

TELSTRA CORPORATION LIMITED

Telstra's Efficient Access Model

User Guide

3 March 2008

Contents

1	Introduction						
2	Syste	m Requirements1					
3	Overv	iew2					
4	Conventions Used In This User Guide						
5	Instal	lation					
	5.1	Installing The Model					
	5.2	Uninstalling The Model6					
6	Gettir	ng Started 8					
	6.1	Open The Model8					
	6.2	The Model Screen9					
	6.3	Close The Model12					
7	The G	rouping Scenario Tab13					
	7.1	Select a Grouping Scenario13					
	7.2	Discard Edits to a Grouping Scenario16					
	7.3	Delete a Grouping Scenario16					
	7.4	Save a Grouping Scenario17					
	7.5	Sort the ESA list					
8	The Er	ngineering Scenario Tab20					
	8.1	Select an Engineering Scenario 20					
	8.2	Discard Edits to an Engineering Scenario 25					
	8.3	Delete an Engineering Scenario26					
	8.4	Save an Engineering Scenario 27					
	8.5	Operating Engineering Modules Separately 27					
9	The Co	osting Scenario Tab32					
	9.1	Select a Costing Scenario					
	9.2	Discard Edits to a Costing Scenario					
	9.3	Delete a Costing Scenario					
	9.4	Save a Costing Scenario					
10	Create	e the Output Costing Spreadsheet					
11	The Co	ost Calculation Module41					
	11.1	Input Worksheets					
	11.2	Composite Cost Calculation Worksheets					
	11.3	Network Quantities Worksheets					
	11.4	Network Cost Worksheets					
	11.5	Capital Cost Calculation					
	11.6 Turri	Investment and Annual Cost Summaries					
12	Iroub	tesnooting53					
13	Ketere	ences55					
14	Index						
APPE	ENDIX A	Editable Variables in The Model57					

1 Introduction

The intention of this document is to provide a "how-to" guide to the user of the TEA Cost Model (The Model). The Model has been designed for the purpose of estimating the efficient cost of the unconditioned local loop service (ULLS).

2 System Requirements

The Model has the following system requirements:

Minimum Required	Recommended
Pentium 4 Processor or AMD equivalent	For better performance, a Dual or Quad Core processor is highly recommended
at least 1 GB RAM	3 GB RAM recommended
1 GB free HDD space	
Microsoft Windows XP Professional with full administration rights	In order to take advantage of Dual or Quad Core capabilities if available in computer, Windows Vista is recommended
.NET 1.1 Framework (should be part of the Windows installation)	
The latest MDAC (Microsoft Data Access Components, also part of a Windows installation)	
Microsoft Excel 2003 or newer	In order to take advantage of the Dual or Quad Core capabilities, Excel 2007 or newer is recommended
CD/DVD drive	
	Microsoft Access 2003 is not necessary to run The Model, but is required if the database is to be viewed

3 Overview

The Model consists of a user-interface which accesses and runs the three underlying modules.

There are the two Engineering modules, one for the distribution network and one for the main network, each of which relies on a set of inputs that can be accessed and revised from the user interface. The output of these modules is the volume of plant, labour and equipment required to deploy the efficient access network. This output feeds into the Cost Calculation Module which generates the model outputs.

The Cost Calculation Module calculates the total investment cost associated with the efficient access network by applying composite fully loaded costs to the plant and equipment volumes produced by the engineering modules. The annual and monthly costs associated with this network are then determined in the Annual Cost Summary worksheet by applying capital cost, direct and indirect expense and indirect investment factors to the investments produced by the module.

All of the modules are MS Excel-based and can be easily accessed and audited. The engineering modules rely on base data extracted, translated and loaded from Telstra's' Cable Plant records for each of Telstra's Band 2 ESAs. These are the same data sources that Telstra uses in planning is own network.

For more information about the methodology used in The Model, refer to the **TEA Model Documentation** (see **Chapter 14. References**).

Bold text	An element of The Model e.g. TEA-Data.mdb or Telstra Model Inputs , or the Operating System e.g. the Start menu
Bold Italic text	A reference to another chapter of this user guide e.g. "See Chapters 7 to 9 for more information"
	This picture highlights the following text as important information that you need to take note of.

4 Conventions Used In This User Guide

5 Installation

If a previous version of The Model has been installed on a machine you should uninstall it prior to beginning installation of the new Model. See **Section 5.2** for the instructions to uninstall the previous version of the Model.

5.1 Installing The Model

1 Insert the Telstra Cost Model Disk into your CD/DVD drive.



2 In **Explorer**, run the file **TelstraCostModelInstall.msi** by double-clicking on it.



3 The setup Wizard will start and guide you through the installation. Click **Next** to continue.

🛃 Telstra Cost Model	
Select Installation Folder	
The installer will install Telstra Cost Model to the following folder.	
To install in this folder, click "Next". To install to a different folder, enter it be	elow or click "Browse".
<u>F</u> older: C:\Program Files\Telstra\Telstra Cost Model\	Browse
	Disk Cost
Install Telstra Cost Model for yourself, or for anyone who uses this compu	ter:
 Just me 	
Cancel < Back	Next >

4 You will be prompted to identify the location of the folder where The Model will be installed.

Navigate to the folder where you want The Model installed by clicking on the **Browse** button.

It is recommended that you choose the default location: C:\Program Files\Telstra\Telstra Cost Model\

In this document it is assumed that The Model is located in the default folder.

Clicking on the **Disk Cost** button will allow you to ascertain if there is sufficient space for the files by bringing up a list of the current drives and available space on each.

Assuming the correct security settings on the computer, clicking on the **Just Me** selector will prevent anyone else operating the computer from gaining access the Model. Selecting to install for **Everyone** will provide any user with access to the model.



The Model requires less than 30MB HDD space. The underlying database requires just over 600MB of space and must be saved in the same folder as the model. It is therefore recommended that the drive have at least 1GB of available space to install the model.

5 Click Next



6 Click **Next** to confirm and start the installation

🥵 Telstra Cost Model			
Installation Complete			
Telstra Cost Model has been successfully	installed.		
Click "Close" to exit.			
Places use) (indexe Hadata to shock for	anu oritical undate	in to the NET Frame	work
Fieldse use windows opuale to check for	any chical update	Stutnet.NET Flaille	WOR.
	Cancel	< Back	Close

7 After The Model has installed, Click **Close**.

8 Copy the file **TEA-Data.mdb** from the **Telstra Cost Model Disk** to the **Data** folder where The Model has been installed – for the default installation this would be **C:\Program Files\Telstra\Telstra Cost Model\Data**.



The Telstra Cost Model install is now complete.

If there is an error opening The Model, you might need to install the **.Net 1.1 Framework**. From the **Telstra Cost Model Disk**, navigate to the **1.1 Framework** folder. Double-click the file **dotnetfx.exe** and follow the instructions for installation. If necessary, a Service Pack release for the **.Net 1.1 Framework** is also included on the disk.

5.2 Uninstalling The Model

1 Open the **Control Panel** – this can be found on the right-hand side of the **Start Menu**.



e Edit View Favorites	s Tools	Help		
)Back - 🕥 - 🎓 🌙	O Search	🏷 Folders 🛛 😨 🔓 🔏 🕼	> D 🖸 🗙 🖸	
fress 🔂 Control Panel			💌 🔁	G
a		Name 🔺	Comments	
Control Panel	æ BW	Accessibility Options Add Hardware Add or Remove Programs Administrative Tools	Adjust your computer settings for vision, hearing, and mobility. Installs and troubleshoots hardware Install or remove programs and Windows components. Configure administrative settings for your computer.	
See Also	۲	Automatic Updates	Set up Windows to automatically deliver important updates	
Help and Support		CD/DVD Drive Acoustic Silencer	Configure and manage your bluecourd devices. Configure the rotation speed of CD/DVD drive. Set the date, time, and time zone for your computer.	
		Subsplay Solder Options Subsplay Strategies	Change the appearance of your desktop, such as the backgr Customize the display of files and folders, change file associ Add, change, and manage fonts on your computer.	
		Game Controllers	Add, remove, and configure game controller hardware such Control the graphics hardware features of this computer.	
		Internet Options Java	Configure your Internet display and connection settings. Java(TM) Control Panel	
		💩 Keyboard 🥥 Mail	Customize your keyboard settings, such as the cursor blink r Microsoft Office Outlook Profiles	
			Customize your mouse settings, such as the button configur Connects to other computers, networks, and the Internet.	

2 Select Add or Remove Programs

🐻 Add or Re	move Programs			
5	Currently installed programs:	Sort by: Name		*
C <u>h</u> ange or Remove	Sony Digital Voice Editor 2	Size	10.48MB	^
Programs	🔂 Telstra Cost Model	Size	18.03MB	
1	Click here for support information.	Used	frequently	
		Last Used On	31/01/2008	
Programs	To change this program or remove it from your computer, click Change or Remove.	Change	Remove	
Add/Remove Windows	🔂 Telstra Office Templates	Size	0.02MB	
	C TOSHIBA Assist	Size	1.14MB	
	掲 TOSHIBA Controls	Size	1.25MB	8
Components	週 TOSHIBA Display Devices Change Utility			
	n TOSHIBA HDD Protection	Size	1.15MB	E
Set Program Access and	Kan TOSHIBA Hotkey Utility for Display Devices			_
	TOSHIBA Management Console Version 3.5 (3.5.4)	Size	1.84MB	
Derduits	105HIBA Mobile Extension3 for Windows XP V3.80.00.XP	Size	0.66MB	~

- 3 Click on the **Telstra Cost Model** program and then click on the **Remove button**.
- 4 A dialog box will appear asking for confirmation Click on **Yes.**

Add or l	Remove Programs 🛛 🕅
2	Are you sure you want to remove Telstra Cost Model from your computer?
	Yes No

5 The underlying sub directories should also be removed by deleting the folder where The Model was installed (i.e. delete the folder **C:\Program Files\Telstra\Telstra Cost Model**)

6 Getting Started

6.1 Open The Model

There are three methods of starting The Model.

1 Installation of The Model as described previously will result in an icon being placed on your Windows desktop. Doubleclicking on this icon will open The Model.



2 During the installation process, an item is placed on your program list under the Start menu.



Select the **Start** menu, then **All Programs**, then **Telstra**, then **Telstra Cost Model** to open The Model this way.

3 The Model can be run directly from the executable file.

Open Windows Explorer and navigate to the folder C:\Program Files\TELSTRA\Telstra Cost Model.



This is the default location. If you installed The Model to another folder you will need to navigate to that folder.

File Edit View Favorites Tools Help						
🗿 Back 🝷 🕥 🗧 🏂 👂 Search 📂 Folders		🗅 🔏 🕼 🌶 🗋 🗙 🗹				
ddress 🛅 C:\Program Files\TELSTRA\Telstra Cost Mo	del					💌 🔁 Go
olders	× Na	ime 🔺	Size	Туре	Date Modified	
Benote Standard		Deta Images Model AcOPB.dl AcOW.cl I.dl Microsoft.Office.Interop.Cwcl1.dl Microsoft.Office.Interop.dl mscontt.dl Microsoft.AcMet.Net.I.dl MSDATASC.cl	100 K8 1,60 K8 4,51 K8 451 K8 451 K8 2,24 K8 407 K8 477 K8 477 K8 5,58 K8 5,58 K8 1,276 K8 1,276 K8 1,276 K8 1,276 K8 1,276 K8 1,276 K8 1,24 K8 9,61 K8 1,84 K8 9,61 K8	File Folder File Folder File Folder Application Extension Application Extension	2501/2008 2:56 PM 11/01/2008 8:11 PM 11/01/2008 8:11 PM 11/01/2008 8:11 PM 27/11/2008 8:11 PM 27/11/2007 7:05 PM 29/05/2007 8:54 AM 4/06/2007 7:21 PM 4/06/2007 7:21 PM 4/06/2007 7:21 PM 4/06/2007 7:21 PM 4/06/2007 7:21 PM 13/09/2007 2:38 PM	
🖃 🥯 Local Disk (D:)	~					

Double-click on the file **TelstraCostModel.exe** to open The Model.

6.2 The Model Screen

The Model has a simple, interactive display. When you run The Model the following initial screen will appear.

Ginoping Engineering Costing Scenario: Default: Default: Contraction All Grouping Scenario: If \$\Phi \nother intermediate Default: Contraction Default: Contraction All Grouping Scenario: If \$\Phi \nother intermediate Default: ESA_State ESA_State ESA_Code BLL_Band Rock*is Selected T Intermediate If ULL_Band: ESA_State ESA_State ESA_State ESA_State Selected T Intermediate Intermediat Intermediate Inte
Brouging Scenario: Image: Transmission of the second of the
Onlow ESA_State ESA_Name ESA_Code IRL_Band Rock%s Selected Y ESA_State ESA_State ESA_Code IRL_Band Rock%s Selected Y CU VIEW VIEW VIEW NotA O O O CU VIEW VIEW NotA O O O O CU VIEW VIEW NotA O O O O CU VIEW VIEW NotA O
ESA_State ESA_Value Fiss_Load Rock vol Selected W0 2014976 2966 900 01 0 W0 2014976 2966 9000 01 0 W0 2014976 2966 9000 01 0 W0 2004976 2966 9000 01 0 QD VVD807537006 1976.6 9000 2 0.1 0 QD VVD80753706 1976.6 9000 2 0.1 0 QD VVD80753706 1976.6 9000 2 0.1 0 QD VVD80753706 VVTR 9000 2 0.1 0 QD VVD80751704N VVTRV 9000 2 0.1 0 QD VVD8075704N VVTRV 9000 2 0.1 0 QD VVD80760 VVTRV 9000 2 0.1 0 NW VVX31144700T VVTRV 9000 2 0.1 0 NW VVX31474700T
OLC_parts (DAVD 2 * Dol Def(t)) Def(t) Def(t) <thdef(t)< th=""> Def(t) <thdef(t)< <="" td=""></thdef(t)<></thdef(t)<>
CLD TERCARGA TWGA BAND 2 0.1 Or QLD VORKXYS XV06 VVN68 BAND 2 0.1 Or QLD VORKXYS XV06 VVN68 BAND 2 0.1 Or QLD WURR XLLA WURR BAND 2 0.1 Or QLD WURR TRULA WURR BAND 2 0.1 Or QLD WURR TROCK WURD 2 0.1 Or QLD WURR TROCK WURD 2 0.1 Or QLD WURST FROMCH WURD 2 0.1 Or NOW WUST FROMCH WURD 2 0.1 Or Selected Intel Sectorsins WURD SECTOR WUST FROMCH WURD 2 0.1 Or
GLD VORESTS INCE VICE BAKD 2 0.1 O GLD VORESTS INCE VICEE BAKD 2 0.1 O GLD VORESTS INCE VICEE BAKD 2 0.1 O GLD VICEE WITE BAKD 2 0.1 O GLD WATERTOWN WITE BAKD 2 0.1 O GLD WATERTOWN WITE BAKD 2 0.1 O GLD WATERTOWN WITE BAKD 2 0.1 O Statistic lass Statistic TOW WIXESTAFFORT WITE BAKD 2 0.1 O
Construction Construction<
CoD VMR R1LA VMR 7 CMO 2 0.1 C CoD VMR R100C VMR R00 2 0.1 C 0.1 C CoD VMR R00 2 0.1 C 0.1 C 0.1 C CoD VMR R00 2 0.1 C 0.1 C 0.1 C CoD VMR R00 2 0.1 C 0.1 C 0.1 C CoD VMR R00 2 0.1 C 0.1 C C 0.1 C CoD VMR R00 2 0.1 C 0.1 C 0.1 C Selected load Scenarios NVW VMS21AP F00T VVTR BAND 2 0.1 C
QLD WHEIT ROCK WTRX BMD 2 0.1 ID VIC WILLMASTOWN WYON BAD 2 0.1 ID VIC WILLMASTOWN WYON BAD 2 0.1 ID Tobirs Model Datputs NOW WST Tamworkin H WYTA BAD 2 0.1 ID Tobirs Model Datputs NOW WST Tamworkin H WYTA BAD 2 0.1 ID Selected loss Semalain NOW WB050R WSOR BAD 2 0.1 ID
VIC WILLMASTOWN WTON BMD-2 0.1 IC CO WREPROO WTO BMD-2 0.1 IC Telstra Model Dutputs MOLDARFOO WTAM BMD-2 0.1 IC Selected load Scawsin MOSTMAPPOOL WTST BMD-2 0.1 IC Now WRSTRAFFOOL WTAM BMD-2 0.1 IC Now WROSCOR WRSTRAFFOOL WTMO BMD-2 0.1 IC
QLD WATERFORD WTPD BAND 2 0.1 W Telstra Model Dutputs NSW W4ST TAMW/CR1H WTAM DAVD 2 0.1 W Selected Inord Scenarios NSW W43D5GR WSTR BAND 2 0.1 W
Totskra Model Dutputs NOW WEST TAMWORTH V/TAM DAVD 2 0.1 Image: Comparison of the tambine of t
Telstra Model Outputs NSW WAGSTAFF POINT WSTF BAND 2 0.1 V Selected Inced Scenarios NSW WINDSOR WSOR BAND 2 0.1 V
Selected inset Scenarios
VIC WARRANWOOD WRWD BAND 2 0.1
Grouping - Default QLD WARNER WRINE BAND 2 0.1
Engineering - Default VIC WAATTBRAA WRRA BAAD 2 0.1
Contine Defect
General Diffust O
NOW WANG WANG WING BAAD 2 0.1
NSW WARRINGO WINGO BAND 2 0.1 F
WA WEMBLEY WIMEY BAND 2 0.1 V
NSW WALLSEND WLSD BAND 2 0.1
VIC WINDSOR WIRC BAND 2 0.1
NSW WILLOUGHBY WILL BAND 2 0.1
VIC WHEELERS HILL WHEL BAND 2 0.1
SA WHYALA JENKINS WHO'S BAND 2 0.1
NSW WAGGA SOUTH WGSO BAND 2 0.1
NSW WETHEROLL PARK WETH BAND 2 0.1
VIC WEST ESERVICIN WESS DAND 2 0.1
A WEST AREADOL WEST BAND 2 0.1
QD WELLINGTON POINT WEIN BAND 2 0.1

There are three basic sections on this screen: a) **Telstra Model Inputs**; b) **Telstra Model Outputs**; and c) **Edit Telstra Model Inputs**.

a) The **Telstra Model Inputs** section allows you to develop various costing scenarios by accessing and revising the inputs for the various modules of The Model.

> There are three tabs in this section that provide the capability to navigate between the various input sheets for The Model.

> There are also buttons that allow you to create a new scenario (라), save the scenario

(💾), delete the scenario (🗡) and access previously saved input scenarios (drop-down box).



Chapters 7 to 9 provide more information on how to use each of the capabilities available in this section of the user interface.

b) The **Telstra Model Outputs** sections' primary function is to generate outputs once the input scenarios are selected.

> This section identifies the scenarios that have been selected and provides a button to start the process of generating results.

Once the results are processed through the various modules you will be transported to the Annual Cost Summary sheet in the Cost Calculation Module to review the results.

The 🧐 Help button takes you to a brief Help screen.



Chapter 10 provides more detail on this section of the user interface.

c) The **Edit Telstra Model Inputs** section identifies the scenario which is currently being worked on.

It also identifies the category of inputs that are accessible on the current screen.

The input categories that can be accessed from the user interface are:

1) Grouping - Main which allow you to select the ESAs to process;

2) **Engineering - Main** which provides access to the inputs for the Main Engineering Module;

3) **Engineering - Distribution** which provides access to the inputs for the Distribution Engineering Module;

4) **Costing - Main** which provides access to the main network unit cost inputs for the Cost Calculation Module.

5) **Costing – Input Ratios** which provides access to the conduit and trench placement ratio inputs for the Cost Calculation Module.

6) **Costing – Capital Costs** which provides access to the capital costing inputs for the Cost calculation Module.

Each input section allows you to identify those inputs which are currently used under the selected scenario and provides the capability for you to change those inputs.

elstra Model Ir	nputs Input Categ Scen	jory: Grouping-Ma ario: Default (De	iin fault Scenario is /	Vot Editable)	
				Check or Uncl	neck: 🔲 All
ESA_State	ESA_Name	ESA_Code	ULL_Band	Rock%	Selected 🗸 🔼
∃ ULL_Band :	BAND 2 - 583 item(s))			
QLD	ZILLMERE	ZMRE	BAND 2	0.1	
QLD	YERONGA	YRGA	BAND 2	0.1	
QLD	YORKEYS KNOB	YNOB	BAND 2	0.1	
QLD	WYNNUM	WYNM	BAND 2	0.1	
QLD	WURTULLA	WURT	BAND 2	0.1	
QLD	WHITE ROCK	WTRK	BAND 2	0.1	
VIC	WILLIAMSTOWN	WTON	BAND 2	0.1	
QLD	WATERFORD	WTFD	BAND 2	0.1	
NSW	WEST TAMWORTH	WTAM	BAND 2	0.1	 Image: A set of the set of the
NSW	WAGSTAFF POINT	WSTF	BAND 2	0.1	
NSW	WINDSOR	WSOR	BAND 2	0.1	
VIC	WARRANWOOD	WRWD	BAND 2	0.1	
	WADNED	WOME	DAME 2	0.1	

The above picture identifies the screen for reviewing and editing the Grouping Scenario. As shown above this is the first screen you will see when accessing The Model.

Chapters 7 to 9 provide a more detailed explanation of how these screens can be accessed and edited.

Appendix A provides a more detailed description of the inputs in each category.

6.3 Close The Model

To close The Model click on the **Close Window** button at the top-right corner of The Model window.

Ensure that you save any scenario changes you wish to retain prior to exiting The Model.



7 The Grouping Scenario Tab

The Grouping Scenario tab is the initial tab that you see when entering the Model. There are two basic functions that can be performed in this section of the user interface:

You can select the ESA or group of ESAs to run in the current scenario; and

You can **adjust by ESA the percentage of rock** that will be encountered when constructing new facilities.

You can select one ESA or any combination of ESAs for the current Model run. You must however select at least one for The Model to operate. Each of these functions is explained in more detail below.

If a large group of ESAs is selected and the scenario also includes changes to the engineering module (i.e. main or distribution assumptions) The Model will need a considerable amount of time to process the data. Sensitivity testing for the impact of changes to engineering inputs can be done efficiently by running the distribution or main engineering input changes on a single or small sample of ESAs. Once the final list of engineering inputs has been determined then they can be run for all ESAs.

Changes to the costing assumptions can be run reasonably quickly for all ESAs.

7.1 Select a Grouping Scenario

- 1 To set up or access a grouping scenario the **Grouping tab** must be open.
 - When you first open The Model you will be directed to this sheet.

If you have moved to an alternative tab in The Model you can return to the **Grouping tab** by selecting it.

Once in the **Grouping Tab** you have two options;

1) select a previously saved Grouping scenario; or

2) create a new Grouping scenario.



- a) Select a saved Grouping Scenario.
 - 1 Once a grouping scenario has been saved you can gain access to it from the **drop-down box** under **Grouping Scenarios**. The desired scenario can be accessed by simply highlighting and selecting it in the drop-down box.

The **Grouping - Main** window will refresh to reflect the selected Grouping Scenario.

See below.



