

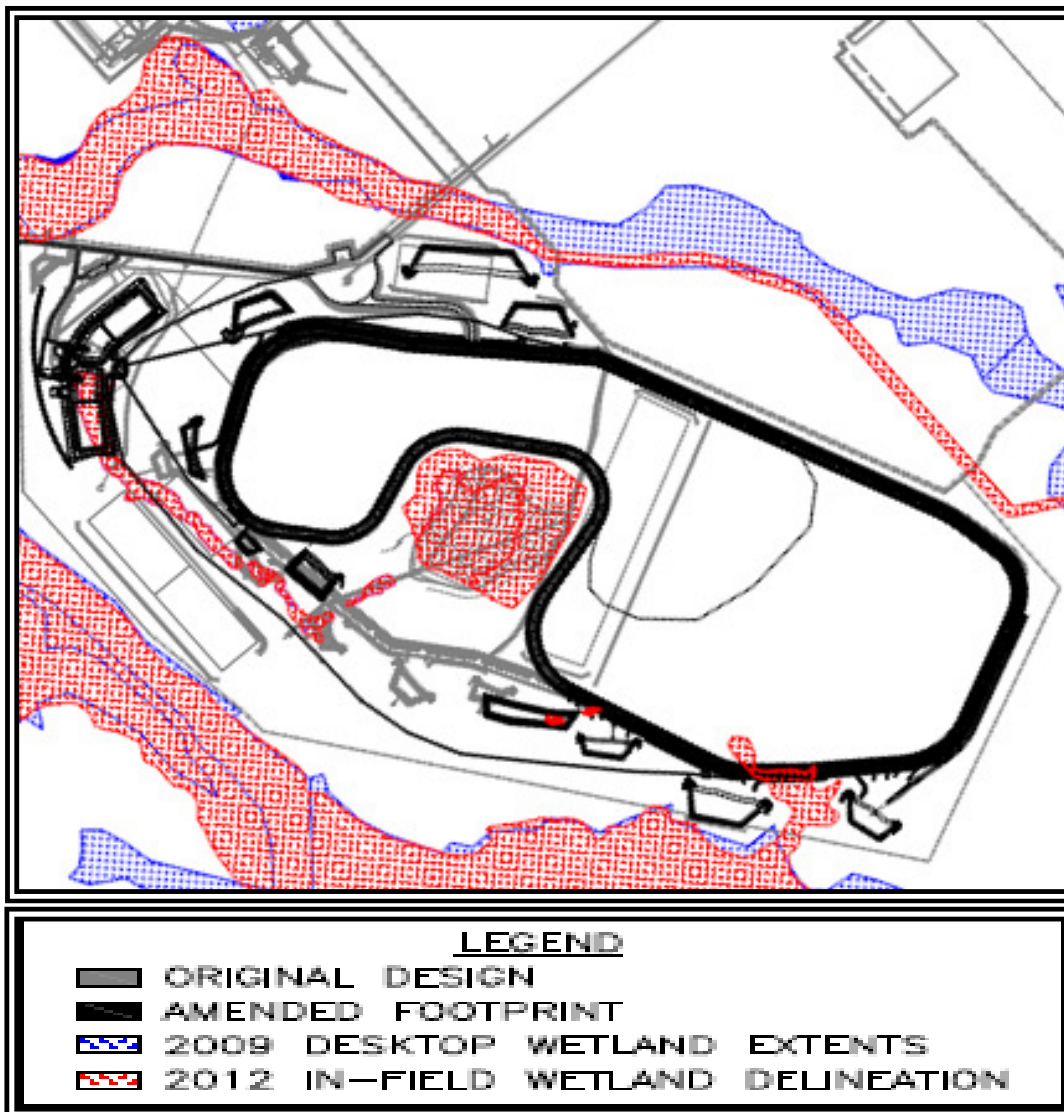
## Wetlands Construction Method Statement

### Kusile Power Station – Combustion Waste Terrace

#### I. Scope

The Construction Method Statement supports the Site Specific Construction Environmental Management Programme for the River Crossings and Wetlands and Construction within Rivers and Wetlands at the Kusile Power Station Combustion Waste Terrace (DEA reference 14/12/16/3/3/1/700). Figure 1 indicates a general site layout with structures relative to the wetlands from the CEMP (2007) and the ground truth wetland delineation (2012).

Figure 1



## II. Design Responsibility

The design of the Combustion Waste Terrace is rather complex with various Consultants and Sub-Consultants involved as shown in Figure 2. The linear services activities described below are examined in detail later.

Material Handling equipment in the ARMCO culvert and Radial Stacker areas form part of Bateman Africa scope.

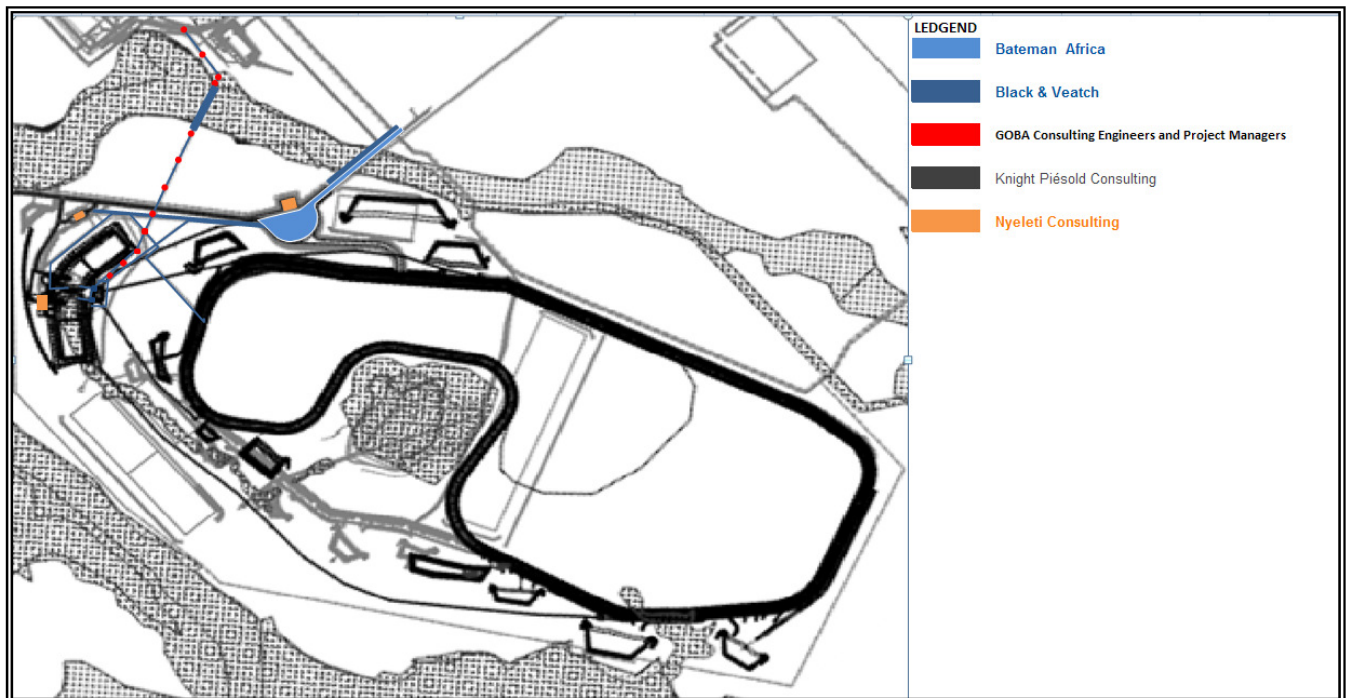
Black & Veatch designed road 1 and 2 (over ARMCO culvert) and other linear services; 525 pipe (ADDD to SDD) including above ground crossing of the wetland, 110/160 diameter pipes (Workshop Terrace to the Power Block), 315 diameter pipe (Ash Dump Dirty Dam to Power Block) and electrical cable routes ( Pump Station to Power Block).

