

APPLICATION FOR ENVIRONMENTAL AUTHORISATIONS

PROPOSED FLOOD REMEDIAL MEASURES ON THE DOORKLOOF SPRUIT Gaut:002/14-15/0094

BACKGROUND INFORMATION DOCUMENT

PURPOSE OF THIS DOCUMENT

The City of Tshwane (CoT) intends to construct flood remedial measures in the Doornkloof Spruit. The purpose of this Background Information Document (BID) is to provide:

- Stakeholders with an opportunity to register as an Interested and Affected Party (IAP),
- Background information on the proposed project,
- Information on the Environmental Authorisation that will be applied for and the process that will be followed, IAP with an opportunity to raise issues and concerns throughout the application process.

Certain areas within the City of Tshwane (CoT) are prone to flooding during rainfall events due to anthropogenic activities such as the increase of runoff from parking areas, and this may pose a serious risk to human lives and damage to infrastructure.

ILISO Consulting Engineers were appointed to assist the CoT in all aspects of flood management. During this process various areas were identified that pose a risk to infrastructure and more important to human lives. Priority areas were identified that require urgent flood remedial measures.

The project area extending along the Doornkloof Spruit from Danie Joubert Freeway (N1) to Botha Avenue was identified as an area requiring urgent attention. The current study area is situated in a residential area where a number of bridges/culvert road crossings were installed over a 1.5 km stretch of the Doornkloof Spruit, between the Danie Joubert Freeway (N1) and Botha Ave (refer to **Figure 1**).

A1:50 and 1:100 year floodline study was conducted in order to assess the properties and road crossings that are negatively affected by the floodlines. The floodlines were determined based on the existing watercourse condition, future land-use flood peaks and available surveys. The

study showed that the road crossings do not have enough capacity to handle the volume of water during bigger rainfall events. This, combined with the problems with the alignment of some of the bridges, results in the damming of water, which leads to flooding of adjacent properties. This causes a great risk to the infrastructure along the 1.5 km stretch. It is therefore of importance that the situation is addressed before significant damage to the affected infrastructure is caused.

Based on the most recent flood hazard assessment, the following properties are situated within the 1:50 and 1:100 year floodlines and are therefore vulnerable to flooding:

- Residential properties on the east of Tugela Avenue;
- The residential property on the corner of Jasper Avenue and Aster Avenue (Protea Street);
- Residential properties on the southern banks of Doornkloof Spruit, on the east of Sonja Street;
- Residential properties on both sides of Doornkloof Spruit, on the east of Glover Avenue; and
- Residential properties on the both sides of Doornkloof Spruit, between Glover Avenue and Jean Avenue.

The road crossings along the Doornkloof Spruit are not safe during flood conditions and do not comply with design standards and norms of the CoT, suggesting that roads should not cause a severe safety hazard during a 1:50 year flood event.



Culverts and Bridges on Sonja Street and Jasper Avenue Respectively

The following issues were identified:

- Significant overflow depth causing a very high safety risk is caused at Sonja Street, Zambezi Avenue, Koranna Avenue and Karin Avenue road crossings;
- A medium overflow depth is caused at the Jasper Avenue and Glover Avenue road crossings; and

