150

Claymore
Communities Project

DATE
May 2012

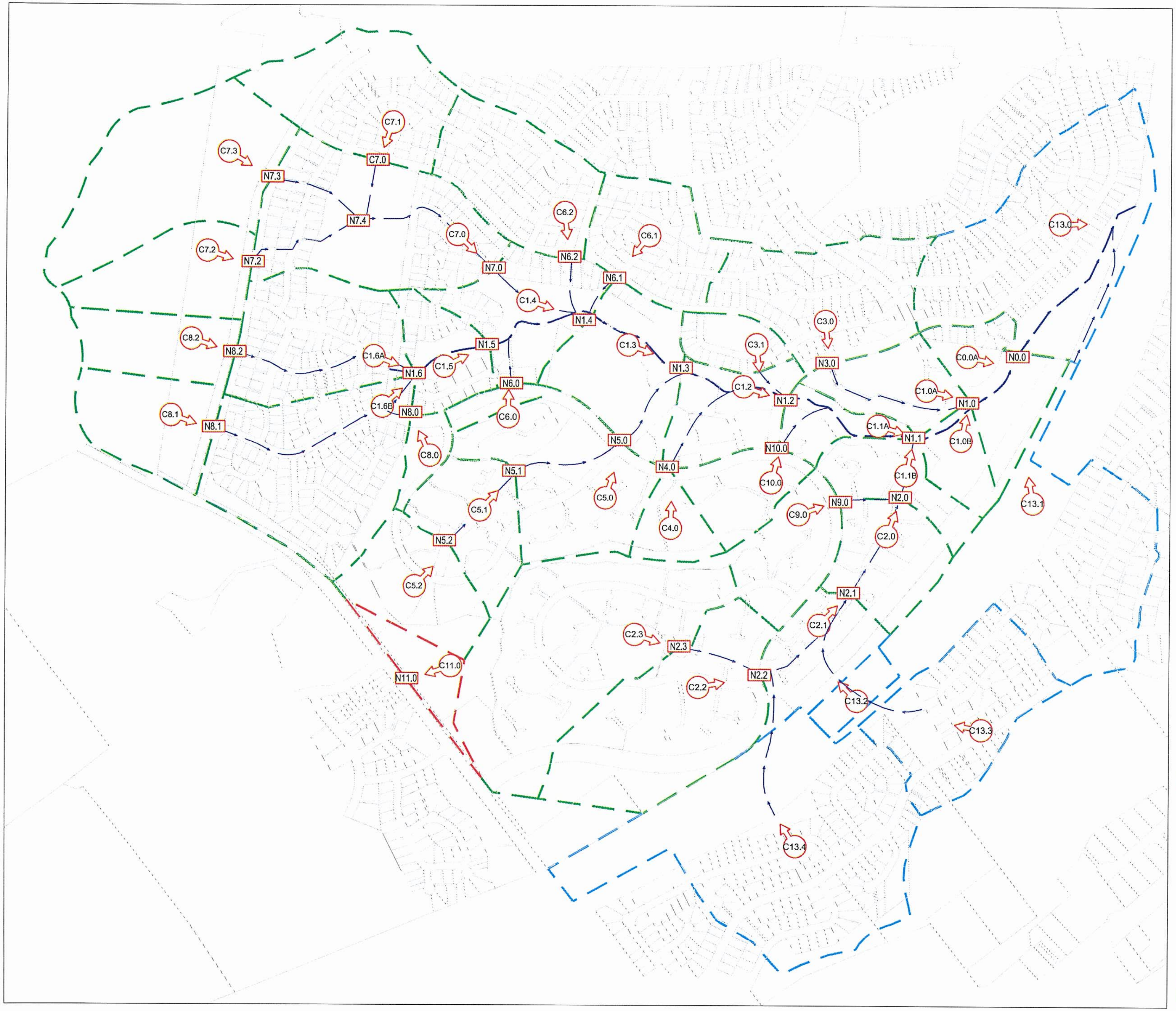
SCALE
1:7500
@ A3

DRAWING TITLE + DESCRIPTION
Existing Site Plan

DRAWING NO.
W01

REVISION
A

Water Cycle Report



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LEGEND

- EXISTING OVERLAND FLOW PATH
- EXISTING CREEK
- RIDGE LINE
- NORTHERN CATCHMENT BOUNDARY
- SOUTHERN CATCHMENT BOUNDARY
- EASTERN CATCHMENT BOUNDARY
- N1.2 RAFTS 'LINK' NODE
- C1.3 RAFTS CATCHMENT NODE

SCALE 1:8000
METRES
100 50 0 200

Claymore
Communities Project

DATE
May 2012

SCALE
1:8000 @
A3

DRAWING TITLE + DESCRIPTION
Existing Catchment Plan

DRAWING NO
W02

REVISION
A

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LEGEND

	SITE BOUNDARY
	EXISTING DETENTION BASIN
	PROPOSED DETENTION BASIN
	PROPOSED INFILTRATION SWALE
	PROPOSED ROAD
	EXISTING ROAD
	SENIORS LIVING
	RETAIL CENTRE
	PARKS / OPEN SPACE
GPT	GROSS POLLUTANT TRAP
TRASH RACK	TRASH RACK
	PROPOSED GRASS SWALE

SCALE 1:6000 METRES — 40 0 100 200

Claymore Communities Project

DATE May 2012

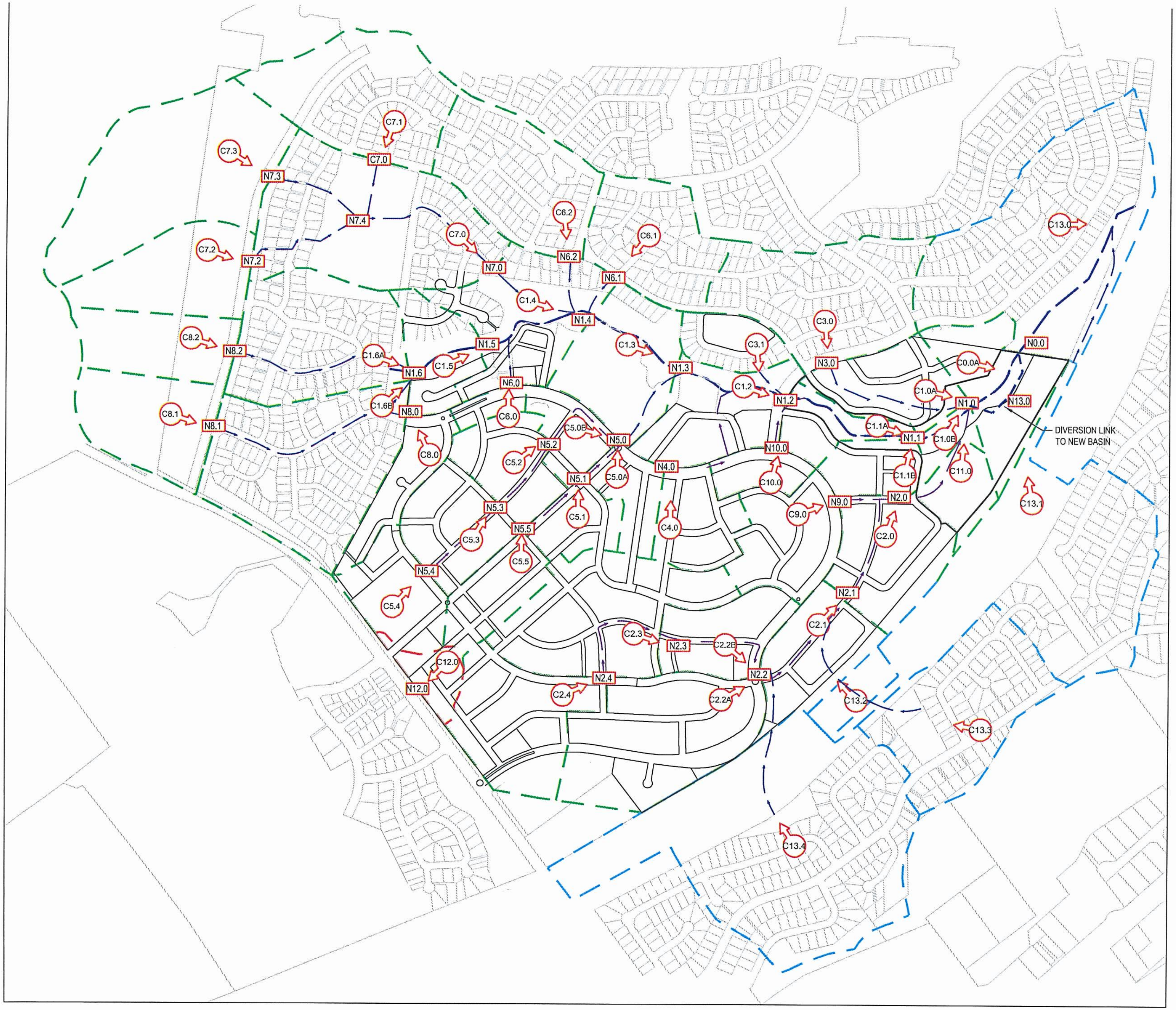
SCALE 1:6000 @ A3

DRAWING TITLE + DESCRIPTION **Proposed Site Plan**

DRAWING NO. W03

REVISION C

Water Cycle Report



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LEGEND

- EXISTING OVERLAND FLOWPATH
- PROPOSED OVERLAND FLOWPATH
- EXISTING CREEK
- RIDGE LINE
- NORTHERN CATCHMENT BOUNDARY
- SOUTHERN CATCHMENT BOUNDARY
- EASTERN CATCHMENT BOUNDARY
- C1.2 RAFTS 'LINK' NODE
- C1.3 RAFTS CATCHMENT NODE

SCALE 1:5000 METRES

100 50 0 100

75 25

Claymore Communities Project

DATE May 2012

SCALE 1:5000 @ A3

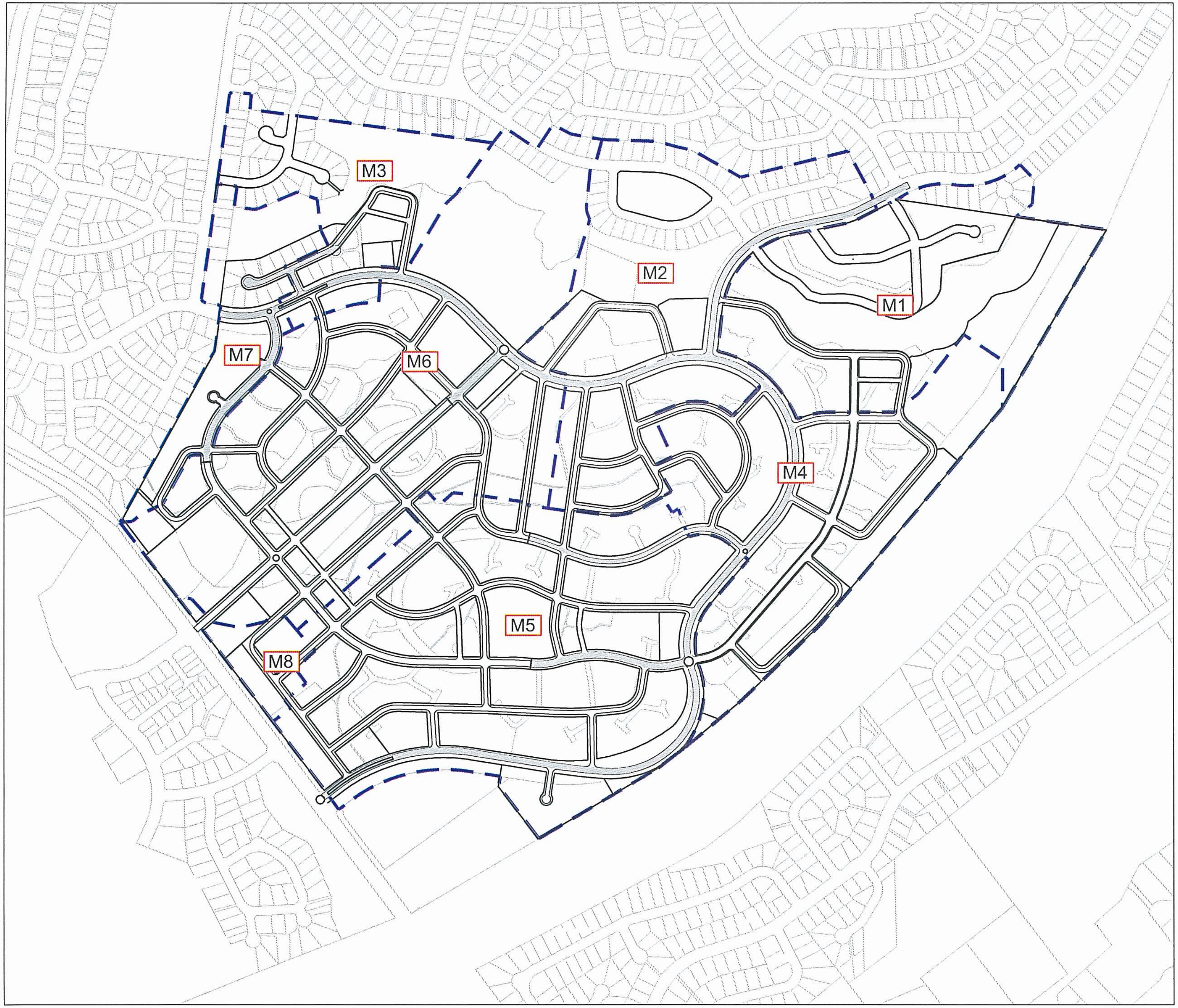
DRAWING TITLE + DESCRIPTION

Proposed Catchment Plan

DRAWING NO. W04

REVISION C

Water Cycle Report



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LEGEND

SUBCATCHMENT BOUNDARY

M4 SUBCATCHMENT LABEL

SCALE 1:6000 METRES
40 0 100 200

Claymore Communities Project

DATE
May 2012

SCALE
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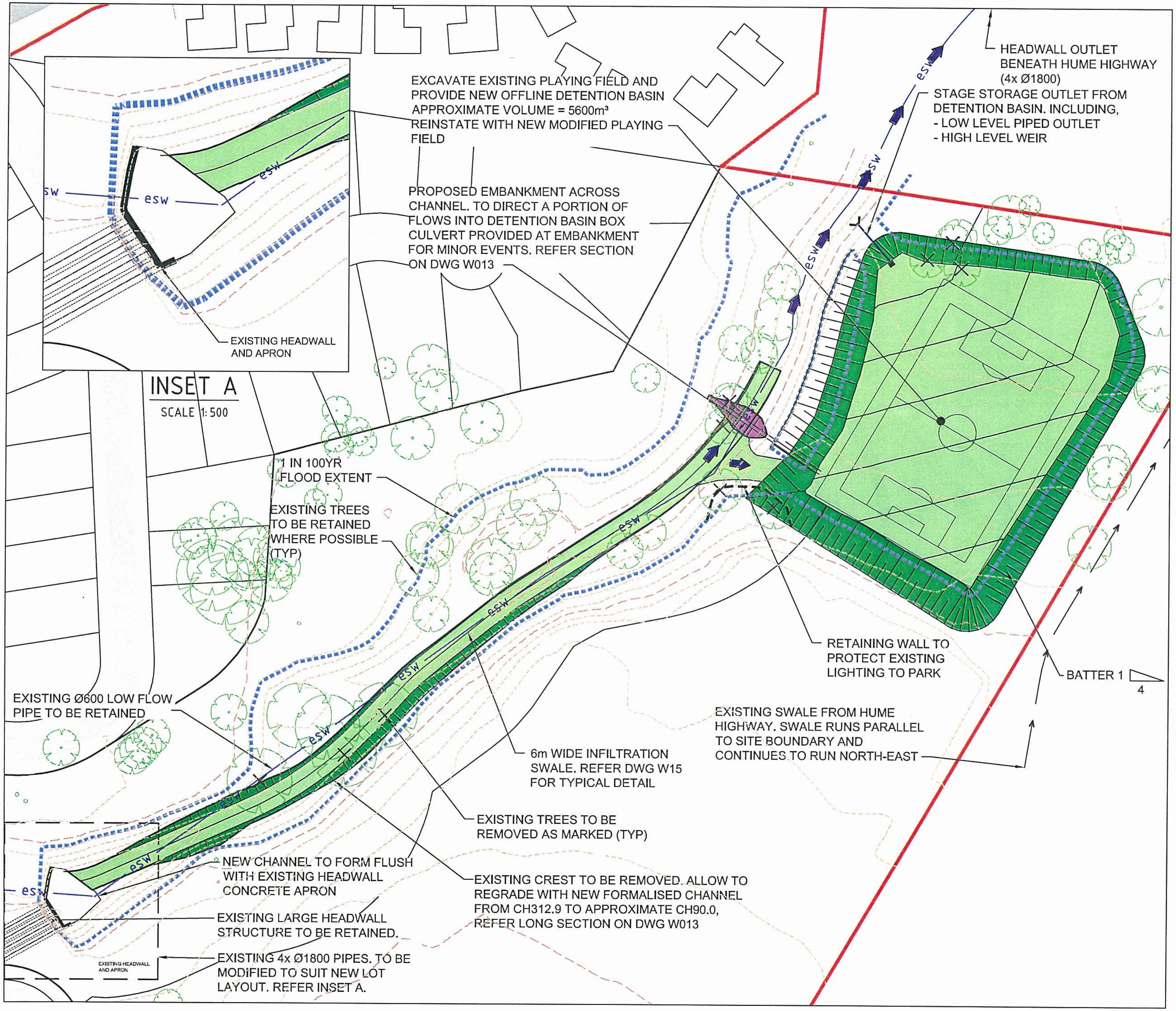
DRAWING TITLE + DESCRIPTION
Stormwater Quality (Music) - Catchment Plan

DRAWING NO
W05

REVISION
C

Water Cycle Report



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LEGEND

OVERLAND FLOW

SCALE 1:5000
METRES
100 50 0 100
75 25

Claymore
Communities Project

DATE
May 2012

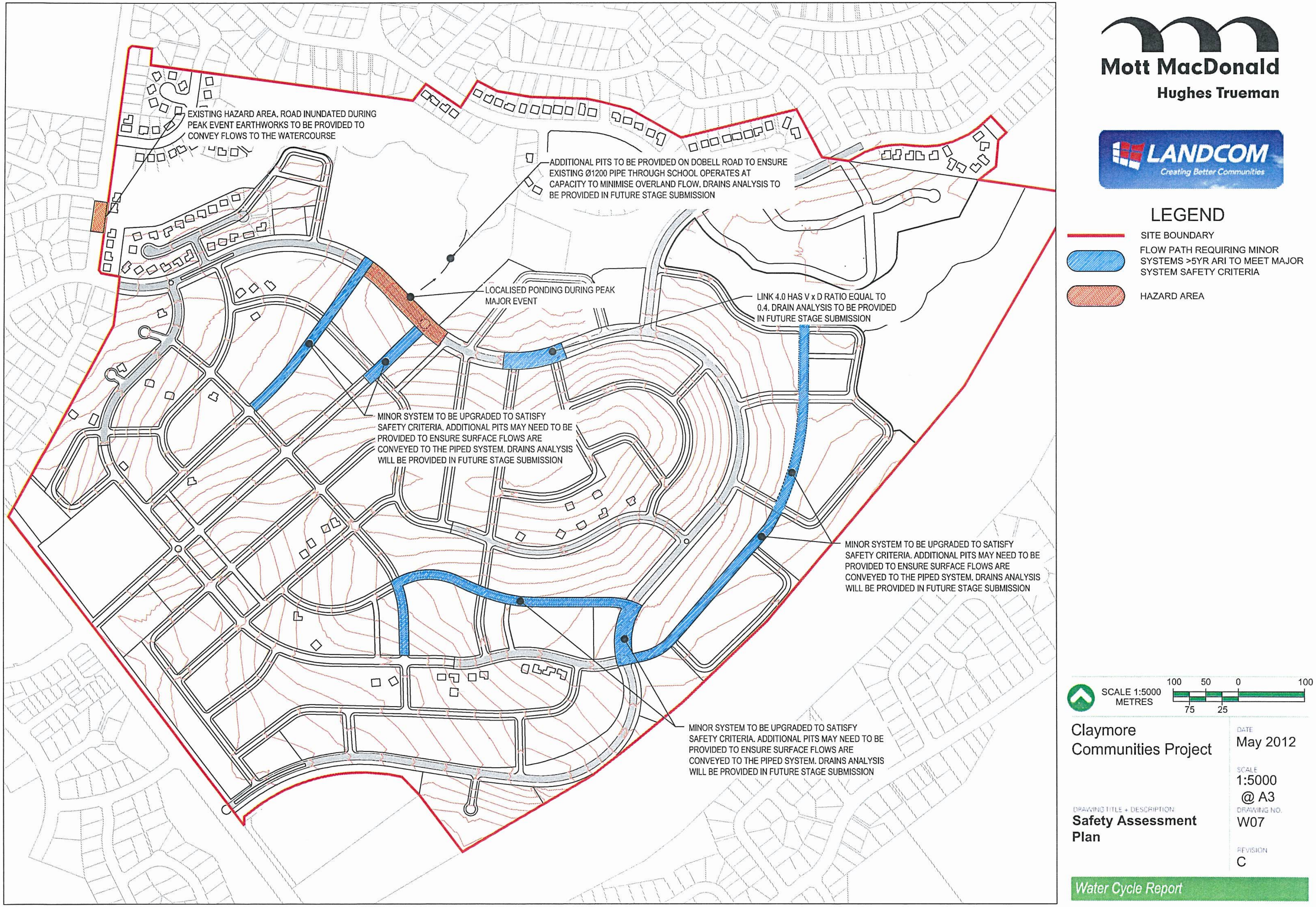
SCALE
1:1000
@ A3

DRAWING TITLE + DESCRIPTION
Detention Basin Plan

DRAWING NO.
W06

REVISION
A

Water Cycle Report



EXISTING HAZARD AREA. ROAD INUNDATED DURING PEAK EVENT EARTHWORKS TO BE PROVIDED TO CONVEY FLOWS TO THE WATERCOURSE
ADDITIONAL PITS TO BE PROVIDED ON DOBELL ROAD TO ENSURE EXISTING Ø1200 PIPE THROUGH SCHOOL OPERATES AT CAPACITY TO MINIMISE OVERLAND FLOW. DRAINS ANALYSIS TO BE PROVIDED IN FUTURE STAGE SUBMISSION
LOCALISED PONDING DURING PEAK MAJOR EVENT
LINK 4.0 HAS V x D RATIO EQUAL TO 0.4. DRAIN ANALYSIS TO BE PROVIDED IN FUTURE STAGE SUBMISSION
MINOR SYSTEM TO BE UPGRADED TO SATISFY SAFETY CRITERIA. ADDITIONAL PITS MAY NEED TO BE PROVIDED TO ENSURE SURFACE FLOWS ARE CONVEYED TO THE PIPED SYSTEM. DRAINS ANALYSIS WILL BE PROVIDED IN FUTURE STAGE SUBMISSION
MINOR SYSTEM TO BE UPGRADED TO SATISFY SAFETY CRITERIA. ADDITIONAL PITS MAY NEED TO BE PROVIDED TO ENSURE SURFACE FLOWS ARE CONVEYED TO THE PIPED SYSTEM. DRAINS ANALYSIS WILL BE PROVIDED IN FUTURE STAGE SUBMISSION
MINOR SYSTEM TO BE UPGRADED TO SATISFY SAFETY CRITERIA. ADDITIONAL PITS MAY NEED TO BE PROVIDED TO ENSURE SURFACE FLOWS ARE CONVEYED TO THE PIPED SYSTEM. DRAINS ANALYSIS WILL BE PROVIDED IN FUTURE STAGE SUBMISSION
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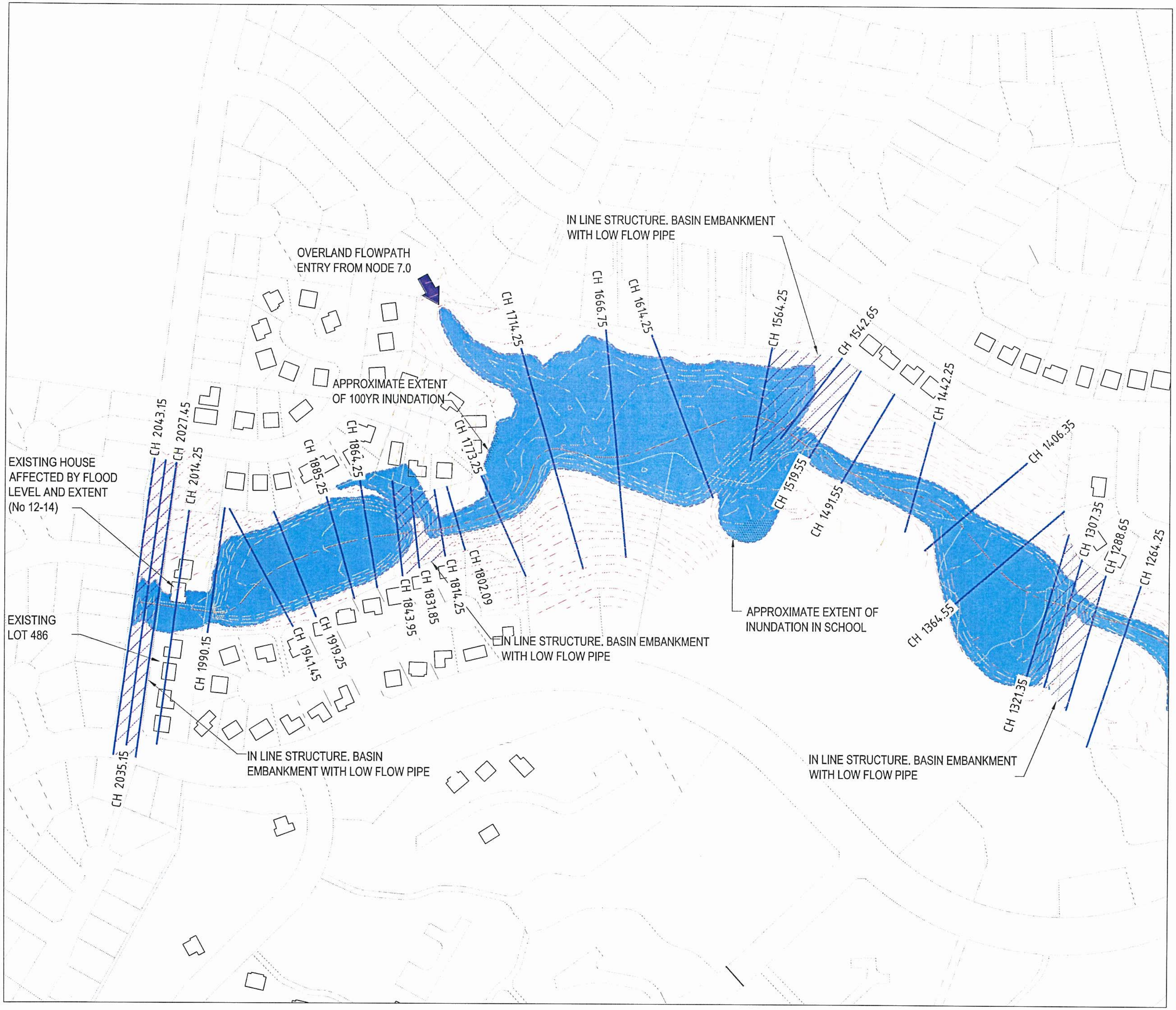
LEGEND
SITE BOUNDARY
FLOW PATH REQUIRING MINOR SYSTEMS >5YR ARI TO MEET MAJOR SYSTEM SAFETY CRITERIA
HAZARD AREA
SCALE 1:5000
METRES
100 50 0 100
75 25
Claymore Communities Project
DATE
May 2012
SCALE
1:5000 @ A3
DRAWING TITLE + DESCRIPTION
Safety Assessment Plan
DRAWING NO.
W07
REVISION
C
Water Cycle Report



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LEGEND

- CREEK CENTRELINE
- HEC-RAS SECTIONS
- 100YR EXISTING FLOOD EXTENT
- SURVEY TO BE CONFIRMED
- INLINE STRUCTURE

SCALE 1:2500 METRES 50 0 50

Claymore Communities Project

DATE May 2012

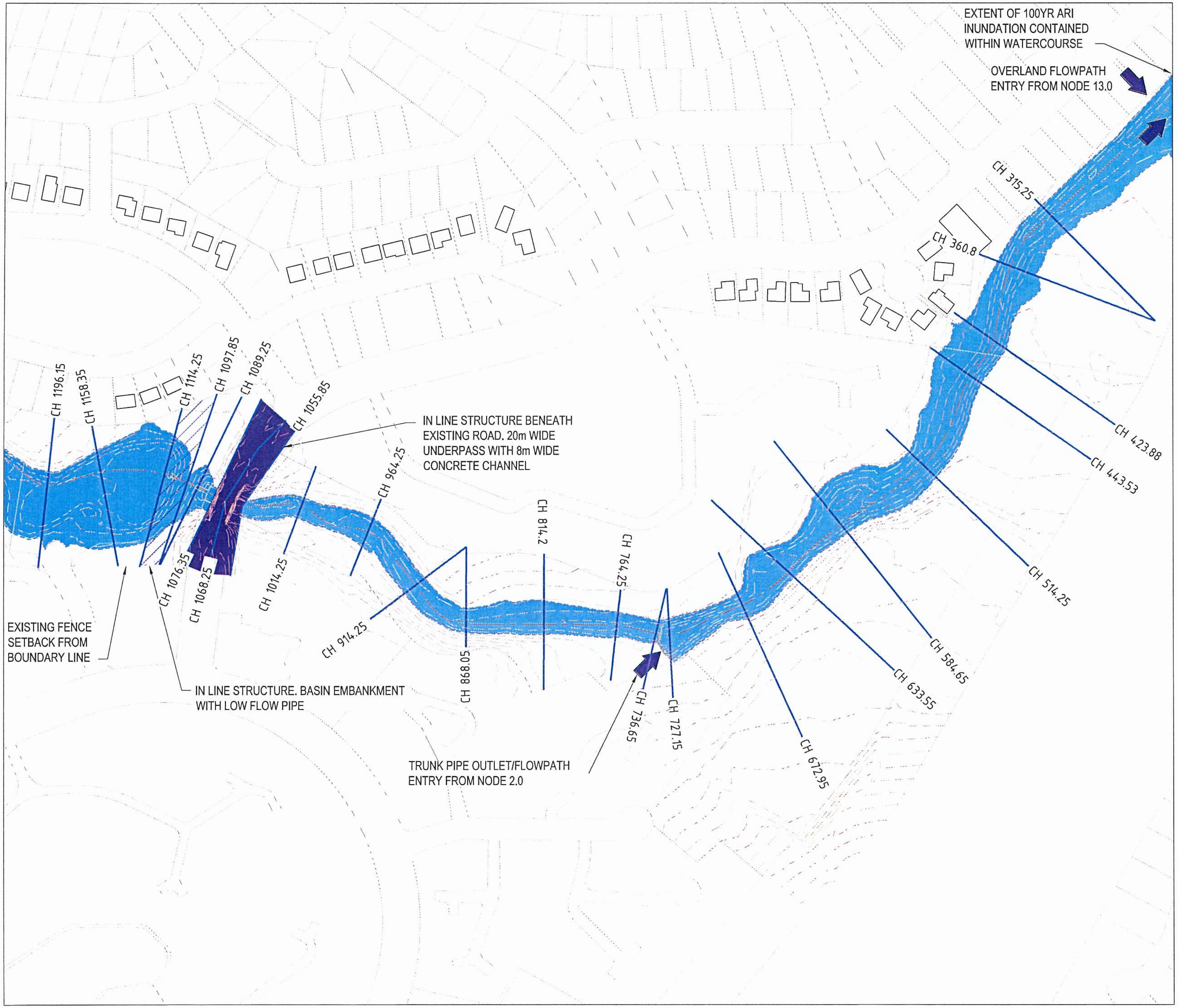
SCALE 1:2500 @ A3

DRAWING TITLE + DESCRIPTION
Existing HEC-RAS Sections

DRAWING NO W08

REVISION B

Water Cycle Report



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LEGEND

- CREEK CENTRELINE
- HEC-RAS SECTIONS
- 100YR EXISTING FLOOD EXTENT
- SURVEY TO BE CONFIRMED
- INLINE STRUCTURE

SCALE 1:2500 METRES
50 0 50

Claymore Communities Project

DATE
May 2012

SCALE
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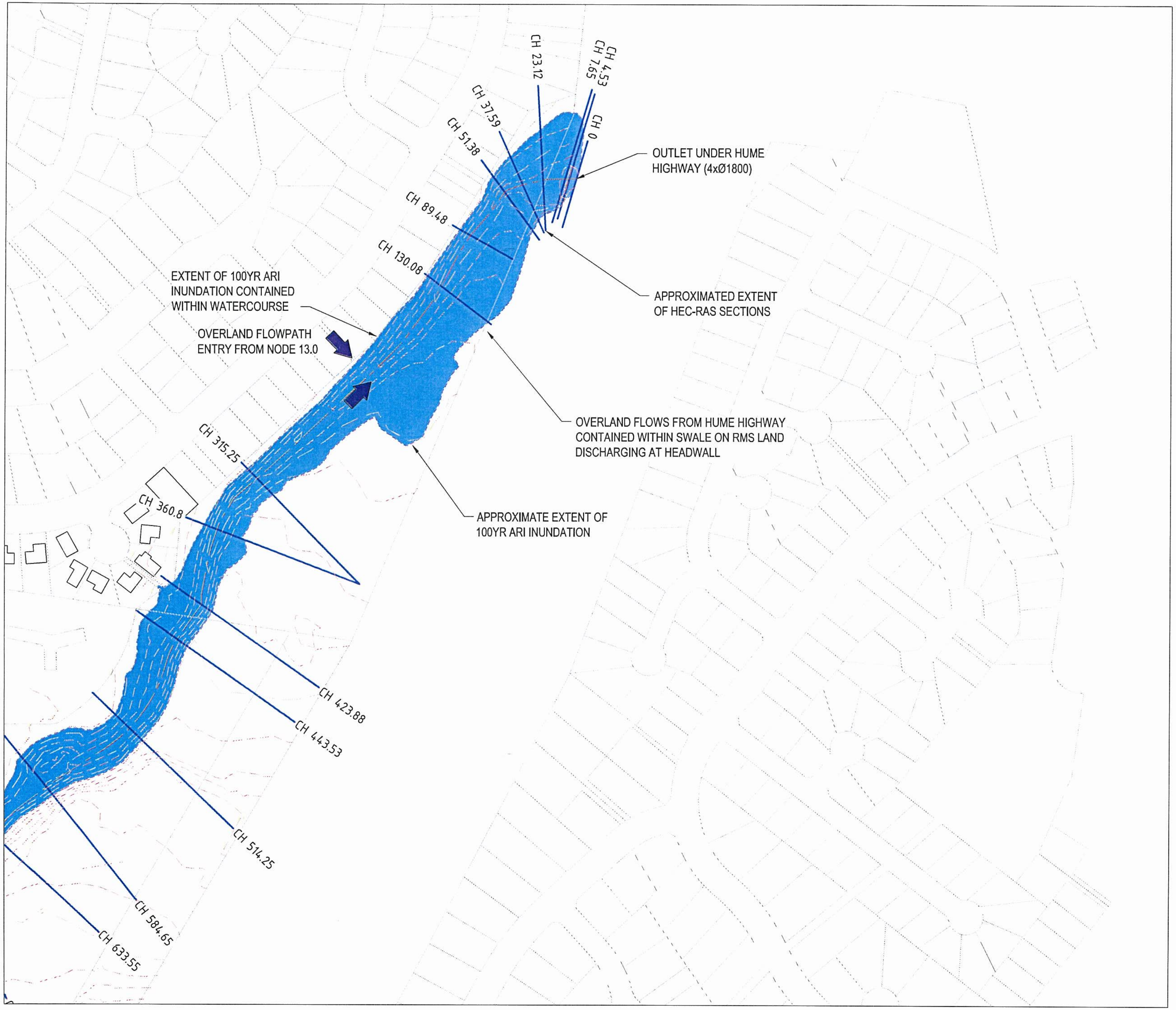
DRAWING TITLE + DESCRIPTION
Existing HEC-RAS Sections

DRAWING NO
W09

REVISION
B

Water Cycle Report



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LEGEND

- CREEK CENTRELINE
- HEC-RAS SECTIONS
- 100YR EXISTING FLOOD EXTENT
- SURVEY TO BE CONFIRMED
- INLINE STRUCTURE

SCALE 1:2500 METRES 50 0 50

Claymore Communities Project

DATE May 2012

SCALE 1:2500 @ A3

DRAWING TITLE + DESCRIPTION **Existing HEC-RAS Sections**

DRAWING NO W10

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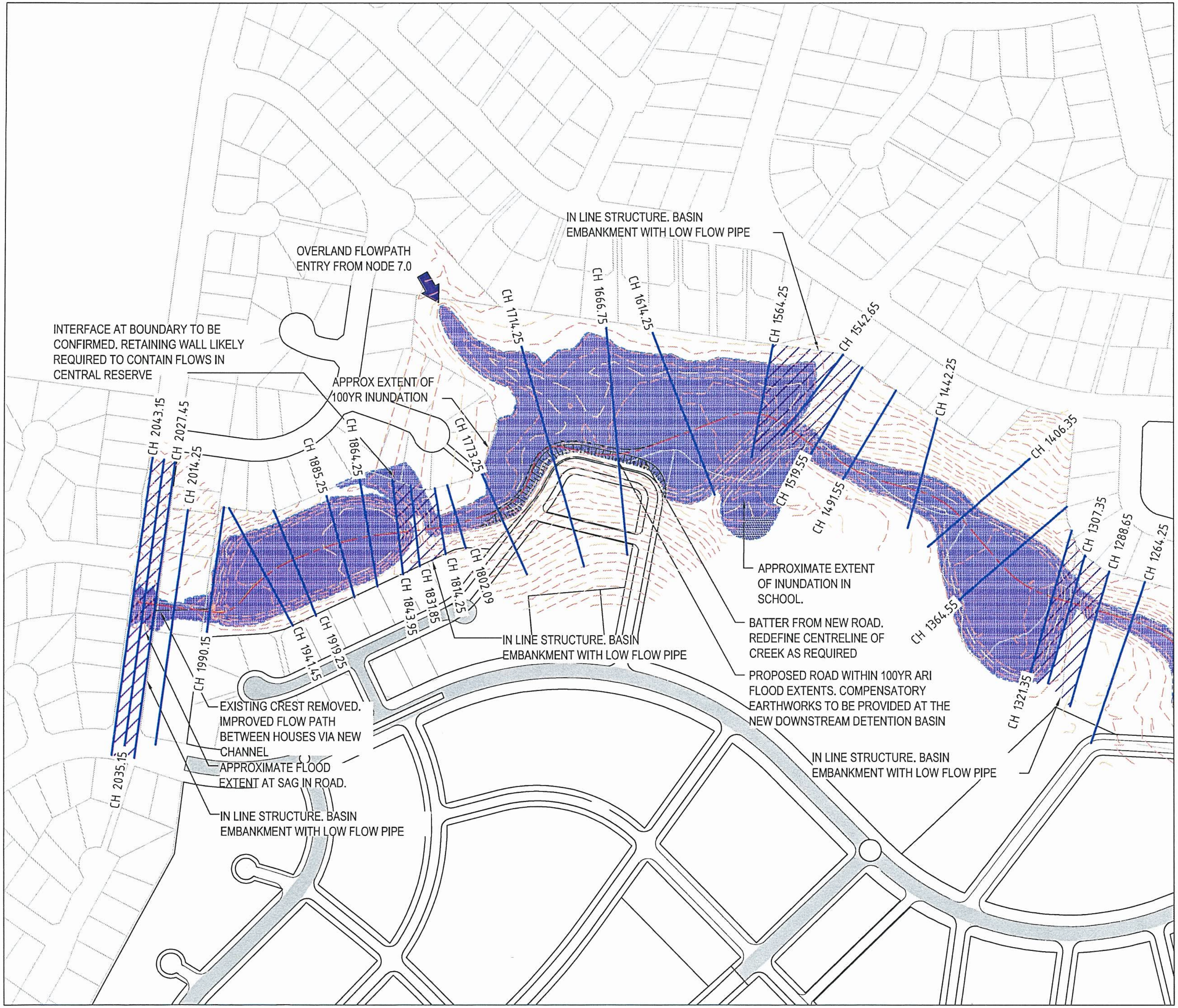
Water Cycle Report



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LEGEND

- CREEK CENTRELINE
- HEC-RAS SECTIONS
- 100YR PROPOSED FLOOD EXTENT
- SURVEY TO BE CONFIRMED
- IN LINE STRUCTURE

SCALE 1:2500 METRES 50 0 50

Claymore Communities Project

DATE
May 2012

SCALE
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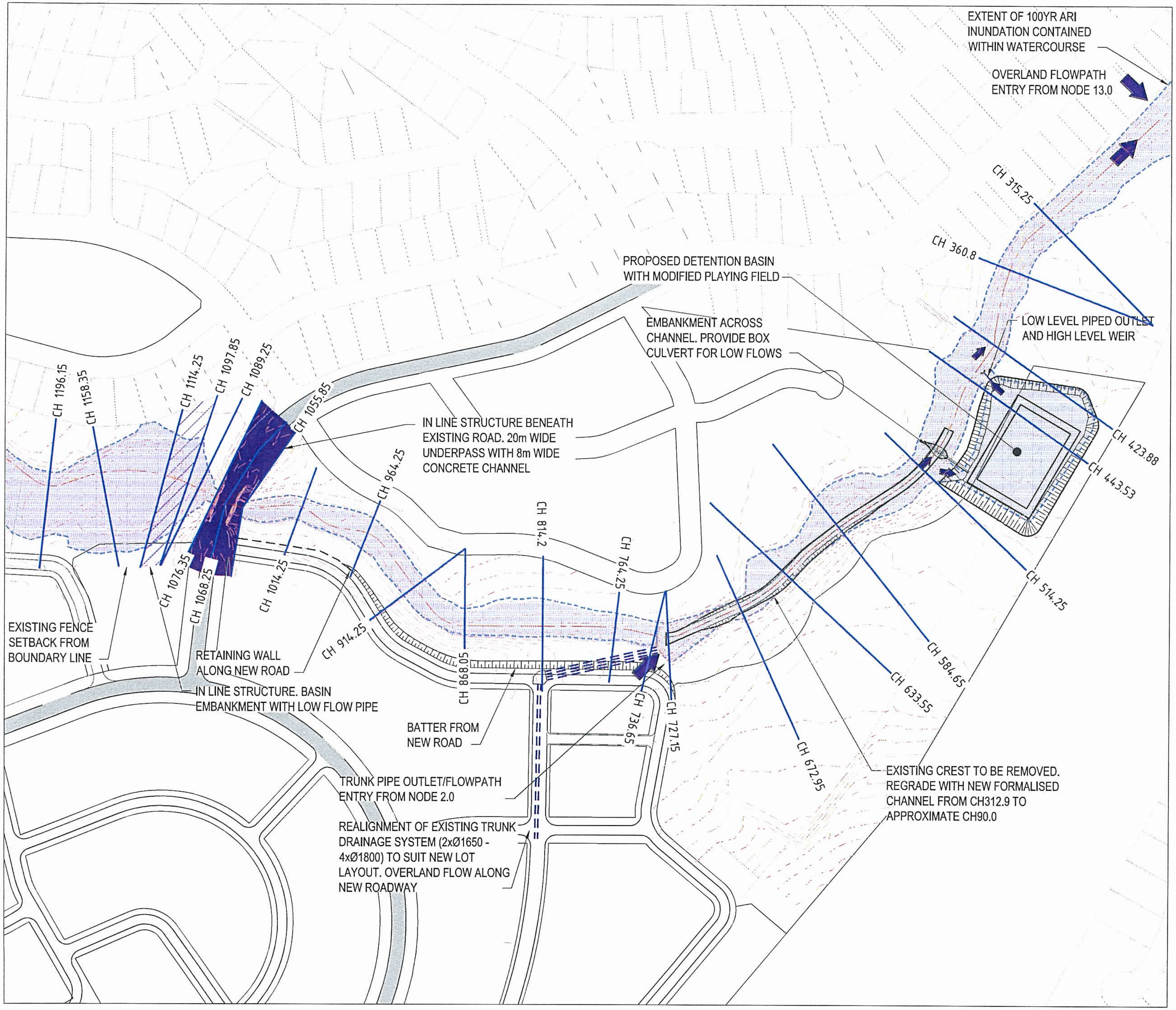
DRAWING TITLE + DESCRIPTION
Proposed HEC-RAS Sections