Goba Consulting Engineering and Project Managers designed Junction Boxes JB949 to JB965.

Nyaleti Consulting designed the Sub-Station, Workshop and Pump Station buildings.

All remainder design work done by Knight Piésold Consulting.

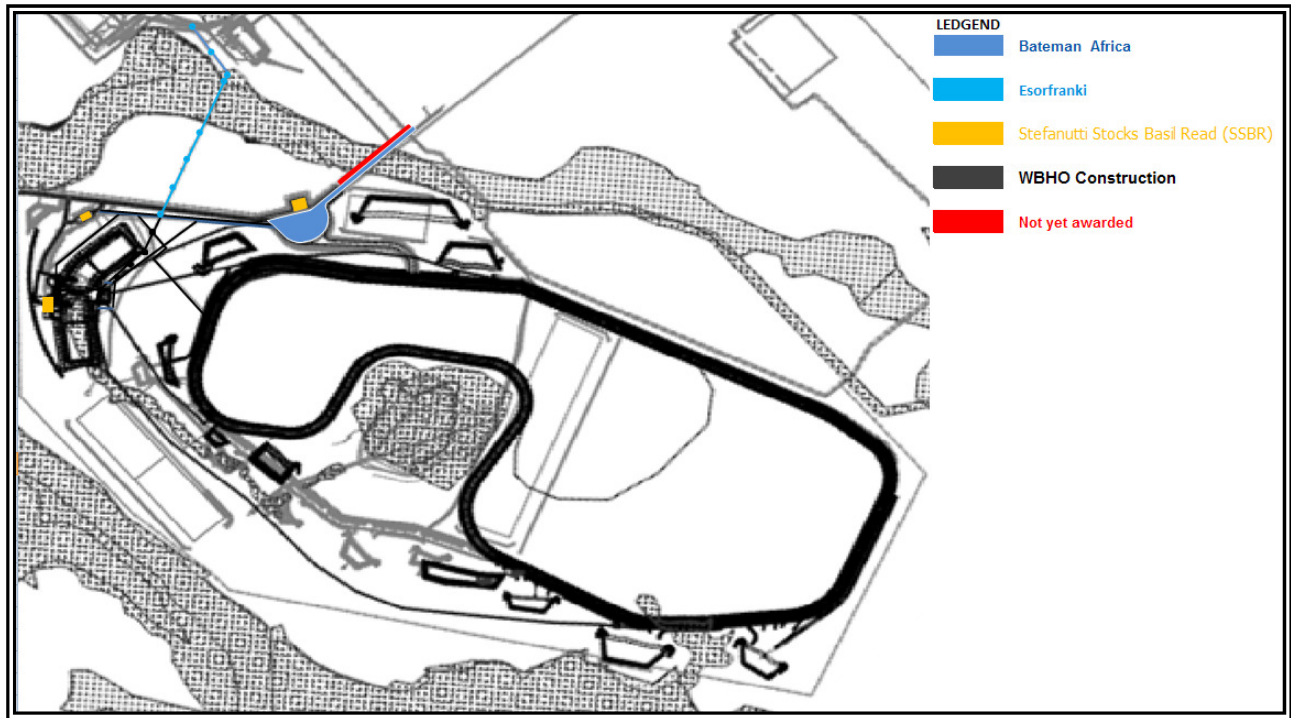
**Figure 2 – Design Responsibilities**



### III. Construction Contractor Responsibility

The current Construction Contractor package split is shown in Figure 3.

