Asset Management GASB 34 Compliance Phase III (HYDRA+)

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Executive Summary

The Alabama Department of Transportation (ALDOT) is faced with critical challenges as it attempts to maintain a desirable level of pavement condition despite ever increasing traffic load, increasing heavy-load truck traffic, resurfacing costs outpacing inflation, and only modest increases in their maintenance budgets. Thus as this project began, management of the State's transportation assets required information system refinements to continue to build and *effectively* maintain the state's transportation network. To meet this challenge the Highway Yearly Data Reduction and Analysis (HYDRA+) system was developed as a network level digital database and reporting pavement system.

Phase III of the HYDRA+ development and deployment delivers:

- 1. Modules designed to monitor the integrity of data received, generate exception reports for potentially invalid data, permit administrative changes to the data, support automated and manual data input, and generate a transaction log;
- 2. A set of budget calculator tools to estimate future budgets and target conditions;
- 3. Extension of the database to provide overlay-centric query and reporting capabilities;
- 4. Generation of refined Preliminary Prioritization Reports and ad-hoc reports, given static yearly routes and overlay tables;
- 5. Ad hoc reporting through Crystal ReportsTM;
- 6. Process and numerical verification for 2003 and 2004 GASB34 condition ratings for the network-wide flexible pavement system, including meetings with State Auditors; and
- 7. Knowledge Transfer to ALDOT staff for the resulting pavement management system (HYDRA+).

Introduction

Faced with the critical challenges of maintaining a desirable level of pavement condition despite an ever increasing traffic load, increasing heavy-load truck traffic, resurfacing costs outpacing inflation, and only modest increases maintenance budgets Thus as this project began, management of the State's transportation assets required information system refinements to continue to build and *effectively* maintain the state's transportation system and to meet the following challenges.

The University of Alabama's Aging Infrastructure Systems Center of Excellence (AISCE), working with the Alabama Department of Transportation (ALDOT), developed the Pavement Asset Management system to meet this challenge. This roadway maintenance management system is known as the Highway Yearly Data Reduction and Analysis (HYDRA+) system. HYDRA+ provides a network level digital database and reporting pavement system. Pavement physical characteristics and conditions are validated and stored; augmented with traffic data, these parameters are transformed into distress indices; and structured to be accessible for reporting. A set of standard reports have been created to aid in prioritizing resurfacing projects and for GASB 34 reporting.

Project Deliverables

HYDRA+ Phase III Deliverables:

Built on the foundation provided by HYDRA+ Phase II capabilities, the development and deployment of HYDRA+ Phase III system enhancements ensure the effective utilization and long-term viability of the system. This is accomplished through the completion of the following deliverables.

1. Refinement and Deployment of Phase II Components

- An administrative console for the HYDRA+ system to update application variables and algorithms, modify historical data and adjust security privileges (See Appendix B: User's Manual);
- Role-based restricted access to system data and functions (administrator, supervisor or tester) (See Appendix A: Technical Operations Manual: Figure A.3, Figure A.11);
- Data analysis and custom *ad-hoc* reporting using Crystal Reports[™] (Appendix A: Technical Operations Manual: Figure A.2; Appendix B: HYDRA+ System User's Manual);
- Data set creation and export to enable generation of network-level maps and graphic charts to enhance what-if analysis, reporting and decision-making capabilities

2. Development and Deployment of Data Validation Support Components

- Assess and validate the data types, ranges, completeness and relationships among required fields associated with the following data (See Appendix A: Technical Operations Manual; Appendix B: User's Manual):
 - Counties and Divisions
 - New Overlays
 - Condition ratings
 - Friction ratings
 - Traffic counts
- Generate exception reports to alert administrator of potential data integrity problems (See Appendix B: User's Manual)
- Enable administrator to insert or change required data (See Appendix B: User's Manual)
- Alert system users of potential data integrity problems that occur during the manual data input operations (See Appendix B: User's Manual)
- Create a transaction log detailing system user changes to data inputs as required for audits and user accountability (See Appendix B: User's Manual)

3. Creation of Pavement Budget and Target Condition Calculator (See Appendix D: Cost-Budget Calculators)

The contract proposal specified a database modification to support overlay structure. The Project Advisory Committee (PAC) requested that this work be removed, and replace by a budget and target condition calculator be substituted.

- The target condition component of the Pavement Maintenance Cost Analysis Budget Calculator allows the user to enter a cost per lane mile for state routes and interstate routes, the rating decay rate, the desired rating to be achieved, the budget inflation rate, and the number of years to achieve the desired rating. The calculator displays the current ratings for every division in the state, plus an average for all divisions. Once the forecast is generated, the calculator will display the budget for each year in each division that must be allotted to achieve the desired rating. The calculator also displays the percentage of the budget that will be allotted to each division and the total that must be spent on that division.
- The budget forecasting component provides estimated future condition values. The user enters a budget amount per division, cost per lane mile for state routes and interstate routes, the rating decay rate, and the budget inflation rate. The calculator displays the state's budget for state and interstate routes, and also the deflation budget for state and interstate routes. It also displays the percentage of state budget allocated to each division. Resultant ratings by division are shown according to the percentage of budget allocation.

4. Refinement and Deployment of Report Generation and Historical Querying Capabilities

- Enable user-defined dates (as-of date and projected number of years) to enable the generation of refined Preliminary Prioritization Reports and ad-hoc reports, given static yearly routes and overlay tables (See Appendix B: User's Manual; Appendix E: Tester's Manual)
- Compare the roadway characteristics of overlays or larger roadway segments across userdefined time periods (See Appendix B: User's Manual)

5. Verification of the Process and Calculation of 2003 GASB 34 Condition Ratings

- Calculate, document and report the roadway condition ratings for 2003 following the procedure developed in the GASB 34 Phase II (See Appendix F: GASB 34)
- Verify results and documentation with ALDOT personnel and State Auditors (See Appendix F: GASB 34)
- Generate GASB 34 reports for 2003 using 2002 algorithms (See Appendix D: Cost-Budget Calculator)
- Extend project scope to provide the capability to use 2002 algorithms to allow for generation of GASB 34 reports for 2004 (See Appendix F: GASB 34)
- Document all deviations from the procedures used in the prior year
- Met with state auditors to review the 2003 and 2004 GASB 34 roadway condition rating report as required
- Data sets required for maps were developed by Materials and Test personnel and transferred to GIS personnel for mapping based on specific formats coordinated by the GIS personnel to ensure the appropriate format is generated for a specific mapping application GIS toolsets.

6. Knowledge Transfer for the HYDRA+ System

- Delivered design specifications for manual and automated workflow to enhance the efficiency, effectiveness, and integration of activities associated with data acquisition, validation, querying, and reporting of roadway assets (See Appendix A: Technical Operations Manual)
- Conduct training for advanced query development and custom report generation
- Delivered design capabilities to integrate facets of the roadway data repository (e.g. traffic volume, functional route status, NHS designation, etc.)
- Refined, in collaboration with ALDOT personnel, the HYDRA+ Technical Operations Manual and User's Manual (See Appendix A: Technical Operations Manual; Appendix B: User's Manual)
- o Established feedback procedures to identify potential system enhancements

7. Modifying the Database Structure

Modifications have been made to the software and database to enable the "as-of" time aspect to the system's querying and reporting capabilities and present a more overlay-centric view of the state's roadway assets given a static yearly routes and overlay tables (See Appendix A: Technical Operations Manual).

Appendix A: Technical Operations Manual

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System Overview

The HYDRA+ system is implemented using a multi-tier client/server architecture. This appendix provides the technical details for its implementation. The client component to the Oracle connection is detailed in Section 1: HYDRA+ Client. The server engine is Oracle 9i. The server manages data storage and most report generation business logic and is implemented in stored procedures. The client component provides user interfaces (input and output) plus initial data value for pavement condition values. Configuration details for the server side are detailed in Section 2: Oracle Installation.

Section 3 provides system hierarchical functional decomposition; that is the graphical flow of the HYDRA+ system. In addition, Section 3 provides the database structural organization in the form of Entity Relation Diagrams (ERD). Section 4 provides documentation for forms, packages, procedures and triggers.

