DRAFT POLICY

Micro-trenching for Electronic Communication Network Fibre to Residential Properties in Tshwane

Date	Author	Version	Change Reference
November 2018	Deon Viljoen	V1.1.	Draft Created
May 2019	Policy Committee	V1.2	Advisory brief
August 2019	Deon Viljoen Karin Oberholzer Jordan Griffiths	V1.3	Standardising policy to comply with Template A approved by MAYCO 16 May 2018
July 2021	Roads and Transport		Review of approved Policy as it is implemented.

Version: V1.3

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1. Definitions and abbreviations

"**Applicant**": means a person issued with a licence to provide services in terms of Chapter 3 of Act 36 of 2005 and the Electronic Communications Amendment Act 1 of 2014;

"**Backfilling**": refers to the replacement of the structural layers in the trench or excavation and includes the base, subbase, selected subgrade and subgrade, but excludes the surfacing (see Reinstatement);

"**Certificate of Completion**" means the document obtained from the Service Coordinator and correctly signed on site by the Applicant, Consultant, Contractor and delegated CoT Official that proof that Work in the PRR was completed according to the requirements of this policy;

"**Consultant**" means a person registered in terms of section 19(2)(b) of Act 46 of 2000.

"**Council**" means the Municipal Council of the City of Tshwane (CoT) established by Provincial Notice No. 6770 of 2000 dated 1 October 2000, as amended, or its successor in title, and any committee or person to which or whom an instruction has been given or any power, function or duty has been delegated or sub-delegated in terms of, or as contemplated in, section 59 of the Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000);

"**Public Road Reserve (PRR)**" means the full width of a public road, and includes the verge and the roadway;

"**Road Classification**":
Class 1: Primary metropolitan distributor
Class 2: Metropolitan distributor
Class 3: District distributor
Class 4(a): Collector non-residential
Class 4(b): Collector residential
Class 5(a): Local street residential access collector
Class 5(b): Local street residential access loop
Class 5(c): Local street access cul-de-sac
Class 5(d): Local street access way
Class 5(e): Local street access court
Class 5(f): Local street access strip

"**Service Coordinator**" means the institutional body established within the Council's Municipal area with the sole responsibility to coordinate and regulate any Work undertaken in those sections of the PRR that fall within the Municipal area of the Council;

"**Wayleave**" means the formal approval to carry out Work in the Public Road Reserve (PRR). A Wayleave is issued by the Service Coordinator and consists of a Wayleave form and approved drawings;

"**Work**" in the Public Road Reserve means any activity related to a Service, carried out within the Public Road Reserve (PRR). It includes any project related activities, irrespective of the size of the project.

"**Work in the Public Road Reserve By-Law**" the By-Law promulgated on 19 February 2014.

2. Problem statement

One of the major challenges that urban municipalities face is the cutting of the existing road pavement to install utility lines such as waste water sewers, water mains, electrical cables and conduits. Once a cut is made, it should be backfilled with new, appropriate material, resulting in a patched surface on the pavement. Using backfilling materials that are unsuitable for the site conditions and not properly installed will lead to premature pavement failures, which can significantly reduce the pavement life.

In the telecommunication industry, the number of internet users has grown considerably over the last 20 years. The internet has become a ubiquitous source of both information and entertainment, resulting in a major surge in bandwidth requirements. Since the data transmission capacity of fibre-optic (FO) cables is higher than that of the existing copper telecommunication infrastructure, the provision of FO networks has become essential to appease users' growing internet demands. Providing FO access to homes and businesses, also known as fibre-to-the-home (FTTH) and fibre-to-the-business (FTTB), can be challenging due to the possible disruption of existing utilities, increased surface restoration costs, temporary interruption of services (traffic, waste collection, etc.) and possible environmental disturbances such as contaminant spills, pollutant emissions and noise.

