# BRUTIS

# Best Rational Urban Tech Information System

## **Urban Drainage and Sewer Management**

# Users Manual

Welcome using Bl	RUTIS version: 6.2	2ho(odb-std-64), Kingo	lom of Cambodia		×
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Phnom Penh, november 2023 Manual for installing and start working with BRUTIS Version 6.3a Foreword:

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SCOPE Users Manual

## 1 Introduction

Welcome to the Urban Drainage Management System BRUTIS, developed by https://www.riodesk.com, based on the best management practice of sewage and drainage professionals in the Netherlands.

BRUTIS is an abbreviation for <u>B</u>est <u>R</u>ational <u>U</u>rban <u>T</u>ech <u>I</u>nformation <u>S</u>ystem. In BRUTIS is drain and sewer management an integral part of the management of all other objects in the urban space.

This software allows you to collect data, investigate conditions, perform assessments, plan, implement and improve drain and sewer systems. Based on the European Standard EN 13508-2

#### Contents

- General philosophy of BRUTIS
- Scope
- Overview of this manual

#### 1.1 General Philosophy

The general philosophy of BRUTIS is simplicity.

The system is easy to install because it consists of one executable: **BRUTIS64.exe**, and a NCSEcw.dll file for viewing ECW aerial photos. You only have to copy **BRUTIS64.exe** and NCSEcw.dll file to your MS Windows operating system.

The user interacts with BRUTIS through a graphical user interface (GUI). The main focus in the design of the interface was to offer an attractive geographical toolbox for rational management of urban drainage and sewer systems. The interface provides for the following functions:

- File management
- Read data from GIS, like Geo-Database, Shape-, CSV<sup>1</sup>- or Internet Files,
- Global Positioning (GPS)
- Data entry and editing
- Assessment tools
- Reporting facilities

The data is stored in a work-file or in a database. Possible databases are: Oracle, MS SQL-Server or MS Access.

After defining a username and password in Oracle or MS SQL-Server or creating a database file (.mdb) with MS Access the user connects with the database with the standard Open Data Base Connectivity (ODBC) functions supplied on all MS Windows computers.

The user is able to experiment, prototype or collect data in a mutation-file. The database administrator transfers the data from mutation-files or data read from GIS to the database with the BRUTIS buttons.

<sup>&</sup>lt;sup>1</sup> CSV is an abbreviation for comma separated values, The shapefile format is a geospatial vector data format for GIS.

After data transfer the database BRUTIS creates automatically a work-file with the database data after the transfer. BRUTIS displays the data in the work-file in the graphical user interface (GUI). With the work-file and mutation-file you can use BRUTIS outdoor for data collection and investigation without database connection.

#### 1.2 Scope

BRUTIS is applicable for urban drain and sewer systems, which operate under gravity or pressure, from the point where the sewage leaves a building or roof drainage system, or enters a road gully, to the point where it is discharged into a treatment works or receiving water.

Urban drainage and sewer systems consist of several objects, for example:

- Conduits:
- drainage canals;
- o pipes;
- culverts in drainage canals;
- o etc.
- Nodes:
- 0
  - Manholes;
  - gates in outlets to rivers;
  - pumping stations;
  - reservoirs or retention basins;
  - o etc.

The most important data input for the management system is:

- What do we have (urban drainage system)
- What is the performance (does it meet design standards)
- What is the level of physic condition (damages)
- What is the level of maintenance (sedimentation)

For a proper management of the entire system, it is of great importance to have access to a reliable database in which data of the entire system are included.

Even more important is to regularly update this database. The purpose of the database is having actual data for investigation of the hydraulic, structural and operational performance and to make yearly and a long-term planning for maintenance and investments.

BRUTIS is the interface between user and database.

#### **1.3 BRUTIS Documentation**

The BRUTIS documentation is arranged in the following two categories:

Documentation	Description
User's Manual	This manual provides installation instructions on how
	to get started and collect data with BRUTIS.
Reporting and Planning Guide	This manual is guide to using BRUTIS for reporting the
	performance, check the physic condition and the level

#### 1.4 Overview of This Manual

This Users manual is the primary piece of documentation on how to use BRUTIS for:

- getting started
- the collection of available data;
- investigation and collection of missing data;
- implementation of the data in a management database.

In appendix A is documented how to change the behaviour of BRUTIS. The CSV and mutation-file coding system is defined in appendix B. The coding system for the registration of the drainage condition is defined in appendix C. Examples of how to import survey data is reported in appendix D. The BRUTIS database is defined in appendix E

SCOPE Users Manual

## 2 Terms and definitions

For the purpose of this manual, the following definitions apply:

#### Canal

Open water course designed to carry wastewater and/or surface water.

#### Culvert/Orifice

Opening in a weir.

#### Conduit

Drain, canal, culvert, rising main or pipeline designed to carry wastewater and/or surface water from node to node. Each conduit is defined by both node numbers and a conduit id.

#### Ditch

Small open water course designed to carry wastewater and/or surface water.

#### Drain

Pipeline or ditch, designed to carry wastewater and/or surface water from a source to a sewer.

#### Drain system

Network of drains and ancillary works that conveys wastewater and/or surface water to a cesspool, sewer system or other place of disposal.

#### Gate/Outfall

Final length of conduit from which sewage is discharged to a treatment works or receiving water.

#### Gully

A deep ditch or channel cut in the earth by running water after a prolonged downpour.

#### Installations

All extra hardware needed to drive pumps, adjust valves or measure data.

#### Invert

Lowest point of the internal surface of the barrel of a pipe or channel at any cross section.

#### Inspection chamber

Chamber with a removable cover constructed on a drain or sewer that provides access from surface level only, but doe not permit entry of a person.

#### Manhole

Chamber with a removable cover constructed on a drain or sewer to permit entry by personnel.

#### Node

Manhole, inspection chamber, outfall or other significant intermediate point. Each node is defined by X- and Y Coordinates and a unique number.

#### Pipeline

Assembly of pipes, fittings, masonry and insitu concrete units and joints between manholes and other structures.

#### **Pumping station**

Facilities including pumps and equipment for pumping fluids from one place to another. They are used for a variety of infrastructure systems that many people take for granted, such as the supply of water to canals, the drainage of low-lying land, and the removal of sewage to processing sites.

#### **Receiving water**

Any body of water such as a sea, river, stream or lake as well as an aquifer into which drain or sewer systems discharge

#### Rehabilitation

All measures for restoring and upgrading the performance of existing drain and sewer systems.

#### Repair

Rectification of local damage

#### **Rising main**

Pipe through which sewage is pumped

#### Sewer

Pipeline, ditch or canal designed to carry wastewater and/or surface water from more then one source.

#### Sewer system

Network of sewers and ancillary works which conveys wastewater and/or surface water from drains to a treatment work or other place of disposal.

#### Spillway

Final node from which sewage is discharged to a treatment works or receiving water.

#### Weir

A dam placed across a canal or in a node to raise or divert the water, or to regulate or measure the flow. A weir is defined by a from and to node number.

## 3 Installing BRUTIS (detailed)

#### Contents

- Installation.
- Configure the menu and passports of the objects;
- How to change the behaviour of BRUTIS by using command line arguments;
- Create a database and connect with Open Database Connectivity (ODBC);
- Connecting a GPS Antenna.

In this tutorial it is assumed that you install BRUTIS in the directory: C:\BrutisData

#### 3.1 Installation

Simply copy the BRUTIS64.exe file to a project directory on your MS Windows operating system. The BRUTIS64.exe has an icon as depicted in figure 3.1



Figure 3.1

#### 3.2 Configure the menu and passports of the objects

BRUTIS has many menu options and an extensive data model. To make it easier to use, it is possible to disable menu options and hide object data.

Menu option: "Display / Configure menu and toolbar...", start the window shown in figure 3.2.1

This window lists all menu options, represented by a code, menu text and an: 1 or 0.

By changing menu texts, you can, for example, clarify them or put them in a different language. With a 1 you ensure that the option is present. With a 0 it is not present.

With the **[OK]** button you save the changes in the file: **brutis\_init.csv**, and close the window. With the **[Cancel]** button you close the window without saving the changes.

Restarting the program takes effect the changes to the menu.

**Brutis\_init.csv** also stores the data field texts of, among other things, the node and pipeline passports. You can also open **brutis\_init.csv** with an editor or with MS Excel, and directly make changes to the menu and passports.

Code	Menu	1/0	
0	up to 60 characters	0	
11321	Toolbar	1	
15421	Add Toolbar	1	
10050	New	1	
10060	Exchange Format Inspection File	1	
10070	KIK BRUTIS File	1	
10080	Hydraulic File	1	
10090	BMP, PNG, JPG, GIF, ICO, EMF or W	1	
10340	TXT Rioscoop datamap (putten.txt	1	
110	Open	1	
10100	Save	1	
10101	Working File	1	
10150	KIK BRUTIS File	1	
120	Save As	1	
10170	Create Geo-Reference File	1	
10180	Print	1	
10190	Set plot parameters	1	
10200	Plot	1	
10210	Plot Window	1	
10230	Exit	1	
11	&File	1	
10250	From Database	1	
10268	Volgens profiel (prf) bestand	1	
10251	Working File	1	
10262	Topography from Database	1	
10260	GML, DXF of SHP topography	1	
10266	GML, DXF of SHP runoff surface	1	
10261	Grid (leveling) Data	1	
10264	Uitvlakken hoogtes uit bestand	1	
10265	Hoogtes overnemen op geselecte	1	
220	Hoogtebestand bewerkingen	1	
10270	ECW, BMP, PNG, JPG, GIF, ICO, EMF	1	
10280	Start	1	
10290	Display Results	1	
230	Exchange Format Inspection File	1	
10420	Start	1	
		1	
	OK		Cancel

Figure 3.2.2. shows an example with a notepad view of brutis\_init.csv and the conduit passport, with all conduit data fields enabled, by code 1.

CONDUIT, AAD, "From node no.:",1 CONDUIT, AAF, "To node no.:",1 CONDUIT, AAZ, "Pipe No:",1 CONDUIT, ABF, "Date of change:",1 CONDUIT, ABG, "Time mutation:",1 CONDUIT, ACJ, "Pipe type:",1 CONDUIT, ACK, "System type:",1 CONDUIT, AC3, "Function:", 1 CONDUIT, AC2, "System GWSW:",1 CONDUIT, AC4, "Operating voltage [v]:",1 CONDUIT, AC5, "Nominal voltage [v]:",1 CONDUIT, ACN, "Year of construction:", 1 CONDUIT, ACM, "Year of renovation:",1 CONDUIT, ACA, "Profile:",1 CONDUIT, ACG, "Length [m]:", 1 CONDUIT, ACC, "Width [mm]:", 1 CONDUIT, ACB, "Height [mm]:",1 CONDUIT, AC6, "Bottom width [mm]:",1 CONDUIT, ACD, "Material:", 1 CONDUIT, AC7, "Material Casing:",1 CONDUIT, AC8, "Material Lining:", 1 CONDUIT, XAC, "Pressure class:",1 CONDUIT, XAD, "SDR value:",1 CONDUIT, ACO, "Joint connection:",1 CONDUIT, AXP, "joint material:",1 CONDUIT, ACS, "Foundation:", 1 CONDUIT, ACX, "Basis:",1 CONDUIT, ACP, "Wall thickness [mm]:",1 CONDUIT, ACH, "NAP BOB From pit no [m]:",1 CONDUIT, ACI, "NAP BOB To pit no [m]:",1 CONDUIT, AKB, "Collection BOB From:",1 CONDUIT, AKL, "Collection BOB To:",1 CONDUIT, XAH, "NAP Setting level [m]:",1 CONDUIT, ACQ, "Hardening type:", 1 CONDUIT, ACR, "Use topsoil:", 1

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Basis: unknown Wall thickness [mm]: 300 NAP BOB From pit no [m]: NAP BOB To pit no [m]: Collection BOB From: unknown Collection BOB To: unknown NAP Setting level [m]: 0.000 Hardening type: unknown	Basis: Wall thickness [mm]:	
Wall thickness [mm]:       300         NAP BOB From pit no [m]:       300         NAP BOB To pit no [m]:       000         Collection BOB From:       unknown         Collection BOB To:       unknown         NAP Setting level [m]:       0.000         Hardening type:       unknown	Wall thickness [mm]:	unknown
NAP BOB From pit no [m]:         NAP BOB To pit no [m]:         Collection BOB From:       unknown         Collection BOB To:       unknown         NAP Setting level [m]:       0.000         Hardening type:       unknown		
NAP BOB To pit no [m]:         Collection BOB From:       unknown         Collection BOB To:       unknown         NAP Setting level [m]:       0.000         Hardening type:       unknown	IND DOD From altera fail	300
Collection BOB From:       unknown         Collection BOB To:       unknown         NAP Setting level [m]:       0.000         Hardening type:       unknown	NAP BOB From pit no [m]:	
Collection BOB To: unknown NAP Setting level [m]: 0.000 Hardening type: unknown		
NAP Setting level [m]: 0.000 Hardening type: unknown		unknown
Hardening type: unknown	Collection BOB To:	unknown
	NAP Setting level [m]:	0.000
Use topsoil: unknown		
	Use topsoil:	unknown

Figure 3.2.2

Figure 3.2.3 shows an Example with a notepad representation of brutis\_init.csv and the conduit passport, in which conduit data fields are disabled, by code 0.

CONDUIT,AAD,"From node no.:",1	Sewerage Common Hydr	aulic Planning	
CONDUIT,AAF,"To node no.:",1	Description	Input	
CONDUIT,AAZ,"Pipe No:",1	From node no.:	P39	
CONDUIT, ABF, "Date of change:", 1	To node no.:	P40	
CONDUIT,ABG,"Time mutation:",1	Pipe No: Date of change:	1 20230310	
CONDUIT,ACJ,"Pipe type:",1	Time mutation:	230603	
CONDUIT, ACK, "System type:",1	Pipe type:	jica	
CONDUIT,AC3,"Function:",0	System type: Year of construction:	pipe 0	
CONDUIT,AC2,"System GWSW:",0	Profile:	unknown	
CONDUIT,AC4,"Operating voltage [v]:",0	Length [m]:	41.959	
CONDUIT,AC5,"Nominal voltage [v]: ",0	Width [mm]:	300	
CONDUIT, ACN, "Year of construction:",1	Height [mm]: Bottom width [mm]:	300 300	
	Material:	unknown	
CONDUIT, ACM, "Year of renovation:",0	Joint connection:	unknown	
CONDUIT,ACA,"Profile:",1	NAP BOB From pit no [m]: NAP BOB To pit no [m]:		
CONDUIT,ACG,"Length [m]:",1	Use topsoil:	unknown	
CONDUIT,ACC,"Width [mm]:",1			
CONDUIT,ACB,"Height [mm]:",1			
CONDUIT,AC6,"Bottom width [mm]:",1	LOGBOEK	ОК	CANCEL
CONDUIT,ACD,"Material:",1			
CONDUIT, AC7, "Material Casing:",0			
CONDUIT,AC8,"Material Lining:",0			
CONDUIT, XAC, "Pressure class:",0			
CONDUIT,XAD,"SDR value:",0			
CONDUIT,ACO,"Joint connection:",1			
CONDUIT,AXP,"joint material:",0			
CONDUIT,ACS,"Foundation:",0			
CONDUIT,ACX,"Basis:",0			
CONDUIT, ACP, "Wall thickness [mm]:",0			
CONDUIT, ACH, "NAP BOB From pit no [m]:",1			
CONDUIT, ACI, "NAP BOB To pit no [m]:",1			
CONDUIT, AKB, "Collection BOB From:",0			
CONDUIT,AKL,"Collection BOB To:",0			
CONDUIT,XAH,"NAP Setting level [m]:",0			
CONDUIT,ACQ,"Hardening type:",0			
CONDUIT,ACR,"Use topsoil:",1			



Brutis\_init.csv contains lines for:

MENU	Menu texts, on/off
OBJECT	Object data field texts, on/off
NODE	Node data field texts, on/off
GULLY	Gully data field texts, on/off
CONDUIT	Conduit data field texts, on/off
PUMP	Pump data field texts, on/off
VALVE	Valve data field texts, on/off
SENSOR	Sensor data field texts, on/off
INST	Installation data field texts, on/off
WEIR	Weir data field texts, on/off
ORIF	Orifice data field texts, on/off

#### 3.3 How to use command line arguments (start options)

You can use command line arguments or define all arguments in start options in a brutis init.xml configuration file, to start your BRUTIS application with special behaviour.

In appendix A you will find a listing of all possible start options.

Go to Windows menu: "Start -> Run" and enter the file path and file name of the application, followed by the command line arguments. For example:

Go to Windows menu: " <b>Start -&gt; Run</b> " and enter the file path and file name of the application, followed by the command line arguments. For example:	scope Users Man
"C:\BrutisData\BrutIS64.exe" utm=BR,init=kc_init.xml	ual

(Including the quotation marks). In this example the file path to the installation directory is C:\BrutisData, the application file name is BRUTIS64.exe, and the command line arguments we are using are:

- utm=BR •
- init=kc init.xml

Between arguments you should place a comma (,) directly between each command line argument that you wish to use.

Option: utm, defines latitude/longitude to UTM coordinate translation type. The default is: 0.

Option: init, defines the name of the configuration file where all start options are defined. The default is: brutis\_init.xml. Use menu option: "Tools / Start Options...", to change the options in the configuration file.

If you regularly wish to start your application using command line arguments then you can also create a shortcut on your Desktop which includes them. To do this, right-click on an open space of the desktop and choose "New -> Shortcut". Follow the wizard to create the new shortcut. When it prompts you for location (not name), type the file path and file name followed by the command line arguments, exactly as in the example above.

#### 3.4 Database and ODBC

BRUTIS interacts with a user-defined database. It uses ODBC, "Open Database Connectivity", to:

- allow user access to database table and field names;
- transmit data to the database:
- execute generated SQL (Structured Query Language) statements.

The user must:

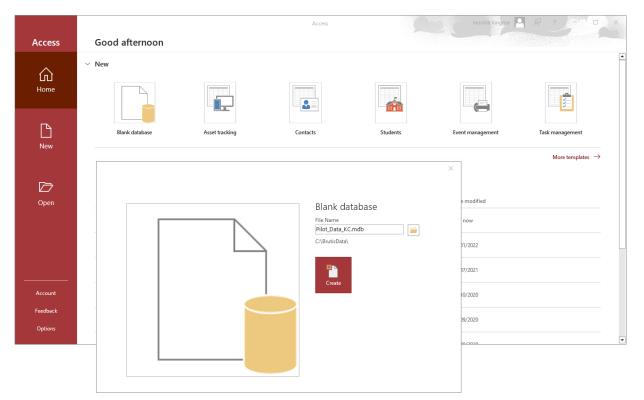
- create the database; •
- configure: •
  - o an ODBC "Data Source Name" for the database or
  - define an ODBC driver name as start option or command-line argument. 0

ODBC allows software products like BRUTIS to interact with a wide variety of Database Management Systems (DBMSs). DBMSs like Oracle, SQL-Server and MS Access. The DBMS must provide a software component known as an ODBC "driver". Most DBMSs available on Windows platforms provide ODBC drivers.

A simple database with ODBC configuration can be created in a matter of minutes, once you know how.

#### Creating a database

The user must provide an empty "target" database.



#### Figure 3.4.1

Here's how to create a database using Microsoft Access:

It is assumed that MS Access is installed on the desktop.

- 1. Start MS Access
- 2. Create a blank mdb file.
  - a. Click on the "**New**" button and choose the "Blank Database" icon. A "Blank Database" dialog will appear as depicted in figure 3.4.1;
  - b. Click on the "Browse for a location to put your database", 🛄 button;
  - c. Select a location, Save as type: "Microsoft Access Databases (2002 2003 format) (\*.mdb). And type a name for your new database. The new database will have a default name, Database1.mdb and it is recommended that you change this name to reflect your data. In this example we give the name: Pilot\_Data\_KC.mdb. Create the database in the assumed directory: C:\BrutisData
- 3. Exit MS Access.

The database: Pilot\_Data\_KC.mdb is created in the directory: C:\BrutisData. At this point the database is empty. The database has no tables, queries, forms, reports, and so forth.

BRUTIS will create the database tables automatically when it connects to an empty database and wants to check the data.

#### Configuring an ODBC Data Source

The user must configure an ODBC "Data Source Name" (DSN) for the database. This is a simple process of choosing a label and applying it to the database. A Windows program: the ODBC Data Source Administrator, is used for this purpose.

The ODBC Data Source Administrator program can be started in several ways:

- choosing BRUTIS menu option: "Tools / ODBC Administrator";
- clicking on the Windows Control Panel "ODBC" icon;
- entering "ODBCAD32" and the Windows command prompt;
- consulting Windows Help and Support: search on "ODBC".

These options are presented because the ODBC Data Source Administrator can be difficult to locate on some systems. The program's file name is ODBCAD32.EXE, and it is often (but not always) in the \WINDOWS\SYSTEM32 directory. Contact www.riodesk.com if you have trouble finding it.

After starting the ODBC Data Source Administrator, a dialog will appear as depicted in figure 3.4.2.

User DSN	Data Source A System DSN			-	Connection F	ooling	About		×
User Data	Sources:								
Name		Platform	Driver				^	Add	
dBASE	Files	N/A	Microsoft	Access di	BASE Driver (*	.dbf, *.no	de la		
denheld		32-bit			river (*.mdb)			Remove	
Excel Fil	es	64-bit			er (*.xls, *.xlsx		·		
exxon		32-bit			Access (*.mdb	)		Configure	
kurt		32-bit	Microsoft Access Driver (*.mdb)						
	ess Database		Microsoft Access Driver (*.mdb, *.accdb)						
Oracle		64-bit		OraDB12H					
SQLEXF	PRESS	32/64-bit	ODBC Dri	ver 17 for	SQL Server				
tb infra		32-bit	Driver do	Microsoft	Access (*.mdb		~		
<						3	<b>F</b>		
	The driver of	this User D	SN does n	ot exist. It	can only be re	emoved			
				_					

Figure 3.4.2

Once you are running the ODBC Data Source Administrator choose the "**Add**" option. Do add a new Data Source:

A dialog will appear as depicted in figure 3.4.3. Choose the appropriate ODBC driver for your DBMS:

Create New Data Source		×	
	Select a driver for which you want to set up a data	source.	
	Name	Versi ^	
	Microsoft Access Driver (*.mdb, *.accdb)	16.0	
011 0	Microsoft Access Text Driver (*.txt, *.csv)	16.0	
	Microsoft Excel Driver (* xls, * xlsx, * xlsm, * xlsb)	16.0	
	ODBC Driver 13 for SQL Server	2017	
	ODBC Driver 17 for SQL Server		
	Oracle in OraDB12Home1	Not	
	Oracle in OraDB12Home2	12.0 🗸	
		>	
	< Back Finish	Cancel	

Figure 3.4.3

The next dialog, which is DBMS-specific, allows you to specify the Data Source Name and the location of your database.

ODBC Microsoft A	access Setup	? ×
Data Source Name:	PilotKC	ОК
Description: Database	Urban Drainage Data Pilot_Data_KC	Cancel
Database: Select	Create Repair Compact	Help Advanced
System Database		
None		
◯ Database:		
	System Database	Options>>

Figure 3.4.4

Enter the data source name and the description of the database. In figure 3.4.4: "PilotKC" and "Urban Drainage Data Pilot\_Data\_KC"

After choosing the Database Select option a dialog will appear as depicted in figure 3.4.5. Select with this dialog the earlier created database file.

er DSN	System	DSN File DS	SN Drivers Tr	racing Connection	n Pooling Ab	out		
Jser Data	ODBO	C Microsoft A	ccess Setup			?	×	
Name dBASE F		Select Data	base			;	×	
denhelde Excel File exxon kurt MS Acce Oracle SQLEXP tb infra <	Data	Database Na Pilot_Data_I Pilot_Data	KC.mdb	Directories: c:\brutisdata Pilot_Da		OK Cancel Help Read Only Exclusive		
	00	List Files of T Access Data	ype: abases (*.m⊨ ∨	Drives:	ws 🗸	Network Optio	ins>>	

Figure 3.4.5

Once you have specified the Data Source Name, the driver, and the database location you are ready.

#### 3.5 Connecting a GPS antenna

For Global Positioning with BRUTIS, you can use:

- The Garmin GPS 18x<sup>2</sup> antenna connected to an available USB port as depicted in figure 3.5.1; •
- A GPS antenna using NMEA-0183 protocol connected to an available serial port;



Figure 3.5.1

<sup>&</sup>lt;sup>2</sup> The Garmin USB 18x is no longer supplied by Garmin

#### Garmin GPS 18x

Drivers are available on www.garmin.com for use on Windows computers.

#### GPS antenna using NMEA-0183 protocol

For working with these antennas, you need to start BRUTIS with the "gpsport" command line argument with the serial port used for the connection. For example:

	SCOPE Users
"C:\Kikker\Kikker.exe" gpsport=COM1:	Manua
	—

Don't forget the double points ":" after the port name.

When the command line argument is specified, BRUTIS reads automatically the data received through the defined serial port.