Section 1: HYDRA+ Client

HYDRA+ Program Installation Instructions:

<u>Step 1:</u>

• Insert the HYDRA+ Installation CD

<u>Step 2:</u>

- The program should begin installing automatically after a few seconds
 - If auto-run is disabled, open windows explorer and navigate to the CD-drive
 - Double-click on "setup.exe"
 - The installation should now begin

<u>Step 3:</u>

- Navigate to C:\Program Files\Common Files\System\Ole DB\Data Links\
- Open the file HYDRA+.udl by double-clicking
- The Data Source should be set to "HYDRA+DB"

🗒 Data Link Properties 🛛 🗙
Provider Connection Advanced All
Specify the following to connect to this data:
1. Enter the data source and/or location of the data:
Data Source: HYDRADB
Location:
2. Enter information to log on to the server:
C Use <u>W</u> indows NT Integrated security
Use a specific user name and password:
User name: HYDRA
Password:
Blank password Allow saving password
3. Enter the initial catalog to use:
Test Connection
OK Cancel Help

Figure A.1: Data link properties

Step 4:

- Click the "Test Connection" button.
- If the connection was successful, the message "Test connection succeeded." will appear in a message box, and the installation is complete



Figure A.2: Test connection succeeded

<u>Step 5:</u>

• If a Microsoft Data Link Error occurs, perform the following steps



Figure A.3: Microsoft data link error

Step 6:

- Navigate to C:\Oracle\network\ADMIN
- o Double click on "tnsnames.ora" and open in Notepad
- If the following text is not located in the file, copy and paste the following into the Notepad window:

```
HYDRA+DB =

(DESCRIPTION =

(ADDRESS_LIST =

(ADDRESS = (PROTOCOL = TCP)(HOST = MITCORASVR)(PORT = 1521))

)

(CONNECT_DATA =

(SID = HYDRA+DB)

(SERVER = DEDICATED)
```



Figure A.4: Tsnames.ora

<u>Step 7:</u>

 \circ Return to C:\Program Files\Common Files\System\Ole DB\Data Links\ and open the "HYDRA+.udl" file.

<u>Step 8:</u>

- Test the connection again
- If the connection was successful, the message "Test connection succeeded." will appear in a message box
- Installation is now complete



Figure A.5: Test connection succeeded

Section 2: Oracle Installation

Oracle Database Installation Outline

- <u>Delete an Oracle Database</u>.
 Refer to *Delete Oracle Database*
- <u>Use Universal Installer to install Oracle products</u>.
 o Refer to <u>Install Oracle Products</u>
- <u>Create the Oracle service. Meaning create the instance of Oracle on the host.</u>
 O Refer to <u>Create Oracle Database Instance</u>
- <u>Check services to see if Oracle created the listener</u> (e.g. OracleOraHome92TNSListenerTESTDB)
- <u>If listener is not present, proceed to Net Configuration Assistant and create a</u> <u>listener with Listener configuration</u>.
 - Refer to <u>Create Oracle Database Listener</u>
- <u>Complete Naming Methods configuration in Net Configuration Assistant</u>.
 o Refer to <u>Create Naming Methods for Oracle Database</u>
- <u>Complete Local Net Service Name configuration in Net Configuration Assistant</u>.
 O Refer to <u>Create Local Net Service Name for Oracle Database</u>
- Go to Enterprise Mgr Console
 - <u>Add database to the tree</u>
 - Logon as SYSTEM, because only user that has permissions at this time, until DBA creates new users
 - Create Tablespace, because each user needs a default tablespace
 Refer to <u>Create Tablespace in Oracle Database</u>
 - <u>Create User for HYDRA+</u>
 Refer to Create User in Oracle Database
 - Import Data
 Refer to Exporting HYDRA+ Database
 - o <u>Export Data</u>
 - Refer to *Exporting HYDRA+ Database*

Install Oracle Products:

<u>Step 1:</u>

- Extract Oracle files:
 - a. Create folders "disk1", "disk2", "disk3" all in the same folder (example "C:\Temp\ disk1", "C:\Temp\ disk2", "C:\Temp\ disk3")
 - b. Insert Oracle disk 1, 2, or 3
 - c. Extract each .zip files to its respective folder (Example: Oracle disk 1 goes in "C:\Temp\disk1")
 - d. Repeat a, b, and c for all three disks

Step 2:

• Run "setup.exe" located in the "disk1" folder (NOTE: All Oracle files must be uninstalled before starting the process. Use the Oracle Universal Uninstaller to accomplish this. Refer to "Delete an Oracle Database.doc" for detailed instructions.

Step 3:

• The setup process begins with the "Welcome" screen:

Oracle Universal Installer: Welcome	<u>- 🗆 ×</u>
Welcome	
The Oracle Universal Installer guides you through the installation and configuration of yo Oracle products.	iur
Click "Installed Products" to see all installed products.	
Deinstall Products	
About Oracle Universal Ins	taller
Exit Help Installed Products Previous Nex	đ

Figure A.6: Welcome screen to universal installer

Step 4:

• Click "Next" on the "Welcome" screen to get to the "File Locations" screen

Step 5:

- If you want to change the path for Oracle from the default settings, do so here
 When you are finished, click next

🛃 Oracle l	niversal Installer: File Locations		<u>_ ×</u>
File I	ocations		
Sourc	e		
Enter th	e full path of the file representing the product(s) you want to install:		
Path:	E:\Temp\disk1\stage\products.jar		Browse)
Destin Enter o	ation select an Oracle Home name and its full path:		
Name:	OraHome92		
Path:	E:\oracle\ora92	-	Browse
	About Or.	acle Unive	rsal Installer
E	it Help Installed Products Previo	us	Next
ORACI	E		

Figure A.7: File locations

Step 6:

• The products will begin loading now. Wait for the "Product Selection" screen...



Figure A.8: Loading from file location

Step 7:

• When the "Available Products" screen appears, choose "Oracle 9i Database 9.2.0.1.0" and click "Next"



Figure A.9: Available products

Step 8:

- You will now be on the "Installation Types" screen
- Select "Enterprise Edition" on the "Installation Types" screen and click "Next"
- The installation program will load the necessary files



Figure A.10: Loading installation types

Step 9:

- On the "Database Configuration" screen, choose "Software Only" and click "Next"
- Wait for the "Oracle Services for Microsoft Transaction Server" screen...



Figure A.11: Software only database configuration

Step 10:

- When the "Oracle Services for Microsoft Transaction Server" screen appears, use the When the "Oracle Services for Wherosoft In default port number 2030 and click "Next"
 Wait for the "Summary" screen to appear

Processing XDK Required Support Files 9.2.0.1.0 97% Oracle Services for Microsoft Transaction Server Oracle MTS Recovery Service Configuration The Oracle MTS Recovery Service is automatically installed with Oracle Services for Microsoft Transaction Server. The Oracle MTS Recovery Service accepts requests to resolve in-doubt MS DTC-coordinated transactions started on this computer. Enter the port number on which the Oracle MTS Recovery Service will listen for requests on this computer.
Oracle Services for Microsoft Transaction Server Oracle MTS Recovery Service Configuration The Oracle MTS Recovery Service is automatically installed with Oracle Services for Microsoft Transaction Server. The Oracle MTS Recovery Service accepts requests to resolve in-doubt MS DTC-coordinated transactions started on this computer. Enter the port number on which the Oracle MTS Recovery Service will listen for requests on this computer.
Oracle MTS Recovery Service Configuration The Oracle MTS Recovery Service is automatically installed with Oracle Services for Microsoft Transaction Server. The Oracle MTS Recovery Service accepts requests to resolve in-doubt MS DTC-coordinated transactions started on this computer. Enter the port number on which the Oracle MTS Recovery Service will listen for requests on this computer.
The Oracle MTS Recovery Service is automatically installed with Oracle Services for Microsoft Transaction Server, The Oracle MTS Recovery Service accepts requests to resolve in-doubt MS DTC-coordinated transactions started on this computer. Enter the port number on which the Oracle MTS Recovery Service will listen for requests on this computer.
Port Number: 2030
Exit Help Installed Products Previous Next

Figure A.12: Oracle services for Microsoft transaction server

Step 11:

• When the "Summary" screen appears, click "Install"



Figure A.13: Installation summary screen

Step 12:

