## New Zealand Info Systems Limited



**NODEM:** an off-the-shelf software, devloped to provide software solution for NAMS ODM Guidelines. It helps Asset Managers more informed & assist in making optimised decisions with confidence.





# **NODEM** Developer's Manual

March 2006



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## 1 A GLIMPSE OF NODEM SYSTEM

## 1.1 Interface for Developer (Object Browser)

Many types of data and operational objects can be created and maintained by the business system configurer to satisfy the business requirements from data capture, data integration, data processing, modelling to information reporting and thematic map presentation. A lot of operations and functions are provided to operate on NODEM objects to make a system without a single line of coding.



## 1.2 Interface for User (Navigation)

Navigation of data (can be list view or map view) and integration of functions can be customised to satisfy the business and user requirements for different business contexts and systems. NODEM can support as many as this kind of systems (to be exactly, sub-systems) based on one single database or different databases. Data operation can be filtered based on the user selection if required.

🔖 NIS Optimised Decision Maki	ng System: E:\Consulting\ACC\NODEMfootpath_ACC_Main.mdb	
File View Mode Tools Window I	lelp	
Footpath Navigator		
All Style Find Lkup	Timpt Tool Proc View Rpt Map	
	Carr_Way_No Carr_Way_Name Start_Name 🔼	
CASTERN BAYS CONCEPTION CONCEPTI	\$587       KEPA RD (0 - 275)       ORAKEI RD         1674       TAMAKI DR (7958 - 8041)       MAHEKE ST         1675       TAMAKI DR (7877 - 7958)       GOLDIE ST         1676       TAMAKI DR (7697 - 7877)       THE PARADE         1731       VANESSA CRES (0 - 233)       ROBERTA AVE         2375       GREENBANK DR (371 - 540)       39/41 GREE         2376       GREENBANK DR (247 - 371)       WORLEY PL         2377       GREENBANK DR (105 - 247)       8/10 GREEN         2378       GREENBANK DR (0 - 105)       NORMAN LE         2434       ALLEN JOHNSTON PL (0       GREENBANK M.         2435       APPLEYARD CRES (161       11/15 APPLE         2439       ARCHDALL ST (0 - 106)       GOWING DR         2440       ARCHDALL ST (106 - 282)       8/10 ARCHD         2441       ARCHDALL ST (282 - 377)       HOUGHTON         2442       BADEN POWEL PL (0 - 1       KORAHA ST	
	1016 item(s)	
	User: Analyst Level: Analyst Mode: Data Operation CAP	25 NUM INS 10:23

## 1.3 Interface for Analysis (Optional Interface)

Complicated modelling and analysis can be customised to the user's convenience and usability of the systems. Operations can be grouped in a logic manner, can be run in batch mode if no much user intervention needed or in step by step base, and can be tracked when operation is finished.



## 1.4 Data Manipulation and View

Data can be viewed and manipulated in default data grid format with many built-in functions in no effort.

1	NIS	S Optimised Deci	sion Making Syste	em: E:\Cons	ulting\FH\	\FH_Analysi	s.mdb					
F	ile V	/iew Mode Tools	Window Help									
	46	Johnork Summar	w On Urban/Rura	L Surface						ſ		
					AZ		اران مم 💬	-		Ŀ		
					Z + A +	🛎 🌱 🐱	old)	5				_
		Summary	Category	Year 00	Year 01	Year 02	Year 03	Year 04	Yea	ar 05		
	-	Roughness (Naasra)	: (Urban-Rural+Surfac	2.43%	2.52%	3.48%	3.89%	5.22%	5.3	7%	_	
	ŕ	Roughness (Naasra)	` (Urban-Rural+Surfac	2.25%	2.18%	2.11%	2.07%	1.96%	2.0	1%	_	
	-	Roughness (Naasra)	: (Urban-Rural+Surfac	1.12%	1.38%	0.38%	0.46%	0.46%	0.5	9%		
		Roughness (Naasra)	Urban-Rural+Surfac	4.42%	4.46%	4.54%	4.72%	4.68%	4.7	9%		
		Roughness (Naasra)	Network Total	2.36%	2.30%	2.27%	2.26%	2.18%	2.2	4%		
	Su	mmary Roughne	ess (Naasra>KPM Thre	shold)	<b>•</b>  •	Record:	1				Þ	H
ľ												
F					ser: Admin	Level: Admin	Mode: Data Adr	ninistration	CAPS	NUM	INS	11:56 a

## 1.5 Definable Data Reports

Reports in NODEM can be seamlessly integrated with Excel with data from the database. So the user can use his Excel skill to design reports and graphs to his very requirements. Designed reports can be linked external files or embedded objects within the database for portability.



## **1.6 Designable Thematic Map**

Map from external GIS system can be saved into NODEM database and link to internal data to be presented on NODEM map viewer. Thematic maps can thus be easily designed to represent the user interest. Designed thematic map can be viewed, printed or exported to feed other GIS software.



## 1.7 Definable Stored Chart for Data View

Data can be viewed (and played) through user definable charts or strip maps in a variety of mixed styles, to give the user maximised visual effects of the data condition and other information to his interest.



## 2 USER MANAGEMENT

User account for NODEM applies to NODEM software itself. In other words, it applies the same access level to all NODEM databases.

## 2.1 User Login

Login	
<u>U</u> ser Name:	Configurer
<u>P</u> assword:	******
	OK Cancel

Once user logged in, user information will be displayed in status bar.

User: Configurer | Level: Configure | Mode: Data Administration

#### 2.2 User Logout

Under Tools menu, select Log Out to log out. Log out will close the database as well

Log Out	
Login as Another User Account	
Generic Utilities	۲
Data Utilities	۲
Data Object Utilities	F
Database Utilities	۲
User Securities	۲
Options	

Logged in user can also log in as another user

#### 2.3 User Securities

Logged in user can change his password no matter what access level he has.

Tools Window Help		
Log Out Login as Another User Account		
Generic Utilities	►	
Data Utilities		
Data Object Utilities		
Database Utilities	•	
User Securities	►	Change Password
Options		Maintain User Account

User Accounts		
ADMIN Analyst aUser bUser Configurer EDITOR PowerUser VIEWER	Adiminstrator System Analyst any name b System Configurer Data Editor Power User Data Viewer	Close
Account Detail		
		_
User ID	Configurer	
User ID User Name	Configurer System Configurer	
User ID User Name Initials	Configurer System Configurer CFG	
User ID User Name Initials Access Level	Configurer System Configurer CFG	Update
User ID User Name Initials Access Level Password	Configurer System Configurer CFG	Update

User of Admin level or above can maintain user accounts added to the system, but not to the built-in user accounts.

User Account		
User Accounts		
ADMIN Analyst	Adiminstrator System Analyst	Close
aUser bUser	any name b	New
Configurer EDITOR PowerUser VIEWER	System Configurer Data Editor Power User Data Viewer	
- Account Detail		Delete
User ID	aUser	-
User Name	any name	
Initials	a	
Access Level	Admin 💌	Update
Password	*****	Cancel
Confirm Password	*****	

## 2.4 User Access Level

User Level	Description		
Viewer	Can only view data objects		
Editor	Can modify data in data object from configured (controlled) operation		
Power User	Can modify data in data object and run operations		
Analyst	Can modify definition in operation object		
Admin	Can modify data object, data in operation object and user account		
Configure	Can create, delete and modify all data objects and user account		

User access to object and operations also depends on system data access mode. For detail about user access level and types of objects, please refer to section NODEM objects

## **3 NODEM OBJECT OPERATIONS**

## 3.1 NODEM Objects

As an open platform, NODEM have many types of objects for system configurer to define to satisfy the business requirements. Following shows all the objects NODEM supports at the time of this manual is developed. Depending on purchase, the user may not have all objects available in his system.



Broadly all NODEM objects can be grouped into following types:

#### Data Object

Including table, query, form and report

#### **Operational Object**

Including sectioning, transformation, constant, variable, model, batch, analysis, chart. All operational objects are executable except constant and variable which are used inside model

#### Viewable Object

Including map and all data objects

#### Designable Object

Including table, query, form, chart, report and all operational objects

#### Executable Object

All operational objects are executable except constant and variable which are used inside model

#### **Document Object**

Text document for user logging and documentation.

#### Other Object

This refers to all objects attached to some of the above objects, including database trigger (which can only attach to table, query and form), runtime (directive) variable (which can be used in operational objects for runtime input and calculation), infowz (information wizard, which can only attach to model and batch for collecting preset runtime variables' value)

## 3.2 NODEM Object Operations

The operation available depends on type of object, system operation mode, level of user access. Broadly NODME supports a list of operations as following:

create new object
open an existing object
design an existing object
property of existing object (not supported yet)
copy an existing object
cut an existing object
paste copied or cut object
simple data graph on data object (table and data query only)
validate data object (table and data query only)
relationship of objects (not supported yet)
define database trigger on data change (table, data query and form only. Form not supported yet)
start wizard for operational object runtime (directive) variable preset value
run executable objects

## 3.3 NODEM Menu Level Functions

A list of functions in NODEM environment system menu level are supplied with NODEM. But their availability is again dependent on user level and access mode. Following are a list of functions:

File	View	Mode	Tools	Window	Help		
N	ew Dati	abase					Ctrl+N
0	pen Da	tabase/I	File				Ctrl+O
C	lose						
G	et Exte	rnal Dat	a				
In	nport D	ata Only	,				
E	xport D	ata					
D	ana Sat						
P	rinter Si	etun					
Pi	rint	ocapiii					
		h. 1					
1	: E:\Cor	nsulting	FH\FH_	Analysis.m	ndb		
2	: E:\Cor	nsulting\	ACC\N0	DEMfootp	ath_A	:C_Main.md	Ь
3	: E:\Cor	nsulting∖	NODEM	Endorse\P	Papakur	a\Ftpath.m	db
4	: E:\Cor	nsulting\	NODEM	Endorse\9	StoreW	ater\SW.md	Ь
E	xit						Ctrl+Q

#### File Menu

Create new database									
Open database or file									
Close database or file									
Import/link to external data									
Import external data									
Export internal data									
Page setup									
Printer setup									
Most recent opened data or file									

#### View Menu

Open operation log Open configured system Open object browser

#### Mode Menu

Change to View mode Change to Operation Mode Change to Admin mode

#### **Tools Menu**

Log out NODEM Log in as another user Generic utilities

Data utilities for data proc Data object utilities

Database utilities

User securities and account Genera options

View Mode Tools Wi	ndow Help
Operation Log	
Sub Systems 🔹 🕨	Network Performance Measure Achievement
Database Objects	

File	View	Mode	Tools	Window	Н	elp				
		Dat	a View							
		🖌 Dat	<ul> <li>Data Operation</li> </ul>							
		Dat	Data Administration							

Tools	Window Help		_
Log Log	Out in as Another User Account		
Ger	eric Utilities	Þ	Console Window
Dat	a Utilities	۲	View Map
Dat	a Object Utilities	۲	Display Image Play Media
Dat	abase Utilities	۱	
Use	r Securities	۲	
Opt	ions		

## 3.4 NODEM Operational Mode

There are 3 operational modes in NODEM. Depending on the user access level, some mode(s) may not be available for the user to switch over. The 3 modes are:



#### **Data Administration**

For user with access level above Analyst (ie Admin or Configure) to administer the system, data objects and operational objects, and other system functions

#### Data Operation

For user with access level above Editor to run and maintain data and operational objects to some extent. For an already configured system, it will support nearly most of the exposed operations.

#### Data View

For user with access level of Viewer and Editor. Data may be editable in controlled context (ie the operation is configured so, such as Edit function inside Navigator) for Editor even in data view mode.

A user of higher level access can limit his own operation on the system by switch to lower level of operational mode available.

#### 3.5 NODEM Object Operation Matrix

Operations depend on user access level and operational mode. Following matrix describes the relationships among user level, operational mode and type of objects.

Viewer (or Data View Mode)									
	Create	Open (View)	Open (Edit)	Design	Delete	Run	Validation		
Table		Х							
Query		Х							
Form		Х							
Report		Х							
Document	Х	Х	Х		Х				
Constant									
Variable									
Sectioning									
Transformation									
Model									
Batch									
Мар		Х							
Analysis									
Chart						Х			
Get External Data									
Import Data Only									
Data Utilities									

Data Object Utilities				
Database Utilities				
Maintain User Account				

Editor (or Data View Mode)									
	Create	Open (View)	Open (Edit)	Design	Delete	Run	Validation		
Table		Х	Χ*						
Query		Х	Χ*						
Form		Х	Χ*						
Report		Х							
Document	Х	Х	Х		Х				
Constant									
Variable									
Sectioning									
Transformation									
Model									
Batch									
Мар		Х							
Analysis									
Chart						Х			
Get External Data									
Import Data Only									
Data Utilities									
Data Object Utilities									
Database Utilities									
Maintain User Account									

\* Data can be edited only in configured context, not from data object browser.

Power User (or Data Operation Mode)									
			Open						
	Create	Open (View)	(Edit/Run)	Design	Delete	Run	Validation		
Table		Х	Х				Х		
Query		Х	Х				Х		
Form		Х	Х						
Report		Х	Х	Х					
Document	Х	Х	Х		Х				
Constant									
Variable									
Sectioning						Х			
Transformation						Х			
Model						Х			
Batch						Х			
Мар		Х	Х	Х					
Analysis						Х			
Chart						Х			
Get External Data									
Import Data Only						Х			
Data Utilities						Х			
Data Object Utilities									
Database Utilities						Х			
Maintain User Account									

## Analyst (or Data Operation Mode)

			Open				
	Create	Open (View)	(Edit/Run)	Design	Delete	Run	Validation
Table		Х	Х				Х
Query		Х	Х				Х
Form		Х	Х				
Report	Х	Х	Х	Х	Х		
Document	Х	Х	Х		Х		
Constant		Х	Х	Х			
Variable		Х	Х	Х			
Sectioning		Х	Х	Х		Х	
Transformation		Х	Х	Х		Х	
Model		Х	Х	Х		Х	
Batch		Х	Х	Х		Х	
Мар	Х	Х	Х	Х	Х		
Analysis		Х	Х	Х		Х	
Chart		Х	Х			Х	
Get External Data						Х	
Import Data Only						Х	
Data Utilities						Х	
Data Object Utilities						Х	
Database Utilities						Х	
Maintain User Account							

Admin (on Data Operation Mode)									
			Open		_				
	Create	Open (View)	(Edit/Run)	Design	Delete	Run	Validation		
Table		Х	Х				Х		
Query		Х	Х				Х		
Form		Х	Х						
Report	Х	Х	Х	Х	Х				
Document	Х	Х	Х		Х				
Constant		Х	Х	Х					
Variable		Х	Х	Х					
Sectioning		Х	Х	Х		Х			
Transformation		Х	Х	Х		Х			
Model		Х	Х	Х		Х			
Batch		Х	Х	Х		Х			
Мар	Х	Х	Х	Х	Х				
Analysis		Х	Х	Х		Х			
Chart		Х	Х			Х			
Get External Data						Х			
Import Data Only						Х			
Data Utilities						Х			
Data Object Utilities						Х			
Database Utilities						Х			
Maintain User Account						Х			

Admin (on Data Administration Mode)							
Create Open (View) (Edit/Run) Design Delete Run Validatio						Validation	
Table	Х	Х	Х	Х	Х		Х
Query	Х	Х	Х	Х	Х		Х

Form	Х	Х	Х	Х	Х		
Report	Х	Х	Х	Х	Х		
Document	Х	Х	Х		Х		
Constant		Х	Х	Х			
Variable		Х	Х	Х			
Sectioning		Х	Х	Х		Х	
Transformation		Х	Х	Х		Х	
Model		Х	Х	Х		Х	
Batch		Х	Х	Х		Х	
Мар	Х	Х	Х	Х	Х	Х	
Analysis		Х	Х	Х		Х	
Chart		Х	Х	Х		Х	
Get External Data						Х	
Import Data Only						Х	
Data Utilities						Х	
Data Object Utilities						Х	
Database Utilities						Х	
Maintain User Account						Х	

\*Additional function available for Admin to load external GIS data into database.