#### **Global Positioning**

BRUTIS starts reading the GPS antenna:

- After start-up and antenna is connected
- choosing BRUTIS menu option: "Display / Find GPS Position"
- choosing BRUTIS menu option: "Display / Display Options"

BRUTIS checks the serial port for valid data if the command line argument: "gpsport", is specified. If not specified BRUTIS checks the USB port if there is a Garmin USB 18 connected.

After start-up BRUTIS searches automatically a connected antenna. When a antenna is found BRUTIS displays a notification dialog as depicted in figure 3.11. After clicking **OK** BRUTIS starts reading the position data.

Direct after start up:

- The antenna acquires satellites. The correct position will not be found immediately. The type of position fix will be 1.
- BRUTIS displays the GPS position at the last known position when it had a good satellite reception. (When the fix was 2 or 3).

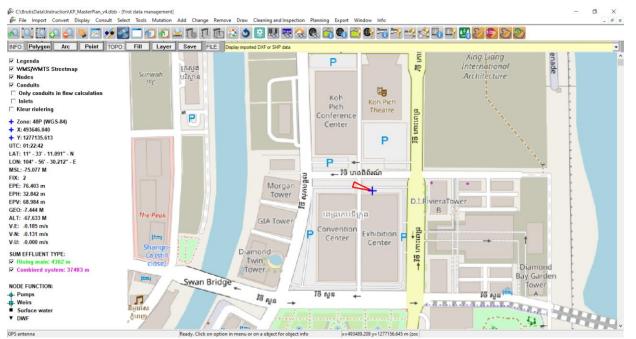
Wait until BRUTIS displays a fix 3 position quality. In most cases the acquire time takes less than a minute. (Although the initial satellite acquire out of the box takes about ten minutes.)

GPS antenna : 3981107818	×
GPS 18x USB Software Version 2.60	
ОК	

#### Figure 3.5.2

Check your current position on overhanging trees, rocks or buildings, if no correct position data is found.

When the GPS antenna has a good reception it sends the latitude and longitude to BRUTIS. BRUTIS converts the received data to UTM zone and coordinates. BRUTIS zooms in on the location and displays the coordinates and received information from the antenna as depicted in figure 3.5.3.





GPS Antenna information:

- Zone: The UTM zone notification and used translation type (WGS-84 in this example)
- X,Y: The UTM coordinates of the zone in meters
- UTC: UTC Time
- LAT: Latitude in degrees minutes and seconds
- LON: Longitude in degrees minutes and seconds
- MSL: Height of WGS84 ellipsoid above Mean Sea Level MSL (meters)
- FIX: Type of position fix (0 = no fix; 1 = no fix; 2 = 2D; 3 = 3D)
- EPE Estimated position error (meters)
- EPH Estimated position error, horizontal only (meters)
- EPV Estimated position error, vertical only (meters)
- GEO Altitude above WGS 84 ellipsoid (meters)
- ALT Height of WGS84 ellipsoid above MSL (meters)
- V-E Velocity east (meters/second)
- V-N Velocity north (meters/second)
- V-U Velocity up (meters/second)

The usage of the default (WGS-84) parameters for latitude/longitude conversion to UTM zone and coordinates is possible via the usage of command line arguments (See chapter 3.3).

### 4 Getting started

#### Contents

- Installing BRUTIS (global)
- Starting BRUTIS
- Opening files and importing Data
- Display options

#### 4.1 Installing BRUTIS (global)

Simply copy the BRUTIS64.exe file to a working or project directory on your operating system. The BRUTIS64.exe has an icon as depicted in figure 3.1. In chapter 3 you will find detailed installation information.

#### 4.2 Starting BRUTIS

Double-click on the BRUTIS Icon.

When you first start BRUTIS, you will see the welcome dialog as shown in figure 4.2.1

Best Rational Urban Tech Information System (BRUTIS)         Networks/Sewerage/Drainage/Gullies         Directory       File       Database       Protocol: HTTP[S], cloud, etc.]         Directory       File       Database       Protocol: HTTP[S], cloud, etc.]         Directory       File       Database       Protocol: HTTP[S], cloud, etc.]         Directory       Choose work file:       Pilot_Data_KC.dbb           Do you want to display coordinates?       Please enter UTM zone letter and number for drawing coordinates. Use menu option: Mutation -> Show Mutations from file, to enable mutation options.         Long. projection zone: [1 to 60]:       48       +         Lat. projection zone: [C to X]:       P       +         See the info window for copyrights.       See the info window for copyrights.	Welcome using B	RUTIS version: (	6.2ib(odb	-std-64), Kingd	om of Cambodia		×
Directory         Choose work file:       Pilot_Data_KC.dbb         Do you want to display coordinates? Please enter UTM zone letter and number for drawing coordinates.         Use menu option: Mutation -> Show Mutations from file, to enable mutation options.         Long. projection zone: [1 to 60]:       48         Lat. projection zone: [C to X]:       P							
See the info window for copyrights.		Directory Choose we Do you wa coordinate Use menu Long. proje	ork file: ant to dis es. option: l ection zo	Pilot_C play coordinat Mutation -> SI one: [1 to 60]:	Data_KC.dbb tes? Please enter UTM zone letter and now Mutations from file, to enable mut 48		wing
Help OK Exit			nfo windo	ow for copyrigh	ts.	ок	Exit

Figure 4.2.1

The welcome dialog has the following 4 tabs:

- **Directory**, you can select a work-file in the folder where BRUTIS64.exe is installed or in the folder defined behind command line argument: address;
- File, you can select a work-file, or other suitable file type, from your computer;
- **Database**, you can connect to a database, after which the program will build a work file from this database and display the data from this file;
- **Protocol**, you can connect to the BRUTIS Cloud, after which the program downloads a work-file and displays the data from this file;

Set the correct UTM Zone for displaying the correct coordinate system and the maps from openstreetmap.org. The correct UTM zone for Cambodia is: 48N.

The [OK] button starts the creating of a working fle (when tab: Database or Protocol, is selected) en displays the data in the work-file or other selected file type.

The [Exit] button exits the program.

#### Database

This tab is used for connecting with a database. When you want to connect to an Oracle or SQL-Server database you need to type your UserName, PassWord and ODBC source name. When connecting with a MS-Access file you only need to type the ODBC source name (See chapter 3.3 or figure 3.5).

For example, type in the ODBC Source name created in chapter 3.5. And click on: On-Line

BRUTIS checks if the database has tables for strategic, tactical and operational planning. If not, you will see a dialog as depicted in figure 4.2

Welcome using B	3RUTIS version: 6.2ia(odb-std-64), Kingdom of Cambodia	×
	Best Rational Urban Tech Information System (BRUTIS)	
	Directory       File       Database         Database       UserName:         PassWord:       (ODBC) source name:         PilotKC (Microsoft Access Driver (*.mdb, *.accdb))         Do you want to display coordinates?         Please enter UTM zone letter and number for dr coordinates.         User menu option:         Mutation -> File, to enable registration options, or open datafiles.	rawing
	Long. projection zone: [1 to 60]: 48 Lat. projection zone: [C to X]: P Status Database No tables for strategic, tac planning. Install extra tables.	imes
	Help OK	OK Cancel



Set the check-box on for automatically installing these tables. And Click on OK.

BRUTIS creates automatically new work-files if the database contains drainage data.

If the database has no data the dialog in figure 4.3 appears.

No database with o	bjects	$\times$
Select work file?		
Yes	No	

Klik [Yes] to change tab, to select a work-file.

#### Display data without Global Positioning System (GPS)

BRUTIS displays data from work-files if available. If there are no work-files available a window will appear as depicted in figure 4.3.

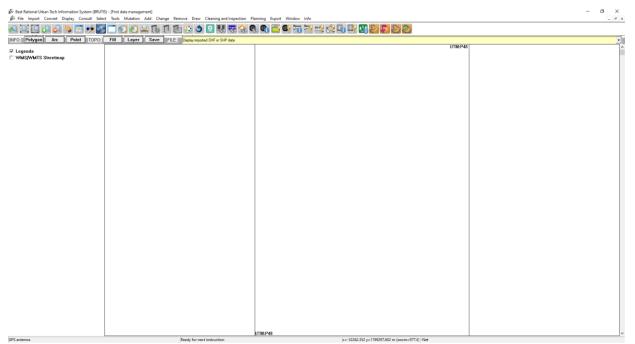


Figure 4.3

#### **Display data with GPS**

BRUTIS automatically starts reading the GPS antenna if the GPS antenna is connected (see chapter 3.5)

When an antenna is found BRUTIS displays a notification dialog as depicted in figure 3.5.2. After clicking **OK** BRUTIS starts reading, and displays the last known position when the GPS fix is 1. Wait for a fix 2 or 3. Fix 3 normally gives an acceptable actual position. In most cases the acquire time takes less than a minute. (Although the initial satellite acquire out of the box takes about ten minutes.)

SCOPE Users Manual

SCOPE Users Manual

## 5 Opening and importing files

BRUTIS is a multi-windows program. Each window represents a file. Each file represents an Urban Drainage Network.

The first window (the start-up window) is called: "First data management". In this window you can create or import a mutation-file for experimenting, prototyping or collecting data.

#### Contents

- Open and read from files
- Import data from files
- Mutation (global)
- Save in work file or database
- Initial creating tables and data storage to database

#### 5.1 Open and read from files

Opening and reading a file can be started in several ways:

- choosing BRUTIS menu option: "File / Open";
- clicking on the toolbar button: "**Open**".

BRUTIS displays the data from the opened files in a new window with the filename as window title. An exception is the opening of a BRUTIS data file (.KIK) with nodes or gullies. When the "First data management" window has no nodes or gullies the data will be imported in this window without the creation of a new window.

BRUTIS opens, reads and displays data from files with the extensions:

- KIK BRUTIS data file with Urban Drainage Network in Comma Separated Format (CSV);
- SUF Inspection data (Used in the Netherlands);
- CYC Cyclone hydraulic calculation data;
- HYD Sobek hydraulic calculation data;
- TXT Mouse hydraulic calculation data (old format);
- UND Mouse hydraulic calculation data (only objects);
- MEX Mouse hydraulic calculation data (objects and catchments);
- DSD InfoWorks hydraulic calculation data (old format). New format via importing CSV files choosing menu option: "Import / CSV Object Data...);
- BMP Bitmap. Geo referenced when: ".bpw" world file available in same directory;
- JPG Or JPEG. Geo referenced when: ".jgw" world file available in same directory;
- PNG Portable network Graphics. Geo referenced when: ".pgw" world file available in same directory;
- EMF Enhanced Metafiles and Windows Metafiles

#### 5.2 Import data from files

Importing data can be started choosing BRUTIS menu option: "Import" followed by one of the following options:

- From Database
- GML, DXF or SHP topography
- ECW, BMP, PNG, JPG, GIF, ICO, EMF or WMG Image
- Exchange format Inspection File / Start

• CSV Object Data / Start.

#### **From Database**

This option is used if you want to import drainage data from database:

- to add the data to the current data
- replace the current data with data from the database.

If not connected a dialog will appear as depicted in figure 5.2.1

Connect with database	
erName:	
PassWord:	
DataSource:	PilotKC (Microsoft Access Driver (* 💌
	OK Cancel

Figure 5.2.1

After connecting to the database, the window according to figure 5.2.2 appears, in which it is indicated which management system has been found.

Status Database	×
Managementsystem:	BrutIS
Inclusive extra tables fo operational planning.	r strategic, tactical and
	OK

Figure 5.2.2

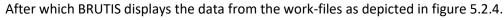
After which a new work file is created behind the scenes. And a window (figure 5.2.3) appears asking if you want to add the found data or replace the current data.

Import network/data		×
Add network/data?		
Yes	No	

Figure 5.2.3

scope Users Manual

scope Users Manual





#### GML, DXF or SHP topography

BRUTIS has the ability to import multiple KML files (.kml), GML files (.gml), cad files (.dxf) and ESRI shape files (.shp). The user uses the topography for:

- display behind the urban drainage;
- convert data from geometry to urban drainage;
- digitizing data from the topographic. The user has snap options on circles and near and endpoints of lines;
- converting straight conduits between nodes to curved/bended conduits. Useful for digitizing rising mains;
- registration of catchments;
- divide the catchments areas to the nodes by creating Voronoi Diagrams;
- selecting conduits in shapes (.shp) or closed polygons (.dxf).

After selecting the: "**Import / GML**, **DXF or SHP topography**", option the user selects a file with the import DXF or SHP file dialog.

If a cad file (.dxf) is selected a dialog, depicted in figure 5.2.5 will appear.

GML, DXF of SHP to	pography	×		
Options:				
Close importe	d DXF lines			
Search for be	nded lines			
Always display topo and text				
Pen Description:				
	Color			
Line type:	Solid 👻			
Width	1 -			
Help	ОК	Cancel		

Figure 5.2.5

If a ESRI shape files (.shp). is selected a dialog, depicted in figure 5.2.6 will appear.

Appendix D describes an example of how to convert data from geometry to the BRUTIS Model.

For very large topographies, building the display can take a very long time. This can be accelerated by giving the "slowtopo" option a zoom factor between 0.1 and 2, via the menu option: **Tools -> Start options**. For example, slowtopo=1. This option only displays the topography at the specified zoom factor.

ile:	C:\Projects\cambodia\Pilot_Data_KC\Shapefiles\Drainage.shp				
antal objecten:	96		ID: Field with unique identification of the shape. Value must be less then 9		
Translate values	in file:		characters.		
	Fieldname in shape		Layer name: Field with layer name of geometry.		
D:		•	goomony.		
_ayer:	Descriptio	-			
Source:		-	Source: Field with source holder code of		
Time:		•	geometry.		
Status:	, 	-	Time: Field with mutation date and time.		
BeginDate:		-	Status: Field with status geometry.		
EndDate:		-	Status. Field with status geometry.		
Options:			_ Enddate: Field with optional termination		
	ay topo and text		date.		
Search for be	nded lines				
Compare ID v	vith met GUID		Help		
Pen Description			J		
'					
	Color				
Line type:	Solid -				
Width	3 🗸		OK Cancel		

#### ECW, BMP, PNG, JPG, GIF, ICO, EMF or WMG Image

Another option available to users is the ability to add background images for display behind the urban drainage schematic.

Importing ECW data is the best solution to display background maps.

In other formats the software will automatically look for a companion file to the image, called a world file. This file contains information about the image, including the coordinate system and the extents of the image. If the world file is not available a dialog will appear as depicted in figure 5.2.7. in this dialog the user enters the coordinates of the pictures and the x-y scale factors. Several graphical formats are supported for background maps , including: .bmp and .jpg/jpeg.

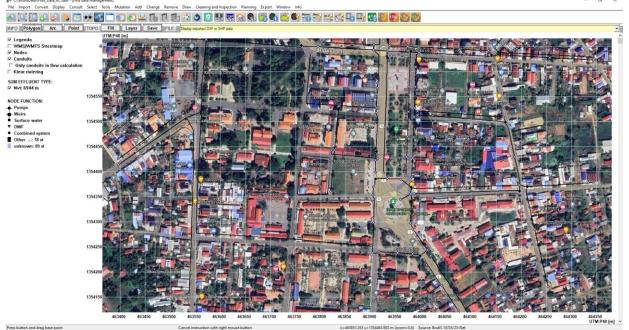
An example of the	usage of	background	images is	depicted	in figure 5.2.	8
-------------------	----------	------------	-----------	----------	----------------	---

BMP,PNG,JPG,GIF,ICO,EMF or WMF Image	ge
V fort- unred for-	463276.606
X coordinate upperleftcorner [m]:	
Y coordinate upperleftcorner [m]:	1354729.57
X scale factor in m/pixel:	0.580418
Y scale factor in m/pixel:	-0.568747
	OK Cancel

#### Figure 5.2.7

Menu option: "File \ Create GeoReference File", enables the user to create a world file by digitizing 2 points with known coordinates on the background image.

- ø ×





#### **Exchange format Inspection File**

The exchange of inspection data is based on the NEN-EN 13508-2+A1 Investigation and assessment of drain and sewer systems outside buildings - Part 2: Visual inspection coding system.

The user adds inspection data from standard inspection file formats to the urban drainage schematic. The software checks the inspection data end connects the data to the conduits. BRUTIS uses the inspection data for:

- automatic reviewing and selecting conduits on repair or rehabilitation measurements, with decision support system (DSS);
- displaying location of damages in conduits in combination with video and photographic details.
- manual reviewing conduits and planning of tactical measurements

Inspection data can also be imported via CSV or mutation-files.

An example of the usage of inspection data is depicted in figure 5.2.9.

#### **CSV Object Data**

This option allows you to import spreadsheet data. The spreadsheet must be in the Comma Separated Value (CSV) format. Most spreadsheet programs and some hydraulic calculation programs like InfoWorks and Sobek can read and write this format. These programs convert existing listings of data to CSV format, which you import in a BRUTIS.

The import of CSV data is documented in appendix B. Appendix D reports an example.

The "Import / CSV Object Data" option has a direct link with the available "Export / CSV Object Data" options. All exported CSV data can be imported directly in BRUTIS, because the CSV headers area known. For a complete overview of the export and import possibilities you should try all options under: "Export / CSV Object Data", and open the resulting CSV export files in a spreadsheet program.

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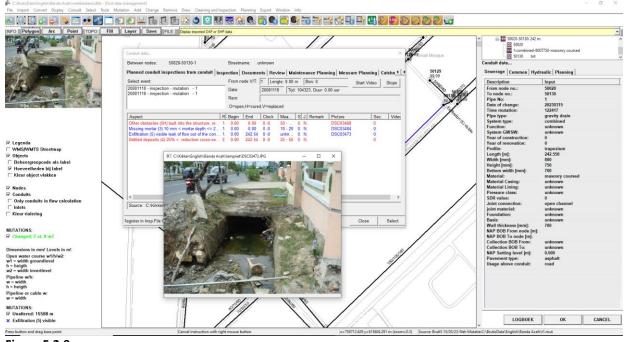


Figure 5.2.9

If the CSV Object data does not have known headers, the program asks what kind of objects it concerns. According to the window in figure 5.2.10.

After choosing the object type, the appropriate window appears to indicate how to copy the CSV data into the BRUTIS model.

In figure 5.2.12. the window of the nodes and in figure 5.2.13 the window of the pipes.

The "how to copy" data is saved in an integration file, for use next time. With the window shown in Figure 5.2.11

Nodes from geom/csv/json/xml		
Save integration passport?		
Yes No		



Objects from geom/	csv/json/xml	×			
Options:					
C Objects					
C Trees-green					
C Masts-furnitur	e				
C Armatures					
C Signs					
C Populations					
C Installations					
○ Road-parts					
○ Water-parts					
C Construction-	parts				
Nodes (manh	Nodes (manholes)				
C Nodes (gullies)					
C Conduits (drai	ins and culverts)				
C Pumps					
C Valves					
C Sensors					
C Weirs					
C Orifices					
Help	ОК	Cancel			
Figure 5.2.10					

## In figure 5.2.12. the window of the nodes and in figure 5.2.12 the window of the pipes.

Description	Input
Node search distance [m]:	0.810000
Levels divide by::	1.
Dimensions multiply by:	1000.
Node no.: Object no.:	MH_id
nlet pipe GUID:	
Date of change:	
Time mutation:	
Functioning status:	Reason
Node type:	Flow_Comp
Year of construction: Year of renovation:	Const_Yr
Profile:	MH_Shp
Length [mm]:	MH_Dia_L
Width [mm]:	
Height [mm]:	
Surface [m2]: Material:	MH Mat
Material: Material Lining:	MH_Mat Cov Mat
Pressure class:	cov_mat
SDR value:	
Type of cover:	Cov_Shp
Flow profile type:	Com_RinL
Construction equipment:	Cover
NAP Rim [m]: NAP Bottom [m]:	MH_TopL MH_BotL
NAP Water level [m]:	
NAP Setting level [m]:	
Collection of NAP Rand:	
X coordinate [m]:	
Y coordinate [m]: Collection coordinate:	
GUID:	
IMGEO ID:	
WIBON Theme:	
Starting date:	
End date:	
Management group code: Management group name:	
Management group name: Object group code:	
Neighbourhood:	
Street code:	
Place name:	
Street name: House number:	
House number: House Letter:	
Owner:	
Administrator:	
Supplier:	
Clock position number:	
Distance number: Comments:	Image 1
Property_0:	Image_1 Location
Property_1:	Pave T
Property_2:	Deb_Comp
Property_3:	MH_Con
Property_4:	
Property_5:	
Property_6: Property_7:	
Property_8:	
Property_9:	
Head Loss Coeff:	
Close Ratio Hell [m2]:	
Closed Ratio Area [m2]:	
Closed Ratio Exit [m2]: Open.Ratio.Hell [m2]:	
Open.Ratio.Area [m2]:	
Open.RatioOutput [m2]:	
Roof Sloping [m2]:	
Roof Flat [m2]:	
Roof Extended Im21.	>
-	
Contir	nue OK Cancel
igure 5.2.12	

Description	Input
\$Node search distance [m]:	0.100000
Levels divide by::	1.
\$Dimensions multiply by:	1.
From node no.:	
To node no.:	
Pipe No: Data of change:	
Date of change: Time mutation:	
Pipe type:	
System type:	ld
Function:	ld True a
System GWSW:	Type Descriptio
Operating voltage [v]:	Descriptio Condition
Nominal voltage [v]:	Dimension
Year of construction:	
Year of renovation:	
Profile:	
Length [m]: Width [mm]:	
Width [mm]:	
Height [mm]: Diameter [mm]:	
Material:	
Material Casing:	
Material Lining:	
Pressure class:	
SDR value:	
Joint connection:	
Foundation:	
Basis:	
Wall thickness [mm]:	
NAP BOB From node [m]:	
NAP BOB To node [m]:	
Collection BOB From: Collection BOB To:	
NAP Setting level [m]:	
NAP Setting level [m]: Pavement type:	
Usage above conduit:	
GUID:	
IMGEO_ID:	
WIBON Theme:	
Starting date:	
End date:	
Object group code:	
Bem area name:	
Street code:	
Place name:	
Street name:	
Owner: Administrator:	
Supplier:	
Functioning status:	
Drawing number:	
Comments:	
Q-score/KIK-Grade:	
Defect points:	
Action year:	
Action type:	
Action type:	
Action costs:	
Wall roughness bottom [mm]	
Wall roughness above [mm]:	
Flow rate [l/s]:	
Close Ratio Hell [m2]: Closed Ratio Area [m2]:	
Closed Ratio Exit [m2]:	
Open.Ratio.Hell [m2]:	
Open.Ratio.Area [m2]:	
Open.RatioOutput [m2]:	
Roof Sloping [m2]:	
Roof Flat [m2]:	
Roof Extended [m2]:	
Inclined [m2]:	
<	>
Cor	ntinue OK Cancel

#### 5.3 Mutation (global)

With the option "**Mutation / Show mutations from File**" a user creates a new, or open and read an existing mutation-file. After selecting this option, a dialog will appear as depicted in figure 5.3.1

Make mutation file or open existing				×
$\leftarrow$ $\rightarrow$ $\checkmark$ $\uparrow$ $\square$ $\Rightarrow$ This PC $\Rightarrow$ Windo	ows (C:) > BrutisData	ٽ ~	🔎 Search Bru	tisData
Organise 👻 New folder			1	= • II ?
🧊 3D Objects	^ Name	Dat	te modified	Туре
🦲 Desktop	openstreetmap	15/	03/2023 09:36	File folder
🚆 Documents	Pilot_Data_KC	13/	/03/2023 12:20	File folder
🕂 Downloads				
👌 Music				
Pictures				
📔 Videos				
Lindows (C:)	v <			>
File name: mutation		~	(*.mut;*.rev)	~
			Open	Cancel

Figure 5.3.1

All data in the mutation-file format is coded in a header line. An example of a file in this format is given in figure 6.1.1

Because BRUTIS does write data directly in a mutation-file and not directly in the database the user cannot damage important data. The user is able to experiment, prototype or collect data in a mutation-file without database connection.

In a shortcut you can use the command line argument: "mut=" to start your BRUTIS with a mutation-file (See chapter 3.2). Or define a mutation file name after start option mutfile. To make life easier when a user collects or digitizes data.

For example, in the command-line:

"C:\BrutisData\BrutIS64.exe" mut=C:\BrutisData\mutation_01.mut

For example, in the window after menu option: "**Tools / Start options**", depicted in figure 5.3.2.

Optie	Starten met		
dbffield			
dbfactief			
coordsys	EPSG:28992		
images			
docu			
bmpmap			
rvvmap			
ecwmap			
csvmap			
lstmap			
dxfmap			
xmlmap	C:\Projecten\xml		
bgtmap	C:\Projecten\xml		
revmap			
tmpmap			
spot			
dxf	topo.lst		
mutfile	C:\BrutisData\mutation_01.mu	t	
reusenr	0		
ribdrive			
		OK	Cancel

#### Create a new mutation-file

Type in the: "Make mutation-file or open existing", dialog the name of the file. After clicking **OK**, a dialog will appear as depicted in figure 5.3.3. In this dialog the user defines the header information of the mutation-file.