• Wait while Oracle installs

Uracle Universal II	nstaller: Install				
Install					
Installing Oracle	JDBC Thin Drive	r for JDK 1.1			
9.2.0.1.0				Oracle 9/	
				The comple e-business	ete solution
Copying ocrs12.zip	0%				
Copying ocrs12.zip	0%			12	XX
Copying ocrs12.zlp Cancel You can find a log of C:\Program Files\Ora	0% this install session cleVnventoryVogsV	at: nstallActions2003-11-25_04-	35-58PM.log		\approx

Figure A.14: Oracle installation progress screen

Step 13:

- "End of Installation" screen appears
- Click "Exit", and then "Yes" when the confirmation box opens

Oracle Universal Installer: End of Installation		_ 🗆 🗵
End of Installation		
The installation of Oracle	×	
Please remember The following information i:	Do you really want to exit?	A
E:\oracle\ora92\Apache\Ar		
The HTTP Server can be a	<u>Yes</u> <u>N</u> o	
http://mitcstatsvr:7778		
111293.7711123121391.4440		
	ON	
Exit Help Ins	talled Products Previous	Next Install
DRACLE		

Figure A.15: Confirm completion of installation

<u>Step 14:</u>

- Disable the Oracle Web Server
 - a. Go to Start->Settings->Control Panel->Administrative Tools->Services
 - b. Right click on "OracleOraHome92HTTPServer"
 - 1. Choose "Properties"
 - 2. Select "General" tab
 - 3. Change startup type to "Disable"
 - 4. Click "Apply"
 - 5. Click "Ok"
 - 6. Exit Services+

Create Oracle Database Instance

Step 1:

• Navigate to "Start->Programs->Oracle-OraHome92->Configuration and Migration Tools->Database Configuration Assistant"

Step2:

• When the "Welcome" screen appears, click "Next"

Database Configuration Ass	istant : Welcome	<u> </u>
	Welcome to Database Configuration Assistant for Oracle database. The Database Configuration Assistant enables you to create a database, configure database options in an existing database, delete a database, and manage database templates.	58
Cancel Help) (< Back Next >>)	

Figure A.16: Welcome screen for database configuration assistant

<u>Step 3:</u>

• On the "Operations" screen, select "Create a database" and then click "Next"

Database Configuration Assista	nt, Step 1 of 8 : Operations	<u>-0×</u>
	Select the operation you want to perform © Create a database C Delete a database C Manage Templates	
Cancel Help	S Back Next >>	

Figure A.17: Database creation operations

Step 4:

- Select Template Name "New Database" with the "Include Datafiles?" option equal to "No"
- Click "Next"



Figure A.18: Database templates

<u>Step 5:</u>

- Enter "HYDRA+DB" as the Global Database Name
 Enter "HYDRA+DB" as the SID

Database Configuration Assis	tant, Step 3 of 8 : Database	e Identification		
	Specify the following data An Oracle9i database is u "name.domain". Global Database Name: A database is referenced	base information. Iniquely identified by a Glot [testdb] by at least one Oracle9i in:	cal Database Name, typically of the for stance which is uniquely identified from	n any
	SID:	testdb		
Cancel Help			G Back Next >) Ei	nish)

Figure A.19: Specify database information

Step 6:

• In the "Database Features" screen, deselect each feature available (NOTE: When deselected, some of the features will ask to delete the tablespace for the feature. When this occurs, select "Yes" as prompted.)

Database Configuration Assist	ant, Step 4 of 8 : Database Features	<u>-0×</u>
	Database Features Custom Scripts	
	Select the features you want to configure for use in your database:	
-	🔽 Oracle Spatial	
	🗹 Oracle Ultra Search	
	Oracle Label Security	
	🔽 Oracle Data Mining	
	☑ Oracle OLAP	
	🔽 Example Schemas	
	I Human Resources	
	☑ Order Entry	
	🔽 Product Media	
	☑ Sales History	
	🔽 Shipping	
	Standard database fea	tures)
Cancel Help	G Back Next >	inish

Figure A.20: Select database features (before screenshot)

Database Configuration Assis	tant, Step 4 of 8 : Database Features	
	Database Features Custom Scripts	
	Select the features you want to configure for use in your database:	
 🖬	Database Configuration Assistant	
	You have deselected the database option "Oracle Data Mining". There is a tablespace "ODM" associated with this database option. Do you also want to delete this tablespace?.	
	Sales History	
	☐ Shipping	
	Standard database	features
Cancel Help	(Back Next >)	Einish

Figure A.21: Database feature selection, delete ODM tablespace



Figure A.22: Database feature selection, delete CWMLITE tablespace
Database Configuration Assist	ant, Step 4 of 8 : Database Features	- O ×
	Database Features Custom Scripts	
	Select the features you want to configure for use in your database:	
	You have deselected the database option "Example Schemas". There is a tablespace "EXAMPLE" associated with this database option. Do you also want to delete this tablespace?.	
	Order Entry Product Media Sales History Shipping	
	Standard databa	se features)
Cancel Help	Sext S	Einish

Figure A.23: Database feature selection, delete EXAMPLE tablespace

Database Configuration Assist	ant, Step 4 of 8 : Database Features	
-	Database Features Custom Scripts Select the features you want to configure for use in your database:	1
	Oracle Ultra Search Oracle Label Security	
	Oracle Data Mining Oracle OLAP	
	Example Schemas Human Resources Order Entry	
	Product Media Sales History	
	L Shipping	atures)
Cancel Help	(<u> ⊴</u> Back <u>N</u> ext ≫) <u>E</u>	inish)

Figure A.24: Database feature selection, deselected database features

Step 7:

- Click the "Standard database features..." button in the lower right-hand side of the window
- Deselect all of the "Standard database features" (NOTE: When deselected, some of the features will ask to delete the tablespace for the feature. When this occurs, select "Yes" as prompted.)
- When all the features have been deselected, click "Ok"
- Then click "Next" to proceed to the next step

Database Configuration As	sistant, Step 4 of 8 : Database Features Database Features Custom Scripts	
	Select the standard database features Select the standard database features you want to configure for use in yr database. Oracle Corporation recommends that you always install these features in your database. Oracle JVM Oracle Intermedia Oracle Text OK Help Bates History Shipping	
Cancel Help	Standard datat	ase features)

Figure A.25: Standard database features

Database Configuration Assis	tant, Step 4 of 8 : Database Features	-미×
	Database Features Custom Scripts	
	elect the standard database features you want to configure for use in you atabase. Oracle Corporation recommends that you always install these satures in your database. Oracle JVM Oracle Intermedia Oracle Text Oracle Text Output Double 1011 DB Output DD	
	OK Help	
Cancel Help	Standard database featu	res) ish

Figure A.26: Standard database features, deselect Oracle JVM feature

a	E standard database features		
	You have deselected the database optio There is a tablespace "DRSYS" associa database option. Do you also want to delete this tablespa Yes	n "Oracle Text". ted with this ce?.	
	LISales History		
		Standard databas	e festures

Figure A.27: Standard database features, delete "DRSYS" tablespace

Database Configuration Assist	ant, Step 4 of 8 : Database Features	_ 🗆 🗙
	Database Features Custom Scripts Standard database features X Database Configuration Assistant X Image: Configuration Assistant X </th <th></th>	
Cancel Help	Standard database fea	tures) inish

Figure A.28: Standard database features, delete "XDB" tablespace

Database Configuration Assistant, Step	o 4 of 8 : Database Features	<u>-0×</u>
Databa Standard Select the database. features in Oracl	ase Features Custom Scripts I database features Standard database features you want to configure for use in yo Oracle Corporation recommends that you always install these your database. e JVM	
	e Intermedia e Text e XML DB (Customize) OK Help)	
	ElBales History	e features)
Cancel Help	(<u> Back</u> Next >) (Einish

Figure A.29: Standard database features, shows deselected standard database features

Step 8:

- Select "Shared Server Mode" to configure for multiple users
- Click "Edit Shared Connections Parameters..."



