KOUGA DAM WALL REHABILITATION

RIPARIAN VEGETATION ASSESSMENT

Prepared for:
GIBB
PORT ELIZABETH
6070

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SPECIALIST REPORT DETAILS

This report has been prepared as per the requirements of the Environmental Impact Assessment Regulations and the National Environmental Management Act (Act 107 of 1998), any subsequent amendments and any relevant National and / or Provincial Acts or Policies related to biodiversity assessments.

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I, Dr. Brian Michael Colloty declare that this report has been prepared independently of any influence or prejudice as may be specified by the National Department of Environmental Affairs and Department of Water Affairs.

Signed:...  .................. Date:...3 October 2012...........

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ACRONYMS

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>CARA</td>
<td>Conservation of Agricultural Resources Act</td>
</tr>
<tr>
<td>CBD</td>
<td>Central Business District</td>
</tr>
<tr>
<td>DEA</td>
<td>Department of Environmental Affairs</td>
</tr>
<tr>
<td>DWA</td>
<td>Department of Water Affairs</td>
</tr>
<tr>
<td>EIS</td>
<td>Ecological Importance and Sensitivity</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>PES</td>
<td>Present Ecological State</td>
</tr>
<tr>
<td>SABIF</td>
<td>South African Biodiversity Information Facility, a SANBI database that contains both faunal and floral species records</td>
</tr>
<tr>
<td>SANBI</td>
<td>South African National Biodiversity Institute</td>
</tr>
<tr>
<td>WUL</td>
<td>Water Use License</td>
</tr>
<tr>
<td>WULA</td>
<td>Water Use License Application</td>
</tr>
</tbody>
</table>
1 INTRODUCTION

Scherman Colloty & Associates (SC&A) was appointed as specialist wetland and aquatic specialist to investigate the proposed rehabilitation of the Kouga Dam wall and associated works, near Patensie (Figure 1). It is therefore our understanding that that the associated works, such as road and bridge upgrades will require an assessment of the downstream riparian vegetation.

This report will also be integrated into an overall assessment of the areas downstream of the Kouga Dam wall. That report will contain detail on the project and related works, with particular reference to the need for the project and the works statement.

Figure 1: Google Earth image of the study area indicating Kouga Dam locality and regional quaternary catchments

Several terms and definitions are used in this report and the reader is referred to the box below for additional detail.

<table>
<thead>
<tr>
<th>Definition Box</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Present Ecological State</strong> is a term for the current ecological condition of the resource. This is assessed relative to the deviation from the Reference State. Reference State/Condition is the natural or pre-impacted condition of the system. The reference state is not a static condition, but refers to the natural dynamics (range and rates of change or flux) prior to development. The PES is determined per component - for rivers and wetlands this would be for the drivers: flow, water quality and geomorphology; and the biotic response indicators: fish, macroinvertebrates, riparian vegetation and diatoms. PES categories for every component would be integrated into an overall PES for the river reach or wetland being investigated. This integrated PES is called the EcoStatus of the reach or wetland.</td>
</tr>
<tr>
<td>Ecoregions are geographic regions that have been delineated in a top-down manner on the basis of physical/abiotic factors.</td>
</tr>
<tr>
<td>• NOTE: For purposes of the classification system, the ‘Level I Ecoregions’ for South Africa, Lesotho and Swaziland (Kleynhans et al. 2005), which have been specifically developed by the Department of Water Affairs (DWA) for rivers but are used for the management of inland aquatic ecosystems more generally, are applied at Level 2A of the</td>
</tr>
</tbody>
</table>
classification system. These Ecoregions are based on physiography, climate, geology, soils and potential natural vegetation.

1.1 Relevant legislation and policy

Locally the South African Constitution, seven (7) Acts and one (1) international treaty allow for the protection of rivers and water courses. These systems are thus protected from the destruction or pollution by the following:

- Section 24 of The Constitution of the Republic of South Africa;
- Agenda 21 – Action plan for sustainable development of the Department of Environmental Affairs and Tourism (DEAT) 1998;
- National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) inclusive of all amendments, as well as the NEM: Biodiversity Act, 2004 (Act 10 of 2004);
- National Water Act, 1998 (Act No. 36 of 1998);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002);
- Nature and Environmental Conservation Ordinance (No. 19 of 1974);
- National Forest Act (No. 84 of 1998); and
- National Heritage Resources Act (No. 25 of 1999).

Apart from NEMA, the Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983) will also apply to this project. The CARA has categorised a large number of invasive plants together with associated obligations of the land owner. A number of Category 1 & 3 plants were found on the site investigated, thus any land owner and contractors must take extreme care to limit further spread of these plants.

**Provincial legislation and policy**

Various guidelines on aquatic buffers have been issued in a number of the provinces, including the Eastern Cape Province and those stated in this report are based on accepted provincial guidelines as stated in the Eastern Cape Biodiversity Conservation Plan or ECBCP (Table 1). These are stated below so that the engineers and contractors are aware of these buffers during the planning phase. Although construction would have to take place within the river, the associated batch plants, stockpiles, lay down areas and construction camps should avoid these buffer areas.
Table 1: The required buffers in grey adapted from Berliner & Desmet (2007).