**Figure 3- Current Package Scope**

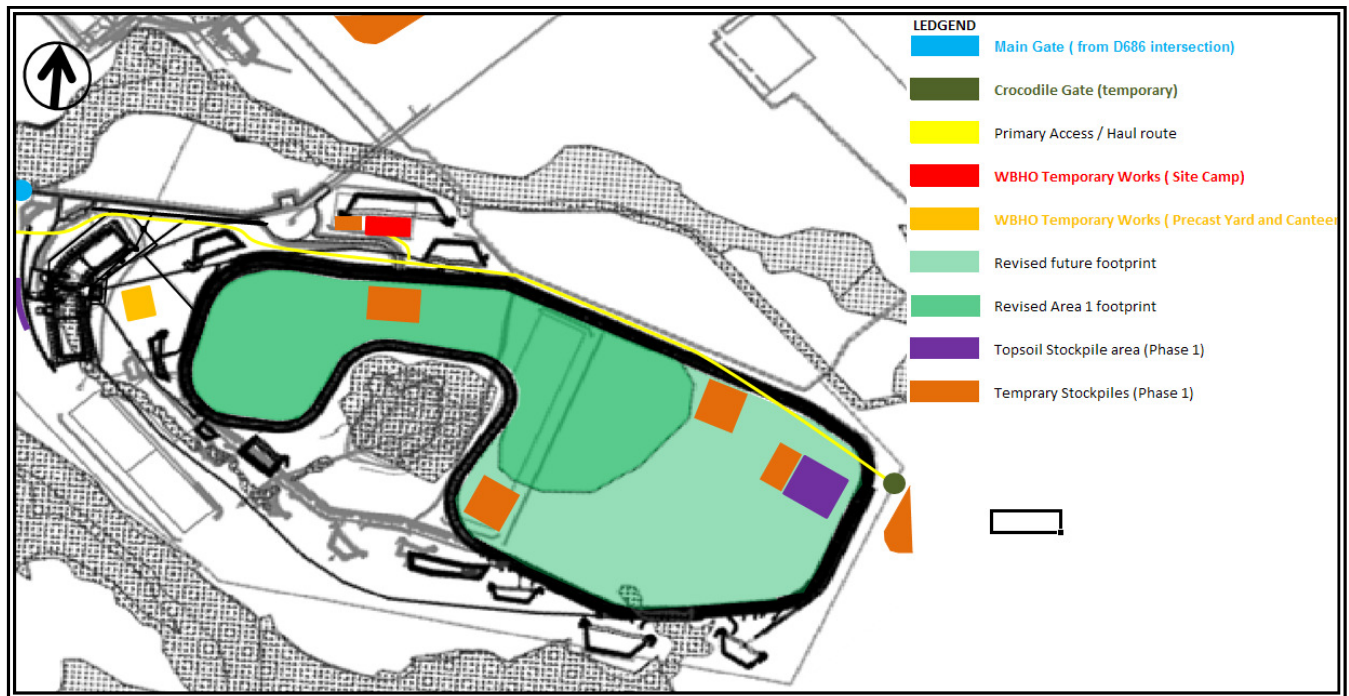


Package 26 Constructing Contractor's the only contractor within the current scope split specializing in piling activities and therefore retains the scope of work outside the Combustion Waste Terrace permanent fence.

### IV. Access Control

It is imperative to construct the permanent fence as soon as possible along the perimeter of the 10 year Combustion Waste Terrace to control unauthorized access to site in response to condition item 7.1 (Appendix III) in the Water Use License 04/B20F/CGI/1836 dated 20/06/2012. The package 23A Constructing Contractor, WBHO Construction, control access to the site until Take Over when control reverts to the Project. Access to site (for authorized employees and their contractors) can be obtained through access gates subject to compliance to access requirements.

**Figure 4- Temporary Works and Access to site**



## V. Regulated activities within a wetland

### 1. Ash Dump Dirty Dam (ADDD) and settling tanks

#### 1.1. Applicable regulation

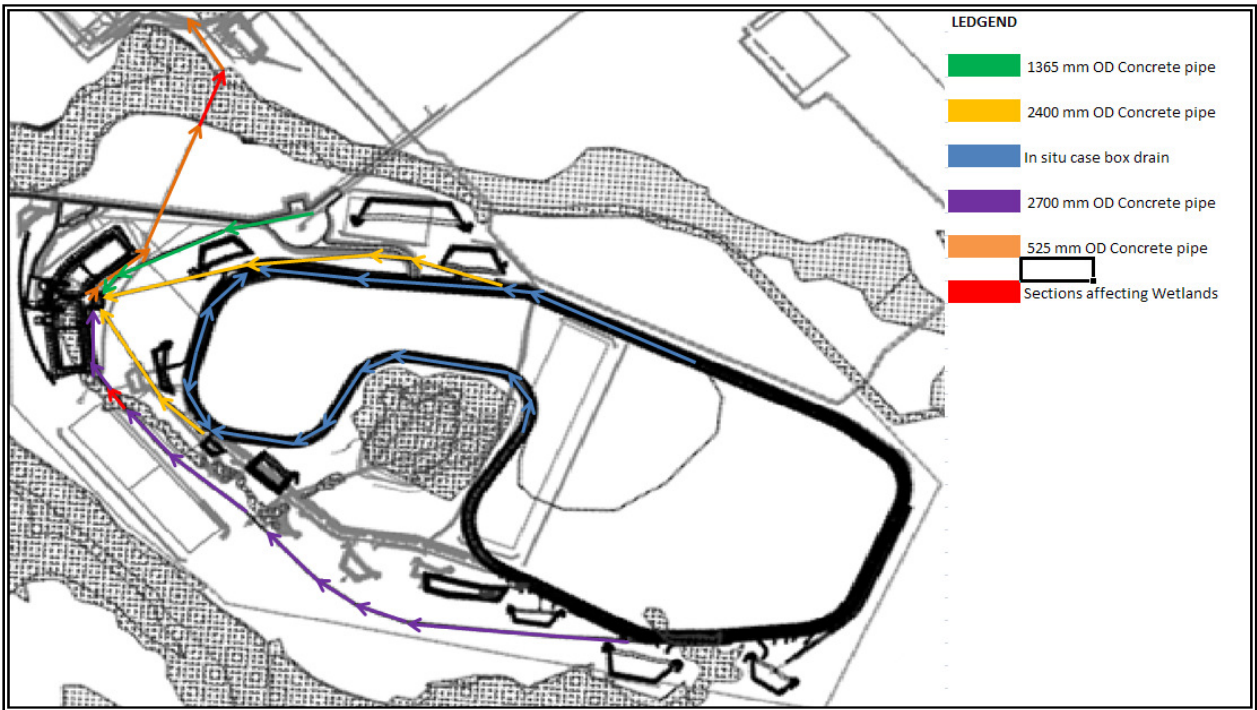
- Activity 11 of GN 544 for the construction of the ash dump dirty dam (ADDD) and settling dams within a wetland
- Activity 18 of GN 544 for the removal of soil located in a wetland for the construction of the ADDD.

#### 1.2. Design

Various Dirty Water Drain pipe systems to and from the ADDD had to be considered in positioning the ADDD as can be seen in Figure 1.2.1. The overflow system (525 OD pipe between the ADDD and the Station Dirty Dam (SDD) in section 5 also refer.



**Figure 1.2.1- Dirty Water Systems**



**1.3. Programme**

Activities within the watercourse are listed in Table 1.21, 1.2.2 and 1.2.3 below. Months of seasonal low flows (September/ October months) have been taken into consideration in the schedule. Due to the complexity and duration of activities, activities could also not be confined to the months of seasonal low flow.