DRAWING NO
W011

REVISION
C

Water Cycle Report



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LEGEND

- CREEK CENTRELINE
- HEC-RAS SECTIONS
- 100YR PROPOSED FLOOD EXTENT

SCALE 1:2500 METRES 50 0 50

Claymore Communities Project

DATE May 2012

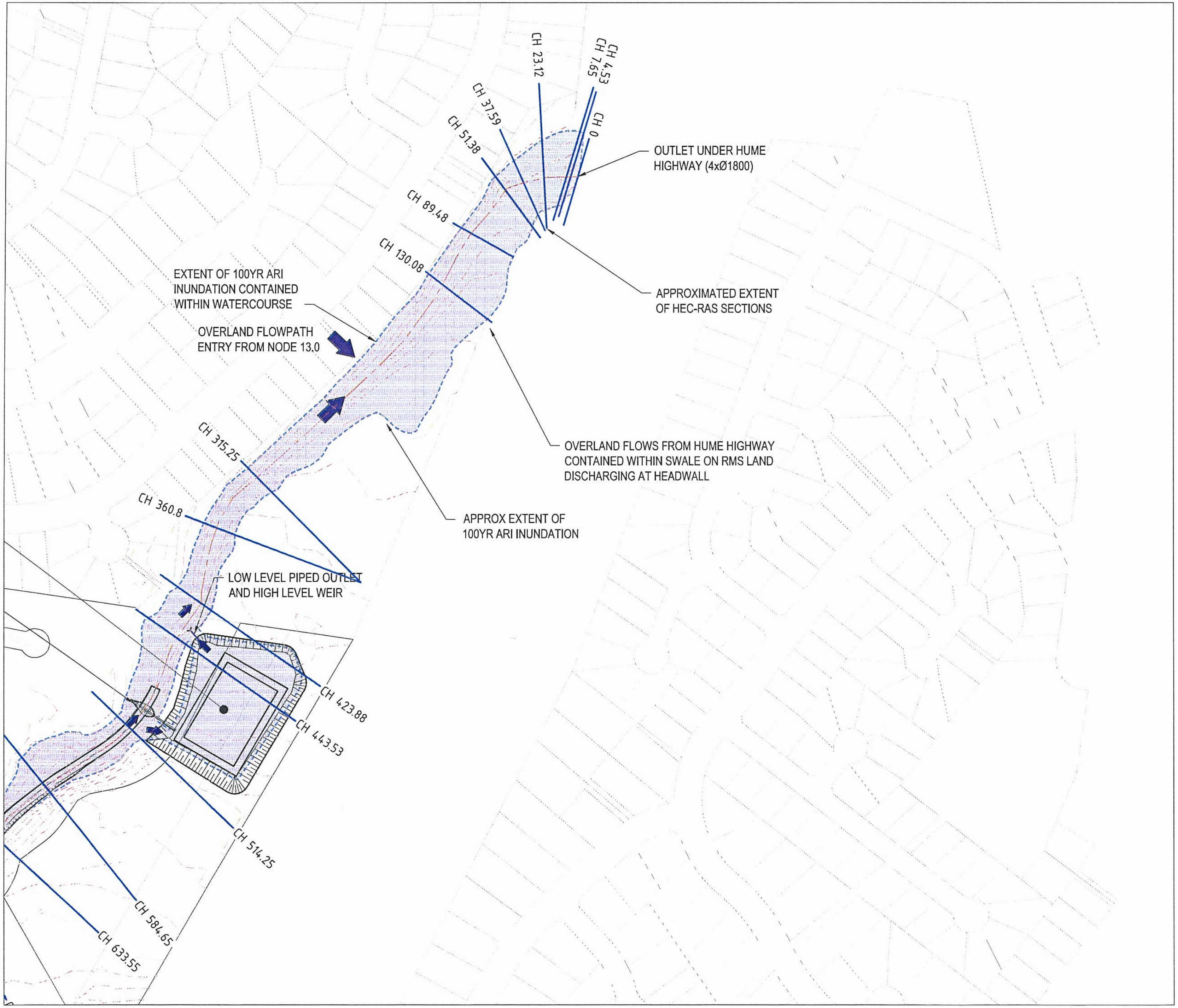
SCALE 1:2500 @ A3

DRAWING TITLE + DESCRIPTION **Proposed HEC-RAS Sections**

DRAWING NO W012

REVISION B

Water Cycle Report



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LEGEND

- CREEK CENTRELINE
- HEC-RAS SECTIONS
- 100YR PROPOSED FLOOD EXTENT

SCALE 1:2500
METRES
50 0 50

Claymore Communities Project

DATE
May 2012

SCALE
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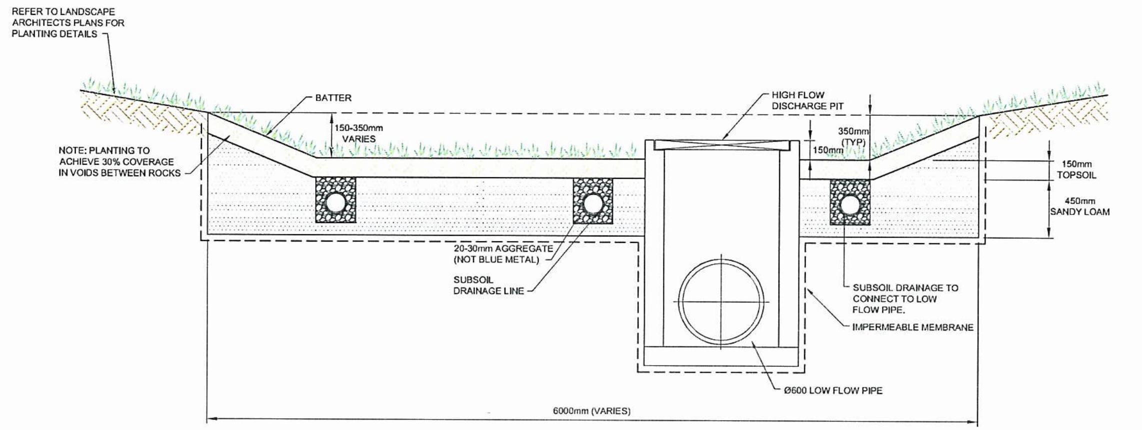
DRAWING TITLE + DESCRIPTION
Proposed HEC-RAS Sections

DRAWING NO
W013

REVISION
A

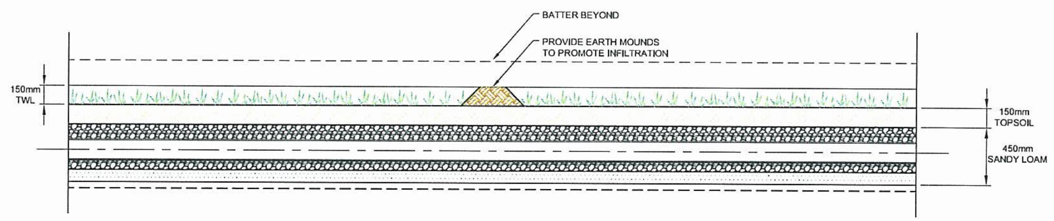
Water Cycle Report



TYPICAL INFILTRATION SWALE

DETAIL A

SCALE 1:40



TYPICAL INFILTRATION SWALE

DETAIL B

SCALE 1:40

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SCALE 1:2500 METRES 50 0 50

Claymore Communities Project

DATE May 2012

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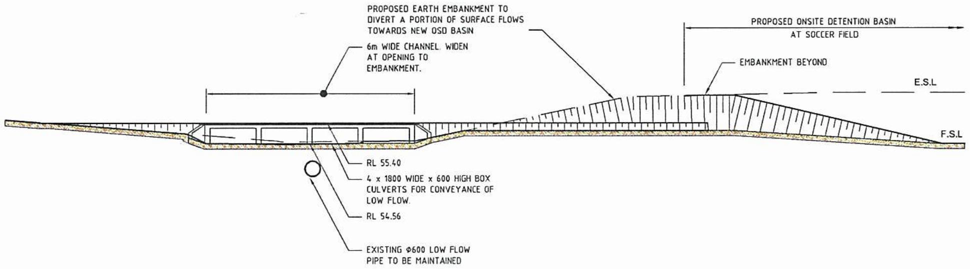
DRAWING TITLE + DESCRIPTION **Proposed Sections and Details**

DRAWING NO W014

REVISION A

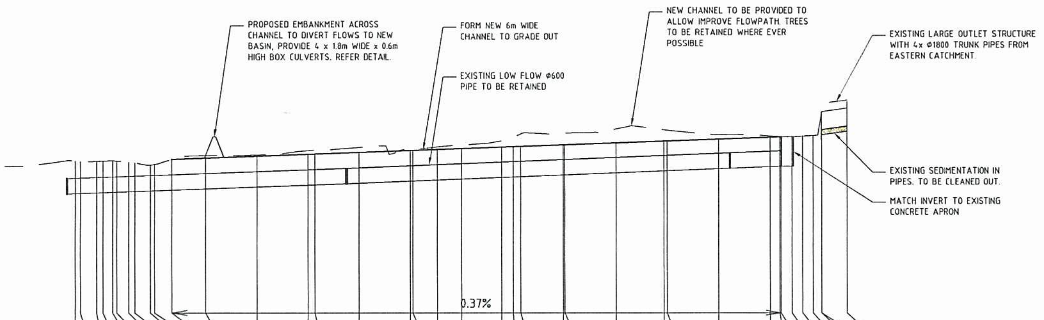
Water Cycle Report



EMBANKMENT ACROSS CHANNEL

DETAIL (A)

SCALE 1:200



CHAINAGE	EXISTING LEVEL	PROPOSED LEVEL
0.000		
20.000	54.37	
29.295	54.45	
31.250	54.44	
37.500	54.44	
40.000	54.45	
43.750	54.46	
45.393	54.44	
50.000	54.41	
52.317	54.38	
58.333	54.29	
60.000	54.32	
66.667	54.50	54.50
80.000	54.66	54.55
100.000	54.68	54.63
120.000	54.85	54.70
122.745	54.87	54.71
140.000	54.97	54.78
160.000	54.94	54.85
161.018	54.95	54.86
170.446	54.99	54.89
180.000	55.07	54.93
195.549	55.23	54.98
200.000	55.37	55.00
202.902	55.50	55.01
219.330	55.52	55.07
220.000	55.53	55.08
240.000	55.69	55.15
258.713	55.66	55.22
260.000	55.64	55.22
280.000	55.48	55.30
300.000	55.42	55.37
303.572	55.40	55.39
304.167	55.39	55.39
308.333	55.40	55.40
312.500	55.41	
316.667	55.43	
319.909	56.36	
320.000	56.41	
330.000	56.82	

SCALE 1:1000 HOR - 1:100 VER

LONGITUDINAL SECTION ALONG CL 1

EMBANKMENT ACROSS CHANNEL
LONGITUDINAL SECTION

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SCALE 1:2500
METRES
50 0 50

Claymore Communities Project

DATE
May 2012

SCALE
1:200 @ A3

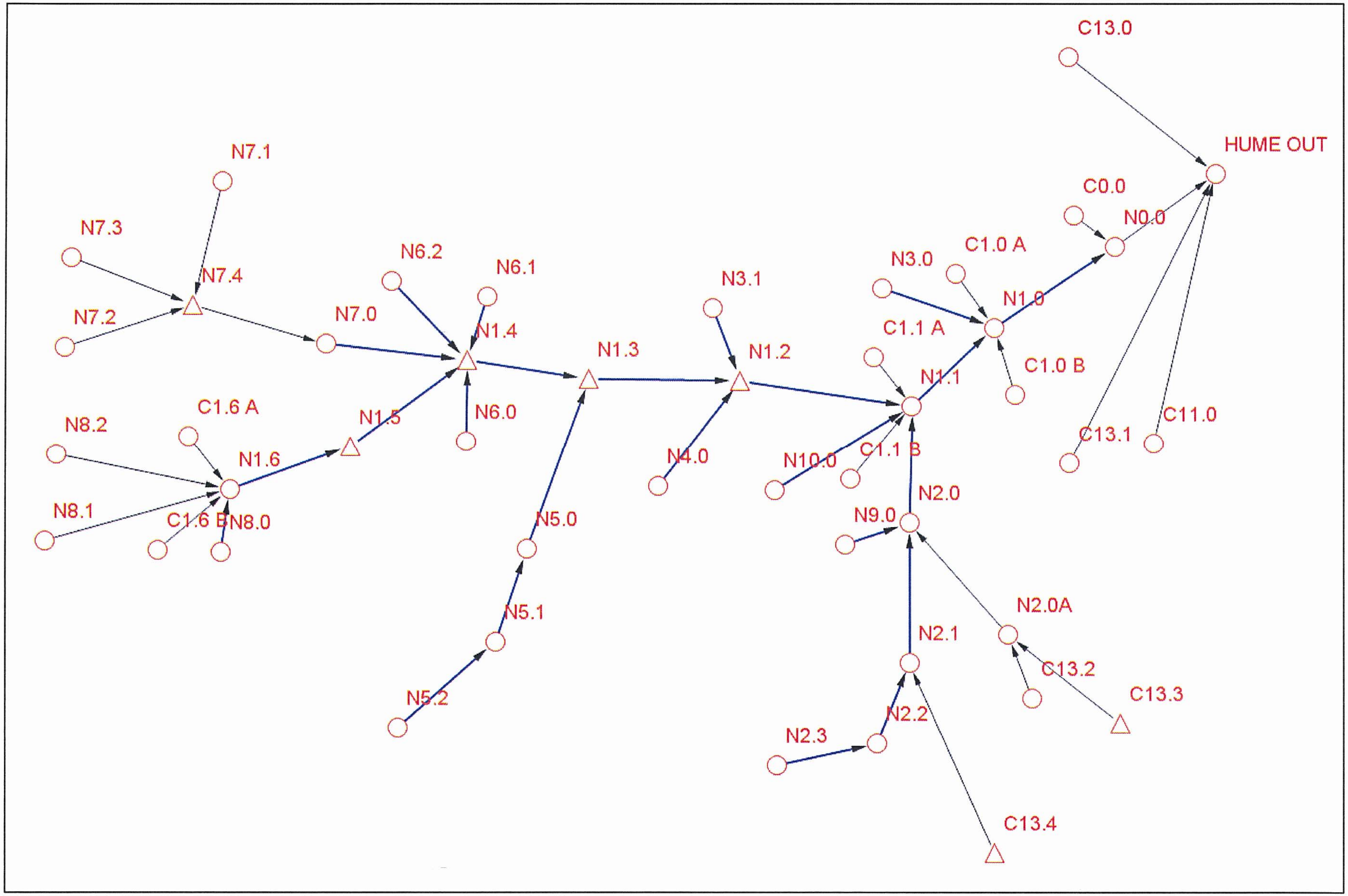
DRAWING TITLE + DESCRIPTION
Proposed Sections and Details

DRAWING NO
W015

REVISION
A

Water Cycle Report

Appendix B: *RAFTS* Model Data


C13.0
HUME OUT
N7.1
C0.0
N0.0
N7.3
C1.0 A
N3.0
N6.2
N6.1
N3.1
N7.4
N1.0
N7.2
N7.0
C1.1 A
N1.4
N1.3
N1.2
C1.0 B
N1.1
C1.6 A
N6.0
N8.2
N1.5
C13.1
C11.0
N1.6
N4.0
N10.0
C1.1 B
N2.0
N8.1
C1.6 B
N8.0
N5.0
N9.0
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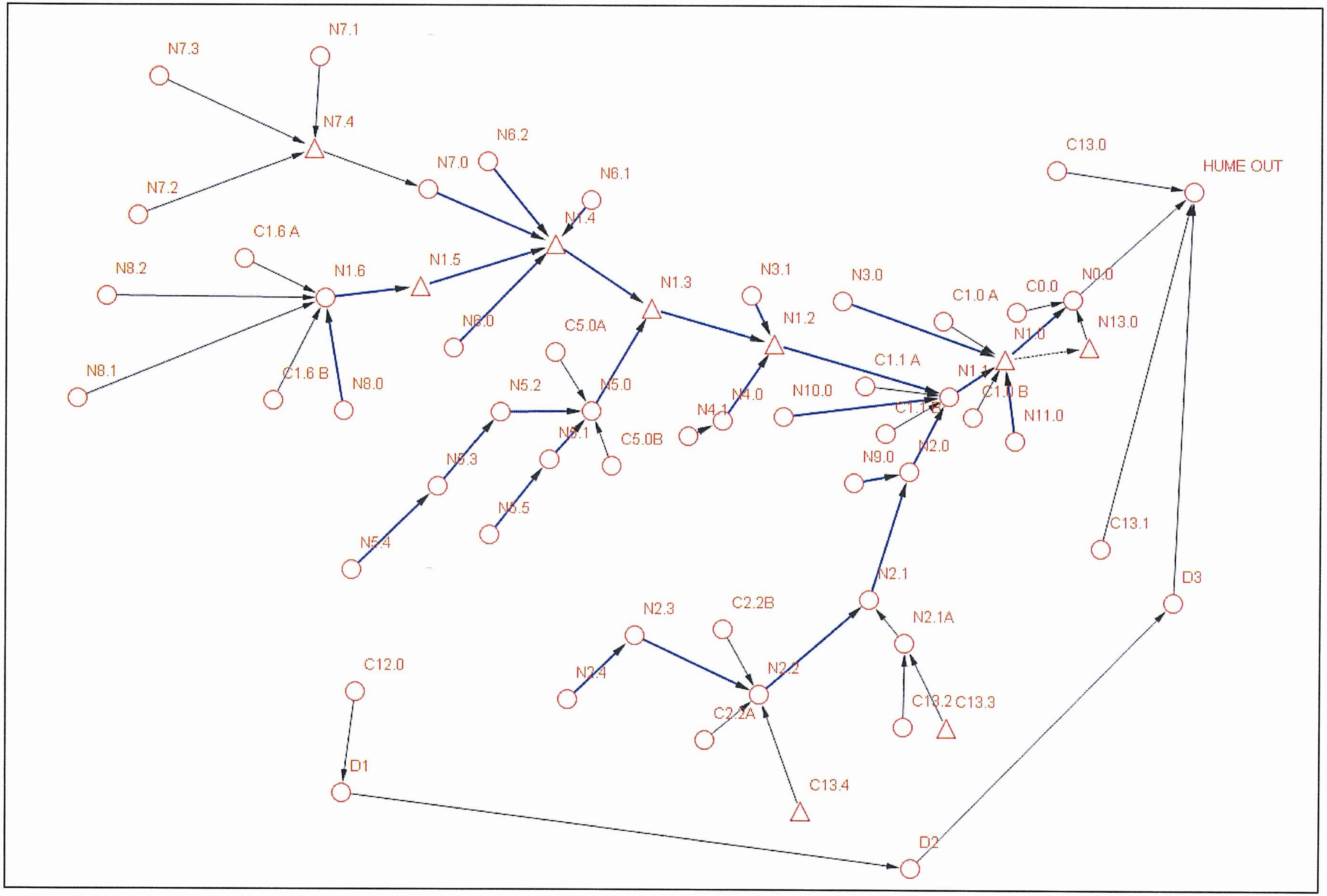
C13.3
N5.2
N2.2
N2.3
C13.4


N7.1
N7.3
N7.4
N7.2
N6.2
N7.0
N6.1
N1.4
C1.6 A
N8.2
N1.6
N1.5
N8.1
C1.6 B
N8.0
N6.0
C5.0A
N5.2
N5.0
N5.1
C5.0B
N5.3
N5.5
N5.4
N1.3
N3.1
N1.2
N4.0
N4.1
N3.0
C1.0 A
C0.0
N0.0
N1.0
N13.0
C1.1 A
N1.1
C1.1 B
C1.0 B
N10.0
N11.0
N9.0
N2.0
C13.0
HUME OUT
C13.1
D3
N2.1
N2.1A
N2.3
C2.2B
N2.2
N2.4
C2.2A
C13.2
C13.3
C13.4
C12.0
D1
D2

Time of Concentration

For 100yr

Kinematic Wave Equation

Length of Flow Path	L	2628	m
Average Slope	S_o	0.03	m/m
Roughness Co-efficient	n	0.025	
	$t_c I^{0.4}$=	244.77	
	t_c=	**43**	**min**

Time (min)	Intensity (mm/hr)	$t_c I^{0.4}$
5	223.0	*43*
6	209.0	*51*
10	171.0	*78*
11	164.0	*85*
15	143.0	*109*
20	125.0	*138*
30	102.0	*191*
45	81.0	*261*
60	68.9	*326*
90	53.7	*443*

Pilgram & McDermott method

Catchment Area	A	3017000	m^2
	A	3.017	km^2
	t_c	1.156	hr
	t_c=	**69.4**	**min**

Bransby Williams formula

Time of concentration	**t_c=**	**69.1**	**min**

Average	61	min
Adopt	**43**	**min**

		Kinematic
Med Density Res	0.06	10min
Parkland	0.15	20min

Claymore Estate Renewal - Existing Catchment Data

Catchement	Total Area (Ha)	Percentage Impervious	Area Break-up (Ha)		Slope (%)
			Impervious	Pervious	
C0.0	6.79	22%	1.52	5.27	3.07
C1.0 A	4.41	52%	2.28	2.13	1.8
C1.0 B	2.44	13%	0.32	2.12	3
C1.1 A	2.52	20%	0.51	2.01	1.76
C1.1 B	4.09	43%	1.77	2.32	4.19
C1.6 A	9.34	66%	6.19	3.15	4.15
C1.6 B	14.22	66%	9.36	4.86	2.97
C11.0	2.19	6%	0.13	2.06	4.97
C13.0	17.70	43%	7.69	10.01	1.14
C13.1	18.84	53%	9.90	8.94	5.36
C13.2	1.62	80%	1.30	0.32	2.1
C13.3	9.95	36%	3.55	6.40	5.51
C13.4	24.50	51%	12.39	12.11	4.59
N1.2	5.12	31%	1.58	3.54	1.67
N1.3	7.59	29%	2.22	5.37	4.07
N1.4	6.69	35%	2.34	4.35	2.67
N1.5	3.91	53%	2.07	1.84	4.51
N10.0	3.89	50%	1.94	1.95	5.54
N2.0	5.45	41%	2.21	3.24	0.96
N2.1	5.02	39%	1.94	3.08	3.28
N2.2	13.55	42%	5.74	7.81	4.56
N2.3	18.59	44%	8.26	10.33	3.39
N3.0	9.95	73%	7.31	2.64	5.97
N3.1	2.47	75%	1.85	0.62	4.48
N4.0	2.50	28%	0.70	1.80	6.69
N5.0	10.26	50%	5.13	5.13	4.48
N5.1	5.37	35%	1.89	3.48	3.91
N5.2	6.09	38%	2.32	3.77	6.13
N6.0	1.09	43%	0.47	0.62	1.93
N6.1	6.53	75%	4.90	1.63	8.21
N6.2	8.38	71%	5.93	2.45	1.78
N7.0	13.48	56%	7.51	5.97	2.49
N7.1	9.47	52%	4.92	4.55	4.38
N7.2	6.39	5%	0.32	6.07	9.46
N7.3	13.54	5%	0.68	12.86	5.65
N8.0	1.51	59%	0.89	0.62	4.66
N8.1	6.15	5%	0.31	5.84	8.03
N8.2	4.92	5%	0.25	4.67	8.28
N9.0	5.20	59%	3.07	2.13	2.96
	301.7		133.7	168.1	

Catchement	Total Area (Ha)	Percentage Impervious	Area Break-up (Ha)		Slope
			Impervious	Pervious	
C0.0	6.79	23%	1.56	5.23	3.07
C1.0 A	4.50	70%	3.15	1.35	1.8
C1.0 B	1.19	10%	0.12	1.07	3
C1.1 A	2.60	40%	1.05	1.55	1.76
C1.1 B	2.51	70%	1.75	0.76	3.34
C1.6 A	9.34	66%	6.19	3.15	4.15
C1.6 B	12.69	66%	8.35	4.34	2.97
C12.0	1.61	67%	1.08	0.53	4.97
C13.0	17.70	43%	7.69	10.01	1.14
C13.1	18.84	53%	9.90	8.94	5.36
C13.2	1.62	80%	1.31	0.32	2.1
C13.3	9.96	36%	3.55	6.40	5.51
C13.4	24.50	51%	12.39	12.11	4.59
C2.2A	10.26	69%	7.03	3.23	4.04
C2.2B	4.26	79%	3.35	0.91	2.93
C5.0A	2.51	45%	1.13	1.38	5.37
C5.0B	2.51	76%	1.90	0.61	3.79
N1.2	5.84	49%	2.89	2.95	1.67
N1.3	6.46	30%	1.94	4.52	4.07
N1.4	7.67	50%	3.82	3.85	2.67
N1.5	3.57	53%	1.89	1.68	4.51
N10.0	1.83	78%	1.43	0.40	4.62
N11.0	2.34	10%	0.23	2.11	1
N2.0	6.01	69%	4.17	1.84	1.56
N2.1	4.94	70%	3.45	1.49	1.57
N2.3	9.81	70%	6.91	2.90	3.24
N2.4	7.28	71%	5.14	2.14	3.53
N3.0	9.95	73%	7.31	2.64	5.97
N3.1	2.47	77%	1.90	0.57	4.48
N4.1	3.68	78%	2.88	0.80	3.69
N5.1	2.56	79%	2.01	0.55	7.64
N5.2	4.00	79%	3.16	0.84	4.96
N5.3	4.62	79%	3.64	0.98	4.7
N5.4	4.12	83%	3.43	0.69	3.89
N5.5	3.34	78%	2.60	0.74	4.05
N6.0	0.93	77%	0.72	0.21	1.24
N6.1	6.53	75%	4.90	1.63	8.21
N6.2	8.38	71%	5.93	2.45	1.78
N7.0	13.48	56%	7.51	5.97	2.49
N7.1	9.47	52%	4.92	4.55	4.38
N7.2	6.39	5%	0.32	6.07	9.46
N7.3	13.54	5%	0.68	12.86	5.65
N8.0	2.96	71%	2.11	0.85	4.43
N8.1	6.15	5%	0.31	5.84	8.03
N8.2	4.92	5%	0.25	4.67	8.28
N9.0	5.09	78%	3.98	1.11	2.42
	301.7		161.9	139.8	

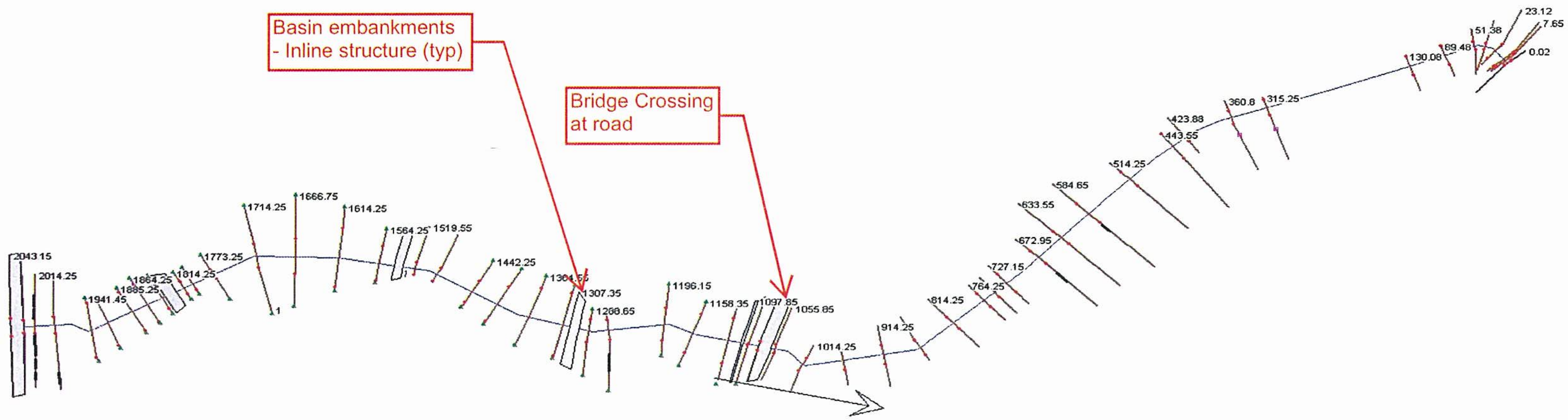
Appendix C: Peak Flows from *RAFTS*

Exiting and Proposed Peak Flow Rates at Hume Highway Outlet

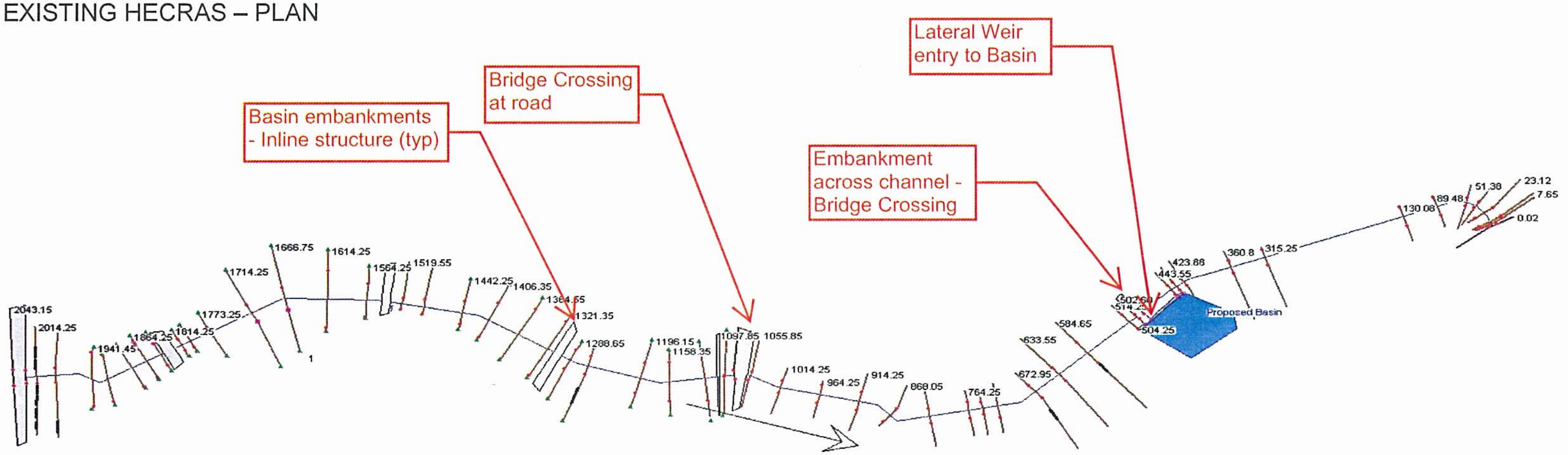
Annual Recurance (Years)	Storm Duration (Minutes)	Peak Flow (m^3/s)	
		Exisitng	Proposed
5	25	27.917	26.032
5	30	26.356	24.84
5	45	22.763	23.221
5	60	27.425	25.839
5	90	30.11	27.36
5	120	28.817	28.394
5	180	22.658	22.623
5	360	20.224	19.83
5	720	19.722	19.649
5	1440	14.916	14.891
20	25	36.397	34.006
20	30	33.886	32.026
20	45	30.276	30.635
20	60	*	32.83
20	90	38.136	35.296
20	120	37.39	36.454
20	180	*	*
50	25	*	36.259
50	30	*	35.123
50	45	34.541	33.711
50	60	38.851	36.972
50	90	42.013	39.376
50	120	42.689	40.76
50	180	33.613	33.214
100	25	42.858	40.074
100	30	41.214	38.785
100	45	38.538	37.19
100	60	42.879	41.883
100	90	47.764	43.475
100	120	48.299	44.876
100	180	38.173	36.798
100	360	32.749	31.493
100	720	32.392	31.372
100	1440	24.349	24.25

* Denotes programing error when attempting to run storm in RAFTS

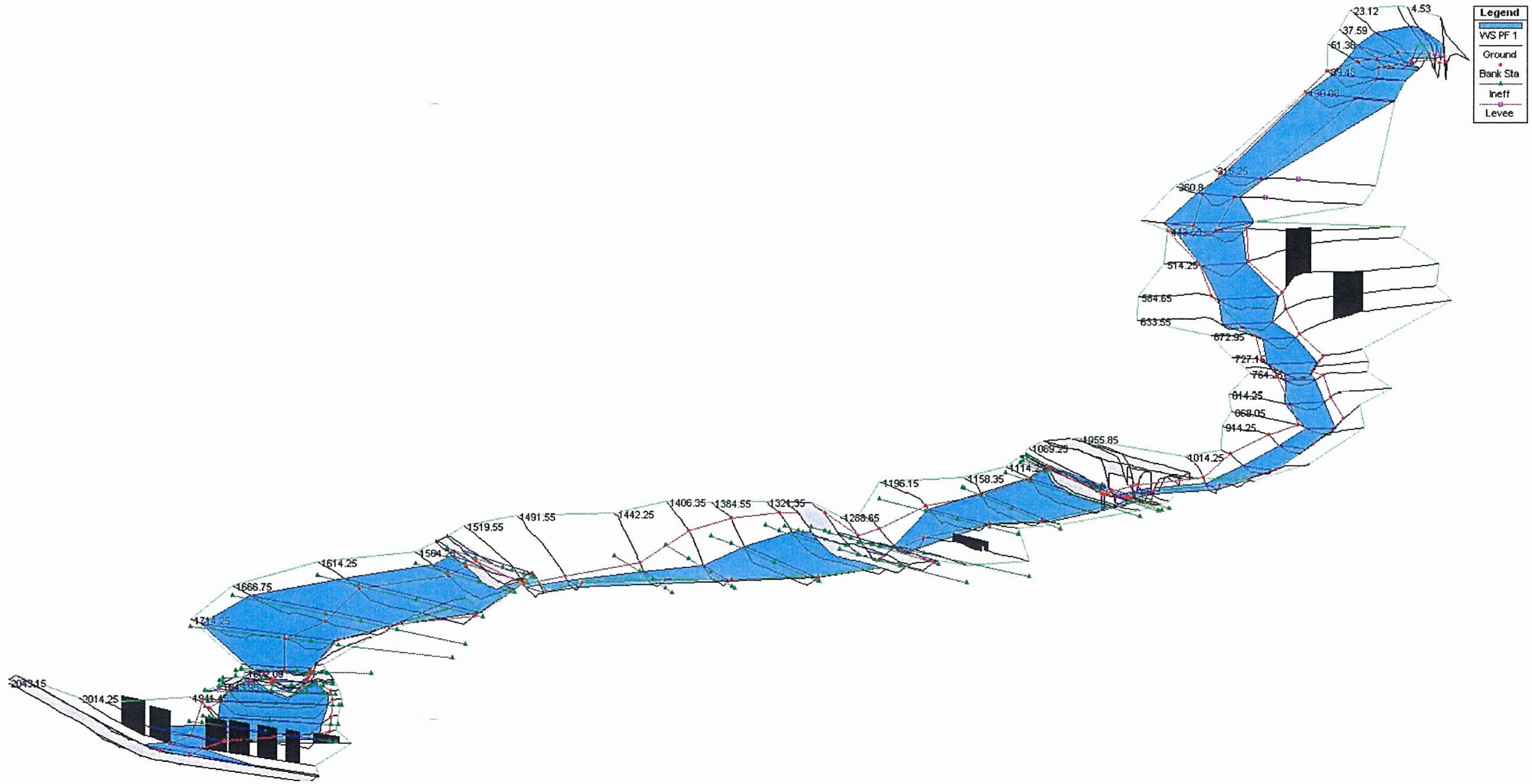
Appendix D: *HEC-RAS* Results



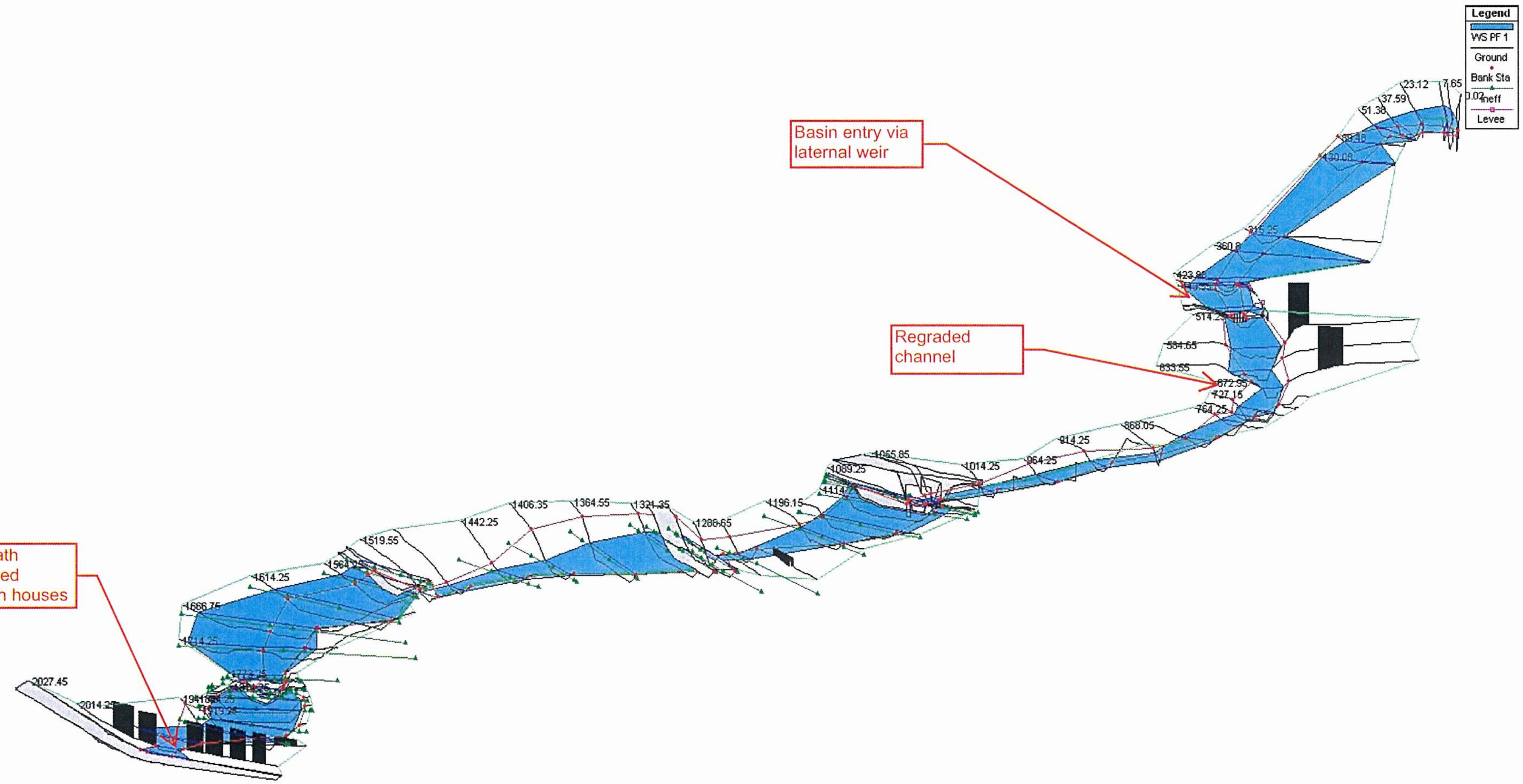
EXISTING HECRAS – PLAN



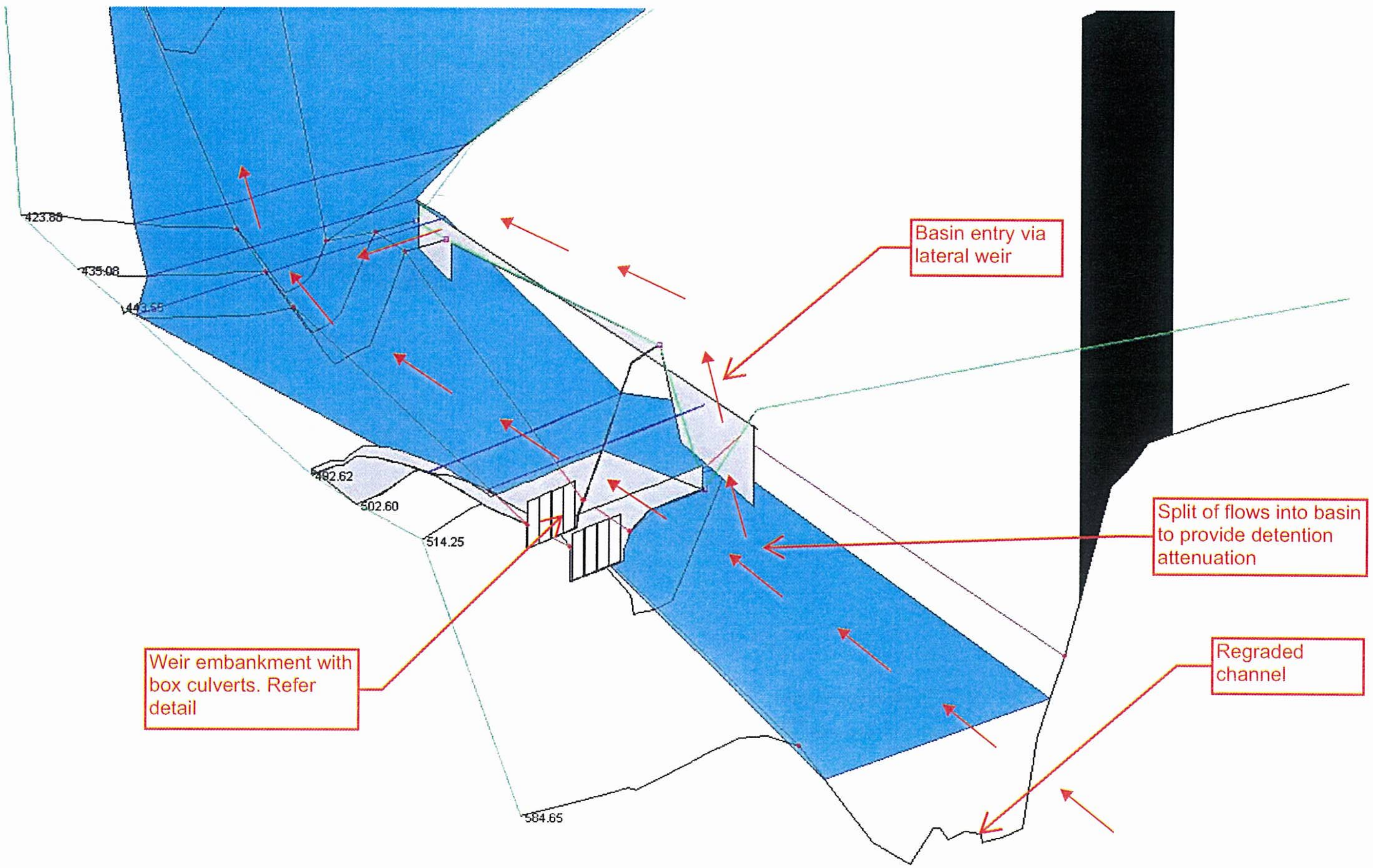
PROPOSED HECRAS – PLAN



EXISTING HECRAS 100 YEAR ARI – XYZ OUTPUT

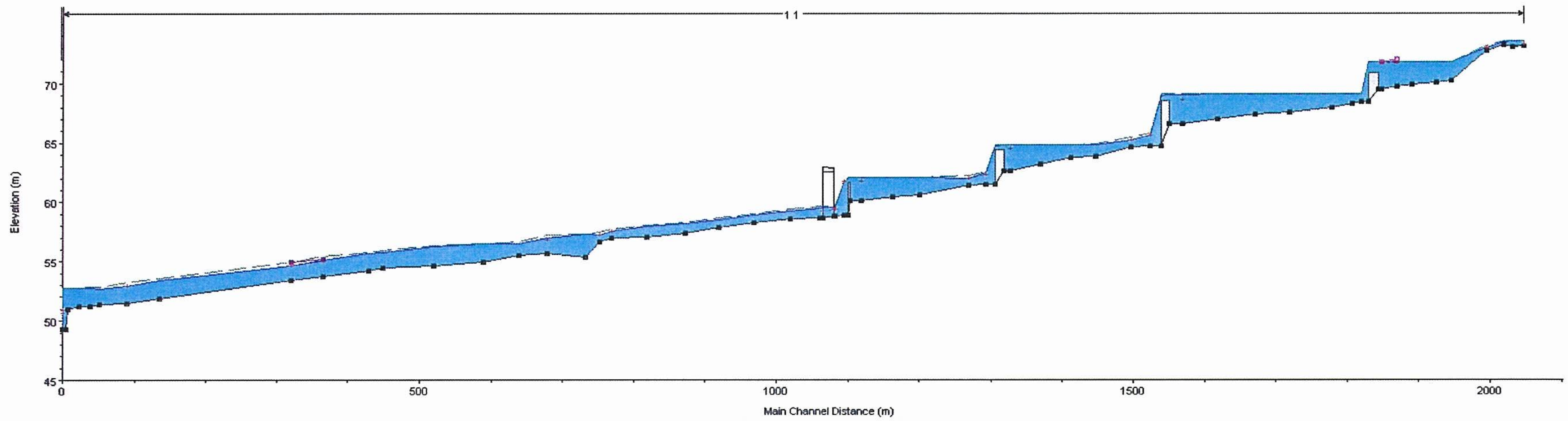


PROPOSED HECRAS 100 YEAR ARI – XYZ OUTPUT

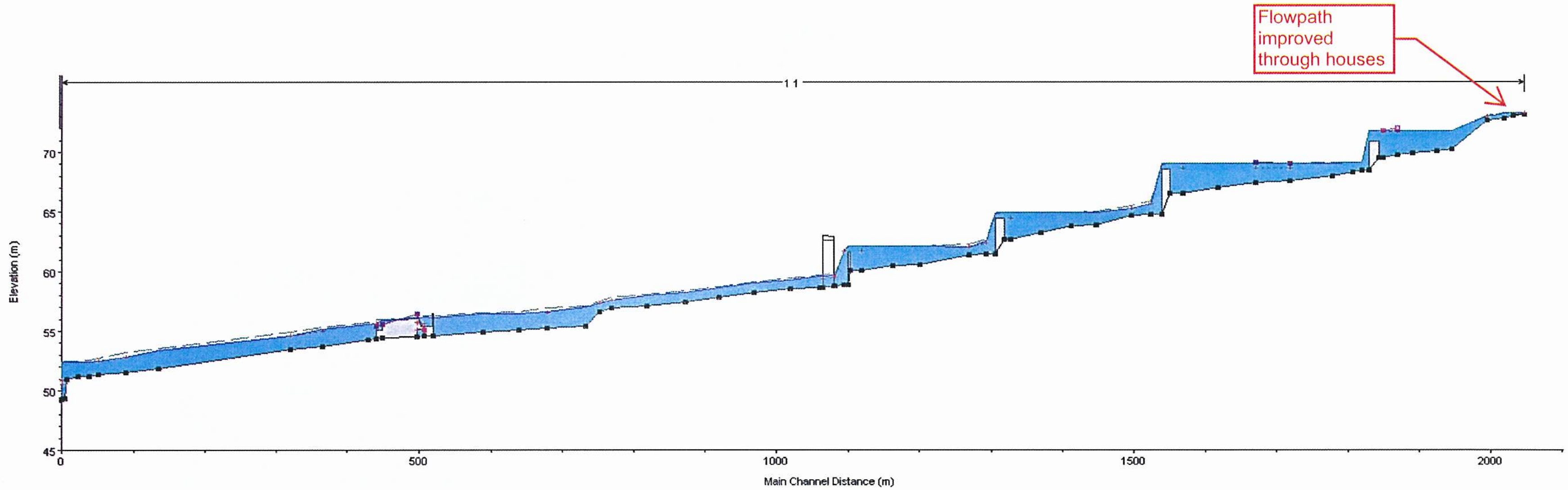


PROPOSED HECRAS 100 YEAR ARI – XYZ OUTPUT

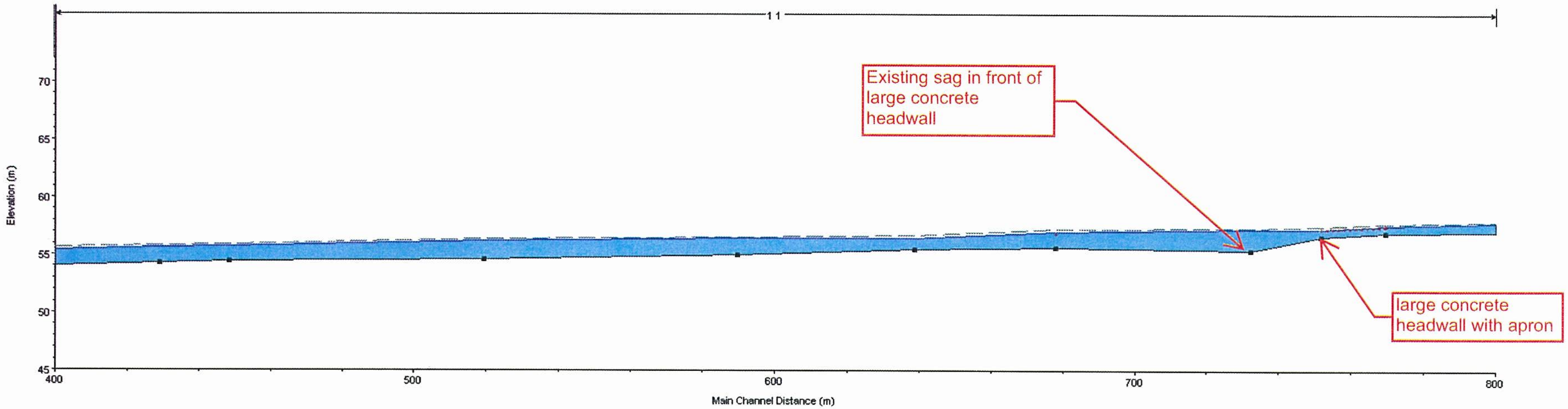
(EMBANKMENT ACROSS CHANNEL AND BASIN ENTRY)