Configure (on Data Administration Mode)							
	Create	Open (View)	Open (Edit/Run)	Design	Delete	Run	Validation
Table	Х	X	Х	Х	Х		Х
Query	Х	Х	Х	Х	Х		Х
Form	Х	Х	Х	Х	Х		
Report	Х	Х	Х	Х	Х		
Document	Х	Х	Х		Х		
Constant	Х	Х	Х	Х	Х		
Variable	Х	Х	Х	Х	Х		
Sectioning	Х	Х	Х	Х	Х	Х	
Transformation	Х	Х	Х	Х	Х	Х	
Model	Х	Х	Х	Х	Х	Х	
Batch	Х	Х	Х	Х	Х	Х	
Мар	Х	Х	Х	Х	Х	Х	
Analysis	Х	Х	Х	Х	Х	Х	
Chart	Х	Х	Х	Х	Х	Х	
Get External Data						Х	
Import Data Only						Х	
Data Utilities						Х	
Data Object Utilities						Х	
Database Utilities						Х	
Maintain User Account						Х	

\*Additional functions available for configurer to design Trigger, run Infowz, and define subsystems (under Tools/Database Utilities/Define Sub Systems)

Please note, sometimes operations may be run implicitly at a lower level. For instance, a trigger may be run with a user of Editor level; a table may get deleted at a user of Power User level from a batch. This is to ensure the configured operation can be run smoothly with a careful design of the system configurer.

## 4 WORKING WITH TABLES

Data tables are used to keep static data in the database.

**Database Objects: Table** functionality available in NODEM to create, modify and delete the existing tables.

A list of all the Tables can be viewed in **Database Objects: Table** window.



## 4.1 Create Table

A new **Table** can be created by clicking on D button in the top menu in the **Data Objects: Table** window. **Name for Table** window allows defining the name and description of the Table.

Name for Table	
Please Enter New Name New Table	OK
Description:	Cancel
Creating New Table	

## 4.2 Design Table Structure

A new data field can be added just clicking on <u>Add Field</u> button.

Define Table Structure	
Database: C:\Program Files	s\NIS Systems\Ftpath.mdb
ID Bemove Field Add Field	General       Validation       Lookup/Transfrom       Indexes       Utility         Name:       ID       Type:       Long       Fixed Length         Size:       4       Ordinale Length       AutoIncrement         Collating Order:       1024       AllowZeroLength         Ordinal Position:       0       Required         Validation Text:       Validation Rule:       Image: Collating Collation Rule:         Data Format       Image: Collation Rule:       Image: Collation Rule:         Description:       Image: Collation Rule:       Image: Collation Rule:
Show Error Log	

The minimum definition required to create a data field include:

Name: Data Field Name Type: Data Field Type Size: Size of the Text Field Description: A Description of the field. This will be displayed in the table header when a table is opened. The examples below show the table without and with the descriptions defined

**Caption:** This defaults to the field Description above. When a data input form is generated for the table

Define Table Structure		X
Database: C:\Program File: Table New Table	s\NIS Systems\Ftpath.	mdb
ID New Field	General Validation	Lookup/Transfrom Indexes Utility
	Name: Type: Size: Collating Order: Ordinal Position: Validation Text: Validation Rule: Data Format Field Default: Description: Caption:	New_Field Single Single Fixed Length AutoIncrement AutoIncrement Required Currency O.00 New Field for Cost New Field
▲ ▲ <u>Remove Field</u> Add Field Table Usage General ▼		Cancel New Field Save New Field
Show Error Log		Close

## 4.3 Define Extended Field Properties

Other specific fields requiring definition include:

Required: If checked, the field is required entry Allow Zero Length: If checked, Text field can have zero length Validation Text: The text to display if the field fails validation Validation Rule: The rule used to validate the data when input or imported Data Format: Allow to select a data format option Field Default: The default value to apply to the field during data entry or importing

#### 4.4 Define Table Validation Rule

**Validation** function available allows to check all data in a table and prepare a list of those records which fail the validation.

Data validation Rule is defined under **Validation** tab in 'Define Table Structure' window.

The parameters used to define validation rules include:

Parameter	Available Option	Description
Importance	General Important	Importance of data in terms of validation requirement (a grouping value) Does not validate the data field Validate data field and flag the data as exceptional data

	Unimportant	Validate data field and replace missing or erroneous data with default value
Default		Default value use to update the data field value
		for unimportant data
Minimum		Minimum data applicable to the data field
Maximum		Maximum data applicable to the data field
Validation		Expression for validation (such as field value
Expression		must be in a list)
Field Visible	Yes/No	Option whether to display field in data view
Field Updatable	Yes/No	Option whether to allow to manually modify value in the data field

Define Table Structure	
Database: C:\Program Files Table New Table	s\NIS Systems\Ftpath.mdb
ID New_Field	General Validation       Lookup/Transfrom       Indexes       Utility         Importance       Important       Important         Default:       0.10       Important         Minimum:       0.00       Important         Validation Expr.       (None)       Important         Field Visible       Important       Important         Field Updatable       Important       Important
▲ ▲ <u>R</u> emove Field Add Field Table Usage General ▼	Cancel New Field Save New Field
Show Error Log	<u>C</u> lose

## 4.5 Defining Indexes for Sorting Data

The '**Indexes**' tab includes options to create indexes for sorting the data available in the table. Indexes are used to increase the speed of searches, but also result in larger files. They are not generally required except for sophisticated databases.

To create an index select **Add Index** button. The index name should be defined (without any spaces). The fields to be used for indexing should be selected from the **Available Fields** box. When selected, they appear in the **Indexed Fields** box.

There are several options to use with indexes:

**Primary:** This is the primary index

**Unique:** This ensures that the index is completely unique in the system. It is recommended that this be turned ON.

**Foreign:** Indicates that this is a secondary key linked to another table

**Required:** Data must be present. This will force the records to be populated.

**Ignore Null:** Ignores null values when creating an index. It is recommended that this be turned ON.

Once the fields have	been selected	and the i	ndex options	defined select	Save New	Index
to create the index.						

Define Table Structure		×
Database: C:\Program Files Table New Table	s\NIS Systems\Ftpath.mdb	
New_Field	General       Validation       Lookup/Transfrom       Indexes       Utility         Index 1       Add Index       Remove Index         Index Name:       Index 1       Primary         Index 1       Unique       Foreign         Indexed Fields:       Foreign       Required         Ippore Null       Index C       Ippore Null         Available Fields       Impore Null       DESC	
Table Usage General	Cancel New Field Save New Field	:
Show Error Log	Close	

## 4.6 Lookup / Transformation

The Lookup/Transformation tab is used to define lookup tables and the way in which data are transformed (summarised) from individual sections to larger or smaller sections.

Input Lookup option is used to link the field in the table to another data source.

Parameter	Available Option	Description
Lookup /Button		Allow to select an option for data lookup or
		button operation for data entry. Options to be
		displayed in <b>Data Source</b> depends on the selection
	(None)	No operation or delete old definition
	Value List	Allows to create a Value List in Data Source to be displayed for selection
	Table/Query	Select a Data Table or Query from which data will be used in Data sources
	Button Action	Assign data field with one of the actions below :
		Browse for File
		Browse or Open File
		Browse and Open File
		Open File

Data Sourco	All Tables All Queries All Tables/Queries All Fields from Tables All Objects of Type Sectioning Definition Open Object of Type Filtering Definition Enumeration Definition	Open With Load Picture Show Font Show Color Display Video Display Image Display Graph Display Table Data Display Table Data Display Query Data Display Query Data Display all tables as list of selection Display all queries as list of selection Display all queries as list of selection Display all tables and queries as list of selection Display all fields from a table (or query) named in a field of this table defined in <b>Data Source</b> Display all objects of a certain type named in a field of this table defined in <b>Data Source</b> Display sectioning definition function (for Sectioning object only) Open a object (named in a field of this table defined in <b>Object Name</b> ) of type (named in a field of this table defined in <b>Object Type</b> ) Open filter building function from a data source named in a field of this table defined in <b>Data Source</b> Open Enumeration Definition function for a field (named in a field of this table defined in Field Name) from a data source (named in a field of this table defined in <b>Object Name</b> )
Data Source		Allows to select a table or Action or Object based on the selected Lookup/Button option
Resolved Value Object Name Object Type Field Name		Define which part of the value displayed to be used Dynamically displayed caption for defining different types of button operations

Define Table Structure	
Database: C:\Program Files	NIS Systems\Ftpath.mdb
ID New_Field ▲ ▼ Bemove Field Add Field	General Validation Lookup/Transfrom Indexes Utility     Input Lookup   Lookup/Button Table/Query   Data Source   CostLookup Image: CostLookup   Resolved Value   1 - FirstPart     Transformation (as Source)   Integrating Class:   Sum   Int. Condition:   (None)   Splitting Class:   Length Wt.   Default Class:   Wt. Length 2Avg
Table Usage General	Cancel New Field Save New Field
Show Error Log	<u>C</u> lose

Transformation definitions included for the mathematical operation to be performed while summarising the data to larger or smaller sections are as follows. The options available for each field are dependent on field data types.

Parameter	Available Option	Description
Integrating		The way in which data from individual small
Class		sections will be combined to larger sections
	Avg	Average
	Count	Count
	First	First
	Last	Last
	Max	Maximum Value
	Min	Minimum Value
	Most Length	Most Length
	StDev	Standard Deviation
	Sum	Sum
	Wt Length Avg	Weighted Length Average
	Length Sum	Sum of Length
	Wt Length Sum	Weighted Length Sum
Int. Condition		Data aggregation from a list of operations and
		data definition for comparison
Splitting Class		The way in which data from larger sections are
1 3		split into smaller sections
	Same Value	Same value
	Length Wt.	Value split based on Length
Default Class	0	When there are null or missing values how
		these will be handled
	Default	Use value defined in <b>Default Value</b>
	Avg	Use average for the Link
	2Avg	Use average of 2 adjacent sections

Zero Null	Apply Zero Value Apply Null Value
Previous	Use value of previous section
Next	Use value of next section
Wt. Length 2Avg	Use length weighted average of 2 adjacent sections, ie (v1*s1+v2*s2)/(s1+s2)
2 Length Wt	Use average of rate or the two adjacent sections, ie $(v1/s1+v2/s2)*(s1+s2)/2$ Value if defined will be applied as default value during transformation if value is missing. The default value is applied only if Default value is selected as Default Class

## 4.7 Table Utility

**Default Value** 

The utility tab is used to import structure of a table. The data source could be Access, Excel, Text or dBase file. User needs to first **Select a Database** available. Then he can select a **Available Table** in the database.

Define Table Structure	×			
Database: C:\Program Files\NIS Systems\Ftpath.mdb				
Table New Table	New Table System Object			
ID New Field	General Validation Lookup/Transfrom Indexes Utility     Select a Database   C:\Program Files\NIS Systems\Ftpath.mdb   Available Tables   CostLookup Copy Structure   Available Table Fields   Vitt Add Fields   Cost Select All Fields   Copy Fld Property			
▲ ▲ <u>R</u> emove Field Add Field				
Table Usage General 💌	Cancel New Field Save New Field			
Show Error Log	<u>C</u> lose			

Various option for selection of the fields are available including :

Copy Structure: Copy the design of whole table

Available Table Fields: Allows to select individual fields available in the source table Select All Fields: This check box will select all the fields available in the source table Copy Fld Property: Applies the field property of the highlighted field of the source table to highlighted field of the current table

## 5 WORKING WITH QUERIES

Queries are extensively used by NODEM. It can be included in most of the objects including Report, Chart, Variables, Models, Batches, Analysis etc. A very user friendly query builder wizard is available to build the query.

The list of all the available queries are included in **Data Objects: Query** window.

🛞 Database Objects: Query						×
🗅 🖻 🐈 😭	Ē	a 🕹 🖻 🗙 📶 🎾	& 🕲 🐁 🗄 🛲			
6	~	Name	SQL Statement	Туре		>
	-	FT_q_5YrPrg	SELECT FT_OutputPrty.TRT_Year_High, FT	Select		-
Query		🔞 FT_q_Alternatives	SELECT FT_InputBase.FtPath_ID, FT_Outp	Select		
		🔞 FT_q_Cnd_Distr	SELECT LU_FT_UseFactor.Desc AS Footpa	Select		
<u> </u>		🔞 FT_q_Cnd_List	SELECT FT_InputBase.Road_ID, FT_InputB	Select		¥
87	~	<			>	:

## 5.1 Create Query

A new **Query** can be created by clicking on button in the top menu in the **Data Objects: Query** window. **Name for Query** window allows to define the name and description of the table.

Name for Query	
Please Enter New Name New_Query	ОК
/ Description:	Cancel
New Query Description	

## 5.2 Design Query

Data Query Builder allows to design different types of query including:

Select Query Make Table Query Update Query Append Query Delete Query

For cross table and other complex queries user can directly type sql statement in the **SQL** tab in **Data Objects: Query** window.

😮 Data Query Builder 📃 🗖 🔀			
Database Type Data Join Fields Condition SQL View			
Select Query Type			
C 01 10	Query:		
<ul> <li>Select Query</li> </ul>	New_Query		
C Cross Table Query	New Query		
C Make Table Query			
C Update Query			
C Append Query			
C Delete Query			
C Others	<u>R</u> efresh		
	Sa <u>v</u> e <u>C</u> lose		

Fields tab allows to select data fields (to be included in queries) from the existing data tables and queries.

😮 Data Query Builder	
Data Query Builder     Database Type Data Join     Table Query All     BRIDGES_FEA     BRIDGES_GE0     Carriageway     Copy of FT_OutputOpt     CostLookup     Footpath     Footpath     Footpath Rating     FT_InputBase	Fields Condition SQL View Selected Data Source
FT_OutputDetr FT_OutputOpt FT_OutputPrty FT_Programme FTg_make_Updt_Road_FEA FTg_Road_FEA	
	Sa <u>v</u> e <u>C</u> lose

Join tab allows to build relationship between the tables, if more than one tables are used in the query.

😮 Data Query Builder 📃 🗖 🔀			
Database Type Data Join Fields Condition SQL View			
Select Table Pair/Field Pair			
Select First Table for the Pair Select a Field from First Table			
Carriageway 💌 Road ID 💌			
Select Second Table for the Pair Select a Field from Second Table			
InnerJoin C Left Join C Right Join     Add to Join			
Table Joins Clear All Joins			
([Carriageway] Inner Join [Footpath] on [Carriageway].[Road ID] = [Footpath].[Road ID])			
Saus   Class			

**Condition** tab allows to build filter condition in the query, if required.

😮 Data Query Builder 📃 🗖 🔀				
Database Type Data Join Fields Condition SQL View				
Define Table/Field Criteria				
Select a Table	Footpath			
Select a Field from Table	Start(m)			
Select an Operator	>=			
Select a Value	0 List Values			
C Select Filter as Criteria —				
Select a Filter				
An	d into Criteria			
Query Condition	Clear Criteria			
([Footpath].[Start(m)] >= 0)				
	Sa <u>v</u> e <u>C</u> lose			

**SQL** tab allows to do any modifications to the SQL statement if required. Please note that any modifications undertaken in the SQL tab may not be retained, as the statement will be rebuilt if modification in any of the tabs except **View** is undertaken.

