Proposed Residential Development on Erf 23731 in Aalwyndal, Mossel Bay, Western Cape.

Aquatic Biodiversity Site Sensitivity Verification and Impact Assessment

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DECLARATION OF SPECIALIST INDEPENDENCE

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);
- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in a professional capacity;
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being members of the general public;
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- I do not have any influence over decisions made by the governing authorities;
- I undertake to disclose all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by a competent authority to such a relevant authority and the applicant;
- I have the necessary qualifications and guidance from professional experts in conducting specialist reports relevant to this application, including knowledge of the relevant Act, regulations and any guidelines that have relevance to the proposed activity;
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- All the particulars furnished by me in this document are true and correct.

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GLOSSARY

Aquatic Biodiversity	The variety of plant and animal life in water ecosystems, relevant to the study due to the site's proximity to potential water bodies.
Desktop Review	Preliminary assessment based on existing data and information, conducted prior to on-site investigations.
Erosion Control Methods	Techniques employed to prevent or minimize soil erosion, such as haybale check dams or silt fencing, crucial in areas with high inherent erosion potential.
Freshwater Ecosystem Priority Area (FEPA)	Designated areas of high importance for freshwater ecosystem conservation, identified as a sensitivity feature in the DFFE screening tool.
General Authorisation	A more simple application for water use authorisation from the Department of Water and Sanitation. Restricted to lower risk activities which are clearly defined in legislation. The application process takes around 30 days.
Site Assessment	Comprehensive evaluation of the proposed development site, including the identification of wetlands, watercourses, and soil characteristics.
Sensitivity	The degree to which a particular area or ecosystem is susceptible to disturbance or impact, crucial in determining potential environmental consequences.
Topography	The physical features of the land surface, considered for its potential influence on drainage and ecological features.
Wetland	An area where water covers the soil, or is present either at or near the surface, contributing to biodiversity and ecological significance.
Western Cape Biodiversity Spatial Plan (WCBSP)	A plan indicating categorized areas based on their ecological importance in the Western Cape region.
WULA	Water Use License Application. An authorisation for various water uses obtgained from the Department of Water and Sanitation. This application generally takes 9-12 months to obtain from start to finish.

ABBREVIATIONS

CD:NGI:	Chief Directorate: National Geo-spatial Information
DFFE:	Department of Environment, Forestry and Fisheries
DWAF:	Department of Water Affairs and Forestry
DWS:	Department of Water & Sanitation
EIS:	Ecological Importance and Sensitivity
ESA:	Ecological Support Area
FEPA:	Freshwater Ecosystem Priority Area
GA:	General Authorisation
GPS:	Global Positioning System
NEMA:	National Environmental Management Act
NFEPA:	National Freshwater Ecosystem Priority Areas
NWA:	National Water Act
NWM5:	National Wetland Map 5
SACNASP:	South African Council for Natural Scientific Professions
WCBSP:	Western Cape Biodiversity Spatial Plan
WUL:	Water Use License

1. INTRODUCTION

Confluent Environmental Pty (Ltd) was appointed by the landowner of Erf 23731 to assess a proposed residential development in terms of Aquatic Biodiversity and Sensitivity (Figure 9). Measuring approximately 6.86 ha, Erf 23731 is a proposed subdivision of the original Erf 21250, and the subdivision was largely informed by environmental sensitivities established on the site (Figure 1). The remainder of the original erf (proposed Erf 23730) will remain in its current condition which has a number of existing residential dwellings and an operating guesthouse.

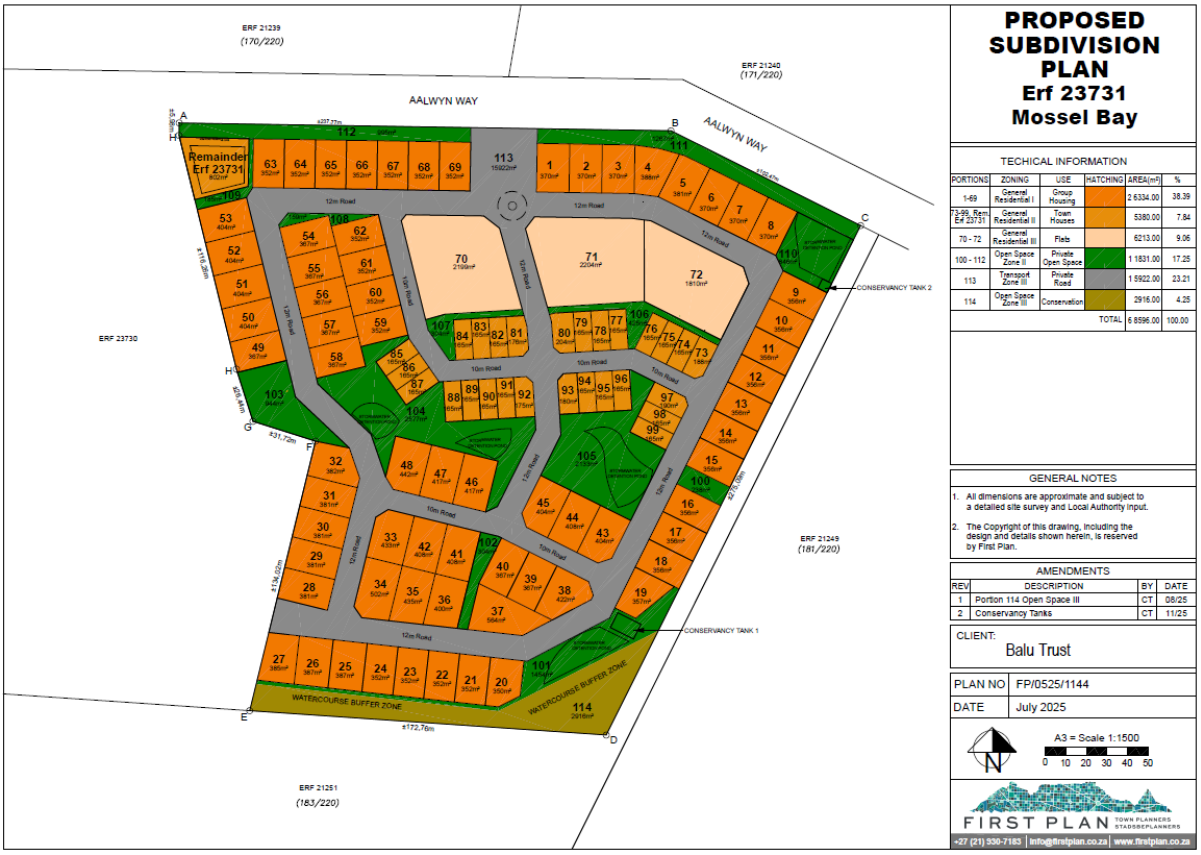

Figure 1. Proposed sub-division of Erf 23731 from Erf 21250 (Rev. 2, Nov 2025).

1.1 The Proposed Development

The most recent Site Development Plan (SDP) is provided in Figure 2. This layout, along with the sub-division, were planned to avoid environmental sensitivities on the erf as far as possible (See Figure 6).

The existing entrance to the operational guesthouse will remain as it is, and a new entrance is proposed midway along the development from Aalwyn Way.

The proposed residential development consists of:

- 69 x General Residential Zone I (26 334 sqm)
- General Residential Zone II (Town houses; 5 380 sqm)
- General Residential Zone III (Flats; 6 213 sqm)
- Open Space Zone I (Private Open Space; 11 831 sqm)

- Transport Zone III (15 922 sqm)
- Open Space Zone III (Conservation; 2 916 sqm)

The development provides for a 40m road servitude (20m from the road centre line, for future expansion) along Aalwyn Way. A series of stormwater detention ponds are positioned in the central green space, south eastern corner and north eastern corner. A conservancy tank is located in the south-eastern corner adjacent to the final stormwater pond.

Figure 2. Site Development Plan (SDP; Rev 10) proposed for Erf 23731, Aalwyndal showing the series of stormwater attenuation ponds and Conservancy Tanks indicated by the yellow arrow.

1.1.1 General Engineering Services

The engineering services report provided a summary of existing and proposed services (Element Consulting Engineers, Revision 2, October 2025). In general the report notes the following:

- Due to some moderate steep slopes across the site, cutting and filling for platforms will be required in places.
- Sufficient pressure and capacity of potable water is available from the municipal Bartelsfontein bulk water line along Aalwyn Way, but will require a minor diameter upgrade of pipeline between the reservoir and the development.
- There is no municipal sewer connection or sewerage network available in Aalwyndal. Three alternative options were considered to support the development of this site, namely:

- Upgrade and expansion of municipal bulk sewer infrastructure;
- Construction of a sewage package plant;
- Utilisation of conservancy tanks.

A discussion about the merits of all three options is provided in the engineering services report. After extensive consultation with the Department of Environmental Affairs and Development Planning (DEA&DP) municipality and project team, it was determined that the best alternative was to use conservancy tanks. While municipal bulk infrastructure would always be the preferred alternative from an environmental perspective, it was deemed too costly and time consuming to provide a workable solution in the short- to medium-term.

- Implementation of the conservancy tank would be considered a temporary measure until such a time as the municipality invests in development of the bulk services, for which a master plan was recently published. Construction of bulk infrastructure is likely to commence from 1 July 2027 at the earliest, and once available, the development at Erf 23731 would transition and connect fully to the municipal service.
- The conservancy tank will be designed in a modular fashion so it can be expanded as each development phase of the project comes online. Detailed descriptors for each of the two proposed tanks are provided in the engineering services report.

1.1.2 Stormwater Management

The Stormwater Management Report (Element, 2025) was compiled for the proposed developent. The property spans a watershed, with approximately 60% drainage towards the general south east direction and 40% draining towards the north east (Figure 3).

Figure 3. Natural drainage zones identified in the engineering services report (Element, 2025).

The sewer and stormwater services layout plan is provided in Appendix 1. The report states the intention to make use of Sustainable Drainage Systems (SuDS) to manage stormwater for the proposed development. To this end, a series of stormwater detention ponds are planned within the development (Figure 3).

Furthermore, a comprehensive list of typical SuDS designs is provided in the report (swales, open pavers, gravel, gabions etc.). Although the specific location, extent and details of SuDS designs is not provided. The report indicates that a formal reticulation plan would be required and provides standards to which such a report would need to comply.

One of the standards not included would need to be criteria highlighted in the **Stormwater Master Plan for Aalwyndal** (Sky High Consulting Engineers, July 2024) which should underpin any stormwater management plans for development in Aalwyndal.

Zone A of the layut drains approximately 85% of the layout via a series of dams to the south eastern corner. Stormwater detention dam volumes were provided as follows:

- Zone A1 = 145 m3
- Zone A2 = 263 m3
- Zone A3 = 584 m3
- Zone A4 = 452 m3
- Zone B1 = 213 m3

Peak flows of drainage zones are as follows:

- Zone A1: 0.43ha; 1:2 peak 0.044m3/s; 1:50 peak 0.126m3/s.
- Zone A2: 0.78ha; 1:2 peak 0.080m3/s; 1:50 peak 0.229m3/s.
- Zone A3: 1.73ha; 1:2 peak 0.178m3/s; 1:50 peak 0.509m3/s.
- Zone A4: 1.34ha; 1:2 peak 0.138m3/s; 1:50 peak 0.394m3/s.
- Zone B1: 0.63ha; 1:2 peak 0.065m3/s; 1:50 peak 0.185m3/s.

Stormwater from remaining areas outside of A1-A4 and B1 along the northern, eastern and southern boundaries will be discharged naturally and unconcentrated along the development boundaries. Stormwater dams are to be vegetated with wetland vegetation, and outlets between dams will be designed as swales

Stormwater from Zone B1 will discharge to the existing municipal v-drain which runs prallel to Aalwyn Way in the road reserve. This v-drain and the existing outlet into the natural watercourse, will be upgraded as part of this proposed development. The outlet will be protected with gabions (Figure 5).

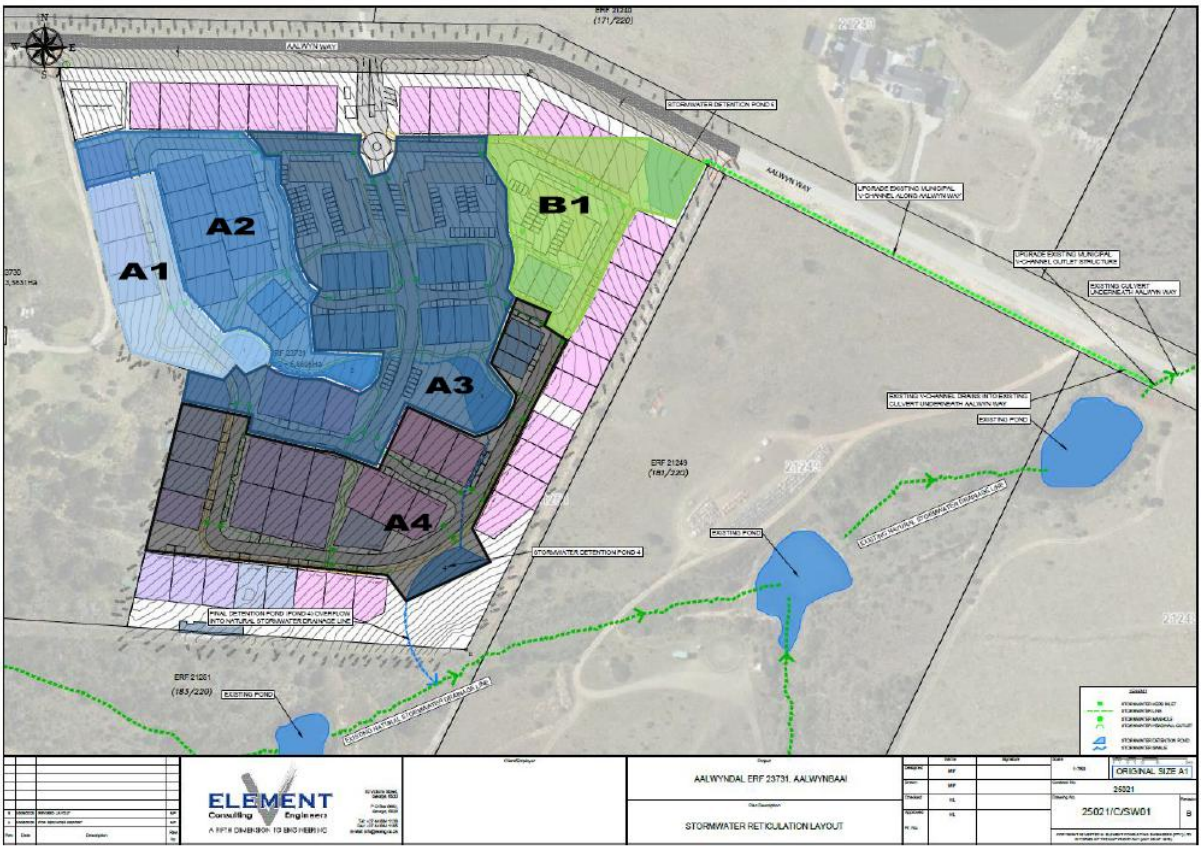

Figure 4. Proposed internal drainage zones and stormwater layout (Element, 2025).

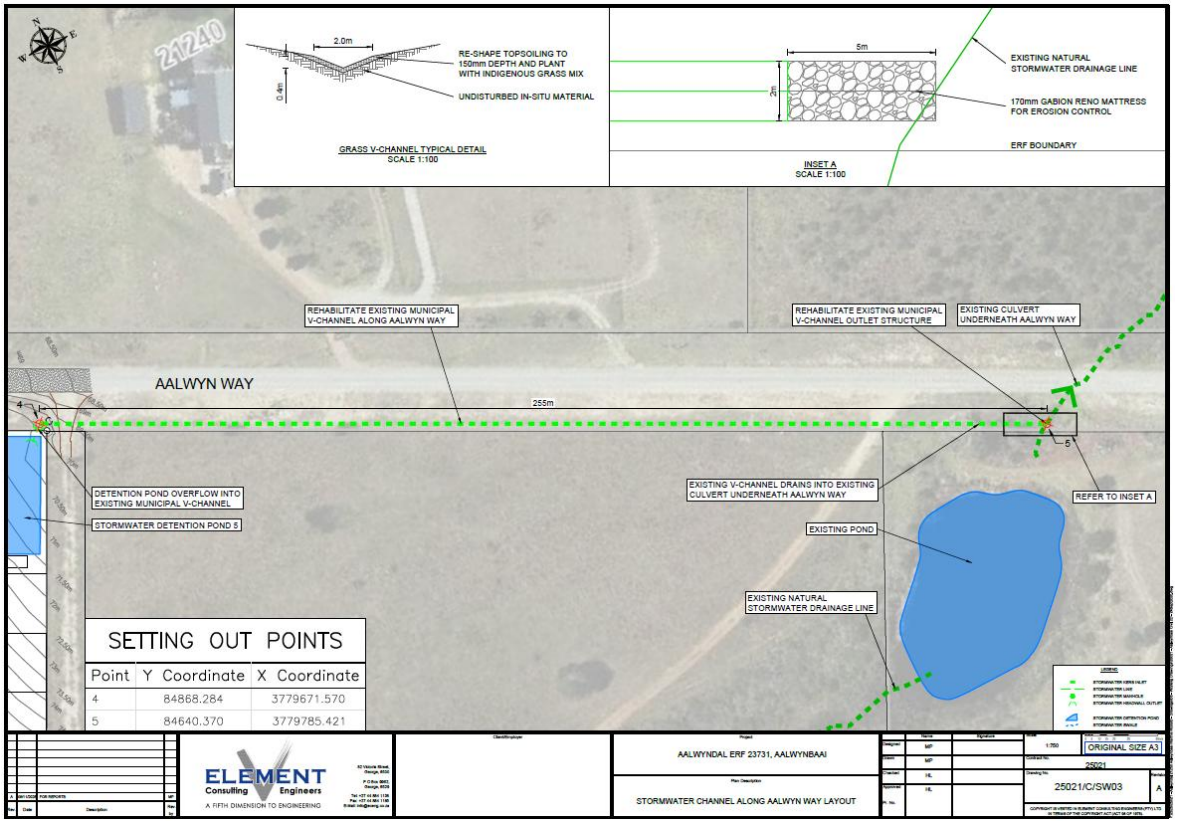

Figure 5. Conceptual plan proposed for the upgrade of the stormwater V-drain leading to the outlet to the stream adjacent to Aalwyn Way.

1.1.3 Aalwyndal Biodiversity Offset Framework Plan

Environmental sensitivities of the site and surrounding area are well understood as a result of the recently concluded Aalwyndal Biodiversity Offset Framework Plan; a series of 5 reports jointly compiled by Confluent Environmental and Eco-Pulse (WCDEDT, 2025). As part of this project a conservation corridor was mapped throughout Aalwyndal. This was aligned with sensitive features such as steep slopes, watercourses, and high sensitivity vegetation. For Erf 23731 the Core Area, as it is known, is aligned with the 30 m riparian buffer zone. While the Offset Framework Plan had not been formally adopted by authorities at the time of writing, the environmental sensitivities that underpinned the plan are well understood, and recommendations regarding the spatial exclusion and management of sensitive areas would be consistent whether the plan is formally adopted, or not.

1.1.4 Delineated Watercourses

Erf 23731 is located on Aalwyn Way on historically transformed and grazed land which slopes gently to the south towards a non-perennial drainage line on the neighbouring property. The only mapped intersection between Erf 23731 and any aquatic features is along the southern boundary and the south-eastern corner where the buffer extends into the erf. The watercourses and associated 30m buffers indicated in Figure 6 were delineated in Report 1 of the series, and therefore no further delineation or classification of watercourses is required.

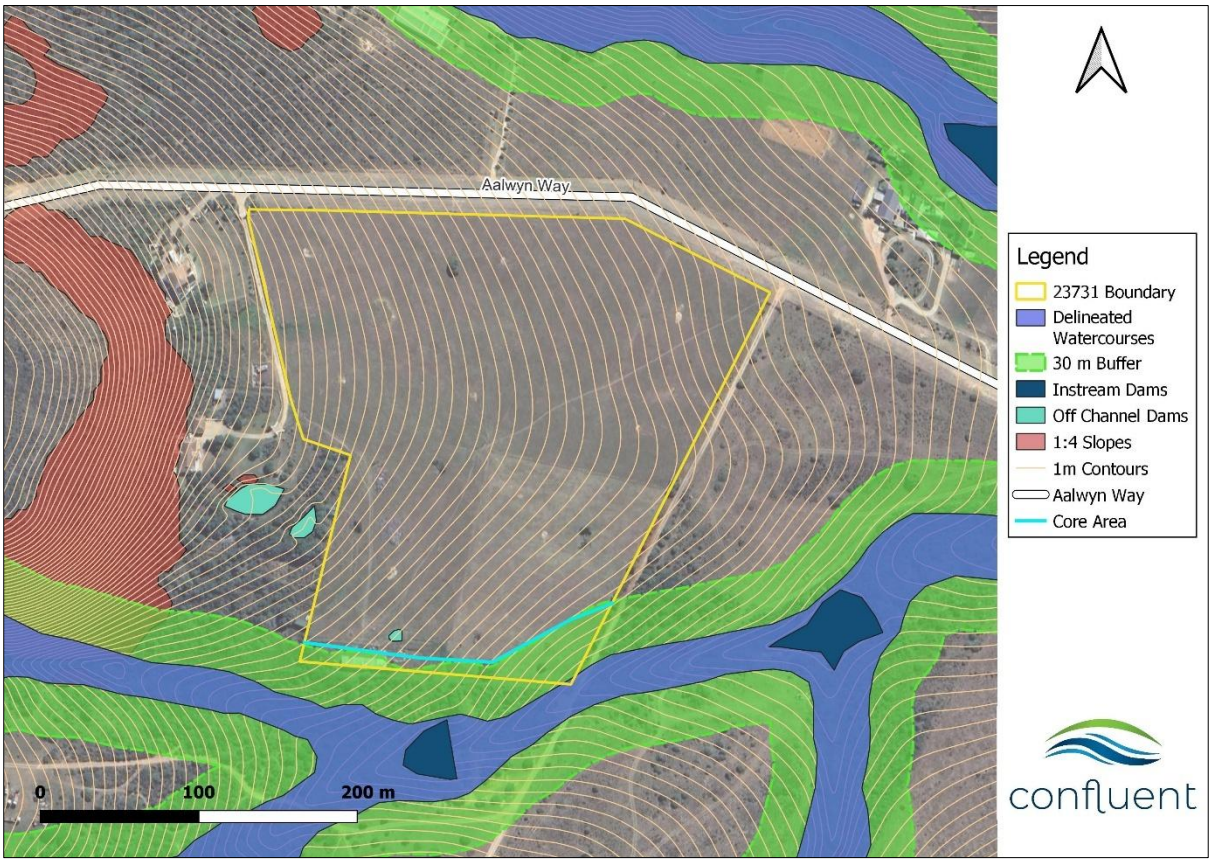

Figure 6. Delineated watercourses and 30m buffer around Erf 23731 (using spatial layers from WCDEDT, 2025).

1.1.5 Site Ecological Importance (SEI) and Biodiversity Offset Requirements

Site Ecological Importance (SEI) was determined for the Aalwyndal precinct in Report 1 of the WCDEDT (2025) series. The SEI integrated the most sensitive ratings for each of the biodiversity sensitivity themes, covering Aquatic, Terrestrial, Botanical and Fauna. The mapped SEI for Erf 23731 indicates the majority of the sub-divided area as Low Sensitivity. The very small strip of High Sensitivity was left out of the proposed development area in the SDP (Figure 2). Areas of Low and Very Low SEI do not require biodiversity offsets.

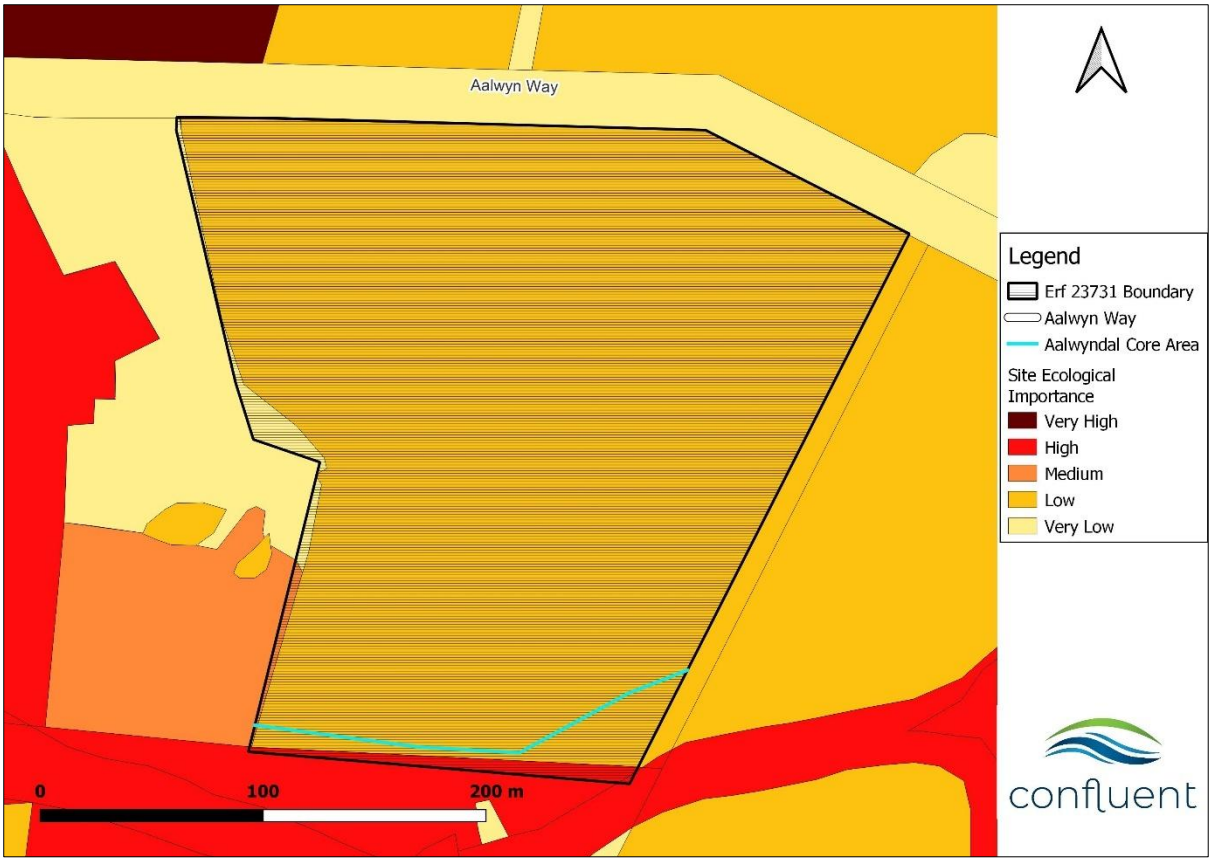

Figure 7. Site Ecological Importance (SEI) determined for Erf 23731 and immediate surroundings (from WCDEDT, 2025).

1.1.6 Core Area

A conservation corridor referred to as the Core Area was proposed through Aalwyndal for the purpose of conserving well connected areas of important or irreplaceable biodiversity (Report 1, WCDEDT, 2025). The aim is for the Core Area to preferentially provide on-site (in Aalwyndal) offset opportunities before off-site areas are required. As such, the Core Area must be set aside and managed for conservation as described in Report 3 of the WCDEDT (2025) series.

A small section of the Core Area is located along the southern boundary and south-eastern corner of Erf 23731 which extends onto neighbouring properties to the west and east. To the west, the Core Area extends behind the existing dwellings and guesthouse close to the original boundary of the Erf 21250 (prior to sub-division).

Regardless of whether the Offset Plan is fully adopted or not, the Core Area is aligned with a suitable riparian buffer which aims to protect the watercourse from impacts associated with the housing development. Therefore, a buffer aligned with the Core Area would have been recommended regardless of the status of the Offset Plan for Aalwyndal.

The proposed Site Development Plan indicates this area with zoning of Open Space III which affirms the intent that the area be set aside for conservation, and not merely form part of the development's private open space.

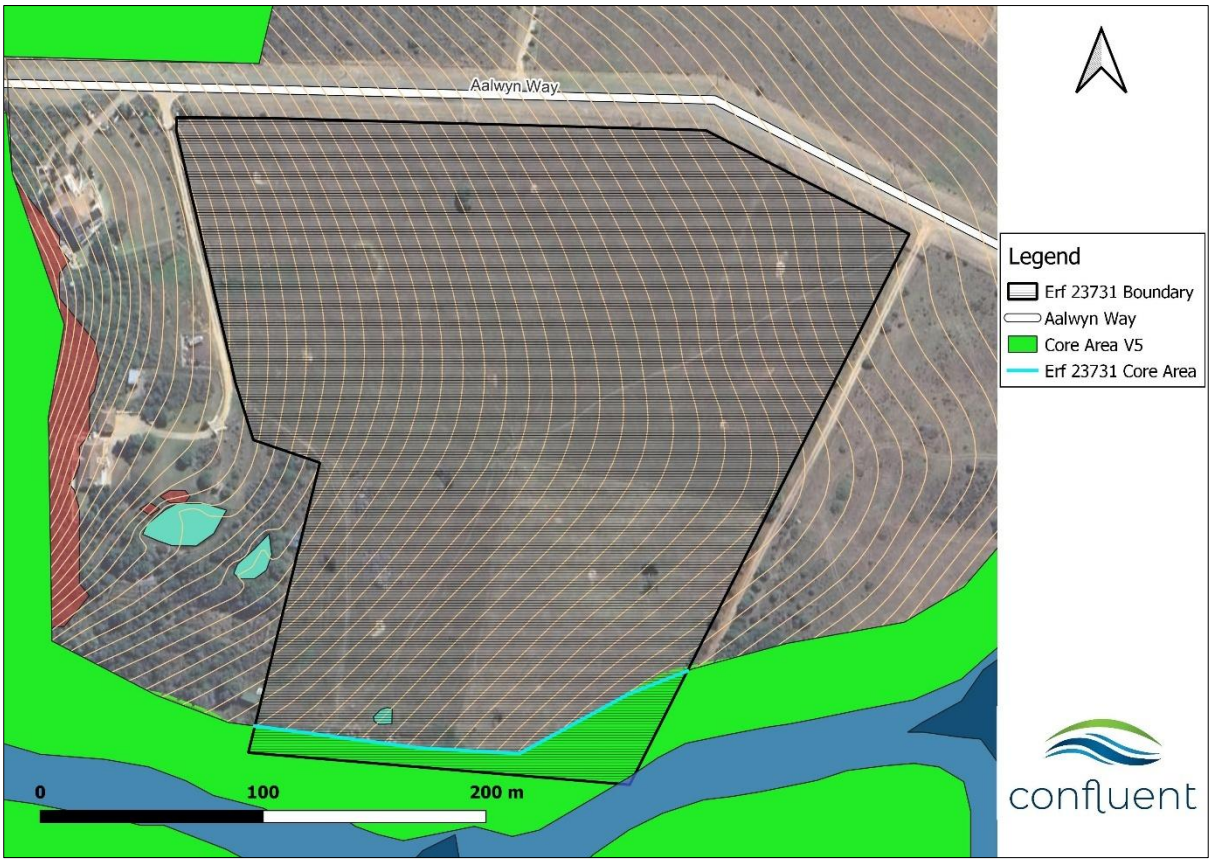

Figure 8. Erf 23731 in relation to the proposed Core Area through Aalwyndal. This area should be fenced off and managed for conservation as indicated in Report 3 (WCDEDT, 2025).

1.1.7 Geotechnical Study

A geotechnical study of Erf 23731 was undertaken by Outeniqua Geotechnical Services (March, 2025). Eight test pits were excavated and described across the site, and the report was reviewed mainly from the perspective of stormwater management.

No water seepage was encountered in any of the test pits. Soils were dominated by clay and silt with potentially problematic shrink/swell characteristics that would necessitate the import of structural filling material. The observed soil types have low permeability, and while no groundwater was detected in the test pits, seasonal seepage through the upper soil profile during wet weather would be expected due to gradual infiltration (Outeniqua Geotechnical Services, 2025).

A result of this is that irrigation with treated wastewater was suggested as not viable. This also means that increased stormwater runoff from hard surfaces on the site would not be acceptable, and recommendations were made to construct stormwater retention dams to provide temporary storage (this issue is well addressed in the stormwater management plan from Element). In addition, road runoff directed into trapezoidal or V drains was recommended.

The report highlighted that erosion would primarily be of concern for excavated / loosened soils which would be highly erodible.

1.2 Key Legislative Requirements

The scope of work for this report is guided by the legislative requirements of the National Environmental Management Act (NEMA) as well as the National Water Act (NWA).

1.2.1 National Environmental Management Act

According to the protocols specified in GN 1540 (Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(A) and (H) and 44 of the National Environmental Management Act, 1998, when Applying for Environmental Authorisation), assessment and reporting requirements for aquatic biodiversity are associated with a level of environmental sensitivity identified by the national web-based environmental screening tool. An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of:

- **Very High** sensitivity for aquatic biodiversity, must submit an Aquatic Biodiversity Specialist Impact Assessment; or
- **Low** sensitivity for aquatic biodiversity, must submit an Aquatic Biodiversity Compliance Statement.

The screening tool classified the site as being of **Very High** aquatic biodiversity. According to the protocol, a site sensitivity verification must be undertaken to confirm the sensitivity of the site as indicated by the screening tool:

- Where the information gathered from the site sensitivity verification differs from the screening tool designation of **Very High** aquatic biodiversity sensitivity, and it is found to be of a **Low** sensitivity, an Aquatic Biodiversity Compliance Statement must be submitted.

The sensitivity features identified by the screening tool are:

- Freshwater Ecosystem Priority Areas (FEPA) Subcatchment ;
- Critical Biodiversity Area 1 (CBA1) Aquatic;
- Wetlands. East Coast Renosterveld bioregion (valley-bottom).

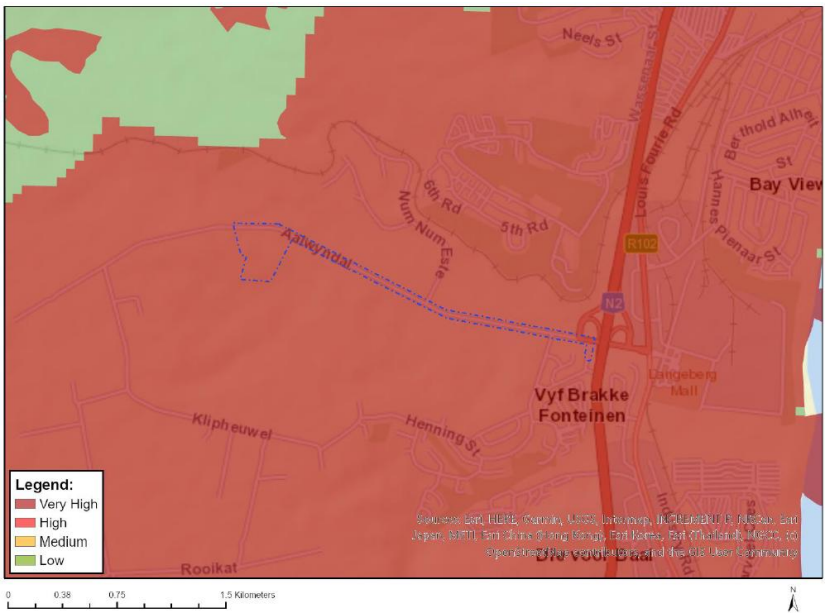

Figure 9: Results of the DFFE Screening Tool which indicate Very High Sensitivity of the Aquatic Biodiversity theme for Erf 23731 and the approximate sewer line route.

As all watercourses associated with the proposed development are well understood, the Very High sensitivity of the site is confirmed. An impact assessment is therefore necessary for the proposed development.

1.2.2 National Water Act

The Department of Water & Sanitation (DWS) is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, or aquifers.

A watercourse means:

- A river or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which, water flows; and
- Any collection of water which the Minister may, by notice in the Gazette, declare to be watercourse, and

For the purposes of this assessment, a wetland area is defined according to the NWA (Act No. 36 of 1998):

"Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil".

Wetlands must therefore have one or more of the following attributes to meet the NWA wetland definition (DWAF, 2005):

- A high water table that results in the saturation at or near the surface, leading to anaerobic conditions developing in the top 50 cm of the soil;

- Wetland or hydromorphic soils that display characteristics resulting from prolonged saturation, i.e. mottling or grey soils; and
- The presence of, at least occasionally, hydrophilic plants, i.e. hydrophytes (water loving plants).

No activity may take place within a watercourse unless it is authorised by the Department of Water and Sanitation (DWS). According to Section 21 (c) and (i) of the National Water Act, an authorization (Water Use License or General Authorisation) is required for any activities that impede or divert the flow of water in a watercourse or alter the bed, banks, course or characteristics of a watercourse. The regulated area of a watercourse for section 21(c) or (i) of the Act water uses means:

a) The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;

b) In the absence of a determined 1 in 100-year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or

c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.

According to Section 21 (c) and (i) of the NWA, any water use activities that do occur within the regulated area of a watercourse must be assessed using the DWS Risk Assessment Matrix (GN4167) to determine the impact of construction and operational activities on the flow, water quality, habitat and biotic characteristics of the watercourse. Low-Risk activities require a General Authorisation (GA), while Medium or High-Risk activities require a Water Use License (WUL).

1.3 Assumptions and Exclusions

A site visit was conducted in July 2024 which is mid-Winter. It is possible that sensitive features such as rare or unique biota (e.g. amphibians), plants or habitat were not observed during the site visit, which could be influenced by season, time of day, flow level or vegetation cover. However, recent good rainfall would have meant that any wetland features other than those already delineated as part of the Aalwyndal Offset project would have been quite evident and easy to identify.

Detailed information typically found in the engineering services report was not available at the time of writing. A high level stormwater management plan was provided which summarised the conceptual approach to stormwater management. This would be guided by the Aalwyndal Stormwater Master Plan and typical SuDS interventions, although no detailed designs were provided, or incorporated into the SDP at the time of writing.

2. CATCHMENT CONTEXT

2.1 Catchment features

The proposed development site is located in the quaternary catchment K10A (Figure 10). Only one non-perennial river is mapped approximately 200 m south of the site flowing in an easterly direction before turning to the north where it joins the Tweekuilen River. No other watercourses are mapped on, or in the vicinity of the site. The Tweekuilen River flows east

through Aalwyndal before exiting through a box culvert under the N2, from where it is mostly canalised beneath built infrastructure before reaching a small estuary.

As the rainfall intensity in the area is classified as Very High and the inherent erosion potential of soils also as High, erosion of soils and stormwater management are factors that must be carefully considered when developing in this area, especially considering the large amounts of stormwater associated with urban developments and sloping ground towards the southern property boundary (Table 1 and Figure 6).

Table 1. Summary of relevant catchment features for the proposed development area.

Feature	Description
Quaternary catchment	K10A
Mean Annual Runoff	68.76 mm
Mean Annual Precipitation	520 mm
Inherent erosion potential of soils (K-factor)	0. 67, High
Rainfall intensity	Very High
Ecoregion Level II	20.02, Southeastern coastal belt
Geomorphological Zone	Not applicable
NFEPA area	Sub-quaternary reach 9292, FEPA.
Mapped Vegetation Type	FRs14: Mossel Bay Shale Renosterveld (Critically Endangered)
Conservation	CBA1 and 2: Aquatic; WCBSP (2023).

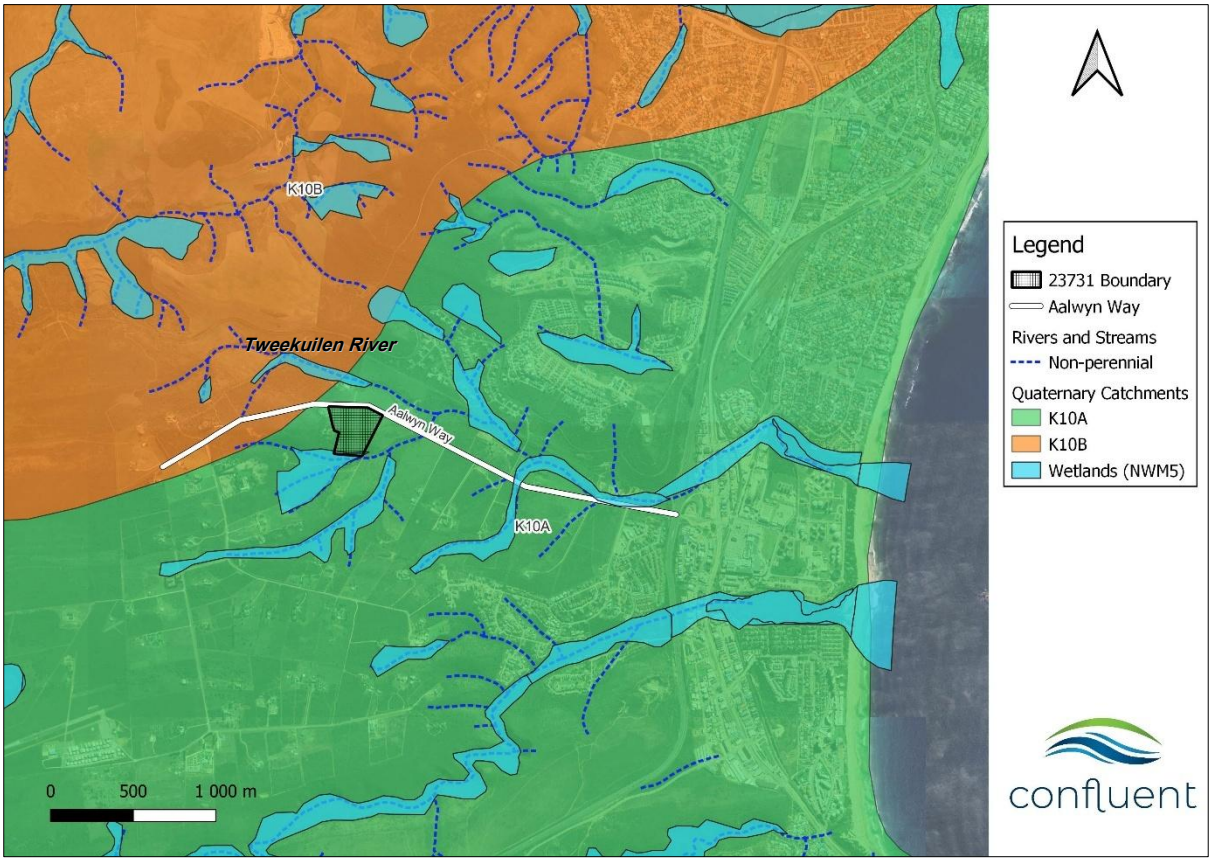

Figure 10. Location of Erf 23731 in the quaternary catchment K10A in relation to mapped watercourses (Wetlands from National Wetland Map Version 5).

Rainfall occurs year-round with seasonal peaks in spring and autumn (Figure 11).

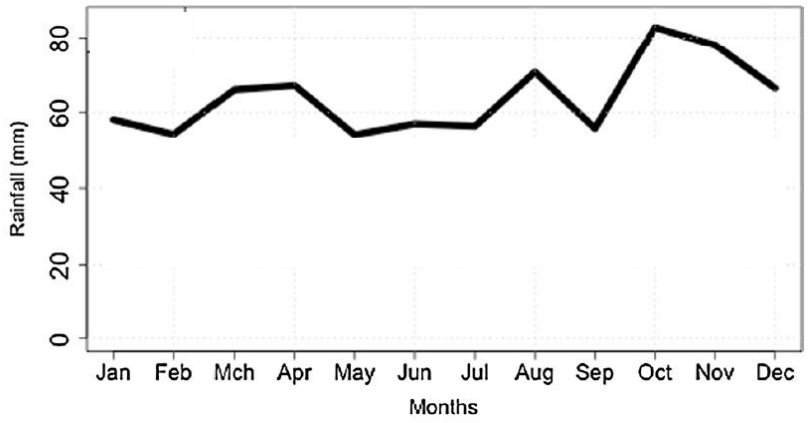

Figure 11. Area-averaged monthly rainfall for the coastal Southern Cape indicating peaks in Mar-Apr, Aug, and Oct. Data averaged between 1979 and 2011 (Engelbrecht et al., 2015).

The project area is located within the southeastern coastal belt (Ecoregion Level 2:20.02). The terrain is described as closed hills of moderate and high relief and moderately undulating plains. Altitude ranges between 0 – 1 300 m.a.m.s.l.

2.2 Vegetation

The vegetation type on Erf 23731 is mapped as Mossel Bay Shale Renosterveld which is listed as Critically Endangered. In the proposed development footprint on Erf 23731, the natural vegetation has been historically cleared and presently supports a range of graminoid (grass) species which are grazed lightly by sheep A more detailed assessment of the vegetation type is provided in the botanical specialist report by B. Fouche (Confluent Environmental, 2025; Figure 12).

Figure 12. Representative photo of typical terrestrial vegetation cover on the general area of Erf 23731 (photo B. Fouche).

Watercourses in the project area are defined as occurring in the East Coast Renosterveld Bioregion according to Van Deventer et al. (2018). Valley bottom wetlands and seeps in this bioregion are assigned an ecosystem threat status of Critically Endangered with a protection status of ‘Not Protected’.

2.3 Conservation and Catchment Management

2.3.1 Western Cape Biodiversity Spatial Plan

The Western Cape Biodiversity Spatial Plan (WCBSP; 2023; *Figure 13*) indicated the following Biodiversity Priority Areas (BPA) on the development site and surrounding area:

Critical Biodiversity Area 1 (CBA1): Aquatic and Terrestrial
Critical Biodiversity Area 2 (CBA2): Degraded Areas

In terms of aquatic features, these biodiversity priority areas were identified due to the presence of the mapped valley-bottom wetland (Figure 10).

The location of CBAs was one of the aspects considered during the revision of the Aalwyndal precinct plan and proposal of the Core Area. Therefore these priority areas have already been ground-truthed and accommodated in the proposed Core Area (Figure 8) which will achieve the specified management actions appropriate to conservation of CBAs (Table 2).

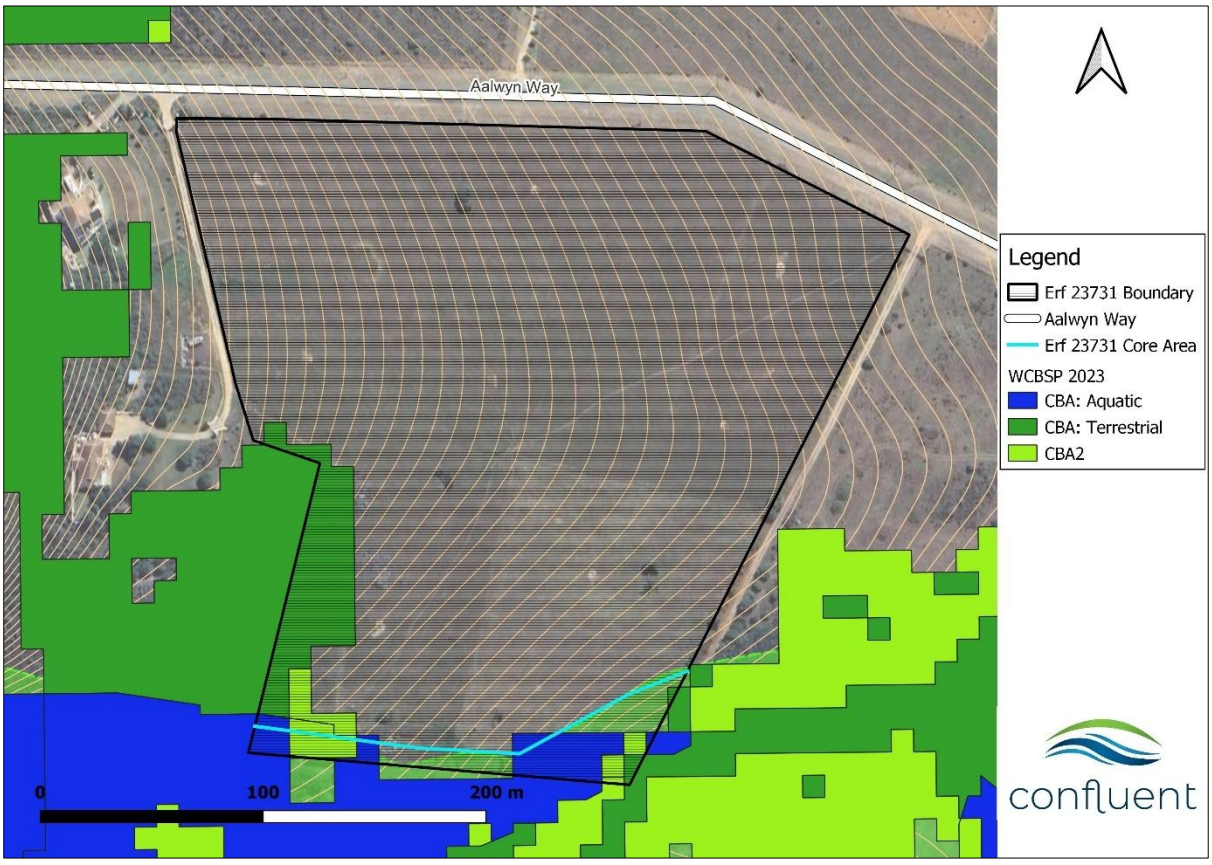

Figure 13. The proposed development area in relation to mapped conservation features of the Western Cape Biodiversity Spatial Plan (2023).

Necessary actions in relation to the WCBSP are to ensure that development on the site does not result in negative impacts on the ecological structure and function of watercourses adjacent to and on to the site (Table 2).

Table 2. Definitions and objectives for conservation categories identified in the Western Cape Biodiversity Spatial Plan (WCBSP, 2023).

WCBSP Category	Definition	Management Objective
Critical Biodiversity Area 1	Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.
Critical Biodiversity Area 2	Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.

2.3.2 National Freshwater Ecosystem Priority Areas

According to the National Freshwater Ecosystem Priority Atlas (NFEPA; Nel *et al*., 2011) the sub-quaternary reach (SQR 9292) is classified as a Freshwater Ecosystem Priority Area (FEPA; NFEPA; Nel *et al*., 2011).

River FEPAs achieve biodiversity targets for river ecosystems and threatened/near-threatened fish species and were identified in rivers that are currently in a good condition (A or B ecological category). Their FEPA status indicated that they should remain in a good condition in order to contribute to national biodiversity goals and support sustainable use of water resources (Nel et al., 2011).

For river FEPAs, the whole Sub-quaternary reach (SQR) is identified as a FEPA. Thus, the whole sub-quaternary catchment indicates needs to be managed in a way that maintains the good ecological condition of the river reach, which in this case, is the watercourse located in the valley-bottom south-east of the development site. It is therefore important that development does not result in any deterioration of the watercourse or its catchment area.

The current development footprint on Erf 23731 does not directly interact with the watercourse and has been adjusted to exclude both the watercourse and its buffer. The point of interaction however, relates to the discharge of stormwater containing treated effluent which would be diluted to varying degrees depending on background rainfall at the time. Both water quantity and water quality would be an important issue to consider given the slope, increase in hard surfaces, and low soil permeability. This aspect is considered in the impact assessment section of this report.

2.4 Resource Quality Objectives

Resource Quality Objectives (RQOs) are defined as clear goals (numerical or descriptive statements) relating to the quality of a water resource and are set in accordance to the management class for the resource to ensure the water resource is protected. The purpose of RQOs is to set clear objectives for the resource against which WULs and the related impacts can be evaluated and managed to achieve a balance between the need to protect and utilise the resource.

The Breede-Olifants Catchment Management Agency concluded an assessment of major rivers in the Water Management Area (DWS, 2018).

The Tweekuilen Estuary was included in the assessment and the RQOs that have been set for the estuary are in many cases directly applicable to how water resources are managed upstream in the catchment. Some of the most applicable objectives are listed as follows:

- Maintain flows as the system is small and needs most of its freshwater flows;
- Waterborne pathogens (e.g. *E. coli*) must be maintained at levels suitable for full contact recreation;
- Flood regime must be maintained to support the natural bathymetry and sediment characteristics of the estuary;
- Clear alien vegetation from the catchment.

The Present Ecological State (PES) of the Tweekuilen Estuary is rated as D (Largely Modified) and the Recommended Ecological Category is listed as C (Moderately Modified). The two main threats to the system are freshwater deprivation and impaired water quality due to stormwater inputs and periodic sewage spills. Based on the PES and REC, the high-density residential developments planned in Aalwyndal must be carefully managed as they could quite possibly result in further degradation of the estuary. If the REC is to be achieved, then potentially affected watercourses on all properties will need to be adequately buffered along with the careful maintenance of flows and water quality.

2.5 Historical Assessment

Historical aerial photographs of the site show that in the 1930s Erf 23731 had a natural vegetation cover, likely representative of the renosterveld mapped as occurring on the site. The watercourse south-east of the site was distinguished by a distinct riparian zone featuring vegetation of a high density.

In 1974 the vegetation on the site had been cleared, presumably for agricultural purposes to make way for grazing of livestock. Riparian zones along the Tweekuilen River to the north and the tributary south-east of Erf 23731 remained intact but were very narrow relative to the delineated extent of the riparian zone at present (Figure 6). Aalwyn Way and the instream dams had not been constructed yet but the onramp for the N2 is visible.

In 1991 the first instream dam in the unnamed tributary south-east of the site was constructed and the vegetation on site remained in a cleared state. Aalwyn Way had still not been constructed.

In 2006 Aalwyn Way has been constructed, and some regrowth of vegetation over approximately two thirds of the property is evident.

In 2016 the vegetation cover is once again more uniform and appears to be grazed on Erf 23731, while the series of three dams that have been constructed along the watercourse on neighbouring properties are all present.

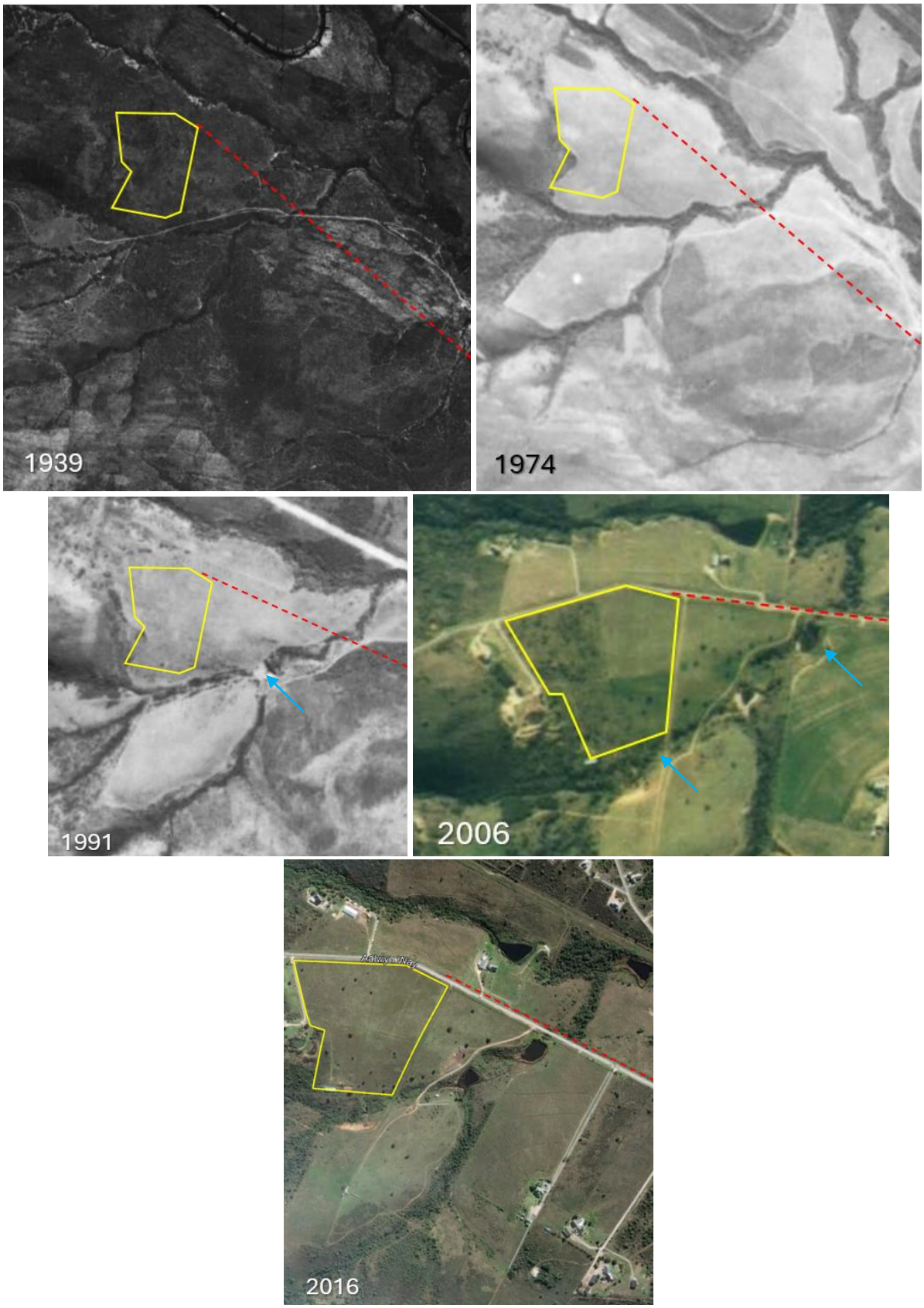

Figure 14. Historical photos showing the approximate location of Erf 23731 and Aalwyn Way (red dotted line) through notable changes between 1939 and 2016 (CD:NGI & Google Earth imagery). Blue arrow indicates the appearance of dams.

Figure 15. Recent drone photo of the Erf 23731 showing grazed vegetation and the approximate development footprint which excludes the designated proposed Core Area associated with the watercourse.

3. SITE ASSESSMENT

The site visit for Erf 23731 was conducted on 17 July 2024 2024 which is considered mid-winter. The full extent of the site was walked including more natural areas west of the proposed development area. A faunal assessment was conducted for the site which included placement of a camera trap next to the dam immediately south of the proposed development area (K. Daniels, Confluent Environmental). Aalwyandal in general, and the length of Aalwyn Way was driven and walked on numerous (>10) occasions in 2024 for the purpose of developing the Biodiversity Offset Framework Plan.

3.1 Site Observations

The full extent of the proposed development footprint is grazed grass with no indication of any wetland features within the site itself. The photo in Figure 16 shows the sloping grass area viewed in a westerly direction towards the watercourse in the valley-bottom. The watercourse is located on the neighbouring property, Erf 21251. The faunal specialist at Confluent Environmental set a camera trap adjacent to the dam near Erf 23731 and identified domestic livestock such as a horse and cows, along with a Black-crowned Night Heron (*Nycticorax nycticorax*) utilising the watercourse. Several other species (e.g. Bushbuck, porcupine, mongoose) are expected to ustilise the watercourse as a corridor for movement, feeding and breeding, which is one of the reasons it has been included in the proposed Core Area for Aalwyndal.

Figure 16. Sloped grazed grass typical of the development footprint with dense, busy vegetation along the valley-bottom watercourse on the neighbouring property.

3.2 Affected Watercourses for Further Assessment

3.2.1 Erf 23731

The proposed development footprint has no watercourse within it.

The edge of the delineated channelled valley-bottom wetland is > 32m from the development footprint on Erf 23731 (Figure 17).

Figure 17. Channelled valley-bottom wetland on property neighbouring Erf 23731. Turquoise line is the approximate limit of the development footprint.

It is therefore unlikely that the proposed development on Erf 23731 will directly impact on the valley-bottom wetland. Furthermore, the wetland has been protected through delineation along the wetland edge and a 30m buffer applied beyond that which links it to the proposed Core Area that connects along watercourses and other sensitive features throughout the Aalwyndal Precinct. A range of management criteria for the proposed Core Area have been stipulated in Report 3 which aim to ensure that biodiversity along with ecological structure and function are preserved as far as possible. Relevant management recommendations have been provided as mitigation measures in this report.

The only way that the development could impact the watercourse would be through the ill-considered handling of stormwater or effluent spillage / overflow which could result in eroded flow paths, sedimentation and/or pollution of the natural wetland.

3.2.2 Stormwater V-Drain and Outlet Upgrade

Currently, a grassed swal carries street runoff to an outlet in to the watercourse downstream of Erf 23731. The outlet is about 220m east of the Erf 23731 on Aalwyn Way. Part of this development proposal includes an upgrade of the swale to a V-drain and gabion protection at the outlet (Figure 5), which is currently badly eroded. The outlet also forms the spillway of a small instream dam immediately upstream (Figure 18).

It is very likely that Aalwyn Way will be widened and upgraded in the future, in which case this improvement to infrastructure will be replaced. However, it cannot remain in its present condition and receive any increase in stormwater inputs, as it is already failing with the current runoff. Although it is likely that dam overflow events (however infrequent) would have had more of an impact on eroding the outlet / spillway then runoff from Aalwyn Way.

Figure 18. Location (yellow arrow) of the proposed stormwater outlet upgrade to the wetland downstream of an existing dam (left photo). The existing outlet / dam spillway was concreted over but has been scoured out, leaving large holes under the concrete surface (right photo).

3.3 Watercourse Delineation & Buffers

As already mentioned, a thorough assessment covering multiple biodiversity themes was undertaken in the precinct in support of the Aalwyndal biodiversity offset framework plan. Two of the outcomes of this project were the complete delineation of watercourses in the precinct, along with a 30m buffer which is preserved within the proposed Core Area, and in some areas is much wider than this. These spatial layers were used to inform the development proposal for Erf 23731.

4. LEGAL IMPLICATIONS

4.1 Site Sensitivity Verification

According to the Department of Environment, Forestry and Fisheries (DFFE) screening tool, Aquatic Biodiversity at the site has a **Very High** sensitivity. Following the desktop and site assessment, this rating is confirmed due to the following reasons:

- While the constructed footprint of the development does not extend beyond the mapped Core Area (30m from the delineated wetland), the combined risk factors of high density development, low soil permeability, sloping ground towards the wetland and high rainfall intensity mean that stormwater and treated effluent runoff could negatively impact on the wetland.

Therefore, an impact assessment must be completed which addresses these risks and provides suitable mitigation measures and recommendations.

4.2 National Water Act

Actions required for development of a residential estate would trigger Section 21 c) and i) water uses if they were located in the regulated area of the watercourse as defined in GN 4167 of 2023. The regulated area of a wetland is defined as:

“A 500 m radius from the delineated boundary (extent) of any wetland or pan.

As the proposed development is located within 500m of the valley-bottom wetland, and work will be undertaken in the wetland to upgrade the stormwater outlet, Section 21 c) and i)

water uses are confirmed and must be included in the Water Use License Application which will include water uses associated with the disposal of wastewater to the conservancy tanks.

5. IMPACT ASSESSMENT

5.1 Background

The impact assessment is fundamentally guided by the mitigation hierarchy, which seeks to avoid and minimise impacts as the first priority (Figure 19). Every effort must be made to avoid and minimise impacts and rehabilitate affected areas. Offsets are the final option in the mitigation hierarchy. The impact assessment includes not only direct and indirect impacts, but also cumulative impacts, which are additive.

Residual impacts are negative impacts that remain after all reasonable and practical changes have been made to location, siting, scale, layout, technology, and design of the proposed development. Provided the residual impacts are Very Low or Low, no offset is required. However, if the residual impacts are Medium or High, then an offset is required. Very High residual impacts cannot be offset and are unlikely to be authorised.

Cumulative impacts in this instance must not cause irreversible decline to the conservation status of species and the presence of special habitats or cause a significant loss in ecosystem services. The cumulative impact of high density residential development in the Aalwyndal precinct as a whole had a significant residual impact (Report 1 of WCDEDT, 2025), resulting in the development of the biodiversity offset framework plan for the precinct. Therefore, following the mitigation hierarchy, a wide range of impacts have already been mitigated through the revised precinct plan which incorporates areas that can be developed (with and without triggering offsets) and those that cannot (within the proposed Core Area).

The newly sub-divided Erf 23731 is one of the few properties in Aalwyndal with no sensitive vegetation or habitat remaining within the development footprint. Given that the SEI of the proposed development area has a Low SEI, no offset would be triggered for development of the sub-divided property as proposed.

Site-specific aspects of the proposed development are considered in terms of the impact assessment, and mitigation measures provided to compliment and support the management aims of the proposed Core Area.

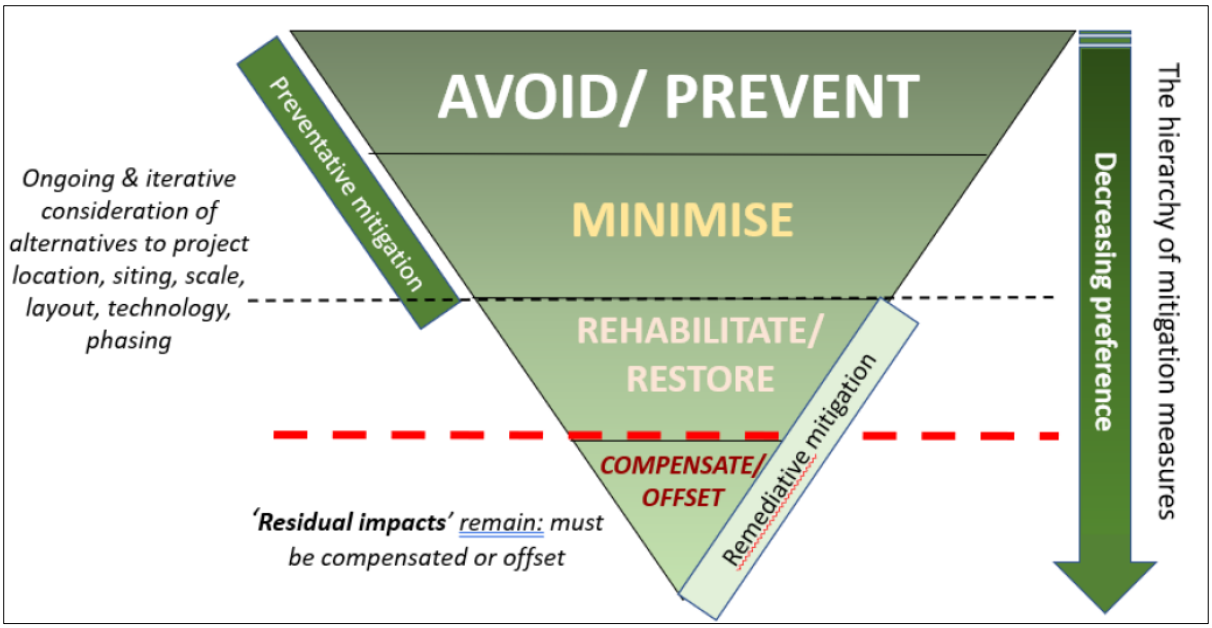

Figure 19. Successive steps shown in the mitigation hierarchy which can only be considered once the previous step has been exhausted (EWT, 2023).

5.2 No-go Development Option

While technically considered feasible, the no-go development option would not be a likely alternative in the case of Erf 23717. The property has confirmed low ecological sensitivity and Aalwyndal has been identified as a key point of expansion and residential development by the Mossel Bay Municipality. The Western Cape Government has made significant investments into the planning and practical aspects of implementing the biodiversity offset for Aalwyndal.

From an aquatic ecosystem perspective however, impacts in terms of increased flows from stormwater and potential pollutant sources (e.g. leaking conservancy tanks) are currently very low, and the no-go would be preferable. Mitigation of these impacts is therefore the primary focus of the impact assessment.

5.3 Design and Layout Phase

5.3.1 Impact 1: Degradation of habitat and water quality in the valley-bottom wetland due to inadequate planning for stormwater management.

The stormwater management plans by Element (2025) provide detail on 5 proposed stormwater detention ponds for the estate (Figure 1). The stormwater ponds are indicated to collect stormwater from two sub-catchments, from where their will discharge to the valley-bottom wetland at two different locations. It is the discharge points to the watercourses which are important, as this is where impacts are most likely to occur. However, sizing of the stormwater detention ponds is an important factor which has an influence on subsequent outflow volumes.

During the wet season when soil in open space areas may be saturated and the detention dams would be relatively full of stormwater, high volumes of fast flowing water could cause erosion where it is discharged into the watercourse.

While there is no doubt that the planned stormwater detention ponds will positively impact on stormwater management for the site, there are still some uncertainties and gaps that should be addressed as part of the design and layout phase.

The stormwater report does not currently refer to the **Stormwater Master Plan for Aalwyndal** (Sky High Engineers, 2024) which stipulates the following requirements for developments in Aalwyndal based on Sustainable Drainage Systems (SuDS) principles:

1. Provide post-development attenuation to pre-development peaks for storm events ranging from 1:5-year to the 1:50-year storm events.
2. Provide controlled discharge of the 1:100-year storm event with freeboard so that the peak outflow from the development site will protect downstream floodplains and developments from the adverse impacts of extreme floods, as well as help in evaluating the effect the 1:100 year storm event will have on the stormwater management system.

Proposed Mitigation:

- The stormwater management plan must be updated to incorporate, reference and address relevant aspects of the Stormwater Master Plan for Aalwyndal (SkyHigh, 2025).
- The SuDS principles mentioned at a conceptual level in the stormwater management plan (e.g. swales, permeable paving etc.) are fully supported and a detailed plan indicating the extent to which each intervention will be implemented should be provided. Measureable and quantifiable areas must be provided so that future compliance and monitoring can effectively assess implementation of these measures. Stating that interventions will be 'considered where practical' provides no assurance of whether an intervention will be implemented or not in the final design.
- Consider whether the outlet from the final stormwater detention pond requires further protection or conveyance of stormwater to the watercourse. While stormwater detention would not be supported in the Core Area, stormwater conveyance, provided it aims to minimise impacts of stormwater to the environment, would be necessary provided excessive environmental impacts are avoided, minimised and rehabilitated where possible.

5.3.2 Design to facilitate transitioning from conservancy tanks to municipal bulk sewerage

The current proposal for wastewater management on Erf 23731 is to provide at least two conservancy tanks for the development's sewage. This would be trucked from the site for disposal to the Hartenbos Wastewater Treatment Works on a daily basis, with increasing numbers of daily trips as the development phases progress. While the plan is a phased construction of the proposed development over several years, it is necessary to plan ahead so that when the municipal bulk sewer line and associated pump station is available, the development can switch over to this system with relative ease, without potentially polluting any watercourses, and without the requirement for costly reconfiguration of infrastructure..

Proposed Mitigation:

- Ensure the internal sewerage reticulation system with the proposed development has the capacity to seamlessly transition from the use of conservancy tanks to the municipal connection.
- The future municipal connection point should be indicated on all plans relating to engineering services (if known).
- A method statement should be provided for how this transition will be achieved.

The assessment of impacts for the design and layout phase was not rated due to incomplete information at the time of writing. Mitigation measures primarily seek clarity in terms of designs and modelling associated with the stormwater management plan. Once the mitigation measures provided have been addressed it may be feasible to more realistically assess the impacts with and without mitigation.

5.4 Construction Phase

Impact ratings for the construction phase of the proposed development on Erf 23731 are presented in Table 3.

5.4.1 Impact 1: Basic rehabilitation of the wetland buffer in the Core Area delayed until after construction could result in poor effort applied to this area.

Description*:* Basic actions are required to protect the Core Area and wetland during construction, and to improve and provide basic rehabilitation for the Core Area within Erf 23731. These should be prioritised prior to construction to give the area the best possible opportunity for improvement. Furthermore, without regular supervision, physical barriers, signage and detailed inductions building contractors generally spread the impacts of construction wherever convenient and pay little heed to sensitive habitat. Vehicles and personnel could move into and degrade habitat in the proposed Core Area that is meant to be maintained and rehabilitated in areas.

Proposed Mitigation:

- An Environmental Control Officer (ECO) must be appointed for the duration of the construction phase of the development. Weekly inspections of the site should be undertaken. The ECO must be provided with and familiarise themselves with all the reports supporting the development application, as well as the report series for the Biodiversity Offset Framework Plan for Aalwyndal (once formally adopted).
- The proposed Core Area must be surveyed and pegged out prior to commencement of construction.
- The livestock pen and labourer dwelling present within the Core Area adjacent to the site should be demolished and all rubble removed and disposed of at a registered landfill. Foundations should be removed to a depth of at least 50cm so that topsoil from the site to be disturbed can be placed over this and it can be more effectively rehabilitated.

- Post clearing of the livestock pens and dwellings can be revegetated using a mix of indigenous grass species (*Cynodon dactylon* and *Stenotaphrum secondatum*) and any bulbs that can be rescued from the actual development area. The latter is purely recommended, and should not be a condition of development approval. There are two species of *Moraea* sp. that occur in the development footprint that could be rescued and replanted. These are not threatened species, but could improve the results of rehabilitation through preservation of indigenous species to the area.
- Any existing fencing within the Core Area adjacent to the proposed development site should preferably be removed in consultation with neighbours. The long-term aim is to remove all internal barriers preventing wildlife movement, especially along watercourses.
- Site preparation prior to construction should include formal fencing off of the Core Area in line with the fencing requirements stipulated in Report 3 of the Biodiversity Offset Framework Plan. That is, to use **galvanised Clear Vu type fencing of 1.8m high**. This would be applicable to the section along the southern extent of the development as shown by the turquoise line in Figure 8. This section is approximately 200m in length and would eventually tie into neighbouring sections of the fenceline to protect this area. The fence should include a gate through which a single vehicle could access this area if necessary for maintenance in future. However, this must be locked for the duration of the construction phase (except for the replacement of topsoil over demolished livestock pens).

Post-mitigation impact rating = *Negligible (Table 3)*

5.4.2 Impact 2: Stormwater runoff from excavated building platforms and road cuts could result in erosion and sedimentation in the valley-bottom wetland.

Description*:* Stormwater runoff from excavated areas with bare soil could result in concentrated flows causing channel incision through the Core Area, sedimentation in the wetland, and impacts to water quality and wetland habitat. Management interventions need to consider proactive and reactive measures in consultation with the ECO to mitigate the impacts of stormwater runoff as the site topography evolves during the construction phase.

Proposed Mitigation:

- Prior to construction, the ECO must measure water clarity (in cm) in the downstream dam using a water clarity tube (available from Grountruth). The baseline value must be used to compare to monitoring, particularly post heavy rainfall during the construction phase.
- The construction team must have a stockpile of suitable erosion control products such as soil saver matting, wooden stakes, shade cloth for silt fencing, and sandbags as a minimum. Haybales can be used for check dams if necessary. See examples in Figure 20.
- The objective of stormwater management during the construction phase is to eliminate the risk as far as possible of discharging sediment-laden water downslope to the wetland either in controlled or uncontrolled circumstances. This means that

erosion protection measures must be installed in conjunction with clearance of the site.

- General principles to be applied are to keep earthworks to a minimum and to phase earthworks as far as possible to minimise areas of exposed soil, making sediment control systems easier to manage.
- Daily and weekly site meetings must consider forecasted rainfall events to avoid working during such events, and to plan accordingly for predicted high rainfall events.
- When rainfall is predicted ensure the site has been well prepared. All foreign materials and equipment must be removed from the edge of the Core Area to prevent them from being washed into this zone.
- Work on the site must cease altogether during and immediately following heavy rainfall events.
- The site office must have a store of suitable materials for a rapid response to erosion control such as shade-cloth (for silt fencing), haybales (for check dams), wooden droppers, hessian fabric, sandbags and fencing wire.
- All building material stockpiles (e.g. sand, cement, topsoil) should be kept on flat areas, out of water flow paths and bunded to prevent material loss during rainfall. Cement mixing must be done on wooden boards or bunded areas and not in the open environment as it is considered an environmental pollutant.
- The construction of low soil berms around active areas of high risk for stormwater runoff can aid the prevention of runoff downslope.
- Monitor the site during/following periods of rainfall, and install haybale check dams or silt fences at points to collect runoff before it leaves the site.
- Following rainfall, any water that must be pumped out of road cuts or excavations must not be directed directly to the wetland, but rather to a temporary sediment control dam where it can evaporate or seep out through a filter material. Temporary haybale structures allow the water to seep through the hay while most of the sediment is removed. Sediment must be removed from the water prior to releasing into the natural environment – any method is acceptable, provided the end result is no sediment in the wetland (Figure 20).
- Protect any inlets to stormwater drains (once constructed) to ensure silt can settle out before discharging to attenuation dams.
- Progressively revegetate disturbed areas of bare soil once works have concluded. Suitable plant species listed in Table 4 of Report 3 of the Biodiversity Offset Framework Plan should be used in rehabilitation of disturbed areas, as well as recommended for gardens and landscaped areas throughout the development.
- Maintain and regularly clear out silt-laden structures to ensure they remain functional for the duration of the construction phase.

Post-mitigation impact rating = *Minor (Table 3)*

Figure 20. Examples of sediment control measures that are recommended during the construction phase: A = hay bale check dams; B = silt fencing; C = sediment control dam; D = drain protection sendbags.

5.4.3 Impact 3: Poor management of waste and materials in the proposed Core Area during and post-construction resulting in unnecessary habitat degradation.

Description: Contractors may dispose of waste materials by throwing or dumping them into the Core Area, instead of taking them to a formal waste disposal site.

Proposed Mitigation:

- The ECO must conduct regular (weekly) inspections along the fence line of the Core Area to ensure that no dumping or access to this area has occurred resulting in habitat degradation.
- Any dumped materials must be removed by hand by the relevant contractor, and the site rehabilitated under supervision of the ECO if damage to vegetation has occurred. Suitable plants for rehabilitation are provided in Table 4 of Report 3 of the Biodiversity Offset Framework Plan.
- To reduce the risk of washing materials into the watercourse all construction materials (topsoil, subsoil, building sand) must be stockpiled as far from the watercourse as practically possible.
- Materials no longer required must be removed from the site without delay to reduce the risk of washing downslope or into the watercourse.
- Any cement mixing must be done on a wooden board and not on open ground (Figure 21).

- Retain the upper 50cm of topsoil (if open trenching) and separate this from subsoils. Topsoil must be carefully stockpiled and preserved so that it can be replaced last to facilitate rehabilitation and landscaping on the site.
- Vehicle refuelling areas must be located as far from watercourses as possible, and a spill kit must be on hand in case of fuel spills.
- Vehicles leaking fuel are not permitted to work on the site unti they have been repaired.
- No materials may be dumped in the watercourse, and any accidental spillages must be cleaned up by hand.

Post-mitigation impact rating = *Negligible (Table 3)*

Figure 21. Example of cement being mixed on a board instead of on bare/vegetated soil.

5.4.4 Impact 4: Post-construction Rehabilitation of Disturbed Areas and Landscaping

Description: At the conclusion of construction there may be areas of bare soil sensitive to erosion and establishment by alien plants. If located near the Core Area, these could negatively impact on the watercourse and surrounding vegetation.

Mitigation Measures:

- Ensure all soil surfaces are reshaped to avoid preferential flow paths and overly steep gradients.
- All areas disturbed during the construction phase must be revegetated and cannot be left bare. Revegetation within the development where grass is desirable can utilise indigenous grass seed (use *Stenotaphrum secundatum* and *Cynodon dactylon*, also known as kweek).
- For landscaping of areas within the estate refer to Table 4 of Report 3 of the Biodiversity Offset Framework Plan for a comprehensive list of plant species that can be purchased from nurseries and are found locally in the area. Avoid planting exotic plant species that diminish the biodiversity value of the area and could introduce alien species adjacent to the watercourse.

- Any steep slopes where grass seed or plugs have been placed should be protected with soil saver matting to reduce the risk of erosion.
- Ensure any litter and/or materials associated with the construction phase are removed from the watercourse. No litter, food scraps, or waste materials can be left in or around the watercourse.

Post-mitigation impact rating = *Negligible (Table 3)*

5.4.5 Impact 5: Construction of the V-drain and upgraded stormwater outlet along Aalwyn Way

Description: Careless operation of machines, storage of materials, or poor understanding of the work area could increase the extent of habitat disturbance and sedimentation in the wetland.

Mitigation Measures:

- Prior to commencement of construction, the ECO and site manager must delineate a minimal, but workable disturbance footprint adjacent to the watercourse using danger tape, temporary fencing, or similar. Signage on the fencing must indicate the area beyond this as a 'No-go Area'.
- A waste material stockpile area must be identified where waste, such as the broken old outlet material can be set aside for removal to a landfill site.
- Any clumps of wetland plants in the way of construction can be excavated out in a clump and set aside for replanting at conclusion of the works. These plants (e.g. *Cyperus textilis*) replant very successfully and can provide rapid stabilisation of disturbed soil to reduce erosion risk.
- Any soil fill material required to backfill the eroded hole should be sourced from the Erf 23731 developent area during construction. Sub-soils can be used as a base, but topsoil from the site should be used in the upper 50cm of soil.
- Only galvanised gabion baskets can be used to prevent rusting, and stones larger than the basket holes must be used. Suitably sized stones sourced on the construction area of Erf 23731 can be used.
- A geotextile such as bidim must be used to line the cavity into which gabions are built. This will prevent washout of material from behind the gabions.
- Care must be taken to consider flows from both the V-drain as well as the dam spillway. The detailed design of the stormwater upgrade must consider this aspect.
- Sandbags must be placed around the work area in the stream base. The intention is to prevent loos soil and mud from entering the watercourse, which may be flowing at the time that work is undertaken.
- At conclusion of the works, replant any esposed areas of soil using plants rescued before the works. Any bare areas of soil can be revegetated with any of the wetland plant species indicated in Table 5.

Post-mitigation impact rating = *Negligible (Table 3)*

Table 3. Construction phase impact assessment for the proposed residential development on Erf 23731.

Impact	Intensity	Duration	Extent	Probability	Significance	Significane Rating	Reversibility	Irreplaceibility	Confidence
Construction Phase Impact Assessment for Proposed Residential Development on Erf 23731									
Erf 23731 Impact 1: Basic rehabilitation of the wetland buffer in the Core Area on Erf 23731.									
Without Mitigation	Moderate	Medium term	Limited	Almost certain	-60	Minor	Medium	Medium	High
With Mitigation	Low	Short term	Very limited	Probably	-28	Negligible	High	Medium	High
Erf 23731 Impact 2: Stormwater runof from excavated platforms and road cuts could result in erosion and sedimentation in the valley-bottom wetland.									
Without Mitigation	Very high	Medium term	Local	Almost certain	-78	Moderate	Low	Medium	High
With Mitigation	High	Medium term	Limited	Probably	-44	Minor	Medium	Medium	High
Erf 23731 Impact 3: Poor management of materials in the proposed Core Area during and post-construction resulting in habitat degradation.									
Without Mitigation	Low	Medium term	Very limited	Almost certain	-48	Minor	Medium	Medium	High
With Mitigation	Very low	Brief	Very limited	Unlikely	-15	Negligible	High	Low	High
Erf 23731 Impact 4: Post construction rehabilitation of disturbed areas and landscaping.									
Without Mitigation	Low	Short term	Very limited	Unlikely	-21	Negligible	High	Low	High
With Mitigation	Very low	Brief	Very limited	Unlikely	-15	Negligible	High	Low	High
Erf 23731 Impact 5: Construction of upgraded V-drain and stormwater outlet along Aalwyn Way									
Without Mitigation	Moderate	Medium term	Very limited	Likely	-45	Minor	Medium	Medium	High
With Mitigation	Low	Brief	Very limited	Probably	-24	Negligible	High	Medium	High

5.5 Operational Phase

Rehabilitation of the Core Area will be required to improve the condition of this area, which has been subject to vegetation clearance, grazing and settlement (workers housing) for many decades. The aim would be restore a dense cover of indigenous vegetation that occurs naturally along the watercourse. The management of this area should be aligned with conservation outcomes and must consider aspects such as fire management and alien vegetation control. Funding to support this work was initially proposed through levies to be raised from residents in new developments and through the purchase of offset credits by developers elsewhere in Aalwyndal. However, this concept has proven unpopular through public participation and was not adopted by the Mossel Bay Municipality. The responsibility to improve this area therefore reverts to the landowner, and potentially the HOA in future. Individual HOAs may still elect to charge a conservation levy for the management of these open space areas, as it would provide a sustainable income for their management and security.

5.5.1 Impact 1: Landscaping and garden maintenance practices within the development that could impact on the watercourse and buffer area.

Description: Extensive areas of exotic vegetation and practices such as throwing garden waste over the fenceline could introduce alien species to the watercourse and smother natural vegetation.

Mitigation:

- Ensure the HOA clearly communicates special management criteria contained within Report 3 of the Biodiversity Offset Framework Plan to all new residents of the estate (Table 5), as well as contracted garden and security services. These should be provided in any appointment, sale or lease agreements. Regardless of whether the offset framework plan is formally adopted or not, these recommendations represent best practice for sensitive areas along a watercourse.
- Consider implementing fines for any transgressions which must cover the cost for rehabilitation or removal where required.
- All landscaped areas of the residential estate should utilise topsoil from the site, and be revegetated using plants that are listed in Table 5.
- Stormwater detention ponds must be vegetated using wetland plant species indicated in Table 5. As there is a direct link between these ponds and the valley-bottom wetland, no exotic species should be planted that could introduce alien plant seeds into the natural system. Stormwater discharge is an important route of dispersal for alien and exotic plant seeds – hence the need to utilise follow the planting guidelines.
- No garden waste or any other type of waste may be disposed of in the Core Area.
- Add signs every 50m along the fenceline indicating the Core Area as a conservation area and highlighting fines for illegal dumping of waste.
- Fenceline boundary pathways should be planted with indigenous grasses such as *Cynodon dactylon* and *Stenotaphrum secondatum* where necessary. Under no circumstances should Kikuyu be planted as this is a listed invasive species known to invade wetlands.
- Apart from cut stump applications of herbicide to Rooikrans or other woody aliens, no herbicide should be sprayed along the fenceline of the Core Area.
- No work should be undertaken in the Core Area unless it aligns with the Conservation Management Plan (Report 3) or a recognised Fire Management Plan representing best practice management for conservation in this area.
- Access to the Core Area must be restricted to walking only, and no pets may be walked in this area.

Post-mitigation impact rating = *Negligible* (Table 4)

5.5.2 Poor functioning of stormwater management structures leading to erosion or sedimentation in the watercourse and buffer area.

Description: Stormwater management structures could become blocked or function poorly if they were poorly designed, sized or maintained. Serious flood events may also put these systems under pressure requiring maintenance.

Mitigation:

- The ECO must inspect all stormwater structures at conclusion of works to ensure they were constructed as per approved plans, are clear of debris and appear to be functioning well.
- As built plans must be submitted to regulating authorities (DEA&DP and BOCMA).
- Estate maintenance teams to ensure inlets and outlets are kept free flowing where specified.
- It may not be necessary to frequently clear out vegetation in stormwater attenuation ponds, unless the vegetation becomes overgrown to the point that it takes up a significant volume of the pond's capacity. Vegetation in this context also serves the purpose of improving water quality through the removal of nutrients and other solutes.
- Areas indicating erosion following heavy rainfall events should be rapidly addressed with inputs from the engineer and/or aquatic specialist if necessary.

Post-mitigation impact rating = *Negligible* (Table 4)

5.5.3 Leakage or overflows of sewage from conservancy tanks leading to stormwater outflows and ultimately the wetland.

Description: Inadequate capacity of conservancy tanks could result in continuous slow overflow of sewage from conservancy tanks if they are undersized for the extent of development. Overflow could also occur if trucks do not arrive promptly to remove wastewater from the tanks.

Mitigation:

- Ensure sufficient capacity is provided by the conservancy tanks for each phase of the development. Capacity should include contingency should a contractor not be able to fulfil removal for a day (e.g. truck breakdown or employee strike).
- Vegetation around the septic tanks must be kept neatly mowed and cut, allowing clear visibility of the tank access points so that any overflows can be immediately observed.
- Signage must be erected on fencing surrounding the tanks indicating that any overflows observed by residents must be immediately reported to the HOA.
- Service level agreements or contracts must be entered into with service providers which ensure efficient removal of sewage in terms of frequency and volumes that maintain capacity for refilling of the tanks over a 24 hour period at least.
- Design of the conservancy tanks must allow for a seamless transition to a municipal connection as soon as it is provided. This woud be preferable to continued use of the conservancy tanks.

***Post-mitigation impact rating* =** *Negligible (Table 4)*

Table 4. Operational phase impact assessment for the proposed residential development on Erf 23731.

Impact	Intensity	Duration	Extent	Probability	Significance	Significane Rating	Reversibility	Irreplaceibility	Confidence
Erf 23731 Impact 1: Landscaping and garden maintenance practices within the development that could impact on the watercourse and buffer area.									
Without Mitigation	Moderate	Ongoing	Limited	Almost certain	-72	Minor	High	Low	High
With Mitigation	Very low	Short term	Very limited	Probably	-24	Negligible	High	Low	High
Erf 23731 Impact 2: Poor functioning of stormwater management structures leading to erosion or sedimentation in the watercourse and buffer area.									
Without Mitigation	High	Ongoing	Local	Probably	-56	Minor	Low	Medium	High
With Mitigation	Moderate	Short term	Limited	Unlikely	-27	Negligible	Medium	Medium	High
Erf 23731 Impact 3: Leakage or overflows from conservancy tanks leading to stormwater outflows and ultimately the wetland									
Without Mitigation	High	Long term	Limited	Likely	-60	Minor	Medium	Medium	High
With Mitigation	High	Medium term	Limited	Probably	-32	Negligible	Medium	Medium	High

5.6 Cumulative Impacts

The cumulative impact of higher density residential development and associated services across the Aalwyndal Precinct will have a significant residual impact on biodiversity in the precinct. However, watercourses have been protected throughout the proposed Core Area with a minimum of a 30m buffer in most places (e.g. Erf 23731), and much larger than this in other areas. The purpose of the Core Area was to provide an onsite offset area which is the final step in the mitigation hierarchy and aims to partially address the cumulative impacts of development in the precinct.

Whether the strategic biodiversity offset framework plan for Aalwyndal is formally adopted or not, the recommendations for management of the riparian buffer along the watercourse adjacent to Erf 23731 would remain the same. The cumulative impact of multiple developments utilising independent wastewater management systems is a concern, putting pressure on the municipality to provide bulk services to facilitate development expansion without compromising the integrity of aquatic ecosystems.

6. CONCLUSIONS

The proposed residential development on Erf 23731 would not directly impact on the adjacent wetland on the neighbouring property, but indirect impacts could occur, mostly through the discharge of stormwater from increased hardened surfaces.

Several mitigation measures have been provided in the design and layout phase to reduce uncertainty and potential risk associated with the management of stormwater. These issues should be addressed to minimise the risk of unanticipated cumulative impacts. Provided they can be adequately addressed, development at the site is supported.

7. REFERENCES

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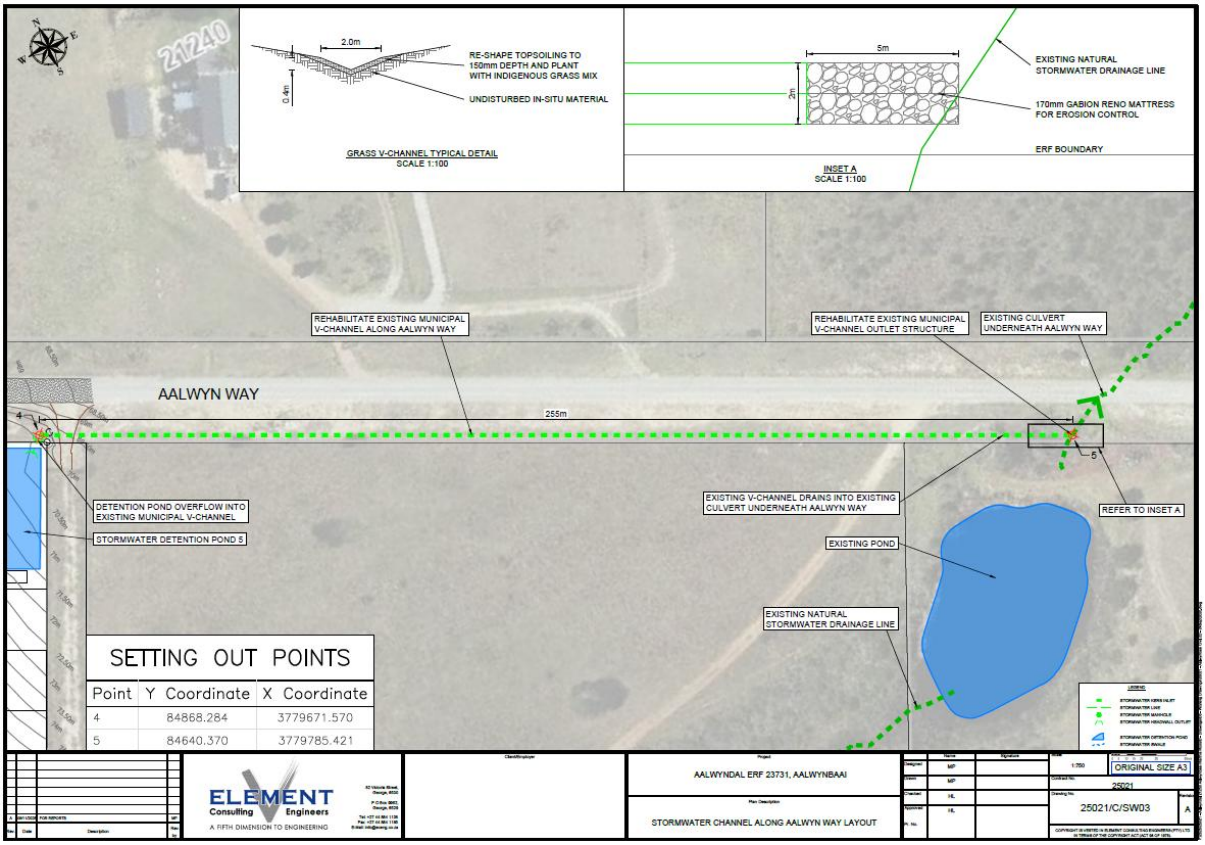
8. APPENDICES

8.1 Stormwater Upgrade of V-Drain and Stream Outlet



8.2 Recommended plant species for gardens and landscaping

Table 5. Recommended plant species for gardens and landscaping in Aalwyndal.

Species Name	Common Name	Broad Vegetation Type
Trees		
Buddleja saligna	False olive	Thicket / Riverine
Cussonia thyrsiflora	Cape coastal cabbage tree	Thicket / Riverine
Pittosporum viridiflorum	Cheesewood	Thicket / Riverine
Polygala myrtifolia	September bush	Thicket / Riverine
Schotia afra	Karoo boer-bean	Thicket / Riverine
Searsia glauca	Blue kunibush	Thicket / Riverine
Searsia lucida	Glossy crowberry	Thicket / Riverine
Searsia pallens	Ribbed kuni-bush	Thicket / Riverine
Sideroxylon inerme	Milkwood	Thicket / Riverine
Tarchonanthus littoralis	Coastal Camphor Tree	Thicket / Riverine
Vachellia karroo	n/a	Thicket / Riverine
Shrubs		
Agathosma ovata	False buchu	Fynbos / Renosterveld
Aloe arborescens	Candelabra aloe	Thicket
Aloe ferox	Bitter aloe	Thicket / Renosterveld
Bobartia robusta	Blombiesie	Fynbos
Carissa bispinosa	Forest Numnum	Thicket
Gnidia squarossa	Saffron bush	Fynbos / Renosterveld
Grewia occidentalis	Crossberry	Thicket
Gymnosporia buxifolia	Common spike-thorn	Thicket
Leucadendron salignum	Sunshine conebush	Fynbos
Osteospermum moniliferum	Bietou	Thicket / Renosterveld / Fynbos
Passerina corymbose	Common gonna	Renosterveld / Fynbos
Pelargonium capitatum	Rose-scented pelargonium	Renosterveld / Fynbos
Pelargonium fruticosum	n/a	Renosterveld / Fynbos
Tecomaria capensis	Cape honeysuckle	Thicket
Thamnochortus insignis	Dekriet	Renosterveld / Fynbos
Perennials, Bulbs & Creepers		
Aristea ecklonii	Blue stars	Thicket / Renosterveld / Fynbos
Bulbine frutescens	Stalked bulbine	Thicket / Renosterveld / Fynbos
Carpobrotus edulis	Sour fig	Thicket / Renosterveld / Fynbos
Cotyledon orbiculata	Pig's ear	Thicket / Renosterveld / Fynbos
Hermannia flammula	Dollrose	Renosterveld / Fynbos
Hypoxis sp.	African potato	Thicket / Renosterveld / Fynbos
Metalasia acuta	n/a	Renosterveld / Fynbos
Metalasia muricata	Blombos	Renosterveld / Fynbos
Rhoicissus digitata	Baboon grape	Thicket / Riverine
Grasses		
Cynodon dactylon	Kweek	Thicket / Renosterveld / Fynbos
Stenotaphrum secondatum	Buffalo grass	Thicket / Renosterveld / Fynbos
Eragrostis curvula	Weeping love grass	Thicket / Renosterveld / Fynbos
Themeda triandra	Red oat grass	Thicket / Renosterveld / Fynbos
Wetland		
Cyperus textilis	Mat sedge	Permanent / Seasonal
Eleocharis limosa	Finger sedge	Permanent / Seasonal
Falkia repens	Little ears	Seasonal
Juncus effussus	n/a	Permanent / Seasonal
Juncus kraussii	n/a	Permanent / Seasonal
Zantedeschia aethiopica	Arum lilly	Seasonal