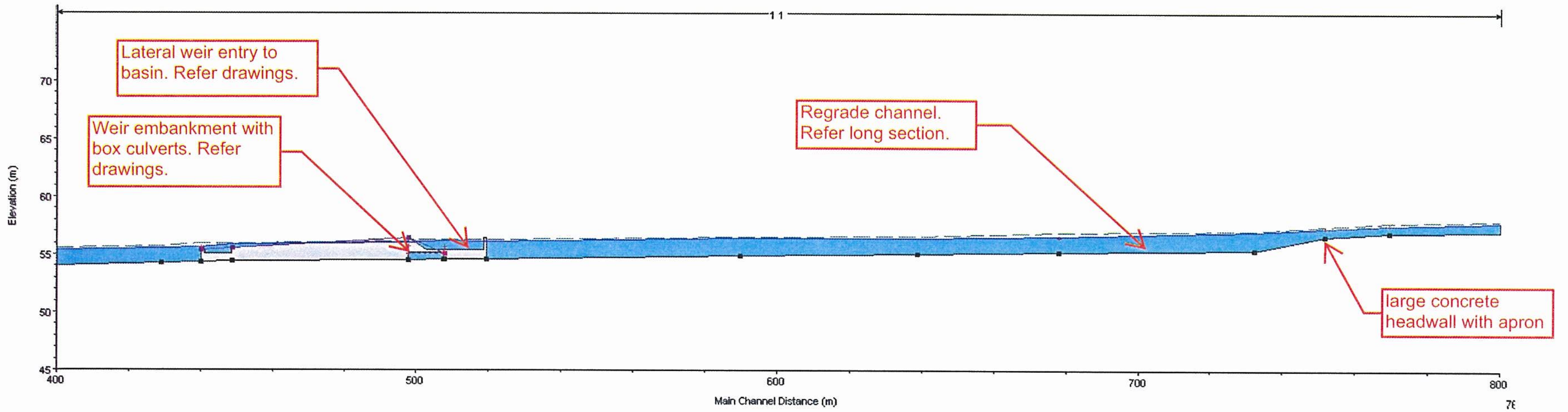
EXISTING HECRAS 100 YEAR ARI – LONG SECTION



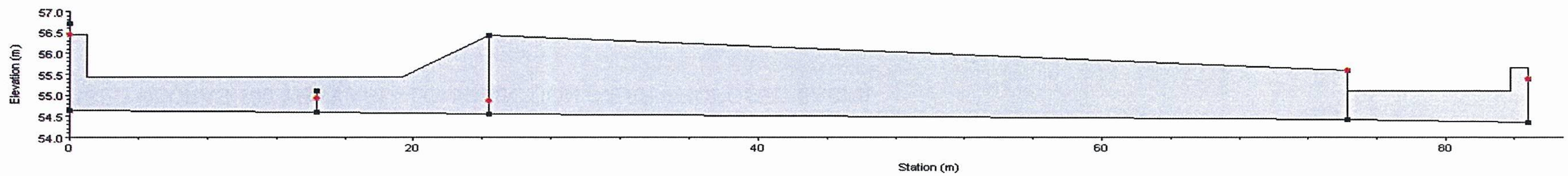
PROPOSED HECRAS 100 YEAR ARI – LONG SECTION



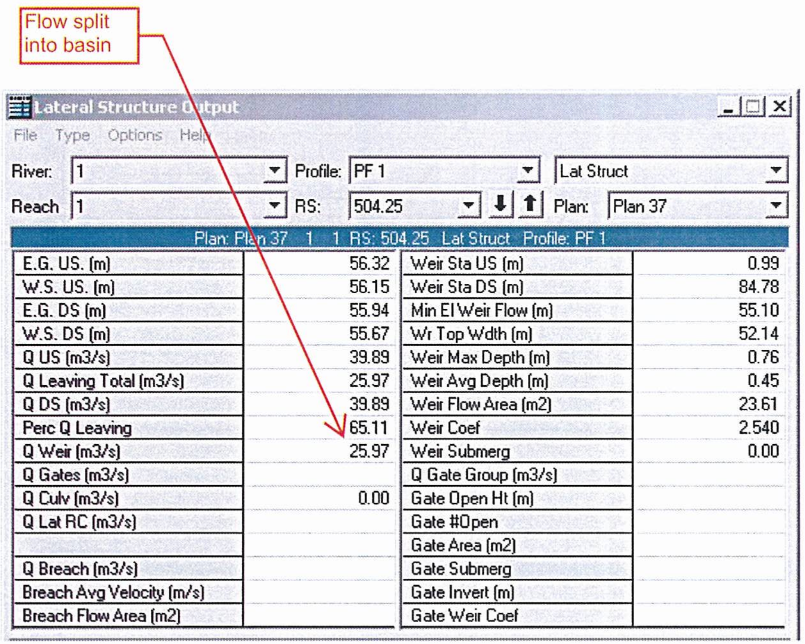
EXISTING HECRAS 100 YEAR ARI – LONG SECTION (NEAR PROPOSED BASIN)



PROPOSED HECRAS 100 YEAR ARI – LONG SECTION (NEAR PROPOSED BASIN)



PROPOSED HECRAS – LATERAL WEIR TO BASIN

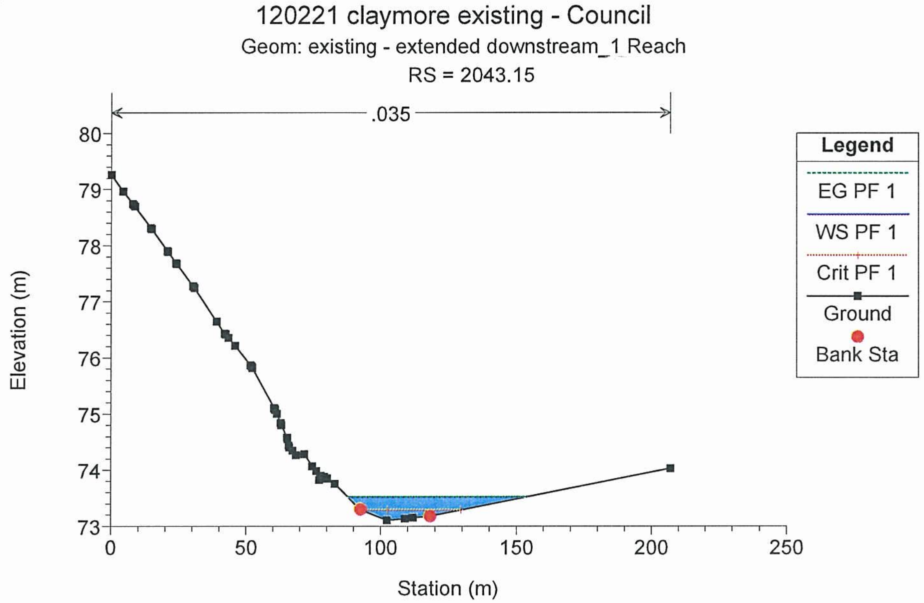


E.G. US. (m)	56.32	Weir Sta US (m)	0.99
W.S. US. (m)	56.15	Weir Sta DS (m)	84.78
E.G. DS (m)	55.94	Min El Weir Flow (m)	55.10
W.S. DS (m)	55.67	Wr Top Wdth (m)	52.14
Q US (m3/s)	39.89	Weir Max Depth (m)	0.76
Q Leaving Total (m3/s)	25.97	Weir Avg Depth (m)	0.45
Q DS (m3/s)	39.89	Weir Flow Area (m2)	23.61
Perc Q Leaving	65.11	Weir Coef	2.540
Q Weir (m3/s)	25.97	Weir Submerg	0.00
Q Gates (m3/s)		Q Gate Group (m3/s)	
Q Culv (m3/s)	0.00	Gate Open Ht (m)	
Q Lat RC (m3/s)		Gate #Open	
		Gate Area (m2)	
Q Breach (m3/s)		Gate Submerg	
Breach Avg Velocity (m/s)		Gate Invert (m)	
Breach Flow Area (m2)		Gate Weir Coef	

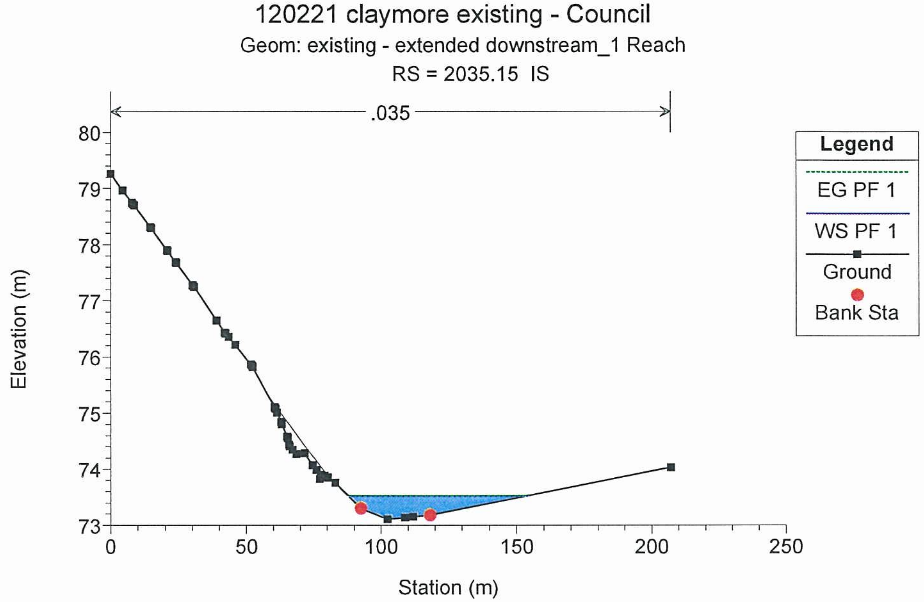
PROPOSED HECRAS – LATERAL WEIR TO BASIN (RESULTS)

HEC-RAS Plan: Plan 37 River: 1 Reach: 1 Profile: PF 1

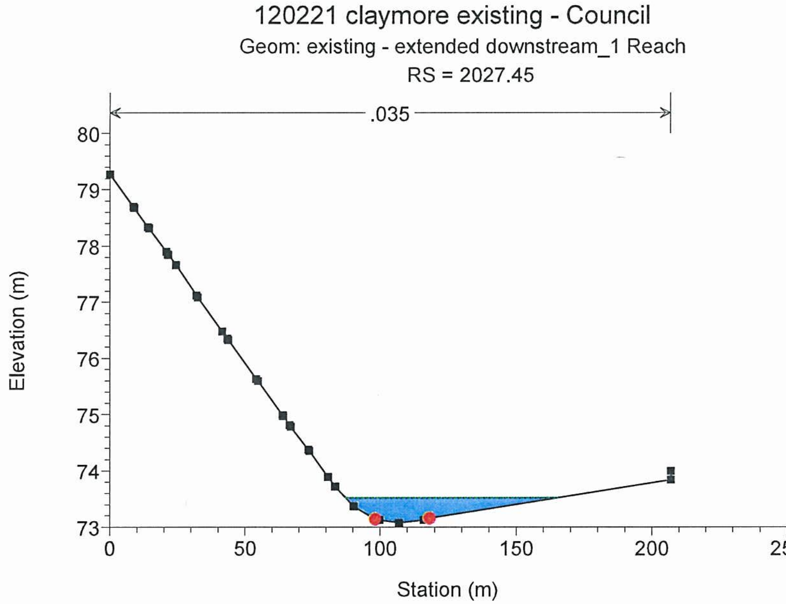
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	2043.15	PF 1	3.60	73.11	73.52	73.29	73.53	0.000370	0.28	15.72	66.06	0.15
1	2035.15		Inl Struct									
1	2027.45	PF 1	3.60	73.08	73.52		73.52	0.000243	0.25	19.04	77.96	0.12
1	2014.25	PF 1	3.60	73.19	73.47		73.51	0.008005	0.86	4.20	21.44	0.62
1	1990.15	PF 1	12.22	72.72	73.01	73.01	73.10	0.021496	1.42	9.19	51.80	1.02
1	1941.45	PF 1	12.22	70.26	71.75		71.75	0.000027	0.17	73.72	61.83	0.05
1	1919.25	PF 1	12.22	70.10	71.75		71.75	0.000018	0.15	82.71	60.11	0.04
1	1885.25	PF 1	12.22	69.91	71.75		71.75	0.000011	0.13	95.63	61.89	0.03
1	1864.25	PF 1	12.22	69.78	71.75	71.69	71.75	0.000011	0.13	93.23	57.85	0.03
1	1843.95	PF 1	12.22	69.53	71.75	71.69	71.75	0.000059	0.27	46.07	38.47	0.07
1	1831.85		Inl Struct									
1	1814.25	PF 1	4.69	68.45	69.06		69.14	0.008109	1.21	3.89	12.52	0.69
1	1802.09	PF 1	4.69	68.30	69.07		69.09	0.001008	0.58	8.15	15.38	0.25
1	1773.25	PF 1	4.69	68.00	69.06		69.06	0.000680	0.39	12.73	28.97	0.14
1	1714.25	PF 1	4.69	67.57	69.06		69.06	0.000008	0.08	68.12	82.98	0.03
1	1666.75	PF 1	19.84	67.37	69.06		69.06	0.000029	0.20	122.94	100.63	0.05
1	1614.25	PF 1	19.84	67.00	69.06		69.06	0.000008	0.12	165.66	102.06	0.03
1	1564.25	PF 1	19.84	66.55	69.05	68.60	69.06	0.000045	0.24	85.19	66.04	0.06
1	1542.65		Inl Struct									
1	1519.55	PF 1	12.27	64.76	65.65	65.60	65.82	0.011371	1.82	6.74	15.04	0.87
1	1491.55	PF 1	12.27	64.66	65.22	65.22	65.42	0.017849	2.00	6.13	15.27	1.01
1	1442.25	PF 1	12.27	63.84	64.84		64.87	0.001298	0.77	15.91	25.14	0.31
1	1406.35	PF 1	12.27	63.79	64.83		64.84	0.000363	0.47	26.30	34.09	0.17
1	1364.55	PF 1	12.27	63.22	64.83		64.83	0.000012	0.12	100.21	73.11	0.03
1	1321.35	PF 1	12.27	62.66	64.83	64.46	64.83	0.000006	0.09	136.97	86.98	0.02
1	1307.35		Inl Struct									
1	1288.65	PF 1	12.09	61.48	62.45	62.28	62.57	0.011028	1.58	7.65	13.17	0.66
1	1264.25	PF 1	12.09	61.39	62.00	62.00	62.22	0.018582	2.09	5.80	13.01	1.00
1	1196.15	PF 1	12.09	60.57	62.05		62.06	0.000087	0.27	45.23	44.75	0.08
1	1158.35	PF 1	12.09	60.47	62.05		62.05	0.000026	0.15	81.16	67.68	0.04
1	1114.25	PF 1	12.09	60.10	62.05	61.70	62.05	0.000010	0.12	102.47	75.18	0.03
1	1097.85		Inl Struct									
1	1089.25	PF 1	12.09	58.90	61.70	61.70	61.71	0.000167	0.42	33.09	38.66	0.08
1	1076.35	PF 1	12.09	58.80	59.59	59.40	59.74	0.005995	1.67	7.22	10.51	0.64
1	1068.25		Bridge									
1	1055.85	PF 1	12.53	58.65	59.51		59.64	0.004793	1.56	8.03	11.00	0.58
1	1014.25	PF 1	12.53	58.56	59.21		59.36	0.009536	1.75	7.18	14.36	0.79
1	964.25	PF 1	12.53	58.23	58.89		58.98	0.005706	1.27	9.85	19.72	0.57
1	914.25	PF 1	12.53	57.82	58.54		58.66	0.007106	1.49	8.39	17.09	0.68
1	868.05	PF 1	12.53	57.41	58.18		58.29	0.008892	1.48	8.47	16.68	0.66
1	814.25	PF 1	12.53	57.08	57.96		58.02	0.002967	1.09	11.68	22.80	0.45
1	764.25	PF 1	12.53	56.96	57.56	57.53	57.73	0.013736	1.83	6.86	16.96	0.92
1	736.65	PF 1	12.53	56.64	57.25	57.25	57.46	0.016550	2.04	6.14	14.73	1.01
1	727.15	PF 1	31.62	55.38	57.28		57.31	0.000449	0.77	41.23	28.34	0.20
1	672.95	PF 1	31.62	55.66	57.00	56.82	57.22	0.009820	2.09	15.16	19.37	0.75
1	633.55	PF 1	31.62	55.51	56.49		56.67	0.021043	1.89	16.73	28.76	0.75
1	584.65	PF 1	31.62	54.97	56.46		56.50	0.000929	0.89	35.66	34.42	0.28
1	514.25	PF 1	37.56	54.62	56.22		56.35	0.004710	1.61	23.29	25.80	0.54
1	443.55	PF 1	37.56	54.42	55.74		55.91	0.008745	1.79	20.95	37.93	0.77
1	423.88	PF 1	38.53	54.25	55.65		55.79	0.003902	1.86	27.21	50.62	0.57
1	360.8	PF 1	38.53	53.74	55.14	55.03	55.42	0.008623	2.36	16.52	24.82	0.82
1	315.25	PF 1	38.53	53.43	54.63	54.61	54.95	0.012768	2.47	15.59	24.33	0.96
1	130.08	PF 1	47.76	51.88	53.42		53.58	0.004884	1.82	28.84	51.32	0.62
1	89.48	PF 1	47.76	51.50	52.96	52.96	53.25	0.010513	2.41	20.83	42.79	0.89
1	51.38	PF 1	47.76	51.37	52.72		52.86	0.004105	1.96	31.18	46.64	0.59
1	37.59	PF 1	47.76	51.24	52.73		52.81	0.001764	1.44	41.58	49.23	0.40
1	23.12	PF 1	47.76	51.19	52.73		52.78	0.001336	1.02	51.51	55.15	0.28
1	7.65	PF 1	47.76	50.95	52.73		52.77	0.000147	0.83	77.40	65.39	0.21
1	4.53	PF 1	47.76	49.32	52.75		52.76	0.000042	0.56	102.38	62.10	0.11
1	0.02	PF 1	47.76	49.28	52.66	50.69	52.75	0.000088	1.34	42.75	24.28	0.24
1	0.01		Culvert									
1	0	PF 1	47.76	49.28	50.68	50.68	51.34	0.001866	3.58	13.35	10.25	1.00



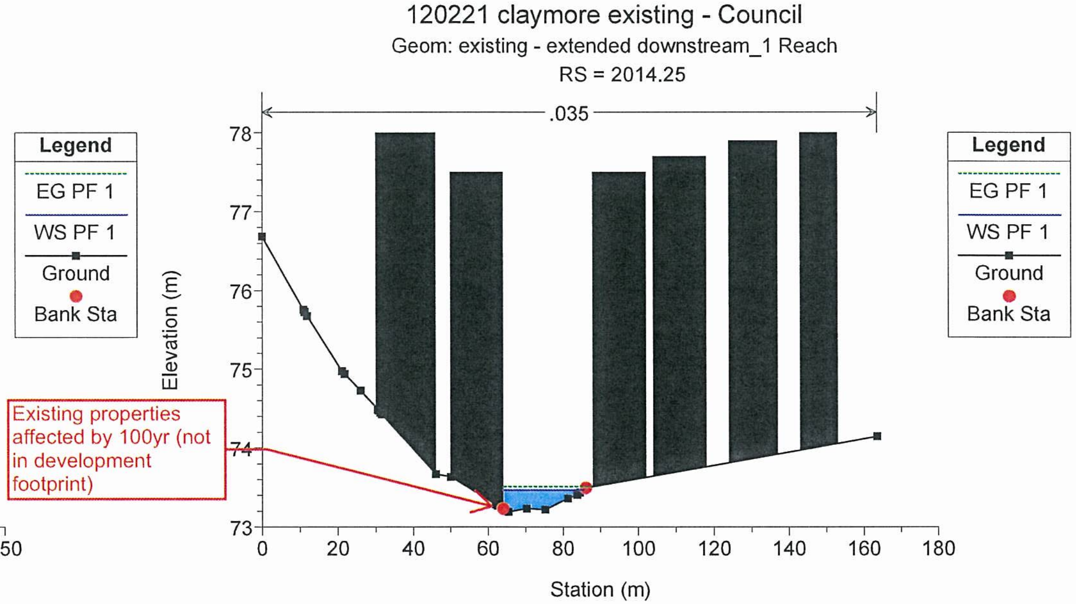
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 2043.15
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta



120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 2035.15 IS
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

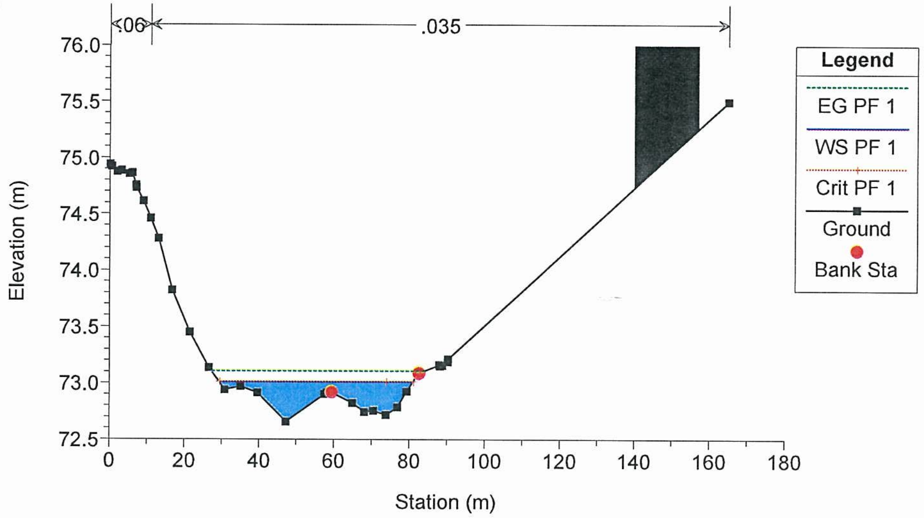


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 2027.45
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

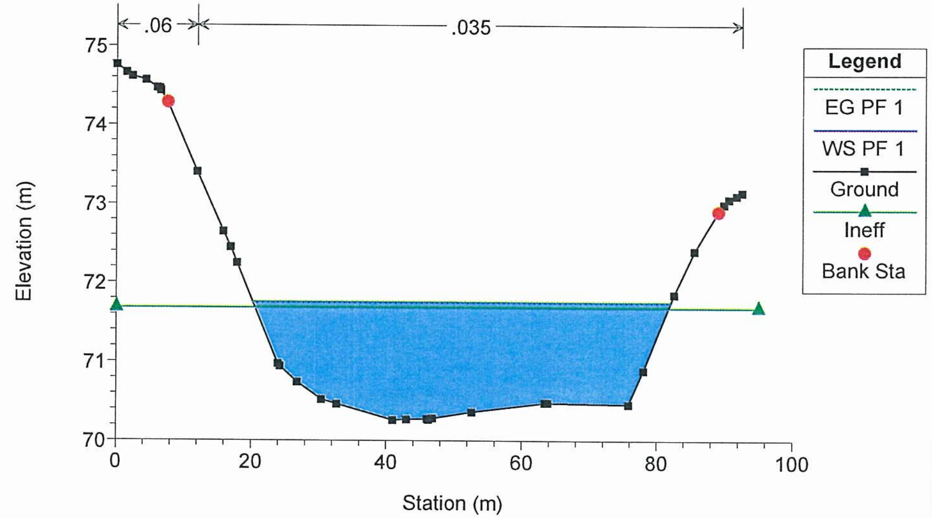


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 2014.25
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Existing properties affected by 100yr (not in development footprint)

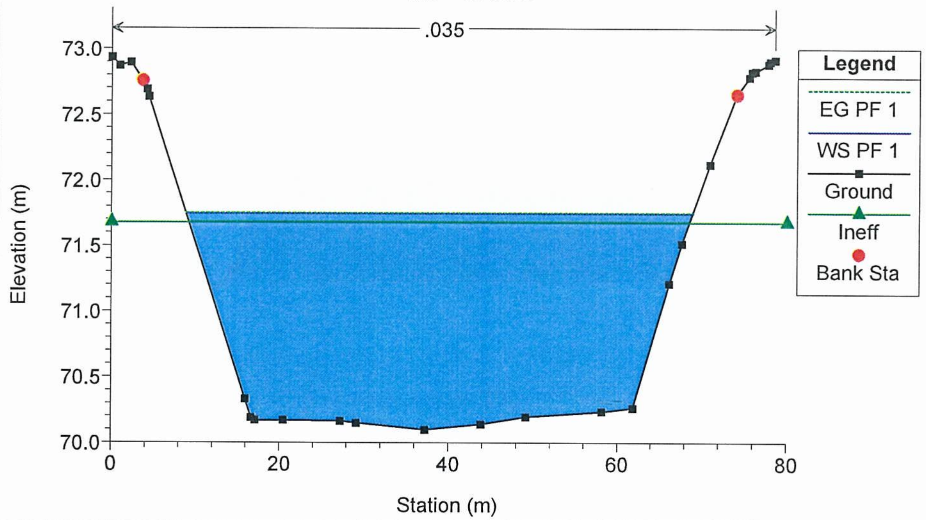
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1990.15



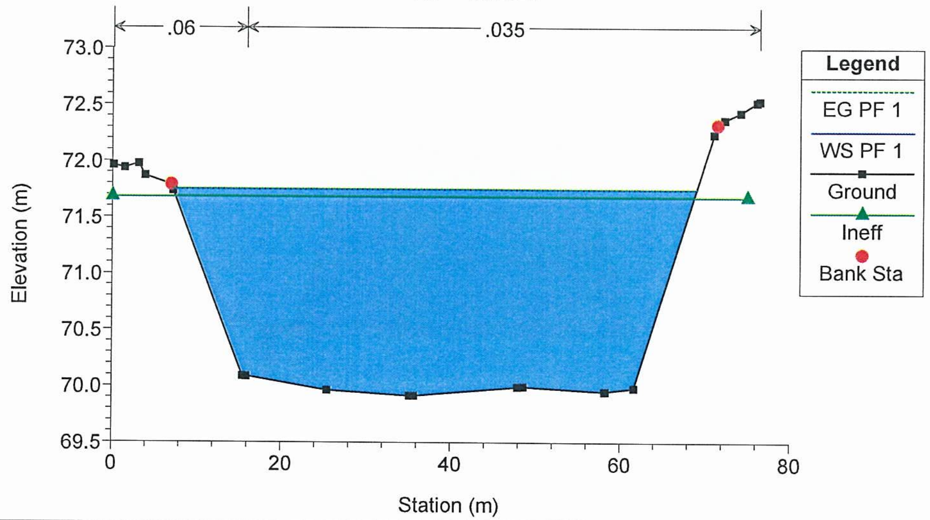
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1941.45

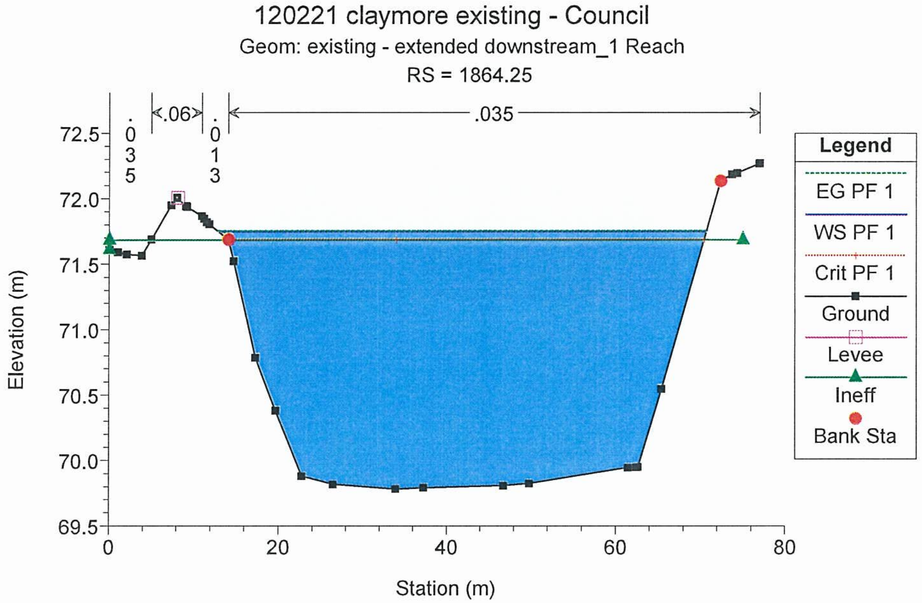


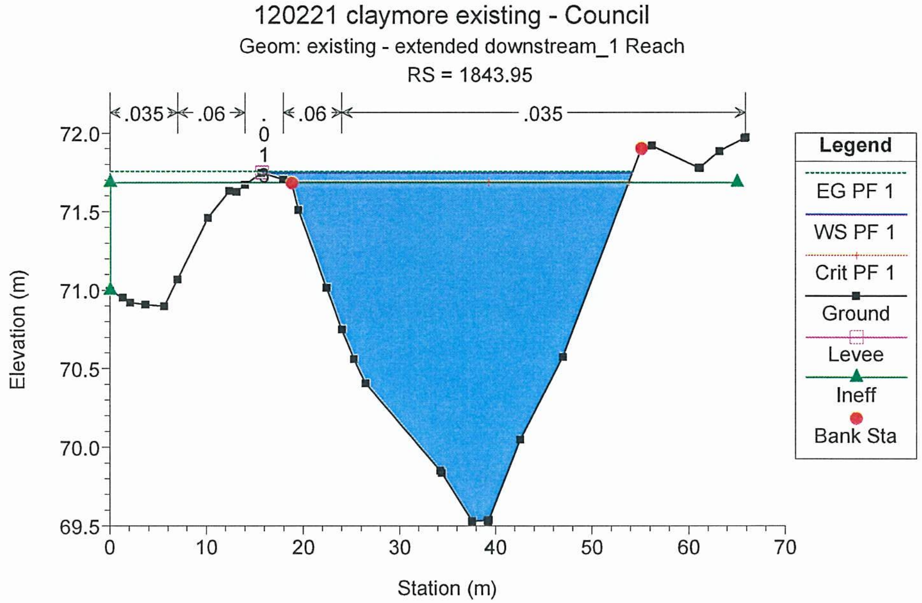
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1919.25

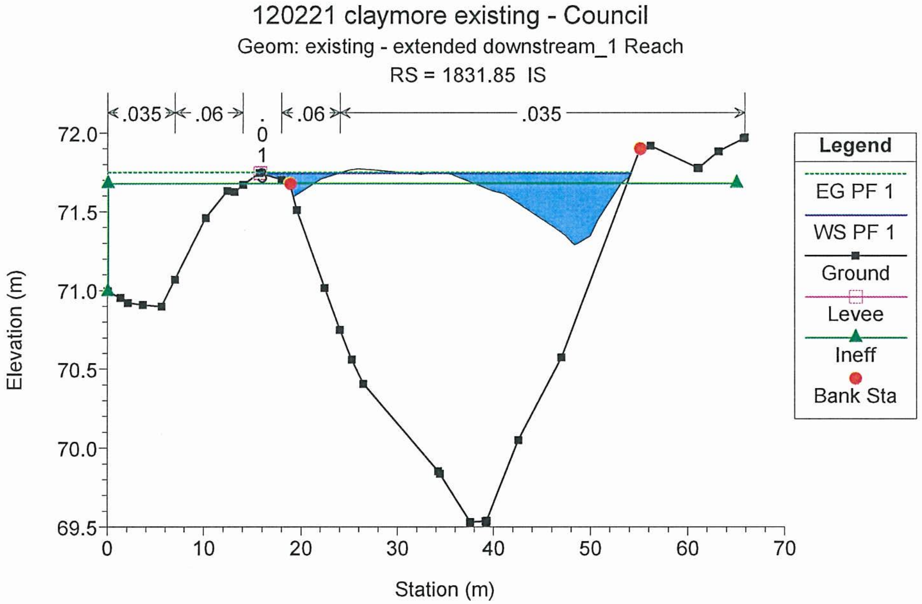


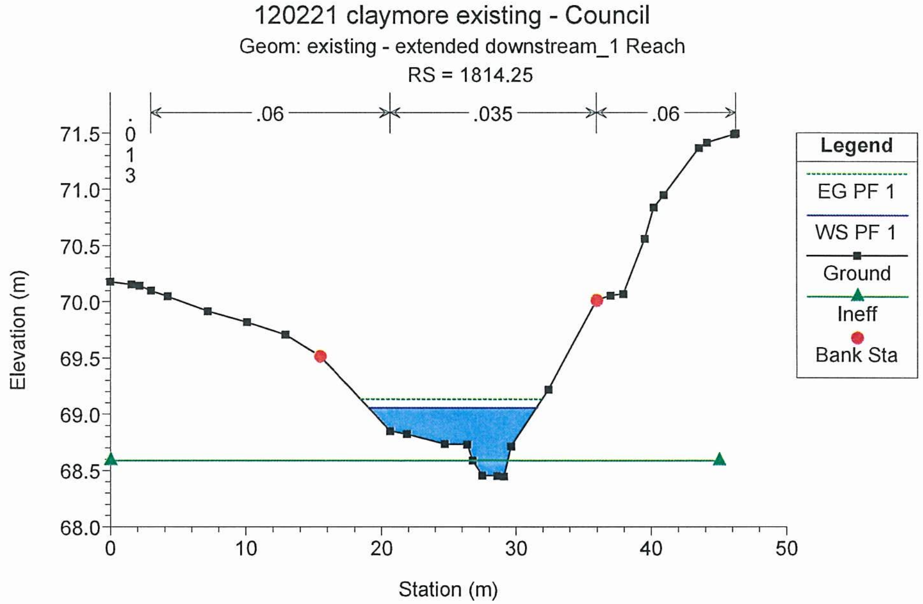
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1885.25

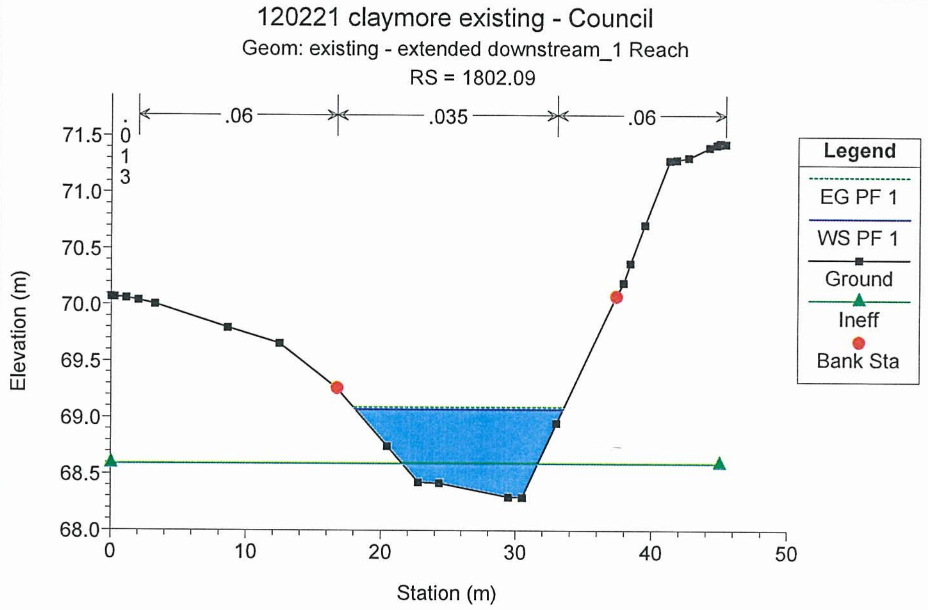


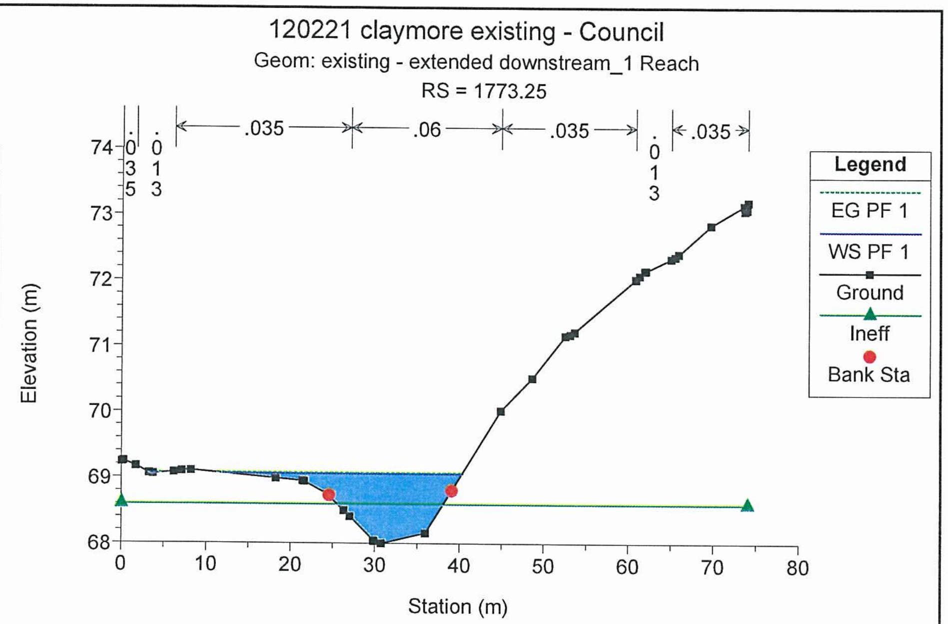

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1864.25
.035
.06
.013
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)

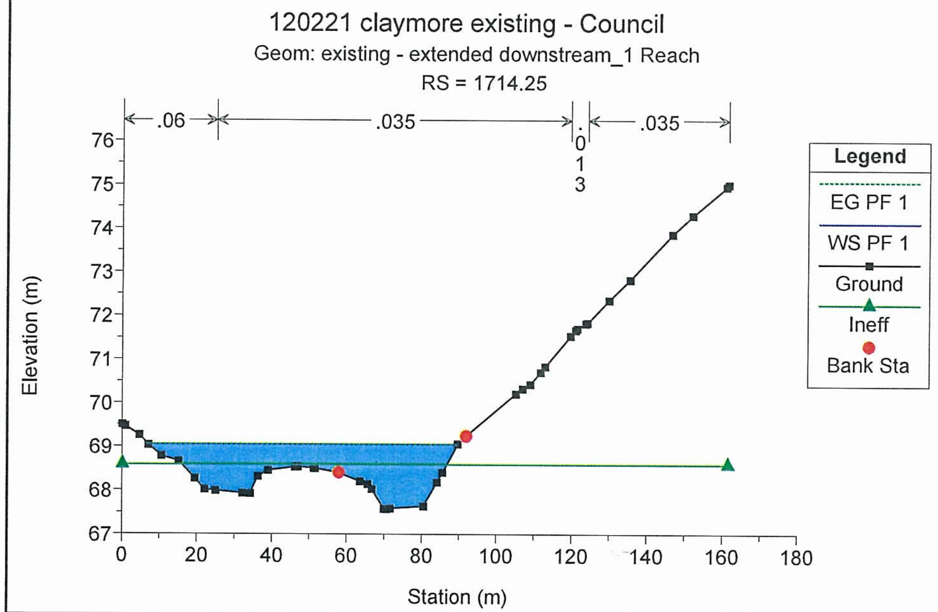

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1843.95
.035
.06
.01
.06
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)

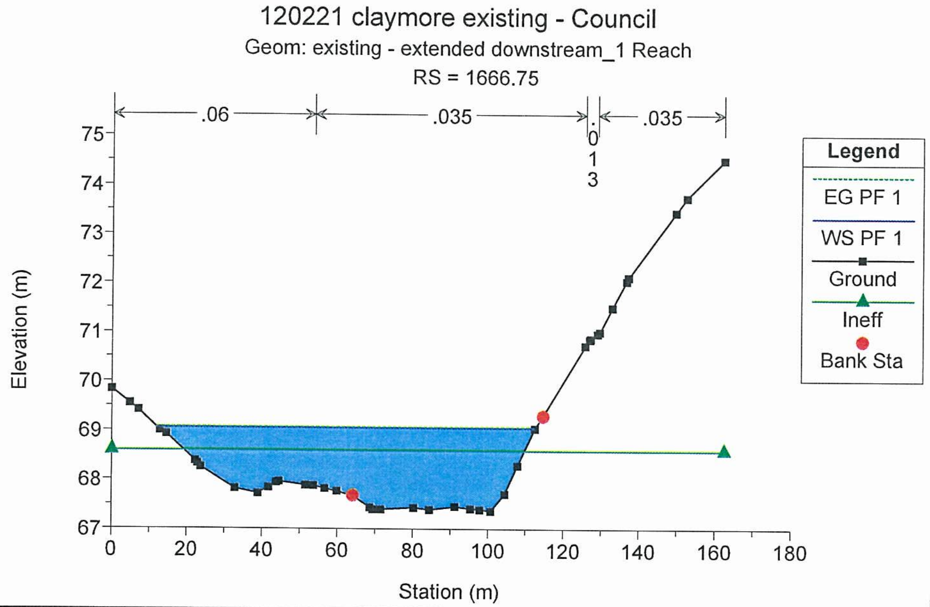

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1831.85 IS
.035
.06
.01
.06
.035
Legend
EG PF 1
WS PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)

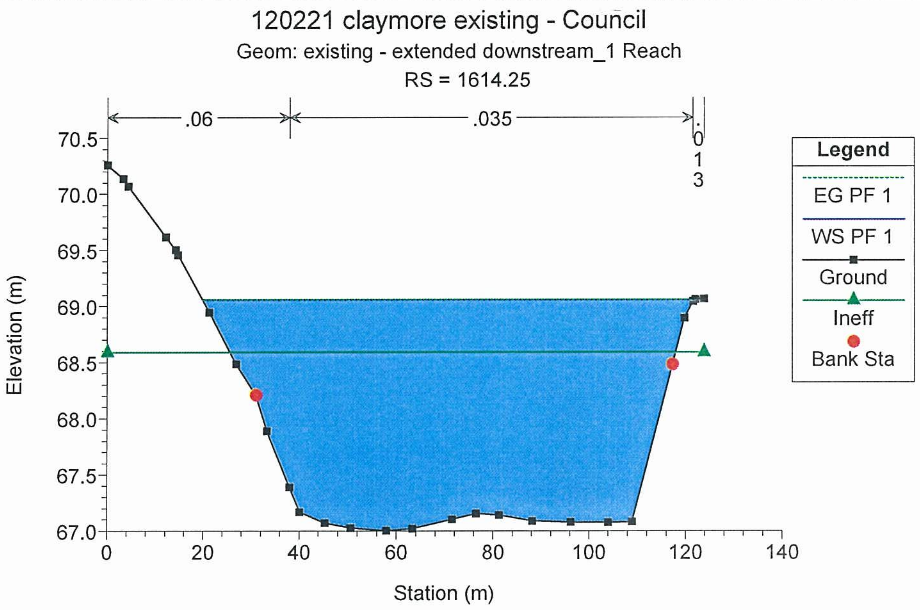

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1814.25
.013
.06
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