😮 Data Query Builder 📃 🗖	×
Database       Type       Data       Join       Fields       Condition       SQL       View         Select       [Footpath].[Road ID], [Footpath].[Start(m)] As [From],       [Footpath].[End(m)] As [To], [Footpath].[Material] From       [[Carriageway] Inner Join [Footpath] on [Carriageway].[Road ID] =       [Footpath].[Road ID]) where ([Footpath].[Start(m)] >= 0) Order         By       [Footpath].[Road ID] ASC, [Footpath].[Start(m)] ASC       Start(m)] ASC	
Sa <u>v</u> e <u>C</u> lose	

View tab allows to view the results of the query

8	Dat	ta Query B	uilder					
	Data	abase   Type	Data J	oin Fields	Condition	SQL 🗌	View	
		ROAD ID	FROM	TO	MATERIAL			<b></b>
	•	33	9	307	С			
		33	9	307	С			
		34	9	182	С			
		34	9	182	С			
		35	12	113	С			
		35	12	113	С			
		36	5	144	С			
		36	5	144	С			
		36	5	142	С			
		36	5	142	С			
		36	5	142	С			
		36	5	144	С			
		36	151	295	С			
		36	151	295	С			
		36	151	295	С			-
			404	400		i		
	K	Record: 1						
						Sa <u>v</u> e		<u>C</u> lose

## 5.3 Use Query

To view an existing query by highlighting the query and click 🛎 button.

To modify a query by highlighting the query and then click the button. The query builder will be displayed for required modification.

The existing query can be included in most of the objects including Model, Batches, Analysis, Reports, Charts etc. Action query (such as append, delete and update etc) can only be run by user with certain privileges and access modes.

## **6 WORKING WITH FORMS**

A versatile and easily customisable data form designing tools is available in NODEM. The Form can be used to enter the data in to the database or to provide parameters at the time of running various functionality available in the system.

 O Database Objects: Form

 D Description

 D

A list of all the Forms can be viewed in **Database Objects: Forms** window.

#### 6.1 Create Form

A new Form can be created by clicking on button in the top menu in the Data Objects: Form window. Name for Form window allows to define the name and description of the Form. Click OK to save the Name for Form.

Name for Form	
Please Enter New Name New_Form	OK
Description: New Form Description	Cancel
,	

#### 6.2 Design Form

A wizard is activated once the Name for Form is saved. Table / Query can be selected as option for the data source to be used by the Form.

🔌 Data Form Wizard	X
Current Database: C:\Program Files\NIS Systems\Ftp	ath.mdb
The Data Form Wizard will help you create a form with objects bound to a data source	Record Source Type
<u>Error Log</u>	< <u>Back N</u> ext > <u>F</u> inish

Clicking Next will open the window allowing to select the Form Layout.

🔌 Data Form Wizard		×
	Select the desired form type Form Layout Single Record Grid (Datasheet) Master/Detail	
Error Log Cancel	< <u>B</u> ack <u>Next&gt;</u> Fini	sh

Clicking **Next** will open the window for selecting data items to be included in the Form.

🔌 Data Form Wizard	×					
Record Source Footpath	Select the record source and then select fields to appear on your form.					
Available Fields: Footpath ID Start Description End Description Side Field10 Offset (Kerb)(m) Offset (LHS)(m) Offset (End - Kerb)(m)	Selected Fields: Road ID Displacement Road Name Start(m) End(m)					
Organise Record in Tab Format       Apply to Tab       Sorting         Tabs Total 3       Per Row 3       Detail        0       Tab 0       >						
Error Log Cancel <	<u>Back N</u> ext> <u>F</u> inish					

Clicking **Next** will generate a Form and open it in the Designer window view. The locations, formats or captions of the generated Form can be easily modified using available functionalities in the Designer. Closing the Form will automatically save the design of the Form.

💊 NIS Optimised Decision Making System: C:\Program Files\NIS Systems\Ftpath.mdb 🔳 🗖 🔀							
File View Mode Tools W	/indow Help						
Sector Footpath	[				×		
-			🔛 A	abi 💷 🔽			
Road ID	Text		EB 🔨 🚯		ea ا		
Displacement	Text		Properties		X		
Road Name	Text		New_Form		-		
Start(m)	Text		Basic	Advanced			
End(m)	Text		Caption	Footpath			
			Name Background Coloi 8	New_Form &H8000000F&			
			Order By				
	Level: Developer	Mode: Data Adminis	stratic /				

## 6.3 Use Form

An existing Form can be opened by highlighting the form and then click button. For modification of a Form, user may need to select/highlight the query and then click button. The Form will be opened in Designer view allowing required modifications.
The Form can be included in most of other operational objects including Model, Batches, Analysis etc. for data operation and manipulation.

# 7 WORKING WITH REPORTS

The reporting functionality in NODEM is fully integrated with MS Excel Chart functions. The Report Designer allows to extract the data from Table or Query and build a Report template using MS Excel components.

The Report template once saved will be available in **Database Objects: Report** window.

🚯 Databas	e Objec	ts: Report			
🗅 🖻 😭	B X	🖪 🗙 🔈 🐁 🕾 📾			
📑	>	Name	Description	Date	>
	_	10YrOptH	10YrOptH	30/06/2005	
Report	_	🔝 Carriageway	Carriageway	30/06/2005	
		🔝 FT_PriorityWorkProgramH	FT_Priority	1/07/2005	~
	~				>

## 7.1 Create New Report Template

A new **Report** template name can be defined by clicking on button in the top menu in the **Data Objects: Report** window. **Name for Report** window allows to define the name and description of the Report.

Name for Report	
Please Enter New Name New_Report	OK
Description: New Benort Description	Cancel

Clicking **OK** will save the **Name** and **Description** of the Report Template.

## 7.2 Design Report Template

The Report designer window can be opened by pressing  $\stackrel{\frown}{\Longrightarrow}$ .

A newly added report needs to start with a new workbook. To create a new workbook for the report, click on  $\square$  button. A workbook with a single worksheet will be created.

New_Rep	🖬 New_Report: Report 📃 🗖 🔀					
🗅 🖻 💑 🚿	🕈 🍋 🚺 Rđ	🖬 🗟 • 🎒	😭 Sheet1		-	<ul> <li>New Report</li> </ul>

The data source to be extracted to the sheet can be defined by clicking on *button*. Define **Data Source for Report template** window will be opened.

Need to click **New** to define a new data source and then enter name in **Description** box. Pressing **Update** will save the name.

Define Data Source for Report	X
General	
Data Source for Current Report	
	New
	Delete
	+
	+
Description	
New Report1	
Cancel Update	
Cancel Save	Close

The **Data Source** tab allows to select fields, available in existing Tables and Queries, to be included in the Report template.

Define Data Source for Report
General Data Source Data Output
Select Data Source 💽 Tables 🔿 Queries
Avaialbe Fields Local Name Adjustment(m) Reason Field28 Width Field31 Depth(mm) Size/Grade(mm)
Define a Criteria to Filtering Data
Output Field Name (Row Header)
Cancel Save Close

The **Data Output** tab allows to select location in the worksheet where the data are to be extracted.

Define Data Source for Report
General Data Source Data Output
Define Output Range Output Sheet Name Sheet1
Column Range (A to IV)  A
Cancel Save Close

Click Save and Close to save and close the Define Data Source for Report window.

A report can have a list of data sources, but each data source contains one data source (table or query) and one data output definition.

Refresh the data display by clicking on Refresh button. Upon a change in the data source, select the button will reflect the data change in report.

🚺 New_Report: Report 📃 🗖 🔀							
🗅 🚅 💑 💅 🐜 🏢 1 🖪 💁 🕳 😭 Sheet1 💽 🔽							
Road ID	Start(m)	End(m)	Length	Material	Area(m2)		
79	0	273	273	С	382.2		
209	0	294	294	С	411.6		
545	0	30	30	С	42		
545	0	30	30	С	42		
234	0	326	326	С	456.4		
96	0	33	33	С	46.2		
387	6	148	142	AB	184.6		
60	6	14	8	С	11.2		
198	6	155	149	С	208.6		

Report can be designed locally by pressing  $^{\checkmark}$  or in Excel by pressing  $^{\ddagger}$ .

<b>N</b>	Aicrosoft E	xcel - Book	:1				X
1	ta ta 2	I 🔁 🖄	2 🖪 🖉	Reply w	vith <u>⊂</u> hanges.		» •
8	<u>F</u> ile <u>E</u> dit	⊻iew <u>I</u> nse	ert F <u>o</u> rmat	<u>T</u> ools <u>D</u> a	ata <u>W</u> indov	v <u>H</u> elp .	- 7 ×
Aria	al	▼ 10	• B 🗄	■ % .00	•.00	🕭 - <u>A</u> -	» ▼
		à % 🗈	🛍 • 🚿	ю + сі +	Σ -	👌 100% 🛛 🗸	» •
	A1	•	<i>f</i> ∡ Road ID	)		_	
	A	В	С	D	E	F	-
1	Road ID	Start(m)	End(m)	Length	Material	Area(m2)	
2	79	. 0	273	273	С	382.2	
3	209	0	294	294	С	411.6	
4	545	0	30	30	С	42	
5	545	0	30	30	С	42	
6	234	0	326	326	С	456.4	
7	96	0	33	33	С	46.2	
8	387	6	148	142	AB	184.6	
9	60	6	14	8	С	11.2	
10	198	6	155	149	С	208.6	-
<b>H</b> 4	H ← → H Sheet1 / · · · ·						
Dra	Draw 🔹 😓 🛛 AutoShapes 🔹 📐 🔌 🗔 🔿 🎒 🤌 🗸 🚄 🗸 🗮 💣 💙						
Selec	t destination	anc					



Save the report template by selecting **File /Update**.

R 1	hicro	osoft Excel - Book1
D	<b>2</b>	🖬 🔒 🔁 🎒 🗟 🖤 🕺 🛍 🛍 • 🚿 🗠 • 🤉
1		🚵 🖾 🐚 😥 🖏 😥 式 Reply with Changes
8	Eile	Edit View Insert Format Tools Chart Window
1	D	New Ctrl+N
С	<b>2</b>	Open Ctrl+O
		⊴lose
		UpdateCtrl+S
		Save Copy <u>A</u> s
	<b>e</b>	Save as Web Page
		Save <u>W</u> orkspace
	1	Searc <u>h</u>
_		We <u>b</u> Page Preview

Close the MS Excel. This report template is now saved in NODEM database.



## 7.3 Use Report Template

To use a Report Template, select the report in the **Database Objects: Report** window and press  $\stackrel{\frown}{\longrightarrow}$ . This will open the Report in a preview mode. If the report needs to be printed or data to be extracted, open the Report in MS Excel format by pressing  $\stackrel{\frown}{\longrightarrow}$ .

Generally Reports are opened from Navigator or Analysis. The functionality available in Subsystem and Analysis objects allows to include the Report Templates.

## 8 WORKING WITH USER DOCUMENTS

User documents refer to working notes the user write down in the working process or period using NODEM system. It is not a document management system used to manage and control access to different types of documents (which can be easily implemented through NODEM)

All available user document set can be viewed in **Database Objects: Document** window.

🚯 Database Ol			
D 🛩 🖻 🐰	🗈 🗙 🛛 🐁 💱 🏥 💼		
RA	Name Name	Description	Date
	-		
	<		>

### 8.1 Create Document

To create a new document, select

Name for Document	
Please Enter New Name Test Document	ОК
Description:	Cancel
A simple text	

Once a document is created, it can be open for view or modification by selecting  $\stackrel{\text{\tiny CP}}{\longrightarrow}$ . User document is more useful for information tracking rather than editing. User can use other software such as **Word** to do the documents and then copy through and save inside the database.

👌 Test Document: Document	
	• B I
Create Document	
To create a new document, select 🗅	
Name for Document	
Please Enter New Name New_DocumentSet	
Description: Cancel	
Once a document is created, it can be open for view or by selecting 🏁	modification
Close	Save

## 8.2 Use User Document

User document can be included in other operations for display and modification.

## 9 WORKING WITH CONSTANTS

Constants in NODEM is used when certain parameter can be given global default value for a parameter.

All the available constants are kept in **Database Objects: Constant** window.

😵 Database Objects: Constant 📃 🗖 🔀						×
🗅 📂 😭 🗉	۵ ۵	🖪 🗙 🖓 🖣				
<b>A</b>	^	Name	Value	Data Type	Date	^
		C TC_IMP	IMP	Text	20/04/2005	-
Constant		OTC_MJR	MJR	Text	20/04/2005	
		n DC Modium	Modium	Tod	20/04/2005	<b>_</b>
~	$\sim$	<			>	

### 9.1 Create Constant

Name for Constant				
OK				
Cancel				

① New_Const	ant: Constant 🛛 🛛 🔀
Constant Name	New_Constant
Constant Name	Nw Constant Description
Data Type	▼ Size
Value	
	Save Close

Click Save to save the constant once defined.

## 9.2 Use Constant

Constant can be used as part of Variable and Model definitions.

## **10 WORKING WITH VARIABLES**

🔞 Database Objects: Variable 📃 🗖 🔀							×
🗅 😅 😭 🎙	<b>≥</b> %	🗈 🗙   🎭   🖭	0- 0-0- 0- 0-0-				
<b>3</b> 35	^	Name	Description	Category	Initialisation		^
AC		🆧 FT_ImpFactor	Importance Factor	Expression	LOOKUP('LU_	Suburb',[Sub	-
Variable		Reference Factor	Usage Factor	Expression	LOOKUP('LU_	FT_UseFact	
		B FT Settlement			<u>n</u>		~
	~	<				>	:

## **10.1 Create Variable**

A new Variable can be defined by clicking on D button in the top menu in the Data Objects: Variable window. Name for Variable window allows to define the name and description of the Variable.

Name for Variable	
Please Enter New Name New_Variable	ОК
Description: New Variable Description	Cancel
Intern variable prescription	

Clicking  $\mathbf{OK}$  after entering the Name and Description will open the Variable Definition window.

🖧 New_Var	iable: Variable 🛛 🔀
Name	New_Variable
Description	New Variable Descriptio
Data Type	Single Size 4
Variable Life	Persistent
Initialisation	{x}
Definition	*
Minimum	Maximum Default
User Category	💌 🕅 Reset Variables
	<u>S</u> ave <u>C</u> lose

The following parameters need to be defined for each variable:

Data Type		Variable data type
Variable Life	Persistent	Value or the variable will be saved as output
	Volatile	Value of the variable will exist in memory only

Initialisation	Expression used by Initialise command	
Definition	Expression used by Definition command	
Minimum	Minimum value possible. If the data generated for the variable is less than this minimum value, this minimum value will be applied.	
Maximum	Maximum value possible. If the data generated for the variable is less than this maximum value, this maximum value will be applied.	
Default	Default value will be applied when the value generated by this variable is null.	
Category	User defined category of variables for grouping (view) only. The possible value can be Expression, Filter, Input, Intervention, Treatment etc	

## **10.2 Define Variable Expressions**

**Expression Builder** is available for both **Initialisation** and **Definition** Variables.

Expression Builder	
<pre>Str([Footpath].[Road ID]) +"-"+Str([Footpath].[Start(m)])</pre>	
	X
	<i>-</i>
	***
+ - * / ^ = > < >= <= <> And Or Not Is Like () ( )	t
🕂 Tables	_
🗄 📲 🥨 Queries	
Constants	
🖌 🦓 Variables	
Σ Functions	
Operators	
Internal Variables	

### **10.3 Define Resets for Reset Variables**

**Resets** are required when the data for a given asset component has to be updated if the condition defined by the expression is true. A typical example is reseting the condition of pavement surface is when a maintenance treatment is applied.