#### Open and read an existing mutation-file

After opening an existing file BRUTIS changes the data initially read from work-files or a BRUTIS file, with the data read from the mutation-file. When no initial data is read all data is new.

Mutation File Information	×
Inspector information:         Inspector:         Inspector:         Company:         Projectmanager:         Date: [YYYY-MM-DD]         2023-03-19         Project information:         Authority:         Kingdom of Cambodia         Project/Contract         Company Code:         Code client:	General: Field seperator: , Number mutations: Insert: Update: Delete: Nodes: Delete: Conduits: Delete: Gully: Delete: Connect.: Delete:
Cleaning data: Applied cleaning pressure in Bar: Type of nozzle: License plate vacuum truck or combi: High pressure unit license plate: Deposit slip number:	Cancel OK



#### After creation / opening

BRUTIS writes all inputted data directly in the mutation-file and saves the data automatically.

#### 5.4 Save to work file or database

Save the BRUTIS model to a work file or database after mutation or converting data from files.

- Save to a work-file via menu option: "File / Save As / Work-File", so that the data obtained can be opened and viewed directly from the work file, immediately from now on.
- If a database is available. Via menu option: Mutation / Move mutation to database / Check mutations. After entering the database connection data, BRUTIS connects to the database and checks whether the changes can be implemented. If the data is acceptable menu option: Mutation / Move mutation to database / Move mutation to database, becomes available to store the data in the database.

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#### Transferring data to the database

When a mutation is finished the database administrator transfers the data from the mutation-file to the database with the option: "Mutation / Move Mutations to database / Check mutations".

After selecting this option the following communication between user and software is started:

- When BRUTIS is not connected to a database a dialog will appear as depicted in figure 5.4.1. In this dialog the user specifies the Data Source Name, and username/password if needed, and clicks on **OK**.
- BRUTIS confirms the database connection with a dialog depicted in figure 5.4.2. If no tables for strategic, tactical and operational planning are found. Confirm this by clicking the check box and click on **OK**. Next time these tables are found and the dialog in figure 5.4.3 wil be shown.
- 3. The results of the mutation to database check are displayed via notepad, as depicted in figure 5.4.4.
- After step 3 menu acceptable menu option: Mutation / Move mutation to database / Move mutation to database, becomes available to store the data in the database.
- 5. BRUTIS transfers the data from mutation-file to temporary tables in the database. In the dialog depicted in figure 5.4.5., the user monitors the data transfer.
- 6. After storing the data to the database a dialog is shown, figure 5.4.6, asking if the work-file has to be updated with the database data.
- After the actions above BRUTIS makes a new work-file with actual data from the database, and displays the contents of the work-file.

Connect with data	base				
erName:					
PassWord:					
DataSource:					•
				_	
			OK	С	ancel
Figure 5.4.1					
Status Databas	e				×
Management	system:	BrutIS			
Exclusive extr operational pla		for strategic	, tactica	al and	
✓ Install extra	a tables.				
		OK		Can	cel
Figure 5.4.2					
					×
Status Databas	e				
Status Databas		-			
Status Databas Managements Tables for bes system (Bruth	t rational	BrutIS urban techr	nology in	nformatio	on
Managements	t rational	1	nology in	nformatio	
Managements	t rational	1	nology in		
Managements Tables for bes system (Brutl	t rational S).	urban techr	nology in	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3	t rational S). atie.log - 1	urban techr	nology in [		
Managements Tables for bes system (Brutl	t rational S). atie.log - f rmat Vie	urban techr Notepad ew Help	nology in [ 	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3 CheckMuta File Edit Fo CONTROL CHAN New Domain V	t rational S). atie.log - I rmat Vid IGES TO I	urban techr Notepad ew Help	nology in 	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3 CheckMuta File Edit Fo CONTROL CHAN	t rational S). atie.log - I rmat Viu IGES TO I 'alues :	urban techr Notepad ew Help	nology in	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3 CheckMuta File Edit Fo CONTROL CHAN New Domain V New Sorts: New admin gr New basins:	t rational S). atie.log - I rmat Vid IGES TO I 'alues: roups:	urban techr Notepad ew Help DATABASE :	nology in	Ok	(
Managements Tables for bes system (Brutl Figure 5.4.3 CheckMuta File Edit Fo CONTROL CHAN New Domain V New Sorts: New admin gr New basins: New neighbou New town nam	t rational S). atie.log - 1 rmat Vid IGES TO 1 ralues: roups: inhoods/i ies:	urban techr Notepad ew Help DATABASE :	nology in [	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3 CheckMuta File Edit Fo CONTROL CHAN New Domain V New Sorts: New admin gr New basins: New neighbou	atie.log - I atie.log - I rmat Vid IGES TO I 'alues: roups: inhoods/i ies: iames:	urban techr Notepad ew Help DATABASE :	nology in 	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3 CheckMuta File Edit Fo CONTROL CHAN New Domain V New Sorts: New admin gr New basins: New neighbou New Street n New Addresse Control Node	t rational S). atie.log - 1 rmat Vie IGES TO 1 /alues: roups: amess: .s:	urban techr Notepad ew Help DATABASE :	nology in [	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3 CheckMuta File Edit Fo CONTROL CHAN New Domain V New Sorts: New admin gr New Joasins: New admin gr New basins: New admin gr New street n New Street n New Addresse Control Node Dele Add	t rational S). atie.log - 1 rmat Vid IGES TO 1 /alues: roups: irhoods/i les: lames: is: s: te: 0	urban techr Notepad ew Help DATABASE :	nology in [	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3 CheckMuta File Edit Fo CONTROL CHAN New Domain V New Sorts: New admin gr New Joasins: New admin gr New basins: New admin gr New street n New Street n New Addresse Control Node Dele Add	t rational S). atie.log - 1 rmat Vid IGES TO 1 ralues: voups: vou	urban techr Notepad ew Help DATABASE :	nology in [	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3 CheckMutt File Edit Fo CONTROL CHAN New Domain V New Sorts: New admin gr New basins: New Addresse Control Node Dele Add Controle lei Dele	t rational S). atie.log - I rmat Vid IGES TO I falues: roups: irhoods/ ies: ames: s: te: 0 igg : 0 dingen: te: 0 : 0	urban techr Notepad ew Help DATABASE :	nology in 	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3 CheckMutt File Edit Fo CONTROL CHAN New Domain V New Sorts: New admin gr New basins: New Addresse Control Node Dele Add Controle lei Dele	t rational S). atie.log - 1 rmat Vid GES TO 1 (alues: oups: urhoods/i les: ames: ss: te: 0 : 0 ge : 0 dingen: te: 0 : 0 ge : 1 atie.log - 1 : allatio	urban techr Notepad ew Help DATABASE : areas :	nology in 	Ok	(
Managements Tables for bes system (Bruth Figure 5.4.3 CheckMuta File Edit Fo (CONTROL CHAN New Domain V New Sorts: New admin gr New Jonain V New Sorts: New admin gr New basins: New admin gr New sorts: New Addressee Control Node Add Chan Control Inst	t rational S). atie.log - I rmat Vid IGES TO I ralues: oups: oups: arhoods/ res: armes: s: s: s: s: s: s: s: s: s: dingen: te: 0 ge : 1 allatio	urban techr Notepad ew Help DATABASE : areas :	UTF		(

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Networks/Sewerage/	Drainage (Gullie	e			USM (Urban Space Man	agement) —			
vetworks/sewerage/	□ Insert: -	。 □ □ Update: -	Delete:	Error:	USH (Urban Space Han	Insert: -	Update:	-Delete:	Error:
lodes	0	0	0	0	Objects	0	0	0	0
Conduits	0	1	0	0	Trees	0	0	0	0
Gullies	0	0	0	0	Construction Parts	0	0	0	0
leasure Data	0	0	0	0	Post/furnature	0	0	0	0
umps	0	0	0	0	Road Section	0	0	0	0
alves	0	0	0	0	Water Object	0	0	0	0
ensors	0	0	0	0	Armatures	0	0	0	0
Veirs	0	0	0	0	Traffic Signs	0	0	0	0
Drifices	0	0	0	0	Populations	0	0	0	0
nstallations	0	0	0	0	Small	0	0	0	0
Inspection	Tasaatu	Update: -	Delete:	Error:	Inspection	Tananti	Update:	-Delete:	Error:
iles	Insert:	0	0	0	Files	Insert:	0	0	0
	0	0	0	0		0	0	0	0
)bjects )bservations	0	0	0	0	Objects Observations	0	0	0	0
USEI VAUOIIS	Ŭ	Ŭ	Ŭ	Ŭ	Observations	•	Ŭ	Ŭ	U
Code and Type Lists	_Insert: _	Update: -	1						
Streetnames	0	0							
dresses	0	0							
Object Groups	0	0							
Projects	0	0							
-									
			]						
nstallation tables									OK

Check mutations	$\times$
Import from database to new work-file?	
Yes No	

#### Figure 5.4.6

The work-file has the same name as the MS-Access database file, database name using SQL-Server or Username using a Oracle database.

Mutations have to be done on the work-file imported from the database. If another work-file is used with for example extra data, all these data will also be stored in the database! If the work-file has another name the dialog depicted in figure 5.4.7 will be shown.

¢

Username does not match work file!	$\times$
Risk of registration in wrong database. Do you want to continue?	1
Yes No	

Figure 5.4.7

The same procedure can be followed for an initial database filling.

After the data transfer the mutation-file can be placed in a backup directory. For next updates, inserts and deletions of data the user must create a new mutation-file. **Don't go on with a mutation-file with transferred data!** 

#### 5.5 Initial creating tables and data storage to database

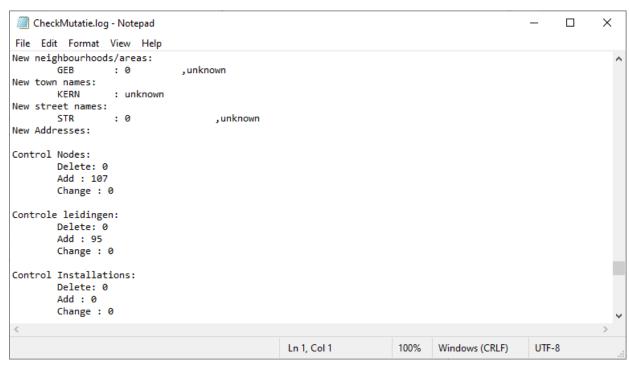
		1	1				and the second
	Connect with da	itabase					
	UserName:						
	PassWord:						
	DataSource:		Pilot	KC (Micro	soft Acc	cess Di	river (* 💌
7					ОК		Cancel
Status [	Database			_	×		
	les for best ratior ation system (Bru		nology				
□ Inst	all extra tables.						
		ОК		Cancel			

Mutation / Move Mutations to Database / Check Mutations

Status Database		×
No tables for best rationa information system (Brut		ду
☑ Install extra tables.		
	ОК	Cancel

Username does not match work fil	e!	×
Risk of registration in wrong datab	oase. Do you want to	o continue?
	Yes	No

CheckMutatie	log - Notepad				_		$\times$
File Edit Form	at View Help						
CONTROL CHANGE	S TO DATABASE:						^
New Domain Val	ues:						
STY	: unknown						
STY	: combined						
STY	: wastewater (dwf)						
STY	: surface water						
STY	: trade effluent						
STY	: culv.watercourse						
STY	: pipe						
STY	: open channel						
MAT	: unknown						
MAT	: concrete						
MAT	: pvc						
MAT	: clay						
MAT	: cast iron						
MAT	: masonry uncours.						
MAT	: polyethylene						
MAT	: steel						
MAT	: masonry coursed						
MAT	: rcc						
< .	· · · · · · · · · · · · ·						
						_	
		Ln 1, Col 1	100%	Windows (CRLF)	UTF-	8	





#### Mutation / Move Mutations to Database / Move Mutations to Database

Username does not match work file!	×
Risk of registration in wrong database. Do you wan	to continue?
Yes	No

Networks/Severage/Dranage/Gulles         Uddate:         Delete:         Conduts         Delete:         Insert:         Uddate:         Delete:         Conduts         Delete:         Delete:	>							e	KIK/Databas	om/to CSV/I	Results Import/Export fro
Indes       107       0				nent) —	nagem	USM (Urban Space Ma				nage/Gullies -	Networks/Sewerage/Drain
Conduits         95         0 <t< td=""><td>Error:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Error:										
Gulles       0	0	-	-	-		-	-	-			
Measure Data       0	0		-		-			-	-		
Pumps         0<	0	-	-	-			-	-			
Valves       0	0	-	-	-		11 · ·	-	-			
Sensors       0	0	-	-					-	-	-	
Wers         0 </td <td>0</td> <td>-</td> <td>-</td> <td></td> <td></td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td>	0	-	-			-	-	-			
Orifices         0 <th< td=""><td>0</td><td>-</td><td>-</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	0	-	-	-							
Installations       0       0       0       0       Small       0       0       0         Inspection       0	0	-	-	-	-	-	-	-	-	-	
Inspection       Insert:       Update:       Delete:       Error:       Inspection       Insert:       Update:       Delete:       0	0	0	0	)	0	Populations	0	0	0	0	
Insert:       Opdate:       Oelete:       Pror:       Insert:       Opdate:       Oelete:       O </td <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>Small</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>Installations</td>	0	0	0	0	0	Small	0	0	0	0	Installations
Insert:       Opdate:       Oelete:       Orror:       Insert:       Opdate:       Oelete:       O<											
Objects 0<	Error:	Delete:	Update:	insert:		Inspection	Error:	Delete:	Update: -	Insert:	inspection
Observations       0	0	0	0	)	0	Files	0	0	0	0	Files
Code and Type Lists       Insert:       Update:         Streetnames       1       0         Adresses       0       0         Object Groups       0       0         Projects       0       0         Installation tables	0	0	0	)	0	Objects	0	0	0	0	Objects
Streetnames     1     0       Adresses     0     0       Object Groups     0     0       Projects     0     0	0	0	0	0	0	Observations	0	0	0	0	Observations
Status Database X									0	0	Adresses Object Groups Projects
Managementsystem: BrutIS	OK					×					
Exclusive extra tables for strategic, tactical and							l and	, tactica		L	_
operational planning. ✓ Install extra tables.										_	

Cancel

OK

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Status Database	>	<
Managementsystem:	BrutIS	
Inclusive extra tables fo operational planning.	r strategic, tactical and	1
		L

Check mutations	$\times$
Import from database to new work-file?	
Yes No	

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## 6 Mutation (detailed)

The creation of mutation-files and the transferring of data from mutation-files to the database are explained in chapter 5.4. and 5.5. This chapter explains some actions between creation and transferring mutation data to the database. The coding system of mutation-files is based on the European Standard EN 13508-2 and is for practical use defined in appendix B and C.

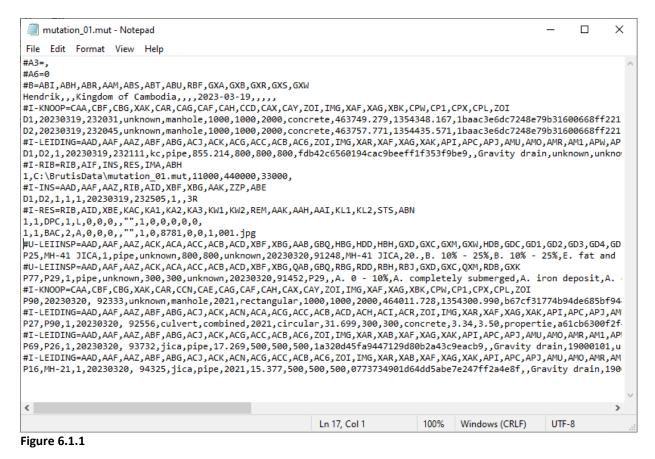
### Contents

- Mutation files
- Conduit Inspection
- Delete Conduit
- Insert Conduit
- Insert Nodes
- Gully Cleaning

### 6.1 Mutation Files

For updating, deleting or inserting data the user must open a mutation-file. With the option "**Mutation / Show mutations from file**" a user creates a new mutation-file or open and read an existing mutation-file. After selecting this option as dialog will appear as depicted in figure 5.3.3.

All data in the mutation-file format is coded with a header line. An example of a file in this format is given in figure 6.1.1.



For example:

"C:\ BrutisData\Brutis64.exe" images=C:\BrutisData\images	SCOPE
Or	≘ s Manua
Start option: images=C:\BrutisData\images	<u> </u>

Because BRUTIS writes data directly in a mutation-file and not directly in the database the user can not damage important data. The user is able to experiment, prototype or collect data in a mutation-file without database connection.

When a mutation is finished the database administrator transfers the data from the mutation-file to the database with the options: "Mutation / Move Mutations to database / Check mutations", followed by: "Mutation / Move Mutations to database / Move Mutations to database ".

### 6.2 Conduit Inspection

With the options under "Cleaning and Inspection" a user adds inspection data to urban drainage schematic.

After selecting this option, the software asks to specify the node from where the inspection is started and the conduit. Select the conduit by clicking on the conduit near the node from which the inspection is started.

A dialog will appear as depicted in figure 6.2.

When there is previous inspection data the data of this inspection is automatically copied in this dialog. The user adds, deletes and updates the inspection data based on the European Standard EN 13508-2 and for practical use on drainage systems defined in appendix C.

Add inspection data by using the next steps:

- 1. Select a damage observation by expanding the list box behind the **Search** field, and select from the listing the observation.
- 2. Select the aspect class of the observation by expanding the list box after the Aspect field.
- 3. Specify the other data belonging to the aspect.
- 4. Click on Insert to Add the observation to the listing of registered observations

- 5. Etc. with next observation
- 6. Commit the action by clicking: **Commit**.

A user can select a observation from the registered observations listing and delete the observation by clicking **Delete** or Update by Clicking **Update** (Button **Insert** is changed in **Update** after selecting a observation)

In figure 5.14 are the results depicted after entering inspection data. Consult the inspection data by selecting the **Logbook** tab in the Conduit info dialog.

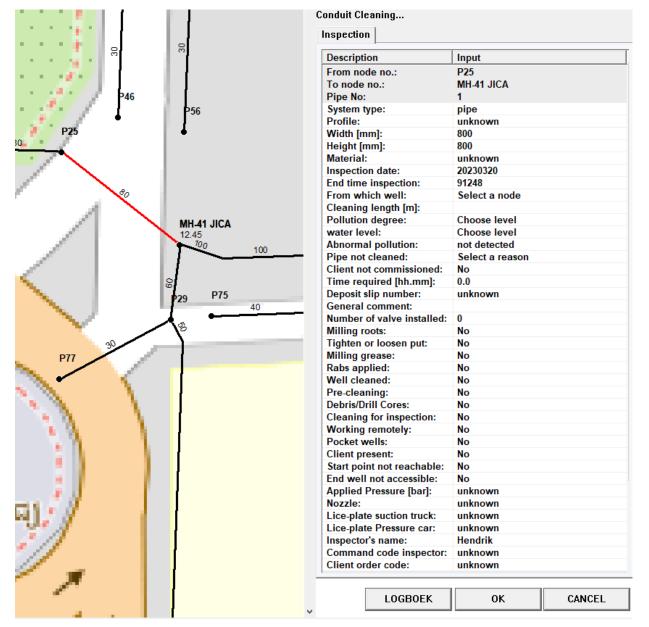


gister inspection Conduit: D1-D2-1-pipe	2
ode number: D1 Coordinates: 463749.279-1354348.167	
onduit Delivery	
Register observation: Search: BAC V Break or collapse V Ref.: 1 Picture: V (* Open	1
Aspect:	
Distance: Cm Clock: Kwant 1 [Getal] C replaced	
Dpm: Kwant 2 [Tekst/Getal] Insert	
Registered observations:	_
Aspect R Begin End Clock Kw1 Kw2 Opmerking S Picture	
General condition (G) not detected        1.       0       0-0       0       0.         Break or collapse (2) pieces of conduit visibly displaced b       1.       0       8781       0-0       0       0.       01.jpg	
Ng.Opm.: Delete	
Select Conduit Close Con	ımi

### Figure 6.2

Reserve memory voor inspections:	
Number pipe/manhole inspections:	11000
	OK

- TO





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~		
MH-41 JICA	Drainage Cleaning	
12.45 700 100	Inspection	
	Description	Input
8 P29 P75	From node no.:	P77
40	To node no.:	P29
	Pipe No:	1
	System type:	pipe
P77	Profile:	unknown
	Width [mm]:	300
	Height [mm]:	300
	Material:	unknown
	Inspection date:	20230320
	End time inspection:	91452
1 1	From which well:	P29
	Cleaning length [m]:	
	Pollution degree:	A. 0 - 10%
	water level:	A. completely submerged
	Abnormal pollution:	A. iron deposit
1. J	Operation after cleaning:	A. drainage is flowing
	Pipe not cleaned:	Select a reason
	Client not commissioned:	No
	Time required [hh.mm]:	0.0
	General comment:	
	Client present:	No
<b>1 1 2</b> <sup>8</sup>		
	LOGBOEK	OK CANCEL

### 6.3 Insert Nodes

Open the "Insert Node" dialog, as depicted in figure: 6.3.1, via button: Insert Node".

or menu option: "Add /

Click on the location of the node before entering the dialog for the direct input of the node coordinates. If the dialog is already entered the cursor has to be positioned in the X- or Y-coordinate field. After the insertion of a node a user can insert the following elements connected to the node:

- Installations by clicking: "Add / Insert Node Elements / Installation"
- Pumps by clicking: "Add / Insert Node Elements / Pump" •
- Weirs by clicking: "Mutation / Insert Node Elements / Weir" •
- Orifices by clicking: "Mutation / Insert Node Elements / Orifice" •

Between two nodes a user can define a conduit.

After selecting option: "Mutation / Insert Node" a dialog appears as depicted in figure 6.9.

//	Insert node Sewerage Common Hyd	
	Description	Input
	Node no.:	P90
• •	Object no.:	
P28	Date of change:	20230320
	Time mutation:	92210
	Functioning status:	unknown
	Node type:	unknown
8	Year of construction:	0
	Year of renovation:	0
P27	Profile:	unknown
	Length [mm]:	0
	Width [mm]:	0
	Height [mm]:	0
	Surface [m2]:	0.00
	Material:	unknown
	Material Lining:	unknown
	Pressure class:	unknown
	SDR value:	0
	Joint connection:	unknown
	joint material:	unknown
	Type of cover:	unknown
	Flow profile type:	unknown
	Construction equipment:	unknown
	NAP Rim [m]:	
	NAP Bottom [m]:	
	NAP Water level [m]:	
	NAP Setting level [m]:	
	Collection of NAP Rand:	unknown
	X coordinate [m]:	464011.728
	Y coordinate [m]:	1354300.990
	Collection coordinate:	unknown
P26		
$\angle$ $\times$ $\times$ .	LOGBOEK	OK CANCEL

Figure 6.3.1

In the dialog the user specifies the node data. The user copies data from another node by clicking on the option: "Data / Nodes" and clicking on an existing node. Al data expect the node number will be copied in to the dialog.

Specify the position of the node by clicking on a position in the GUI eventual using the snap options. When changing a position of an existing node a user must locate the cursor in the X- or Y coordinate field.

After saving the data by clicking: **OK** in the, "Insert node" dialog, the dialog is ready for the next node.

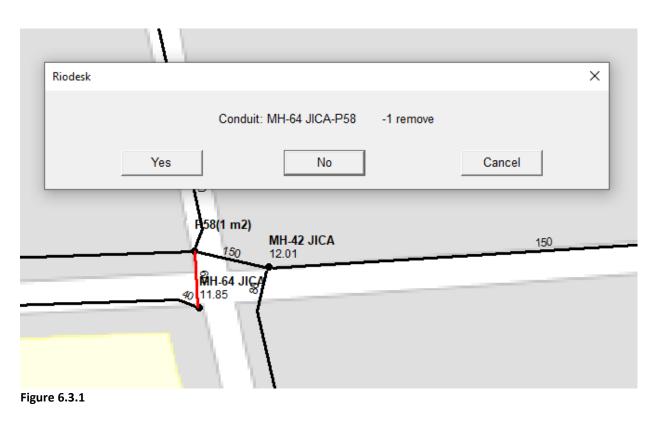
### 6.4 Delete Conduit

With the option "**Mutation / Delete Conduit**" a user deletes a conduit. Nodes can't be deleted if there are still conduits connected.

After selecting this option the software asks to specify the conduit. Select the conduit by clicking on the conduit.

A dialog will appear for confirmation of the removal of the conduit.

Notice the painting of crosses along the removed conduit, depicted in figure 6.4. The conduit will be definitely removed after transferring the deletion action to the database.



### 6.5 Insert Conduit

With the option "**Mutation / Insert Conduit**" a user inserts a conduit. In this chapter we describe the insertion of a curved conduit.

After selecting this option, a dialog will appear as depicted in figure 6.4.1 In the dialog the user specifies the conduit data. The user copies data from another conduit by clicking on the option: "Data / Conduits" and clicking on an existing conduit. Al data expect the node numbers and conduit length will be copied in to the dialog.

If the conduit is a straight line between the nodes, the node can be defined by putting the cursor in the node number fields and clicking on the nodes in the GUI.