Edit Te	lstra Model Inj	puts Input Catego Scena	ory: Grouping - Ma ario: BLBN	ain				
Check or Uncheck: 🔲 All								
E	SA_State	ESA_Name	ESA_Code	ULL_Band	Rock%	Selected 7		
Ξ	ULL_Band : B	AND 2 - 583 item(s)						
	VIC	BLACKBURN	BLBN	BAND 2	0.1	 Image: A set of the set of the		
	QLD	ZILLMERE	ZMRE	BAND 2	0.1			
	QLD	YERONGA	YRGA	BAND 2	0.1			
	QLD	YORKEYS KNOB	YNOB	BAND 2	0.1			
	QLD	WYNNUM	WYNM	BAND 2	0.1			
	QLD	WURTULLA	WURT	BAND 2	0.1			
	QLD	WHITE ROCK	WTRK	BAND 2	0.1		7	
	1077	UTU TAMETOUN	UITON	DAND 0	0.1		-	

b) Create a new Grouping Scenario.

 In each tab, the first step in creating a new inputs scenario is to click on the ♣ Add Grouping Scenario icon

> A warning will appear if you try to adjust the default scenario without having clicked this icon.

Once the icon is selected a dialog box will appear for you to enter the name of the scenario.

Q	Telstra Cost Model	
	Telstra Model Inputs	Edit Telstra
	Grouping Engineering Costing	
	Grouping Scenarios: 💈 🛟 🗙 🖪	
	Default Add Grouping	Scenario SA_
		QL
-	New Grouping Cooperin News	
1	New Grouping Scenario Name:	
e		
	<u> </u>	
١,		

- 2. Enter a name for the scenario and click on the Bave New Scenario icon to save the name.
- 3. The default scenario has all ESAs selected. To deselect all ESAs, click on the **check box** marked "All" above the "Selected" column. Click on the box until it is blank to deselect all exchanges.
- 4. Select one, several or all ESAs
 - To select an ESA in the main window click on the check box in the "Selected" column corresponding to the desired ESA name then press Enter.
 - To select more than one ESA, select the check box for each corresponding ESA name. Press Enter after making the last selection.

New Grouping Scenario Name:	₽ ,×	stra Mode
BLBN	Save Net	w Scenario

At Teletra Mudel Joputs Ingu Category, Bayers Man Scower, BURN ESA_State ESA_Name I ESA_Code UKL_Band Rock®. Selected V									
Direck of Uncheck: Total Direck of Uncheck: Direck of Uncheck:									
ESA_State	ESA_Name	I ESA_Code	ULL_Band	Rock%	Selected T				
GULL_Band :	BAND 2 - 583 Item(s))							
0.0		JMRE		0.1					
QLD	VERIONISA	YRGA	BAND 2	0.1	0				
QLD	YORKEYS KNOB	11VOB	BAND 2	0.1					
QLD	WYNAUM	WYNDM	BAND 2	0.1					
QLD	WURTULLA	WURT	BAND 2	0.1					
QLD	WHITE ROCK	WTRK	BAND 2	0.1					
VIC .	WILLIAMSTOWN	WTON	DAND 2	0.1	1				
QLD	WATERFORD	WTFD	BAND 2	0.1					
MEM	MEST TANKINGTH	ULTAR.	DILES D	0.1	F1				

	cistra Piloci I	sor	nario: BLBN	an			
					Dheck or Unic	heck: T AB	
1	ESA_State	ESA_Name	ESA_Code	ULL_Band	Rock%	Selected	7
	WA	BLUFF POINT	8LPT	0M20 2	0.1		
	NSW	DALLINA	OLNA	BAND 2	0.1		_
	WA	BALLAJURA	EL3A	BAND 2	0.1		
	QLD	BALD HELLS	BUHS	NND 2	0.1	<u></u>	
	WA.	BALCATTA	BLCT	BAND 2	0.1		-
	ACT	SELCONNEN	81.CN	BAND 2	0.1	0	-
1	VIC	BLACKBURN	BLEN	DAND 2	0.1		_
	VIC	BLAIRGOWREE	BLAR	BAND 2	0.1	20	
	NSW	BLAKEHURST	8LAK	BAND 2	0.1		
	a la beneration de la companya de la						

		Sce	natio BLBN			
					Check or Unch	eck: C.Al
E	SA_State	ESA_Name	ESA_C	ULL_Band	Rock%	Selected
	WA	BLUFF POINT	DLPT	DAVAD 2	0.1	
	NSW	BALLINA	BUNA.	BAND 2	0.4	
	AWA	DALLAXIRA	DL3A	EAND 2	0.1	1
	QLD	BALD HILLS	BLH5	BAND 2	0.1	
	WA	BALCATTA	BLCT	EAND 2	0.1	1
	ACT	BELCONNEN	BLCN	BAND 2	0 1	
0	VIC	BLACELEN	DEDN	BAND-2	0.1	1
	VIC	BLAIRGOWRIE	BLAR.	BAND 2	0.1	10
	NSW	BLAKEHURST	BLAK	EAND 2	0.1	

After pressing Enter the selected ESAs may disappear from the view. Once the selection has been made the list will be re-sorted with the selected ESAs appearing at the top of the list. See **Chapter 7.5 Sort the ESA List** for a discussion of the sort function.

- To select all ESAs, click on the check box marked "All" above the "Selected" column.
- When you enter The Model under the default scenario all ESAs will be automatically selected.
- Save the scenario by clicking on the Bave Grouping Scenario icon.

it Telstra Model I	nputs Input Cale Scen	ony Grouping-Ma aria BLBN	in .			_
			(Check or Unch	weck: IF All	
ESA_State	ESA_Name	ESA_C	ULL_Band	Rock%	Selected	11
G ULL_Band :	BAND 2 - 583 Item(s	1				16
QLD	ZILLMERE	ZMRE	BAND 2	0.1	2	~
QLD	YERONGA	YRGA	BAND 2	0.1	2	11
QLD	YORKEYS KNOB	YNOB.	BAND 2	0.1	1	11
QLD	WYNNUM	WYNM	BAND 2	0.1	2	11
QLD	WURTLELA	WURY	BAND 2	0.1	2	11
QLD	WHITE ROCK	WTRK	BAND 2	0.1	2	11
VBC	WILLIAMSTOWN	WTON	BAND 2	0.1	2	1
QLD	WATERFORD	WIFD	BAND 2	0.1	2	11
NSW	WEST TAMWORTH	WTAM	BAND 2	0.1	2	11
auffact.	the set of the set	in the second se	and a	÷.	172	1.

🍒 Telstra Cost Model	
Telstra Model Inputs	Edit Telstra Moo
Grouping Engineering Costing	
Grouping Scenarios: 💈 🕁 🗡 🖳	
BLBN Save	Grouping Scenario
	ULL_Bar



See **Appendix A** for a description of the variables on the Grouping input category page.

7.2 Discard Edits to a Grouping Scenario

If you have made changes to a Grouping Scenario that you do not wish to retain you can revert to the saved Grouping Scenario, discarding any edits since the scenario was last saved.

1 Click on the 😤 **Reload Grouping** Scenario icon.

🗓 Telstra Cost Model	
Telstra Model Inputs	Edit Tels
Grouping Engineering Costing	
Grouping Scenarios: 💈 🕂 🎽 💾	
BLBN Peload Grouping S	ES/
[Keload di odpirig]	
TelstraCostModel	X
There are Edits Pending, Do you want to Save y	our changes?
Yes	

2 A dialog box will appear asking you if the recent edits should be saved.

Click on **No** to revert to the last saved version of the current Grouping Scenario.

The **Grouping Main** window will revert to the last saved values for the Grouping Scenario.

If you click on **Yes** to save the edits this has the same result as clicking on the **Bave Grouping Scenario** icon, and the new grouping will replace the previously saved scenario.

7.3 Delete a Grouping Scenario

If a Grouping Scenario listed in the drop-down box is no longer required, it can be permanently deleted.

1 Select the Grouping Scenario to be deleted from the **drop-down box**.



Click on the Collecte Grouping
 Scenario icon to delete the selected Grouping Scenario.

Telstra Model Inputs	Edit Telstra
Grouping Engineering Costing	
Grouping Scenarios: 💈 🕁 🏋	3
BLBN	e Grouping Scenario
	► VIC
	QLD
	QLD
	QLD
	QLD
	I I OLD

3 You will be prompted by a dialog box to confirm the deletion.

Confirm	i Delete 🛛 🔀
2	Are you sure you want to Delete the Grouping Scenario, BLBN?
	Yes No

- 4 Click on **Yes** to delete the Grouping Scenario. The **Grouping Main** window will revert to the data for the Grouping Scenario identified at the top of the drop-down list.
- 5 Click on **No** to cancel the deletion of the Grouping Scenario. The **Grouping Main** window will retain the data for the selected scenario.

7.4 Save a Grouping Scenario

At any time during editing of the Grouping Scenario, the current data may be saved.

 Saving a file is simply done by clicking on the B Save Grouping Scenario icon at any time during the editing process.



Ū	Telstra Cost Model			
Te	lstra Model Inputs	E	dit	Telstra Mod
G	rouping Engineering Costing			
і Г	Grouping Scenarios: 💈 🕂 🗡 📴	Gr		
				ULL_Ban VIC QLD QLD QLD

If you wish to edit an existing scenario while retaining that scenario for future reference, you **must** save the new scenario prior to making any edits.

First you must select the scenario you wish to revise from the drop-down box. Once it is selected click on the random Add Grouping Scenario icon to initiate a new scenario. Name the new scenario and begin your edits. If a new scenario is not initiated prior to any editing any attempt to save the current edits will overwrite the original scenario.

If you have not saved the Grouping Scenario, and attempt to navigate to another tab (e.g. to the **Engineering** tab), you will be prompted to save (or not) the scenario. If you do not save the scenario you will lose any edits made.

7.5 Sort the ESA list

Sorting the ESA list has no impact on the order of calculation, but can be a useful aid in identifying and analysing ESAs for various potential Grouping Scenarios.

1 Select the **Grouping** tab under **Telstra Model Inputs**.

The ESAs are in descending order (z to a) based on their ESA Code. However, if a group of ESAs is selected they will move to the top of the list where the selected ESAs will again be sorted by descending order.



2 To change the sort order, click on any of the headings for the columns.

	Edit '	Telstra Model I	nputs Input Catego Scena	ory: Grouping - Ma rio: BLBN	ain			
Check or Uncheck: F All								
	1	ESA_State	ESA_Name	ESA_Code	ULL_Band	Rock%	Selected 🗸	~
`	\mathbf{k}	💷 ULL_Band :	BAND 2 - 583 item(s)					
		VIC	BLACKBURN	BLBN	BAND 2	0.1	V	
		QLD		ZMRE	BAND 2	0.1		
		QLD	YERONGA	YRGA	BAND 2	0.1		
		QLD	YORKEYS KNOB	YNOB	BAND 2	0.1		
		QLD	WYNNUM	WYNM	BAND 2	0.1		
		QLD	WURTULLA	WURT	BAND 2	0.1		

3 A small triangle will appear to the right of the selected heading denoting the sort order.

ESA_Code	ΔI	Ascending
ESA_Code	⊽It	Descending
ESA_Code	l	Not sorted

_Name	ESA_Code 🗡	ULL_Band
- 583 item(s)	\smile	
IIA RIDGE	AARE	BAND 2
OKLYN PARK	AASS	BAND 2
TA BEACH	ABCH	BAND 2
NY CREEK	ABCK	BAND 2

Sorting by descending Selected will bring the selected ESAs to the top of the list.

There is another function that can be performed from the Grouping Tab. The percent rocky placement can be revised. These functions will be discussed in more detail in **Appendix A**.

8 The Engineering Scenario Tab

The Engineering Scenario tab provides you with the ability to create scenarios with revised engineering rules and parameters. There are two input categories that can be accessed under this tab:

Engineering Main; and

Engineering Distribution.

These sheets provide the general plant criteria and dimensioning rules used to determine the types, sizes and quantities of the network facilities required to deploy a new efficient access network. The Engineering - Main sheet contains the provisioning criteria and rules for designing a main network. The Engineering – Distribution sheet contains the provisioning criteria and rules for designing a distribution network.



Changes to engineering rules require a significant time to process for a large grouping of ESAs. Sensitivity testing for the impact of changes to engineering inputs can be done efficiently by running the input changes on a single or small sample of ESAs. Once the final list of engineering inputs revisions has been decided, all ESAs can be run with the new inputs.

8.1 Select an Engineering Scenario

To set up or access an Engineering scenario the **Engineering tab** must be open.

If you are in an alternative tab in The Model you can return to the **Engineering tab** by selecting it.

When you first enter the Engineering Tab a warning will appear informing you that it is not necessary to run the engineering models every time you wish to generate outputs. Running these modules can take a significant amount of time.

Click on the X Close This Warning icon to proceed.

This warning only appears the first time you select the **Engineering** tab during a work session.



Once you have closed the warning the following screen appears.

Once in the **Engineering Tab** you have two options;

1) select a previously saved Engineering scenario; or

2) create a new Engineering scenario.

🔥 Telstra Cost Model	
Telstra Model Inputs	
Grouping Engineering Costing	
Engineering Scenarios: 💈 🕂 🏋 📳	
Default	
Main C Distribution	
🜩 Generate Engineering Data 🛛 🔞	

- a) Select a saved Engineering Scenario.
 - 1 Once an Engineering scenario has been saved you can gain access to it from the **drop-down box** under **Engineering Scenarios**. The desired scenario can be accessed by simply highlighting and selecting it in the drop-down box.

The **Engineering - Main** window will refresh to reflect the selected Engineering Scenario.



See below.

Basic Service Design Criteria I Engineering Design	a-Main Net	<u>twork</u>	
Design Criteria	<u>a-Main Net</u>	<u>twork</u>	
l Engineering Desig			
l Engineering Desig			
	<u>n</u>		
Feeder Mair	n Cable Design	Fill	
Multiplexing	y Cabinet Desigr	n Fill Factor	
	Feeder Mai	Feeder Main Cable Design Multiplexing Cabinet Desig	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor Main

- b) Create a new Engineering Scenario.
 - 1 In each tab, the first step in creating a new inputs scenario is to click on the ♣ Add Engineering Scenario icon.

A warning will appear if you try to adjust the default scenario without having clicked this icon. The warning will let you know that you cannot edit the default scenario.

Once the icon is selected a dialog box will appear for you to enter the name of the scenario. 🍯 Telstra Cost Model Telstra Model Inputs Edit Telst Grouping Engineering Costing Engineering Scenarios: XB 2 4 Default -Add Engineering Scenario Main C Distribution 🖹 🗡 New Engineering Scenario Name: 9 Lill La

2 Enter a name for the scenario and click on the Save New Scenario icon to save the name.



There are two engineering scenario input sheets (i.e. Main and Distribution).

The Main and Distribution selectors are directly below the drop-down Engineering Scenario box.

Selecting one or the other will populate the **main window** with the relevant input sheets for the Main or Distribution networks.

By simply clicking these two buttons you can easily navigate between sheets but any edits will be lost if they are not saved. You will be prompted to save any edits before moving.

😼 Telstra Cost Model		
Telstra Model Inputs	E	
Grouping Engineering Costing		
Engineering Scenarios: 💈 🕂 🎽 💾		
BLBN		
Main Distribution		



An alert box under the **Main** and **Distribution** selectors will appear after saving an Engineering Scenario. This alert notifies you that the pending edits have not been processed through the model to generate the new data. Data must be generated and transferred to the cost module in order to generate results from the new scenario.

Make any required changes to the variables before generating the Engineering Data.

Any new engineering scenario will take a significant time to process if a large number of ESAs have been selected.

G Teistra Cost Model	
Telstra Model Inputs	Ec
Grouping Engineering Costing	
Engineering Scenarios: 🐲 🗗 🗡 💾 BLBN 🔹 Main C Distribution Main C Distribution)

Changes to the inputs in either the Engineering – Main or Engineering –
 Distribution sheets can be made by simply highlighting the selected input box and entering the revised value.

User adjustable inputs are highlighted in red font with blue background.

r elstra Model Inputs Input Catego Scena	ory: Engineering - Main 🎐 ario: BLBN	
Network Design: 💿 ULL 🔿 Basi	ic Service	
General Plant Desi	ign Criteria-Main Network	
Fill Factors at Optimal Engi	ineering Design	
•		
00%	Feeder Main Cable Design Fill	
90% 90%	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor	
90% 90%	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor	
90% 90% Cable-Design Criteria-Main	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor	
90% 90% <u>Cable-Design Criteria-Main</u> Normal Gauge .40mm Con	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor	
90% 90% <u>Cable-Design Criteria-Main</u> Normal Gauge .40 mm Con	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor ductor-Main Max Dist to	
<u>90%</u> 90% <u>Cable-Design Criteria-Main</u> Normal Gauge .40 mm Con Cable Sizes (pairs)	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor ductor-Main Max Dist to Next Joint (Metres)	
30% 90% <u>Cable-Design Criteria-Main</u> Normal Gauge .40 mm Con <u>Cable Sizes (pairs)</u> 2400	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor ductor-Main Max Dist to Next Joint (Metres) 250	
30% 90% <u>Cable-Design Criteria-Main</u> Normal Gauge .40 mm Con <u>Cable Sizes (pairs)</u> 2400 1200	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor Muttor-Main Max Dist to Next Joint (Metres) 250 500	
30% 90% <u>Cable-Design Criteria-Main</u> Normal Gauge .40 mm Con <u>Cable Sizes (pairs)</u> 2400 1200 800	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor ductor-Main Max Dist to Next Joint (Metres) 250 500 500	
30% 90% Cable-Design Criteria-Main Normal Gauge .40 mm Con Cable Sizes (pairs) 2400 1200 800 400	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor Muttor-Main Max Dist to Next Joint (Metres) 250 500 500 500 500	
30% 90% Cable-Design Criteria-Main Normal Gauge .40 mm Con Cable Sizes (pairs) 2400 1200 800 400 200	Feeder Main Cable Design Fill Multiplexing Cabinet Design Fill Factor Muttor-Main Max Dist to Next Joint (Metres) 250 500 500 500 1000	

4 Once the edits are completed they should be saved by clicking on the B Save Engineering Scenario icon.

😼 Telstra Cost Model	
Telstra Model Inputs	Edit Telstra Model In
Grouping Engineering Costing	
Engineering Scenarios: 💈 🕂 🔀 🏣	Network D
BLBN	
Main C Distribution	

- See **Appendix A** for a description of the variables on the Engineering input category pages.
- 5 To process the new scenario click on **Generate Engineering Data**.

🔨 Telstra Cost Model		
Telstra Model Inputs	E	
Grouping Engineering Costing		
Engineering Scenarios: 💈 🕂 🎽 💾		
BLBN		
Main C Distribution		
The Selected Engineering Scenario has no Data Generated for it. You must Generate Data for the Selected		
Engineering Scenario before you can Generate Outputs againt it.		
Generate Engineering Data		
Generate Engineering Da	ta	

6 A dialog box will appear once **Generate Engineering Data** has been selected. If you are certain that this is the scenario that needs to be processed click on **Yes** in the resulting dialog box to proceed. If you are not sure that you want to take the time necessary to process the data at this time click on **No** to cancel.

Telstra	CostModel	
?	Generating Engineering Data can be a Time Consuming Process. Are you sure you want to Generate Engineering Data for the Selected Scenario?	Engineering

- 7 If you click **No** you will cancel the Data Generation, and will be returned to The Model screen.
- 8 If you click **Yes** to proceed, a message box will appear informing you of the progress. You may now get a cup of tea. Or two.



9 A dialog box will appear informing you when the data generation has completed. Click on **OK**.



If any changes are made to the selected Engineering Scenario after generating the Engineering Data, you will need to repeat the above process for generating data.

8.2 Discard Edits to an Engineering Scenario

If you have made changes to an Engineering Scenario that you do not wish to retain, you can revert to the saved Engineering Scenario, discarding any edits since the scenario was last saved.

1 Click on the Reload Engineering Scenario icon.

🖌 Telstra Cost Model			
Telstra Model Inputs	Edit Tels		
Grouping Engineering Costing			
Engineering Scenarios: BLBN Reload Engineering Main C Distribution	3 Scenario		

2 A dialog box will appear asking you if the recent edits should be saved.

Click on **No** to revert to the last saved version of the current Engineering Scenario.

The **main window** will revert to the original values for the Engineering Scenario.

Telstra	CostModel 🛛 🕅
2	There are Edits Pending, Do you want to Save your changes?
	Yes No

If you click on **Yes** to save the edits this has the same result as clicking on the **Bave Engineering Scenario** icon, the new edits will replace the previously saved scenario.

8.3 Delete an Engineering Scenario

If an Engineering Scenario listed in the drop-down box is no longer required, it can be permanently deleted.

1 Select the Engineering Scenario to be deleted from the **dropdown box**.

🚡 Telstra Cost Model						
Telstra Model Inputs	Ed					
Grouping Engineering Costing						
Engineering Scenarios: 🐲 🕂 🎽 BLBN 🔹 BLBN 🔹 CTONA CTONA Default new Default new Default FSRYA Newport WTON						

2 Click on the **Click on the** Engineering Scenario icon to delete the selected Engineering Scenario.

(🗓 Telstra Cost Model	
	Telstra Model Inputs	Edit Telstra Mo
	Grouping Engineering Costing	
	Engineering Scenarios: 💈 🕂 🏋 💾	Net
	BLBN	G
	Main Distribution	gineering Scenario
		<u>Fill</u>

3 You will be prompted by a dialog box to confirm the deletion.



- 4 Click on **Yes** to delete the Engineering Scenario. The **main window** will revert to the data for the Engineering Scenario identified at the top of the drop-down list.
- 5 Click on **No** to cancel the deletion of the Engineering Scenario. The **main window** will retain the data for the selected scenario.

8.4 Save an Engineering Scenario

At any time during editing of the Engineering Scenario, the current data may be saved.

- Saving a scenario is simply done by clicking on the Bave Engineering Scenario icon at any time during the editing process.
 - The revised scenario will replace the previously saved scenario that you were editing.



If you wish to edit an existing scenario while retaining that scenario for future reference, you **must** save the new scenario prior to making any edits.

First you must select the scenario you wish to revise from the drop-down box. Once it is selected click on the Add Engineering Scenario icon to initiate a new scenario. Name the new scenario and begin your edits. If a new scenario is not initiated prior to any editing any attempt to save the edits will over-write the original scenario.

If you have not saved the Engineering Scenario, and attempt to navigate to another tab (e.g. to the **Costing** tab), you will be prompted to save (or not) the scenario. If you do not save the scenario you will lose any edits made.

8.5 Operating Engineering Modules Separately

Each of the engineering modules can be operated separately to recreate the detail engineering data for any exchange. This provides you with the capability to review the data

for each exchange. To run the models separately you must open the models. There are two methods for accessing the engineering modules to operate them from outside the front end.

You can access the engineering modules by using windows to navigate to the file in which they reside on your computer.

1. In Windows Explorer navigate to the folder C:\Program Files\TELSTRA\Telstra Cost Model\Model

This is the default location. If you installed The Model to another folder you will need to navigate to that folder.