Construction timeframes are shown in table 1.2.1 below based on the receiving a positive Environmental Authorization on 1 May 2013 for each of the listed activities

Table 1.2.1

Wetland/ River Crossing Number	Description	GPS location		Start Date	Finish Date
		South	East		
10	removal of soil located in a wetland for the construction of the ADDD	25°56'4.61"	28°53'51.75"	2013/05/01	2013/08/29
1	Construction of the ash dump dirty dam (ADDD) within a wetland	25°56'4.61"	28°53'51.75"	2013/05/01	2014/11/26

A positive Environmental Authorization on 1 June 2013 for each of the listed activities will result in the following impacts to the schedule. Allowance of 20 days for the 2014 Builders Break allowed for in the Completion of the ADDD. A summary of the activities are shown in Table 1.2.2

Table 1.2.2

Wetland/ River Crossing Number	Description	GPS location		Start Date	Finish Date
		South	East		
10	removal of soil located in a wetland for the construction of the ADDD	25°56'4.61"	28°53'51.75"	2013/06/01	2013/09/29
1	Construction of the ash dump dirty dam (ADDD) within a wetland	25°56'4.61"	28°53'51.75"	2013/06/01	2015/01/16

A positive Environmental Authorization on 1 July 2013 for each of the listed activities will result in the following impacts to the schedule. Allowance of 30 days for re-mobilization, induction and training allowed for in both start dates. Allowance of 20 days for the 2014 Builders Break allowed for in the Completion of the ADDD. A summary of the activities are shown in Table 1.2.3.

Table 1.2.3

Wetland/ River Crossing Number	Description	GPS location		Start Date	Finish Date
		South	East		
10	removal of soil located in a wetland for the construction of the ADDD	25°56'4.61"	28°53'51.75"	2013/07/30	2013/11/29
1	Construction of the ash dump dirty dam (ADDD) within a wetland	25°56'4.61"	28°53'51.75"	2013/07/30	2015/03/16

## 1.4. Methodology

Process	Materials and Equipment	On / Off site Transport	Movement of Materials on site	Method and Storage of Material
Excavation of a cut off trench South side	360° Excavator, Tipper trucks	Equipment will access the site from the North of the hillside seep (not traverse through the wetland from the South). Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers)	360° Excavator will excavate from East to West. Excavated material will be trucked away by tipper trucks along haul roads ( refer to figure 4)	Materials will not be stockpiled on site (Sidecast) and will be spoiled at approved dumping sites of the Project (refer to figure 4)
Excavate Compartment 1,2 JB05 and pump station terrace	360° Excavator, Tipper trucks		Compact selected layer. TLB or telescopic handler will off load the geotextile and using a spreader bar, spread the geotextile. 19 mm washed stone placed in the geotextile and geotextile closed on top	Only sufficient material, to be used during that day, will be temporary stockpiled on site within servitude.
Construct Drain under liner	Geotextile, Pioneer, Fill, 360° Excavator, Tipper trucks, Flatbed truck, Compactor/ Rollers		TLB or telescopic handler will off load the material and using a spreader bar, spread the sheets and then welded in situ by skilled workers	
Install Liner System incl cuspatated sheet	Geotextile, HDPE Liner, Cuspatated sheet Fill, 360° Excavator, Tipper trucks, Flatbed truck, Compactor/ Rollers		Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers/ water pumps)	Manual installation by skilled workers / may be assisted by crane
Construct Concrete liner and Energy Discipators/ Junction Boxes	Formwork (wood or steel shutters)	Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers/ water pumps)	Manual installation by skilled workers	Stacked and stored within the site
	Steel Reinforcing (Mesh & dowels)		Direct Discharge/ chute/ Pump or Crane and bucket dependant on reach	Off Site
	Ready-mix Concrete, Mixer truck, floats			

## 2. Silt Retention Ponds

### 2.1. Applicable regulation

Activity 11 of GN 544 for the construction of settling dams within a wetland.

### 2.2. Design

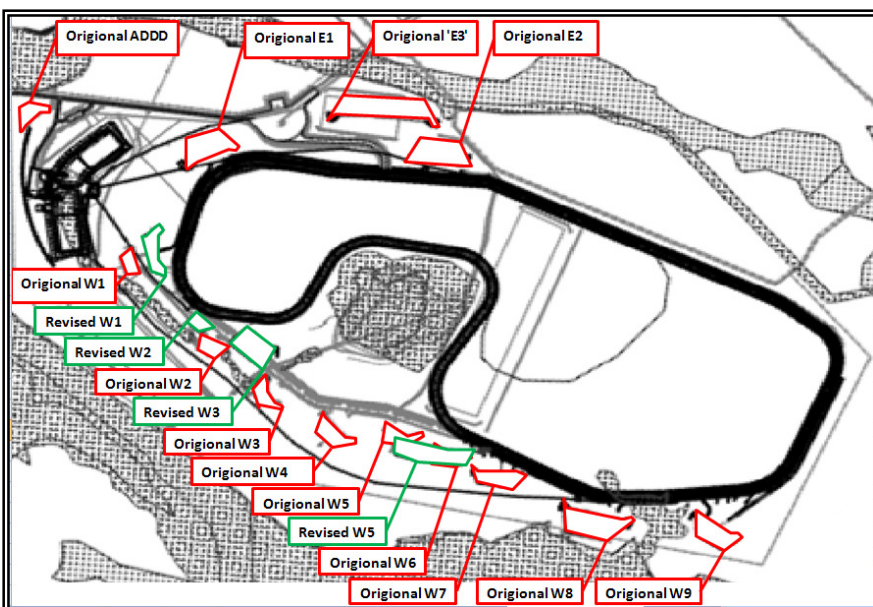
Construction phase and operation phase storm water management include the construction of a number of Silt Retention Ponds (SRP). The location of these SRP can be seen in Figure 2.2.1.

The Engineer revised the SRP W1, W2, W3 and W5 in mitigation of impacts to wetlands based on the latest (2012) specialist wetlands study and the revised Combustion Waste Terrace footprint.

A series of temporary and permanent drainage v-drains channel storm water to the various strategically placed SRPs. Permanent v-drains are lined with topsoil and grassed. Channel slopes are targeted to be less than 2 % based on the existing contour map.