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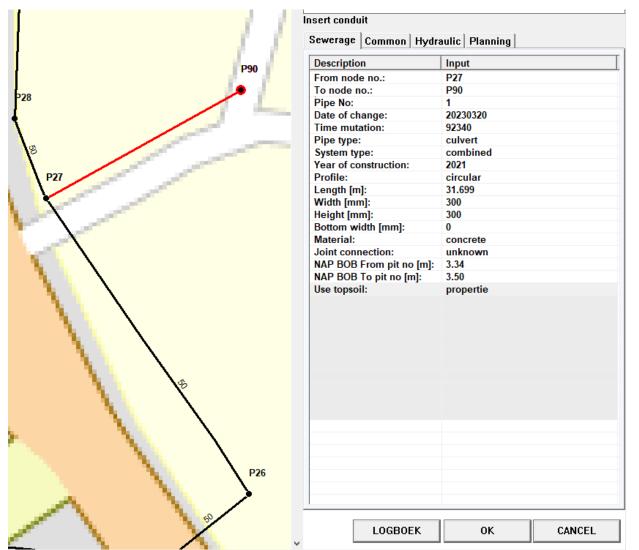


Figure 6.4.1

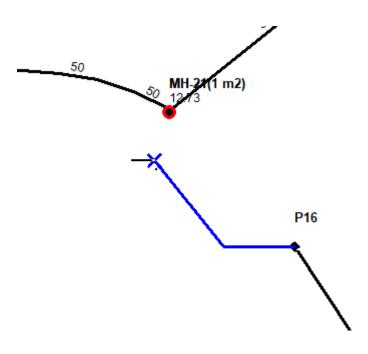
Riodesk				×
	Conduit: P17	-MH-21	-1 For copy info to new conduit	
	Yes		No Cancel	

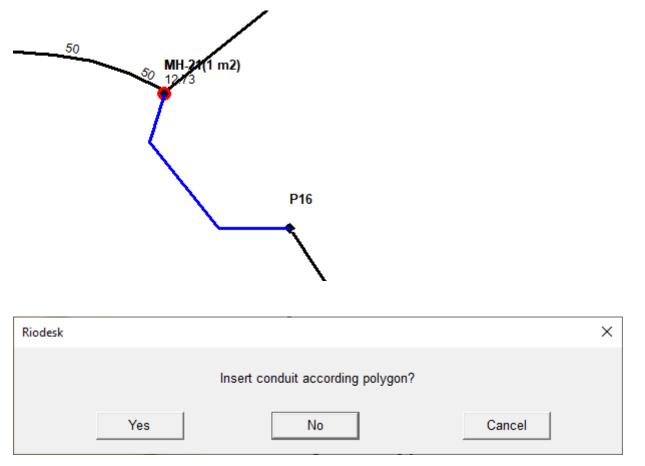
Follow the next steps for entering a curved line between nodes:

- 1. Open the "Snap Options" dialog by performing a right button click in the GUI. A menu will appear as depicted in figure 6.5. Click "**Snap Options**".
- 2. Start drawing a polygon by performing a right button click in the GUI again. Click "Make Polygon".
- 3. Click on the Node snap radio button in the "Snap Options" dialog. Like in figure 6.4
- 4. Click on the from node in the GUI. The software paints the node as if it is selected as depicted in figure 6.5

- 5. Click on the **Direct snap** radio button in the "Snap Options" dialog.
- 6. Specify the route off the polygon by clinking in the GUI. Stop before reaching the to node location. As depicted in figure 6.6.
- 7. Click on the **Node snap** radio button in the "Snap Options" dialog.
- 8. Click on the to node location in the GUI.

Snap Opties			×			
Type UTM coordinates [in m]:						
X: 463999.014000	Y: 1354232.390000 Zon	e: Calc.				
Snap (where):	Snap (on):	Type ETRS89:	Offset			
C Topography	C Coordinate	Lat.: Lon.: h:	Go X			
C Conduits	C On line		Go Y			
C Trees	C Intersection		Rotate			
C GPS position	• Mid of circle	Calc.	Scale			
Node	out along [m]:		Up			
C Snap Off			Down			





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Insert conduit Sewerage Common Hydraulic Planning Description Input MH-21(1 m2) P16 From node no.: 50 MH-21 To node no.: Pipe No: 1 Date of change: 20230320 Time mutation: 93853 Pipe type: unknown System type: unknown Year of construction: 0 P16 Profile: unknown Length [m]: 12.192 Width [mm]: 0 Height [mm]: 0 Bottom width [mm]: 0 Material: unknown Joint connection: unknown NAP BOB From pit no [m]: NAP BOB To pit no [m]: Use topsoil: unknown LOGBOEK 0K CANCEL

### Figure 6.4

Figure 6.5

Figure 6.6

Figure 6.7

The conduit is painted as a curved line. Save the data clicking: OK in the, "Insert conduit" dialog

A dialog will appear as depicted in figure 6.7. for confirmation of the insertion of the conduit according the polygon.

The result is shown in figure	6.8.		
*	Insert conduit Sewerage Common Hydr	aulic Planning	
10	Description	Input	
P16	From node no.: To node no.: Pipe No: Date of change: Time mutation: Pipe type: System type: Year of construction: Profile: Length [m]: Width [mm]: Height [mm]: Bottom width [mm]: Material: Joint connection: NAP BOB From pit no [m]: Use topsoil:	P16 MH-21 1 20230320 93853 jjica pipe 2021 unknown 15.377 500 500 500 500 unknown unknown unknown	
	LOGBOEK	ОК	CANCEL

Figure 6.8

### 6.6 Gully Cleaning

With the option "**Mutation / Gully Cleaning**" a user registers the condition of gullies. This option is very useful operated by the driver of a gully cleaning vehicle in combination with the GPS Antenna. The GPS antenna keeps the location of the vehicle in the mid of the GUI. The drivers places and updates gullies in relation with the topography loaded as background.

After selecting this option a dialog will appear as depicted in figure 6.4. In the dialog the user specifies the observed condition of gullies.

The data is registered in the mutation-file and after finishing the cleaning round transferred to the database. The software generates new work-files as basis for the next cleaning round.

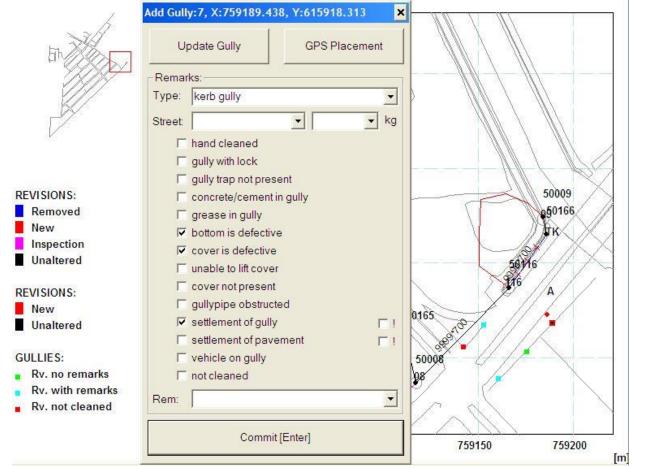


Figure 6.10

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## 7 Display Options

The BRUTIS Graphical user Interface (GUI) exists off a:

- pull down menu above;
- status bar below;
- caption/legend on the left;
- tree view on the right;
- button bar. Each button is also defined in the pulldown menu;
- quick menu behind right mouse button click in the GUI.

### Contents

- Adjusting the GUI
- Zoom Options
- Find Options
- Adjust Text Formats

### 7.1 Adjusting the GUI

The display of each window is defined in the "Display Options" dialog.

After clicking the option: "**Display / Display Options**" a tabbed dialog appears as depicted in figure 7.1 and, 7.2.

### Display Tab (figure 7.1)

Adjust the GUI by clicking the check boxes.

### Conduits Tab (figure 7.2)

Adjust the thematic display of conduits by clicking the radio buttons. If button: **Mutations** is selected the GUI displays deleted conduits (patterned with crosses).

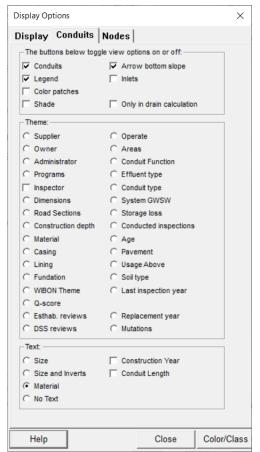
Set the display of conduit text by clicking the conduit text radio buttons.

### Other Tabs

As with the conduits, there are tabs for nodes, gullies, notifications and objects, like: road section-, construction-, water-parts, trees, masts.

If a function exists in the data, the tab will be shown.

Display Op	tion	5			×
Display	Co	nduits	Nodes		
Display The butt Carlor Leger Locat Coord Addre Quant Enable GPS c Long WMS/ WMS/ ECW/	ons t ion linate ess o lities ge GP data profi	eelow tog bjects in legend S connect les	gle view opt tion nap	ions on or off. —	
Displa	/iew ew satL syler	istView ngth in legn ent group	end and filte s	r WebMapServices	\$
Help				Close	Color/Class
igure 7.1					





### 7.2 Zoom Options

In addition to adjusting the GUI there are options available to zoom and pan through the urban drainage schematic, background topographic and images. These options can be started from the **Display** menu, the button bar and quick menu behind the right mouse button.

The zoomed schematic is displayed in the upper left corner of the caption/legend area. This area contains the conduits of the entire schematic, with a red rectangle defining the area that is zoomed in.

The next zoom options are available:

**Zoom In**: This option allows the user to zoom in on a piece of the schematic. This is accomplished by selecting **Zoom In** from the **Display** Menu, Button Bar or Quick menu. Place the mouse pointer on the centre of the desired area. Then press down on the left mouse button and release the button. This function is repeating when the GPS antenna was not connected starting BRUTIS. The function repeats until the user opens the quick menu with the right mouse button or selects a new option.

**Zoom Out**: This option allows the user to zoom out on a piece of the schematic. This is accomplished by selecting **Zoom Out** from the **Display** Menu, Button Bar or Quick menu. Place the mouse pointer on the centre of the desired area. Then press down on the left mouse button and release the button. This function is repeating when the GPS antenna was not connected starting BRUTIS. The function repeats until the user opens the quick menu with the right mouse button or selects a new option.

**Zoom All**: This option re-draws the schematic or background topographic to its full original size. This is accomplished by selecting **Zoom All** from the **Display** Menu, Button Bar or Quick menu.

**Pan**: This option allows the user to move and zoom around in the schematic. This is accomplished by selecting **Pan** from the **Display** Menu, Button Bar or Quick menu. Move the schematic by moving the mouse pointer around wile holding the left mouse button down. Scrolling the mouse wheel causes zooming in and out on the centre of the mouse pointer. This function is repeating when the GPS antenna was not connected starting BRUTIS. The function repeats until the user opens the quick menu with the right mouse button or selects a new option.

**Zoom Window**: This option allows the user to zoom in on a piece of the schematic. This is accomplished by selecting **Zoom Window** from the **Display** Menu or Quick menu. Defining the zoom area is accomplished by placing the mouse pointer in the upper left corner of the desired area. Then press down on the left mouse button and drag the mouse to define a box containing the desired zoom area. Finally, release the left mouse button and the viewing area will display the zoomed in schematic.

**Zoom Dynamic**: This option allows the user to zoom in and out on a piece of the schematic. This is accomplished by selecting **Zoom Dynamic** from the **Display** Menu or Quick menu. Defining the zoom area is accomplished by placing the mouse pointer in the centre of the desired area. Then press the left mouse button down and release the button. Then locate the mouse on a corner of the area. Press the left mouse button down and drag the mouse to and from the centre. Finally, release the left mouse button and the viewing area will display the zoomed in schematic.

### 7.3 Find Options

This option allows the user to have the interface locate a specific feature on the schematic. This is especially useful when very large and complex systems are being modelled.

These options can be started from the **Display** menu, the button bar and quick menu behind the right mouse button.

The next find options are available:

**Find Node**: This option allows the user to specify a node number and zoom in on the area around the node.

**Find Street**: This option allows the user to select/specify a streetname from a listing and zoom in on the area around the street. The conduits in the street are painted red.

**Find Adres**: This option allows the user to select/specify an address from a listing and zoom in on the area around the address. The address is painted with a red cross.

**Find Node**: This option allows the user to specify an EAN Code and zoom in on the area around the node with an installation containing the EAN code.

In addition to adjusting the GUI there are options available to zoom and pan through the urban drainage schematic, background topographic and images. These options can be started from the button bar and quick menu behind the right mouse button.

### 7.4 Adjust Text formats

This option allows the user to change the text format of node, conduit and topographic text.

These options can be started from the **Display / Text Format**, menu.

The next find options are available:

**Node Number**: This option starts a font dialog which allows the user to specify a font, font style, size and effect.

**Dimensions and Levels**: This option starts a font dialog which allows the user to specify a font, font style, size and effect.

**DXF Text**: This option starts a font dialog which allows the user to specify a font, font style, size and effect.

The options above do not save for a next session. Use the next start options, available via menu option: **Tools / Start options**, for fixing text heights for subsequent sessions:

txtlv: for the text height in the passports. After changing this option, the program has to be restarted before the change has effect;
txtadr:for the text height of address text;
txtnod: for the text height of node and object text, like the node number;
txtstr: for the text height of conduit text, like the conduit dimension;

**txtdxf**: for the height of text in topograp; **txtdef**: for the height of all the other text.

## 8 Data Options

This option allows the user to consult the data of gullies, nodes, conduits and shapes.

### Contents

- Nodes
- Conduits

### 8.1 Nodes

This option allows the user to consult the data of nodes.

- 1. Start the option **Node** from the **Data** menu, the button bar and quick menu behind the right mouse button.
- 2. Place the mouse pointer near the node. Then press down on the left mouse button and release the button.
- 3. a tabbed passport will appear as depicted in figure 8.2.

### Figure 8.2

- 4. Change tabs by clicking with left mouse button on a tab.
- 1. Select a next node as described in step 2 or quit the dialog.

### 8.2 Conduits

This option allows the user to consult the data of conduits.

- 1. Start the option **Conduit** from the **Data** menu, the button bar and quick menu behind the right mouse button.
- 2. Place the mouse pointer near the conduit. Then press down on the left mouse button and release the button.
- 3. a tabbed passport will appear as depicted in figure 8.3.

### Figure 8.3

- 4. Change tabs by clicking with left mouse button on a tab.
- 5. Select a next conduit as described in step 2 or quit the dialog.

•

scope Users Manual Between arguments you should place a comma (,) directly between each command line argument that you wish to use!

Command	Result	Example
address=	Directory location BRUTIS will use searching and creating work-files	address =C:\BrutisData
images=	Directory location for searching data files connected to inspection data. For	<pre>images=C:\BrutisData\HEC\Tando</pre>
	example images, spreadsheets, pdf and datafiles containing HEC RAS:	
	Cross sections, Bridges/Culverts and Lateral structures.	
dxf=	Start-up with displaying geographical data from defined file.	dxf=C:\BrutisData\DXF\Lampriet
		tertier channel.dxf
rev=	Open defined mutation-file after start-up. Display mutation data and set filepointer	rev=C:\BrutisData\REV\check01.rev
	to end of file for adding new mutations. Mutations are written in ASCII format.	
way=	Open defined way-point registration file. GPS way-point data will be written in	<pre>way=C:\BrutisData\WAY\wasehere.dxf</pre>
	DXF format	
ribdrive=	Defines drive letter of medium with inspection video and photo data. BRUTIS	Ribdrive=f
	replaces the default drive letter with this letter.	

#### File arguments:

### Database arguments

Command	Result	Example
rbtype=	When exploring a database first look for tables of defined management system.	rbtype=DHV
sectie=	BRUTIS selects only data off defined section from DG-DIALOG database.	sectie=xx
timeout=	Database selection or and connection timeout parameter in seconds	timeout=60
username=	Automatically connect with database with specified username.	username=scott
password=	Automatically connect with database with specified password.	password=tiger
datasource=	Automatically connect with database with specified data source name.	datasource=BRUTIS
insrdtab	Also install Riodesk Database tables and indexes when they do not exist in an database with concurrent tables. Default BRUTIS does not install tables in a database with existing management tables.	insrdtab
nonode	Node data will not be checked and saved when transferring data from mutation- file to database.	nonode
nopipe	Conduit data will not be checked and saved when transferring data from mutation-file to database.	nopipe
doadres ( <i>new</i> )	From version 4.3 and newer by default BRUTIS does not check the database for inserting address data. When this option is added to the command line BRUTIS will check the database and insert address data.	doadres

## Appendix A Command Line Arguments

GPS arguments

Command	Result	Example
gpsd (new)	Get GPS data from gpsd deamon when running BRUTIS under Linux/Wine	gpsd
	operating system.	
gpsport=	Defines serial port for connecting a serial GPS antenna. Antenna must send	gpsport=COM1:
	NMEA \$GPGAA data line through serial port. Don't forget the double points ":"	
	after the serial port.	
frq=	Defines repaint frequency in milliseconds. Default is 2000. Only active when GPS	frq=5000
	antenna is connected	
stp=	Defines repaint distance of new GPS location. When GPS position is moved more	stp=2.
	then defined value the data will be repainted. Default distance is 5. m	
utm=	Defines latitude/longitude to UTM coordinate translation type. English versions	utm=BR
	have default type 0.	
	Possible entries are:	
	0 or WE: WGS-84	
	1 or AA: Airy	
	2 or AN: Australian National	
	3 or BR: Bessel 1841	
	4 or BN: Bessel 1841 (Nambia	
	5 or CC: Clarke 1866	
	6 or CD: Clarke 1880	
	7: Everest	
	8: Fischer 1960 (Mercury	
	9: Fischer 1968	
	10: GRS 1967	
	11 or RF: GRS 1980	
	12 or HE: Helmert 1906	
	13 or HO: Hough	
	14 or IN: International	
	15 or KA: Krassovsky	
	16 or AM: Modified Airy 17: Modified Everest	
	17: Modified Everest 18 or FA: Modified Fischer 1960	
	19 or SA: South American 1969	
	20: WGS 60	
	20: WGS 60 21: WGS 66	
	22 or WD: WGS-72	
	22 OI WD. WGS-72	

## Appendix A Command Line Arguments

Command	Result	Example
send=	Internet timeout value in milliseconds for sending data	send=60000
receive=	Internet timeout value in milliseconds for receiving data	receive=60000
url=	After start-up BRUTIS selects automatically data from internet database and opens a default mutation-filename. Possible entries are: 1 select only gully data from internet database 2 select only conduit and node data from internet database 3 select all data from internet database	url=1
revurl	When reading mutation-file BRUTIS sends all found data to internet database.	

Internet arguments (applies only to internet version of BRUTIS):

#### Display arguments:

Command	Result	Example
pen=	Defines the thickness off the painted conduits.	pen=2
slowtopo=	Display DXF of SHP depends on zoom factor. Only the box defined with	slowtopo=4.
	maximum and minimum coordinates of geographical data will not be painted if the	
	users zooms out to a certain level.	
noblock	Block (or AutoCAD object data) will not be painted	noblock
dispspu	Always display nodetype instead of node number	dispspu
dispnode	Always display node numbers	dispnode

### DXF Export arguments (new in BRUTIS version 4.3):

Command		Result	Example
dimnode=	(new)	Defines the height of nodes in to be exported DXF. Default value is 0.8	dimnode=1.
dimtxt1=	(new)	Defines the height of dimension text in to be exported DXF. Default value is 1.3	dimtxt1=1.5
dimtxt2=	(new)	Defines the height of level text (invert, cover or surface levels) in to be exported	dimtxt2=1.3
		DXF. Default value is 1.2	
dimtxt3=	(new)	Defines the height of node numbers in to be exported DXF. Default value is 1.8	dimtxt3=2.0

## Appendix A Command Line Arguments

Command	Result	Example
adjustnode (new)	Menu option: "Tools / Get Sewage from DXF" creates new conduits and nodes. If an endpoint of DXF/SHP line or poly line is near an existing node. The coordinates of that node will be updated with the coordinates of the endpoint of the line or poly line.	adjustnode
mvhsnap (new)	Snaps the found Z coordinate to node Coverlevel (only when snapping to midpoint of circle or snapping to GPS position.	mvhsnap
stripnull (new)	Strips leading zero's (0) from node numbers when reading work-files or SUFRIB inspection files. Don't use this function when you want to change data in the database.	stripnull
spurename (new)	Sets node types automatically to External Weir, Internal Weir or Pump when BRUTIS has evidence that the node is such type. In previous versions this was done by default.	spurename
begend (new)	When defined a polyline/trace conduit trace must be connected to centerpoints of nodes. When not connected an error message is displayed.	begend

Data manipulation arguments (new in BRUTIS version 4.3):

### Menu and dialog behaviour arguments:

Command	Result	Example
kolkgps	Display gully cleaning menu options, adjust and display gully cleaning dialog. Search for GPS antenna.	kolkgps
slibgps	Display gully cleaning menu options, adjust and display gully cleaning dialog. Fill the conduit inspection dialog with thickness of sediment aspect data, so the operator has only to fill in the thickness.	slibgps
	Always set default conduit cleaning and search for GPS antenna.	
instgps	Display installation mutation buttons in menu	instgps
viewgps	Display buttons for outdoor usage in menu	viewgps
revigps	Display node and conduit mutation buttons in menu	revigps
autonum	BRUTIS automatically numbers nodes when a conduit is added as a polyline.	autonum
norepeat	Don't automatically repeat the zoon in, zoom out and pan zoom functions.	norepeat
sumcatch	Before importing catchments data the existing data in memory will not be set to 0. So the imported amount of catchments will be added.	sumcatch
rioscoop	After selecting a conduit the data of the conduit is copied in the file: RioscoopKikker.rib in the TEMP directory.	rioscoop
glbinsp	Only display global inspection aspects. Only implicated in road management version of BRUTIS.	glbinsp
newcode	User can add new descriptions. In English version of BRUTIS always on.	newcode

## Appendix B CSV and Revision file coding system

This appendix describes the CSV and mutation-file coding system for survey of the inventory and visual inspection of drainage systems.

The purpose, method and codes related to the inventory and visual inspection are defined in appendix C.

The coding system is used to:

- transfer data from surveyor to the database of the BRUTIS management system.
- exchange data between databases.

The BRUTIS mutation system rules the transfer of data from surveyor to the database. The BRUTIS CSV file export and import system rules the exchange of data between databases. If the surveyor uses a spreadsheet program, the CSV export and import system can also be used to transfer data from spreadsheet to the database.

The header information of mutation and CSV file types is coded in appendix C section 3.

Both file formats have a variable length. Only the <u>underlined headers</u> are mandatory. The order of headers can be changed.

By default BRUTIS uses a comma as field separator. Changing the field separator is possible by defining the next field separator identification on the first line. Before the headers.

**#A3=** Example: **#A3=;** 

BRUTIS uses as a rule a decimal point for the decimal point.

BRUTIS uses no surround character (example: "). Normally surround characters are used before and after text fields where text contains the field separator. As a rule in BRUTIS, text fields must not contain field separator characters!

Each data row contains a mutation date and optionally a mutation time. When importing CSV or mutation data BRUTIS checks if the date and time are newer then those registered in the data set. If the to be imported data has an older date and time the data will not be imported in BRUTIS. When transferring to the database this check is also performed between data set and database contents.

#### Caution!

BRUTIS does not read regional settings defined in Microsoft (MS) Windows!

In the regional settings the field separator and decimal point characters are defined.

BRUTIS does not read CSV files if MS Excel exports with the wrong field separators. Also has MS Excel the bad habit of loosing end of line field separators when fields near the end of line are empty

### 1. CSV files

An example of a CSV file is given in figure D.4 and D.5. How to import and export is documented in chapter 5.

CSV files contain data of one object type. The data fields are defined by the headers. Each row contains one object. The object type is defined by the Field description header. Thanks to the headers and field description it is possible to place the contents of CSV files in one file. Like in a file created with the menu option: "File / Save As / KIK BRUTIS File". BRUTIS copies in this file all CSV file data contents depicted with menu option: "Export / CSV Object Data". This is called a BRUTIS file. It has all the data (except inspection data when saved in a new window). In fact the BRUTIS file is a whole database in CSV format.

### Tip:

First export an example CSV file when creating new CSV files. Use the options depicted with menu option: "**Export / CSV Object Data**", to get the format of CSV files.

## Appendix B CSV and Revision file coding system

### 2. Mutation files

An example of a Mutation file is given in figure 6.1. The creation of mutation-files and the transferring of data from mutation-files to the database are explained in chapter 5.1. Chapter 6 explains how to note data in the mutation-file and to transfer data to the database.