Figure A.30: Database configuration options

Step 9:

- A "Shared Server Mode" window will open, and the "Basic" basic tab is selected by default
- Choose the "Advanced" tab, and change "Multiplexing" to "On"
- Click "Ok" to return to the "Database Connection Options" screen
- On the "Database Connection Options" screen, click "Next" to proceed to the next step

Shared	Server Mode	×
Basic	Advanced	
Review th appropria	ne following shared server informa ate changes :	tion and make any
Protocol	TCP	•
Number	of dispatchers : erride Default Value :	
Maximun	n number of connections per dispa erride Default Value :	tcher
Maximun Ov	n number of dispatchers erride Default Value : 5	
Number	of server processes erride Default Value :	
Maximun Ov	n number of server processes erride Default Value : 20	
	OK Cancel) (Hel	p)

Figure A.31: Shared server mode options, basic tab

Shared	Server Mode	×
Basic	Advanced	
Review tł make any	he following advanced shared server information y appropriate changes :	and
Multiplexi	ing : Off	Ŧ
Connecti ⋐ Disa — ⊂ Ena	ion Pooling able ible	
Ticks,	in seconds :	
□ inco	ming connections timeout, in ticks :	i i
□ Outg	going connections timeout, in ticks :	ē I
Maximum ☐ Ov	n number of network sessions erride Default Value :	
	OK Cancel (Help)	

Figure A.32: Shared server mode options, advanced tab (before)

Shared	Server Mode	
Basic	Advanced	
Review ti make an	he following adva y appropriate cha	anced shared server information and anges :
Multiplex	ing :	Ön
Connecti Dis	ion Pooling able	
- O Ena	able	
Ticks,	in seconds :	
[Inco	ming connection	ns timeout, in ticks :
□Out	going connection	is timeout, in ticks :
Maximun Ov	n number of netv rerride Default Va	vork sessions

Figure A.33: Shared server mode options, advanced tab (after)

Step 10:

- o On the "Initialization Parameters" screen, select the "Memory" tab
- Select "Typical"
- Set "Percentage of physical memory" to 60%
- Set "Database Type" to "Multipurpose"

Memory	Character Sets	DB Sizing	File Loc	ations	Arch
C Typical					
Percentag	je of physical memor	(2047 MB) for	Oracle: 70)	
Database	Туре:		D	ata Wareho	using
Show d	stribution of Memory.	.)			
Custom					
Shared P	ool: 48			M Bytes	*
Buffer Ca	che: 24			M Bytes	-
Java Pool	: 0			M Bytes	*
Large Po	ol: 8			M Bytes	*
PGA:	24			M Bytes	•
Total Men	nory for Oracle: 144 I otal memory includes arameters , if any.	4 Bytes 40MB of Oracle	Process S	ize and the	defaul
All Initialization	n Parameters)			Fi	e Loc

Figure A.34: Initialization parameters (before), memory tab

Database Configuration Assista	ant, Step 6 of 8 : Initializ	ation Parame	eters				
	Memory Cha	racter Sets	DB Sizing	File Loca	ations	Archive	I,
	Typical						
	Percentage of phy	sical memory	(2047 MB) for C	oracle: 60			
	Database Type:			M	ultipurpose		-
	Show distributio	n of Memory)				
	C Custom						
	Shared Pool:	48			M Bytes		
	Buffer Cache:	24			M Bytes	~	
	Java Pool:	0			M Bytes	-	
	Large Pool:	8			M Bytes	~	
	PGA:	24			M Bytes		
	Total Memory for (Total men parameter	Dracle: 144 M hory includes rs , if any.	1 Bytes 40MB of Oracle	Process Si	ze and the (defaults for th	ie empty
	All Initialization Param	eters)			Fil	e Location Va	ariables)
Cancel Help				🔇 🗄ac	k Nex	t ») (Einish

Figure A.35: Initialization parameters (after), memory tab

Step 11:

- Select the "Character Sets" Tab
- Select "Use the default"

	Memory	Character Sets	DB Sizing	File Locations	Archive
	— Database C	Character Set			
יתהת	Use the	e default			
	The defa operatin	ault character set for ig system: WE8MSW	this database is IN1252.	based on the lang	juage setting of this
	O Use Un	icode (AL32UTF8)			
	Setting of groups.	character set to Unic	ode (AL32UTF8)) enables you to sto	ore multiple languag
<u> </u>	C Choose	e from the list of char	acter sets		
	[VVE8M8	3WIN1252			
<u>}</u> =	National Char	acter Set: AL16UTI	16 🔹		
	All Initialization	Parameters)			File Location Varia
				C2 Deals	

Figure A.36: Initialization parameters, character sets tab

Step 12:

- Select the "DB Sizing" tab
 Change the "Block Size" to 8192 Bytes
 Change the "Sort Area Size" to 50 "M Bytes"
- Click "Next" to proceed to the next step

	Memory	Character Sets	DB Sizing	File Locations	Archive
	Data block is the database can be	smallest unit of s	torage for alloca the database cre	tion and for I/O. Da ation time.	ita block size of a
न्तर्ग 🖃	Block Size:	6144	Bytes		
	Specify the maxi	num amount of m	emory that can b	e used during sor	ting operations. La
-	Value Improves e	Enclency of large s	ons.	-	
	SUIT Alea Size.	524200	Levies .	1	
_					
-					
					~
	All Initialization Pa	arameters)			File Location Var

Figure A.37: Initialization parameters (before), DB sizing tab

	Memory	Character Sets	DB Sizing	File Locations	Archive
	Data block is the database can be	smallest unit of st specified only at t	orage for alloca he database cri	ition and for I/O. Dat eation time.	a block size of a
র্কা 🖻	Block Size:	8192	Bytes	-	
	Specify the maxis value improves a	mum amount of m efficiency of large s	emory that can orts.	be used during sorti	ng operations. Lari
	Sort Area Size:	50	MBytes	-	
<u>_</u>					
	All Initialization P	aramatara)		6	File Location Varia
	An initialization F	arameters			File Location varia

Figure A.38: Initialization parameters (after), DB sizing tab

Step 13:

- The "Database Storage" screen should now be displayed
- For the following "Database Storage" steps, the location of the items for the database needs to be specified. These will show where the drive location was changed (in this example, the drive location was "d:\")

Impo i datafi chang	cific object from within the object type folder and click Remove .
	 prtant: If you select a seed database template, you will not be able to add or remove files, tablespaces, or rollback segments. Selecting a seed template allows you to only nge the following: The name of the database Destination of the datafiles Controlfiles or log groups.
Add Remove	File Location Variables.

Figure A.39: Database storage

- a. Click "Controlfile" under the "Storage" folder on the left of the screen
- b. Change "{Oracle_BASE} to the drive or file location (in this example, the drive location was specified as "d:\")

Hi Controlfile	General Options	
Tablespaces	Controlfile Mirror Image	s:
Datafiles	File Name	File Directory
Rollback Segments	control01.ctl	{ORACLE_BASE}\oradata\{DB_NAME}\
Redo Log Groups	control02.ctl	{ORACLE_BASE}\oradata\{DB_NAME}\
	control03.ctl	{ORACLE_BASE}\oradata\{DB_NAME}\
		{ORACLE_BASE}\oradata\{DB_NAME}\

Figure A.40: Database storage (before), control files

atabase Configuration Assistar	nt, Step 7 of 8 : Database	Storage	
Storage	General Options		
	Controlfile Mirror Image	S:	
⊕-⊡Datafiles	File Name	File Directory	
 ➡ ☐ Rollback Segments ➡ ☐ Redo Log Groups 	control01.ctl	d:\oradata\{DB_NAME}\	
	control02.ctl	d:\oradata\{DB_NAME}\	
	control03.ctl	d:\oradata\(DB_NAME)\	
		diloradata\(DB_NAME)\	
(Add Remove)		File Lo	cation Variables
Cancel Heln		2 Back Nevt	

Figure A.41: Database storage (after), control files

- c. Click the "Datafiles" folder under the "Storage" folder
 o For each datafile, the drive or file location needs to be specified under "Name" on the "General" tab

H Storage	
	General Storage
∲- ⊡ Tablespaces	Name: d:\oradata\(DB_NAME)\undotbs01
	Tablespace: UNDOTB81
- 4 SYSTEM	- Status
	Online C Offline
TOOLS	Cire
UNDOTBS1	File Size: 200 M Bytes
USERS	
⊖ Datafiles	Reuse Existing File
High d:\oradata\{DB_NAME}\indx01.dbf	
Hitoradata (DB NAME) system 01.dbf	
d:\oradata\{DB_NAME}\temp01.dbf	8
- d:\oradata\/DB_NAME.\tools01.dbf	
- dtoradataVDB_NAMENundotbs01.dbf	
d:\oradata\{DB_NAME}\users01.dbf	
⊕ Bollback Segments	
🕀 🖸 Redo Log Groups	
Add Remove)	File Location Variables.

