27 Heron Circle
Kommetjie
7975
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Enviro-EAP Environmental Consultants
Att: Nicolaas Hanekom

PROPOSED UPGRADING OF A BULK WATER SUPPLY FROM ALFA STREET, MALMESBURY TO DISTRICT ROAD 1111, SWARTLAND MUNICIPALITY WESTERN CAPE

INDEPENDENT PEER REVIEW OF AQUATIC BIODIVERSITY ASSESSMENT (ENVIRO-EAP, 2025)

1 Background

The Swartland Municipality proposes to upgrade the bulk water supply by installing a new 315mm diameter pipeline from Alfa Street in Malmesbury to District Road (DR) 1111 which lies on the southern side of the Diep River as indicated in Figure 1. The proposed upgrade requires environmental authorisation in terms of the NEMA EIA Regulations (2014, as amended) given that the development triggers NEMA-listed activities. The proposed upgrade also requires a Water Use License Application (WULA) in terms of the National Water Act, Act 36 of 1998 (NWA) as the pipeline will cross the Diep River and as a result constitutes Section 21 c and i activities.

Given the requirement for prior environmental authorisation in terms of the NEMA EIA Regulations, there is a mandatory requirement to apply the national, web-based Screening Tool to the site in question as this determines the suite and scope of specialist studies that must be conducted as part of such a process. The Screening Tool indicated the site to have a VERY HIGH sensitivity for the Aquatic Biodiversity Theme which means that an Aquatic Biodiversity Assessment that is compliant with the gazetted protocol is required. The Malmesbury Municipality appointed Enviro-EAP Environmental Consultants ("Enviro-EAP") as the Aquatic Biodiversity specialist who then confirmed that the site has a VERY HIGH sensitivity and accordingly conducted an Aquatic Biodiversity Assessment.

However, the authority with competency over the NEMA EIA Regulations, the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP), indicated the Enviro-EAP does not have the requisite expertise to conduct specialist aquatic biodiversity assessments and therefore a SACNASP registered scientist with expertise in the field of aquatic ecology must conduct an independent peer review of the Enviro-EAP Aquatic Biodiversity Assessment. EnviroSwift Western Cape ("EnviroSwift") was accordingly appointed by Enviro-EAP to conduct the independent peer review. The CV of the review specialist, Mr Nick Steytler of EnviroSwift, which demonstrates Mr Steytler's competence to conduct aquatic biodiversity specialist assessments is provided as Appendix A.

In order to provide this input EnviroSwift conducted a site visit on 29 December 2025. This letter-format report outlines the findings of this peer review.

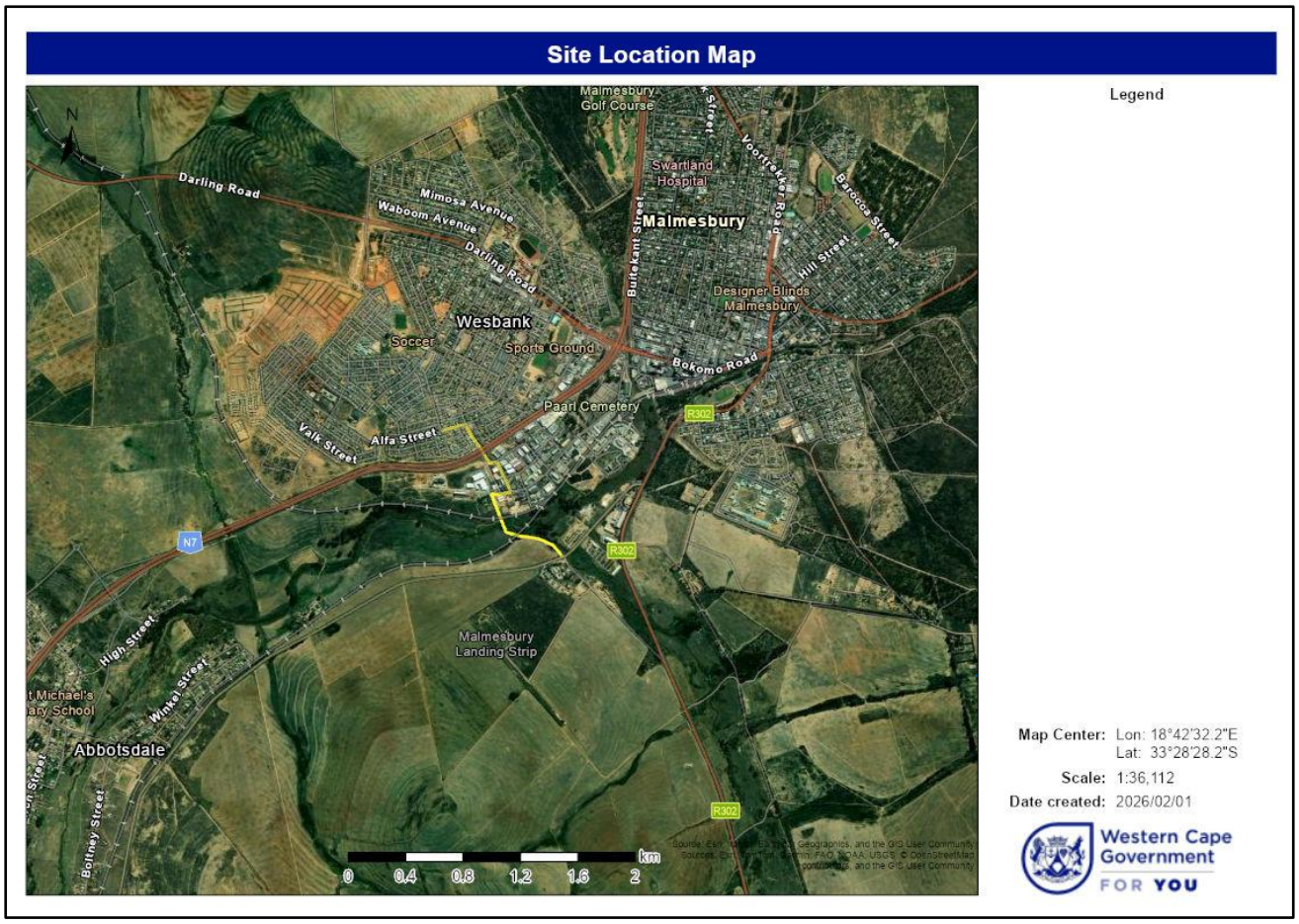

Figure 1: Location of the proposed site (pipeline route) which is indicated as a yellow line.

2 Description of the Proposed Development

The following project description was taken from the Enviro-EAP report:

The proposed pipeline will have a nominal diameter (ND) of 315 mm and will extend for a distance of approximately 1.7 km. It will connect to the existing 315 mm pipeline at the intersection of Alfa Street and Myrtle Avenue. The pipeline route will then follow Alfa Street to Koljander Street, then proceed along Koljander Street, passing beneath the N7 national road. It will continue along Nywerheid Crescent, turning westward onto Schoonspruit Way for 120 meters, before turning south along the edge of Erf 12370. The pipeline will cross the railway line on Erf 365, traverse Erf 7455 where the Diep River is located, and then pass beneath another railway line on Portion 4 of Farm 771. From the railway line on Farm 771, the pipeline will continue south over the remainder of Farm 1113 and the remainder of Farm 771, following a gravel farm road and terminating at the Provincial Road DR 1111. The pipeline will include 200 mm diameter connections towards Abbotsdale and Malmesbury for future upgrades.

Figure 2 shows the proposed pipeline route.