- 2. Open the module you wish to run by double clicking on the selected file. The name of the file identifies the module and version number (i.e. Engineering-Main-Engine-v1.0 or Engineering-Dist-Engine-v1.0).
 - For the purposes of this discussion we will use the main engineering module. The steps for running the distribution module are virtually identical to the steps for running the main module.



3. When you open the workbook press the **Enable Macros** button in the popup screen.

You are now in the main engineering module.

You can also access the individual engineering modules from the user interface.

- 1. Access the user interface page for the engineering module you wish to access.
- 2. Click on the hour glass icon next to the Engineering Main title in the Edit Telstra Model Inputs section of the worksheet.

Edit Telstra Model Inputs	Input Category: Scenario:	Engineering - Main BLBN	View Engineering Main Model
Network Design: 🧿	ULL C Basic Se	rvice	
<u>General P</u>	lant Design	n Criteria-M	<u>ain Network</u>



E

The following warning will appear on the screen. This warning lets you know that data generated from changes to inputs made directly into the engineering main or distribution modules will not flow to the Cost calculation module in order to generate outputs (i.e. investment and annual costs).

If you wish to generate outputs you must operate the model through the front end.



- 3. Click on the Yes button to enter the Main Engineering Module. You are now in the main engineering module.
- 4. Select the *Main Inputs* tab and scroll down to the bottom of the worksheet.

Microsoft Excel - Eng-Main-Engi	ne-v1.0								
Ele Edit View Insert Format	Tools Data	Window Help					Type a guestion	n for help 🗖	_ # X
			0 I I I I I I I I I I I I I I I I I I I	s Al Zi	/16a 🔐	100%			
	n a u u	▼ 12 ♥ =) ▼	(**************************************	▼ J≭ Ž↓ Ā		100% • 0	-		
Arial • 10 • B	′⊻∣≣≣	≣ № \$ %	• .00 .00		· 🔗 - <u>A</u>	• 🚽 🔅 🚯 🖓		K 🔶 🛄	
M131 👻 🏂								1	
A	B	C	D	E		F	G	H	^
Run Ontions									
99									
100 Current ESA									
101 102 PL PN	-						Com		
102 DLDN				mport Iviain			Com	pact	
104 Engineering Scenario									
105	-								
106 Default							Popu	late	
107 108 Current Band									
109	_								
110 2									
111 112 Innut Database									- 1
113									
114 TEA-Data-v1.0.mdb							Trace I	Main	
115 116 Scenario Database									=
110 Scenario Database									
118 Scenario-v1.0.mdb							Clear Main H	Lightights	
119							Clear Ivrain F	ingringing	
120									_
	iollopcod / Ma	in Dotail \ Main-	Inpute /						~
Ready	опарьей Д Ма	indetail Airiain-	mputs/					NUM	
Noday						1		non	

5. In the box labelled **Current ESA** type the four letter ESA code for the ESA that you wish to run and press Enter.



6. Click on the button labelled **Import** Main.

Import Main
.%-



The base data sections of the **Main – Detail** and **Main – Collapsed** worksheets are now populated with the data for the selected ESA (AARE).

7. At this point the base data in the **Main Module** has been populated with the data from the AARE ESA. To calculate the results for the ESA you need to click on the **Populate** button at the bottom of the **Main - Inputs** worksheet.

Compact	
Populate	

The **Populate** button creates results. The **Compact** button removes all the calculations in the spreadsheet except for the first two rows. This function makes it easier to make changes to and save the model by speeding up the processes.



The **Main - Summary** worksheet is now populated with the totals of each type of equipment required for the selected scenario.

	Kicrosoft Excel - Eng-Main-Engine-v1.0											
:2	Eile Edit	⊻iew Insert	Format <u>T</u> ool	s <u>D</u> ata <u>W</u> in	dow <u>H</u> elp					Туре	a question for h	elp 🗸 🗖 🗙
		3 3 3 3	X 64 12	Da (B (B)	In - 0	- 🥺 Σ -	∫x ∆↓ Z↓	100%	- 0 -			
: Tin	『Trimes New Roman ・10 ・ B Z TI 三三三国 S % ・ 始めに注注 田・ 3 ・ A ・ S % 時時 47 47 2 (4) 回用時間 図											
-	D9	▼ f _x				· .00 ->:0 =;-		<u> </u>	· V lan an	1 *0 *0 ¥.	19 V 🛥	
	A	В	C	D	E	F	G	Н	I	J	K	L
1												
				Demand at					_			
2				Fibre Fed		Length	of Main Cop	per Cables A	letres		L	ength of Ma
3				Pillars (ULL Only)	0.400	Size	e of .40 Gaug	je Main Cabl	es	400	(000	Size of .6
4	ESA	Band	Scenario D. C. fr	01119)	2400	1200	800	400	200	100	1200	
6	AARE	2	Derault	2,570	15,223	5,917	6,477	9,413	7,090	4,954	4,320	3,819
7												
8	1				l							
9												=
10												
11												
13												
14	1											
15												
16												
17	-											
19												
20]											
21			Marke Colleges		at / Maria Tau							~
	ГРИ∖Ма Г	ain-Summary /	Main-Collapse	ed / Main-Det	aii <u>/</u> Main-Inp	outs /						>
Rear	1y										NUM	

The **Main-Detail** and **Main-Collapsed** worksheets will identify the detailed calculations of the quantities for each component of the network required to provide access services for the selected exchange.

- 8. To run the **Distribution Module** for an ESA you would follow the same steps as you did in producing results with the Main Module.
 - Open the Eng-Dist-Engine-v1.0.xls file.
 - In the **Distribution Inputs Module** worksheet type the four letter ESA code for the ESA that you wish to run in the box labelled **Current ESA**.
 - Click on the button labelled Import Distribution.
 - Click on the **Populate** button.

Kicrosoft Excel - Eng-Dist-Engine-v1.0			
Eile Edit View Insert Format Tools Data	<u>W</u> indow <u>H</u> elp	Type a que	stion for help 🛛 🗕 🗗 🗙
	- 🛱 🍼 - (≃ - 😣 Σ - <i>f</i> x 2↓ 7↓	🛍 📣 100% 📼 🕢 📃	
Arial • 10 • B <i>I</i> U = =	■國家%,*%,% 建建 =.	≫ - A - I : 🧆 D= D= I	-e-el.21 🚸 📲
C119 v fx			
A B	C D E	F G	Н
110 Run Options			_
111			
112 Current ESA			1
113 114 PL PM	Import Distribution	Compact	
114 DLDN 115			
116 Engineering Scenario			
117		Populate	
118 Default			
119 120 Current Band	L <u>l</u>		_
121			٦ L
122 2			
123		Trace Distribution	
124 Input Database			1
126 TEA-Data-v1.0.mdb			
127		Clear Distribution Colors	
128 Scenario Database			
129 130 Scenario v1.0 mdb			
131			
132 Study Selection - Network Design (from Eng	g-Main-Engine.xls)		
133			
		/ .	~
Prest → MIX_Distribution-Summary_Z_Distribution-C	.oliapsed / Distribution-Detail / Distribution-		
кеаду			NUM

9 The Costing Scenario Tab

The Costing Scenario tab provides you with the ability to create scenarios with revised costing rules and parameters. There are three input categories that can be accessed under this tab:

Costing Main;

Costing Input Ratios; and

Costing Capital Costs.

These sheets provide the unit costs, input ratios and capital cost factors used to determine the total cost of the network facilities required to deploy a new efficient access network. The **Costing - Main** sheet contains the unloaded unit costs for each component of plant identified by the Engineering Modules. The **Costing – Input Ratios** sheet contains the ratios used in developing the composite weighted costs for each type of conduit, pit and manhole construction activity. The **Costing – Capital Costs** sheet contains the capital cost factors, depreciation lives, the O&M factors and indirect expense and support asset factors used to convert the investments cost produced by the model into annual and monthly operating costs.



Processing changes to the costing inputs require a minimal amount of time. Sensitivity testing for the impact of changes to these variables can be processed for large groupings of ESAs in a relatively short time if there are no changes to the underlying engineering scenarios.

9.1 Select a Costing Scenario

To set up or access a Costing scenario the **Costing tab** must be open.

If you are in an alternative tab in The Model you can return to the **Costing tab** by selecting it.

Once in the **Costing Tab** you have two options;

1) select a previously saved Costing scenario; or

2) create a new Costing scenario.

🗓 Telstra Cost Model					
Telstra Model Inputs	E				
Grouping Engineering Costing					
Costing Scenarios: 💈 🖧 🛪 🔳					
Default					
💿 Main 🔿 Input Ratios 🔿 Capital Costs					

- a) Select a saved Costing Scenario.
 - 1 Once a Costing scenario has been saved you can gain access to it from the drop-down box under Costing Scenarios. The desired scenario can be accessed by simply highlighting and selecting it in the drop-down box.

The **Costing - Main** window will refresh to reflect the selected Costing Scenario.

🔓 Telstra Cost Model	
Telstra Model Inputs	
Grouping Engineering Costing	
Costing Scenarios: 💈 🕂 🍞	<
BLBN	
Default new Default Newport1 test	

See below.

	Input Category: Scenario:	Costing - Costs BLBN				
Cost Inputs	- Costs and	Rules Docu	ments			
					Designat	es Innut
					a congreat	oo mpar
						oo mpar
General Plant Des	ign Criteria					
<u>General Plant Des</u> Loading Factor for Ir	ign Criteria ndirect Overheads			13.00%		
<mark>General Plant Des</mark> Loading Factor for Ir Conduit Sharing Bet	<mark>ign Criteria</mark> ndirect Overheads ween Main and IE	N		13.00%		

- b) Create a new Costing Scenario.
 - In each tab, the first step in creating a new inputs scenario is to click on the Add Costing Scenario icon.

A warning will appear if you try to adjust the default scenario without having clicked this icon.

Once the icon is selected a dialog box will appear for you to enter the name of the scenario.

🗓 Telstra Cost Model	
Telstra Model Inputs	Edit T
Grouping Engineering Costing	
Costing Scenarios: 💈 🖧 🗙 🖪 Default	
Add Costing S Main C Input Batios C Capital Costs	i <mark>cenario</mark>
	_
New Costing Scenario Name:	×
	<i>c i</i>

Enter a name for the scenario and click on the Bave New
 Scenario icon to save the name.

There are three costing scenarios input sheets:

Main-which has all the prices and plant dimensioning rules used to price out the new facilities;

Input Ratios-which contain the ratios used to develop composite placement costs for manholes, pits and conduits; and

Capital Costs-which contain the capital cost inputs, depreciation lives and direct and indirect expense and investment factors required calculate monthly and annual operating costs from investment costs.



🗓 Telstra Cost Model		
	Telstra Model Inputs	
	Grouping Engineering Costing	
	Costing Scenarios: 🛛 💈 🕂 🎽	
	BLBN	
	 Main C Input Ratios C Capital Costs 	þ



The **Main**, **Input Ratios** and **Capital Costs** selectors are directly under the dropdown **Costing Scenario** box.

Selecting one of these will populate the **main window** with the relevant input sheets for the **Main** network unit costs, the **Input Ratios** for conduit and trench placement, or the **Capital Cost** calculation variables.

By simply clicking these buttons you can easily navigate between these input sheets but any inputs will be lost if they are not saved. You will be prompted to save any edits before moving.
3 Changes to the **Costing – Main, Costing – Input Ratios** and **Costing – Capital Costs** can be made by simply highlighting the selected input box and entering the revised value.

100	
1.0	
- N -	
	- A
	1/3
	-

User adjustable inputs are highlighted in red font with blue background.

elstra Model Inputs	Input Category: Scenario:	Costing - Costs BLBN				
Cost Inputs -	Costs and	Rules Doci	uments			
					Designates Inpu	ıt
General Plant Desig	<u>gn Criteria</u>					
General Plant Design	gn Criteria direct Overheads		1	3.00 <mark>%</mark>		
General Plant Desident Conduit Sharing Betw	gn Criteria direct Overheads veen Main and IE	N		3.00 <mark>%</mark> 5.00%		

4 Once the edits are completed they should be saved by clicking on the 🖹 Save Costing Scenario icon.

🗓 Telstra Cost Model	
Telstra Model Inputs	Edit Telstra Mo
Grouping Engineering Costing	
Costing Scenarios: 🐲 🕂 🏹 📑 🖓 BLBN - Save ⓒ Main ⓒ Input Ratios ⓒ Capital Costs	Input Costing Scenario

See **Appendix A** for a list of the variables on the Costing input category pages.

9.2 Discard Edits to a Costing Scenario

If you have made changes to a Costing Scenario that you do not wish to retain, you can revert to the saved Costing Scenario, discarding any edits since the scenario was last saved.

1 Click on the Reload Costing Scenario icon.

🖥 Telstra Cost Model	
Telstra Model Inputs	Edi
Grouping Engineering Costing	
Costing Scenarios: 🚁 🖓 🛠 💾	
BLBN Reload Costing Scen	nario
Main C Input Ratios C Capital Costs	

2 A dialog box will appear asking you if the recent edits should be saved.

Click on **No** to revert to the last saved version of the current Costing Scenario.

The **main window** will revert to the original values for the Costing Scenario.



If you click on **Yes** to save the edits this has the same result as clicking on the **Bave Costing Scenario** icon, the new edits will replace the previously saved scenario.

9.3 Delete a Costing Scenario

If a Costing Scenario listed in the drop-down box is no longer required, it can be permanently deleted.

1 Select the Costing Scenario to be deleted from the **drop-down box**.

a Telstra Cost Model								
Telstra Model Inputs								
Grouping Engineering Costing								
Costing Scenarios: 💈 🕂 🎽								
BLBN Default new								
Newport1 test								

2 Click on the **X** Delete Costing Scenario icon to delete the selected Costing Scenario.

١	🔥 Telstra Cost Model								
	Telstra Model Inputs	Edit Telstra							
	Grouping Engineering Costing								
	Costing Scenarios: 💈 🕂 🎦 BLBN	In							
	Delete Cos Main C Input Ratios C Capital Costs	ting Scenario							

3 You will be prompted by a dialog box to confirm the deletion.

Confirm	Delete 🛛 🕅
2	Are you sure you want to Delete the Costing Scenario, BLBN?
	Yes No

- 4 Click on **Yes** to delete the Costing Scenario. The **main window** will revert to the data for the Costing Scenario identified at the top of the drop-down list.
- 5 Click on **No** to cancel the deletion of the Costing Scenario. The **main window** will retain the data for the selected scenario.

9.4 Save a Costing Scenario

At any time during editing of the Costing Scenario, the current data may be saved.

 Saving a scenario is simply done by clicking on the B Save Costing Scenario icon at any time during the editing process.

The revised scenario will replace the previously saved scenario that you were editing.

🖌 Telstra Cost Model	
Telstra Model Inputs	Edit Telstra Mo
Grouping Engineering Costing	
Costing Scenarios: 💈 🕂 🗶	Inpu
Save	Costing Scenario

If you wish to edit an existing scenario while retaining that scenario for future reference, you **must** save the new scenario prior to making any edits.

First you must select the scenario you wish to revise from the drop-down box. Once it is selected click on the Add Costing Scenario icon to initiate a new scenario. Name the new scenario and begin your edits. If a new scenario is not initiated prior to any editing any attempt to save the edits will over-write the original scenario.

R	٦	-	-	2	
ħ			-	-	
N			-	-	
1	Ŀ.			-	
	۰.				

If you have not saved the Costing Scenario, and attempt to navigate to another tab (e.g. to the **Grouping** tab), you will be prompted to save (or not) the scenario. If you do not save the scenario you will lose any edits made.

10 Create the Output Costing Spreadsheet

Once all of the scenarios have been finalized, and the engineering scenarios have been processed to generate outputs, the investment and cost outputs need to be calculated and saved in the **Cost Calculation Module** Excel worksheets.

If you have not made any changes to the engineering scenarios, you should not reprocess the engineering data. Processing the engineering data takes a significant amount of time.

The Cost Calculation spreadsheets apply the input costs and ratios to the plant and equipment volumes, produced by the engineering modules, to calculate the total investment, annual costs and monthly costs associated with the efficient access network.

See **Chapter 11** for more detail on the output created.

The **Telstra Model Outputs** section of the user interface identifies the list of the currently selected Grouping, Engineering and Costing scenarios.

1 Before proceeding, ensure that the identified scenarios are the ones you wish to process.



2 To run the Cost Calculation Module click on **Generate Outputs**.



3 You will be prompted to enter a name for the model run and select a location for the file to be saved.

Save Excel Oup	ut before Viewi	ing			? 🗙
Save in:	🗀 New Folder		•	🗢 🗈 💣 🎫	
My Recent Documents Desktop					
My Documents					
My Computer					
					
My Network Places	File name:			•	Save
	Save as type:	Excel Workbooks (*.xls)		•	Cancel

4 Navigate to the folder where the file is to be saved, name the file and click Save.

Save Excel Oup	ut before View	ing			? 🔀
Save in:	C New Folder		•	🗢 🗈 💣 🏢	
Documents					
B					
Desktop					
My Documents					
My Computer					
					
My Network Places	File name:	BLBN		•	Save
	Save as type:	Excel Workbooks	(*.xls)	•	Cancel

The Model will begin generating the output and a message box will appear informing you of the progress.



5 Once the processing is complete, a pop-up box will appear reminding you to save the results before closing the workbook. Click on the OK button to see the results.



6 The Model will open the Excel output file for viewing. The first page that will appear is the **ULL Investment by Band Summary** sheet that identifies the projected investment per line for the new network.

-											
	AICROSOFT EXCEL - BLBN.XIS										
	🚰 🔒 🔒 🖨 🚨 💖 🕯	S 17 − (2	- Σ -		Arial		•	14	- B I	U I	
:	1 🖆 🖄 🖾 💁 🖄 1 🖾 🏷 1	ð 🖣 🖗 I	杉 Reply wi	th ⊆h	anges E <u>n</u> d	Revie	ew 📮 🛛 🏹		3> 3> <3	≤ 1	2 🔶 🛅
:8)	<u>File E</u> dit <u>V</u> iew Insert F <u>o</u> rma	it <u>T</u> ools <u>D</u> a	ita <u>W</u> indo	w	Help						
	A1 🝷 🏄 ULL In	vestment by	Band Sun	nmar	у						
	A		В		С		D		E		F
1	ι	ILL Inve	stmen	t by	y Band	Su	mmary				
2			Invest	nen	t Per Line						-
3											
4											
5	Investment Category		Band 1		<u>Band 2</u>		Band 3		Reserved		<u>Total</u>
6	- · ·										
7	Conduit	\$	-	\$	375.60	\$	-	\$	-	\$	-
8	Pits and Manholes	\$	-	\$	62.45	\$	-	\$	-	\$	-
9	Ducts and Pipes-Main	\$	-	\$	438.04	\$	-	\$	-	\$	-
10											
11	Copper Cables	\$	-	\$	328.33	\$	-	\$	-	\$	-
12	Copper Cable Joints	\$	-	\$	67.95	\$	-	\$	-	\$	-
13	Copper Cables-Main	\$	-	\$	396.28	\$	-	\$	-	\$	-
14	F 1 A H									~	
15	Fibre Cables	\$	-	\$	2.23	\$	-	\$	-	\$	-
16	Fibre Cable Joints	\$	-	\$	1.27	\$	-	\$	-	\$	-
17	Optical Fibre	\$	-	\$	3.50	\$	-	\$	-	\$	-



Don't forget to save the file as soon as possible.

See **Chapter 11** for a description of the **Cost Calculation Module Excel file**.

11 The Cost Calculation Module

The **Cost Calculation Module** (or Output Spreadsheet) applies the input costs and ratios to the plant and equipment volumes, produced by the engineering modules, to calculate the total investment cost associated with the efficient access network. The capital costs associated with the assets are calculated using the capital cost and depreciation inputs. The Operating and maintenance expenses, indirect expenses and indirect asset costs are determined by applying the expense and indirect asset factors to the direct investment. The capital costs, operating and maintenance expenses, indirect and support asset costs and the indirect expenses are combined to calculate the total annual and monthly costs for an efficient access network.

There are twelve worksheets in the **Cost Calculation Module**. These worksheets can be combined into the following seven categories:

Input worksheets; Composite cost calculation worksheets; Network quantities worksheets; Network cost worksheets; Capital Cost Calculation; and Investment and Annual Cost Summaries.

Each of these categories of worksheets performs specific functions that are critical to the calculation of the investments and annual costs.

11.1 Input Worksheets

There are three input worksheets in the **Cost Calculation Module**. Each worksheet is designed to accommodate sets of similar inputs. Virtually all the inputs are user adjustable. However, adjustments to these inputs should be made throughs the user interface. Changes made through the user interface will be populated into these worksheets once a specific scenario is run. Changes which are made directly into the input sheets in the **Cost Calculation Module** will be overridden with the data in the user interface once the integrated Model is run. The three input worksheets are:

Inputs Cost and Rules; Inputs Ratios; and

Inputs Capital Costs.

a) Inputs Costs and Rules

The Inputs Costs and Rules worksheet contains all the costs for the various network components required to provide the ULLS. Most of these costs are taken directly from the **Access Network Modelling Costing Information** document that was assembled by the Telstra engineering department. There are more than 200 network cost inputs in this worksheet and they fall into the following general categories:

Costs for main and distribution copper and fibre;

Costs for constructing pits and manholes;

Costs for pillars including the pillar strips;

Breakout and reinstatement costs;

Cost for buying and placing conduit in different terrains;

Costs for terminating all the distribution facilities in the exchange; and

Costs for building terminals and two pair lead-ins.

The **Inputs Costs and Rules** also include inputs which represent network rules or placement and cost estimates. The estimates include the level of capitalized overheads, the level of conduit placed by developers in new estates, the sharing of entrance facility cost between the inter-exchange and distribution network, the size of conduit trenches and the size of manholes and pits. There are also a few capacity and fill factor inputs which are derived from the **Access Network Dimensioning Rules**.

🖼 Elle Edit View Insert Format Iools Data Window Help Type a question for help 🗸 🖌	×
D.3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	=
	-
1 Cost Inputs - Costs and Rules Documents	
3 Designates Innut	
4 Designates Formula	
5 Designates Input from Engineering Scenario	
6	
7 Note that only those amounts highlighted in hed are used in this module of the model. An amounts shown in black are used in other moduli changing them here will have no impact on model results.	35
9	
10 General Plant Design Criteria	
11	
12 Study Parameters 1 UIL Network Design	
14 Tapering Selection 2 Use Non-Tapering Distribution Design	
15	
16 Fill Factors at Optimal Engineering Design	
17 49 Main Cable Environment Design Fill	
19 Nixin Cable Engineering Design Fill 30/2	
20 Multiplexing Cabinet Design Fill Factor 90%	
21	
22 Loading Factor for Indirect Overheads 13.00%	
23 Loading Factor-Reserved U.UU%	
27 Constant President President (Julie 1 de Della / January Caribi Cari	~
	11



If you wish to revise the input values in this worksheet, take note that only those cells with red text on a blue background are editable. Making changes to any other variables will have no impact on the model results contained in this spreadsheet.

Any changes to inputs made in the **Cost Calculation Module** will be overwritten when the model is operated from the user interface. Input changes should be made in the user interface.