The first part of the data for a visual inspection or inventory of geometric data contains information about the format of the data. Each item of data appears in on a separate record. Each record is prefixed with the character # followed by the identification code for the information, the = sign and the code for the data. The header information is described in table B.1

Identification	Description	Example
#A3=	The field separator. This is a single character used to separate the items of data in a record	#A3=,
#A6=	Defines a start id for identifying gullies. The first inserted gully will have this id. The next will have this id +1, the next id +2 etc.	#A6=1001
#B=	Identifies the record with mutation-file information	<pre>#B=ABI,ABH,ABR,AAM,ABS,ABT,ABU,RBF ,,,Pilot_Data_KC,,,2008-11-18</pre>
#1=	Identifies a record with an object and data to be inserted.	#I=CAA,CAB,CBF,CBG Node1,758417.500-615311.000,20081119, 94130
#U=	Identifies a record with an object identification and to the to be updated data.	#U=CAA,CAB,CBF,CBG Node1,758182.250-615210.500,20081119, 93943
#D=	Identifies a record with a to be deleted object.	#D=CAA,CBF,CBG Node1,20081126, 94309

### Table B.1

SCOPE CSV and Revision file coding system

This appendix describes the purpose, method and coding system related to the inventory, condition and visual inspection of drainage systems.

The coding system is:

- based on the European Standard EN 13508-2 and is made practical for use with drainage.
- used to:
  - o transfer data from surveyor to the database of the BRUTIS management system.
    - exchange data between databases.

Appendix B describes the BRUTIS mutation and CSV file export and import system which rules the data exchange from inspector to the database. Or the exchange of data between databases

The next sections describe the:

- 1. Purpose
- 2. Method
- 3. Codes related to the inventory and condition of drainage
- 4. Codes related to the visual inspection (to asses the condition) of drainage

### 1. Purpose

The information about the condition of the drainage can be used for the following purposes:

- to assess the performance of the drainage as part of the development of a rehabilitation plan;
- to provide information for use in the planning of maintenance activities, e.g. drainage cleaning programmes;
- to investigate specific maintenance or operational problems;
- the recording of inventory data.

### 2. Method

Each drain is defined by a conduit between two nodes with a unique number. The geometric data of nodes and conduits are defined in table C.1 and C.2.

The **nodes** define drainage:

- junctions;
- changes of cross section, not caused by conditional aspects;
- changes of material and year of construction.

The **conduits** define the alignment of the drainage.

Not all the geometric data in the tables is needed for the purpose. The minimum geometric data for assessing the condition and needed maintenance and operational problems are painted dark grey (orange). The minimum extra geometric data for assessing the hydraulic capacity are painted light grey (yellow).

The survey of the geometric data of drainage is done once. The visual inspection of the condition of the drainage is done frequently. The frequency is depending of the management goals.

Part of the visual inspection of the drainage condition is the registration of damages, sediment, obstacles and bridges. These conditional aspects influence the hydraulic capacity of the drainage and have to be counted for when performing hydraulic calculations. Do not locate nodes at conditional aspects because the maintenance of the geometric data will be a struggle and a punishment.

In <u>micro</u> drainage (neighbourhood level) systems it is not applicable:

- to locate nodes at conditional aspects like bridges or obstacles
- to perform advanced hydraulic calculations. Calculations should be based on judgement of the condition and geometric data.

In <u>macro</u> drainage (village/city level) systems it is more applicable:

- to locate nodes where bridges or obstacles changes the cross section.
- to perform advanced hydraulic calculations.

The visual inspection can be carried out in one of the following ways:

- inspection of the not covered drainage from the surface;
- inspection of covered drainage or culverts with mirrors or photographic camera
- With a laptop, notebook or tablet computer. Installed on the computer the program BRUTIS with the drainage network, topography and Global Positioning System (GPS). The BRUTIS program employs the personnel with a system to register inventory and condition aspect locations, extends, characterisations, quantifications and photos.

The inspection shall be carried out sufficiently slowly to enable all features to be observed. A photographic camera is used to register aspects.

### 3. Codes related to the inventory of drainage

The tables in this section define the codes in the mutation-files and the headers in the CSV files. The key values are underlined. The minimum geometric data for assessing the condition and needed maintenance and operational problems are painted dark grey (orange). The minimum extra geometric data for assessing the hydraulic capacity are painted light grey (yellow).

Conduits

FieldDescription

The tables C.1 through C.12 define the geometric data.

The tables C.13 through C.15 define the condition data.

The coding system related to the visual inspection of drainage is defined in section 4

Nodes		
FieldDescription		rd_node
CSV		Revision
Node MutDate (yyyymmd	<u>d)</u>	CBF
Node.MutTime (hhmmss)		CBG
Node ID		<u>CAA</u>
x (m)		CAX
y (m)		CAY
Quality coordinates		CKC
Ground Level		CAC
Quality Ground Level		CKM
Chamber Floor Level		CAD
Water Level		CFJ
Chamber Shape		CAE
Chamber Width (mm)		CAF
Chamber Length (mm)		CAG
Node Type		CAR
Node Material		CCD
Chamber Plan Area		CFG
System Type		CCU
Node Cover Type		CCO
Node Flow Profile		CFH
Node Construction		CFI
Node Adresses		CZA
Node Inflow (I/h)		CZB
Head Loss coefficient		CZC
Node Remarks		CDE

Table C.1

rieldDescription .	Id_pipe
CSV	Revision
Cond.MutDate (yyyymmdd)	ABF
Cond.MutTime (hhmmss)	ABG
US Node ID	AAD
DS Node ID	AAF
<u>Conduit ID</u>	AAZ
Offset Distance (m)	AAY
Conduit Type	ACJ
System Type	ACK
Year of Construction	ACN
Conduit Material	ACD
Shape ID	ACA
Joint Construction	ACO
Soil Type	ACX
Foundation Type	ACS
US Invert Level (m AD)	ACH
DS Invert Level (m AD)	ACI
Quality Invert Levels	AKB
Street Code	AAS
Street Name	AAJ
	ACR
Street Type	
Pavement Type Width	ACQ ACC
	ACC
Height	
Invert Width	ACP
Length	ACG
Quality Length	AKL
Bottom Roughness	ACV
Top Roughness	ACW
District Code	BOM
District Name	AAO
Inspection Date	API
Year of Measure	AMO
Review Tactical Measure	
	AMR
Replacement direct (m)	AM1
Replacement < 5 y. (m) Replacement < 10 y.	AM5
(m)	A10
No Replacement (m)	AM0
No inspect/review (m)	NOI
Operational Measure	APL
•	APL
Projectname Replacement Cost	
Replacement Cost	
Conduit Remarks	ADE

rd\_pipe

:

Conduit points on poly line FieldDescription :	rd_trace
CSV	Revision
<u>Cond.MutDate (yyyymmdd)</u>	<u>ABF</u>
<u>Cond.MutTime (hhmmss)</u>	<u>ABG</u>
<u>US Node ID</u>	<u>AAD</u>
<u>DS Node ID</u>	<u>AAF</u>
Conduit ID	AAZ
Pline X	ATX
Pline Y	ATY
Pline Z	ATZ

Table C.3

#### **Electro Mechanical Installations**

	115
FieldDescription :	rd_inst
CSV	Revision
Inst.MutDate (yyyymmdd)	IAZ
Inst.MutTime (hhmmss)	IAT
Installation Node Nr	INO
Installation Name	INA
Installation Number	IPO
Installation Year	IJ
Housing Year	IJK
Phone Number	ITN
Meter Number	IMN
Location Meter	ILM
Frequency Maintenance	IOF
Town Name	IKR
Installation Type	ITY
Lock Type	ISL
Control Type	IBS
Installer	IIN
Owner	IEI
Storage (m3)	IPB
Housing Width (mm)	IKW
Housing Heigth (mm)	IKH
Housing Length (mm)	IKL
Ann. Type Malfunction	IST
Ann. Type Thermal	ITE
Ann. Type Phase Gone	IFA
Ann. Type High Water	IHO
Ann. Type Low Water	ILA
Overhaul Installation	IRV
Date NEN3140	INE

Tabla C E

Pumps FieldDescription	:	hw_pump
Tieldbesenption	•	im_pump
CSV		Revision
Link Suffix		ACT
Link Type		ACU
Pump MutDate (yyyymmdd)		PIZ
Pump.MutTime (hhmmss)		PIT
US Node ID		PAD
DS Node ID		PAF
Pump ID		PID
Tag ID		PNR
Switch on Level		PUN
Switch off level		PUF
DS Switch on Level		PDN
DS Switch off level		PDF
Base level		PAB
Discharge		PCA
Pump Type		PMP
Date Install.(yyyymmdd)		PDA
Design		PWU
I/О Туре		PNI
Year of construction		PJV
Serial Number		PSE
Impeller Type		PWA
Impeller Dimension		PWD
Demand		PAV
Voltage		PSV
Cos Phi 1-0		PAM
Revs		PRF
Inominaal (mA)		PIN
Oil Filling		POL
Foot Rack		PVR
Hour Meter		PUT
Kwh Indicator		PKM
Frequency Transvormer		PFO
Telemetry		PTE
Overhauld		PRV
Disch. Necessary (l/s)		PNO
Discharge 2010 (l/s)		P10
Discharge 2020 (l/s)		P20
Q/H1 Discharge (l/s)		PC1
Q/H1 Water Level (m AD)		PN1
Q/H2 Discharge (I/s)		PC2
Q/H2 Water Level (m AD)		PN2
Q/H3 Discharge (l/s)		PC3
Q/H3 Water Level (m AD)		PN3
Q/H4 Discharge (l/s)		PC4
Q/H4 Water Level (m AD)		PN4
Q/H5 Discharge (I/s)		PC5
Q/H5 Water Level (m AD)		PN5
Q/H6 Discharge (I/s)		PC6
Q/H6 Water Level (m AD)		PN6
Q/H7 Discharge (l/s)		PC7
Q/H7 Water Level (m AD)		PN7
Q/H8 Discharge (l/s)		PC8
Q/H8 Water Level (m AD)		PN8

Weirs		Catchments		
	: hw_weir	FieldDescription	:	hw_subcatchment
·		·		
CSV	Revision	CSV		Revision
Link Suffix	ACT	Node ID		CAA
Shape ID	ACA	х		CAX
Link Type	ACU	у		CAY
Weir MutDate (yyyymmdd)	WIZ	System Type		CCU
Weir.MutTime (hhmmss)	WIT	US Node ID		AAD
US Node ID	WAD	DS Node ID		AAF
DS Node ID	WAF	Subcatchment ID		CFI
Weir ID	WID	Total Area (ha)		CFT
Crest	WAH	Contributing Area (ha)		CFC
Weir Width	WAW	Closed Pav		<b>0</b> • /
Discharge Coefficient	WAC	Steep(%/ha)		C01
Flow Direction	WAL	Closed Pav Flat(%/ha)		C02
		Closed Pav		000
Table C.6		Stretc(%/ha)		C03
		Open Pav Steep(%/ha)		C04
		Open Pav Flat(%/ha)		C05
Orifices	1	Open Pav Stretc(%/ha)		C06
FieldDescription	: hw_orifice	Unpaved Steep(%/ha)		C07
<b>22</b> <i>1</i>		Unpaved Flat(%/ha)		C08
CSV	Revision	Unpaved Stratabod <sup>(9)</sup> /ba)		C09
Link Suffix	ACT	Stretched(%/ha)		C09 C10
Shape ID	ACA	Roof Steep(%/ha)		C10 C11
Width	ACC	Roof Flat(%/ha)		C11 C12
Height	ACB	Roof Stretched(%/ha)		
Link Type	ACU	Closed Pav Steep(m2)		M01
US Node ID	WAD	Closed Pav Flat(m2)		M02
DS Node ID	WAF	Closed Pav Stretc(m2)		M03
Weir ID	WID	Open Pav Steep(m2)		M04
Discharge Coefficient	WAC	Open Pav Flat(m2)		M05
Flow Direction	WAL	Open Pav Stretched(m2)		M06
Orif.MutDate (yyyymmdd)	WCZ	Unpaved Steep(m2)		M07
Orif.MutTime (hhmmss)	WCT	,		
Invert Level	WBO	Unpaved Flat(m2)		M08 M09
Discharge Coefficient	WAO	Unpaved Stretched(m2)		
Limiting Discharge(I/s)	WCL	Roof Steep(m2)		M10
		Roof Flat(m2)		M11
Table C.7		Roof Stretched(m2)		M12

Table C.8

Gullies FieldDescription	rd_con	Addresses FieldDescription	: rd_adr
CSV	Revision	CSV	Revisio
Gull.MutDate (yyyymmdd)	HAZ	Street Code	AAS
Gull.MutTime (hhmmss)	HAT	Street Name	AAJ
Gully ID	HAA	Adres Number	ONR
Gully Street Name	HAJ	Adres Letter	OLE
x (m)	HAX	Adres Addition	OAD
y (m)	HAY	Adres x (m)	OCX
Gully Type	HAR	Adres y (m)	OCY
Gully Remarks	HDE	Adres Type	OTY
Deposit weight	HDM	Adres Outflow (I/h)	OLH
Hand Cleaned	HA1		
Gully With Lock	HB4	Table C.11	
Gully Trap Not Present	HA2		
Cement In Gully	HA3		
Grease In Gully	HA4	Street names	
Bottom Is Defective	HA5	FieldDescription	: rd_str
Cover Is Defective	HA6	001/	Davisia
Unable To Lift Cover	HA7	CSV	Revisio
Cover Not Present	HA8	Street Code	AAS
Gully Pipe Obstructed	HA9	Street Name	AAJ
Settlement Of Gully Settlement Of	HB0	Table C.12	
Pavement	HB1		
Vehicle On Gully	HB3		
Not Cleaned	HB2	Theme/Area/District na	ames
Table C.9		FieldDescription	: rd_bem
		CSV	Revisio
Connections between gul	lies	District Code	BOM
FieldDescription	rd_col	District Name	AAO
i leiab ooonption	14_001	Colour number	

## CSV

CSV	Revision
Conn.MutDate (yyyymmdd)	SAZ
US Gully ID	SAD
DS Gully ID	SAF
Connector Material	SCD
Connector Width (mm)	SCC
Connector Type	SCK
US Invert Level (m AD)	SCH
DS Invert Level (m AD)	SCI
Year of Construction	SCN

### Table C.10

1 loid2 decilption	•	l'a_aai
CSV		Revision
Street Code		AAS
Street Name		AAJ
Adres Number		ONR
Adres Letter		OLE
Adres Addition		OAD
Adres x (m)		OCX
Adres y (m)		OCY
Adres Type		OTY
Adres Outflow (I/h)		OLH
Table C.11		
Street names		
FieldDescription	:	rd_str
CSV		Revision
Street Code		AAS
Street Name		AAJ
Table C.12		

FieldDescription	:	rd_bem
CSV		Revision
District Code		BOM
District Name		AAO
Colour number		LCO
District Theme		MKL

### Table C.13

### Inspection mutation file

FieldDescription	:	rd_rib
<b>CSV</b> Inspection File ID Inspection FileName Number of Inspections Number of Results Number of Images Company Name		Revision RIB AIF INS RES IMA ABH

### Table C.14

Inspections		
FieldDescription	:	rd_ins

on

### Table C.15

### Inspection results

FieldDescription	:	rd_res
------------------	---	--------

CSV Inspection File ID Inspection ID Node Reference Axial begin location Axial end location Radial end location Radial end location Damage Type Classification First characteristic Second characteristic Picture FileName Video FileName Video Position Kwantification 1 Kwantification 2	Revision RIB AID AAK AAH AAI KL1 KL2 XBE KAC KA1 KA2 ABN ABO ABM KW1 KW2
Status	KW2 STS

### 4. Codes related to the visual inspection of drainage

This section defines the coding system for the visual inspection. How to perform visual inspection is documented in chapter 6.2.

The coding system is based on the European Standard EN 13508-2 and is made practical for use with drainage.

For sewer systems BRUTIS uses an extended coding system based on the European Standard.

The tables C.21 through C.39 define the coding system for visual inspection of the drainage. The aspects are observed with:

- the characterisation and quantification code (column: C1 and C2) of aspects;
- the location and extends of the aspects along the alignment measured from a node;
- Optional:
  - o a measure of the aspects (in mm, for example the height of settled deposits)
  - o a photographic picture to visualize the aspect

BRUTIS adds automatically the seriousness (column: S) of aspects. The seriousness and the extend of aspects are used in the decision support system for rehabilitation and the maintenance planning.

The tables C.13 through C.15 define the condition data.

Aspect:				Fissure
Code	S	C1	C2	Description
BAB	1	0	0	no fissure detected
	2	А	0	surface crack
	4	В	0	visible crack on the conduit wall
	5	С	0	fracture or visibly open crack in a conduit wall

### Example:

BAB 4

В

0



Table C.21

Aspect:				Break or collapse
Code	S	C1	C2	Description
BAC	1	0	0	no break or collapse detected
	2	А	0	pieces of conduit visibly displaced but not missing
	4	В	0	missing pieces of wall
	5	С	0	complete loss of structural integrity

### Example:

BAC 4 B

0



Example:	
----------	--

BAC 5 C 0



Table C.22

Defective brickwork

Code	S	C1	C2	Description
BAD	1	0	0	no defective brickwork or masonry detected
	2	А	0	displaced
	3	В	0	missing
	4	С	0	dropped invert
	5	D	А	collapse

#### Example:

BAD 3 B

0



Table C.23

			Missing Mortar
S	C1	C2	Description
1	0	0	no missing mortar detected
2	0	0	mortar depth <= 10 mm
3	0	0	10 mm < mortar depth <= 20 mm
4	0	0	20 mm < mortar depth <= 40 mm
5	0	0	mortar depth > 40 mm
	1 2 3 4	1 0 2 0 3 0 4 0	1       0       0         2       0       0         3       0       0         4       0       0

Example:

No example of missing mortar

Aspect:				Surface damage
Code	S	C1	C2	Description
BAF	1	0	0	no surface damage detected
	2	А	0	increased roughness
	2	В	0	breaking away of small fragments
	2	С	0	visible aggregate
	2	J	0	corrosion products on surface
	3	D	0	aggregate projecting from surface
	3	F	0	visible reinforcement
	4	Е	0	missing aggregate
	4	G	0	reinforcement projecting from surface
	5	Н	0	corroded reinforcement
	5	I	0	missing wall

#### Example:

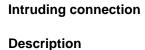
BAF

0	A CONTRACTOR		
		~	
			<b>A</b>
		. 6	

#### Table C.25

Aspect:				I
Code	S	C1	C2	I
BAG	1	0	0	I
	3	0	0	
	5	0	0	I

3 D



		•
)	0	length of intrusion <= 10% height of conduit
、	0	400/ law attactive of the sight

#### 0 10% < length of intrusion <= 25 % height of conduit

0 length of intrusion > 25% height of conduit

#### Example:

BAG	5	0	0



Aspect:				Defective connection
Code	S	C1	C2	Description
BAH	1	0	0	no defect detected
	2	А	0	the position of the connection is incorrect
	3	В	0	there is a gap between end of connection and conduit
	3	С	0	there is a gap around connection
	4	D	0	the connection is damaged
	5	Е	0	the connection is blocked

#### Example:

BAH	2	А	0



Table C.27

Aspect:				Defective repair
<b>Code</b> BAL	1	0 A B	<b>C2</b> 0 0 0 0	<b>Description</b> no defective repair detected part of the wall is missing a deliberately made hole has become defective other

Example:

No example of defective repair

Aspect:				Vegetation
Code	S	C1	C2	Description
BBA	1	0	0	no Vegetation detected
	2	0	0	reduction cross-sectional area <= 10%
	3	0	0	10% < reduction cross-sectional area <= 25%
	4	0	0	25% < reduction cross-sectional area <= 50%
	5	0	0	reduction cross-sectional area > 50%

## Example:

BBA	5	0

0



Table C.29

Aspect:

#### Settled deposits

Code	S	C1	C2	Description
BBC	1	0	0	reduction cross-sect area <= 5%
	2	0	0	5% < reduction cross-sect area <= 10%
	3	0	0	10% < reduction cross-sect area <= 25%
	4	0	0	25% < reduction cross-sect area <= 50%
	5	0	0	reduction cross-sect area > 50%

### Example:

BBC	4	0	0



			Ingress of soil
S	C1	C2	Description
1	0	0	no ingress of soil detected
2	0	0	reduction cross-sectional area <= 5%
3	0	0	5% < reduction cross-sectional area <= 15%
4	0	0	15% < reduction cross-sectional area <= 25%
5	0	0	reduction cross-sectional area > 25%
	1 2 3 4	1 0 2 0 3 0 4 0	1       0       0         2       0       0         3       0       0         4       0       0

## Example:

BBD	5	0	0
000	•	•	•



Table C.31

Aspect:

# A Bridge Culvert

Code	S	C1	C2	Description
BEB	1	0	0	reduction cross-sectional area <= 5%
	2	0	0	5% < reduction cross-sectional area <= 10%
	3	0	0	10% < reduction cross-sectional area <= 25%
	4	0	0	25% < reduction cross-sectional area <= 50%
	5	0	0	reduction cross-sectional area > 50%

### Example:

	•	~
BEB	2	0

0



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Table C.32

Aspect:				Other obstacles
Code	S	C1	C2	Description
BBE	1	0	0	reduction cross-sectional area <= 5%
	2	0	0	5% < reduction cross-sectional area <= 10%
	3	0	0	10% < reduction cross-sectional area <= 25%
	4	0	0	25% < reduction cross-sectional area <= 50%
	5	0	0	reduction cross-sectional area > 50%

#### Example:

	~	~	~
BBE	3	0	0



Table C.33

Aspect:				Infiltration
Code	S	C1	C2	Description
BBF	1	0	0	no ingress of water through the wall or joints detected
	2	А	0	sweating - slow ingress of water - no visible drips
	3	В	0	dripping - dripping in - not continuous flow
	4	С	0	flowing - a continuous flow
	5	D	0	gushing - entering under pressure

Example:

No example of infiltration

Aspect:				Exfiltration
<b>Code</b> BBG	<b>S</b> 1 5			<b>Description</b> no visible leak detected visible leak of flow out of the conduit
Example:				
				No example of exfiltration
Table C.35	i			
Aspect:				Photograph
<b>Code</b> BDA	<b>S</b> 1	<b>C1</b> 0	<b>C2</b> 0	<b>Description</b> General photograph
Table C.36	i			
Aspect:				Remarks
<b>Code</b> BDB	<b>S</b> 1	<b>C1</b> 0	<b>C2</b> 0	Description General remark

Table C.37

Aspect:				Water level
Code	S	C1	C2	Description
BDD	1	0	0	height <= 10% of cross-section height
	2	0	0	10% < height <= 25% of cross-section height
	3	0	0	25% < height <= 50% of cross-section height
	4	0	0	50% < height <= 75% of cross-section height
	5	0	0	height > 75% of cross-section height

### Example:

BDD 5 0

0



#### Table C.38

Aspect:				Loss of vision
Code	S	C1	C2	Description
BDG	1	А	0	bridge, culvert or slab
	1	В	0	silt
	1	Ζ	0	other, details should be recorded in remarks section

#### Example:

BDG	1	Δ	0
DDG		~	0



An important feature of BRUTIS is the ability to import geometric data, and convert data form the geometry to a BRUTIS Model. This feature makes it easy for a user to import data sets and start using BRUTIS immediately.

In this example: Converting data from SHP files to data in BRUTIS work file. Adding data from old BRUTIS work files and importing inspection data from KML and CSV file.

#### Example: Re-inventory of sewerage management data Kampot

Received: SHP- file containing the results of a sewer re-inventory. The assignment is to convert these results into a BRUTIS work file. Add data not in SHP-files and available inspection data.

This can be done in the following steps:

- 1. Assess data;
- 2. Start BRUTIS64.exe and open/create mutation file;
- 3. Transfer of data from source file 1 (nodes);
- 4. Transfer of data from source file 2 (conduit);
- 5. Save the result in a work file or database;
- 6. Create work file with data not in SHP-files and add to the data obtained from the SHP-files;
- 7. Add inspection-data from KML, to link photos to nodes;
- 8. Add inspection data from CSV, to link condition data and photos to nodes.

#### 1. Assess data:

a. Place the zip file in a folder, for example as below, at brutis64.exe

Name	Date modified	Туре	Size
FrutIS64.exe	02/11/2023 13:50	Application	15.000 KB
Existing_AsBuilt_Kampot_01112023.zip	01/11/2023 14:26	Compressed (zipp	194 KB
NCSEcw.dll	14/02/2018 02:56	Application exten	7.332 KB

b. Then extract the zip file. It contains shapefiles (SHP files): KP\_Conduits and KP\_Nodes.

Name ^	Date modified	Туре	Size
KP_Conduits.cpg	01/11/2023 15:10	CPG File	1 KB
KP_Conduits.dbf	01/11/2023 15:10	DBF File	628 KB
KP_Conduits.prj	01/11/2023 08:43	PRJ File	1 KB
KP_Conduits.sbn	01/11/2023 15:10	SBN File	17 KB
KP_Conduits.sbx	01/11/2023 15:10	SBX File	2 KB
KP_Conduits.shp	01/11/2023 15:10	AutoCAD Shape S	157 KB
KP_Conduits.shp.xml	01/11/2023 15:08	XML Document	30 KB
🙀 KP_Conduits.shx	01/11/2023 15:10	AutoCAD Compil	14 KB
KP_Nodes.cpg	01/11/2023 15:10	CPG File	1 KB
KP_Nodes.dbf	01/11/2023 15:10	DBF File	383 KB
KP_Nodes.prj	01/11/2023 08:42	PRJ File	1 KB
KP_Nodes.sbn	01/11/2023 15:10	SBN File	17 KB
KP_Nodes.sbx	01/11/2023 15:10	SBX File	1 KB
KP_Nodes.shp	01/11/2023 15:10	AutoCAD Shape S	48 KB
KP_Nodes.shp.xml	01/11/2023 14:55	XML Document	16 KB
sha KP_Nodes.shx	01/11/2023 15:10	AutoCAD Compil	14 KB

c. Open the .dfb files with, for example, MS-Excel and assess what data is included with the node and conduit geometry SHP files. Find out where the node numbers are. And under which column is what.