Reset button is enabled, when **Data Type** is 'Boolean' and **Reset Variables** option is checked.

🖧 New_Tre	atment: Variable 🛛 🔀
Name	New_Treatment
Description	
	<u></u>
Data Type	Boolean Size 1
Variable Life	Persistent
Initialisation	.T. {x}
Definition	[Footpath Rating].[Cracked] >5
Minimum	Maximum Default
User Category	Treatment 🔽 Reset Variables
	Image: Non-State     Image: Non-State     Image: Non-State       Reset     Cancel     Save     Close

Clicking the Reset button will open the Variable Reset Definition window.

Reset Definition for Variable New_Treatment	
Reset Definitions	•
Reset Variable Reset to Using	
	+
	<b>.</b>
Edit Reset	
Reset Variable	
Reset To (Object Type)	
Using (Object)	
	1
<u>Option</u> <u>Cancel</u> Save <u>Clos</u>	e

To add a Reset Definition click on <u>at the right hand side of</u>. A new line with <u>Reset Variab...</u> will appear.

S Variable Reset Definition						
Reset Definition for Variable New_Treatment						
Reset Definitions						
Reset Variable Reset to Using						
New_Variable Value 2	*					
Reset Variab To Type Using	<u> </u>					
	+					
1						
Edit Reset						
Reset Variable New_Variable	<b>•</b>					
Bacat Ta (Object Tupe) Value						
Reset To (Object Type) Value						
Using (Object)	<u> </u>					
Option Cancel	Save Close					

Need to select the variable to be reset using drop down menu of **Reset Variable** combo box. The optional object types available for Reset in Reset To (Object Type) combo box include:

Reset To (Object Type)	Description
Variable	Allows to select from a Variable (defined in the database)
	from Using (Object) box
Variable (Expression)	Allows to select from a Variable defined as Expression in
	Category (defined in the database) from Using (Object)
	box
Constant	Allows to select from Constants (defined in the database)
	from Using (Object) box
Value	Allows to define absolute value as Reset in Using (Object)
	box
Expression	Allows to define expression as Reset in Using (Object) box
То Туре	Default value to be replaced (enetered)

More than one variable can be defined for Reset. Click **Save** to save the Reset Definitions.

### 10.4 Use Variables

Variables are used in Models for data processing.

# 11 WORKING WITH RUNTIME (DIRECTIVE) VARIABLES

Runtime variables can be used inside models, batches and triggers where they are simply defined in-line with other definitions. Runtime variables are mainly used for gaining user input, confirmation and some preliminary calculations before or during object execution.

## **11.1 Types of Runtime Variable**

Runtime variables can be broadly classified as 3 types: input, output and calculation.

### Input Variables

There are certain 12 types of user input variables. But they can be grouped into 5 types as following:

- <u>Textbox</u>, to gain single user input. Including InputTextBox, InputFileFolder, InputFileOpen, InputFileSave
- <u>Combobox</u>, to gain single input from a list of selections. Including InputComboBox, InputObjectComboBox, InputFieldComboBox
- Listbox: to gain multiple input from a list of selections. Including InputListBox, InputObjectListBox, InputFieldListBox
- Checkbox: to gain multiple choices from a list of selections. Including InputCheckBox only
- Confirmation: to gain confirmation (and a selection from a few choices). Including InputConfirmation only.

### Input Calculations

Variables for calculation without saving. Including only 1 type – InputCalculation

### **Output Calculations**

Variables for calculation and output to destination data table. Including only 1 type - OutputVariable

Output variables can only be used inside trigger definition.

## **11.2 Define Runtime Variable**

Runtime variable is in-line definition inside object (model, batch or trigger) etc. Format for defining runtime variables is the same for all types of object, although the head may slightly different. Following are the definition format for runtime variables

ID	Operation	ObjType /ObjectType	ObjName /ObjectName	Param /Parameter	FldName /Parameter2	Open	Comment	Included	InclAtRunT
Order	InputFileFolder	Prompt	Variable	(Empty)	Default	(No action)	comment	True/False	True/False (exp or var)
1	InputFileFolder	Please select the RAMM Unload Folder	Loc	(File Pattern if InputFileOpen/Save)	Default			TRUE	
Order	InputComboBox	Prompt	Variable	(Empty)	Default	(No action)	comment	True/False	True/False (exp or var)
2	InputComboBox	Define Analysis Area	Ward	Select Ward from qry_Suburb	HOBSON			TRUE	
Order	InputListBox	Prompt	Variable	(Empty)	Default(s)	(No action)	comment	True/False	True/False (exp or var)
3	InputListBox	Select Analysis Area(s)	Ward	Select Ward from qry_Suburb	HOBSON			TRUE	
Order	InputCheckBox	Prompt	List of Variables	(Empty)	Defaults	(No action)	comment	True/False	True/False (exp or var)
4	InputCheckBox	Define Optimisation Operations	<i>Organise Data,Transpose Data,Calc NPV,Optimise</i>		0,0,0,1			TRUE	

ID	Operation	ObjType /ObjectType	ObjName /ObjectName	Param /Parameter	FldName /Parameter2	Open	Comment	Included	InclAtRunT
Order	InputConfirmatio n	Variable	VariableName	Expression (definition)	Default	Open to define	comment	True/False	True/False (exp or var)
5	InputConfirmation	Variable	DelOldData	IF(@FWP Section@=0, 'All data will be transposed, but you may want to prepare data for current year (@BaseYear@) only. Select Yes for current year only; No for all years; Cancel to stop the processing.',1)				TRUE	

Input Calculation Variables

ID	Operation	ObjType /ObjectType	ObjName /ObjectName	Param /Parameter	FldName /Parameter2	Open	Comment	Included	InclAtRunT
Order	InputCalculation	Variable	VariableName	Expression (definition)	Default	Open to define	comment	True/False	True/False (exp or var)
6	InputCalculation	Variable	Ins_Sect	Lookup('mSysSQL', 'Ins_Sect', 'SQLStatement')			global generic	TRUE	

### **Output Calculation Variables**

ID	Operation	ObjType /ObjectType	ObjName /ObjectName	Param /Parameter	FldName /Parameter2	Open	Comment	Included	InclAtRunT
Order	OutputCalculatio n	Variable	VariableName	Expression (definition)	Default	Open to define	comment	True/False	True/False (exp or var)
7	OutputCalculatio n	Variable	Naasra_Pred_03	@A1@*([Naasra_Pred_02]) ^@A2@+@A3@				TRUE	@Surf_Age_ 03@=0 And @DoCalc@

## **11.3 Use Runtime Variable**

Runtime variables are directive definitions, so they are resolved on the fly. This determines their scope of usage.

#### Use Runtime Variables in Model

Model execution can be broken into a few steps:

- Initialising Model Operations (parse model definitions)
- Executing Model Definitions (parse variable definition and precompile models)
- Run other dedicated operations (such as optimisation etc)
- Runtime variables can only be used in the model initialisation stage.

#### Use Runtime Variables in Batch and Trigger

Since all operations in batch and trigger are simply calculation on the fly, runtime variables can be used throughout the whole object definitions.

#### Format to Use Runtime Variables

Runtime variables are simply defined with a variable name (a string per standard naming convention). But to use it, variable name will need to be delimited with @, make it as @VarName@.

Here are some points to be careful of:

- Output variables can only be used inside triggers
- Input variables should normally used inside batches or models only
- Except model, normal variables and constant cannot be used within object definitions
- Expression definition for variables is the same for all objects no matter defined inline within objects or as normal variables

Since runtime variables can be used to build any strings or statement, necessary delimitation with quotes or type cast will need attention as well.

### 11.4 Interface for Getting User Input at Runtime

#### Input Text Box

Please Input Base Year	
Please Enter a Value : BaseYear	ОК
2005	Cancel

### Input File Folder/Open/Save



## Input File Locator

Please select p	reliminary FWF	9 Data			? 🛛
Look in:	Exports		•	← 🗈 💣 💷-	
My Recent Docktop Desktop My Documents	<ul> <li>123.txt</li> <li>123.xls</li> <li>Abc.txt</li> <li>Abc.txt</li> <li>Ccc.txt</li> <li>FWP.txt</li> <li>Model.xls</li> <li>Schema.ini</li> <li>test1.xls</li> <li>test3.xls</li> <li>test5.xls</li> <li>test1.xls</li> </ul>				
	File name:	teset1.xls		•	Open
My Network Places	Files of type:			•	Cancel
1 10000		Open as read-only			/

### Input Folder Locator

Browse for Folder	<
Please select the RAMM Unload Folder	
Exports ConterInfo RAW_RAMM_Data	
inal0405 inal0	
HDC	
OK Cancel	

## Input Combo Box

Define Analysis Area	
Please Make Your Selection: Ward	ок
HOBSON	Cancel

Input Check Box

Define Optimisation Operations
Please Make Choices ☐ Organise Data ☐ Transpose Data ☐ Calc NPV ✓ Optimise

#### Input List Box

Define Analysis Area	
Please Make Your Selection: Ward AVONDALE-ROSKIL EASTERN BAYS DEDEN-ALBERT GULF-RAKINO GULF-WAIHEKE WHOBSON	OK Cancel

### **Input Confirmation**

NIS Opti	imised Decision Making System
?	All data will be transposed, but you may want to prepare data for current year (2005) only. Select Yes for current year only; No for all years; Cancel to stop the processing.
	Yes No Cancel

## 11.5 Preset Runtime Variable Value

Input runtime variables, except InputConfimration variables, can be preset through Info Wizard and thus bypassed from user intervention during object execution. This is particularly useful for customisation of general model definition and some batch operation.

For detail, please refer to section Working with Info Wizard.

## **12 WORKING WITH MODELS**

Models are used to carry out data calculation and processing. The possible use of Models could include:

- Predictive Modelling
- Optimisation
- Running templates
- Data calculation

All available models are listed in the Database Objects: Model window which is opened by clicking Model in the left hand box of the Database Objects window

## 12.1 Create Model

To create a new model, select **Model** in the Left hand side box of Database Objects window and then click in the drop down menu of the Database Objects window.

🚯 Database O	jects: Model	
🗅 📂 😭 🖣	👗 🖻 🗙 📝 🎄 🕲 🕒 🔚	
Model	FTm_Build_MCAData2     FTr_     FTm_CalculateMCA     G FTs_     FTr_RiskAnalysis	RiskData _Deterioration _Optimisation
	< <	>

User should give unique model name when a window Name of Model appears.

Name for Model	
Please Enter New Name New Model	OK
Description: New Model Description	Cancel
,	

If similar model is available user can create a new model by copying an existing model using and then the can modify the models as required.

## 12.2 Define Model

A model definition window can be opened by selecting (highlighting) a model from the model list, and then clicking button on the top menu. It can be opened by simply double clicking the model name as well.

1	New N	Aodel: Mo	del								
		III - 🗈	. 8 /	/ 🖻 🕺 I	🖥 🗙   🗠   🖬 📗			VJ	X 🗉 🛤	🍾 🖛 🗂 :	r S
	I	Operation	n	ObjType	ObjName	Param	FldName	Open	Comment	Included	InclAtRunT
*											
M	<b>∢</b> Re	cord: 0									H I

User needs to define various operations in the model table. The columns/fields included in the table include.

Table	Operation Parameter/		Comments				
Caption	Variables	Values					
ID	The operation identifier and in this sequential order (duplicates allowed).						
Operation	Allows selection of ava	ilable operations in t	the operation library.				
ObjType	Allows selection of the	following object typ	e for operation:				
	Table		Allows to select a table				
	Query		Allows to select a query				
	Variable		Allows to select a variable				
	Constant		Allows to select a constant				
ObjName	The list of the predefined by <b>ObjType</b> objects will be available in the dropdown						
-	menu for selection						
Parameter	Allows to enter SQL statement as filter or for executing certain operation						
FldName	Allows to select a field	from table or query	defined by ObjName				
Open	Allows to open the give	en object defined by	ObjName				
Comment	Any comments related	to the operation					
Included	Whether or not to include the operation in the model run						
	0		Skip this operation				
	-1		Include this operation				
InclAtRunT	Whether or not to include the operation in run time						

#### List of Operations related to ODM process

General Operation	าร			
LookupData	Table/Query to be used for lookup			
Initialise	Variable	Calculate the expression defined as <b>Initiation</b> expression of a given variable		
Calculate	Variable	Calculate the expression defined as Calculation expression of a given variable		
Loop function				
LoopStart	Table/Query Or LoopVar	Defines parameter used by the loop		
LoopEnd		End of the loop		
IfStart	Boolean Variable	Boolean variable. Block if start		
ElseStart		Block else start		
IfEnd		Block if end		
SkipOn	Boolean Variable			
BreakOn	Boolean Variable			
FilterOn	Boolean Variable			
Specific Operation	ns related to Predictive m	odelling and alternatives generation		
InputData	Table/Query	Defines the name of source data table or query		
OutputData	Table	Defines the name of table where the output data to be written		
MaximumAlternativ	es MaxNum	Maximum number of strategies		
AllowDoNothing	0/-1	Do nothing strategy		
ClearReset		Clear resetting for next calculation		

LoadReset	Load reset for strategy generation
NewUpdate	Add a record and Save
Update	Save the current record
WriteReset	Save the generated stragety
Reset	Do reset operation
Specific Operation Related to Prioritisation an	d Optimisation Functions
PriDoPrioritisation	Run Prioritisation Routine
OptOrganiseData	To run data organisation process as
	part of Optimisation process
OptTransposeData	To run data organisation process as
	part of Optimisation process
OptCalculateIBC	To Calculate IBC
OptDoOptimisation	To undertake final optimisation

For more model related statements, please see section **System Built-in Statements** 

### 12.3 Test Model

For testing of the model user can open the Operation Log window by selecting **View / Operation Log**.

File	View	Mode	Tools	Wi	ndow	Help
	Operation Log				del	
B	Sut	Sub Systems			XI	18
	Da	atabase Objects)			e	<b>/</b> 01

Example of a blank operational log window is given below. User can empty the messages from the previous operations by clicking on **Empty Log** window. Similarly the messages can be saved to an external file for future references using **Save** button.

🔓 Operation Log	
Empty Log	Close Save

To execute the model, click on *b* button on the top menu. The operations executed and any error message will be logged and displayed in the operation log window. For debugging purpose, the user can change the statement to ShowMessage, then values or expression can be displayed in operation log.

## 12.4 Use Model

Models are generally included in **Trigger**, **Batch or Analysis** objects or in sub system navigator to be used for various procedures.

## **13 WORKING WITH BATCHES**

Batch object in NODEM is used to run a number of operations as a batch, normally without too many user interventions. Runtime user input may required inside batch as well to increase the flexibility of batches.

### 13.1 Create Batch

To create a new batch, select **Batch** in the Left hand side box of Database Objects window and then click in the drop down menu of the Database Objects window.