DOORNKLOOF FLOOD REMEDIAL MEASURES

LOCALITY MAP

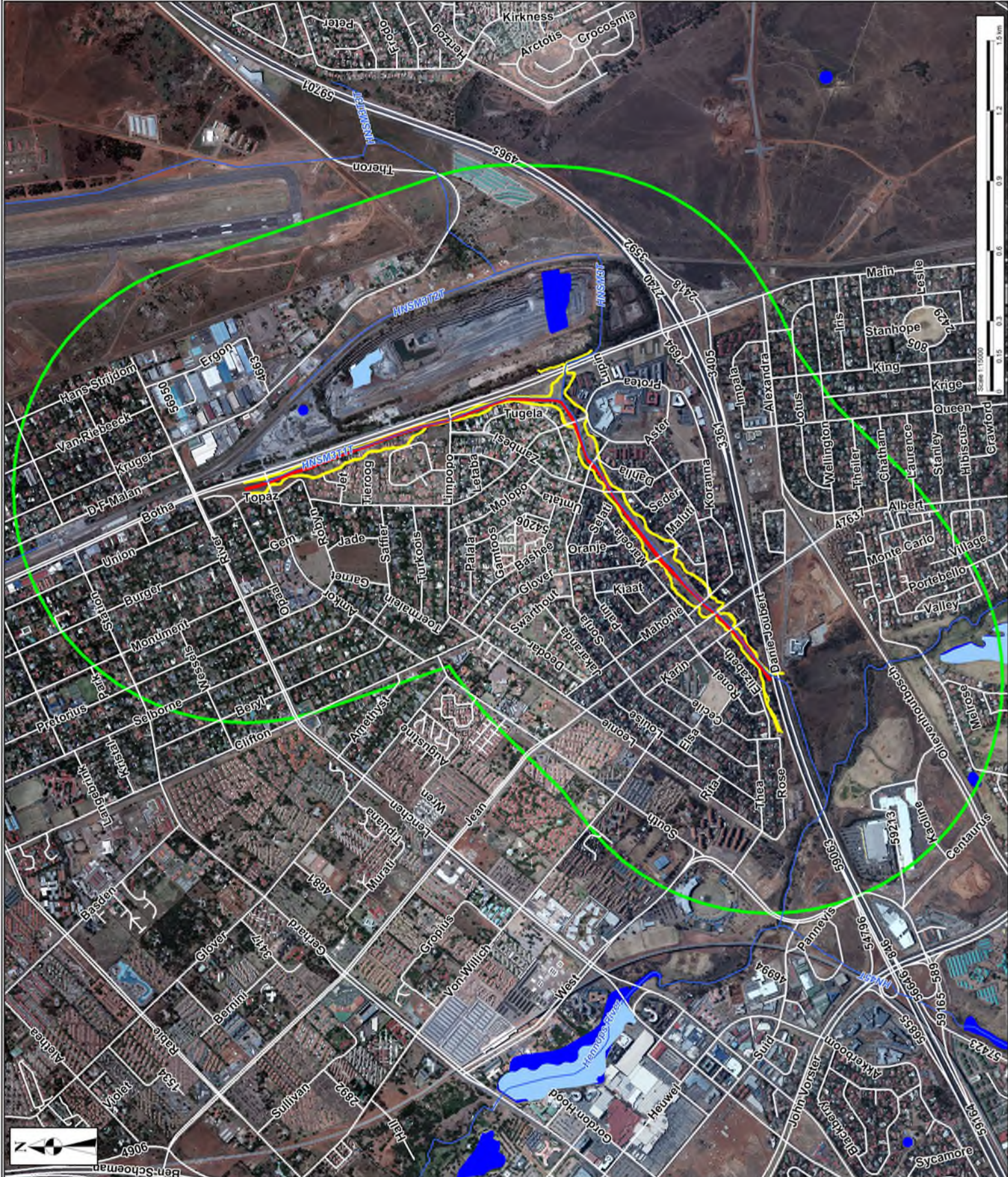
Legend

- SANBI Wetlands
- Dams
- Floodlines
- Project Area
- 1km Buffer
- Roads
- Rivers



SYSTEM: HARTEBEESSHOEK94

DATE: 24 FEBRUARY 2014



- A low overflow depth is caused at the Jean Avenue Road crossing.

A study based on the existing flooding problems was conducted to identify the remediation measure alternatives that could be used. The identified options are as follows:

- Option 0. Do Nothing (Status Quo).
- Option 1. Removal of Road crossings.
- Option 2. Earth Embankments Only and Drainage Pipes behind the embankment (No Road Crossing Upgrade).
- Option 3. Combination of Earth Embankments limited to 1.3 m height with Drainage Pipes behind the embankment and enlarging of road crossings.
- Option 4. Modify the existing road crossing to low level crossings.
- Option 5. Maximum Enlarging of Road Crossings.
- Option 6. Combination of Maximum Enlarging of Road crossings and lowest possible earth embankments.
- Option 7. Flood Peak Attenuation Only.

All the options investigated will also include a channel upgrade and an intake wall upstream of the existing Danie Joubert Freeway (N1) road crossing at the lower end of the Doornkloof Spruit.

An environmental screening was conducted and the identified remediation measures were classified in terms of their effectiveness in reducing the flooding risk and their associated environmental issues as follows:

- Remedial measures that are not viable;
- Remedial measures that are viable, but will not solve the whole problem; and
- Remedial measures that are considered to be viable.

