Background

The Taroom Sewage Treatment Plant (STP) is owned and operated by Banana Shire Council (BSC). The plant services a population of approximately 900 persons, with an Average Dry Weather Flow of 210 kL/d. The site is located on the corner of Tai Shue and Rigby Streets.

In 2021, Fewster Brothers (FB) Contracting began the construction of a new Aerofloat Moving Bed Biofilm Reactor (MBBR) plant adjacent to the existing plant.

FB engaged the following parties to undertake the design components of the D&C Works:

- Aerofloat – MBBR treatment plant
- GANDEN – Balance of plant civil and structural engineering design
- Comlek – Electrical and controls

FB Contracting had engaged the services of DSQ Land Surveyors to undertake a detailed topographical survey of the original site prior to construction of the new plant. The original survey has been attached (Refer to Appendix C).

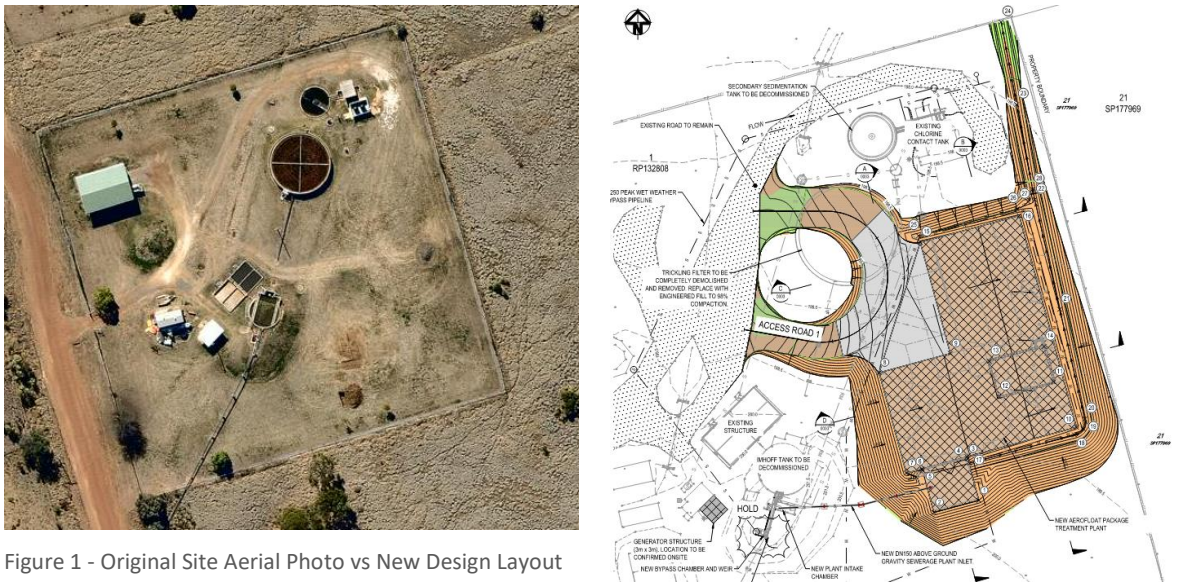

Figure 1 - Original Site Aerial Photo vs New Design Layout

In 2022, FB Contracting went into liquidation, resulting in the site being left in an unfinished state with no red-line markups or construction records available to allow Council to finalise the construction works package including handover documentation.

GANDEN and BSC require a surveyor to complete a detailed topographical survey of the site to achieve the following:

1. Confirm whether concrete structure and gravity pipework design levels were achieved, which is critical to plant hydraulics, by confirming RL of:
    a. Process slab heights to ensure that site drainage can be achieved with the available grade
    b. Inlet works structure to allow GANDEN to develop a rehabilitation design
2. Establish current earthworks levels to allow a new bulk earthworks drawing and drainage plan to be developed, and
3. Extent, location and RL of process slabs to confirm the extent of re-design required for the apron slabs

Due to excessive build-up of silt and refuse on the slabs, the surveyor is to locally shovel/clear off build-up on the process slabs to pick up the true surface level.

Site photographs taken June 2022 have been included in Appendix B.

Specific requirements are detailed further in this survey brief.