Figure A.42: Database storage, datafiles

- d. Click the "Redo Log Groups" folder under the "Storage" folder
 o For each log group (1, 2, 3), change the file or drive location for the "File Directory"
 - Click "Next" once all the log group file directories have been specified

LIELINDY	General	
	Group #: 1 File Size: 102400) KBytes +
	Redo Log Members:	File Directory
Datafiles Datafiles d:\oradata\{DB_NAME}\indx01.dbf d:\oradata\{DB_NAME}\system01.dbf d:\oradata\{DB_NAME}\temp01.dbf d:\oradata\{DB_NAME}\temp01.dbf	redo01.log	(DRACLE_BASE)\orada
Add Remove)		File Location Variables.

Figure A.43: Database storage (before), redo log groups

Hablespaces		77	
- UINDX - UISYSTEM - UITEMP - UINDOLS - UNDOTBS1	Gener Gener F F Bedo J	ral 1 Froup #: 1 file Size: 102400	(K Bytes +)
USERS	File	e Name	File Directory
 d:\oradata\(DB_NAME)\\indx01.dbf d:\oradata\(DB_NAME)\\system01.dbf d:\oradata\(DB_NAME)\\temp01.dbf d:\orad		JUU 1.10g	
Add Remove			File Location Variables.

Figure A.44: Database storage (after), redo log groups

<u>Step 14:</u>

• Select "Create Database", and then click "Finish".

Database Configuration Assistan	t, Step 8 of 8 : Creation Options	_ _ _×
	elect the following database creation options: Create Database Save as a Database Template Name: Description:	
	Generate Database Creation Scripts Destination Directory: E:\oracle\admin\testdb\scripts	Browse
Cancel Help	🔏 Back 🛛 Ne	xt >) (<u>Einish</u>)

Figure A.45: Database creation options

Step 15:

- \circ Review Summary of database creation.
- \circ Next Figures show the summary of the database creation.
- After reviewing the summary, click "OK"

Creation of database v	vith db nam	e "TEST2DB".	
	Use this te	mplate to create a customized database.	
Common Or	tions		
Option Name	Selected		
Example Schemas	false		
Oracle Data Mining	false		
Oracle Intermedia	false		
Oracle JVM	false		
Oracle Label Security	false		
Oracle OLAP	false		
Oracle Spatial	false		
Oracle Text	false		
Oracle Ultra Search	false		
Oracle XML DB	false		
nitialization	Param	eters	
Namo		Valuo	1
hackground dumn d	oct	(ORACLE BASE)admin/DB NAME)bdumn	
background_ddmp_d	0.01	(or mode_brochadmin(DD_NAME/bddnip	
		Save as a	n HTML fi
		Contract of the second s	

Figure A.46: Database creation summary page1

Name	Value	
background_dump_dest	{ORACLE_BASE}\admin\{DB_NAME}\bdump	
compatible	9.2.0.0.0	
control_files	("d:\oradata\{DB_NAME}\control01.ctl", "d:\oradata\{DB_NAME} \control02.ctl", "d:\oradata\{DB_NAME}\control03.ctl")	00.000
core_dump_dest	{ORACLE_BASE}admin{DB_NAME}cdump	
db_block_size	8192	16
db_cache_size	601MB	
db_domain		
db_file_multiblock_read_count	16	
db_name	TEST2DB	
dispatchers	(protocol=TCP)(mul=ON)	
fast_start_mttr_target	300	
hash_join_enabled	TRUE	
instance_name	TEST2DB	
java_pool_size	OMB	
large_pool_size	118MB	
open_cursors	300	

Figure A.47: Database creation summary page 2

nga aggregate target	267MB	
nroresses	150	
query rewrite enabled	FALSE	
remote login passwordfile	EXCLUSIVE	
shared pool size	200MB	
sort area size	50MB	
star_transformation_enabled	FALSE	
timed_statistics	TRUE	
undo_management	AUTO	
undo_retention	10800	
undo_tablespace	UNDOTBS1	
user_dump_dest	{ORACLE_BASE}\admin\{DB_NAME}\udump	
Character Sets	ue	
Name Val Database Character Set WE8MSV National Character Set AL16U	VIN1252 JTF16	

Figure A.48: Database creation summary page 3

	Control file	e		
d:\oradat	a\{DB_NAME}	Acontrol01.ctl		
d:\oradat	a\{DB_NAME}	Acontrol02.ctl		
d:\oradat	a\(DB_NAME)	Acontrol03.ctl		
aple	spaces			
			-	
NUU 111 3	225			
Status	Name	Туре	Extent management	
Status ONLINE	Name INDX	Type PERMANENT	Extent management	
Status ONLINE ONLINE	Name INDX SYSTEM	Type PERMANENT PERMANENT	Extent management LOCAL LOCAL	
Status ONLINE ONLINE ONLINE	Name INDX SYSTEM TEMP	Type PERMANENT PERMANENT TEMPORARY	Extent management LOCAL LOCAL LOCAL	
Status ONLINE ONLINE ONLINE ONLINE	Name INDX SYSTEM TEMP TOOLS	Type PERMANENT PERMANENT TEMPORARY PERMANENT DEERMANENT	Extent management LOCAL LOCAL LOCAL LOCAL	
Status ONLINE ONLINE ONLINE ONLINE	Name INDX SYSTEM TEMP TOOLS UNDOTBS1	Type PERMANENT PERMANENT TEMPORARY PERMANENT PERMANENT, UNDO	Extent management LOCAL LOCAL LOCAL LOCAL LOCAL	

Figure A.49: Database creation summary page 4

ONLINE	UNDOTES1	PERMANENT UNDO	OCAL	<u> </u>	
ONLINE	USERS	PERMANENT	LOCAL		
Data	Files				
Etatuo		Nome	Tobloonage	Cino/M	
ONLINE	d:)oradata)(D	NAME))indx01 dbf	INDX	312e(IM)	
ONLINE	d:\oradata\{D	B NAME%system01.dbf	SYSTEM	250	
ONLINE	d:\oradata\{D	B NAME (temp01.dbf	TEMP	40	
ONLINE	d:\oradata\{D	B_NAME)\tools01.dbf	TOOLS	10	
ONLINE	d:\oradata\{D	B_NAME}undotbs01.dbf	UNDOTBS1	200	
ONLINE	d:\oradata\{D	B_NAME}users01.dbf	USERS	25	
Group S 1 1 2 1 3 1	Log Gr 5ize(K) 02400 02400 02400	roups			

Figure A.50: Database creation summary page 5

<u>Step 16:</u>

• Wait while the database is created...

Database Configuration Assistant, Step 8 of 8 : Select the follow	Creation Options ing database creation options:	<u>-0×</u>
Database Configuration As	Seistant Creating and starting Oracle instance Creating database files Creating data dictionary views Completing Database Creation Database creation in progress 38% Stop	X
Cancel Help	G Back	Next > Einish

Figure A.51: Database is created

Step 17:

- Type in the "SYS" and "SYSTEM" passwords (NOTE: Remember these passwords they will be used to enter the database for the first time)
- Click "Exit"

	Database creation complete. Check the logfiles at E:\oracle\admin\testdb\create for details.	
P	Database Information: Global Database Name: testdb System Identifier(SID): testdb Server Parameters Filename: E:toracletora92t/databasetspfiletestdb.ora	
	Change Passwords	
	For security reasons, you must specify a password for the SYS and SYSTEM accounts in the new database.	
	SYS Password:	
	Confirm SYS Password:	
	SYSTEM Password:	
	Confirm SYSTEM Password:	Browse
	Note: All database accounts except SYS, SYSTEM, DBSNMP, and SCOTT are locked. Select the Password Management button to view a complete list of locked accounts or to manage the database accounts. From the Password Management window, unlock only the accounts you will use. Oracle Corporation strongly recommends changing the default passwords immediately after unlocking the account.	
	Password Management)	

Figure A.52: Creating passwords for the database instance

Create an Oracle Database Listener:

A listener is created to allow the Oracle service to listen for requests from Oracle clients.

