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PROJECT 2011/3

**HERITAGE IMPACT ASSESSMENT REPORT: INSTALLATION
OF LONG-HAUL DARK FIBRE DUCTING INFRASTRUCTURE
ALONG THE N 2 BETWEEN DURBAN AND EAST LONDON,
KWA-ZULU NATAL AND EASTERN CAPE PROVINCES**



PREPARED FOR

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DATE: 11 February 2011

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EXECUTIVE SUMMARY

This report contains a heritage impact assessment investigation in accordance with the provisions of Sections 38(1) and 38(3) of the *National Heritage Resources Act (25/1999)*.

The project entails the installation of optical cable infrastructure ducting (dark fibre) between Durban and East London along the N 2 national road. Depending on local conditions the ducting may be installed on either side of the road.

The purpose of this report is to enable the relevant heritage authorities (SAHRA, Heritage Kwa-Zulu Natal and the Eastern Cape Heritage Resources Authority) to approve the proposed development as required in terms of Section 38 of the NHRA.

The aim of the investigation is to ensure that the needs of socio-economic development are balanced by the needs to preserve significant heritage resources by identifying possible impacts caused by installation work and recommending measures to manage such impacts.

The objectives of this report are:

- To survey the proposed duct corridor
- To identify and map heritage resources that may be affected directly and indirectly
- To assess the cultural significance of these heritage resources
- To assess the impact of the development on these heritage resources
- To assess the benefits of conserving these heritage resources in relationship to the socio-economic benefits of the development
- To provide the public with an opportunity to comment on the heritage aspects of the proposed development
- To consider alternatives if heritage resources will be affected in a negative manner
- To determine methods to mitigate negative impacts before, during and after construction activities

"Dark fibre" can be described as an optical fibre infrastructure which has been installed but is not being used. "Dark fibre" refers to unlit optical fibre. Fibre optic cable is the medium through which transmission equipment transmits data via light forms. As there is no light being transmitted in dark fibre it can be described as being "unlit". Dark fibre will comprise a ducting system capable of housing independent fibre strands which are commissioned on an "as required" basis by licensed operators. This dark fibre infrastructure should have sufficient capacity to cater for all the current and future requirements of all operators that may wish to provide services to customers on that particular route. The ducts are laid in trenches made through a system called micro-trenching, 60 – 150 mm wide and 160-450 mm deep, which are then covered by asphalt or soil (depending upon where they are laid) to reinstate the original surfaces. The size of the trenches and the installation process is designed to be done rapidly and to minimise any adverse impacts on the environment.

The ducts will be installed as follows:

- Overpasses: Horizontal directional drilling below the cross road formation will be employed for the installation of the ducts.
- Underpasses: The ducts will be routed through the base of the bridge parapets. Where this is not practical, horizontal drilling techniques will be employed to install the ducts under the cross road or railway line.
- River bridges and culverts: The crossing of riverbeds will be avoided. The ducts will be routed to pass over the bridge, using ducts in the bridge parapet, where available, or micro trenching in the surfaced shoulder of the road. In the case of conventional culverts (stormwater systems), the ducts will be routed to pass over the stormwater culvert barrel in the road side-fill where possible, or routed alongside the fill passed the bottom of the stormwater culvert.
- Interchanges and intersections: The duct will be routed along the outside boundary of the interchange precinct. In the case of at-grade intersections, the cable will be installed under the cross road by trenching or horizontal drilling, depending on traffic volumes.
- Urban areas: The ducts will be laid in trenches in the surfaced road sides or under the pavement.

The affected area is the N 2 with its medians (freeway section), road reserves, road verges, bridges, viaducts, over- and underpasses, toll plazas etc. As a cultural landscape this environment is a combination of historic farmland (rural areas), historic urban areas and historic rural villages.

The following “triggers” resulted in this HIA:

- Development longer than 300 meters
- Possibility of heritage resources along existing roads (memorial crosses and bridges older than 60 years)
- Possibility of buildings and structures older than 60 years in towns and villages

The HIA involves a thorough and focused assessment of mitigation and heritage impacts of the proposals, including the identification of appropriate management actions. It fulfils all the requirements of Section 38 (3) of the National Heritage Resources Act, namely the identification and mapping of heritage resources and the assessment of the significance thereof, an assessment of the positive and negative impacts of the proposals, the results of consultation with I&APs, the consideration of alternatives and plans for the mitigation of any adverse impacts.

The following method of work was applied:

- Desktop study using historic and contemporary 1:50 000 maps, published literature, previous unpublished reports for similar projects, Google Earth images
- Route survey. Special attention was given to anything of heritage significance in road reserves, historic structures in urban areas and the age of existing bridges.

Heritage impacts are categorised as:

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries
- Indirect impacts, e.g. restriction of access, gradual deterioration of heritage features due to ongoing vibration, dust etc or visual intrusion concerning the broader environment
- Cumulative impacts that are combinations of the above

The impacts of the proposed development **may** affect heritage features (e.g. memorial crosses) **during installation work**, in case of which the impacts may be direct and physical. The impact will not be indirect and cumulative (associated with the functioning of the system) since the cabling will be buried.

Heritage impacts (both direct and indirect) can be managed through one or a combination of the following measures:

- Mitigation (minimising adverse impacts through documentation and research before a feature is altered, destroyed or temporarily removed)
- Avoidance (by-passing a feature)
- Monitoring heritage features (that will be by-passed) during construction work (for this certain baseline information is needed as a monitoring benchmark)
- Compensation (balancing of making good the destruction of one heritage feature by the preservation of another one)
- Enhancement (positive impacts on heritage features, e.g. by fencing unprotected graves before construction)
- Rehabilitation (re-use of preserved heritage features)
- Interpretation (providing information on heritage features)
- Memorialisation (retaining the memory of important heritage features that have been destroyed)
- No action
- Relocation (historic equipment, graves)
- Alternatives

Of the above measures, “no action”, avoidance, monitoring and mitigation apply in the case of this project, depending on the type and locality of the heritage feature that may be affected.

This report complies as follows with the provisions of Section 38 (3) of the *National Heritage Resources Act* (Act 25 of 1999):

- (a) Identification and mapping of heritage resources
- (b) Cultural significance
- (c) Predicted impacts
- (f) Mitigation responses before construction

See below summarising table.

TABLE 1: Identification of heritage features, impacts and mitigation measures

The predicted impacts are determined by the location of the trench; in other words, if a heritage feature occurs on the western side of a road but trenching takes place on the opposite side, there will be no impact.

Heritage resource	(a)		(b)	(c)	(f)
	Site	GPS			
Buildings, structures, places and equipment of cultural significance	Langgewacht memorial cross (Section Harding-Kokstad)	30°30'19.98"S 29°37'38.28"E	Low local	Medium to neutral (depends on duct location)	Memorial cross on north side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Klipdrif Bridge (Section Harding-Kokstad)	30°33'54.74"S 29°28'26.98"E	Low local	Medium	Bridge built in 1945. Mitigation: Cable installation should be invisible, reversible and not seriously damage the bridge. Document (photograph) bridge sections before installation and photograph installation process. Prepare detailed design drawings that explain the cable installation method for purposes of authorisation by heritage authorities.
	Koppieskraal Bridge (Section Harding-Kokstad)	30°34'26.19"S 29°26'52.28"E	Low local	Medium	Bridge built in 1945. Mitigation: Cable installation should be invisible, reversible and not seriously damage the bridge. Document (photograph) bridge sections before installation and photograph installation process. Prepare detailed design drawings that explain the cable installation method for purposes of authorisation by heritage authorities.
	Bethswana Memorial (Section Kokstad-Mount Ayliff)	30°46'13.16"S 29°22'57.10"E	Low local	Medium to neutral (depends on duct location)	Memorial plinth on south side of N 2. Avoid and monitor if possible, otherwise mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Old shops and other buildings, main street, Mount Frere	-	Medium local	Low to neutral (depends on duct location)	Mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
	Mawusheni memorial cross (Section Mount Frere-Qumbu)	31°0'21.06"S 28°55'10.67"E	Low local	Medium to neutral (depends on duct location)	Memorial cross on north side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Mzike River memorial cross (Section Mount Frere-Qumbu)	31°9'1.44"S 28°52'2.28"E	Low local	Medium to neutral (depends on duct location)	Memorial cross on west side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Tsolo Commonage memorial (Section Qumbu-Mthatha)	31°19'44.25"S 28°48'23.85"E	Low local	Medium to neutral (depends on duct location)	T-shaped memorial, west side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	St John's Cathedral, Alexandria Street (Mthatha)	31°35'32.97"S 28°47'19.90"E	High local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage during trenching, installation and surface rehabilitation.

