

# Quick Guide to Drainage Detailed Plan Submission



*Lower Seletar Reservoir*

# USEFUL REFERENCES

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Useful drainage design guidelines can be found in the following:

- Drainage
  - Drainage Handbook on Managing Urban Runoff
  - Technical Guide on On-site Stormwater Detention Tank Systems
- Alternate Sources of Water
  - Rainwater Harvesting
- ABC Waters Design Guidelines

Developers/owners are advised to purchase the DIP within 6 months prior to DC Submission so that the latest information is available for planning of the development proposals.

# WHAT DO YOU NEED TO SUBMIT?

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- Your DP submission should show proposed drainage works clearly as follow:
    - Drainage layout plan showing the platform levels, crest levels, internal and external drainage systems, common drain, DR, basement stormwater tank, structural detention and retention features, ABC Waters design features, flood protection measures, and discharge points.
    - Longitudinal section of the drain indicating drain gradient, invert and cope levels (including existing drain connections).
    - Cross sectional details of the drains.
    - Other required details for flood protection measures, basement stormwater tank, structural detention and retention features, ABC Waters design features, pumped drainage systems.
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# FOR DEVELOPMENT WITH PROPOSED ROADSIDE DRAIN/ ENTRANCE CULVERT

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- The submission should include the Professional Engineer (PE)'s endorsement of the following live loads for design of the drain:
  - The entrance culvert is designed to withstand vehicular loading in accordance to Land Transport Authority's latest standards and relevant code of practices.
  - Drains (box drain or open drain) are designed with a nominal live load surcharge of  $10\text{kN/m}^2$ .
  - Drains (adjacent to roads and affected by vehicular loading) are designed with a live load surcharge of  $20\text{kN/m}^2$

# FOR DEVELOPMENT WITH PROPOSED ROADSIDE DRAIN/ ENTRANCE CULVERT

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- Where an entrance culvert/crossing is proposed at a stretch of closed drain, gratings/openings shall be provided at the closed drain sections upstream and downstream of the proposed entrance culvert/crossing.
- The internal width and clear depth of a roadside drain/culvert (including entrance culvert) shall be at least 600mm or same as the size of the existing drain size (whichever is bigger).
- False bottom of well compacted hardcore shall be provided for the reconstructed drain to tie in with upstream and downstream invert levels of existing drains. The depth of the false bottom shall be at least 300mm.



# FOR SERVICES WITHIN AND/OR ACROSS DRAIN/DRAINAGE RESERVE

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Services are required to undercross drain/drainage reserve

- Services shall be laid to undercross the drain throughout the full width of the drain with a 1.0 m minimum clearance below the invert of the existing or proposed drain.
- Where new drains are to be constructed or existing drains are to be reconstructed, all existing services within or across the drains shall be re-laid at the cost of the developer/owner to undercross the new or reconstructed drains