🚯 Database Objec	ts: Batch		
🗅 🛩 😭 🖷 🐰	💼 🗙 📝 🖧 V	<u>دهم محمد محمد م</u>	
Batch	Name	Description	Date
×	<	1111	

User should give a unique name for the Batch when a window **Name of Model** appears.

Name for Batch	
Please Enter New Name New_Batch	OK
Description: New Batch Description	Cancel

## 13.2 Define Batch

A batch definition window can be opened by selecting (highlighting) a Batch available in Batch list window, and then clicking button on the top menu. It can be opened by simply double clicking the Batch name as well.

ø	New_B	latch: Batc	h							
		<b>Ⅲ</b> •   <b>△</b> , e	5   🖊   Ba	% <b>ඬ</b> X   ≤	) 🖪 🗐		₹↓ Z↓	I 💱	8	# % 🗝 🕾
	ID	Operation	ObjectType	ObjectName	Parameter	Parameter2	Open Con	nment	Included	InclAtRunT
*										
	8									
	4 0	1.0								× [ 11
	Rec	ora: U								P PI

Table	Operation	Parameter/	Comments	

Caption	Variables	Values			
ID	The operation identifie	r defined	by an Inte	eger (Duplicate allowed) . The operations	
	are executed in ascending sequential order based on number defined in this				
	column				
Operation	Allows selection of the	available (	operations	in the operation library.	
	Open				
	Run				
	Delete Object		Delete ar	n Object	
	Delete Data		Delete da	ata in a table or query	
	Join		Join Tabl	e or Query	
	Validate		Run Valio	dation object	
	Export		Export da	ata	
ObjType	Allows selection of the following object type for operation:				
	Table		Allows to	select a table	
	Query		Allows to	select a query	
	Form		Allows to	select a form	
	Report		Allows to	select a report	
	Document		Allows to	select a document	
	Sectioning		Allows to	select a Sectioning	
	Transformation		Allows to select a Transformation		
	Batch		Allows to	select a Batch	
	Model		Allows to	select a Model	
ObjName	The list of the predefined by <b>ObjType</b> objects will be available in the dropdown menu for selection				
Parameter	First parameter for a	an operati	on. Norm	ally a SQL statement as filter or for	
	executing certain opera	ation			
Parameter2	Second parameter for an operation. Normally default value, file name etc				
Open	Allows to open the given object defined by ObjName				
Comment	Any comments related to the operation				
Included	Whether or not to include the operation in the model run				
	0			Skip this operation	
	-1			Include this operation	
InclAtRunT	Whether or not to inclu	ide the op	eration in	run time	

# 13.3 Test Batch

For testing of the model user can open the Operation Log window by selecting **View / Operation Log**.



Example of a blank operational log window is given below. User can empty the messages from the previous operations by clicking on **Empty Log** window. Similarly the messages can be saved to an external file for future references using **Save** button.

🗟 Operation Log	
Empty Log	CloseSave

To execute the Batch, click on  $\checkmark$  button on the top menu. The operations executed and any error message will be logged and displayed in the operation log window.

## 13.4 Use Batch

Batches are generally included in **Analysis** objects to be used for various procedures.

## 14 WORKING WITH ANALYSES

Analysis object in NODEM is used to organise complex modelling and analysis in logic order and execute in a step by step base. Any type of object can be included, from data object (for view or data entry), through data modelling and analysis to output presentation (reports graphs and maps).

A typical analysis at run time is as following.

💝 Model Analy	rsis 🛛 🔀
NIS Opt	imised Decision Making System
NPM	Network Performance Management  Loading Data  Loading RAMM Unloads  Loading Preliminary FWP Data  Loading Other Data  Validating Data  Validating Lookup Data  View/Edit NPM Setup  View/Edit NPM Setup  View/Edit NPM Setup  View Data View Data  View Result Reports And Graphs
Execute Reset Check	Comment:

# 14.1 Create Analysis

To create a new batch, select **Analysis** in the Left hand side box of Database Objects window and then click in the drop down menu of the Database Objects window.



User should give a unique name for the Analysis when a window **Name for Analysis** appears.

ОК
Cancel

### 14.2 Define Analysis

An analysis definition window can be opened by selecting (highlighting) an Analysi

available in Analysis list window, and then clicking button on the top menu. It can be opened by simply double clicking the Analysi name as well.

ø	🖻 NPM: Analysis						
	🔚   🎟 •	🖪 (	💁   🖊   🖻 🐰	🖻 🗙   🕫   🖬			V 😵
	Order	Level	Caption	Operation	ObjectType	ObjectName	Paramel 🔺
►	10	1	Loading Data	Description			
	20	2	Loading RAMM Unloa	Run	Batch	Load RAMM Unloads	
	30	2	Loading Preliminary F	ImportData	Table	FWP	<b></b>
◄							•
K	Record:	1					<b>I</b>

Table	Operation	Parame	ter/	Comments	
Caption	Variables	Values			
Order	The sequential order for	or building	analysis i	nterface	
Level	The indentation level w	hen displa	ау		
Caption	The caption for an oper	ration on c	dispaly		
Operation	Allows selection of the	available o	operations	in the operation library.	
	Description		Used for	display a group of operations	
	Open		Open dat	ta object	
	Run		Run oper	rational object	
	Delete Object		Delete a	n Object	
	Delete Data		Delete da	ata in a table or query	
	Join		Join Tabl	e or Query	
	Validate		Run Validation object		
	Export		Export data		
	ImportData		Import Data to a table		
ObjType	Allows selection of the	following (	Jobject type for operation:		
	Table		Allows to select a table		
	Query		Allows to select a query		
	Form		Allows to select a form		
	Report		Allows to select a report		
	Document		Allows to select a document		
	Sectioning		Allows to select a Sectioning		
	Transformation		Allows to select a Transformation		
	Batch		Allows to	select a Batch	
	Model		Allows to select a Model		

	Chart		Allows to select a chart
ObjName	The list of the predefined by <b>ObjType</b> objects will be available in the dropdown		
	menu for selection		
Parameter	First parameter for an	operation.	Allows to enter SQL statement as filter or for
	executing certain operation		
Parameter2	Second parameter for an operation. Normally default value, file name etc		
Open	Allows to open the given object defined by ObjName		
Comment	Any comments related to the operation		
Included	Whether or not to include the operation in the model run		
	0		Skip this operation
	-1		Include this operation
InclAtRunT	Whether or not to include the operation at run time		

## 14.3 Test Analysis

For testing of the Analysis user can open the Operation Log window by selecting **View / Operation Log**.



Example of a blank operational log window is given below. User can empty the messages from the previous operations by clicking on **Empty Log** window. Similarly the messages can be saved to an external file for future references using **Save** button.

🗟 Operation Log	
Empty Log	Close Save

To execute the Batch, click on *button* on the top menu. The operations executed and any error message will be logged and displayed in the operation log window.

## 14.4 Use Analysis

Analysis objects can be executed from database object browser, but mainly run from sub system navigator.

## **15 WORKING WITH THEMATIC MAPS**

NODEM comes with a built-in map viewer which can support most of the industrial standard GIS data format. It can directly support ArcView project file, MapInfo project or workspace file etc. For map layers, it can support most of the standard field format including Shp, Tab, Cad, Jpeg, Tiff etc. And most importantly, NODEM map viewer can make Geo database and directly use data inside the database to dynamically generate and present timely information in GIS format. NODEM can also export GIS data to feeder other GIS system.



# 15.1 Map Vierer Window Components

Following are all components for a typical set of map layers

- 1. Map tool bars, provides all functions related to map operations
- 2. List of layers on map. Select an item from the list will navigate to the right layer
- 3. Mini map, when mini map has map layer, it is used to navigate to desired location when the main map window is zoomed in
- 4. Main map window, all map layers are drawn here
- 5. Map layer legend
- 6. Map information for selected features for a given map layer
- 7. Status bar with map layer information

Following tables describe the functionality in NODEM map viewer.

Map Tool Bars	provides all functions related to map operations
New D	Create new project (or configuration file)
Open 😅	Open an existing project file
Save 💾 🛛	Project (configuration) Save (default) /Save operation
Database Tools 🖉 🔹	Tool for Load SQL Layer (saved database layer, default) and Save as SQL layer (save external map layer)
Add Layer 🕈 🔹	Add External Layer (external files), Add SQL Layer (default), and Add Layer (current layer to Mini map)
Carriageway	Map layer selection combo box
Delete Layer	Delete Layer (delete layer from map display only, default), Delete Layer from Mini Map display
Map Tools 🏂 👱	Layer Property (current layer, default), Calculate Extent (calculate map extent), Export Layer to File (save layer to outside for other GIS system)
Map Properties	Map View Properties (default), Hide/Show Mini map, Hide/Show Legend, Hide/Show Info (current selection)
View Data	View map data (if selection exist, then only selected data). Support SQL layer only (not external data file)
Preview/Print	Preview/Print map
Full Extent 🧐	Display full map
Zoom 완 🔎 🔍 🔍	Map zooming modes
Pan 🐫	Map moving (can also use slider bar in main map view)
Select Mode	Deselect All (deselect in current layer), Multi/Single Select, Select by Point/Line/Polygon/Circle/Rectangle
Find Shape	Find/filter map shapes satisfying a criteria
Mini Map	For area navigation. The main map display location and rectangle in minim map location are synchronised. So move the rectangle in the mini map will relocate the main map display location, and zoom or pan the main map will relocate the rectangle in the mini map as well
Legend	Map layer and property displayed as legend. Double click will invoke the definition of layer properties; hold and move a layer will change the order of the layer in map; highlight a layer will make it current layer (same as the Map Layer Selection combo box)
Map Info	Current (display the data for current shape), or Summary (for all selected shapes)

# 15.2 Prepare GIS Data

Currently NODEM comes only with Map Viewer for thematic map presentation. All GIS shapes thus will need to be prepared through GIS software or GPS data collection. Fortunately this is not a problem at all as a lot of GIS shape data already exist in standard format of one way or the other.

NODEM map viewer can work with most of the standard GIS file format directly or convert the data and save into database. Upon save, the map layer will be registered inside NODEM, and two data tables will be created with a name of the layer plus a suffix "\_FEA" (for feature) or "\_GEO" (for geography), and these tables are linked through a unique identification field (UID).

Data inside the database thus can be very easily linked to the \_GEO table through newly generated table or query. As long as a table or query named as a layer plus suffix "\_FEA"

with linkage (UID), NODEM Map Viewer will treat it as the layer feature definition, and will be loaded to the Map Viewer. This makes the NODEM Map Viewer extremely flexible to work with different types of data. For detail, please see section <u>Working with Tables</u> and <u>Working with Queries</u>.

# **15.3 Create Thematic Map**

Once all necessary GIS layers are defined (and saved inside the database), the user can define map of different themes to satisfy various purposes. Thematic map can be defined by user of analyst level or above. Thematic map is actually a configuration of map layers inside the sub systems

Open database object browser and locate the Map icon in left list view. All existing thematic maps will be displayed.



Select<sup>1</sup> to create new thematic map. It will be added into the list.

ime for Map	
Please Enter New Name Test_Map	ОК
Description: Test Thematic Map	Cancel
Test Thematic Map	

## **15.4 Define Thematic Map**

Definition for a newly created thematic map is empty and need to be made through the NODEM Map Viewer. Defined thematic map can be modified as well.

Select  $\stackrel{\text{\tiny CP}}{\longrightarrow}$  to open a thematic map. If configuration existing for a thematic map, it will be used for loading map layers. It not yet, then the user will need to select the layers and define the properties for each layer.

The user can define, modify and at last save the configuration (as an external file). Once it is done, the configuration can be used for the thematic map.



### Load Map Layer and Configure Thematic Map

### Map View Property

Map Properties	×
Color Property Map Background Color Mini Map Background Color Map Legend Background Color	
Map Selection         Map Selection Color         Map Layer Selection Transparancy (0 - 100)         Map Layer Selection Width (0 - 100)         Selection On Outline Only	
Map Units Undefined	

### **Define Map Layer Properties**

Vector: Carriageway			
Layer Section Render First Second Number of zones Mir 5 * 1 Start color End Start size End 0.8pt * 5.0	er Line Area nimum value d c <u>o</u> lor d size Opt *	Marker Label	Cancel
Render Expression (must b         FT_v_CndLvlOfMax         +         Msible Rendererr[FT_v	e numeric)	Round	
			<u>W</u> izard

### 15.5 Use Thematic Map

Thematic maps are mainly used in analysis object and sub system navigator. Although the configuration (saved externally) can be used directly from the Map Viewer for display.

## Printing Thematic Map

Click to print preview the map. Before printing, the user can do some basic printing setup and preview the map.



Click **Preivew** for preview, **Print** to print out the map.


## 16 WORKING WITH STORED CHARTS

Stored charts are graphic view of data of different features with certain relations. They will be configured to run, and limited data operations are allowed depending on the way a chart is configured.

## **16.1 Chart Window Components**

Following are all components for a typical chart.



The components show above are:

- Chart Group Navigator: a list of group data item IDs or Names (such as Road\_ID/Road\_Name). To switch between them, set focus to the combo box, then press CTLR+V. Selecting a item from the list will navigate the to the chart for that item
- 2. Navigation Buttons: including move to previous (<<) and move to next (>>0).
- 3. Copy: copy chart to clipboard. It will only copy the chart area
- 4. Save Char to File: save chart area to a bmp file
- 5. Print: print chart area to file
- 6. Chart Title: an combination of user define chart caption plus group item name
- 7. Chart Area: the area chart and axes are drawn, not including sliding and scaling bars
- 8. Chart Drawn Area: area where all chart series are drawn
- 9. Y Axis: y axis and title. A chart may have a lot of Y Axes
- 10. Chart Series: a line chart series with square shape marking data points
- 11. Chart Series: a strip series
- 12. X Axis: chart X axis. Defined for all chart series
- 13. Min Value: minimum value for current series
- 14. Max Value: maximum value for current series
- 15. X: x value per X Axis
- 16. X Slider: to move the chart in horizontal direction

- 17. Y: y value per chart scale. Not a meaningful value for series
- 18. X Scale: to change the scale value of x axis
- *19. Legend*: chart series legends, including a lot of different attributes for a chart series definition. A Chart series can be turned on or off from display
- 20. Chart Data: chart data display in data grid format
- 21. Chart Data Group Tab: series can be grouped into different data group. Data from different data source cannot be put into same group.

## **16.2 Create Stored Chart**

Login as NODEM configurer and select Data Administration mode, then start database object browser and locate the Chart icon in left list view. Then all existing charts will be displayed.



Here the user can:

## Create New Chart

Define a new chart with name and description. The newly defined charts will be added to the list for design.

Name for Chart	
Please Enter New Name ChartForTest	OK
Description: A Chart for Test	Cancel
,	

# Open Chart Definition 🚔

Define chart head information. This is a single record definition with a lot of fields to define. A selection list or button click operation has been supplied whenever applicable,

including value selection, list of data sources and fields, colour selection, filter definition etc.