The results from the ranking exercise are discussed below.

REMEDIAL MEASURES THAT ARE NOT VIABLE

- **Option 0: Do nothing (Status Quo):** The status quo option entails leaving the situation as it is. This option is not recommended as the existing properties are already within the floodline and thus there is a need for the remedial measures to be constructed to reduce the current flooding problems.
- **Option 1: Removal of Road Crossings:** The removal of road crossings was considered to be an impractical option due to issues concerning access to private property. This option will also result in increase in traffic in the remaining access roads. The option will also not solve the whole problem as there will still be areas along the Doornkloof Spruit where flooding will occur.
- **Option 4: Modify the existing road crossing to low level crossings:** For this option, the existing culvert heights would be decreased by 0.2 m hence decreasing the road level by 0.2 m. This option was classified as not feasible as it would require road profiles to be changed which would also make the crossing more dangerous during flooding events. The roads cannot be lowered by much due to the culverts that are close to the road soffit thereby resulting in minimal changes in flood levels along the development. Lowering the roads will mean that water will flow over the road and not under it creating road and traffic hazards. This option will not solve the problem as there will still be flooding on some of the properties. This option will therefore not be included in the impact assessment.
- **Option 7: Flood Peak Attenuation Only:** Three sites situated on the eastern side of Botha Avenue were identified as possible sites for flood peak attenuation dams. The study however, showed that option 7 does not attenuate the flood peaks sufficiently to reduce all flooding risks along the Doornkloof Spruit. It was furthermore observed that the proposed attenuation dams would be situated on Dolomitic ground which would cause sink holes and hence be not viable.

REMEDIAL MEASURES THAT ARE VIABLE BUT WILL NOT SOLVE THE WHOLE PROBLEM

- **Option 2: Earth Embankments Only and Embankment Drainage Pipes (No Road Crossing Upgrade):** Option 2 proposed that compacted earth embankments with heights between 1 and 1.8 m be constructed along the relevant reaches. The side slopes would be approximately 1:2. The embankment would need to be grassed for erosion protection. This option is considered to be a feasible option, though not one of the preferred options as it will result in visual, social and safety impacts. The option will also impact on the flow of water from behind the embankments and will result in ponding behind the embankment. This will therefore require pipes to drain the water behind the embankments.
- **Option 5: Maximum Enlarging of Road Crossings:** This option entailed the maximum enlarging of road crossings to handle the 1:50 year flood peak with a freeboard for the 1:100 year flood level. The road crossings were extended to the largest practical crossings. However, due to space constraints (height and width of the road), some of the road crossings still could not handle the 1:50 year flood peak. This option was considered to be feasible and would result in the reduction of the floodline to a fair degree. This option would however not solve the problem on its own and would also result in high construction footprint impacts.

VIABLE REMEDIAL MEASURES

- **Option 3: Combination of Earth Embankments limited to 1.3m with Embankment Drainage Pipes and enlarging of road crossings:** Some of the proposed earth embankments calculated for option 2 were too high and thus in order to reduce their heights, a combination of earth embankments and road crossing enlargement study was done. The Doornkloof area has sufficient space available for the construction of earth embankments along the river banks. For option 3, it was proposed that compacted earth embankments with minimum levels as between 1 and 1.3 m (with the highest height at the N1 of 1.7 m) be constructed along the relevant reaches. The side slopes will be approximately 1:2 and the embankment will be grassed for erosion protection. Drainage pipes or non-return valves would be positioned at the lowest level of the area to allow local Stormwater to drain away from the developments during minor rainfall events as well as after a major storm. Option 3 is considered a feasible alternative, with less visual impacts than option 2. This option can allow for lower embankments and the use of flat slopes and landscaping.
- **Option 6: Combination of Maximum Enlarging of Road crossings and lowest possible earth embankments:** Option 6 entails the maximum enlargement of road crossings and construction of earth embankments in section where the enlarged road crossings could still not handle the 1:50 year flood peaks. The compacted earth embankments with minimum levels (height ranging between 0.5 and 0.9 m, except at N1 where the height will be 1.7 m. Drainage pipes or non-return valves would need to be positioned at the lowest level of the area behind the embankments to allow local Stormwater to drain away from the developments during minor rainfall events as well as after a major storm. Option 6 was identified as the most preferred option as it

includes embankments in areas where enlarging of road crossings will not have an effect on. The footprints of the embankments will be low (less than 1 m in height). For this option, the existing bridges will not be removed, but additional culverts will be installed therefore the environmental impact is expected to be low. The velocity of the flowing water will be reduced, thereby preventing scouring and erosion of the river bed and banks.