The locations of SRP's are therefore not only determined by the size of the catchment and the rate of runoff but also the location of the v-drains. The existing contours at the location of each SRP also influence the height of the dam's wall. W5 remains with a small residual impact to the wetlands.

**Figure 2.2.1- SRP locations**





## 2.3. Programme

Table 2.3.1

Wetland/ River Crossing Number	Description	GPS location		Start Date	Finish Date
		South	East		
2	Construction of settling dams within a wetland (W5)	25°56'32.92"	28°54'51.87"	2014/03/30	2014/7/30

## 2.4. Methodology

Process	Materials and Equipment	On / Off site Transport	Movement of Materials on site	Method and Storage of Material
Excavation of SRP including dam wall key and outlet pipe	360° Excavator, Tipper trucks	Equipment will access the site from the North (not traverse through the wetland from the South). Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers)	360° Excavator will excavate and material will be trucked away by tipper trucks	Materials will not be stockpiled on site (Sidecast) and will be spoiled at approved dumping sites of the Project
Installation of Pipe	360° Excavator, Tipper trucks, Hi-ab Flatbed truck, Compactor/ Rollers. HDPE pipe		Suitable material will be imported from elsewhere on site, pipe bedding installed and on completion of pipe installation backfilled with suitable material from elsewhere on site	Only sufficient material, to be used during that day, will be temporary stockpiled on site within servitude
Backfilling of permanent works				

### 3. Dirty Water Drain (toe drains)

#### 3.1. Applicable regulation

Activity 11 of GN 544 for the construction of Dirty Water Drains (toe drains) within a wetland.

#### 3.2. Programme

The section of Dirty Water Drain do not form part of the current Constructing Contractor scope of work, the impacted area being close to SRP W8. The Project Strategy is that this will be constructed by Eskom Generation at a later date. Eskom Generation will notify the Department (s) prior to commencement of the activity.

#### 3.3. Methodology

Methodology used elsewhere on site for the same activity.

Process	Materials and Equipment	On / Off site Transport	Movement of Materials on site	Method and Storage of Material
Excavation of box cut trench	360° Excavator, Tipper trucks	Equipment will access the site from the North of the hillside seep (not traverse through the wetland from the South). Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers)	360° Excavator will excavate. Excavated material will be trucked away by tipper trucks along haul roads to stockpile areas (refer to figure 4)	Materials will not be stockpiled on site (Sidecast) and will be spoiled at approved dumping sites of the Project (refer to figure 4)
Construct Dirty Water Drain	Formwork (wood or steel shutters)	Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Cranes/ pumps)	Crane or telescopic handler will off load the material and assembled and installed a by skilled workers	
	Steel Reinforcing		Manual installation by skilled workers / may be assisted by crane	Stacked and stored within the site
	Ready-mix Concrete,		Direct Discharge/ chute/ Pump or	Off Site

	Mixer truck, floats		Crane and bucket dependant on reach	
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#### 4. Ash Dump Access Embankment and ARMCO culvert

##### 4.1. Applicable regulation

- Activity 11 of GN 544 for the construction of the ash dump access embankment (with culvert) within a wetland.
- Activity 18 of GN 544 for the infilling of soil and rock into a wetland for the construction of the ash dump access embankment (with culvert).

##### 4.2. Programme

Activities within the watercourse are listed in Table 4.21 below. Months of seasonal low flows (September/ October months) have been taken into consideration in the schedule. Due to the complexity and duration of activities, activities could also not be confined to the months of seasonal low flow.

Construction timeframes are shown in table 4.2.1 below based on the receiving a positive Environmental Authorization on 1 May 2013 for each of the listed activities. Sub activities include, construction of the diversion berm and temporary stream diversion (40 days), founding level (50 days), installation of the 3 x 5 meter diameter ARMCO pipe culverts (90 days), and backfilling of the 215 000 cubic meter embankment (overall height 10 meters from invert level).

Table 4.2.1

Wetland/ River Crossing Number	Description	GPS location		Start Date	Finish Date
		South	East		
9	infilling of soil and rock into a wetland for the construction of the ash dump access embankment(with culvert)	25°55'31.89"	28° 54'31.61"	2013/05/01	2014/11/26
4	Construction of the ash dump access embankment (with culvert) within a wetland	25°55'31.89"	28°54'31.61"	2013/05/01	2014/11/26

### 4.3. Methodology

Process	Materials and Equipment	On / Off site Transport	Movement of Materials on site	Method and Storage of Material
Deviation of stream - Excavation	360° Excavator, Tipper trucks	Equipment will access the site from the North of the stream (not traverse through the stream from the South).	360° Excavator will excavate from West to East ( Downstream to Upstream), Excavated material will be trucked away by tipper trucks	Materials will not be stockpiled on site (Sidecast) and will be spoiled at approved dumping sites of the Project
Deviation of stream - Installation of Pipe	360° Excavator, Tipper trucks, Hi-ab Flatbed truck, Compactor/ Rollers	Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers)	Suitable material will be imported from elsewhere on site, pipe bedding installed and on completion of pipe installation backfilled with suitable material from elsewhere on site	Only sufficient material, to be used during that day, will be temporary stockpiled on site within servitude
Deviation of stream - Deviation of Stream	360° Excavator, Tipper trucks	Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers)	360° Excavator will excavate from West to East ( Downstream to Upstream), Excavated material will be trucked away by tipper trucks	Materials will not be stockpiled on site (Sidecast) and will be spoiled at approved dumping sites of the Project
Temporary Embankment - Excavation		Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers)	360° Excavator can excavate North to South or South to North. Excavated material will be trucked away by tipper trucks	
Temporary Embankment - Filling	Dumprock, Pioneer, Fill, 360° Excavator, Tipper trucks, Compactor/ Rollers	Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers/ water pumps)	Dumprock/ Pioneer (as and when required) will be imported and fill sources from elsewhere on site.	Only sufficient material, to be used during that day, will be temporary stockpiled on site.
Excavation of permanent works	360° Excavator, Tipper trucks	Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers/ water pumps)	360° Excavator will excavate and excavated material will be trucked away by tipper trucks	Materials will not be stockpiled on site (Sidecast) and will be spoiled at approved dumping sites of the Project
Installation of Subsoil drain	360° Excavator, Tipper trucks, water pump		Pioneer (as and when required) will be imported and fill sources from elsewhere on site. Water will be returned to the stream (downstream) through a siltnet	Only sufficient material, to be used during that day, will be temporary stockpiled on site within servitude.