台	SchartForTest: Chart Definition								
	🖻 🔐   🎟 -   💁     🖻 🖇 🖻 🗙   🕬   🖺 🗉   💷 🗏 🗉   🎒 🕺 🖬   🍞   🐮   🕮 📣 💊 🕶 🖘								
	Name	Description	ChartType	GroupSource	GroupField	GroupDescField	GovernSeri		
Ì	ChartForTest	A Chart for Test	StripMap	dFWP_Play	•				
*				a 🧹	•				
				ABC dCARR_WAY dFWP dFWP_Play					
•				dHSDROUGH N	<u> </u>		•		
K	Record: 1								

List of Value as Selection List

Description	ChartType		GroupSource
A Chart for Test	StripMap	•	dFWP_Play
	StripMap NormalChart ManualRef		

### List of Tables as Selection List

ChartType	GroupSource	GroupSource			
StripMap	dFWP_Play	•	Road_ID		
	dFWP_Play	^			
	dHSDROUGH				
	dHSDRUTT				
	dHSDTEXT				
	dROADNAMES				
	dSKIDRES	~			

### **Colour Selection**



### **Filter Definition**

Filtering Data				
Select a Field Select an Operator Select a Value	Hierarchy = NSHS URBA	▼ N	List	▼ :⊻alues
Criteria Text [And [[Hierarchy] = 'NSH	l'into Criteria IS URBAN')	<u>O</u> r into Crite	eria	
		Apply		<u>C</u> lose

### **Enumeration Definition**

 👑 Enumeration Defintion 🛛 🔀												
Typical Values (Hint Only)												
	To		ОК									
1CHIP		1		1CHIP		Cancel						
2CHIP		2		2CHIP								
AC		3		AC								
B/S		4		B/S								
BOLID		5		BOLID		Clear						
OGEM		6		OGEM								
OGPA		7		OGPA								
RACK		8		RACK								
SMA		9		SMA								
TEXT		10		TEXT								
VFILL		11		VFILL								

Following are description about all the field definitions:

- Name: Chart name to be identified as object identifier. Must be unique through all charts
- > **Description**: Chart description for information
- ChartType: type of chart. Please select *StripMap*, as this type support all functions and can be flexibly configured to various view styles.
- GroupSource: chart group list source table or query name, used to make as list of items (such as Roads) for chart navigation.
- GruopField: chart unique group item field name (such as Road\_ID)
- GroupDescField: chart group item description field name (such as Road\_Name). To be useful, GroupDescField need to be unique as well
- GovernSeriesName: the main series to govern the X-Axis for chart view, chart horizontal sliding and scaling. This must be the series name inside the chart detail definition.

- > XAxisTitle: x axis title
- InputData: reserved
- > OutputData: reserved
- > AllowRefine: reserved
- ForeColor: chart foreground colour
- BackColor: chart background colour
- MinMarginPct: minimum horizontal margin for chart area (including both chart and Y Axis) to left and right chart frame area.
- > **FilterString**: a string to filter the selection of group item list
- OptimiseDataSource: join series from same data source together or not. An internal flag, and can left as -1 (True) all the time.
- > Left: left position of chart window when open
- > **Top**: top position of chart window when open
- > Height: height of chart window when open
- > Width: width of chart window when open
- > **HSplit**: horinzontal split bar position (top)
- > VSplist: vertical split bar position (left)
- > **Tool**: toolbar to be customised
- > **Design**: toolbar to be customised
- > **Property**: toolbar to be customised (display or not)
- > View: toolbar to be customised
- **Save**: toolbar to be customised
- Save: toolbar to be customised
- > Undo: toolbar to be customised (display or not)
- > **Date**: the date record defined

### **16.3 Define Stored Chart Detail**

**Design Chart** : define chart series detail. A chart must have at least the governing series and other series for display. Each series is a single record definition with a lot of fields to define. A selection list or button click operation has been supplied whenever applicable, including value selection, list of data sources and fields, colour selection, filter definition and enumeration definition etc.

<b>1</b>	hartForT	est: Chart	Detail Definition						
	- 🖽 -	🛾 🖪	🖻 X 🖻 🗙		≝ ⊒ ⊉↓ ∡↓	📱   🍞   🕱   🗒	🏘 💊 🕶 🏢	₩ = = =	
	ChartID	SeriesID	SeriesName	Source	GroupNameField	LocFromField	LocToField	¥alueField	ValueDescField
►	8	1	FWP Section	dFWP_Play	Road_ID 🚽	Start_m	End_m	Length	
	8	2	Surface Material	dFWP_Play	Road ID 🗛	Start_m	End_m	Surf_Material	Surf_Material
	8	3	Roughness	qryN_HSD_Rough	Road_Name =	start_m	end_m	Naasra	
*					Start_m				
					Hierarchy Urban_Rural 💌		-	1	
•									F
K	Record:	1							H

Following are description about all the field definitions:

- > ChartID: Chart ID from chart (header) definition
- > Series ID: Series ID of a series in a chart definition
- SeriesName: name of a series. One of the names must match the GovernSeriesName inside chart definition
- Source: series data source.
- GroupNameField: the field with value matches the GroupNameField definition inside chart definition. A must have
- > LocFromField: location from field (such as Start\_m) in x axis. A must have

- LocToField: location to field (such as End\_m) in x axis. A series may not have LocToField.
- > ValueField: the Y axis value, a must have
- > ValueDescField: description of Y value. May be the same as ValueField.
- EnumDefinition: use enumerated value to represent series ValueField. Enumeration is typically used for string or date value display, but can also be used for number as well. In latter case, either discrete value (if series value is discrete) or range (discrete or continuous value) can be used. Up to 16 enumerated values can be used with represented value or colour
- SeriesType: type of the series, selected from a list of values, including point, line, bar, strip and step
- UseEnumValue: use enumerated value to draw or not if existing
- UserEnumColor: use enumerated colour definition to draw or not
- > ForeColor: chart series fore colour
- **BackColor**: chart series background colour.
- DrawWidth: chart series drawing width
- DrawStyle: chart series drawing style, selected from a list of values including SolidDash, DashDot, DashDotDot, Dot, InsideSolid, Invisible
- FillStyle: chart series drawing filling style for series of bar and strip types, selected from a list of values, including Solid, Cross, Diagonal Cross, DownwardDiagonal, UpwardDiagonal, Transparent, HorizontalLine, VerticalLine
- SeriesPointType: point type of chart series, selected from a list of values, including None, Dot, Square, Plus, Cross, HollowDot, HollowSquare
- ShowValueDesc: display value description or not (depending on ValueDescField as well)
- BandLocPct: chart series drawing bottom position in terms of percentage of height of chart drawing area
- BandHeightPct: chart series drawing height in terms of percentage of height of chart drawing area.
- BandID: band id or the series. All chart series in the same band will be drawn together and share some common attributes, such as . Same band (ID) should normally have same BandLocPct and BandHeightPct, but it may differ in specific occasion
- BandBottomLined: draw a bottom line for a band, normally at BandLocPct. It can be drawn at the SplitLevel when a series is with split for Y value
- ShowSereislegend: display series legend or not, selected from a list of values, including not show, show title only, show axis (with title)
- > SereisTitle: title of series for axis
- YScaleMode: scale mode of series values, selected from a list of values, including NoScale – automatically pick up the min and max value from the data source without any rounding, AutoScale – automatically pick up the min and max value for a particular group item (eg a road) with rounding, ManualScale – use manually set scale limits, RangeScale – automatically pick up the min and max value with rounding from the data source (thus for all group items), Dynamic – use the min and max value for a particular group item without rounding
- > YMinValue: series manual set lower limit
- > YMaxValue: series manual set upper limit
- WithSplit: series with a split for value above and below SplitLevel
- SplitLevel: a threshold value for a chart series. It will better reflect the data for series of bar type, all other types are anyway continuous drawing
- DataGroupName: for series data to be selected in tab format. Different series can be put in the same group if they are from the same data source
- > AllowEditRef: allow to modify the Governing series definition of x axis
- > AllowEditData: allow to modify series data
- EditMode: mode for edit, selected from a list, including 0 ReadOnly, 1 Allow Edit, 2 – Allow Add, 3 – Allow Delete. EditMode will dependent on AllowEditData as well

- FullSource: include whole source table for the series or only the series related fields
- Display: display series or not. If not displayed, it can be turned on for display at runtime. The governing series should be displayed all the time
- **ExtraData**: extra data field(s) to be included in the data group for reference.
- > **ColPopup**: lookup definition for series field values
- > **ColWidth**: column width when displayed in data grid format
- > Format: series value display format in data grid
- > FilterString: a filter string to filter series data to be included
- > Date: time when the series to be created
- Included: a series may have been defined but not included at runtime. The governing series should not be excluded.

### 16.4 Use Stored Chart

Stored chart can be run directly from database object browser, or from controlled operations, such as navigator, batch, analysis etc.

#### Run from Object Browser

Select *i* to run the highlighted chart. All group items (such as Roads) will be included for the user to view chart against.

#### Call to Run from Other Object

Stored chart can be configured to run inside navigator, even with filter through list item selection from navigator. The configuration format can be:

Order	Tab	Item	Value	Value1	Other		
					FWP	Play	with
825	NPM	Chart	FWP	RunOrRunFilter@[Road_ID]	Graph	-	

For detail, please see Working with Sub System Configuration

Stored chart can also be called from analysis and batch, the format is basically as:

Operation	ObjectType	ObjectName
Run	Chart	FWP

## **17 WORKING WITH TRIGGERS**

Not like database trigger coming with database management system, NODEM trigger is used to automatically invoke other operations when data changed. Current two types of triggers are supported:

- **OnUpdateField**: happens after column updated but before record updated
- **OnUpdateRecord**: happens after record updated

NODEM trigger can be used to do calculation using runtime variables, can call batch, model and other operations.

## 17.1 Define Trigger for Data Object

Trigger is dependent object attached to data objects such as table and query.

#### Create Trigger

Login as NODEM configurer and select Data Administration mode, select a table, then select to define trigger for the data object.



曾	dFWP_Pla	y: Trigger Defini	tion					
	E   🖽 י	•   🖪 🚭    Pa	š 🖻 🗙 🗠			📱   🍞   🛣   🖺	) 🏘 💊 🖛 🖅	5
	ID	DBTrg Type	Data Object Type	Data Object	Data Object Field	Operation	ObjectType	ObjectName 🔺
⊁	1	OnUpdateField	Table	dFWP_Play	TRT_00	Run	Trigger	Calc_Predictions
	2	OnUpdateField	Table	dFWP_Play	TRT_01	Run	Trigger	Calc_Predictions
	3	OnUpdateField	Table	dFWP_Play	TRT_02	Run	Trigger	Calc_Predictions
	4	OnUpdateField	Table	dFWP_Play	TRT_03	Run	Trigger	Calc_Predictions
	5	OnUpdateField	Table	dFWP_Play	TRT_04	Run	Trigger	Calc_Predictions
	6	OnUpdateField	Table	dFWP_Play	TRT_05	Run	Trigger	Calc_Predictions 🚽
•								•
	◀ Record:	1						► ►

Columns for Object Trigger are:

- > **ID**: identifier of a trigger
- > DBTrgType: NODEM trigger type. Currently OnUpdateField and OnUpdateRecord

- > **DataObjectType**: NODME object type, such as table, query etc
- > DataObject: NODEM object name
- > DataObjectField: field name in data object
- > **Operation**: operation to be called when field value change
- ObjectType: type of object to be called for operation. One type is Trigger, and here is the only entry for defining trigger detail
- > **ObjectName**: object to be operated by operation
- Parameter: parameter applied when calling an operation, normally a filter string and useful for OnRecordUpdate
- > **Open**: open to display/edit object detail
- > Comment: comment
- > Included: included or not at runtime

## **17.2 Define Trigger Detail**

Many triggers can be defined for the fields of one data object. And in turn one field can have many trigger operation as well. If the object type is Trigger, then the trigger detail can only be defined from here by clicking button displayed in **Open** field.

	Calc_Prediction	s: Trig	ger Definition									
	🖃 🔳 • 🖪	3	Ъ, <b>с X</b>		) 🔣 🗉 📄 🤶	X 🗓 🖉	( 🗏 🏘 🗞	0-11	- <b>-</b>			
	Name	ID	Operation	ObjectType	ObjectName	Parameter	Parameter2	Open	Comment	Included	InclAtRunT	-
	Calc_Predictions	1	InputCalculation	Variable	DoCalc	'@TriggerField@'='Tf				-1		
•	Calc_Predictions	2	InputCalculation	Variable	TRT	[TRT_00]				-1	@DoCalc@	
	Calc_Predictions	3	OutputCalculatio	Variable	Surf_Age_00	DateDiff('d', [Surf_D				-1	@DoCalc@	
	Calc_Predictions	4	OutputCalculatio	Variable	Surf_Type_00	Lookup('LU_Surf_Ty;				-1	@DoCalc@	
	Calc_Predictions	4	OutputCalculatio	Variable	Pave_Age_00	DateDiff('d', [Pave_[				-1	@DoCalc@	
	Calc_Predictions	5	InputCalculation	Variable	DoLkUp	0				-1		
	Calc_Predictions	10	Remark	Calc Naasra						-1		
	Calc_Predictions	11	InputCalculation	Variable	DoCalc	'@TriggerField@'='Tf				-1	@DoCalc@=False	
	Calc_Predictions	12	InputCalculation	Variable	TRT	[TRT_01]				-1	@DoCalc@	
	Calc_Predictions	13	InputCalculation	Variable	DoLkUp	'@TRT@'<>" And @				-1	@DoCalc@	
	Calc_Predictions	15	InputCalculation	Variable	E1	0				-1	@DoCalc@	
	Calc_Predictions	15	InputCalculation	Variable	E2	0				-1	@DoCalc@	-
K	Record: 25											· M

Columns for defining trigger details are:

- > **Name**: trigger object name
- > ID: trigger execution order
- > **Operation**: list of operation supported
- > **ObjectType**: object type for the operation
- > **ObjectName**: object name for the operation
- > **Parameter**: parameter for the object operation
- > **Parameter2**: second parameter for the object operation
- > **Open**: a quick linkage to display/define an object
- **Comment**: comment
- > Included: included or not when load all definitions
- InclAtRunT: included at runtime or not. Depending on a runtime calculation. Default to true.

Trigger detail definition is very much similar to the definition of other operational objects like batch, model etc with minor difference: only runtime (directive) variables can be used and no compiling supplied for calculation. Everything is done on the fly.

## 17.3 Use Trigger

There is no direct calling to execute a trigger – as it is basically tied up with data change. The running of a trigger is automatically fired when a data change happens in a data object with trigger defined.

## **18 WORKING WITH INFO WIZARDS**

Info Wizard is a function to collection preset value for input runtime variables. It is particularly useful for customisation of general definitions of models and batches. Info Wizard is only available for system configure during system development stage.

## 18.1 Use Info Wizards to Collect Preset Value for Runtime Variables

## Start Up Info Wizard

Login as NODEM configurer and select Data Administration mode, then start database object browser. Locate an operational object, the Info Wizard button will be available.