Service Location Scope of Works

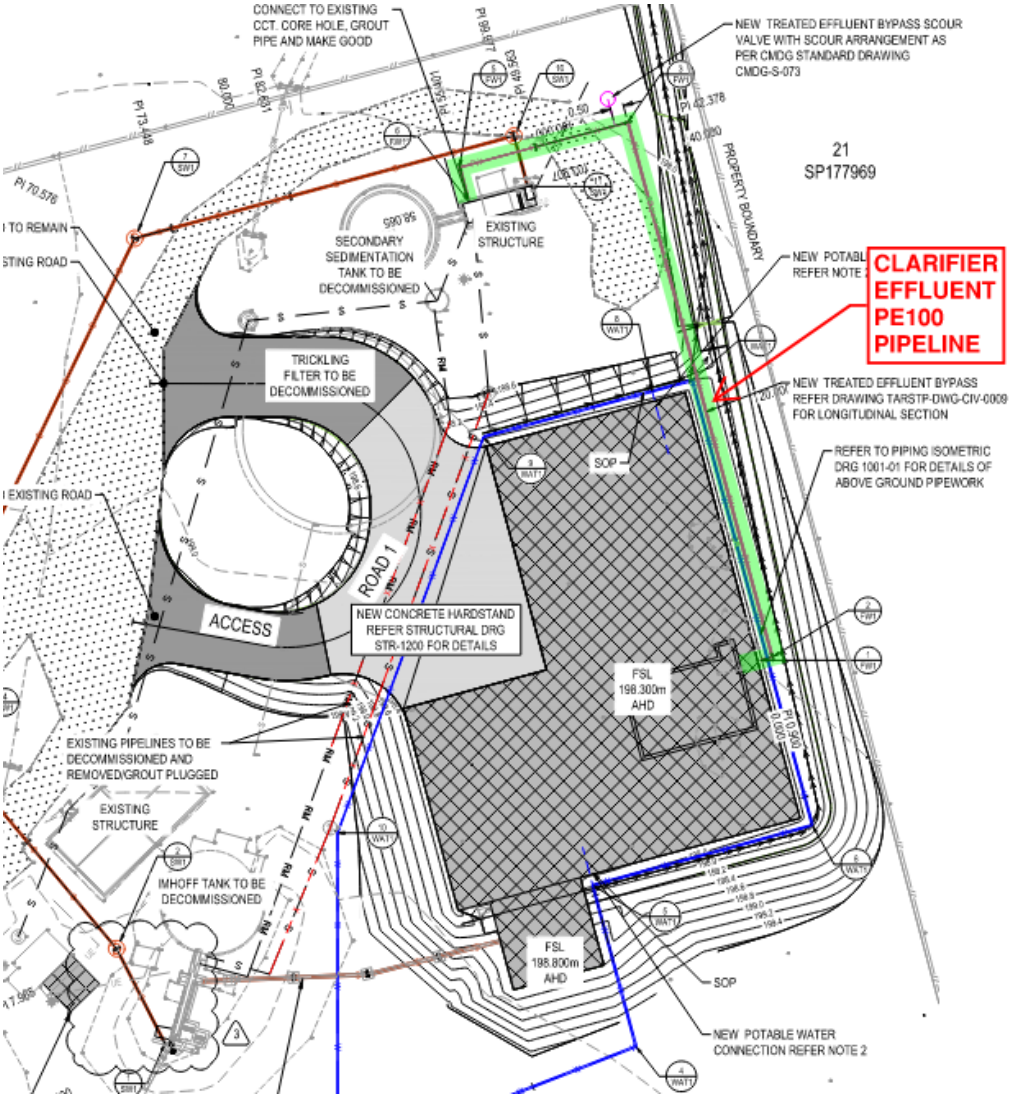

Figure 2 - Marked Up Services to be Located – Clarifier Effluent Pipeline

Locate the installed alignment of the clarifier effluent PE100 pipeline. BSC will have organised potholing prior to attending site, and conduits will be left to be picked up by the surveyor. It should be noted that the actual installed location may deviate from the design shown above.