Black text on a yellow background designates an input that is actually used in one of the engineering modules. These inputs are identified on this sheet only as a means of having a single sheet that identifies all cost and rules inputs used in the model. Changing these inputs in this Module will have no impact on the model outputs.

b) Inputs Ratios

The **Inputs Ratios** worksheet identifies ratios which reflect the probable occurrence of various types of placement activities when building a new network. The ratios in the ratio input sheet are designed to reflect the actual environment in which new construction would occur. The ratios identified on this page fall into the following categories:

- Ratios for determining the type and thickness of concrete or asphalt that would be encountered in building facilities in different areas;
- Ratios for identifying the portion of time each type of the breakout and reinstatement activities would be encountered when placing conduits, pits and manholes in different areas; and
- Ratios for identifying the portion of time each type of conduit placement activities (e.g. trenching roads, trenching sod, boring, etc.) would be encountered when placing conduit in different areas.

The ratios for placing pits, manholes and conduit in distribution areas are segregated into five density zones. A sixth density zone was included in The Model for potential use in addressing very rural areas in Band 3. In addition, separate ratios were developed for densely populated central business districts (CBDs).

The Model also provides separate ratios for different sizes of main conduit configurations. Again separate ratios are identified for conduit runs within a CBD and in other urban areas.

Microsoft Excel - BLBN						
: File Edit View Insert Format Tools Da	ta Window Helj	5			Type a question for help	8 ×
	 	- 0	5 - E A Z	1 🕼 🙈 100%		
Arial • 14 • B I U ≡	≡ ≡ ⊡ \$ '	% ,		🦀 • 📥 • 🥫 🔅	🚯 524 524 455 455 🖧	. 🔮 🚊
A1 🔻 🏂 ^Cost Inputs - Appli	cation Ratios Us	ed to Develop C	omposite Costs			
A B C	D	E	F	G	H	<u> </u>
1 Cost Inputs - Appl	ication Rat	ios Used i	to Develop	o Composit	te Costs	
2						
3		Designates Inp	ut			
4		Designates Fo	mula			
5						
b Pits and Manholes-Application Ratios for	Developing Co	mposite Place	ment Costs			
8 Ratios for Developing Composite Breako	ut and Reinstate	mont Costs fo	r Concrete and	Aenhalt Pite &	Manholes	
9	at and itemstate	sment coata te	r concrete unt	r Aspirarei ras d	Mannores	
10	Ma	in	Distrib	ution		
Description	Percent Applicable CBD	Percent Applicable Other Bande	Percent Applicable CBD	Percent Applicable Other Bande		
12 Concrete (< 75 mm thick)		70%		70%		
13 Concrete (75 to 100 mm thick)						
14 Concrete (Over 100 mm thick)	S					
15 Reinforced (< 75 mm thick)		30%		30%		
16 Reinforced (75 to 100 mm thick)	50%		50%			
17 Reinforced (100 to 150mm thick)	50%	10004	50%			
18 Total	100%	100%	100%	100%		
19 20 Aonholt (25 mm thick)	1		<u>.</u>			
20 Asphalt (20 mm thick)	50%	100%	50%	100%		
22 Asphalt (75 mm thick)	50%	100 %	50%	100 %		
23 Total	100%	100%	100%	100%		
24	the second second		or our management	20		
IN A DATE IN Inputs Cost and Rules Inputs Rat	tios / Inputs Car	ital Cost / Co	st Calcul			
Ready					NUM	



If you wish to revise the input values in this worksheet, take note that only those cells with red text on a blue background are editable. Making changes to any other variables will have no impact on the model results contained in this spreadsheet.

Any changes to inputs made in the **Cost Calculation Module** will be overwritten when the model is operated from the user interface. Input changes should be made in the user interface. Black text on an orange background designates a cell that is a calculation. These calculations are incorporated into the model to assure that the sum of all the possible placement activities equals 100 percent. Overriding these calculations may lead to errors.

c) Inputs Capital Costs

The **Inputs Capital Costs** worksheet identifies all the inputs required to turn an investment amount into an annual cost. All the inputs for determining capital costs and the direct and indirect ratios for determining operating expenses and indirect asset costs are identified on this worksheet.

The capital cost inputs include the costs for debt and equity, the capital structure ratios, the tax rate and the depreciation lives for each of the asset categories.

The sheet also includes expense factors for operating and maintenance expenses (expressed as a percentage of investment) and indirect expenses such as general administration and information technologies (expressed as a percentage of direct operating and maintenance expense).

There are also two sets of indirect investment ratios for network assets and general and administrative assets which are expressed as a percentage of direct plant in service.

By applying these capital and expense factors to investment one can derive annual and monthly capital costs.



F

If you wish to revise the input values in this worksheet, take note that only those cells with red text on a blue background are editable. Making changes to any other variables will have no impact on the model results contained in this spreadsheet.

Any changes to inputs made in the **Cost Calculation Module** will be overwritten when the model is operated from the user interface. Input changes should be made in the user interface.

11.2 Composite Cost Calculation Worksheets

There are two cost calculator worksheets: **Cost Calculator-Main** and **Cost Calculator Distribution**. On these sheets the inputs from the Inputs Cost and Rules and the Inputs Ratios are used to derive composite costs that can be applied against the investment quantities derived in the **Engineering Distribution** and the **Engineering Main Modules**. One worksheet is the cost calculator worksheet for costs for the Main network, and the other is for the Distribution network.

Functions performed on these worksheets include:

- Combining the various types of costs for a given activity to derive a combined cost for that activity (e.g. combining the material and hauling costs for cable to derive a combined single cost per metre);
- Applying the ratios for different types of placement activities to the cost of those activity to get a composite cost by density group (distribution) or conduit size (both main and distribution) to apply to quantities;
- Applying ratios to account for the cost savings that occur when placing cable in developer supplied trenches and when sharing trenches between the main cable and inter-exchange network facilities; and
- Applying factors to account for normal overhead loadings.

1	Noreceft Even	DI DN							
	AICTUSUIT EXCEL-	DEDIN							
: 1	<u>Eile E</u> dit <u>V</u> iew	Insert Formal	: <u>T</u> ools <u>D</u> ata	<u>W</u> indow <u>H</u> elp				Type a question	n for help 👻 🗕 🗗 🗙
:			* * • * •	12 🝼 🔊 - (🛛 - 🤮 Σ - f _a	- <u>2</u> ↓ <u>Z</u> ↓ <u>U</u> , A	🚯 100% 🔹 🕜	-	
Tim	ies New Roman	• 16 • B	7 ⊻ 📑 👅 🤋	\$ %	· .00 .00 1 = 1	E 🖽 • 🖄 • 🔒	🛆 • 📕 🤅 🌾 I 🖏	· >	2 🐠 🛄 🔠 📲
-	A1 👻	∱ ^Calcul	ation of the Fully	Loaded Material	& Activity Costs-N	Main Network			
	A	В	C	D	E	F	G	Н	
1			Calculati	on of the F	habeo I vilu	Matarial &	R. Activity	Costs Main	Network
1			Calculation	JI OI UIE F	uny Loaueu	Material	x Activity	COSUS-IVIAIII	TVELWOIK -
2									
3	Cable Costs	-Main							
4									
5	Cable Cost Nor	mal Gauge .40	mm Conductor	Main					
6									
7	Fully Loaded C	Cable Cost			To Main Cost Cal	Iculations			
8		10-01280-117-010-017 10-01280-117-010-017							
	Cable Sizes	Material (per	Hauling Rate	Cost (per	Loading	Loading	Loaded Cost		
9	(pairs)	metre)	(per metre)	Metre)	Factor 1	Factor 2	(per Metre)		
10	a	b=input	c=input	d=b+c	e=input	f=input	g=d loaded		
11	2400	\$ 141.60	\$ 11.32	\$ 152.92	13.00%	0.00%	\$ 172.80		
12	1200	\$ 68.50	\$ 7.04	\$ 75.54	13.00%	0.00%	\$ 85.36		
13	800	\$ 47.44	\$ 7.04	\$ 54.48	13.00%	0.00%	\$ 61.56		
14	400	\$ 26.01	\$ 4.79	\$ 30.80	13.00%	0.00%	C 34.80		
15					10 0041	0.0070	ψ		
	200	\$ 11.13	\$ 4.79	\$ 15.92	13.00%	0.00%	\$ 17.99 \$ 17.99		
16	100	\$ 11.13 \$ 6.26	\$ 4.79 \$ 2.17	\$ 15.92 \$ 8.43	13.00% 13.00%	0.00%	\$ 17.99 \$ 9.53		
16 17	100	\$ 11.13 \$ 6.26	\$ 4.79 \$ 2.17	\$ 15.92 \$ 8.43	13.00% 13.00%	0.00%	\$ 17.99 \$ 9.53		
16 17 18	100 Cost Per Joint	\$ 11.13 \$ 6.26	\$ 4.79 \$ 2.17	\$ 15.92 \$ 8.43	13.00% 13.00%	0.00%	\$ 17.99 \$ 9.53		
16 17 18 19	100 Cost Per Joint	\$ 11.13 \$ 6.26	\$ 4.79 \$ 2.17	\$ 15.92 \$ 8.43	13.00% 13.00%	0.00%	\$ <u>17.99</u> \$ <u>9.53</u>		
16 17 18 19	100 Cost Per Joint Cable Sizes	\$ 11.13 \$ 6.26	\$ 4.79 \$ 2.17	\$ 15.92 \$ 8.43 Enclosure	13.00% 13.00% Total Cost	0.00% 0.00% Loading	\$ 17.99 \$ 9.53	Loaded Cost	
16 17 18 19	200 100 Cost Per Joint Cable Sizes (pairs)	\$ 11.13 \$ 6.26	\$ 4.79 \$ 2.17	\$ 15.92 \$ 8.43 Enclosure Cost Per Pair	13.00% 13.00% Total Cost Including Enclosuro	0.00% 0.00% Loading Factor 1	\$ 17.99 \$ 9.53 Loading Factor 2	Loaded Cost (Per Pair)	
16 17 18 19 20 21	200 100 Cost Per Joint Cable Sizes (pairs)	\$ 11.13 \$ 6.26 Jointing Rate (per pair) h=input	\$ 4.79 \$ 2.17 Joint Enclosure Cost	\$ 15.92 \$ 8.43 Enclosure Cost Per Pair	13.00% 13.00% Total Cost Including Enclosure e=b+d	Loading Factor 1	\$ 17.99 \$ 9.63 \$ 9.63	Loaded Cost (Per Pair) h=e loaded	
16 17 18 19 20 21 22	100 Cost Per Joint Cable Sizes (pairs) a 2400	\$ 11.13 \$ 6.26 Jointing Rate (per pair) b=input \$1.57	\$ 4.79 \$ 2.17 Joint Enclosure Cost c=input \$604.77	\$ 15.92 \$ 8.43 Enclosure Cost Per Pair d=c/a \$ 0.25	13.00% 13.00% Total Cost Including Enclosure e=b+d \$ 1.82	0.00% 0.00% 0.00% Loading Factor 1 f=input 13.00%	\$ 17.99 \$ 9.63 \$ 9.63 Loading Factor 2 g=input 0.00%	Loaded Cost (Per Pair) h=e loaded \$ 2.06	
16 17 18 19 20 21 22 23	200 100 Cost Per Joint Cable Sizes (pairs) a 2400 1200	\$ 11.13 \$ 6.26 Jointing Rate (per pair) b=input \$1.57 \$1.57	\$ 4.79 \$ 2.17 Joint Enclosure Cost c=input \$604.77 \$443.87	\$ 15.92 \$ 8.43 Enclosure Cost Per Pair d=c/a \$ 0.25 \$ 0.37	13.00% 13.00% Total Cost Including Enclosure e=b+d \$ 1.82 \$ 1.94	0.00% 0.00% Loading Factor 1 <u>f=input</u> 13.00%	\$ 17.99 \$ 9.53 \$ 9.53 Loading Factor 2 g=input 0.00% 0.00%	Loaded Cost (Per Pair) h=e loaded \$ 2.06 \$ 2.19	
16 17 18 19 20 21 22 23 23	200 100 Cost Per Joint Cable Sizes (pairs) a 2400 1200	\$ 11.13 \$ 6.26 Jointing Rate (per pair) b=input \$1.57 \$1.57	\$ 4.79 \$ 2.17 Enclosure Cost c=input \$604.77 \$443.87	\$ 15.92 \$ 8.43 Enclosure Cost Per Pair d=c/a \$ 0.25 \$ 0.37	13.00% 13.00% Total Cost Including Enclosure e=b+d \$ 1.82 \$ 1.94	Loading Factor 1 f=input 13.00%	34.00 17.99 17.99 9.53 9.53 10.00% 0.00% 0.00% 0.00% 0.00%	Loaded Cost (Per Pair) h=e loaded \$ 2.05 \$ 2.19	
16 17 18 19 20 21 22 23 23	200 100 Cost Per Joint Cable Sizes (pairs) a 2400 1200 ► ₩ Cost Ca	\$ 11.13 \$ 6.26 Jointing Rate (per pair) b=input \$1.57 \$1.57 \$1.57 tculator-Main 7	\$ 4.79 \$ 2.17 Joint Enclosure Cost \$604.77 \$443.87 Cost Calculator D	\$ 15.92 \$ 8.43 Enclosure Cost Per Pair d=c/a \$ 0.25 \$ 0.37 \$ 0.37	13.00% 13.00% Total Cost Including Enclosure e=b+d \$ 1.82 \$ 1.94 (sults Main-Qtys)	Loading Factor 1 <u>f=input</u> 13.00% (Results) C	■ 34.80 \$ 17.99 \$ 9.53 \$ 9.53 ■ 19.53 ■ 19.55 ■ 19	Loaded Cost (Per Pair) h=e loaded \$ 2.06 \$ 2.19 6 2.00	×

3 M	icrosoft Excel -	BLBN												
8)	<u>File Edit View</u>	Insert Format	<u>I</u> (ools <u>D</u> ata j	<u>W</u> ind	ow <u>H</u> elp						Type a que	stion for help 💂	-8>
0		A 149 64 1	34	1 Do 194 -	rên	10-0			. 41 4	Z 1 (3) 🧟	100% - @			
			iu e		- 🗔				• Z*	A+ 1 000 -0				
Time	es New Roman	• 16 • B	<u>r</u> <u>u</u>			\$ %	, 1	00 →.0 1 IF 1		• 🥙 • 🛓	🛓 📲 🗧 😵 🐼	• 50• 1•03 •03 2	K 😻 🛄 🗄	
_	A1 -	f& ^Calcul	ation	of the Fully	Load	led Material	& A	ctivity Costs-	Distrib	ution Netwo	ork			
_	A	В		C		D		E		F	G	Н		
1		C	alc	ulation o	ft	he Fully	Lo	aded M	ateri	al & A	ctivity Cos	ts-Distribut	tion Netwo	rk 🛛
2	-													
3	Material and	Placement (Cos	t-Distribut	ion									
4														
5	Cable Cost Nor	mal Gauge .40	mm	Conductor-	Dist	ribution								
5				<u>ан а .</u>				C 11 D						
/	Development o	f the Fully Loa	dec	Cable Cost	Per	Metre for C	opp	er Cable-Di	stribut	ion				
0	50 usere 1770	Cable Sizes	Ma	torial (nor	Ha	uling Pate	(oet (nor	Los	adina	Loading	Total Cost		
9	Cable Type	(pairs)	INIC	metre)	ín	er metre)		Metre)	Ea	ctor 1	Eactor 2	Loaded		
0	а	b=input		c=input	u.	d=input		e=c+d	f=i	nput	q=input	h=e loaded		
1	CPFUT PE	100	\$	5.56	\$	1.91	\$	7.47		13.00%	0.00%	\$ 8.44		
2	CPFUT PE	50	\$	2.95	\$	1.91	\$	4.86		13.00%	0.00%	\$ 5.49		
3	CPFUT PE	30	\$	1.96	\$	1.91	\$	3.87		13.00%	0.00%	\$ 4.37		
4	CPFUT PE	10	\$	0.82	\$	1.91	\$	2.73		13.00%	0.00%	\$ 3.08		
5 6 7	Development o	f the Fully Loa Cable Sizes	ded Joi	Cost Per W nting Rate	ire J	oint Includi Joint	ing l	Enclosure-D nclosure	istribu Tota	tion Inclue	ling Serving P Loading	'it Loading	Total Loaded	Tota
18	Capie Type	(pairs)	- S	(per pair)	5	Cost	Co	st Per Pair	Enc	losure	Factor 1	Factor 2	Enclosure	En
9	a	b=input		c=input		d=input		e=d/b	f=	c+e	g=input	h=input	i=f loaded	j=f
0	CPFUT PE	100	\$	1.88	\$	130.19	\$	1.30	\$	3.18	13.00%	0.00%	\$ 2.12	\$
1	CPEUT PE	50	\$	1.88	\$	130.19	\$	2.60	\$	4.48	13.00%	0.00%	\$ 2.12	\$
2	OPEUT DE	3U 10	\$	1.68	\$	130.19	\$	4.34	¢	14.00	13.00%	0.00%	a 2.12	3
1	UFIULPE	10	Φ	1.00	Φ	100.19	Φ	13.02	φ	14.90	13.00%	0.00%	φ 2.12	Φ
5	Cost nor Wire (onnection at 9	and	ing Pit										
4	H Cost Cast	Iculator-Main	Cost	Calculator D	Distr	ibution / R	esult	s Main-Qtys	/ Res	iults E <				>
ead	1												NUM	
-					-									

These worksheets do not contain any editable variables and making changes to the formulas may result in unpredictable cost outcomes.

11.3 Network Quantities Worksheets

There are two network quantities worksheets: **Results Main – Qtys** and **Results Distribution – Qtys**. Each of these sheets displays the output by ESA that is produced by the Engineering Distribution Module and the Engineering Main Module. There is one line of data for each ESA and that one line of data coincides with the single line of data that would be shown on the Distribution – Summary and Main – Summary worksheets when any single ESA was processed through the two modules. These worksheets simply import the data from the Engineering Modules.

	licrosoft Excel	- BLBN								
:8)	<u>Eile E</u> dit <u>V</u> ie	w <u>I</u> nsert F	ormat <u>T</u> ools <u>D</u> ata	a <u>W</u> indow <u>H</u> el	lp			Type a ques	stion for help 🚽	_ # ×
	😂 🖬 🖪 i 8	3 💁 🗳 🕯		• 🛱 🛷 🔊	- (* - 🤮 🗴	E + f≠ ≩↓ Z↓	🏭 🦓 100%	• • @ -		
Aria	al de la companya de	• 10 •	B I U 🔳	s 🗐 🔤 💲	% ,	∉∉ ⊞・	💩 • 🗛 • 💂	i 🚸 i 🐎 🐎 i		
	J37 💌	fx								
	А	В	С	D	E	F	G	Н		^
1	Sun	amary Infor	mation	T (11)	Excluded		Leng	yth of Main Co	pper Cables-M	etres
2	6276346			Total Lines	Fibre Fed	2 100	1000	Size of .40 Gau	ge Main Cable	s
3					Demanu	2400	1200	800	400	<u> </u>
5										
6	1	Number	of ESAs in Rur	1						
7										
17										
18										
19					202					
20	ESA	Band	% Rock	#	#	24.000	2.044	0.500	7.550	
21	DLDIN	2	10%	10,/50	104	21,006	3,641	0,009	7,002	
23										
24										
25										
26										
27										
29										
30										
31										~
14 4	► ► \ Result	s Main-Qtys	Results Distribut	ion-Qtys / Re	esults Main-Costs	/ Result <				>
Read	У								NUM	3



These worksheets do not contain any editable variables and making changes to the formulas may result in unpredictable cost outcomes.

11.4 Network Cost Worksheets

There are two network quantities worksheets: **Results Main** –**Costs** and **Results Distribution** -**Costs**. In each of these sheets the cost by ESA for each type of plant identified on the network quantity worksheets is calculated by applying the costs developed in the cost calculator worksheets to the quantities in the network quantity worksheets.

-									
	Aicrosoft Excel - BLBN								
:8)	<u>File E</u> dit <u>V</u> iew Insert Format	Tools Data	Window <u>H</u> elp				Type a question	for help 🚽 🚽 🖌	s ×
ED		a 🔏 🖻a 📇 -	Ê 🥑 🔊 -	🔍 - 🧶 Σ -	fx A↓ Z↓	📜 🐴 100% 🕞	0		
Ari	al • 10 • B <i>I</i>		s %	· •.0 .00 =		• • A • • •	[월일 일일 [4]	21213	**
-	A1 & & ABesults	hy Wire Center	Groupings	.00 .01 =-			1 24 24 1 23	an 1 578 🍝	F
	A B	C	D	E	F	G	Н		~
1	Desults by Miss Contex C					Cost of .	Joints .40 Gau	ge Copper Mai	in
2	Results by whe Center G	oupings	Total Lines	Linoc		S	ize of .40 Gau	ge Main Cable	s
3				Lines	2400	1200	800	400	
4									
5	Band (CBD)	1	-	-	\$0.00	\$U.UU #240.700	\$0.00	\$0.00	
5	Band	2	10,750	18,646	\$3,629,656 ¢0.00	\$310,796 ¢n.nn	\$525,699 ¢0.00	\$262,651 ¢0.00	
8	Beserved	3	2	5 0	φ0.00	40.00	40.00	φ0.00	
9	Total								
10									
11	Single Exchange								
12					8				_
13	Description			2			Cost Pe	er Metre	_
14		AU N _ CDD			. 470.00	e 05.00		·	
15	Cost Per Unit Normal Terrain	All Non CBD			\$ 172.80	\$ 85.36	\$ 61.56	\$ 34.80	\$
10	Cost Per Unit Rocky Terrain	CBD							
18	Cost Per Unit Rocky Terrain	CBD							
19		000							
20	ESA Band	% Rock	#	#					
21	BLBN 2	10%	18,750	18,646	\$3,629,858	\$310,796	\$525,699	\$262,851	5
22									~
14	▶ ► Results Main-Costs / Re	sults Distribution	n-Costs / Cap	ital Cost Calculat	:ion / < 💷				>
Read	iv							NUM	

Micr	osoft Excel - BLBN							
:B) Eile	e <u>E</u> dit <u>V</u> iew Insert Format <u>I</u>	ools <u>D</u> ata <u>W</u> ir	idow <u>H</u> elp			1	Type a question for h	elp 🛛 🗕 🗗 🗙
! 🗋 🖆	i 🖬 🔒 🕘 💁 🖏 🛤 .	X 🗅 🔁 • 🖻] 🍕 19 - 19 -	🧶 Σ - <i>f</i> _x		🚯 100% 💌 🤅	0	
Arial	• 10 • B <i>I</i> <u>I</u>	! ≣ ≣ ⊒	••• \$ % ,	tion .00 📰 🖬	E 🖽 + 🙆 +	A • 🚽 🐼 🛛	\$P \$P ~C ~C	2 V 🖞
A	√1 ▼ <i>f</i> ≈							
	A B	С	D	E	F	G	Н	· · · · ·
1	l			Cost of (Cable			
2	Results by Wire Center Gro	upings		Cable	Size			Join
3			100	50	30	10	100	50
4				60	F O	* 0	F O	* 0
5 Ba	na (CBD) na	1	ው 1751 100	\$U r0	φU ¢O	<u></u> ቆሀ ድር	\$U #1.100.212	5U 10 000
0 Da	nd	2	a∠,/31,130 ©Ω	φU \$Ω	φU \$0	40 60	01,100,315 ۵۱	\$10,083 \$0
8 Re	served	3	φυ	φυ	φυ	ψŪ	φυ	40
9 Tot	tal							
10								
11 Sin	ngle Exchange							
12	35. CON							
13	Per Unit Costs	Area						
14			1220100					
15 Cos	st Per Unit Normal Terrain	All Non CBD	\$8.44	\$5.49	\$4.37	\$3.08	\$3.60	\$5.07
16 Cos	st Per Unit Rocky Terrain	All Non CBD						
19 Co	st Per Unit Normal Terrain	CBD						
19	strei omt kocky renam	CDD						
20	ESA Band	% Rock						i
21 BL	BN 2	10%	\$2,751,136	\$0	\$0	\$0	\$1,186,315	\$10,893
22		1999 - 1999 - 1997 - 1 99		•		-		
	N / Results Main-Costs \ Result	s Distribution-	Costs / Canital I	Cost Calculation	1			×
Ready	MA Resolution Main Costs Artesun	o biscribudur	Coves A capital	cost carcoradorr			NI IM	
Reduy							NOM	

Ē

These worksheets do not contain any editable variables and making changes to the formulas may result in unpredictable cost outcomes.