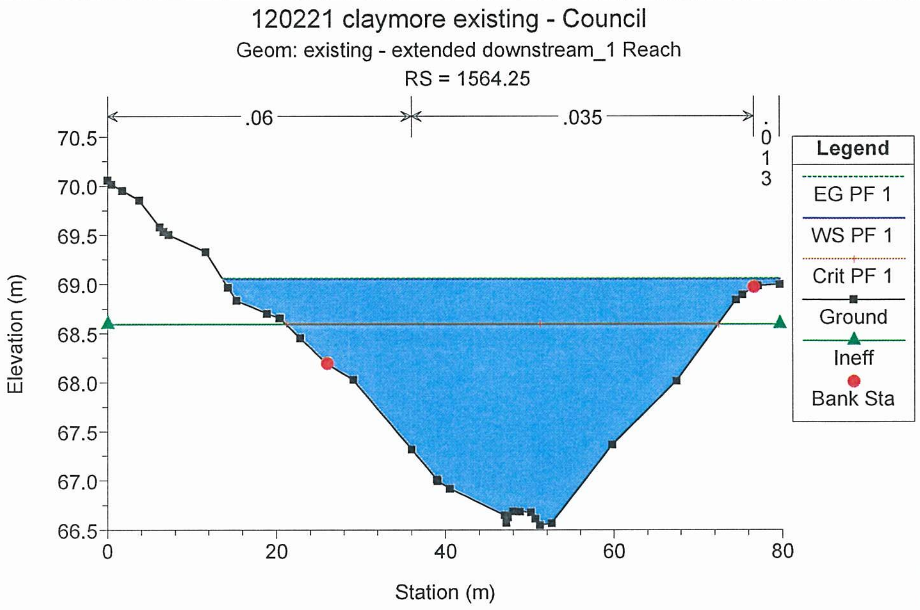

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1802.09
.06
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

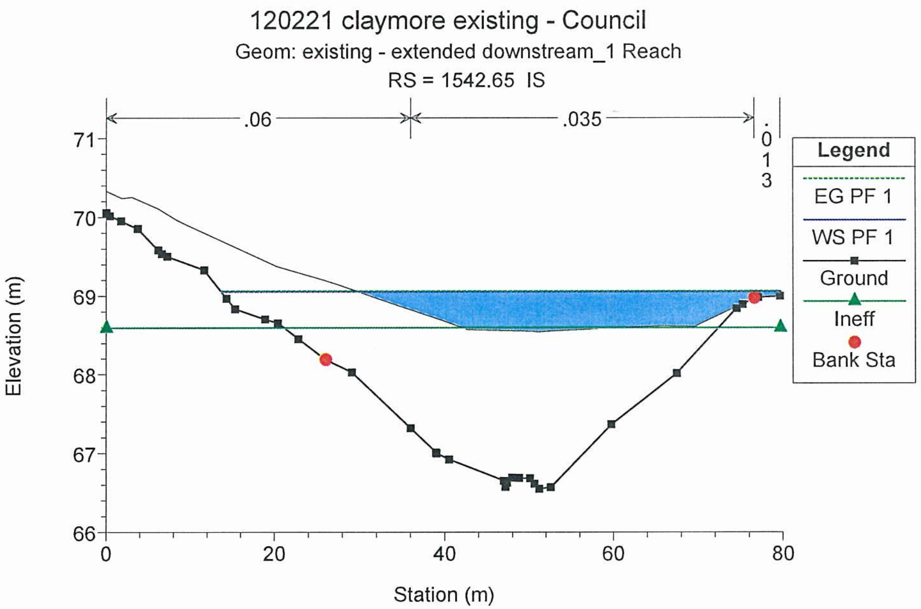

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1773.25
.035
.06
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

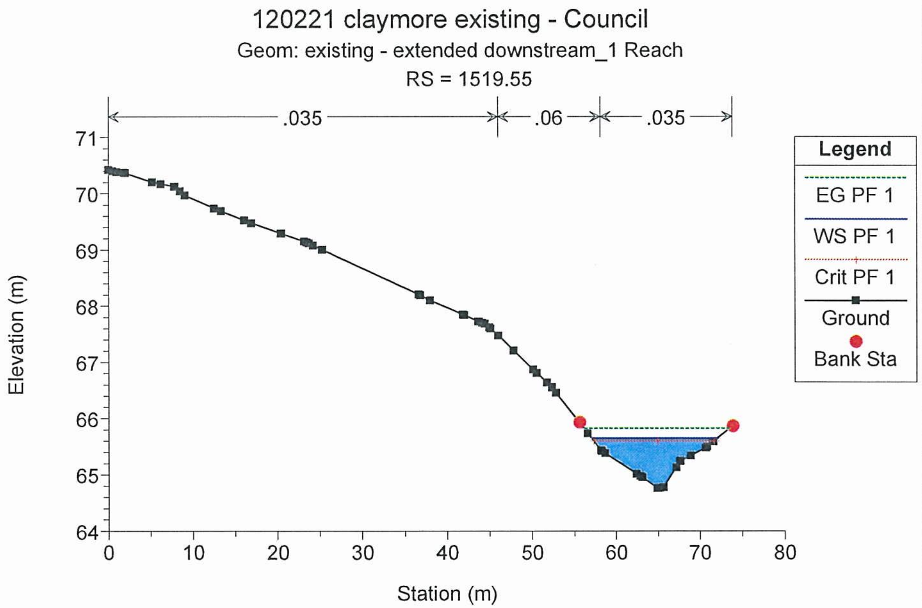

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1714.25
.06
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

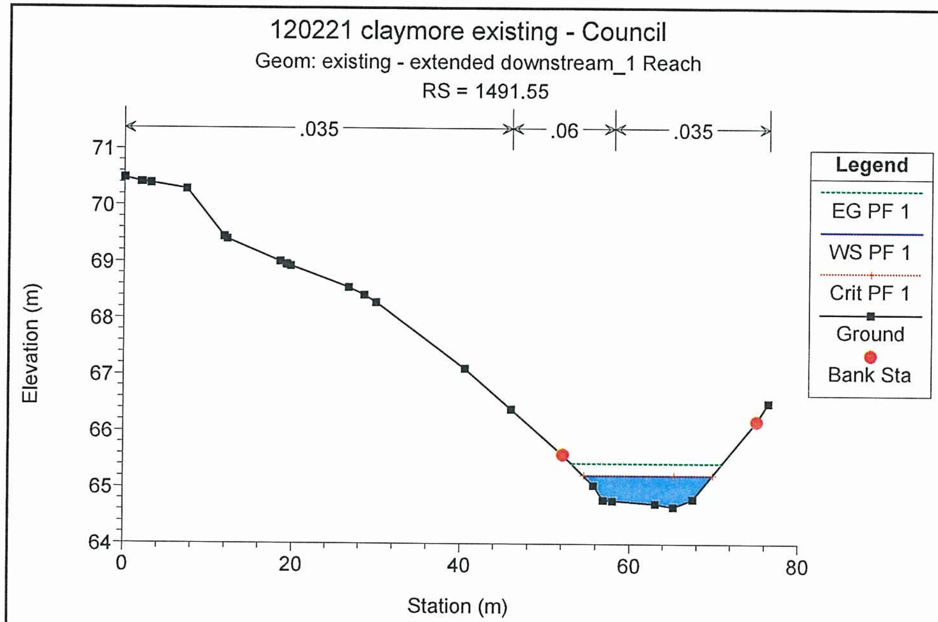

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1666.75
.06
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

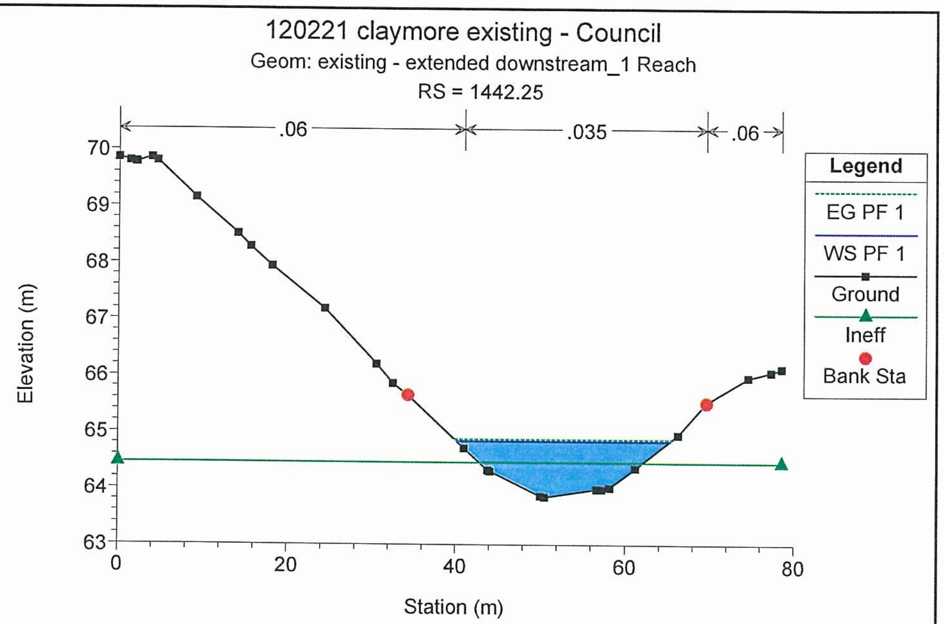

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1614.25
.06
.035
.013
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

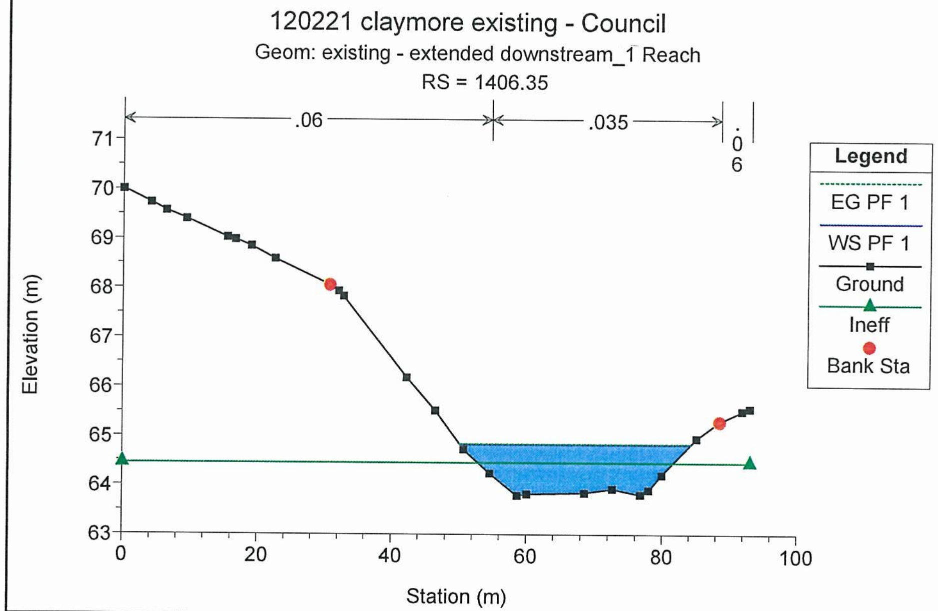

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1564.25
.06
.035
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

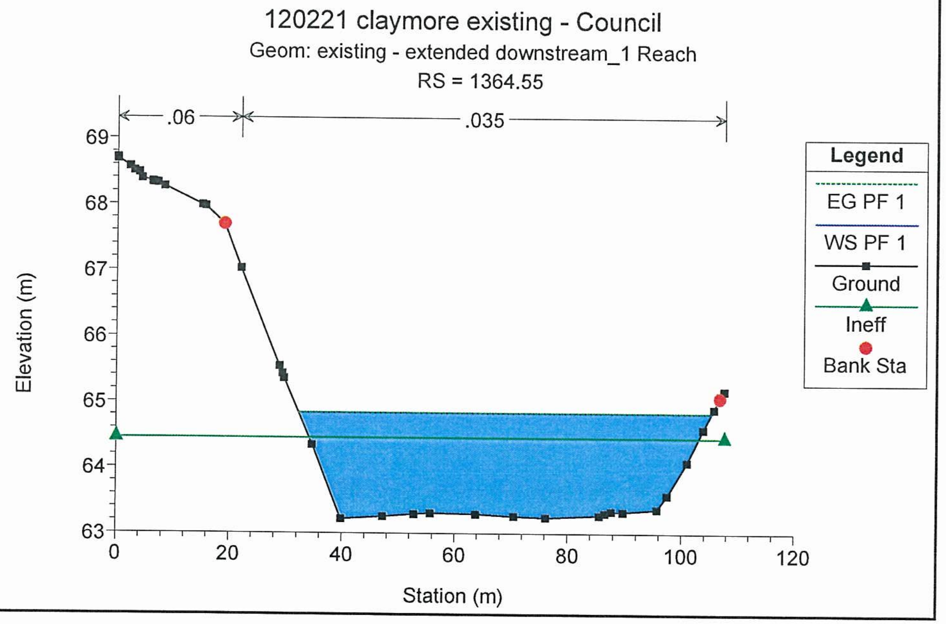

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1542.65 IS
.06
.035
.013
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1519.55
.035
.06
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

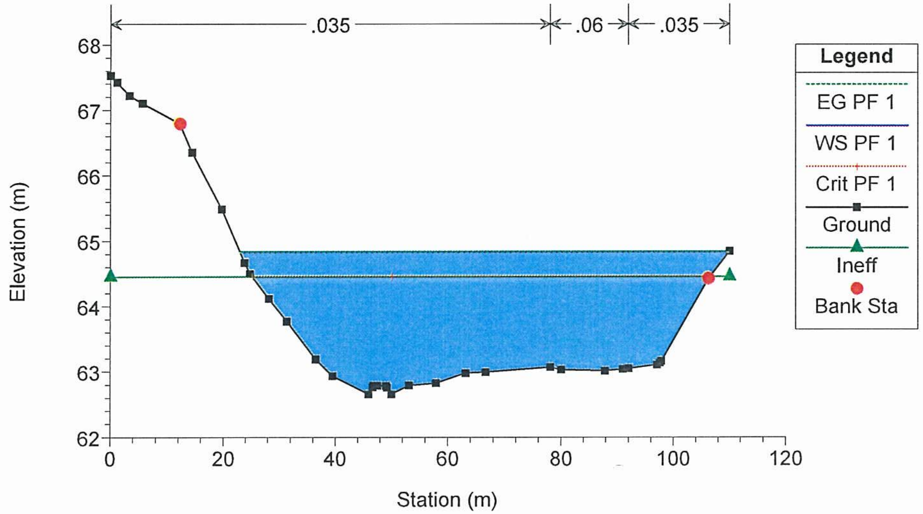

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1491.55
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1442.25
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

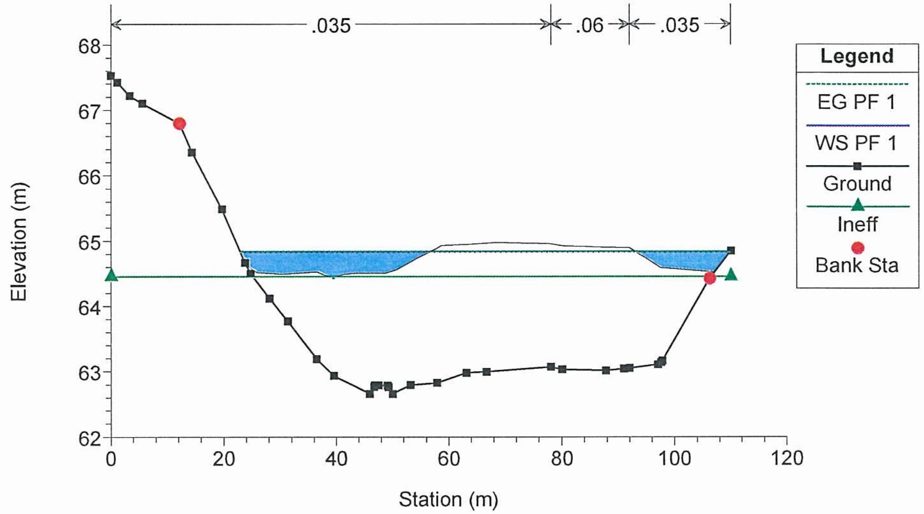

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1406.35
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1364.55
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

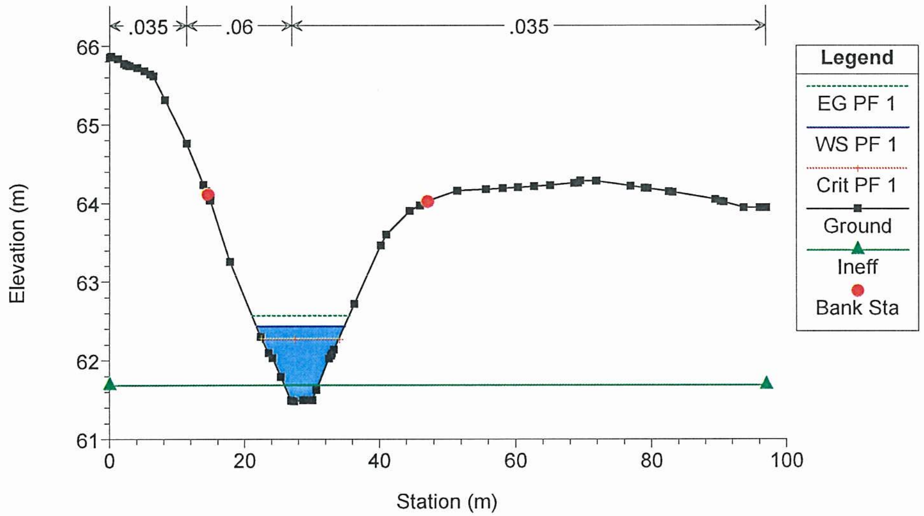
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1321.35



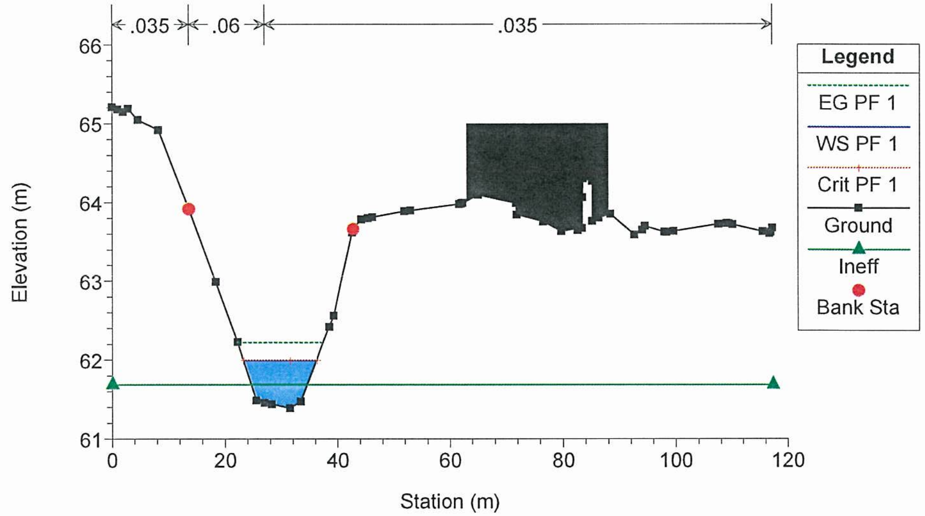
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1307.35 IS

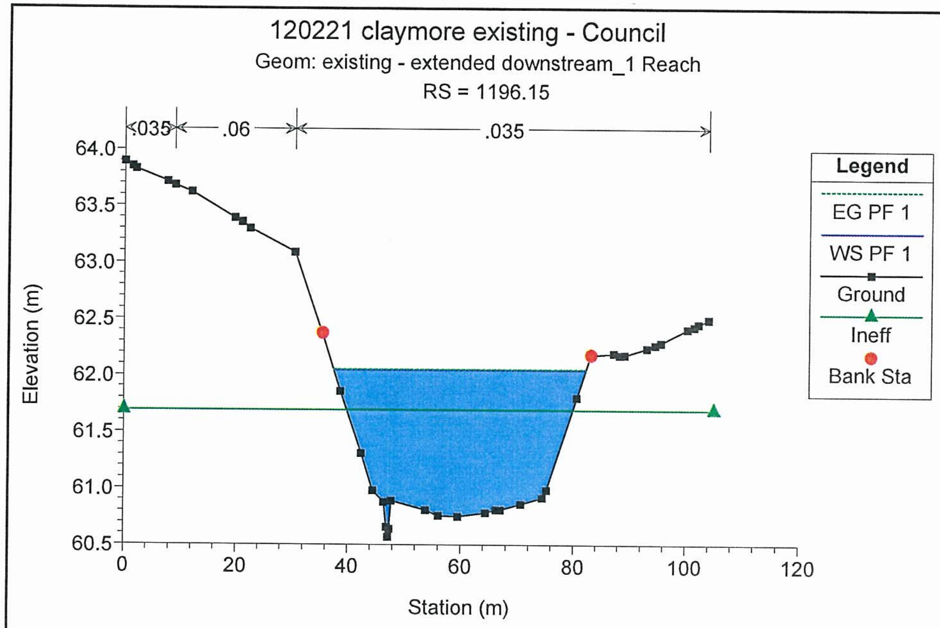


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1288.65

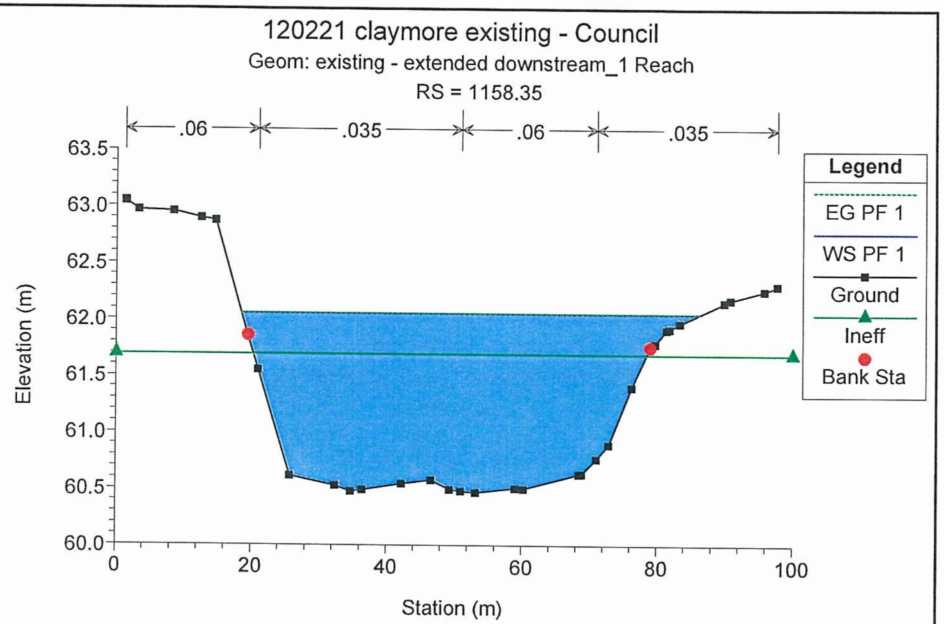


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1264.25

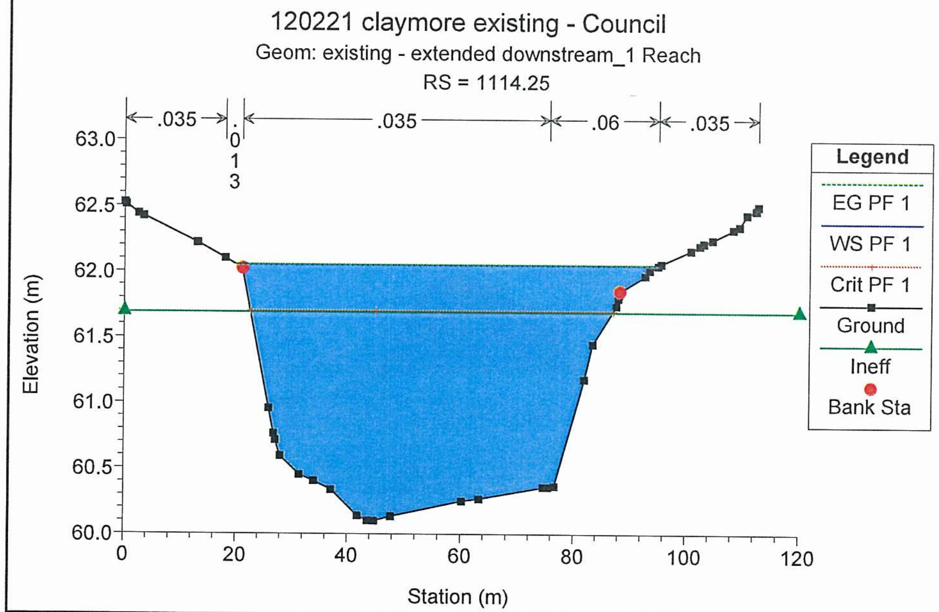




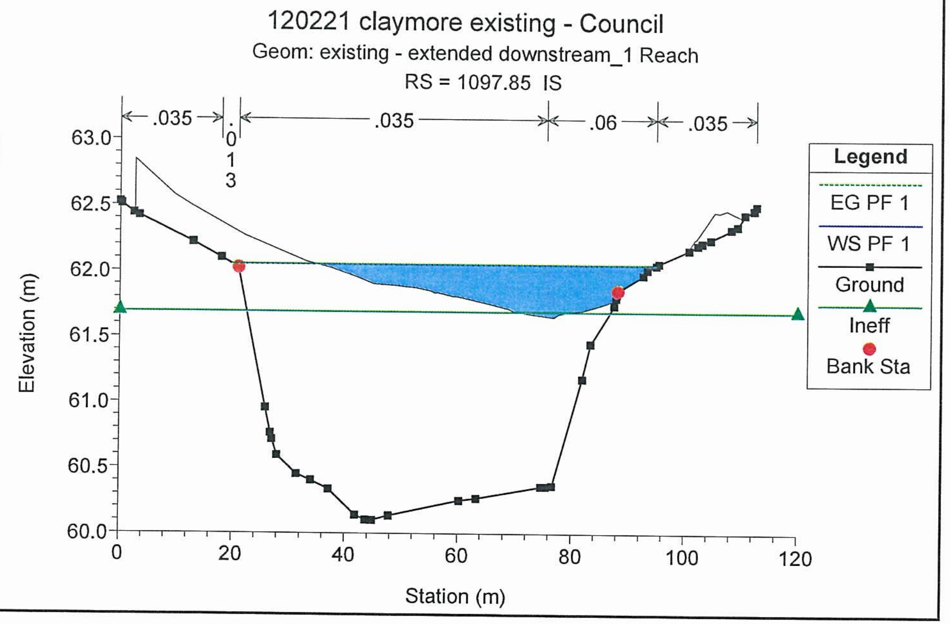
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1196.15
.035
.06
.035
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
64.0
63.5
63.0
62.5
62.0
61.5
61.0
60.5
0
20
40
60
80
100
120



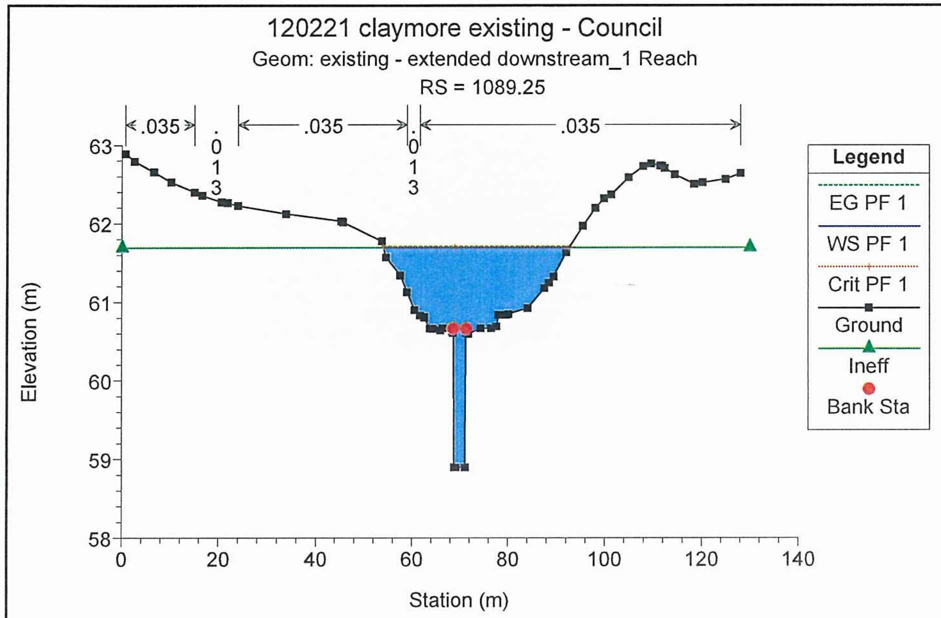
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1158.35
.06
.035
.06
.035
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
63.5
63.0
62.5
62.0
61.5
61.0
60.5
60.0
0
20
40
60
80
100

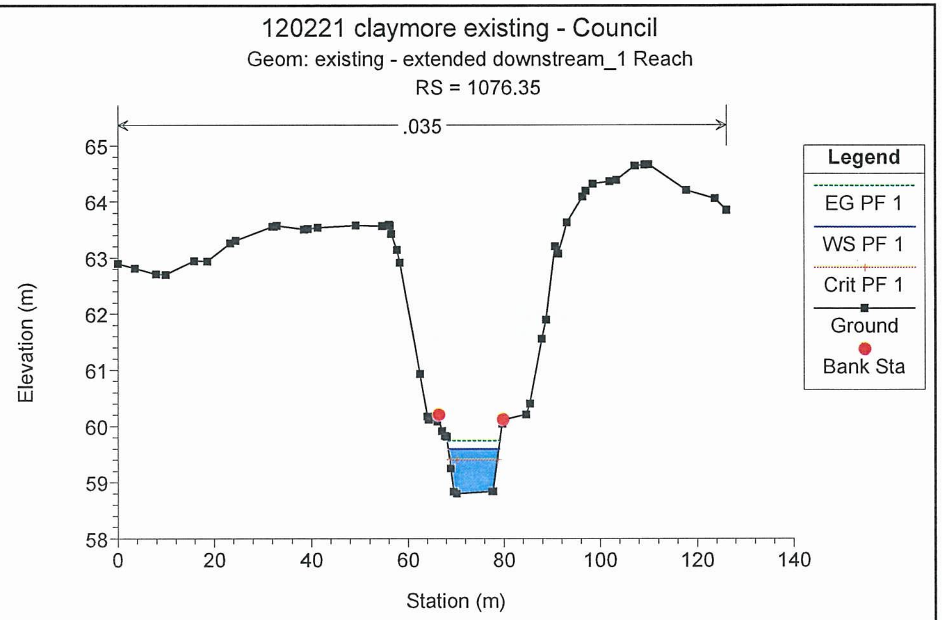


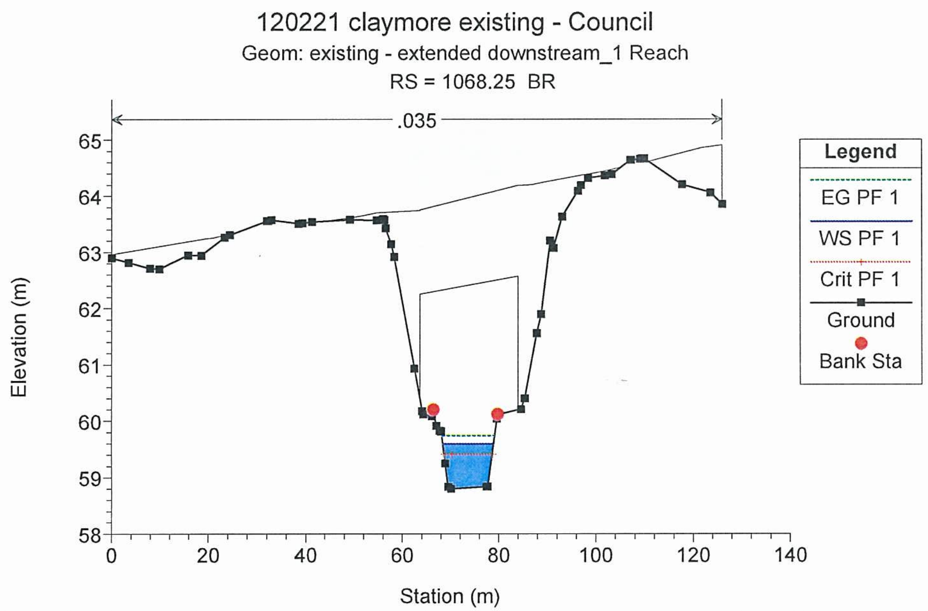
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1114.25
.035
.013
.035
.06
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
63.0
62.5
62.0
61.5
61.0
60.5
60.0
0
20
40
60
80
100
120

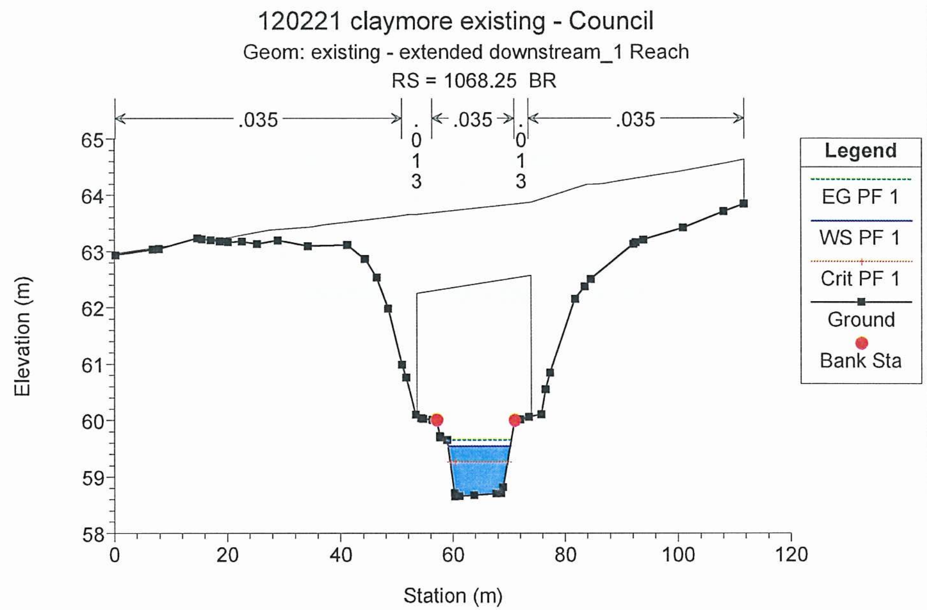


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1097.85 IS
.035
.013
.035
.06
.035
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
63.0
62.5
62.0
61.5
61.0
60.5
60.0
0
20
40
60
80
100
120


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1089.25
.035
.035
.035
.013
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1076.35
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

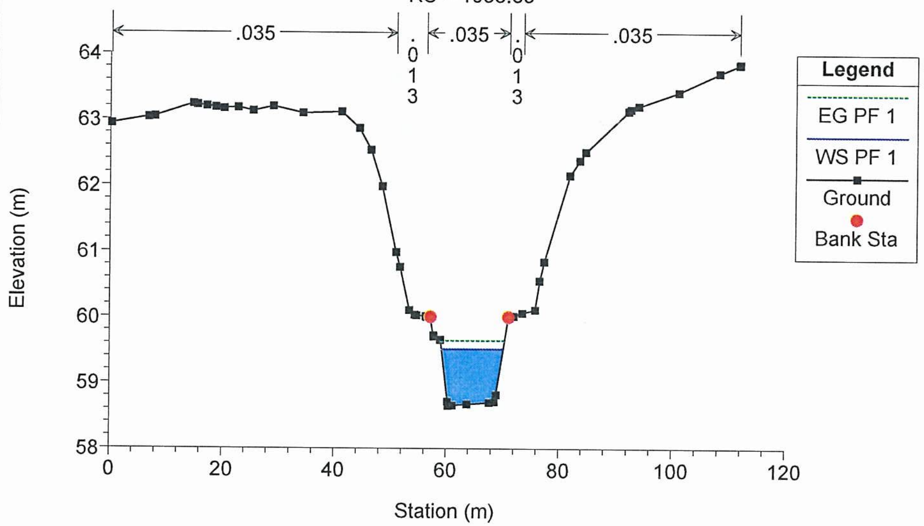

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1068.25 BR
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 1068.25 BR
.035
.035
.035
.013
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

120221 claymore existing - Council

Geom: existing - extended downstream_1 Reach

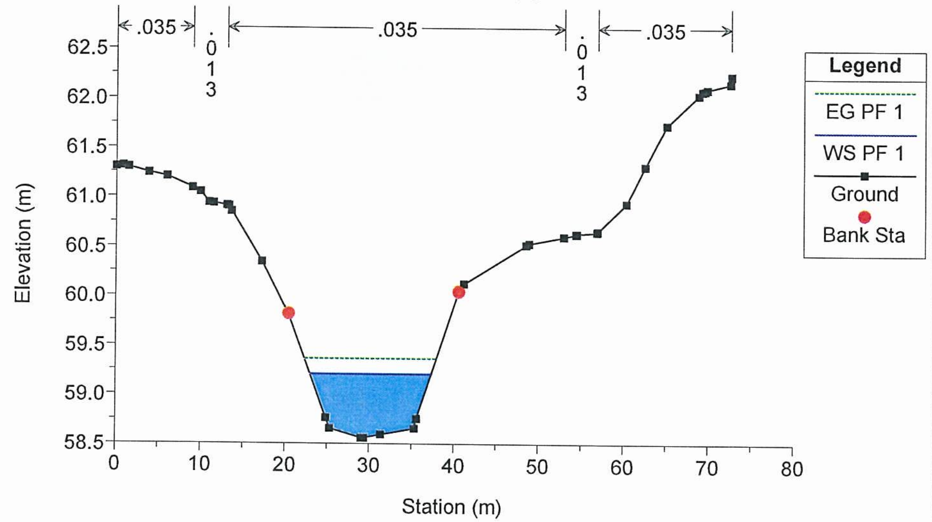
RS = 1055.85



120221 claymore existing - Council

Geom: existing - extended downstream_1 Reach

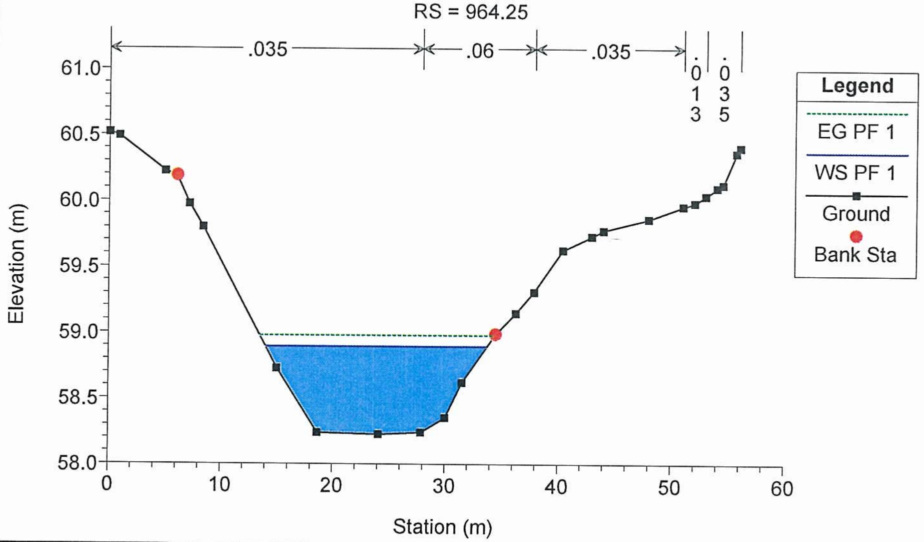
RS = 1014.25



120221 claymore existing - Council

Geom: existing - extended downstream_1 Reach

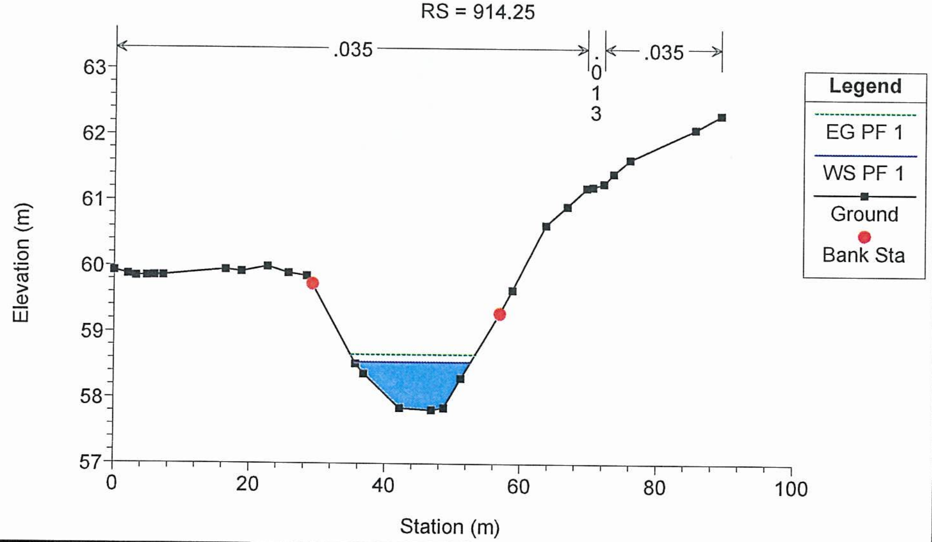
RS = 964.25

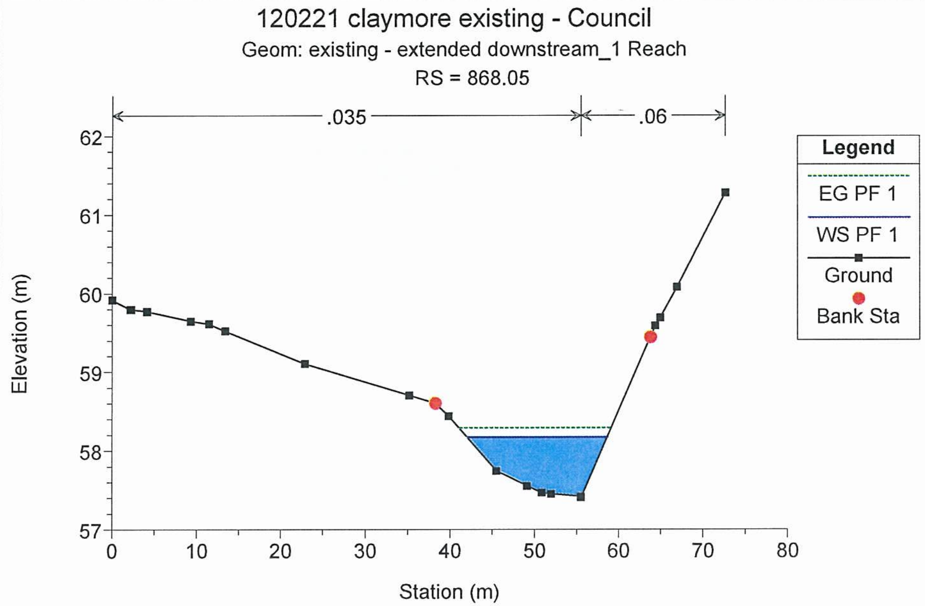


120221 claymore existing - Council

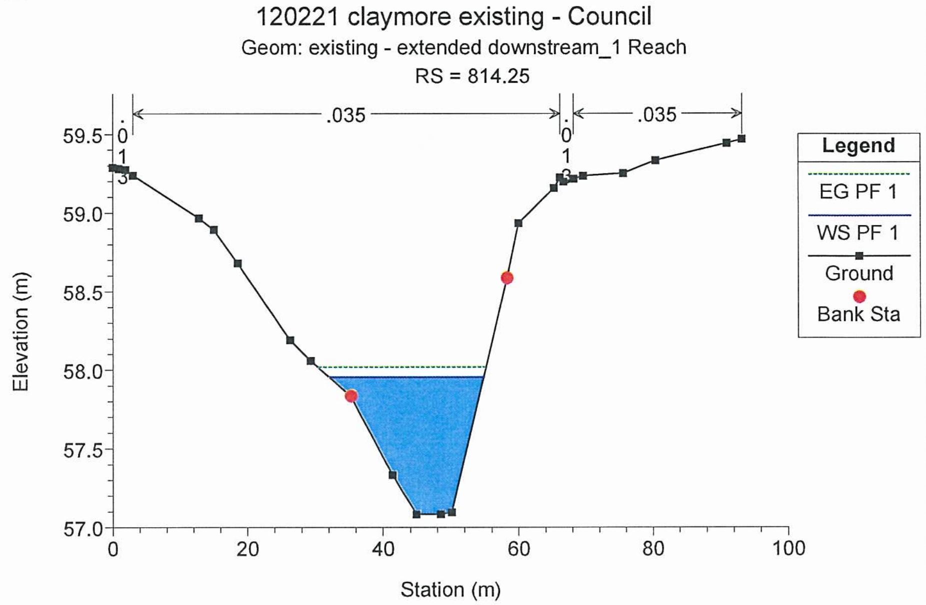
Geom: existing - extended downstream_1 Reach