Heritage resource	(a)		(b)	(c)	(f)
	Site	GPS			
	Other old buildings, N2 and Alexandria street, (Mthatha)	-	Low local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
	Mandela House (Qunu)	31°48'20.65"S 28°36'20.95"E	High national	Outside duct corridor	50 m south of N 2. Ensure access during installation work.
	Dutywa Magistrate's Court	32° 5'56.31"S 28°18'16.34"E	Medium local	Outside duct corridor	1929 building, north side. Ensure access during installation.
	Dutywa Post Office	32° 5'57.46"S 28°18'18.20"E	Low local	Low to neutral (depends on duct location)	South of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to building during trenching, installation and surface rehabilitation.
	Dutywa War Memorial	32° 5'57.85"S 28°18'16.83"E	Medium local	Low to neutral (depends on duct location)	South of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to building during trenching, installation and surface rehabilitation.
	Dutywa Anglican Church	32° 5'57.36"S 28°18'14.77"E	Medium local	Low to neutral (depends on duct location)	North of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to building during trenching, installation and surface rehabilitation.
	Other old buildings (Dutywa)	-	Low local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
	Butterworth Monument	32°19'56.16"S 28° 8'42.22"E	High local	Low to neutral (depends on duct location)	North of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structure during trenching, installation and surface rehabilitation.
	Other old buildings (Butterworth)	-	Low local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
	Kei Pass memorial cross (Section Butterworth-Kei River)	32°24'52.31"S 27°59'3.47"E	Low local	Medium to neutral (depends on duct location)	Memorial cross on west side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Old Transkei Border Post (Kei River)	32°30'18.39"S 27°58'48.46"E	Low local	Low to neutral (depends on duct location)	Now Kei Ultra City. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
	East London memorial cross (Section N 6-Western Ave)	32°58'12.35"S 27°54'30.36"E	Low local	Medium to neutral (depends on duct location)	Memorial cross on north side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
Areas to which oral traditions are attached or which are associated with intangible heritage	Roadside memorials and historic buildings	-	-	Medium to neutral (depends on location of ducting)	See above for detailed recommendations.
Historical settlements and townscapes	Mount Frere, Mthatha, Dutywa, Butterworth	-	-	Neutral	No direct or visible impacts
Landscapes and natural features of cultural significance	None	-	-	-	-
Geological sites of scientific or cultural importance	None	-	-	-	-

Heritage resource	(a)		(b)	(c)	(f)
	Site	GPS			
Archaeological and palaeontological sites	None	-	-	-	Monitor for chance finds during trenching and installation
Graves and burial sites	Grave	31°10'0.69"S 28°51'59.69"E	Medium local	Neutral (depends on duct location)	Possible grave just south of Qumbu, outside road reserve. Avoid.
Other features associated with labour history	None	-	-	-	-
Movable objects	None	-	-	-	-

(d) Social and economic benefits

The development will have no direct benefits related to the conservation of heritage resources (structures) since none will be permanently affected.

The ducting infrastructure is capable of transporting far in excess of the anticipated traffic requirements of the South African telecommunications market over the next 20 years. Additional fibre can be installed and commissioned at short notice. Access to the ducting circuits is only possible via remotely controlled access points. The fibre optic circuits are dedicated to individual customers and spliced seamlessly between their sites, providing full control and physical separation from other client's services. New technology developments and innovations in transmission technology can be accommodated by customers upgrading their own equipment, without any changes to the infrastructure.

(e) Public consultation

This is part of the EIA process.

(g) Mitigation during construction

Except for monitoring of chance finds (foundations, unmarked burial sites, concentrations of objects, etc) during site preparation and construction work, no mitigation measures apply.

Findings

The anticipated impact on the identified structures as heritage resources will in general be low and reversible (where memorial crosses are affected) or neutral (where historic buildings and structures are affected). Although memorial crosses are illegal, they are an emerging part of the heritage landscape and have sentimental and emotional memories for people.

Bridges (often indicating the age of roads) were constructed between the early 1960s to the early 2000s and therefore fall outside the 60-year protection clause. The only exceptions are two 1945 bridges on the N 2 east of Kokstad, which are still in use. They fall under the protection of the Kwa-Zulu Natal Heritage Act (4 of 2008) and therefore special permission (Section 33) is required for alterations (the installation of a duct is a form of alteration). As part of the process of obtaining permission the client should be able to demonstrate that the installation of the duct will not seriously damage or affect the structure and that the duct should be removable.

There are no compelling reasons not to authorise the proposed ducting installation or fatal flaws that may go against it from a heritage perspective. There are also no compelling reasons to memorialise any heritage features since none will be permanently and negatively affected. The nature and significance of what has been found in terms of heritage is not of such importance that the proposed project should be suspended or stopped, or that alternatives for the proposed ducting route should be investigated.

Recommendations

It is recommended that the heritage agencies and authorities authorise the proposed development with the following conditions:

1. Site preparation activities must be monitored for the occurrence of any other archaeological material (concentrations of objects, bones, foundations etc) and similar hidden/buried chance finds. Special attention was paid to any unmarked graves in road reserves but none were observed. Should such chance finds be discovered, work should be suspended and an archaeologist should be requested to inspect the find site.
2. Where crosses and memorials in the road reserve are affected, the current situation must be photographed, then remove cross (and any plaques etc) before trenching and installation and replace afterwards during surface rehabilitation.
3. Where historic buildings and structures are affected, the current situation must be photographed/documentated before installation starts. Monitor damage (caused by vibrations, dust, flying debris etc) during trenching, installation and rehabilitation.
4. Where historic structures (such as 1945 bridges) may be directly affected, installation of the duct should not seriously damage or affect the structure and the duct should be removable. It may be necessary to prepare and submit special designs when such conditions are prevalent as part of the process of obtaining the necessary authorisations.
5. The above recommendations must be included in the Environment Management Programme for the proposed project.



RC DE JONG

Date: 23 September 2010

1. REPORT CONTEXT

1.1 General notes

1.1.1 Report structure

The structure of this report is based on:

- SOUTH AFRICAN HERITAGE RESOURCES AGENCY, Heritage Impact Assessment: Notification of intent to develop (form)
 - DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING, PROVINCIAL GOVERNMENT OF THE WESTERN CAPE, 2005, Guideline for involving heritage specialists in EIA processes (document)
 - DEPARTMENT OF ENVIRONMENT AFFAIRS AND TOURISM, Integrated Environmental Management Guidelines
 - SOUTH AFRICAN HERITAGE RESOURCES AGENCY, 2006, *Minimum standards: Archaeological and palaeontological components of impact assessment reports* (unpublished).
 - PROVINCIAL HERITAGE RESOURCES AUTHORITY GAUTENG, 2010, *Report requirements for HIA reports* (unpublished).
 - WORLD BANK, *Environmental Assessment Sourcebook Update No 8, September 1994: Cultural Heritage in Environmental Assessment*.
 - Best-practice HIA reports submitted by Cultmatrix and other heritage consultants
2. This report is informed by the *National Heritage Resources Act (25/1999)* (NHRA) and is consistent with the various ICOMOS charters for places of cultural significance.
 3. Recommendations contained in this application do not exempt the applicant from complying with any national, provincial and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA.
 4. Rights and responsibilities that arise from this report are those of the applicant and not that of the heritage consultant. The consultant assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report.
 5. The consultant assumes no responsibility whatsoever for any loss or damages that may be suffered as a direct or indirect result of information contained in this application. Any claim that may however arise is limited to the amount paid to the consultant for services rendered to compile this report.
 6. Although all possible care is taken to identify all sites of cultural importance during the survey of study areas, the nature of archaeological and historical sites are as such that it always is possible that hidden or subterranean sites could be overlooked during the study. The consultant will not be held liable for such oversights or for costs incurred as a result thereof.

1.1.2 Background and terms of reference

Dark Fibre Africa appointed Rock Environmental Consulting to conduct an environmental impact assessment and apply for environmental authorisation for a dark fibre optic duct that is proposed between Durban and East London.

The assessment of impacts in the Rock Environmental report is conducted in terms of National Environmental Management Act (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment (EIA) Regulations, as well as the EIA guidelines and other appropriate legislation (refer to Section 3).

Rock Environmental appointed RC de Jong to conduct a heritage impact assessment in terms of Section 38 of the National Heritage Resources Act.

1.2 Purpose of the report

1.2.1 Purpose of this report

The purpose of this report is to obtain comments from Rock Environmental and Dark Fibre Africa before submission to the heritage authorities.

1.2.2 Purpose of final report

After the clients have agreed with the contents of this report, it should be submitted to the below offices for comments, approval and authorisation, preferably including the results of any public participation in terms of the EIA.