11.5 Capital Cost Calculation

The **Capital Cost Calculation** worksheet develops composite capital cost factors for each category of plant used in The Model. These factors account for the cost of financing throughout the plants life (i.e. equity and debt), the annual depreciation accruals throughout the life of the plant for each plant category and the income taxes associated with the equity return component of capital costs. These are all combined into a single factor that can be applied to the investment levels developed on the other worksheets.

1		iseri Format	Tools Dat	a <u>Window I</u>	<u>H</u> elp				Type a questi	on for help 🛛 💌	- 8 2
:		1 489 ASL 1 A	A V PS P	- 商 - (1)	0.0.16	5 - 6	ALZIIA	A 100%			
			1 & 43 Q	• 1121 -	-1 - (6	j ∠ • Jx	Z + A +	100 %	_		
Ari	ial 💌 1	0 - B I	<u>u</u> 📰 🗄	[클 코 \$	% , .00	.00	🖽 🕶 🖄 🕶	A . 3	왕왕(조	इ≪: 솠 <	2
-	A1 👻	f∗ ^Capital	Cost Factor	Calculation							
	A	В	С	D	E	F	G	Н		J	K
1					C	apital Cost	Factor Calcu	lation			
2											
3				Custon	er Access N	etwork					
4		Ducts and Pipes-Main	Copper Cables- Distribution	Ducts & Pipes- Distribution	Copper Cables-Main	Lead-Ins	Multiplexing Systems	Radio Equipment- CAN	Network Management	Support Structures	Build Fitou
5	Life	40	20	30	10	25	10	12	11	30	
6	Depreciation Rate	2.50%	5.00%	3.33%	10.00%	4.00%	10.00%	8.33%	9.09%	3.33%	10
7	WACC Post Tax	11.86%									
8	Tax Gross-up-WACC	33.99%									
9	Net Present Value	1.2690795	1.2118563	1.2476997	1.1467630	1.2322413	1.1467630	1.1633210	1.1553172	1.2476997	1.14
10	PMT EOP	0.1522572	0.1608405	0.1533122	0.2018137	0.1556084	0.2018137	0.1866035	0.1934011	0.1533122	0.20
11											
12	Year										
13											
14	1	0.183940	0.208940	0.192273	0.258940	0.198940	0.258940	0.242273	0.249849	0.192273	0.25
15	2	0.179967	0.200993	0.186975	0.243046	0.192582	0.243046	0.229028	0.235400	0.186975	0.24
16	3	0.175993	0.193046	0.181677	0.227152	0.186225	0.227152	0.215783	0.220951	0.181677	0.22
17	4	0.172020	0.185099	0.176379	0.211258	0.179867	0.211258	0.202538	0.206502	0.176379	0.21
18	5	0.168046	0.177152	0.171081	0.195364	0.173510	0.195364	0.189293	0.192053	0.171081	0.19
19	6	0.164073	0.169205	0.165783	0.179470	0.167152	0.179470	0.176048	0.177604	0.165783	0.17
20	7	0.160099	0.161258	0.160485	0.163576	0.160794	0.163576	0.162803	0.163155	0.160485	0.16
21	8	0 156126	0.153311	0.155187	0.147682	0 154437	0 147682	0 149558	0 148705	0 155187	0.14
e .	 Mapital Cost 	Calculation	A investmer	ic summary /	(Annual Cost	summary /	<	and the second second			>

This worksheet does not contain any editable variables and making changes to the formulas may result in unpredictable cost outcomes.

11.6 Investment and Annual Cost Summaries

There are two summary worksheets. The **Investment Summary** worksheet identifies the ULL investment per line for each customer in ESA's that were processed. The investment costs on the two network cost worksheets are totalled by category and then divided by the number of customers in the studied ESAs. This produces an investment cost per customer for each category of plant in The Model (e.g. copper and fibre cables).

The annual and monthly costs for the investment derived above are calculated on the **Annual Cost Summary** worksheet. First the capital costs factors developed in the Capital Cost Calculation are applied to each of the investments for the various plant categories identified in the investment summary. Next the direct and indirect expense amounts are calculated by asset category. Finally, indirect asset costs are derived by asset category. These various costs are then combined to identify the annual and monthly costs associated with providing the service.

The calculations performed by each of these worksheets and how they produce the final results are described in more detail in the document **TEA Model Documentation**.

	Aicrosoft Excel - BLBN														
:2	File Edit View Insert Form	nat <u>T</u> ools <u>D</u> a	ta <u>W</u> indo	w	<u>H</u> elp						Тур	e a question	for help		đΧ
10			- 10-	31	0.00.	0	5 - 6	A	Z (m 2	100%	- @				
-					a de la companya de l	9		2*	A* 1 000 -0			5			
Ari	al 💽 14 💽 🖪	IU			% ,	00 -00			🛛 • 🤔 • 🛓		: 🌒 Ele	132 193	SE 2	. 🔍	Ŧ
1	A1 🔻 🏂 ^ULL	Investment by	Band Su	mma	ry	_									
	A		В		С		D		Е		F	G		Н	~
1		ULL Inve	stmen	tby	/ Band	Su	mmary								
2			Invest	nent	Per Line										
3															
4															
5	Investment Category		Band 1		Band 2		Band 3		Reserved		Total				
6	0.1.5				075.00										
1	Conduit	\$		\$	375.60	\$	-	\$	-	\$	-3				
8	Pits and Manholes	5	-	\$	62.45	\$	-	\$	-	3	- 2				-
9	Ducts and Pipes-Main	,		э	438.04	\$	-	Þ	-	3	-				
11	Conner Cables	¢		¢	338 33	¢		æ	1	¢					
12	Conner Cable Jointe	Ψ ¢	10	¢ ¢	67.95	¢		¢	1990	¢	2				
13	Conner Cables Main	\$		\$	396.28	\$		\$		\$	55				
14	copper curres mun	.**			330.20	÷									
15	Fibre Cables	\$		\$	2.23	\$	-	\$		\$	-				
16	Fibre Cable Joints	\$	12	\$	1.27	\$	-	\$	14	\$	23				
17	Optical Fibre	\$	82	\$	3.50	\$	2.2	\$	21	\$	<u>1</u> 25				
18															
19	Field MUX Equipment-Main	\$	17	\$	13.18	\$		\$	1570	\$	7/				
20	CO MUX Equipment-Main	\$	17	\$	2.39	\$		\$	-	\$					
21	Fibre Terminating Frame	\$	15	\$	0.51	\$				\$	53				
22	Pair Gain Systems	\$		\$	15.57	\$	1.0	\$	-8	\$	÷)				*
H.	▶ N / Capital Cost Calculation	n) Investme	nt Sumn	hary	Annual G	ost S	ummary /		<						>
Rea	tv.	11-10			da.								NUM		

Microsoft Excel - BLBN	
19 File Edit View Insert Format Tools Data Window Help Type a question for help.	×
Arial10 × 10 × 18 Z U 事 事 署 涵 \$ % , % 總 罪 罪 ⊞ • △ • ▲ • 1% (計 時 時 時 時) [16 時 8	i 🙉 🖕
J26 🗸 🏂 =SUM(D26:126)	
A B C D E F G H I J	K 🔽
Annual ULL Costs Per Line Calculation	
A Monthly Cost	
6 Main Network	Di
Capital Ducts and Copper Optical Fibre Multiplexing Network Local Iotal Main Duct	s & Pipes
7 Plant Classsification Cost Factor Pipes-Main Cables-Main Cables Systems Buildings Switching Network Dis	tribution
8	
9 Investment Per Line \$ 438.04 \$ 396.28 \$ 15.57 \$ 5.15 \$ 9.69 \$ 868.23 \$	1,636.42
11 Sharing Reveues Per Line	
12 Conduit Leasing Revenues § 2.50 \$ 2.50	
13 Iotal Per Line 3 2.30 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 2.30 3	
15 Direct Cost Eactors	
16 Cost of Capital Including Tax 0.152257 0.201814 0.155608 0.201814 0.152842 0.212387	0 153312
17 O&M Expenses 0.002793 0.087735 0.033104 0.045093 0.037454	3.002793
18	
19 Direct Cost	
20 Cost of Capital Including Tax \$ 66.70 \$ 79.98 \$ 0.54 \$ 3.14 \$ 0.79 \$ 2.06 \$ 153.20 \$	250.88
21 O&M Expenses \$ 1.22 \$ 34.77 \$ 0.12 \$ 0.70 \$ 0.36 \$ 37.17 \$	4.57
ZZ I otal Direct Costs \$ 67.92 \$ 114.74 \$ 0.66 \$ 3.84 \$ 0.79 \$ 2.42 \$ 187.95 \$	255.45
23 24 Network Arest Caste	
24 Interwork Asset Costs ↓ • • • • • • • • • • • • • • • • • • •	> ľ
	(100)

These worksheets do not contain any editable variables and making changes to the formulas may result in unpredictable cost outcomes.

This last worksheet is where you will find the annual (and monthly) cost per line, averaged for all of the ESAs chosen in the Grouping Scenario. The cost is broken down into the component asset categories.

ß

12 Troubleshooting

If there is an error opening The Model, you might need to install the .Net 1.1 Framework. From the **Telstra Cost Model Disk**, navigate to the "**1.1 Framework**" directory. Double-click the file "**dotnetfx.exe**" and follow the instructions for installation. If necessary, a Service Pack release for the .Net 1.1 Framework is also included on the disk. See **Section 5.1 Installing The Model**.

Validation Err	or
🔀 The D	efault scenario is not editable. Please select or create a different scenario if you would like to make changes and save them.
	ОК
lssue:	You have tried to edit a cell in the default scenario.
Solution	Create a new scenario before making the required changes. For further information see Section 7.1 for the Grouping scenario, Section 8.1 for the Engineering scenario or Section 9.1 for the Costing scenario.

Validati	on Error 🛛 🔀
8	The cell you attempted to edit is not editable.
	ок

Issue: You have tried to edit a cell which is not editable.

Solution Only those items noted in **Appendix A** can be edited. They are generally recognisable by the red text on a blue background (except in the Grouping Scenario where the only editable items are the Rock% and the ESA selection).

Error	
8	There was an Error opening a valid connection to the requested Telstra Database. If this problem persisists, please report the following Error to your Software Administrator: Error Desc: Could not find file 'C:\Program Files\TELSTRA\Telstra Cost Model\Data\TEA-Data.mdb'. OK
Telstr	aCostModel 🔀
8	There was an Error Running the Main Engineering Model: Fill: SelectCommand.Connection property has not been initialized.
	ОК
lssue:	The TEA-Data database is not in the expected location and The Model could

Solution Ensure that the TEA-Data database is located in the installation folder. See **Section 5** for more information.

not make a connection to the database to generate the Engineering data.

Generating Te	ilstra Cost Model O	utputs
 \mathbf{X}	Current Model: Current Action: Status:	Engineering Distribution Model Running Band 2 ESAs Running Band 3 ESAs

Issue: The Model doesn't seem to finish and you can see this dialog on screen with the status of data generation referring to Band 3 ESAs.

Solution The Model currently only runs on Band 2 ESAs. If you see this message, the engineering data generation has completed and The Model is waiting for you to click on the **OK** button on the dialog informing you of this. If this dialog (shown below) is not currently visible, it can be found by scrolling through the list of open windows using Alt-Tab. Click on the **OK** button and you will return to The Model.

TelstraC	CostModel 🛛 🔀
(į)	The Engineering Models were run successfully and Engineering data has been created for the selected Engineering Scenario.
	ОК

13 References

Document Title	Description
TEA Model Documentation	Documentation of The Model architecture and methodology.
Access Network Modelling Costing Information	Documentation of the unit costs included in the model.
Access Network Dimensioning Rules	Documentation of the rules representing efficient network engineering best practices.

14 Index

Α

add scenario	
costing	
engineering	
grouping	14

С

costing	 11
Costing Scenario Tab.	 -37

D

database	6
default folder	4, 6, 7, 8, 28
delete scenario	
costing	
engineering	
grouping	
discard scenario edits	
costing	
engineering	
grouping	
drop-down box	
costing	
engineering	
grouping	
0 1 0	,

Ε

Edit Telstra Model Inputs . 11, 13-19	, 20–31, 32–37
engineering	
engineering module files	
Engineering Scenario Tab	
ESA	
exiting the model	

G

generate engineering data	24
getting started	8
grouping	11, 13–19
Grouping Scenario Tab	13–19

Н

I

nstallation 3	
Istanauon	

Μ

modules			
costing	2,	11,	41-52
engineering	. 2, 11,	13,	20-31

0

output	38–40, 41–52
overview	2

R

running the	model	
-------------	-------	--

S

save scenario	
costing	
engineering	
grouping	17
select scenario	
costing	
engineering	
grouping	14
setup	
sorting ESAs	
system requirements	1

Т

TEA-Data.mdb	See database
Telstra Model Inputs	10, 13-19, 20-31, 32-37
Telstra Model Outputs	

U

V

variables									
default values								1	5
description								57-90	0
editing	15,	18,	23,	35,	43,	45,	46,	57-90	0

APPENDIX A Editable Variables in The Model

A.1 Overview

The model contains an extensive list of user input variables. All these variables are accessed through the user interface¹. There are six input sheets or input categories in the user interface:

- (a) **Grouping Inputs** the primary purpose of this input category is to provide the ability to select the ESAs to be process in any given run of the model;
- (b) General Plant Design Criteria Main Network This category of inputs lists the engineering rules and criteria used in the Main Engineering Module in determining the types, sizes and quantities of each component of the main network required to efficiently provision a new customer access network for unbundled local loop (ULL) service;
- (c) General Plant Design Criteria Distribution Network This category of inputs lists the engineering rules and criteria used in the Distribution Engineering Module in determining the types, sizes and quantities of each component of the distribution network required to efficiently provision a new customer access network.;
- (d) Cost Inputs Costs and Rules Documents This category of inputs provides the network construction prices (i.e. equipment and placement prices) and network dimensioning criteria (i.e. sizes of trenches and manholes) used in the Cost Calculation Module to quantify the investment cost for the various network components identified in the engineering modules;
- (e) Cost Inputs Application Ratios Used to Develop Composite Costs - This category of inputs identifies ratios which reflect the probable occurrence of various types of placement activities which will be needed when building a new network; and
- (f) **Cost Inputs Capital Costs and Factors** The category of inputs identifies all the inputs required to turn an investment amount into an annual cost including capital costs, depreciation lives, income taxes, direct and indirect expense and investment factors.

The network dimensioning and design criteria used in the engineering modules to quantify and size the network components required to efficiently provide access service were obtained from the **Access Network Dimensioning Rules** (**Rules**) document. These **Rules** were developed by Telstra's' plant engineering department and were based on the actual rules used by that department to design and construct new plant facilities. Most of the critical network dimensioning rules and parameters

¹ Note that these inputs can be also accessed and changed by dropping down into each of the modules; however, any changes made to these worksheets will be over ridden when the integrated model is run using the user interface.

are built into the model as user adjustable inputs. The inputs parameters also allow selection of the type of serviced being modelled (ULL or basic service) and/or the basic distribution network cable layout (i.e. tapered or non-tapered).

The vast majority of network construction pricing and dimensioning inputs are obtained from the **Access Network Modelling Costing Information** document compiled by the Telstra engineering department. The costing information contained in this document was primarily obtained from the Schedule of Rates document attached to vendor contracts. However, in certain instances the information in the contract had to be supplemented by either contractor quotes or engineering estimates. Virtually all of these pricing and dimensioning rules are user adjustable inputs into the model.

Application ratios are designed to account for variations in the environment and terrain in which the new facilities will be constructed. Construction costs vary based on the terrain (i.e. rocky or normal) and the type of construction environment (i.e. turf, roads, footpaths and driveways) that will be encountered when placing the facilities. The application ratios identify the percentage of time each type of placement activity will be required.

The capital cost inputs are the rate of return on equity, the cost of debt, the capital structure ratios, the income tax rate and the average depreciable life for each category of asset used in the TEA model. The expense inputs consist of factors to derive annual costs for:

- Direct expenses (e.g. maintenance, product management);
- Indirect expenses (e.g. information technologies, accounting);
- Network assets (e.g. network buildings, power systems); and
- Indirect assets (e.g. buildings, computer systems).

The list of user adjustable inputs provides a user with maximum flexibility and ease of use. The categories of inputs identified above allow users of the model to adjust the preponderance of critical parameters used in calculating the replacement CAN costs.

It should be noted that when making changes to the engineering inputs it can take many hours to process all ESAs through the model. Therefore, it is recommended that sensitivity runs on the impacts of changes to the engineering input variable be tested using one or a small group of ESAs. Once the final list of proposed inputs is determined then they can be run for all ESAs.

Note that changes to other input variables (i.e. network prices and ratios, capital costs, expense factors and rock percentages) are not processed through the engineering modules so processing time is reasonably fast even when all ESAs are being processed as long as there were no concurrent changes to the engineering variables.

The following sections describe in more detail the input variables by the categories listed above.

A.2 Grouping Variables

The **Grouping Main** scenario input sheet provides two capabilities:

- The ability to select the specific ESA(s) that will be processed in any given • model run; and
- The ability to adjust the percentage of rocky terrain that would be • encountered in any ESA.

You can select to process any single, or any combination of, ESAs in a scenario.

lodel Inputs E	dit Telstra Model II	nputs Input Catego	ory: Grouping - Ma	ain			
Engineering Costing		Scena	rio: Default (De	fault Scenario is Not	Editable)		
) Scenarios: 💈 🕂 🗡 🔝					Check or Unc	heck: 🔽 All	
•	ESA State	ESA Name	ESA Code	ULL Band	Rock%	Selected	~ 7
	E LILL Band :	BAND 2 - 594 item(c)					
	OID	ZILLMEDE	ZMDE	BAND 2	0.1		_
	OLD	VERIONGA	VPGA	BAND 2	0.1		
	OLD	YORKEYS KNOB	VNOB	BAND 2	0.1		_
	OLD	WYNNIM	WYNM	BAND 2	0.1		
	OLD	WURTULLA	WURT	BAND 2	0.1		
	QLD	WHITE ROCK	WTRK	BAND 2	0.1	~	
	VIC	WILLIAMSTOWN	WTON	BAND 2	0.1		
	QLD	WATERFORD	WTFD	BAND 2	0.1		
	NSW	WEST TAMWORTH	WTAM	BAND 2	0.1		
Outputs	NSW	WAGSTAFF POINT	WSTF	BAND 2	0.1		
	NSW	WINDSOR	WSOR	BAND 2	0.1		
nput Scenarios	VIC	WARRANWOOD	WRWD	BAND 2	0.1	V	
bing - Default	QLD	WARNER	WRNE	BAND 2	0.1	V	
ring - Default	VIC	WANTIRNA	WRNA	BAND 2	0.1		
ang Derauk	NSW	WARILLA	WRLA	BAND 2	0.1		
ting - BLBN	NSW	WOY WOY	WOYY	BAND 2	0.1		
	NSW	WOLFE	WOLF	BAND 2	0.1	~	
🐟 Generate Outputs 🛛 🔞	QLD	WOOLLOONGABBA	WOBB	BAND 2	0.1	 Image: A start of the start of	
	QLD	WINDAROO	WNRO	BAND 2	0.1	V	
	NSW	WANGI WANGI	WNGI	BAND 2	0.1		
	NSW	WARRIMOO	WMOO	BAND 2	0.1	V	
	WA	WEMBLEY	WMBY	BAND 2	0.1	 Image: A set of the set of the	
	NSW	WALLSEND	WLSD	BAND 2	0.1	V	
	NSW	WOLLONGONG	WLGG	BAND 2	0.1		
	VIC	WINDSOR	WIRC	BAND 2	0.1		
	NSW	WILLOUGHBY	WILL	BAND 2	0.1		

The above picture shows the Grouping main input sheet. This sheet will appear when first opening the model or when the grouping tab is selected. The following categories of information are contained in each column of the sheet:

Column Heading	Description	⊠ User Adjustable
ESA_State	The Australian State in which the ESA is Located	×
	ACT – Australian Capital Territory NSW – New South Wales NT – Northern territory QLD-Queensland SA-South Australia TAS-Tasmania VIC-Victoria WA-Western Australia	
ESA_Name	The name of the ESA – often corresponds with the locality (town, suburb)	X
ESA_Code	The four-letter identification code for the ESA	X
ULL_Band	The band to which the ESA is assigned according to the density rules.	X
	The Model currently includes only Band 2 ESAs.	
Rock%	The percentage of rocky ground that would be encountered in an ESA. This variable is used to determine placement costs in the Distribution Results – Costs tab of the Cost Calculation Module.	Ø
Selected	Box identifying which ESA have been selected for processing in the current run of the model. A checkmark will be in the box if the ESA has been selected.	V

Only the rock percentage and the ESA selection is user adjustable in the model at this time.

A.3 Engineering Variables : Engineering - Main

a) General

The **Engineering - Main** input sheet contains the key design criteria for the main network. These rules are taken from the **Access Network Dimensioning Rules** ("**Rules**") developed by the Telstra engineering department. The **Rules** are designed to reflect the best in-use engineering practices and procedures for deploying a new ULL network. Many of these rules can be adjusted in the input sheets incorporated into the user interface to the models². The user adjustable rules and model parameters that are included in the **Engineering - Main** sheet are:

- The selection that specifies whether the module will design a main network for the ULL product (designated by a 1) or a network to provide basic service (designated by a 2);
- the main cable fill that is used to design the copper cable network in the main module;
- the multiplexing cabinet fill that is used to size the multiplexing equipment in the main module;
- the maximum haul length for each size (number of pairs) and gauge of main copper cables, which is used to determine the maximum distance between cable joints;
- the maximum haul length for each size (number of fibres) of main fibre cables, which is used to determine the maximum distance between cable joints; and
- the maximum allowable distance between manholes and pits in the main network.