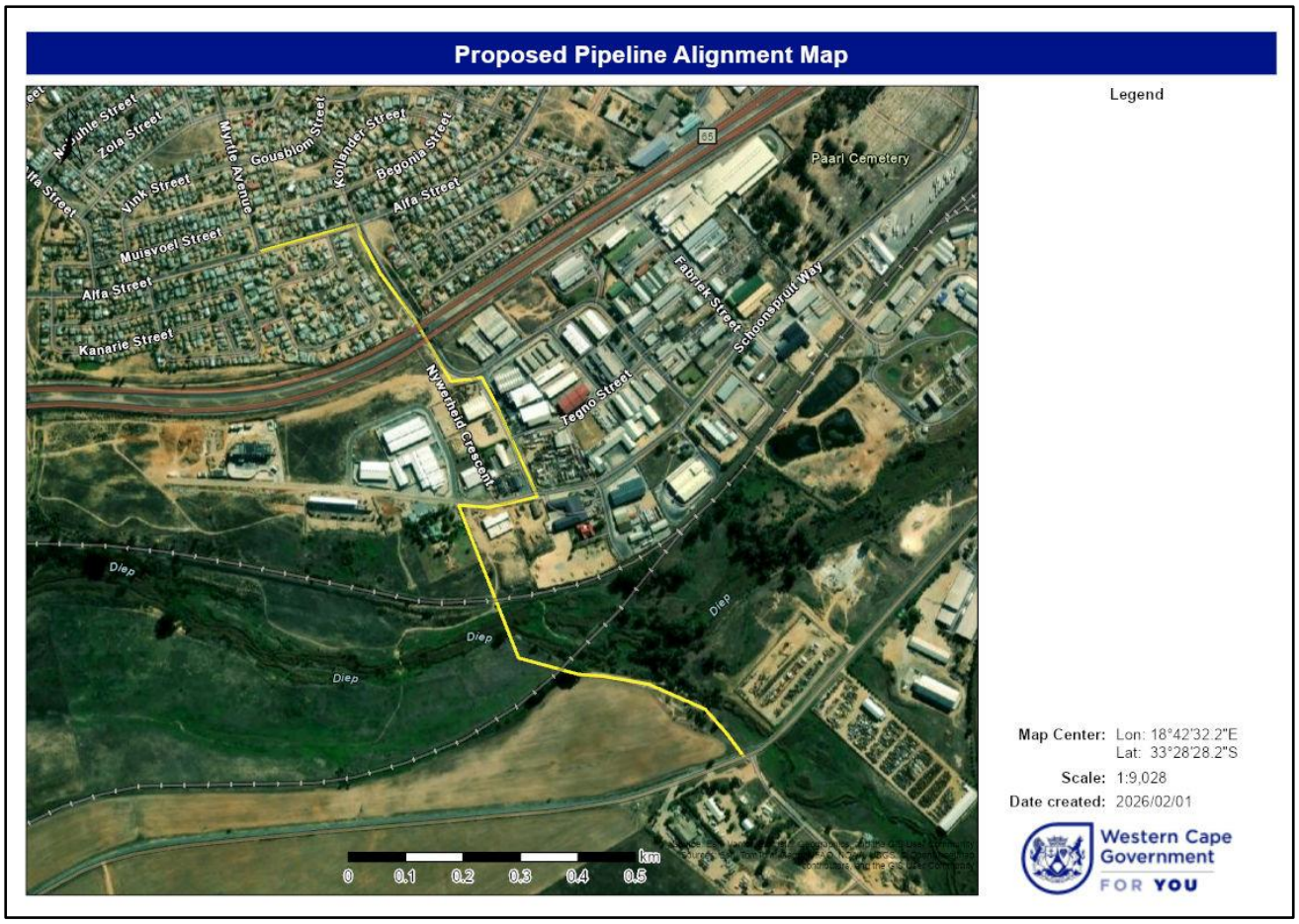

Figure 2: Proposed pipeline route.

3 Aquatic Biodiversity Sensitivity of the Site

This independent peer review must first evaluate Enviro-EAPs rationale for confirming the VERY HIGH aquatic biodiversity sensitivity of the site. Enviro-EAP, while explaining the role of the site sensitivity verification process in the report, does not provide any rationale for confirming the sensitivity of the site. What is provided in Section 3 of the Enviro-EAP report which should address this is the following:

"*A literature review and desktop analysis were undertaken prior to the field investigation, utilizing various sources including the South African National Biodiversity Institute (SANBI) data and other relevant sources. Recent and historical aerial imagery of the site was reviewed in order to identify points for investigation during the field survey. Utilising the above information, a field investigation was undertaken whereby:*

- *Sites of geomorphological or topographic variance were identified and subjected to an evaluation of species present within transects established across the selected site.*
- *Species were identified.*
- *Additional random sample points were selected from other sites surrounding the proposed impacted areas for comparative purposes*."

The above does not constitute a sensitivity verification method or if there are elements of a site sensitivity method, Section 3 of the Enviro-EAP report does not explicitly address this issue and reach a sensitivity rating. This is a potential short-coming of the report. However, there is no guidance from the authorities as to how "sensitivity" should be verified for the aquatic biodiversity theme. Several aquatic specialists including Dr Liz Day, Dr Dean Ollis and Dr Justine Ewart-Smith (the author of this report also participates in this working group) in the Western Cape have established a voluntary working group to discuss *inter alia* this fundamental short-coming of the Screening Tool/Site Sensitivity Verification process. The group has largely agreed that if a development is associated with NWA Section 21 c and i activities then the site should be considered as having a VERY HIGH sensitivity thereby necessitating a detailed Aquatic Biodiversity Assessment as this would align with the reporting requirements of the NWA given the requirement to authorise the Section 21 c and i activities.

In this case, the proposed pipeline would cross the Diep River which confirms that Section 21 c and i water uses are applicable. Given the lack of guidance from the authorities on this issue, EnviroSwift cannot make a judgement of the Enviro-EAP site sensitivity verification method in this regard and can only support what the Screening Tool has determined (i.e. that the sensitivity is VERY HIGH) and accordingly an Aquatic Biodiversity Assessment is required to fulfil the requirements of the NEMA EIA Regulations.

4 Baseline Description of Aquatic Ecosystems

Establishing the baseline is the critical first step in effectively and accurately assessing impacts on natural resources. Enviro-EAP presents the following Terms of Reference for the baseline description which are gleaned from the gazetted protocol for Aquatic Biodiversity Assessments and highlights that the following aspects **as a minimum** must be considered in the baseline description:

- A description of the aquatic biodiversity and ecosystems on the site, Including:
  a. Aquatic ecosystem types;
  b. Presence of aquatic species and composition of aquatic species communities, their habitat, distribution and movement patterns;
- Threat status, according to the national web based environmental screening tool of the species and ecosystems, including Listed Ecosystems, as well as locally important habitat types identified;
- National and Provincial priority status of the aquatic ecosystem (i.e. is this a wetland or river Freshwater Ecosystem Priority Area (FEPA), a FEPA sub catchment, a Strategic Water Source Area (SWSA), a priority estuary, whether or not they are free-flowing rivers, wetland clusters, etc., a CBA or an ESA; including for all a description of the criteria for their given status; and
- A description of the Ecological Importance and Sensitivity of the aquatic ecosystem including:
  a. The description (spatially, if possible) of the ecosystem processes that operate in relation to the aquatic ecosystems on and immediately adjacent to the site (e.g. movement of surface and subsurface water, recharge, discharge, sediment transport, etc.);
  b. The historic ecological condition (reference) as well as Present Ecological State (PES) of rivers (in-stream, riparian and floodplain habitat), wetlands and/or estuaries in terms of possible changes to the channel, flow regime (surface and groundwater).

The above Terms of Reference encompass both field work (first bullet) and desktop reviews of available databases (2nd and 3rd bullets) which can then inform the determination of the ecological importance and sensitivity and ecological health assessment of the potentially affected aquatic ecosystems (4th bullet).

The following sections evaluate Enviro-EAPs meeting of the aspect of the Terms of Reference relating to the following:

- Site work to determine hydrogeomorphic types and delineate their extent (see Section 4.1);
- Desktop study to determine the ecological context (see Section 4.2);
- The manner in which the potentially affected aquatic ecosystems are described (see Section 4.3); and
- The detailed ecological assessment of the potentially affected aquatic ecosystems to determine their ecological condition, importance and sensitivity (see Section 4.4).

4.1 Groundtruthing, Classification and Delineation of Freshwater Ecosystems

In identifying the potentially affected aquatic ecosystem types, groundtruthing is essential and site-based methods should be used including and not limited to augering of the soils associated with the identified aquatic systems *viz-a-viz* rivers and wetlands (DWAF, 2008 and Job, 2009). There is no evidence in the report that this has been done nor is there any classification of the aquatic ecosystems as per Ollis *et al.* (2013) which is considered a material short-coming. What is acknowledged in the report is the presence of a perennial river (the Diep River) and associated floodplain wetlands with the focus of the detailed ecological assessment (see following section) on the Diep River only. This suggests that this is the only aquatic ecosystem that is at risk of being impacted. The fact that the proposed pipeline runs alongside a non-perennial tributary of the Diep River and at its nearest point being approximately 15m from the tributary indicates that this tributary should also be classified, delineated and assessed. There is no evidence in the report to suggest that this was done. It is the opinion of the review specialist that the non-perennial tributary comprises a channelled valley bottom wetland meaning that a delineation of the outer boundary of the wetland seasonal/temporary zone is necessary to

confirm the proximity of the wetland to the proposed pipeline which constitutes an important aspect of any aquatic biodiversity assessment.

In summary, insofar as the groundtruthing and delineation of aquatic ecosystems is concerned the Enviro-EAP assessment needs to include the following:

- Augering within the channel of the Diep River to confirm the dominance of alluvial processes;
- Augering within any areas considered to comprise floodplain wetlands associated with the Diep River to confirm their classification as “wetlands”;
- Augering within the channel and alongside the channel of the non-perennial tributary of the Diep River to allow for the correct classification of the aquatic system;
- Delineation of the outer boundary of the seasonal/temporary zones of any identified wetlands (channelled valley bottom and floodplain wetlands); and
- Delineation of the main channel of the Diep River and any associated riparian zones if these are considered to exist (note: in many transformed rivers the riparian zones cannot be identified because the naturally occurring riparian vegetation has been removed).

Undertaking a comprehensive groundtruthing and delineation of the potentially affected aquatic ecosystems is arguably the most important aspect of the baseline assessment of any aquatic biodiversity assessment as this allows for an accurate and well-informed ecological assessment and impact assessment. A review of the detailed aquatic ecological assessment is presented in Section 4.4 while the review of the impact assessment conducted by Enviro-EAP is presented in Section 5.

4.2 Desktop Study to Determine the Freshwater Ecological Context

In accordance with accepted best-practise the aquatic biodiversity specialist must consult available online databases including but not limited to databases and maps that show the alignment of drainage lines (both perennial and non-perennial), the extent of wetlands and also the biodiversity conservation importance of the site and adjacent areas. In the opinion of EnviroSwift the following databases should at a minimum be consulted:

- National Geospatial Information and Vector data for rivers (NGI Rivers database, available on Cape Farm Mapper);
- The National Wetlands Map Vers. 5 (NWM5, CSIR, 2018); and
- The Western Cape Biodiversity Spatial Plan (WCBSP, 2023).

Enviro-EAP has only presented maps generated from Cape Farm Mapper which reflects the WCBSP (2023) and the National Freshwater Ecosystems Priority Assessment (NFEPA, 2011) which is also supported but given that no evidence that any national rivers or the current wetland databases *viz-a-viz* the NWM5 have been undertaken, it is considered a short-coming of the desktop component of the study.

