DESKTOP AND FIELD-BASED FRESHWATER SENSITIVITY SCREENING REPORT FOR THE PROPOSED ENLARGEMENT OF DAMS WITHIN THE STEENBERG GOLF COURSE

City of Cape Town Metropolitan Municipality, Tokai, Western Cape Province, South Africa

2025/09/25

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Report Name	**DESKTOP AND FIELD-BASED FRESHWATER SENSITIVITY SCREENING REPORT FOR THE PROPOSED ENLARGEMENT OF DAMS WITHIN THE STEENBERG GOLF COURSE**
Specialist Theme	Freshwater Sensitivity Screening
Project Reference	Dam Enlargements - Steenberg Golf Course
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Client	Steenberg Estate Property Company
Desktop Study **Fieldwork** **Report Writer**	Cole Grainger (Pr. Sci. Nat. 119870) (Freshwater Perspective Consulting) 
Report Reviewer	Prasheen Singh (Pr. Sci. Nat. 116822) 
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

1 Project and Scope of Works

The Biodiversity Company (TBC) was appointed by Steenberg Estate Property Company to produce a freshwater sensitivity screening letter on behalf of the proponent, Steenberg Golf Course (Lower Tokai), City of Cape Town Metropolitan Municipality, Western Cape Province, South Africa. The proponent wishes to enlarge two dams on their property, namely, "the 5th Tee dam" and the "Northern Entrance Dam", to increase storage and moreover, irrigation capacity for the putting greens.

The proponent also wishes to construct a new golf cart track around the newly constructed Northern Entrance Dam, considering that the existing golf cart track will be lost to the newly enlarged Northern Entrance Dam.

The freshwater sensitivity screening letter is to:

- Detail the presence of any watercourses, as defined in the National Water Act (Act 36 of 1998) (NWA) that are associated with the proposed dam enlargements;
- Compile a Government Notice (GN)4167[1] Risk Assessment Matrix in which the risk impact significances of the proposed dam enlargement and associated activities on the resource quality of the identified watercourses are determined; and
- Discuss the enviro-legal (Environmental and Water Use Authorisation) and future reporting implications, as directed by the National Environmental Management Act (Act 107 of 1998), as amended (NEMA) and the NWA of the proposed dam enlargements and associated activities in terms of 1) the location of the proposed dam enlargement activities relative to watercourses and their regulatory areas, and 2) the outcome of the GN4167 Risk Assessment Matrix.

2 Dam Design and Method Statements

According to the method statements provided by the project engineer (Storey Engineering (PTY) LTD), the dam will be constructed using general large earth moving equipment, including excavators, roller compactors, and trucks. The perimeter retaining wall will be constructed primarily by hand but with concrete either mixed on-site in a small mixer, or imported in trucks from a ready-mix plant.

A stockpile area will be created for materials to be used in the construction of the dam. These materials will include the liner, bricks, cement, reinforcing steel, sand, stone, geofabric, and drainage pipes. The contractor may also use this area as a temporary site camp. This area will be within the overall extent of the works area.

It is anticipated that the construction of the dam will take four to five months.

The following activities are required to construct the dams, as listed in Table 1.

Table 1 Proposed dam enlargement activities

Activity	5th Tee Dam	Northern entrance Dam
Full Supply Level	32 690 m^3	23 560 m^3
Extent of works to be fenced off with Ready Fence that is covered with shade cloth	✓	✓
Grass/lawn will be lifted and stockpiled where it will be maintained for reuse	✓	✓
The irrigation pipes and sprinklers will be removed and stockpiled for reuse or disposed of at an off-site waste site	✓	✓

[1] The published General Notice (GN) 4167 in Government Gazette (no. 49833) on the 8th December 2023 by the Department of Water and Sanitation (DWS) under Section 39 of the National Water Act (Act no. 36 of 1998) (NWA) for Section 21 (c) and (i) water uses.GN4167 replaces GN 509 of 2016 and GN 3139 of 2023) and outlines the process of a General Authorisation (GA), which replaces the need to apply for a full Water Use Licence Application (WULA) in terms of Section 40 of the NWA, provided that the water use is within the limits and conditions of the GA, including the applicant being listed under Appendix D1 or Appendix D2 of the same notice.

Activity	5th Tee Dam	Northern entrance Dam
Existing services such as electricity cables, sewers, and water pipes will be exposed and relocated outside the area of the dam.		✓
Trees that can be replanted will be removed and stockpiled where they will be maintained for reuse	✓	✓
Other vegetation that cannot be reused will be removed and disposed of, either in the golf course compost yard or at an off-site waste site	✓	✓
The dam will be excavated and the material will be transported for use elsewhere on the golf course. Excess material will be disposed of at an off-site waste site. Some material will be stockpiled for use as the cover blanket for the dam liner	✓	✓
The dam will be excavated and the material will be used as filler where the fairway has to be modified or it will be placed in the berm that is to be constructed	✓	✓
Should groundwater be encountered, sub-soil drains and a sump will be installed to keep the excavation dry for the duration of construction. The groundwater will then be pumped out onto the golf course to infiltrate and recharge the groundwater resource	✓	✓
Where required, a reinforced concrete and brick stone-faced perimeter wall will be constructed along the dam's edge	✓	✓
A brick barrier wall will be constructed around two sides of the existing pump room.		✓
The excavated surface will be trimmed and shaped, after which the liner will be placed and covered with material from the stockpile	✓	✓
The final trimming and site clearance will be done, after which the golf course maintenance contractor will re-establish the irrigation system and vegetation	✓	✓
As the dam will be constructed during the dry months, surface draining is not anticipated. However, should construction start or extend over a period during which rain can be expected, surface drainage channels will be provided to lead water away from the area of the works. Geofrabric screens will be provided to trap sediment in the run-off water.	✓	✓

The designs are illustrated below for the 5th Tee and Northern Entrance Dams for which the extent of the working area, final dam perimeter and its full supply level are indicated (Figure 1 and Figure 2).

It must be noted that the 5th Tee Dam is filled using approximately 10% surface runoff water and 90% purchased treated effluent, while the Northern Entrance Dam is filled with approximately 10% surface runoff and 90% borehole water.

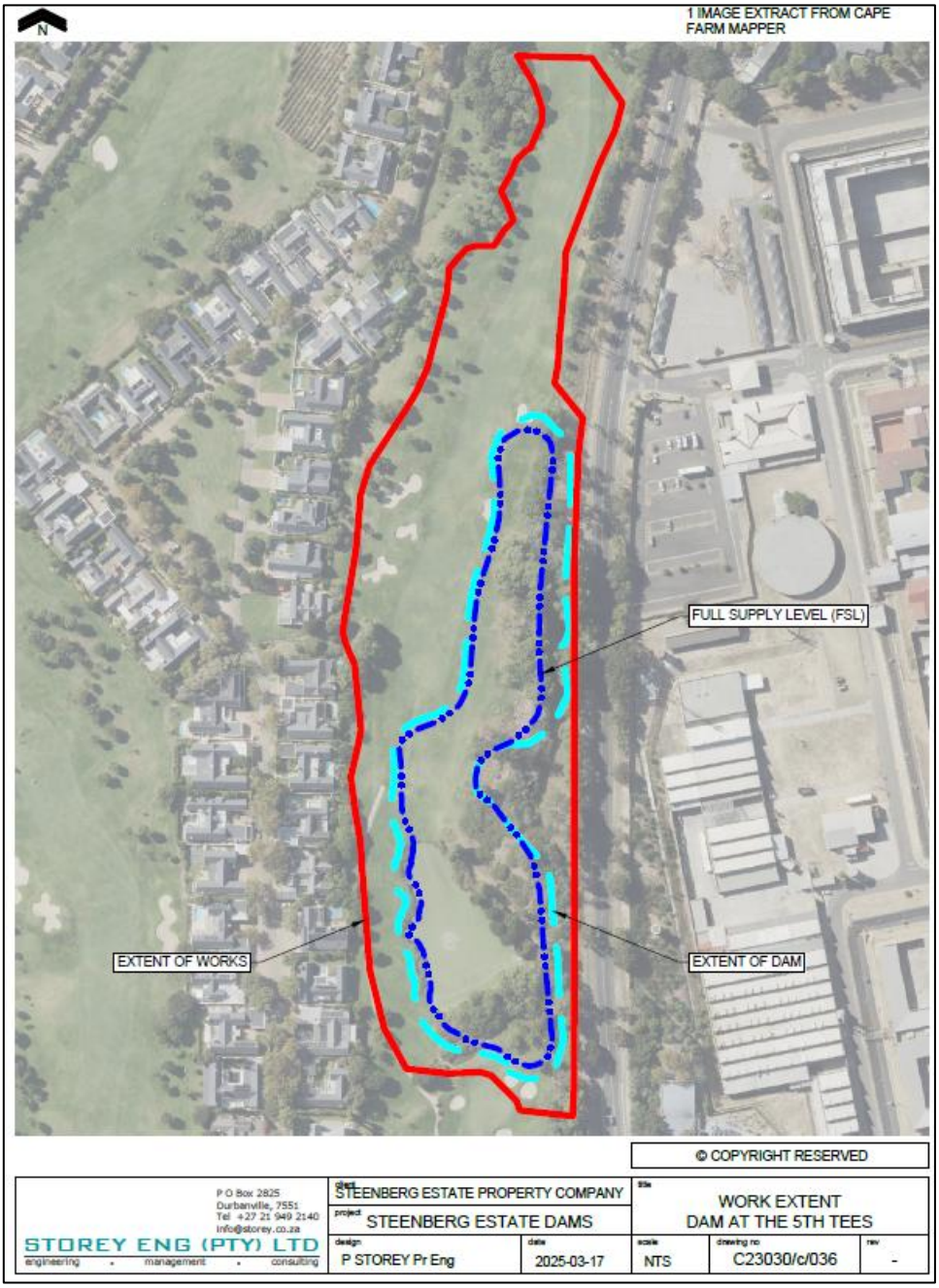

Figure 1 Extent of the work area, dam perimeter and full supply level of the 5th Tee Dam

Figure 2 ***Extent of the work area, dam perimeter and full supply level of the Northern Entrance Dam***

3 Watercourses identified

The freshwater screening site visit was conducted on the 21st May 2024 to verify watercourses within the vicinity of the two (2) dams, within an area of a 500 m radius around these dams, as stipulated in GN4167, as it pertains to the NWA. This will be referred to as the Project Area of Influence (POAI).

The following watercourses were field verified within the golf course (Figure 3):

- The **Prinseskasteel Stream** which has been formalised and impounded and split into two major courses as it traverses through the Steenberg Golf Course. The western course presents as an open grassed channel and the eastern course as a landscaped boulder-style bed that accommodates a sparse distribution of restios and rushes; and

- The **dam on the 12th** ("Dam_Hole12") and several other instream dams are considered highly modified watercourse reaches of the Prinseskasteel Stream in terms of its bed and banks.

The following watercourses were desktop identified that were outside of the golf course (Figure 3):

- The unchannelled valley bottom wetland (UCVBW) of the Prinseskasteel Stream, north of the Steenberg Golf Course;

- The UCVBW reach, and a channelled valley bottom reach of the Westlake River, south west of the Steenberg Golf Course; and

- The Keysers River into which the Prinseskasteel Stream drains (not shown in maps).

The offstream dams ("Dam_Northern Entrance", "Dam_Hole5" and "Dam_Hole8") are not considered watercourses as they are artificially filled from sources such as stormwater runoff and borehole water and have no hydrological connection to riverine or wetland systems. The consideration to treat these offstream dams as watercourses is ultimately the decision of the Department of Water and Sanitation (DWS), the custodians of the freshwater resource in South Africa, this decision which is based typically on whether the dams are deemed of sufficient ecological importance, based on wetland ecoservice provision, irrespective of them being hydrologically isolated from true watercourses within the Steenberg Golf Course. Specifically, if the above listed dams provide adequate freshwater habitat, such that an array of freshwater plants and accompanying fauna can be supported, then these dams may be regarded as watercourses by the regulator.

As of the timing of this freshwater screening report, based on the flow of freshwater through the landscape and ecological characteristics of the offstream dams, it is the reasoned opinion of the Freshwater Specialist that these offstream dams do not qualify as watercourses.

Table 2 Photographs of the dams and Prinseskasteel Stream

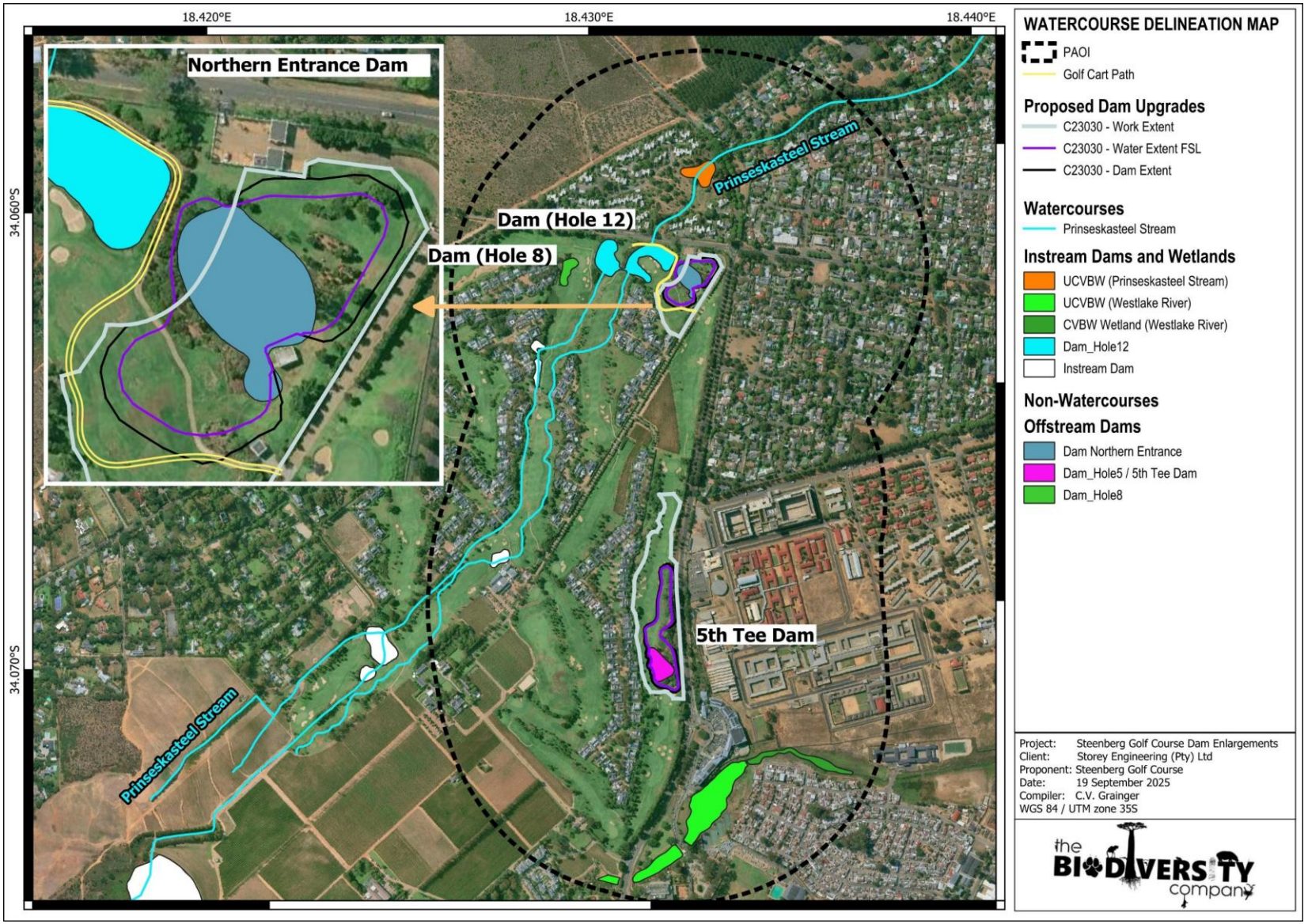

Figure 3 Watercourse identification in relation to the proposed dam enlargements and the POAI

4 Legislative Requirements

Watercourses in South Africa are protected under two primary legal frameworks, namely, NEMA and the NWA which are summarised below in Table 3. In terms of NWA, this report specifically addresses the Section 21 (c) and (i) water uses, these being:

- Section 21 (c) – the impedance and/or diversion of water within a water course; and
- Section 21 (i) – the altering of the bed, banks, characteristics and course of water in a water course.

Table 3 South African legislation that governs the protection of watercourses

Legal Framework	Legal Framework Principles
National Environmental Management Act, 1998 (Act No. 107 of 1998)	The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, state that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.
National Water Act , 1998 (Act No. 36 of 1998)	The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes: • The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way; • The prevention of the degradation of the water resource; and • The rehabilitation of the water resource. The National Water Act, 1998 (Act No. 36 of 1998) recognises that the entire ecosystem and not just the water itself in any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the Department of Water and Sanitation (DWS). Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) & (i). **A watercourse is defined as**: a) A river or spring; b) A natural channel in which water flows regularly or intermittently; c) A wetland, lake or dam into which, or from which water flows; and d) Any collection of water which the minister may, by notice in the Gazette, declare a watercourse.

The need to follow the WUA or EA process with the NWA or NEMA respectively is subject to triggering the following Zone of Applicability criteria in Table 4 below.

Table 4 NWA and NEMA triggers that require the WUA or EA processes to be followed

Regulatory Organisation	Zone of Applicability (Zones of Regulation)
Government Notice 4167 as published in the Government Gazette 49833 of 08 December 2023 as it relates to the NWA (Act No. 36 of 1998) as amended **The Department of Water and Sanitation is the Competent Managing Authority**	GN 4167 outlines the process of a General Authorisation (GA), which replaces the need to apply for a full Water Use Licence in terms of Section 40 of the NWA, provided that the water use is within the limits and conditions of the GA. The notice **replaces GN 509 of 2016.** The GA sets out the requirement to determine the regulated area (Zones of Regulation) of a watercourse, which are defined as: a) the outer edge of the 1 in 100-year flood line 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 100 m distance from the edge of a watercourse** where the edge of the watercourse (excluding flood plains) is the first identifiable annual bank fill flood bench; or

	c) In respect of a wetland, a **500 m radius around the delineated boundary (extent) of any wetland**, including pans. As per Section 3 of GN4167, an applicant is not eligible for a GA under the following scenarios: *(b): "the use of water in terms of section 21 (c) or (i) of the Act within the regulated area of a watercourse where the Risk Class is **Medium** or **High** as determined by the Risk Matrix"*; *(c): in instances where an **application must be made for a water use license for the authorisation of any other water use a defined in section 21 of the Act** that may be associated with a new activity; and* *(e) "to any section 21 (c) or (i) water use associated with construction/installation or maintenance of main or bulk sewerage pipelines, French drains, pipelines containing hazardous materials. Notwithstanding this requirement, conservancy tanks of not more than 1(one) tank per hectare and internal sewerage reticulation in residential or mixed use development including minor sewerage connections to main sewers are not excluded from this Notice provided that the maximum flow in the pipelines are below the 120 l/s threshold"*
Listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations (2014), as amended. **The Department of Environmental Affairs and Development Planning (DEA&DP) is the Competent Managing Authority**	Activities of Listing Notice 1 (GN 983) of the National Environmental Management Act, 1998 (Act No.107 of 1998) EIA regulations, 2014 (as amended): **Activity 12:** The development of— **(a)** dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres;or **(b)** infrastructure or structures with a physical footprint of 100 square metres or more. where such development occurs: a) **within a watercourse;** b) in front of a development setback; or c) **if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.** **Activity 19:** The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from (i) **a watercourse**; (ii) the seashore; or (iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or estuary, whichever distance is the greater— but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies. <u>Activities of Listing Notice 3 (GN 985) of the National Environmental Management Act, 1998 (Act No.107 of 1998) EIA regulations, 2014 (as amended)</u> **Activity 14** *The development of—* ***(i)*** *dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or* ***(ii)*** *infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs—* *(a)* ***within a watercourse;*** *(b)* *in front of a development setback; or* *(c)* ***if no development setback has been adopted, within 32 metres of a watercourse****,* *Western Cape:* ***i)*** *Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.*

Zones of Regulation (ZoR) are not necessarily development exclusion zones, but areas within which EA or WUA is required with NEMA or the NWA respectively. ZoRs are deemed to be areas surrounding the watercourse within which development activities might pose a quantum of risk to the watercourse.

ZoR in accordance with GN4167 and NEMA as described above have only been assigned to freshwater features that are within the natural freshwater course of the Prinseskasteel Stream. The ZoR assignment is as follows in Table 5 below and further illustrated in Figure 4 below.

Table 5 Zones of Regulation applied to the watercourses within the POAI

Watercourse	Zones of Regulation		
	32m (NEMA)	100m (GN4167)	500m (GN4167)
Prinseskasteel Stream	✓	✓	
All instream Prinseskasteel Dams	✓	✓	
UCVBW of the Westlake River	✓		✓
CVBW of the Westlake River	✓		✓
UCVBW of the Prinseskasteel Stream	✓		✓

The need for WUA and EA is based on the proposed dam enlargement activities falling with the ZoR of the above watercourses, which is summarised below in Table 6.

Table 6 Activities falling with the Zones of Regulation of watercourses

Proposed Activity	Within the watercourse	Within ZoR of the specified watercourse- not necessarily posing a quantum of impact to that watercourse			
	Direct Impact	32m (NEMA)	100m (GN4167)	1: 100 year floodline	500m (GN4167)
Enlargement of the Northern Entrance Dam			Prinseskasteel Stream	Prinseskasteel Stream	UCVBW of the Prinseskasteel Stream
Enlargement of the dam on the 5th tee					UCVBW of Westlake. River
Construction of golf cart track		Prinseskasteel Stream		Prinseskasteel Stream	UCVBW of the Prinseskasteel Stream

As Table 6 indicates, the workable extent of both the 5th Tee and the Northern Entrance Dam will be outside of the footprint of the delineated watercourses, including outside of the 32 m NEMA ZoR. The newly proposed golf cart track will be within the 32 m NEMA ZoR. The Northern Entrance Dam activities will however take place within the 1:100 year floodline of the Prinseskasteel Stream

This is illustrated below in Figure 4.

Both the 1:100 year floodline and 100m GN4167 ZoR are indicated, as the 1:100 year floodline was only modelled for the reach of the Prinseskasteel Stream adjacent to the Northern Entrance Dam.

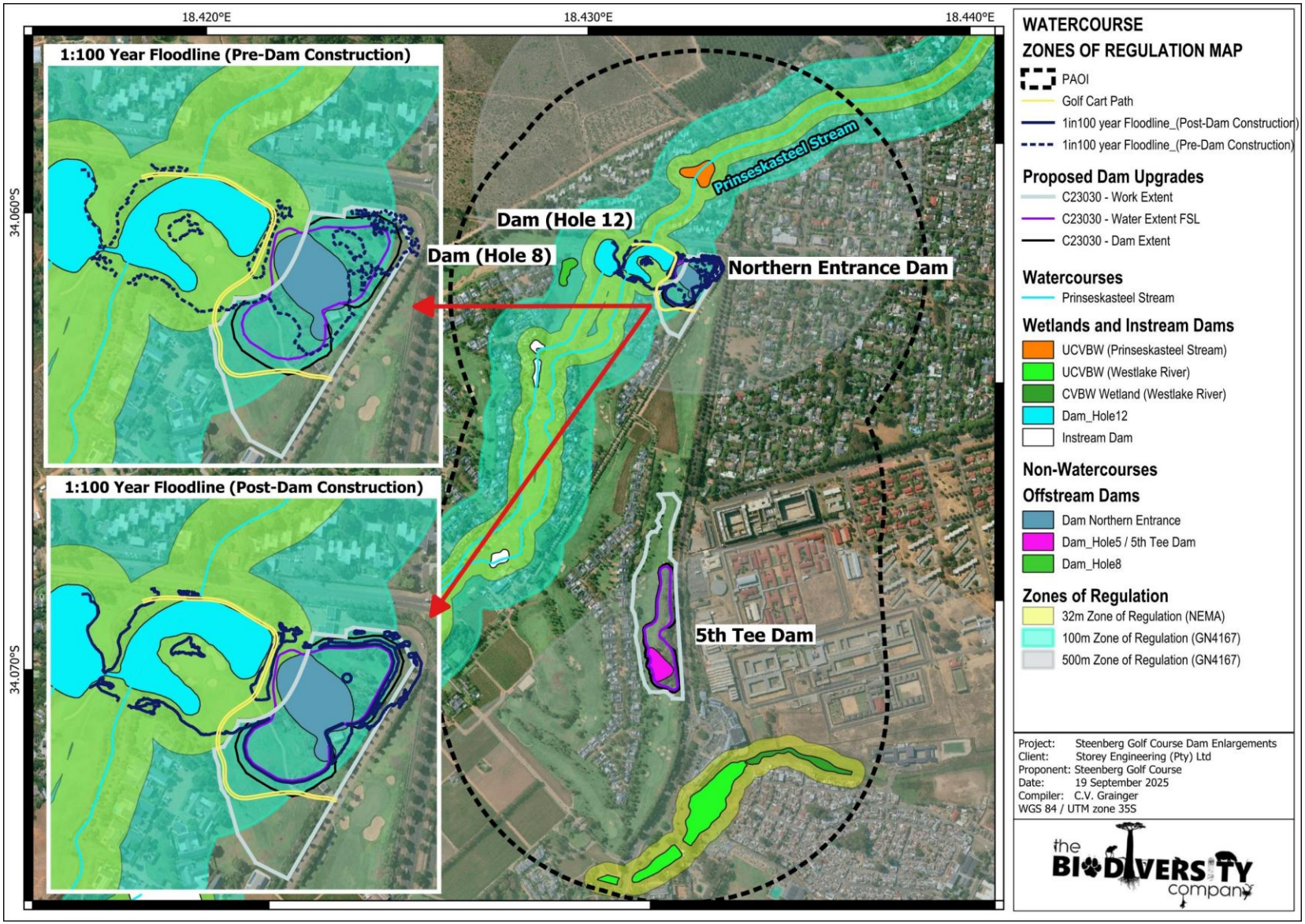

Figure 4 ***Watercourse Zones of Regulation (NEMA and the NWA) in relation to the proposed dam enlargements and the POAI***

5 Risk Assessment Matrix

5.1 Risk Assessment inputs and assumptions

- Risk significance impacts were computed for the Prinseskasteel Stream and receiving Keysers River which is approximately 1600 m downstream of the Northern Entrance Dam;
- The GN4167 Risk Assessment Matrix was applied to the downstream reach of the Prinseskasteel Stream, considering that the stream reach adjacent to the proposed activities of the Northern Entrance Dam is already completely modified (impounded);
- The activities associated with the 5th Tee Dam were not assessed in the risk assessment matrix, considering that this dam is not associated with any proximate downstream watercourses, and therefore no quantum of risk to freshwater infrastructure is envisaged;
- As per GN4167, the risk significance of impact assumes that mitigation measures on site were successfully affected on site; notwithstanding several inherent watercourse characteristics, such as Present Ecological Status, Ecological Importance and Sensitivity;
- The envisaged activity impacts were also considered, in terms of spatial scale and duration of influence and probability of impact, which ultimately is a reflection of the perceived ability of mitigation success on site, and the nature of the proposed development and its proximity to the subject watercourse. The anticipated construction of the dams will take four to 5 months;
- The Present Ecological Status of the Prinseskasteel Stream was qualitatively assessed to be in a Class E (Seriously Modified), based on formalization of its reach traversing through the Golf Course and general loss of natural aquatic habitat, notwithstanding several instream impoundments which limit freshwater transport and ecological services to the downstream reaches of the Prinseskasteel Stream, and ultimately the receiving Keysers River. However, the downstream reach of this stream, downstream of Tokai Road is considered to be in a Class D (Largely Modified) ecological condition, which is the reach that is being assessed for impact. The Present Ecological Status of the Keysers River was qualitatively assessed to be in a Class D (Largely Modified) based on its catchment being transformed to agricultural and urban landuse and numerous street crossings which have collectively imposed hydrological and subsequent geomorphological impacts on this system; and
- The Ecological Importance and Sensitivity (EIS) of the Prinseskasteel Stream, downstream of Tokai Road was deemed to be of Moderate EIS. The EIS of the Keysers River by contrast was assessed to be High, based on the Keysers River being a much larger system in terms of catchment size, its transition to an unchannelled valley bottom wetland where flow loses confinement, and it being a notable contributor to the Zandvlei Estuary in the suburb of Muizenberg.

5.2 Risk Assessment Discussion

The risk assessment only computed Low risk significance impacts for the proposed dam enlarging activities which are envisaged to impose a quantum of impact on the freshwater resource. The Low impacts are based on several factors, such as the watercourse Present Ecological Status, which is used to determine how much of a subject watercourses' ecological integrity can still be lost to development (reflected through activity impact severity ratings), watercourse Ecological Importance and Sensitivity, and the probability that the activity will indeed cause a negative impact to the freshwater resource.

Given that the working area for both dams is located outside of the 32m Zone of Regulation (NEMA), which in itself is an effective mitigation measure, the probability of impacts was generally assigned within the range of 20-40% during the construction phase.

The potential dewatering of the impoundment (Hole 12) on the Prinseskasteel Stream, as a result of the dewatering of the Northern Entrance Dam, which may encourage the ingress of groundwater from Hole 12 Dam into the Northern Entrance Dam was deemed to also be of Low risk. This is both because the hydraulic connectivity between the impounded reach of the Prinseskasteel Stream and the Northern Entrance Dam is deemed to be low, and because, even if dewatering were to occur, this would be minimal due to dam construction occurring in the low flow dry season, and lastly, because an emergency plan will be in place whereby water will be pumped directly into the downstream reach of the Prinseskasteel Stream, at a rate that maximises assurance of supply to maintain a wetted surface of the relevant stream reach.

The project engineer believes that there is no hydrological link between these two dams, which if there was, would have been identified in the form of contamination of the Northern Entrance Dam, in terms of receiving treated effluent from the Hole 12 Dam, into which treated effluent is discharged.

The probability of impacts during the operation phase were deemed to be 60% in terms of alien invasive encroachment spread over time.

It is however strongly suggested that the water levels of the Hole 12 Dam be closely monitored during the construction phase, and that interventions are in place to ensure that the continued freshwater transport to the downstream reaches of the Prinseskasteel Stream.

It is also strongly suggested that alien invasive plant species be timeously managed on site, especially around the stockpile areas, to prevent their spread into the associated watercourses.

The Risk Assessment Matrix is provided below in Table 7.

5.3 Mitigation Measures

DAM ENLARGEMENT ACTIVITIES

- All dam enlargement activities will be planned outside the 32m NEMA Zone of Regulation of the Prinseskasteel Stream, this in itself is considered mitigation to prevent any potential impacts to the ecological integrity of this system,

- The stockpiled lawn that was lifted and removed to enable dam enlargement must be closely monitored to not become a habitat for the establishment of alien and invasive vegetation that could disburse to other areas, including the downstream reach of the Prinseskasteel Stream, outside the Steenberg Golf Course. The same is true for the laydown of construction materials. Best practice to avoid the establishment and spread of alien and invasive vegetation is to temporarily cover the stockpile with hessian sheeting or geotextile. This should isolate the stockpile from foreign seed, but still allow sunlight to penetrate the grass in efforts to keep it alive for the duration of the excavation and backfill activities;

- Sediment control measures such as sandbags or a sediment drift fence must be put in place to ensure that sediment does not enter into the Prinseskasteel Stream (irrespective of the potentially affected reach being impounded). This is especially relevant at the northern entrance dam whose enlargement area is upgradient of the impounded reach of the Prinseskasteel Stream. The dam enlargement activities are proposed during the dry summer months, which will decrease the number of surface runoff days during construction;

- The concrete works for the construction of the dam perimeter must take place with caution according to the following guidelines:
    - Ready mix concrete is preferred over batching concrete on site as this minimising the handling of concrete on site, and thereby the potential for environmental spillage;
    - Mixing of fresh concrete must be done within a construction camp, at least 30 m away from watercourses, on a batter board/platform mixing tray, else within a lined, bound or bunded portable mixer. No mixing on bare ground is permitted;
    - Cement bags must be disposed of in demarcated hazardous waste receptacles;
    - Spilled or excess concrete must be disposed of at a suitable landfill site; and
    - A washout area must be designated outside of the delineated extent of watercourses and wash water must be treated on site or discharged to a suitable landfill site. Chain of custody documentation in this regard is required;

There is a small probability that the northern entrance dam is hydraulically connected to the impounded section of the Prinseskasteel Stream. If this is the case, then dewatering of the northern entrance dam may cause lateral movement of water from the Prinseskasteel Stream impoundment into the northern entrance. Another form of hydraulic connection is via the groundwater table, whereby dewatering of the northern entrance dam may cause an associated decrease in groundwater levels underlying the Prinseskasteel system. This could lower the dam level to an elevation which is below the dam outlet, which would then dewater the downstream reach of the Prinseskasteel Stream which flows through the suburbs of Tokai, on route to the Keysers River.

- It is suggested that the water levels of the impounded reach of the Prinseskasteel Stream be monitored, and an emergency plan already be in place, to pump stream water that has been collected in the northern entrance dam into the downstream reach of the Prinseskasteel Stream;
- The pump rate would need to both ensure that erosion to the downstream reach of the Prinseskasteel Stream is avoided and that the assurance of freshwater flows is preserved. This is especially critical during the low flow season when watercourses and associated biota are already under the most stress;
- While it is acknowledged that the hydrological signature of the Prinseskasteel Stream has already been completely modified, the contractor must simply ensure, that whatever flows the downstream reach of the Prinseskasteel Stream typically received pre-construction, are preserved.

GOLF CART TRACK ACTIVITIES

- Removed grass stockpiles must be protected from becoming sources of alien and invasive vegetation, by being protected with hessian sheeting or geotextile that permits sunlight, but prohibits alien seed from contacting the stockpile; and
- It is imperative that the surface layers/wearing layers of the newly constructed golf cart track be constructed during the summer dry season, to avoid the potential for the runoff of highly toxic substances such as concrete or asphalt into the stream. This is also true for herbicides that are used to prohibit regrowth and penetration of vegetation through the overlying imported material

Table 7 The DWS Risk Assessment Matrix applied to the associated watercourses, compiled by Cole Grianger (Pr.Sci.Nat. 119870)

Phase	Activity	Impact	Potentially affected watercourses			Overall Intensity (max = 10)	Spatial scale (max = 5)	Duration (max = 5)	Severity (max = 20)	Importance rating (max = 5)	Consequence (max = 100)	Likelihood (Probability) of impact	Significance (max = 100)	Risk Rating	Confidence level
			Name/s	PES	Overall Watercourse Importance										
CONSTRUCTION	Lawn to be lifted and stockpiled in preparation for subsequent excavation activites **(Northern Entrance Dam)**	Stockpiles are substrates on which alien and invasive vegetation inhabit and spread to other terrestrial and watercourse areas	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**4**	1	5	**10**	**3**	**30**	40%	**12**	**L**	Medium
			Keysers River	D	High	**2**	2	5	**9**	**4**	**36**	40%	**14,4**	**L**	Medium
	Laydown of construction materials **(Northern Entrance Dam)**	Laydown areas can become areas of disturbance which promotes the encroachment and establishment of alien and invasive vegetation which could spread into watercourses. Laydown areas can also impede and/or divert surface water away from its intended downstream reaches	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**4**	1	5	**10**	**3**	**30**	40%	**12**	**L**	Medium
			Keysers River	D	High	**2**	2	5	**9**	**4**	**36**	40%	**14,4**	**L**	Medium
	Earthworks for the excavation of the dam **(Northern Entrance Dam)**	Operation of machinery may cause potential contamination of the associated watercourses as a result of hydrocarbon contaminant spills and associated runoff into watercourses during vehicular and machinery operation	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**2**	1	1	**4**	**3**	**12**	20%	**2,4**	**L**	Medium
			Keysers River	D	High	**6**	2	1	**9**	**4**	**36**	20%	**7,2**	**L**	Medium
		Stockpiled earthworks material may become a substrate on which alien and invasive vegetation may establish and spread into watercourses	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**4**	1	5	**10**	**3**	**30**	60%	**18**	**L**	Medium
			Keysers River	D	High	**2**	2	5	**9**	**4**	**36**	60%	**21,6**	**L**	Medium
		Potential sedimentation of the receiving watercourses from the generated sediment laden surface runoff during rainfall events as a result of the earthworks activities	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**4**	1	5	**10**	**3**	**30**	20%	**6**	**L**	Medium
			Keysers River	D	High	**2**	1	5	**8**	**4**	**32**	20%	**6,4**	**L**	Medium
		Increased sedimentation of the watercourses may provide areas of substrate which encourages the encroachment and establishment of alien and invasive vegetation, which may then spread to other areas in this watercourse	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**4**	1	5	**10**	**3**	**30**	60%	**18**	**L**	Medium
			Keysers River	D	High	**2**	2	5	**9**	**4**	**36**	60%	**21,6**	**L**	Medium

Phase	Activity	Impact	Potentially affected watercourses			Overall Intensity (max = 10)	Spatial scale (max = 5)	Duration (max = 5)	Severity (max = 20)	Importance rating (max = 5)	Consequence (max = 100)	Likelihood (Probability) of impact	Significance (max = 100)	Risk Rating	Confidence level
			Name/s	PES	Overall Watercourse Importance										
CONSTRUCTION	Earthworks for the excavation of the dam **(Northern Entrance Dam)**	Increased likelihood of the dewatering of the Prinseskasteel Stream via two mechanisms: Mechanism 1: Via dewatering of the impounded reach of the Princessvlei Stream (Hole 12) into the newly excavated area of the northern entrance dam which may attract water from adjacent areas due to the new casm that is created Mechanism 2: Via dewatering of the impounded reach of the Princessvlei Stream (Hole 12) due to groundwater abstraction from the northern entrance dam, which may lower the groundwater level in Hole 12 which is positioned in the Prinseskasteel Stream This would essentially cause increased hydrologically stress on the downstream receiving reach of the Prinseskasteel Stream in terms of increased desiccation of aquatic habitat and increased zero flow days. The decrease in water delivered via the Prinseskasteel Stream into the Keysers River is also considered here.	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**10**	2	2	**14**	**3**	**42**	40%	**16,8**	**L**	Medium
			Keysers River	D	High	**4**	3	2	**9**	**4**	**36**	20%	**7,2**	**L**	Medium
	Concrete works for the construction of the dam perimeter **(Northern Entrance Dam)**	Concrete is highly toxic to aquatic life and has an alkaline pH which is above the natural signature of river systems in the region	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**6**	1	1	**8**	**3**	**24**	40%	**9,6**	**L**	Medium
			Keysers River	D	High	**6**	2	1	**9**	**4**	**36**	40%	**14,4**	**L**	Medium
	Layerworks for the construction of the golf cart track **(Northern Entrance Dam)**	Overuse of herbicide that is used to prohibit regrowth and penetration of vegetation through the overlying imported foreign material which could contaminate the watercourse and negatively impact indigenous vegetation and aquatic biota	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**8**	1	1	**10**	**3**	**30**	20%	**6**	**L**	Medium
			Keysers River	D	High	**6**	2	1	**9**	**4**	**36**	20%	**7,2**	**L**	Medium

Phase	Activity	Impact	Potentially affected watercourses			Overall Intensity (max = 10)	Spatial scale (max = 5)	Duration (max = 5)	Severity (max = 20)	Importance rating (max = 5)	Consequence (max = 100)	Likelihood (Probability) of impact	Significance (max = 100)	Risk Rating	Confidence level
			Name/s	PES	Overall Watercourse Importance										
CONSTRUCTION	Layerworks for the construction of the golf cart track **(Northern Entrance Dam)**	Pouring of asphalt and spraying of the road sealant which is highly toxic to aquatic life should this enter into the watercourse. This includes the use of concrete as part of the layerworks.	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**8**	1	1	**10**	**3**	**30**	20%	**6**	**L**	Medium
			Keysers River	D	High	**6**	2	1	**9**	**4**	**36**	20%	**7,2**	**L**	Medium
		Compaction of foreign material that could contain alien seeds and introduce alien invasive vegetation to the watercourses	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**4**	1	5	**10**	**3**	**30**	60%	**18**	**L**	Medium
			Keysers River	D	High	**2**	2	5	**9**	**4**	**36**	60%	**21,6**	**L**	Medium
OPERATIONAL	Operation of the proposed dams **(Northern Entrance Dam)**	Alien invasive encroachment as a result of general disturbance in the area since the construction phase, with re-establishment and spreading during the operational phase	**Prinseskasteel Stream (downstream reach)**	D	Moderate	**4**	1	5	**10**	**3**	**30**	60%	**18**	**L**	Medium
			Keysers River	D	High	**2**	2	5	**9**	**4**	**36**	60%	**21,6**	**L**	Medium

6 Authorisation Timelines

6.1 Water Use Authorisation

The proposed dam enlargement activities on the Northern Entrance Dam takes place within the 1:100 year floodline of the GN4167 Zone of Regulation, and therefore WUA must be sought with the DWS.

The WUA timelines are dependent on the type of WUA process being followed (GA vs WULA) once all required supporting documentation has been delivered to the relevant authority. The DWS are allocated a 30-working day period to award or reject a GA, and 90 days to award or reject a WULA. It is outside the scope of this letter to determine the need to register a GA or WULA and this is a decision to be taken solely by the DWS during pre-application meeting. An excerpt of the Water Use Licensing Process is provided below in Table 8.

Table 8 Water Use Licensing Process as per Section 27 of the NWA (E-Wulaas website)

Phase	Description	Responsible person	Time frames
1. Pre-application process	Engagement between the applicant and DWS to determine type of authorisation, conduct site inspection and information requirements.	Applicant	No count
	Applicant submits the application, technical report supporting the application is identified. Applicant compile technical report and submit to the Department		
2. Screening of technical report	The technical reporting supporting the application is screened, resulting in its acceptance or rejected. If rejected the application is closed.	Department	90 days
3. Assessment and decision	The application and technical report are evaluated, leading to recommendations and decision.		

6.2 Environmental Authorisation

All dam enlargement activities are taking place outside the 32 m NEMA ZoR, while the newly proposed golf cart track will take place within the 32 m NEMA ZoR. The Freshwater Specialist is of the understanding that the proponent has already completed an applicability checklist for the golf cart track and overarchingly, that no Environmental Authorisation (EA) is required. This is ultimately to be determined by the EAP in consultation with the relevant Competent Authority.

7 Way Forward

This report, after taking into consideration the findings and recommendations provided by the Freshwater Specialist herein, should inform and guide the Registered Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making as to the ecological viability of the proposed dam enlargement project and the nature of EA and Water use Authorisation.

8 Appendix Items

8.1 Appendix A – Specialist Declaration of Independence

I, Cole Grainger, declare that:

I act as the independent specialist in this application;

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority 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 the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

All the particulars furnished by me in this form are true and correct; and

I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Cole Grainger

Freshwater Specialist

The Biodiversity Company

September 2025

8.2 Appendix B – Specialist Subconsultant CVs

PERSPECTIVE Consulting
Freshwater Impact Assessment & Biomonitoring
Cole Grainger (Pr.Sci.Nat.)
Freshwater Specialist
cole@fwpc.co.za|084 397 6753

INTRODUCTION

Cole Grainger is a SACNASP registered Professional Scientist in the field of Aquatic Science.

He is a Freshwater Specialist with 10 years' experience in wetland and river impact assessments and biomonitoring.

Cole's MSc aimed at broadening the understanding of benthic algal community shifts in winter and summer rainfall areas as part of the testing of the biomonitoring viability of various algal groups in South Africa to nutrient and flow regime mixed effects.

Cole has since broadened his aquatic biomonitoring experience to both wetland and riverine disciplines.

Cole furthermore is a reasonably experienced River Ecostatus Monitoring Programme assessor and has applied the IHI, FRAI, MIRAI and VEGRAI models.

Areas of Interest

Research

Cole is passionate about freshwater conservation and multivariate ecological research and has a keen interest to contribute to the advancement of benthic algae and macroinvertebrate riverine biomonitoring protocols in South Africa, as these organisms play key foundational roles in the regulation of the trophic food web, and thus the overall health of aquatic ecosystems.

Consulting

Cole aims to provide holistic freshwater solutions that balance the needs of sustainable freshwater resources management and development goals.

KEY EXPERIENCE

Consulting Industries

- Research and Development
- Renewable Energy and mining
- Residential/Industrial/Commercial developments

Monitoring Disciplines

- Surface and groundwater quality
- River discharge
- Groundwater levels
- SASS5 and Benthic algae
- Wetland health
- Ecotoxicity

Assessment Tools

- WET-Health, WET-Ecoservices
- Buffer determination
- IHI, VEGRAI, MIRAI, FRAI

Reporting

- Wetland and Riverine Ecological Impact Assessments
- Monitoring Compliance
- Rehabilitation plans

Miscellaneous

- Aquatic Macroinvertebrate Species Identifications
- Water Use Licencing

Software Programs

- Multivariate Ecological Research (PRIMER Software)
- GIS and Sensitivity Mapping (ArcGIS, QGIS)

NATIONALITY

South African (ID:8807065007080)

LANGUAGES

- English – Proficient
- Afrikaans – Good

QUALIFICATIONS

- Pr. Sci. Nat. (119870) – Aquati Science
- MSc (University of Stellenbosch) - Conservation Ecology (*Cum Laude*)
- DST-NRF Internship with th Freshwater Consulting Group - Department of Science an Technology
- BSc Honours (University o Stellenbosch) – Conservation Ecology

COURSES

- SASS 5 (2018-2028) – Department o Water Affairs and Sanitation Rive Health Programme
- Tools for Wetland Assessment - Rhodes University
- River Ecostatus Monitorin Programme – Department of Wate and Sanitation (Pending)

PROVINCIAL EXPERIENCE

Western, Eastern and Northern Cape, Free State, Mpumalanga and Limpopo

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

SUPPLEMENTARY WATER USE INFORMATION
Section 21(c) and (i) Water Uses
Section 21(c) ~ impeding or diverting the flow of water in a watercourse
Section 21(i) ~ altering the bed, banks, course or characteristics of a watercourse

Please read:

(1) The requirements of this form should be discussed with the relevant Regional Office and Primary Responsible Official for these water uses during a pre-application consultation meeting and documented agreement reached in terms of:
 (a) Assistance and information to be supplied by the Department (e.g. procedures (refer items 1.2.3 and 1.2.4), management objectives etc.) - this is of particular reference to emerging water users that are not in a position to provide the information as required in this form; and (b) The scale and level of detail required.

(2) Should any of the supporting documentation to the licence application (e.g. Technical Report, Environmental Impact Assessment Report, Environmental Management Plan or Programme) already contain the requested information below, the applicant is not required to duplicate the information. In such instances, a comprehensive list of these documents must be compiled and this form must be completed by referring to the relevant sections in the supporting documentation.

(3) All maps, Google images, drawings and plans must be at an appropriate detailed scale and have sufficient annotations (North arrow, line scale, legend, co-ordinates, etc.) and must be recent (at least 6 months) representations.

(4) All supporting documentation and reports must be final documents signed off by both the applicant and the compiler of the report.

(5) Information requirements in respect of Section 27 of the National Water Act, 1998 (Act No. 36 of 1998)[NWA] that have to be considered in the issuing of a licence, are appropriately incorporated and indicated in this form (e.g. item 2.2.3 <Provide information to support efficient and beneficial use of water in the public interest [refer Section 27(1)(c)]>).

(6) This form may be updated from time to time as required to comply with best practice and legal requirements. When completing this form, clearly date it since it will be evaluated against the information requirements related to the edition of the form at that time.

1. Watercourse Attributes

1.1 Locality

1.1.1. <Provide a description of the location of the watercourse at which the water use/s is to take place>

The Prinseskasteel Stream (hereafter, "***stream***") and its associated instream dams drains in a north-easterly direction through Steenberg Estate and then Steenberg Golf Club on which the enlargement of two (2) dams (i.e. the Northern Entrance Dam and the 5th Tee Dam) is to take place.

The coordinates for these dams are as follows:

- Northern Entrance Dam: 34° 3' 44.92''S and 18° 25' 56.08'' E
- 5th Tee Dam: 34° 4' 15.44''S and 18° 25' 50.48'' E

The project also involves the development of a new golf cart track to circumvent the new perimeter of the Northern Entrance Dam, and tie into the existing golf cart track that borders the eastern, western and northern border of "hole 12", which is the impounded reach of the Prinseskasteel Stream which is adjacent to the Northern Entrance Dam (see Figure 2).

The Prinseskasteel Stream is located within the Breede-Olifants Water Management Area, within the Greater Cape Town Sub Water Management Area, within the G22D quaternary catchment and Sand River topographical catchment.