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Sort &amp; Find &amp; Filter - Select - Enting Type errcular</td> <td>Add-ins Add-ins Add-ins Material RC RC RC RC RC RC RC RC RC RC RC RC RC</td> <td></td>	E         Alignment           Alignment         Alignment           ROUGHINESS         0,0100000000           0,0100000000         0,0100000000           0,0100000000         0,0100000000           0,0100000000         0,0100000000           0,0100000000         0,01000000000           0,0100000000         0,0100000000           0,0100000000         0,0100000000           0,0100000000         0,0100000000           0,0100000000         0,0100000000           0,01000000000         0,01000000000           0,01000000000         0,01000000000           0,01000000000         0,01000000000           0,01000000000         0,01000000000           0,01000000000         0,01000000000           0,01000000000         0,01000000000           0,01000000000         0,01000000000           0,01000000000         0,01000000000           0,01000000000         0,01000000000           0,010000000000         0,01000000000           0,010000000000         0,01000000000           0,01000000000000         0,01000000000000           0,0100000000000000000000         0,010000000000000000000000000           0,010000000000000000000000000000000000	¢ Center v 50 v 100 v 10	96 + 152 23 Number 6 SLOPE	Conditional Form Formatting * Tability Styles Wildth_mm 1000 600 600 600 600 600 600 600 600 600	Itat         Cell           Itat         Cell           Itat         Cell           Itelght_mm         BW_m           1000         600           600         600           600         600           1000         1000           1000         1000           1000         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600           600         600	J K Format Format K Format K Form	Z T Find & Sort & Find & Filter - Select - Enting Type errcular	Add-ins Add-ins Add-ins Material RC RC RC RC RC RC RC RC RC RC RC RC RC	

#### 2. Start BRUTIS64.exe and open/create mutation file:

a. Run BRUTIS64.exe. Tab: Directory or File. Don't choose a file to start without data. Click button: [OK]

Welcome using Bl	RUTIS version: 6.3a(odb-stdx64), Freeware version	×
FT REAL	Best Rational Urban Tech Information System (BRUTIS)	
	Networks/Sewerage/Drainage/Gullies	
	Directory File Database Protocol: HTTP(S), cloud, etc.	
i.	Protocol: HTTP(S), cloud, etc.	
	UserName:	
	PassWord:	
	(ODBC-)name/URL: https://www.riodesk.com	
	Do you want to display coordinates? Please enter UTM zone letter and number for drawing coordinates.	
	Use menu option: Mutation -> Show Mutations from file, to enable mutation options.	
Stor All	Long. projection zone: [1 to 60]: 48	
	Lat. projection zone: [C to X]: N	
	See the info window for copyrights.	
	Help OK Exit	

b. The management window is started, without data:

	et Stels Motation Insert Change Debte Draw Cleaning and Impection Planning Dr		- σ <u>x</u> . σ x
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D KOCARDAN MORT	Ready for next instruction	x=2144447.072-y=7938584.636 m (zoom=882C)*Net	

c. Open a mutation file to add and mutate data, via menu option: **Mutation->Show mutations from file....** The "Make mutation file" window appears, with which you can choose a location and name of the file, with extension . mut. Click button: [Open] to open or create the mutation file.

Make mutation file or open exis	-	ndows (C:) > Projects > brutis_v62]_freeware_64b v 0 // Search brutis_v62]_freeware							
Organise 🔻 New folder						?			
🖶 Downloads	^	Name	Date modified	Туре	Size				
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File name:	(p01.mut			~ (*.mut;*.i	rev)	$\sim$			
				Open	Canc	el			
				open	- I - Curre				

d. You will then be given the opportunity to enter basic data and default values. Entry is not required. Click [OK]

From now on, all mutations according to the EN13508 coding system will be stored in this file.

inspector information:		General:
Inspector: Company: Projectmanager: Date: [YYYY-MM-DD]	2023-11-02	Field seperator: , Number mutations: Insert: Update: Delete: Nodes: Conduits:
Project information: Authority: Project/Contract Company Code: Code dient:	Freeware version	Gully: Connect.:
Cleaning data: Applied cleaning pressu Type of nozzle: License plate vacuum t High pressure unit licer Deposit slip number:	ruck or combi:	Cancel

- 3. Importing the nodes from SHP-File: KP\_Nodes (always the nodes first, if available)
  - a. Start menuoption: **Import->GML, DXF of SHP Topography**", to Import the geometry from SHP file: KP\_Nodes.

	2-	V Ö 🔎 Sear	pot_01112025	2j_freeware_64b > Existing_AsBuilt_Ka	cts > brutis_v	$\div \rightarrow \checkmark \uparrow$ 🔤 « Projects
						Organise 🔻 New folder
	Size	Туре	Date modified	Name	^	🖶 Downloads
	157 KB	AutoCAD Shape S	01/11/2023 15:10	KP_Conduits.shp		👌 Music
	30 KB	XML Document	01/11/2023 15:08	KP_Conduits.shp.xml		Pictures
	48 KB	AutoCAD Shape S	01/11/2023 15:10	KP_Nodes.shp		🚆 Videos
	16 KB	XML Document	01/11/2023 14:55	KP_Nodes.shp.xml	~	Lindows (C:)
~	d formats(*.dxf	<ul> <li>✓ Supporte</li> </ul>		ηp	e: KP_Nodes.s	File name:
	48 KB 16 KB	AutoCAD Shape S XML Document	01/11/2023 15:10	KP_Nodes.shp		Videos 🛀 Windows (C:)

The "Import DXF or SHP file" window appears, go to the location where you can find the SHP-File, select it and import the geometry from the file with the [Open] button.

GML, DXF of SHP topography..

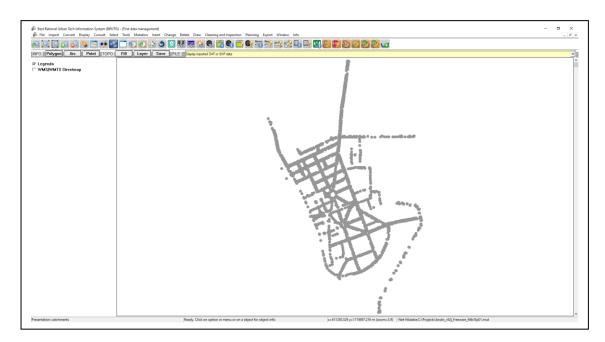
b. When importing geometry from SHP files, the program displays a window that allows you to indicate which column determines the layer name of the geometry. So that you can later select geometry on this layer name. In the adjacent window, the column: Type, is used to extract the layer name.

It is not mandatory to indicate layer name. You can also leave the field blank. The same goes for the other fields. It is useful to indicate a thickness, so that the knots are immediately visible. Start the import with the [OK] button.

Aantal objecter	1731	ID: Field with unique identification of the shape. Value must be less then 9
Translate value	es in file:	characters.
	Fieldname in shape	Layer name: Field with layer name of
ID:		geometry.
Layer:	Туре	-
Source:		Source: Field with source holder code of
Time:		geometry.
Status:		Time: Field with mutation date and time.
BeginDate:		Status: Field with status geometry.
EndDate:		•
Options:		Enddate: Field with optional termination
Always dis	play topo and text	date.
Search for	bended lines	
Compare IE	) with met GUID	Help
Pen Descriptio		
r en bescripti		
	Color	
Line type:	Solid 👻	
Width	10 👻	OK Cancel

c. The node geometry has been imported:

×



d. Select the geometry from which the data should be taken. This can be done via menu option: **Select -> Select Geometry -> With Filter...** 

And click button: [Add all items to filter] in the "Select geometry" window, to select all manhole geometry. This one turns yellow. Close the window with button: [Close].

Total in file: Topografie Laagr	1731 st naam Geometrie BGT pl		l (filtered): GT function B	1731 st GT type   Plus	physica 💶 🕨	
Select items:	Tot.[st] Sel.[st] Filter 1731 0 Yes		l or remove item ons below.	s from filter with	the	•
	1101 0 100		Add all it	tems to filter		
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			ition: No items in ns in filter.	n filter is the sar	ne as all	
		with		l button simultar iple selection of ith filter option		
	Save	New	Close	Reset	List	100 m

It is also possible to select geometry within a polygon. To do this, first draw a polygon

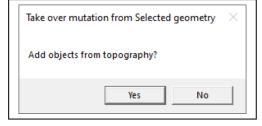
using button: and button: to close the polygon. You also close the polygon with a double click on the before last polygon point. And then menu option: Select -> Select Geometry -> Select geometry in polygon...

e. Click menu option: Mutation -> Take over mutation from selected geometry -> Nodes... , to extract the nodes from the selected geometry.

Click: [Yes], to transfer the data of selected geometry to the nodes.

Take over mutation from Selected geometry $~~ imes~$						
Copy data from selected geometry to Nodes?						
	Yes	No				

Click: [Yes], to add nodes from geometry.



For the BRUTIS fields, choose the correct columns from the SHP file. So that the data from the SHP-File ends up in the correct BRUTIS data field.

If dimensions are specified in meters in the SHP file, these can be converted to mm via the "\$Dimensions multiply by" factor, by entering the value 1000 here.

Click: [OK], as soon as, as many BRUTIS data fields as possible have been provided with the columns from the SHP-File.

Nodes from geom/csv/json/xml $~ imes~$						
Save integration pass	port?					
Yes	No					

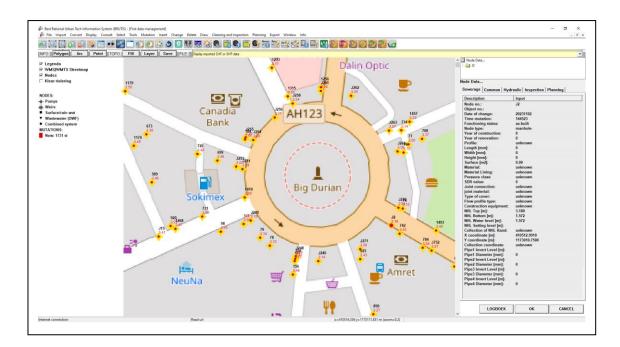
Click: [Yes], to save the choices in the integration file. The integration file is saved with the SHP-File, ready to automatically populate the integration window next time. Or to use for an automated conversion of data, with a bacth-file.

Description	Input
\$Node search distance [	0.810000
Levels divide by::	1.
Dimensions multiply by:	1.
Node no.:	NAME
Object no.:	
Inlet pipe GUID:	
Date of change:	
Time mutation:	
Functioning status:	Note
Node type:	Туре
Year of construction:	
Year of renovation:	
Profile:	
Length [mm]:	
Width [mm]:	
Height [mm]:	
Surface [m2]:	
Material:	
Material Lining:	
Pressure class:	
SDR value:	
Type of cover:	
Flow profile type:	
Construction equipment:	
NHL Top [m]:	RIMELEV
NHL Bottom [m]:	INVERTELEV
NHL Water level [m]:	
NHL Setting level [m]:	
Collection of NHL Rand:	
X coordinate [m]:	
Y coordinate [m]:	
Collection coordinate:	
Pipe1 Invert Level [m]:	
Pipe1 Diameter [mm]:	
Pipe2 Invert Level [m]:	
Pipe2 Diameter [mm]:	
Pipe3 Invert Level [m]:	
Pipe3 Diameter [mm]:	
Pipe4 Invert Level [m]:	
Pipe4 Diameter [mm]:	
GUID:	
IMGEO ID:	
WIBON Theme:	
Starting date:	
End date:	
Management group code:	
Management group name:	
Object group code:	
<	>
Co	ntinue   OK Cancel

f. The result with WMS/WMTS Streetmap button checked, registration of the location of the

images in start option: images, and the via button: , consult of a node:

SCOPE Example of how to convert data from geometry to the BRUTIS Model



#### 4. Importing the conduit from SHP-File: KP\_Conduits

a. Start menu option: Import -> GML, DXF of SHP Topografie, to Import the geometry from SHP file: KP\_Conduits.

The "Import DXF or SHP file" window appears, with which you can find the SHP-File, select it and import the geometry from the file with the [Open] button.

🛧 📙 « Projec	ts → brutis_v	62j_freeware_64b → Existing_AsBuilt_Kan	npot_01112023	v <b>5</b> ∨	Search Existing_AsBuilt_Kam
Organise 🔻 New folder					III 🕶 🔟 🧃
🕂 Downloads	^	Name ^	Date modified	Туре	Size
👌 Music		KP_Conduits.shp	01/11/2023 15:10	AutoCAD Shape S	157 KB
E Pictures		KP_Conduits.shp.xml	01/11/2023 15:08	XML Document	30 KB
📕 Videos		KP_Nodes.shp	01/11/2023 15:10	AutoCAD Shape S	48 KB
Lindows (C:)	~	KP_Nodes.shp.xml	01/11/2023 14:55	XML Document	16 KB
File name	KP_Condui	ts shn		~ Supp	orted formats(*.dxf v

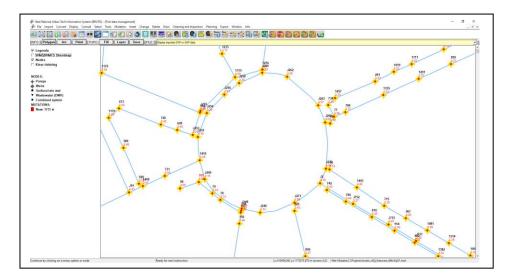
b. When importing geometry from SHP files, the program displays a window that allows you to indicate which column determines the layer name of the geometry. So that you can later select geometry on this layer name. In the adjacent window, the column: Type, is used to extract the layer name.

> It is not mandatory to indicate layer name. You can also leave the field blank. The same goes

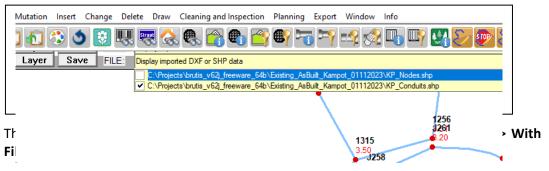
File:	C:\Projects\brutis_v62j_freew	vare_64b\Existing_AsBuilt_Kampot_01112023\KP_0
Aantal objecten - Translate value	]	ID: Field with unique identification of the shape. Value must be less then 9 characters.
Translate value	Fieldname in shape	Layer name: Field with layer name of
ID:		geometry.
Layer:	Туре	
Source:	Туре	Source: Field with source holder code of
		geometry.
Time:		Time: Field with mutation date and time
Status:		
BeginDate:		<ul> <li>Status: Field with status geometry.</li> </ul>
EndDate:		
Options:		Enddate: Field with optional termination
Always disp	play topo and text	date.
C Search for b	pended lines	
Compare ID	with met GUID	Help
Pen Descriptio	on:	
	Color	
Line type:	Solid	

for the other fields. It is useful to indicate a thickness and a different colour, so that the conduits are immediately visible. Start the import with the [OK] button.

c. The conduit geometry has been imported:



d. Select the geometry from which the data should be taken. First of all, by turning off the geometry with the nodes by removing the check mark in front of the file name in the topography bar.



And click button: [Add all items to filter] in the "Select geometry" window, to select all conduit geometry. These turns yellow. Close the window with button: [Close].

Selecteer GeoStuF ge					× 1315
Total in file:	1751 st	Selec	ected (filtered):	1751 st	1313 3.50 1258
Topografie Laag	jnaam   Geometrie   BGT p			BGT type Plus	
Item KP_Conduits.sh	Tot.[st] Sel.[st] Filter p 1751 0 Yes		buttons below.		321
			Add a	all items to filter	
			Add sele	ected items to filter	r
			Remove se	elected iten from fill	ter
			Remove	all items from filter	r l
			Caution: No item items in filter.	ns in filter is the sa	ime as all
				Ctrl button simulta nultiple selection of	
			Display lengt	h with filter option	
	Save	New	Close	Reset	List
		920	<b>731</b> 3.50		J249 101 3.15
		920 3.23468	(	98	3.55

It is also possible to select geometry within a polygon. To do this, first draw a polygon via

the button: and then button: to close the polygon. You also close the polygon with a double click on the before last polygon point. And then menu option: Select -> Select Geometry -> Select geometry in polygon...

e. Click menu option: Mutation -> Take over mutation from selected geometry -> Conduits..., to extract the conduits from the selected geometry.

Take over mutation from Selected geometry $\qquad imes$	Take over mutation from Selected geometry $~~ imes~$
Copy data from selected geometry to Conduits?	Add objects from topography?
Yes No	Yes No

Click: [Yes], to transfer the data of selected geometry to the conduit.

Click: [Yes], to add conduits from geometry.

For the BRUTIS fields, choose the correct columns from the SHP file. So that the data from the SHP-File ends up in the correct BRUTIS data field.

When converting the conduits, BRUTIS searches for nodes that can be connected based on the start and end coordinates of the conduit geometry. Factor: "\$ Node Search distance [m]", is used here. Only nodes within this distance are linked. If a node is not present, it will be created. If no "From Node no" and "To node no" are specified, the program creates new node numbers starting with the letter indicated after start option: letter.

If dimensions in cm are specified in the SHP file, these can be converted to mm via the "\$Dimensions multiply by" factor, by entering the value 10 here.

Click: [OK], as soon as, as many BRUTIS data fields as possible have been provided with the columns from the SHP-File.

Click: [Yes], to save the choices in the integration file. The integration file is saved with the SHP-File, ready to automatically populate the integration window next time. Or to use for an automated conversion of data.

f. On the next page the image with the result with

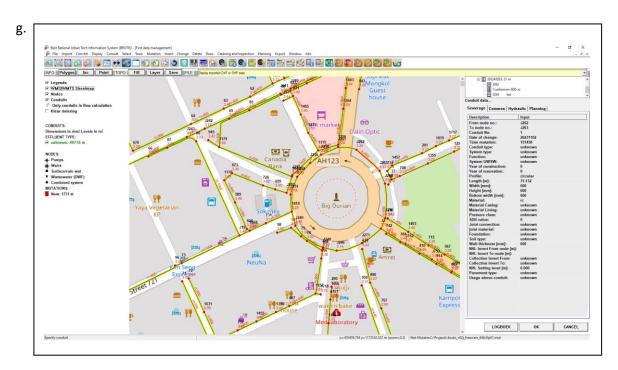
Description	Input	
\$Node search distance	[ 0.810000	
Levels divide by::	1.	
\$Dimensions multiply	oy: 1.	
From node no.:		
To node no.:		
Conduit No:		
Date of change:		
Time mutation:		
Conduit type:		
System type:		
Function:		
System GWSW:		
Operating voltage [v]:		
Nominal voltage [v]:		
Year of construction:		
Year of renovation:		
Profile:	Туре	
	Type LENGTH	
Length [m]:		
Width [mm]:	Width_mm	
Height [mm]:	Height_mm	
Diameter [mm]:	BW_mm	
Material:	Material	
Material Casing:		
Material Lining:		
Pressure class:		
SDR value:		
Joint connection:		
Foundation:		
Soil type:		
Wall thickness [mm]:		
NHL Invert From node		
NHL Invert To node [m		
Collection Invert From		
Collection Invert To:		
NHL Setting level [m]:		
Pavement type:		
Usage above conduit:		
GUID:		
IMGEO_ID:		
WIBON Theme:		
Starting date:		
End date:		
Object group code:		
Bem area name:		
Street code:		
Place name:		
Street name:		
Owner:		
Administrator:		
Supplier:		
Functioning status:	Note	
Drawing number	note	
<		>
	Continue OK Ca	ncel
		ncer



OK

Cancel

WMS/WMTS Streetmap button checked and consulting the conduit, via button:



If in the invert levels of the conduits are missing, BRUTIS uses the node invert levels for the registration of the conduit invert levels.

#### 5. Store the results in a work file or database

a. Save to a work-file via menu option: File -> Save As -> Work-File, so that the data obtained can be opened and viewed immediately from now on.

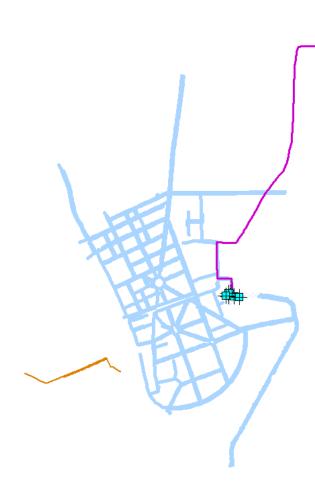
🜮 Opslaan in werkbestand			×
$\leftarrow$ $\rightarrow$ $\checkmark$ $\uparrow$ $\blacksquare$ $\rightarrow$ This PC $\Rightarrow$ Wir	✓ <sup>™</sup> > Sei	arch brutis_v62j_freeware	
Organise 🔻 New folder			::: - ?
Pictures	^ Name ^	Date modified	Type Size ^
Videos	Existing_AsBuilt_Kampot_01112023	02/11/2023 15:14	File folder
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File name: Existing_AsBuilt_K	Kampot_01112023.dbb		~
Save as type: Buitenruimte *.dbl	b		~
∧ Hide Folders		Help Sar	ve Cancel
	ailable. Via menu ontion:		

After entering the database connection data, BRUTIS connects to the database and checks whether the changes can be implemented.

After this menu option: **Mutation -> Move mutation to database -> Move mutation to database**, to store the data in the database.

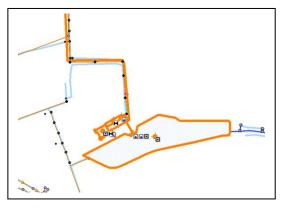
#### 6. Create work file with data not in SHP-files and add to the data obtained from the SHP-files

the light blue lines in the view below represent the conduits obtained from the SHP file. Not in the SHPfiles is the data of a pumping station, rising main (purple) to a waste water treatment plant and some conduits on the other side of the river (brown). The data of these objects is in another work file and we want to add it to the data.



- a. Start BRUTIS with the other work file with the extra data above.
- b. Select the parts above, by drawing a polygon

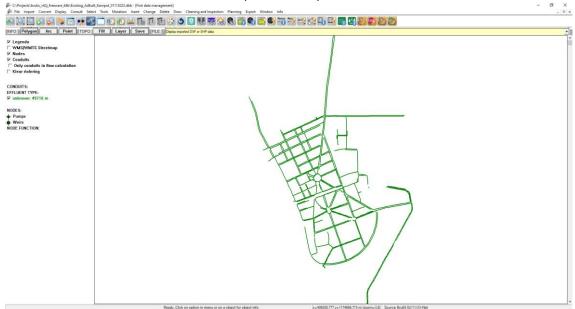
around those parts, using the button: , and double click to close the polygon. Select the objects in the polygon with menu option: Select -> Select Object in polygon -> All Objects. Until all to be added objects are coloured orange.



- c. Copy the selected objects to the clipboard, with menu option: Tools -> Copy to Clipboard.
- d. Open a new window with men option: **File -> New**.
- e. And paste from clipboard, with menu option: **Tools -> Paste from Clipboard**.
- f. Save to a work-file via menu option: **File -> Save As -> Work-File**, so that the data obtained can be imported in the work-file with the data obtained from SHP-files.
- g. Exit BRUTIS and restart with the data obtained from the SHP-files:

Welcome using B	RUTIS version:	6.3a(odb-	stdx64), Freewa	ire version		×	<
			Tech Informat /Drainage/Gull	ion System (BRUTIS)			
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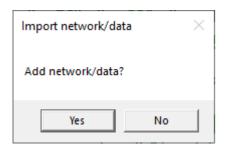
h. The data obtained from SHP-files in the previous steps:



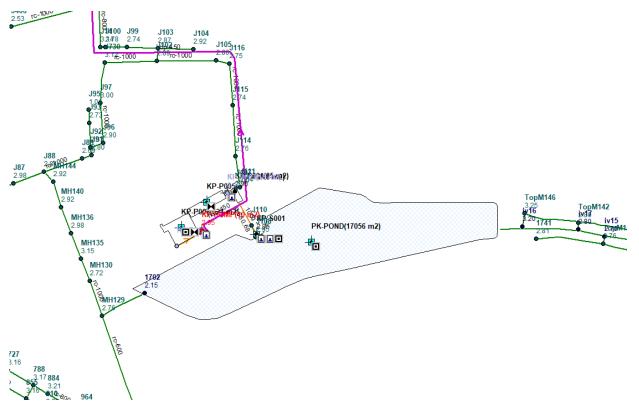
i. Add the pumping station, rising main, waste water treatment plant from the other work-file, with menu option: **Import -> Work file**.

