

Annexure 2

Erosion and Sediment Control Plan Spring Creek Crossing

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EROSION AND SEDIMENT CONTROL STAGING REQUIREMENTS

All erosion and sediment controls for each stage/section of works must be installed and functioning prior to undertaking any stripping or earthworks for that particular stage. The site supervisor or environmental manager is to ensure this. Stripping and earthworks necessary to implement the required erosion and sediment controls is permitted but is to be kept to an absolute minimum.

Erosion and sediment control locations, details and sizes to be confirmed onsite during construction with detailed survey. Controls may need to be varied to suit site conditions.

General Road Works

Before commencement of stripping and earthworks, the site is to be secured and the following erosion and sediment control measures installed in order except for Items 11 to 15 which are to be undertaken progressively as required throughout all stages of works (Refer to the Monitoring and Maintenance notes):

- Barrier fencing should be installed around the edge of the construction boundary to restrict access and in any additional locations as necessary to minimise unnecessary disturbance. Refer to the 'Barrier Fencing' notes below.
- Establish sediment fencing in the locations shown and following Standard Drawing SD 6-8 (Refer to the 'Sediment Fencing' notes below).
- Establish a site office, toilet and parking area (alternatively existing amenities can be used).
- Temporary waterway crossings are to be installed in accordance with Standard Drawing S-1.
- Prior to stripping topsoil, gypsum is to be spread evenly over the ground surface at a rate of 5 tonnes/ha to be stripped up with the topsoil (Refer to the 'Soil Treatment and Stabilisation' notes).
- Clean water diversion drains and topsoil bunds are to be formed and stabilised (Refer to Table 5 and Detail 1 for all sizing and lining specifications). Energy dissipaters are to be installed at the outlets (Refer to Detail 2).
- Sediment basins are to be constructed including their outlet spillways and energy dissipaters (Refer to Standard Drawing SD 6-4 and the 'Sediment Basin' notes below for construction details and Table 4 for sizing and lining specifications).
- Dirty water diversion drains are to be formed and stabilised (Refer to Table 5 for all sizing and lining specifications). Energy dissipaters are to be installed at the outlets (Refer to Detail 2) and check dams are to be installed as nominated (Refer to Drawings 13000046_P02_ESCP04 to 05 for locations and to Standard Drawing SD 5-4 for construction details).
- Establish stockpile areas (if required) within the locations specified and following Standard Drawing SD 4-1 (Refer to the 'Stockpiling' notes below). Note: Other locations may be possible, however, approval must be granted and appropriate erosion and sediment controls implemented.
- Earthworks can now commence. Stockpile topsoil and subsoil separately and in accordance with the requirements on Standard Drawing SD 4-1 and the 'Stockpiling' notes below.
- Slope lengths across disturbed lands to be maintained at the required intervals during all rainfall events (Refer to the 'Slope Lengths' notes).
- Dust suppression to be carried out when required (Refer to the 'Dust Suppression' notes).
- Treatment of dirty water is to be carried out as necessary in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes.
- Monitoring, maintenance and auditing is to be carried out regularly as required, in accordance with the 'Monitoring and Maintenance' notes and the 'Self Auditing Program' notes.
- Undertake progressive stabilisation of lands (including soil treatment) as final earthworks and road works are complete in each area (rather than waiting until the completion of works).
- Final soil treatment and stabilisation is to be completed in accordance with the 'Soil Treatment and Stabilisation' notes and Table 1.

Works Within the Spring Creek Waterway Extent (Pipe Installation and Roadway Fill/Earthworks)

Refer to the detailed staging plans (Drawings 13000046_P02_ESCP06 to 08) for erosion and sediment control staging requirements for works in the Spring Creek waterway extent (see Drawings 13000046_P02_ESCP03 & 04 for the waterway extent).

STOCKPILING

Stockpile locations are shown on Drawings 13000046_P02_ESCP03 to 05. Other locations may be possible, however, approval must be granted and appropriate erosion and sediment controls implemented. They should also incorporate clearly defined access controls and comply with the regulations outlined below.

All stockpiles must be constructed and maintained in accordance with Standard Drawing SD 4-1 and the following regulations:

- All stockpiles must have sediment fencing installed around their bases as per Standard Drawing SD 4-1.
- Stockpiles are not to be positioned within a riparian zone (i.e. within 40m of a drainage reserve/creek).
- Mulched vegetation, topsoil and subsoil (if applicable) are to be stockpiled separately.
- Stockpiles are to be trimmed and immediately sown with permanent pasture species.
- Stockpiles are to be stabilised to achieve a C-factor of 0.1 within 10 days of formation. Stabilisation measures on stockpiles must be employed as per the requirements set out in Table 1.
- Stabilisation can be achieved by seeding and spraying stockpiles with Vital P47, hydromulching, covering with jute matting or geotextile (or equivalent).
- Stockpiles should be constructed to no more than 2 meters in height.
- The working face of the stockpile should be battered down to no steeper than 2:1 (H:V).

GENERAL EROSION AND SEDIMENT CONTROL REQUIREMENTS**SEDIMENT FENCING**

- Install sediment fences in the locations shown on Drawings 13000046_P02_ESCP03 to 05.
- Install all sediment fencing in accordance with Standard Drawing SD 6-8.
- Sediment fences must be firmly trenched into the ground for their entire length.
- Sediment fences must include small 'returns' (see Standard Drawing 6-8) to minimise the risk of water flowing along them rather than through them.
- Sediment fences are to be installed around the toe of all stockpiles (Refer to Standard Drawing SD 4-1).

BARRIER FENCING

- Barrier fencing is to be used to delineate the work extent.
- Install barrier fencing around the edge of the works boundary. Install 2-5m from the edge of the construction area.
- Barrier fencing can simply be made from tape wound around star pickets or stakes. Alternatively, sediment fence, flagging or chain wire fences can be used for this purpose if so desired. Existing site fences can also be used where it is present in the relevant locations.
- Barrier fencing is to be used at the discretion of the site manager to delineate other 'no go' areas to minimise unnecessary disturbance.
- The soil erosion hazard on the site will be kept as low as practicable by minimising land disturbance. Some ways of doing this are outlined in Table 2.

SEDIMENT BASINS

- The required sediment basin sizes and details are shown in Table 4.
- Sediment basins are to be constructed in accordance with Standard Drawing SD 6-4.
- Gypsum is to be shallow ripped into the basin internal walls at a rate of 5 tonnes/ha during basin construction.
- The sediment basins are to be built to incorporate a primary outlet (weir overflow/spillway) sized to have a capacity to pass the 100 year ARI peak flow. (Refer to Table 4 for sizing and details).
- An energy dissipater is to be incorporated into the outlet of the spillway overflow. Dissipater is to extend to watercourse or 100% vegetated lands. Construct with geotextile and rock size equivalent to the spillway overflow and in accordance with Standard Drawing SD 5-8.
- Gypsum is to be shallow ripped into the spillway surfaces and dissipater surface at the base of the spillway at a rate of 10 tonnes/ha prior to placing geotextile and rock.
- Water quality is to be tested prior to discharge to verify compliance with Table 3.
- Any release of water from the sediment basins will need to comply with the water quality requirements prior to being discharged from site (Refer to the 'Dirty Water Treatment and Discharge Requirements' below for further details).
- Note that, if sediment basin water is pumped into a tanker truck for later use, it cannot be discharged from the tanker offsite or into a creek/dam without first being tested and where necessary treated (Refer to the 'Dirty Water Treatment and Discharge Requirements' below for further details).
- The sediment basins must be effectively flocculated (where necessary), settled, tested to comply with the water quality limits (Table 3) and discharged within 5-days or less following a rainfall event.
- A sediment basin marker is to be installed within all sediment basins indicating the sediment volume level.
- Sediment is to be cleaned out (removed) from the sediment basins prior to it reaching this sediment volume level.

DIRTY WATER TREATMENT AND DISCHARGE REQUIREMENTS

- Any water accumulating onsite within sediment basins or within the general works area (e.g. excavations, boxed out road sections, sediment traps, sumps or any other low point) must be considered as dirty water and is to be tested and flocculated as necessary to ensure it complies with the water quality requirements in Table 3 prior to being discharged from site.
- If the water is going to be used within the construction site for dust-suppression purposes and will drain back into the sediment capture system it will not require flocculation.
- Flocculation is to be achieved by using gypsum at a rate of approximately 40 kg/100 m3 of stormwater to achieve 40mg/L or less of suspended sediment. Alternative flocculation agents can be used if approved.
- It is essential that the flocculating agent is spread evenly over the entire pond surface for proper treatment of water.
- pH of discharge waters must be in the range of 6.5-8.5.

DUST SUPPRESSION

- Dust suppression should be carried out whenever necessary to minimise sediments becoming air borne due to wind erosion.
- Ensure a reliable water source and/or dust suppression management system (i.e. dustex, dustguard or Vital Stonewall) is available onsite prior to starting any construction works (including stripping and clearing works).

SOIL TREATMENT AND STABILISATION

- Prior to stripping topsoil, gypsum is to be spread evenly over the ground surface at a rate of 5 tonnes/ha to be stripped up with the topsoil.
- Undertake progressive stabilisation of disturbed ground surfaces as they are completed rather than at the end of the works program (Refer to Table 1).
- Final stabilisation is to achieve the C-factors outlined in Table 1.
- Stabilisation of batters and general surfaces can be achieved by:

- Shallow ripping gypsum into the subgrade at a rate of 5 tonnes/ha and to a depth of 50-100mm to break up hardsetting surfaces.
 - Placing treated topsoil over the ripped subgrade surface.
 - Seeding, then placing locally sourced native mulch over the soil (see Standard Drawing SD 4-2 and SD 7-1 for instructions regarding topsoil replacement). Alternatively, topsoil can be placed then hydromulched (with seed) or seeded and sprayed with Vital P47 (or equivalent).
- Appropriate seedbed preparation should be carried out when stabilising lands (See Standard Drawing SD 7-1).
 - Diversion drains, bunds and table drains are to be stabilised as indicated in Tables 1 and 5.
 - Stockpiles are to be stabilised as per the requirements of Table 1 and as shown in Standard Drawing SD 4-1.
 - As surfaces are stabilised and permanent drainage measures are installed, temporary water management structures can be removed (e.g. diversion drains).