Figure 3 below presents a combined map of the NGI Rivers database and the NWM5. The map confirms the fact that the proposed pipeline would cross the Diep River which is indicated as comprising a perennial river. According to the NWM5 there are no wetlands within the NWA Regulated Area for wetlands (500m). It also indicates that a part of the proposed pipeline would run alongside and within approximately 15m of a non-perennial tributary of the Diep River. What this means in terms of conducting aquatic biodiversity specialist studies, irrespective of whether the study is only a Compliance Statement or a detailed Aquatic Biodiversity Assessment, is that any mapped watercourses (drainage lines and wetlands within the respective NWA Regulated Areas for these aquatic systems), need to be groundtruthed and if found to exist, delineated and classified as either a river system driven by predominantly alluvial processes or a wetland if driven mostly by groundwater (see following section).

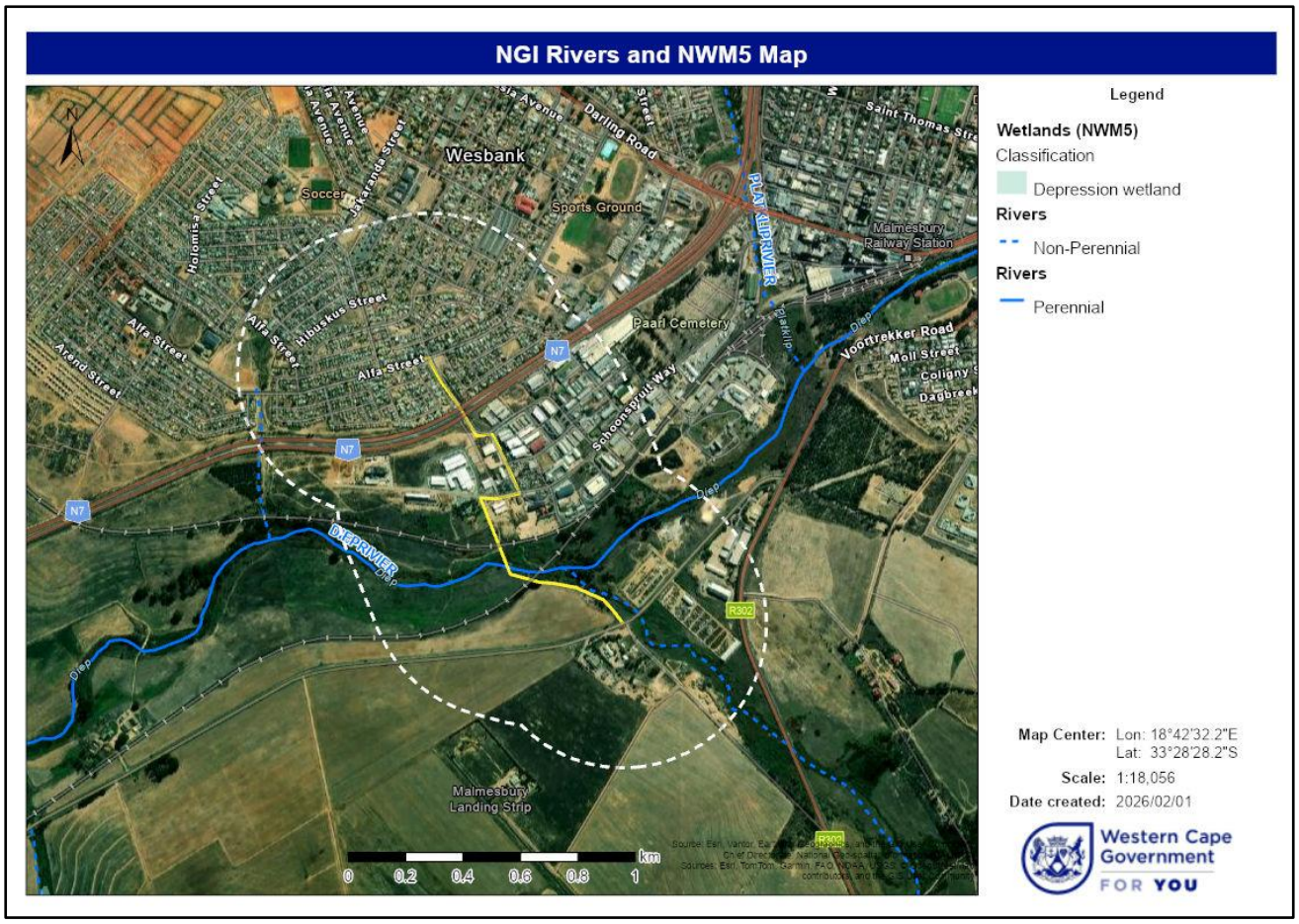

Figure 3: NGI Rivers and NWM5 Map. The white stippled line indicates the NWA Regulated Area (500m) for wetlands.

4.3 Description of Aquatic Biodiversity

In order to meet the Terms of Reference insofar as this relates to describing the potentially affected aquatic ecosystem types and identifying key aquatic species and species communities necessitates a thorough site investigation backed up by literature searches in some cases (e.g. when the aquatic ecosystems comprise known habitat for Species of Conservation Concern [SCC]).

The description presented in the Enviro-EAP report is however gleaned from online databases and presents various climatic and soil type information as well as whether nearby land or aquatic ecosystems have been identified as having conservation importance (i.e. comprises CBAs or ESAs) but does not present the description of the potentially affected aquatic ecosystems and associated biodiversity based on groundtruthing. Several photographs taken during the site investigation are presented in the report but these do not suffice as a "description" per se. Best practise dictates that a comprehensive written description should be presented, noting important biophysical features and important aquatic species as well as identifying key existing or historic impacts that have modified or degraded the aquatic ecosystems. At the very least a description of the vegetation associated with the aquatic ecosystems should be presented where common hydrophytic species are identified and the extent of alien invasive plants is determined.

Enviro-EAP does confirm that the dominant hydrophytic species associated with the Diep River is *Phragmites australis* (common reed) as shown in Figure 4. However, within a short distance downstream of the crossing point stands of *Cyperus textilis*, a wetland facultative plant, are clearly visible (see Figure 5) and should have been included in the description. Other species also observed in the greater area included *Typha capensis* (bullrush) and the grasses *Cynodon dactylon* and *Pennisetum clandestinum*, the latter being a listed alien invasive species.

During the EnviroSwift site investigation in late December 2025 the presence of a large manhole immediately adjacent to the crossing point on the right-hand bank of the river was clearly visible (see Figure 6). There was also evidence of leakages from the manhole and pollution (see Figure 7). The presence of this pollution source should also have been described and given that the Municipality is responsible for the leaking manhole, an opportunity exists through the project to bring awareness to the issue with the possibility of the matter being rectified. Failure to identify this ongoing threat to the aquatic biodiversity of the Diep River would have resulted in a lost opportunity cost.

EnviroSwift undertook augering in close proximity to the crossing point with the auger samples in the area adjacent to the dense stands of *P. australis* revealing mottles which is indicative of the presence of a seasonal/temporary wetland zone (see Figure 8). Given that in its reference condition the Diep River would have been associated with floodplain wetlands that would have abutted the main river channel, the auger results may confirm that elements of the historical floodplain wetlands still remain despite extensive channelisation of river through the town of Malmesbury (see Figure 9). This sort of analysis was lacking from the Enviro-EAP report.

Figure 4: Close-up view from the northern bank of the portion of the Diep River that will be crossed by the proposed pipeline. The dominance of *Phragmites australis* as reported by Enviro-EAP is notable.

Figure 5: *Cyperus textilis* as seen growing alongside the channelised Diep River immediately downstream of the crossing point.

Figure 6: A manhole located immediately adjacent to the proposed pipeline crossing which shows signs of overtopping.

Figure 7: The area between the manhole and the Diep River showing signs of pollution from leakages from the manhole.

Figure 8: Auger sample taken at the edge of the Diep River near the proposed pipeline crossing point. The auger sample showed the presence of mottles which suggests that wetland elements exist along the edge of the Diep River, most likely remnants of floodplain wetlands which have been transformed as a result of channelisation.

Figure 9: Photograph of a portion of the Diep River within the centre of Malmesbury several hundred metres upstream from the proposed crossing point. Note how the river has been extensively channelised and devoid of any naturally occurring riparian vegetation.

In summary, EnviroSwift considers the description presented in the report as inadequate for the purposes of impact and risk assessment and does not comply with the protocol requirements. A detailed and comprehensive written description is required, supported by selective photographs which show the key features being described.

4.4 Detailed Ecological Assessment of the Affected Watercourses

Enviro-EAP utilised the following aquatic ecological assessment indices to determine the ecological condition and ecological importance and sensitivity of the potentially affected aquatic ecosystems:

- PES: The Rapid Habitat Assessment Method (RHAM) which is a simplified approach to measure and estimate habitat conditions according to cross sections through broadly defined morphological units (Kleynhans & Louw, 2007); and
- EIS: The EIS method (Kleynhans & Louw, 2007) is based on the approach adopted by the Department of Water Affairs (DWA) as detailed in the document “Resource Directed Measures for Protection of Water Resources” (1999).

These indices were only applied to the perennial Diep River which is the aquatic system that will be impacted directly as the pipeline has to cross the river. However, no ecological assessment of any floodplain wetlands that are associated with the Diep River were undertaken nor the non-perennial tributary of the Diep River along which a portion of the proposed route would follow. All three types of aquatic ecosystems are at either at direct risk of being impacted or indirectly because, in the case of the non-perennial tributary, the proposed pipeline would be aligned within 15m of the drainage line with accelerated run-off, contaminants and sediment potentially reaching the aquatic system due to its proximity.