	> Windows	(C:) > Projects > brutis_v62j_freeware_64b >	~	õ	, Search bru	tis_v62j_freew	are,
Organise • New folder					1	. • 💷	0
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j. Select the working file and click [Open]. And in the subsequent dialog, click [Yes] to merge the networks of both work files.



k. The merged data is shown below:



Don't forget to save the merged data in a new work file.

#### 7. Add inspection-data from KML

There is a KML file available with photos of nodes. In this step we connect the photos to the nodes in the work file by importing the KML as topography and match the nodes in the KML with the nodes in the work file by using the coordinates.

Via menu option: **Tools -> Start options**, it is important to set a match distance and to set the option to avoid replacing nodes coordinates with coordinates from the KML.

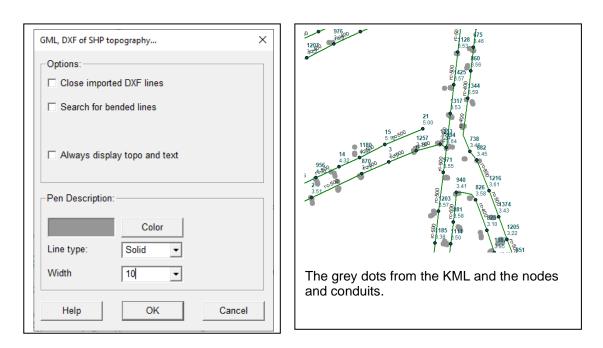
Optie	Starten met		^
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draingps	0		
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slibgps	0		
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klikless	0		
wijzig012	0		
historie	1		
special	1		
vuilgraad	0		
black	0		
slowtopo	0.000		
matchdis	10.000		
levensduur	70		
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baud	4800		
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replen_c	12
replen d	12
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extrageo	0.316
klicdiepte	1
expribguid	
nomove	1
kous	0
instnaam	1
dubbel	0
nobxa	1
karlabel	0
ribkas	0
ontwerp	0
wrap	1
exclbput	0
offset	0.000
driver	
tnsname	
eonvor	× •
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	OK Cancel

a. Import the KML as topography, with menu option: Import -> GML, DXF or SHP Topography.

$\rightarrow$ $\checkmark$ $\uparrow$ $\bullet$ This PC $\rightarrow$	Window	vs (C:) → Projects → brutis_v62j_	freeware_64b > KMZ >	~	ට 🔎 Searc	h KMZ	
rganise 🔻 New folder						•== •	
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🚪 Videos							
Lindows (C:)							
Seagate Backup Plus Drive (F	n Y						
File name: do	c.kml				<ul> <li>Supported</li> </ul>	formats(*.dxf	`

- b. Select the KML file. And Click [Open].
- c. dialog appears that allows you to set the colour and thickness of the topography to be imported. In this example we choose a grey colour with a thickness of 10 pixels.hat the data obtained can be opened and viewed immediately from now on.



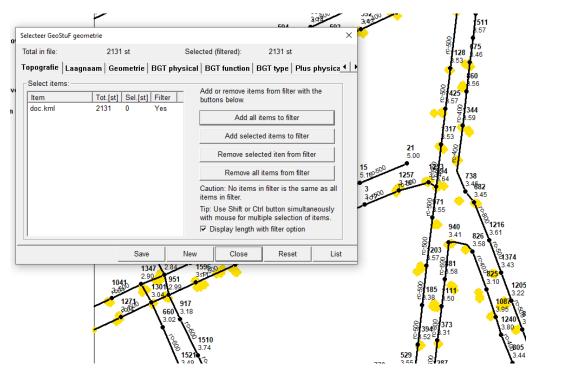
e. Open a mutation file to catch all KML inspection data, via menu option: **Mutation->Show mutations from file....** The "Make mutation file" window appears, with which you can choose a location and name of the file, with extension . mut. Click button: [Open] to open or create the mutation file.

→ × ↑ 📑 → This P	C → Windows (C:)	→ Projects → cambodia →	Kampot_data > KMZ > 🗸 🗸	S Q S	Search KMZ	
Organise 👻 New folder						
👆 Downloads	↑ Nar	me	Date modified	Туре	Size	
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🏪 Windows (C:)	~					
File name	kmz_01.mut			~ (*.mut	t;*.rev)	~

- f. You will then be given the opportunity to enter basic data and default values. Entry is not required. Click [OK]
- d. Select the geometry from which the data should be taken. This can be done via menu option:
   Select -> Select Geometry -> With Filter...

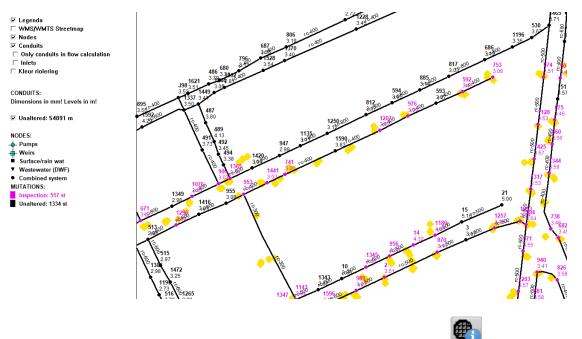
And click button: [Add all items to filter] in the "Select geometry" window, to select all manhole geometry. These turns yellow. Close the window with button: [Close].

Inspector information:		General:
Inspector:	1	Field seperator: ,
Company:		Number mutations:
Projectmanager:		Insert: Update: Delete:
Date: [YYYY-MM-DD]	2023-11-02	Nodes:
	1	Conduits:
Project information:		- Gully:
Authority:	Freeware version	
Project/Contract		Connect.:
Company Code:		
Code dient:		
Cleaning data:		
Applied cleaning pressu	ure in Bar:	
Type of nozzle:		
License plate vacuum t	ruck or combi:	
High pressure unit licer	nse plate:	

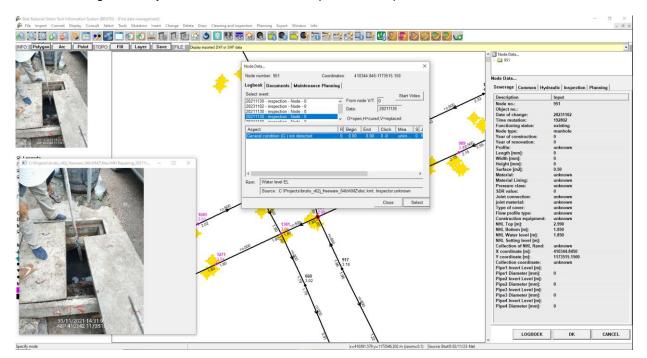


- e. Click menu option: Mutation -> Take over mutation from selected geometry -> Nodes... , to extract the inspections from the selected geometry.
- f. The program starts a dialog: whether you want to accept data from the selected geometry [Yes], to accept inspection data. Whether you want to add data [No] Do not add nodes from KML. And finally, whether you want to import the inspection data [Yes]. To import the inspection data.
- g. The result is shown on the next page. The inspected nodes have a purple colour.

Take over mutation from Selected geometry $ imes$
Copy data from selected geometry to Nodes?
Yes No
Yes
Take over mutation from Selected geometry $~~ imes~$
Add objects from topography?
Yes No
No
Show mutations from file $ imes$
Also import inspection data from a transaction?
Yes No
Yes



You can consult the inspection data by clicking on a node after the button: After which the data of the node will be displayed. Below the data you will find the button: [Logbook], to display the inspection data. In the log window you can click on a status aspect to view photos.



h. Don't forget to save the merged data in a new work file.

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$\leftarrow$ $\rightarrow$ $\checkmark$ $\uparrow$ $\Box$ $\rightarrow$ This PC $\Rightarrow$ Window	s (C:) > Projects > brutis_v62j_freeware_64b >	ې 5	Search brutis_v62j_freewar	'e
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∧ Hide Folders		Help	Save Cancel	

i. And add the inspection data in the export to work file

Ja of Nee		×
	Add inspection data in export?	
	Yes	No

j. [Yes].

#### 8. Add inspection data from CSV

Before you import data from CSV, it is wise to view the data via MS Excel. To get an idea of what data is involved. In this case it contains rules recording the dimensions and bob levels of connected pipes and the quality of the well cover with photo file names.