Changes to engineering rules require a significant time to process for a large grouping of ESAs. Sensitivity testing for the impact of changes to engineering inputs can be done efficiently by running the input changes on a single or small sample of ESAs. Once the final list of engineering inputs revisions has been decided, all ESAs can be run with the new inputs.

² Changes to these rules or parameters should be made in the inputs sheets incorporated into the user interface to the model. Input changes made directly into this module will not flow through to the Cost Calculation Module or results).

To access the **Engineering** input sheets select the **Engineering** tab and then click on the K button to remove the warning.

Telstra Cost Model (v 1.0)							
Telstra Model Inputs							
Grouping Engineering Costing							
 The Engineering Model is Optional and is not Required to View the Telstra Cost Model Outputs. Only run an Engineering Scenario if you require new Engineering Data. Close This Warning Close Warning 							

Click on the button titled **Main** which is immediately below the drop down box to access the **Engineering Main** input sheet.

🖥 Telstra Cost Model (v 1.0)						
Telstra Model Inputs						
Grouping Engineering Costing						
Engineering Scenarios: 💈 🕀 🗡 💾						
BLBN						
Main C Distribution						
🔿 Generate Engineering Data 🕜						

Once you have entered the **Engineering Main** page the following sheet appears in the **Edit Telstra Model Inputs** section of the page. Note that any item highlighted in red font with blue background is a user adjustable input. There are more than 25 user adjustable input variables on this sheet. Each can be adjusted by merely clicking on the box and typing in another input value. The default values for these inputs follow the guidelines specified in the **Rules**.

Edit Telstra Model Inputs	Input Category: Scenario:	Enginee Default	ring - Main 🔍 (Default Scenario i	s Not Editable)	
Network Design: 🦸	ULL 🧿 Basic Se	ervice			Talat
General P	lant Design	. Crite	aria-Main Ne	work	Versi
General	ant Design	Cild		WOIK	versi
Fill Factors at (Optimal Engine	erina De	sian		
		-			
90)%	Feeder	Main Cable Design	Fill	
91	J%	Multiple	exing Cabinet Desig	n Fill Factor	
<u>Cable-Design (</u>	<u>Criteria-Main</u>				
Normal Caugo	40 mm Conduz	tor Mai	n		
Normai Gauge	.40 mm Conduc	.01-141			
			Max Dist to	7	
Cable Siz	es (pairs)	Ne	xt Joint (Metres)		
24	00		250		
12	200		500		
8			500		
4	UU 		500		
2	UU 		1000		
1	JU		1000		
Cable Cost Hea	wy Gauge .64 m	ım Con	ductor.Main		
	ing sunge lot in				
			Max Dist to		
Cable Siz	es (pairs)	Ne	xt Joint (Metres)		
12	200		250		
8	00		250		
4	00		500		
2	00		500		
1	00		1000		
Fibre Cables-M	ain				
I				<	



You will need to use the scrollbars located at the right and bottom of the main window to display all of the available information on these pages. Each of these inputs will be discussed in the order they appear on this sheet.

b) Specific Inputs

The model provides you with two options regarding the type of network being deployed:

- 1) Unbundled Local Loop; or
- 2) Basic Service.

The main difference between the two approaches is that the ULL service is provided over all copper facilities. Under this option the model will place copper facilities wherever they currently reside in the network.

Ē

You designate the type of network to be modelled by selecting the **Network Design** button that corresponds to your selection. The ULL and Basic Service network design buttons are found at the very top of the **General Plant Design Criteria-Main Cables Network** input sheet as shown below.

Edit Telstra Model Inputs	Input Category: Scenario:	Engineering - Main BLBN	Q
Network Design: 💿			

You can adjust the capacity criteria used by the model to design the main network. There are two user adjustable fill factors or capacity design criteria in the main model. Both are taken from the **Rules** document.

The **Feeder Main Cable Design Fill** is used to determine the number and size of main cables required to serve a given demand. This percentage designates the maximum level of usage that can be accommodated by any size of cable. Once this maximum is exceeded a larger cable or additional cable will be placed in the cable segment. For example, at the default 90% fill factor in the model, a 100 pair main cable can only accommodate 90 customers before a larger cable will be required (i.e. a 200 pair cable).

E

The **Multiplexing Cabinet Design Fill** factor is used, along with the multiplexing equipment maximum capacity limits, to determine the number and size of multiplexers that will be required.

Fill Factors at Optimal Engineering Design

90%	Feeder Main Cable Design Fill
90%	Multiplexing Cabinet Design Fill Factor
	• •

The next grouping of inputs identifies the **maximum haul distance for each size and type of main cable**. Once a cable run exceeds these distance parameters a new cable will need to be installed. To connect the two cables a cable joint is required. These distances determine how many of these joints will be required.

C 11 B 1	C H H H
Cable-Desid	an Criteria-Main

	Max Dist to
Cable Sizes (pairs)	Next Joint (Metres)
2400	250
1200	500
800	500
400	500
200	1000
100	1000
Caple Sizes (pairs)	Next Joint (Metres)
Cable Sizes (naire)	Next Loint (Metree)
1200	250
1200	200
800	250
800 400	250 250 500
800 400 200	250 250 500 500
800 400 200 100	250 250 500 500 1000
800 400 200 100 Fibre Cables-Main	250 250 500 500 1000 Max Dist to
800 400 200 100 Fibre Cables-Main Number of Fibres	250 250 500 1000 Max Dist to Next Joint (Metres)
800 400 200 100 Fibre Cables-Main Number of Fibres 120	250 250 500 1000 Max Dist to Next Joint (Metres) 15,000
800 400 200 100 Fibre Cables-Main Number of Fibres 120 60	250 250 500 1000 Max Dist to Next Joint (Metres) 15,000 24,000
800 400 200 100 Fibre Cables-Main Number of Fibres 120 60 48	250 250 500 500 1000 Max Dist to Next Joint (Metres) 15,000 24,000 24,000
800 400 200 100 Fibre Cables-Main Number of Fibres 120 60 48 36	250 250 500 500 1000 Max Dist to Next Joint (Metres) 15,000 24,000 24,000 24,000
800 400 200 100 Fibre Cables-Main Number of Fibres 120 60 48 36 24	250 250 500 500 1000 Max Dist to Next Joint (Metres) 15,000 24,000 24,000 24,000 24,000
800 400 200 100 Fibre Cables-Main Number of Fibres 120 60 48 36 24 12	250 250 500 500 1000 Max Dist to Next Joint (Metres) 15,000 24,000 24,000 24,000 24,000



There are currently three types of main cable in the model: normal .40 gauge; heavy .64 gauge; and fibre cables. Normal gauge main cables come in six sizes ranging from 100 to 2400 pair. Heavy .64 gauge cables range is size from 100 to 1200 pairs. Fibre cables contain between 6 and 120 fibres. The maximum haul distances are set at the length of cable that can be placed on a single cable drum.

The final category of user adjustable inputs in the main model is the **maximum distance between main pits and manholes**. The defaults for these inputs are taken from the **Rules**. Although the model allows you to adjust the maximum distance by manhole size the rules specify a maximum distance of 250 metres regardless of the size of pit or manhole that is placed.

	Max Distance
Name	Between Manholes (m)
PF28 manhole	250
PF20 manhole	250
PF12 manhole	250
PF4 manhole	250
No. 9 Pit	250

Pits, Manholes and Pillars-Design Criteria

A.4 Engineering Variables : Engineering - Distribution

a) General

Engineering - Distribution contains the key design criteria for the distribution network. These criteria are taken from the **Rules** developed by the Telstra engineering department. The **Rules** are designed to reflect the best in-use engineering practices and procedures for deploying a new ULL network. Many of these rules can be adjusted in the input sheets incorporated into the user interface to the models³. The rules and model parameters that are included in the **Engineering - Distribution** worksheet are:

- the identifier that specifies whether a tapered or non-tapered design is used in the model run (i.e. 1 designates a tapered design and 2 designates a non-tapered design);
- the distribution cable fill that is used to design the copper cable network in the distribution module;
- the range of customers per square kilometre that are used to categorise DAs by density zone;
- the maximum haul length for each size of distribution cable, which is used to determine the maximum distance between cable joints;
- the maximum allowable distance between pits in the distribution network; and
- the percentage of time that one through four customers are served from a single pit.



Changes to engineering rules require a significant time to process for a large grouping of ESAs. Sensitivity testing for the impact of changes to engineering inputs can be done efficiently by running the input changes on a single or small sample of ESAs. Once the final list of engineering inputs revisions has been decided, all ESAs can be run with the new inputs.

³ Changes to these rules or parameters should be made in the inputs sheets incorporated into the user interface to the model. Input changes made directly into this module will not flow through to the Cost Calculation Module or results.

To access the **Engineering Distribution** input sheet click on the button titled **Distribution** which is immediately below the drop down box.

😼 Telstra Cost Model
Telstra Model Inputs
Grouping Engineering Costing
Engineering Scenarios: 💈 🕂 🎽 💾
BLBN
C Main C Distribution
🐟 Generate Engineering Data 🛛 🔞

Once you have entered the **Engineering Distribution** page the following sheet appears in the **Edit Telstra Model Inputs** section of the page. Note that any item highlighted red font with blue background is a user adjustable input. There are more than 15 user adjustable input variables on this sheet. Each can be adjusted by merely clicking on the box and typing in another input variable. The default values for these inputs follow the guidelines specified in the **Rules**.

elstra Model Inputs	Input Category: Scenario:	Engineering - Distribution BLBN	_		
Distribution Design: C	🖯 Tapering 💿 I	Non-Tapering			~
<u>General Pla</u>	ant Desigr	n Criterea-Distr	ibution Network	<u>(</u>	
Distribution Desi	gn Criteria				
Fill Factors at Op	ptimal Engine	ering Design			
					=
60%	Distr	ribution Cable Engineeri	ng Design Fill		
<u>Density Range C</u>	haracteristics	-Ranges Customers / :	s <u>q. km</u>		-
Designation		From	То		
Density Range 1		4.000	And Up		
Density Range 2		1.600	3,999		
Density Range 3		800	1,599		
Density Range 4		400	799		
Density Range 5		0	399		
					_
Cable-Design Cri	iteria-Distribut	tion			_
Normal Gauge .4	40 mm Condu	ctor-Non Tapered Dist	ribution		
		May Dist to	1		
Cable Sizes	(naire)	wax Dist to			
100	(pana) i	500			
100			1		
Normal Gauge A	10 mm Condu	ctor.Tanered Distribut	ion and Buiding Termi	nal Connections	×
			<		> //

B

You will need to use the scrollbars located at the right and bottom of the window to display all of the available information on these pages. Each of these inputs will be discussed in descending order as they appear on this sheet.

b) Specific Inputs

The model provides two options regarding the design of the distribution network:

1) a tapered cable design; or

2) a non-tapered cable design.

The default scenario is specified in the **Rules** document as a non-tapered network design. Under this design, a standard 100 pair cable is used throughout the distribution network regardless of the demand on any given segment. This approach provides numerous efficiencies when installing and operating a distribution network and is the approach Telstra uses when deploying new distribution networks. Under the tapered network option the model will select the smallest size of cable that can be deployed (i.e. 10, 30, 50 or 100 pair cables) to meet the existing demand requirements based on the specified fill factor.

You designate the type of network to be modelled by selecting the **Network Design** button that corresponds to your selection. The **Tapered** and **Non-Tapered** distribution design buttons are found at the very top of the **General Plant Design Criteria - Distribution Network** Worksheet as shown below.



You can adjust the capacity criteria (i.e. fill factor) used by the model to design the distribution network. There is one user adjustable fill factor or capacity design criteria in the distribution. This factor is taken from the **Rules** document.

The **Distribution Cable Engineering Design Fill** is used to determine the number and size of distribution cables required to serve a given demand. This percentage designates the maximum level of usage that can be accommodated by any size of cable. Once this maximum is exceeded a larger cable (in the tapered network design) or additional cable (in the untapered network design) will be placed in the cable segment.

Fill Factors at Optimal Engineering Design

60%	Distribution Cable Engineering Design Fill

The **Density Range Characteristics** identify upper and lower limits for the number of customers per square kilometre for each of the density ranges. These limits are

used to group distribution areas into various categories based on customer density. This is required since the environment in which the new facilities must be placed (i.e. the types and number of manmade and natural obstacles that must be negotiated) will vary based on the customer density in a serving area. It should be noted that only the upper limit for each density group is adjustable. The lower limits are established using the upper limits for the other density zones.

Designation	From	To
Density Range 1	4,000	And Up
Density Range 2	1,600	3,999
Density Range 3	800	1,599
Density Range 4	400	799
Density Range 5	0	399

The next grouping of inputs identifies the maximum haul distance for each size and type of distribution cable for a tapered and a non-tapered network design. Once a cable run exceeds these distance parameters a new cable will need to be installed. To connect the two cables a cable joint is required. These distances determine how many of these joints will be required.

Cable-Design Criteria-Dist	ribution	
Normal Gauge .40 mm Co	nductor-Non Tapered Dis	tribution
	Max Dist to]
Cable Sizes (pairs)	Next Joint (Metres)	
100	500	
		-
Normal Gauge .40 mm Co	nductor-Tapered Distribut	- tion and Buiding Terminal Connections]
Normal Gauge .40 mm Co Cable Sizes (pairs)	nductor-Tapered Distribut Max Dist to Next Joint (Metres)	- tion and Buiding Terminal Connections
Normal Gauge .40 mm Co Cable Sizes (pairs) 100	nductor-Tapered Distribu Max Dist to Next Joint (Metres) 500	- tion and Buiding Terminal Connections
Normal Gauge .40 mm Co Cable Sizes (pairs) 100 50	onductor-Tapered Distribu Max Dist to Next Joint (Metres) 500 500	- tion and Buiding Terminal Connections - - -
Normal Gauge .40 mm Co Cable Sizes (pairs) 100 50 30	onductor-Tapered Distribu Max Dist to Next Joint (Metres) 500 500 500	- tion and Buiding Terminal Connections - - - -
Normal Gauge .40 mm Co Cable Sizes (pairs) 100 50 30 10	onductor-Tapered Distribu Max Dist to Next Joint (Metres) 500 500 500 500 500	- tion and Buiding Terminal Connections - - - - -

There is only one type of cable in the Non Tapered distribution design.

The **maximum distance between distribution pits** is also a user adjustable distribution engineering input. These inputs can vary by size of pit, however, the default inputs are taken from the **Rules** document and do not vary by size of pit.

Pits-Design Characteristics	
	Max Distance
Name	Between Pits (m)
No. 9 Pit	100
No. 6 Pit	100
No. 5 Pit	100
	•

The **number of two pair lead-ins to be served from a standard distribution pit** is also a user adjustable input. The number of pits required will is dependent on the number of customers served by each pit. Per the **Rules**, up to four two pair leadins can be served from any one pit. However, there may be times when less than four customers can be served from a single pit. The model allows you to adjust the number of times 1, 2, 3 or 4 customers will be served from a single pit. The default in the model is the maximum allowed (i.e. 4).

Calculation of the Average Number of 2-Pair Lead-ins Served from a Pit

Number of Pairs	Occurance Percentage	Weighted Pairs/Pit
Served by Pits		
4	100%	4.00
3	0%	0.00
2	0%	0.00
1	0%	0.00
Neighted Average	100%	4.00

A.5 Costing Variables : Costing - Main

a) General

The **Cost Inputs --Costs and Rules Documents** contains all the costs for the various network components required to provide the unbundled local loop. Most of these costs are taken directly from the **Access Network Modelling Costing Information** document that was assembled by the Telstra engineering department. The primary source for the costing information contained in this document was the Schedule of Rates document attached to Telstra's vendor contracts. However, in certain instances the information in the contract had to be supplemented by either contractor quotes or engineering estimates. There are more than 200 network cost inputs in this worksheet and they fall into the following general categories:

- Costs for main and distribution copper and fibre cables which include the cost for the cable, the costs for hauling cables through conduit and the costs for joining the cables;
- Costs for constructing pits and manholes;
- Costs for pillars including the pillar strips;
- Breakout and reinstatement costs incurred when constructing pits, manholes and conduit runs;
- Costs for buying and placing conduit in different terrains;
- Costs for terminating all the distribution facilities in the exchange building including the entrance facilities, cable pressurization systems and cable terminating racks and blocks; and
- Costs for building terminals and two pair lead-ins.

The **Cost Inputs - Costs and Rules Documents** also include inputs which represent network rules or plant sizing dimensions, design criteria and cost estimates. The estimates include the level of capitalized overheads, the amount of conduit placed in developer provided trenches in new estates and the amount of sharing of entrance facility cost between the interoffice and distribution network. Network dimensioning parameters include the width of the trenches for various sizes of conduit runs and the size of manholes and pits. The design criteria include the fill factors for various pieces of equipment. The estimates are based on Telstra's actual costs and/or construction experience. The dimensioning parameters and design criteria were taken from the plant specification and **Rules**.

A minimal amount of time is required to process changes to the cost and rules inputs regardless of the number of ESAs included in the run assuming no changes are made to the engineering inputs.

To access the **Costing – Main** input sheet select the **Costing** tab and then click on the button titled **Main** which is immediately below the drop down box.

🗓 Telstra Cost Model
Telstra Model Inputs
Grouping Engineering Costing
Costing Scenarios: 🛛 💈 🕂 🏋 🔳
Default
Main ○ Input Ratios ○ Capital Costs S

Once you have entered the **Costing - Main** page the following sheet appears in the **Edit Telstra Model Inputs** section of the page. Note that any item highlighted red font with blue background is a user adjustable input. There are more than 200 user adjustable input variables on this sheet. Each can be adjusted by merely clicking on the box and typing in another input variable. The default values for these inputs are generally obtained from **Rules** or the **Access Network Modelling Costing Information**.

	Input Category: 0 Scenario: [Costing - Costs Default (Default Scena r	io is Not Editable)			
Cost Inputs - Costs and Rules Documents						
				Designates Input		
General Plant Desig	<u>gn Criteria</u>				_	
Leedina Fretovica Ia	diverset. Over the sector		10.00%			
Loading Factor for Inc	direct Overneads		13.00%			
Conduit Sharing Betw	veen Main and IEN		5.00%			
_				-		
New Estates Ratio			1.00%			
Cable-Materials and Cable Cost Normal	d Placement Cost Gauge .40 mm Co	<u>s and Design Criteria</u> onductor-Main	L			
Cable-Materials and Cable Cost Normal	d Placement Cost Gauge .40 mm Co Cable Sizes	s and Design Criteria onductor-Main Material Cost	Hauling Rate	Jointing Rate	Joint End	
<u>Cable-Materials and</u> Cable Cost Normal Cable Type	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs)	s and Design Criteria onductor-Main Material Cost (per metre)	Hauling Rate (per metre)	Jointing Rate (per pair)	Joint End Cost	
Cable-Materials and Cable Cost Normal Cable Type CPIUT MB	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400	s and Design Criteria onductor-Main Material Cost (per metre) \$141.60	Hauling Rate (per metre) \$11.32	Jointing Rate (per pair) \$1.57	Joint End Cost \$60	
Cable-Materials and Cable Cost Normal Cable Type CPIUT MB CPIUT MB	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400 1200	s and Design Criteria onductor-Main Material Cost (per metre) \$141.60 \$68.50	Hauling Rate (per metre) \$11.32 \$7.04	Jointing Rate (per pair) \$1.57 \$1.57	Joint End Cost \$60	
Cable-Materials and Cable Cost Normal Cable Type CPIUT MB CPIUT MB CPIUT MB	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400 1200 800	s and Design Criteria onductor-Main Material Cost (per metre) \$141.60 \$68.50 \$47.44	Hauling Rate (per metre) \$11.32 \$7.04 \$7.04	Jointing Rate (per pair) \$1.57 \$1.57 \$1.57	Joint End Cost \$60 \$44 \$37	
Cable-Materials and Cable Cost Normal Cable Type CPIUT MB CPIUT MB CPIUT MB CPFUT MB	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400 1200 800 400	s and Design Criteria onductor-Main Material Cost (per metre) \$141.60 \$68.50 \$47.44 \$26.01	Hauling Rate (per metre) \$11.32 \$7.04 \$7.04 \$4.79	Jointing Rate (per pair) \$1.57 \$1.57 \$1.57 \$1.57 \$1.57	Joint End Cost \$60 \$44 \$37 \$27	
Cable-Materials and Cable Cost Normal Cable Type CPIUT MB CPIUT MB CPIUT MB CPFUT MB CPFUT MB	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400 1200 800 400 200	s and Design Criteria onductor-Main Material Cost (per metre) \$141.60 \$68.50 \$47.44 \$26.01 \$11.13	Hauling Rate (per metre) \$11.32 \$7.04 \$7.04 \$4.79 \$4.79	Jointing Rate (per pair) \$1.57 \$1.57 \$1.57 \$1.57 \$1.57 \$1.88	Joint End Cost \$60 \$44 \$37 \$27 \$16	
Cable-Materials and Cable Cost Normal Cable Type CPIUT MB CPIUT MB CPIUT MB CPFUT MB CPFUT MB CPFUT MBHJ	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400 1200 800 400 200 100	s and Design Criteria onductor-Main Material Cost (per metre) \$141.60 \$68.50 \$47.44 \$22.01 \$11.13 \$6.26	Hauling Rate (per metre) \$7.04 \$7.04 \$7.04 \$4.79 \$4.79 \$2.17	Jointing Rate (per pair) \$1.57 \$1.57 \$1.57 \$1.57 \$1.57 \$1.88 \$1.88	Joint En Cost \$44 \$37 \$27 \$18 \$18	
Cable Materials and Cable Cost Normal Cable Type CPIUT MB CPIUT MB CPIUT MB CPFUT MB CPFUT MB CPFUT MBHJ Cable Cost Heavy G	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400 1200 800 400 200 100 Sauge .64 mm Con	s and Design Criteria onductor-Main Material Cost (per metre) \$68,50 \$47,44 \$26,01 \$11,13 \$6,26 nductor-Main	Hauling Rate (per metre) \$11.32 \$7.04 \$7.04 \$4.79 \$4.79 \$2.17	Jointing Rate (per pair) \$1.57 \$1.57 \$1.57 \$1.57 \$1.57 \$1.88 \$1.88	Joint End Cost \$60 \$44 \$37 \$27 \$16 \$16	
Cable Materials and Cable Cost Normal Cable Type CPIUT MB CPIUT MB CPIUT MB CPFUT MB CPFUT MB CPFUT MBHJ Cable Cost Heavy G	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400 1200 800 400 200 100 Sauge .64 mm Con Cable Sizes	s and Design Criteria onductor-Main Material Cost (per metre) \$141.60 \$68.50 \$47.44 \$26.01 \$11.13 \$6.26 nductor-Main Material Cost	Hauling Rate (per metre) \$11.32 \$7.04 \$7.04 \$4.79 \$4.79 \$2.17 Hauling Rate	Jointing Rate (per pair) \$1.57 \$1.57 \$1.57 \$1.57 \$1.57 \$1.88 \$1.88 \$1.88	Joint End Cost \$60 \$44 \$37 \$27 \$16 \$16 \$16	
Cable Materials and Cable Cost Normal Cable Type CPIUT MB CPIUT MB CPIUT MB CPFUT MB CPFUT MBHJ Cable Cost Heavy G Cable Type	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400 1200 800 400 200 100 Gauge .64 mm Cor Cable Sizes (pairs) 1200	s and Design Criteria onductor-Main Material Cost (per metre) \$47.44 \$26.01 \$11.13 \$6.26 nductor-Main Material Cost (per metre) \$144.60	Hauling Rate (per metre) \$11.32 \$7.04 \$7.04 \$4.79 \$4.79 \$2.17 Hauling Rate (per metre) \$11.32	Jointing Rate (per pair) \$1.57 \$1.57 \$1.57 \$1.57 \$1.57 \$1.88 \$1.88 \$1.88 Jointing Rate (per pair) \$1.57	Joint End Cost \$60 \$44 \$37 \$27 \$16 \$16 \$16 \$16	
Cable Materials and Cable Cost Normal Cable Type CPIUT MB CPIUT MB CPFUT MB CPFUT MB CPFUT MBHJ Cable Cost Heavy G Cable Type CPIUT MB	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400 1200 800 400 200 100 Gauge .64 mm Cor Cable Sizes (pairs) 1200 800	s and Design Criteria onductor-Main Material Cost (per metre) \$141.60 \$68.50 \$47.44 \$26.01 \$11.13 \$6.26 nductor-Main Material Cost (per metre) \$141.60 \$141.60 \$141.60	Hauling Rate (per metre) \$11.32 \$7.04 \$7.04 \$4.79 \$4.79 \$2.17 Hauling Rate (per metre) \$11.32 \$7.04	Jointing Rate (per pair) \$1.57 \$1.57 \$1.57 \$1.57 \$1.88 \$1.88 \$1.88 Jointing Rate (per pair) \$1.57 \$1.57 \$1.57	Joint End Cost \$60 \$44 \$37 \$16 \$16 \$16 Joint E C \$60 \$60 \$60	
Cable Materials and Cable Cost Normal Cable Type CPIUT MB CPIUT MB CPFUT MB CPFUT MB CPFUT MBHJ Cable Cost Heavy G Cable Type CPIUT MB CPIUT MB CPIUT MB	d Placement Cost Gauge .40 mm Co Cable Sizes (pairs) 2400 1200 800 400 200 100 Sauge .64 mm Con Cable Sizes (pairs) 1200 800	s and Design Criteria onductor-Main Material Cost (per metre) \$141.60 \$68.50 \$47.44 \$26.01 \$11.13 \$6.26 nductor-Main Material Cost (per metre) \$141.60 \$104.63	Hauling Rate (per metre) \$11.32 \$7.04 \$7.04 \$4.79 \$4.79 \$2.17 Hauling Rate (per metre) \$11.32 \$7.04 \$4.70	Jointing Rate (per pair) \$1.57 \$1.57 \$1.57 \$1.57 \$1.88 \$1.88 \$1.88 Jointing Rate (per pair) \$1.57 \$1.57 \$1.57 \$1.57	Joint Enc Cost \$60 \$44 \$37 \$16 \$16 \$16 \$16 \$16 \$16 \$16 \$16 \$16 \$16	

You will need to use the scrollbars located at the right and bottom of the main window to display all of the available information on these pages. Each of these inputs will be discussed in the order they appear on this sheet.

b) Specific Inputs

The initial input section identifies certain estimates that are used to calculate costs in the model. These estimates are the indirect overhead loading factor, the level of conduit sharing between the Inter-exchange and main networks and the percentage of occurrence of new estates.