<table>
<thead>
<tr>
<th>River criterion used</th>
<th>Buffer width (m)</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountain streams and upper foothills of all 1:500 000 rivers</td>
<td>50</td>
<td>These longitudinal zones generally have more confined riparian zones than lower foothills and lowland rivers and are generally less threatened by agricultural practices.</td>
</tr>
<tr>
<td>Lower foothills and lowland rivers of all 1:500 000 rivers</td>
<td>100</td>
<td>These longitudinal zones generally have less confined riparian zones than mountain streams and upper foothills and are generally more threatened by development practices.</td>
</tr>
<tr>
<td>All remaining 1:50 000 streams</td>
<td>32</td>
<td>Generally smaller upland streams corresponding to mountain streams and upper foothills, smaller than those designated in the 1:500 000 rivers layer. They are assigned the riparian buffer required under South African legislation.</td>
</tr>
</tbody>
</table>

2 STUDY AREA DESCRIPTION

The proposed project is located along the Kouga River, west of the town of Patensie in the Eastern Cape (Figure 1) and includes the area directly below the dam wall, as well as the road that leads up to the dam wall.

2.1 Hydrology

The study area hydrology is characterised by flows over the Kouga Dam only as no releases are made from the dam. The study area is located within the South Eastern Coastal Belt Ecoregion in the L82J quaternary catchment (Figure 1). The steep river banks within the survey reach are formed flooding events that have incised the river gorge area before widening out into a broad floodplain area, that have been converted to agriculture (Plate 1).
Plate 1: The area downstream of the dam wall beyond the riparian area that will be mined

Plate 2: The typical riparian zone (left bank) that will be mined for aggregate directly below the dam wall.

3 METHODS

3.1 Study terms of reference

SC&A based this study on the following scope of work:

- Identify and delineate aquatic systems and associated biota that may be impacted upon by the proposed road upgrade;
- Identify and rate potential environmental risks with regard the riparian zone;
- Provide a significance rating of surface water impacts which includes a rating of the ecological sensitivity of the site, and the effect of the project on the riparian ecology of the site;
- Identify mitigations for negative impacts.

Based on our understanding of these requirements, SC&A would produce the following:

- Riparian area delineation supplied together with an analysis of the potential riparian aquatic sensitivity.
- Riparian Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) assessment after a short site visit has been conducted; in line with the Department of Water Affairs requirements with regard the necessary licenses.
3.2 Study methods

This assessment was initiated with a survey of the pertinent literature, past reports that exist for the study region. Maps and Geographical Information Systems (GIS) were then employed to ascertain, which portions of the proposed development, could have the greatest impact on the water courses and associated habitats.

A site visit was then conducted to ground-truth the above findings, thus allowing critical comment of the proposed project. Information was also collected to determine the PES and Ecological Importance and Sensitivity (EIS) of the site. These analyses were based on the models developed by the Department of Water Affairs, with the results producing a rating (A – F), summarised in Table 2.

Aquatic areas (Figure 2) were then assessed on the following basis:

- Vegetation type – verification of type and its state or condition based, supported by species identification using Germishuizen and Meyer (2003), Vegmap (Mucina and Rutherford, 2006 as amended) and the South African Biodiversity Information Facility (SABIF) database. The SABIF database contains older species records for areas, thus allowing a comparison of present versus past states.
  - Plant species were further categorised as follows:
    - Terrestrial: species are not directly related to any surface or groundwater base-flows and persist solely on rainfall
    - Facultative: species usually found in wetlands (inclusive of riparian systems) (67 – 99% of occurrences), but occasionally found in terrestrial systems (DWAF, 2005)
    - Obligate: species that are only found within rivers and wetlands (>99% of occurrences) (DWAF, 2005)

- Mitigation measures or recommendations required
Table 2: Description of A – F ecological categories based on Kleynhans et al., (1999).

<table>
<thead>
<tr>
<th>ECOLOGICAL CATEGORY</th>
<th>ECOLOGICAL DESCRIPTION</th>
<th>MANAGEMENT PERSPECTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Unmodified, natural.</td>
<td>Protected systems; relatively untouched by human hands; no discharges or impoundments allowed</td>
</tr>
<tr>
<td>B</td>
<td>Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.</td>
<td>Some human-related disturbance, but mostly of low impact potential</td>
</tr>
<tr>
<td>C</td>
<td>Moderately modified. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.</td>
<td>Multiple disturbances associated with need for socio-economic development, e.g. impoundment, habitat modification and water quality degradation</td>
</tr>
<tr>
<td>D</td>
<td>Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive.</td>
<td>Often characterized by high human densities or extensive resource exploitation. Management intervention is needed to improve health, e.g. to restore flow patterns, river habitats or water quality</td>
</tr>
<tr>
<td>F</td>
<td>Critically / Extremely modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.</td>
<td></td>
</tr>
</tbody>
</table>

4 RESULTS

A site survey was conducted along 2km reach, which started from the dam wall and ended upstream of agricultural pivot areas, as well as areas upstream and downstream of 2 -3 potential road crossings. The proposed crossing will include 2.4 m high culverts x 5 cells wide, elevating the road above the present levels of the current low level crossing, possibly improving flows downstream when completed.