Micro-trenching (MT) is a promising method for FTTH connection. The last 200 m of fibre deployment can be particularly difficult to deliver, given obstacles to be navigated both above and below ground, and these difficulties increase installation time and cost. Providers have found that typical savings of 75% less time and 50% less construction costs may be realised when employing MT procedures. Due to its advantages, MT is growing in popularity as a means of quickly, efficiently and cost-effectively connecting properties or base stations to the main fibre network, and many installers are now switching to MT.

The MT process starts by cutting a narrow trench. Depending on the size of the conduit used, the trench is narrower than 25 mm wide and up to 120 to 300 mm deep. Next, the cable or conduit is placed inside the trench, and the process finishes with surface reinstatement.

Good quality of backfilling plays an important role in the performance of MT. It secures the cable in the trench bottom and provides a mechanical protection to the cable against traffic loads. Several studies have been conducted on using different granular, concrete and bituminous material for backfilling, as well as using recyclable waste materials as an environment-friendly alternative to natural resources. Due to the tiny dimensions of the trench in micro-trenching, the backfilling material should be flowable enough to penetrate and completely fill the whole trench depth. The other essential requirements for backfilling materials used for flexible pavements include the following: being flexible so as to allow movement with the existing pavement material; bonding to the existing material; sealing the trench against water ingress; resisting permanent deformation; hardening rapidly to allow the road to be re-opened to traffic quickly; and being simple to apply by multi-skilled installer teams.

This innovative construction technique has been studied by the Roads and Transport Department since 2009. Test sections of this construction method was allowed in Thabo Sehume Street and valuable lessons were learned. The test sections were no longer than 5 m to 10 m and the positions were on the high traffic wheel area. The lessons learned by the department gave rise to the drafting of this policy.

3. Desired outcomes

Time, quality, safety, cost
The Roads and Transport Department has determined that for specific applications, micro-trenching is an innovative deployment technique that is generally cheaper, less disruptive, quicker than conventional dig techniques and less disruptive to traffic, and it requires less extensive restoration work. Hence the department decided to authorise MT as an alternative to conventional trenching in residential streets, but only for supplying fibre to residential properties and high-density residential developments.

4. Strategic alignment

The strategy for broadband for RSA has been published nationally under the title “South Africa Connect” with an intention to connect 90% of South Africans at a minimum speed of 5 Mbps by 2020.

5. Regulatory context

- Work in the Public Road Reserve By-Law;
- Electronic Communications Act 36 of 2005;
- Electronic Communications Amendment Act 1 of 2014.

6. Policy parameters

The City of Tshwane wayleave procedure as prescribed in the Work in the Public Road Reserve By-Law must be followed and the application reason must be clearly marked as: Micro-trenching.

7. Role players and stakeholders

1. The City of Tshwane (owner, responsible for adherence and application of the policy):
    - City Planning Department to assist Applicant (s) on information on new developments if asked ;
    - The Regional CoT representatives to oversee and inspect the work done and ensure compliance to the required standards;
    - Roads and Transport Department to administer wayleave process.
2. Applicants (Electronic Communication Licensees) – responsible to adhere to the policy);
3. Residents (eyes and ears on the ground).

8. Policy directives

What is micro-trenching?
Micro-trenching (or slot-cutting) is an innovative technique that can be used to deploy communications infrastructure, typically fibre-optic cable, in residential streets. Under the right circumstances the technique has the potential for low-impact deployment methodology in which fibre-optic cables and sometimes conduits are laid into a slot-cut trench less than 50 mm wide, and typically between 175 mm and 300 mm deep, without disrupting or damaging existing infrastructure in the public road reserve. The trench is then backfilled, often making the works almost invisible.
Before applying to the Roads and Transport Department for a wayleave for micro-trenching, the network licensee must obtain a certificate from all other network licensees