When undertaking the detailed ecological assessment of wetlands current best practise dictates that the following indices be utilised:

- PES: WET-Health Version 2 (Macfarlane *et al.*, 2020) is a tool designed to assess the health or integrity of a wetland. Wetland health is defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition. This technique attempts to assess hydrological, geomorphological, water quality and vegetation health in four separate modules. The modules are then combined to determine the overall Present Ecological State (PES) of the wetland.
- EIS: The EIS method applied to wetlands is based on the assessment tool developed by Rountree *et. al,* (2014) and is used to determine the ecological importance and sensitivity of wetlands, incorporating the traditionally examined criteria used in EIS assessments of other water resources by the Department of Water Affairs and Sanitation (DWS) and thus enabling consistent assessment approaches across water resource types.

A third index, WET-Ecoservices Version 2 (Kotze et al., 2021) to assess the ecosystem goods and services delivered by wetlands can also be used in addition to the PES and EIS assessments and its application is invaluable in understanding the ecological functioning of the wetland. Such an assessment is identified in the Protocol for Aquatic Biodiversity Assessment as a key component (see Section 3.5 in Table 1).

The results of the application of the detailed ecological indices by Enviro-EAP to the Diep River is as follows:

- PES: The overall PES for the section of the Diep River which would be crossed by the pipeline is a Category "D" which means that the aquatic ecosystem has been Largely Modified (with the riparian and instream components were also determined to both be Category "D"); and
- EIS: The EIS for the Diep River was determined to be High which means that the Diep River at Malmesbury is considered to be unique on a national scale based on it's biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) may be sensitive to flow modifications but in some cases may have substantial capacity for use.

While EnviroSwift has not applied ecological assessment indices (as the present study is an independent peer review of a report), EnviroSwift supports the finding that the Diep River immediately downstream of Malmesbury in the vicinity of the proposed crossing point has a PES of Category "D" due to historic and ongoing impacts associated with the river's urban context. Similarly, the EIS assessment result of High for this section of the Diep River as undertaken by Enviro-EAP is supported. What is lacking in the assessment, relating to the PES and EIS assessments, is the determination of the Recommended Ecological Category (REC) which is a Resource Quality Objective for the hydrogeomorphic feature under assessment (note this is identified as an aspect requiring assessment in the Protocol). The general rule is that for features that have been determined to have a High or Very High EIS, the REC should be set at a minimum of Category "C" meaning that the feature should be rehabilitated to reach the REC if there is a reasonable opportunity to do so. A development application such as the proposed bulk water supply upgrade presents such an opportunity because the Swartland Municipality is the authority responsible for bulk infrastructure upgrades and the management and maintenance of the Diep River and, in particular, any infrastructure associated with the river such as the manhole that appears to be a source of contamination (see Figures 6 & 7). It is EnviroSwift's opinion that the REC should be presented in the report with an optional recommendation that the Swartland Municipality seriously consider the repair of the leaking manhole and address other impacts that prevent the river from reaching the REC of Category "C". There should also be some evaluation of the impact of the proposed development on the PES as this should inform the authorisation opinion (i.e. if the development results in the PES deteriorating to a lower category then there may be reason to not support the proposed development).

5 Assessment of Potential Impacts on Aquatic Biodiversity

The standard methods for identifying and assessing potentially significant impacts during the life-cycle of the project have been implemented. However, Enviro-EAP has provided the assessment by means of impact rating tables only and has not provided a separate written description and assessment of the identified potentially significant impacts. Best practise dictates that the tables should be used primarily to summarise the findings of a more detailed written assessment.

Enviro-EAP identified only the following two potentially significant impacts associated with the construction and operational phases of the proposed dam:

- Soil erosion and dust; and
- Loss of freshwater habitat.

Soil erosion and dust emissions generated during the construction phase are undoubtedly a potential impact that would impact on the site's aquatic ecosystems. Regarding the possibility of other aquatic ecological impacts such as riparian and instream habitat disturbance, alteration of flow regime, water quality impairment, erosion and sedimentation and biota loss occurring, Enviro-EAP indicates that these will not occur because either the aquatic features at risk are severely degraded or because other impacts can be effectively mitigated through the implementation of an EMP with oversight from an independent ECO. The former reasoning is flawed because, regardless of the state of degradation, further degradation is still possible, particularly associated with the construction phase which, aside from generating dust and erosion, would likely cause at least the following potentially significant impacts:

- Aquatic habitat disturbance: The operation of construction machinery within and near aquatic habitat and excavations within the channel would cause disturbance of riparian, instream and possibly wetland habitat
- Alteration of flow regime: site preparation and clearing of vegetation and shacks would cause a reduced catchment roughness which would then exacerbate run-off and cause an increase in flow velocity and food peaks;
- Erosion and sedimentation: Excavations within close proximity and within the main channel of the Diep River would increase the risk of erosion and sedimentation with sediment plumes being a likely consequence of any instream excavations during the wet, rainy season;
- Water quality impairment: The use and placement of construction materials upslope and in close proximity to rivers and wetlands can lead to water quality impairment as cement is likely to be used as well as many chemicals such as paints and solvents. Also, the use of construction vehicles and machinery in close proximity to aquatic features can contribute to toxicant loading if any vehicles or machinery present unchecked leaks or if these are refuelled on-site without any containment;
- Biota loss (including temporary displacement): Noisy construction activities would displace biota which are mobile such as avifauna and the use of machinery, driving of construction vehicles and any spills of contaminants with the delineated extent of aquatic habitat would potentially cause biota mortalities.

The latter reasoning is also flawed insofar as the assessment approach used by Enviro-EAP is not aligned with best practise in the field of impact assessment. Using the post-mitigation scenario in instances where the identified potentially significant impact can be effectively mitigated, as a basis for indicating that there will be no such impact if the mitigation measure is implemented without presenting an assessment of the "prior to" or "without" mitigation scenario is not supported. This type of approach is typically used in Aquatic Biodiversity Compliance Statements which do not include any impact assessment but allow for the specialist to recommend measures that would effectively mitigate any potential impacts. Best practise in EIA dictates that the assessor should always "cast the net widely" and identify and assess the full suite of potentially significant impacts and not just the ones that have been determined to be associated with significant residual impacts (i.e. potential impacts which cannot be effectively mitigated). The rationale for this is that the reader is presented with the reasoning for the selection of the recommended mitigation measure and allows for an appraisal by the reader of the efficacy of the recommended mitigation measure. An appraisal of the impact management and mitigation measures recommended by Enviro-EAP is presented in Section 6.

6 Recommended Impact Management and Mitigation Measures

Enviro-EAP indicates that the following impact management measures must be implemented and included in the EMPr:

- Limit the footprint area of the construction activity to what is absolutely essential in order to minimise the loss of aquatic habitats in the area.
- Keep all demarcated sensitive zones outside of the construction area off limits during the construction phase of the project. The non-impacted areas of the water course and wetland, its riparian zones and buffer areas is regarded as no go and no impact areas.
- Contractor laydown areas and stockpiles to be established outside of the 100m zone implemented around the water courses and wetlands.
- Vehicles to be serviced at the contractor laydown area and all re-fuelling is to take place outside of all relevant zones of regulation

- Care must be taken to ensure that all concrete mixing is done on batter boards or within suitably bunded areas and no cement laden run-off may enter into the preferential surface flow pathway or the downstream ephemeral stream
- Allow only essential construction personnel within 32m of all riparian systems;
- Restrict construction activities to the drier summer months, if possible, to avoid sedimentation and siltation of riparian features in the vicinity of the proposed development.
- Invasive vegetation to be removed during construction (the material that cannot be used for fire wood) to be disposed of at landfill site in such a manner that seeds must not be able to spread from the disposal site or during transportation.
- At no point may construction equipment stand unauthorised within or near the river or wetland.
- All excess sediment removed from the watercourses must be utilised as part of the building activities or be removed from site. At no point may this material be dumped on site or within any of the other freshwater features identified within the surrounding area. Topsoil will have a high density of alien invasive seeds which will need to be controlled into the operational phase.

EnviroSwift believes that while these recommended measures are largely applicable and warranted, some need to be rephrased or should be more detailed and prescriptive. For example, as regards the second bullet above, it is a shortcoming to recommend as mitigation that all demarcated sensitive areas must be regarded as No-Go areas if the specialist has not identified any such areas. The specialist must identify the sensitive areas in the report and should also consider whether buffers are applicable. There was no evidence of either in the Enviro-EAP report. Generally, the delineated feature and its buffer would be considered as No-Go areas and if any construction activities are required within the No-Go areas then this should only be permissible via an ECO-approved method statement. Another example relates to the recommendation that “construction activities should be restricted to the drier summer months, if possible, to avoid sedimentation and siltation of riparian features in the vicinity of the proposed development”. If Enviro-EAP wants to use the rationale that sedimentation would not occur because it would be effectively mitigated through implementation of the recommended mitigation measures (as Enviro-EAP has indicated in response to the question of whether erosion and sedimentation is likely), then this rationale is flawed because the way in which the recommended measure is phrased leaves it optional for the developer to undertake the stream crossing during the dry summer months. The recommendation should be rephrased to state that either it is mandatory that the river crossing be undertaken during the dry summer months or if phrased as in the Enviro-EAP report where this is optional, then a further mitigation measure that is equally effective needs to be recommended in the event that the river crossing is undertaken during the winter rainy season. If no such practicable mitigation exists then it stands to reason that the impact would persist and then the statement that erosion and sedimentation would not occur is incorrect.

