Leiden Crescent
Durbanville
Cape Town
7551

April 2017

Sarel Bester Ingenieurs BK

Lyellstraat 62
Posbus 21
Ceres
6835
Tel: 023-312 2017
Faks: 086-514 3350
Email: lizbe@sbri.co.za

Attention: Mrs. L. Bester

DWS RISK ASSESSMENT MATRIX APPLIED TO THE PROPOSED DEVELOPMENT OF A DAM LOCATED ON PORTION 5 OF THE FARM VAN DER WATTSKRAAL 399, NEAR RIVIERSONDEREND WITHIN THE WESTERN CAPE PROVINCE

The Risk Assessment Matrix as required in terms of GA 509 gazetted on the 26th of August 2016 has been completed by Natasha van de Haar (SACNASP Reg. no. 400229/11). Please refer to signature at the bottom of this letter for contact details.

Summary of proposed activities.

The proponent wishes to convert wheat fields to citrus plantations. In order to do so water will be required for irrigation purposes. Water presently conveyed by a watercourse located within the immediate vicinity of the area proposed for the citrus plantations is brackish and cannot be utilised for irrigation. Therefore, a dam will need to be constructed within the existing watercourse, which will be filled with fresh water abstracted from an existing abstraction point at a weir located on the Sonderend River. The weir is located approximately 5.7km to the north west of the proposed dam and water will be conveyed from the river to the proposed dam via a pipeline. The pipeline between the weir and the N2 highway has already been in place for several years, therefore the pipeline will only be extended from the N2 highway to the dam. This extended portion of the pipeline will not traverse any watercourses.

Brackish water currently conveyed by the portion of the watercourse upslope of the proposed dam will be intercepted by a pipeline which will convey the water below the dam and will release the water into the portion of the watercourse downstream of the dam. A 315 mm diameter uPVC pressure conduit cast in reinforced concrete and founded on a firm formation will also be developed under the embankment of the dam. The conduit will terminate with a 300mm gate valve in order to release any bottom brackish water which accumulates at the base of the dam due to the release of salts from sediment within the dam.

Figure 1: Google Earth imagery (2016) indicating the locality of the area proposed for the development of the dam, presented in blue.

Brief Synopsis of the Freshwater Assessment undertaken by EnviroSwift dated April 2017.

Summary of background Information:

According to the National Freshwater Ecosystems Priority Areas project (NFEPA, 2011), the proposed dam will intersect one watercourse consisting of two Hydrogeomorphic (HGM) units namely a natural valleyhead seep wetland and floodplain wetland which are indicated to be within a critically modified condition. The perennial Riviersonderend River is located approximately 1.5km to the north west of the proposed dam, however the catchment in which the proposed dam falls has not been selected as a River Freshwater Ecosystem Priority Area (FEPA), which would have increased conservational importance of the catchment.

According to the Western Cape Biodiversity Spatial Plan (WCBSP, 2017) for the Swellendam Municipality, the proposed dam will intersect an Ecological Support Area 2 (ESA 2) which is associated with a watercourse and wetland area. Category 2 ESAs are areas that are likely severely degraded or have no natural cover remaining and therefore require restoration. These areas are not essential for meeting biodiversity targets but play an important role in supporting the functioning of Critical Biodiversity Areas (CBAs) or protected areas, and are often vital for delivering ecosystem services. The management objectives for Category 2 ESAs is to restore or manage the features to minimize impacts on ecological processes and ecological infrastructure functioning, especially soil and water related services, and to allow for faunal movement.

Summary of freshwater assessment results:

The proposed dam will be located on a watercourse which has been indicated as a combination of floodplain wetland and valleyhead seep wetland by the WCBSP (2017). However, upon inspection of the watercourse the feature was considered to be more representative of an unchannelled valley bottom wetland.

The unchannelled valley bottom wetland was dominated by the obligate wetland species *Juncus* sp. with scattered, isolated patches of *Scirpus nodosus* and *Phragmites australis*. The extent of natural vegetation along the watercourse has been significantly reduced as a result of surrounding cultivation activities as well as the development of three small impoundments in the upper reaches of the feature. These impoundments also capture runoff from the catchment which would have originally augmented downstream wetland areas, in turn changing the natural hydrological zonation along the watercourse. In addition, wetland habitat has also been impacted as a result of the stockpiling of rocks and creation of roads.

The WET-Health tool[1] was used to assess the PES of the unchannelled valley bottom wetland prior to and after the development of the dam:

- The overall wetland health score calculated for the unchannelled valley bottom wetland in its present state falls within Category C – Moderately modified: A moderate change in ecosystem processes and loss of natural habitat has taken place but the natural habitat remains predominantly intact.
- The overall health of the wetland after the development of the dam will fall within a Category D - Largely modified: A large change in ecosystem processes and loss of natural habitat and biota.