Report category	Aim	Heritage authority office submitted to	Requested response
Screening	The aim of the screening investigation is to provide an informed heritage-related opinion about the proposed development by an appropriate heritage specialist. The objectives of this investigation are to screen potential heritage issues through a site inspection, to develop a broad understanding of heritage policy-related context, to review any existing data on the history and heritage significance of the site, to check if the site has any formal heritage status, to discuss the proposed development with heritage contacts and to scan the development proposals. The result of this investigation is a brief statement indicating potential heritage impacts/issues and the need for further investigation.	-	-
		-	-
		-	-
Scoping (basic assessment)	The aim of the scoping investigation is to analyse heritage issues and how to manage them within the context of the proposed development. The objectives are to assess heritage significance (involving site inspections and basic desktop and archival research); to identify the need for further detailed inputs by heritage specialists, to consult with local heritage groups and experts, to review the general compatibility of the development proposals with heritage policy and to assess the acceptability of the proposed development from a heritage perspective. The result of this investigation is a heritage scoping report indicating the presence/absence of heritage resources and how to manage them in the context of the proposed development.	-	-
		-	-
		-	-
Full HIA	The aim of the full HIA investigation is to analyse and recommend heritage management mitigation measures and monitoring programmes. The objectives are to analyse heritage issues, to research the chronology of the site and its role in the broader context, to undertake a comprehensive assessment of heritage significance, to analyse the nature and scale of the proposed development, to consult with local heritage groups and experts as part of the broader EIA stakeholder engagement process, to establish the compatibility of the proposed development with heritage and other statutory frameworks and to assess alternatives in order to promote heritage conservation issues.	Heritage Kwa-Zulu Natal (Amafa)	Approval
		Eastern Cape heritage resources authority	Approval
		-	-

1.3 History of the report

This HIA report is the first report for the proposed project.

The section between Gonubie and Mthatha was the subject of another HIA investigation (2008) in connection with the EIA for the proposed Wild Coast Toll Road. Information from this report is included where relevant in this HIA report.

1.4 Legal context of the report

TABLE 2: Applicable category of heritage impact assessment study and report

ACT	COMPONENT	IMPLICATION	RELEVANCE	COMPLIANCE
NHRA	S 34	Impacts on buildings and structures older than 60 years	Historic buildings	Permanent alteration to structure older than 60 years must be approved in terms of NHRA Section 34
	S 35	Impacts on archaeological and palaeontological heritage resources	Chance finds in Eastern Cape	Approval for sampling, excavation and destruction by SAHRA
	S 36	Impacts on graves	Identified grave will be avoided	Approval for sampling, excavation, exhumation and destruction by SAHRA
	S 37	Impacts on public monuments	Butterworth Monument, Ditywa War Memorial	Any alterations to be approved by the local authority
	S 38	Developments requiring an HIA	Development is listed activity	Full HIA
NEMA	EIA Regulations	Activities requiring an EIA	Development is subject to an EIA	HIA is part of EIA
KwaZulu-Natal Heritage Act	S 33	Impacts on buildings and structures older than 60 years	Old bridges in KZN	Approval for permanent alterations by Amafa
KwaZulu-Natal Heritage Act	S 34-36	Impacts on archaeological and palaeontological heritage resources, as well as on burial sites	Chance finds in KZN	Approval for sampling, excavation, exhumation and destruction by Amafa

1.5 Benefits of the proposed project

The ducting infrastructure is capable of transporting far in excess of the anticipated traffic requirements of the South African telecommunications market over the next 20 years. Additional fibre can be installed and commissioned at short notice. Access to the ducting circuits is only possible via remotely controlled access points. The fibre optic circuits are dedicated to individual customers and spliced seamlessly between their sites, providing full control and physical separation from other client's services. New technology developments and innovations in transmission technology can be accommodated by customers upgrading their own equipment, without any changes to the infrastructure.

This project is in line with the vision and mission of the Presidential National Commission on the Information Society and Development.

1.6 Development criteria in terms of Section 38 of the NHRA

1.6	Development criteria in terms of Section 38(1)	Yes/No details
1.6.1	Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	Yes
1.6.2	Construction of bridge or similar structure exceeding 50m in length	No
1.6.3	Development exceeding 5000 sq m	No
1.6.4	Development involving three or more existing erven or subdivisions	No
1.6.5	Development involving three or more erven or divisions that have been consolidated within past five years	No
1.6.6	Rezoning of site exceeding 10 000 sq m	No
1.6.7	Any other development category, public open space, squares, parks, recreation grounds	No

1.7 Property details

1.7	Property details	
1.7.1	Name and location of affected properties	Road reserves and bridges: • N2 between Durban and East London
1.7.2	Erf or farm numbers	-
1.7.3	Magisterial districts	Various

1.7	Property details	
1.7.4	Affected towns	Durban, Port Shepstone, Harding, Mount Frere, Mthatha, Dutywa, Butterworth, East London
1.7.5	Local authority	Various
1.7.5	Current use	Transport
1.7.5	Current zoning	Transport
1.7.5	Predominant land use of surrounding properties	Farming, industrial, residential, commercial, transport, vacant
1.7.9	Total length of project	632 km

1.8 Property owner

1.8	Property owner	
1.8.1	Name and contact address	SANRAL and local authorities
1.8.2	Telephone number	
1.8.3	Fax	
1.8.4	E-mail	

1.9 Implementing Agent/Developer

1.9	Implementing Agent/Developer	
1.9.1	Name and contact address of representative	Dark Fibre Africa (Pty) Ltd, 55 Regency Drive, Route 21 Corporate Park, Nellmapius Drive, Irene
1.9.2	Telephone number	(012) 345-7540
1.9.3	Fax	(012) 345-7606
1.9.4	E-mail	regulatory@dfafrica.co.za

1.10 Environmental specialist

1.10	Environmental Specialist	
1.10.1	Name and contact address	Pieter van der Merwe, Rock Environmental Consulting (Pty) Ltd, PO Box 40541, Moreleta Park 0044
1.10.2	Telephone number	(012) 997 4742
1.10.3	Fax	(012) 997 0415
1.10.4	E-mail	rockec@lantic.net

1.11 Heritage impact assessment practitioners

1.11	Specialist (1)	
1.11.1	Name and contact address	Dr RC de Jong (formerly of Cultmatrix cc), PO Box 12013, Queenswood 0121, Pretoria
1.11.2	Qualifications and field of expertise	PhD (Cultural History) UP (1990), Post-Graduate Museology Diploma UP (1979), generalist heritage management specialist with experience in museums and heritage since 1983
1.11.3	Relevant experience	DFA Somerset West- East London HIA (2010)
1.11.4	Telephone number	(082) 577-4741
1.11.5	Fax number	(086) 612-7383
1.11.6	E-mail	cultmat@iafrica.com

2. DEVELOPMENT CONTEXT

2.1 Development site/area location

This report deals with the installation of a fibre optic cable duct (dark fibre) between Durban and East London along the N2 national road.

