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Department of Planning, Housing
and Infrastructure

Kempt Field Remediation

Soil and Sediment Control
Plan

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February 2025

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Kempt Field Remediation Soil and Sediment Control Plan

Department of Planning, Housing and Infrastructure

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	Name	Date	Signature
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Approved by:	Eleanor Parry	12/02/2025	

WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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1 Introduction

1.1 Purpose of this document

This Soil and Sediment Control Plan (SSCP) has been prepared on behalf of Property and Development NSW as part of the NSW Department of Planning, Housing and Infrastructure (DPHI) to assist with the project approvals for the remediation of Kempt Field (the project).

This plan has been prepared to meet the standards defined in *Managing Urban Stormwater: Soils and Construction Vol 1, 4th Edition*, Chapter 2 Landcom, 2004 ('The Bluebook')

This plan has been prepared by an experienced Certified Professional in Erosion and Sediment Control (CPESC #6805).

This plan has been prepared based on the proposed works as outlined in the *Remediation Action Plan* (RAP-WSP, 2024) and should be used as a planning guide only. This plan is conceptual only and is to be reviewed upon completion of the detailed design. Specific locations of proposed erosion and sediment control measures are to be defined prior to commencement of works onsite and based on detailed design via a site layout plan and incorporated as an appendix to this document.

1.2 Scope of this document

This plan includes the management measures required for erosion and sediment control for the earthworks phase of the proposed park remediation works.

As defined in chapter two of The Bluebook, this plan includes information on:

- principles of erosion and sediment control
 - project specific requirements
 - geographic and climatic constraints and timing of works
 - topsoil storage and reuse
 - temporary site stabilisation and permanent rehabilitation
 - inspection and maintenance requirements
 - a site layout drawing appendix (to be confirmed during detailed design) including:
 - works footprint and location of proposed erosion and sediment control measures
 - approximate grades and drainage patterns
 - waterways and stormwater discharge points
 - location of vegetation, for removal or retention (including no go zones)
 - location of all soil and other material stockpiles
 - location of site access, compounds and hardstands
 - existing and proposed drainage patterns with stormwater discharge points.
-

1.3 Site constraints

The site is a legacy landfill formed in a former clay and shale quarry pit that has been filled since 1961 and currently functions as a public park. The site is located at 75 Durham Street, Allawah (Lot 1, Deposited Plan 596535).

The total site disturbance area is expected to be approximately 3 hectares. However, due to the proposed staged construction methodology, this total area will be broken into a number of smaller disturbance footprints. This methodology will reduce the risk of sedimentation from the site.

The site is surrounded by urban streets with residential and commercial properties. There is a railway line running along the southern boundary and public roads along the eastern and northern boundary. The remediation works are located within the existing extent of disturbance associated with the former landfill and the park known as Kempt Field.

The site is a largely disturbed landscape, comprising uncontrolled fill used to backfill the former quarry. It is noted in the RAP that the depth of fill on-site reaches about 20 metres below the surface, underlain by shale geology and is not likely as containing potential or actual acid sulfate soils.

The existing site surface comprises a relatively level sporting field on the western half of the site (elevation approximately 57 metres AHD). The northern and eastern portions of the site are raised as high as 64 metres AHD via a grassed embankment and comprise an internal sealed service roadway looping around the field, with a landscaped soft-fall playground in the northern portion of the site.

There are no defined natural drainage lines at the site however ephemeral surface water may be present following periods of heavy or prolonged rainfall, within the central and lower lying parts of the site. Part of the on-site surface water flows are likely captured by the on-site stormwater drainage system and would otherwise follow the local topography, or seep through the capping layer into the underlying landfill material.

There are existing council-maintained stormwater pits and pipes located at the southern end of the site.

Water draining from the site flows into existing stormwater infrastructure and into Kogarah Bay Creek approximately 1.1 km to the south of the site. This ultimately flows into Kogarah Bay (off Botany Bay) located 2.5 km south-east.

Vegetation at the site consists of no native vegetation communities and is a landscaped urban parkland, with large grass covered areas and isolated stands of trees. It is assumed that all vegetation will be removed from the site for the purpose of the remediation works.

The site is not considered flood prone, but council flood mapping indicates potential inundation at probable maximal flood level (Georges River Council).

The existing site layout including contours and drainage is shown in Figure 1.1 overpage.

1.4 The project

The project is to remediate the site to address the landfill gas emissions, as well as asbestos-contaminated soil, to enable Kempt Field to be used as a recreational space for the general public.

The project works involve:

- site mobilisation
- site preparation and infrastructure removal
- tree clearing
- installing a landfill gas ventilation system
- importing and placement of required capping material to seal the surface of the landfill and provide a physical separation layer to contain asbestos contaminated material
- reinstalling of required monitoring wells and completion of site validation works to confirm the remediation works meet the objectives of the project
- construction of a stormwater detention basin and associated stormwater drainage
- landscaping and rehabilitation of the site.

Further detail on the project is provided in the RAP and the design drawings. It should be noted that the detailed remediation design is yet to be finalised, and this plan will be reviewed prior to mobilisation to site.

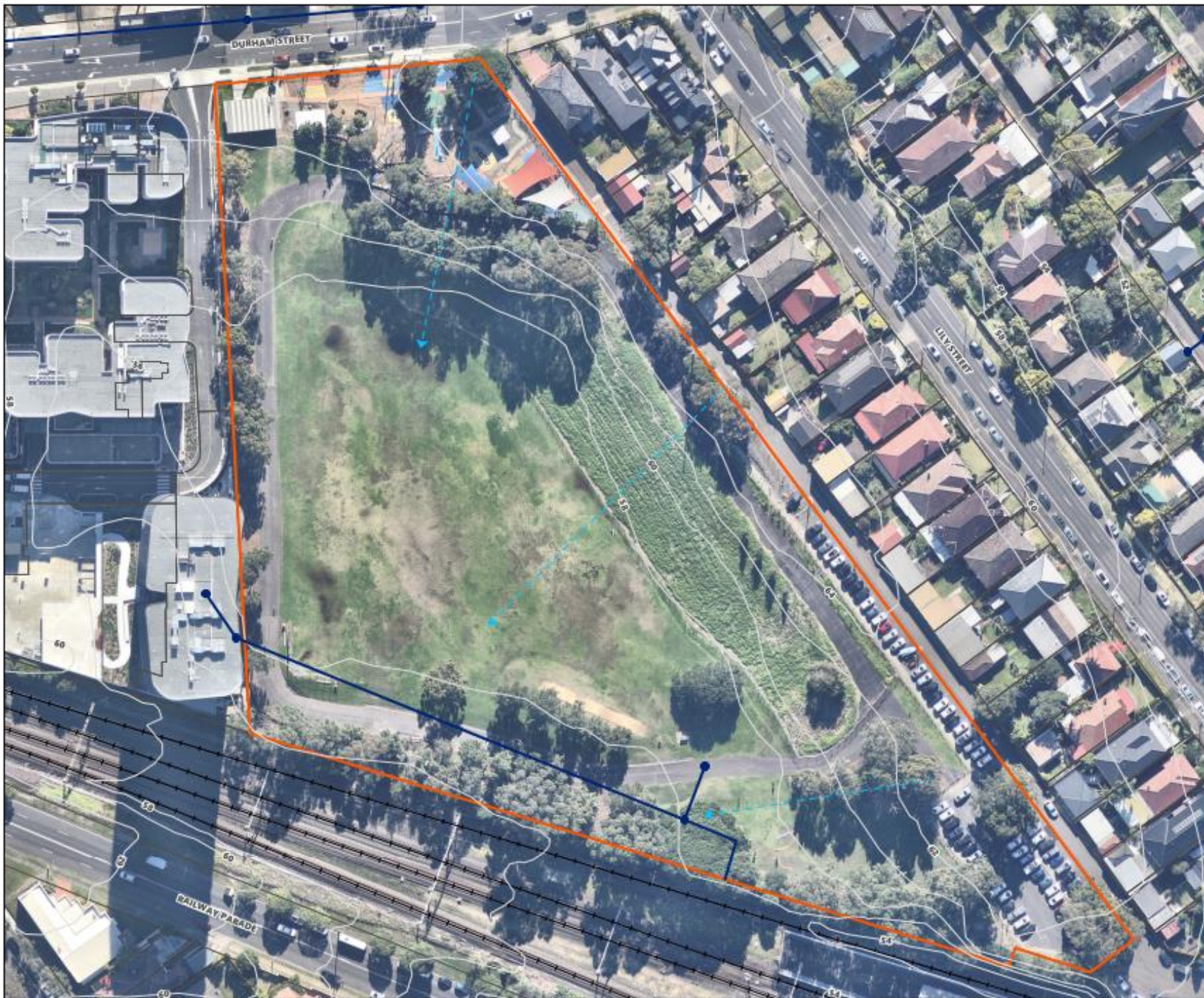


Figure 1.1
Site Layout

Legend

- Cadastre
- Property boundary
- Railway
- Contour
- Approximate overland flow direction
- Council stormwater pipes
- Council stormwater pits



Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A3

1:1,000 Date: 28/06/2024

Data sources: NSW, EPA, Queensland, Australia, November 2024

GDA 2020

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1.5 Site contact details

Principal Contractor	TBC
Site Manager	TBC
Project Manager	TBC
Site Address	TBC

2 Erosion and sediment control planning

2.1 Principles of erosion and sediment control

The following general principles are to be adhered to during works:

- minimise disturbance footprint area and time of exposure through appropriate works planning
 - focus on erosion control as a priority wherever applicable
 - install sediment controls downslope before disturbing ground and for the duration of disturbance
 - monitor and maintain controls to ensure function, especially before and after rain
 - progressive stabilisation of disturbed areas should be undertaken during works
 - review and update the plan as required as site conditions change through the works.
-

2.2 Timing of works

Weather conditions and forecasts are to be regularly monitored (as a minimum daily) during the project, particularly during the filling/capping phase.