The WET-EcoServices[2] tool was used to assess wetland services and functions provided by the unchannelled valley bottom wetland prior to and after the development of the dam:

- The wetland is currently considered to be of increased importance in terms of assimilation of phosphates, nitrates and toxicants, as well as in terms of sedimentation and erosion control due to the extent to which the catchment of the wetland is cultivated.
- Benefits that will increase with development of the dam include streamflow regulation, carbon storage and water for direct human use as well as tourism and recreation. The remainder of the indirect and direct benefits are only expected to decrease marginally with the development of the dam.

The unchannelled valley bottom wetland was determined to be of a moderate Ecological Importance and Sensitivity (EIS) (Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers).

It is recommended that the PES of the wetland is maintained as a Category C. It is considered possible to achieve this with the implementation of both essential mitigation measures as well as monitoring guidelines listed within the impact assessment section.

It will not be practical to designate a 'No Go' buffer zone around the unchannelled valley bottom wetland as the proposed dam will be developed within the wetland area. However, it is still considered important that the construction footprint is physically demarcated, prior to the commencement of any construction related activity, and that all vehicles and construction related activities be prohibited outside of the demarcated footprint area.

<u>Conclusion and specialist opinion (extracted from EnviroSwift, 2017):</u>

The unchannelled valley bottom wetland has been significantly impacted as a result of surrounding cultivation activities and as a result of the historical development of three small impoundments in the upper reaches of the feature. The disturbance has reduced the overall PES of the wetland to a Category C (Moderately modified). However, the wetland is still considered to be of a moderate EIS and is considered

[1] Macfarlane *et. al.* 2010
[2] Kotze *et al.* 2007

of increased importance in terms of the assimilation of phosphates, nitrates and toxicants, and in terms of flood attenuation, sediment trapping and erosion control. Furthermore, the wetland has been indicated as a Category 2 ESA (WCBSP, 2017) for which the objectives are to restore or manage the feature to minimise impacts on ecological processes and ecological infrastructure functioning.

Following the assessment of direct impacts it can be surmised that the significance of the majority of the impacts associated with the proposed development of the dam can be reduced with the implementation of effective mitigation measures. The exception would be the loss of temporary and seasonal wetland habitat during the construction phase and alteration of the hydrological regime and vegetation characteristics during the operational phase which both rated a medium (negative) impact significance and for which no practical mitigation would be possible.

Taking into consideration the degree to which the ESA wetland in which the development of the dam is proposed, has already been transformed, as well as the high potential of effectively mitigating most construction and operational related impacts, it is the opinion of the specialist that the proposed project may proceed. It should however be noted that the proposed construction of the dam will require Environmental Authorisation in terms of the NEMA Environmental Impact Assessment Regulations (2014) as well as authorisation from DWS in terms of Section 21 (c) and (i) of the NWA.

Risk Assessment

A brief summary of the approach is provided below with reference to the completed Risk Assessment Matrix. In addition, refer to the freshwater impact assessment completed for the project (EnviroSwift, 2017).

Summary of the reasoning behind the most noteworthy considerations/ratings:

- Activities will take place within wetland habitat during the construction of the dam and flooding will result in impact on wetland habitat during the operational phase. A severity score of 5 was therefore designated for the impact on the flow regime, water quality, habitat, and biota for risks for which no mitigation measures can be implemented to decrease severity. It is the opinion of the specialist that it will be possible to decrease the significance of the remainder of the risks assessed with the implementation of mitigation measures.
- The impact the impoundment of water could have on wetlands and river systems downstream were also considered. It is however the opinion of the specialist that the lowering of water volumes is unlikely due to the fact that brackish water immediately upstream of the dam will be intercepted by a pipeline which will convey the water below the dam and will release the water into the portion of the watercourse downstream of the dam. There is a possibility of pooling of water around the pipe inlet structure which will result in some of the water filtering into the ground as oppose to flowing into the pipe. However, this volume will be substituted by the brackish water which accumulates at the base of the dam which will be released downstream of the dam. Additional seepage from the dam is also deemed likely.
- Impacts associated with the loss of temporary and seasonal wetland habitat as part of the initial construction phase as well as flooding during the operational phase would remain for an extended duration of time and were scored accordingly.
- It is expected that all the impacts assessed would be detected immediately.
- All of the activities that will be required as part of the construction of the dam will be located within the wetland habitat itself and would therefore be legally governed.

A MODERATE risk class was obtained for the loss of seasonal and temporary wetland habitat during the construction phase as well as alteration of the hydrological regime of areas directly upstream of the dam during the operational phase. The remainder of the risks assessed calculated scores falling within a LOW risk class. Please refer to the Risk Assessment Matrix appended.

Please do not hesitate to contact me should there be any aspect of the Risk Assessment you would like to discuss.

Regards
Natasha van de Haar
natasha@enviroswift.co.za
082 866 9849