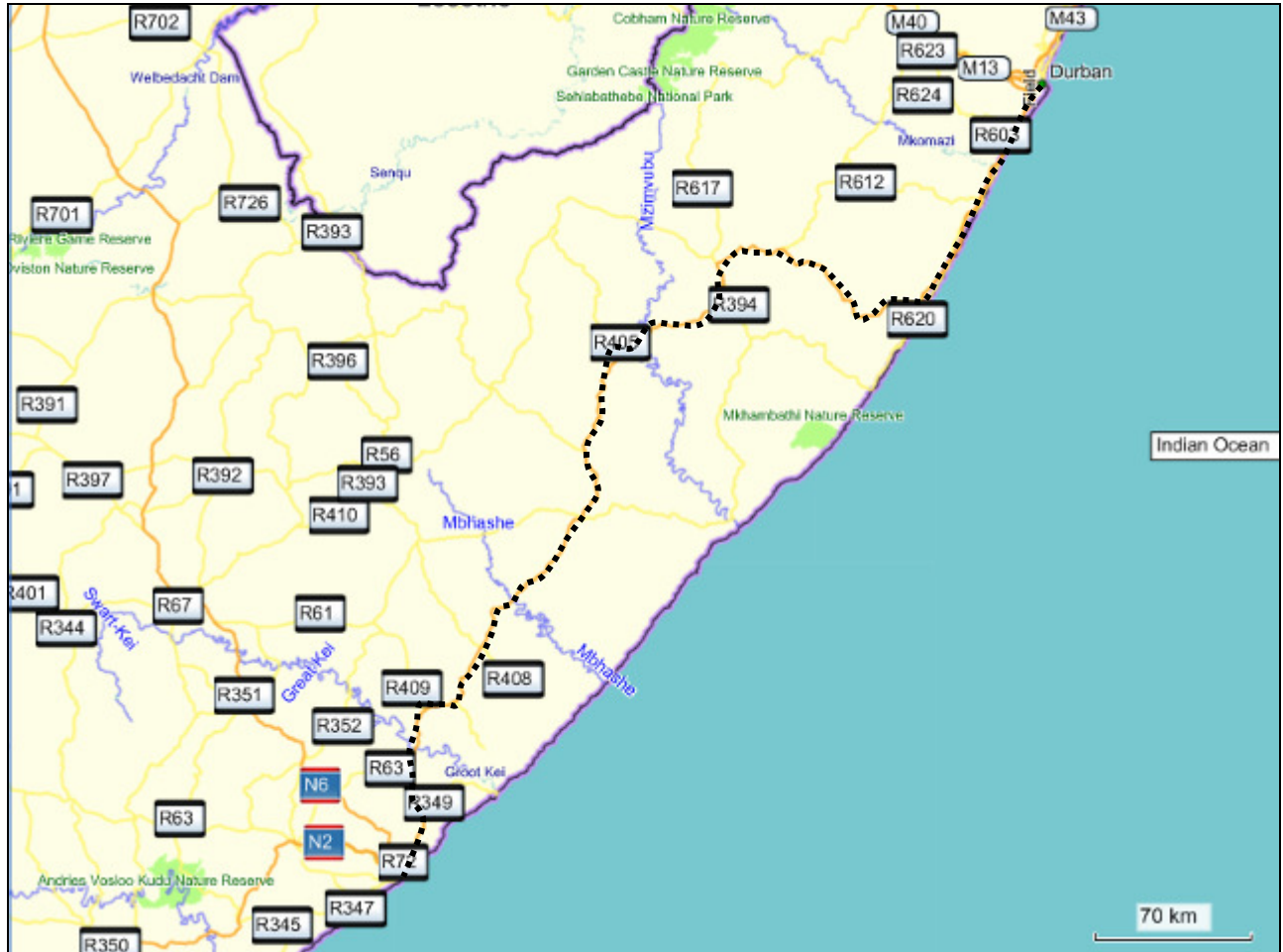


FIGURE 1: N2 route between Durban and East London

2.2 Description of distinguishing features

2.2.1 Environmental features

The project is located in a transportation environment that has been transformed through road-making and other activities and has left few features of natural significance, except for rivers.

2.2.2 Heritage features

TABLE 3: Heritage features that may be affected

S 3(2) NHRA heritage resource	Identification of heritage resources	
	Development site	Components
Buildings, structures, places and equipment of cultural significance	Towns, villages, roadside memorials	Old bridges, mountain passes, freeways, roads, urban areas, memorial crosses, etc. There are no formally protected sites.
Areas to which oral traditions are attached or which are associated with intangible heritage	Entire route	Roadside memorials and historic buildings

S 3(2) NHRA heritage resource	Identification of heritage resources	
	Development site	Components
Historical settlements and townscapes	All	Commercial farms along the N 2 between East London and the Great Kei River. Small development nodes clustered around small towns and villages between Great Kei River and the border with Kwa-Zulu Natal. Commercial farms, plantations and towns between the border and Durban. There are no formally protected areas.
Landscapes and natural features of cultural significance	None	-
Geological sites of scientific or cultural importance	None	-
Archaeological and palaeontological sites	None	Low risk of chance finds during trenching activities
Graves and burial grounds	Grave near Qumbu (just outside road reserve)	Low risk of finding burial sites hidden by vegetation and soil during trenching activities
Areas of significance related to labour history	None	-
Movable objects	None	-

2.2.3 Description of corridor/route

The affected area is the N 2 with its medians (freeway section), road reserves, road verges, bridges, viaducts, over- and underpasses, toll plazas etc. As a cultural landscape this environment is a combination of historic farmland (rural areas), historic urban areas and historic rural villages.

The road alignments in relationship to existing and potential heritage features can be described as follows:

- Between Durban and Port Shepstone the N 2 follows a new alignment, consisting of a dual-carriage freeway, constructed between 1969 and 1978. Sections near Port Shepstone were upgraded in 1992. The implication is that the road corridor is a recently transformed and sterile landscape in which no original heritage features of significance would have remained.
- Between Port Shepstone and East London the N 2 follows an alignment of existing provincial and local roads that was already proposed as a national route in 1936. By 1946 the sections between Kokstad and Dutwya had been upgraded. After 1969 a bypass around Harding was opened. Historic 1:50 000 maps indicate that most sections in the former Transkei were upgraded after 1982, which included the replacement of old girder bridges across the Bashee, Tsitsa and Tina rivers. Further upgrades (near the Kei River) took place in the late 1990s. Near East London the N 2 becomes a dual carriage freeway, constructed in 1970-1971. The implication is that the road corridor is a historically transformed and sterile landscape in which no original heritage features of significance would have remained. Road construction resulted in the creation of new heritage features such as bridges, culverts and viaducts.

It is possible that heritage features are potentially covered by soil and vegetation and may only be located during the installation phase. However, as stated above, the presence of any such features is considered unlikely given the road construction and upgrading activities that have taken place to date over a period of more than 60 years.

2.3 Development description

2.3	Development description	
2.3.1	Nature of proposed development	Fibre optic cable duct (more details below)
2.3.2	Possible impacts on heritage value of sites and contents	Neutral (no impact) to low temporary negative (during construction work)
2.3.3	Structures older than 60 years affected by proposed development	Old bridges east of Kokstad (directly), historic buildings (indirectly depending on location of duct and proximity to building)
2.3.4	Rezoning or change of land use	No
2.3.5	Construction work	Yes
2.3.6	Total floor area of proposed development	-

2.3	Development description	
2.3.7	Extent of land coverage of development	-
2.3.8	Earth moving and excavation	Micro-trenching
2.3.9	Number of storeys	Immaterial
2.3.10	Maximum height above ground level	Immaterial
2.3.11	Monetary value development	-
2.3.12	Time frames	Urgent

"Dark fibre" can be described as an optical fibre infrastructure which has been installed but is not being used. "Dark fibre" refers to unlit optical fibre. Fibre optic cable is the medium through which transmission equipment transmits data via light forms. As there is no light being transmitted in dark fibre it can be described as being "unlit". Dark fibre will comprise a ducting system capable of housing independent fibre strands which are commissioned on an "as required" basis by licensed operators. This dark fibre infrastructure should have sufficient capacity to cater for all the current and future requirements of all operators that may wish to provide services to customers on that particular route. The ducts are laid in trenches made through a system called micro-trenching, 60 – 150 mm wide and 160-450 mm deep, which are then covered by asphalt or soil (depending upon where they are laid) to reinstate the original surfaces. The size of the trenches and the installation process is designed to be done rapidly and to minimise any adverse impacts on the environment.

The ducts will be installed as follows:

- Overpasses: Horizontal directional drilling below the cross road formation will be employed for the installation of the ducts.
- Underpasses: The ducts will be routed through the base of the bridge parapets. Where this is not practical, horizontal drilling techniques will be employed to install the ducts under the cross road or railway line.
- River bridges and culverts: The crossing of riverbeds will be avoided. The ducts will be routed to pass over the bridge, using ducts in the bridge parapet, where available, or micro trenching in the surfaced shoulder of the road. In the case of conventional culverts (stormwater systems), the ducts will be routed to pass over the stormwater culvert barrel in the road side-fill where possible, or routed alongside the fill passed the bottom of the stormwater culvert.
- Interchanges and intersections: The duct will be routed along the outside boundary of the interchange precinct. In the case of at-grade intersections, the cable will be installed under the cross road by trenching or horizontal drilling, depending on traffic volumes.
- Urban areas: The ducts will be laid in trenches in the surfaced road sides or under the pavement.



FIGURE 2: Freeway landscape near Scottburgh



FIGURE 3: N 2 landscape west of Port Shepstone



FIGURE 4: N 2 landscape near Kokstad



FIGURE 5: N 2 landscape at Eastern Cape border



FIGURE 6: N 2 crossing the Mzimvubu River



FIGURE 7: N 2 entering Mount Frere from the east



FIGURE 8: N 2 approach to Mthatha from the east



FIGURE 9: N 2 landscape between Mthatha and Dutywa



FIGURE 10: N 2 approach to Dutywa from the east



FIGURE 11: N2 approach to Butterworth from the east



FIGURE 12: Great Kei Bridge landscape



FIGURE 13: N2 landscape near Gonubie



FIGURE 14: Dual-carriage freeway near East London

3. HERITAGE IMPACT CONTEXT

3.1 Cultural landscape evidence

TABLE 4: Cultural landscape classification

HERITAGE LANDSCAPE CONTEXT	ELEMENTS	EVIDENCE
A. PALAEOONTOLOGICAL LANDSCAPE CONTEXT	Fossil remains. Such resources are typically found in specific geographical areas, e.g. the Karoo and are embedded in ancient rock and limestone/calcrete formations.	None
B. ARCHAEOLOGICAL LANDSCAPE CONTEXT	Archaeological remains dating to the following periods: <ul style="list-style-type: none"> • Early Stone Age • Middle Stone Age • Late Stone Age • Early Iron Age • Late Iron Age • Historical 	None
C. HISTORICAL BUILT URBAN LANDSCAPE CONTEXT	<ul style="list-style-type: none"> • Historical townscapes/streetscapes • Historical structures; i.e. older than 60 years • Formal public spaces • Formally declared urban conservation areas • Places associated with social identity/displacement 	None
D. HISTORICAL FARMLAND CONTEXT	These possess distinctive patterns of settlement and historical features such as: <ul style="list-style-type: none"> • Historical farm werfs • Historical farm workers villages/settlements • Irrigation furrows • Tree alignments and groupings • Historical routes and pathways • Distinctive types of planting • Distinctive architecture of cultivation e.g. planting blocks, trellising, terracing, ornamental planting. 	None
E. HISTORICAL RURAL TOWN CONTEXT	<ul style="list-style-type: none"> • Historical mission settlements • Historical townscapes 	Yes
F. PRISTINE/NATURAL LANDSCAPE CONTEXT	<ul style="list-style-type: none"> • Historical patterns of access to a natural amenity • Formally proclaimed nature reserves • Evidence of pre-colonial occupation • Scenic resources, e.g. view corridors, viewing sites, visual edges, visual linkages • Historical structures/settlements older than 60 years • Pre-colonial or historical burial sites • Geological sites of cultural significance. 	None
G. RELIC LANDSCAPE CONTEXT	<ul style="list-style-type: none"> • Past farming settlements • Past industrial sites • Abandoned and working mines • Places of isolation related to attitudes to medical treatment • Battle sites • Sites of displacement, 	Remains of farm buildings, infrastructure, planted vegetation, crops
H. BURIAL GROUND & GRAVE SITE CONTEXT	<ul style="list-style-type: none"> • Pre-colonial burials (marked or unmarked, known or unknown) • Historical graves (marked or unmarked, known or unknown) • Human remains (older than 100 years) • Associated burial goods (older than 100 years) • Burial architecture (older than 60 years) 	None