RS = 914.25

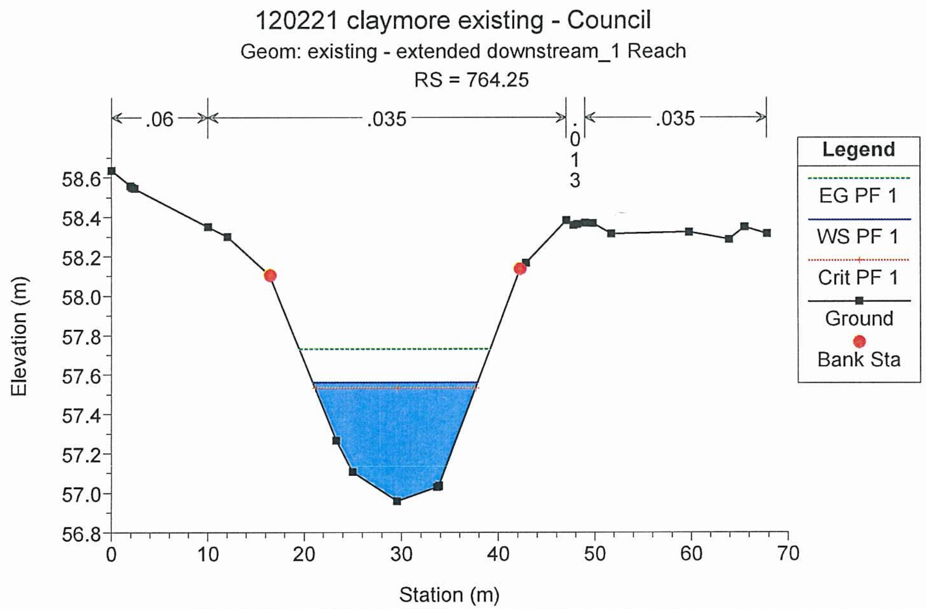




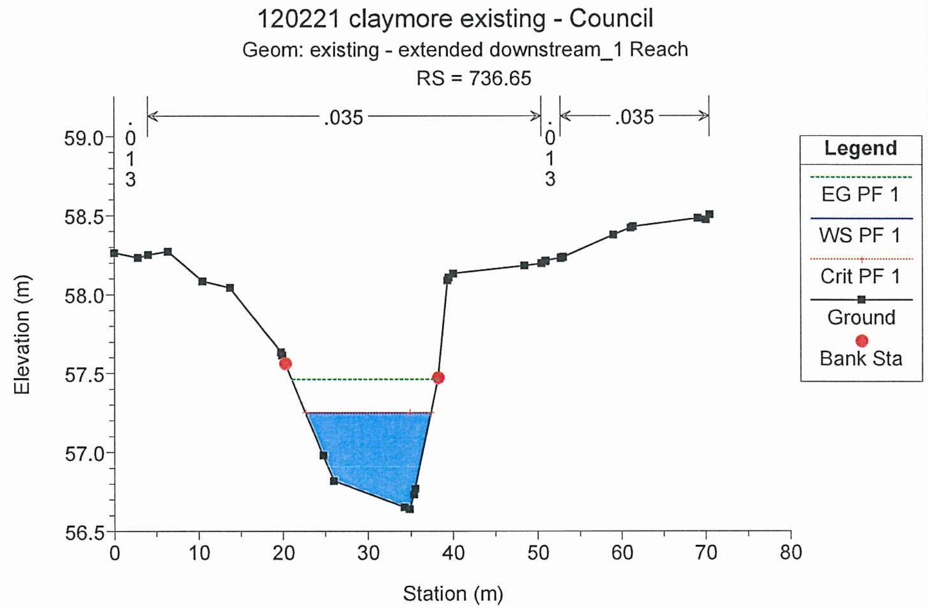
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 868.05
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta



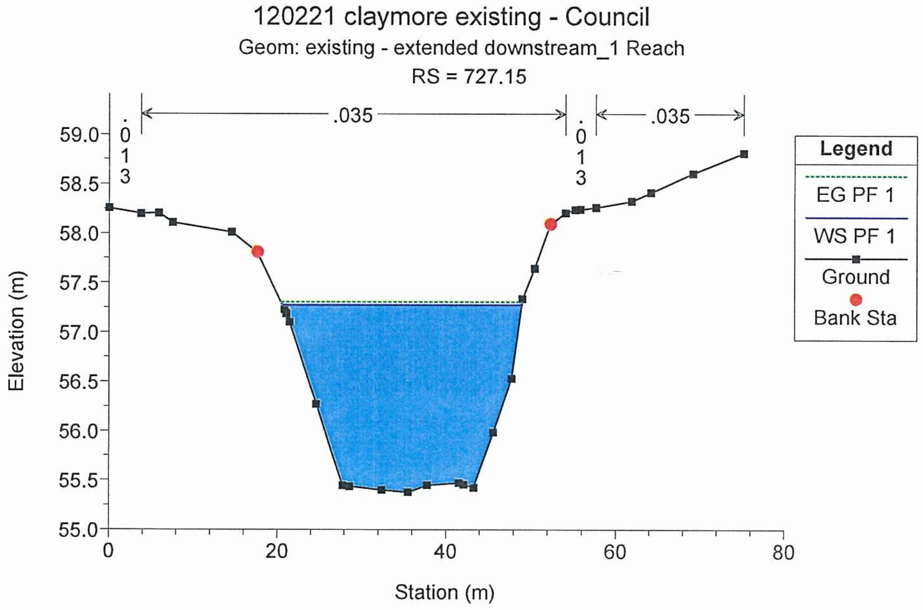
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 814.25
.035
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

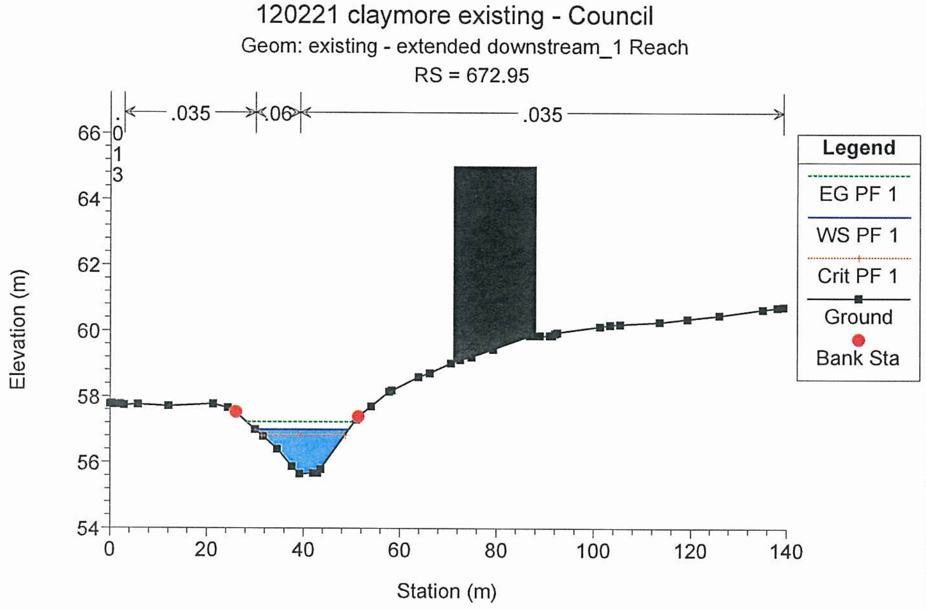


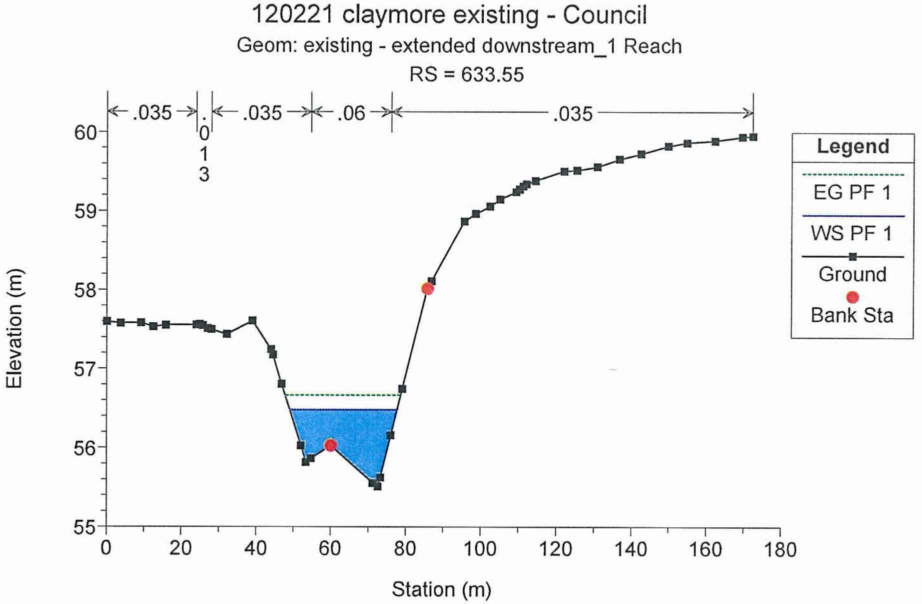
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 764.25
.06
.035
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

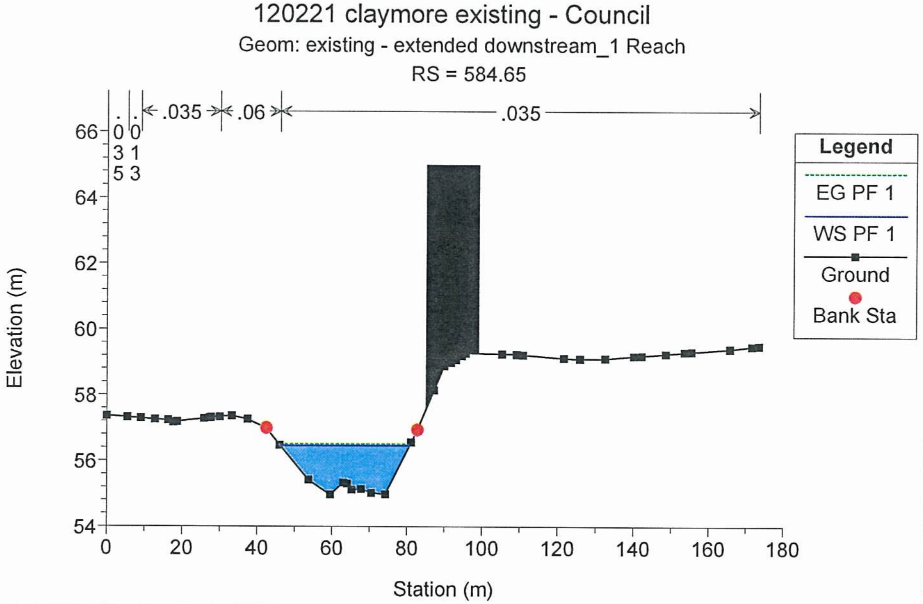


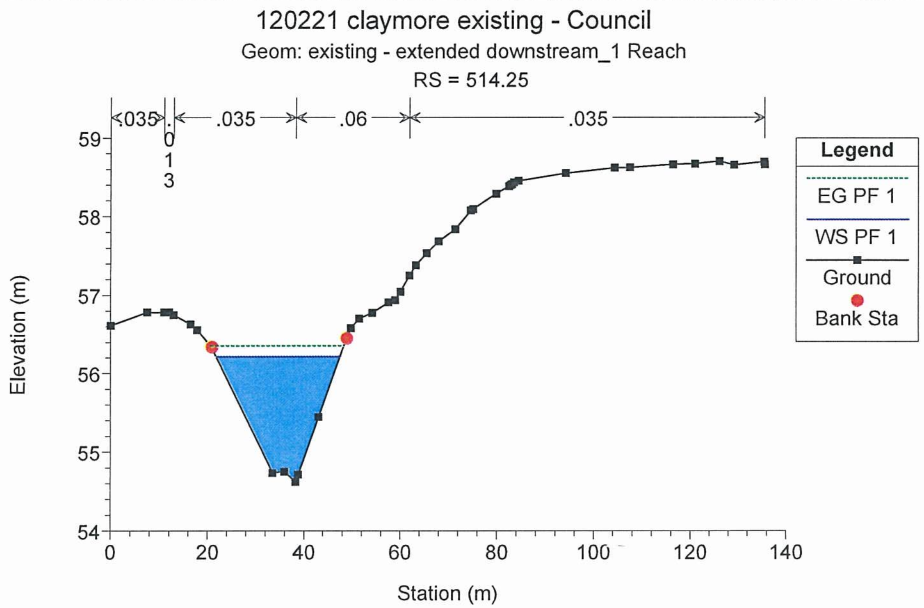
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 736.65
.035
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

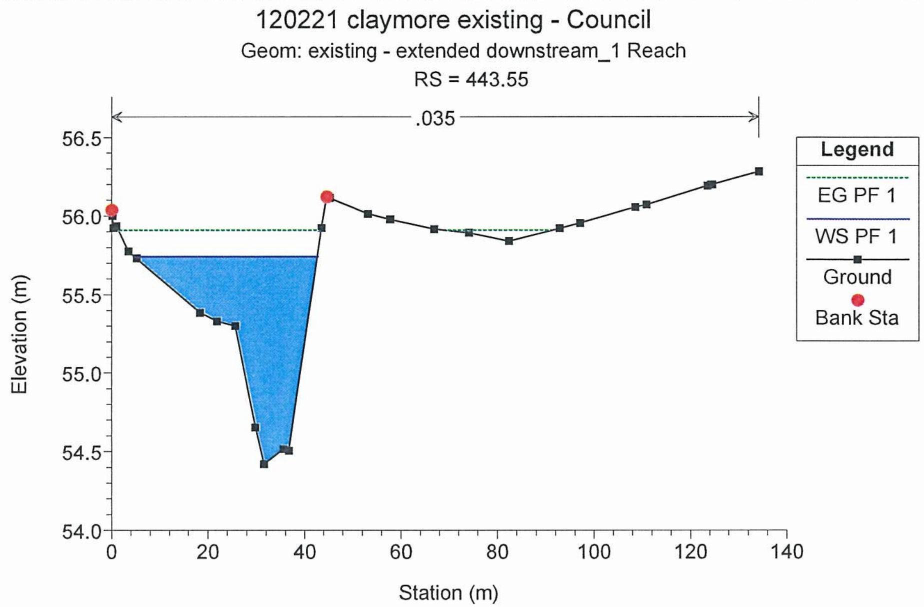

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 727.15
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

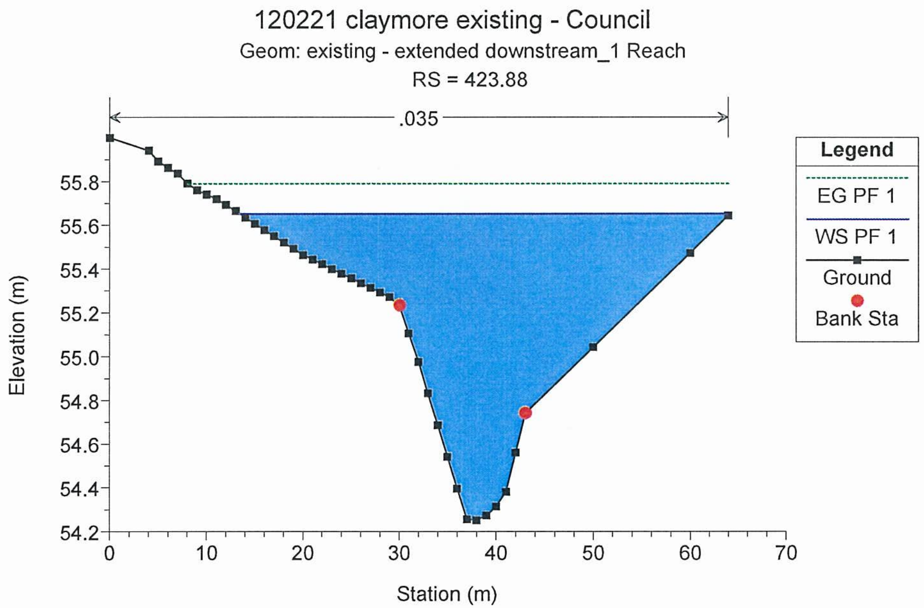

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 672.95
.035
.06
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

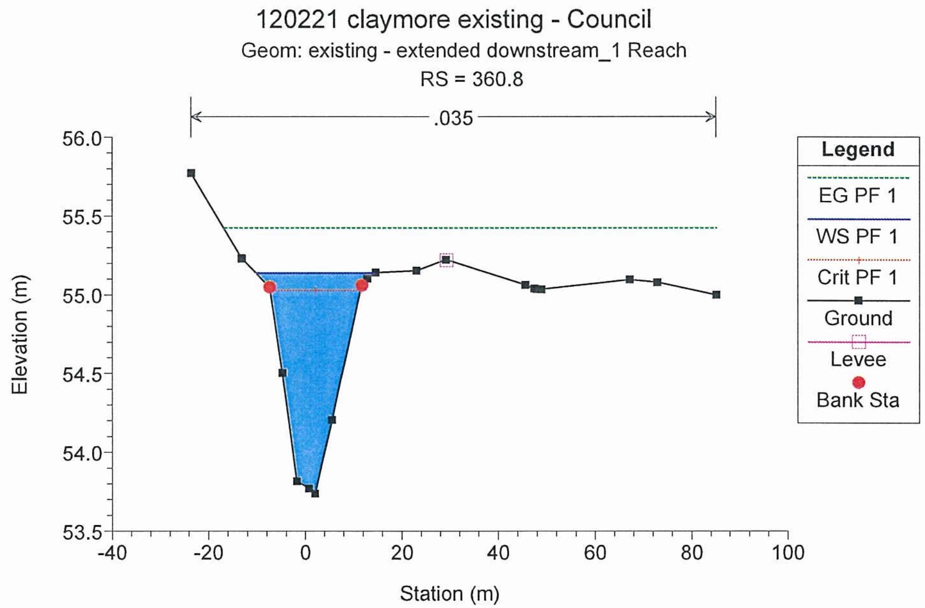

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 633.55
.035
.035
.06
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

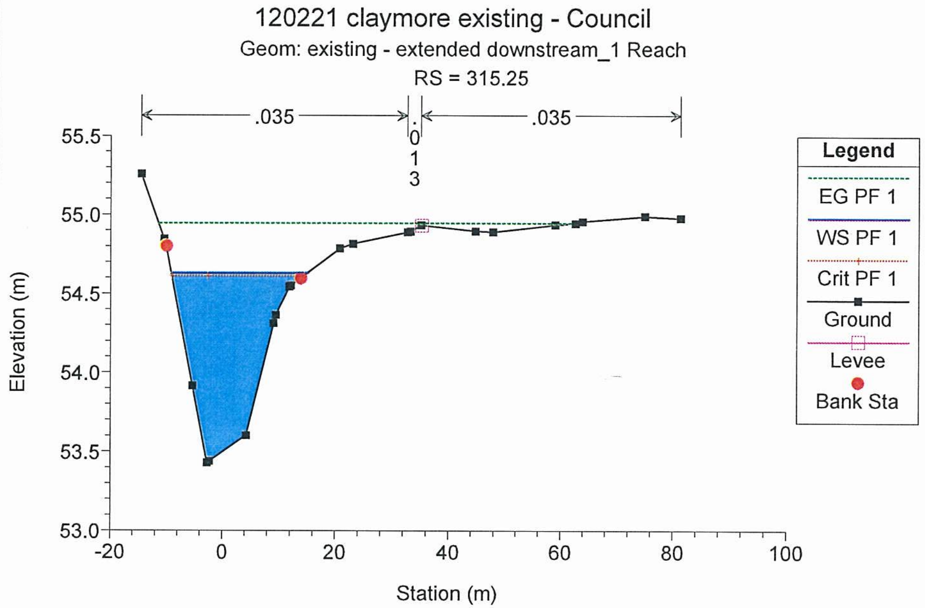

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 584.65
.035
.06
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

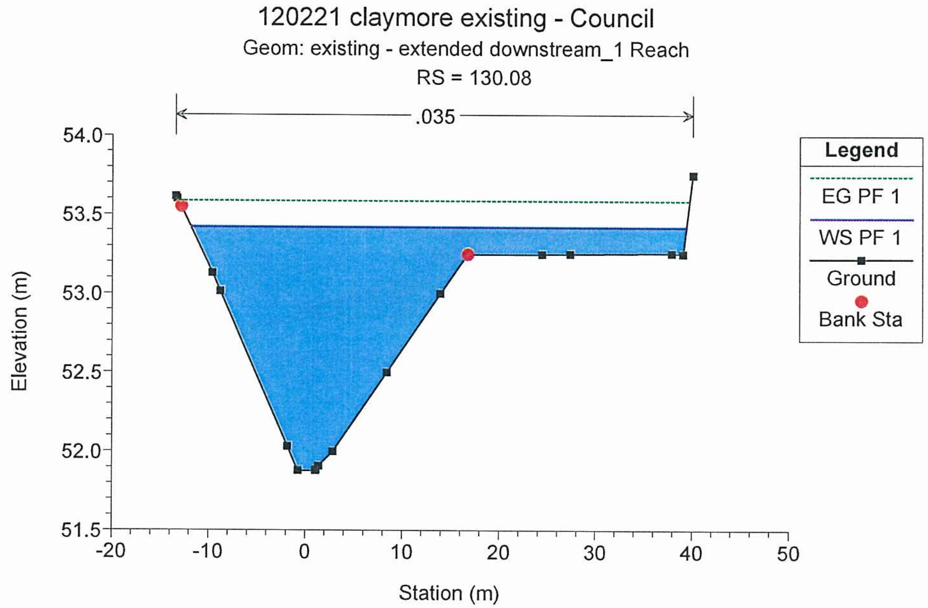

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 514.25
.035
.013
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

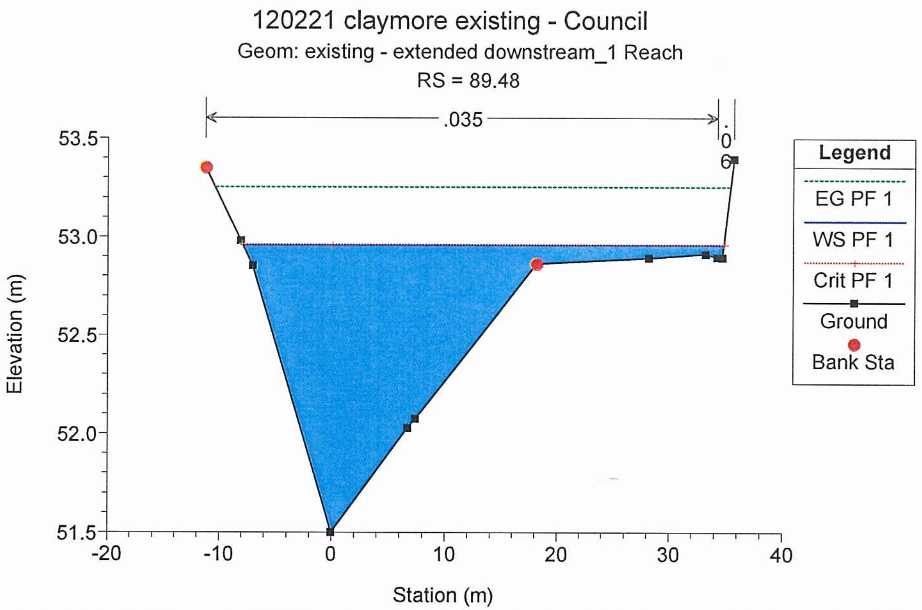

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 443.55
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

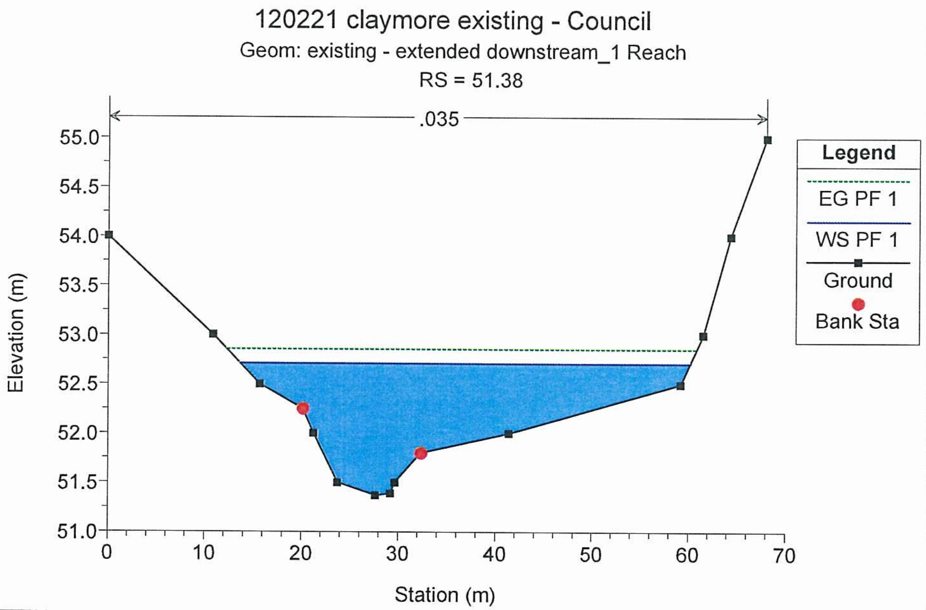

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 423.88
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 360.8
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

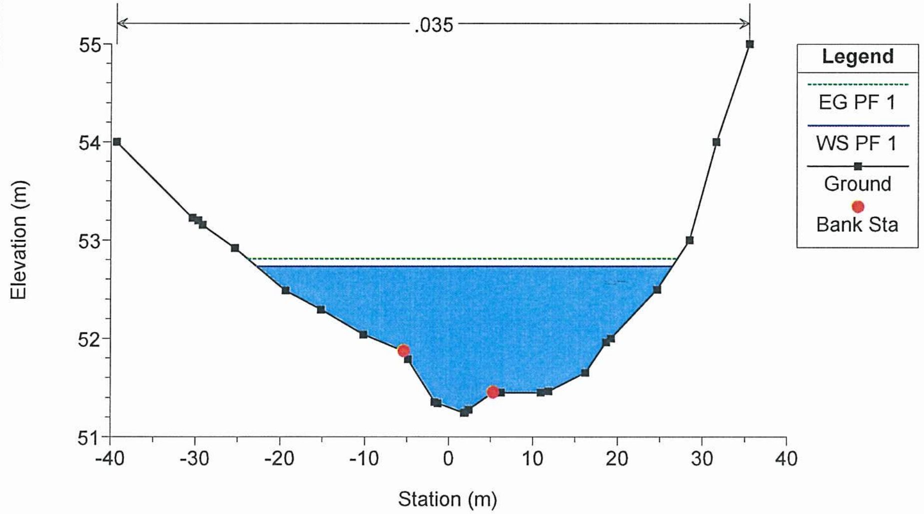

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 315.25
.035
.035
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
55.5
55.0
54.5
54.0
53.5
53.0
-20
0
20
40
60
80
100


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 130.08
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
54.0
53.5
53.0
52.5
52.0
51.5
-20
-10
0
10
20
30
40
50

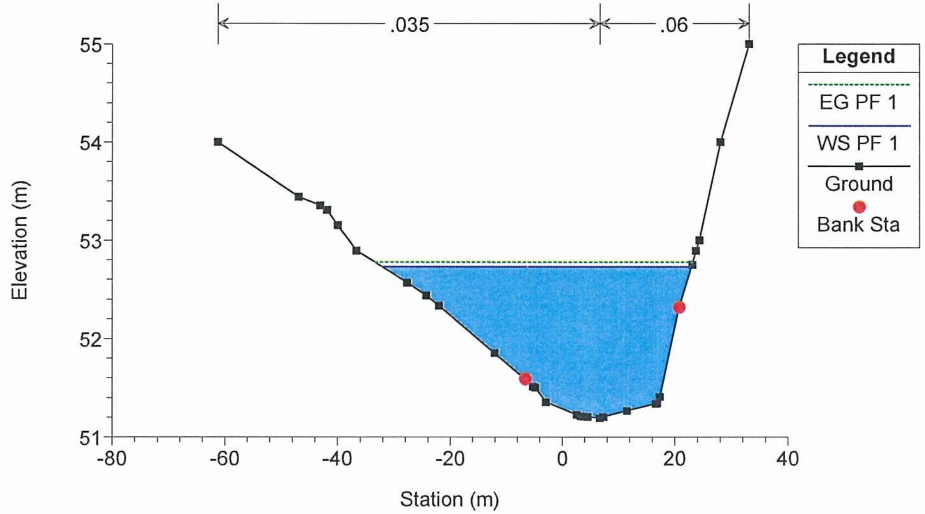

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 89.48
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
53.5
53.0
52.5
52.0
51.5
-20
-10
0
10
20
30
40


120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 51.38
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
55.0
54.5
54.0
53.5
53.0
52.5
52.0
51.5
51.0
0
10
20
30
40
50
60
70

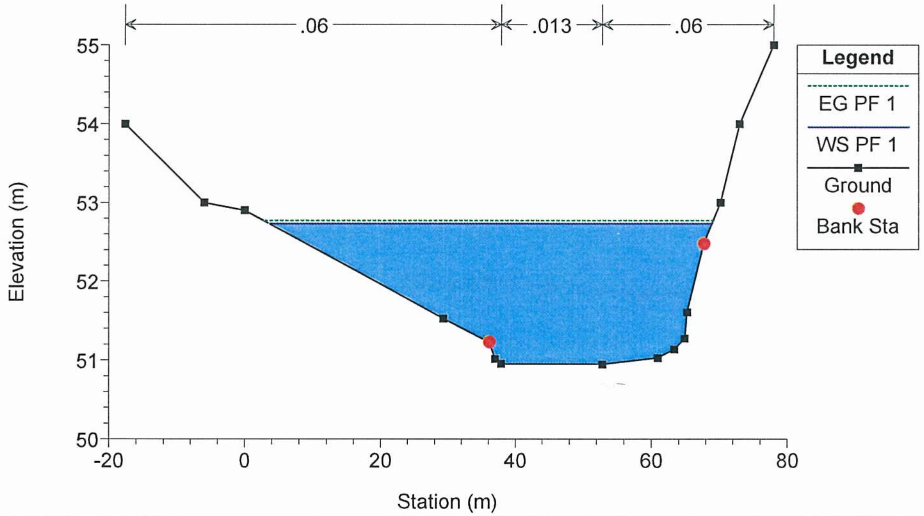
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 37.59



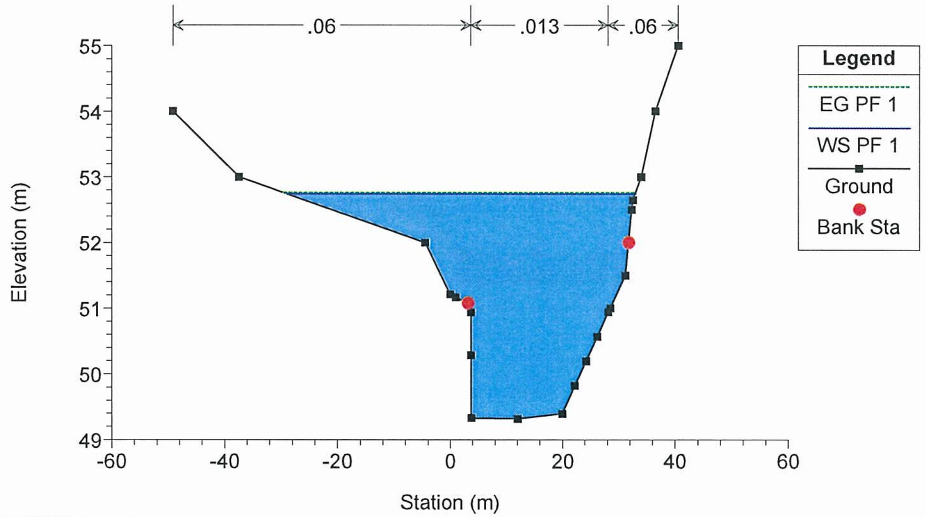
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 23.12

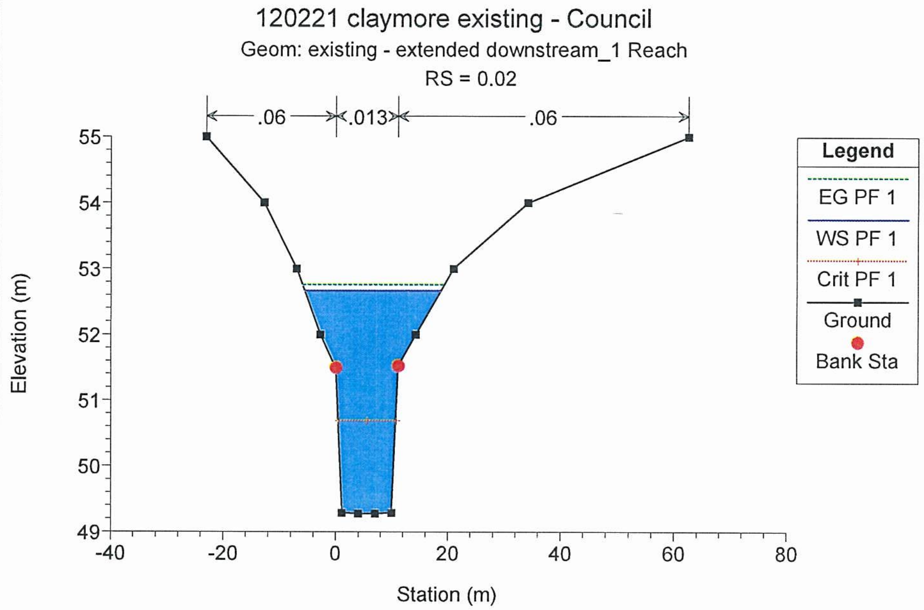


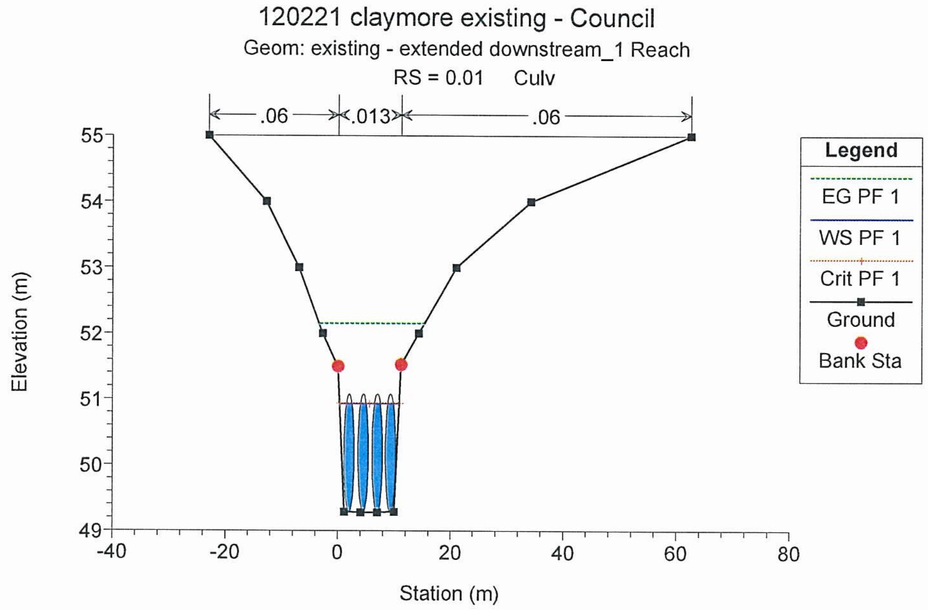
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 7.65

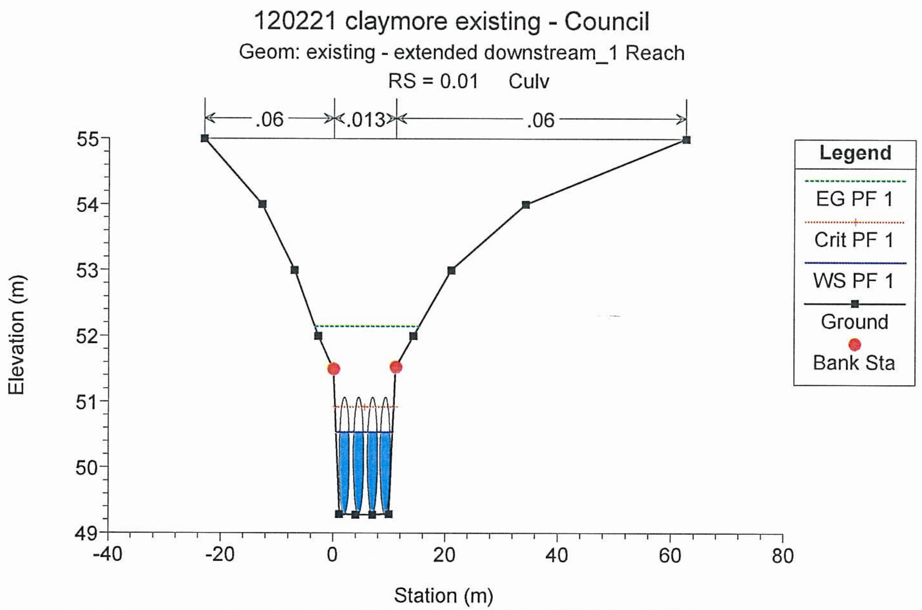


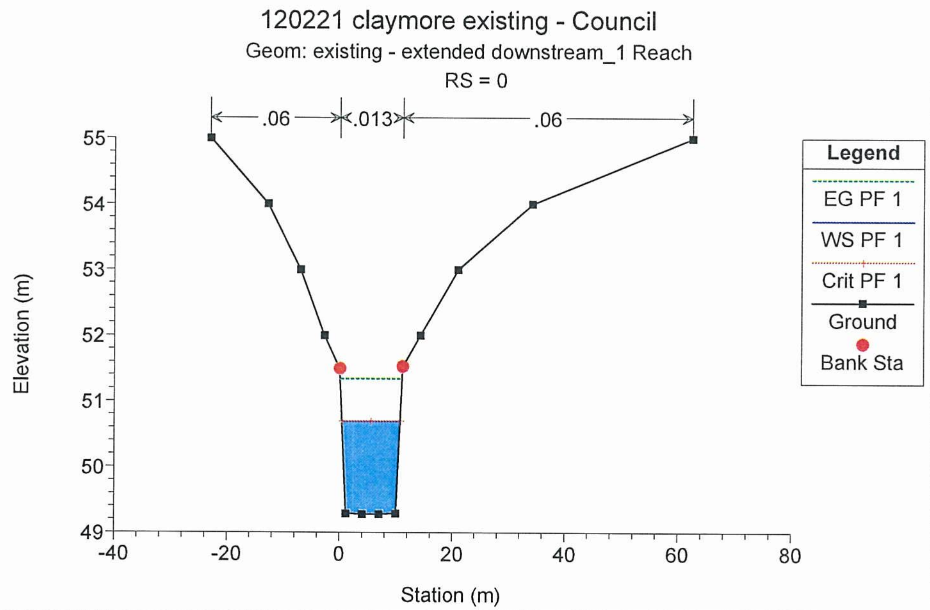
120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 4.53




120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 0.02
.06
.013
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

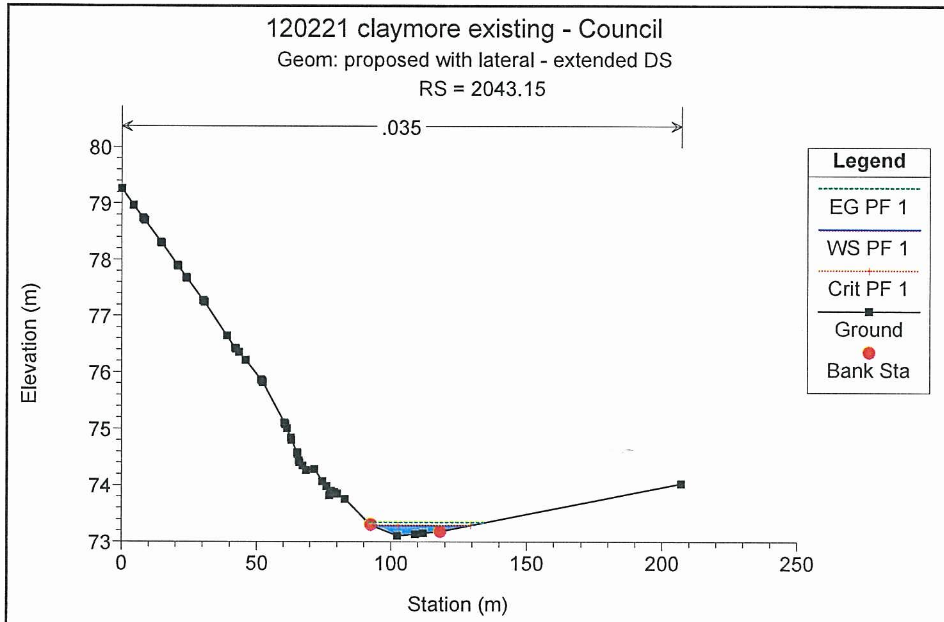

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 0.01 Culv
.06
.013
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

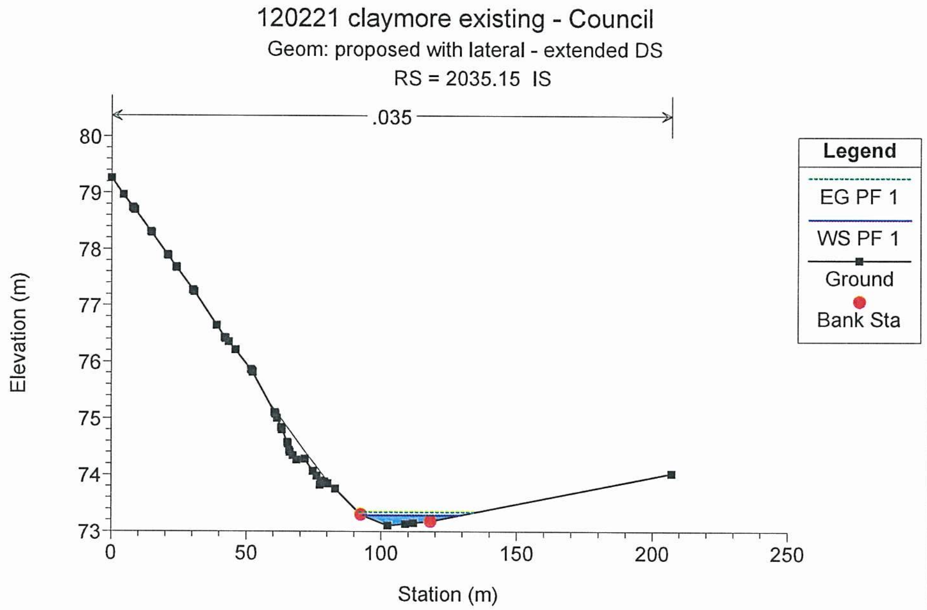

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 0.01 Culv
.06
.013
.06
Elevation (m)
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

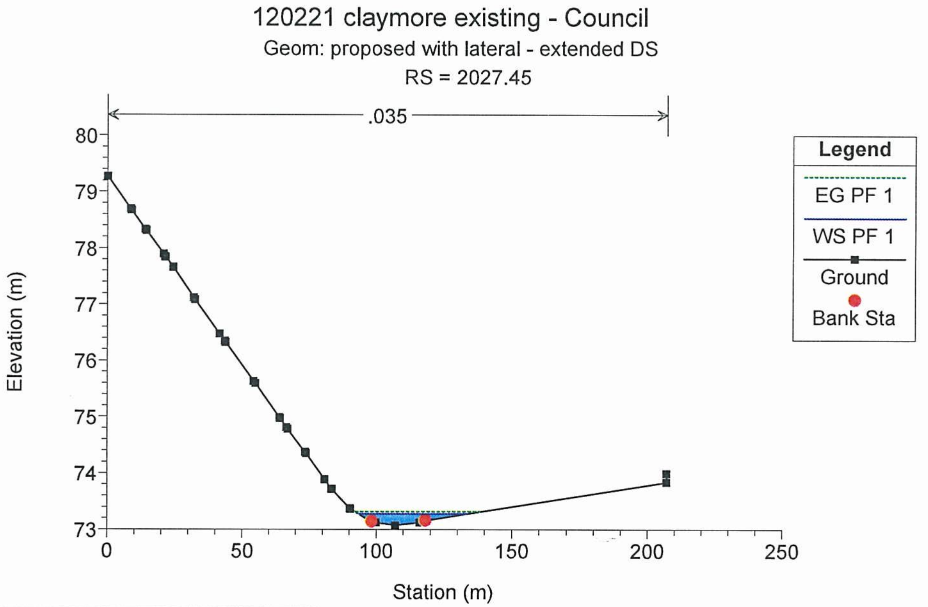

120221 claymore existing - Council
Geom: existing - extended downstream_1 Reach
RS = 0
.06
.013
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