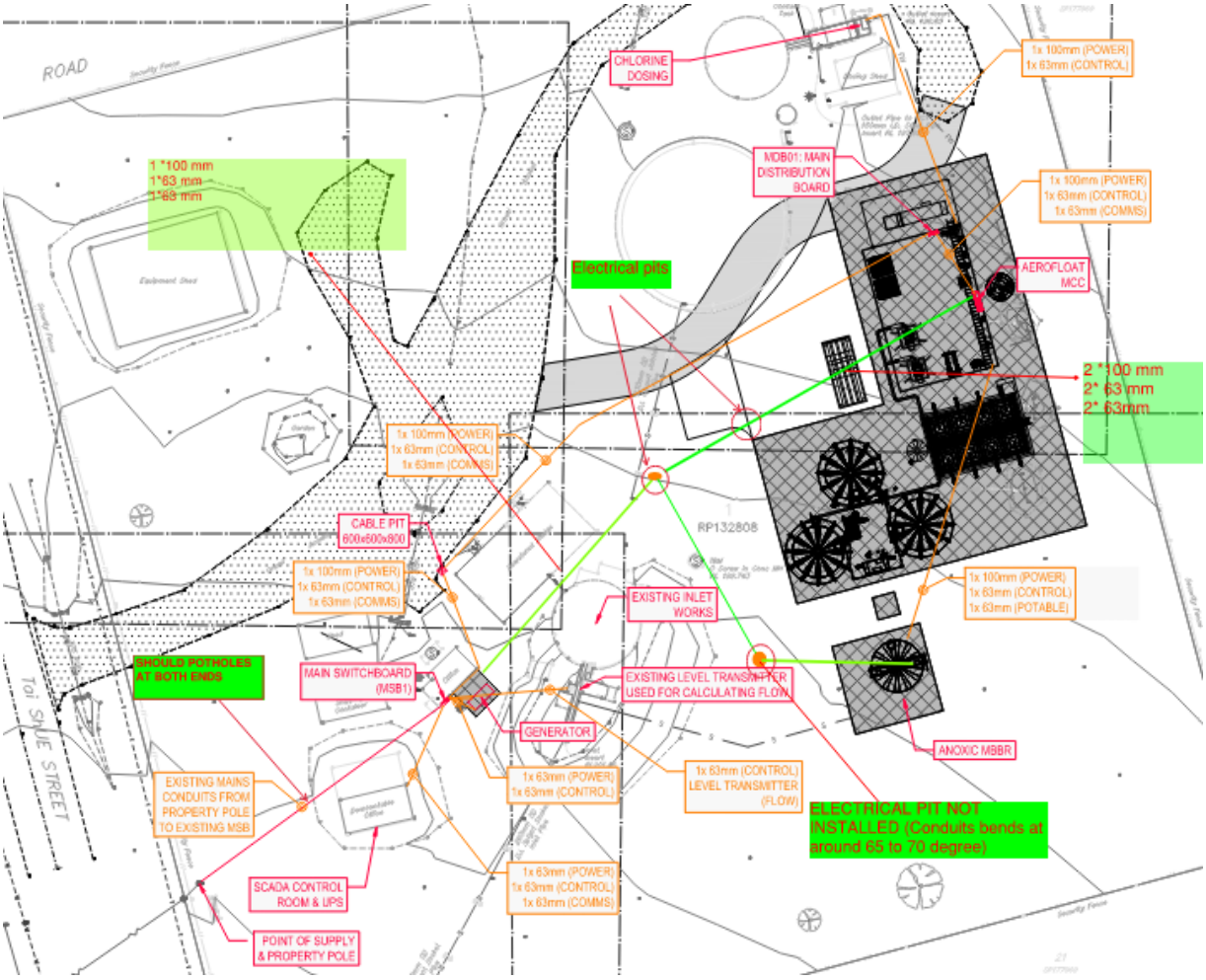

Figure 3 - Marked Up Services to be Located – Electrical Conduits

Locate all electrical conduits as described in Figure 3 above. BSC representatives will be available on site to provide project history to assist with the locating of services if not installed as described.

Generally, the existing services locator is to include layouts showing required extents for service location, potholing plans etc.

Feature Survey Scope of Works

1.1 General Requirements

Complete a topographical survey of the general site as identified in the markup below.

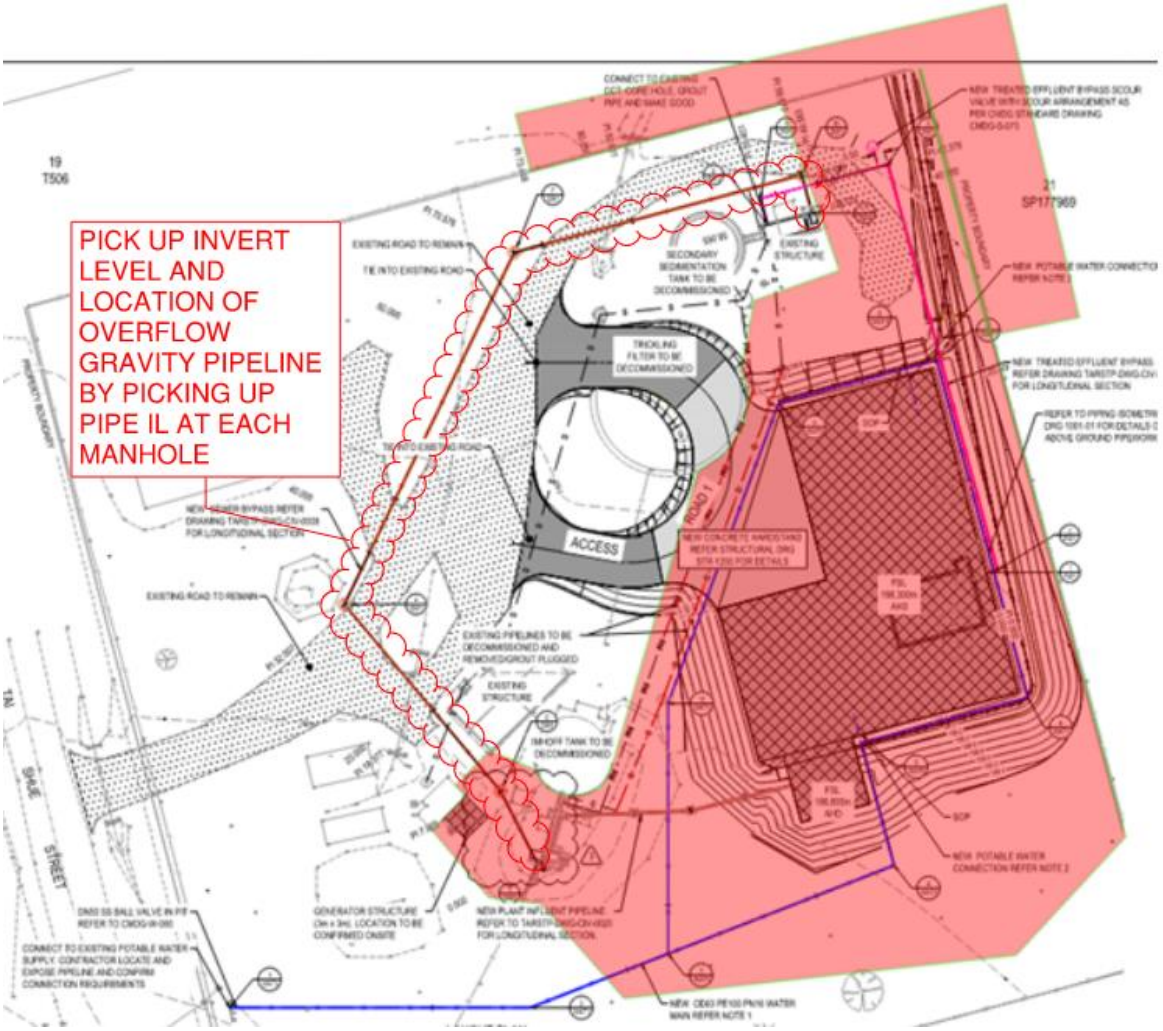

Figure 4 - Overview of Feature Survey Extents

- Obtain required cadastral and level information of the existing treatment plant site
- Field survey in connection to Australian Height Datum (AHD) and MGA94 as necessary (GDA94 and AHD to be based on published values of local permanent survey marks)
- Survey to pick up pipes/conduits as defined in the services locating brief in the section above.
- Survey to capture upstream and downstream invert levels of overflow gravity pipeline manholes
- Survey to capture all existing ground surfaces within the shaded extents shown in Figure 3. The following additional information is required:
    - Cadastral boundaries including LOT and RP numbers to match in with existing survey
    - Permanent survey markers
    - Natural surface spot heights at a suitable grid spacing to allow the surface TIN to be created (surface TIN and contours to be provided with survey data)
    - Concrete slabs and gravity drainage (detailed further below). Where covered by earth, dig out to expose top of concrete
    - Visible existing services features including manholes, valve boxes, grates etc.
    - Fences and gates
    - Trees (including trunk diameter and canopy extents) and vegetation
- Provide a list of control marks and adopted co-ordinates.

- BSC will provide access and site inductions.

Feature survey to be provided in the following formats:

- A 2-dimensional fully edited AutoCAD drawing in electronic format containing all features and contours
- A 3-dimensional AutoCAD drawing in electronic format containing all features as a 3D digital terrain model and a 3D triangulated surface (tin).
- A fully edited PDF drawing in electronic format containing all features and contours.

1.1.1 Concrete Slabs

GANDEN will be updating the original design drawings to ensure that the apron slabs originally designed are compatible with what was built by the original contractor and requires accurate pickup of all constructed slab surfaces.

Surveyor to also pick up the concrete slabs (shaded red in Figure 4), floor drains & drainage grates, and invert levels of drainage pipework within the process building connecting to the clarifier pit (blue dashed line below). Other items, including pumps, equipment, tanks etc. does not require pickup.

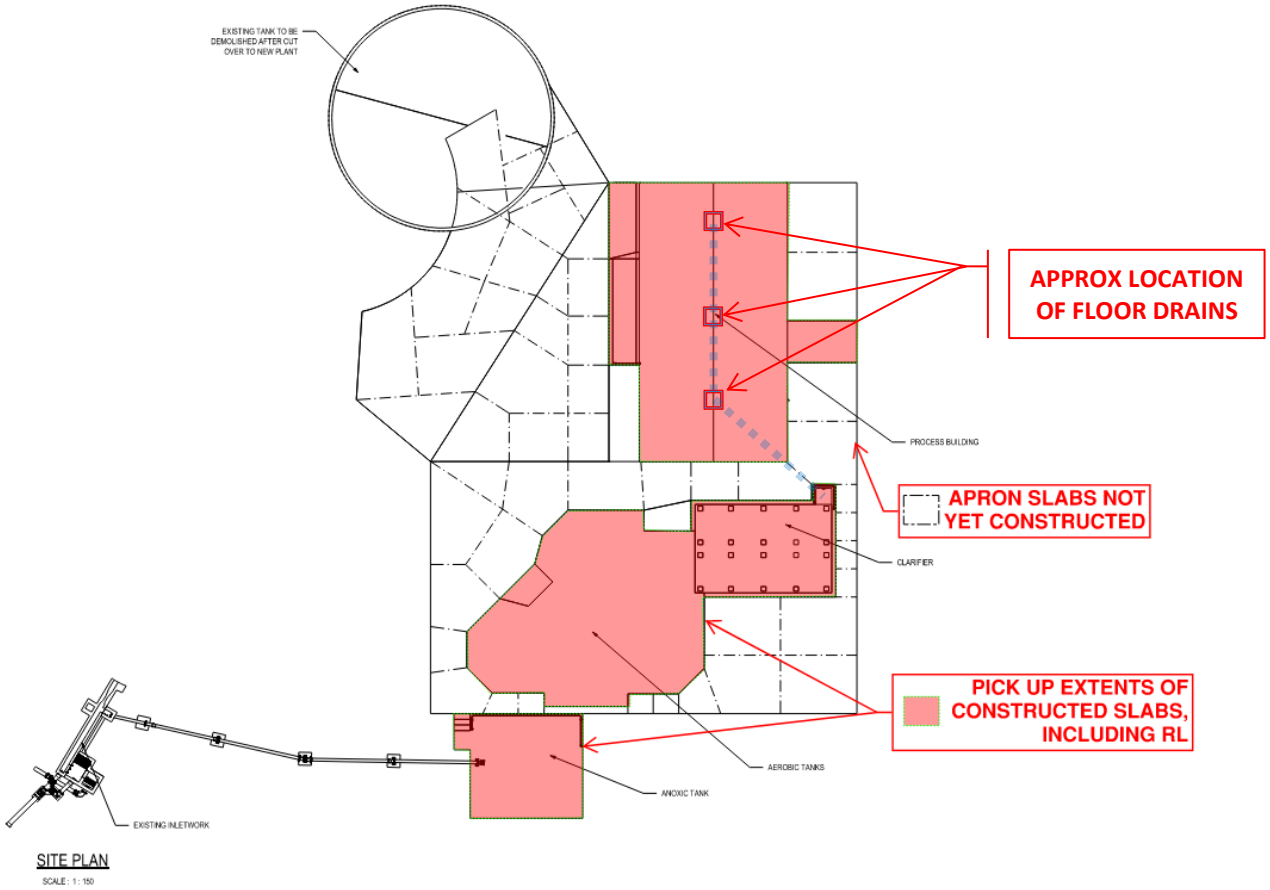

Figure 5 - Marked Up Plan Showing Constructed Slabs (red) to be Surveyed

1.1.2 Topographical Survey Outside of Boundary

To ensure that the site free drains, the stormwater design must be revisited. Surveyor to extend the surveyed plot to outside of the boundary as nominated in the below markup.

BSC will clean up current refuse within the survey location prior to the date of survey.