😵 Database Objects: Model												
🗅 🛩 😭 🖻	👗 🖻 🗙 📝 🖧 🍋 🕒 🗄 📾											
	Name	Description	Date	Туре								
- A-	院 FT_Build_Base		19/04/2005 7:	Model								
	🙀 🖬 FT_Build_BaseVX		9/12/2005 11:	Model								
Transformat	🔚 🖬 FT_Deterioration		11/01/2006 1	Model								
ion	🔚 🖬 FT_Deterioration_old		2/11/2005 6:3	Model								
	😨 FT_Optimisation	Optimisation	2/11/2005 6:3	Model								
	🖥 FTr_Rank_High	Constraint ra	24/11/2005 8:	Model								
V	🖫 FTr_Rank_Low		24/11/2005 1	Model								
Model	🔚 🛱 FTr_Rank_Medium		24/11/2005 1	Model								
	😨 FTr_Rank_Unlimited	Ranking on E	24/11/2005 8:	Model								
<b>N</b>	🔚 🖬 FTs_Deterioration		30/10/2005 6:	Model								
	🔚 🖬 FTs_DeteriorationVX		9/12/2005 5:2	Model								
Batch	🖫 FTs_Optimisation		30/10/2005 7:	Model								
	📲 🖬 FTs_OptimisationVX		10/12/2005 1:	Model								
	🔚 🖬 FTs_PostProcessing	Post Process	25/11/2005 9:	Model								
	🔚 🖬 FTs_PostProcessing_Flag		16/12/2005 7:	Model								
Мар	🖫 FTs_PostProcessing_VX		11/12/2005 1	Model								
	📓 FTv_Valuation	Footpath Valu	20/11/2005 1	Model								
	FTs_Optimisation_General											
0												
Analysis												
				>								

Click to start Info Wizard, a welcome screen will display.

Information Collection Wizard							
ins help	Welcome to the wizard for gathering information for Model 'FTs_Optimisation_General' Please select Next to start Status: Ready						
Reset All Cancel	Skip < Back Next > Finish						

## **18.2 Info Wizard Buttons Functions**

Following are detailed operations for all buttons.

Button	Operation Description
Reset All	Discard all collected values for all variables, and upon save (Finish) all collected (or
	previously saved) variable values will be thrown away
Cancel	Cancel the operation and newly collected variable values will not be ignored
Skip	Skip the current variable (do not collect value for this variable, or ignore the value if
	collected). This button displays as <u>Skip</u> when the variable has not been collected at
	all, and Reset if value has been collected. It will display UnSkip upon click
Reset	Clear and skip the current variable (clear any value collected and skip the current
	variable)
UnSkip	Value collected for current variable will be kept
< Back	Move to previous input variables. It will be disabled at start and for the first variable.
	Before you can move to previous variable, you must have a valid input for current
	variable unless you skip it.
Next >	Start the collection or move to next input variables. It will be disabled for the last
	variable. Before you can move to next variable, you must have a valid input for
	current variable unless you skip it
Finish	Fnish the collection operation and save all collected value for the object

## 18.3 Info Wizard Input Screens

In compliance with the types of runtime input variables, different user interface is provided for variable value collection. Following are a list of input screens.

TO T INDUL TEAL DOA (WILLI OF WILLIOUL DULLON)
--

Info Wizard for Load RA	MM Unloads (Batch)
ins T	Please select the RAMM Unload Folder
help	Please Enter a Value : Loc
RIN.	
1984	Status: Variable(s) will be included
Reset All Cancel	Skip < Back Next > Finish

Text box can accept user input directly, although text box with button (for variable types of InputFileFolder, Input FileSave and InputFileOpen) can get the input from corresponding folder browser and file open/save dialog.

### Input Combo Box

Info Wizard for FTs_Opt	imisation_General (Model)
ins	Please Select the Budget Data Table
help	Please Make Your Selection: BudgetData
	FTs_LU_Av/Funding
1114	Status: Variable(s) will be included
Reset All Cancel	Skip < Back Next > Finish

Input combo box can accept direct user input (such as a simple user input, or a table doest not yet exist but will be created after an object execution), or select from a list of options. The available selection list can be a list of values (simple value, or SQL select string), a list of objects (such as tables), or a list of fields from a table or query.

### > Input List Box

Info Wizard for FTs_Opti	misation_General (Model)
help	Select Level of Service (LOS)  Please Make Your Selection: LOS  A - High Level B - Medium Level C - Low Level
1318	Status: Variable(s) will be included
Reset All Cancel	Skip < Back Next > Finish

Input list box can accept input from a list of selections. The available selection list can be a list of values (simple value, or SQL select string), a list of objects (such as tables), or a list of fields from a table or query.

### > Input Check Box

Define Budget Scenario Levels
Please Make Choices         Very High         High         Medium         Low         Very Low         Status: Variable(s) will be included
Reset All Cancel Skip < Back <u>Next &gt;</u> Finish

Input check box collects values for a number of variables, and the value is basically 0 or 1 (or false or true).

## **18.5 Use Preset Value for Runtime Variables**

Preset value for runtime variables is for the purpose of general object configuration and customisation. The value collected for variables can be used once for all.

To use preset values for variables at runtime is simple. Add following operation in the corresponding object before any input runtime variables (this is dependent on the execution order, ie ID field). All other fields will be left blank.

### ID Operation

0 LoadRunTimeVariables

During runtime, any input variable (except InputConfirmation variable) without a preset value will b popped up for a user input. But if a preset value does exist, then that value will be used for that variable throughout the execution period, although the user can overwrite that value in input or output calculation variables.

### **19 WORKING WITH SUB-SYSTEM CONFIGURATION**

Sub-system is an integrated organisation of similar or related data, functionality, operations and processes to fulfil business requirements from a system point of view. A sub system is one part of or a whole complex business system, but technically itself is a software system from physical or logic perspectives.

Take road network for instance, one road information management system (RIMS) may do all the work. Alternatively, there can be road information system (RIS) to store road data, pavement management system (PMS) to use data for management and administration, a footpath management system (FMS) for footpath data storage and maintenance management etc. All these are sub systems of road network, but actually each in turn is a system in nature by itself.

Sub systems can be easily configured in NODEM with all data and operational objects and presented to the user as a workspace (the main user interface - Navigator). With built-in data navigation, filtering and system wise user access control, sub system navigators make sub systems fully self-contained, consistent and very much user friendly.

4 2 rigator 3 path N ABC ø 鋓 **2**11 ΕĒ. a y Мар All Lkup Tool Proc View Style Find, Impt Rpt AVONDALE-ROSKIL Carr\_Way\_No Carr\_Way\_Name Start\_Name 🛬 ACTON PL  $\mathbf{\nabla}$ ACTON PL (0 - 103) BLOCKHOU ADDISON ST 5  $\checkmark$ 2 ADDISON ST (0 - 247) TAYLOR ST  $\checkmark$ ADMIRAL BEATTY 🗖 🗧 З AHIRIRI AVE (0 - 146) ST GEORGE  $\checkmark$ AHIRIRI AVE 4 ALANBROOKE CRES (0 - 1 ... ARRAN ST AKARANA AVE  $\checkmark$ **- 1**5 ALANBROOKE CRES (141 ... STEDMAN F ALANBROSKE CRE 2 **-** 6 ALANBROOKE CRES (270 ... 33/35 ALAI 6  $\checkmark$ ALAUNIA PL **D** 7 AMSTERDAM PL (0 - 156) WOLVERTO ALBRECHT AVE  $\checkmark$ 8 ARMAGH RD (0 - 246) ENDEAVOU  $\checkmark$ ALDERSGATE RD 9 ARMAGH RD (246 - 420) 20/22 ARM  $\checkmark$ ALEX BOYD LINK **1**0 ARRAN ST (0 - 201) KELVINSIDE ALFORD ST  $\checkmark$ **D** - 11 ARRAN ST (201 - 386) ALANBROO  $\checkmark$ ALLISON ST 12 ASH ST (0 - 216) GREAT NOF  $\checkmark$ ALVERSTON ST ÷ 13 ASH ST (216 - 332)  $\checkmark$ AMSTERDAM PL HIGHBURY 14  $\checkmark$ ANDES PL п ASH ST (332 - 569) ROSEBANK  $\checkmark$ ANITA AVE - 15 ASH ST (569 - 738) 21/23 ASH ARAMUTU RD 16 M ASH ST (738 - 888) 43/45 ASH  $\checkmark$ ARLINGTON ST 17 ASH ST (888 - 1075) WAIRAU A'🜄 ADMACH DD 8 > 1506 item(s)

Following are a typical sub system navigator



Components can be used or configured inside sub system are

- 1. Data Group: high level grouping of data, such as Hierarchy of road. The data list based on the group will be added under the button for selection.
- 2. Style: detailed data item list view style, including Large Icons, Small Icons, List and Detail for data list, or GIS view if configuration is available.
- *3. Find*: a button to find the listed item based on certain criteria. If item is listed in the list view, the found one will be selected; otherwise, no item will be marked
- 4. Toolbar buttons for configuration: a list of operations can be configured under different buttons, including Lookup, Setup, List, Import, Tools, Process, Edit Data, View Data, Report, Chart, Thematic Map
- 5. Second Level Data Group: a second level grouping of data, such as Area or Suburb for road.
- 6. Data List: a list of data in parent level, such as road or link
- 7. Data Item List: a list of data items, such as link under road, or sections under road or link etc. All selection of data items are done in this view. Normally if no item listed, then presume all data items; if some items are listed by none are selected (checked), then all listed items is presumed to be included; if some items are selected in the view, then only selected items will be included as selection. Popup menu can be configured to for information or operation as well. Here can also be GIS view, similar law applies
- 8. Status bar: information about listed data items or map information in GIS view.
- 9. GIS View Toolbar: toolbar for GIS view data navigation
- 10. GIS View: basic layers for navigation and selection
- 11. GIS Status bar: information about GIS layer

### **19.1 Decide Needs for Sub System (Navigator)**

Since sub system (sometimes it is simply referred as Navigator) is a system for certain business system, rules of business requirements to a information system and methodologies of software development life cycle (SDLC) applies. Specific to NODEM as a

system platform, a transformational way of thinking and design will need to be maintained in the system development life.

Following is brief guidelines for NODEM sub system configuration (development):

#### Data Needs

Business data to be captured, integrated or linked from other external data source and data to be processed and presented etc will need to be identified, defined and developed if required. This mainly includes data table, query, various types of documents (such as media, design), GIS data etc. All these can be referred to as data objects inside NODEM.

#### Process Needs

Business process is business functions and activities exerted on business data. The interaction of activity and data can be implemented as different types of operational objects in NODEM, including trigger (some complex business rules), batch ( a bunch of operations), model (data processing and calculation) and analysis (an step by step organisation of operations) etc.

#### **Presentation Needs**

Presentation of data refers to user interface and data presentation, including data table/query opening formats, data forms, data reports and graphs, documents such as media, stored charts and thematic maps, and mainly the organisation of all these objects and operational objects for the user to interface with.

#### Miscellaneous Needs

Other needs for sub system including consideration for user access, data navigation and filtering and operation integration inside navigator.

One main part of sub system configuration is about the data navigation, that is, how a system will be most effectively working in terms of business data. There is no simple rule for this, but the client of the system definitely knows better what they want.

### **19.2 Configure Sub System**

Once all data and operation objects are clearly identified and defined (see each section above for detail regarding object definition and design), configuration of sub system is just another type of data entry.

Login as NODEM configurer and select Data Administration mode, then select Tools | Database Utilities | Define Sub Systems to start up sub system definition (yet a sophisticated sub system configuration interface is under development).

File	View	Mode	Tools	Window	Help		
			Log Log	Out in as Anotl	her User Acc	ount	
		Generic Utilities					
	Data Utilities 🔶				•		
			Data Object Utilities			•	
		Database Utilities				•	Resolve Table Linkage
			Use	r Securitie	s	•	Define Sub Systems
_		Opt	Options			Repair Database Compact Database	
						-	Set Database Password

(É)	)efine Su	b Systems						
		• 🖪 🖨	🕒 🖁 🛍 🔁 🗠			🈼   🖫 i	斜 💊 🖛 🏢 羣	
	Order	Tab	Item	¥alue	¥alue1	¥alue2	Other	Description 🔺
	302	Default	SubSystemCode	Footpath			Footpath Manageme	Default Sub System 🦷
	304	SubSystem	Name	Footpath	2		Footpath Manageme	
	315	Footpath	GISConfigure	ACC-Default.ttkgp				Default BMS Configura
	316	Footpath	GISMiniMap	Wards				Default BMS Mini Map
	317	Footpath	GISProjection	GED	Geodetic (Unprojecte			Unprojected Datum
	318	Footpath	GISUnit	20	Degree			GIS layer unit - Degre
	320	Footpath	NavGroup	[Hierarchy], [Hierarchy] a:			FT_Hierarchy	Group list tab
	330	Footpath	NavArea	[Ward], [Ward] as [Descri			FT_Suburb	Area list table
	340	Footpath	NavRoad	[Road ID], [Road Name]			FT_Road	Road list table
	350	Footpath						Link list table. Can be
	360	Footpath	NavList	*			FT_Carriageway	List View List (can be [
	370	Footpath	NavLayer	Wards			Area.Color = 16777(	Map Layer. Can have
	380	Footpath	NavLayer	Carriageway			Line.Color = 255;Lin	Map Layer. Can have
	390	Footpath	NavLayer				Line.Color = 65535;L	Map Layer. Can have
	400	Footpath	NavLayer				Marker.Color = 255	Map Layer. Can have
	410	Footpath	NavCurrentLayer	Carriageway				current layer. Must ha
	415	Footpath	NavMiniMapLayer	Wards				Map Layer. Can have
	420	Footpath	NavShapeIDField	Carr_Way_No				current layer shape IC
	430	Footpath	NavShapeNameField	Carr_Way_Name				Current layer shape n
•	440	Footpath	NavShapeLabelField			1	1	Current layer shape la
Fi	lter On: Ta	b, Item	All Data)		I I I Reco	ord: 1		► H

## 19.3 Columns within Sub System Configuration

Columns inside the above data sheets are:

- Order: the definition order of system (subsystem(s)). The order is very important for building subsystem navigator at runtime
- > Tab: a sub system group or some global definitions
- Item: a sub system entry or some global definitions fro that sub system
- > Value: the key value for the subsystem entry, normally is object name
- > Value1: the second value for the subsystem entry, normally is key operation
- > Value2: the third value for the subsystem entry, normally menu group definition
- > **Other**: the fourth value for the subsystem entry, normally caption for display
- > **Description**: used for configuration comment
- > **Display**: reserved for future use
- > **Date**: the time when the entry added

Built-in dynamic filter can be applied on **Tab** and **Item** fields for easy data entry. Some preliminary entries will be defined for a new system to start.

## **19.4 Combinations of Tab and Item Columns**

Typical combinations of the values for Tab and Item are:

Default – SubSystemCode: define the default sub system to start when NODEM start

鱈	😰 Define Sub Systems 📃 🗖 🔀										
В 🖬 - 🖪 - 🖪   🖻 🗼 🖻 × 🗠 🧾 🗉 🖩 🖩 🖉 - 🚺 🖉 - 🛃 🖉 🏹 🕱 🗐 📣 💊											
Default - SubSystemCode											
	Order	Tab	Item	Yalue	Yalue1	¥alue2	Other				
•	302	Default	SubSystemCode	Footpath			Footpath Management System				
*											
•											
Fi	Filter On: Tab, Item Default - SubSystemCode										

Here *Default* and *SubSystemCode* must be kept, while Value is the code of the system in sub system definition.