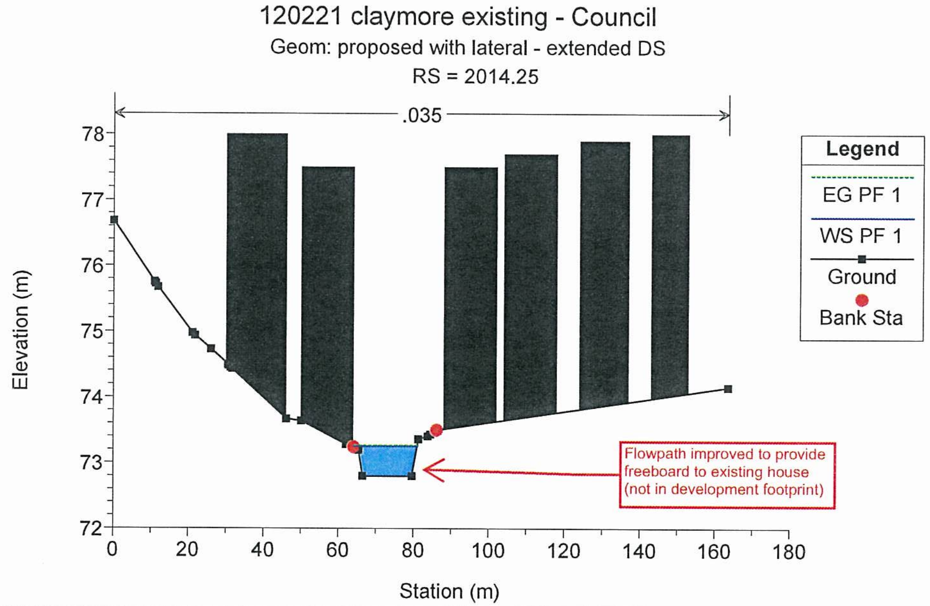
HEC-RAS Plan: Plan 37 River: 1 Reach: 1 Profile: PF 1

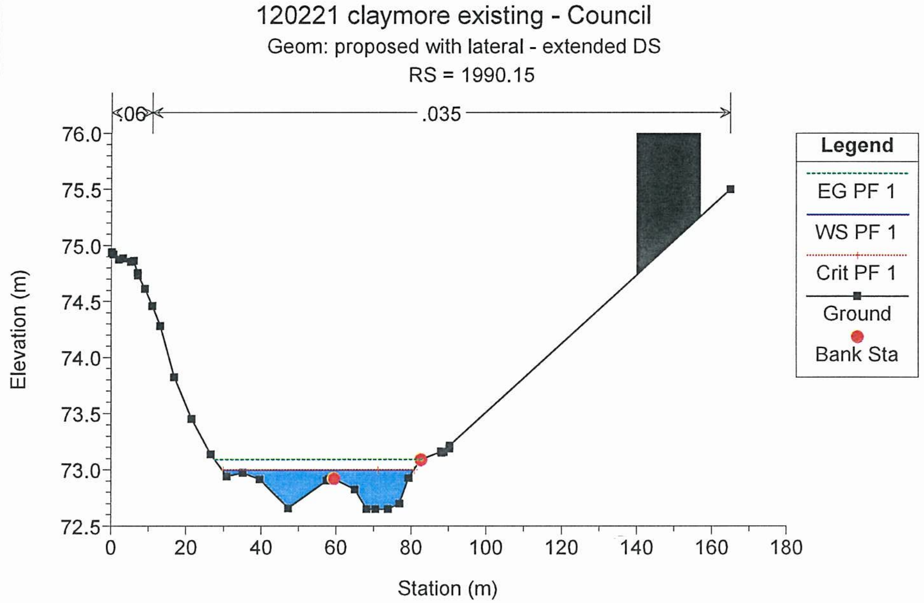
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	2043.15	PF 1	3.60	73.11	73.29	73.29	73.34	0.021710	1.04	3.71	36.40	0.95
1	2035.15		Inl Struct									
1	2027.45	PF 1	3.60	73.08	73.28		73.31	0.010432	0.90	4.64	40.26	0.69
1	2014.25	PF 1	3.60	72.80	73.25		73.27	0.001328	0.55	6.56	16.99	0.28
1	1990.15	PF 1	12.29	72.65	73.00	73.00	73.09	0.018513	1.47	9.47	51.18	0.97
1	1941.45	PF 1	12.99	70.26	71.75		71.75	0.000030	0.18	73.76	61.84	0.05
1	1919.25	PF 1	12.99	70.10	71.75		71.75	0.000020	0.16	82.74	60.11	0.04
1	1885.25	PF 1	12.99	69.91	71.75		71.75	0.000013	0.14	95.66	61.90	0.03
1	1864.25	PF 1	12.99	69.78	71.75	71.69	71.75	0.000012	0.14	93.26	57.86	0.03
1	1843.95	PF 1	12.99	69.53	71.75	71.69	71.75	0.000067	0.28	46.07	38.47	0.08
1	1831.85		Inl Struct									
1	1814.25	PF 1	4.68	68.45	69.08		69.15	0.006612	1.12	4.17	12.81	0.63
1	1802.09	PF 1	4.68	68.30	69.09		69.11	0.000913	0.55	8.45	15.60	0.24
1	1773.25	PF 1	4.68	68.00	69.07		69.08	0.001216	0.49	10.33	27.67	0.18
1	1714.25	PF 1	4.68	67.57	69.07	68.60	69.07	0.000008	0.08	66.13	87.53	0.03
1	1666.75	PF 1	20.65	67.39	69.07	68.60	69.07	0.000049	0.26	102.47	85.91	0.07
1	1614.25	PF 1	20.65	67.00	69.07		69.07	0.000009	0.13	166.76	103.71	0.03
1	1564.25	PF 1	20.65	66.55	69.06	68.60	69.07	0.000047	0.25	85.89	66.12	0.06
1	1542.65		Inl Struct									
1	1519.55	PF 1	13.59	64.76	65.68	65.64	65.86	0.011497	1.88	7.22	15.47	0.88
1	1491.55	PF 1	13.59	64.66	65.25	65.25	65.47	0.017598	2.05	6.62	15.65	1.01
1	1442.25	PF 1	13.59	63.84	64.95		64.97	0.000988	0.72	18.75	26.85	0.28
1	1406.35	PF 1	19.62	63.79	64.92		64.94	0.000665	0.66	29.54	35.24	0.23
1	1364.55	PF 1	19.62	63.22	64.93		64.93	0.000025	0.18	107.53	74.20	0.05
1	1321.35	PF 1	19.62	62.66	64.93	64.46	64.93	0.000013	0.14	145.64	87.59	0.03
1	1307.35		Inl Struct									
1	1288.65	PF 1	13.93	61.48	62.50	62.33	62.64	0.011369	1.66	8.40	13.73	0.68
1	1264.25	PF 1	13.93	61.39	62.05	62.05	62.29	0.018247	2.16	6.45	13.48	1.00
1	1196.15	PF 1	13.93	60.57	62.09		62.09	0.000104	0.30	46.91	45.23	0.09
1	1158.35	PF 1	14.71	60.47	62.09		62.09	0.000035	0.18	83.71	69.16	0.05
1	1114.25	PF 1	14.71	60.10	62.09	61.70	62.09	0.000014	0.14	105.32	78.35	0.04
1	1097.85		Inl Struct									
1	1089.25	PF 1	14.71	58.90	61.70	61.70	61.71	0.000248	0.51	33.09	38.66	0.10
1	1076.35	PF 1	14.71	58.80	59.66	59.48	59.84	0.006613	1.85	7.96	10.73	0.68
1	1068.25		Bridge									
1	1055.85	PF 1	14.62	58.65	59.57		59.71	0.005296	1.70	8.61	11.17	0.62
1	1014.25	PF 1	14.62	58.56	59.31		59.46	0.007164	1.66	8.79	15.24	0.70
1	964.25	PF 1	14.62	58.23	59.01		59.08	0.007075	1.20	12.16	21.38	0.51
1	914.25	PF 1	14.62	57.82	58.60		58.72	0.007006	1.56	9.38	17.72	0.68
1	868.05	PF 1	14.62	57.41	58.23		58.36	0.009000	1.55	9.43	17.36	0.67
1	814.25	PF 1	14.62	57.08	58.01		58.08	0.002988	1.15	13.03	24.64	0.46
1	764.25	PF 1	14.62	56.96	57.61	57.58	57.79	0.013610	1.90	7.68	17.71	0.92
1	736.65	PF 1	14.62	56.64	57.30	57.30	57.53	0.016010	2.12	6.91	15.33	1.01
1	727.15	PF 1	33.84	55.38	57.04		57.08	0.000852	0.98	34.64	26.84	0.27
1	672.95	PF 1	33.84	55.22	56.61	56.50	56.95	0.008989	2.59	13.08	14.45	0.87
1	633.55	PF 1	33.84	55.07	56.46		56.62	0.005498	1.84	21.32	28.91	0.61
1	584.65	PF 1	33.84	54.89	56.45		56.49	0.000924	0.91	37.24	34.33	0.28
1	514.25	PF 1	39.89	54.63	56.15		56.32	0.009682	1.81	21.99	24.80	0.62
1	504.25		Lat Struct									
1	502.60	PF 1	39.89	54.59	56.17	55.63	56.25	0.001500	1.43	34.21	34.05	0.37
1	497.60		Culvert									
1	492.62	PF 1	39.89	54.55	56.02	55.69	56.17	0.002998	1.95	26.09	30.73	0.52
1	443.55	PF 1	39.89	54.42	55.86		56.00	0.003835	1.83	26.98	45.69	0.57
1	435.08	PF 1	39.89	54.35	55.67	55.67	55.94	0.008357	2.44	19.27	38.63	0.82
1	423.88	PF 1	35.93	54.25	55.61		55.75	0.004188	1.87	24.92	48.16	0.59
1	360.8	PF 1	35.93	53.74	55.12	54.99	55.38	0.007996	2.24	16.14	23.60	0.78
1	315.25	PF 1	35.93	53.43	54.57	54.57	54.90	0.013962	2.53	14.22	21.81	1.00
1	130.08	PF 1	43.48	51.88	53.40		53.55	0.004372	1.70	27.91	51.14	0.59
1	89.48	PF 1	43.48	51.50	52.86	52.86	53.20	0.014054	2.58	16.84	25.11	1.01
1	51.38	PF 1	43.48	51.37	52.53	52.53	52.76	0.008531	2.49	22.53	43.91	0.83
1	37.59	PF 1	43.48	51.24	52.42		52.57	0.004600	1.94	27.31	41.84	0.62
1	23.12	PF 1	43.48	51.19	52.42		52.50	0.003026	1.30	35.82	45.13	0.41
1	7.65	PF 1	43.48	50.95	52.43		52.47	0.000240	0.95	58.78	57.61	0.26
1	4.53	PF 1	43.48	49.32	52.45		52.47	0.000051	0.57	85.55	51.62	0.11
1	0.02	PF 1	43.48	49.28	52.36	50.60	52.46	0.000104	1.36	35.97	21.00	0.26
1	0.01		Culvert									
1	0	PF 1	43.48	49.28	50.68	50.60	51.22	0.001562	3.27	13.30	10.24	0.92

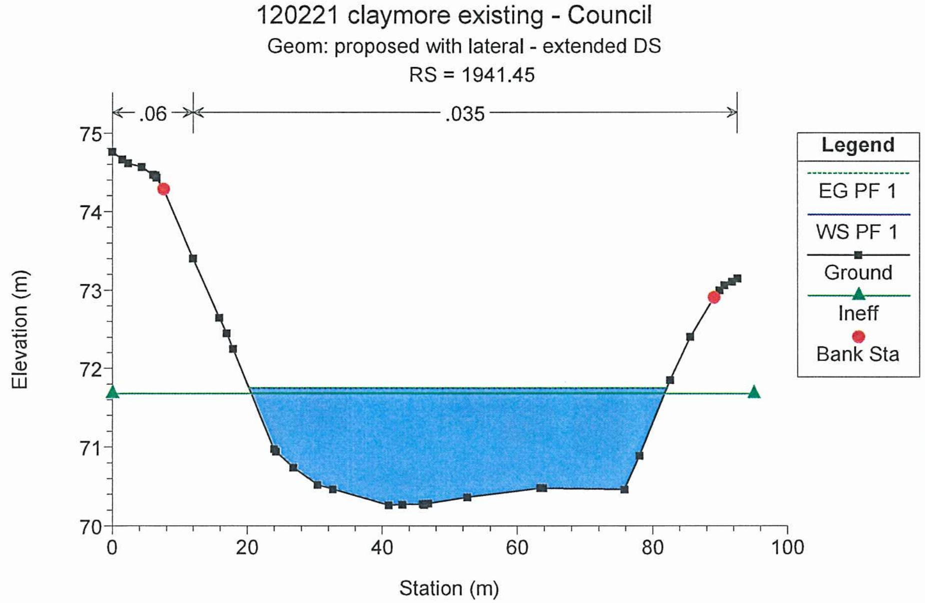

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 2043.15
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

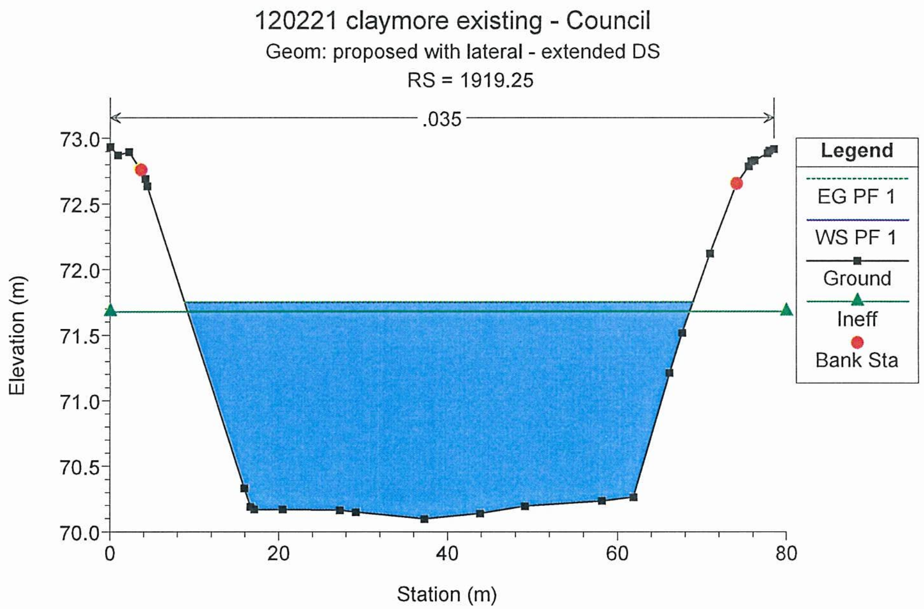

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 2035.15 IS
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

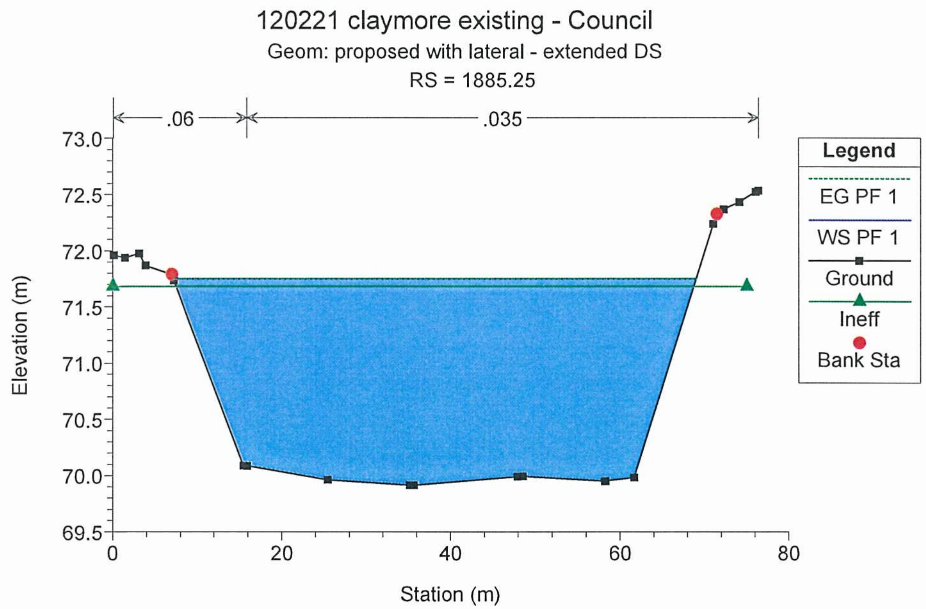

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 2027.45
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

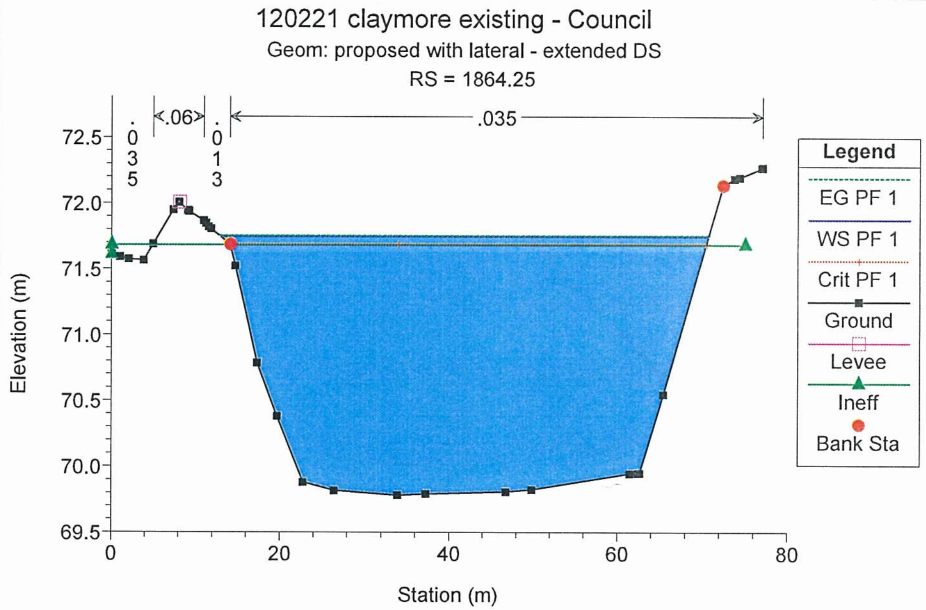

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 2014.25
.035
Elevation (m)
Station (m)
Flowpath improved to provide freeboard to existing house (not in development footprint)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

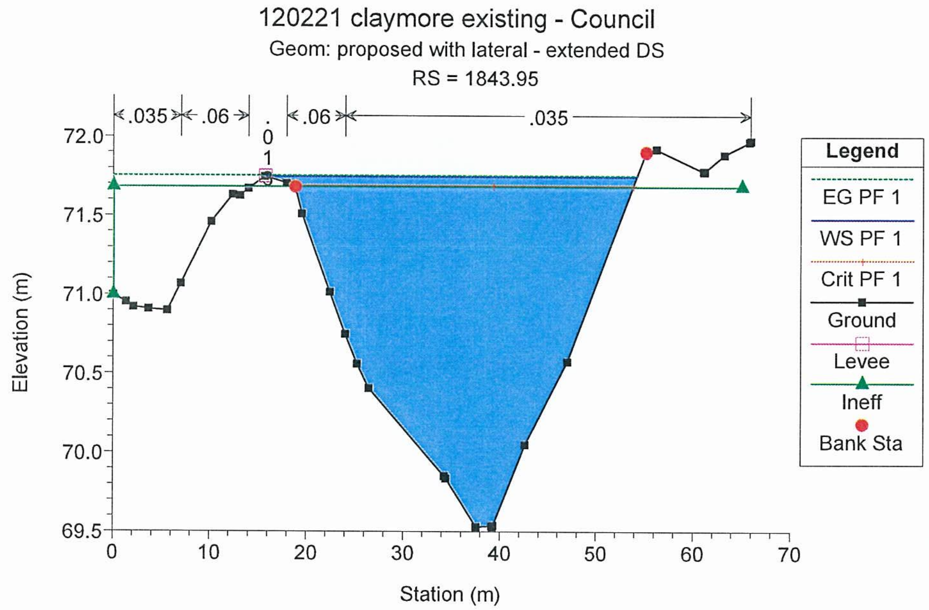

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1990.15
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

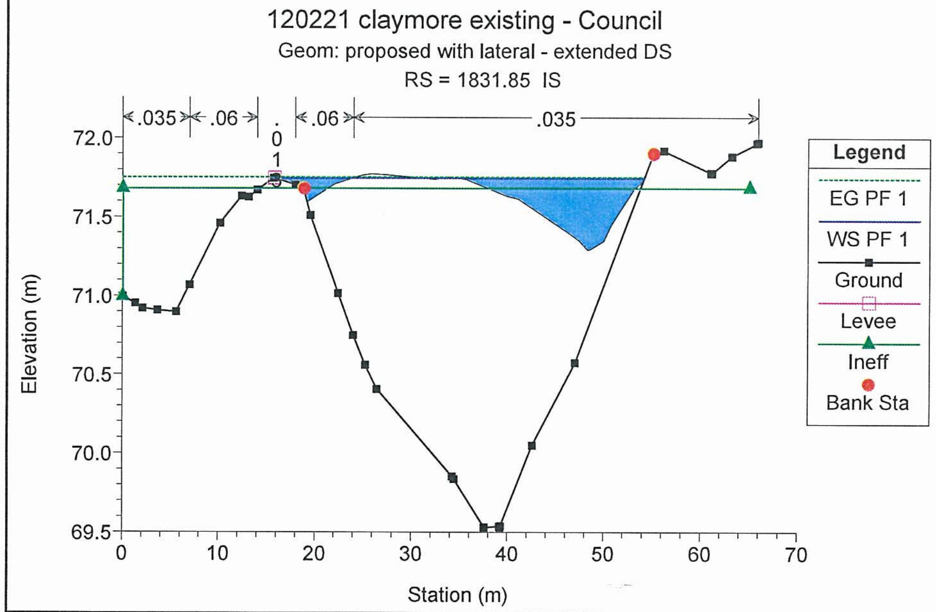

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1941.45
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

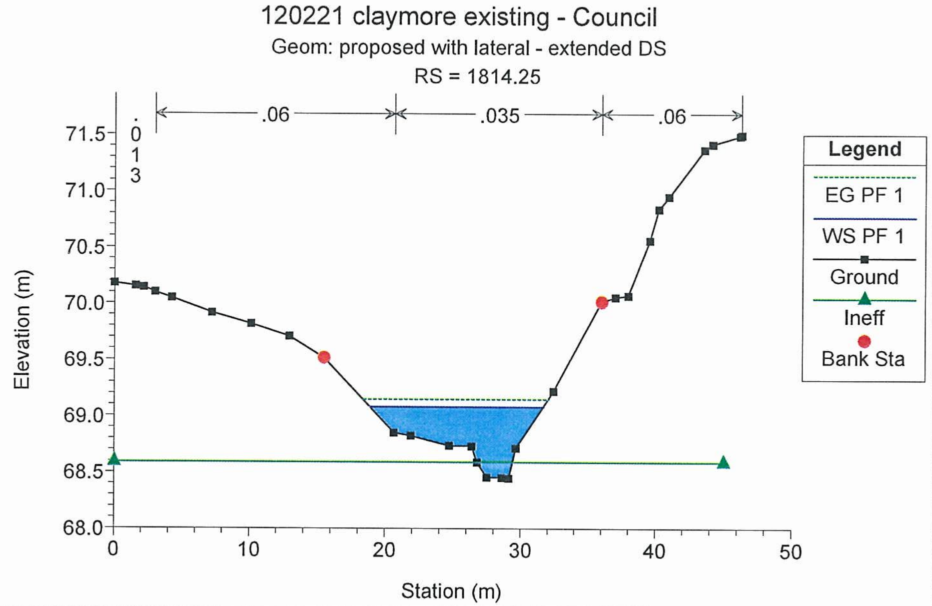

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1919.25
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

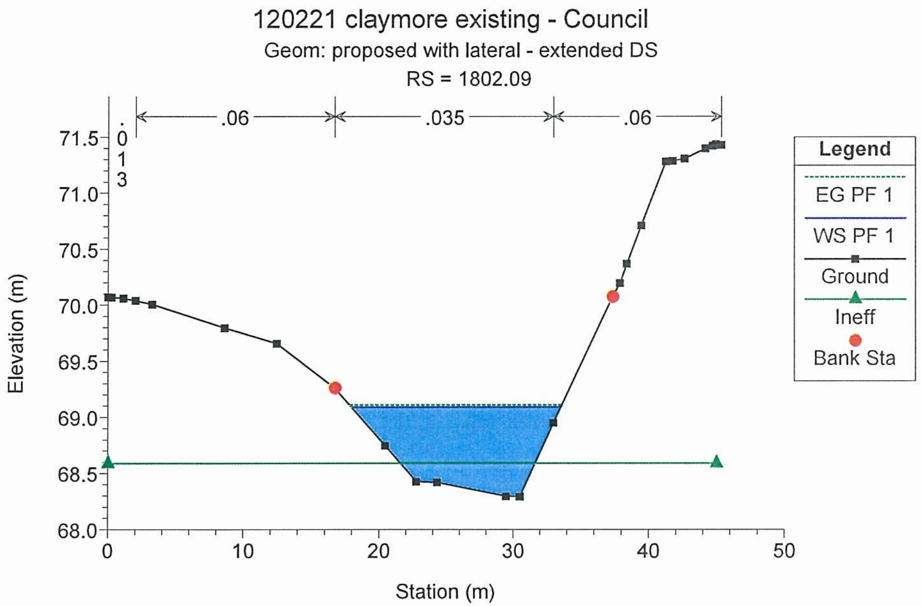

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1885.25
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

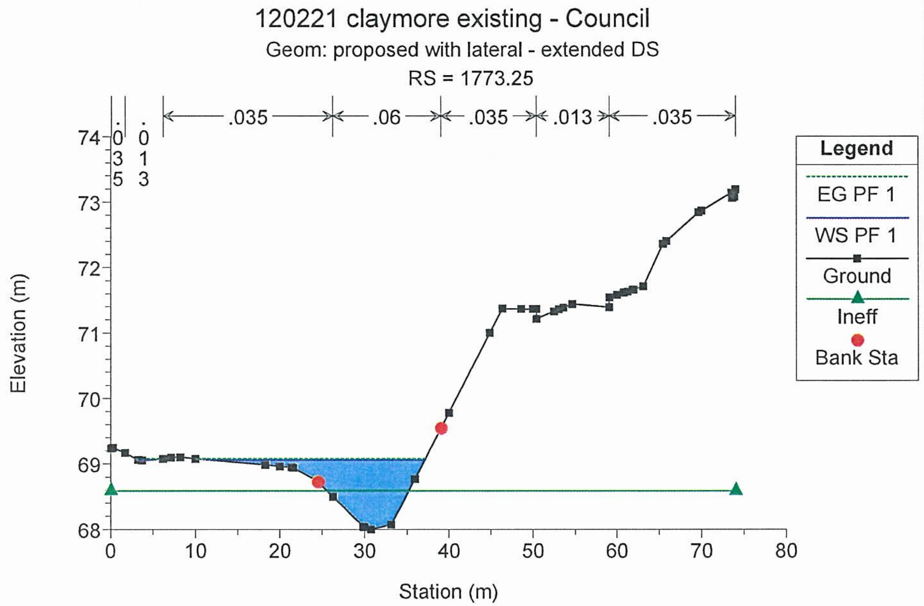

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1864.25
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta

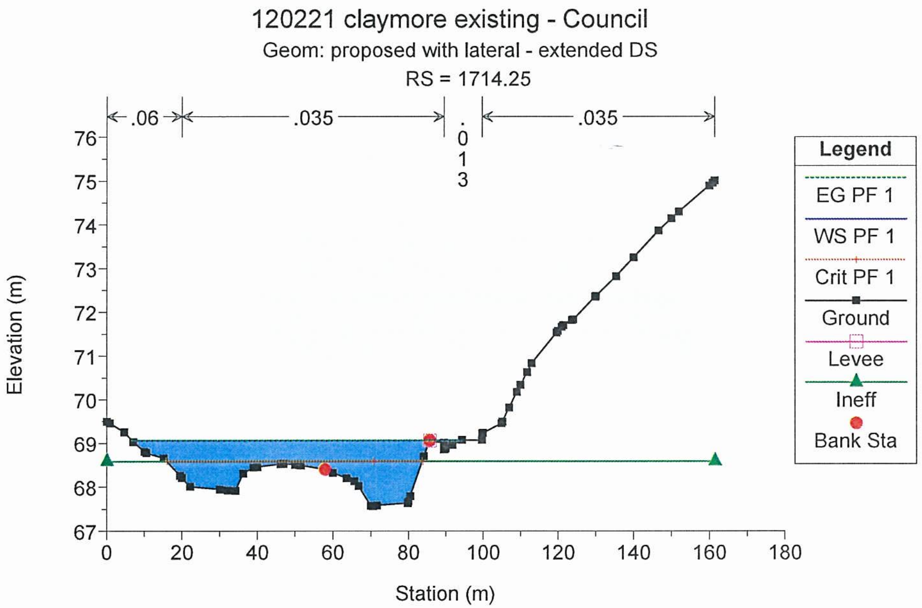

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1843.95
.035
.06
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta

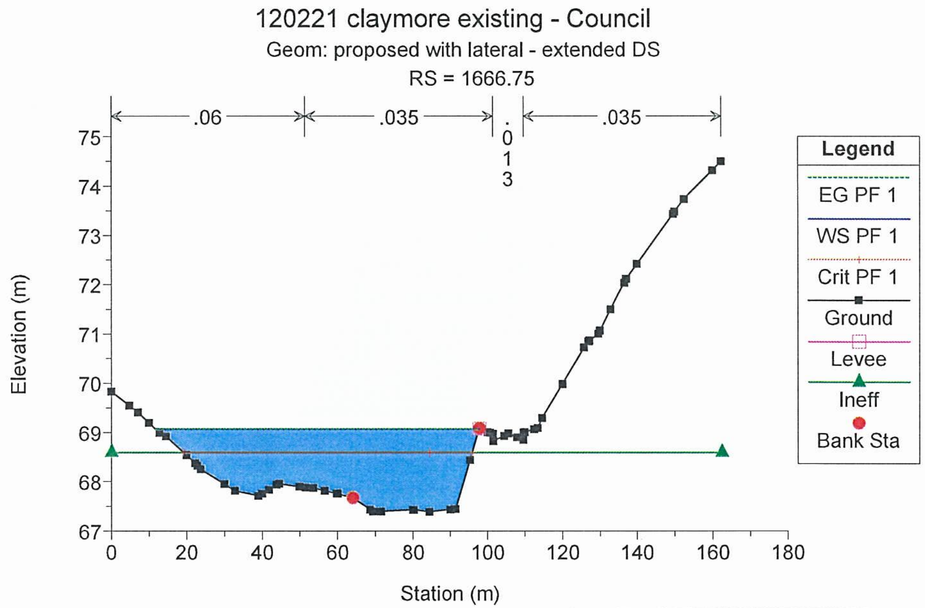

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1831.85 IS
.035
.06
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Levee
Ineff
Bank Sta

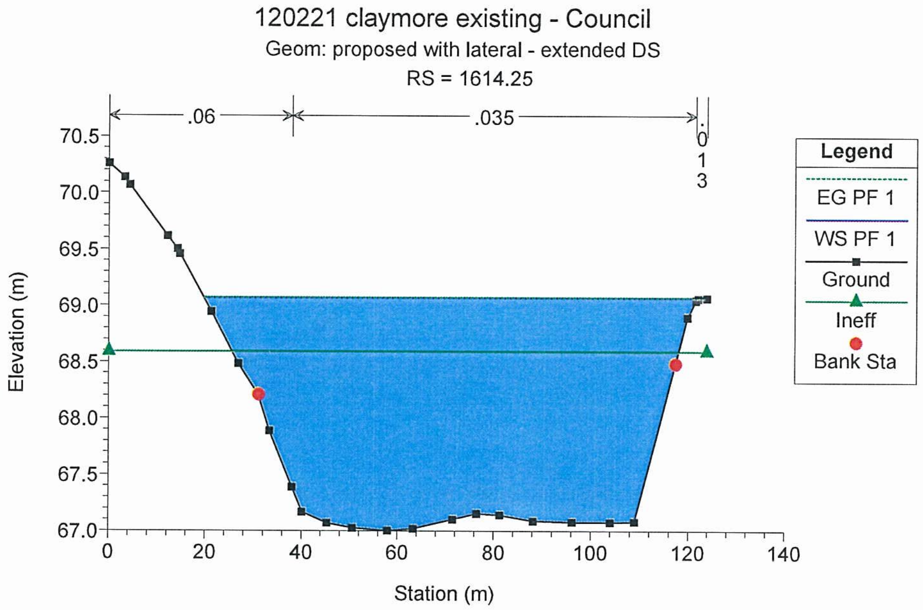

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1814.25
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

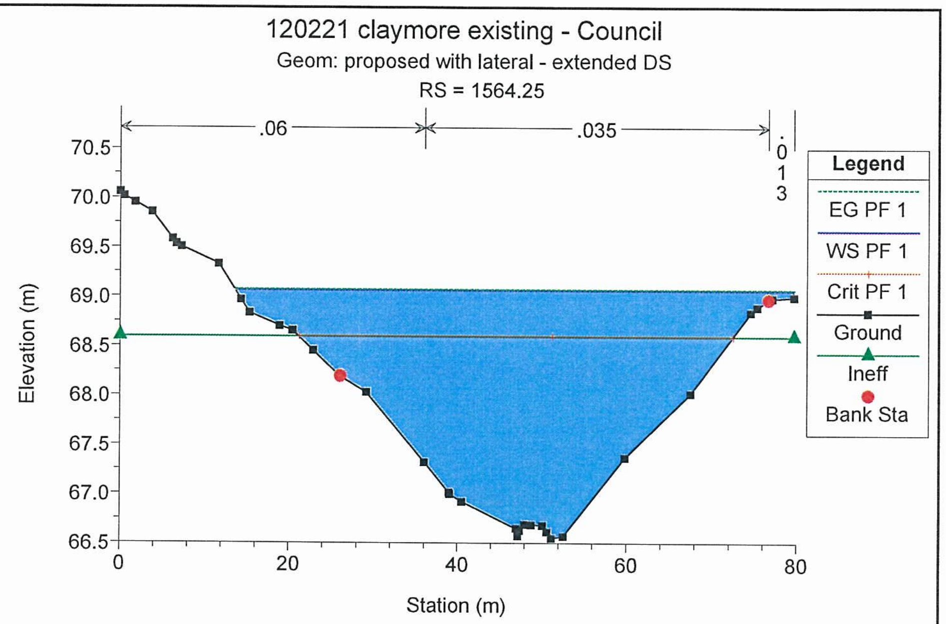

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1802.09
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

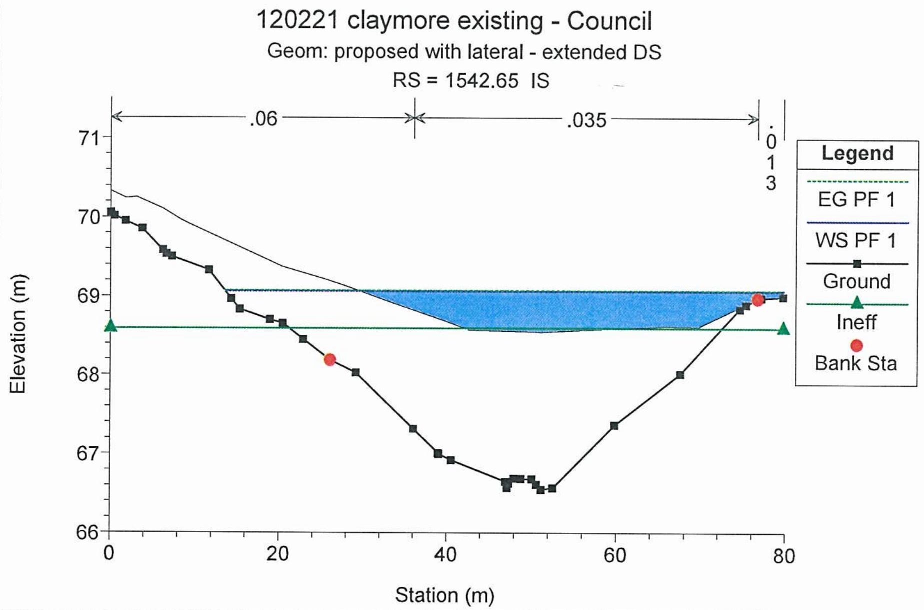

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1773.25
.035
.06
.035
.013
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

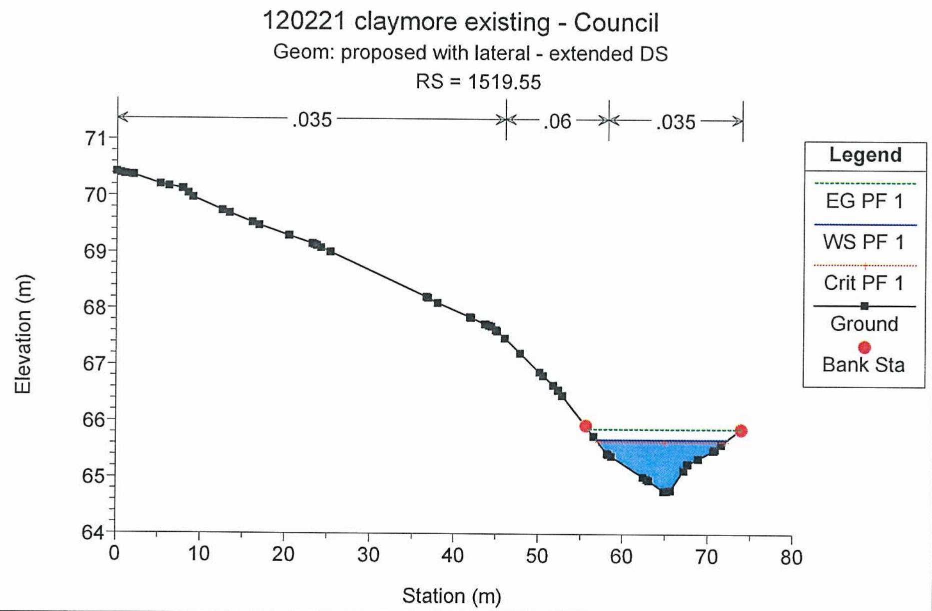

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1714.25
.06
.035
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1666.75
.06
.035
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta

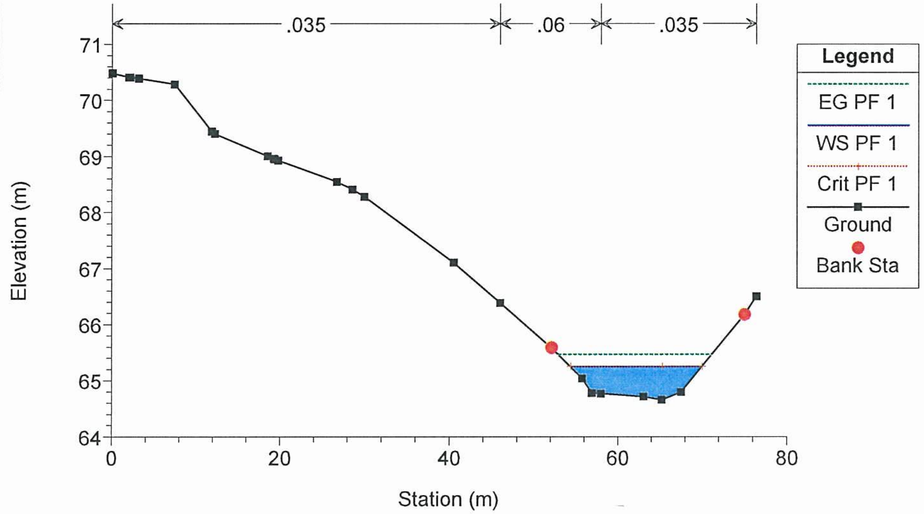

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1614.25
.06
.035
.013
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1564.25
.06
.035
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

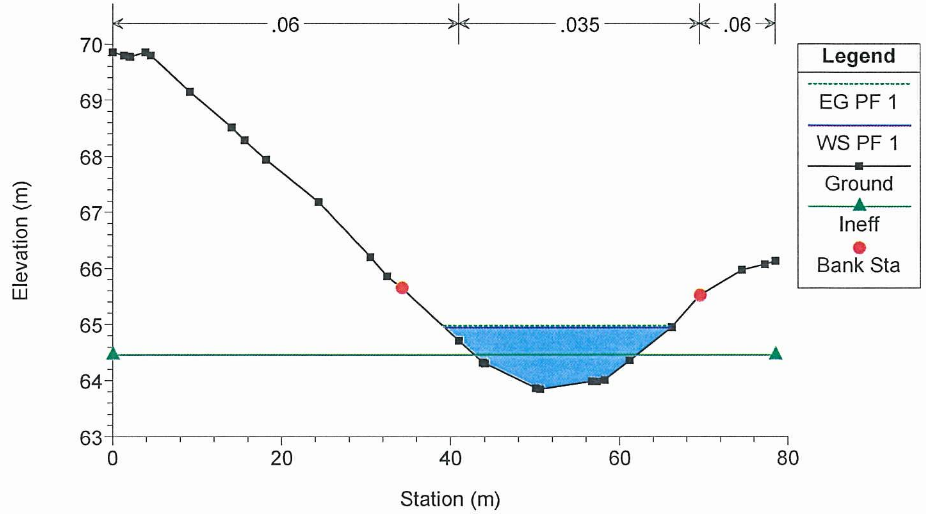

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1542.65 IS
.06
.035
.013
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1519.55
.035
.06
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

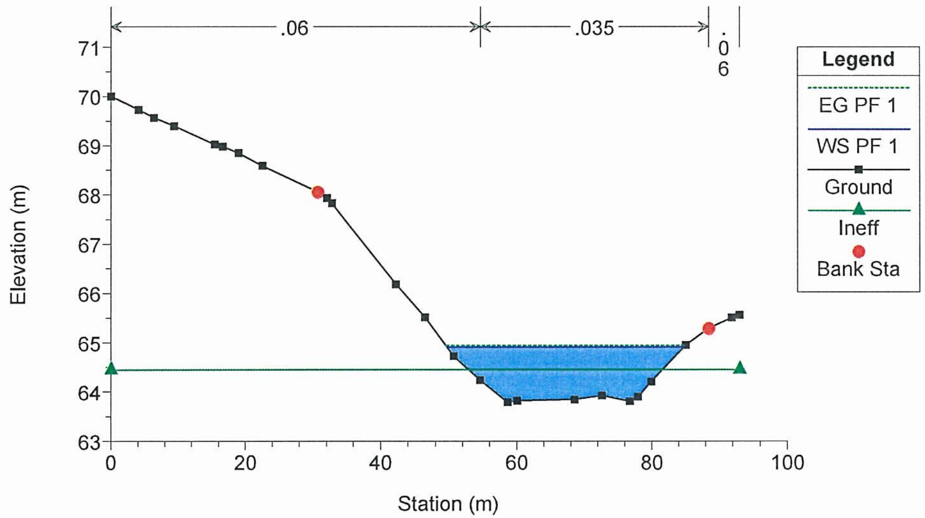
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1491.55



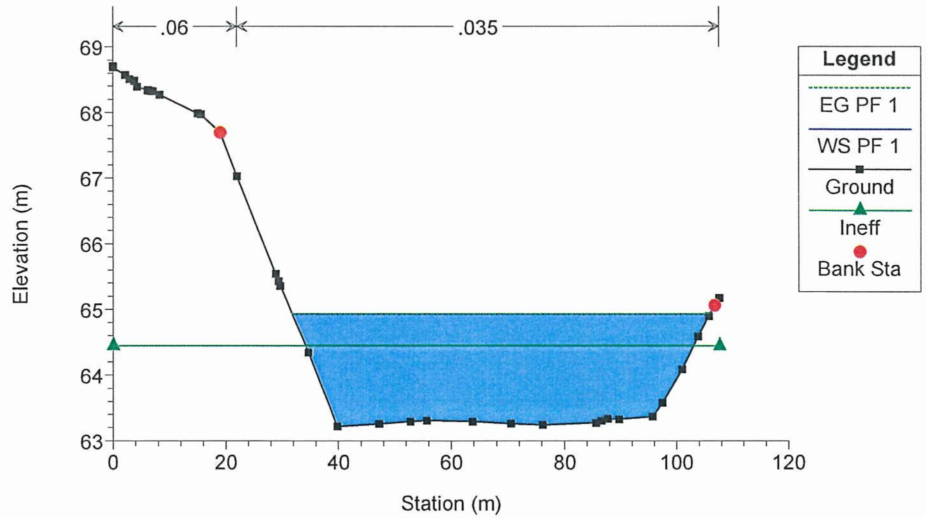
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1442.25