Broad aquatic and riparian zones were limited to floodplain areas, with only a few permanent riparian / obligate riparian species found within this reach. This lack of diversity was due to the steep nature of the river banks, which precludes the development of wide riparian floodplains and the degree of degradation as a result of past dam wall construction activities, agricultural development and the recent flooding that has taken place.

Forb and woody species were thus limited, but include to invasive or encroaching species *Acacia karroo* (Sweet thorn Acacia) as well as *Combretum* spp.

Three facultative hydrophytic plants species were evident within greater study area, namely *Phragmites australis* (Common Reed), *Cyperus spp* (grazed, thus no identification could be made) and *Typha capensis* (Bulrushes).
No protected or species of special concern were observed within or adjacent to the water courses due to the degree of past disturbance within the riparian zones.

The overall condition or Present Ecological State (PES) of the riparian vegetation for this reach of the river was assessed using accepted methodologies. The Department of Water Affairs conducted a desktop analysis of the region in 1999 (Kleynhans, et al. 1999), in which the overall PES for the study system was rated as E-F (Severely degraded – Table 3). The PES system, using an updated DWA method is presently being revised by SC&A on a province wide scale. Due to the overall degradation of the site, the current riparian vegetation PES would be similar when compared to the 1999 rating, E-F. This is due to the lack of riparian zone continuity due to removal or disturbance of the river bank vegetation. This system only shows some form of recovery (Class D – moderately modified) approximately 4 km downstream of the dam wall near the Kouga Rivers confluence with the Gamtoos River.

4.1 Conservation importance

Rivers and the associated riparian zones are protected by several sections of national legislation. This together with the associated flood risk associated with “flashy ephemeral” systems should preclude any development along these rivers, regardless of their conservation value. The Environmental Importance and Sensitivity or EIS is a measure of the conservation value. Due to the current disturbances within the study area the EIS would be rated as LOW, due to the lack of any important riparian vegetation or sensitive plant species associated with the river.

Of interest is the National Freshwater Ecosystems Priority Areas project (CSIR, 2011), several important catchments (sub-quaternaries or SQ) have been earmarked, based either on the presence of important biota (e.g. rare or endemic fish species) or the degree of riverine degradation, i.e. the greater the catchment degradation the lower the priority to conserve the catchment. The important catchments areas are then classified as Freshwater Ecosystems Priority Areas or FEPAs.

The survey reach does not fall within any of these identified by this project (Figure 2), but it was indicated that the particular study area SQ does require rehabilitation (Figure 2) and as a consequence the River Conservation rating was C (moderate need for conservation), as this catchment is surrounded by catchments that may contain the endangered Goldie barb Barbus pallidus (IUCN Red Data List - http://www.iucnredlist.org/details/63269/0).
Figure 2: The project locality and water course in relation the Freshwater Ecosystems Priority Areas (CSIR, 2011).
Figure 3: Study area reach locality indicating the extent of the riparian zones /floodplain areas affected by the project

4.2 Recommended buffers

According to national policies and DWA accepted best practices, these rivers should receive a buffer of 50 m (Table 1). Based on this assessment and the proposed designs, this project would have little physical impact on the conservation importance and functioning on the riparian systems, should the project proceed. It is however recommended that no stockpiles or laydown areas, construction camps or other works associated with the project are located within the 50 m buffer or must outside of the 1:100 floodline beyond the proposed mining.

5 CONCLUSION AND RECOMMENDATIONS

It would seem that the proposed project could proceed as current land use has a greater impact on the functioning and importance of the riparian systems within the study region, i.e. the no-go option. This is largely due to the present day land use practices, which has allowed the spread of alien vegetation, limiting the functioning and importance of the riparian zones within the study reach.

With the proposed road upgrades, it would be beneficial to the riparian and instream areas, to rather have elevated structures within the instream areas, i.e. only bridge piers, versus the current low water bridges. Low water bridges act as barriers, restricting the movement of instream fauna and also result in sedimentation and erosion problems downstream.

The following recommendations are made:

- Stormwater from the proposed road crossings should be managed using suitable structures such as swales, gabions and rock rip-wrap so that any run-off from the site will not create any form of erosion.
- The removal of alien vegetation within the study area should be encouraged.
- The mining activities should be managed in such a manner to minimise the potential impact of silt suspension and downstream sedimentation at all time. It is therefore recommended that bunds or small coffer dams are placed around the mining area to prevent erosion of the pit area.
- The mining should occur in a phased approach that that rehabilitation / shaping of the pit area occurs immediately together with some form of stabilisation (e.g. re-vegetation) in order to prevent erosion.
- It is also recommend that Total Suspended Solid (TSS) values are monitored and that these don’t exceed the current background values.
6 REFERENCES

Agenda 21 – Action plan for sustainable development of the Department of Environmental Affairs and Tourism (DEAT) 1998.

Agricultural Resources Act, 1983 (Act No. 43 of 1983).