HERITAGE LANDSCAPE CONTEXT	ELEMENTS	EVIDENCE
I. ASSOCIATED LANDSCAPE CONTEXT	<ul style="list-style-type: none"> Sites associated with living heritage e.g. initiation sites, harvesting of natural resources for traditional medicinal purposes Sites associated with displacement & contestation Sites of political conflict/struggle Sites associated with an historic event/person Sites associated with public memory 	None
J. HISTORICAL FARM WERF CONTEXT	<ul style="list-style-type: none"> Setting of werf and its context Composition of structures Historical/architectural value of individual structures Tree alignments Views to and from Axial relationships System of enclosure, e.g. werf walls Systems of water reticulation and irrigation, e.g. furrows Sites associated with slavery and farm labour Colonial period archaeology 	None
K. HISTORICAL INSTITUTIONAL LANDSCAPE CONTEXT	<ul style="list-style-type: none"> Historical prisons Hospital sites Historical school/reformatory sites Military bases Roads 	Yes
L. SCENIC/VISUAL	<ul style="list-style-type: none"> Scenic routes 	None
K. AMENITY LANDSCAPE CONTEXT	<ul style="list-style-type: none"> View sheds View points Views to and from Gateway conditions Distinctive representative landscape conditions Scenic corridors 	

3.2 Determining levels of sensitivity and potential impacts

Sensitivity is the ability of a cultural landscape (or heritage resource) to absorb changes or adapt to changes whilst maintaining an acceptable degree of cultural significance.

Within the context of this study, levels of sensitivity can generally be associated with certain classes or categories of cultural landscapes as tabulated below.

TABLE 5: Relationship between cultural landscape classes and levels of sensitivity

CATEGORY	DESCRIPTION	EVIDENCE
A	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources	No
B	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources	No
C	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources	No
D	Of little or no intrinsic, associational or contextual heritage value due to disturbed, degraded conditions or extent of irreversible damage	Yes

3.3 Determining potential impacts

TABLE 6: Categories of development types

CATEGORY	ONE OR MORE ELEMENTS	EVIDENCE
A: Minimal intensity development	<ul style="list-style-type: none"> • No rezoning involved; within existing use rights • No subdivision involved • Upgrading of existing infrastructure within existing envelopes • Minor internal changes to existing structures • New building footprints limited to less than 1000m2 	Fibre optic cable duct installation in covered trench etc
B: Low-intensity development	<ul style="list-style-type: none"> • Spot rezoning with no change to overall zoning of a site • Linear development less than 100m • Building footprints between 1000m2-2000m2 • Minor changes to external envelop of existing structures (less than 25%) • Minor changes in relation to bulk and height of immediately adjacent structures (less than 25%). 	No
C: Moderate intensity development	<ul style="list-style-type: none"> • Rezoning of a site between 5000m2-10 000m2 • Linear development between 100m and 300m • Building footprints between 2000m2 and 5000m2 • Substantial changes to external envelop of existing structures (more than 50%) • Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 50%) 	No
D: High intensity development	<ul style="list-style-type: none"> • Rezoning of a site in excess of 10 000m2 • Linear development in excess of 300m • Any development changing the character of a site exceeding 5000m2 or involving the subdivision of a site into three or more even • Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 100%) 	No

3.4 Expected impact significance

TABLE 7: Expected impact significance matrix

HERITAGE CONTEXT	TYPE OF DEVELOPMENT			
	CATEGORY A	CATEGORY B	CATEGORY C	CATEGORY D
A: High heritage value	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected	Very high heritage impact expected
B: Medium to high heritage value	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected
C: Medium to low heritage value	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected
D: Low heritage value	Little or no heritage impact expected	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected

In terms of the above matrix, the predicted or anticipated impact of the proposed development on heritage features (in particular those that may be discovered as chance finds) will be low to neutral.

4. HERITAGE IMPACT ASSESSMENT

4.1 Approach

4.1.1 Definitions and assumptions

The following aspects have a direct bearing on the investigation and the resulting report:

- *Cultural (heritage) resources* are all non-physical and physical human-made occurrences, as well as natural occurrences that are associated with human activity. These include all sites, structures and artefacts of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development.
- The *cultural significance* of sites and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.
- The *value* is related to concepts such as *worth, merit, attraction or appeal*, concepts that are associated with the (current) usefulness and condition of a place or an object. Hence, in the development area, there are instances where elements of the place have a high level of significance but a lower level of value.
- It must be kept in mind that significance and value are not mutually exclusive, and that the evaluation of any feature is based on a combination or balance between the two.
- Isolated occurrences: findings of artefacts or other remains located apart from archaeological sites. Although these are noted and samples are collected, it is not used in impact assessment and therefore do not feature in the report.
- Traditional cultural use: resources which are culturally important to people.
- All archaeological remains, artificial features and structures older than 100 years and historic structures older than 60 years are protected by the relevant legislation, in this case the National Heritage Resources Act (NHRA) (Act No. 25 of 1999). No archaeological artefact, assemblage or settlement (site) and no historical building or structure older than 60 years may be altered, moved or destroyed without the necessary authorisation from the South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority. Full cognisance is taken of this Act in making recommendations in this report.
- The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3, and the Australian ICOMOS Charter (also known as the Burra Charter) are used when determining the cultural significance or other special value of archaeological or historical sites.
- It should be kept in mind that archaeological deposits usually occur below ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted, and it would be required that the heritage consultants would be required to be notified in order for an investigation and evaluation of the find(s) to take place (*cf.* NHRA (Act No. 25 of 1999), Section 36 (6)).

4.1.2 Limiting/Restricting factors

The investigation has been influenced by the following factors related to the overall HIA:

- Difficulty in establishing intangible heritage values
- Unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence)
- Due to high traffic volumes, dangerous road conditions at places and narrow road verges it was not possible to stop at some of the identified heritage features.

4.1.3 Field work

- Route survey. Special attention was given to anything of significance in road reserves, historic structures in urban areas and the age of existing bridges.

4.1.4 Desktop study

- Published literature
- Unpublished reports
- Historic and current 1:50 000 maps
- Google Earth images

4.2 General issues of site and context

4.2.1 Context		
	<i>(check box of all relevant categories)</i>	<i>Brief description/explanation</i>
X	Urban environmental context	<ul style="list-style-type: none"> • Roads • Buildings • Vacant land • Farms • Towns and villages • Rivers • Hills and mountains • Passes
X	Rural environmental context	
x	Natural environmental context	
Formal protection (NHRA)		
	Is the property part of a protected area (S. 28)?	No
	Is the property part of a heritage area (S. 31)?	No
Other		
	Is the property near to or visible from any protected heritage sites?	No
	Is the property part of a conservation area or special area in terms of the Zoning Scheme?	No
x	Does the site form part of a historical settlement or townscape?	Yes
x	Does the site form part of a rural cultural landscape?	Yes
x	Does the site form part of a natural landscape of cultural significance?	Yes
x	Is the site within or adjacent to a scenic route?	Sections of N2, e.g. Great Kei River Pass
x	Is the property within or adjacent to any other area which has special environmental or heritage protection?	Possibly sections of the N 2 affecting rivers and wetlands
x	Does the general context or any adjoining properties have cultural significance?	Yes: Historic farms, towns, infrastructure etc.