ENVIRONMENTAL AUTHORISATIONS

The construction of the proposed flood remedial works at the Doornkloof Spruit requires an Environmental Authorisation from the Gauteng Department of Agriculture and Rural Development (GDARD) and a Water Use Licence from the Department of Water and Sanitation (DWS).

The proposed project triggers the following listed activities in terms of the EIA Regulations 2010:

- Section 11 of Regulation 544: The construction of infrastructure covering 50 square meters or more where such construction occurs within a watercourse or within 32 m of a watercourse
- Section 18 of Regulation 544: The infilling or depositing of any material of more than 5 cubic meters into a watercourse

The proposed activity also requires a Water Use Licence in terms of Section 21 of the National Water Act 1998 (Act 36 of 1998) for the following water uses:

- S 21 (c) impeding or diverting of the flow of water in a water course, and
- S 21 (i) the altering of beds, banks course or characteristics of a water course.



Figure 2: Affected Road Crossings on Zambezi and Glover Avenues

THE BASIC ASSESSMENT APPROACH

In terms of the EIA Regulations 2010, the Basic Assessment Process needs to be followed and this will include:

- Motivation for the construction of the flood remedial works,
- A draft Environmental Management Programme, and
- A Public Participation Process

A Basic Assessment Report (BAR) will be drafted in terms of the Environmental Impact Assessment Regulations (GN 543 of 2010) promulgated in terms of Section 24 (5) of NEMA and will include:

- Activity information,
- Description of the site and surrounding area,
- Public Participation, and
- Quantification of impacts associated with the activity.

THE WATER USE LICENCE APPLICATION APPROACH

The Water Use Licence Application process will be initiated once the Environmental Authorisation has been issued and will entail compilation of a technical report. The technical report will address but will not be limited to the following:

- The project description
- Status of the environment
- Impact on the water environment
- Mitigation measures to prevent, minimise or rehabilitate the impact on the surrounding environment.

THE PUBLIC PARTICIPATION PROCESS

The public participation process will be conducted by ILISO Consulting in accordance with Chapter 6 of the EIA Regulations, 2010.

In order to ensure that your concerns are considered during the basic assessment process you are invited to register as an interested and affected party by completing the attached registration form and submitting it to Ms Ndomupei Dhemba (details provided below) within **14 days (29 September 2014)** of receipt of this Background Information Document.

All issues and comments received during the public participation process will be captured in an Issues and Response Report. This report will be updated as the project commences and will form an appendix to the BAR and will be submitted to GDARD for authorisation.

The draft Basic Assessment Report will be made available to all stakeholders who have registered as an IAP for comment. The comments received will be incorporated into the final BAR, which will be made available to the IAPs to verify that all the issues and responses have been captured and adequately addressed in the report.



For further information please contact:

ILISO Consulting

Ndomupei Dhemba

Tel: 012 685 0900, Fax: 012 665 1886, Email: ndomupei@iliso.com

**APPLICATION FOR AN ENVIRONMENTAL AUTHORISATION
AND WATER USE LICENCE
PROPOSED FLOOD REMEDIAL MEASURES ON THE
DOORNKLOOF SPRUIT
Gaut:002/14-15/0094**

BACKGROUND INFORMATION DOCUMENT

Please complete and return to Ndomupe Dhemba at ILISO Consulting (Pty) Ltd by **29 September 2014**

PO Box 6873
Highveld
0169

Tel: 012 685 0900
Fax: 012 665 1886
E-mail: ndomupei@iliso.com

Title		First Name	
Initials		Surname	
Organisation			
Postal Address		Postal Code	
Street Address			
Tel Number		Fax Number	
Cell Number			
E-mail			

Comments: (You may use a separate sheet if necessary)

The following issues must be considered during this variation application.

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Please add the following individual(s) to your mailing list.

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We thank you for you participation!