Backfilling of permanent works	Dumprock, Pioneer, Fill, 360° Excavator, Tipper trucks, Compactor/ Rollers		Dumprock/ Pioneer (as and when required) will be imported and fill sources from elsewhere on site.	
Installation of a temporary crane pad (as and when required if unsuitable founding conditions encountered)				
Installation of ARMCO Culvert	Crane/ Hi-ab Flatbed truck		Installation will be done in sections from East to West and level or below original stream invert level to prevent upstream damming	Material will be stored within reach of the crane within servitude
Construct Wing wall Bases	Formwork (wood or steel shutters)	Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator/ rollers/ water pumps)	Manual installation by skilled workers / may be assisted by crane	Stacked and stored within the servitude
	Steel Reinforcing		Manual installation by skilled workers	Stacked and stored within the servitude
	Ready-mix Concrete		Direct Discharge / chute	Off Site
Construct Wing wall Walls	Formwork (wood or steel shutters)		Manual installation by skilled workers / may be assisted by crane	Stacked and stored within the servitude
	Steel Reinforcing		Manual installation by skilled workers	Stacked and stored within the servitude
	Ready-mix Concrete, truck, crane or pump		Crane & bucket / piped	Off Site
Construct ARMCO Liner	Formwork (wood or steel shutters)		Manual installation by skilled workers	Stacked and stored within the servitude
	Ready-mix Concrete, truck, crane or pump		Crane & bucket / piped	Off Site
Redirect FLOW THROUGH CULVERT	360° Excavator, Tipper trucks		360° Excavator will block temp pipe entrance with soil	N/A
Removal of Temporary Works			360° Excavator will excavate temp embankment and then from Downstream to Upstream, Excavated material will be trucked away by tipper trucks	Materials will not be stockpiled on site (Sidecast) and will be spoiled at approved dumping sites of the Project
Backfilling of permanent works	Dumprock, Pioneer, Fill, 360° Excavator, Tipper trucks,		Dumprock/ Pioneer (as and when required) will be imported and fill sources from elsewhere on site.	Only sufficient material, to be used during that day, will be temporary stockpiled on site till work progressed above



	Compactor/ Rollers		1:100 year floodline.
Stabilization of Subbase	Cement ,Motor Grader Recycler(optio nal), rollers, Watercarts	Grader/ Recycler mix cement into layerworks Watercarts provide moisture during processing and curing period	Only sufficient material, to be used during that day, may be temporary stockpiled on site within servitude
Base Coarse	Base coarse, Motor Grader , rollers, Watercarts	Grader process layerworks Watercarts provide moisture during processing	On Site
Prime/ Wearing Coarse	Prime, Bearcat, Handpump / Apshalt, paver, tippers, rollers	Bearcat spray Base at required applied rate/ Handpump spreading for small areas, Paver spreads asphalt and rollers compact	Off Site

## 5. Spillage Mitigation pipeline between ADDD and SDD

### 5.1. Applicable regulation

Activity 11 of GN 544 for the crossing of wetlands by pipeline between the ADDD and Station Dirty Dam (SDD).

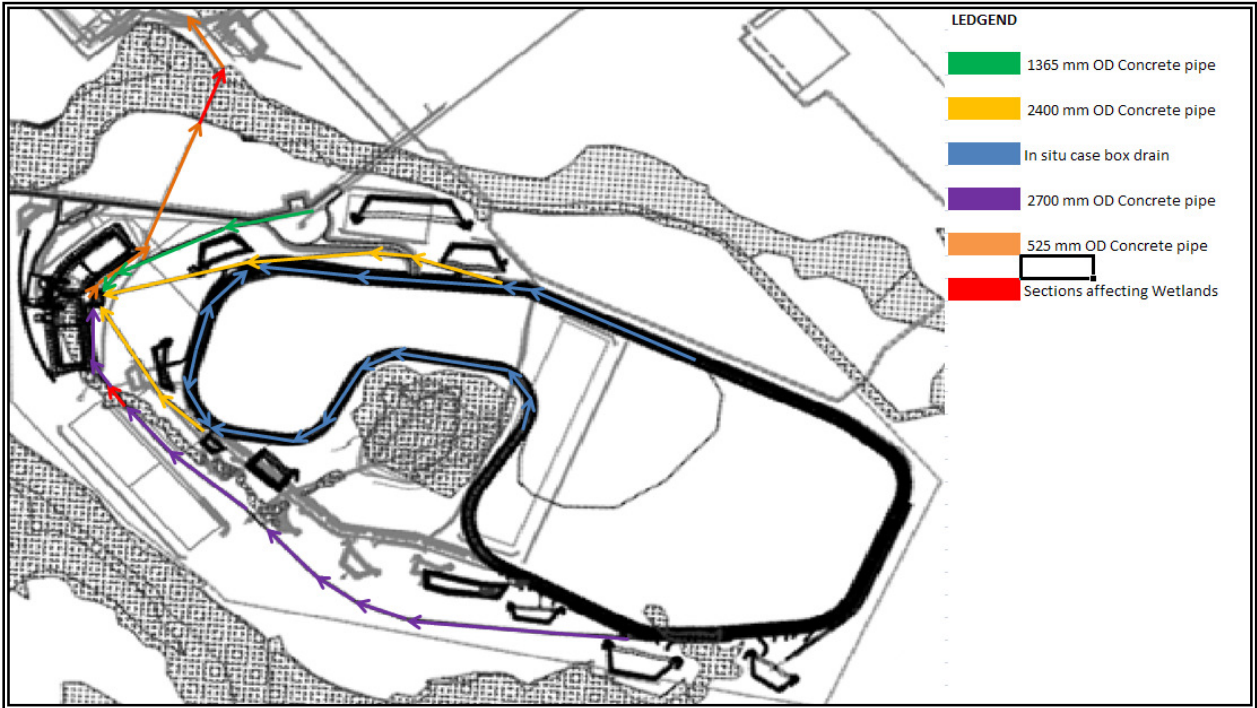
### 5.2. Design

The 525 mm OD pipeline system has been conceptually designed to mitigate the risk of ADDD overflow being spilled within the wetland. Dirty Water collected through the various pipe systems is retained at the ADDD and reused on the CWT dust suppression system during normal operations. The emergency system has been designed above ground level within the wetland in line with the recommendations of the EMP (2007) in mitigation of the risk of forming a preferential flow path along the pipe bedding.