that no excess capacity is available in the location the network licensee proposes for MT. The network licensee must attach that certificate to the wayleave application.
Recommendation 1: Where possible, network licensees should look to use existing networks before considering MT.
A map should be provided showing the street location of the conduit including the side of the street the conduit is on, the beginning and ending points of the conduit, the number of ducts in the conduit, and the number of ducts of excess capacity in the conduit. The map must accurately reflect the addresses of buildings that are passed by the conduit. The map may be made public, by itself or in aggregation with other maps, at the discretion of the department.
The method of forming the slot or micro-trench has not been specifically addressed in the two specifications, although it was contemplated that slots formed by disc-cutting (normally mechanical floor saws) or narrow (micro-) trenches formed by rotary "toothed" spinners were the most likely.
It should be noted that MT may not be suitable in all types of roads, and any deployment will depend on the composition of the road and the location of existing buried infrastructure. This is because there is a greater risk of plants being damaged, and in certain road types (such as concrete and evolved roads), it may not be possible to reinstate the road in a manner that preserves the long-term integrity of the road structure.

One micro-trench per street
One micro-trench on one side of the road will be allowed.
The licensee applying for the wayleave to construct the micro-trench and install the fibre service must upload proof that all other licensees were contacted and requested to sign a co-build/lease agreement.
The ideal position of a micro-trench will be on the high side (topographically) of the road, especially if the road is constructed with a mono camber.

9. Implementation programme

Micro-trenching will only be allowed in streets with the following classification:
Class 5(a): Local street residential access collector;
Class 5(b): Local street residential access loop;
Class 5(c): Local street access cul-de-sac;
Class 5(d): Local street access way;
Class 5(e): Local street access court;
Class 5(f): Local street access strip.

Communication with residents:
The applicant will communicate at his cost with residents at least 14 days before construction starts about the upcoming micro-Trench construction in the area.

Fees and Tariffs:
All fees and tariffs will be determined by the City as part of the Annual Budget.

<u>Standard</u>

a) All standards as set out in the Standard Specification for Municipal Civil Engineering Works (1991) and the General Conditions of Contract for the Construction of Civil Engineering Works (2005) must be adhered to;
b) Class 5 (a to f) residential roads only;
c) Crossing of Class 4 and Class 3 roads will only be allowed if motivated by the professional engineer for the applicant and approved by the Group Head Roads and Transport;

d) All fibre to residential premises must be installed in such a way that no new manhole, hand hole or junction boxes are built in the public road reserve. Jointing boxes can be motivated by the professional engineer and must be approved by the Group Head Roads and Transport;
e) Micro-trench = maximum 50 mm wide and maximum 300 mm deep;
f) A micro-trench next to a kerb must have a slot-cut at 56 mm from the kerb, 5 mm deep and 4 mm wide, before the micro-trench is cut;
g) At road crossings the pre-cut slot must be 62 mm apart, 5 mm deep and 4 mm wide, before the micro trench is cut;
h) A trench on the verge must be a minimum of 450 mm deep and have a warning plastic ribbon 300 mm from the natural ground level.

Specification

a) No specification for fibre and bedding around the fibre;
b) Backfill material: The material that was excavated must/can be used for backfill. It must be modified to have an unconfined compressive strength (UCS) of 3,0 MPa. No aggregates may be larger than 26,4 mm. Care must be taken to do the backfill as ‘‘green” as possible and to reuse all the extracted material and not import new material;
c) Rejuvenating product: A bituminous product must be applied to the inside wall of the micro-trench and must be 25 mm wide to rejuvenate the old asphalt;
d) Reinstatement: Only hot fine asphalt with a minimum thickness of 35 mm will be allowed and no more than 1 000 kg may be on site at any time. Asphalt with a temperature of 112 ˚C and lower must be removed from the site and cannot be used for reinstatement.

As-built information

a) On completion inspection, all as-built information must be submitted to the City of Tshwane in the prescribed format;
b) The “as-built” drawing/information will be treated as proprietary and confidential, to the extent permitted by law.

10. Monitoring, evaluation and review

All construction work must/will be executed under supervision of the consultant.
The backfill of the micro-trench must be evaluated by the Licensee, consultant and CoT’s dedicated representative one year after the date of the completion certificate has been signed by CoT. All issues must be addressed within 2 months after this inspection.

This policy must be reviewed in July 2021 and a report must be submitted to Council of the outcome of the review.