Step 1:

- To create a listener, navigate to Start->Programs->Oracle-OraHome92->Configuration and Migration Tools->Net Configuration Assistant
- Select "Listener configuration"
- Click "Next"



Figure A.53: Net configuration assistant welcome

<u>Step 2:</u>

- Select "Add"
- Click "Next"

Oracle Net Configuration Assistant	: Listener Configuration, Listener	×
	For remote connections to be made to your Oracle database, you must configure a Oracle Net listener. The Oracle Net Configuration Assistant allows you to add, reconfigure, rename or delete a listener.	
	Select what you want to do:	
	Add	
A CONTRACT	O Reconfigure	
	C Delete	
State of the second sec	O Rename	
Cancel Help	<u> </u>	

Figure A.54: Listener configuration, listener

<u>Step 3:</u>

- Type in the service name of the databaseClick "Next"

Oracle Net Configuration Assistant: Lis	stener Configuration, Listener Name	×
	For remote connections to be made to your Oracle database you must have at least one Oracle Net listener. Enter the name of the listener you want to create: Listener name: TESTDB	
Cancel Help	🔇 Back 🛛 Next 📎	

Figure A.55: Listener configuration, listener name

<u>Step 4:</u>

- Select "TCP" as the network protocol
 Click "Next"

Oracle Net Configuration Assistant:	Listener Configuration, Select Protocols	×
	You can configure the listener to accept connections over one or more protocols. Select which protocols you want to configure for this listener. Keep your configuration as simple as possible by configuring only the protocols you need.	
	Available Protocols Selected Protocols TCPS IPC NMP	
Cancel Help	(⊴ Back <u>Next</u> ≫)	

Figure A.56: Listener configuration, select protocols

<u>Step 5:</u>

- The default setting for port 1521 is appropriate default for the TCP/IP network protocol
 Click "Next"

Oracle Net Configuration Assistant:	Listener Configuration, TCP/IP Protocol	×
	Which TCP/IP port number should the listener use? The port number selected should not be used by any other software on this computer.	
	Use the standard port number of 1521 Use another port number: 1521	
Cancel Help	S Back Next >	

Figure A.57: Listener configuration, TCP/IP protocol

<u>Step 6:</u>

- Select "No" to configuring another listener
 Click "Next"

Oracle Net Configuration Assistant: Listene	r Configuration, More Listeners?	×
	Would you like to configure another listener? No Yes	
Cancel Help		

Figure A.58: Listener configuration, more listeners

Step 7:

- A screen verifies that the listener has been configured
- Click "Next"
- Click "Finish



Figure A.59: Listener configuration done

Step 8:

- To ensure the listener has been configured and running, navigate to the following: Start->Settings->Control Panel->Administrative Tools->Services
- Scroll the menu and see if the an Oracle listener is displayed as "Started"

Create Naming Methods:

<u>Step 1:</u>

- After a listener has been verified or created, naming methods for Oracle must be configured
- Go to Start->Programs->Oracle-OraHome92->Configuration and Migration Tools->Net Configuration Assistant
- The "Oracle Net Configuration Assistant: Welcome" screen opens
- Select "Naming Methods configuration"
- o Click "Next"

Oracle Net Configuration Assist	ant: Welcome X
	Welcome to the Oracle Net Configuration Assistant. This tool takes you through the following common configuration steps: Choose the configuration you would like to do: C Listener configuration
	 Naming Methods configuration Local Net Service Name configuration Directory Usage Configuration
Cancel Help) < Back Next > Einish

Figure A.60: Select naming methods configuration

Step 2:

- For HYDRA+ at the University of Alabama, the selected naming methods necessary were "Local" and "Oracle Names"
- Click "Next"

Oracle Net Configuration Assist	ant: Naming Methods Configuration, Select Naming Methods	×
Oracle Net Configuration Assist	When connecting to a remote database or other service you specify a net service name. This name is resolved using one or more naming methods into the information necessary to locate and connect to the database or service. Select the naming methods you want to use for resolving net service names and the order in which you want them used. Keep your configuration as simple as possible by configuring only the naming methods you need. Recommended naming methods have been preselected for you. Available Naming Metho Host Name Sun NIS DCE CDS	×
Cancel Help) <u> </u>	

Figure A.61: Naming methods configuration, select naming methods

Step 3:

• The next screen confirms that the naming methods have been properly configured

Create Local Net Service Name:

Step 1:

- To create a Local Net Service Name, go to Start->Programs->Oracle-OraHome92->Configuration and Migration Tools->Net Configuration Assistant
- Choose "Local Net Service Name configuration"
- o Click "Next"



Figure A.62: Add net service name

Step 2:

- Select "Add" (NOTE: If the "Delete" option is available and the full installation began with deleting an old database, choose "Delete" and remove any previous Net Service Name in the same manner as adding)
- Click "Next"

Oracle Net Configuration Assistant	: Net Service Name Configuration X
	To access an Oracle database, or other service, across the network you use a net service name. The Oracle Net Configuration Assistant allows you to work with net service names resolved using local naming.
	Select what you want to do:
7	Add
	C Reconfigure
	C Delete
4	O Rename
1 MARX	CTest
Cancel Help	🔇 Back Next 📎

Figure A.63: Net service name configuration
<u>Step 3:</u>

- Choose the Oracle Database version ("Oracle 8i or later database or service")
 Click "Next"

Oracle Net Configuration Assistant:	Net Service Name Configuration, Database Version	×
	What version of Oracle database or service do you want to access?	
	Oracle8i or later database or service Oracle8 release 8.0 database or service	
Cancel Help		

Figure A.64: Choose database version

<u>Step 4:</u>

- Enter the service name that was entered when creating the database
 Click "Next"

Oracle Net Configuration Assistant: Net	Service Name Configuration, Service Name	×
	For an Oracle8i or later database or service you must provide its service name. An Oracle8i or later database's service name is normally its global database name. Service Name: TESTDB	
Cancel Help	🔇 Back 🛛 Next >>	

Figure A.65: Enter service name

<u>Step 5:</u>

- Select the network communication protocol. (University of Alabama uses TCP)
- Click "Next"

Oracle Net Configuration Assistant	Net Service Name Configuration, Select Protocols	×
	To communicate with the database across a network, a network protocol is used. Select the protocol used for the database you want to access. $\frac{TCP}{TCPS}$ IPC NMP	
Cancel Help	(

Figure A.66: Select communication protocol

Step 6:

- Enter the host name of the host server (e.g. MITCSTATSVR)
- Use the default standard port number (1521)
 Click "Next"

Oracle Net Configuration Assistant: N	et Service Name Configuration, TCP/IP Protocol	×
	To communicate with the database using the TCP/IP protocol, the database computer's host name is required. Enter the host name for the computer where the database is located. Host name: MITCSTATSVR A TCP/IP port number is also required. In most cases the standard port number should be used. Use the standard port number of 1521 C Use another port number: 1521	
Cancel Help	🕜 Back Next >)	

Figure A.67: Enter server/computer host name

Step 7:

- Select "Yes, perform a test" to confirm that the client is able to communicate with the server entered above
- Click "Next"



Figure A.68: Test database availability

Step 8:

- The first test will always fail, because the system does not have the correct password
- Click "Change Login" located just below the detailed information
- Enter the correct database username (SYSTEM) and the password created during the "Create Database" procedure.
- o Click "Ok"
- If the test is successful, click "Next"
- If the test was unsuccessful, check password created in the "Create Database" procedure and try again



Figure A.69: Database availability test outcome (failure)

👹 Change Login	×
— Change Logir	ı ———
Username:	system
Password:	******
	OK Cancel

Figure A.70: Enter correct database password

Oracle Net Configuration Assista	Oracle Net Configuration Assistant: Net Service Name Configuration, Connecting			
	Wait while the Oracle Net Configuration Assistant tries to connect to the database using the information you provided Details: ConnectingTest successful.			
Cancel Help	Back			

Figure A.71: Database availability test outcome (success)

Step 9:

- Enter a service name for the client being created. This example uses the same name as the database
- Click "Next"
- If no access is needed for another database, select "No" to configuring another net service name
- o Click "Next"



Figure A.72: Enter net service name



Figure A.73: Configure another net service name

Step 10:

- Now open the file "tnsnames.ora" from the {root}\Oracle\ora92\network\admin folder
- Change the name of the database from "HYDRA+DB.eil-server.cba.ua.edu = " (or similar) to simply "HYDRA+DB = "

Delete an Oracle Database:

This example shows how to remove an Oracle Database from a server. This example will disable the services and remove all Oracle folders from the server.