4.2.2 Property features and characteristics		
	<i>(check box if YES)</i>	<i>Brief description</i>
x	Have there been any previous development impacts on the property	Yes: Road and freeway construction since the 1940s
x	Are there any significant landscape features on the property?	Mountain passes
	Are there any sites or features of geological significance on the property?	No

	Does the property have any rocky outcrops on it?	No
x	Does the property have any fresh water sources (springs, streams, rivers) on or alongside it?	Yes
	Does the property have any sea frontage?	No
	Does the property form part of a coastal dune system?	No
	Are there any marine shell heaps or scatters on the property?	No
	Is the property or part thereof on land reclaimed from the sea?	No

4.2.3 Heritage resources on the property		
	<i>(check box if present on the property)</i>	<i>Name / List / Brief description</i>
Formal protections		
	National heritage site	No
	Provincial heritage site	No
	Provisional protection	No
	Place listed in heritage register	No
General protections (NHRA)		
x	structures older than 60 years	Adjacent to route, old N 2 bridges east of Kokstad
	archaeological site or material	No
	palaeontological site or material	No
x	graves or burial grounds	Grave outside Qumbu
x	public monuments or memorials	Yes: Memorial crosses
Other		
	Any heritage resource identified in a heritage survey (state author and date of survey and survey grading/s)	No
	Any other heritage resources (describe)	No

4.2.4 Property history and associations		
	<i>(check box if YES)</i>	<i>Brief description/explanation</i>
x	Provide a brief history of the property (e.g. when granted, previous owners and uses).	See Appendix 1
x	Is the property associated with any important persons or groups?	Yes
x	Is the property associated with any important events, activities or public memory?	Vehicle transport since the 1930s
	Does the property have any direct association with the history of slavery?	No
	Is the property associated with or used for living heritage?	No
x	Are there any oral traditions attached to the property?	Possible

4.3 Affected heritage resources, significance, possible impacts and possible mitigation measures

4.3.1 General

Alteration of destruction of places, buildings, structures and equipment

Most, if not all, of the buildings in the urban areas affected indirectly by the proposed project are younger than sixty years, and do not constitute heritage resources of significance. There are also a large (as yet uncounted) number of households living on the borders of the proclaimed road reserve, comprising informal residences. These structures and buildings will not be directly affected by the proposed project. Few of these structures constitute heritage resources older than sixty years, or with other heritage significance. Those buildings that are definitely older than 60 years and/or have special heritage significance are discussed in Section 4.3.3 below.

Destruction or alteration of places to which oral traditions are attached or which are associated with living heritage

There are a large (as yet uncounted) number of households living on the borders of the proclaimed road reserve. These people will not be directly affected. In contrast, some of the roadside memorials may be affected by the proposed project, although temporarily. These are discussed in Section 4.3.2 below.

Destruction or alteration of historical settlements and townscapes

Direct effects of the proposed project on the historical townscapes of Mount Frere, Mthatha, Dutywa and Butterworth will be minimal. The effects would be limited to CBDs, but the sense of place of the CBD would not be altered significantly and permanently.

Destruction or alteration of landscapes and natural features

The landscape affected by the proposed project is dominated by the Kwa-Zulu Natal coastal zone and the Eastern Cape interior. Both are considered landscapes or natural feature with cultural significance for their aesthetic, historical and scientific values. Because the ducting will be located sub-surface, these landscapes will not be affected indirectly (aesthetically or visually).

Destruction or alteration of geological sites of scientific or cultural importance

No specific geological sites of scientific or cultural importance occur in the project area and the cable duct (which will be located sub-surface) will not directly and indirectly affect the geological landscape.

Destruction or alteration of archaeological and palaeontological sites

Due to the fact that the road reserve represents a sterile environment that has been created over a period of more than 60 years, it is unlikely that significant archaeological or palaeontological sites will be affected.

Destruction or alteration of graves and burial grounds

It is possible that unmarked ancestral graves are located within or adjacent to the proclaimed road reserve, associated with the informal settlement of households in the more rugged and mountainous sections of the Eastern Cape. Graves, both marked and unmarked, could also be located outside of proclaimed cemeteries. The oldest editions of 1:50 000 maps indicated a grave or burial site just outside Qumbu (Section 4.3.4), but the exact whereabouts could not be verified.

Destruction or alteration of sites of significance relating to the history of slavery or labour in South Africa

There are no records for sites of special significance relating to the history of slavery or labour in South Africa along the N 2. Accordingly, it is highly unlikely that any heritage resources in this category will be affected by any of the proposed project.

4.3.2 Roadside memorials

TABLE 8: Roadside memorials identification and impact management

Heritage resource	(a)		(b)	(c)	(f)
	Site	GPS			
Buildings, structures, places and equipment of cultural significance	Langgewacht memorial cross (Section Harding-Kokstad)	30°30'19.98"S 29°37'38.28"E	Low local	Medium to neutral (depends on duct location)	Memorial cross on north side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Betshwana Memorial (Section Kokstad-Mount Ayliff)	30°46'13.16"S 29°22'57.10"E	Low local	Medium to neutral (depends on duct location)	Memorial plinth on south side of N 2. Avoid and monitor if possible, otherwise mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Mawusheni memorial cross (Section Mount Frere-Qumbu)	31°0'21.06"S 28°55'10.67"E	Low local	Medium to neutral (depends on duct location)	Memorial cross on north side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Mzike River memorial cross (Section Mount Frere-Qumbu)	31°9'1.44"S 28°52'2.28"E	Low local	Medium to neutral (depends on duct location)	Memorial cross on west side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Tsolo Commonage memorial (Section Qumbu-Mthatha)	31°19'44.25"S 28°48'23.85"E	Low local	Medium to neutral (depends on duct location)	T-shaped memorial, west side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Kei Pass memorial cross (Section Butterworth-Kei River)	32°24'52.31"S 27°59'3.47"E	Low local	Medium to neutral (depends on duct location)	Memorial cross on west side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	East London memorial cross (Section N 6-Western Ave)	32°58'12.35"S 27°54'30.36"E	Low local	Medium to neutral (depends on duct location)	Memorial cross on north side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.



FIGURE 15: Mzike River memorial cross

Table 9: Roadside memorials impact assessment

CRITERIA	IMPACT			
	CONSTRUCTION		OPERATION	
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent	On site	On site	Immaterial	Immaterial
Duration	Long-term	Temporary	Immaterial	Immaterial
Intensity	High	Low	Immaterial	Immaterial
Probability	Probable	Probable	Immaterial	Immaterial
Significance	Medium	Low	Immaterial	Immaterial
Status	Negative	Neutral	Immaterial	Immaterial
Confidence	High	High	Immaterial	Immaterial

4.3.3 Historic buildings and structures

TABLE 10: Identification and impact management of historic buildings and structures

Heritage resource	(a)		(b)	(c)	(f)
	Site	GPS			
Klipdrif Bridge (Section Harding-Kokstad)		30°33'54.74"S 29°28'26.98"E	Low local	Medium to low	Bridge built in 1945. Mitigation: Cable installation should be invisible, reversible and not seriously damage the bridge. Document (photograph) bridge sections before installation and photograph installation process. Prepare detailed design drawings that explain the cable installation method for purposes of authorisation by heritage authorities.
Koppieskraal Bridge (Section Harding-Kokstad)		30°34'26.19"S 29°26'52.28"E	Low local	Medium to low	Bridge built in 1945. Mitigation: Cable installation should be invisible, reversible and not seriously damage the bridge. Document (photograph) bridge sections before installation and photograph installation process. Prepare detailed design drawings that explain the cable installation method for purposes of authorisation by heritage authorities.
Old shops and other buildings, main street, Mount Frere	-		Medium local	Low to neutral (depends on duct location)	Mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
St John's Cathedral, Alexandria Street (Mthatha)		31°35'32.97"S 28°47'19.90"E	High local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage during trenching, installation and surface rehabilitation.
Other old buildings, N2 and Alexandria street, (Mthatha)	-		Low local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
Mandela House (Qunu)		31°48'20.65"S 28°36'20.95"E	High national	Outside duct corridor	50 m south of N 2. Ensure access during installation work.
Dutwya Magistrate's Court		32°5'56.31"S 28°18'16.34"E	Medium local	Outside duct corridor	1929 building, north side. Ensure access during installation.
Dutywa Post Office		32°5'57.46"S 28°18'18.20"E	Low local	Low to neutral (depends on duct location)	South of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to building during trenching, installation and surface rehabilitation.
Dutywa War Memorial		32°5'57.85"S 28°18'16.83"E	Medium local	Low to neutral (depends on duct location)	South of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to building during trenching, installation and surface rehabilitation.

Heritage resource	(a)		(b)	(c)	(f)
	Site	GPS			
Dutywa Anglican Church		32° 5'57.36"S 28° 18'14.77"E	Medium local	Low to neutral (depends on duct location)	North of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to building during trenching, installation and surface rehabilitation.
Other old buildings (Dutywa)		-	Low local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
Butterworth Monument		32° 19'56.16"S 28° 8'42.22"E	High local	Low to neutral (depends on duct location)	North of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structure during trenching, installation and surface rehabilitation.
Other old buildings (Butterworth)		-	Low local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
Old Transkei Border Post (Kei River)		32° 30'18.39"S 27° 58'48.46"E	Low local	Low to neutral (depends on duct location)	Now Kei Ultra City. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.