Loading Factors for Indirect Overheads cover network management, materials handling and purchasing and other construction related costs that Telstra is required to capitalise.

The **Conduit Sharing Between Main and IEN** factor reflects the amount of time that the EIN and main network share the same trench.

The **New Estate Ratio** is based on the amount of time Telstra would be able to use contractor provided trenches when it installs a new network.

General Plant Design Criterea	
Loading Factor for Indirect Overheads	13.00%
Conduit Sharing Between Main and IEN	5.00%
New Estates Ratio	1.00%



Each of the ratios and factors were derived from Telstra's actual experience and/or the opinions of experts in the respective areas.

There is an extensive list of user adjustable **main copper cable costs**. These costs vary by size and type of cable. There are six sizes of normal .40 gauge cable (i.e. 100, 200, 400, 800, 1200 and 2400). There are five sizes of heavy .60 gauge cable in the model (i.e. same sizes as normal cable excluding the 2400 pair). There are seven sizes of fibre cable ranging from 6 to 120 fibres. There are five separate costs associated with each size and type of main copper cable: **material costs;** hauling rate; joint rate; joint enclosure cost; and branch enclosure cost.

The **Material Costs** reflect the actual per metre cost for each size and type of cable.

The **Hauling Rate** is stated as a cost per metre and is the amount a contractors charge for pulling the cable through conduit.

Jointing Rate is for each pair of wires that are connected. The **Joint Enclosure** encases a joint and is required each time two cables are joined together.

An additional **Branch Enclosure Kit** is required when the joint is the result of merging two or more cable runs.

Cable-Materials and Placement Costs and Design Criteria

Cable Cost Normal Gauge .40 mm Conductor-Main

	Cable Sizes	Material Cost	Hauling Rate	Jointing Rate	Joint Enclosure	Branch Enclosure
Cable Type	(pairs)	(per metre)	(per metre)	(per pair)	Cost	(Connection)
CPIUT MB	2400	\$141.60	\$11.32	\$1.57	\$604.77	\$25.93
CPIUT MB	1200	\$68.50	\$7.04	\$1.57	\$443.87	\$25.93
CPIUT MB	800	\$47.44	\$7.04	\$1.57	\$371.52	\$22.67
CPFUT MB	400	\$26.01	\$4.79	\$1.57	\$270.93	\$21.84
CPFUT MB	200	\$11.13	\$4.79	\$1.88	\$162.82	\$17.70
CPFUT MBHJ	100	\$6.26	\$2.17	\$1.88	\$162.82	\$17.70

Cable Cost Heavy Gauge .64 mm Conductor-Main

	Cable Sizes	Material Cost	Hauling Rate	Jointing Rate	Joint Enclosure	Branch Enclosure
Cable Type	(pairs)	(per metre)	(per metre)	(per pair)	Cost	(Connection)
CPIUT MB	1200	\$141.60	\$11.32	\$1.57	\$604.77	\$25.93
CPIUT MB	800	\$104.63	\$7.04	\$1.57	\$443.87	\$25.93
CPFUT MB	400	\$53.92	\$4.79	\$1.57	\$270.93	\$21.84
CPFUT MB	200	\$26.53	\$4.79	\$1.88	\$270.93	\$21.84
CPFUT MBHJ	100	\$13.20	\$2.17	\$1.88	\$162.82	\$17.70

Fibre Cables-Main

	Number of	Material & Placing	Hauling Rate	Jointing Rate
Cable Type	Fibres	(per metre)	(per metre)	(per pair)
FNPEHJ/STD	120	\$7.28	\$3.83	\$20.19
FNPEHJ/STD	60	\$4.24	\$3.83	\$20.19
FNPEHJ/STD	48	\$5.21	\$3.83	\$20.19
FNPEHJ/STD	36	\$2.43	\$3.83	\$20.19
FNPEHJ/STD	24	\$1.86	\$3.83	\$20.19
FNPEHJ/STD	12	\$1.35	\$3.83	\$20.19
FNPEHJ/STD	6	\$0.98	\$3.83	\$20.19

The costs for each of these functions are taken directly from the **Access Network Modelling Costing Information** document.

There are similar cost inputs for **fibre cables** with the exception that instead of having a separate cost for branch enclosures the branch enclosure cost is included in a separately identified joint enclosure for cable merges. The fibre cable material costs, hauling rate and jointing rate are identified in the above inputs section. The fibre joint enclosure costs are incorporated into a separate cost matrix.

Fibre Optic Joint Enclosure-Main

Joint Enclosure
Cost
\$309.69
\$549.52
\$1,269.56
\$1,222.68
\$1,529.18
\$1,698.26

There is a similar set of user adjustable inputs for **Distribution Copper Cables**. There are four sizes of distribution cable (i.e. 10, 30, 50, and 100). Note that 100 pair cables are the only one used in the distribution network when a non tapered network design is selected. However, the other size cables will still be required for lead-ins to building terminals. Like main cables, there are the same five costs associated with each size of distribution cable: **Material Costs; Hauling Rate; Jointing Rate; Joint Enclosure Cost;** and **Branch Enclosure Cost**. The costs for each of these functions are user adjustable and the default values are taken directly from the **Access Network Modelling Costing Information** Document.

	Cable Sizes	Material Cost	Hauling Rate	Jointing Rate	Joint Enclosure	Branch Enclosure
Cable Type	(pairs)	(per metre)	(per metre)	(per pair)	Cost	(Connection)
CPFUT PE	100	\$5.56	\$2.17	\$1.88	\$130.19	\$0.00
CPFUT PE	50	\$2.95	\$2.17	\$1.88	\$130.19	\$0.00
CPFUT PE	30	\$1.96	\$2.17	\$1.88	\$130.19	\$0.00
CPFUT PE	10	\$0.82	\$2.17	\$1.88	\$130.19	\$0.00
			-	<u></u>	<u>^</u>	

Cable Cost Normal Gauge .40 mm Conductor-Distribution and Buiding Terminal Connections

There are also two inputs for costs associated with connecting 2 pair cables to the distribution network.

Cost per Wire Connection at Serving Pit-Distribution

	Cable Sizes	Connecting Wires	Joint Enclosure
Cable Type	(pairs)	(Per Pair)	Cost
PEIFLI PE	2	\$1.88	\$130.19

The model has 40 user adjustable inputs associated with the costs and dimensions for distribution and main **Pits** and **Manholes**. For each size of pit and manhole there are contractor costs for purchasing and placing the pit or manhole in normal and rocky terrain. The size of the top of each type of pit or manhole, including the excavation margins required to allow for placing each size of pit or manhole, are also user adjustable inputs. These manhole and pit dimensions are required to identify the extent of any breakout or reinstatement activity that would be required in building a new network.

Pits, Manholes an	d Pillars-Materials an	id Placement Costs a	nd Design Criteria			
Manhole Cost-Mai	in					
	Normal Placement	Rocky Placement	Width	Length	Margin on Sides	Margin at Ends
Description	Cost	Cost	(Metres)	(Metres)	Pit/MH	Pit/MH
PF28 manhole	\$20,006.12	\$24,596.70	5.15	1.80	0.20	0.20
PF20 manhole	\$11,877.73	\$14,793.32	3.86	1.73	0.20	0.20
PF12 manhole	\$6,210.52	\$7,957.56	2.90	1.38	0.20	0.20
PF4 manhole	\$4,896.56	\$6,132.60	2.60	1.24	0.20	0.20
No. 9 Pit	\$1,261.37	\$1,516.10	2.04	0.55	0.20	0.20
Pit Costs-Main an	d Distribution	Rocky Placement	Width	Length	Margin on Sides	Margin at Ends
Description	Cost	Cost	(Metres)	(Metres)	Pit/MH	Pit/MH
No. 9 Pit	\$1,261.37	\$1,516.10	2.04	0.55	0.10	0.10
No. 6 Pit	\$708.63	\$843.23	1.37	0.55	0.10	0.10
No. 5 Pit	\$254.82	\$314.21	0.71	0.46	0.10	0.10
					·	

There are costs for two sizes of **Pillars** in the model (i.e. an 1800 and 900 pillar). The costs are unloaded contractor prices for a fully installed terminal. There are also costs for the **Terminal Strips** used to attach the cables to the terminals.

Pillar Cos	sts
------------	-----

	Pillar Cost	Terminal Strips
Туре	(per unit)	(per unit)
Large	\$1,863.67	\$426.16
Small	\$1,639.10	\$286.34

When deploying a new network a company will frequently encounter roads or driveways that need to be removed (i.e. breakout) in order to dig the trench, and then replaced (i.e. reinstated) once the trench is dug. These **Breakout and Reinstatement Costs** vary by the type and thickness of material that is being removed and replaced (i.e. concrete, asphalt, pavers, sod, etc.). The model has costs for each of these breakout and reinstatement activities.

Breakout and Reinstatement Costs for Manholes, Pits and Conduits

		Breakout Cost	Reinstate Cost		
Description		(Per Sq Metre)	(Per Sq Metre)		
Concrete (< 75 mm thick)		\$60.66	\$67.55		
Concrete (75 to 100 mm thick)		\$72.33	\$85.06		
Concrete (over 100 mm thick)		\$86.29	\$94.14		
Reinforced (< 75 mm thick)		\$60.66	\$83.73		
Reinforced (75 to 100 mm thick)		\$72.33	\$106.63		
Reinforced (100 to 150mm thick)		\$72.33	\$119.47		
Asphalt (25 mm thick)		\$60.66	\$63.06		
Asphalt (50 mm thick)		\$60.66	\$78.52		
Asphalt (75 mm thick)		\$60.66	\$99.05		
Brick Pavers		\$48.61	\$64.42		
Kerbing		\$60.66	\$97.22		
Turf			\$13.50		
Average Width Breakout and Rein	statement for Trenching	Roads, Footpaths, S	Sidewalks and Drive	s (cm)-Main & Distril	6 x 100mm
Average Width Breakout and Rein	statement for Trenching 1 x 50mm Conduit	Roads, Footpaths, S	Sidewalks and Drive 2 x 100mm Conduit	s (cm)-Main & Distril 4 x 100mm Conduit	6 x 100mm Conduit
Average Width Breakout and Rein Description Width Trench-Road Crossing	statement for Trenching 1 × 50mm Conduit 22 450	Roads, Footpaths, S	Sidewalks and Drive 2 x 100mm Conduit 36	s (cm)-Main & Distril 4 x 100mm Conduit 36	6 x 100mm Conduit
Average Width Breakout and Rein Description Width Trench-Road Crossing Ave Width Replaced Footpath	statement for Trenching 1 × 50mm Conduit 22 150	Roads, Footpaths, S	Sidewalks and Drive 2 x 100mm Conduit 36 150	s (cm)-Main & Distril 4 x 100mm Conduit 36 150	6 x 100mm Conduit 50 150
Average Width Breakout and Rein Description Width Trench-Road Crossing Ave Width Replaced Footpath	tatement for Trenching 1 x 50mm Conduit 22 150	Roads, Footpaths, S	Sidewalks and Drive 2 x 100mm Conduit 36 150	s (cm)-Main & Distril 4 × 100mm Conduit 36 150	6 x 100mm Conduit 50 150
Average Width Breakout and Rein Description Width Trench-Road Crossing Ave Width Replaced Footpath	1 x 50mm Conduit 22 150 8 x 100 mm	Roads, Footpaths, S 1 x 100mm Conduit 22 150 12 x 100mm	idewalks and Drive 2 x 100mm Conduit 36 150 16 x 100mm	s (cm)-Main & Distril 4 x 100mm Conduit 36 150 20 x 100mm	6 x 100mm Conduit 50 150 24 x 100mm
Average Width Breakout and Rein Description Width Trench-Road Crossing Ave Width Replaced Footpath Description	statement for Trenching 1 x 50mm Conduit 22 150 8 x 100mm Conduit	y Roads, Footpaths, S 1 × 100mm Conduit 22 150 12 × 100mm Conduit Conduit	Sidewalks and Drive 2 × 100mm Conduit 36 150 16 × 100mm Conduit	s (cm)-Main & Distril 4 × 100mm Conduit 36 150 20 × 100mm Conduit	bution 6 × 100mm Conduit 50 150 24 × 100mm Conduit Oct
Average Width Breakout and Rein Description Width Trench-Road Crossing Ave Width Replaced Footpath Description Width Trench-Road Crossing	statement for Trenching 1 x 50mm Conduit 22 150 8 x 100mm Conduit 64 4	Roads, Footpaths, S 1 x 100mm Conduit 22 150 12 x 100mm Conduit 50	idewalks and Drive 2 x 100mm Conduit 36 150 16 x 100mm Conduit 64	s (cm)-Main & Distril 4 × 100mm Conduit 36 150 20 × 100mm Conduit 64 150	6 x 100mm Conduit 50 150 24 x 100mm Conduit 64

The model also provides user adjustable inputs for the **width of the trenches and footpaths** that will be removed and reinstated. These dimensions are necessary to ascertain the volume of the breakout and reinstatement activity that will be required when deploying conduit in different areas. There are two measurements for each type of conduit run. The first is the width of the trench that will be required to place that particular conduit configuration. This will be used when bisecting a drive, street or footpath. The second measurement is for the standard width of a footpath. When the right of way for a conduit run is directly below the footpath the whole footpath must be removed and replaced.

There are numerous **costs for constructing conduit runs**. The costs vary by the size of the conduit configuration: 1 50 millimetre (mm) conduit; 1 100 mm conduit; 2 100 mm conduits; 4 100 mm conduits; 6 100 mm conduits; 8 100 mm conduits; 12 100 mm conduits; 16 100 mm conduits; 20 100 mm conduits and 24 100 mm

conduits. Costs also vary between rocky and normal terrain and the type of trenching or boring placement techniques used.



Boring is only possible for the smaller conduit configurations (i.e. up to 2 100 mm conduits).

Costs can vary based on the environment in which the trenching is taking place (e.g. under roadways). The model has numerous user adjustable inputs to reflect all of these circumstances.

Conduit Costs including Placing	Cost-Distribution and	<u>a Main</u>				
Cost Per Metre for Placing Cone	duit Runs Including th	e Cost for Boring a	nd Trenching Lines	-Distribution and M	Чain	
		1 z 50mm	1 z 100mm	2 z 100mm	4 z 100mm	6 z 100mm
		Conduit	Conduit	Conduit	Conduit	Conduit
Description	Soil Type	(Cost/Metre)	(Cost/Metre)	(Cost/Metre)	(Cost/Metre)	(Cost/Metre)
Trench-Turf	Normal	\$23.76	\$28.50	\$36.18	\$60.30	\$93.85
Trench-Turf	Rock	\$79.79	\$95.01	\$108.38	\$145.41	\$314.11
Trench-Road Xing	Normal	\$99.53	\$133.70	\$155.77	\$183.24	\$210.00
Trench-Road Xing	Rock	\$168.76	\$180.30	\$216.49	\$243.72	\$360.00
Trench-Footpaths & Drives	Normal	\$99.53	\$133.70	\$155.77	\$183.24	\$210.00
Trench-Footpaths & Drives	Rock	\$168.76	\$180.30	\$216.49	\$243.72	\$360.00
Boring-Footpath & Drives	Normal	\$47.87	\$69.93	\$120.72		
Boring-Footpath & Drives	Rock	\$264.47	\$297.52	\$502.08		
Boring-Under Roads	Normal	\$51.59	\$76.75	\$120.72		
Boring-Under Roads	Rock	\$284.02	\$322.76	\$502.08		
New Estates-Open Trench		\$8.57	\$12.65	\$22.48		
		8 z 100mm	12 x 100mm	16 x 100mm	20 x 100mm	24 z 100mm
		Conduit	Conduit	Conduit	Conduit	Conduit
Description	Soil Type	(Cost/Metre)	(Cost/Metre)	(Cost/Metre)	(Cost/Metre)	(Cost/Metre)
Trench-Turf	Normal	\$129.62				
Trench-Turf	Rock	\$454.29				
Trench-Road Xing	Normal	\$235.00	\$260.00	\$270.85	\$342.80	\$416.63
Trench-Road Xing	Rock	\$500.00	\$734.63	\$1,051.06	\$1,358.46	\$1,792.14
Trench-Footpaths & Drives	Normal	\$235.00	\$260.00	\$270.85	\$342.80	\$416.63
Trench-Footpaths & Drives	Rock	\$500.00	\$734.63	\$1,051.06	\$1,358.46	\$1,792.14

The model has costs for two sizes of **remote multiplexers** (i.e. Alcatel CMUX AU). The large remote CMUX has a maximum capacity of 786 services and the smaller unit can handle a maximum of 384 services. These remote multiplexers are connected to a unit in the exchange building (i.e. Alcatel CMUX NU). The exchange building unit has the capacity to terminate services from seven remote units.

Costs for all of the structure required for terminating cables in the exchange building are also user adjustable inputs into the model. These entrance facilities include the **Cable Vault**, the **Main Distribution Frame (MDF)**, the **Cable Termination (MDF) Blocks** and the **Cable Racking** needed to carry the cables from the vault to the mainframe. There is also a separate cost for attaching the cables to the blocks on the main frame (**Joint Cost**). The cost for a cable vault and the associated cable rack vary by the size of the ESA (i.e. number of distribution conduits entering the office). It is assumed that a cable vault is not required if the office serves less than 12 distribution conduits. Finally there are separate inputs to identify the **Percentage** of the cable racking and vault cost that will be assigned to basic access services.

Multiplexing Systems-Costs and Design Criteria

	Cost
Type of Equipment	per System
Alcatel CMUX AU	\$87,900
Alcatel CMUX AU	\$72,900
Alcatel CMUX NU	\$39,611

Entrance Facility-Costs and Design Criteria

	Co	st Cable Vault	Cost	Cable Racking	Percent Vault	Percent Racking
Type of Equipment	p (er Exchange	pe	r Exchange	Assigned to CAN	Assigned to CAN
Up to a 12 Conduit Requirement						
13 to 23 Conduit Requirement	\$	90,000.00	\$	18,000.00	95%	95%
24 to 35 Conduit Requirement	\$	130,000.00	\$	45,000.00	95%	95%
36 or Greater Conduit Requirement	\$	180,000.00	\$	74,000.00	95%	95%
		Cost]			
Type of Equipment		per System				
Siemens MDF Block		\$168.34				
MDF Ironwork		\$2,400.00]			
I THE REAL TO DO T		£1.10	1			

The larger main cables (i.e. 1200 pair and up) are pressurised with air. An air compressor and its accessories are required to pressurize these cables. The model has costs for each one of the components of the **Cable Pressurization System**. Only one compressor and flow panel is required for each exchange building. However, certain infrastructure costs and the air access point (RTAP) costs are incurred for each cable connected to the system.

Cable Pressurisation System-Dry Air Compressor

	Contract
Dry Air Compressor Basic System	Price
Compressor & Infrastructure	\$5,000.00
Flow Panel	\$1,000.00
	Contract
Dry Air Compressor Per Cable Components	Price
Air Access Point (RTAP)	\$209.26

An **Optical Fibre Terminating Unit** is required for terminating fibre cables in the exchange building. These units have the capability to terminate up to 120 fibres. A **rack** is also required to house the optical fibre terminating unit. Each rack can accommodate up to 6 terminating units.

Termination of Optical Fibre at Exchange

		Cost
Type of Equipment	р	er System
Optical Fibre Termination Unit	\$	7,357.72
Type 92 Rack	\$	1,179.86

There is a cost for terminating large lead-ins for **Building Terminals**. The costs include the strip on which the cable is terminated and the cost for connecting the cable to that strip. The model contains a composite cost for acquiring and

installing the terminal strip and connecting the cables to those strips. There is a separate cost for each size of building terminal lead-in that is based on the cable costs identified above.



The building terminal itself is supplied by the building owner.

Size	Cost
100	\$317.57
50	\$175.17
30	\$110.00
10	\$63.22

Building Terminal Strip Cost-Installed (Includes Joint)-Terminal Provided By Owner

The model also includes a composite cost for **Lead-ins**. There is a standard flat rate per lead-in and additional rates for the cost for the lead-in cable.