# FOR DEVELOPMENT WITH BASEMENT PUMP DRAINAGE SYSTEM

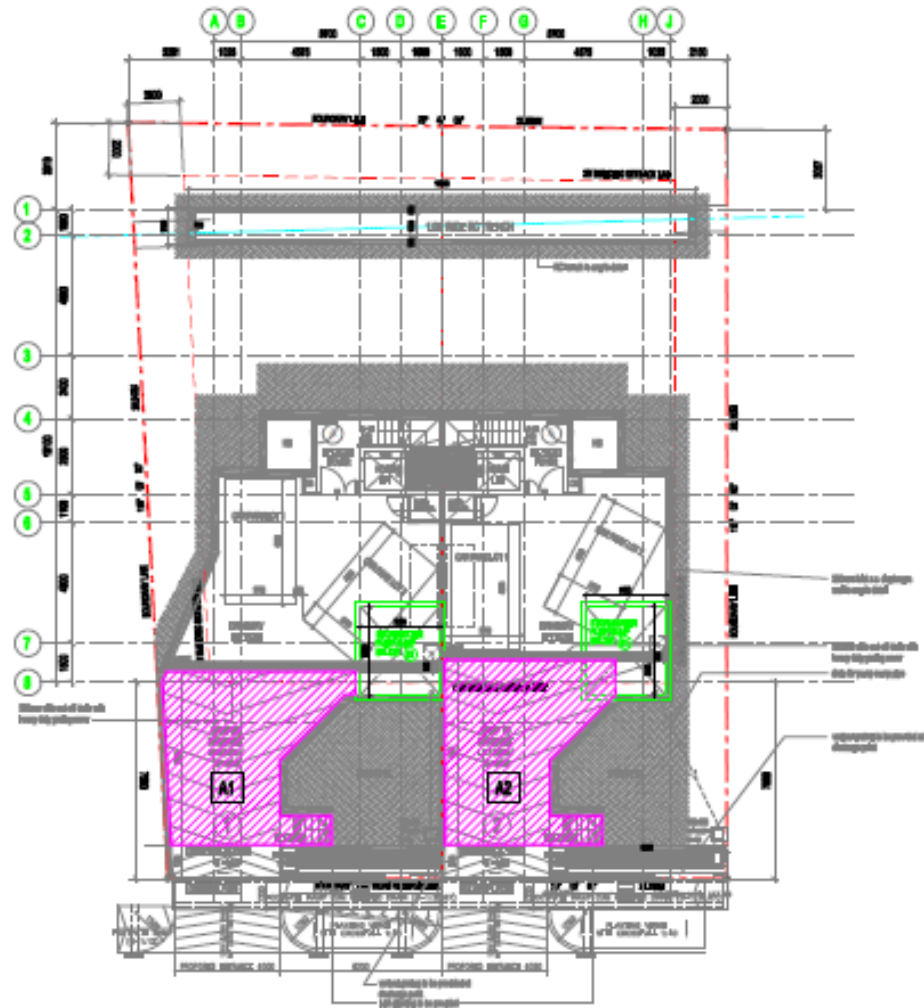
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- The submission should include the relevant PE's endorsement showing clearly the following details:-
  - Catchment plan of the rain water ingress to basement
  - Basement drainage system with summit point and flow direction indicated
  - Location, plan and cross-section plan of the pump sump
  - Pump outlet discharge pipe showing the swan neck connection to the surface internal drain or internal sump before conveyance to the roadside drain.

# FOR DEVELOPMENT WITH BASEMENT PUMP DRAINAGE SYSTEM

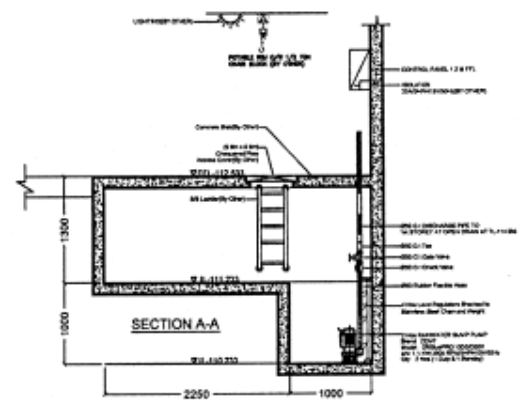
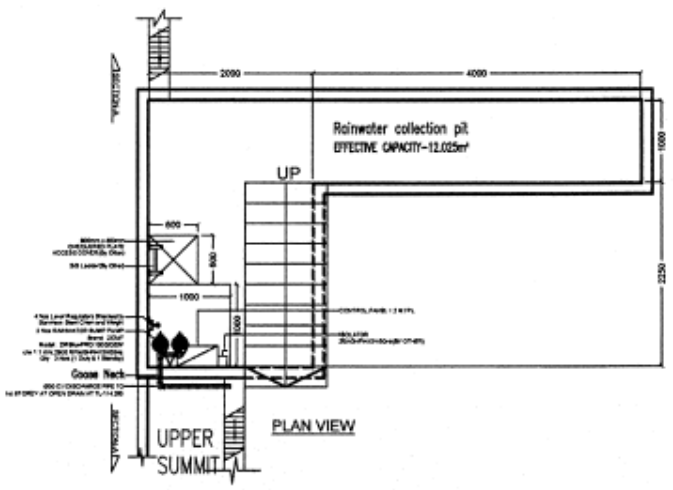
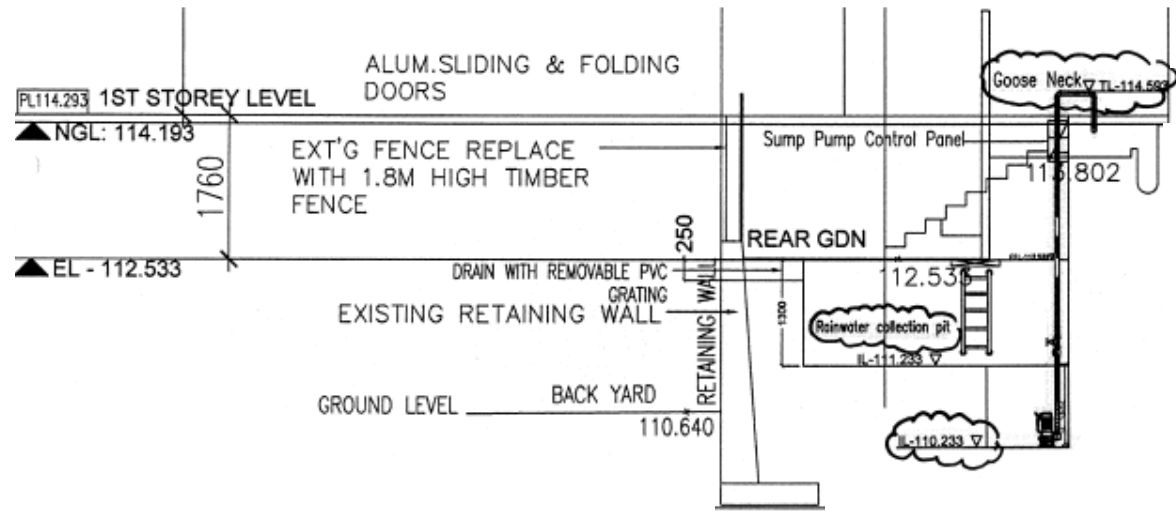
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- Pumped drainage system shall comply with sections 4.9 and 10 of the current Code of Practice on Surface Water Drainage.
- PE (Civil) shall submit design calculations for pump sump with sufficient storage capacity to cater for the total quantum of inflow from the entire source catchment area over duration of at least 3 hours shall be provided.
- PE (Mech) shall submit pump design calculations including the operation sequence, maintenance and monitoring measures of the proposed pumped drainage system at DP stage.
- Basement pump drainage system shall not be discharged directly into the roadside/public drain.
- Swan neck connection to internal drain must comply with the minimum crest level requirement as stated in Clause 2.2.



 **BASEMENT PLAN**  
 1:100

ROOM NO.	ROOM NAME	AREA (sq. ft.)	PERIMETER (sq. ft.)	PERIMETER (sq. ft.)	PERIMETER (sq. ft.)	PERIMETER (sq. ft.)
A1	MECHANICAL ROOM	121	121	121	121	121
A2	MECHANICAL ROOM	121	121	121	121	121

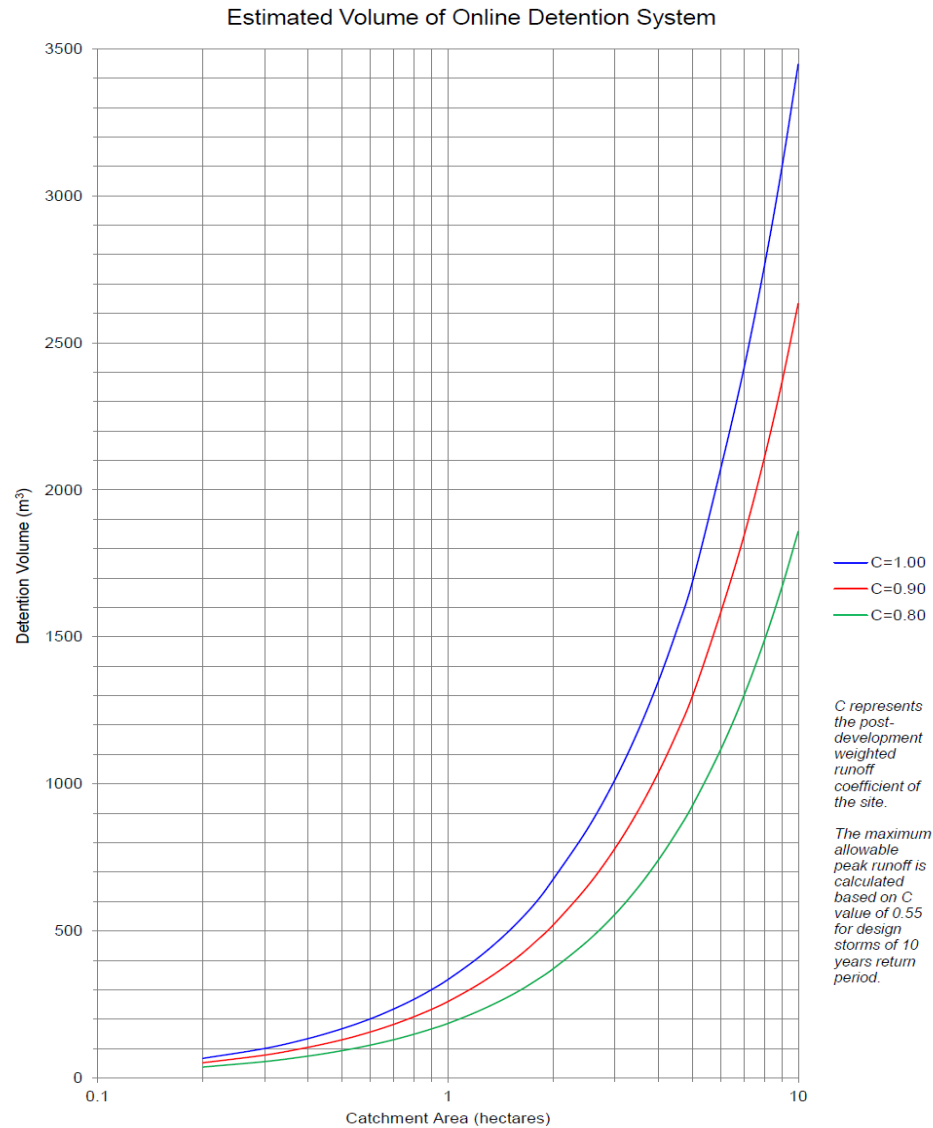


# FOR DEVELOPMENT WITH STORMWATER DETENTION TANK

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- New erection and reconstruction works to commercial, industrial, institutional and residential developments  $\geq 0.2$  ha in site area and Additions & Alterations (A&A) works to existing commercial, industrial, institutional and residential developments where affected site area is  $\geq 0.2$  ha are required to control the peak runoff discharged from the proposed development.
- Design of stormwater detention tank shall comply with section 7.1.5 of the current Code of Practice on Surface Water Drainage.

# FOR DEVELOPMENT WITH STORMWATER DETENTION TANK



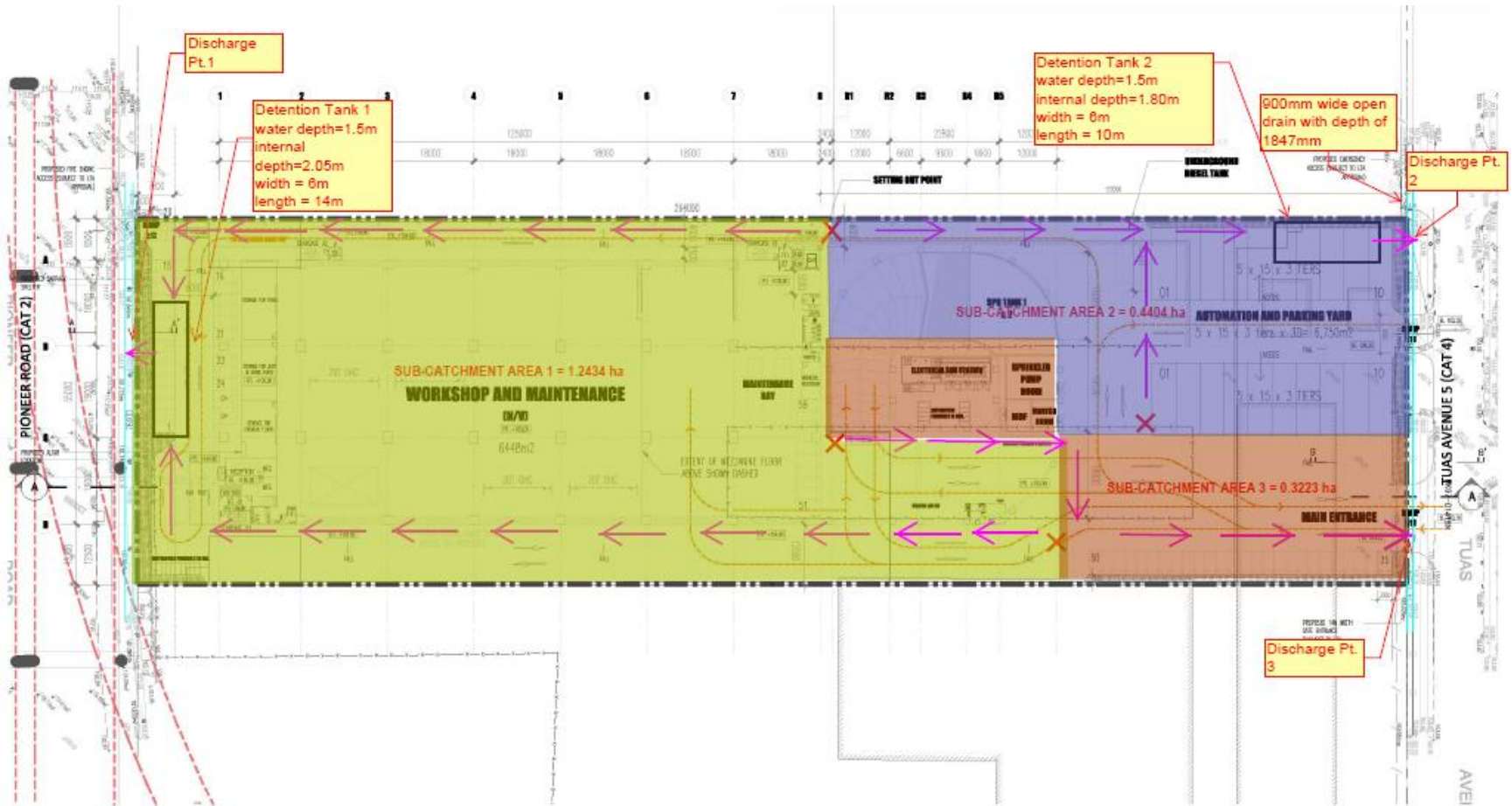
Note: The chart provides an indicative estimate of the volume required for an online detention system only. The Qualified Person shall determine the type of detention system and number of sub-catchments best suited for the site.

# FOR DEVELOPMENT WITH STORMWATER DETENTION TANK

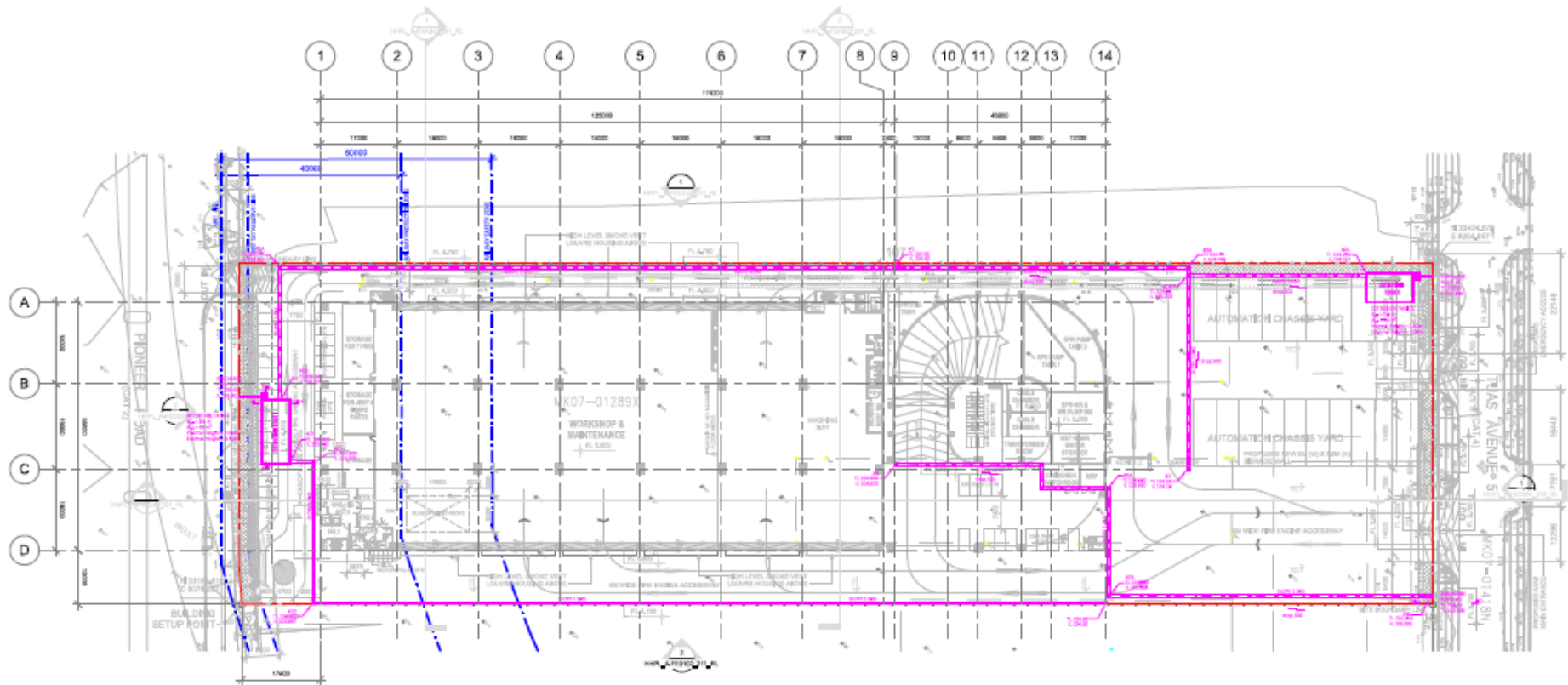
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The PE(Civil)'s submission should show clearly the following:

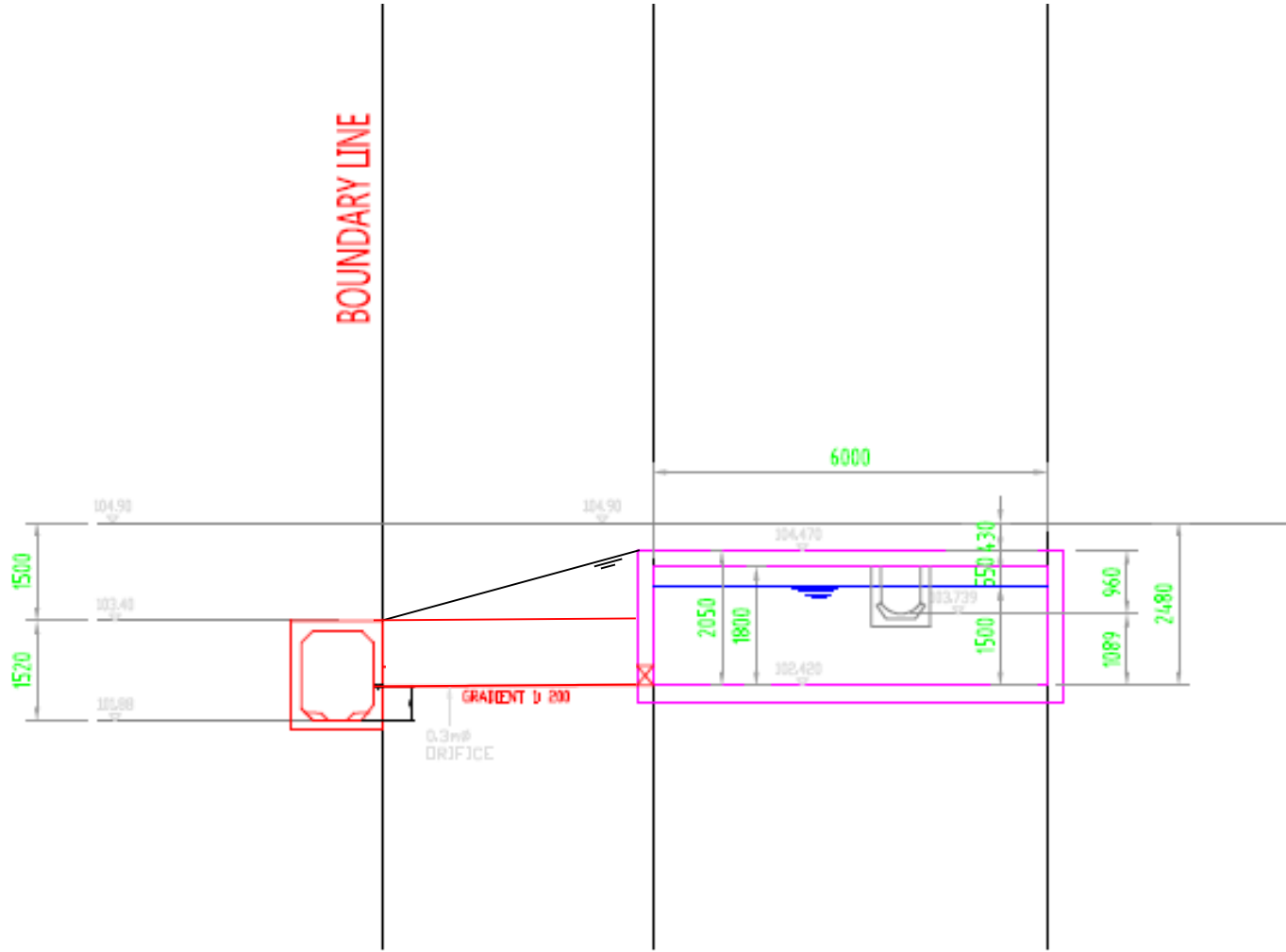
- Catchment and sub-catchment plan for the proposed internal drainage system within the development.
- Internal drainage system flowing to the stormwater detention tank system with summit point and flow direction indicated.
- Layout plan, cross-sectional details, inlet and outlet configuration and levels, connections to upstream drainage network and downstream internal and external of the stormwater detention tank system.
- Detailed design calculations and modelling check computations of the stormwater detention tank system.
- The details of the proposed pumped discharge system or gravity discharge system.
- Operation sequence, maintenance and monitoring measures of the proposed stormwater detention tank system.







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 600mm (WIDE) INTERNAL DRAIN LAYOUT PLAN  
 0m 4.5m 23m 45m  
 SCALE 1:450



# FOR DEVELOPMENT OF SITE AREA EXCEEDING 0.4 HA

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- Hydraulic calculations for the proposed internal drainage system shall be submitted at DP stage.
- The submission shall include catchment/sub-catchment plan of the drainage system.
- The calculations shall be endorsed by a PE (Civil).

# COMMONLY MADE MISTAKES

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- No cover letter and wrong CORENET form
  - Remember to attach a cover letter with the correct CORENET form for your submission
  - Seek approval for waivers and deviations from the COP by highlighting clearly in cover letter and Deviation Form (PUB-DEV-DRA).
- Wrong classification of drainage works
  - Tick the correct drainage works according to classification under “minor” and “other drainage”.
- Incomplete submission
  - Missing endorsements as required by PUB.

# COMMONLY MADE MISTAKES

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- Please remember to attach a cover letter together with your submission
- Endorse the following certifications on plan (as directed in the DC checklist):
  - The planning, design, construction activities and procedures for plan submission shall comply fully with the requirements as stipulated in the latest edition of the Code of Practice on Surface Water Drainage and the Sewerage and Drainage (Surface Water Drainage) Regulations
  - The capacity of internal drains shall be sufficient to intercept and discharge all runoff from the development site.
  - The runoff within, upstream of and adjacent to the development lot can be effectively drained away without causing flooding within the lot or in areas outside the lot.

# Thank You



*Lower Seletar Reservoir*