SELF AUDITING PROGRAM

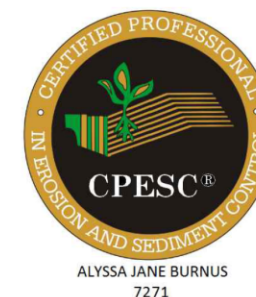
- A self-auditing program must be initiated for the site. The site manager is to inspect the site at least weekly and maintain a log of inspections, paying particular attention to:
 - Removal of spilled soils or other materials from near creeks/drainage lines.
 - Ensuring barrier fencing is maintained and exclusion zones are being observed by all workers and contractors.
 - Constructing additional erosion and/or sediment control works as might become necessary to ensure the desired water control is achieved.
 - Maintaining erosion and sediment control measures in a functioning condition for the duration of the excavation works.
 - Removal of trapped sediment and disposal to safe areas.
- Areas of localised soil erosion are to be identified and appropriate preventative measures implemented. These might include but are not limited to:
 - Planting additional stabilising vegetation or wind breaks.
 - Stabilising soils with mulches or alternative soil binders.
 - Taking steps to minimise any concentrated stormwater flows.
- Any areas of localised poor drainage are to be identified and appropriate remedial action taken. This might include but are not limited to:
 - Installing formalised drainage channels or pipes.
 - Improving soil permeability by cultivating the soil surface.
 - Improving soil permeability by installing infiltration trenches.

SLOPE LENGTHS

- Ensure slope lengths are maintained at no more than 80m (except in CA2 which are to be maintained at maximum 40m) across all disturbed lands during any rainfall event.
- Diversion bunds/drains, low flow earth banks (Standard Drawing SD 5-5) or sandbags/equivalent should be installed prior to any forecast rainfall event to achieve this.

MONITORING AND MAINTENANCE**General**

- The site manager is to delineate an appropriate location for the site office or compound/s (or existing amenities can be used).
- A rain gauge is to be installed on site and daily rainfall is to be recorded.
- Safe storage areas for wastes, fuels and other hazardous materials are to be delineated at the discretion of the site manager.
- Storage locations for erosion control materials (e.g. jute matting) are to be delineated at the discretion of the site manager.
- Any waste materials (such as rocks and debris) are to be removed from any publically trafficked road surface as soon as possible.
- Any sediment accumulated in trapping devices is to be removed and deposited in a secure location where there is a low risk that it will be re-entrained in runoff.
- Waste receptacles are to be emptied as necessary. Disposal of waste must be in a manner approved by the site superintendent.



REV	DATE	DES.	DRN.	APP.	REVISION DETAILS	DRAWING STATUS	North	CLIENT	PROJECT TITLE	DRAWING TITLE
						DESIGN BY A.J.B.				EROSION & SEDIMENT CONTROL PLAN
						DRAWN BY A.J.B.				GENERAL NOTES & REQUIREMENTS
						FINAL APPROVAL A.M.				PROJECT NO.
						SCALE: (on A3 Original)				SUB-PR NO.
02	19/05/15	A.J.B.	A.J.B.	M.P.	REVISED SEDIMENT BASIN DESIGN				DARGUES GOLD PROJECT T.S.F. HAUL ROAD	DRAWING NO.
01	21/01/15	A.J.B.	A.J.B.	M.P.	ISSUE FOR CONSTRUCTION					REV
00	29/04/14	A.J.B.	A.J.B.	A.M.	ISSUE FOR TENDER					
A	02/04/14	A.J.B.	A.J.B.	A.M.	DRAFT ISSUE FOR CONSULTATION	FINAL				

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BACKGROUND AND CALCULATIONS

RUSLE: $A = \text{SOIL LOSS (tonnes/ha/yr)} = R.K.L.S.P.C.$

THE AVERAGE ANNUAL SOIL LOSS CALCULATIONS WERE UNDERTAKEN USING THE "BLUE BOOK" – MANAGING URBAN STORMWATER (LANDCOM, 2004)

R-FACTOR	2,500 (MANAGING URBAN STORMWATER, LANDCOM, 2004)
K-FACTOR	0.06 SOILS ARE TYPE D (DISPERSIBLE)
LS-FACTOR	CA1: SLOPE = 10.5%, SLOPE LENGTH = 80m CA2: SLOPE = 20.5%, SLOPE LENGTH = 40m CA3: SLOPE = 14%, SLOPE LENGTH = 80m
P-FACTOR	1.3 – DEFAULT ASSUMED
C-FACTOR	1 – DEFAULT ASSUMED
ESTIMATED SOIL LOSS	CA1 (0.12ha) = 591 t/ha/yr = 70.92 tonnes/yr (SOIL LOSS CLASS 5) CA2 (0.15ha) = 867 t/ha/yr = 130.05 tonnes/yr (SOIL LOSS CLASS 6) CA3 (0.50ha) = 899 t/ha/yr = 449.5 tonnes/yr (SOIL LOSS CLASS 6)
TOTAL ESTIMATED SOIL LOSS	650.47 tonnes/yr

THE "BLUE BOOK" REQUIRES THE INSTALLATION OF A SEDIMENT BASIN ON THE SITE IF THE SOIL LOSS > 200 tonnes/yr.
THE SOIL LOSS FOR THIS SITE IS > 200 tonnes/yr, THEREFORE SEDIMENT BASIN/S ARE REQUIRED.
EVEN THOUGH THE SOIL LOSS FOR CA1 AND CA2 IS < 200 tonnes/yr SMALLER SCALE SEDIMENT BASINS WILL STILL BE PROVIDED FOR THESE CATCHMENTS.

ADOPTED VALUES FOR SEDIMENT BASIN AND DRAINAGE CALCULATIONS:

- 2yr, 6hr ARI event = 10.5mm/hr
- 5-day, 85th%ile rainfall depth = 42.4mm
- $C_v = 0.9$
- C_e (for disturbed/construction areas) = 0.9
- C_{10} (for grassed upslope/clean water areas) = 0.55

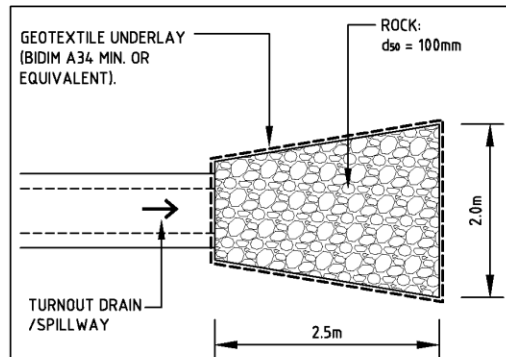
TABLE 3**STORMWATER DISCHARGE/RELEASE LIMITS**

CHARACTERISTIC	LIMIT
pH	6.5–8.5
Total suspended solids (mg/L)	40* (Maximum)
Turbidity (NTU)	An approved correlated NTU value which corresponds to <50mg/L TSS
Hydrocarbons	Nil

* TSS has been reduced from the Blue Book standard of 50mg/L to account for the inherent sensitivity of the receiving environment.

TABLE 1 MAXIMUM ACCEPTABLE C-FACTORS AT NOMINATED TIMES

LANDS	MAXIMUM C-FACTOR	REMARKS
Waterways and other areas subjected to concentrated flows (e.g. table drains), post construction and during operation	0.05 (70%)	Applies after ten working days from completion of formation and before they are allowed to carry any concentrated flows. Flows will be limited to those shown in Table 5.2 of Landcom (2004). Foot and vehicular traffic will be prohibited in these areas
Stockpiles and batters, post construction	0.10 (60%)	Applies after ten working days from completion of formation. Maximum C-factor of 0.10 equals 60% ground cover
All lands, including waterways and stockpiles during construction and operation	0.15 (50%)	Applies after 20 working days of inactivity, even though works might continue later. Maximum C-factor of 0.15 equals 50% ground cover
All lands post construction	0.05	Applies after 60 working days of completion of works. Maximum C-factor of 0.05 equals 70% ground cover

DETAIL 2 – ROCK DISSIPATER

- ROCK DISSIPATERS TO BE INSTALLED IN ACCORDANCE WITH BLUE BOOK STANDARD DRAWING (SD 5-8).
- GYPSUM IS TO BE SHALLOW RIPPED INTO THE SUBGRADE SURFACE (AT A RATE OF 10 tonnes/ha) PRIOR TO PLACING THE GEOTEXTILE AND ROCK.
- BASIN SPILLWAY DISSIPATERS ARE TO BE CONSTRUCTED WITH GEOTEXTILE, ROCK AND AN OUTLET WIDTH OF EQUIVALENT SIZE/SPECIFICATIONS TO THE SPILLWAY REQUIREMENTS.
- BASIN SPILLWAY DISSIPATERS TO EXTEND TO A WATERCOURSE OR 100% VEGETATED LANDS.

TABLE 2 LIMITATIONS TO ACCESS DURING CONSTRUCTION

LAND USE	LIMITATION	REMARKS
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans	All site workers should clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope) or similar materials.
Access corridors	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones on site. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries
Remaining lands, including revegetation areas	Entry prohibited except for essential management works	Thinning of growth might be necessary, for example, for fire reduction or weed removal

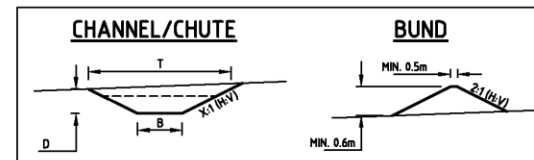
TABLE 4 – SEDIMENT BASIN AND BASIN SPILLWAY SIZING DETAILS

Basin	Sediment Storage Volume (m³)	Settling Volume (m³)	Total Basin Volume (m³)	Basin Spillway				Lining
				Depth (m)	Side Slope (H:V)	Base Width (m)	Top Width (m)	
SCCSB1	9	46	55	0.5	3:1	1	3	Rock (d ₅₀ = 100) with geotextile underlay (bidim A34 min.).
SCCSB2	17	57	74	0.5	3:1	1	3	
SCCSB3	69	229	298	0.75	3:1	2	5	Rock (d ₅₀ = 200) with geotextile underlay (bidim A34 min.).

- Sediment basins are to be installed in accordance with Blue Book Standard Drawing SD 6-4.
 - Gypsum is to be shallow ripped into the basin walls at a rate of 5 tonnes/ha during basin construction.
 - Spillways are to be installed in accordance with Blue Book Standard Drawing SD 6-4.
 - Gypsum is to be shallow ripped into the spillway walls at a rate of 10 tonnes/ha during basin construction.
 - A sediment marker is to be installed within each basin (well away from the inlets and outlets) to indicate the sediment storage volume level (measured from the bottom surface of the basin).
 - Ensure the total basin volumes are provided within the available basin capacity below the spillway level.
 - Dissipaters are to be provided at the outlet of sediment basin spillways and are to extend to a watercourse or 100% vegetated lands.

TABLE 5 – DIVERSION DRAIN SIZING AND LINING DETAILS

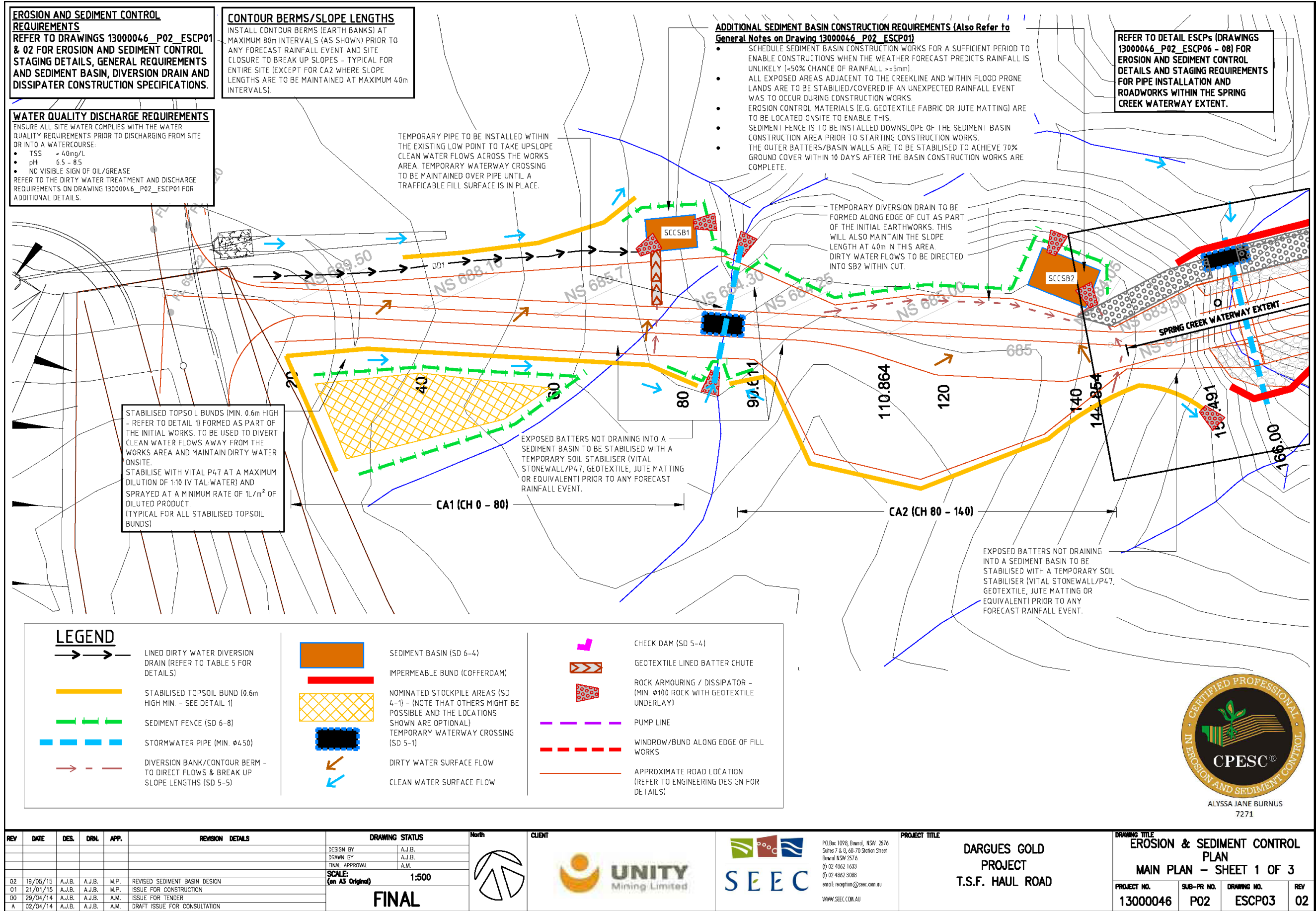
DRAIN SIZING DETAILS					DRAIN/BUND STABILISATION AND LINING	
Refer to 'Detail 1' below and Blue Book Standard Drawings SD 5-5 and SD 5-6					Soil preparation prior to lining drains:	
Structure Name	DD1	DD2	DD3	DD4	- Refer to Blue Book Standard Drawing SD 5-7.	
Channel Details					- Gypsum is to be shallow ripped into the subgrade surface at a rate of 10 tonnes/ha prior to placing topsoil.	
Flow Rate, Q (m³/s)	0.05	0.2	0.15	0.11	- Place treated topsoil over entire drain surface to a minimum depth of 75mm.	
Flow depth (m)	0.06	0.1	0.08	0.08	- Drain lining: - Coir mesh + Vital Stonewall (or bitumen spray) + seeding (or equivalent).	
Channel depth, D (m)	0.4	0.4	0.4	0.4	- Vital stonewall to be applied at a maximum dilution of 1:10 (Vital:Water)	
Channel base width, B (m)	0.5	1	1	0.5	- Seeding: Use rye grass for winter months / Japanese Millet for summer months and a combination with a suitable perennial (long term) local native grass mix for long term drains.	
Channel side slope (H:V)	3	3	3	3	- Watering: - Regular watering required where rainfall is insufficient.	
Channel top width, T (m)	2.9	3.4	3.4	2.9	- Ensure water is applied gently (not with a pressure spray).	
Drain slope (%)	Drain slopes to be relative to the site topography. However, the minimum drain slope to be 1%.					
In locations where permanent drains are used as diversion drains for erosion and sediment control, construct drains to permanent sizing requirements.						