Uninstall the Oracle Database Products:

<u>Step 1:</u>

o Go to Start->Programs->Oracle Installation Products->Universal Installer



Figure A.74: Universal installer

o Click Deinstall Products

Step 2:

- Next select the "+" on OraHome92.
- Place a check in the box next to Oracle9i Database 9.2.0.1.0 to remove all of the Oracle Database products.

🔀 Oracle Univers	al Installer: Welcome	
	You have the following Oracle products installed:	N
Welcom The Oracle Oracle prod Click "Install	 P-Independent Products Oracle Homes OraHome92 Dracle9i Database 9.2.0.1.0 	of your
	Product Information: Location: E:\oracle\ora92\oracle.server	
	If you want to remove Oracle software, please checkmark the item(s) and click "Remove". Help Remove Save As Close	ucts al Installer
Exit	Help Installed Products Previous	Next

Figure A.75: Oracle product selection screen

• Click Remove

<u>Step 3:</u>

• Review and confirm the removal of Oracle products selected to remove.



Figure A.76: Uninstall confirmation screen

• Click yes to remove products. Click no to return to previous Oracle product selection screen (Figure 2).

<u>Step 4:</u>

Oracle Universa	al Installer: Welcome	_O×
	Vou have the following Oracle products installed:	×
Welcom The Oracle Oracle prod Click "Install	Performing deinstall actions Performing deinstall actions Cancel Product Information: Location: E: Voracle Vorage Voracle .server	of your
	If you want to remove Oracle software, please checkmark the item(s) and click "Remove". Help Remove Save As Close	al Installer
Exit	Help Installed Products Previous	Next
ORACLE"		

Figure A.77: Removal of oracle products progress screen

<u>Step 5:</u>

Cracle Univers	al Installer: Welcom	e		
	Inventory You have the follow	ing Oracle products installed:	×	
Welcom The Oracle Oracle prod Click "Install	If you want to rem click "Remove".	ove Oracle software, please checkma Remove	ark the item(s) and	of your ucts al Installer
	Help	Installed Products	Previous	Next

Figure A.78: Installed products viewer

• Click Close

<u>Step 6:</u>

Oracle Universal Installer: Welcome	
Welcome	
The Oracle Universal Instal	configuration of your
Click "Installed Products" Do you really want t	o exit?
<u>Yes</u>	No
	Deinstall Products
	About Oracle Universal Installer
Exit Help Installed Products	Previous Next

Figure A.79: Exit universal installer

- Click Exit
- Click Yes to exit

<u>Step 7:</u>

- **Disable Installed Services for the Oracle Database**: Oracle has installed services for this database, so:
 - Reboot server
 - Turn off services and listeners (OracleService[DatabaseName] and OracleOraHome92TNSListener)
 - How to turn off services and listeners:
 - Go to Start->Settings->Control Panel->Administrative Tools->Services
 - Go to service you want to turn off and right click on it
 - Go to "Properties"
 - From the "Startup type" dropdown box, select "Manual" or "Disabled"
 - Then click "Stop"
 - Click "Apply" to finish turning off the service

🖏 Services	OracleServiceTES	TDB Properties (I	.ocal Computer)	<u>?</u> ×	
<u>] A</u> ction ⊻iew]	General Log On	Recovery Depe	ndencies		
Tree	. Service name: Display name:	OracleServiceTE: OracleServiceTE	STDB		og On As 🗾 🔺 ocalSystem ocalSystem
	Description:	le:			bcalSystem bcalSystem bcalSystem
	e:\oracle\ora92\	.bin\ORACLE.EXE 1	TESTDB		bcalSystem bcalSystem
	Startup type:	Disabled		•	pcalSystem pcalSystem pcalSystem
	Service status:	Started			pcalSystem
	Start	Stop	Pause	Resume	bcalSystem
	You can specify from here.	the start parameters	that apply when you	u start the service	pcalSystem pcalSystem pcalSystem pcalSystem pcalSystem pcalSystem
			OK Cane	el Apply	pcalSystem 🔽

Figure A.80: Disable database service

Services	OracleOraHome92	2TNSListener Properties (Local Computer)	
<u>Action</u> ⊻iew →	General Log On	Recovery Dependencies	
Tree Services (Local)	Service name:	OracleOraHome92TNSListener	em 🔺
2 2. And the second s	Display name:	OracleOraHome92TNSListener	em
	Description:		em
	Path to executab	ole:	em
	E:\oracle\ora92	\BIN\TNSLSNR	em
	Startup type:	Disabled	em
			em em
	Service status:	Stopped	em
	Start	Stop Pause Resume	
	You can specify	the start parameters that apply when you start the service	em
	rrom here.		em
	Start parameters:		em
	. <u></u>		em
1		OK Cancel Apply	

Figure A.81: Disable database listener

<u>Step 8:</u>

• Remove Folders containing Oracle Information

- Find where the Oracle folder was placed during the installation process, open the folder and delete the items within.
 - Reason: Can cause trouble when trying to reinstall.
- Exit out of folder and delete the Oracle Folder.

Example to create a HYDRA+ LARGE TableSpace (HYDRA+_LARGE_TS):

Step 1:

- Open the Oracle Enterprise Manager Console (Standalone) by navigating to "Start -> Programs -> Oracle - OraHome92 -> Enterprise Manager Console"
- Expand the "Network", "Databases", "HYDRA+", and "Storage" folders
 Under the "Storage" folder for HYDRA+, right click the "Tablespaces" folder and click "Create..."

🎎 Oracle	e Enterprise Manager Console, Stand	dalone						
	Eile Navigator Object Tools Cor	nfiguration <u>H</u> elp						
	⊖-¥KNetwork	Name	Type	Extent Management	Size (M)	Used (M)	Used %	a manager
	Elle Navigator Object Tools Cor Network Databases HYDRADBX.EIL-SERV Schema Schema Schema Schema Controlfile Contr	Mame NDX SYSTEM SYSTEM OUNDOTBS1 UNDOTBS1 USERS TEMP	Type PERMANENT PERMANENT UNDO PERMANENT TEMPORARY	Extent Management LOCAL LOCAL LOCAL LOCAL LOCAL LOCAL LOCAL	Size (M) 25.000 10.000 200.000 25.000 40.000	Used (M) 0.063 181.063 0.063 0.063 0.000 0.000	Used % 0.25 72.43 0.63 34.53 0.25 0.00	Whanager

Figure A.82: Tablespaces folder

Step 2:

- The "Create Tablespace" screen should appear, with the "General" tab selected
 For the name, enter "HYDRA+_LARGE_TS"

🍀 Create Tablespace - system@H	YDRADBX.EIL-SERVER.	CBA.UA.ED	ou 🗙							
General Storage			_							
Name: HYDRA_LARGE_TS	3									
Datafiles										
File Name File Directory Size										
🤰 🔡 HYDRA_LARGE_TS.ora	C:\ORADATA\HYD	5	MB							
8 8										
- Status										
Online Read Only										
O Offline Normal	-									
— Туре										
Permanent										
C Temporary	T-11									
Set as Default Temporary	Taplespace									
OUndo										
	⊇reate Cancel	Show S	QL Help							

Figure A.83: Create tablespace screen (general tab)

Step 3:

- Click the "Storage" tab
- Check to make sure the defaults are as follows:
 - Extent Management:
 - Select "Locally managed"
 - "Automatic Allocation"
 - Segment Space Management:
 - "Automatic"
 - Enable Logging:
 - "Yes"
 - Verify the block size is set to 8192 Bytes
- o Click "Create"