FIGURE 16: Mount Frere Main Street with old buildings



FIGURE 17: St John's Cathedral, Mthatha



FIGURE 18: Mandela House, Qunu



FIGURE 19: Dutywa Magistrate's Court



FIGURE 20: Dutywa Post Office



FIGURE 21: Main street, Butterworth



FIGURE 22: Butterworth Memorial



FIGURE 23: Old Transkei border post, Great Kei River Bridge

TABLE 11: Historic buildings and structures impact assessment

CRITERIA	IMPACT			
	CONSTRUCTION		OPERATION	
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent	On site	On site	Immaterial	Immaterial
Duration	Short-term	Temporary	Immaterial	Immaterial
Intensity	Low	Neutral	Immaterial	Immaterial
Probability	Possible	Possible	Immaterial	Immaterial
Significance	Low	Neutral	Immaterial	Immaterial
Status	Negative	Neutral	Immaterial	Immaterial
Confidence	Low	Low	Immaterial	Immaterial

4.3.4 Graves

TABLE 12: Identification and impact management of graves

Heritage resource	(a)		(b)	(c)	(f)
	Site	GPS			
Graves and burial sites	Grave	31 °10'0.69"S 28 °51'59.69"E	Medium local	Neutral (depends on duct location)	Possible grave just south of Qumbu, outside road reserve. Avoid.

4.3.5 Summarised impact assessment

TABLE 13: Summarised impact management table

Heritage resource	(a)		(b)	(c)	(f)
	Site	GPS			
Buildings, structures, places and equipment of cultural significance	Langgewacht memorial cross (Section Harding-Kokstad)	30°30'19.98"S 29°37'38.28"E	Low local	Low to neutral (depends on duct location)	Memorial cross on north side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Klipdrif Bridge (Section Harding-Kokstad)	30°33'54.74"S 29°28'26.98"E	Low local	Low	Bridge built in 1945. Mitigation: Cable installation should be invisible, reversible and not seriously damage the bridge. Document (photograph) bridge sections before installation and photograph installation process. Prepare detailed design drawings that explain the cable installation method for purposes of authorisation by heritage authorities.
	Koppieskraal Bridge (Section Harding-Kokstad)	30°34'26.19"S 29°26'52.28"E	Low local	Low	Bridge built in 1945. Mitigation: Cable installation should be invisible, reversible and not seriously damage the bridge. Document (photograph) bridge sections before installation and photograph installation process. Prepare detailed design drawings that explain the cable installation method for purposes of authorisation by heritage authorities.
	Betshwana Memorial (Section Kokstad-Mount Ayliff)	30°46'13.16"S 29°22'57.10"E	Low local	Low to neutral (depends on duct location)	Memorial plinth on south side of N 2. Avoid and monitor if possible, otherwise mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Old shops and other buildings, main street, Mount Frere	-	Medium local	Low to neutral (depends on duct location)	Mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
	Mawusheni memorial cross (Section Mount Frere-Qumbu)	31°0'21.06"S 28°55'10.67"E	Low local	Low to neutral (depends on duct location)	Memorial cross on north side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Mzike River memorial cross (Section Mount Frere-Qumbu)	31°9'1.44"S 28°52'2.28"E	Low local	Low to neutral (depends on duct location)	Memorial cross on west side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Tsolo Commonage memorial (Section Qumbu-Mthatha)	31°19'44.25"S 28°48'23.85"E	Low local	Low to neutral (depends on duct location)	T-shaped memorial, west side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	St John's Cathedral, Alexandria Street (Mthatha)	31°35'32.97"S 28°47'19.90"E	High local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage during trenching, installation and surface rehabilitation.
	Other old buildings, N2 and Alexandria street, (Mthatha)	-	Low local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
Mandela House (Qunu)	31°48'20.65"S 28°36'20.95"E	High national	Outside duct corridor	50 m south of N 2. Ensure access during installation work.	
Dutwya Magistrate's Court	32°5'56.31"S 28°18'16.34"E	Medium local	Outside duct corridor	1929 building, north side. Ensure access during installation.	
Dutywa Post Office	32°5'57.46"S 28°18'18.20"E	Low local	Low to neutral (depends on duct)	South of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to building during trenching, installation and	

Heritage resource	(a)		(b)	(c)	(f)
	Site	GPS			
				location)	surface rehabilitation.
	Dutywa War Memorial	32° 5'57.85"S 28°18'16.83"E	Medium local	Low to neutral (depends on duct location)	South of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to building during trenching, installation and surface rehabilitation.
	Dutywa Anglican Church	32° 5'57.36"S 28°18'14.77"E	Medium local	Low to neutral (depends on duct location)	North of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to building during trenching, installation and surface rehabilitation.
	Other old buildings (Dutywa)	-	Low local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
	Butterworth Monument	32°19'56.16"S 28° 8'42.22"E	High local	Low to neutral (depends on duct location)	North of N 2. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structure during trenching, installation and surface rehabilitation.
	Other old buildings (Butterworth)	-	Low local	Low to neutral (depends on duct location)	Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
	Kei Pass memorial cross (Section Butterworth-Kei River)	32°24'52.31"S 27°59'3.47"E	Low local	Low to neutral (depends on duct location)	Memorial cross on west side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
	Old Transkei Border Post (Kei River)	32°30'18.39"S 27°58'48.46"E	Low local	Low to neutral (depends on duct location)	Now Kei Ultra City. Avoid and mitigation: Photograph and document current situation before trenching. Monitor damage to structures and buildings during trenching, installation and surface rehabilitation.
	East London memorial cross (Section N 6-Western Ave)	32°58'12.35"S 27°54'30.36"E	Low local	Low to neutral (depends on duct location)	Memorial cross on north side of N 2. Mitigation: Photograph current situation, then remove memorial before trenching and installation and replace afterwards during surface rehabilitation.
Areas to which oral traditions are attached or which are associated with intangible heritage	Roadside memorials and historic buildings	-	-	-	See above for detailed recommendations.
Historical settlements and townscapes	Mount Frere, Mthatha, Dutywa, Butterworth	-	-	Neutral	No direct or visible impacts
Landscapes and natural features of cultural significance	None	-	-	-	-
Geological sites of scientific or cultural importance	None	-	-	-	-
Archaeological and palaeontological sites	None	-	-	-	-
Graves and burial sites	Grave	31°10'0.69"S 28°51'59.69"E	Medium local	Neutral (depends on duct location)	Possible grave just south of Qumbu, outside road reserve. Avoid.
Other features associated with labour history	None	-	-	-	-
Movable objects	None	-	-	-	-

4.4 Social and economic benefits

The development will have no direct benefits related to the conservation of heritage resources (structures) since none will be permanently affected.

The ducting infrastructure is capable of transporting far in excess of the anticipated traffic requirements of the South African telecommunications market over the next 20 years. Additional fibre can be installed and commissioned at short notice. Access to the ducting circuits is only possible via remotely controlled access points. The fibre optic circuits are dedicated to individual customers and spliced seamlessly between their sites, providing full control and physical separation from other client's services. New technology developments and innovations in transmission technology can be accommodated by customers upgrading their own equipment, without any changes to the infrastructure.

4.5 Public participation

This process is part of the EIA as a whole.

4.6 Key mitigation and enhancement measures during installation

- Check for any unknown/hidden archaeological features such as burial sites (unlikely), middens, foundations etc.

4.7 Consideration of alternatives

The nature and significance of what has been found in terms of heritage is not of such importance that the proposed project should be suspended or stopped, or that alternatives for the proposed ducting route should be investigated.

4.8 Monitoring

Baseline information is needed to enable future comparison between the existing status or condition of graves and heritage buildings and any future status or condition that may have been affected by construction activities.

The system of monitoring graves and heritage buildings, as well as chance finds, is informed by the following parameters:

- Documentation (recording, baseline data)
- Conservation controls, guidelines, legal encumbrances
- Management plan (EMP)
- Implementation system (EMP)

It is recommended that monitoring should be done as follows:

- Data reports should be produced to relate and facilitate comparison between past and present status results. This section essentially comprises raw data providing a "snapshot" of the site at a given time, juxtaposing it with a past snapshot, and simply describing objectively the differences. Changes observed to the site's status should be listed in a summary form.
- Evaluation reports in which conclusions are drawn and recommendations are made based on the objective data generated by the baseline report and periodic reviews.

4.9 Findings and recommendations

The anticipated impact on the identified structures as heritage resources will in general be low and reversible (where memorial crosses are affected) or neutral (where historic buildings and structures are affected). Although memorial crosses are illegal, they are an emerging part of the heritage landscape and have sentimental and emotional memories for people.

Bridges (often indicating the age of roads) were constructed between the early 1960s to the early 2000s and therefore fall outside the 60-year protection clause. The only exceptions are two 1945 bridges on the N 2 east of Kokstad, which are still in use. They fall under the protection of the Kwa-Zulu Natal Heritage Act (4 of 2008) and therefore special permission (Section 33) is required for alterations (the installation of

a duct is a form of alteration). As part of the process of obtaining permission the client should be able to demonstrate that the installation of the duct will not seriously damage or affect the structure and that the duct should be removable.