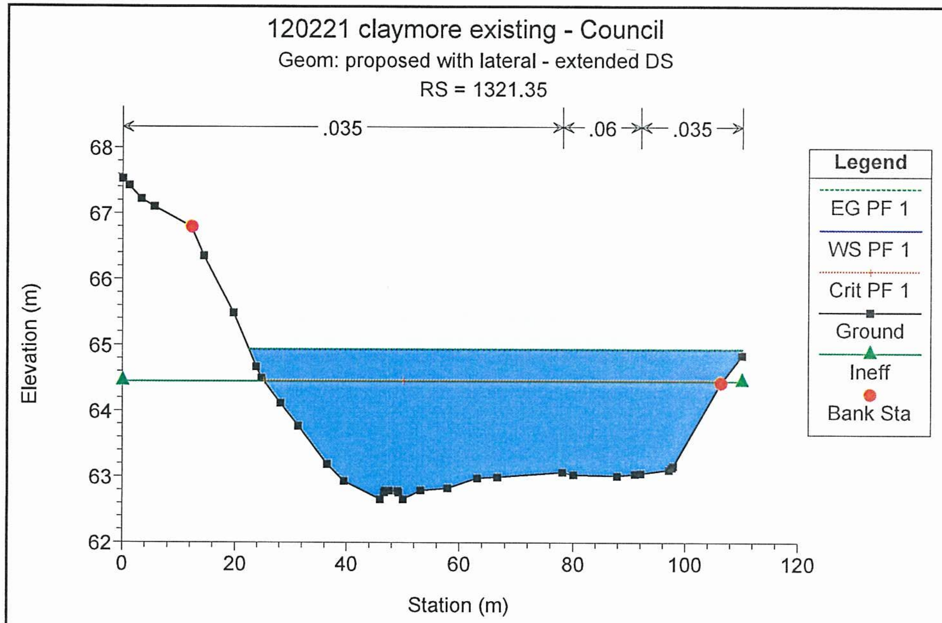


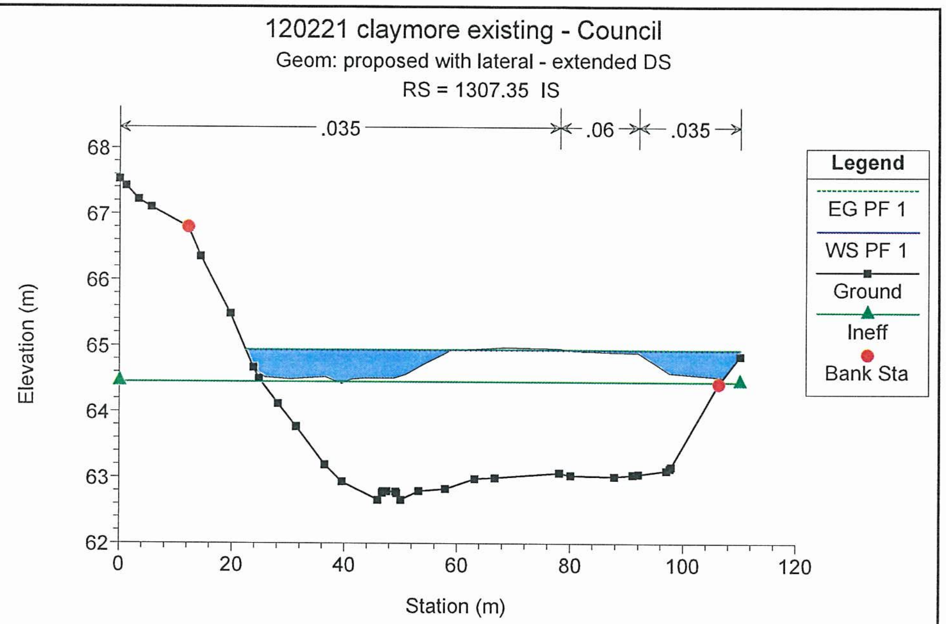
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1406.35

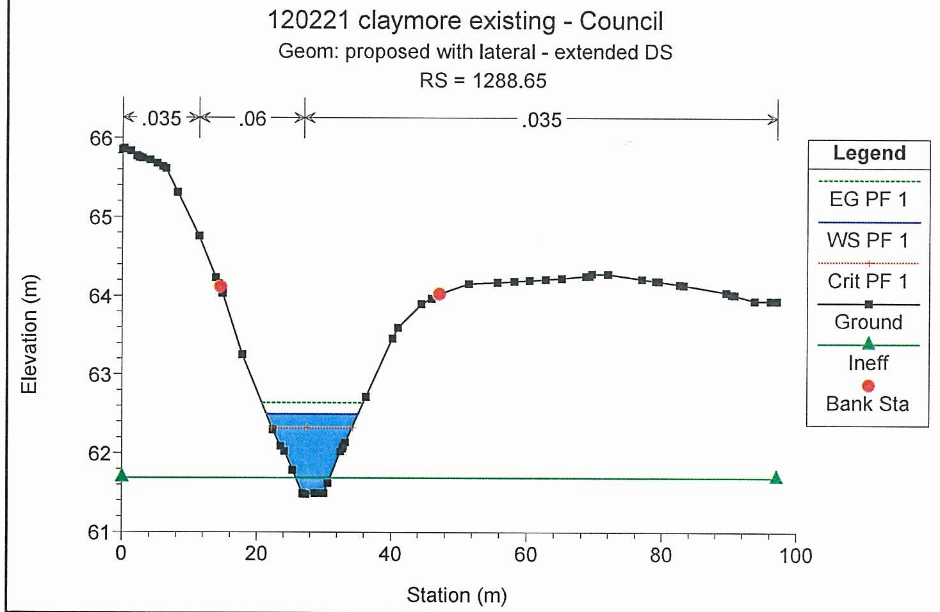


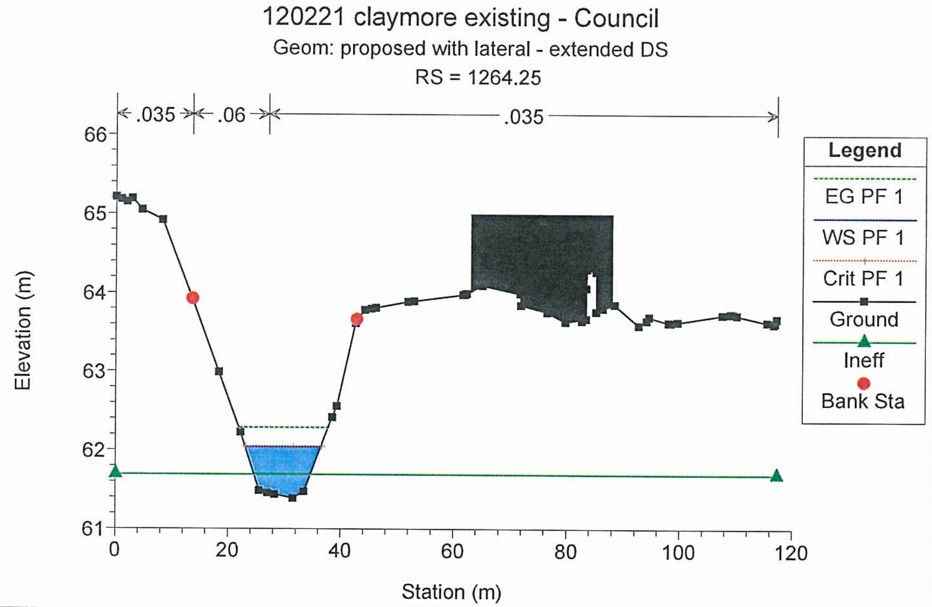
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1364.55

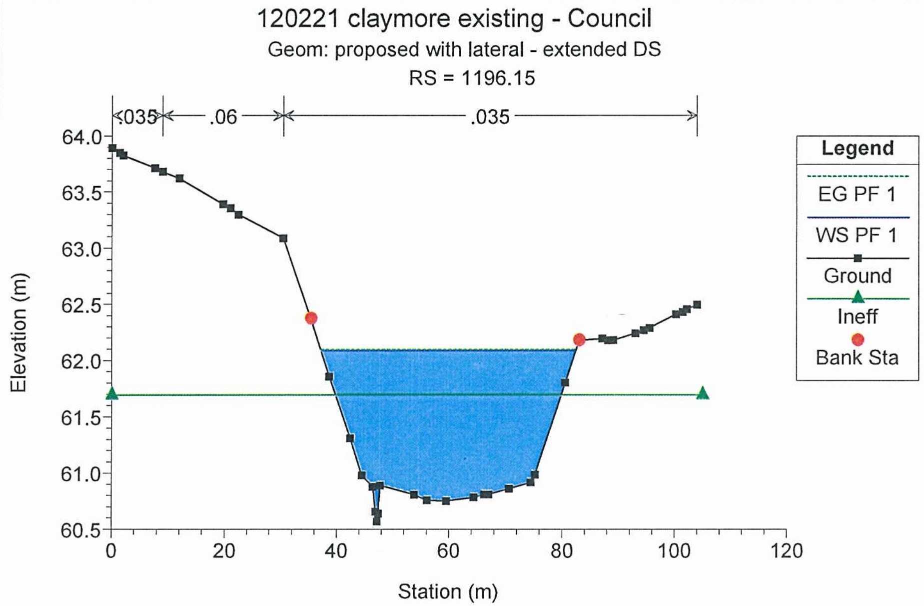



120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1321.35
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

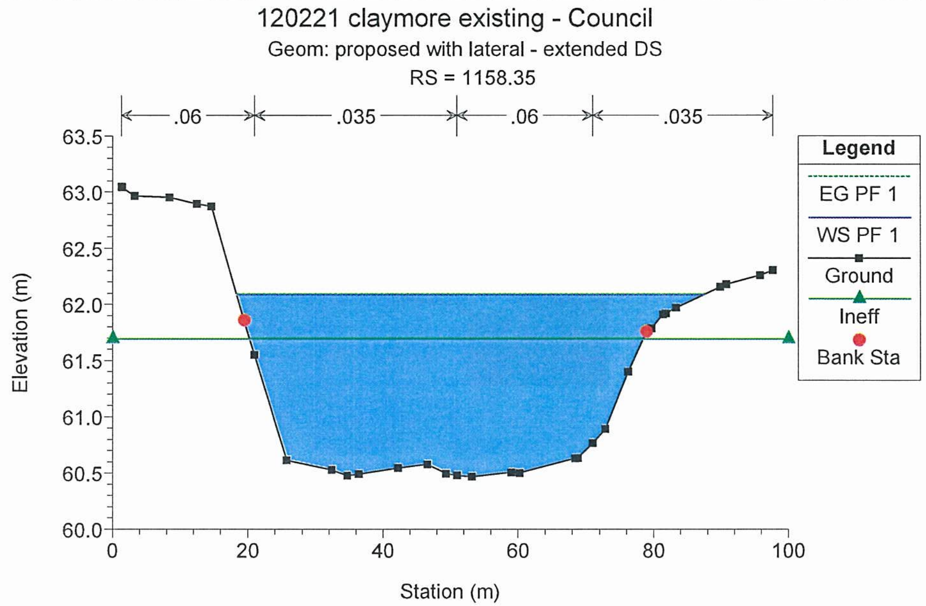

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1307.35 IS
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1288.65
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

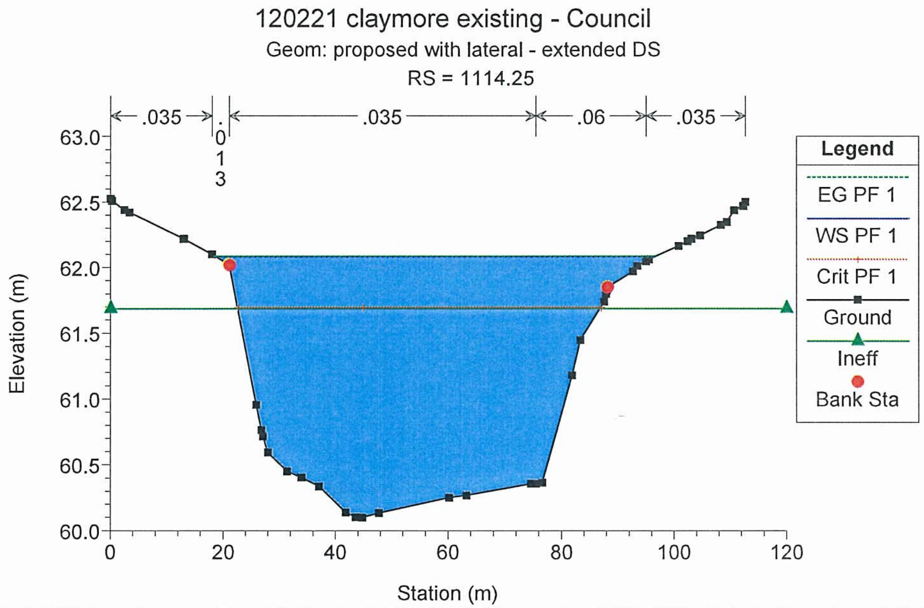

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1264.25
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta



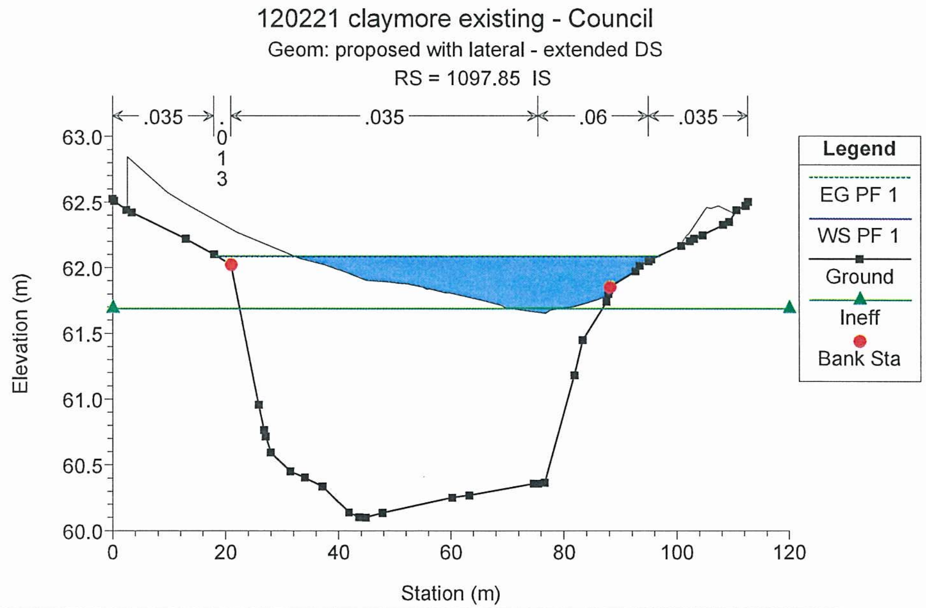
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1196.15
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta



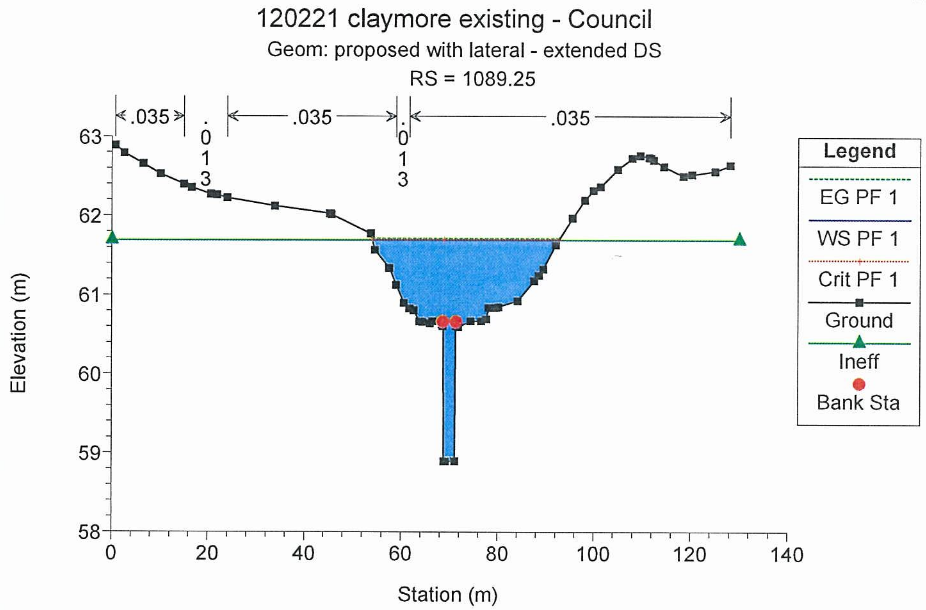
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1158.35
.06
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

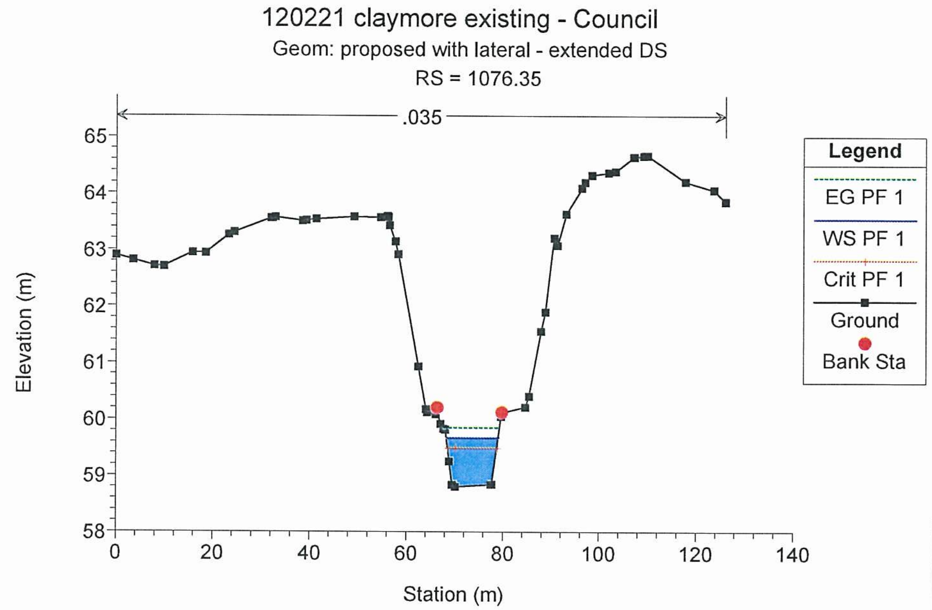


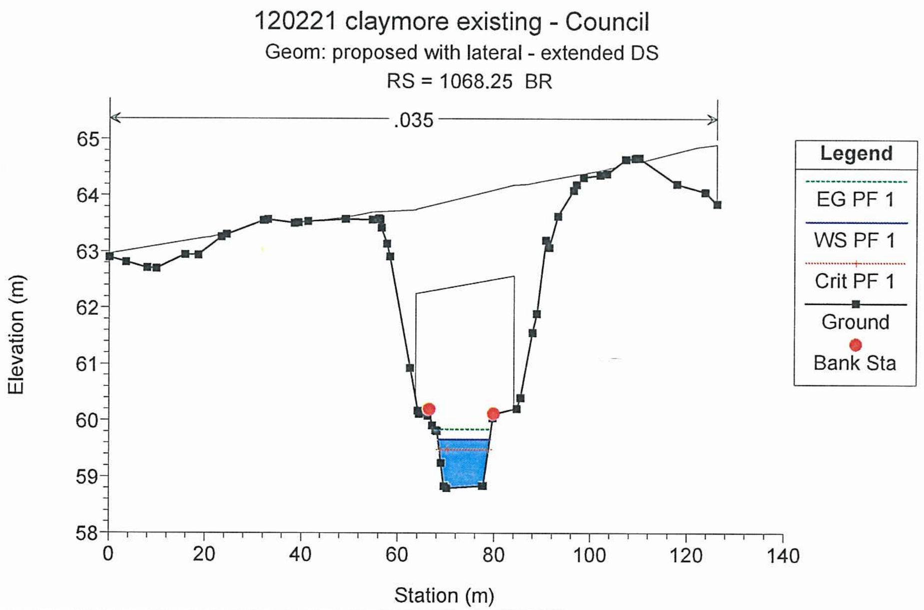
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1114.25
.035
.013
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

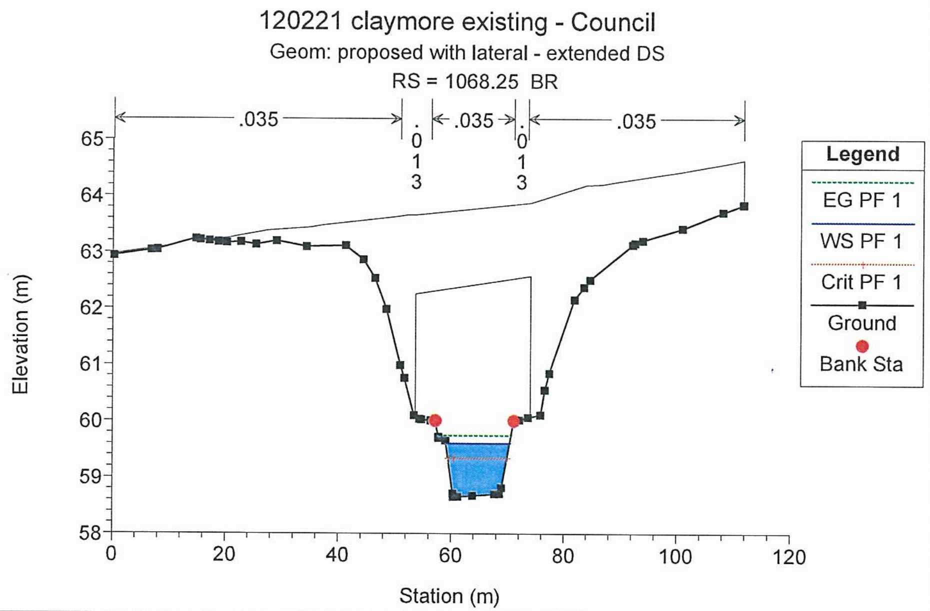


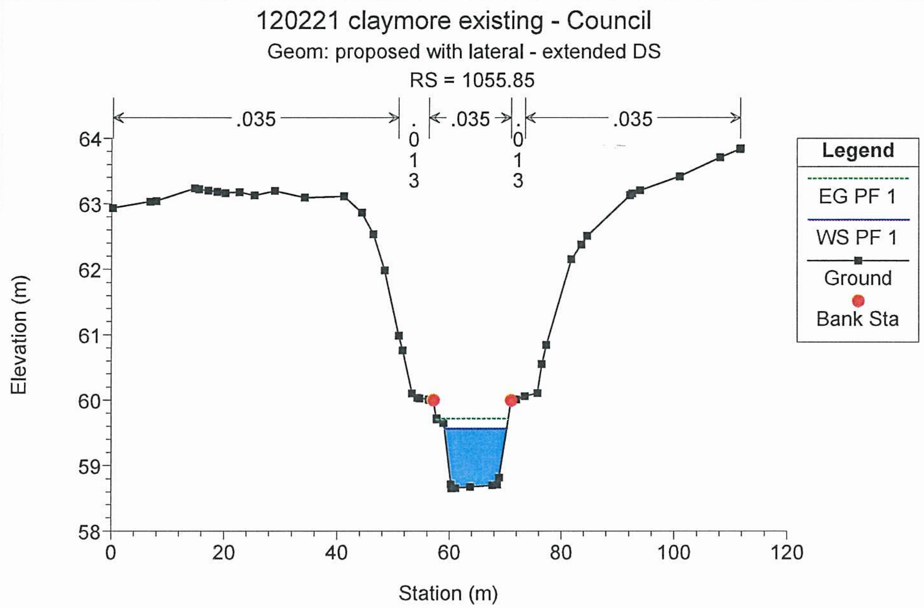
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1097.85 IS
.035
.013
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

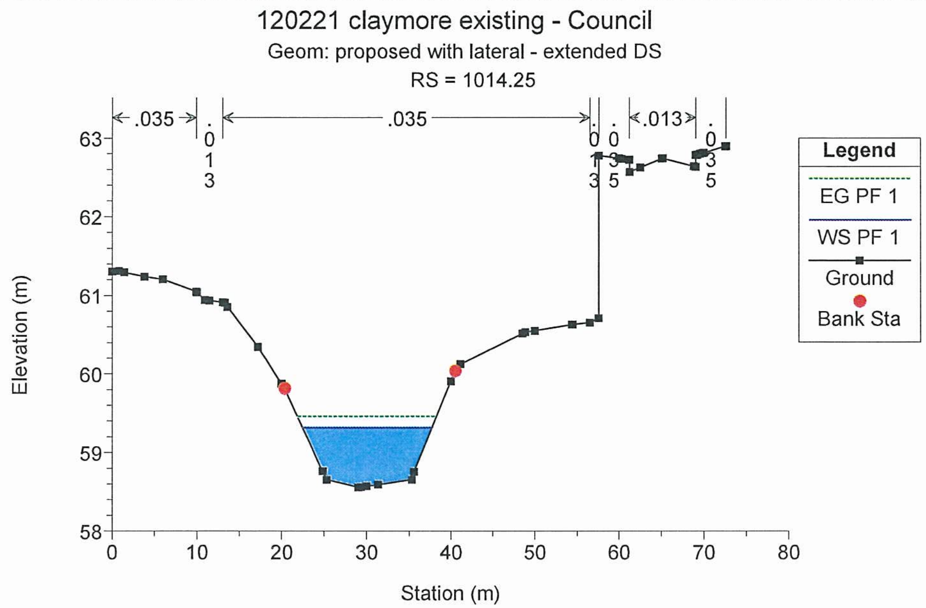

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1089.25
.035
.013
.035
.013
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

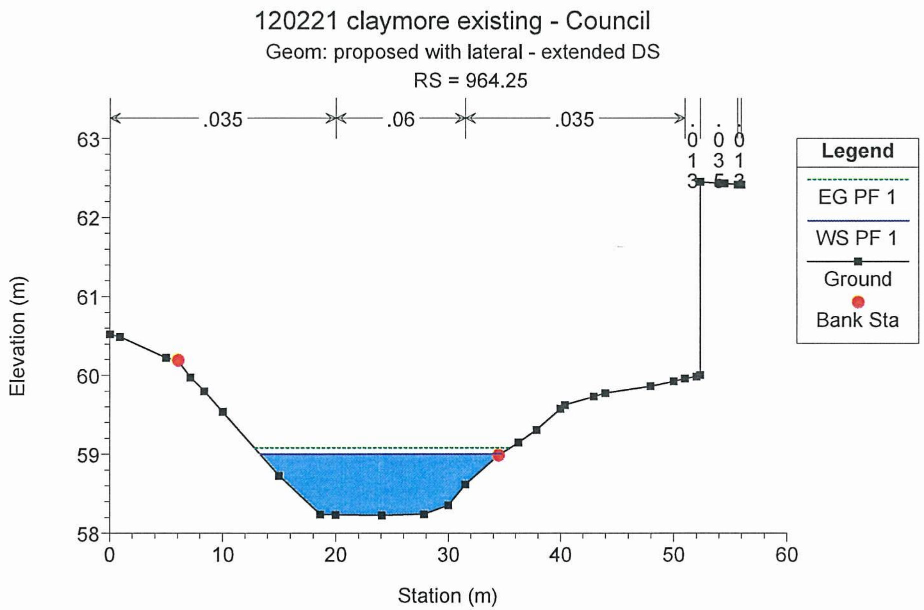

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1076.35
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

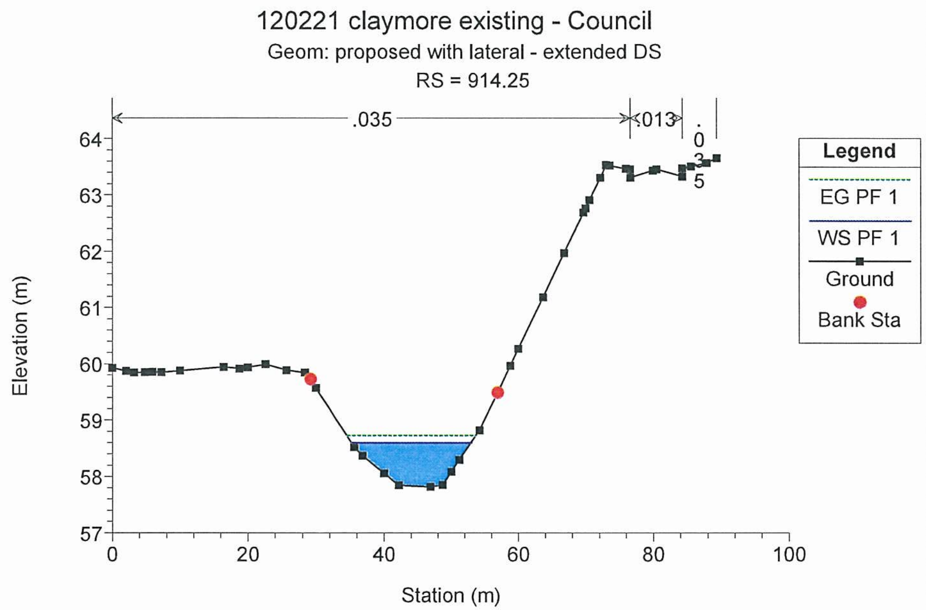

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1068.25 BR
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

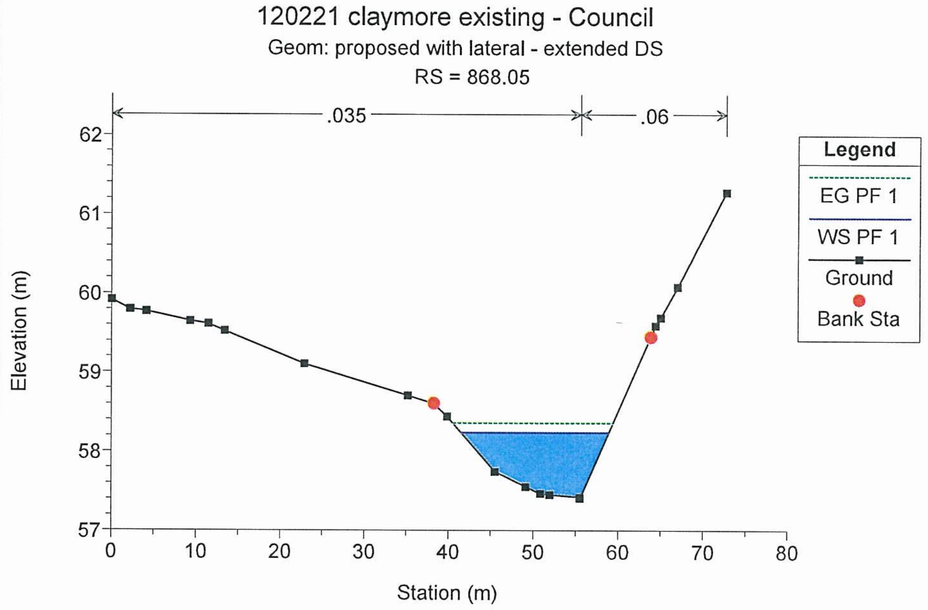

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1068.25 BR
.035
.013
.035
.013
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

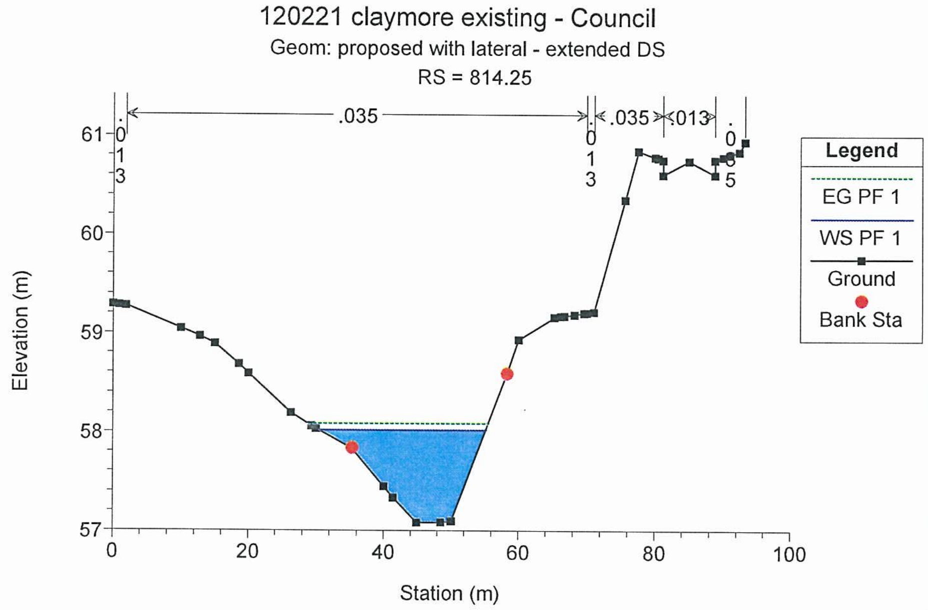

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1055.85
.035
.035
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

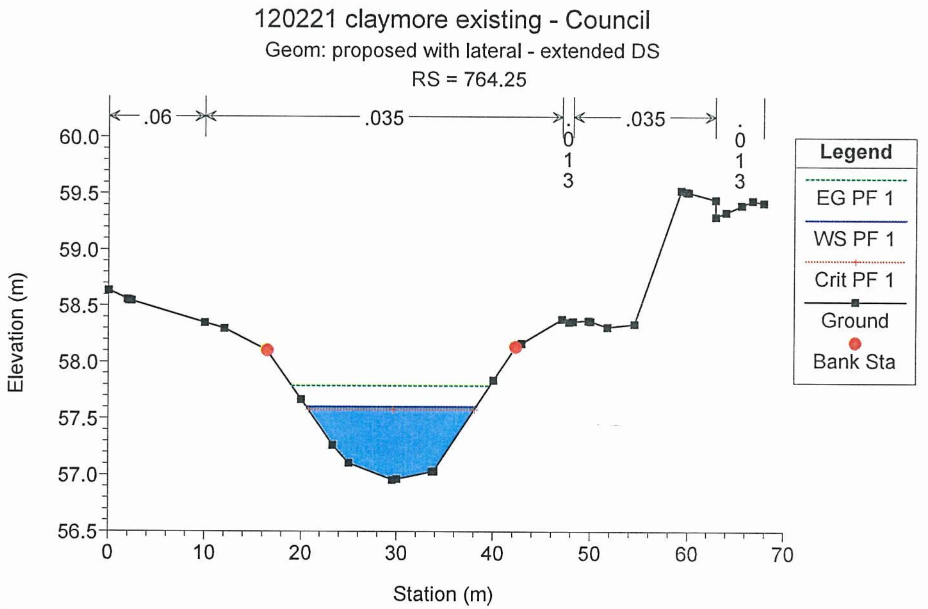

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 1014.25
.035
.035
.013
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

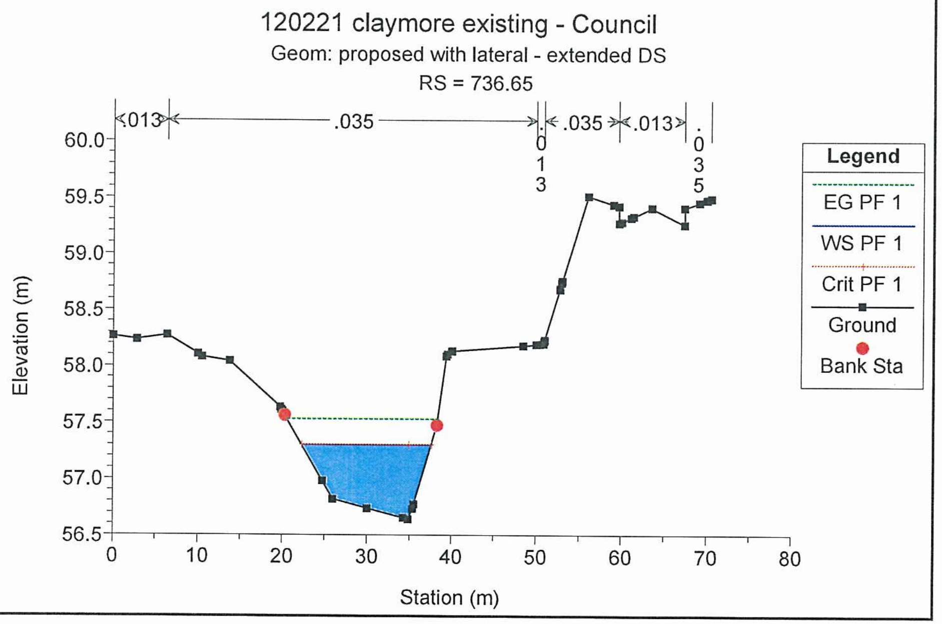

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 964.25
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

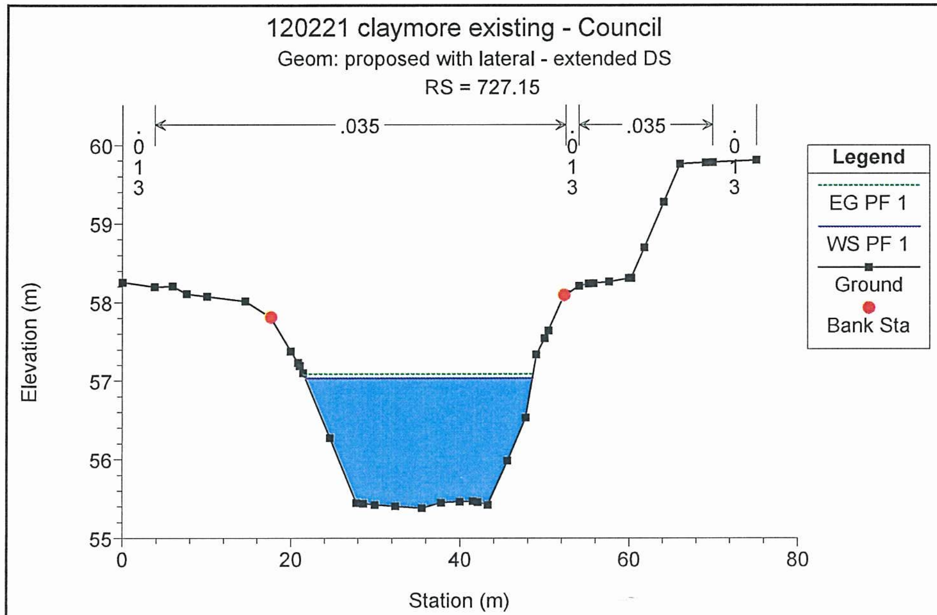

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 914.25
.035
.013
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

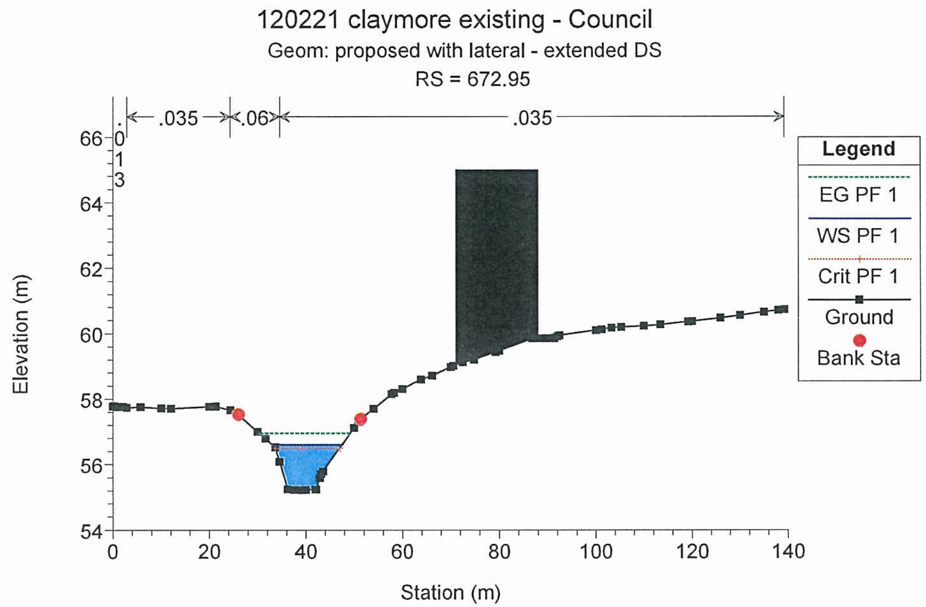

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 868.05
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

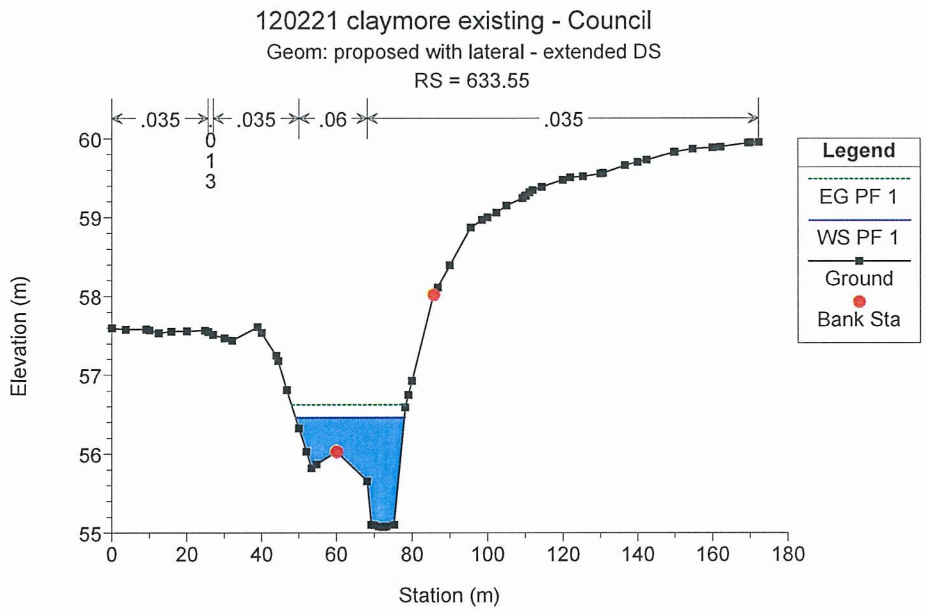

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 814.25
.035
.035
.013
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

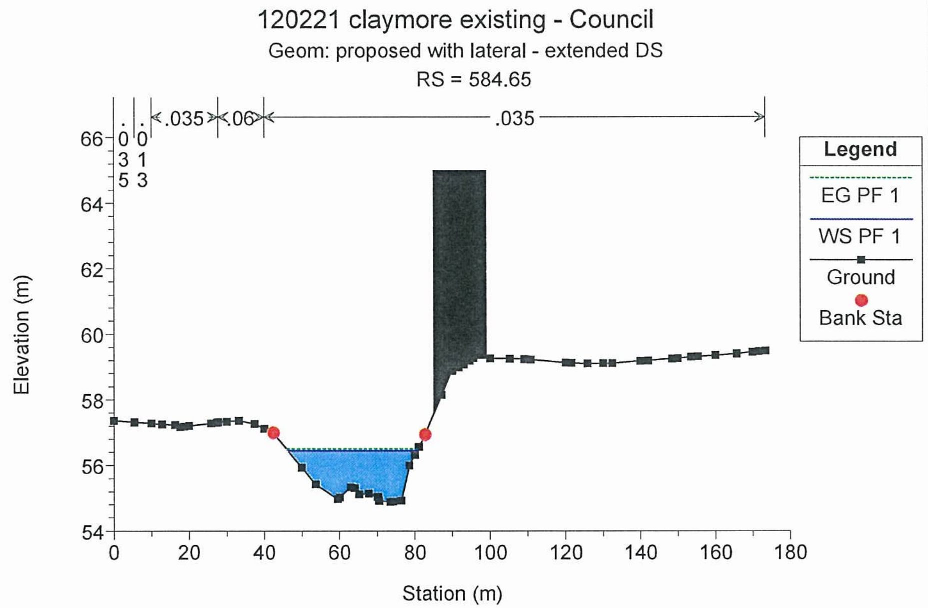

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 764.25
.06
.035
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

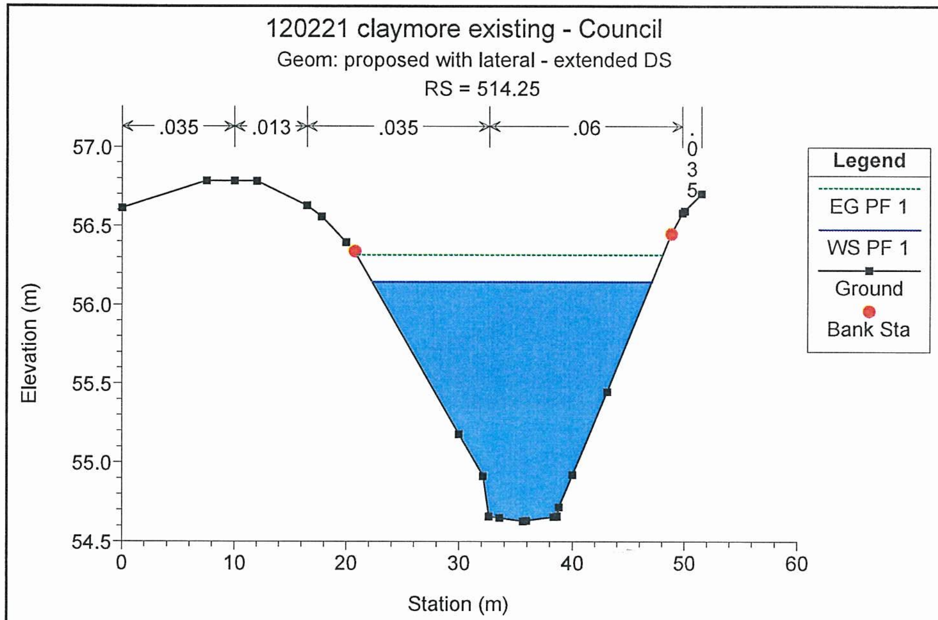

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 736.65
.013
.035
.035
.013
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