The optimum route selection, based on the smallest possible impact, is shown in Figure 5.2.1 after considering the alternatives of crossing at the ARMCO culvert (next to the Raw Water pipeline from Kendal crossing) and crossing at the Access Road (D686). These alternatives are not feasible due to an elevation constraint; only a 0,6% slope available on the selected route.

The Project assumed that the foundation structures to be small as the pipe system is rather small (in design terms) and requires access to the wetland to do the geotechnical investigation in order to complete the detail design for the above ground section (wetlands section).

**Figure 5.2.1- Dirty Water Systems**



**5.3. Programme**

Only the wetlands section referred to below.

Wetland/ River Crossing Number	Description	GPS location		Start Date	Finish Date
		South	East		
5a	Crossing of wetlands by pipeline between the ADDD and station dirty dam (Geotech Investigation);	25°55'25.92"	28°54'7.95"	2013-07-31	2013-09-29
5b	Crossing of wetlands by pipeline between the ADDD and station dirty dam (Construction);	25°55'25.92"	28°54'7.95"	2014-02-25	2014-10-30

## 5.4. Methodology

The Project requires access to the wetland to do the geotechnical investigation in order to complete the detail design for the above ground section.

Process	Materials and Equipment	On / Off site Transport	Movement of Materials on site	Method and Storage of Material
Piling excavation	Bobcat /mini excavator/ Rig with auger	Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( tractors etc.) and at least 100 m away from wetlands (excavator, water pumps)	Pile borings will be sidecast, picked up on a daily basis and spoiled outside the 100 meter buffer zone trucked away by tipper trucks	Materials will not be stockpiled overnight and will be spoiled at approved dumping sites of the Project
Piling	Steel Reinforcing		Manual installation by skilled workers	Stacked and stored within the servitude
	Ready-mix Concrete, bobcat (or similar light equipment)		Direct Discharge / chute	Off Site
Construct Pile caps / Foundations	Formwork (wood or steel shutters)		Manual installation by skilled workers / may be assisted by crane	Stacked and stored within the servitude
	Steel Reinforcing		Manual installation by skilled workers	Stacked and stored within the servitude
	Ready-mix Concrete, bobcat (or similar light equipment)		Direct Discharge / chute	Off Site
Rehabilitation	Tractor with disc harrow or plough		Disc or plough with contours to loosen soil compacted through plant movement and reinstate wetland banks	N/A
Rehabilitation	Seeds, seed spreader		Disc or plough with contours to loosen soil compacted through plant movement correcting preferential flow paths along equipment tracks and reinstate wetland banks	Harvest seeds in this area in current/ store in a cool dry place for use in next season

The remainder of the pipe system (below ground) as follows;

Process	Materials and Equipment	On / Off site Transport	Movement of Materials on site	Method and Storage of Material
Excavation of pipe trench	360° Excavator, Tipper trucks	Equipment will access the site from the downstream end. Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least > 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator)	360° Excavator will excavate in sections from direction South ( Southern leg) or visa versa. Excavated material will be sidecast outside the 100 meter buffer zone or trucked away by tipper trucks	Materials will be stockpiled on site (sidecast) on the upstream side of the trench and excess can be spoiled at approved dumping sites of the Project
Pipe Bedding	Bedding material, 360° Excavator, Tipper trucks		360° Excavator will place material in sections from direction South ( Southern leg) or visa versa. Stockpiled material will be placed downstream outside the 100 meter buffer zone	Materials will be stockpiled on site (sidecast) on the upstream side of the trench and excess can be spoiled at approved dumping sites of the Project
Pipe installation	Concrete pipes, 360° Excavator or mobile crane, Flatbed trucks		Pipes will be delivered to site by supplier and stockpiled downstream of the trench.	Pipes will be delivered to site by supplier and stockpiled downstream of the trench.
Construct Junction Boxes walls	Formwork (wood or steel shutters)		Manual installation by skilled workers / may be assisted by crane	Stacked and stored within the servitude
	Steel Reinforcing		Manual installation by skilled workers	Stacked and stored within the servitude
	Ready-mix Concrete		Direct Discharge / chute	Off Site
Construct Junction Boxes and walls	Formwork (wood or steel shutters)		Manual installation by skilled workers / may be assisted by crane	Stacked and stored within the servitude
	Steel Reinforcing		Manual installation by skilled workers	Stacked and stored within the servitude
	Ready-mix Concrete, truck, crane or pump		Crane & bucket / piped	Off Site
Backfilling of permanent works	Fill ex excavation, 360° Excavator, Tipper trucks, Compactor/ Rollers		fill sources from sidecast on site.	fill sources from sidecast next to trench. Excess spoiled at approved dump site