Figure 6 - Extent of Survey to Extend Outside Site Boundary

1.1.3 Inlet Works

During the construction of a bypass chamber attached to the existing inlet works structure, the structural foundation scoured as it was left excavated during a heavy rainfall event. The Contractor attempted to remediate the structure by installing screw piles under the extended bypass chambers, however the required levels were not achieved. Flows now incorrectly flow back through to the bypass chamber due to the inconsistent levels.

Surveyor to confirm all concrete and pipeline RLs for the inlet structure (extents as shown in Figure 6), sufficient to allow an accurate 3D model of the structure to be created for design purposes. The following is to be included as a minimum:

- Structure chamber and channel invert RLs at all corners and changes in level (ensure top of concrete is surveyed – clear away grit or other solids build-up that may have accumulated on top of the concrete)
- Structure top of concrete RLs at all corners and changes in level (note that there is a vertical kink in the channel which occurred during subsidence of the upstream section of the inlet works – this needs to be surveyed)
- Top of pipes as shown in the images below

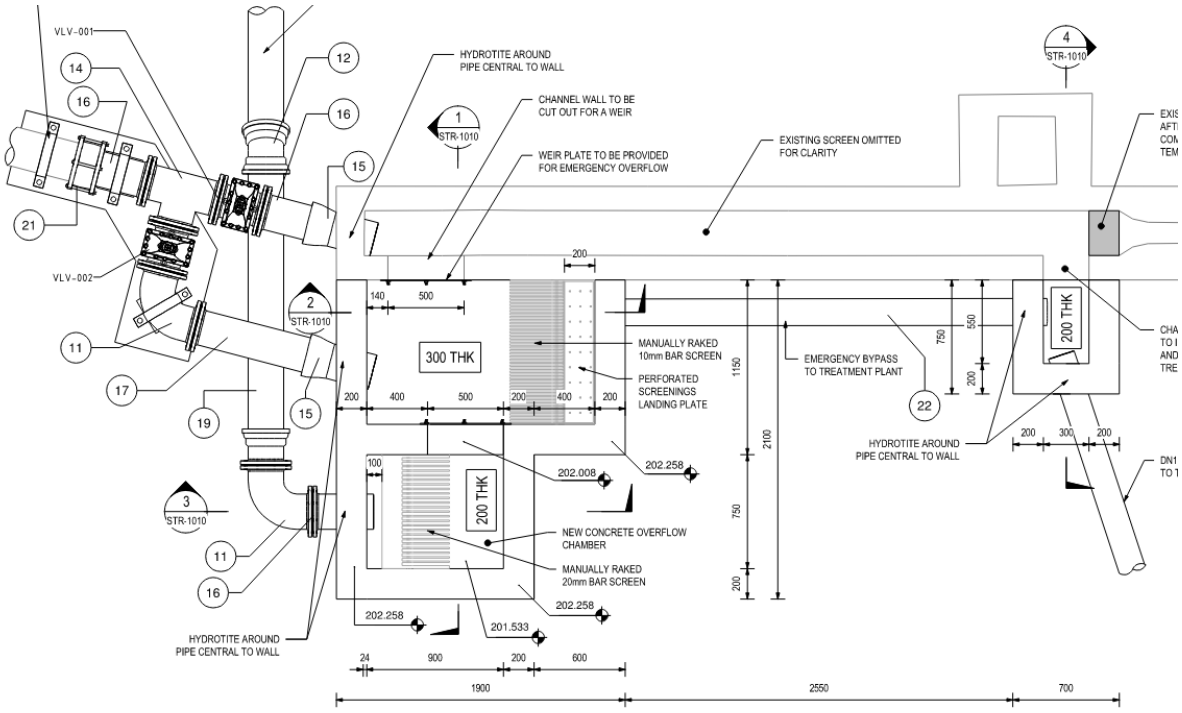

Figure 7 - General Arrangement of Inlet Works Design. Surveyor to pick up everything shown

Figure 8 - Vertical Kink in Channel

Figure 9 – Critical Inlet Works Infrastructure to be Picked Up

Program

The following milestone timeframes are required:

- Date of site survey – Within one week of award
- Submission of survey deliverables – Within one week of the site investigation

Quotation Submission Requirements

Submit a lump sum quotation for survey works as specified, with an optional provisional sum to complete a 3D point cloud laser scan of the finished site once construction has been completed .

As part of your quotation please provide information on the following:

- Qualifications of personnel to be used for the survey and reporting
- Proposed investigation methodology and major equipment to be used for the site investigation
- Any proposed variances to the scope or program, and
- Any other specific requirements not addressed above.