DETAIL 1 – DIVERSION DRAIN/CHUTE

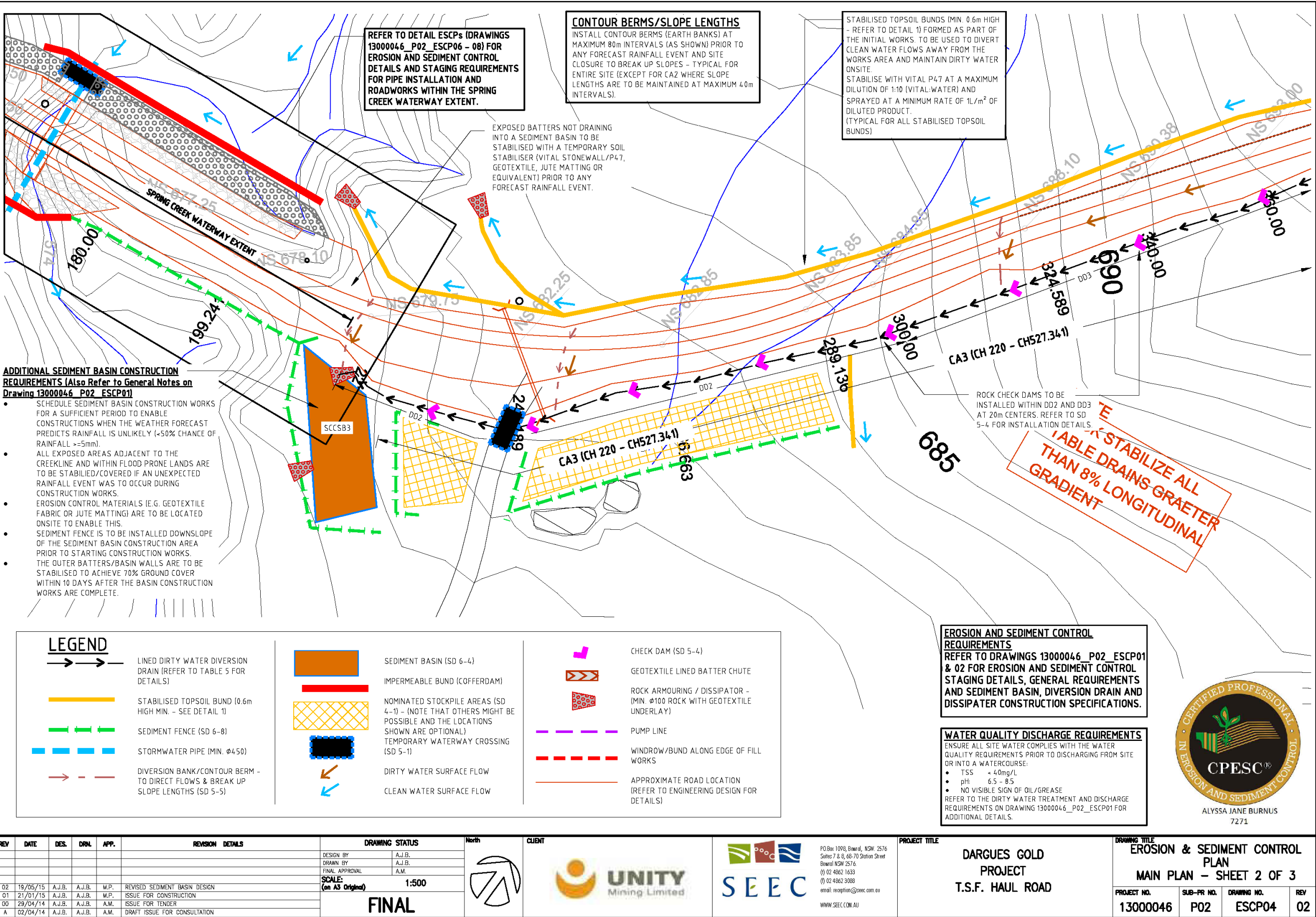
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						DESIGN BY: A.J.B.				EROSION & SEDIMENT CONTROL PLAN
						DRAWN BY: A.J.B.				CALCULATIONS, TABLES & DETAILS
						FINAL APPROVAL: A.M.				
						SCALE: (on A3 Original)				
02	19/05/15	A.J.B.	A.J.B.	M.P.	REVISED SEDIMENT BASIN DESIGN					
01	21/01/15	A.J.B.	A.J.B.	M.P.	ISSUE FOR CONSTRUCTION					
00	29/04/14	A.J.B.	A.J.B.	A.M.	ISSUE FOR TENDER					
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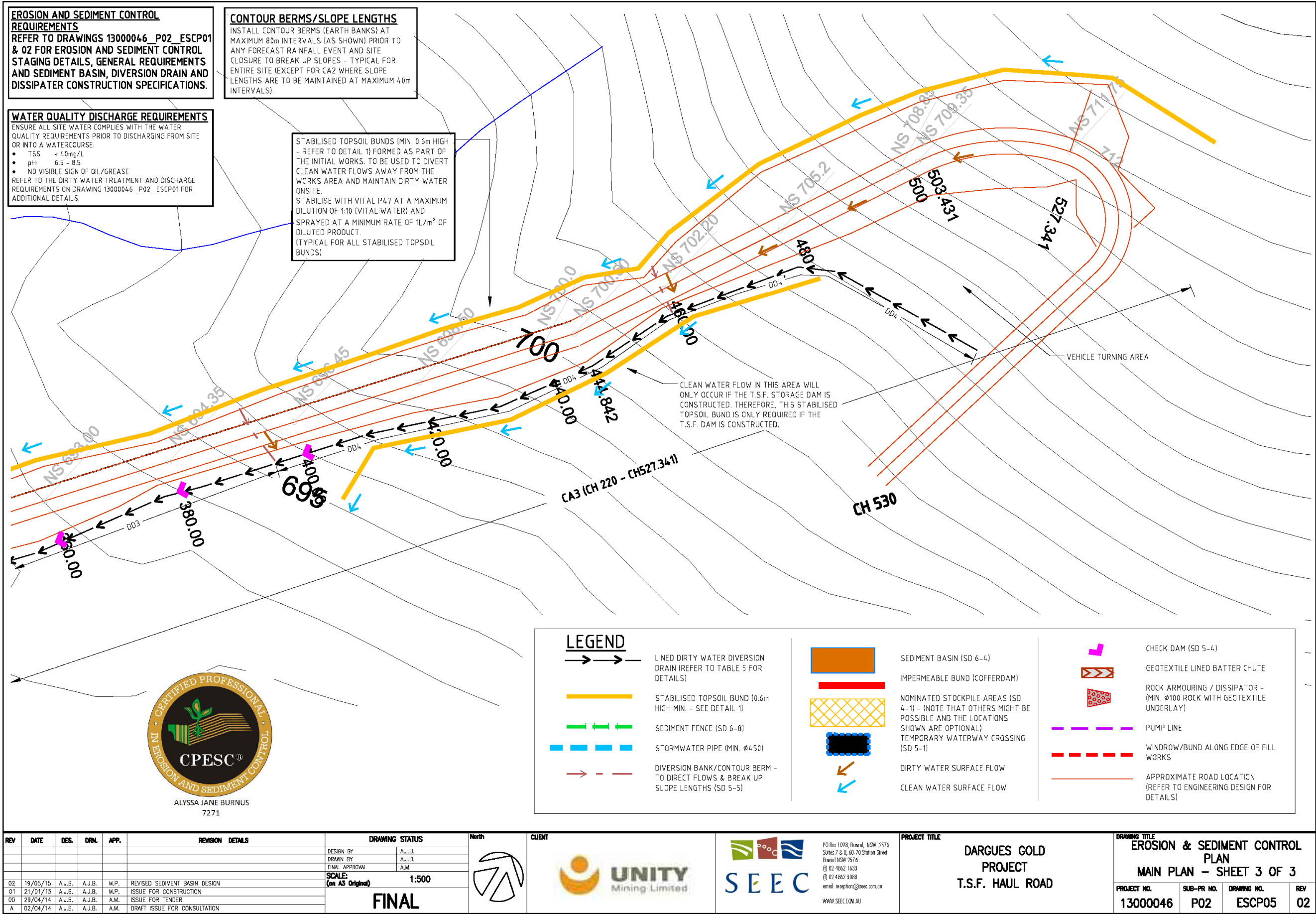
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EROSION AND SEDIMENT CONTROL REQUIREMENTS FOR WORKS WITHIN SPRING CREEK

GENERAL

- ALL WORKS ARE TO BE SCHEDULED FOR THE MONTHS FROM APRIL TO MAY INCLUSIVE OR JULY TO SEPTEMBER INCLUSIVE (THE LOWEST RAINFALL EROSIVITY AND AVERAGE RAINFALL MONTHS BASED ON DATA SOURCED FROM THE BLUE BOOK (2004) AND THE BUREAU OF METEOROLOGY WEBSITE (APRIL 2014)).
- PRIOR TO UNDERTAKING ANY CONSTRUCTION OR EARTHWORKS ENSURE TEMPORARY GROUND COVER MATERIALS (E.G. GEOFABRIC OR BLACK PLASTIC) ARE TO BE LOCATED ON SITE FOR STABILISATION OF EXPOSED SURFACES.
- EARTHWORKS OR SOIL DISTURBANCE OF ANY KIND MUST NOT COMMENCE WITHIN THE WATERCOURSE UNTIL A CLEAN DIVERSION (PUMP/PIPE) IS IN PLACE TO TAKE UPSTREAM FLOWS AROUND THE WORK AREA.
- AT ALL TIMES DURING WORKS, ENSURE THAT NATURAL CREEK FLOWS ARE PIPED OR PUMPED AROUND THE WORK SITE WITHOUT COMING INTO CONTACT WITH EXPOSED SOIL OR DIRTY CONSTRUCTION WATER.
- TEMPORARY CLEAN WATER DIVERSIONS (PUMPS/PIPES) HAVE THE CAPACITY TO TAKE LOW FLOWS ONLY. HIGHER CREEK FLOWS DURING LARGER STORM EVENTS MAY OVERTOP THE CLEAN DIVERSION AND THEREFORE ALL EXPOSED SOILS WITHIN THE WATERWAY MUST BE COVERED OR LINED PRIOR TO RAINFALL TO MINIMISE THE RISK OF EROSION.
- DURING ALL WORKS STAGES ALL EXPOSED SOILS WITHIN THE WATERWAY EXTENT ARE TO BE STABILISED WITH A TEMPORARY GROUND COVER (E.G. GEOFABRIC OR BLACK PLASTIC) PRIOR TO RAINFALL. THE TOP SURFACE OF THE EARTHWORKS FILL PLATFORM MAY BE STABILISED WITH VITAL STONEWALL PRIOR TO RAINFALL (IN PLACE OF GEOTEXTILE) ONCE THE SUBJECT LEVEL IS AT LEAST 500mm ABOVE THE CREEK OVERFLOW LEVEL.
- EXPOSED BATTERS WITHIN THE WATERWAY EXTENT WHERE WORKS ARE NOT ACTIVELY OCCURRING ARE TO BE TEMPORARILY COVERED WITH GEOTEXTILE OR EQUIVALENT.
- DISTURBANCE WITHIN IN-STREAM LOCATIONS IS TO BE MINIMISED AS MUCH AS POSSIBLE.
- FINAL STABILISATION OF SURFACES IS TO OCCUR PROGRESSIVELY AS EACH SECTION OF WORKS ARE COMPLETE.
- DIRTY (ON-SITE) WATER ACCUMULATING WITHIN THE WORKS AREA IS TO BE PUMPED TO A SEDIMENT BASIN FOR TREATMENT OR TREATED IN-SITU PRIOR TO DISCHARGING INTO THE CREEK. ALTERNATIVELY ONSITE WATER CAN BE USED FOR DUST SUPPRESSION ON THE ROADWORK AREAS OUTSIDE OF THE WATERWAY EXTENT (I.E. AREAS THAT DRAIN BACK INTO A SEDIMENT BASIN).

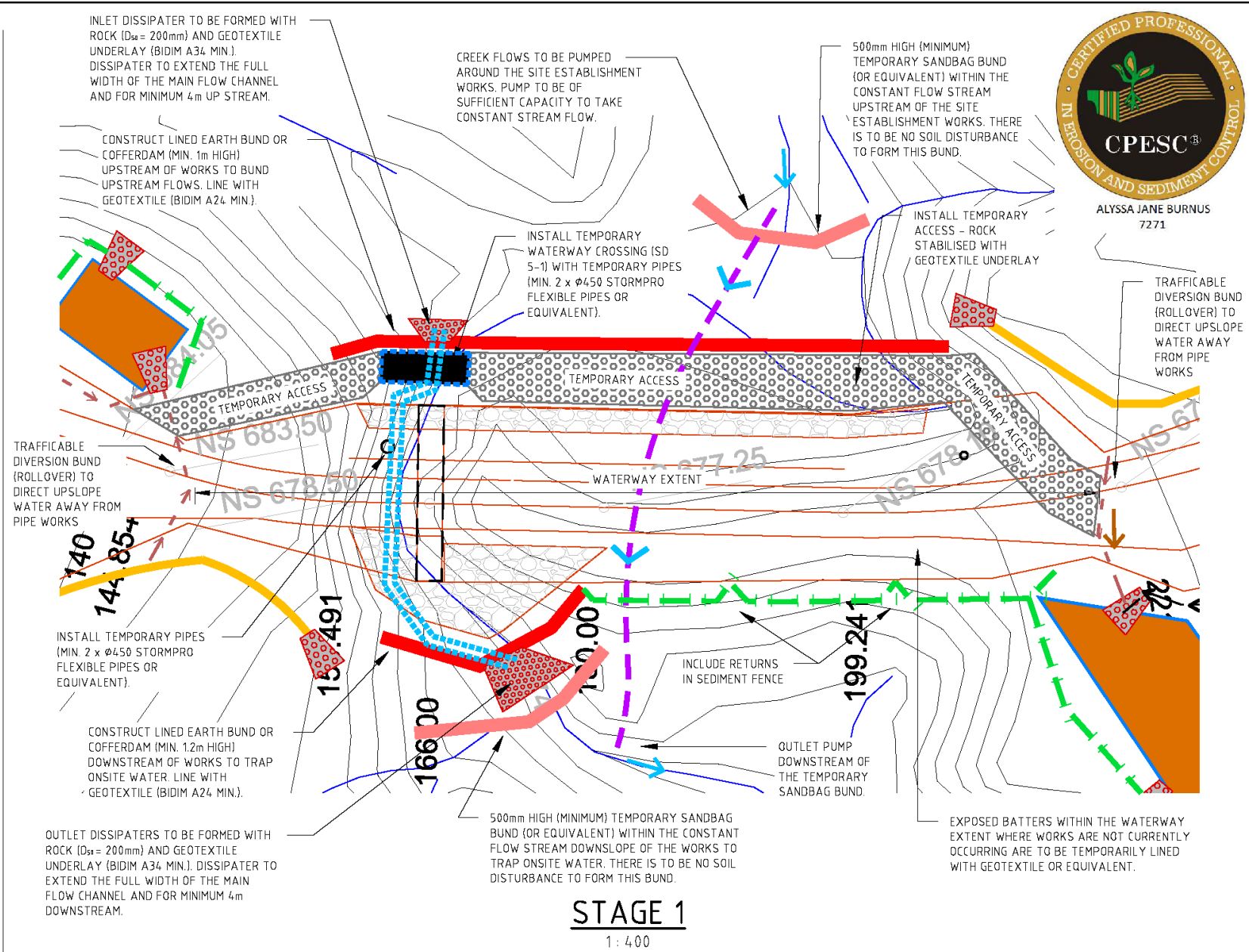
STAGING

WORKS ARE TO BE UNDERTAKEN IN THE FOLLOWING ORDER (REFER TO THE DETAIL PLANS OF EACH STAGE FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS).

- STAGE 1 – SITE ESTABLISHMENT AND CLEAN DIVERSION INSTALLATION (AS SHOWN ON THIS PLAN).
- STAGE 2 – PIPE INSTALLATION AND ROADWAY/FILL CONSTRUCTION WORKS (REFER TO ESCP07).
- STAGE 3 – FINISHING WORKS – REMOVAL OF TEMPORARY ACCESS AND LINED EARTH BUNDS (REFER TO ESCP08).

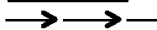
STAGE 1 – SITE ESTABLISHMENT AND CLEAN DIVERSION INSTALLATION

- SCHEDULE WORKS FOR A DRY PERIOD. MONITOR CREEK FLOW AND WEATHER FORECASTS – LOW FLOWS AND AT LEAST 5 CLEAR DAYS ARE NEEDED TO UNDERTAKE STAGE 1 (I.E. 5 DAYS TO DO STEPS 2 TO 9).
- CONSTRUCT TEMPORARY UP AND DOWNSTREAM SANDBAG BUNDS WITHIN THE EXISTING CREEK TO BUND UPSTREAM WATER AND TRAP ONSITE WATER. THERE IS TO BE NO SOIL DISTURBANCE CREATED IN ORDER TO INSTALL THESE BUNDS.
- SET UP PUMP SYSTEM AND DIVERT THE CONSTANT CREEK FLOW AROUND THE SITE ESTABLISHMENT WORKS.
- INSTALL SEDIMENT FENCE IN THE LOCATIONS SHOWN.
- INSTALL STABILISED ROCK ACCESS INTO THE WORKS AREA AND CONSTRUCT TEMPORARY WATERCOURSE CROSSING IN ACCORDANCE WITH SD 5-1. THE WATERCOURSE CROSSING IS TO INCORPORATE TEMPORARY PIPES – MINIMUM 2 X Ø450 STORMPRO FLEXIBLE PIPES (OR SIMILAR).
- CONTINUE THE TEMPORARY PIPES (SPECIFIED ABOVE) TO THE DOWNSTREAM SIDE OF THE WORKS (AS SHOWN), TO TAKE CREEK LOW FLOWS AROUND THE ENTIRE PIPE INSTALLATION WORKS AREA. INSTALL ROCK DISSIPATERS AT THE INLET AND OUTLET OF THE TEMPORARY PIPES.
- INSTALL THE LINED EARTH BUNDS UP AND DOWNSLOPE OF THE WORKS AREA.
- STABILISE ALL EXPOSED AREAS UP AND DOWNSTREAM OF THE LINED BUNDS (THAT MAY HAVE BEEN DISTURBED DURING THE SITE ESTABLISHMENT STAGE) WITH JUTE MATTING, GEOTEXTILE OR EQUIVALENT.
- REMOVE SANDBAG BUND AND PUMP SYSTEM AND DIRECT CREEK FLOWS INTO THE TEMPORARY PIPE DIVERSION SYSTEM.



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LEGEND



LINED DIRTY WATER DIVERSION DRAIN (REFER TO TABLE 5 FOR DETAILS)



STABILISED TOPSOIL BUND (0.6m HIGH MIN. - SEE DETAIL 1)



SEDIMENT FENCE (SD 6-8)



STORMWATER PIPE (MIN. Ø450)



DIVERSION BANK/CONTOUR BERM - TO DIRECT FLOWS & BREAK UP SLOPE LENGTHS (SD 5-5)



SEDIMENT BASIN (SD 6-4)



IMPERMEABLE BUND (COFFERDAM)



NOMINATED STOCKPILE AREAS (SD 4-1) - (NOTE THAT OTHERS MIGHT BE POSSIBLE AND THE LOCATIONS SHOWN ARE OPTIONAL)



TEMPORARY WATERWAY CROSSING (SD 5-1)



DIRTY WATER SURFACE FLOW



CLEAN WATER SURFACE FLOW



CHECK DAM (SD 5-4)



GEOTEXTILE LINED BATTER CHUTE



ROCK ARMOURING / DISSIPATOR - (MIN. Ø100 ROCK WITH GEOTEXTILE UNDERLAY)



PUMP LINE



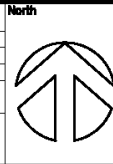
WINDROW/BUND ALONG EDGE OF FILL WORKS



APPROXIMATE ROAD LOCATION (REFER TO ENGINEERING DESIGN FOR DETAILS)

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS	DRAWING STATUS
						DESIGN BY: A.J.B.
						DRAWN BY: A.J.B.
						FINAL APPROVAL: A.M.
02	19/05/15	A.J.B.	A.J.B.	M.P.	REVISED SEDIMENT BASIN DESIGN	SCALE: 1:400
01	21/01/15	A.J.B.	A.J.B.	M.P.	ISSUE FOR CONSTRUCTION	(on A3 Original)
00	29/04/14	A.J.B.	A.J.B.	A.M.	ISSUE FOR TENDER	
A	02/04/14	A.J.B.	A.J.B.	A.M.	DRAFT ISSUE FOR CONSULTATION	

FINAL



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PROJECT TITLE

DARGUES GOLD
PROJECT
T.S.F. HAUL ROAD

DRAWING TITLE
EROSION & SEDIMENT CONTROL
PLAN
WATERWAY DETAIL PLAN – STAGE 1

PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
13000046	P02	ESCP06	02

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EROSION AND SEDIMENT CONTROL REQUIREMENTS FOR WORKS WITHIN SPRING CREEK

GENERAL

- ALL WORKS ARE TO BE SCHEDULED FOR THE MONTHS FROM APRIL TO MAY INCLUSIVE OR JULY TO SEPTEMBER INCLUSIVE (THE LOWEST RAINFALL EROSIVITY AND AVERAGE RAINFALL MONTHS BASED ON DATA SOURCED FROM THE BLUE BOOK (2004) AND THE BUREAU OF METEROLOGY WEBSITE (APRIL 2014)).
- PRIOR TO UNDERTAKING ANY CONSTRUCTION OR EARTHWORKS ENSURE TEMPORARY GROUNDCOVER MATERIALS (E.G. GEOFABRIC OR BLACK PLASTIC) ARE TO BE LOCATED ON SITE FOR STABILISATION OF EXPOSED SURFACES.
- EARTHWORKS OR SOIL DISTURBANCE OF ANY KIND MUST NOT COMMENCE WITHIN THE WATERCOURSE UNTIL A CLEAN DIVERSION (PUMP/PIPE) IS IN PLACE TO TAKE UPSTREAM FLOWS AROUND THE WORK AREA.
- AT ALL TIMES DURING WORKS, ENSURE THAT NATURAL CREEK FLOWS ARE PIPED OR PUMPED AROUND THE WORK SITE WITHOUT COMING INTO CONTACT WITH EXPOSED SOIL OR DIRTY CONSTRUCTION WATER.
- TEMPORARY CLEAN WATER DIVERSIONS (PUMPS/PIPES) HAVE THE CAPACITY TO TAKE LOW FLOWS ONLY. HIGHER CREEK FLOWS DURING LARGER STORM EVENTS MAY OVERTOP THE CLEAN DIVERSION AND THEREFORE ALL EXPOSED SOILS WITHIN THE WATERWAY MUST BE COVERED OR LINED PRIOR TO RAINFALL TO MINIMISE THE RISK OF EROSION.
- DURING ALL WORKS STAGES ALL EXPOSED SOILS WITHIN THE WATERWAY EXTENT ARE TO BE STABILISED WITH A TEMPORARY GROUNDCOVER (E.G. GEOFABRIC OR BLACK PLASTIC) PRIOR TO RAINFALL. THE TOP SURFACE OF THE EARTHWORKS FILL PLATFORM MAY BE STABILISED WITH VITAL STONEWALL PRIOR TO RAINFALL (IN PLACE OF GEOTEXTILE) ONCE THE SUBJECT LEVEL IS AT LEAST 500mm ABOVE THE CREEK OVERFLOW LEVEL.
- EXPOSED BATTERS WITHIN THE WATERWAY EXTENT WHERE WORKS ARE NOT ACTIVELY OCCURRING ARE TO BE TEMPORARILY COVERED WITH GEOTEXTILE OR EQUIVALENT.
- DISTURBANCE WITHIN IN-STREAM LOCATIONS IS TO BE MINIMISED AS MUCH AS POSSIBLE.
- FINAL STABILISATION OF SURFACES IS TO OCCUR PROGRESSIVELY AS EACH SECTION OF WORKS ARE COMPLETE.
- DIRTY (ON-SITE) WATER ACCUMULATING WITHIN THE WORKS AREA IS TO BE PUMPED TO A SEDIMENT BASIN FOR TREATMENT OR TREATED IN-SITU PRIOR TO DISCHARGING INTO THE CREEK. ALTERNATIVELY ONSITE WATER CAN BE USED FOR DUST SUPPRESSION ON THE ROADWORK AREAS OUTSIDE OF THE WATERWAY EXTENT (I.E. AREAS THAT DRAIN BACK INTO A SEDIMENT BASIN).

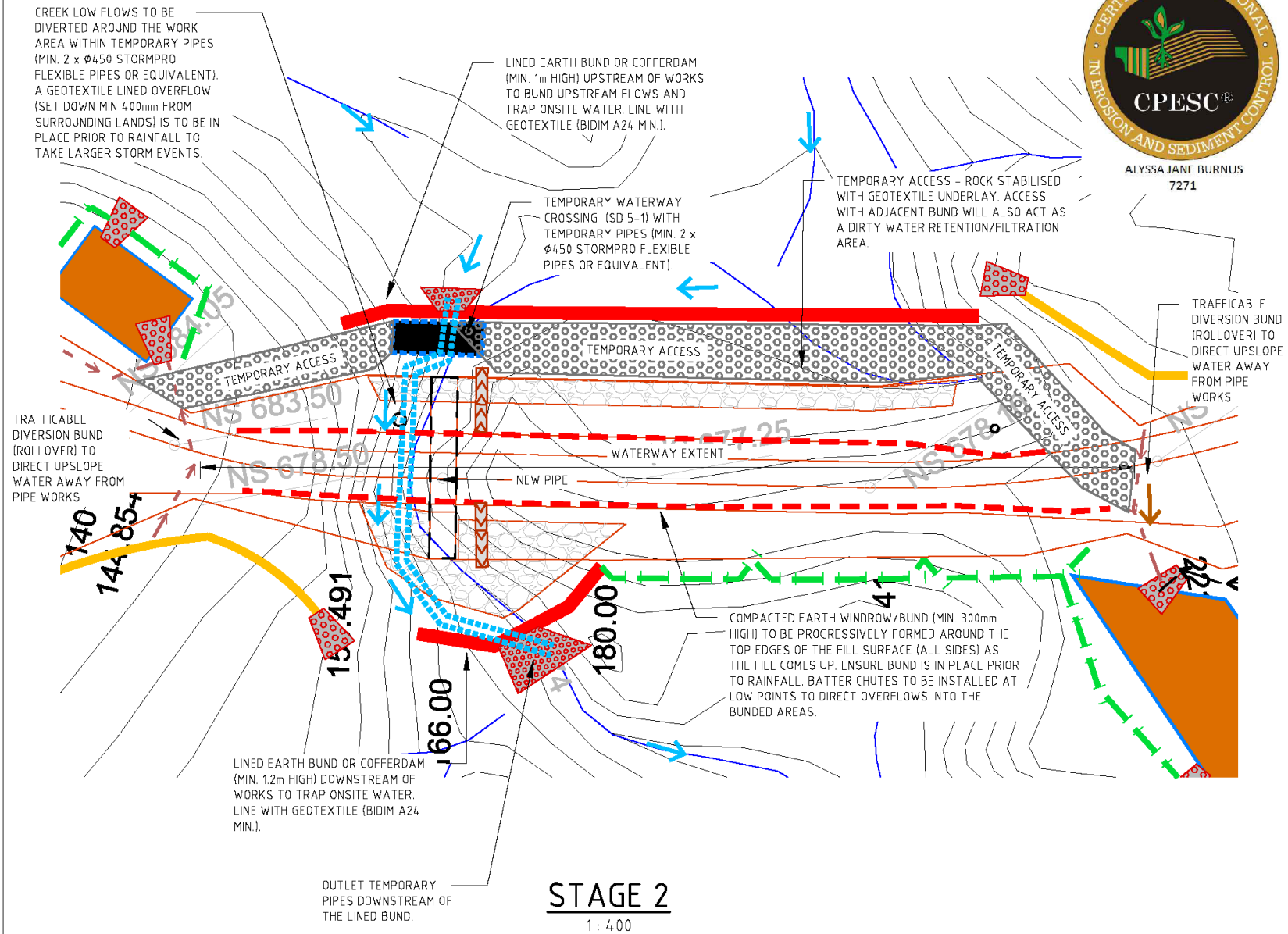
STAGING

WORKS ARE TO BE UNDERTAKEN IN THE FOLLOWING ORDER (REFER TO THE DETAIL PLANS OF EACH STAGE FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS).

- STAGE 1 - SITE ESTABLISHMENT AND CLEAN DIVERSION INSTALLATION (REFER TO ESCP06).
- STAGE 2 - PIPE INSTALLATION AND ROADWAY/FILL CONSTRUCTION WORKS (AS SHOWN ON THIS PLAN).
- STAGE 3 - FINISHING WORKS - REMOVAL OF TEMPORARY ACCESS AND LINED EARTH BUNDS (REFER TO ESCP08).

STAGE 2 - PIPE INSTALLATION AND ROADWAY/FILL CONSTRUCTION WORKS

- ONCE ALL UPSTREAM CREEK FLOWS ARE SUCCESSFULLY DIVERTED INTO THE TEMPORARY PIPES, CONSTRUCTION AND EARTHWORKS CAN COMMENCE. AIM TO HAVE ALL CONSTRUCTION WORKS INCLUDING STABILISATION WORKS COMPLETED WITHIN A 2 MONTH PERIOD.
- AIM TO HAVE THE PERMANENT PIPE (INCLUDING PERMANENT INLET AND OUTLET DISSIPATION STRUCTURES) INSTALLED AND BACKFILLED AS PART OF THE INITIAL CONSTRUCTION WORKS AND COMPLETE AS QUICKLY AS POSSIBLE.
- ONCE PERMANENT PIPE INCLUDING INLET AND OUTLET SCOUR PROTECTION IS INSTALLED CREEK FLOWS ARE TO BE DIRECTED INTO THIS PIPE AND THE TEMPORARY PIPES CAN BE REMOVED.
- COMPLETE ALL ADDITIONAL CONSTRUCTION AND EARTHWORKS WITHIN THE WATERWAY CROSSING EXTENT AS QUICKLY AS POSSIBLE.
- ONCE CONSTRUCTION WORKS ARE COMPLETE, UNDERTAKE FINAL STABILISATION WORKS TO ENSURE ALL EXPOSED AREAS ARE LINED/STABILISED.



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						DESIGN BY A.J.B. DRAWN BY A.J.B. FINAL APPROVAL A.M. SCALE: (on A3 Original) 1:400				EROSION & SEDIMENT CONTROL PLAN
02	19/05/15	A.J.B.	A.J.B.	M.P.	REVISED SEDIMENT BASIN DESIGN					PROJECT NO.
01	21/01/15	A.J.B.	A.J.B.	M.P.	ISSUE FOR CONSTRUCTION					SUB-PR NO.
00	29/04/14	A.J.B.	A.J.B.	A.M.	ISSUE FOR TENDER					DRAWING NO.
A	02/04/14	A.J.B.	A.J.B.	A.M.	DRAFT ISSUE FOR CONSULTATION	FINAL				REV
										02

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DARGUES GOLD PROJECT
T.S.F. HAUL ROAD

PROJECT NO. 13000046
SUB-PR NO. P02
DRAWING NO. ESCP07
REV 02

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EROSION AND SEDIMENT CONTROL REQUIREMENTS FOR WORKS WITHIN SPRING CREEK

GENERAL

- ALL WORKS ARE TO BE SCHEDULED FOR THE MONTHS FROM APRIL TO MAY INCLUSIVE OR JULY TO SEPTEMBER INCLUSIVE (THE LOWEST RAINFALL EROSIVITY AND AVERAGE RAINFALL MONTHS BASED ON DATA SOURCED FROM THE BLUE BOOK (2004) AND THE BUREAU OF METEROLOGY WEBSITE (APRIL 2014)).
- PRIOR TO UNDERTAKING ANY CONSTRUCTION OR EARTHWORKS ENSURE TEMPORARY GROUNDCOVER MATERIALS (E.G. GEOFABRIC OR BLACK PLASTIC) ARE TO BE LOCATED ON SITE FOR STABILISATION OF EXPOSED SURFACES.
- EARTHWORKS OR SOIL DISTURBANCE OF ANY KIND MUST NOT COMMENCE WITHIN THE WATERCOURSE UNTIL A CLEAN DIVERSION (PUMP/PIPE) IS IN PLACE TO TAKE UPSTREAM FLOWS AROUND THE WORK AREA.
- AT ALL TIMES DURING WORKS, ENSURE THAT NATURAL CREEK FLOWS ARE PIPED OR PUMPED AROUND THE WORK SITE WITHOUT COMING INTO CONTACT WITH EXPOSED SOIL OR DIRTY CONSTRUCTION WATER.
- TEMPORARY CLEAN WATER DIVERSIONS (PUMPS/PIPES) HAVE THE CAPACITY TO TAKE LOW FLOWS ONLY. HIGHER CREEK FLOWS DURING LARGER STORM EVENTS MAY OVERTOP THE CLEAN DIVERSION AND THEREFORE ALL EXPOSED SOILS WITHIN THE WATERWAY MUST BE COVERED OR LINED PRIOR TO RAINFALL TO MINIMISE THE RISK OF EROSION.
- DURING ALL WORKS STAGES ALL EXPOSED SOILS WITHIN THE WATERWAY EXTENT ARE TO BE STABILISED WITH A TEMPORARY GROUNDCOVER (E.G. GEOFABRIC OR BLACK PLASTIC) PRIOR TO RAINFALL. THE TOP SURFACE OF THE EARTHWORKS FILL PLATFORM MAY BE STABILISED WITH VITAL STONEWALL PRIOR TO RAINFALL (IN PLACE OF GEOTEXTILE) ONCE THE SUBJECT LEVEL IS AT LEAST 500mm ABOVE THE CREEK OVERFLOW LEVEL.
- EXPOSED BATTERS WITHIN THE WATERWAY EXTENT WHERE WORKS ARE NOT ACTIVELY OCCURRING ARE TO BE TEMPORARILY COVERED WITH GEOTEXTILE OR EQUIVALENT.
- DISTURBANCE WITHIN IN-STREAM LOCATIONS IS TO BE MINIMISED AS MUCH AS POSSIBLE.
- FINAL STABILISATION OF SURFACES IS TO OCCUR PROGRESSIVELY AS EACH SECTION OF WORKS ARE COMPLETE.
- DIRTY (ON-SITE) WATER ACCUMULATING WITHIN THE WORKS AREA IS TO BE PUMPED TO A SEDIMENT BASIN FOR TREATMENT OR TREATED IN-SITU PRIOR TO DISCHARGING INTO THE CREEK. ALTERNATIVELY ONSITE WATER CAN BE USED FOR DUST SUPPRESSION ON THE ROADWORK AREAS OUTSIDE OF THE WATERWAY EXTENT (I.E. AREAS THAT DRAIN BACK INTO A SEDIMENT BASIN).

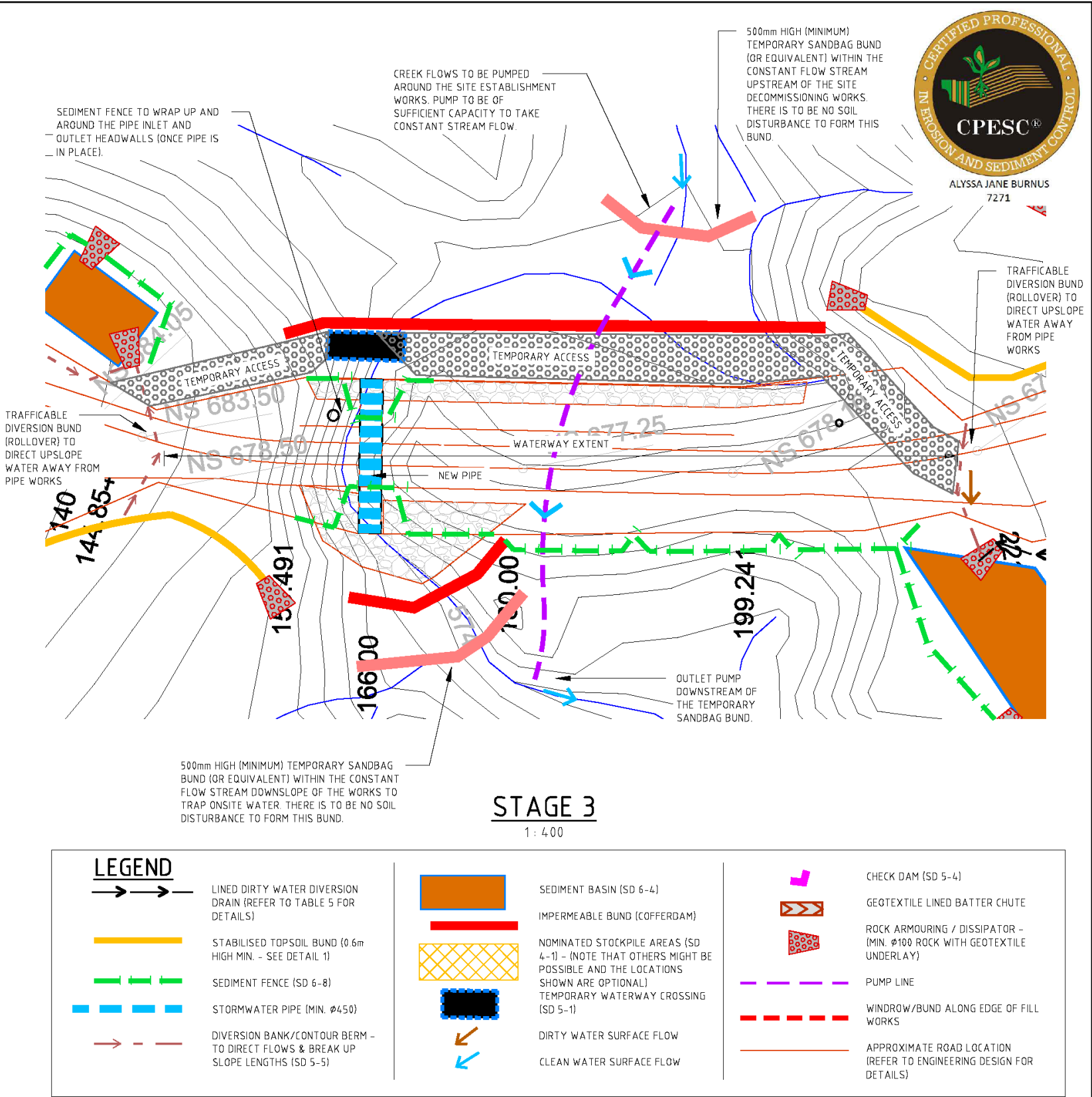
STAGING

WORKS ARE TO BE UNDERTAKEN IN THE FOLLOWING ORDER (REFER TO THE DETAIL PLANS OF EACH STAGE FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS).

- STAGE 1 – SITE ESTABLISHMENT AND CLEAN DIVERSION INSTALLATION (REFER TO ESCP06)
- STAGE 2 – PIPE INSTALLATION AND ROADWAY/FILL CONSTRUCTION WORKS (REFER TO ESCP07)
- STAGE 3 – FINISHING WORKS – REMOVAL OF TEMPORARY ACCESS AND LINED EARTH BUNDS (AS SHOWN ON THIS PLAN).

STAGE 3 - FINISHING WORKS – REMOVAL OF TEMPORARY ACCESS AND LINED EARTH BUNDS

- SCHEDULE WORKS FOR A DRY PERIOD. MONITOR CREEK FLOW AND WEATHER FORECASTS – LOW FLOWS AND AT LEAST 3 CLEAR DAYS ARE NEEDED TO UNDERTAKE STAGE 3 (i.e. 3 DAYS TO DO STEPS 2 TO 6).
- CONSTRUCT TEMPORARY UP AND DOWNSTREAM SANDBAG BUNDS WITHIN THE EXISTING CREEK (SIMILAR TO STAGE 1) TO BUND UPSTREAM WATER AND TRAP ONSITE WATER. THERE IS TO BE NO SOIL DISTURBANCE CREATED IN ORDER TO INSTALL THESE BUNDS.
- SET UP PUMP SYSTEM AND DIVERT THE CONSTANT CREEK FLOW AROUND THE WORK AREA.
- REMOVE THE TEMPORARY ACCESS AND WATERCOURSE CROSSING (IF STILL REMAINING) AND REMOVE THE LINED EARTH BUNDS.
- COMPLETE FINAL REHABILITATION WORKS TO ENSURE ALL REMAINING DISTURBED/EXPOSED SOIL AREAS ARE STABILISED.
- REMOVE SANDBAG BUND AND PUMP SYSTEM AND DIRECT CREEK FLOWS INTO THE NEW PIPE.