1.1.2. <Provide a locality map/s indicating the relevant catchment[1], surrounding land use, towns, infrastructure etc.>

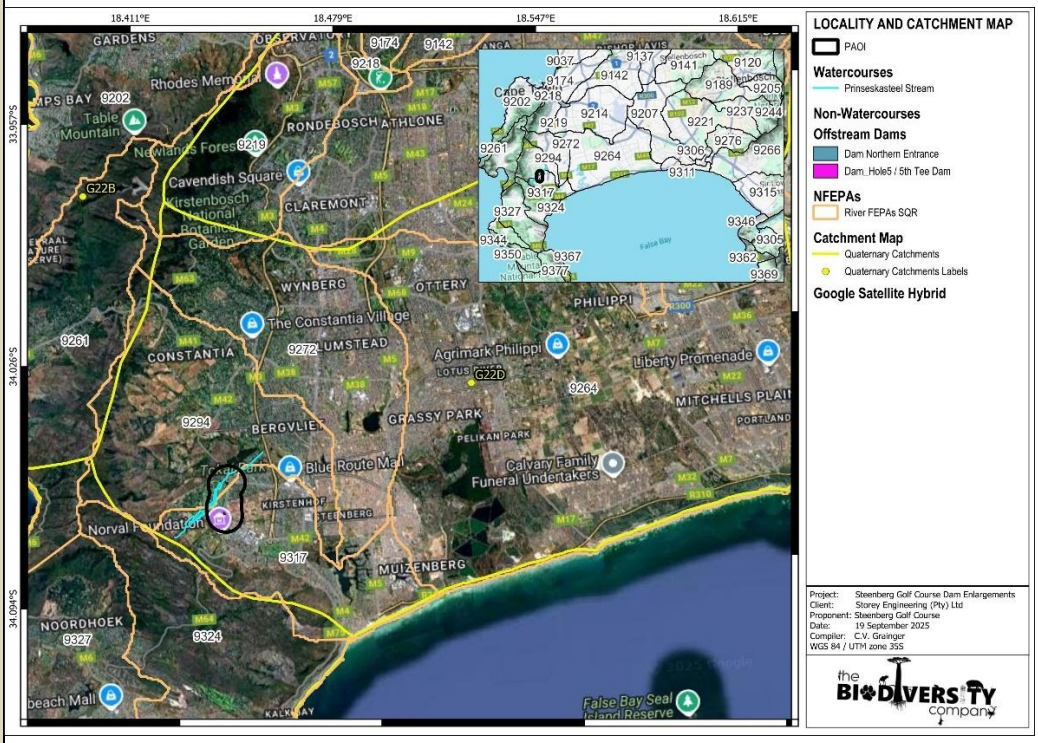

Figure 1: Locality and catchment Map

(PAOI = Project Area of Influence) which is a 500 m radius surrounding the project that the freshwater specialist must consider in terms of project viability, according to Government Notice GN4167 of 2024 – National Water Act

1.1.3. <Provide the catchment reference number>

Sub Quaternary Catchment: 9294 (Northern Entrance Dam)
Sub Quaternary Catchment: 9317 (5th Tee dam)
Quaternary Catchment: G22D
Sub Water Management Area: Greater Cape Town
Water Management Area: Breede-Olifants

1.2 Description

1.2.1. <Provide the name and/or description of the affected watercourse>

The 5th Tee Dam is not associated with any watercourses and so the potentially impacted watercourse is discussed below with reference to the Northen Entrance Dam only.

The instream dam of the Prinseskasteel Stream (i.e. the impounded reach of this stream) would potentially, but highly unlikely be impacted by the proposed enlargement activities of the Northern Entrance Dam during the construction phase of the project. This stream drains to the Keysers River downstream, which may also experience a small quantum of impact, in the event of receiving poor water quality from the Prinseskasteel Stream, or in the event that the stream ceases to flow due to dewatering of its instream impoundment during construction.

The extent of dam enlargement works has however been planned outside of the 32m NEMA Zone of Regulation of this stream, and the Freshwater Specialist considers this to be a sufficient mitigation measure to ensure that no quantum of impact is posed on the stream in terms of sedimentation, and habitat loss.

This does not include the golf cart track which will be constructed within the 32m NEMA Zone of Regulation of the stream, which will circumvent the impounded reach of the stream on its eastern, western and northern borders. The GN4167 Risk Assessment Matrix was also applied to this activity, with the associated mitigation listed in Section 3.4 below.

The dewatering of the Northern Entrance Dam may however, but unlikely cause the dewatering of the impounded reach of the stream for several reasons. These are discussed at length in Section 3.4 further below.

The Northern Entrance Dam falls within the 1:100 year floodline of the stream. Given that this stream has been completely formalised through the Steenberg Golf Course grounds, the

[1] The order of the catchment is to be verified with the relevant Regional Office and Primary Responsible Official

probability of flooding its artificially landscaped banks is low, given that formalisation would escalate water into the instream dam (Hole 12) which would effectively act as an attenuation pond, before release of the water further downstream (Figure 3).

The pre and post 1:100 year floodlines are reasonably similar and indicate that floodwaters of the stream would enter into the Northern Entrance Dam to the east of the instream dam on the stream, irrespective of whether the dam is enlarged or not (Figure 3).

The Prinseskasteel Stream is indicated in the below sections in Figure 2 and Figure 3 for clarity, along with the dams that are proposed for enlargement, including the Zones of Regulation and pre and post 1:100 year floodlines.

1. Watercourse Attributes

1.2.2. <Provide a map with accompanying photographs (dated) indicating the segment and affected reach/es of the watercourse in which the water use/s is to take place and which indicates/delineates the regulated area[2] including:

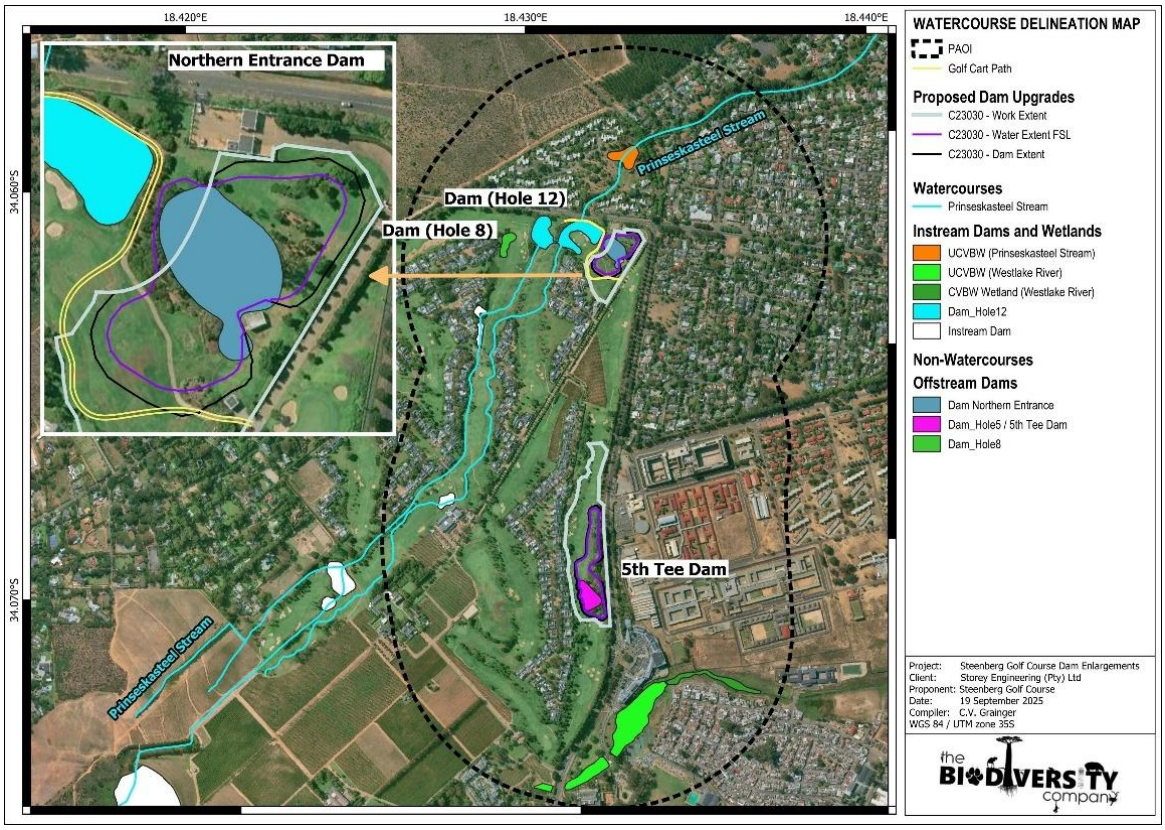

Figure 2: Watercourse Delineation Map of the Prinseskasteel Stream system

[2] The applicant will require a water use authorisation from the Department for any activity within the *regulated area* which is the outer edge of the riparian habitat or 1:100 year flood line, whichever is the greatest distance from the watercourse. The outer edge of the watercourse must be delineated using the Departmental guideline, *A Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas* or *Field method for the delineation of Riparian Zones for South African Rivers*

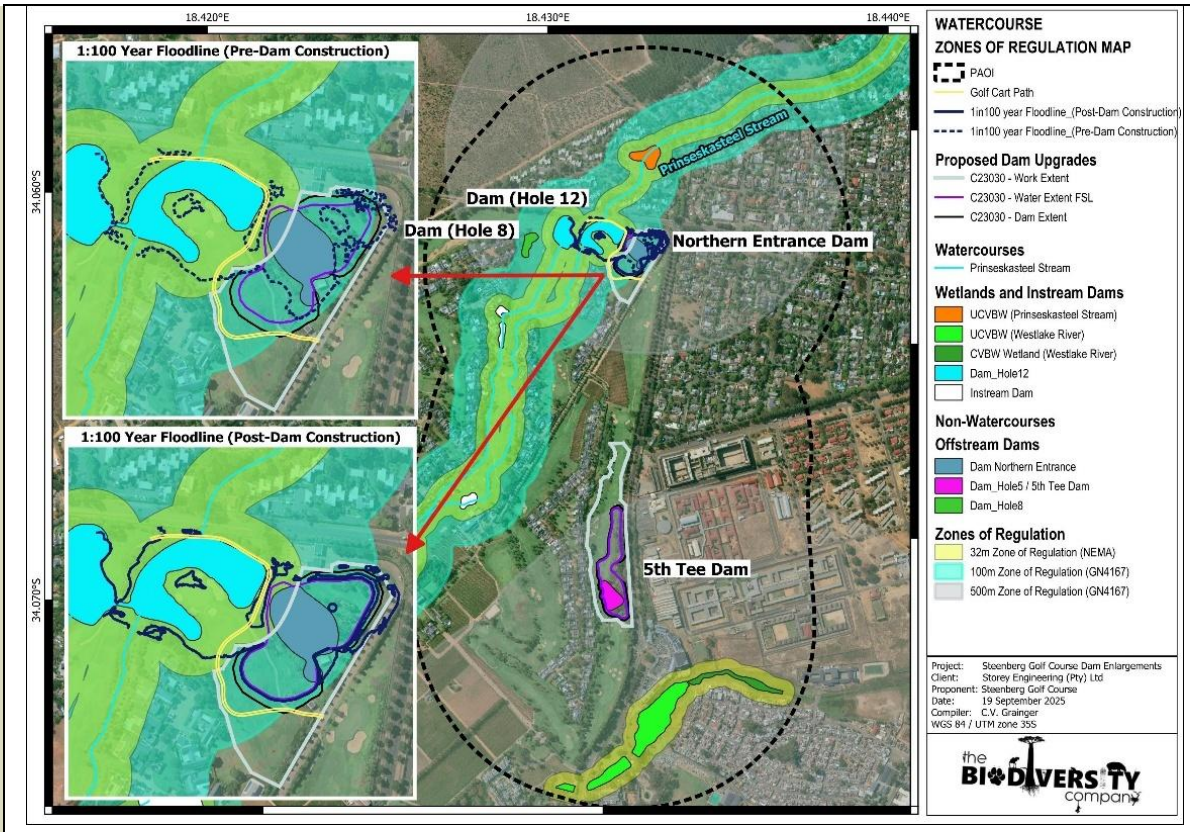

Figure 3: Watercourse Delineation, NEMA and GN4167 (NWA) Zones of Regulation and pre and post dam development 1:100 year floodlines

Figure 4: Photographs of the dams and the Prinseskasteel Stream

1.2.2.1. The extent of the riparian habitat; and

No impact – the stream reach on the Steenberg Golf Course has been completely formalised as per Figure 4 above, meaning that no riparian zone exists. The stream instead consists of planted sedges and restios within its instream habitat zone, but what would be its riparian habitat zone has become part of the golf course grounds and is regularly mowed. If it is assumed that the course of the stream has remained unchanged after formalisation, then the Freshwater Specialist is of the opinion that the proposed dam enlargement would fall outside of what would have been the riparian zone of the stream.

Moreover, from the Freshwater Specialist's knowledge of the area, the Prinseskasteel Stream and other rivers flowing into the Keysers River, including the Keysers River itself were all historically valley bottom wetland systems, meaning that they were not accompanied by a riparian zone. It is only since urbanisation and agricultural activity in the area that these systems have transitioned from diffuse flowing to concentrated, unidirection (fluvial) systems, still not necessarily expressing a riparian zone due to high levels of disturbance, and perhaps.

The riparian habitat of the downstream reach of the Prinseskasteel Stream, traversing through Tokai would also be unaffected by the proposed dam enlargement activities.

1.2.2.2. The 1:100 year flood line>>

The pre and post-dam enlargement 1:100 year floodline is indicated above in Figure 3 and although it is acknowledged that the proposed enlargement of the Northern Entrance Dam falls within this floodline, it is highly unlikely that the formalised Prinseskasteel Stream would top its banks under current flow conditions. If it did, then the consequences for the pre and post-operation of the Northern Entrance Dam are that the Northern Entrance Dam would have more capacity to catch the stream's floodwaters, which would otherwise run off as surface water to the east, and eventually infiltrate back into the groundwater, else be caught in the road stormwater network.