<u>2 Pair Lead-Ins</u>				
Lead-in Cost Exclu	ıding Cable			
Cost of Placing Le	ad-in			
Size	Cost]		
2	\$282.91]		
Cost of Cable				
	Cable Sizes	Material Cost	Hauling Rate]
			(
Cable Type	(pairs)	(per metre)	(per metre)	

A.6 Costing Variables : Costing - Input Ratios

a) General

The **Cost Inputs – Application Ratios Used to Develop Composite Costs** sheet identifies ratios which reflect the probable occurrence of various types of placement activities when building a new network. In deploying a new network, a company would face various types of environments where facilities would need to be constructed. In dense central business districts almost all placement of conduit and manholes would occur in areas with existing concrete or pavement. In rural areas, the probability that the trenching or constructing activity would require dealing with concrete or pavement is significantly less. The ratios in the ratio input sheet are designed to reflect the actual environment in which this new construction would occur. The ratios generally fall into the following categories:

• Ratios for determining the type and thickness of concrete or asphalt that would be encountered in building facilities in different areas;

- Ratios for identifying the portion of time each type of the breakout and reinstatement activity would be required when placing pits and manholes in different areas;
- Ratios for identifying the portion of time each type of conduit placement activity (e.g. trenching and boring) would be required when placing conduit in different areas.

In determining the types of placement activities that would be encountered in placing a new network, the model needed to be able to differentiate between serving areas. It is clear that the amount of concrete footpaths and roads that would be encountered varies based on the density of the area being served. For this reason the ratios for placing pits, manholes and conduit in distribution areas are segregated into five density zones. A sixth density zone was included in the model for potential use in addressing very rural areas in Band 3. In addition, separate ratios were developed for densely populated central business districts (CBDs). By providing separate inputs for serving areas with significantly different characteristics the model is better suited to reflect the construction activities that would be required in the real world.

The model also provides separate ratios for different sizes of main and distribution conduit configurations. Again separate ratios are identified for main and distribution conduit runs within a CBD and in other urban areas. The ratios used in the model vary by the size of the conduit configuration. Exchange buildings are generally located in the densely populated downtown area of an ESA. Main conduit runs are generally small on the outskirts or fringes of the ESA and get larger as they accumulate demand as they approach the exchange building. The ratio inputs allow you to reflect the different characteristics of various portions of the ESAs along these main conduit runs.

A minimal amount of time is required to process changes to the cost and rules inputs regardless of the number of ESAs included in the run assuming no changes are made to the engineering inputs.

To access the **Costing – Input Ratios** input sheet select the **Costing** tab and then click on the button titled **Input Ratios** which is immediately below the drop down box.

🗓 Telstra Cost Model
Telstra Model Inputs
Grouping Engineering Costing
Costing Scenarios: 💈 🕂 🗡 💾
JBLBN
🗢 Main 💿 Input Hatios 🤍 Capital Costs

Once you have entered the **Costing – Input Ratios** page the following sheet appears in the **Edit Telstra Model Inputs** section of the page. Note that any item highlighted red font with blue background is a user adjustable input. Each user input can be adjusted by merely clicking on the box and typing in another input value.

os for Developing Comp eakout and Reinstatem Main Percent Applicable CBD	Doosite Placement Costs Dent Costs for Concrete a Main Percent Applicable Non-CBD 70%	Designates Inp Designates For nd Asphalt-Pir Distribur Percent App CBD
os for Developing Comp eakout and Reinstatem Main Percent Applicable CBD	posite Placement Costs pent Costs for Concrete a Main Percent Applicable Non-CBD 70%	nd Asphalt-Pir Distribur Percent Apj CBD
eakout and Reinstatem Main Percent Applicable CBD	ent Costs for Concrete a Main Percent Applicable Non-CBD 70%	nd Asphalt-Pir Distribur Percent Apj CBD
Main Percent Applicable CBD	Main Percent Applicable Non-CBD 70%	Distribut Percent Apj CBD
Percent Applicable CBD	Percent Applicable Non-CBD 70%	Percent App CBD
CBD	Non-CBD 70%	CBD
	70%	
	30%	
50%		
50%		
100%	100%	
50%	40000	
50%	100%	
50%	4000/	
	50% 50% 100% 50% 50% 100%	50% 50% 100% 100% 50% 100% 50% 100% 50% 100% 50% 100% 50%

You will need to use the scrollbars located at the right and bottom of the main window to display all of the available information on these pages. Each of these inputs will be discussed in the order they appear on this sheet.

Certain ratios on many of these input sheets are highlighted in orange. The orange designates a formula. In most instances the sum of all the factors must equal 100 percent. For instance, some form of activity will be required every time a conduit run is constructed. The formulas highlighted in orange ensure that the sum of all the factors total 100 percent. Overriding these formulas could lead to input errors.

b) Specific Inputs

There are inputs for **Breakout** and **Reinstatement** costs for six types of concrete pavement and three types of asphalt pavement in the model. Ratios were required to develop a composite cost for concrete and asphalt breakout and reinstatement. Note that these ratios do not identify the amount of time that a breakout or reinstatement activity is required. The ratios merely identify the type or thickness of concrete or asphalt that will be encountered when a road, driveway or pathway is removed and replaced. The input box below identifies the **proportion of time each thickness and/or type of concrete or asphalt will be encountered when placing pits**. There is a separate input section that is virtually identical to the one identified below that is used to calculate breakout and reinstatement costs for conduit runs.

D ii	Main Percent Applicable	Main Percent Applicable	Distribution Percent Applicable	Distribution Percent Applicable
Description	CBD	NON-CBU	CBD	NON-CBU
Concrete (< 75 mm thick)		70%		70%
Concrete (75 to 100 mm thick)				
Concrete (over 100 mm thick)				
Reinforced (< 75 mm thick)		30%		30%
Reinforced (75 to 100 mm thick)	50%		50%	
Reinforced (100 to 150mm thick)	50%		50%	
Total	100%	100%	100%	100%
Asphalt (25 mm thick)				
Asphalt (50 mm thick)	50%	100%	50%	100%
Asphalt (75 mm thick)	50%		50%	
Total	100%	100%	100%	100%

Ratios for Developing Composite Breakout and Reinstatement Costs for Concrete and Asphalt-Pits & Manholes

There are five types of environments that necessitate incurring breakout and reinstatement costs:

- concrete;
- asphalt;
- kerbing;
- pavers; and
- turf.

The following input sheets allow you to adjust the amount of each type of breakout and reinstatement activity that would be encountered when building a new network.

There is also an input box for no activity required so the total of all placement activities should be 100 percent.

In the main network there are separate ratios for each size of manhole (i.e. PF28, PF 20, PF12 and PF 4) and pit (Number 9 pit). There are also separate ratios for the central business district. As a main route approaches an exchange the customer density increases increasing the likelihood of encountering concrete, asphalt or other obstacles. The size of the manholes required also increases the closer the route is to the exchange. For this reason, separate input ratios are assigned to each size of manhole and pit along the main cable route.

Ratios for Developing Composite Breakout and Reinstatement Costs for Pits and Manholes-Main

	Non-CBD Percent Applicable	Non-CBD Percent Applicable PE 20	Non-CBD Percent Applicable DE 12	Non-CBD Percent Applicable DE 4
Type or Mainole	FF 20	FF 20	FF 12	FF 7
Breakout Concrete	60%	60%	60%	38%
Breakout Asphalt	35%	35%	35%	20%
Breakout Pavers	5%	5%	5%	5%
Breakout Kerbing				
Reinstate Turf				32%
No Activity				5%
Total	100%	100%	100%	100%

Ratios for Developing Composite Breakout and Reinstatement Costs for Pits by Density Zone-Distribution

	All Pits	All Pits	All Pits	All Pits
	Percent Applicable	Percent Applicable	Percent Applicable	Percent Applicable
Density Range	DR1	DR2	DR3	DR4
Breakout Concrete	60%	50%	30%	15%,
Breakout Asphalt	20%	25%	25%	10%
Breakout Pavers	15%	5%	5%	5%
Breakout Kerbing				
Reinstate Turf	5%	20%	40%	65%
No Activity				5%
Total	100%	100%	100%	100%



There is also a different set of placement ratios for each of the density zones for distribution cable. There are five density zones in the model with the potential to add a sixth. Each zone has its own set of input factors. In addition there is a separate set of factors for distribution networks in a central business district.

There are five separate costs associated with placing conduit in the ground:

- 1) trenching through turf;
- 2) trenching through roads;
- 3) trenching through footpaths and drives;
- 4) boring under roads; and
- 5) boring under footpaths and drives.

The model contains ratios to identify the **percentage of time each activity would be encountered** in a new build. The model contains a separate set of inputs for each size of main conduit configuration.

As laid out in the previous section, there are nine main conduit configurations running in size from one 100 millimetre (mm) conduit to twenty four 100 mm conduits.

There is also a separate set of inputs for small conduit runs in rocky terrain. In normal terrain ploughing would typically be used to place small conduit configurations under roads and footpaths. However, this option is not generally used in rocky terrain so a separate set of inputs is required for these small conduit configurations.

Ē

There is another set of inputs for placing main conduits in central business districts due to the unique nature of these areas.

Ratios of the Amount of Each Type of Conduit Placement Activity for Areas Outside the CBD-MAIN (Exception for small conduit runs in rocky terrain below)

	Main	Main	Main	Main	Main
Type of Placement Activity	Percent Applicable				
Number of 100 mm Conduits	1 X 100mm Conduit	2 X 100mm Conduit	4 X 100mm Conduit	20 X 100mm Conduit	24 X 100mm Condui
Trench-Turf	56%	56%	40%		
Trench-Road Xing	2%	2%	22%	22%	22
Trench-Footpaths & Drives	2%	2%	38%	78%	78
Boring-Footpath & Drives	20%	20%			
Boring-Under Roads	20%	20%			
Total	100%	100%	100%	100%	100*

Exception for the Alternate Amount of Each Type of Conduit Placement Activity for Rocky Areas Outside the CBD-MAIN (Small conduit runs only)

Type of Placement Activity	Percent Applicable	Percent Applicable
Trench-Turf	56%	2 × 100 mm
Trench-Road Xing	22%	22%
Trench-Footpaths & Drives	22%	22%
Boring-Footpath & Drives	0%	0%
Boring-Under Roads	0%	0%
Total	100%	100%

Ratios of the Amount of Each Type of Placement Activity Used in the Model Within the CBD-MAIN

Type of Placement Activity	Percent Applicable
Max # 100 mm Conduits	All
Trench-Road Xing	22
Trench-Footpaths & Drives	78
Total	100

There is also an extensive set of inputs for the **types of placing activities that would be encountered in distribution areas**. As with main conduit configurations, the type of placing activity varies by size of the conduit configuration. In addition, there is a separate set of ratios for each of the five distribution density zones identified in the model.

> There are seven distribution conduit configurations in the model ranging from one 50 mm conduit to twelve 100 mm conduits. Unlike main conduits, there are separate placement ratios for every density zone for each distribution conduit configuration. As a consequence each conduit configuration requires a separate matrix as shown by the examples below.



There is also a separate matrix for placing small conduit configurations in rocky terrain. Separate ratios are also provided for placing distribution cables in central business districts.

Ratios of the Amount of Each Type of Conduit Placement Activity Used in the Model for 1x50 Conduit Configurations Outside the CBD-DISTRIBUTION

<u>Normal Terrain</u>	Percent Applicable	Percent Applicable	Percent Applicable	Percent Applicable
Description	Normal DR1	Normal DR2	Normal DR5	Reserved
Trench-Turf	5%	20%	85%	100%
Trench-Road Xing	2%	2%	2%	
Trench-Footpaths & Drives	2%	2%		
Boring-Footpath & Drives	71%	56%	3%	
Boring-Under Roads	20%	20%	10%	
Total	100%	100%	100%	100%

Rocky Terrain	Percent Applicable	Percent Applicable	Percent Applicable	Percent Applicable
Description	Normal DR1	Normal DR2	Normal DR5	Reserved
Trench-Turf	5%	20%	85%	: 100%
Trench-Road Xing	22%	22%	102	
Trench-Footpaths & Drives	73%	58%	52	(
Boring-Footpath & Drives	0%	0%	02	(
Boring-Under Roads	0%	0%	02	:
Total	100%	100%	100%	: 100%

Ratios of the Amount of Each Type of Conduit Placement Activity Used in the Model for 12x100 Conduit Configurations Outside the CBD-DISTRIBUTION

All Terrain	Percent Applicable All DB1	Percent Applicable All DB2	Percent Applicable All DB5	Percent Applicable Beserved
Trench-Road Xing	22%	22%	22%	Treserved
Trench-Footpaths & Drives	78%	78%	78%	100%
Total	100%	100%	100%	100%

The final category of ratio inputs is used to ascertain the **percentage of time each type of breakout and reinstatement activity would be encountered** when trenching through footpaths, drives and streets. In other words when going through streets what is the relevant relationship between the amount of time the street was made of asphalt or concrete.

There are separate inputs for urban band two ESAs and central business districts. There are also separate matrices for main and distribution conduit runs.

Batios of Composite Breakout and Beinstatement Costs for Conduit Buns-MAIN	MAX NUMBER OF CONDUITS
Hades of Composite Dirakout and Hemstatement Costs for Conduct Hans Filling	PILITING PILICET OF CONCOUNTS

				Trenching Footpaths	Trenching Footpaths	
	Trenching Turf	Trenching Roads	Trenching Roads	& Trenching Drives	& Trenching Drives	Boring &
Description	Non CBD	Non CBD	CBD	Non CBD	CBD	New Estates
Breakout & Reinstate Concrete		15%	15%	85%	85%	
Breakout & Reinstate Asphalt		75%	75%	10%	10%	
Breakout & Reinstate Pavers		5%	5%	5%	5%	
Breakout & Reinstate Kerbing		5%	5%	0%	0%	
Reinstate Turf	80%					
No Reinstatement	20%					100%
Total	100%	100%	100%	100%	100%	100%

E

The distribution network matrix is virtually identical to the main matrix shown above.

A.7 Costing Variables : Costing - Capital Cost

a) General

The **Cost Inputs - Capital Costs and Factors** identifies all the inputs required to turn an investment amount into an annual cost. All of the inputs for determining capital costs and the direct and indirect ratios for determining operating expenses and indirect asset costs are identified on this worksheet.

The capital cost inputs include the costs for debt and equity, the debt ratio for determining the capital structure, the tax rate and the depreciation lives for each of the asset categories.

The sheet also includes expense factors for operating and maintenance expenses (expressed as a percentage of investment) and indirect expenses such as general administration and information technologies (expressed as a percentage of direct operating and maintenance expense).

There are also two sets of indirect investment ratios for network assets and general and administrative assets which are expressed as a percentage of direct plant in service.

Applying these capital and expense factors to investment derives annual and monthly capital costs.

A minimal amount of time is required to process changes to capital cost or factor inputs regardless of the number of ESAs included in the run assuming no changes are made to the engineering inputs.

To access the **Costing – Cap Cost** sheet select the **Costing** tab and then click on the button titled **Capital Costs** which is immediately below the drop down box.

🖥 Telstra Cost Model							
Telstra Model Inputs							
Grouping Engineering Costing							
Costing Scenarios: 💈 🕂 🎽 BLBN							
C Main C Input Ratios Capital Costs							

Once you have entered the **Costing – CapCost** page the following sheet appears in the **Edit Telstra Inputs** section of the page. Note that any variable highlighted red font with blue background is a user adjustable input. Each user input can be adjusted by merely clicking on the box and typing in another input variable.

Edit Telstra Model Inputs	Input Category: Costing - Scenario: Default	CapCost (Default Scenario is Not Editable)	
Cost Inputs - (Capital Costs ar	nd Factors	Telstr;^ Versic
Cost of Capital In	oputs	Designates F	ormula 🗏
	, uto		-
		Input	
Ci	ost of Equity	13.44%	
C	Cost of Debt	8.18%	
E	Equity Ratio	70.00%	
	Debt Ratio	30.00%	
	Tax Rate	30.00%	
Depreciation Inp	uts		-
	Customer Access Netv	vork	
	0.0000000000000000000000000000000000000	Life (Years)	
Ducts	and Pipes-Main	40.00	
Copper	Cables-Distribution	20.00	
Ducts &	Pipes-Distribution	30.00	
Сорр	er Cables-Main	10.00	
	Lead-Ins	25.00	
Multip	olexing Systems	10.00	
Radio	Equipment-CAN	12.00	
	Indirect Assets		
		Life (Years)	
Network Management		20.00	
		20.00	
Power Systems		12.00	

If a ratio on these sheets is highlighted in <mark>orange</mark> the ratio is the result of a calculation. In most instances, the sum of all the factors must equal 100 percent. Overriding these formulas could lead to input errors.

You will need to use the scrollbars located at the right and bottom of the main window to display all of the available information on these pages. Each of these inputs will be discussed in the order they appear on this sheet.

b) Specific Inputs

There are four **capital cost and tax inputs** into the model. These inputs include the cost of equity, the cost of debt, the debt ratio and the income tax rate. The equity ratio is also identified in the input box but it is the result of a calculation that determines the reciprocal of the debt ratio. The debt ratio, cost of equity and cost of debt were provided by Telstra's finance department and are supported by an extensive study. The tax rate is the corporate tax rate.

Cost of Capital Inputs

Cost of Equity 13.44% Cost of Debt 8.18% Equity Ratio 70.00% Debt Ratio 30.00% Tax Rate 30.00%		Input
Cost of Debt 8.18% Equity Ratio 70.00% Debt Ratio 30.00% Tax Rate 30.00%	Cost of Equity	13.44%
Equity Ratio 70.00% Debt Ratio 30.00% Tax Rate 30.00%	Cost of Debt	8.18%
Debt Ratio 30.00% Tax Rate 30.00%	Equity Ratio	70.00%
Tax Rate 30.00%	Debt Ratio	30.00%
	Tax Rate	30.00%

The **depreciation lives for each category of asset** are inputs into the model. These lives were provided by Telstra's accounting department and were based on studies of Telstra's actual asset lives. These factors are applied to the projected plant balances to determine the annual depreciation accruals.

Customer Access Network	
	<u>Life (Years)</u>
Ducts and Pipes-Main	40.00
Copper Cables-Distribution	20.00
Ducts & Pipes-Distribution	30.00
Copper Cables-Main	10.00
Lead-Ins	25.00
Multiplexing Systems	10.00
Radio Equipment-CAN	12.00
Indirect Assets	
	<u>Life (Years)</u>
Network Management	20.00
Power Systems	12.00
Network Buildings	32.00
Other Indirect (Fleet, etc.)	10.00
Information Technology	5.00
Software	5.00
Buildings	48.00
Interexchange	
	<u>Life (Years)</u>
Optical Fibre	25.00
SDH Transmission Equipment	15.00
IEN Software	5.00
Radio Transmission	16.00
Radio Spectrum	14.00
Misc. Transmission	10.00
Switching	
	<u>Life (Years)</u>
Local Switching	9.00
Switching Software	5.00

Depreciation Inputs

The model includes an **offset for sharing conduit** with other providers. A provider wishing to share Telstra's conduit can do this by leasing the conduit through commission approved lease rates. To reflect this sharing of conduit costs the model has a set of inputs to ensure these leased revenues reduce the overall cost of the distribution network. The specific inputs into model to reflect conduit sharing through leasing are the annual amount of anticipated conduit leasing revenues, the portion of the total that is attributable to leasing distribution CAN as opposed to IEN ducts and pipes and the portion of the total revenue that can be attributed to leasing facilities in band two operating areas. The default revenue value is Telstra's actual leasing revenues.

Conduit Sharing Leasing

Conduit Sharing Annual CAN Revenue	\$ 39,927,674
Percent CAN	50%
Percent Band 2	94%

The **operating and maintenance expense ratios** were developed from Telstra's actual annual expense accruals. There is a separate operating and maintenance factor for each asset category. Actual expenses were adjusted to eliminate costs that should not be recovered from the ULL rate (e.g. retail sales costs and installation charges that are recovered through separate rates). These adjusted amounts are then divided by the actual plant balance on Telstra's books for each category of expense to develop the factors. There are two exceptions to this process. For main and distribution ducts and pipes and main and distribution copper cables the denominator in the factor development is the projected investment in each of these assets as opposed to the book investment. This is necessary due to the large differential between historic and projected investment.

Customer Access Network	Base Factor		
Ducts and Pipes	0.002793		
Copper Cables	0.087735		
Multiplexing Systems	0.045093		
Other	-		
Contraction Frankramment	Dere Frieter		
Switching Equipment	Base Factor		
Switching Equipment-Local	0.037464		
Switching Equipment-Trunk	0.077557		
Switching Equipment-Other	0.034526		
Inter-Exchange Investment	Base Factor		
Inter-Exchange Cables	0.033104		
Other Cables-CAN			
Transmission Equipment	0.051134		
Radio Bearer Equipment-CAN	0.073840		
Radio Bearer Equipment	0.100515		
Other Systems and Equipment	Base Factor		
Data Equipment	0.089859		
Mobile Network and Terminating Equipment	0.023202		
Customer Equipment	0.126526		
Satellite Equipment	0.069264		
International Network-Cables	0.006601		
International Network-Other Systems	0.033127		
Other Communications Diant 9 Equipment	0.069754		

\sim	•		F +
••	x	IVI.	Factors
~	~		1 401013

There are also numerous **factors for reflecting the costs of indirect expense and investment** in the model. Indirect expenses include product management, information technology, general and administrative and other organizational costs. The factors for these costs were also based on Telstra's actual expenses. The booked expense was first adjusted to eliminate retail costs and costs which are recovered through rates other than the ULL rate. The adjusted amounts are divided by the total adjusted actual operating and maintenance expenses to derive a factor to apply to operating and maintenance expenses in the model.

	Base Facto
Product and Customer	0.1788
General Administration	0.357
Information Technology	0.3003
Accommodation & Property	0.0480
Other Non Communications Asset Costs	0.0455
Other Organizational Costs	0.0052
Indirect Asset Factors	
	Base Factor
Land	0.0019
Buildings	-
Building Improvements	0.0103
Information Technology	0.0008
Other Indirect (Fleet, etc.)	0.00621
Software	0.00579
Intangibles	0.00842
Network Support Asset Factors	Base Factor
Network Land	0.00304
Network Buildings	0.0152
Network Building Improvements	0.0005
Network Power Systems	0.0058
Network Management Systems	0.00249

Indirect assets are general purpose land and buildings, information technology assets and software and other indirect assets (i.e. fleet, intangibles). These factors were based on Telstra's actual investment in these categories of assets. Book amounts for the assets were adjusted to remove cost of retail assets and assets recovered through non ULL rates. The adjusted investment was then divided by the total book investment for direct assets adjusted to reflect the forward looking cost of copper cables and pipes and ducts. The resulting factors are applied to the projected plant in the model to derive the projected investment in these indirect assets. Capital cost factors are then applied to the modelled investment to derive annual and monthly costs for the assets.

Network support assets include network land and buildings, network power systems, network management systems and support structures. The network support asset factors are calculated using the same basic approach that was used to develop the factors for the other category of indirect assets. Adjusted book network support asset amounts were divided by adjusted total direct asset costs to derive the factors.