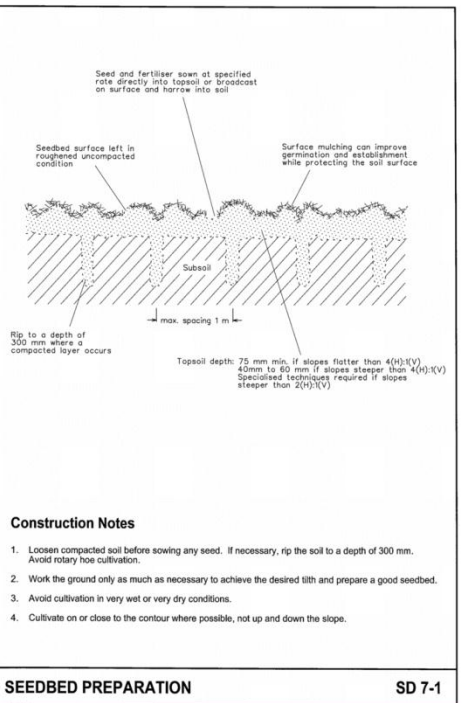
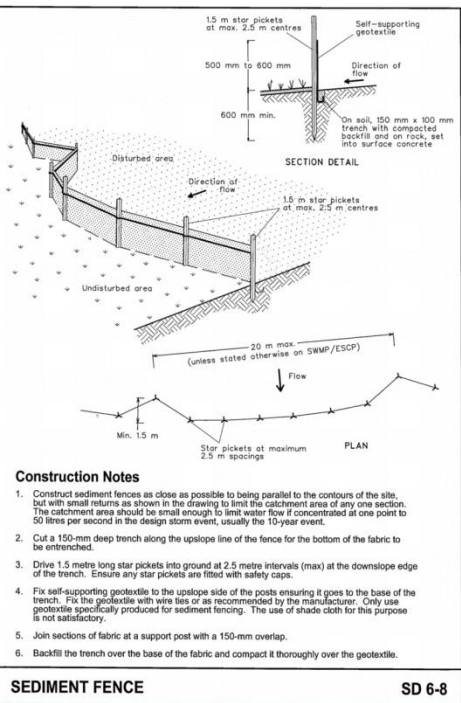
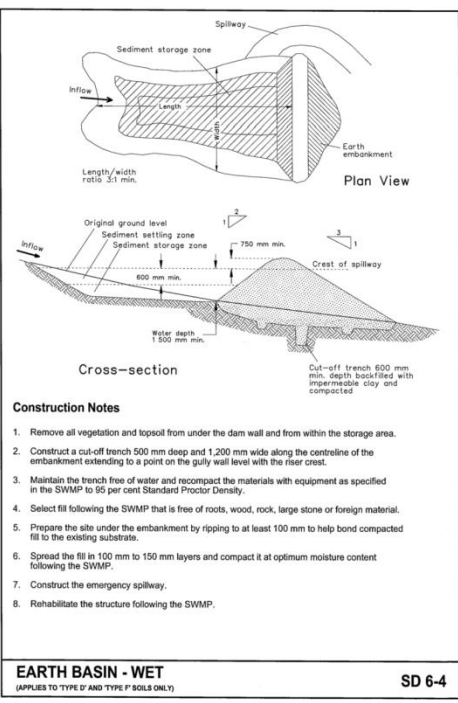
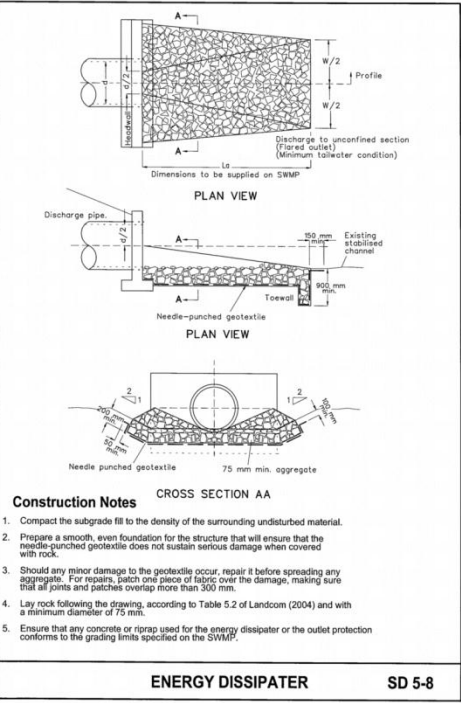
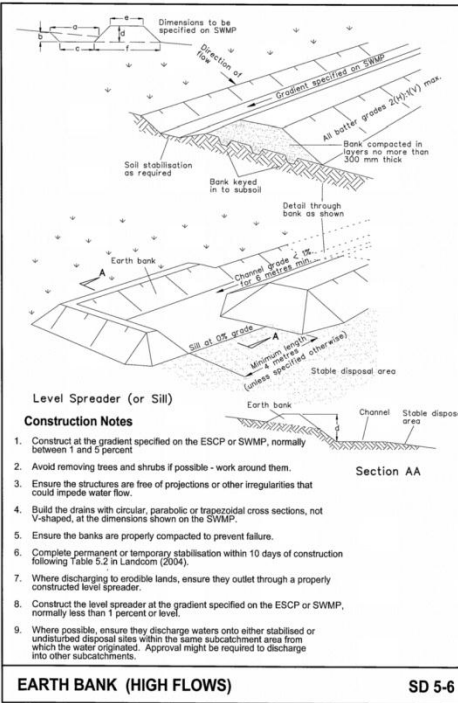
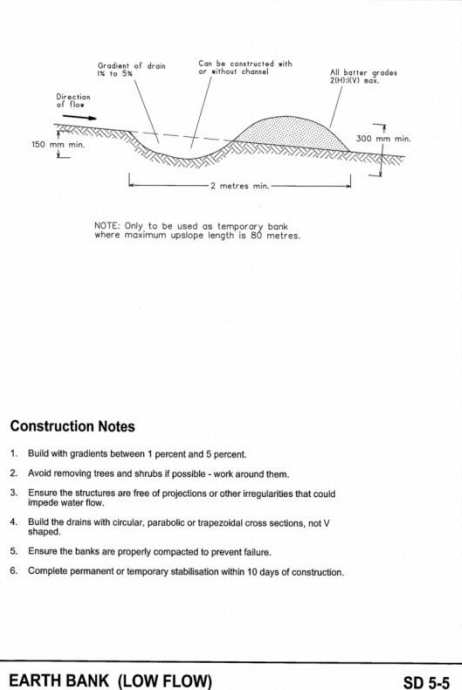
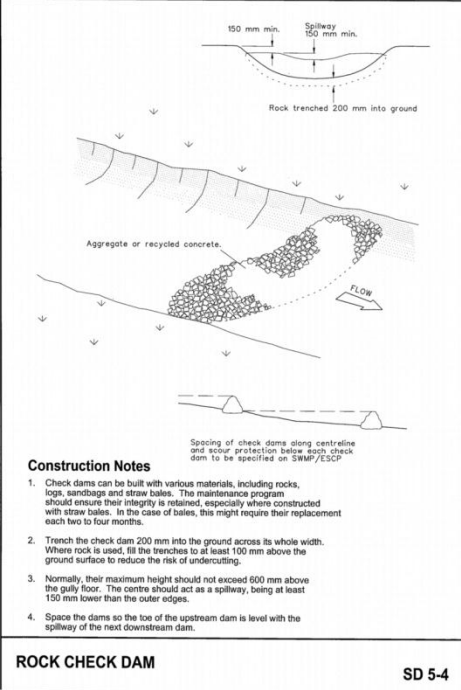
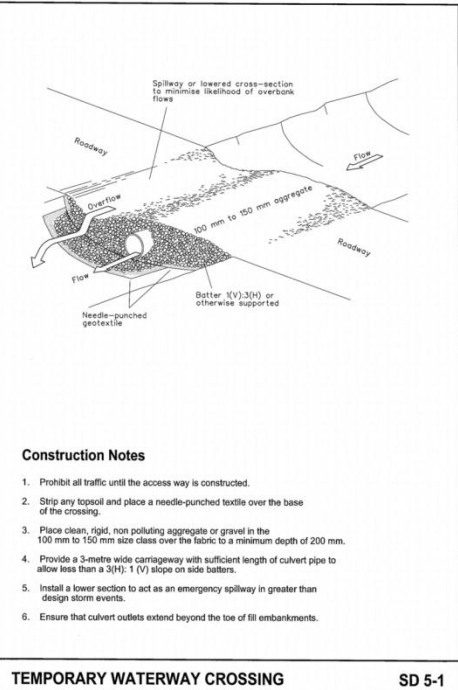
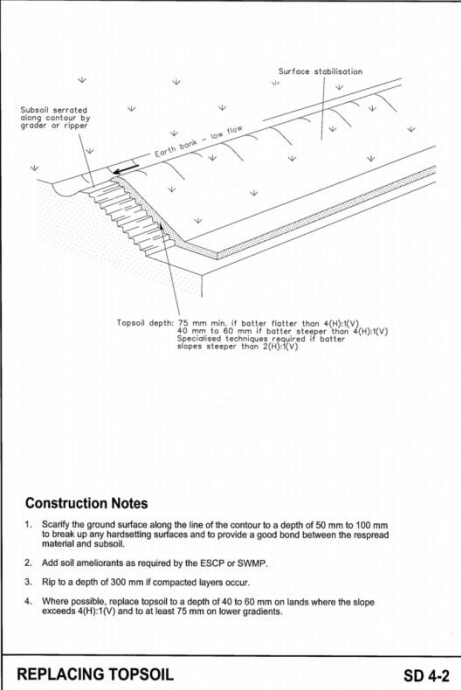
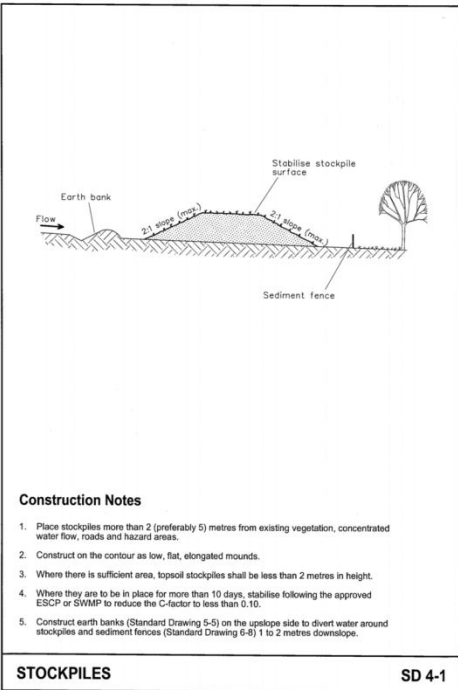


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						DESIGN BY: A.J.B. DRAWN BY: A.J.B. FINAL APPROVAL: A.M. SCALE: (on A3 Original) 1:400 FINAL				EROSION & SEDIMENT CONTROL PLAN WATERWAY DETAIL PLAN – STAGE 3
02	19/05/15	A.J.B.	A.J.B.	M.P.	REVISED SEDIMENT BASIN DESIGN					
01	21/01/15	A.J.B.	A.J.B.	M.P.	ISSUE FOR CONSTRUCTION					
00	29/04/14	A.J.B.	A.J.B.	A.M.	ISSUE FOR TENDER					
A	02/04/14	A.J.B.	A.J.B.	A.M.	DRAFT ISSUE FOR CONSULTATION					

PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
13000046	P02	ESCP08	02

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						DESIGN BY A.J.B.				EROSION & SEDIMENT CONTROL
						DRAWN BY A.J.B.				PLAN
						FINAL APPROVAL A.M.				STANDARD DRAWINGS
						SCALE: (on A3 Original)				
02	19/05/15	A.J.B.	A.J.B.	M.P.	REVISED SEDIMENT BASIN DESIGN					
01	21/01/15	A.J.B.	A.J.B.	M.P.	ISSUE FOR CONSTRUCTION					
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PROJECT TITLE

DARGUES GOLD
PROJECT
T.S.F. HAUL ROAD

DRAWING TITLE

EROSION & SEDIMENT CONTROL
PLAN
STANDARD DRAWINGS

PROJECT NO.

13000046

SUB-PR NO.

P02

DRAWING NO.

ESCP09

REV

02

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