7 Compliance with the gazetted Protocol for Aquatic Biodiversity Assessment

Given that the report comprises an Aquatic Biodiversity Assessment its compliance with the gazetted Protocol needs to be reviewed. Table 1 overpage presents the findings of the assessment of compliance.

Table 1: Compliance with the reporting requirements as per the Protocol for Aquatic Biodiversity Assessments

No.	Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments	Compliance of current report
1	The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:	
1.1	a description of the aquatic biodiversity and ecosystems on the site, including;	
	(a) aquatic ecosystem types; and	Non-compliant due to a lack of detail and descriptions based solely based on desktop sources whereas site work should have also informed the description presented (see Section 4). Also, the report only identifies and assesses one aquatic ecosystem type, a perennial river. There is a possibility that remnant floodplain wetlands are also affected and the non-perennial tributary of the Diep River that a portion of the proposed pipeline will run adjacent to may well be a channelled valley bottom wetland.
	(b) presence of aquatic species, and composition of aquatic species communities, their habitat, distribution and movement patterns	Partially compliant as only one species of indigenous hydrophytic vegetation was identified. There was no written description and instead only photographs of the vegetation communities were provided. EnviroSwift observed a species of Cyperaceae as well as invasive annuals and grasses that should have been included in the description.
1.2	the threat status of the ecosystem and species as identified by the Screening Tool	Partially compliant due to the incorrect focus of the assessment on the Diep River as the only aquatic ecosystem at potential risk of being impacted. The site investigation undertaken by EnviroSwift suggests that floodplain wetland remnants and a channelled valley bottom wetland were also at risk of being impacted. Had the floodplain wetlands associated with the Diep River (if groundtruthed to exist at the proposed crossing point or immediately downstream of the crossing point) and the non-perennial tributary confirmed to comprise a channelled valley bottom wetland then the threat status of the applicable wetland vegetation type and the wetland hydrogeomorphic type would have been gleaned from NFEPA. Instead, Enviro-EAP only provided the threat status of the terrestrial ecosystem type.
1.3	an indication of the national and provincial priority status of the aquatic ecosystem, including a description of the criteria for the given status (i.e. if the site includes a wetland or a river freshwater ecosystem priority area or sub catchment, a strategic water source area, a priority estuary, whether or not they are free -flowing rivers, wetland clusters, a critical biodiversity or ecologically sensitivity area)	Compliant. In addressing this aspect Enviro-EAP has referred to the WCBSP (2023), which indicates the spatial distribution of CBAs and ESAs in relation to the proposed site.
1.4	a description of the Ecological Importance and Sensitivity (EIS) of the aquatic ecosystem including:	Partially compliant as the EIS assessment was only for the Diep River and did not include EIS assessments of possible floodplain wetlands associated with the Diep River and the non-perennial tributary of the Diep River which has the

No.	Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments	Compliance of current report
		appearance of a channelled valley bottom wetland (see Section 4).
	(a) the description (spatially, if possible) of the ecosystem processes that operate in relation to the aquatic ecosystems on and immediately adjacent to the site (e.g. movement of surface and subsurface water, recharge, discharge, sediment transport, etc.); and	Partially compliant because no written description was provided in the report although such an understanding gained from the site investigation would have informed the PES and EIS assessments conducted by Enviro-EAP.
	(b) the historic ecological condition (reference) as well as Present Ecological State (PES) of rivers (in- stream, riparian and floodplain habitat), wetlands and/or estuaries in terms of possible changes to the channel and flow regime (surface and groundwater).	Partially compliant as the report contains a PES assessment but there is no description of the likely reference condition of the site's aquatic ecosystems. There is also a methodological flaw given the sole focus on the Diep River and not its floodplain wetlands (the presence of which within the zone of influence which needs to be confirmed by Enviro-EAP) or the tributary of the Diep River which needs to be correctly classified as comprising either a river or a wetland and assessed in terms of PES.
2	The assessment must identify alternative development footprints within the preferred site which would be of a "low" sensitivity as identified by the screening tool and verified through the site sensitivity verification and which were not considered appropriate.	No alternative scheme is being assessed.
3	Related to impacts, a detailed assessment of the potential impacts of the proposed development on the following aspects must be undertaken to answer the following questions:	
3.1	Is the proposed development consistent with maintaining the priority aquatic ecosystem in its current state and according to the stated goal?	Partially compliant as Enviro-EAP concludes that the proposed development would not compromise the overall ecological condition of the Diep River but presents no basis for reaching this conclusion. While Enviro-EAP mentions REC in the methods section of the report no REC was set for the affected aquatic ecosystems. Had this been done then some basis for the statement would have existed.
3.2	Is the proposed development consistent with maintaining the resource quality objectives for the aquatic ecosystems present?	No resource quality objectives have been formally established for the aquatic ecosystems under assessment. In the absence of such objectives it is necessary to determine the REC.
3.3	How will the proposed development impact on fixed and dynamic ecological processes that operate within or across the site? This must include:	
	(a) impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes);	Enviro-EAP indicates that the proposed development will not impact on hydrological functioning at a landscape level but EnviroSwift differs in opinion in this regard (see Section 5).
	(b) will the proposed development change the sediment regime of the aquatic ecosystem and its sub -catchment (e.g. sand movement, meandering river mouth or estuary, flooding or sedimentation patterns);	Briefly assessed as a potential impact in the report by stating that "*The proposed development will not result in changes to the sediment regime of the aquatic ecosystem and its sub-catchment. Provided that the management and mitigation measures included in impact assessment table is included in the EMPr and adhered to*". EnviroSwift is of the opinion that a

No.	Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments	Compliance of current report
		more comprehensive assessment of this potential impact for the without mitigation scenario is required (see Section 5).
	(c) what will the extent of the modification in relation to the overall aquatic ecosystem be (e.g. at the source, upstream or downstream portion, in the temporary / seasonal / permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.); and	The report indicates that there would be no modification in the event that the recommended mitigation measures are adhered to. EnviroSwift is of the opinion that a more comprehensive assessment of this potential impact for the without mitigation scenario is required (see Section 5).
	(d) to what extent will the risks associated with water uses and related activities change	Partially compliant as a Risk Assessment has been undertaken based on the 2016 Risk Assessment Matrix (RAM) but this RAM has been updated and the current 2023 RAM should have been used.
3.4	How will the proposed development impact on the functioning of the aquatic feature? This must include:	
	(a) base flows (e.g. too little or too much water in terms of characteristics and requirements of the system);	Enviro-EAP indicated that base flows will not be affected. In the opinion of EnviroSwift, it is possible that there would be impacts on base flow as a result of any leaks from the pipeline as the pipeline both crosses a river and is aligned in close proximity to a suspected wetland.
	(b) quantity of water including change in the hydrological regime or hydroperiod of the aquatic ecosystem (e.g. seasonal to temporary or permanent; impact of over -abstraction or instream or off stream impoundment of a wetland or river);	While Enviro-EAP indicated that the proposed development would not alter the flow regime of the aquatic resource, EnviroSwift believes this not to be the case as explained above (i.e. that base flows would possibly be affected in event of leakage from the pipeline).
	(c) change in the hydrogeomorphic typing of the aquatic ecosystem (e.g. change from an unchannelled valley- bottom wetland to a channelled valley -bottom wetland); (d) quality of water (e.g. due to increased sediment load, contamination by chemical and/or organic effluent, and/or eutrophication);	Compliant. EnviroSwift agrees with the statement by Enviro-EAP that the proposed development would not lead to changes in the hydrogeomorphic typing of the potentially affected aquatic ecosystems. Regarding water quality, Enviro-EAP indicates that the proposed development would not affect the quality of the water provided the recommended management and mitigation measures are implemented. EnviroSwift is of the opinion that the proposed development may well impact on water quality during the construction phase due to the requirement for construction vehicles and machinery to operate within and in close proximity to aquatic ecosystems.
	(e) fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal); and	EnviroSwift disagrees with Enviro-EAP that the proposed development would not cause wetland fragmentation. In EnviroSwift's opinion the system would be fragmented temporarily as a result of the requirement to cross the Diep River but in time it would return to a system that is

No.	**Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments**	**Compliance of current report**
		hydrologically and ecologically connected (i.e. the impact would be temporary).
	(f) the loss or degradation of all or part of any unique or important features associated with or within the aquatic ecosystem (e.g. waterfalls, springs, oxbow lakes, meandering or braided channels, peat soils, etc.);	N/A as no such unique or important features were identified on or near the site.
3.5	How will the proposed development impact on key ecosystems regulating and supporting services especially:	No assessment was conducted of the ecological services provided by the potentially affected aquatic ecosystems. Had all the aquatic ecosystem types been correctly classified then this would have allowed for the identification and assessment of ecological services provided by the direct hydrogeomorphic types which in turn would have resulted in the accurate determination of the EIS and PES of the various aquatic ecosystem types which was not done as only the Diep River was assessed in terms of PES.
	(a) flood attenuation;	
	(b) streamflow regulation;	
	(c) sediment trapping;	
	(d) phosphate assimilation;	
	(e) nitrate assimilation;	
	(f) toxicant assimilation;	
	(g) erosion control; and	
	(h) carbon storage?	
3.6	How will the proposed development impact community composition (numbers and density of species) and integrity (condition, viability, predator - prey ratios, dispersal rates, etc.) of the faunal and vegetation communities inhabiting the site?	Non-compliant as Enviro-EAP did not respond to this question and presented no assessment of impacts on biota. Impacts on biota are particularly likely given the requirement for the proposed pipeline to cross the Diep River which would probably cause displacement of biota and also some mortalities.
No.	**Minimum information requirements for an Aquatic Biodiversity Specialist Assessment Report**	
1	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae	Compliant
2	a signed statement of independence by the specialist	Complaint
3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment	Compliant
4	the methodology used to undertake the site inspection and the specialist assessment, including equipment and modelling used, where relevant	Compliant
5	a description of the assumptions made, any uncertainties or gaps in knowledge or data	Compliant
6	the location of areas not suitable for development, which are to be avoided during construction and operation, where relevant	Non-compliant. While reference is made to sensitive areas that need to be set aside as No-Go areas in the recommended mitigation measures, Enviro-EAP has not identified or mapped such areas (see Section 6).
7	additional environmental impacts expected from the proposed development	Compliant
8	any direct, indirect and cumulative impacts of the proposed development on site	Compliant
9	the degree to which impacts and risks can be mitigated, reversed and can cause loss of irreplaceable resources	Compliant although the identification of detailed mitigation measures and an explanation of their mitigatory effect is lacking in the report (see Section 6).
10	a suitable construction and operational buffer for the aquatic ecosystem, using the accepted methodologies	Given that the development proposal comprises the installation of a pipeline (i.e. a linear development) buffers may not be entirely appropriate. However, Enviro-EAP should have indicated the extent of sensitive areas so that the