There are no compelling reasons not to authorise the proposed ducting installation or fatal flaws that may go against it from a heritage perspective. There are also no compelling reasons to memorialise any heritage features since none will be permanently and negatively affected.

It is recommended that the heritage agencies and authorities authorise the proposed development with the following conditions:

1. Site preparation activities must be monitored for the occurrence of any other archaeological material (concentrations of objects, bones, foundations etc) and similar hidden/buried chance finds. Special attention was paid to any unmarked graves in road reserves but none were observed. Should such chance finds be discovered, work should be suspended and an archaeologist should be requested to inspect the find site.
2. Where crosses and memorials in the road reserve are affected, the current situation must be photographed, then remove cross (and any plaques etc) before trenching and installation and replace afterwards during surface rehabilitation.
3. Where historic buildings and structures are affected, the current situation must be photographed/documentated before installation starts. Monitor damage (caused by vibrations, dust, flying debris etc) during trenching, installation and rehabilitation.
4. Where historic structures (such as 1945 bridges) may be directly affected, installation of the duct should not seriously damage or affect the structure and the duct should be removable. It may be necessary to prepare and submit special designs when such conditions are prevalent as part of the process of obtaining the necessary authorisations.
5. The above recommendations must be included in the Environment Management Programme for the proposed project.

APPENDIX 1: SOCIO-CULTURAL TIMELINE OF AFFECTED CORRIDOR

- 1835 Durban founded
- 1845 East London founded
- 1857 Dutywa founded
- 1867 Port Shepstone founded, 1913 township
- 1871 Kokstad founded
- 1876 Mount Frere founded
- 1880 Butterworth founded
- 1882 Mthatha founded
- 1911 Harding founded
- 1935 National Roads Act and National Road Board
- 1936 Proclamation of national roads (including N 2)
- 1948 National Transport Commission
- 1971 National Roads Act
- 1998 SA National Roads Agency

APPENDIX 2: INFORMATION SOURCES USED IN THIS REPORT

Databases

Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
Heritage Sites Database, Pretoria
SAHRA database of AIA reports (2009)

Literature

FLOOR, B, 1985, *The history of national roads in South Africa*. Cape Town: CTP.

ICOMOS Australia. 1999. *The Australia ICOMOS Burra Charter for the conservation of places of cultural significance*.

Kwa-Zulu Natal Heritage Act (Act 4 of 2008)

National Heritage Resources Act (Act 25 of 1999)

RAPER, PE, 2004, *New Dictionary of South African Place Names*. Jeppestown: Jonathan Ball Publishers.

Standard Encyclopedia of Southern Africa.

Unpublished reports

Anderson, G. 1996. *Archaeological Survey of the Proposed Route for the Kokstad-Mt. Frere Transmission Line*. An unpublished report by Umlando on file at SAHRA as: 1996-SAHRA-0001.

Van Schalkwyk, L.O. 2008. *Heritage Impact Assessment of the Proposed N2 Wild Coast Toll Highway*. An unpublished report by eThembeni Cultural Heritage on file at SAHRA as: 2008-SAHRA-0167. Available on www.nra.co.za.

1:50 000 Maps

3228 CC (1971, 1996)
3228 CA (1964, 1996)
3227 DB (1960, 1996)
3227 BD (1961, 1996)
3228 AC (1945, 1996)
3228 AA (1954, 1996)
3228 AB (1950, 2001)
3128 CD (1982, 2001)
3128 DC (1982, 2001)
3128 DA (1959, 1995)
3128 DB (1982, 1995)
3128 BD (1956, 1982)
3128 BB (1982, 1995)
3028 DD (1982)
3029 CC (1971, 1982)
3029 CD (1963, 1982)
3029 CB (1963, 1982)
3029 DA (1968, 1981)
3029 DB (1969, 1981)
3030 CA (1969, 1993)
3030 CC (1969, 1993)
3030 CB (1972, 1996)

Aerial photographs

Google Earth 2011

Internet

www.dfafrica.co.za

www.nra.co.za

APPENDIX 3: GLOSSARY OF TERMS

Cultural significance (Burra Charter)

Aesthetic, historic, scientific, social or spiritual importance, meaning or noteworthiness for past, present or future generations

Cultural significance is embodied in the place itself (intrinsic significance), its fabric, setting, use, associations, meanings, records, related places and related objects.

Cultural significance is assessed in terms of the following criteria, some of which are embodied in the NHRA:

- Historic value: Material or intangible evidence resulting from changing social, political and environmental circumstances or conditions
- Rarity: Unique or unusual features also possess rarity value, apart from their age. Section 34 of the NHRA provided general protection for all structures older than 60 years. This does not imply that recently erected structures cannot possess rarity, or for that matter cultural value.
- Scientific value: Indicates research potential (the capacity to yield more knowledge)
- Typical: Indicates that the feature is a good example of a certain class or type of heritage resource
- Aesthetic: Other than artistic or architectural expression, aesthetic value can also be evident in craftsmanship, technique, visual cohesion (harmony), visual evidence of permanence and stability, setting etc.
- Technological: Indicates value in terms of a technological achievement
- Personal/Community: Indicates value in terms of association with a certain person, community, organisation or cultural group
- Landmark: A sense of place or belonging involves the physical and visual relationship between a feature and its environment.
- Condition (material integrity): Indicates substantial evidence of authentic fabric with minor degree of lost or obliterated fabric; also refers to a structure's restoration potential
- Sustainability: The potential for lasting economic viability (use) and the perpetuation of the original use or part thereof.

Heritage resources/features (NHRA)

Any place or object of cultural significance, including:

(a) places, buildings, structures and equipment of cultural significance;

(b) places to which oral traditions are attached or which are associated with living heritage;

(c) historical settlements and townscapes;

(d) landscapes and natural features of cultural significance;

(e) geological sites of scientific or cultural importance;

(f) archaeological and palaeontological sites;

(g) graves and burial grounds, including—

(i) ancestral graves;

(ii) royal graves and graves of traditional leaders;

(iii) graves of victims of conflict;

(iv) graves of individuals designated by the Minister by notice in the *Gazette*;

(v) historical graves and cemeteries; and

(vi) other human remains, which are not covered in terms of the Human Tissue Act, 1983 Act No. 65 of 1983);

(h) sites of significance relating to the history of slavery in South Africa;

(i) movable objects, including—

(i) objects recovered from the soil or waters of South Africa, including

archaeological and palaeontological objects and material, meteorites and rare geological specimens;

(ii) objects to which oral traditions are attached or which are associated with living heritage;

(iii) ethnographic art and objects;

(iv) military objects;

(v) objects of decorative or fine art;
(vi) objects of scientific or technological interest; and
(vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

Heritage significance (NHRA)

(a) its importance in the community, or pattern of South Africa's history;
(b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
(c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
(d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
(e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
(f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
(g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
(h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
(i) sites of significance relating to the history of slavery in South Africa.

Historic period

Since the arrival of the white settlers - c. AD 1840 in this part of the country

Impact

A description of the effect of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space

Impact assessment

Issues that cannot be resolved during screening (Level 1) and scoping (Level 2) and thus require further investigation

Intangible heritage

Defined in terms of the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003) as:

- Oral traditions and expressions, including language as a vehicle of the intangible cultural heritage;
- Performing arts;
- Social practices, rituals and festive events;
- Knowledge and practices concerning nature and the universe;
- Traditional craftsmanship.

The "intangible cultural heritage" means the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage. This intangible cultural heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity.

Visual and social impact assessments as part of an HIA are directly associated with intangible cultural heritage.

Iron Age

Early Iron Age (EIA)	AD 200 - AD 1000
Late Iron Age (LIA)	AD 1000 - AD 1830

Issue

A question that asks what the impact of the proposed development will be on some element of the environment

Maintenance

Keeping something in good health or repair

Management actions

Actions that enhance benefits associated with a proposed development or avoid, mitigate, restore, rehabilitate or compensate for the negative impacts

Preservation

Conservation activities that consolidate and maintain the existing form, material and integrity of a cultural resource

Reconstruction

Re-erecting a structure on its original site using original components

Rehabilitation

Re-using an original building or structure for its historic purpose or placing it in a new use that requires minimal change to the building or structure characteristics and its site and environment.

Restoration

Returning the existing fabric of a place to a known earlier state by removing additions or by reassembling existing components

SAHRA - South African Heritage Resources Agency

Stone Age

Early Stone Age (ESA)	2 000 000 - 150 000 Before Present
Middle Stone Age (MSA)	150 000 - 30 000 BP
Late Stone Age (LSA)	30 000 - until c. AD 200

Value

Worth, conservation utility, desirability to conserve etc in terms of physical condition, level of significance (importance), economy (feasibility), possible new uses and associations/comparisons with similar features elsewhere