1.2.3. <Describe within context of the immediate catchment and segment, the historic as well as current state (Present Ecological State or PES) of the affected reach/es of the watercourse with regards to the following characteristics (attributes)[3]:

1.2.3.1. Flow and sediment regimes (quantity, pattern, timing, water level and assurance of in stream flow);

Currently the stream suffers to flow attenuation/containment in several upstream impoundments, both within the Steenberg Golf Course and further upstream within the catchment. Impoundment of flows would serve to flatten temporal flow variability across seasons, especially at the beginning of the wet season when high base flows would first be collected in the various upstream impoundments before being translated into elevated stream discharge. Eventually the dams would fill and overtop as elevated discharge in the formalised river bed of this stream, but given that there are several dams installed in succession on the golf course, it is largely irrelevant whether the high or low flow signature is non intact. This is especially considering that the river bed instream habitat is artificial, non-heterogeneous in terms of stoney, vegetation and gravel, sand and mud habitat, with an absent riparian zone and is not expected to accommodate a diverse community of aquatic fauna and flora.

By contrast, and to add to the extreme hydrological signature that has been created via impoundment, the majority of the reach of the Prinseskasteel Stream is poorly vegetated in terms of taller plants that act as a frictional barrier to flows, meaning that under natural conditions they would help to slow and regulate flows through the stream. However, under the current conditions, the flow, after exiting an impoundment is effectively escalated into the next impoundment, meaning collectively that this stream is designed to be "dry", and contain water only in its impoundments.

The downstream reach of the stream below Tokai Road would be unimpacted by the dam enlargement activities, given that current flow operation from the impounded reach (hole 12) on the stream will be maintained throughout the construction and operational phases of the project.

In terms of sediment flows, the stream would collect sediment in impoundments and not be able to transfer sediment downstream, meaning that this stream favours erosion over deposition. There is thus a large imbalance in sediment distribution and retention in the stream, whereby sediment is held back from its downstream reach, and ultimately the receiving Keysers River.

The hydrological regime of this stream is considered to be in a PES E (Seriously Modified) ecological condition.

1.2.3.2. Water quality (including the physical, chemical and biological characteristics of the water) in relation to the flow regime

The water quality in the flowing reaches of the Prinseskasteel Stream would be of a fair condition, with pH anticipated to be in the range of 6.5-8.5, Electrical Conductivity to be < 80 mS/m and Dissolved Oxygen to be in the region of 6 mg/L.

In the impounded section of the stream, (Hole 12), the electrical conductivity is envisaged to be slightly elevated, and the dissolved oxygen to be slightly depleted – this is a natural phenomenon of standing waters such as those in impoundments.

Elevated turbidity is expected in the stream flow between impoundments during the winter season when the upstream dams overtop and when their sediments are disturbed by the incoming upgradient flows, becoming part of the suspension load once more.

It must be noted that water quality was not measured on site, as this fell outside the scope of works of the field verification at the time.

The water quality component of this stream is considered to be in a PES C (Moderately Modified) ecological condition.

1.2.3.3. Riparian and In stream Habitat

As described above, the riparian zone is absent and the instream habitat is a landscaped mosaic of restios and sedges within a grass bed. The downstream reach of this stream however does support riparian habitat, but no downstream impacts on envisaged for this project, as described above.

The riparian and instream habitat of this stream is considered to be in a PES E (Seriously Modified) ecological condition.

1.2.3.3.1. Morphology (physical structure)

The physical structure of the stream has been critically modified for the reasons described above.

1.2.3.3.2. Vegetation

The vegetation component of this stream has largely been lost to formalisation. Under natural circumstances, riverine systems may support, floating and submerged aquatic plants, emerging plants in the marginal riparian subcomponent and then more woody species in the non-marginal subcomponent of the riparian zone. Most of these components have thus been lost, hence the seriously modified PES assigned.

1.2.3.4. Biota>

A biotic assessment was not undertaken on site given the nature of transformation of the watercourse.

According to the 2014 DWS RQOs database, the following fish and macroinvertebrates are expected at the SQR monitoring point G22D-09294 (Keysers River). The Keysers River is a recipient of the Prinseskasteel Stream, and therefore the summary below is to communicate the biotic community that is dependant (in part) by water from this stream

Table 1: Fish Species expected in the Keysers River reach

Fish species	Common Name	SA IUCN Status (IUCN 2024)	GLOBAL IUCN Status (IUCN 2024)
Galaxius zebratus	Cape Galaxius	Data Deficient	Data Deficient
Sandelia capensis	Cape Kurper	Data Deficient	Data Deficient
Oreochromis mossambicus	Mozambique Tilapia	Vulnerable	Vulnerable

Table 2: Macro-invertebrate species expected in the Keysers River reach

Invertebrate family	Quality Value	Physico-Chemistry Intolerance Category	Present	Invertebrate family	Quality Value	Physico-Chemistry Intolerance Category	Present
PORIFERA	5	Low	☐	Hydropsychidae 2 sp	6	Low	☐
COELENTERATA	1	Very Low	☐	Hydropsychidae > 2 sp	12	High	☐
TURBELLARIA	3	Very Low	☒	Philopotamidae	10	Moderate	☐
Oligochaeta	1	Very Low	☒	Polycentropodidae	12	High	☐
Hirudinea	3	Very Low	☒	Psychomyiidae/Xiphocentronidae	8	Moderate	☐
Amphipoda	13	High	☐	Barbarochthonidae SWC	13	High	☐
Potamonautidae*	3	Very Low	☒	Calamoceratidae	11	Moderate	☐
Atyidae	8	Moderate	☐	Glossosomatidae SWC	11	Moderate	☐
Palaemonidae	10	Moderate	☐	Hydroptilidae	6	Low	☐
HYDRACARINA (Mites)	8	Moderate	☒	Hydrosalpingidae SWC	15	High	☐
Notonemouridae	14	High	☒	Lepidostomatidae	10	Moderate	☐
Perlidae	12	High	☐	Leptoceridae	6	Low	☒
Baetidae 1sp	4	Low	☒	Petrothrincidae SWC	11	Moderate	☐
Baetidae 2 sp	6	Low	☒	Pisuliidae	10	Moderate	☐
Baetidae > 2 sp	12	High	☐	Sericostomatidae SWC	13	High	☐
Caenidae	6	Low	☒	Dytiscidae/Noteridae*	5	Low	☒
Ephemeridae	15	High	☐	Elmidae/Dryopidae*	8	Moderate	☒
Heptageniidae	13	High	☐	Gyrinidae*	5	Low	☒
Leptophlebiidae	9	Moderate	☐	Haliplidae*	5	Low	☐
Oligoneuridae	15	High	☐	Helodidae	12	High	☒
Polymitarcyidae	10	Moderate	☐	Hydraenidae*	8	Moderate	☐
Prosopistomatidae	15	High	☐	Hydrophilidae*	5	Low	☐
Teloganodidae (SWC)	12	High	☐	Limnichidae	10	Moderate	☐
Tricorythidae	9	Moderate	☐	Psephenidae	10	Moderate	☐
Calopterygidae	10	Moderate	☐	Athericidae	10	Moderate	☐
Chlorocyphidae	10	Moderate	☐	Blepharoceridae	15	High	☐
Synlestidae	8	Moderate	☐	Ceratopogonidae	5	Low	☒
Coenagrionidae	4	Low	☒	Chironomidae	2	Very Low	☒

Lestidae	8	Moderate	☐	Culicidae*	1	Very Low	☒
Platycnemidae	10	Moderate	☐	Dixidae*	10	Moderate	☐
Protoneuridae	8	Moderate	☐	Empididae	6	Low	☐
Aeshnidae	8	Moderate	☒	Ephydridae	3	Very Low	☐
Corduliidae	8	Moderate	☐	Muscidae	1	Very Low	☒
Gomphidae	6	Low	☒	Psychodidae	1	Very Low	☐
Libellulidae	5	Low	☒	Simuliidae	5	Low	☒
Crambidae (Pyralidae)	12	High	☐	Syrphidae*	1	Very Low	☐
Belostomatidae*	3	Very Low	☒	Tabanidae	5	Low	☒
Corixidae*	3	Very Low	☒	Tipulidae	5	Low	☐
Gerridae*	5	Low	☒	Ancylidae	6	Low	☒
Hydrometridae*	6	Low	☐	Bulininae*	3	Very Low	☐
Naucoridae*	7	Moderate	☒	Hydrobiidae*	3	Very Low	☐
Nepidae*	3	Very Low	☒	Lymnaeidae*	3	Very Low	☒
Notonectidae*	3	Very Low	☒	Physidae*	3	Very Low	☒
Pleidae*	4	Low	☒	Planorbinae*	3	Very Low	☒
Veliidae/Mesoveliidae*	5	Low	☒	Thiaridae* (=Melanidae)	3	Very Low	☐
Corydalidae	8	Moderate	☐	Viviparidae*	5	Low	☐
Sialidae	6	Low	☐	Corbiculidae	5	Low	☐
Dipseudopsidae	10	Moderate	☐	Sphaeriidae	3	Very Low	☐
Ecnomidae	8	Moderate	☐	Unionidae	6	Low	☐
Hydropsychidae 1 sp	4	Low	☒				☐

1-3: Very Low Intolerance | 4-6: Low Intolerance | 7-11: Moderate Intolerance | 12-15 High Intolerance (based on Thirion 2007)

	1.2.4. <Describe the ecological importance and sensitivity (EIS)[4] as well as the Socio-
1. Watercourse Attributes	
	cultural Importance (SI)[4] of the affected reach/es of the watercourse including the functions[5]> The potentially affected reach of the Prinseskasteel Stream is its impounded section ("hole 12") in the most northern portion of the Steenberg Golf Course, whereafter it drains underneath Tokai Road and drains in a north easterly direction through the suburb of Tokai before confluencing with the south easterly flowing Keysers River. The proposed enlargement of the Northern Entrance Dam would not impact on the social/cultural element that the Prinseskasteel Stream brings, as in the potentially impacted reach, this is based on its aesthetic to Steenberg Golf Course clientele. It is however envisaged that the downstream reach of this stream (through Tokai) is enjoyed by residents and nature enthusiasts of the local area. Ecologically speaking, the Prinseskasteel Stream (within the Steenberg Golf Gourse grounds) is not deemed ecologically sensitive nor ecologically important, as this watercourse has been completely formalised, both from a habitat and hydrological perspective. The stream however does assist with the flow regulation of the receiving Keysers River and therefore is an important triburary of the Keysers, along with the Grootbos River/Prinskasteel River and Spaanschemat Rivers.
	1.2.5. <Discuss existing land and water use impacts (and threats) on the characteristics of the watercourse> Please refer to section 1.2.3
	1.2.6. <List and map sensitive environments in proximity of the project locality - sensitive environments include wetlands, nature reserves, protected areas, etc.> Several Protected Areas surround the project. These include the Cape Peninsula Nature Reserve which accommodates the Cape Floral Region Protected Areas just north of the project. Further east of the project is the Rondevlei Bird Sanctuary and Zeekoeivlei Nature Reserve. The Prinseskasteel Stream flows into the Keysers River which drains into the Zandvlei Estuary downstream which is proclaimed as the Zandvlei Estuary Nature Reserve, which drains at Muizenberg Beach which forms part of the Table Mountain National Park Marine Protected Area. Refer to Figure 5 below for context.