No.	**Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments**	**Compliance of current report**
		boundaries of such areas can be marked before construction commences.
11	proposed impact management actions and impact management outcomes for inclusion in the Environmental Management Programme (EMPr)	Recommended mitigation measures are not sufficiently detailed or appropriately phrased in the report.
12	a motivation must be provided if there were development footprints identified as per requirement No. 2 above that were identified as having a "low" aquatic biodiversity sensitivity and that were not considered appropriate	N/A
13	a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability or not of the proposed development and if the proposed development should receive approval or not	Partially compliant. While the report does not explicitly include an authorisation opinion some reasoning is provided in the conclusion section which states "*Most of the impacts would be during the construction phase. With effective implementation of the recommended mitigation measures, including the environmental water requirements and implementation of an approved EMP, the condition of the Diep River could be maintained at the desired level of ecosystem functioning"*. In this statement there is reference to environmental water requirements, the relevance of which is unknown as the report does not present the findings of any assessment of environmental flow requirements (EFRs), reserve determination, etc and does not present any indication of what the desired level of ecosystem functioning should be. It is recommended that the authorisation opinion be based on the assessment of impacts as presented in the report.
14	any conditions to which this statement is subjected	While the statement is made that this is conditional upon the implementation of management and mitigation measures, some of these measures have not been correctly phrased or adequately described in sufficient detail in the report.

8 Conclusion and Recommendations

The peer review of the Enviro-EAP (2025) Aquatic Biodiversity Assessment of the proposed upgrading of the potable water supply in Malmesbury that entails a new pipeline crossing of the Diep River has identified a number of short-comings in terms of alignment with best practice in the field of aquatic biodiversity assessment. The key shortcoming of the assessment is the lack of any site-based delineation methods of the various potentially affected aquatic ecosystems in accordance with the accepted best-practise methods (DWAF, 2008 and Job, 2009) that would have assisted in providing an accurate and sufficiently detailed baseline description which in turn would have informed a comprehensive assessment of the potentially significant aquatic ecological impacts.

The other key shortcoming identified in this independent peer review is failure to distinguish between systems driven by alluvial processes (rivers and streams) and systems driven by groundwater (most wetland types) and apply a classification system (Ollis *et al.*, 2013). Why this is material is because the drivers of these two different types of aquatic ecosystems differ significantly and accordingly the risk exposure of these different systems can differ significantly (e.g. alluvial systems are mostly affected by alterations in stormwater run-off brought about by hard surfacing whereas wetlands, in addition to being affected by stormwater run-off are also affected by interflow). Also, the ecological assessment indices can differ for alluvial versus wetland systems as some indices are more suited to rivers and associated riparian systems and others to wetlands.

When assessed in terms of compliance with the gazetted Protocol for Aquatic Biodiversity Assessment the report is found to have the following critical flaws:

- Failure to present a sufficiently detailed description of the aquatic ecosystems at risk of being impacted. Had auger samples been taken within the various features, any evidence of alluvial processes versus wetland soil characteristics would have been identified and the potentially affected aquatic ecosystem types correctly identified as either a river/riparian system or a wetland.
- As a result of (incorrectly in the opinion of EnviroSwift) assessing the aquatic features at direct risk of being impacted as comprising only river/riparian systems driven primarily by alluvial processes, the detailed ecological assessment was incomplete and did not include any assessment of the ecological services and products that rivers/riparian systems and wetlands are typically associated with was undertaken. The implication is that Enviro-EAP would have had a limited understanding of the functional and habitat value of the various aquatic ecosystem types potentially affected by the proposed development in order to undertake a comprehensive assessment of risk and impact significance.
- Failure to provide detailed impact management and mitigation measures (designation of No-Go areas, measures to be adopted by the Contractor to avoid and minimise impacts associated with construction activities near wetlands) and the failure to articulate these in terms of the desired mitigation outcome; and
- Failure to present a sufficiently detailed reasoned authorisation opinion based on a thorough evaluation of the assessment criteria and outputs (both as part of the desktop assessment and site investigation) that comprises an Aquatic Biodiversity Assessment.

Regarding the latter, Enviro-EAP presented the opinion that the proposed development is appropriate as it will not affect the status of the on-site aquatic biodiversity features on the basis of the existing level of disturbance to the features. This reasoning is flawed as the overall aim of an impact assessment is to determine, based on the assessments made, whether the proposed development should be supported and under what conditions. While limited impacts have been assessed in impact rating tables and mitigation measures recommended, a synthesis of the impact ratings insofar as how they inform an authorisation opinion is required.

In conclusion, provided the following is undertaken by Enviro-EAP then EnviroSwift supports the authorisation opinion that the proposed development should be supported from an aquatic biodiversity perspective:

- .On the basis of site-based investigation and in accordance with accepted best-practise (DWAF, 2008 and Job, 2009) confirm the hydrogeomorphic type of the potentially affected aquatic ecosystems and delineate their full extent within the zone of influence of the proposed development (in the opinion of EnviroSwift this should extend a short distance upstream from the crossing point, approximately 50m, include the non-perennial tributary of the Diep River and extend for a distance of approximately 100m downstream of the proposed crossing point);
- Include a more comprehensive written description of the aquatic biodiversity associated with the various aquatic ecosystems and include selected photographs of key features and include a description of the manner in which the various aquatic ecosystem types have been historically impacted, transformed and degraded;

- Undertake separate EIS and PES assessments of each hydrogeomorphic type and if wetlands are confirmed to be directly or indirectly impacted then include a description of the ecological goods and services provided by the wetlands;
- Cast the net widely and identify and assess all potentially significant aquatic ecological impacts generated by the proposed development throughout the project life-cycle (i.e. construction, operational and decommissioning phases);
- Based on the impact assessment recommend practicable mitigation measures that have a demonstrable mitigation effect and ensure that the recommended measures are phrased in such a way that they are effectively implemented and allow for the determination of compliance when assessed in due course by an independent environmental auditor; and
- Undertake the Risk Assessment using the current, updated RAM and ensure that each Section 21 c and i activity is correctly identified and assessed independently in the RAM noting that the RAM must reflect the with-mitigation scenario.

Prepared by:

Nick Steytler SACNASP Reg. no. 400029/02
EnviroSwift Western Cape
Cell 082-322 4074

9 References

Cape Farm Mapper. 2025. https://gis.elsenburg.com/apps/cfm/

Council for Scientific and Industrial Research. 2018 National Wetland Map 5 and Confidence Map [Vector] 2018. Available from the Biodiversity GIS website.

Department of Water Affairs and Forestry. 2008. Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, prepared by M. Rountree, A. L. Batchelor, J. MacKenzie and D. Hoare. Stream Flow Reduction Activities, Department of Water Affairs and Forestry, Pretoria, South Africa.

Enviro-EAP. 2025. Aquatic Biodiversity Impact Assessment. Swartland Municipality – Bulk Water Supply Upgrade from Alfa Street Malmesbury to DR1111 (Malmesbury to Abbotsdale) Road. February, 2025.

Job, N. 2009. Application of the Department of Water Affairs and Forestry (DWAF) wetland delineation method to wetland soils of the Western Cape.

Kleynhans CJ, Louw MD. 2007. Module A: EcoClassification and EcoStatus determination in River EcoClassification: Manual for EcoStatus Determination (version 2). Joint Water Research Commission and Department of Water Affairs and Forestry report. WRC Report No.

Kotze, D.C., Macfarlane, D. and Edwards, R. 2021 WET-EcoServices (Version 2): A technique for rapidly assessing ecosystem services supplied by wetlands and riparian areas. WRC Report No. 2737/1/21. July 2021.

Macfarlane, D.M. and Bredin, I.P. 2016. Buffer zone guidelines for drainage lines, wetlands and estuaries. Part 1: Technical Manual. WRC Report No (tbc), Water Research Commission, Pretoria.

Macfarlane, D.M. and Bredin, I.P. 2016. Buffer zone guidelines for drainage lines, wetlands and estuaries. Part 2: Practical Guide. WRC Report No (tbc), Water Research Commission, Pretoria.

Macfarlane, D.M. and Bredin, I.P. 2017. Buffer zone guidelines for rivers, wetlands and estuaries. Part 1: Technical Manual. WRC Report No. TT 715-1-17, Water Research Commission, Pretoria.

Nel, JL, Driver, A., Strydom W.F., Maherry, A., Petersen, C., Hill, L., Roux, D.J, Nienaber, S., Van Deventer, H., Swartz, E. & Smith-Adao, L.B. 2011a. Atlas of Freshwater Ecosystem Priority Areas in South Africa: Maps to support sustainable development of water resources. Water Research Commission Report No. TT 500/11, Water Research Commission, Pretoria, RSA.

Ollis, D.J., Snaddon, C.D., Job, N.M. and Mbona, N. 2013 Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African National Biodiversity Institute, Pretoria.

WCBSP. 2023. Western Cape Biodiversity Spatial Plan. Department of Environmental Affairs and Development Planning. Cape Town.

APPENDIX A:
CV of the Specialist

Curriculum Vitae

of

NICHOLAS STEYTLER

Director – EnviroSwift Western Cape

CONTACT DETAILS	
Address	32 Rameron Road, Imhoffs Gift, Kommetjie 7975
Email	Nick@enviroswift.co.za
Cell	082-322 4074
PERSONAL INFO	
Full Names	Nicholas Sean Steytler
Date of Birth	28 March 1970
Nationality	South African
Languages	English, Afrikaans, isiZulu (fair)
Identity Number	7003285202088

ACADEMIC QUALIFICATIONS		
BSc	University of Natal (Pmb)	1990
BSc Honours (Zoology & Entomology) ***Cum Laude***	University of Natal (Pmb)	1991
MSc (Entomology)	University of Natal (Pmb)	1994

PUBLICATIONS

Steytler, NS and Samways, 1995. MJ. Biotope selection by adult male dragonflies (Odonata) at an artificial lake created for insect conservation in South Africa. Biological Conservation Volume 72 Issue 3, December 1995, Pages 381 – 386.

Samways, MJ and Steytler, NS. 1996. Dragonfly (Odonata) distribution patterns in urban and forest landscapes, and recommendations for riparian management. Biological Conservation Volume 78 Issue 3, December 1996, Pages 279 – 288.

MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS

Registered Environmental Scientist (Pr Sci Nat 400029/02)

Member of IAIA SA

FIELDS OF EXPERTISE	**Years experience**
Integrated Environmental Management	25 years +
Natural Resource Management Planning	25 years +
Freshwater Ecological Specialist Studies	5 years +

EMPLOYMENT HISTORY

2019 – present: EnviroSwift Western Cape. Director / owner

2007 – present: KHULA Environmental Consultants. Director / owner

2005 – 2009: DJ Environmental Consultants. Associate Consultant.

2000 – 2005: SRK Consulting, Cape Town, Environmental Department. Senior Environmental Scientist.

1996 – 2000: Institute of Natural Resources, Pietermaritzburg. Associate Researcher: Natural Resources Management Programme.
WORK EXPERIENCE (note IEM experience not listed below)
Freshwater ecological specialist studies:
Freshwater ecological impact assessment of the development of housing opportunities on Portion 22 of the Farm Koopmans Kloof No. 221, Kraaifontein, City of Cape Town (2025)
Freshwater ecological impact assessment to support a S24G Rectification Application for the development of a residential dwelling on Farm 1620 Stellenbosch, Western Cape (2025)
Freshwater ecological risk assessment and preparation of a Rehabilitation Plan for the establishment of a Construction Site Camp in a wetland on Erf 65266 Wynberg, City of Cape Town (2025)
Freshwater ecological impact assessment for the proposed residential development of Erf 534 Bantry Bay, City of Cape Town (2025)
Freshwater ecological impact assessment for the proposed residential development of Erf 2534 Yzerfontein, Western Cape (2025)
Freshwater screening study for the proposed redevelopment of Erf 3129 Oranjezicht, City of Cape Town (2025)
Freshwater screening study for the proposed agricultural expansion at Rio Largo Olive Farm (Farms 757 and 758), Scherpenheuwel, Worcester, Western Cape (2025)
Freshwater screening study for the proposed residential development of Remainder Erf 474 St. Helena Bay, Western Cape (2025)
Freshwater screening study for the proposed residential development of Erf 919 Constantia, City of Cape Town (2025)
Freshwater screening study for the proposed redevelopment of Erf 2762 Camps Bay, City of Cape Town (2025)
Freshwater screening study for the proposed expansion of a school at Erf 4929 Lekkerwater Road, Sunnydale, City of Cape Town (2025)
Freshwater ecological impact assessment for the proposed residential development of Erf 3368 Higgovale, City of Cape Town (2025)
Freshwater screening study for the proposed residential development of Erf 17678 Capri, City of Cape Town (2024)
Freshwater screening study for the proposed Eersteriver Station Development, Erven 18-21, 25-29 and 1072, Eersteriver, City of Cape Town (2024)
Freshwater ecological impact assessment as part of a NEMA Section 24G Rectification process for the unlawful expansion of an egg-laying poultry farm on Portion 128 of the Farm Stocklands and Oatlands No. 878, Currys Post, KwaZulu-Natal (2024)
Freshwater ecological impact assessment as part of a NEMA Section 24G Rectification process for the unlawful clearance of indigenous vegetation on Portion 48 of the Farm 708, Franskraal, Overstrand Municipality (2024)
Freshwater ecological impact assessment for the proposed single residential development of Portions 125 & 126 of Farm 599 Bettys Bay, Overstrand Municipality (2024)
Freshwater ecological impact assessment for the proposed development 4 residential dwellings and associated infrastructure on Portion 86 of the Farm Bosjesmans Valley No. 218, Worcester (2024)
Freshwater screening study for the proposed development of Erf 1847 Hout Bay, City of Cape Town (2024)
Freshwater screening study as part of a NEMA Section 24G Rectification process for the proposed single residential development of Erf 5629 Bettys Bay, Overstrand Municipality (2024)
Freshwater ecological impact assessment for the proposed development of Erf 8384 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed development of Erf 4502 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed subdivision of Erf 4476 in Waterfall Lane, Hout Bay, City of Cape Town (2024)
Freshwater ecological impact assessment as part of a NEMA Section 24G Rectification process for the unlawful development of tourism accommodation facilities at the Portion 1 of Farm 866, Bot River, Theewaterskloof Municipality (2024)
Freshwater screening study for the proposed development of Erf 1472 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed expansion of the Montana Seed Processing Facility, Joostenbergvlakte, City of Cape Town (2024)
Freshwater screening study for the German School, Kloof Neck, City of Cape Town (2024)
Freshwater screening study for the proposed telecommunications mast on Portion 6 of the Farm Harkerville No 423, Knysna Road, Plettenberg Bay (2024)
Freshwater screening study for the proposed residential development of Erven 3233 and 3234 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed residential development of Portion 3 of Farm 1643, Franschhoek, Drakenstein Municipality (2024)
Freshwater screening study for the proposed new in-stream dam on the Remaining extent of Farm Sevilla No. 135, Clanwilliam (2024)
Freshwater screening study for the proposed Morning Star affordable housing scheme, Durbanville, City of Cape Town (2024)
Freshwater screening study for the proposed temporary staging facility for the proposed Wynberg IRT bus depot, City of Cape Town (2024)
Freshwater screening study for the proposed subdivision of Erf 4795 Noordhoek, City of Cape Town (2024)

Freshwater screening study for the proposed single residential development of Erf 88844 Clovelly, City of Cape Town (2023)
Wetland delineation at the propsoed Eagles Rest Private Nature Reserve, Cape Point (2024)
Freshwater ecological impact assessment for external services for Welmoed Urban Node, Stellenbosch (2024)
Freshwater screening study for proposed solar PV facilities on the Remainder of Portion 5 of the Farm Rietvallei No. 167, Montagu (2023)
Amendments to freshwater specialist reports submitted in support of the applications for environmental approval for the Calcutta Cemetery, Farm 29 Stellenbosch (2023)
Freshwater screening study for the proposed development of Erf 325 Atlantis, City of Cape Town (2023)
Freshwater screening study for the proposed development of solar PV facilities on Farms 788-6 and 792-RE, Philippi, City of Cape Town (2023)
Freshwater screening study for the Proposed development of solar PV facilities on Erven 551 and 553, Schaapkraal, City of Cape Town (2023)
Freshwater ecological impact assessment for the proposed expansion of the Rusty Gate Mountain Retreat, Greyton (2023)
Freshwater screening study of the proposed redevelopment of portions of Stikland Hospital, Erf 6300 Stikland, Bellville (2023)
Freshwater ecological specialist review & assessment for the proposed amendment to the scope of the authorised extension of Erica Drive, Belhar, City of Cape Town (2023)
Freshwater Screening study for the proposed telecommunications base station on Portion 20 of the Farm Matroosberge No. 57, De Doorns (2023)
Freshwater ecological impact assessment for the proposed subdivision of Erf 10546 Hout Bay (2023)
Freshwater screening study for the proposed expansion of Louwville township, Vredenburg (2023)
Freshwater ecological impact assessment for the residential development of Erf 178092 Newlands, City of Cape Town (2023)
Freshwater screening study for Erf 2068 Somerset West, City of Cape Town (2023)
Freshwater screening study for Portion 3 of Farm 1025 Wemmershoek, Stellenbosch Municipality (2023)
Freshwater ecological impact assessment for a new Wastewater Treatment Works for Matjiesfontein, Laingsburg Municipality (2023)
Freshwater ecological impact assessment for the development of tourism accommodation facilities at the Farm Hemelrand, Hemel en Aarde Valley, Overstrand Municipality (2023)
Freshwater screening study for residential development at Oude Bosch, Hermanus Lagoon, Overstrand Municipality (2022)
Freshwater ecological impact assessment for a proposed shopping centre at Erf 666 Hout Bay, City of Cape Town (2022)
Freshwater screening study for the proposed formalisation of the Valhalla Park informal settlement, Cape Flats, City of Cape Town (2022)
Freshwater screening study for a proposed telecommunications mast, Overhex, Breede Valley Winelands Municipality (2022)
Freshwater ecological impact assessment for the proposed expansion of the Leopard Rock residential estate, Onrusrivier, Overstrand Municipality (2022)
Freshwater screening study for the proposed low cost housing development at Wolwerivier, City of Cape Town (2022)
Freshwater ecological impact assessment for the proposed low cost housing development of Erf 148 Philadelphia, City of Cape Town (2022)
Freshwater screening study of Erf 10932 Constantia, City of Cape Town (2022)
Freshwater screening study of Erf 49 Faure, City of Cape Town (2021)
Freshwater screening study for a proposed concrete factory on the Remainder of the Farm Bultfontyn 128, near Middelburg in the Eastern Cape (2021)
Freshwater ecological impact assessment for the proposed expansion of vineyards at Mountain Rose Farm, Hemel en Aarde Valley, Overstrand Municipality (2022)
Freshwater ecological impact assessment for unlawful agricultural expansion at Plennegy Farm, Oudtshoorn, Western Cape (2021)
Freshwater screening study for the development of erven 41 and 59, Knole Park, City of Cape Town (2021)
Freshwater ecological impact assessment for proposed truck stop on Portion of Erf 10229, Beaufort West, Western Cape (2021)
Freshwater screening study for the proposed redevelopment of the Mowbray Golf Course, Pinelands, City of Cape Town (2021)
Provision of rehabilitation specifications for the unlawful excavation of a trench in a non-perennial drainage line at the Farm Vergelegen, Robertson, Western Cape (2021)
Freshwater ecological impact assessment for unlawful agricultural expansion at Samber Farms, Riversdale, Western Cape (2021)
Freshwater ecological impact assessment for proposed expansion of an in-stream irrigation dam at Farm Hartebeest Kuil, George, Western Cape (2021)
Freshwater screening study for the proposed residential development of Erf 208 Bishopscourt, City of Cape Town (2021)
Freshwater screening study for the proposed agricultural processing facility, Maqinqi communal area, Port St. Johns Municipality, Eastern Cape (2021)