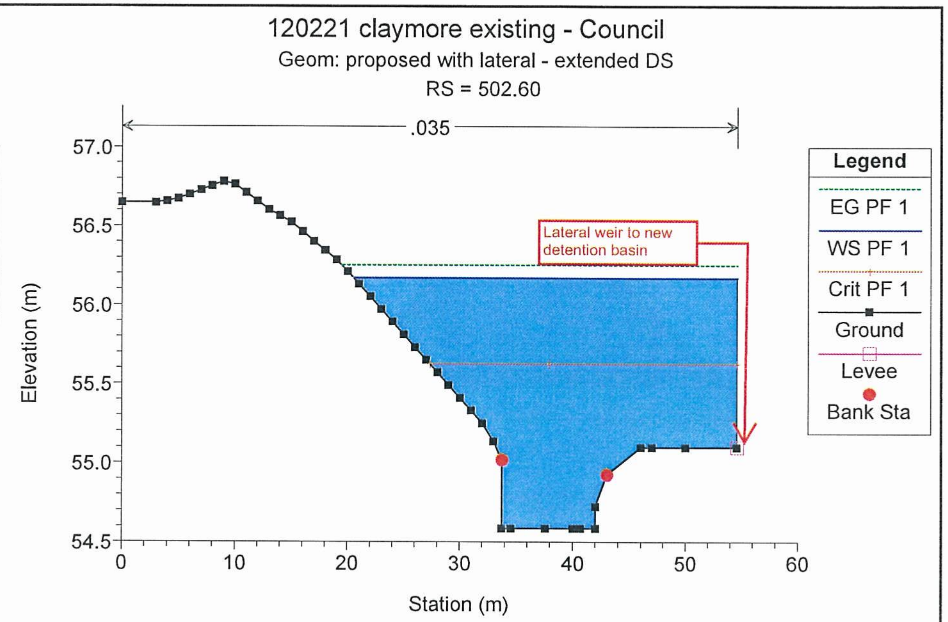

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 727.15
.035
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

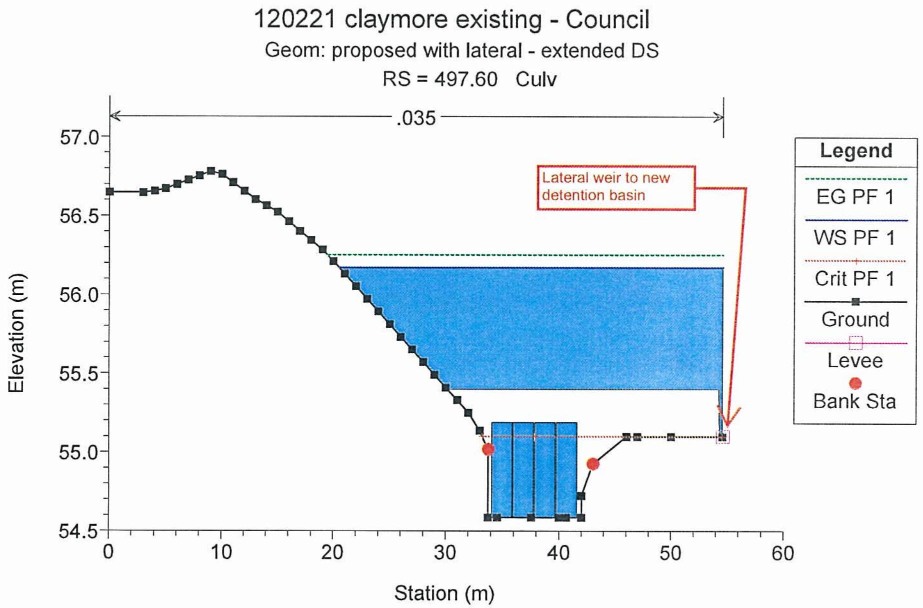

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 672.95
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

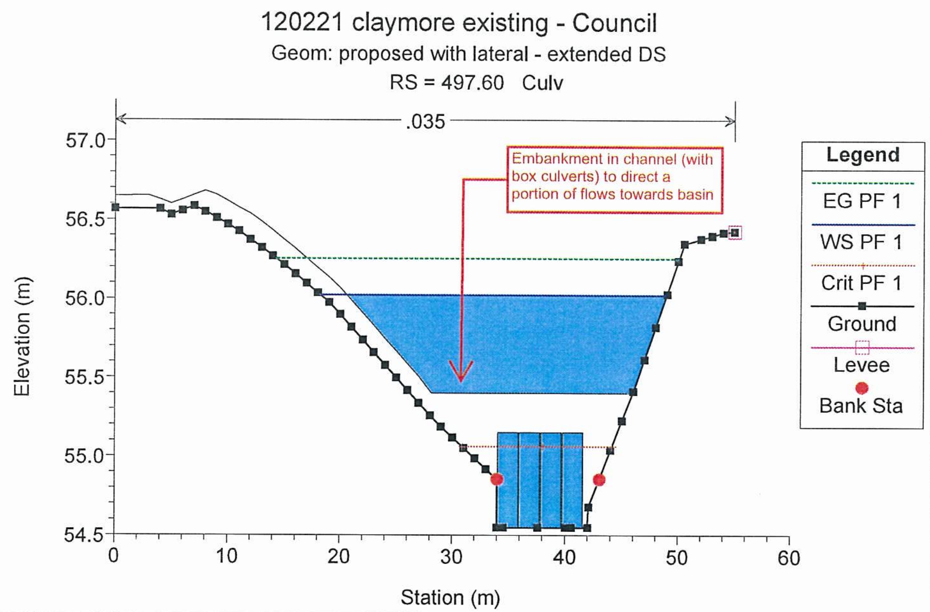

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 633.55
.035
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

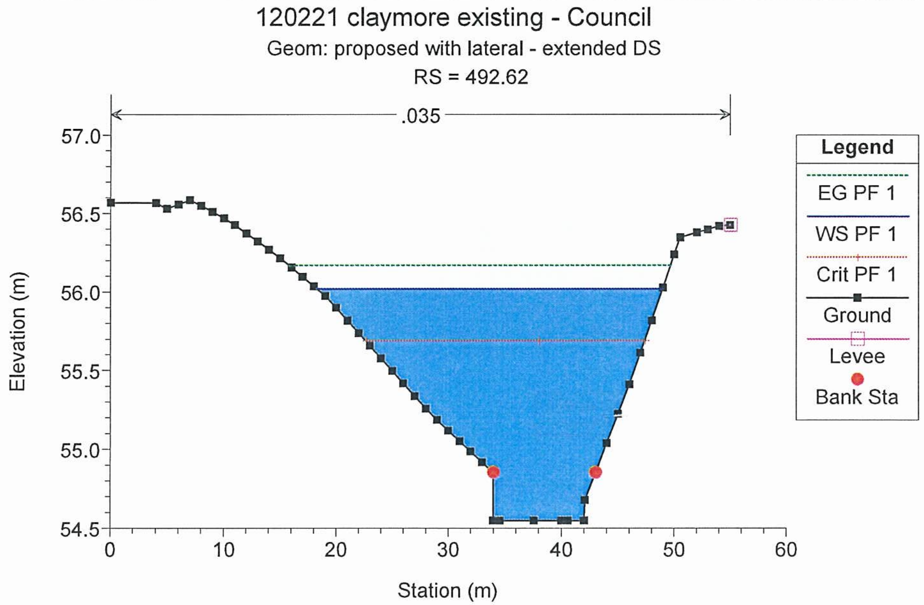

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 584.65
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 514.25
.035
.013
.035
.06
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

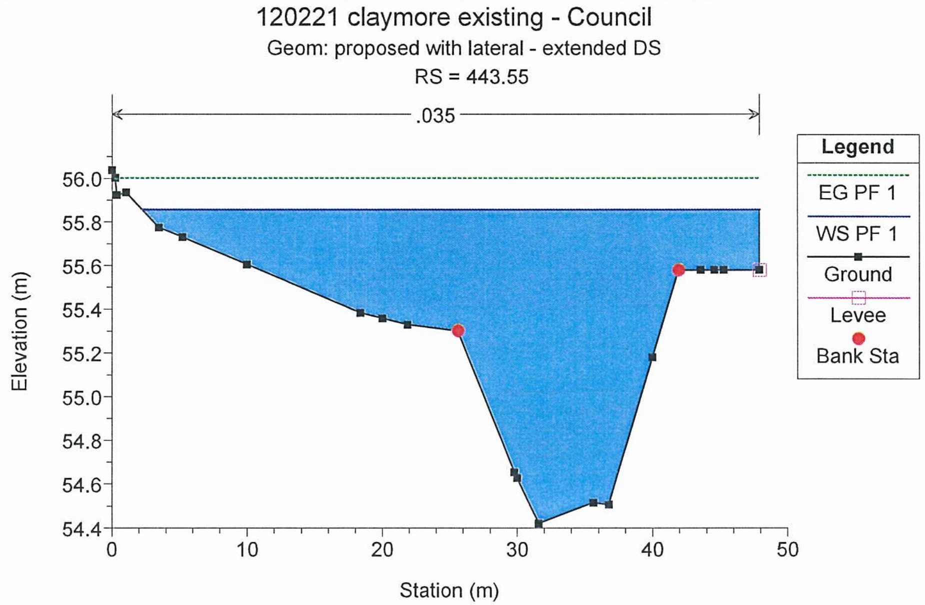

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 502.60
.035
Lateral weir to new detention basin
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 497.60 Culv
.035
Lateral weir to new detention basin
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

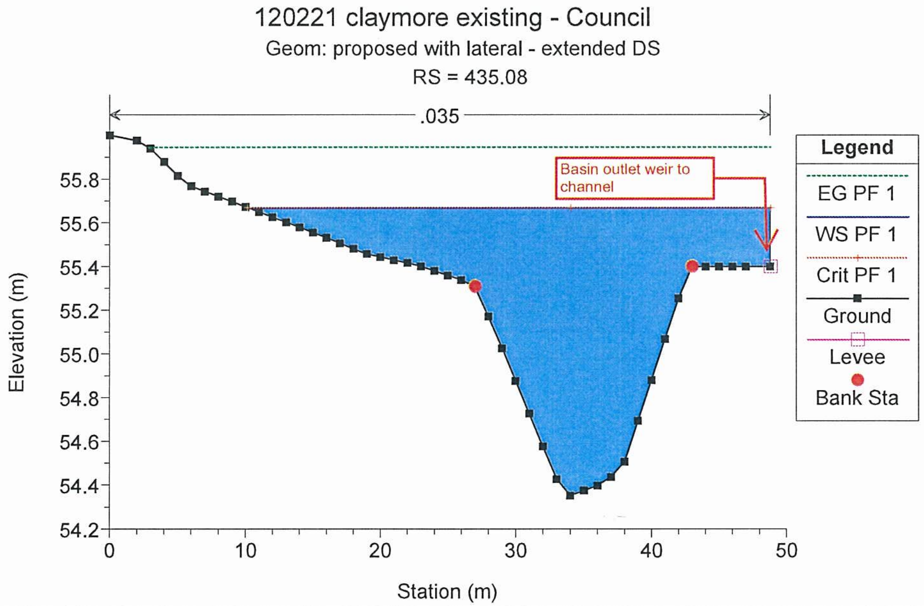

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 497.60 Culv
.035
Embankment in channel (with box culverts) to direct a portion of flows towards basin
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta



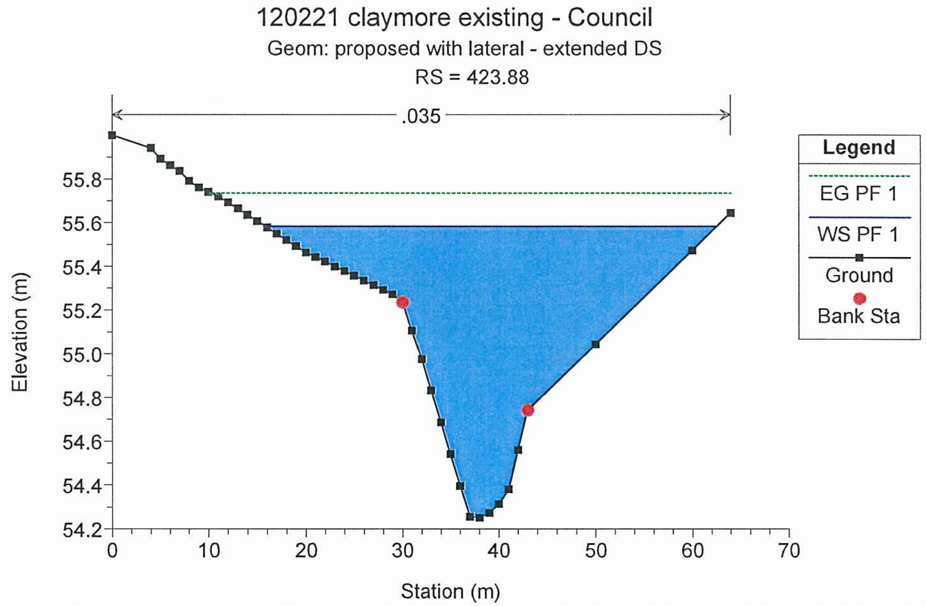
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 492.62
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta



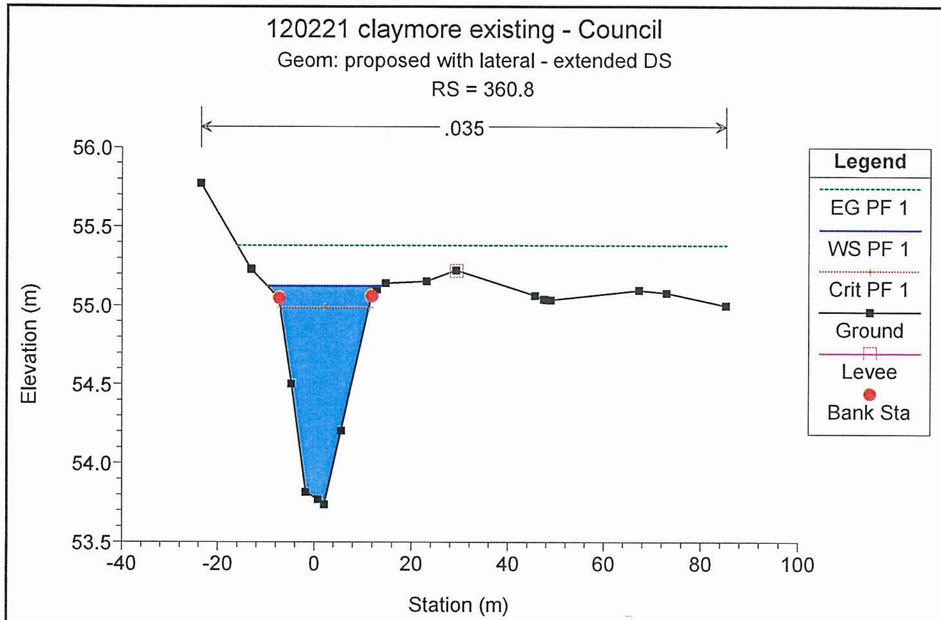
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 443.55
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Levee
Bank Sta

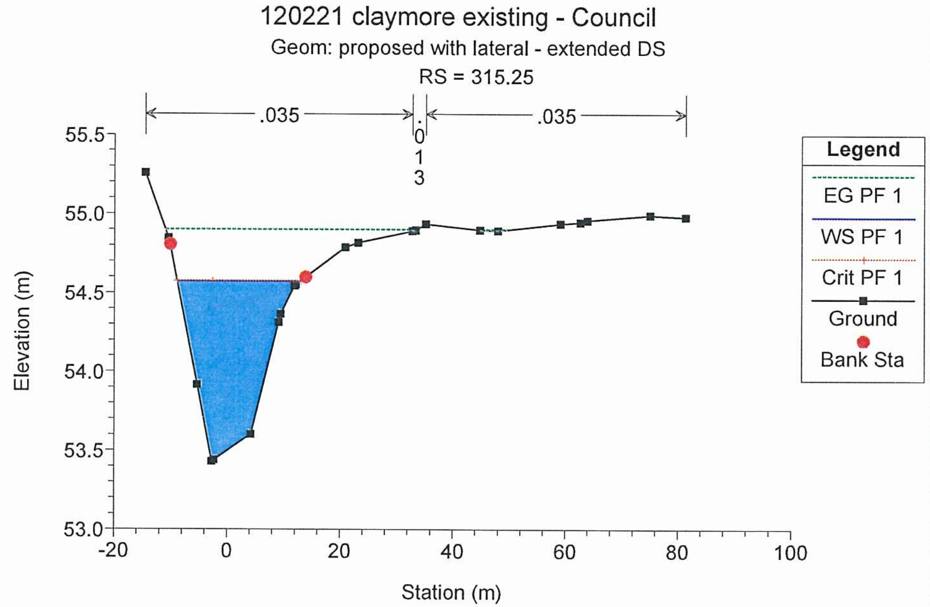


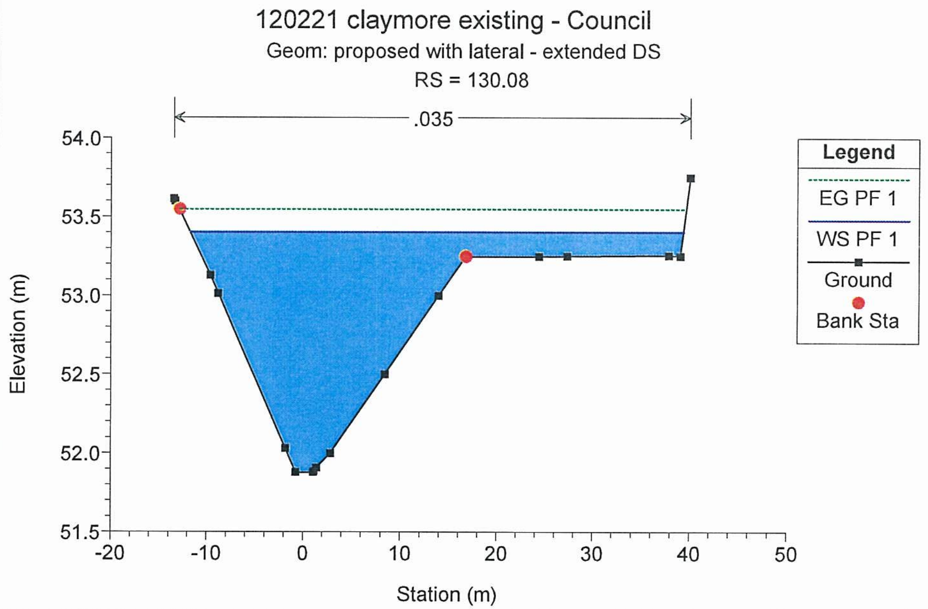
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 435.08
.035
Basin outlet weir to channel
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

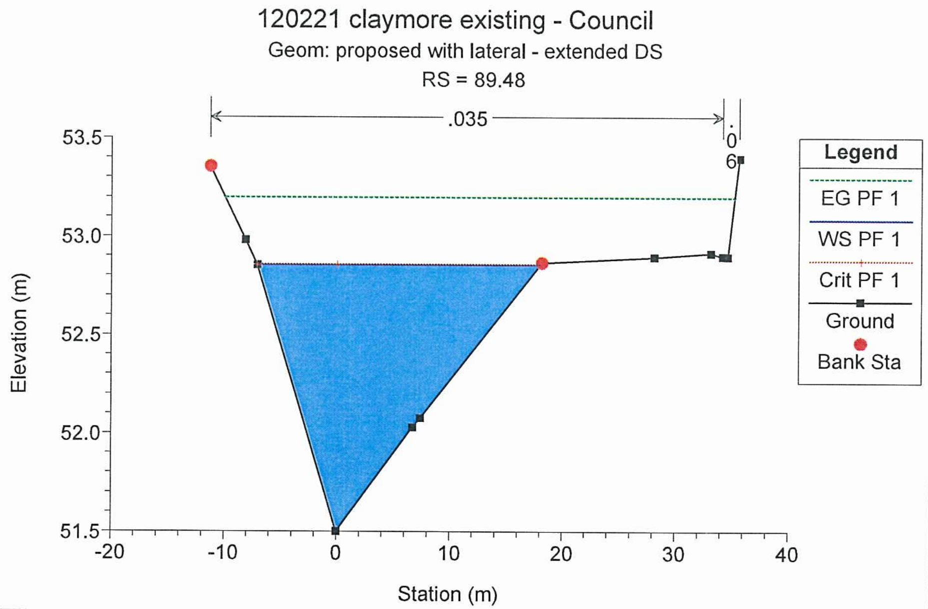


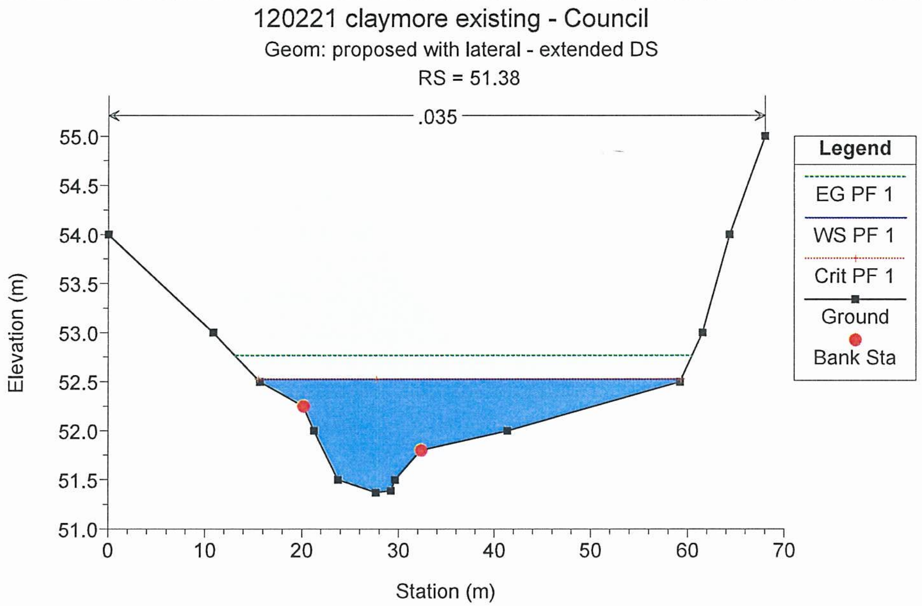
120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 423.88
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

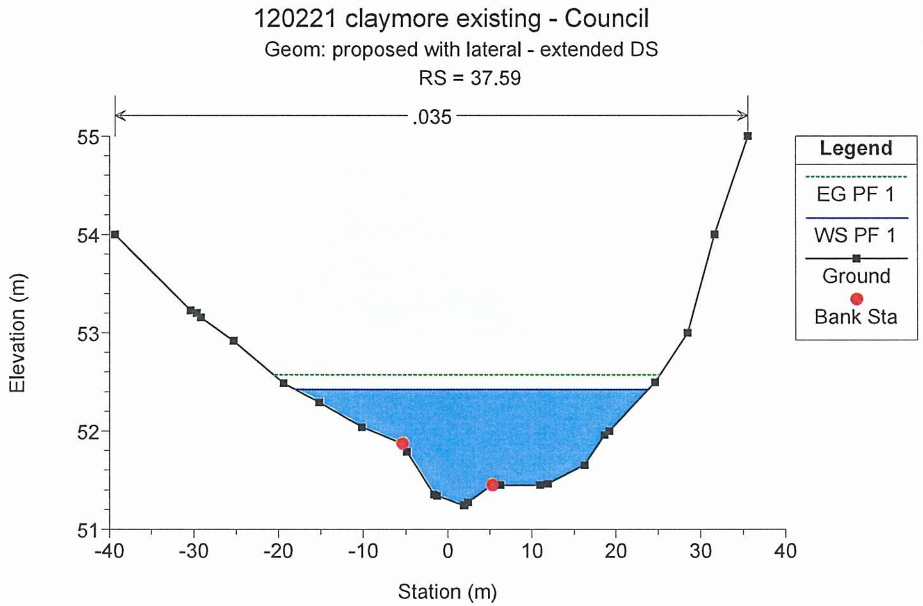

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 360.8
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

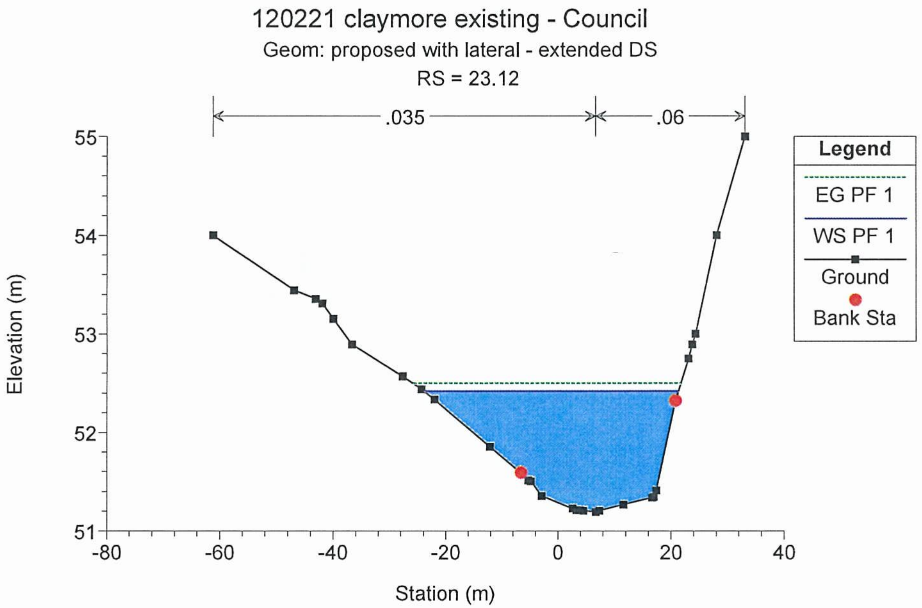

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 315.25
.035
.013
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

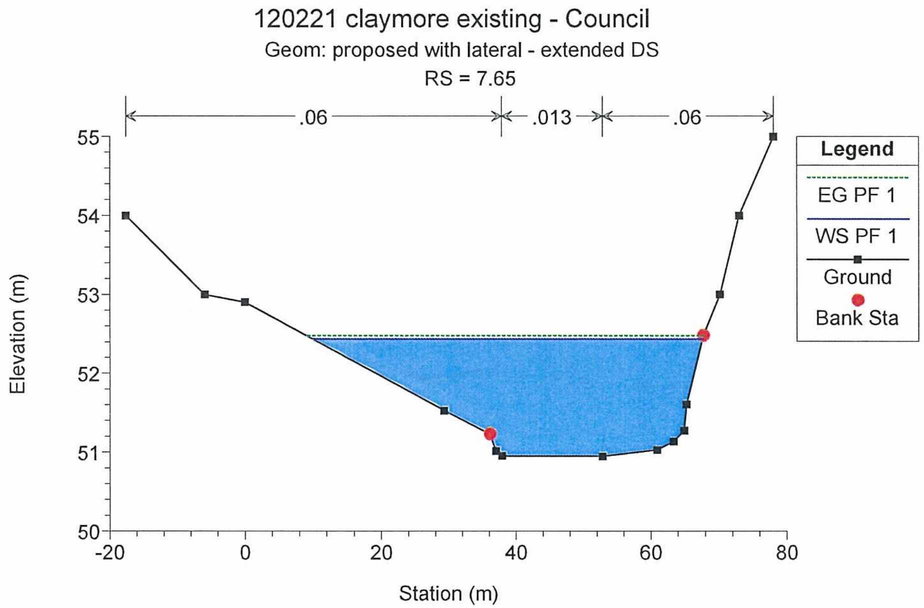

120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 130.08
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 89.48
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 51.38
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 37.59
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
RS = 23.12
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


120221 claymore existing - Council
Geom: proposed with lateral - extended DS
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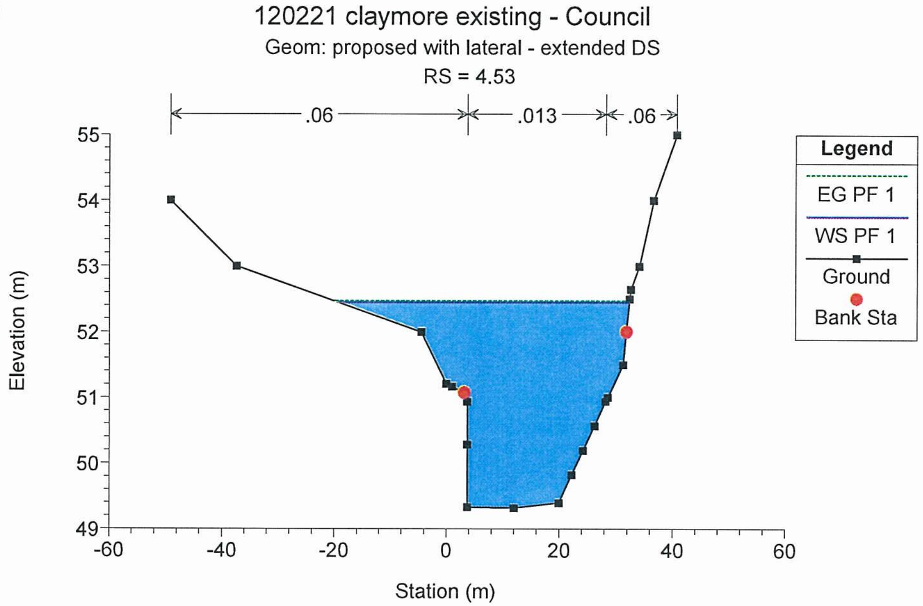
.013
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)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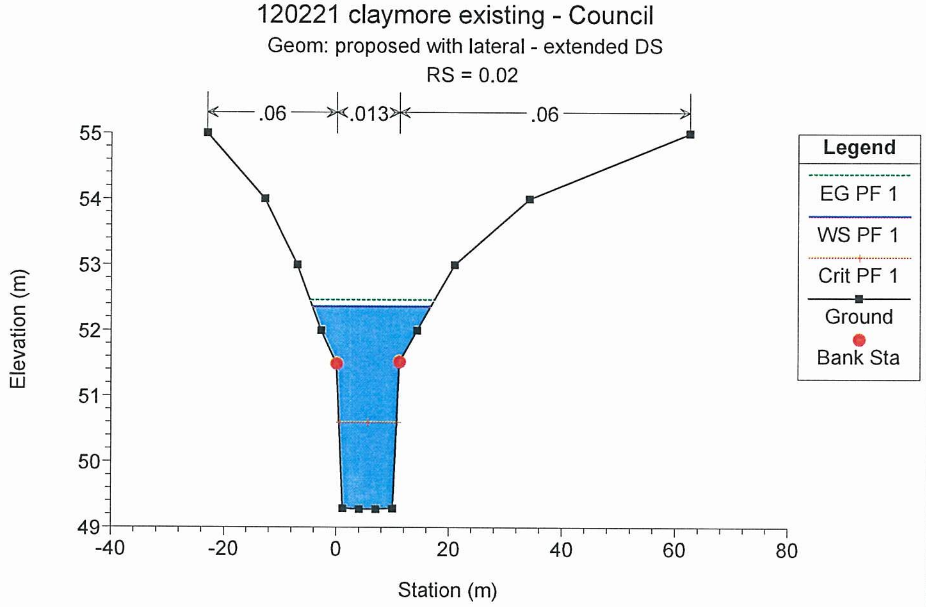
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta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Station (m)
Legend
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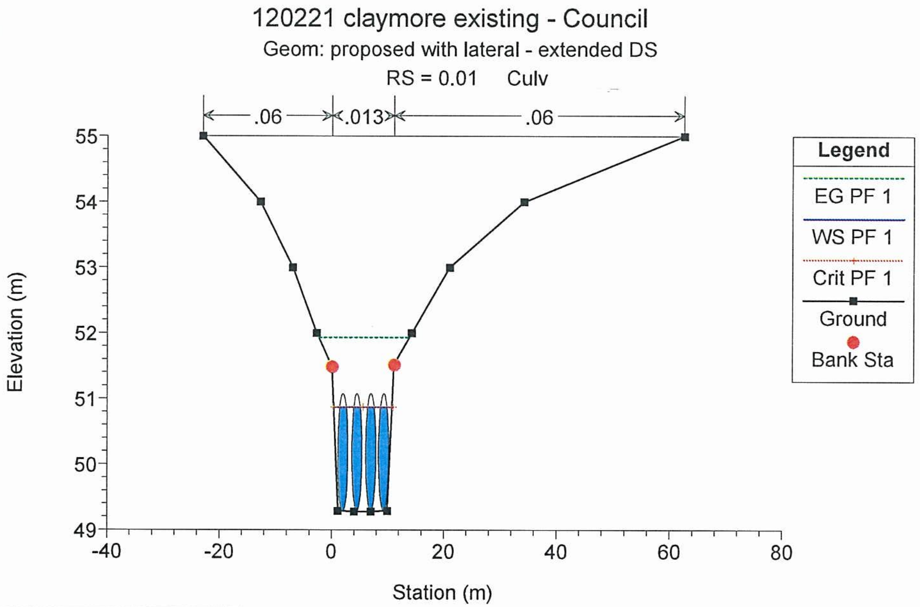
WS PF 1
Crit PF 1
Ground
Bank Sta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.013
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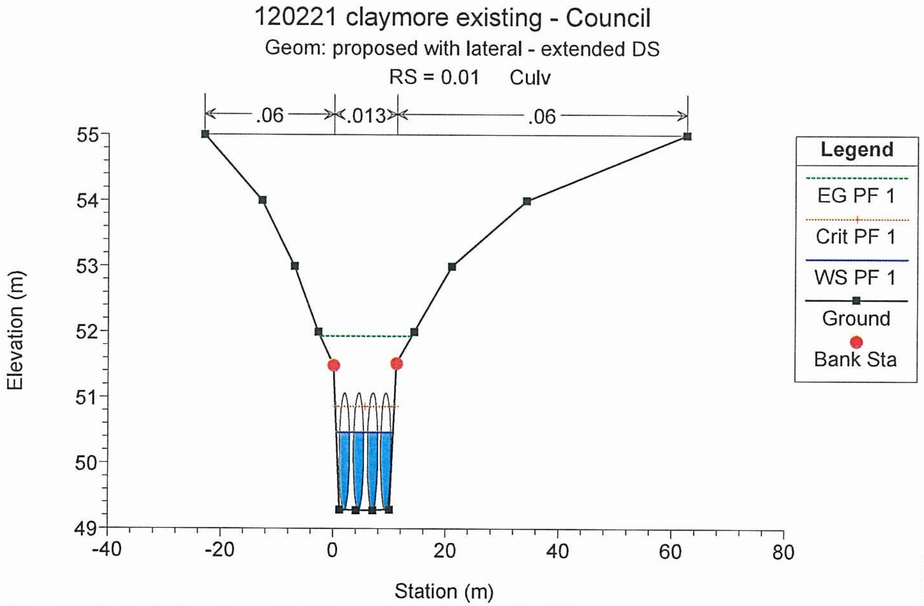
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta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Station (m)
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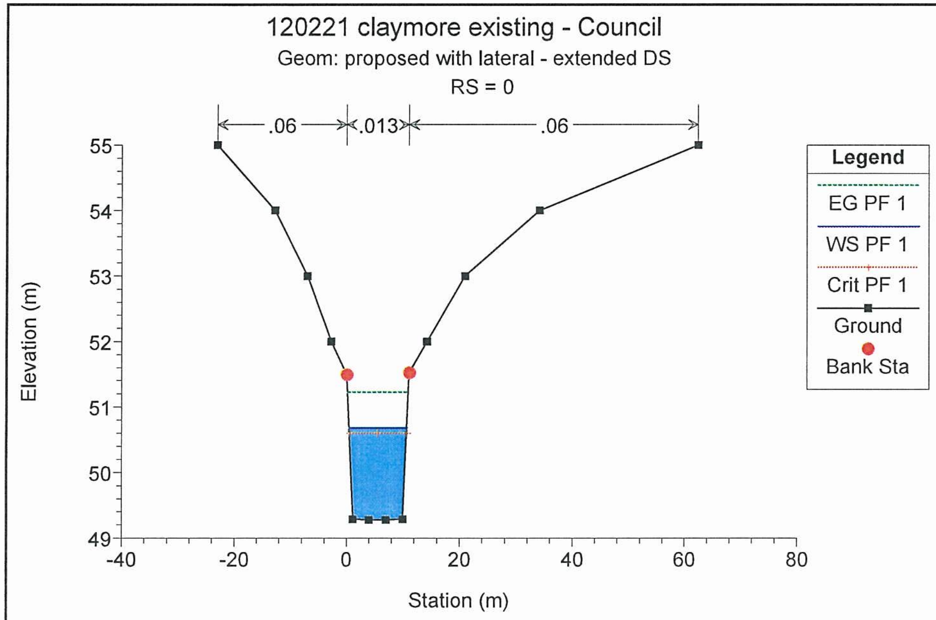
Crit PF 1
WS PF 1
Ground
Bank Sta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Geom: proposed with lateral - extended DS
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.06
.013
.06
Elevation (m)
55
54
53
52
51
50
49
-40
-20
0
20
40
60
80
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

Appendix E: Salinity Maps

Appendix F: BASIX Output and Figure

BASIX® Report

Building Sustainability Index www.basix.nsw.gov.au

Project summary		
Project name	Sample Project	
Street address	999 Sample Street Claymore 2559	
Local Government Area	Campbelltown City Council	
Plan type and plan number	deposited 999	
Lot no.	999	
Section no.	-	
Project type	separate dwelling house	
No. of bedrooms	3	
Project score		
Water	40	Target 40
Thermal Comfort	Pass	Target Pass
Energy	66	Target 40

Project address	
Project name	Sample Project
Street address	999 Sample Street Claymore 2559
Local Government Area	Campbelltown City Council
Plan type and plan number	Deposited Plan 999
Lot no.	999
Section no.	0
Project type	
Project type	separate dwelling house
No. of bedrooms	3
Site details	
Site area (m²)	450
Roof area (m²)	270
Conditioned floor area (m2)	245
Unconditioned floor area (m2)	25
Total area of garden and lawn (m2)	120

Assessor details and thermal loads		
Assessor number	n/a	
Certificate number	n/a	
Climate zone	n/a	
Area adjusted cooling load (MJ/m².year)	n/a	
Area adjusted heating load (MJ/m².year)	n/a	
Other		
none	n/a	
Project score		
Water	40	Target 40
Thermal Comfort	Pass	Target Pass
Energy	66	Target 40

Schedule of BASIX commitments

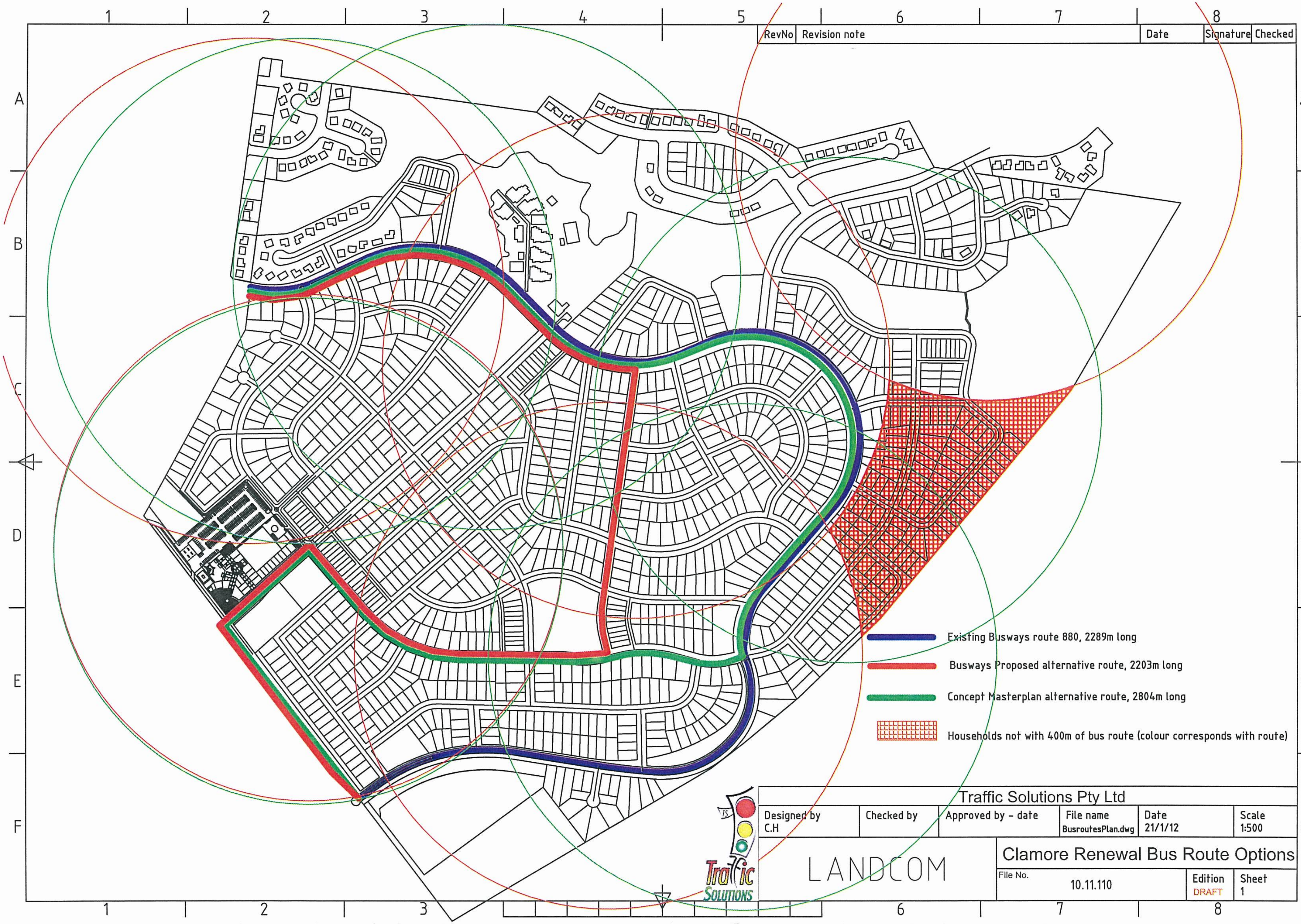
The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

Water Commitments	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
Landscape			
The applicant must plant indigenous or low water use species of vegetation throughout 20 square metres of the site.	✓	✓	
Fixtures			
The applicant must install showerheads with a minimum rating of 3 star (> 4.5 but <= 6 L/min) in all showers in the development.		✓	✓
The applicant must install a toilet flushing system with a minimum rating of 3 star in each toilet in the development.		✓	✓
The applicant must install taps with a minimum rating of 3 star in the kitchen in the development.		✓	
The applicant must install basin taps with a minimum rating of 3 star in each bathroom in the development.		✓	
Alternative water			
Rainwater tank			
The applicant must install a rainwater tank of at least 2500 litres on the site. This rainwater tank must meet, and be installed in accordance with, the requirements of all applicable regulatory authorities.	✓	✓	✓
The applicant must configure the rainwater tank to collect rain runoff from at least 135 square metres of the roof area of the development (excluding the area of the roof which drains to any stormwater tank or private dam).		✓	✓
The applicant must connect the rainwater tank to:			
• all toilets in the development		✓	✓
• at least one outdoor tap in the development (Note: NSW Health does not recommend that rainwater be used for human consumption in areas with potable water supply.)		✓	✓

APPENDIX 5

SUBMIT UNDER SEPARATE COVER

APPENDIX 6



Traffic Solutions Pty Ltd					
Designed by C.H	Checked by	Approved by - date	File name BusroutesPlan.dwg	Date 21/1/12	Scale 1:500

LANDCOM

Clamore Renewal Bus Route Options

File No. 10.11.110

Edition DRAFT

Sheet 1

APPENDIX 7

Claymore Urban Renewal Development Control Guidelines (DCG)

Prepared by BBC Consulting Planners

May 2012

CONTENTS

1. INTRODUCTION

1.1 Purpose of the Development Control Guidelines

These guidelines have been prepared to guide the design of subdivision and construction of housing in the Claymore Urban Renewal area (Figure 1).

These guidelines form part of the Concept Plan approval for the renewal project. Development for the purpose of subdivision of land and the construction of dwellings are to occur generally in accordance with these guidelines and with the terms of approval of the Concept Plan (MP11_0010).

1.2 Aims and Objectives of the Development Control Guidelines

The aims of the DCG are to:

1. Ensure that development occurs generally in accordance with the Claymore Urban Renewal Project Concept Plan (MP11_0010).
2. Encourage the creation of safe, secure and liveable environments.
3. Provide high quality affordable housing choices.
4. Ensure that the principles of ecological sustainability are incorporated into the design, construction and ongoing operation of development.

The objectives of the DCG are to:

Social:

1. Provide for a mixture of affordable housing types.
2. Foster greater social interactions between residents from various housing styles and tenure.
3. Create a network of open spaces, focal points and community facilities which provide for the active and passive recreational opportunities for the community.
4. Provide for a network of pedestrian and cycle routes throughout the site which connect open space areas and community facilities for direct access and encourages walking and cycling as an alternative and desirable method of transport.
5. Ensure safety and security through passive surveillance of streets and open space areas by following the principles of 'safety by design'.
6. Build on the existing sense of community and further develop the sense of place and distinctive identity.

Environmental:

1. Create a legible and functional road network which provides good connections with the surrounding areas and encourages safe and convenient access throughout the site.
2. Establish quality streetscapes which add to the visual and environmental amenity of the site.
3. Design an integrated stormwater management system which improves the quality and quantity of the water entering and leaving the site, and which also harnesses the principles of water sensitive urban design.
4. Create linkages between open spaces along the streets inside the site and into the surrounding areas by an extensive street tree planting strategy.

5. Encourage environmentally responsible building practices including solar passive design solutions for all housing and community buildings.

Economic:

1. Ensure that social and private housing design is of equal quality, in accordance with the desired character of the area;
2. Ensure that the future development enhances the surrounding suburbs and positively impacts upon market values in the area;
3. Create variety in housing types and tenure mix which is marketable and feasible;
4. Provide appropriate housing for low income earners, the aged and people with disabilities.

1.3 Land to which the DCG applies

The DCP applies to all land contained within the Claymore Urban Renewal Area as defined in Figure 1.

Figure 1: Claymore Urban Renewal Area

1.4 The Consent Authority

Campbelltown City Council (Council) is the consent authority for local development within the Claymore Urban Renewal Area (subject to provisions of the EP&A Act and relevant environmental planning instruments and concept plan approval determinations).