SubSystem – Name: register a sub system inside NODEM

<b>B</b>	😰 Define Sub Systems 📃 🗖 🔀									
``````````````````````````````````````										
SubSystem - Name										
	Order	Tab	Item	Value	Yalue1	¥alue2	Other			
•	304	SubSystem	Name	Footpath	2		Footpath Management System			
	2000	SubSystem	Name	KerbChannel	2		Kerb & Channel Management Sys			
*										
Fi	lter On:	Tab, Item	SubSystem - Name		•	Rec	ord: 1 🕨 🕨			

Here *SubSystem* and *Name* must be kept, while **Value** will hold the sub system code with **Other** the sub system name (description).

Some Sub System Global Definition: applies to the sub system. They are for example:

ß	🖻 Define Sub Systems									
	В 🔲 - 🖸 - 🖸 - 🚱   🖻 % 🖻 ×   ∽   🗉 🗉   🖩 🧏 🗉   2↓ 🗱 🗑 🍞 涨   🗉 🚧 🗞 ⊷									
	Order	Tab	Item	Value	Yalue1	¥alue2	Other 🔺			
	315	Footpath	GISConfigure	ACC-Default.ttkgp			_			
	316	Footpath	GISMiniMap	Wards						
	317	Footpath	GISProjection	GED	Geodetic (Unproj:					
	318	Footpath	GISUnit	20	Degree		-			
•			1	1	1	,				
Fi	ter On:	Tab, Item	(All Data)		•	Record:	1			

- **Footpath GISConfigure**: default GIS configurations when any thematic map loaded for the sub system
- **Footpath GISMiniMap**: default mini amp layer when any thematic map loaded for the sub system
- Footpaht GISProjection: GIS map projection
- Footpath GISUnit: map unit

- **Footpath –Spatial**: map layer included in sub system (can have popup menu definition defined in Value2 as Field, Caption, Operation; ...)
- **Footpath Popup**: popup menu definition in navigator

**Sub System Navigation Definition**: for sub system data navigation, including a list of combinations in a format of Tab as sub system code with item starting with "Nav". They are for example:

🖻 Define Sub Systems								
	Order	Tab	Item	Value	Value1	Value2	Other	[ .
•	320	Footpath	NavGroup	[Hierarchy], [Hierarchy]			FT_Hierarchy	
	330	Footpath	NavArea	[Ward], [Ward] as [Desc			FT_Suburb	F
	340	Footpath	NavRoad	[Road ID], [Road Name]			FT_Road	F
	360	Footpath	NavList	*			FT_Carriageway	ī
	370	Footpath	NavLayer	Wards			Area.Color = 16777088	1
	380	Footpath	NavLayer	Carriageway		1	Line.Color = 255;Line.Width=-1	1
	390	Footpath	NavLayer				Line.Color = 65535;Line.Width=-	- 1
	400	Footpath	NavLayer				Marker.Color = 255	1
	410	Footpath	NavCurrentLayer	Carriageway				c
	415	Footpath	NavMiniMapLayer	Wards	9			1
	420	Footpath	NavShapeIDField	Carr_Way_No			-	c
	430	Footpath	NavShapeNameField	Carr_Way_Name	0			T
	440	Footpath	NavShapeLabelField					7
	450	Footpath	NavShapeLabelWidth	3000				ī 🗸
4								
Fi	Filter On: Tab, Item     (All Data)							

- **FoothPath NavGroup**: data definition for navigation data group (here based on hierarchy)
- **Footpath NavArea**: data definition for navigation area for second level of grouping (here ward)
- Footpath NavRoad: data for navigation data list or third level of grouping (here Road) This can be SubSystemCode – Link, or under Footpath –Road.
- **Footpath NavList**: data for navigation data item (here foothpath carriageway section)
- Footpath NavLayer: GIS layer((s) for navigation
- Footpath NavCurrentLayer: GIS layer for all navigation operations
- Footpath NavMinMapLayer: GIS mini map layer for area location
- Footpath NavShapel DField: used for both GIS data and list view data
- Footpath NavShapeNameField: used for both GIS data and list view data
- Footpath NavShapeLabelField: used for GIS display
- Footpath NavShapeLabelWidth: used for GIS display.
- Sub System Toolbar Definition: configuration of all toolbar buttons. The combinations can be:
  - Footpath Lookup: define all lookup data for analysis
  - Footpath List: define all lookup list for data entry
  - Footpath Setup: define all set up for analysis
  - Footpath Import: define data import functions
  - Footpath Tools: define some functions or utilities to include
  - **Footpath ExecProc**: define running processes to include
  - Footpath EditData: define data to edit
  - Footpath ViewData: define data to view
  - Footpath Report: define reports to include

- Footpath Chart: define stored charts to include
- Footpath SpatialView: define thematic map to include

Default access levels for these buttons are:

Function	Access Level	Access Mode	Modify Level	Modify Mode
Lookup	All	All	PowerUser	Operation
List	All	All	Admin	Administration
Setup	All	All	Analyst	Operation
Import	Power User	Operation	Not applicable	
Tools	Power User	Operation	]	
Process	Power User	Operation		
EditData	Editor	All	Editor	All
ViewData	All	All	Not allowed	Not allowed
Report	All	All	Default object acces	ss control applies
Chart	All	All	]	
SpatialView	All	All		

Extension for the access control can be done through redirection. For instance, if a chart is only supposed to operate by analyst, then we can add it under *Tools* but execute it through *Chart* function, the format is Value->Chart.

## **19.5 Typical Values for Other Fields**

Combination of Tab and Item values describe most of the functionalities existing NODEM sub system, the detailed operations and objects will need to be defined. Following is the possible objects for different tool bar buttons.

Function	Value	Value1	Value2
Lookup	Table, query,	[2], Open	[2], Group[3], Obj@[Type], Grp@[Group], GroupItem,
	form name[1]		GroupItem@(Grp@[Group]Obj@[Type])
List	Table, query,	, Open	, Group, Obj@[Type], Grp@[Group], GroupItem,
	form name		GroupItem@(Grp@[Group]Obj@[Type])
Setup	Table, query,	, Open	, Group, Obj@[Type], Grp@[Group], GroupItem,
	form name		GroupItem@(Grp@[Group]Obj@[Type])
Import	Table name		
Tools	Any type of	Data or operational object operations (such as	, Group, Obj@[Type], Grp@[Group], GroupItem,
	object, CMT,	Open, Run, w/o filter etc)	GroupItem(@Grp@[Group]Obj@[Type]). Anything extra will
	MRD[4]		be filtering for selection list build. Data feeder group name for
			CMT (commit) and MRD (most recent) operation
Process	Operational	, Run, RunOrRunFilter, RunFilterOnly,	, Group, Obj@[Type], Grp@[Group], GroupItem,
	object name	RunOrRunFilter@[Field](as[Alias]),	GroupItem(@Grp@[Group]Obj@[Type]). Anything extra will
		RunFilterOnly@[Field](as[Alias])	be filtering for selection list build
EditData	Table, query,	Open, OpenFilterOnly, Filter,	, Group, Obj@[Type], Grp@[Group], GroupItem,
	form name	OpenFilterOniy@[Field]as[Alias],	Groupitem(@Grp@[Group]Obj@[Type]). Anything extra will
ViewDete	Tabla auroma	Filter@[Field]as[Allas]	be filtering for selection list build
viewData	form nome	Open, OpenFilterOnly, Filter,	, Group, Obj@[Type], Grp@[Group], GroupItem,
	iorm name	Ciltor@[Eiold]as[Alias]	be filtering for selection list build
Poport	Poport	Open (OpenEilterOply and Eilter pet supported	Croup Croupling Obj@[Poport]
κεροπ	кероп	, Open (OpenFilterOnly and Filter not supported	, GroupItem@Obj@[Peport]
Chart	Chart name	Bup	Group* Crouptom Obj@[Chart]
Chart		Ruit	, GroupItem@Obi@[Report]
SpatialView	Thematic man	Onen	
Data			Fooder (used to build a list of tables for carrying out
Feeder			committing data and flagging most recent data)
Popup	FieldName	, Display Image (Video), Display Data Table	

[1]: an object can be defined under one function group (button), but executed through another function group. This is called redirection. The format is ObjectName->Function Group, for instance, defining a chart object FWP\_Chart under Tools but run through chart, FWP\_Chart->Chart

[2]: value can be empty, and default operation will be used

[3]: when a Group is used, a menu group with sub menu will be created. All submenu are defined by GroupItem

[4]: CMT and MRD must be under tools and are internal name for dedicated functions. A list of data tables (Feeder) will be defined for the operation.

### 19.6 Use Sub System

Sub system(s) definition is embedded within database. Once a sub system is defined, it will be automatically added to NODEM system menu under View | Sub Systems. The one set as default will automatically start. A sub system can also be started by selecting from the sub menu.

File	View	Mode	Tools	Wi	ndow Help
	Ор	eration I	Log		
	Sub Systems			•	Footpath Management System
	Database Objects			Kerb Channel Management System	

### **19.7 System Built-in Statements**

Here are some NODEM system built-in statements

#### **Runtime input statement**

Applies to batch, trigger, model etc

Operation	description
Comment or Remark	anything
LoopStart*	applies to trigger only. Issue edit data command
UnAttended	execution cannot be stopped
NullStringValue	default value if Null
NullNumberValue	default value if Null
NullDateValue	default value if Null
InputTextBox	gain input from user
InputComboBox	gain input from user
InputListBox	gain input from user
InputCheckBox	gain input from user
InputCalculation	calculate a variable expression
OutputCalculation	calculate a variable expression and save it to database. Applies to trigger only
InputFileFolder	browse for a folder as input
InputFileOpen	browse for a file to open
InputFileSave	browse for a file to save

	InputConfirmation	message for confirmation (continue or not etc)
	LookupData*	lookup data for runtime variables
	ShowMessage RunCommand RunSQL LoopEnd* Anything else	display message (or status or variable value etc) in operation log (if Variable, then value; if Confirmation, then as confirmation) Reserved run SQL statement Applies to trigger only. Issue update command and resume to LoopStart Treat as object operation (such open table, run mode, run chart etc)
	* Item defined in model works differently and not for runtime variables	
Model Statement	Including model definition and runtime controlling	except Runtime Variables, all will only be resolved at model execution time
general statement		
	InputTextBox, InputComboBox, InputListBox, InputCheckBox InputCalculation UnAttended NullStringValue NullNumberValue NullDateValue Remark, Comment ShowMessage ResumeFromError RunCommand RunOperation RunSQL ProgressControl PreCompileMode MaximumAlternatives	runtime variable (before model execution) runtime variable (before model execution) whole process whole process whole process whole process comment only Variable, Constant or Confirmation, can be used as runtime controlling whole process Reserved execute operation (before model execution) execute operation (before model execution) display execution progress (Model execution only) for model execution for model execution (generate strategy only)
	AllowDoNothing	for model execution (generate strategy only)

	BreakOn, SkipOn, FilterOn,	
	IFStart	model runtime logic controlling
	LookupData	model runtime using
	OutputData	model runtime using
	LoopStart	model runtime logic controlling. Can loop through a table, query or a value range
	ClearReset, LoadReset, WriteReset, Reset Intilialise, Calculate, Update,	model runtime controlling (generate strategy only)
	ElseStart, IfEnd, Directive	model runtime controlling (generate strategy only)
Dedicated Statement		
	OptOrganiseData	organise strategy data (finish the link list) (part of optmisation)
	OptTransposeData	transpose data to make each strategy has only one record (part of optmisation)
	OptCalcNPVBCR	calculate NPV BCR based on transposed data (part of optmisation)
	OptCalculateIBC	calculate IBC based on transposed data (part of optmisation) do optimisation based on transposed data with NPV or IBC etc (part of
	OptDoOptimisation	optmisation)
	PriDoPrioritisation	Do prioritisation based on data (can be any source)
	PrgSchDoProgramSchedule	do programming and scheduling (data need to be organised first after optimisation or prioritisation)
Optimisation Definition	Optimsation can include d	lata organising, transposing, BC/NPV/IBC calculation and optimisation
	OptimiseDefStart	definition start
	OptSourceData	source data to be optimised (organize data output as well)
	OptMaxIteration	maximum run iteration for optmisation
	OptOutputData	optimisation output (or transpose output as well)
	OptIdentityField, OptAlternativeField, OptPrevAlternativeField, OptStrategyYrField, OptDiscFactorField, OptInflateFactorField	field match definition

OptTrtCostField, OptTrtTypeField, OptTrtCatgField, OptBenefitField	Root definition to do field match (eg field may be a combination of year, type, category etc). Field to calculate performance index improvement area (compare with base
OptPIAreaField	option)
OptDoNothingTrt, OptDoMinimumTrt, OptRoutineTrt, OptStrategyYrLimit, OptFinancialTax	a value (or constant) to assign to these definitions
OptBudgetCategory, OptBudgetScenario, OptAnalysisPeriod,	a value (or constant) to assign to these definitions, and will be used to resolve budget scenario definitions
OptBenefitFactor, OptCostFactor	factor used inside calculation
OptTotDiscCostName, OptTotDiscBenefitName, OptTotUnDiscCostName, OptTotUnDiscBenefitName, OptDiscBCName, OptUnDiscBCName, OptIBCName, OptBCRName,	
OptNPVName	field for writing total data (and may or may not exist)
OptIBCOnField	Apply IBC calculation on field name
OptIBCCheckBC	Check Benefit>Cost or not
OptPIAreaFieldSlope	1: upward slope; -1: downwards slope
OptSelName	Select field name. Temporarily for optimisation (not used)
OptTransposePrdCostName	Data transpose definition
OptMaxFieldName OptMinFieldName	field to do Max or Min calculation if based on value only. Field name in Output table. Can be benefit or BCR for Max, Field name in Output table. Can be cost or NPV etc for Min
OptOptimalRoot	optimal field Root

	OptPickupFirstTrt, OptPickupSecondTr OptOnDiscBC OptFinishOnMinCostOpt OptIncludeField OptFilterField OptBudgetPeriodData	generate First or Second Treatment related data or not optimisation on Discounted BC (not used) Stop if budget not enough for min cost (not used) Field(s) included for transpose (and it is year based) Field(s) included for transpose (and not year based) budget period data definition
Prioritisation Statement	OptBudgetPeriodID, OptBudgetPeriodFrom, OptBudgetPeriodTo OptimiseDefEnd <i>Prioritisation only work of</i> PriorityDefStart PriAllowBudgetToCarry PriorityData	Field definition inside budget period data definition end <b>In calculated result, and data order must be clearly defined in data source.</b> allow budget to carry to next year or not data as source and output
	PrildentityField, PriTrtCostField, PriTrtTypeField, PriTrtCatgFieldPriSelName, PriTrtYrFldName	Field match definition
	PriBudgetCategory, PriBudgetScenario PriBudgetPeriodData	Root definition to do field match (eg field may be a combination of year, type, category etc). budget period data definition
	PriBudgetPeriodID, PriBudgetPeriodYear PriorityDefEnd	Budget period field definition (only year, not from and to, so need to organise the original calculation right as well) definition end
Programming/Scheduling	Before can be played, pro	gram/scheduling data must be organised to feed this model
	PrgSchDefStart	definition start
	PrgSchDataTable, PrgSchDataQuery PrgSchBudgetScenario	data table or query to play on budget scenario definition
	PrgSchIdentityField, PrgSchSelectField, PrgSchModifyField, PrgSchDataSourceField	field match definition

PrgSchCostAdjField, PrgSchOptSelectedField, PrgSchPriSelectedField, PrgSchTrtTypeField	field match definition
PrgSchTrtYearField, PrgSchTrtCostField, PrgSchTrtCatgField, PrgSchOptTrtYearField	field match definition
PrgSchOptTrtTypeField, PrgSchOptTrtCostField, PrgSchOptTrtCatgField, PrgSchMCAField	field match definition
PrgSchCostData, PrgSchMCAData, PrgSchPriorityData, PrgSchOptimalData PrgSchMCAModel	data to be used MCA model to be executed during playing