Earthworks will be put on hold, and site stabilised in periods of rainfall where runoff cannot be managed effectively at the site. Note that unexpected storms may be experienced in this area.

Effective construction planning will be critical to reducing erosion risk at this site by minimising both area and duration of exposed soil surfaces during works. The following general measures are to be adhered to during works and incorporated in works methodology and staging:

- Retain grass cover and sealed access roads where feasible.
- Install capping material directly over geofabric layer placed on existing grass surface (no stripping).
- Re-establish groundcover via revegetation (Hydromulch) as soon as possible and progressively.
- Dust producing works are to be put on hold during dry and/or windy periods if dust cannot be effectively mitigated and contained within the site boundary.
- Temporary erosion and sediment control measures will be in place prior to commencement of earthworks and remain in place until suitable long term ground cover (grass and other permanent measures) is established.
- Staging will reduce catchment sizes by breaking works into sub catchments during capping works.
- Retain sediment on site with sufficient controls suitable for the expected volume of water from each sub catchment during capping works.
- Establish sediment retention basin (in line with project staging).

2.2.1 Staging of works

The construction contractor is to prepare and implement appropriate measures to mitigate potential soil erosion and sedimentation from the site based on the proposed works staging plans outlined below and found in Appendix B. The below is the expected staging for the works:

- 1 Establish site:
 - a Establish compound and stable site access point at north of site.
 - b Install sediment control measures on all site boundaries, around temporary stockpile areas and construct sediment retention basin (in line with project staging).
 - c Retain all existing hardstand access roads for use in construction where feasible.

d Retain all existing stable grassed surfaces during construction where feasible.

- 1 Demolish existing park structures to ground level.
- 2 Remove trees, cut to ground – retain root balls in-situ – avoid disturbing root zones.
- 3 Mulch removed trees and stockpile mulch at northern compound for reuse.
- 4 Install the gas ventilation system – retain all existing surrounding grassed areas during this stage. Install temporary sediment controls downslope of each vent disturbance area. Total disturbance area for ventilation system is minor and isolated (estimated at maximum 5% of site area).
- 5 Install geofabric marker layer directly over existing grassed surface prior to capping.
- 6 Install capping material in compacted layers over existing geofabric. Install topsoil and undertake progressive stabilisation for this capping material to reestablish grass cover ASAP and progressively. Install temporary erosion and sediment controls as per staging plans (Further detail in Appendix B):
 - a Capping Stage 1 – 0.45Ha
 - b Capping Stage 2 – 0.17Ha
 - c Capping Stage 3 – 1.3Ha
 - d Capping Stage 4 – 0.4Ha.

1 Make good and disestablishment of site.

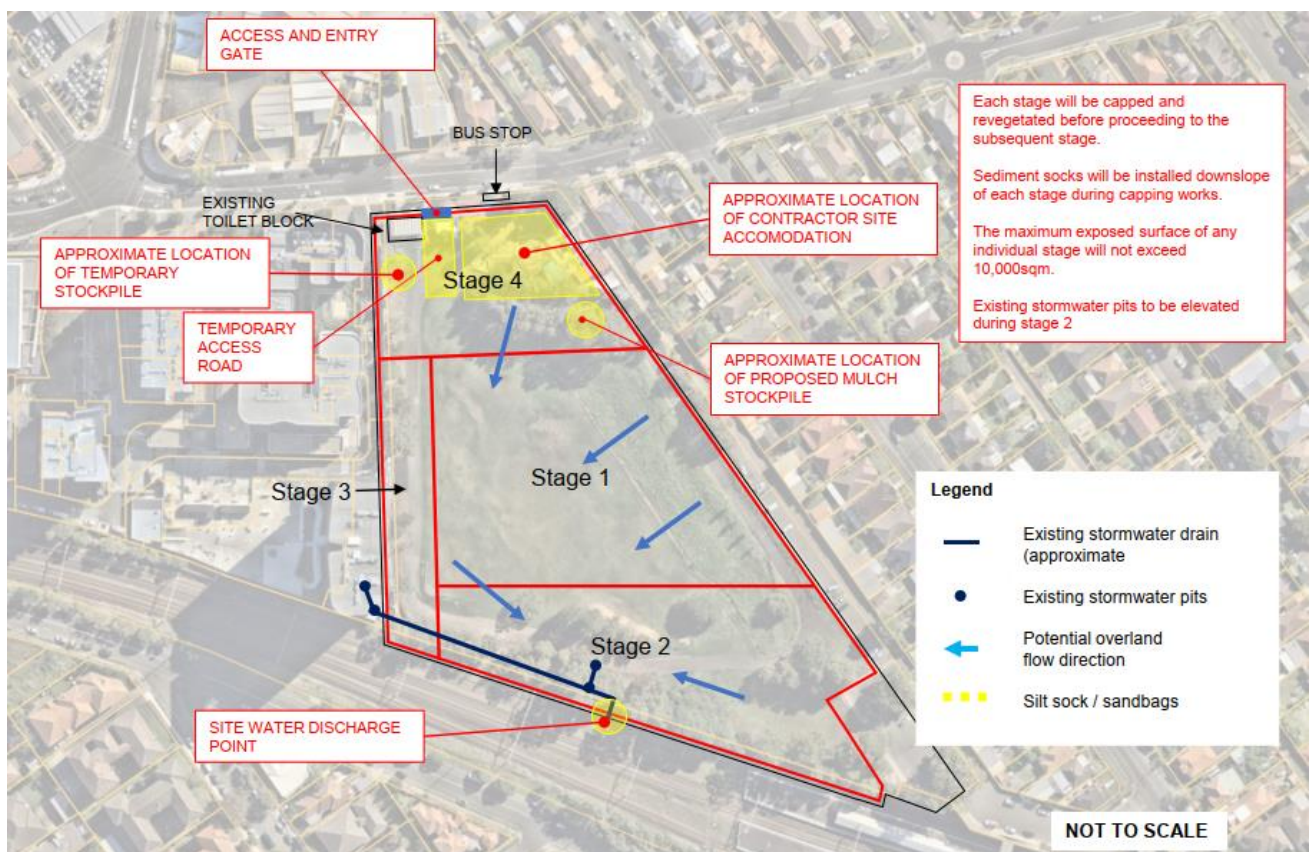


Figure 2.1 Proposed staging plan

2.3 Erosion and sediment control

The primary erosion mitigation measure for this project will be taking a staged approach (as outlined in section 2.2 above and detailed in Appendix B) to minimise both the area and duration of exposed soil surfaces. This approach will reduce the erodible soil footprint at any one time and allow the project to avoid the construction of a sediment basin by reducing potential sources of sediment and catchment sizes.

The weather forecast will need to be carefully monitored during the capping stage to adequately plan for rain events. Works should be suspended during excessive wet weather. Any site shutdowns and/or prior to forecast rain events during the capping phase will require temporary erosion protection (such as application of spray on soil binders) to mitigate erosion risk during capping during works.

Sediment and drainage control may be managed through the construction of a sediment retention basin in the southern portion of the site. This basin would be designed to mitigate sedimentation offsite.

Guidance on suitable controls and installation techniques can be found in Appendix E Standard Drawings and in the Bluebook.

2.4 Sediment basin requirements

If the above staged approach to minimise disturbance is not feasible, and the scope then requires full disturbance of the 3-hectare area, then Bluebook section 6.3.2 states that a sediment basin is then a requirement for this site. An estimated potential soil loss of 113 tonnes / hectare / year is estimated for this total 3 hectare area. Basin calculations have been provided (if required) in Appendix D. A basin may be establish at the southern end of the site in line with project staging.

2.5 Discharge criteria

Any water discharged from site is to have no negative effect on receiving water quality. Discharge is only permitted for water within the criteria identified in Table 2.1, and be free from other site contamination or pollutants.

Table 2.1 Site discharge criteria

Criteria	Measurement
Turbidity	<=50 NTU
pH	6.5-8.5
Contamination (other chemical)	Within ANZECC guidelines

Any site water likely to be contaminated must be analysed for any likely contaminants of concern identified as part of the Remediation Action Plan (RAP) prior to discharge or disposal of water offsite:

- all site water is to only be discharged via existing stormwater or open drainage lines
- site water disposal to sewer is not permitted without written approval from asset owner
- any suspected or confirmed contaminated site water will require appropriate treatment or disposal offsite
- ensure that regular testing of discharge water is monitored for water quality and records are retained.

2.6 Erosion control

The most effective erosion control is to avoid disturbance of stable soil surfaces. Existing ground cover and site vegetation is to be retained, where feasible, to minimise the risk of erosion. This can be achieved through:

- planning works to avoid grass disturbance and not disturbing until necessary
- delineation of no-go areas on site to avoid disturbance unless necessary
- progressive stabilisation of disturbed areas during works to reestablish grass surfaces as soon as possible
- temporary erosion control measures to be implemented on bare soil areas during works
- installation of permanent erosion control measures progressively, as soon as possible and at completion.

2.7 Sediment control

Sediment controls are temporary measures to be installed prior to ground disturbance and maintained for the duration of works until site is stabilised with effective revegetation:

- All sediment controls are to be monitored and maintained regularly to ensure function during construction.
- Controls may only be removed once site stabilisation and make good is complete.
- No spoil is to be stockpiled without appropriate sediment control in place.
- All stormwater pits within the site footprint are to have temporary inlet protection installed prior to ground disturbance (refer to Appendix E and the Bluebook for guidance).
- Ensure that controls are monitored and cleaned out after rainfall as required to ensure function.
- Removed sediment can be reincorporated as fill on the site.

During capping stage, it is recommended to break up the area into smaller manageable catchments (such as via installation of diversion bunds and small sediment sump traps, in conjunction with temporary erosion control measures (surface protection) to reduce sediment loss and management requirements for the sediment retention basin.

As a minimum the following sediment control measures are to be implemented at this site and maintained for the duration of disturbance:

- High grade sediment fencing to be erected around the entire boundary of the works disturbance area where there is a risk of sedimentation offsite (installation as per figure SD6-8 in the Bluebook – refer to Appendix E for guidance). Ensure adequate trenching into ground, spacing of support posts and regular upslope returns to avoid fence failure in rain events.
- Stormwater inlets are to be protected with effective sediment controls with inlet controls as per figure SD-6-12.
- Break up catchments during capping works and install controls as per staging plans in Appendix B.

2.8 Site access

During the works controls will be placed on the operation and movement of equipment to reduce risk of sediment tracking offsite. General procedures that will be implemented include:

- excavation equipment to be cleaned of soil and contamination prior to leaving the site
- effective truck wheel-washing facilities will be provided at the site egress to minimise risk of tracking onto the nearby streets
- construction vehicles are to enter and exit the site only via a stable access point at the north boundary of the site off Durham Street
- no trucks or equipment carrying contaminated soils should be allowed to move across unsealed ground surfaces with the exception of designated transport corridors

- all vehicle loads transporting soil or potentially contaminated materials are to be covered, to minimise dust generation / material falling from the vehicle
 - the stabilised access point is to be maintained for the duration of the works in a condition that will prevent tracking of sediment onto roads
 - if sediment does track onto the road for any reason, remove it immediately via broom (do not use hose to wash sediment into gutter or drain)
 - check the stabilised access at the end of each day and before and after a rain event to ensure function.
-

2.9 Stockpile management

Surplus soil requiring off-site disposal will be classified in accordance with NSW EPA, Waste Classification Guidelines (2014) prior to being taken off site and transported to an appropriately licenced landfill facility.

Site excavated material may require temporary stockpiling prior to removal (contaminated) or reuse as backfill (clean fill). The following will be implemented for stockpiles:

- stockpiles are not to be located in drainage lines
 - if stockpiles and batters will remain bare for more than 14 days, they are required to be stabilised or covered
 - stockpiles are to have an upslope diversion and downslope sediment control in place for duration as per standard drawing 4-5 in the Bluebook
 - separate differently classified materials from each other and from the surrounding soils to avoid cross contamination
 - all stockpiles of soil or other materials likely to generate dust shall be covered
 - daily inspections will be undertaken to ensure that stockpiles are contained within control measures.
-

2.10 Compound area

Stable site parking and amenities are to be established at the northern section of the site.

2.11 Dust mitigation

Dust emissions shall be confined within the site boundary. The following dust control procedures may be employed to mitigate generation of dust during works:

- retain existing vegetation where possible
- no go areas to be defined to minimise disturbance on site
- plan works and stripping areas progressively and only when and where it is necessary for excavation works to occur
- install long term stabilised surfaces progressively and as soon as practicable
- use light water spray for load tipping, excavation or to wet down trafficable surfaces if dust generation is occurring. Water from sediment retention basin may be reused on site for dust suppression if applicable
- completed fill surfaces are to be compacted and trim
- minimise temporary soil stockpiling and cover as required where dust is generated
- vehicle movements are to be minimised and restricted to defined haulage routes
- reduce drop heights of material where applicable
- enforce speed limits to minimise wheel-generated dust
- all loads will be covered when transporting granular material offsite
- completed works areas are to be stabilised and revegetated progressively and upon completion completed to mitigate the generation of dust.

2.12 Site drainage

Structures required to convey concentrated flows of water through the site are required to:

- divert ‘clean’ upslope water away from disturbed areas and reduce erosion risk and
- convey ‘dirty’ site generated water and sediment to sediment controls

The existing site drainage consists largely of uncontrolled overland flow. There is a council maintained existing stormwater inlet at the south of the site adjacent to the existing internal road.

All dirty water generated on site are to be conveyed through appropriate sediment controls.

2.12.1 Drains

Any drains installed on bare soil within the site for the duration of works are to have erosion protection measures to ensure that concentrated flows do not erode drains.

For installation guidance, refer to Bluebook standard drawings 5-22 for check dams and 5-28 for geofabric lining.

2.13 Vegetation management

All existing grass, trees, shrubs and other vegetation located site are proposed to be removed as part of the rehabilitation works.

Trees will be cut to ground and root system will be left in situ to minimise disturbance of site soils.

All removed vegetation is to be mulched onsite and either removed for recycling offsite or reused in site erosion and sediment control and for stabilisation, as required.

For reuse on site in erosion and sediment control, mulch should be coarse, tub ground and free from sediment or other contamination.

2.13.1 Finished surface revegetation

Revegetation of the completed landfill cap will be required to stabilise the completed cap.

Revegetation species should consist of selection which allows for rapid establishment and long-term ground coverage, and achieve the following:

- minimal maintenance requirements
- long term stability of the capping system by supporting topsoils and reducing risk of erosion of the cap
- reduce the quantity of surface water requiring management at the site through absorption and subsequent evapotranspiration by vegetation
- improve the visual amenity of the rehabilitated site and meet long term plans for the site.

Revegetation of the site will be undertaken progressively and as soon as is feasible during works to reduce erosion risk.

Bare soil areas are to have grass re-established via hydro mulching and turf as required.

- compacted construction surfaces are to be scarified prior to hydro mulching to improve establishment
- revegetation may be dependent on climate conditions and seasonality, as well as water availability
- a specialised contractor is to undertake hydro mulching and incorporate appropriate soil amelioration based on soil testing, a sterile (annual) cover crop and long term (perennial) suitable species mix as recommended based on local experience
- sediment control measures are to remain in place until the site revegetation is fully established
- fully established means at least 70 per cent of the disturbed ground within the site is covered by permanent species vegetation (i.e. not just cover crop)

- temporary sediment controls and permanent pollution controls must be maintained until the site or each stage for which they were designed to manage pollution from is stabilised.
-

2.14 Maintenance of controls

All controls are to be inspected daily and maintained to ensure function as per intended use:

- monitor weather forecast regularly for likely rainfall or wind impacts
 - inspect all sediment control measures regularly – particularly before and after rainfall
 - make repairs as needed to ensure function of control measure
 - remove collected sediment from traps and kerb and gutter after rainfall events
 - dispose of trapped sediment spoil as per RAP requirements offsite, or as excavation backfill if suitable
 - maintain records of checks and maintenance of controls as per the table in Appendix A.
-

2.15 Plan review

This plan is to be reviewed regularly during works and updated as required to reflect changes in site conditions or scope as the project progresses.

Site controls as per the site ESCP in Appendix B are to be reviewed for functionality and changed or upgraded as required as site works progress and if current controls inadequate to mitigate sedimentation from the site.

3 References

Soils and Construction, Managing Urban Stormwater Volume 1 4th Ed 2004 (Landcom NSW).

IECA Best practice Erosion and Sediment Control (International Erosion Control Association (Australasia)).

Remediation Action Plan, Kempt Field Hurstville, NSW PS208375-WSP-CLW-REP-RAP, WSP 2024.

Waste Classification Guidelines, NSW Environmental Protection Agency (EPA) 2014.

4 Limitations

4.1 Qualifications and assumptions

The services undertaken by WSP in preparing this document were limited to those specifically detailed in the document and are subject to the scope, qualifications, assumptions and limitations set out in the document or otherwise communicated to the Client.

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Appendix A

Example daily site environmental control
checklist

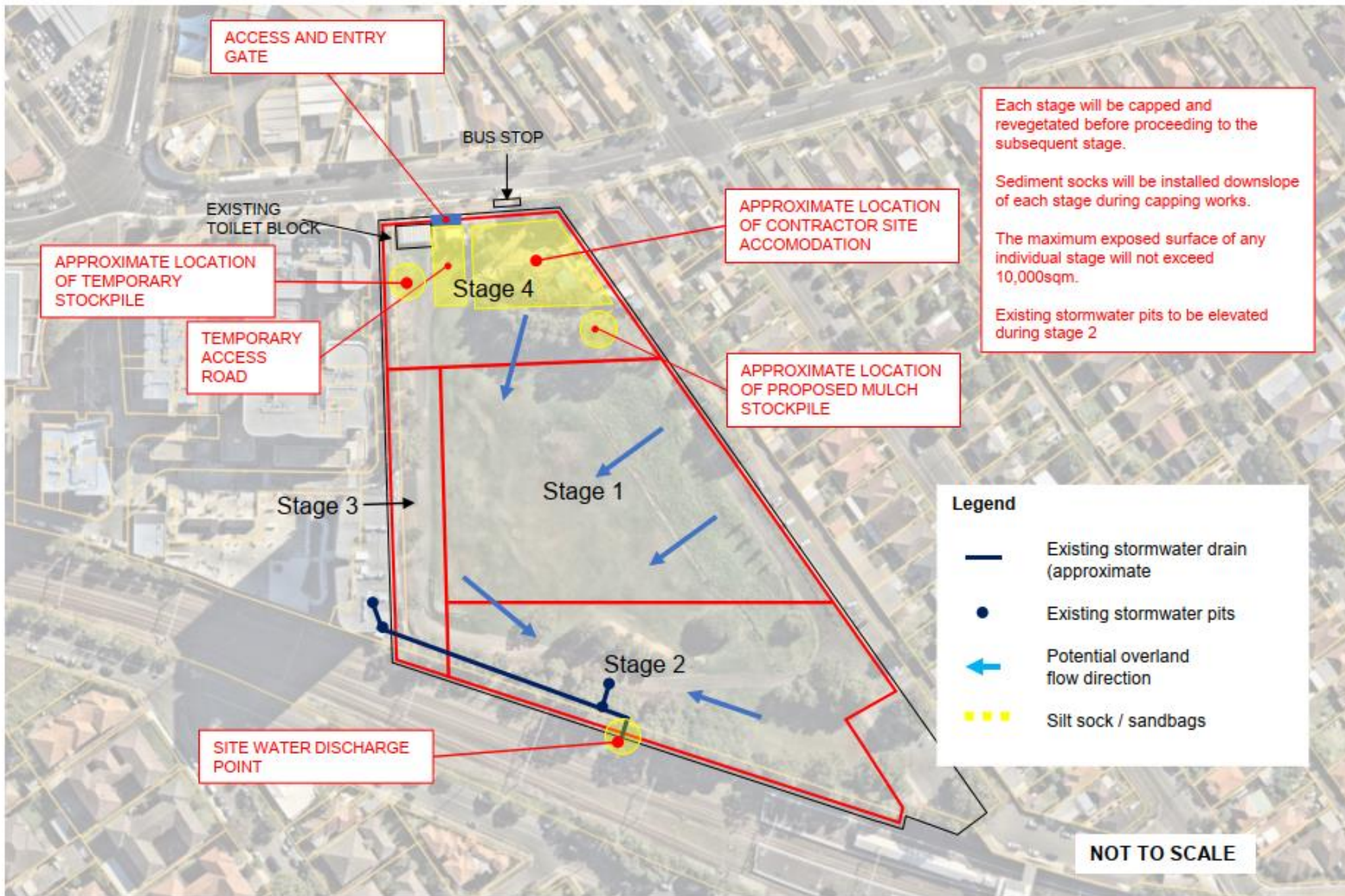


Site: Date: Checked by:	Weather conditions:		Forecast weather conditions:
Environmental control (e.g.)	Location	Functional?	Repair undertaken?
Site access			
Road (outside site) clean?			
Drains			
Check dams			
Internal access routes			
Sediment controls			
Erosion controls			
Temporary erosion controls			
No go areas			
Sediment basin inlet			
Sediment basin outlet			
Basin capacity			

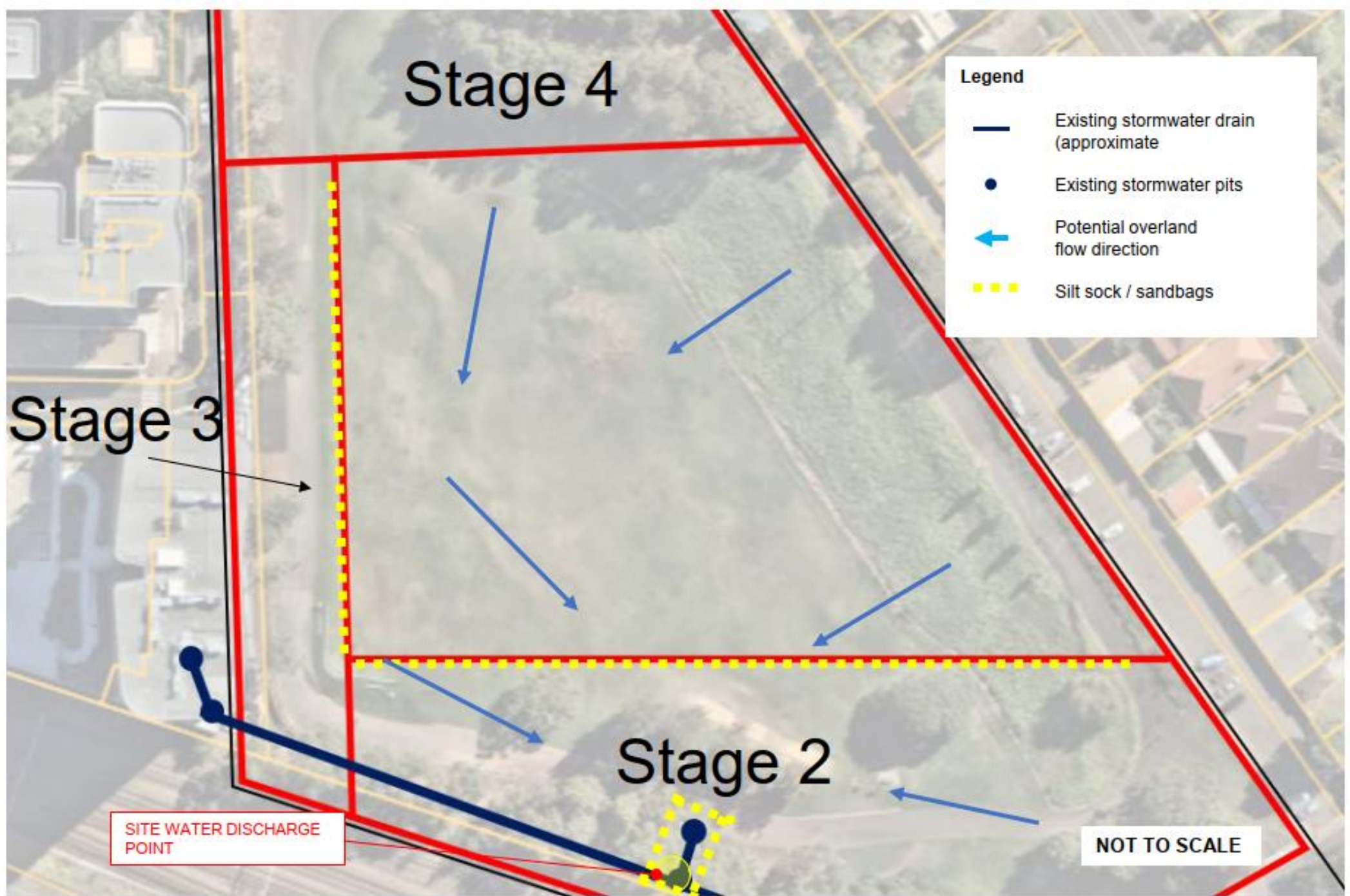
Appendix B

Proposed staging plans



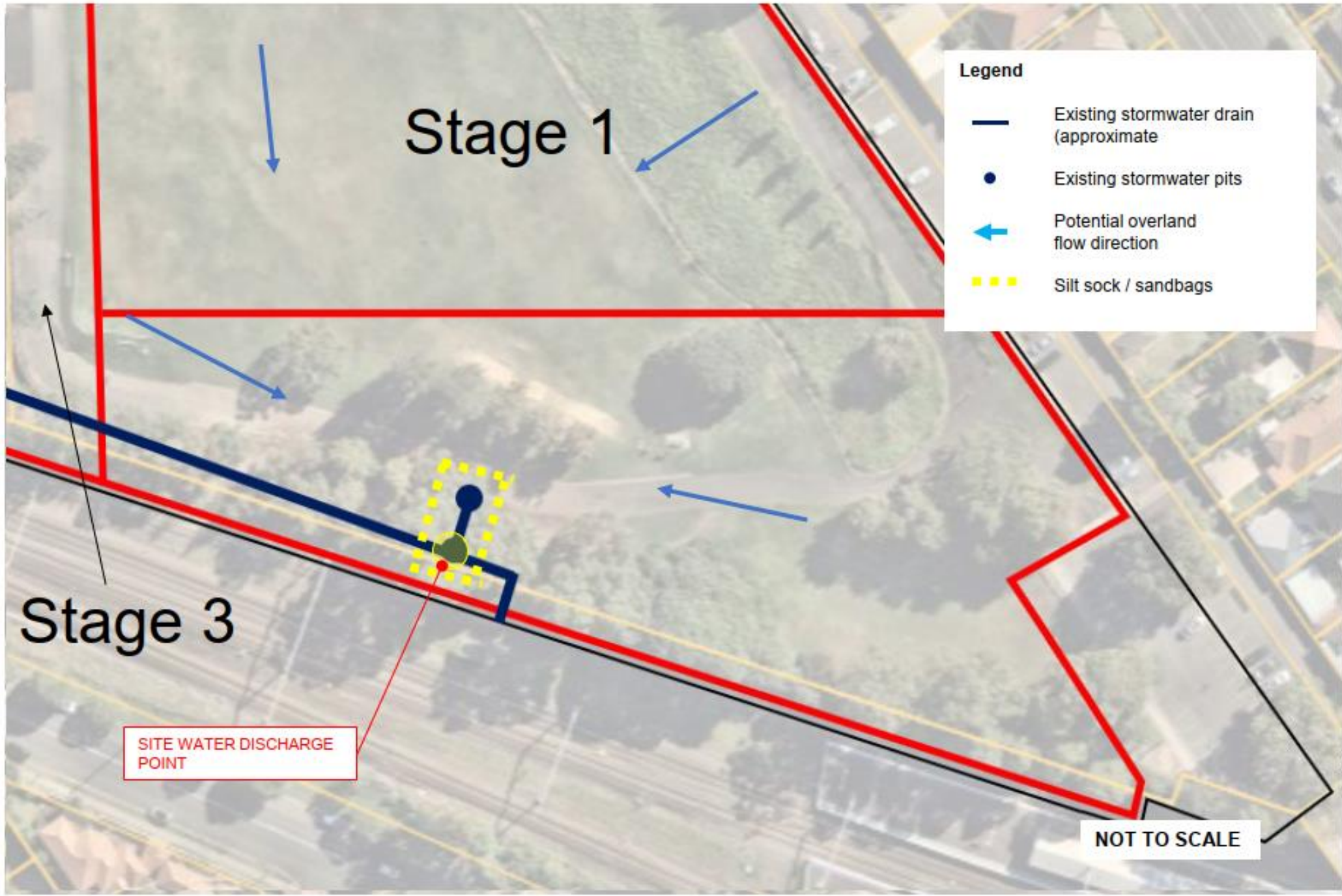


Kempt Field, Hurstville

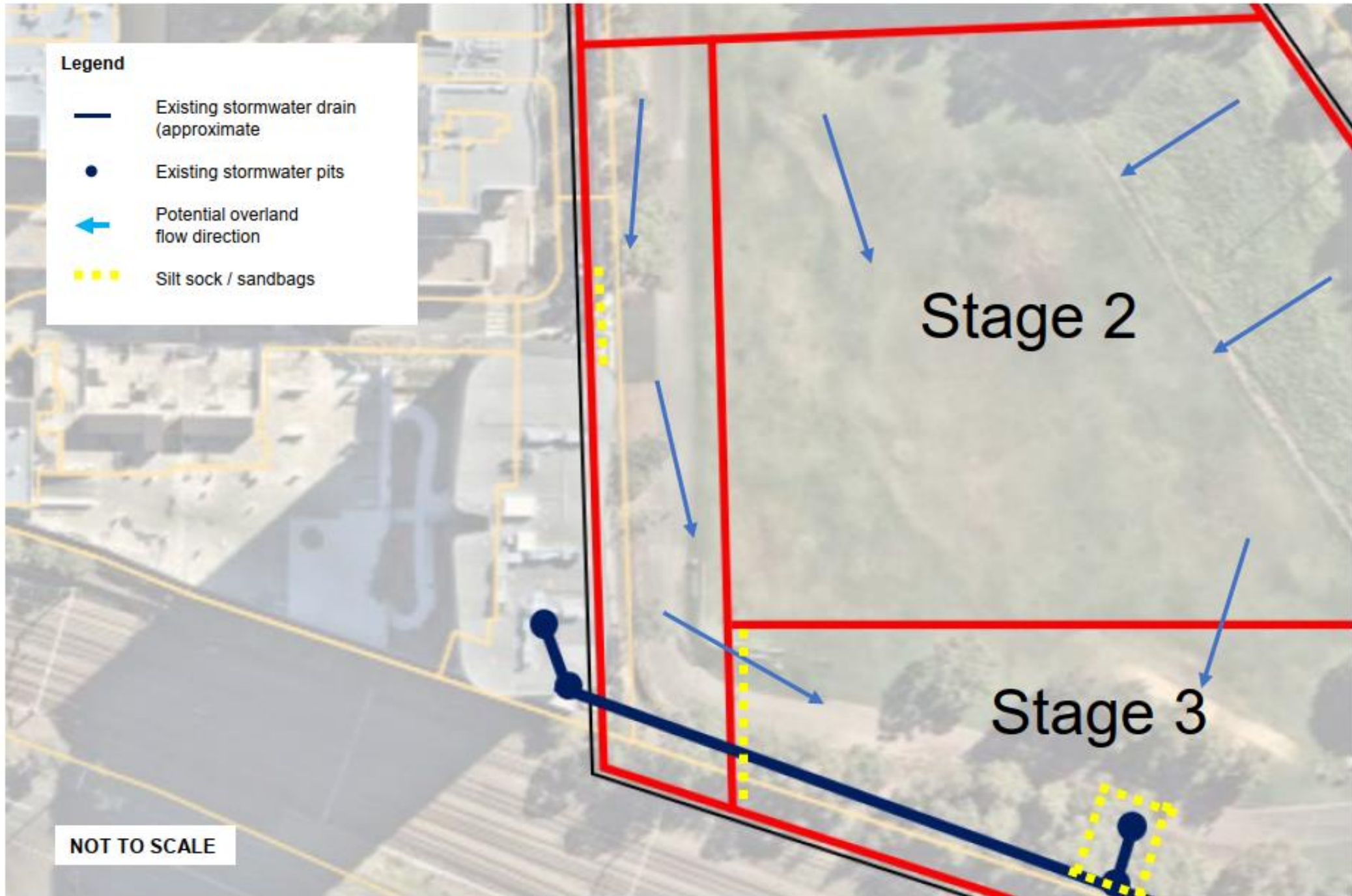


Kempt Field, Hurstville

Erosion and Sediment Control Layout – Stage 1



Kempt Field, Hurstville



Kempt Field, Hurstville

Erosion and Sediment Control Layout – Stage 3



Kempt Field, Hurstville

Erosion and Sediment Control Layout – Stage 4

Appendix C

Example water quality testing and discharge record



Appendix D

Estimated basin volume



D1 Erosion risk

Erosion risk is a quantitative assessment of the potential risk for erosion from a site for the purposes of planning erosion and sediment control. This is based on a number of factors including rainfall, slope, soil types and site management conditions. The erosion risk has been determined for this site based on the Revised Universal Soil Loss equation (RUSLE) in Appendix A1 of the Bluebook.

Erosion risk (A) = R K L S P C

Assumed factors:

- R Rainfall erosivity = 3500 (Sydney R factor map)
- K Soil erodibility = 0.025 (Assume fine soils, poor fertility, poor structure, porous – Gynea)
- LS Slope length/gradient = 1.00 (5m elevation/200m length=2.5%)
- P Erosion control practice = 1 (worst case construction phase)
- C Groundcover management = 1.3 (worst case construction phase).
- Site disturbance area = 3 hectares

Note this assumes that full disturbance of the 3 hectare site would occur including stripping, reshaping and installation of cap. The existing site has good groundcover and is considered stable until disturbed.

Based on an estimated soil loss of 113.75 tonnes per hectare per year, there is a generally low erosion risk from this site. This is mainly due to the low overall gradient and lack of concentrated flow paths and expected porosity of landfill area. It should be noted that there are areas with steeper slopes that may require additional management during works.

Due to the potential for a large area of soil disturbance at some stages of construction (up to 3 hectares), careful management of erosion and sediment control will be required for this project.

The erosion risk will be greatly reduced by taking a cautious approach to works planning to:

- planning around climate and weather for periods of reduced rainfall
- reduce duration of soil surface exposure and area exposed at any one time.

Stage works and break up catchments and area of disturbance

Based on the Bluebook, the below calculations have been made for the required basin volume.

The capacity of a sediment retention basin is the sum of two components:

- 1 A settling zone, within which water is stored allowing the settlement of suspended sediment. The settling zone is designed to capture most sediment in a nominated design rainfall event and, in turn, a specific discharge water quality.
- 2 A sediment storage zone, where deposited sediment is stored until the basin is cleaned out – or for the life of the project where land disturbance is of a short duration (<two months).

Note: This volume is the required size for the site area based on 3ha disturbance footprint. This volume can be reduced by reducing catchment sizes for site generated water and maintaining a focus on erosion control throughout construction to avoid sediment movement into basin.

The location of the basin is most likely to be suitable at the southern end of the site, based on existing contours. The exact location should be determined based on detailed design and with consideration of constructability.

During construction, maintaining groundcover and a focus on erosion protection of soil surfaces will aid in reducing potential issues with sediment basin management.

D2 Basin volume

The below factors have been assumed to calculate volume requirements for sediment retention basin at the site. Refer to the Bluebook section 6.3.3 for further guidance.

Assumed factors

Soil type	= Type F (fine grained, non-dispersive)
Soil Hydrologic group	= Group C (moderate to high runoff potential)
Volumetric runoff coefficient (Cv)	= 0.5 (general construction)
R _{75%, 5day} depth (Bluebook table 6.3a)	= 23.4

Settling zone calculations

$$\begin{aligned}\text{Settling zone Volume (m}^3\text{)} &= 10 * C_v * A * R_{(y\%ile, 5\text{ day})} \\ &= 10 * 0.5 * 3 * 23.4 = 351\text{m}^3\end{aligned}$$

10 is a conversion factor, C_v = Runoff Coefficient, A = Catchment area for basin in hectares, R = 5 day total rainfall depth in mm for a certain design rainfall percentile

Notes

- A runoff coefficient (CV) of 0.5 is recommended for general use on construction sites in NSW.
- The 75th%ile/5 days is a general standard assumed for design of basin. This assumes that 5 days may be needed after rain to flocculate and dewater the basin. The 75th percentile is often assumed for basin design unless tighter control is required such as a sensitive receiving environment downstream.
- Rainfall design depths have been taken from the Bluebook. If further design is required, IFD data should be sourced.

Storage zone

$$\text{Storage zone (m}^3\text{)} = 0.5 * 351 = 175.5\text{m}^3$$

Basin total volume

$$\begin{aligned}&= 175.5 + 351 \\ &= 526\text{ m}^3\end{aligned}$$

As per table 6.1 in the Bluebook, the storage zone can be calculated as either based on the following equation to calculate 2 months soil loss from the site or taken as 50% of the calculated settling zone. Usually, the larger of the 2 should be adopted for design. A conservative approach assumes 50% of settling one as per table 6.1 Bluebook, however, a reduced volume of 395m³ may be adopted.

These dimensions are a guide for planning only and should be reviewed based on detailed design.

D3 Basin construction

As per the Bluebook section 6.1, sediment retention basins should be built with:

- a length to width ratio of 3L:1W or greater, or use internal baffles
- a stable inlet to contain site water for design rainfall event
- a stable emergency spillway for emergency overflows
- internal batter gradients that are consistent with safety requirements and generally limited to 2.5(H):1(V) on earth structures
- dam walls to be built top engineering requirements.

Choice of construction materials generally depends on constraints imposed by the project design criteria and site conditions and maintenance constraints.

D4 Sediment basin management in construction

Basins are to be monitored during construction and managed to minimise the risk of spillways overtopping with dirty site water discharge during rain events.

- A full basin is less effective at retaining sediment than a properly managed basin with regular testing and dewatering.
- Retained water may require treatment to meet discharge criteria (refer to section 2.4.3) and is to be free from other contamination.
- If contamination of retained water is identified, then water should be disposed of offsite via sucker truck or other measures as per the RAP.
- Flocculation to separate out sediment as required is to be achieved via dosing with gypsum (Calcium sulfate dihydrate $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) to maintain pH of water.
- Basin inlet channels can be lined with gypsum for pre-dosing to aid flocculation and reduce sediment settling times.
- Ensure that dewatering is undertaken via a floating pump inlet, so only to remove the ‘clean’ water from the surface of the basin without removing any of the sediment that has settled to the bottom of the basin.
- Discharge of water from pump outlet is not to cause erosion of receiving environment.
- Retained sediment may be removed if dam is dewatered to maintain capacity. Removed sediment may be spread for drying and reused as fill onsite – if validated for reuse.
- If sediment is contaminated it may require removal and disposal offsite as per the RAP. This is to be determined onsite by contaminated lands specialist.

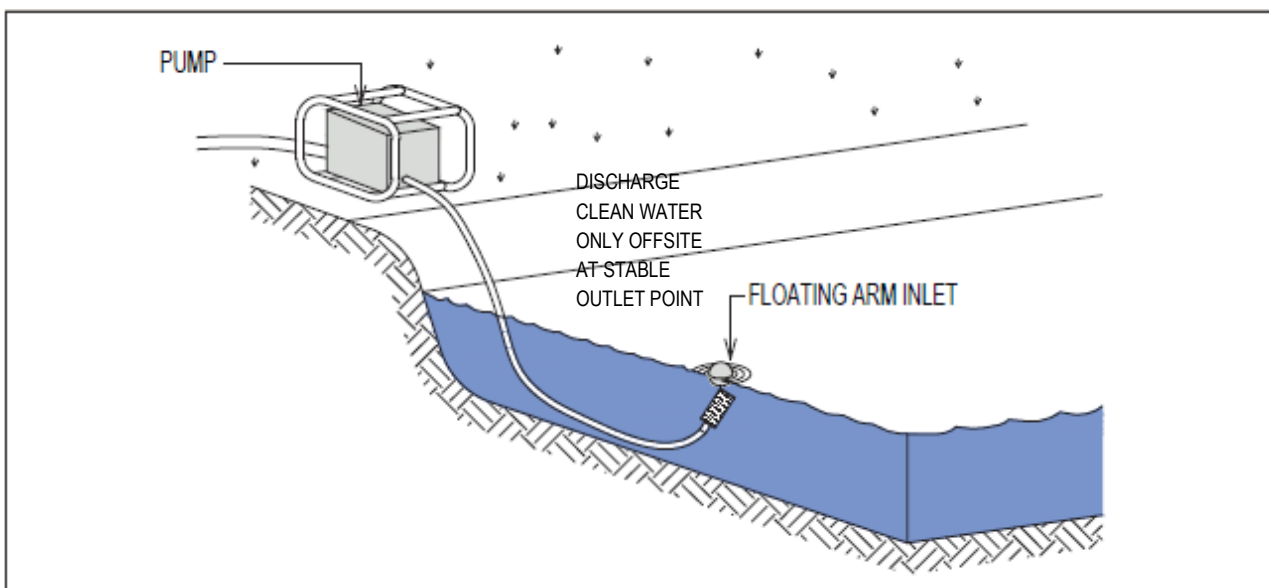
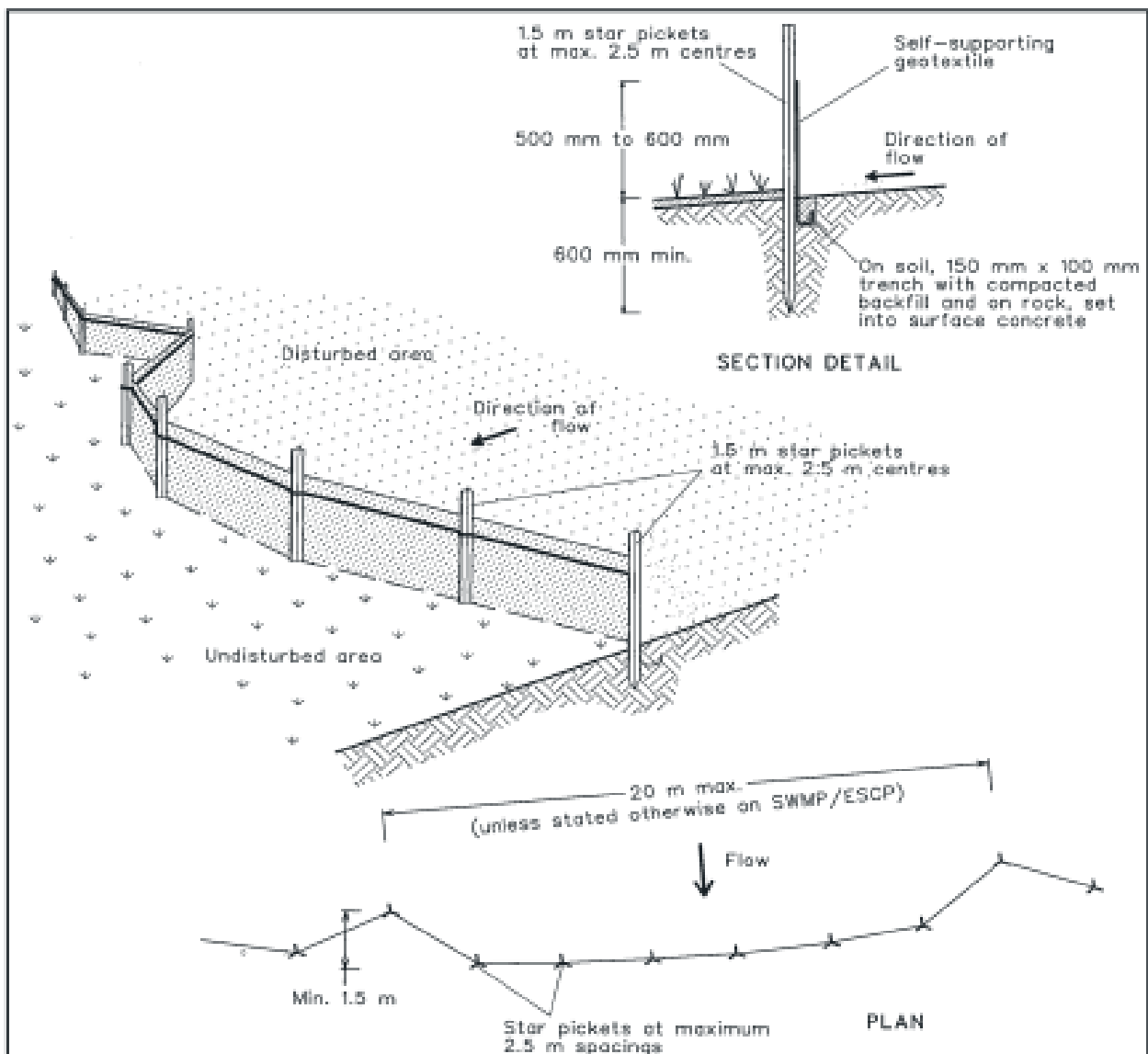


Figure D.1 Concept dewatering setup

Appendix E

Standard drawings



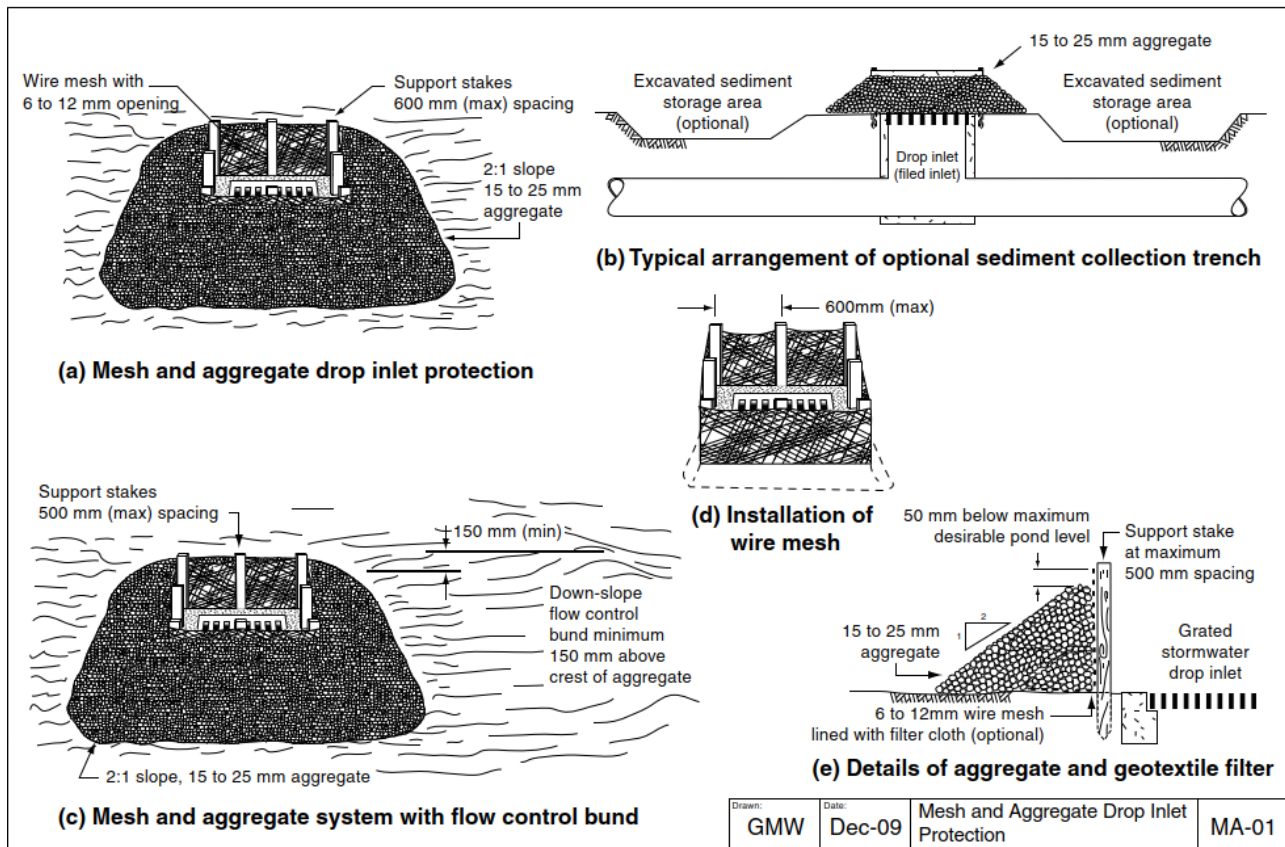


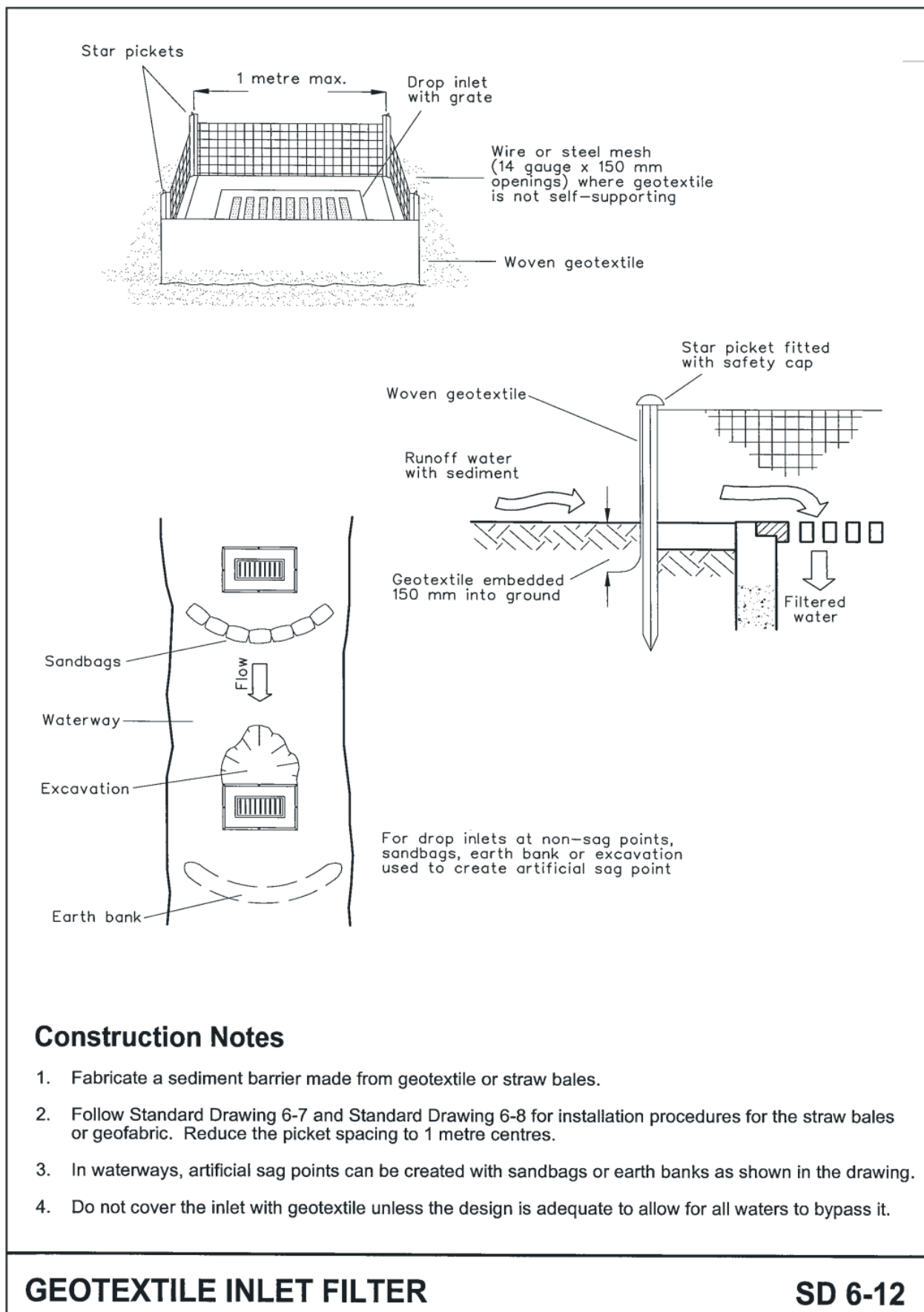
Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE

SD 6-8





Construction Notes

1. Fabricate a sediment barrier made from geotextile or straw bales.
2. Follow Standard Drawing 6-7 and Standard Drawing 6-8 for installation procedures for the straw bales or geofabric. Reduce the picket spacing to 1 metre centres.
3. In waterways, artificial sag points can be created with sandbags or earth banks as shown in the drawing.
4. Do not cover the inlet with geotextile unless the design is adequate to allow for all waters to bypass it.

GEOTEXTILE INLET FILTER

SD 6-12

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CLEAR THE LOCATION FOR THE BANK, CLEARING ONLY THE AREA THAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND EQUIPMENT.

3. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD THE BANK.

4. FORM THE BANK FROM THE MATERIAL, AND TO THE DIMENSION SPECIFIED IN THE APPROVED PLANS.

5. IF EARTH IS USED, THEN ENSURE THE SIDES OF THE BANK ARE NO STEEPER THAN A 2:1 (H:V) SLOPE, AND THE COMPLETED BANK MUST BE AT LEAST 500mm HIGH.

6. IF FORMED FROM SANDBAGS, THEN ENSURE THE BAGS ARE TIGHTLY PACKED SUCH THAT WATER LEAKAGE THROUGH THE BAGS IS MINIMISED.

7. CHECK THE BANK ALIGNMENT TO ENSURE POSITIVE DRAINAGE IN THE DESIRED DIRECTION.

8. THE BANK SHOULD BE VEGETATED (TURFED, SEEDED AND MULCHED), OR OTHERWISE STABILISED IMMEDIATELY, UNLESS IT WILL OPERATE FOR LESS THAN 30 DAYS OR IF SIGNIFICANT RAINFALL IS NOT EXPECTED DURING THE LIFE OF THE BANK.

9. ENSURE THE EMBANKMENT DRAINS TO A STABLE OUTLET, AND DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

MAINTENANCE

1. INSPECT FLOW DIVERSION BANKS AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. INSPECT THE BANK FOR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD. MAKE REPAIRS AS NECESSARY.

3. CHECK THAT FILL MATERIAL OR SEDIMENT HAS NOT PARTIALLY BLOCKED THE DRAINAGE PATH UP-SLOPE OF THE EMBANKMENT. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

4. DISPOSE OF ANY COLLECTED SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

5. REPAIR ANY PLACES IN THE BANK THAT ARE WEAKENED OR IN RISK OF FAILURE.

REMOVAL

1. WHEN THE SOIL DISTURBANCE ABOVE THE BANK IS FINISHED AND THE AREA IS STABILISED, THE FLOW DIVERSION BANK SHOULD BE REMOVED, UNLESS IT IS TO REMAIN AS A PERMANENT DRAINAGE FEATURE.

2. DISPOSE OF ANY SEDIMENT OR EARTH IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

3. GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION.

4. STABILISE THE AREA BY GRASSING OR AS SPECIFIED IN THE APPROVED PLAN.

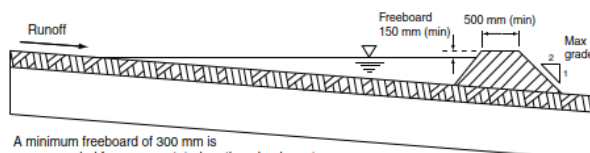
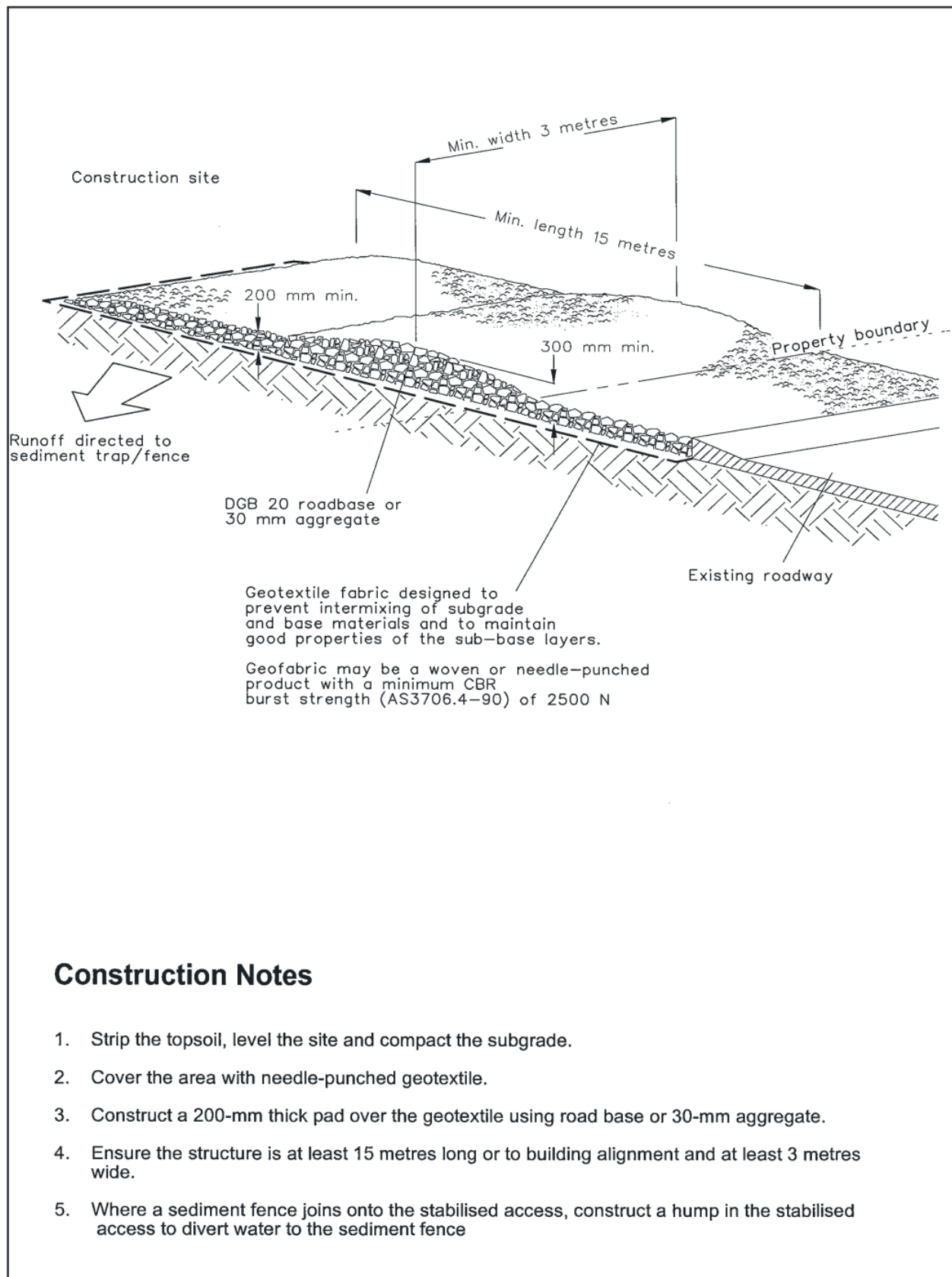


Figure 1 - Typical profile of flow diversion bank formed from earth

Table 1 - Recommended dimensions of flow diversion banks

Parameter	Earth banks	Vegetated banks	Compost berms	Sandbag berms
Height (min)	500 mm	500 mm	300 mm	N/A
Top width (min)	500 mm	500 mm	100 mm	N/A
Base width (min)	2500 mm	2500 mm	600 mm	N/A
Side slope (max)	2:1 (H:V)	2:1 (H:V)	1:1 (H:V)	N/A
Freeboard	300 mm	150 mm	100 mm	50 mm

Drawn:	Date:		
GMW	Dec-09	Flow Diversion Banks	DB-01

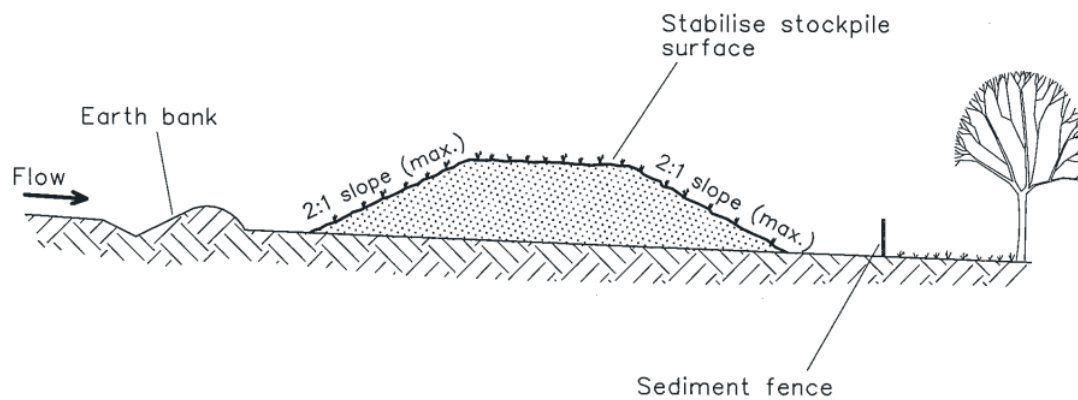


Construction Notes

1. Strip the topsoil, level the site and compact the subgrade.
2. Cover the area with needle-punched geotextile.
3. Construct a 200-mm thick pad over the geotextile using road base or 30-mm aggregate.
4. Ensure the structure is at least 15 metres long or to building alignment and at least 3 metres wide.
5. Where a sediment fence joins onto the stabilised access, construct a hump in the stabilised access to divert water to the sediment fence

STABILISED SITE ACCESS

SD 6-14

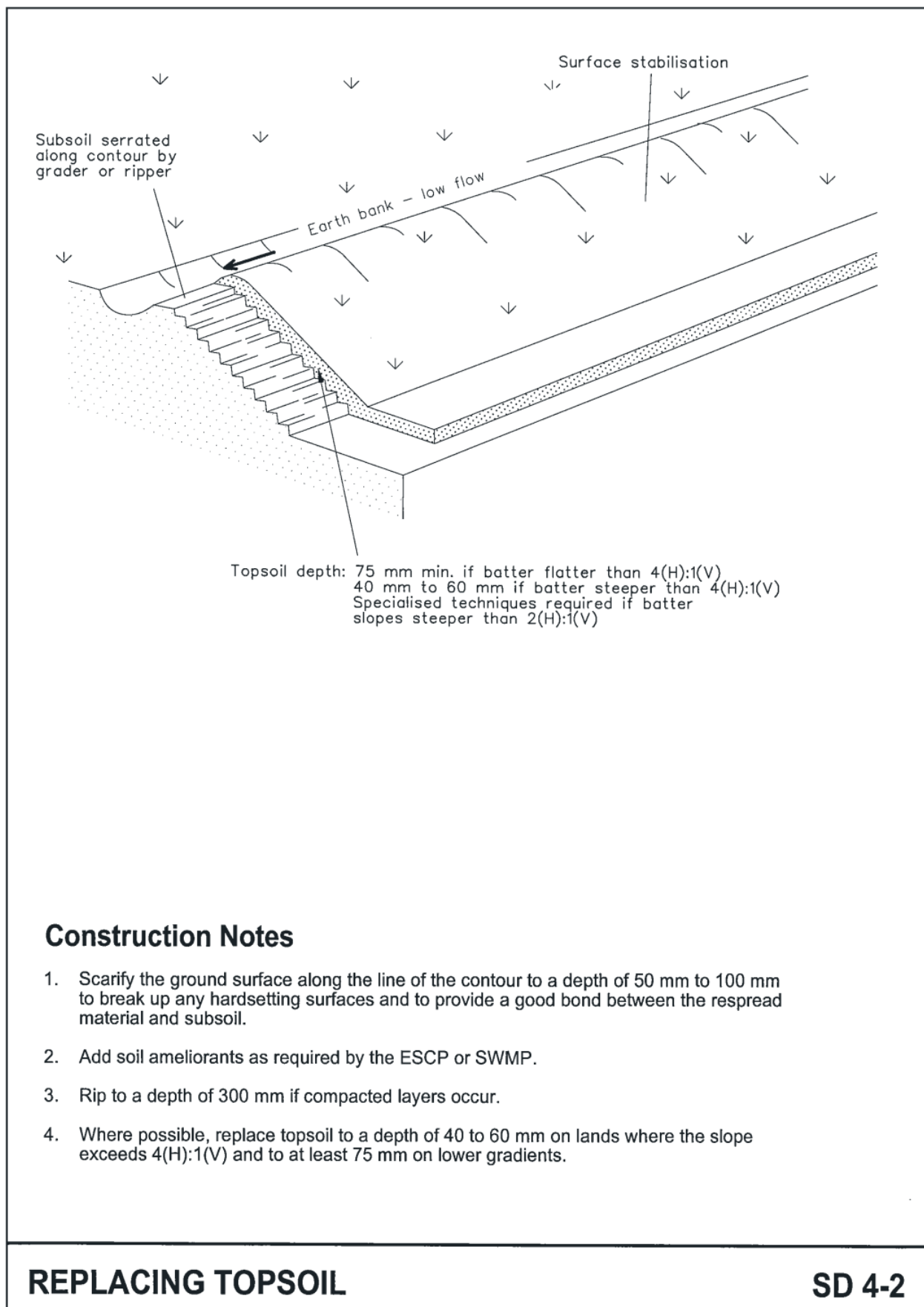


Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

STOCKPILES

SD 4-1



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