[4] SI reflects the dependency of people on a healthy functioning watercourse and also to its cultural and tourism potential.
[5] Refer to the RDM procedure for determining Ecological Importance and Sensitivity

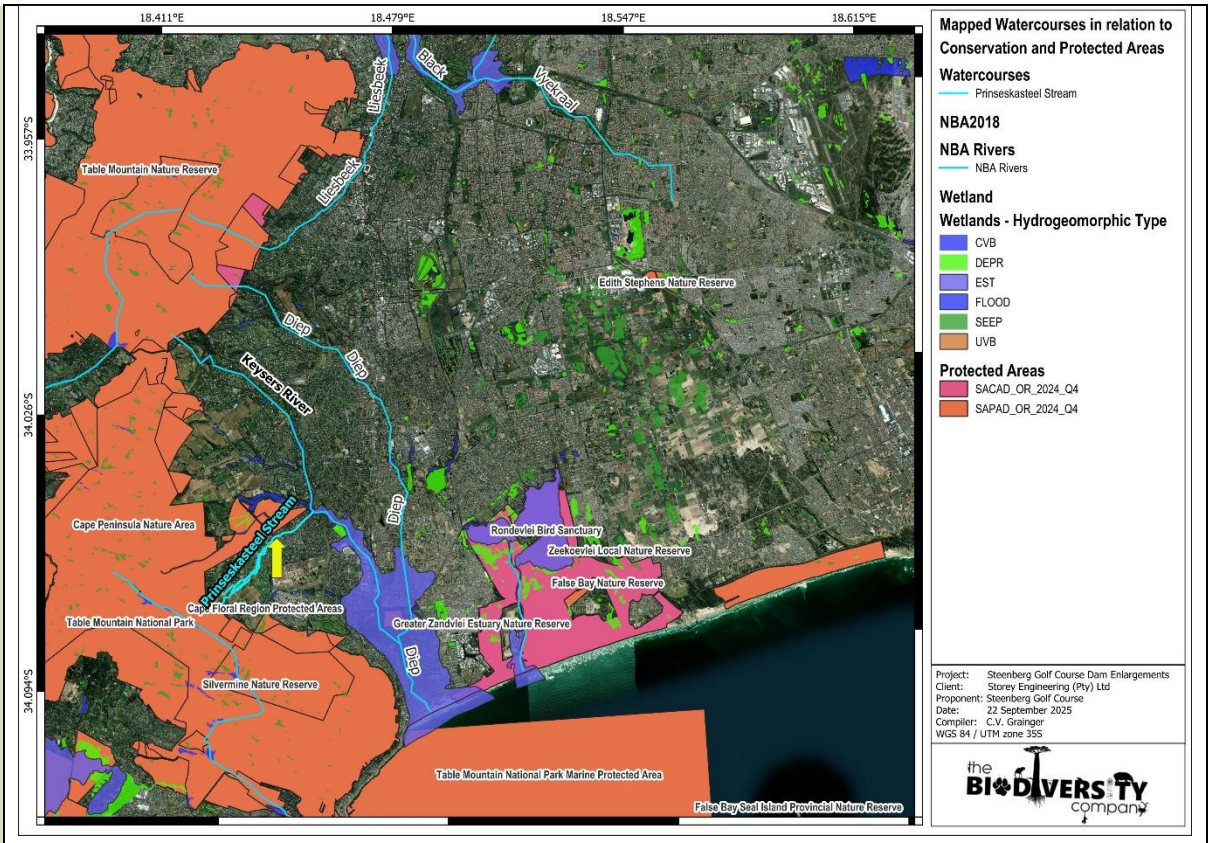

Figure 5: Environmental sensitivities in terms of watercourses, protected areas and conservation area

2.[6] Water Use Information

2.1 Description and Methodology

2.1.1. <Describe the activities associated with the water use/s>

According to the method statements provided by the project engineer (Storey Engineering (PTY) LTD), the dam will be constructed using general large earthmoving equipment, including excavators, roller compactors, and trucks. The perimeter retaining wall will be constructed primarily by hand but with concrete either mixed on-site in a small mixer or imported in trucks from a ready-mix plant.

A stockpile area will be created for materials to be used in the construction of the dam. These materials will include the liner, bricks, cement, reinforcing steel, sand, stone, geofabric, and drainage pipes. The contractor may also use this area as a temporary site camp. This area will be within the overall extent of the works area.

It is anticipated that the construction of the dam will take four to five months.

The following activities are required to construct the dams, as listed in Table 3 below.

Table 3: Proposed Dam Enlargement Activities

Activity	5th Tee Dam	Northern entrance Dam
Full Supply Level	32 690 m³	23 560 m³
Extent of works to be fenced off with Ready Fence that is covered with shade cloth	✓	✓
Grass/lawn will be lifted and stockpiled where it will be maintained for reuse	✓	✓
The irrigation pipes and sprinklers will be removed and stockpiled for reuse or disposed of at an off-site waste site	✓	✓
Existing services such as electricity cables, sewers, and water pipes will be exposed and relocated outside the area of the dam.		✓
Trees that can be replanted will be removed and stockpiled where they will be maintained for reuse	✓	✓

[6] The EIS of a watercourse is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales. Ecological sensitivity refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred. Both biotic and abiotic components of the system are taken into account.

Other vegetation that cannot be reused will be removed and disposed of, either in the golf course compost yard or at an off-site waste site	✓	✓
The dam will be excavated and the material will be transported for use elsewhere on the golf course. Excess material will be disposed of at an off-site waste site. Some material will be stockpiled for use as the cover blanket for the dam liner	✓	
The dam will be excavated and the material will be used as filler where the fairway has to be modified or it will be placed in the berm that is to be constructed	✓	✓
Should groundwater be encountered, sub-soil drains and a sump will be installed to keep the excavation dry for the duration of construction. The groundwater will then be pumped out onto the golf course to infiltrate and recharge the groundwater resource	✓	✓
Where required, a reinforced concrete and brick stone-faced perimeter wall will be constructed along the dam's edge	✓	✓
A brick barrier wall will be constructed around two sides of the existing pump room.	✓	✓
The excavated surface will be trimmed and shaped, after which the liner will be placed and covered with material from the stockpile	✓	✓
The final trimming and site clearance will be done, after which the golf course maintenance contractor will re-establish the irrigation system and vegetation	✓	✓
As the dam will be constructed during the dry months, surface draining is not anticipated. However, should construction start or extend over a period during which rain can be expected, surface drainage channels will be provided to lead water away from the area of the works. Geofrabric screens will be provided to trap sediment in the run-off water.	✓	✓

Please refer to illustrations of the dam designs below in Figures 6 and 7

2.1.2. <Describe the project phases for each activity (i.e. planning, construction, operation and maintenance, decommissioning) including, but not limited to, the programme for and duration of the various phases

Planning Phase – Design the dam enlargement, obtain WULA - 18 months.
Construction Phase – Construct the enlargements – 5 months.
Operation and Maintenance Phase – Use and maintain the dams as intended – Ongoing
Currently there is no decommissioning plans.

2.1.3. <Provide a site lay-out plan/s (master plan) indicating the various activities and existing and proposed infrastructure in relation to the 1:100 flood line and edge of the watercourse, etc. – a letter or certificate by a qualified surveyor must also be submitted that verifies the correctness of the site lay-out plans, in particular for wetlands>

Please refer to Figure 3 above which indicates the pre and post 1:100 year floodlines in relation to the delineated extent of the Prinseskasteel Stream. The engineering drawings for both dams are provided below in Figures 6 and 7 below.

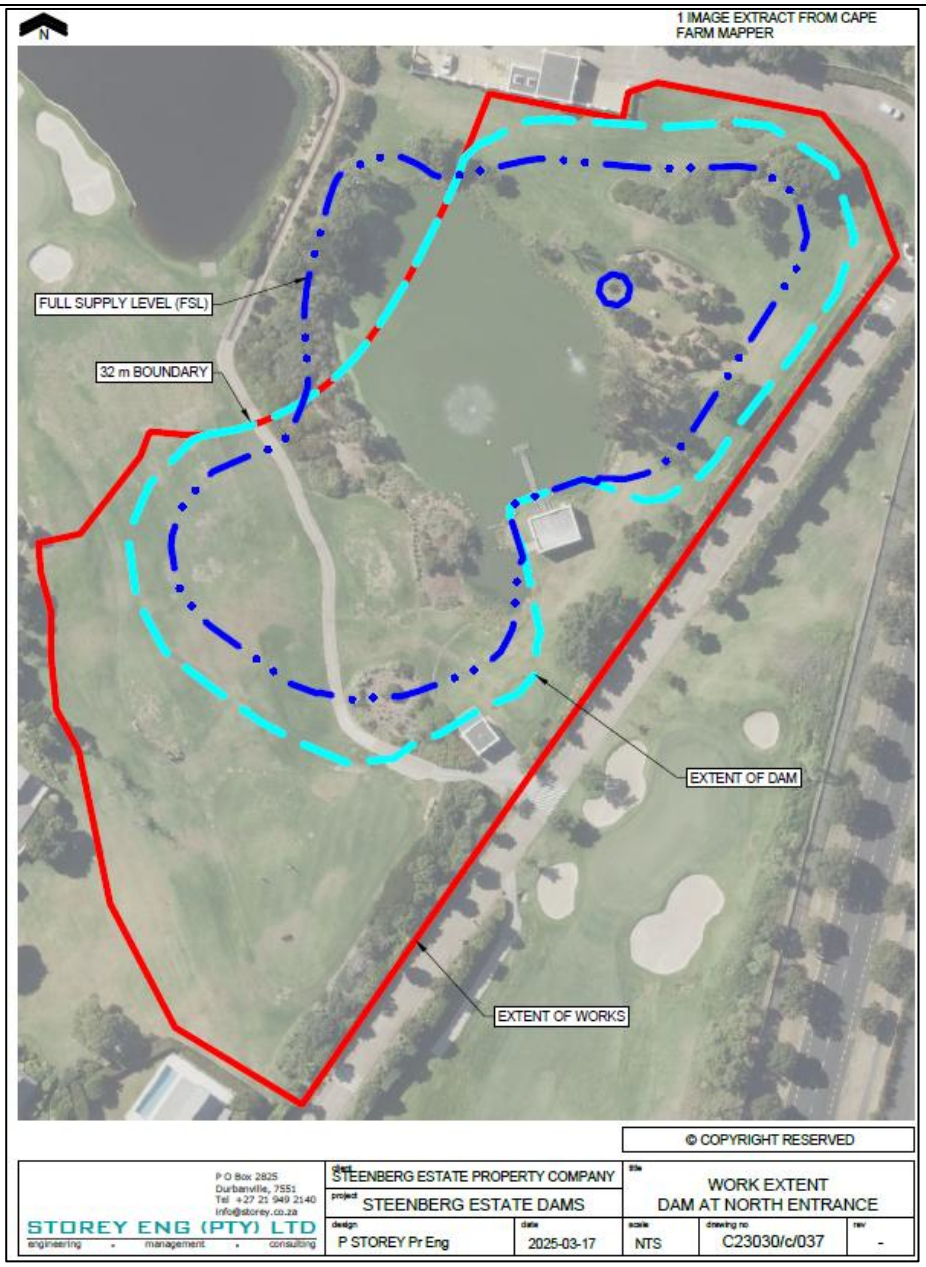

Figure 6: Extent of the work area, dam perimeter and full supply level of the Northern Entrance Dam

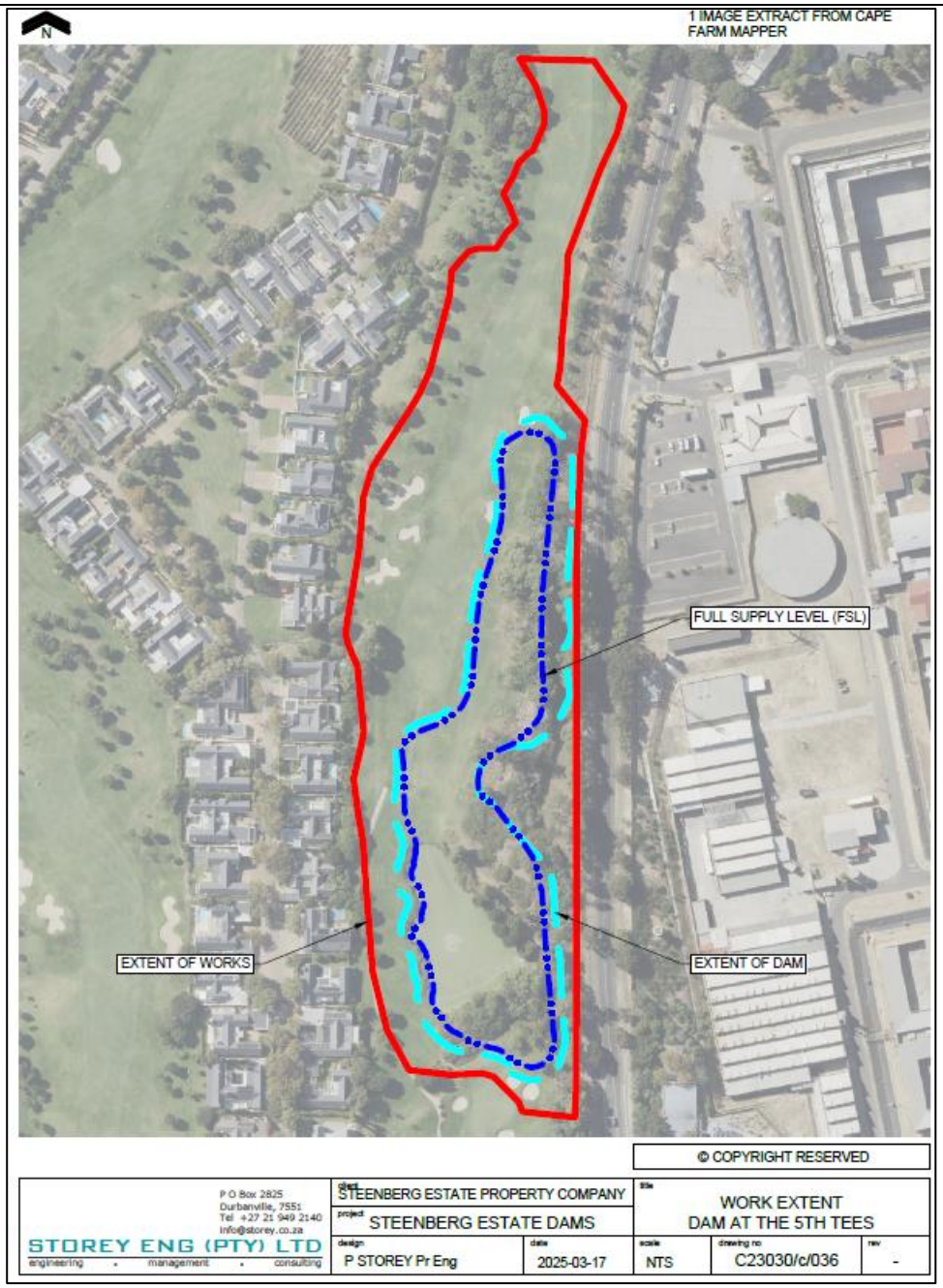

Figure 7: Extent of the work area, dam perimeter and full supply level of the 5th tee dam

2.1.4. <Provide work method statements for the various water use activities>

The Northern Entrance Dam will be filled using approximately 10% surface runoff and 90% borehole water, while the 5th tee dam will be filled through purchase of treated effluent (90%) and surface runoff (10%).

Please refer to the GN4167 Risk Assessment Matrix that is in the accompany Freshwater Screening Report.

2.1.5. <Provide engineer design drawing(s) for construction activities within the watercourse>

Not applicable – no construction is taking place within a watercourse, but see Figures 6 and 7 above for the dam designs.

	2.1.6. <Provide a description and a map/s indicating any Storm Water Management Practices (SWMPs) specifically addressing 'end of pipe' practices> Not applicable, this project involves only the enlargement of the dams and does not contribute to increased stormwater generation on site. In the event that water is pumped from the Northern Entrance Dam into the downstream reach of the Prinseskasteel Stream, erosion protection procedures will be put in place. Refer to Section 3.4 below.
	2.1.7. <Provide information on all existing lawful water uses [refer Section 27(1)(a)]> Refer to Section 27 Motivation
	2.1.8. <Provide information on investments already made and to be made by the water user in respect of the proposed water use/s [refer Section 27(1)(h)]> Refer to Section 27 Motivation
	2.1.9. <Indicate and motivate the probable duration of any undertaking for which the water use/s should be authorised [refer Section 27(1)(k)]> Refer to Section 27 Motivation
2.2 Motivation	*2.2.1. <Provide information on the need/intention/objective of the water use/s>* The proponent wishes to enlarge two dams on their property, namely, "the 5th Tee dam" and the "Northern entrance dam", to increase storage and moreover, irrigation capacity for the putting greens.
	2.2.2. <Provide information on contributions to rectify the results of past racial and gender discrimination[7] [refer Section 27(1)(b)[8]]> Refer to Section 27 Motivation
	2.2.3. <Provide information to support efficient and beneficial use of water in the public interest [refer Section 27(1)(c)]> Refer to Section 27 Motivation
	2.2.4. <Provide information on relevant catchment management strategies[9] and local government planning frameworks that support the proposed water use [refer Section 27(1)(e)]> Refer to Section 27 Motivation

[7] Refer to the DWAF *Broad-Based Black Economic Empowerment (BBBEE) Guidelines For Water Allocation, Final Draft, June 2007* and the Department of Trade and Industry's requirements relating to compliance with the BBBEE Act, 2003 (Act No. 53 of 2003)

[8] The applicant must provide information on how he/she implements the seven elements of BBBEE (i.e. Ownership, Management, Employment equity, Skills development, Procurement, Enterprise development, Socio-economic development) and how this complies with the relevant Sector Charter and score card (e.g. Construction, Agriculture, Mining, Tourism etc). A BBBEE certificate or external verification must accompany the application (refer list of Verification Agents on the Department of Trade and Industry's website)

[9] Consult the relevant Regional Office and Primary Responsible Official

	2.2.5. <Provide information on the strategic importance of the water use to be authorised [refer Section 27(1)(i)]> Refer to Section 27 Motivation

3.	Impact Assessment and Management	
3.1	**Impact Prediction and Assessment**	*3.1.1. <Provide a prediction and assessment of the likely environmental and socio-economic impacts or effects[10] associated with the water use/s for the different project phases:* *3.1.1.1. On the watercourse and its characteristics as set out in 1.2.3 above [refer Section 27(1)(f)]* No impact to the ecological integrity of the Prinseskasteel Stream is envisaged for the reasons described thus far in this form, and given the mitigation measures suggested below in Section 3.4. *3.1.1.2. On other water users [refer Section 27(1)(f)]* The surface water components for the Northern Entrance Dam and 5th Tee Dam are approximately 10% in terms of proportion contribution to volume. If the surface water was not caught in these dams, it would likely runoff further downslope and ultimately be caught in the road stormwater system, else it would infiltrate into the groundwater source. Considering that the downslope area is urban residential, the reliance on this surface runoff is deemed minimal, with the availability of domestic potable supply. *3.1.1.3. On the broader public and property* No impacts envisaged *3.1.1.4. If the water use/s is not authorised [refer Section 27(1)(d)]>* Refer Section 27 Motivation *3.1.2. <Provide a description of the methodologies employed to undertake impact prediction and assessment as well as a motivation for these>* The water levels in the impounded section of the Prinseskasteel Stream (hole 12) will be closely monitored during excavation activities of the Northern Entrance Dam, considering that dewatering of hole 12 and into the Northern Entrance Dam is a possibility, although unlikely. This is due to an increase in the differential of hydraulic pressure between hole 12 and the emptying Northern Entrance Dam.
3.2	**Risk Assessment**	*3.2.1. <Provide an assessment of the risks associated with the water use/s and related activities>* Please refer to the GN4167 Risk Assessment Matrix in the accompanying Freshwater Screening report.
3.3	**Alternatives**	*3.3.1. <Describe the alternatives considered to prevent negative impacts on the watercourse with regard to locality, procedures, materials, etc.>* No alternatives have been considered
3.4	**Mitigation and Management Measures**	*3.4.1. <Provide mitigation measures[11] to prevent, reduce, remediate or compensate the predetermined impacts; also provide emergency responses>* **DAM ENLARGEMENT ACTIVITIES** • All dam enlargement activities will be planned **outside the 32m NEMA Zone of Regulation of the Prinseskasteel Stream**, this in itself is considered mitigation to prevent any potential impacts to the ecological integrity of this system, • The **stockpiled lawn** that was lifted and removed to enable dam enlargement must be closely monitored to not become a habitat for the establishment of alien and invasive vegetation that could disburse to other areas, including the downstream reach of the Prinseskasteel Stream, outside the Steenberg Golf Course. The same is true for the laydown of construction materials. Best practice to avoid the establishment and spread of alien and invasive vegetation is to temporarily cover the stockpile with hessian

[10] Assess the potential impacts with regard to their nature, extent, magnitude, duration, probability and significance – each impact must be described in terms of source of impact, pathway (propagation of impact) and receptor (target that experience the risk or impact)

[11] The mitigation measures should be collated in an Environmental Management Plan (EMP) - refer to the Department of Environmental Affairs and Tourism's regulations, Government Notice No. R. 385 in Government Gazette No. 28753 of 21 April 2006 for minimum standards [12] Refer Section 51 of the NWA

sheeting or geotextile. This should isolate the stockpile from foreign seed, but still allow sunlight to penetrate the grass in efforts to keep it alive for the duration of the excavation and backfill activities;

- **Sediment control measures** such as sandbags or a sediment drift fence must be put in place to ensure that sediment does not enter into the Prinseskasteel Stream (irrespective of the potentially affected reach being impounded). This is especially relevant at the northern entrance dam whose enlargement area is upgradient of the impounded reach of the Prinseskasteel Stream. The dam enlargement activities are proposed during the dry summer months, which will decrease the number of surface runoff days during construction;

- The **concrete works** for the construction of the dam perimeter must take place with caution according to the following guideines:

    - Where feasible, as much material must be prefabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site;

    - Ready mix concrete is preferred over batching concrete on site as this minimising the handling of concrete on site, and thereby the potential for environmental spillage;

    - Mixing of fresh concrete must be done within a construction camp, at least 30 m away from watercourses, on a batter board/platform mixing tray, else within a lined, bound or bunded portable mixer. No mixing on bare ground is permitted;

    - Cement bags must be disposed of in demarcated hazardous waste receptacles;

    - Spilled or excess concrete must be disposed of at a suitable landfill site; and

    - A washout area must be designated outside of the delineated extent of watercourses and wash water must be treated on site or discharged to a suitable landfill site. Chain of custody documentation in this regard is required;

There is a small probability that the northern entrance dam is hydraulically connected to the impounded section of the Prinseskasteel Stream. If this is the case, then dewatering of the northern entrance dam may cause lateral movement of water from the Prinseskasteel Stream impoundment into the northern entrance. Another form of hydraulic connection is via the groundwater table, whereby dewatering of the northern entrance dam may cause an associated decrease in groundwater levels underlying the Prinseskasteel system. This could lower the dam level to an elevation which is below the dam outlet, which would then dewater the downstream reach of the Prinseskasteel Stream which flows through the suburbs of Tokai, on route to the Keysers River.

It is suggested that the water levels of the impounded reach of the Prinseskasteel Stream be monitored, and an emergency plan already be in place, to pump stream water that has been collected in the northern entrance dam into the downstream reach of the Prinseskasteel Stream.

The pump rate would need to both ensure that erosion to the downstream reach of the Prinseskasteel Stream is avoided and that the assurance of freshwater flows is preserved. This is especially critical during the low flow season when watercourses and associated biota are already under the most stress.

While it is acknowledged that the hydrological signature of the Prinseskasteel Stream has already been completely modified, the contractor must simply ensure, that whatever flows the downstream reach of the Prinseskasteel Stream typically received pre-construction, are preserved.

GOLF CART TRACK ACTIVITIES

- Removed grass stockpiles must be protected from becoming sources of alien and invasive vegetation, by being protected with hessian sheeting or geotextile that permits sunlight, but prohibits alien seed from contacting the stockpile; and

	• It is imperative that the surface layers/wearing layers of the newly constructed golf cart track be constructed during the summer dry season, to avoid the potential for the runoff of highly toxic substances such as concrete or asphalt into the stream. This is also true for herbicides that are used to prohibit regrowth and penetration of vegetation through the overlying imported material
	3.4.2. <Provide a site map/s that marks the limits of disturbance to the watercourse and in particular indicates erosion and sediment controls> Not applicable – but see Figures 6 and 7 which detail the extent of the dam works
	3.4.3. <If the developer (applicant) of water use related infrastructure is not the end user/beneficiary and will not be responsible for long term maintenance of the infrastructure, provide a programme for hand over to the successor-in-title[12] including a brief management/maintenance plan for infrastructure along with allocation of responsibilities>
3. Impact Assessment and Management	
	The developer is the end user and is responsible for the maintenance of the proposed infrastructure.
3.5 Changes to the Watercourse	*3.5.1. <Assess to what extent the impacts after mitigation will bring about changes in respect of the PES (and recommended ecological category, if this information is available at the stage of study) and functionality of the watercourse; as well as the socio-economic environment (including redress considerations as well impacts on other water users)>* Application of the prescribed mitigation measures will simply ensure that the downstream reach of the stream, downstream of the Steenberg Golf Club will not be impacted in terms of alien and invasive vegetation, water quality perturbations and changes to the timing and pattern of flows to the system. No deterioration or improvement in the Present Ecological Status of any watercourses is envisaged.
3.6 Monitoring and Compliance	*3.6.1. <Provide a detailed monitoring programme and describe the auditing, compliance and reporting mechanisms to ensure execution of the mitigation measures and for informing DWAF of incidents – ensure that these measures are appropriate in relation to the impacts, mitigation measures, status of the watercourse, etc.>* Monitoring of the water levels in hole 12 during the construction phase of the Northern Entrance Dam will be required for the duration of this phase. If water is required to be pumped into the downstream reach of the stream, downstream of Tokai road, then this reach will also need to be monitored for erosion and/or sedimentation for the duration of the pumping activity. • A monitoring report detailing pre-construction, construction and post construction can be submitted to the Competent Authorities to illustrate that this project was conducted in a manner which caused no harm to the Prinseskasteel Stream and its downstream reaches.