Freshwater ecological impact assessment for the proposed agricultural expansion at the Farm Vergelegen, Robertson, Western Cape (2021)
Freshwater ecological impact assessment for a proposed residential development in Plattekloof, City of Cape Town (2021)
Freshwater ecological screening study for the proposed sewerage pipeline for Schulz Vlei development, Philippi, City of Cape Town (2021)
Freshwater ecological impact assessment for the proposed development of an agro-industrial facility, Wemmershoek, Western Cape (2021)
Freshwater ecological screening study for a proposed filling station in Eerste River, City of Cape Town (2020)
Freshwater ecological impact assessment for an unlawfully constructed tourist accommodation facility, Tulbagh, Western Cape (2020)
Freshwater ecological screening study and risk assessment for additions and alterations to an existing residential dwelling, Breede River, Western Cape (2020)
Freshwater ecological screening study for a proposed truck depot and filling station, Paarl, Western Cape (2020)
Freshwater ecological screening study for a proposed phosphate mine, Saldanha, Western Cape (2020)
Freshwater ecological screening study for a single residential development at Oppi Berg, Ceres, Western Cape (2020)
Freshwater ecological screening study for a proposed industrial area expansion, Bredasdorp, Overberg, Western Cape (2020)
Freshwater ecological impact assessment for proposed Canola plant at Erf 15711 Wellington, Drakenstein Municipality (2020)
Freshwater ecological impact assessment for single residential development of Ptn 13 of Farm 563 Kleinmond (2020)
Freshwater ecological impact assessment for new IRT bus depot, Wynberg, City of Cape Town (2019)
Freshwater ecological screening study for Blackheath Printers, Blackheath, City of Cape Town (2019)
Freshwater ecological screening study for La Motte residential extension, St. Helena Bay (2019)
Freshwater ecological impact assessment for Vloedbos Resort, Overberg (2019)
Freshwater ecological screening study for Erf 3660 Hout Bay, City of Cape Town (2019)
Freshwater ecological screening study for Erf 2145 Constantia, City of Cape Town (2019)
Freshwater ecological impact assessment for low-cost housing development in Khayelitsha (2019)
Freshwater ecological impact assessment for Kommetjie Vineyards Estate, City of Cape Town (2018)
Freshwater ecological screening study for Remainder Erf 177887 Ottery, City of Cape Town (2018)

Environmental Planning and Natural Resources Management:
Preparation of an Invasive Alien Plant Clearing Plan for Erf 6289 Hout Bay, City of Cape Town (2021)
Preparation of an Invasive Alien Plant Clearing Plan for Shamballah Tea House, Cape Point, City of Cape Town (2019)
Preparation of an Invasive Alien Plant Clearing Plan for Imhoff Farm, Southern Peninsula, City of Cape Town (2018)
Preparation of a River Maintenance Management Plan for the Jakkals River, Elgin, Theewaterskloof Municipality (2018)
Preparation of a River Maintenance Management Plan for wetlands associated with the Bottelary River, Hazendal Wine Farm, Stellenbosch (2017)
Preparation of an Alien Plant Clearing Plan for the Farm Wildschutsbrand, Cape Point (2017).
Preparation of an Alien Plant Clearing Plan for Lalapanzi Farm, Cape Point (2017).
Preparation of a River Maintenance Management Plan for the Dawidskraal River, Bettys Bay, Overstrand (2016)
Preparation of a Site Rehabilitation and Management Plan for wetlands at Kraaifontein Shooting club, Northern Cape Metro (2015)
Preparation of a Wetland Maintenance and Management Plan for De Goede Hoop Estate, Noordhoek, South Peninsula (2014)
Application for Off-Road Vehicle Regulations licence for boat launching facility, Oceana Power Boat Club slipway, V&A Waterfront (2014)
Preparation of a Maintenance Management Plan for the Silvermine River, Clovelly Country Club, South Peninsula (2014)
Preparation of a Maintenance Management Plan for the rehabilitation and maintenance of an unnamed stream and associated infrastructure, Klein Constantia Winefarm, Cape Metropole (2014)
Environmental Screening for the proposed redevelopment of the Tygerberg Hospital, Northern Cape Metropole (2014)
Establishment of a Permanent Coastal Development Setback Line for the V&A Waterfront, City of Cape Town (2014)
Preparation of a Maintenance Management Plan for the ongoing maintenance of the access road to the West Coast Rock Lobster holding facility, Witsand Island, Scarborough, City of Cape Town (2013)
Preparation of a Maintenance Management Plan for the Kromboom River, Erf 117459 Lansdowne, Cape Metropole (2013)
Preparation of a Rehabilitation Plan for the remediation of unlawful infilling of a wetland at Lalapanzi Farm, Cape Point (2012)
Preparation of a Rehabilitation Plan for the remediation of unlawful construction of a parking area at Erf 935 Noordhoek Farm Village, City of Cape Town (2012)
Preparation of a rehabilitation plan for the closure of the Retreat Filling Station, City of Cape Town (2012)
Khayeltisha Wetlands Park – Park Delineation and Management Review, City of Cape Town (2010)
Preparation of the Coast & Estuaries Theme for the 1st review of Eastern Cape State of the Environment Report (2009)
Preparation of 2010 FIFA World Cup Greening Business Plan for Polokwane, Limpopo Province (2008)

Preparation of 2010 FIFA World Cup Greening Business Plan for Rustenburg, North West Province (2008)
Revision of the Table Mountain National Park Conservation Development Framework, City of Cape Town (2006)
Comparative Evaluation of alternative venues for the 2010 FIFA World Cup Stadium, City of Cape Town (2006)
Preparation of a Strategic Management Framework for the Kogelberg Biosphere Reserve, Overberg (2005 – 2006)
Preparation of concept document and proposal to undertake a SADC regional market survey of the indigenous fibre trade, SADC Region (2006)
Strategic Planning of Cemeteries in the Drakenstein Municipality (2006)
Environmental assessment of overnight sites for the Hoerikwaggo Trails, Table Mountain National Park, Western Cape (2005)
Preparation of the Year 1 State of the Environment Report for the Western Cape (2005)
Preparation of a Water Resources Management Strategy for Mozambique (2004)
Due Diligence Study for the proposed Mozaq Limitada Prawn Farm, Mozambique (2003)
Preparation of the Culemborg Development Framework, City of Cape Town (2001)
Restoration Planning of the Bokramspruit River, Kommetjie, City of Cape Town (2001)
Management and Maintenance Planning of the Dwars River, Ceres (2001)
Preparation of the Garden Route Spatial Development Framework, Southern Cape (2001)
Strategic Planning of the information needs of a Medicinal Plants Network in the SADC region (1999)
Research to determine potential commercial products from the Wild - Medicinal Plants component, South Africa (1999)
Economic Evaluation of the Cultivation of Nine Species of Medicinal Plants Indigenous to South Africa (1998)
Faunal specialist assessment for the proposed N2 by-pass, Natal Drakensberg, KwaZulu-Natal (1997).
Freshwater specialist assessment for the proposed construction of a bridge over the Msunduzi River, Voortrekker Highschool, Pietermaritzburg (1997)
Strategic Planning of a proposed community based indigenous forest management project, Eastern Cape (1998)
Preparation of a decision support manual for community-based urban riparian systems management (RIPARI-MAN) (1998)
Preparation of an Integrated Catchment Management Plan for the Msunduzi River Catchment, Pietermaritzburg (1997)
Development of Flood Response Strategies for the Msunduzi River Catchment, Pietermaritzburg (1997)
Evaluating community-based wildlife management projects in the SADC region as part of the international project by IIED / IUCN called “Evaluating Eden” (1996)