Inter         Inter <th< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>M</th><th>1H_SV_Manho</th><th>ole.csv -</th><th>- Excel</th><th></th><th></th><th></th><th></th><th>hendri</th><th>ik kingma</th><th></th><th>-</th><th></th><th>×</th></th<>									M	1H_SV_Manho	ole.csv -	- Excel					hendri	ik kingma		-		×
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A         B         C         D         E         F         G         H         J         K         L         M         N         O         P         Q         R         S         T         U         V           1         Dometry Remarks         Top Level Bottom LePipe 1 Um Pipe 2 Dia Pipe 3 Dia Pipe 3 Inv Pipe 4 Dia Water Lev Sediment Inspectior Condition Photo 1         Photo 2         2021201 Good         Mi SV_2021201 Gr464735 Jipg         2021201 Gr464735 Jipg         2021	85	~ @ ~ <b>Q ~</b> =				-												-				
D         Geometry Remarks         Top Level Bottom: Le /Pec Lum /Ppe 1 Da /Ppe 2 Lum /Ppe 3 Da /Ppe 3 Da /Ppe 4 Da Water Lev. Sediment: Inspection: Condition Photo.1         Photo 2           2         1         POINT Z (104.3657395.10.61101998.4.153)         2         2221201         Cood         MI SV 20 MH SV 20 2022.201.074041978.jpg           3         POINT Z (104.165674.3.22         1.62         1.62         0.6         1.83         0.6         2.81         2.3         0.5         20221201         Mond mt SV 20 MH SV 20 2010.9704448715.jpg           6         4         POINT Z (104.185674.3.22         1.62         0.6         1.60         0.6         2.23         0.4         20221201         Good MH SV 20 MH SV 20210.97061485.jpg           6         7         POINT Z (104.1853573.30         1.43         1.66         0.6         2.23         0.6         20221201         Good MH SV 20 MH SV 202100.08051307.jpg           8         9         POINT Z (104.1853573.312         1.30         1.66         0.6         2.23         0.6         20221201         Good MH SV 20 MH SV 2021201.080513796.jpg         11         POINT Z (104.18598.31         1.51         1.75         0.8         2.216         0.6         2.230         0.6         2.230         0.6         2.2010         Good MH SV 20 MH SV 2021201.080513796.jpg	A1	• : × ~	f <sub>x</sub> ID																			~
2       1       POINT Z (104.2087395 10.6110938 4.13)       1       1       POINT Z (104.155674) 3.22       1.70       1.82       0.6       1.80       0.6       2.41       0.4       2021201 Good       Mrv 20 MH SV 2021201 070441973 (pg         5       4       POINT Z (104.155464) 3.22       1.62       0.6       1.80       0.6       2.23       0.5       2021201 Good       Mrv 20 MH SV 2021201 070441973 (pg         6       7       POINT Z (104.155406) 0.09       1.4       1.65       0.6       1.60       0.6       2.23       0.3       2021201 Good       MH SV 20 MH SV 2021201 07051185 (pg         7       8       POINT Z (104.155373 3.12       1.30       1.66       0.6       2.23       0.3       2021201 Good       MH SV 20 MH SV 2021201 08051307 (pg         9       10       POINT Z (104.155373 3.12       1.30       1.66       0.6       2.23       0.3       2021201 Good       MH SV 20 MH SV 2021201 08051307 (pg         11       POINT Z (104.155373 3.12       1.30       1.68       0.6       1.68       0.6       2.23       0.6       2.23       0.6       2.23       0.6       2.23       0.6       2.23       0.6       MH SV 20 MH SV 20 MH SV 2021201 08251307 (pg       1.16       1.16 POINT Z (104.155664 8.15 V 20 MH SV 20 MH SV	4	ВС	D	E	F	G	н	1	J	к	L	м	N	0	Р	Q	R	S	т	U	v	Ŀ
3       2 POINTZ (10.418576 3.22       1.70       1.82       0.6       2.41       0.4       2022101 (cood MH SV_200H SV_202210) (74041575.)pg         5       4 POINTZ (10.418576 3.22       1.87       0.6       1.83       0.6       2.38       0.5       2022101 (mod am HSV_200H SV_202210) (74041575.)pg         6       7 POINTZ (10.418576 3.20       1.4       1.65       0.6       1.60       0.6       2.23       0.4       2022101 (cood MH SV_200H SV_202210) (74041575.)pg         7       8 POINTZ (10.418576 3.20       1.4       1.65       0.6       1.64       0.6       2.23       0.4       2022101 (cood MH SV_200H SV_2022100) (200501644.)pg         8       9       10 POINTZ (10.418567 3.12       1.30       1.75       0.8       1.4       0.6       2.23       0.4       2022101 (cood MH SV_200H SV_202210) (2022100) (20231760.)pg         10       11 POINTZ (10.418665 3.15       1.53       1.77       0.8       1.72       0.8       2.14       0.3       2022101 (cood MH SV_200H SV_202210) (20244444)       2021200 (cood MH SV_200H SV_202210) (20244444)       2021201 (cood MH SV_200H SV_202210) (20244444)       20110 (10.418659.06       1.35       1.70       0.8       1.75       0.8       2.14       0.4       2021201 (cood MH SV_20H SV_202120) (20244444)       2021201 (cood MH SV_20H SV_202120) (202444	1 ID	Geometry Remarks	Top Leve	I Bottom	Le Pipe 1 I	nv Pipe 1 l	Dia Pipe 2 I	Inv Pipe 2 Dia	Pipe 3 In	v Pipe 3 Dia	Pipe 4	Inv Pipe 4 Di	ia Water	Lev Sedim	ent Inspectio	r Conditio	on Photo 1	Photo 2				
4       3 POINT 2 (04.185494 3.22       1.62       1.87       0.6       1.83       0.6       2.8       0.5       20221201 Minor dam MH SV_20 MH SV_2021201_07448715; jpg         6       7 POINT 2 (104.1854903 10.00096090-1.000)       7       20221201 Minor dam MH SV_20 MH SV_2021201_00051104; jpg         7       8 POINT 2 (104.1853933 3.20       1.43       1.66       0.6       1.64       0.6       2.23       0.4       20221201 (000 MH SV_2021201_00051104; jpg         9       10 POINT 2 (104.185393 3.20       1.43       1.66       0.6       1.44       0.6       2.23       0.3       20221201 (000 MH SV_2021201_0025114068) jpg         9       10 POINT 2 (104.185083 3.11       1.51       1.75       0.8       1.44       0.6       1.44       0.6       2.13       0.3       20221201 (000 MH SV_2021201_0025114068) jpg         10       11 POINT 2 (104.186963 3.15       1.6       1.71       0.8       1.75       0.8       2.04       0.3       20221201 (000 MH SV_2021201_00487155) jpg         13       14 POINT 2 (104.186953 3.6       1.4       1.55       0.8       1.53       0.8       2.09       0.4       20221201 (000 MH SV_2021201_02487155) jpg       1.31       1.45       0.6       2.34       0.6       2.44       0.4       20221201 (000 MH SV_20149		1 POINT Z (104.2087539	95 10.6110	01938 -4.1	153)										20221201	Good						
5         4         POINT Z (104,18542018 10.60699690 - 1.060)         F         C         20222101 (aport Dam MH SV 20 MH SV 20221201, 00501135, jpg           6         7         POINT Z (104,1832563 .320         1.43         1.66         0.6         1.23         0.4         2.23         0.4         20221201 (abod MH SV 20 MH SV 2021201, 008051307, jpg           8         9         POINT Z (104,1835873.12         1.30         1.66         0.6         1.44         0.6         2.23         0.6         20221201 (abod MH SV 20 MH SV 2021201, 008051307, jpg           9         IDPOINT Z (104,185083 .30         1.43         1.66         0.6         2.23         0.6         20221201 (abod MH SV 20 MH SV 2021201, 008215298, jpg           10         IPOINT Z (104,185083 .11         1.51         1.77         0.8         1.72         0.8         2.04         0.3         20221201 (abod MH SV 20 2014) S0221201, 082815760, jpg           11         12 POINT Z (104,18683 .36         1.51         1.6         0.8         1.75         0.8         2.04         0.3         20221201 (abod MH SV 20 2014) S0221201, 08242434, jpg           12         POINT Z (104,18683 .36         1.51         1.70         0.8         1.75         0.8         2.04         0.2021201 (abod MH SV 20 MH SV 2021201, 120201, 1202731, 1202033, jpg		2 POINT Z (104.185674	3.22	1.70	1.82	0.6	1.80	0.6					2.41		20221201	Good	MH SV_20	0 MH SV_2	0221201_0	74041978.j	pg	
6         7         POINT 2 (104.185260 1.09         1.4         1.65         0.6         1.60         0.6         2.23         0.4         20221201 Good         MH SV_20 MH SV_2022101 (08050104, jpg           7         8         POINT 2 (104.185383 1.2)         1.30         1.66         0.6         1.64         0.6         2.23         0.6         2021201 Good         MH SV_20 MH SV_2022101 (0813163, jpg           9         10         POINT 2 (104.185088 3.11         1.51         1.75         0.8         1.44         0.6         2.33         0.6         2021201 Good         MH SV_20 MH SV_2022101 (08213569, jpg           11         12         POINT 2 (104.185089 3.15         1.6         1.71         0.8         1.75         0.8         2.14         0.3         20221201 Good         MH SV_20 MH SV_2022101 (08213769, jpg           12         13         POINT 2 (104.184869 3.15         1.6         1.71         0.8         1.75         0.8         2.14         0.3         20221201 Good         MH SV_20 MH SV_2022101 (08237769, jpg           13         14         POINT 2 (104.184869 3.15         1.6         0.6         2.4         0.6         2.4         0.6         2.4         0.6         2.4         0.6         2.4         0.6         2.4						0.6	1.83	0.6					2.38	0.5			_					-
7       8       POINT Z (104.18533 3.2.0       1.43       1.66       0.6       1.64       0.6       2.23       0.3       20221201 Good       MH SV_20 MH SV_2021201_080951307,jpg         9       POINT Z (104.18508 3.11       1.51       1.75       0.8       1.44       0.6       1.44       0.6       2.23       0.4       20221201 Good       MH SV_20 MH SV_2021201_08213760,jpg         10       11       POINT Z (104.18608 3.11       1.51       1.77       0.8       1.72       0.8       4       0.6       2.24       0.3       20221201 Good       MH SV_20 MH SV_2021201_082813760,jpg         11       I1       POINT Z (104.18698 3.15       1.57       0.8       1.75       0.8       2.06       2.04       0.6       2.04       2.0221201 Good       MH SV_20 MH SV_2021201_08423143,jpg         12       I3       POINT Z (104.18695 3.06       1.35       0.70       0.8       1.75       0.8       2.06       2.44       0.6       2.270       0.2       2021201 Good       MH SV_20 MH SV_2021201_0124303663.jpg         13       14       POINT Z (104.186359 3.4       2.47       2.42       0.6       2.34       0.6       2.244       0.4       2021201 Good       MH SV_20 MH SV_2021201_124237431.jpg         14																	_					-
8       9 POINT 2 (104.185187 3.12       1.30       1.68       0.6       1.65       0.6       2.23       0.6       20221201 Good       MH SV_20 MH SV_20221201_081341628.jpg         9       10 POINT 2 (104.18508 3.11       1.51       1.75       0.8       1.4       0.6       1.44       0.6       2.13       0.3       20221201 Good       MH SV_20 MH SV_2021201_0821358.jpg         11       12 POINT 2 (104.18669 3.15       1.55       1.77       0.8       1.72       0.8       1.75       0.8       2.72       0.6       2.214       0.3       20221201 Good       MH SV_20 MH SV_2021201_0823434.jpg         13       14       POINT 2 (104.18696 3.06       1.35       1.70       0.8       1.75       0.8       2       0.6       2.215       0.30       20221201 Good       MH SV_20 MH SV_2021201_08233.jpg         13       14       POINT 2 (104.18695 3.66       1.4       1.55       0.6       2.34       0.6       2.244       0.3       20221201 Good       MH SV_20 MH SV_2021201_0233.jpg         16       17 POINT 2 (104.18597 3.42       2.4       0.6       2.34       0.6       2.244       0.4       20221201 Good       MH SV_20 MH SV_2021201_124617534.jpg         16       17 POINT 2 (104.1867702.3.4       2.6       2																						
9       10       POINT Z (104.185088 3.11       1.51       1.75       0.8       1.4       0.6       2.13       0.3       20221201 Good       MH SV_20 MH SV_20221201_002.082152598.jpg         10       11       POINT Z (104.186021.3.16       1.53       1.77       0.8       1.72       0.8       2.09       0.4       20221201 Good       MH SV_20 MH SV_20221201_002.082152598.jpg         12       13       POINT Z (104.18663.3.15       1.6       1.71       0.8       1.75       0.8       2.09       0.4       20221201 Good       MH SV_20 MH SV_20221201_002.0853.jpg         13       14       POINT Z (104.18663.3.5       1.6       1.71       0.8       1.75       0.8       2.09       0.4       20221201 Good       MH SV_20 MH SV_2022101_120.0853.jpg         14       I5 POINT Z (104.1887973.20       0.6       2.30       0.6       2.34       0.6       2.44       0.3       20221201 Good       MH SV_20 MH SV_202210_01223078.jpg         15       I6 POINT Z (104.1887773.25       2.13       2.08       0.6       2.34       0.6       2.84       0.3       20221201 Good       MH SV_20 MH SV_202210_01243731.jpg       1.243731.jpg       1.243731.jpg       1.240732.jpg       1.240732.jpg       1.240732.jpg       2.250       1.240733.jpg       2																						
11       POINT Z (104.185021 3.16       1.53       1.77       0.8       1.72       0.8       2.09       0.4       20221201 Minor dan MH SV 20 MH SV 20221201 062819760.jpg         11       12       POINT Z (104.184693.15       1.6       1.71       0.8       1.75       0.8       2.14       0.3       20221201 Good       MH SV 20 MH SV 20221201 0642443.jpg         13       14       POINT Z (104.184693.15       1.6       1.71       0.8       1.75       0.8       2.09       0.4       20221201 Good       MH SV 20 MH SV 20221201 0630567155.jpg         13       14       POINT Z (104.184593.38       2.47       2.42       0.6       2.44       0.6       2.70       0.2       20221201 Good       MH SV 20 MH SV 20221201 124237431.jpg         16       17       POINT Z (104.18777) 2.5       2.13       2.08       0.6       2.34       0.6       2.84       0.4       20221201 Good       MH SV 20 MH SV 20221201 124237431.jpg       2021201 124237441.jpg       2021201 124237441.jp										_							_					-
11       12       POINT Z (104.184869 3.15       1.6       1.71       0.8       1.75       0.8       2.14       0.3       20221201 Good       MH SV_2 00 MH SV_20221201_08424434,jpg         12       13       POINT Z (104.184869 3.06       1.45       1.70       0.8       1.75       0.8       2.09       0.4       20221201 Good       MH SV_2 00 MH SV_20221201_080607.jpg         14       15       POINT Z (104.188299 3.4       2.47       2.42       0.6       2.44       0.6       2.70       0.2       20221201 Good       MH SV_2 00 MH SV_20221201_122302633,jpg         15       16       POINT Z (104.188777) 3.25       2.13       2.08       0.6       2.34       0.6       2.84       0.4       20221201 Good       MH SV_2 00 MH SV_2021201_12423743.jpg         16       17       POINT Z (104.1877721 2.06042441-12.450)         2.68       0.3       20221201 Good       MH SV_2 00 MH SV_2021201_1252011_12620575,jpg         18       19       POINT Z (104.187672)       2.66       2.30       0.6       2.68       0.3       20221201 Good       MH SV_2 00 MH SV_2021201_12520171_12605055,jpg         19       20       POINT Z (104.1865043.12       2.21       0.6       2.38       0.6       2.68       0.3       20221201 Good<									1.44	0.6							_	_	_			
12       13       POINT Z (104.184865 3.06       1.35       1.70       0.8       1.75       0.8       2.09       0.4       20221201 Good       MH SV_20 MH SV_20221201_0604667155, jpg         13       14       POINT Z (104.184823 3.06       1.4       1.55       0.8       2.15       0.30       20221201 Good       MH SV_20 MH SV_2022101_12230633.jpg         15       16       POINT Z (104.1889393.4       2.47       2.42       0.6       2.44       0.6       2.84       0.3       20221201 Good       MH SV_20 MH SV_2022101_124237431.jpg         16       17       POINT Z (104.1887771 210.66624041-12.450)       0.6       2.84       0.6       2.84       0.4       20221201 Good       MH SV_20 MH SV_2022101_12420754.jpg         18       19       POINT Z (104.187771 210.66624041-12.450)       0.6       2.68       0.3       20221201 Good       MH SV_20 MH SV_2022101_125210.17420174.916765.jpg         19       20       POINT Z (104.185797.3.25       2.10       2.23       0.6       2.68       0.2       2021200 Good       MH SV_20 MH SV_2021201_125201.12501.1460756.jpg         19       20       POINT Z (104.185795.3.18       2.01       2.23       0.6       2.66       0.2       2021200 Good       MH SV_20 MH SV_2021201_1250555.jpg       221201 Intoot MH SV_20 MH S																	_	_	_			
13       14 POINT Z (104.18423 3.08       1.4       1.55       0.8       1.33       0.8       2.15       0.30       2021201 Good       MH SV 20 MH SV 2021201 21300633, pg         14       15 POINT Z (104.186399 3.4       2.47       2.42       0.6       2.4       0.6       2.77       0.2       20221201 Good       MH SV 20 MH SV 2021201 12430633, pg         15       16 POINT Z (104.185399 3.4       2.47       2.42       0.6       2.34       0.6       2.44       0.4       20221201 Good       MH SV 20 MH SV 2021201 12430733, pg         16       17 POINT Z (104.187777 3.25       2.13       2.08       0.6       2.44       0.6       2.44       0.4       20221201 Good       MH SV 20 MH SV 2021201 12461753, hg         18       19 POINT Z (104.187702 3.40       2.16       2.35       0.6       2.30       0.6       2.68       0.3       20221201 Good       MH SV 20 MH SV 2021201 1256071, hg         18       19 POINT Z (104.186493 3.0       2.36       0.6       2.68       0.3       20221201 Good       MH SV 20 MH SV 2021201 12550371, hgg         21       22 POINT Z (104.186963 3.0       2.36       0.6       2.78       0.3       20221201 Good       MH SV 20 MH SV 2021201 13535958, hgg         22       23 POINT Z (104.186963 7.5, 15																						-
14       15       POINT Z (104.188599 3.4       2.47       2.42       0.6       2.4       0.6       2.70       0.2       20221201 Good       MH SV_20 MH SV_2021201_121302633,jpg         15       16       POINT Z (104.188115,3.3)       2.06       2.30       0.6       2.34       0.6       2.84       0.3       20221201 Good       MH SV_20 MH SV_2021201_124237431,jpg         16       17       POINT Z (104.1877712 10.60642041-12.450)        20221201 Good       MH SV_20 MH SV_2021201_12430575,jpg         17       18       POINT Z (104.1876720 3.40       2.16       2.35       0.6       2.30       0.6       2.68       0.3       20221201 Good       MH SV_20 MH SV_2021201_12530575,jpg         18       19       POINT Z (104.1876953.18       2.01       2.23       0.6       2.26       0.2       20221201 Good       MH SV_20 MH SV_2022101_125305758,jpg         19       20       POINT Z (104.186643.32       2.20       2.35       0.6       2.38       0.6       2.78       0.3       20221201 Mion dar MH SV_20 MH SV_2022101_12530578,jpg       2.2101 (104.186473.15       2.00       2.65       2.48       0.3       20221201 Mion dar MH SV_20 MH SV_2022101_13533598,jpg       2.25       POINT Z (104.186473.15       2.00       2.05       0.6       2.30																						
15       16       POINT Z (104.188115 3.33       2.06       2.30       0.6       2.34       0.6       2.84       0.3       20221201 Good       MH SV_2 0M H SV_2022120_124237431,jpg         16       17       POINT Z (104.18777) 3.25       2.13       2.08       0.6       2.84       0.3       20221201 Good       MH SV_2 0M H SV_202210_124237431,jpg         18       19       POINT Z (104.18777) 2.10.6642401 - 12.450)       0.6       2.68       0.3       20221201 Good       MH SV_2 0M H SV_202210_124237431,jpg         18       19       POINT Z (104.187720_3.44)       2.16       2.35       0.6       2.30       0.6       2.68       0.3       20221201 Good       MH SV_2 0M H SV_202210_12540741,jpg         19       20       POINT Z (104.186564 3.22       2.02       2.35       0.6       2.38       0.6       2.78       0.3       20221201 Good       MH SV_2 0M H SV_202210_12559351,jpg         21       22       POINT Z (104.186564 3.22       2.00       0.6       2.38       0.6       2.38       0.6       2.38       0.4       2.38       0.4       2.38       0.4       2.38       0.4       2.38       0.4       2.38       0.4       2.38       0.4       2.38       0.4       2.38       0.4       2.28 </td <td></td> <td>_</td> <td>_</td> <td>_</td> <td></td> <td></td> <td></td>																	_	_	_			
16       17 POINT Z (104.187797 3.2       2.13       2.08       0.6       2.04       0.60       2.84       0.4       20221201 Good       MH SV_20 MH SV_2021201_2124617534,jpg         17       18 POINT Z (104.1872772 1.20.50642.041 - 12.450)       20221201 Good       MH SV_2 20 MH SV_2021201_212405763,jpg       20221201 Good       MH SV_20 MH SV_2021201_212405763,jpg         19       19 POINT Z (104.186523.18       2.01       2.23       0.6       2.68       0.2       20221201 Good       MH SV_20 MH SV_2021201_1256021,jpg         20 21 POINT Z (104.186643.22       2.0       2.38       0.6       2.68       0.3       20221201 Good       MH SV_20 MH SV_2021201_1256021,jpg         21       22 POINT Z (104.18643.32       2.30       0.6       2.84       0.4       20221201 Good       MH SV_20 MH SV_2021201_13525093,jpg         23       24 POINT Z (104.18643.32       2.30       0.6       2.81       0.3       20221201 Good       MH SV_20 MH SV_2021201_13525093,jpg         24       25 POINT Z (104.186398 1.30.6565696 - 4.407)       -       -       20221201 Good       MH SV_200 MH SV_2021201_13152795,jpg         24       25 POINT Z (104.1857993 1.060573590 - 5.397)       -       -       20221201 Good       MH SV_200 MH SV_2021201_13152795,jpg         26       27 POINT Z (104.185437.350       2.0									2.24	0.6							_		_			
17       18       POINT Z (104.18747712 10.60642041 - 12.450)       0       20221201 Good       MH SV_2 00 MH SV_2 0221201_12323174.jpg         18       19       POINT Z (104.187202 3.40       2.16       2.35       0.6       2.66       0.3       20221201 Good       MH SV_2 00 MH SV_2 0221201_12231774.jpg         19       20       POINT Z (104.186564 3.22       2.20       2.35       0.6       2.38       0.6       2.66       0.2       20221201 Good       MH SV_2 00 MH SV_2 0221201_125238578.jpg         20       21       POINT Z (104.186564 3.22       2.20       2.35       0.6       2.38       0.6       2.78       0.3       20221201 Good       MH SV_2 00 MH SV_2 0021201_125298558.jpg         21       22       POINT Z (104.186473 3.15       2.00       2.66       2.78       0.3       20221201 Good       MH SV_2 00 MH SV_2 0021201_131529955.jpg         23       24       POINT Z (104.186473 7.15       2.00       2.66       2.66       0.4       20221201 Good       MH SV_2 00 MH SV_2 0021201_13152995.jpg         24       25       POINT Z (104.186473 7.15       2.00       2.05       0.6       2.07       0.6       2.06       2.02       2.02       0.02       2.02       0.02       2.02       0.02       2.02       0.02       <									2.34	0.0												
18       19       POINT Z (104.187202 3.40       2.16       2.35       0.6       2.30       0.6       2.68       0.3       20221201 Good       MH SV_20 MH SV_2022120_125213714,jpg         19       20       POINT Z (104.186523,3.18       2.01       2.23       0.6       2.26       0.2       20221201 Good       MH SV_200 MH SV_2022120_12550021.jpg         21       POINT Z (104.186643,32       2.20       2.35       0.6       2.38       0.6       2.78       0.3       20221201 Good       MH SV_200 MH SV_202210_125203714,jpg         21       22       POINT Z (104.186643,32       2.20       2.35       0.6       2.38       0.6       2.78       0.3       20221201 Good       MH SV_200 MH SV_202210_13353958,jpg       2.23       POINT Z (104.186473,15       2.00       0.6       2.66       2.56       0.4       20221201 Good       MH SV_200 MH SV_202210_131524759,jpg       2.24       POINT Z (104.186473,15       2.00       0.6       2.66       2.56       0.4       20221201 Good       MH SV_200 MH SV_202210_131524759,jpg       2.25       0.6       2.60       2.25       0.8       2.25       0.8       2.26       0.11       20221201 Good       MH SV_200 MH SV_20210_131524759,jpg       2.25       0.8       2.26       0.8       2.294       0.5						0.0	2.04	0.00					2.04	0.4								
19       20       POINT Z (104.186952 3.18       2.01       2.23       0.6       2.20       0.6         21       POINT Z (104.186952 3.18       2.01       2.23       0.6       2.38       0.6       2.78       0.3       20221201 Good       MH SV_2 00 H SV_2021201 125933598, Jpg         22       23       POINT Z (104.186643.82       2.02       2.35       0.6       2.38       0.6         22       23       POINT Z (104.18693.30       2.36       2.33       0.6       2.81       0.3       20221201 Good       MH SV_2 200 H SV_20221201 J3253995, Jpg         22       23       POINT Z (104.1864387 10.6066569 -2.407)       2.56       0.4       20221201 Good       MH SV_2 200 H SV_2022101 J31255995, Jpg         23       24       POINT Z (104.186593 0.50.577)        2.256       0.4       20221201 Moinor dar MH SV_200 H SV_2022101 J3175776, Jpg         25       26       POINT Z (104.1856390 10.60565946-4.289)        20221201 Major Dar MH SV_200 H SV_2021201 J31918043, Jpg         26       27       POINT Z (104.1856350 3.56       2.2       0.8       2.0       0.11       20221201 Good       MH SV_200 M SV_2021201 J3233404, Jpg         28       29       POINT Z (104.1864413.3.55       1.9       2.25       0.8       2.2						0.6	2.20	0.6					2.60	0.2			_	_	-			
20       21       POINT Z (104.186644 3.22       2.20       2.35       0.6       2.38       0.6         21       22       POINT Z (104.18699 3.30       2.36       2.33       0.6       2.88       0.3       20221201 [Minor dari MH SV_20 MH SV_20221201_1343938,jpg]         21       22       POINT Z (104.18699 3.30       2.36       2.33       0.6       2.81       0.3       20221201 [Good MH SV_20 MH SV_20221201_1343938,jpg]         23       24       POINT Z (104.186043871 LooS066569-2407)       2021201 [Into 36057350 - 5.3937)       20221201 [Into 36057350 - 5.3937)       20221201 [Into 36057350 - 5.3937)         24       25       POINT Z (104.1857493 10.60565546 - 4.289)       20221201 [Into 3605446 + 3.289)       20221201 [Into 3605446 + 3.289)         26       27       POINT Z (104.1857493 10.60565546 - 4.289)       20221201 [Into 360544 + 3.289)       20221201 [Into 360544 + 3.289)         26       27       POINT Z (104.1857493 3.36       2.19       2.25       0.8       2.94       0.5       20221201 [Into 3604 MH SV_2021201_131251464.398]         28       POINT Z (104.185043 3.56       2.19       0.8       2.25       0.8       2.94       0.5       20221201 [Into 3604 MH SV_20211.3123315463.198]         28       29       POINT Z (104.185043 3.56       2.15       0.8       2.																	_	_	-			
21       22       POINT Z (104.186398 3.30       2.36       2.33       6       2.3       0.6       2.81       0.3       20221201 Good       MH SV_20 MH SV_20221201_30243938,jpg         22       23       POINT Z (104.186497 3.15       2.00       2.05       0.6       2.07       0.6       2.56       0.4       20221201 Good       MH SV_20 MH SV_20212101_31322599.jpg         23       24       POINT Z (104.1860487 10.605673590 -5.407)       20221201 Good       MH SV_200 MH SV_20212101_31322769.jpg         24       25       POINT Z (104.1857993 10.60573590 -5.397)       20221201 Good       MH SV_200 MH SV_20212101_3132767.jpg         26       27       POINT Z (104.185643 1.0.60573590 -5.397)       20221201 Good       MH SV_200 MH SV_2021201_3132476.jpg         26       27       POINT Z (104.185643.55       1.92       2.2       0.8       2.05       0.8       0.1.1       20221201 Good       MH SV_200 MH SV_2021201_323316.04.jpg         27       28       POINT Z (104.186437.35.5       2.0       0.2       0.8       2.94       0.5       20221201 Good       MH SV_200 MH SV_2021201_3233216.3.jpg         28       29       POINT Z (104.186473.3.5       0.0       2.7       0.8       2.2       0.8       2.20       0.8       2.20       0.8       2																	_	_	-			
22       23       POINT Z (104.186147 3.15       2.00       2.05       0.6       2.07       0.6         23       24       POINT Z (104.18604387 10.6056559 -2.407)       0       0       20221201       Good       MH SV_2 20 MH SV_2 20221201_31255995,jpg         24       25       POINT Z (104.18604387 10.6056559 -2.407)       0       0       20221201       Minor dar MH SV_2 20017_37756,jpg         25       26       POINT Z (104.1856399 0.6055946 -4.289)       0       20221201       Minor dar MH SV_2 20017_37376,jpg         26       27       POINT Z (104.1856396 3.34       1.92       2.2       0.8       2.05       0.8       0       0.1.1       20221201       Minor dar MH SV_2 20017_37376,jpg         27       28       POINT Z (104.18563356       1.92       2.2       0.8       2.05       0.8       0.1.1       20221201       Good       MH SV_2 2001 MSV_2 2021201_3233440,jpg         28       29       POINT Z (104.184473,55       1.9       2.22       0.8       2.2       0.8       2.26       0.8       2.294       0.8       20221201_323751869,jpg         28       29       POINT Z (104.184473,55       1.9       2.22       0.8       2.2       0.8       2.26       0.8       2.2021201_3333450,jpg						0.0																
23       24       POINT Z (104.18604387 10.60566569 - 2.407) <ul> <li>20221201 [Minor dari MH SV_20011_3152476].jpg</li> <li>20221201 [Minor dari MH SV_20011_3233151063].jpg</li> <li>20221201 [Minor dari MH SV_20011_322335410.jpg</li> <li>2011 Z (104.185043].55</li> <li>2.19</li> <li>2.25</li> <li>0.8</li> <li>2.05</li> <li>0.8</li> <li>2.05</li> <li>0.8</li> <li>2.06</li> <li>2.06</li> <li>2.06</li> <li>2.07</li> <li>0.08</li> <li>2.07</li> <li>0.08</li> <li>2.07</li> <li>0.08</li> <li>2.07</li> <li>0.08</li> <li>2.07</li> <li>0.00</li> <li>2.00</li> <li>2.15</li> <li>0.8</li> <li>2.20</li> <li>0.8</li> <li>2.30</li> <li>0.8</li> <li>2</li></ul>						0.6											_	_	_			
24       25       POINT Z (104.1857993 10.60573590 -5.937)       C       20221201 Good       MH SV_20 MH SV_20221201_13157576.jpg         25       26       POINT Z (104.1854393 10.6056594 - 4.289)       20221201 Good       MH SV_20 MH SV_2021201_13131604.3jpg         27       28       POINT Z (104.185098 3.34       1.92       2.2       0.8       2.05       0.8       0       1.1       20221201 Good       MH SV_200 MH SV_2021201_13231604.3jpg         27       28       POINT Z (104.185098 3.56       2.19       2.25       0.8       2.2       0.8       2.94       0.5       20221201 Good       MH SV_200 MH SV_2021201_13237580.9jpg         28       29       POINT Z (104.184573.50       2.00       2.17       0.8       2.15       0.8       0.8       20221201 Good       MH SV_200 MH SV_2021201_13237166.jpg         29       30       POINT Z (104.184573.50       2.04       2.18       0.8       2.15       0.8       2.80       0.5       20221201 Good       MH SV_200 MH SV_2021201_133231263.jpg         29       30       POINT Z (104.1842473.50       2.04       2.18       0.8       2.15       0.8       2.24       0.8       20221201 Good       MH SV_200 MH SV_202121_0133393766.jpg         31       32       POINT Z (104.1842473.50 <td< td=""><td></td><td></td><td></td><td></td><td></td><td>0.0</td><td>2.07</td><td>0.0</td><td></td><td></td><td></td><td></td><td>2.30</td><td>0.4</td><td></td><td></td><td>_</td><td></td><td>_</td><td></td><td>PB</td><td></td></td<>						0.0	2.07	0.0					2.30	0.4			_		_		PB	
25       26       POINT Z (104.18543390 10.60565946 - 4.289)       Image: Control of the state of the																						
26       27       POINT Z (104.185296 3.3.4       1.92       2.2       0.8       0.1.1       20221201 (Good       MH 5V_200 MH 5V_20221201_3233540.)pg         27       28       POINT Z (104.185296 3.3.56       2.19       2.25       0.8       2.9       0.5       20221201 (Good       MH 5V_200 MH 5V_20221201_32323450.)pg         28       29       POINT Z (104.185083 3.56       2.19       2.25       0.8       2.9       0.5       20221201 (Good       MH 5V_200 MH 5V_20221201_323231263.)pg         29       30       POINT Z (104.184413.355       1.9       2.22       0.8       2.6       0.8       2.201201 (Minor dari MH 5V_200 MH 5V_2021201_133231263.)pg         29       30       POINT Z (104.184413.355       1.9       2.22       0.8       2.2       0.8       2.80       0.5       20221201 (Minor dari MH 5V_200 MH 5V_2021201_133331263.)pg       0.8       2.94       0.8       2021201 (Minor dari MH 5V_200 MH 5V_2021201_133331263.)pg       0.8       2.94       0.8       2.021201 (Minor dari MH 5V_200 MH 5V_2021201_13439365.0B)       0.8       2.86       0.4       20221201 (Minor dari MH 5V_200 MH 5V_2021201_134395640.)pg       0.8       0.8       2.86       0.4       20221201 (Minor dari MH 5V_200 MH 5V_20211_01_134395640.)pg       0.8       0.8       0.8       0.8       0.8       0.8       <																						
27       28       POINT Z (104.185083 3.56       2.19       2.25       0.8       2.2       0.8       2.94       0.5       20221201 Good       MH SV_20 MH SV_20221201_132751869.jpg         28       29       POINT Z (104.1845773.50       2.00       2.17       0.8       2.15       0.8       0.8       20221201 Good       MH SV_20 MH SV_2021201_13232163.jpg         29       30       POINT Z (104.1846473.55       1.9       2.22       0.8       2.80       0.5       20221201 Minor dan MH SV_20 MH SV_2021201_13393765.jpg         30       31       POINT Z (104.184473.55       1.95       2.31       0.8       2.30       0.8       2.86       0.4       20221201 Good       MH SV_20 MH SV_2021201_13393765.lpg         31       32       POINT Z (104.184243 3.51       1.95       2.31       0.8       2.30       0.8       2.86       0.4       20221201 Good       MH SV_20 MH SV_2021201_1349545088.pg         31       32       POINT Z (104.184243 3.51       1.95       2.31       0.8       2.30       0.8       2.86       0.4       20221201 Good       MH SV_20 MH SV_2021201_13495440.jpg         MH SV_Manhole						0.9	2.05	0.9						011			_	_	_			
28       29       POINT Z (104.18457 3.50       2.00       2.17       0.8       2.15       0.8       0.8       20221201 Good       MH SV_200 HISV_20221201_133231263.jpg         29       30       POINT Z (104.184431.35.5       1.9       2.22       0.8       2.8       0.5       20221201 Minor dar MH SV_200 HISV_20221201_133937665.jpg         30       31       POINT Z (104.184473.55       2.04       2.18       0.8       2.24       0.8       2.24       0.8       2.294       0.8       20221201 Minor dar MH SV_200 HISV_20221201_33937665.jpg         31       32       POINT Z (104.184424 3.51       1.95       2.31       0.8       2.30       0.8       2.86       0.4       20221201 Good       MH SV_20M HSV_2021210_134905440.jpg         32       POINT Z (104.184224 3.51       1.95       2.31       0.8       2.30       0.8       2.86       0.4       20221201 Good       MH SV_20M HSV_202121_01_34905440.jpg         4       MH_SV_Manhole       ①													2.94				_	_	_			
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30       31       POINT Z (104.184447 3.50       2.04       2.18       0.8       2.15       0.8       2.94       0.8       20221201 Minor dar/ MH SV_20 MH SV_20221201_134356188.jpg         31       32       POINT Z (104.184224 3.51       1.95       2.31       0.8       2.30       0.8       2.86       0.4       20221201 Good       MH SV_20 MH SV_2021201_134905440.jpg         MH SV_Manhole       ⊕													2 90				_	_	_			
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You can import a huge amount of data via CSV and SHP and link it to existing data. Much more than at KML.

If you do not want to copy coordinates from the CSV, it is also important to give start option: **nomove the value 1**, via menu option: **Tools -> Start options**. To disable the replacement of coordinates from import data.

a. Import the CSV data, via menu option: Import -> CSV Object data -> Start.

ightarrow 🔺 📕 « Windo	ows (C:) → Pr	ojects > brutis_v62j_freeware_64b > M	H KP CSV → ~	✓ Ö	MH KP CSV
rganise 👻 New folder					
🕹 Downloads	^	Name	Date modified	Туре	Size
👌 Music		MH_SV_Manhole	22/03/2023 04:55	File folder	
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📑 Videos		MH_SV_Manhole.csv	02/11/2023 19:22	Microsoft Excel C	57 KB
Lindows (C:)	~				
File name	e: MH_SV_Mai	abole cov		Comma Sep	arated Values File

- b. Select the file and click [Open]
- c. If the column headings are unknown, the program will ask for the data type in the next window.

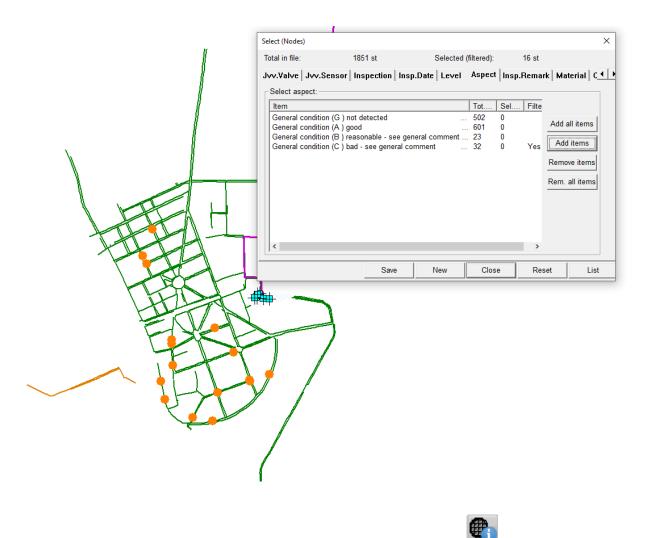
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○ Signs								
C Populations								
C Installations								
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C Water-parts								
C Construction-parts								
• Nodes (manholes)								
C Nodes (gullies)								
C Conduits (drains and culverts)								
C Pumps								
C Valves								
C Sensors								
C Weirs								
C Orifices								
C Notifications								
Help OK Cancel								

- d. Click on the nodes checkbox to indicate that it concerns node data. And then click the [OK] button.
- e. The window will then appear in which you can indicate how the data from the CSV file should be processed. And what the **matchdis** parameter is to link the node date to the existing nodes.
- f. Almost at the bottom you will find the Wellknown test (WKT) field, behind which you register the "geometry" column from the CSV file.
- g. Click: [OK], as soon as, as many BRUTIS data fields as possible have been provided with the columns from the SHP-File.
- h. Click: [Yes], to save the choices in the integration file. The integration file is saved with the SHP-File, ready to automatically populate the integration window next time. Or to use for an automated conversion of data.

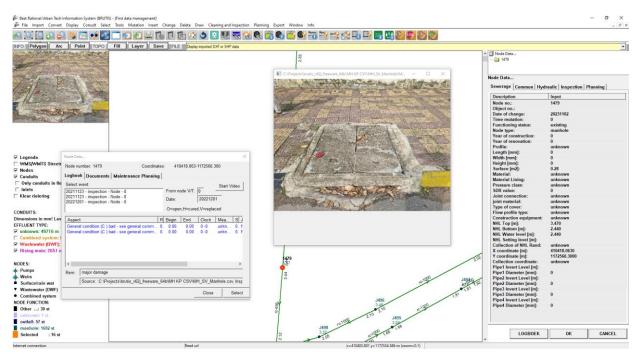
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Year of renovation:	
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Flow profile type:	
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Clock position number:	
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Nodes from geom/csv/json/xm Description Well-known text (WKT) latitude longitude	Condition Photo1 Photo2 Continue OK Cancel I - C:\Projects\brutis_v62j_freeware_64 × Input

- i. If inspection data is found the program ask's if the data should be imported. Click [Yes].
- j. You can see the results below. Via the menu option: Select -> Via filter -> nodes, you start a window with which you can select the quality of nodes via the tab: Aspect.

Show mutations	from file	×
Also import insp	ection data from a t	ransaction?
	Yes	No



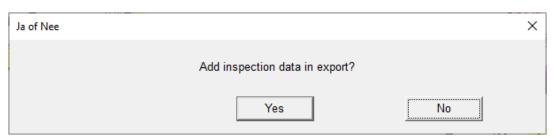
You can consult the inspection data by clicking on a node after the button: , after which the data of the node will be displayed. Below the data you will find the button: [Logbook], to display the inspection data. In the log window you can click on a status aspect to view photos.



k. Don't forget to save the merged data in a new work file.

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I. And add the inspection data in the export to work file



m. [Yes].

# Appendix E BRUTIS Database

When no tables found BRUTIS creates automatically the next urban drainage management tables: