Parsons & Associates
specialist groundwater consultants cc
CK 96/27895/23

201 High Level Road, Pringle Bay
PO Box 151, Pringle Bay, 7196
Tel (063) 403-9309 Fax 086 604 8082
E-mail: info@pasgc.co.za
Members: Roger Parsons, Jenny Parsons

Ref 345/INF-let_s/tank

11 September 2020

Fraser Consulting Civil Engineering cc
PO Box 178
Sedgefield
6573

Attention: Mr Alastair Fraser

Dear Sir

PROPOSED DEVELOPMENT ON ERF 134 INFANTA : USE OF SEPTIC TANKS

Proposed Development

Our client – Westerhelling Investments cc – intends developing 21 erven on Erf 134, Infanta and is currently going through the process of obtaining authorisation from the relevant authorities. The development is directly south of the mouth of the Breede River in the Western Cape Province.

It is planned to supply water to the development from boreholes tested and assessed by two qualified hydrogeologists (myself and Mr Willem van Biljon of Geo Pollution Technologies) (Figure 1). Testing indicated that the boreholes are capable of meeting the 1 260 m^3/a water demand of the proposed development without impacting other groundwater users or the environment.

The disposal of sewage from the development is still to be finalised. The preferred alternative presented in the services report by Fraser (2014) proposed each individual erf has its own septic tank and soakaway system (hereafter referred to as a septic tank). Other options include the use of conservancy tanks or the use of a package wastewater treatment (WWT) plant.

Figure 1: Extent of the proposed development in relation to the village of Infanta and Infanta Park showing the position of the boreholes that supply water to Infanta Park and Erf 134.

Existing Situation

The proposed development is located between the village of Infanta and Infanta Park, formerly a caravan park (Figure 1). Infanta Park is supplied from a borehole adjacent to their reservoir in the south-western part of the property. Residents of the village provide their own water, either through individually owned and operated wellpoints and boreholes and / or rainwater tanks. The is no municipal water supply infrastructure and the water service provider – Swellendam Local Municipality - does not provide water to either the village or Infanta Park.

Historically, sewage was successfully disposed of through septic tanks. Since cira 2005, new developments or alterations have to install a conservancy tank to be emptied by a municipal vacuum tanker (honeysucker) and the sewage disposed of off-site. About 70% of the village still make use of the septic tanks. The existing dwelling on the site of the proposed development makes use of a septic tank. No municipal waterborne sewage system is available, but the municipality does service the conservancy tanks.

Septic Tanks

Septic tanks with soakaways are used around the world as an acceptable for of managing sewerage. They are particularly used in rural and low density settings. International and local research have documented the efficacy of using these systems to manage sewage. If correctly designed and installed, these systems are a highly effective means of wastewater treatment and disposal (Wright, 1999a). Contamination resulting from these systems is only related to poor location, poor design and lack of maintenance. Wright (1999a) concluded that such systems remain the most cost effective means of sewage disposal, and use of these systems should continue and be actively promoted. Several authors have promoted use of these systems and presented guidelines on proper siting, design and maintenance procedures, to prevent contamination of groundwater resources (EPA, 1987; Wright, 1994; 1995; 1999b)."

Setback distances between soakaways and boreholes and surface water bodies presented in the literature vary considerably, ranging mainly between 10 m and 50 m. In rare instances, distances of 200 m are prescribed. In their protocol on on-site sanitation and water sources, DWAF (1997) proposed the two should be kept 50 m apart. Also, no activity other than collecting water was allowed within 30 m of a borehole. These distances generally aim to ensure a travel time of more than 30 days between the potential source of contamination and the water source. This allows for the die-off of bacteria and the attenuation of other matter in the subsurface.

Risk Assessment

The proposed number and low density of septic tanks is less than currently the case in the village and at Infanta Park. With the occupancy also expected to be dominated by weekenders and holidaymakers, experience with the current soakaways demonstrates that the septic tanks at the proposed development will work as required, and without problem.

The hazard posed by the septic tanks relates to potential groundwater contamination caused by the discharge of treated effluent from the soakaway. An assessment of prevailing conditions and what is planned indicates that the risk of other groundwater users or the environment being affected is very low:

- Emergence of potentially contaminated groundwater below the high tide mark or into the sea is the hazard of concern, but no problems are known or reported along the coast fronting the village. It is probable that the same situation will prevail with the proposed development. With a low likelihood of occurrence and with the consequence of it being of limited significance, this hazard is argued to be of very low risk.
- It is improbable that the stream mapped by Snaddon (2013) is fed by groundwater, and because of the interpreted direction of groundwater flow – it is even less probable that groundwater in the vicinity of the propose development will discharge into the stream. Therefore, this hazard also poses a very low risk.
- The boreholes used to supply water to Infanta Park and those to be used to supply the proposed development are distant (more than 450 m) and upgradient of the planned septic tanks. Both considerations render it impossible for the planned septic tanks to impact the water supply and the groundwater users. The discharge of effluent from the soakaway thus poses no risk to the drinking water supplies.
    - Multiple sampling of boreholes 134A and 134C – located 120 m upgradient of septic tanks at Infanta Park – showed no sign of contamination of the boreholes from this potential source.
- The proposed soakaways are further away from existing boreholes in the village than the soakaways already in the village. On this basis – and considering that the proposed soakaways are not upgradient of the existing boreholes and wellpoints in the village - it is argued that the proposed soakaways pose no increased risk to the existing water supplied.
    - Boreholes and septic tanks have been operated side-by-side in the village for decades without apparent problems – as demonstrated by the continued use of wellpoints and boreholes for domestic water supply and septic tanks for sewage disposal. No contamination was detected by Toens & Partners (1999) in their investigation into this issue.

The proposed use of septic tanks by the 21 residential units poses a very low risk to either other water users or the environment. This method of sewage disposal has already been used in Infanta for decades without ill-effect. The additional 21 septic tanks will not significantly change the cumulative impact of the current situation, are distant from the water supply boreholes and are not upgradient of other water users.

Using guidance provided by Xu and Braune (1995), a minimum setback distance of 46 m is prescribed in a fractured sandstone environment with a water table less than 5 m deep and with thin soils. Notwithstanding the very low risk of impact described above, it is possible to apply this order of setback distance to the proposed development by positioning the soakaways:

- as far west as practically possible on Erven 9 to 13 and Erven 19 to 21; and
- as far north as possible on Erven 13 to 16 and as far south as possible on Erven 17 to 19.

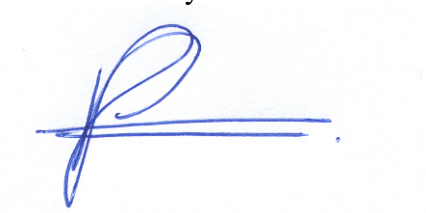
Three independent site-specific hydrogeological investigation in and around Infanta have reached the same conclusions. In addition to Toesn & Partners (1999) and Parsons & Associates (2006), GeoPollution Technologies (2012) found "soak away systems are also acceptable". They further recorded that the implementation of a WWT plant is not required.

Recommendations

Based on a consideration of existing knowledge and a review of the risk of impacting other water users or the environment, it is motivated that the use of septic tanks with soakaways be the preferred means of managing sewage to be generated at the proposed development. This motivation is based on worldwide experience in the use of septic tanks, local research and site-specific experience and observations.

To reduce the risk of treated effluent impacting either the marine environment or the stream mapped by Snaddon (2013), it is recommended that soakaway fields on properties adjacent to these two water bodies be located on the property, but as far as practically possible from the water bodies.

Yours sincerely



Dr Roger Parsons
Ph.D (U.F.S) Pr.Sci.Nat.

REFERENCES

EPA (1987) Septic Tank Siting to Minimize the Contamination of Ground Water by Microorganisms. U.S. Environmental Protection Agency, Office of Ground-Water Protection, Office of Water, Washington, June 1987.

Fraser, A (2014) Infanta, Erf 134 - Civil Engineering Infrastructure Report For EIA; Report AF134-1-r12 of 25 August 2014 Rev.12, Fraser Consulting Civil Engineering, Sedgefield.

Geo-Pollution Technologies (2012) Hydrogeological Impact Assessment Report: Erf 134, Infanta; GPT Reference Number: JJICI/12/11, Geo-Pollution Technologies, Cape Town.

Joubert, CSW (2003) An Assessment of the Possible Impacts of Lilliput Package Plants on Water Resources, Human Health and the Environment. Enviro Check CC, 11 November 2003.

Parsons & Associates (2006) Geohydrological Assessment of the Planned Development at Erf 134, Infanta. Parsons and Associates, Somerset West.

Snaddon, K (2013) Environmental Impact Assessment for Erf 134, Cape Infanta - Freshwater Ecosystems; The Freshwater Consulting Group, Cape Town.

Toens & Partners (1999) Overberg District Council - Cape Infanta: Groundwater Investigation. T&P Report No. 990219, report prepared by D Visser, November 1999.

Wright, A (1994) Septic Tank Systems – A Source of Groundwater Contamination. A Summary Note, April 1994.

Wright, A (1995) Guidelines for the Use of Septic Tank Systems in the South African Coastal Zone. Compiled for Water Research Commission, WRC Report No. 597/2/95.

Wright, A (1999a) Septic Tank Systems in the South African Coastal Zone. Report to the Water Research Commission by the Groundwater Programme, Division of Water, Environment and Forestry Technology, CSIR, Stellenbosch. WRC Report No. 597/1/99.

Wright, A (1999b) Guidelines for the Use of Septic Tank Systems in the South African Coastal Zone. Report to the Water Research Commission by Environmentek, CSIR. WRC Report No. TT 114/99, October 1999.

Xu, Y and Braune, E (1995) A guideline for groundwater protection for the community water supply and sanitation programme; Department of Water and Sanitation, Pretoria.