## 6. Dirty Water Pipeline between Ash Dump and ADDD

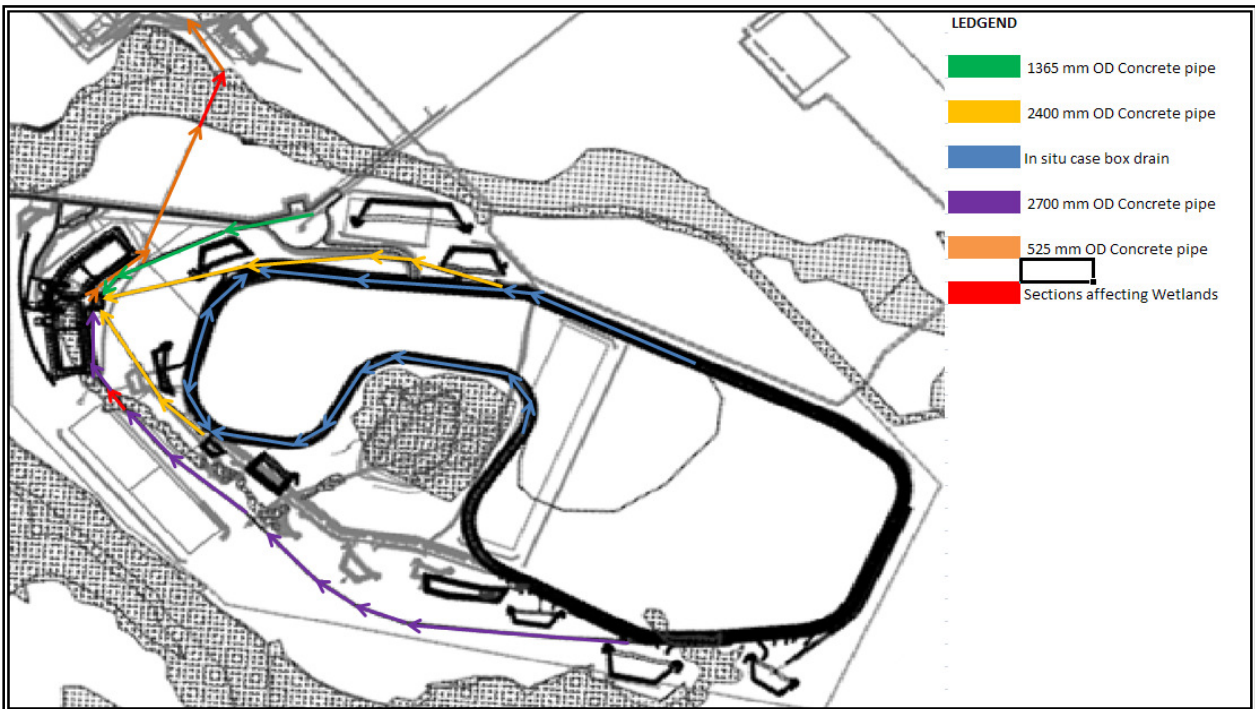
### 6.1. Applicable regulation

Activity 11 of GN 544 for the crossing of the wetland by a dirty water pipeline between the Ash Dump and the ADDD.

### 6.2. Design

The affected area can be seen along the 2700 mm OD pipeline highlighted in red – Figure 6.2.1.

Figure 6.2.1- Dirty Water Systems



### 6.3. Programme

The section of Dirty Water Drain do not form part of the current Constructing Contractor scope of work, the impacted area being close to SRP W8. The Project Strategy is that this will be constructed by Eskom Generation at a later date. Eskom Generation will notify the Department (s) prior to commencement of the activity.



## 6.4. Methodology

Process	Materials and Equipment	On / Off site Transport	Movement of Materials on site	Method and Storage of Material
Excavation of pipe trench	360° Excavator, Tipper trucks	<p>Equipment will access the site from the downstream end. Equipment will use predetermined haul route. Equipment will be stored overnight at camps or at least &gt; 100 meter away from wetlands. Equipment will be refuelled at filling depot ( trucks etc.) and at least 100 m away from wetlands ( Excavator)</p>	360° Excavator will excavate in sections from direction South ( Southern leg) or visa versa. Excavated material will be sidecast outside the 100 meter buffer zone or trucked away by tipper trucks	Materials will be stockpiled on site (sidecast) on the upstream side of the trench and excess can be spoiled at approved dumping sites of the Project
Pipe Bedding	Bedding material, 360° Excavator, Tipper trucks		360° Excavator will place material in sections from direction South ( Southern leg) or visa versa. Stockpiled material will be placed downstream outside the 100 meter buffer zone	Materials will be stockpiled on site (sidecast) on the upstream side of the trench and excess can be spoiled at approved dumping sites of the Project
Pipe installation	Concrete pipes, 360° Excavator or mobile crane, Flatbed trucks		Pipes will be delivered to site by supplier and stockpiled downstream of the trench.	Pipes will be delivered to site by supplier and stockpiled downstream of the trench.
Construct Junction Boxes walls	Formwork (wood or steel shutters)		Manual installation by skilled workers / may be assisted by crane	Stacked and stored within the servitude
	Steel Reinforcing		Manual installation by skilled workers	Stacked and stored within the servitude
	Ready-mix Concrete		Direct Discharge / chute	Off Site
Construct Junction Boxes and walls	Formwork (wood or steel shutters)		Manual installation by skilled workers / may be assisted by crane	Stacked and stored within the servitude
	Steel Reinforcing		Manual installation by skilled workers	Stacked and stored within the servitude
	Ready-mix Concrete, truck, crane or pump	Crane & bucket / piped	Off Site	
Backfilling of permanent works	Fill ex excavation, 360° Excavator, Tipper trucks, Compactor/ Rollers	fill sources from sidecast on site.	fill sources from sidecast next to trench. Excess spoiled at approved dump site	

## 8. Perimeter fencing

### 8.1. Applicable regulation

Activity 11 of GN 544 for the crossing of wetlands by the fence-lines around the Kusile ash dump and the Kusile Power Station.

### 8.2. Design

Three different design solutions are applicable. In area 7 (Coal Stock Yard) a fence bridge over the concrete structure has been provided, in area 4 (ARMCO culvert) the perimeter fence will cross the wetlands at the culvert embankment and in area 8 the perimeter fence cross the wetlands with a buried 300 mm section of bonnox wire mesh imbedded along the fence route as shown.

### 8.3. Programme

Wetland/ River Crossing Number	Description	GPS location		Start Date	Finish Date
		South	East		
4	Construction of the ash dump access embankment (with culvert) within a wetland	25° 55'31.89"	28°54'31.61"	2014-08-01	2014-11-26
7	Crossing of wetlands by the fence-lines around the Kusile ash dump and the Kusile Power Station.	25° 55'48.71"	28°55'50.71"	2014/07/25	2014/10/25
8	Crossing of wetlands by the fence-lines around the Kusile ash dump and the Kusile Power Station.	25° 56'42.78"	28°55'23.01"	2014/07/25	2014/10/25

## 8.4. Methodology

Only at location 8 craft workers will work in "contact" with the wetland

Process	Materials and Equipment	On / Off site Transport	Movement of Materials on site	Method and Storage of Material
Hand Excavation of fence post holes and anchor trench	Spades, picks , wheel barrows and shovels	Care should be taken not to create preferential flow paths along fence route	material sidecast and re-used later as backfill	Excess material will be removed
installation of fence	Concrete, wheel barrows, fence material, backfill ex sidecast		the use of vehicles and plant to deliver materials within the wetlands prohibited to prevent vehicle tracks forming preferential flow paths	No pouring of concrete in standing/ running water allowed, excess concrete to be contained within a plastic lined bund till set. Waste containers to be provided >100 meter from the wetland for disposal of waste.
Backfilling of permanent works				Level backfilled material to simulate as close as possible the existing grade