• A window will appear confirming the creation of the tablespace

🍀 Create Tablespace - system@HYDRADBX.EIL-SERVER.CBA.UA.EDU 🛛 🛛 🔀
General Storage
Extent Management: Occally managed OManaged in the dictionary
Automatic Allocation O Uniform Allocation
Size: K Bytes
Segment Space Management
Automatic Objects in the tablespace automatically manage their free space. It offers high performance for free space management.
Manual Objects in the tablespace will manage their free space using free lists. It is provided for backward compatibility.
Enable logging
Yes - Generates redo logs and recoverable
C No - Paster updates, no redo logs generated and not recoverable
Block Size: 8192 Bytes
<u>Create</u> Cancel Show SQL Help

Figure A.84: Create tablespace (storage tab)

Step 4:

- Return to the "Tablespaces" folder and click on "HYDRA+ LARGE TS"
- In the "General" tab, verify that the size is set to 200 MB
 - If necessary, change to 200 MB
- o Click "Apply"



Figure A.85: HYDRA+_LARGE_TS (general tab)

<u>Step 5:</u>

- Expand the "HYDRA+_LARGE_TS" folder, and then expand the "Datafiles" folder
- Click the "Storage" tab
- Select "AUTOEXTEND"
 - Enter the Increment size as 5120 K Bytes
 - Enter the Maximum Size Value as 32767 M Bytes
- Click "Apply"

🍀 Oracle Enterprise Manager Console, Standalone	
Eile Navigator Object Tools Configuration Help	CRACLE Enterprise/Manager
 Vetwork Otatabases HYDRADBX.ELL-SERVER.CBA.UA.EDU - system Instance Security Storage Controllile Tablespaces Controllile Tablespaces Controllile Controll	General Storage Automatically extend datafile when full (AUTOEXTEND) Increment \$120 Maximum Size Unlimited Value 32767 Møytes

Figure A.86: HYDRA+_LARGE_TS (storage tab)

Create a HYDRA+ User:

Step 1:

- Open the Oracle Enterprise Manager Console (Standalone) by navigating to "Start -> Programs -> Oracle - OraHome92 -> Enterprise Manager Console"
- Expand the "Network", "Databases", and "HYDRA+" folders
- Now expand the "Security" folder, right click on "Users" and select "Create..."

🎎 Oracl	e Enterprise Manager Console, Standalone						_	
	Eile Navigator Object Tools Configuration Help						RACLE priseManag	er
	⊖-₩ Network	Username	Account Status	Expire Date	Default Tablespace	Temporary Tablespace	Profile	Crea
	😓 🛄 Databases	DBSNMP	OPEN		SYSTEM	TEMP	DEFAULT	03-F
3	🕂 🎭 HYDRADBX.EIL-SERVER.CBA.UA.EDU - system	PUBLIC	OPEN	U3-Feb-2006	SYSTEM	IEMP	DEFAULT	U3-F
	🗗 📅 Instance	SYS	OPEN		SYSTEM	TEMP	DEFAULT	03-F
a.	🕀 🔩 Schema	SYSTEM	OPEN	00 5-6 2008	SYSTEM	TEMP	DEFAULT	03-F
30	🖯 🦀 Security	VVMSYS	EXPIRED & LUCKED	U3-Feb-2006	SYSIEM	IEMP	DEFAULT	U3-F
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Figure A.87: Users folder

Step 2:

- The "Create User" screen appears
 Under the "General" tab, use the following information:
 - Name: HYDRA+
 - Default Tablespace: HYDRA+_LARGE_TS
 - Temporary Tablespace: TEMP
 Enter Password

🗱 Create User - system@HYDRADBX.EIL-SERVER.CBA.UA.EDU
General Role System Object Quota Consumer Group Proxy Users
Profile: DEFAULT
Authentication Password
Enter Password:
Confirm Password:
Expire Password Now
Tablespaces Default: HYDRA_LARGE_TS
Temporary: TEMP
Status O Locked © Unlocked
Create Cancel Show SQL Help

Figure A.88: Create HYDRA+ User (general tab)

Step 3:

- Now click the "Role" tab
- Under "Available", select "DBA" and click the down arrow button
 Set the "Admin Option" for "CONNECT" and "DBA" to checked

 \otimes

8 64	Cr	eat	e U	ser	- sys	ster	n@ŀ	YDRA	DBX.E	IL-SI	RVER	.CBA.UA	.EDU				×
ľ	Ge	ner	al	R	ole	s	yste	m 0	bject	Q	Jota	Consu	mer Gi	roup P	roxy Us	sers	
A	vai	ilabl	le:														
1	٩Q	_AD	MIN	IIST	RAT	OR	_RC	LE									
ł	۹Q	_US	BER	_R(DLE												
		NN A	EC.	Γ													
	DE		Έ	CAT	AL O	G	ROL	F									
E	ΞX	ECU	ле,	_CA	TAL	OG	_RC	- LE									
E	ΞX	P_F	ULL	D	ATA	BAS	E										
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	ЭL Je		₩ <u></u> _/	AQ_ J D	USE	:R_	ROL	.E									
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G	ira	nteo	1:														
		Rol	e										Admi	n Option	Defau	ult	
		CO	NNE	ЕСТ										 Image: A second s		~	
	đ	DB/	4											 Image: A second s		~	
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										<u>C</u> rea	ate	Can	cel	Show 9	BQL	Help	
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Figure A.89: Create HYDRA+ user (role tab)

<u>Step 4:</u>

- Click the "System" tab
- Move the following privileges from "Available" to "Granted":
 - "ALTER ANY SEQUENCE"
 - "CREATE ANY SEQUENCE"
 - "CREATE ANY SYNONYM"
 - "CREATE ANY TABLE"
 - "CREATE ANY TRIGGER"
 - "CREATE ANY VIEW"
 - "UNLIMITED TABLESPACE"
- Set the "Admin Option" for all of these to checked
- Click "Create" to finish

8 (reate User - system@HYDR	ADBX.EI	L-SERVE	R.CBA.UA.EDU			×				
G	eneral Role System	Object	Quota	Consumer 0	Broup F	Proxy Users					
Av:	ailable:	0.0,000									
R	ESTRICTED SESSION										
R	ESUMABLE										
S	SELECT ANY DICTIONARY										
SI	ELECT ANY SEQUENCE										
SI	ELECTANY TABLE										
U	NDER ANT TABLE										
Ŭ	NDER ANY VIEW										
Ũ	NLIMITED TABLESPACE										
U	PDATE ANY TABLE										
A	CCESS_ANY_WORKSPACE						1				
M	ERGE_ANY_WORKSPACE										
		S	9 0	8							
Gr	anted:	_									
	System Privilege					Admin Opti	on				
2	ALTER ANY SEQUENCE					×					
2	CREATE ANY SEQUENCE					v -					
2	CREATE ANY SYNONYM					 ✓ 					
2	CREATE ANY TABLE					v .					
2	CREATE ANY TRIGGER					 ✓ 					
2	CREATE ANY VIEW					 ✓ 					
2	UNLIMITED TABLESPACE					×					
		C	Create	Cancel	Show	SOL Hel					
			Sicaro		Onow						
<u>e</u>							TP)				

Figure A.90: Create HYDRA+ user (system option)

Import a HYDRA+ Database:

<u>Step 1:</u>

• Open the Enterprise Manager Console by navigating to "Start->Programs->Oracle – OraHome92->Enterprise Manager Console"

Step 2:

• Connect to HYDRA+DB with username "SYS" and change "connect as" to "SYSDBA"

<u>Step 3:</u>

- Navigate to "Security->Users->HYDRA+"
- Right click on "HYDRA+" and click "Remove"

<u>Step 4:</u>

• See "Creating a HYDRA+ user"

<u>Step 5:</u>

- Open the command prompt
- Type "imp"
- Enter "HYDRA+@HYDRA+dbx" as the Username
- Enter the system password as the Password
- Specify the .DMP file to import
- Accept the default "No" for "List contents of import file only"
- Accept the default "No" for "Ignore create error due to object existence"
- Accept the default "Yes" for "Import grants"
- Accept the default "Yes" for "Import table data"
- Type "Yes" for "Import entire export file"

Step 6:

• Wait for import process to finish...

Exporting the HYDRA+ Database:

<u>Step 1:</u>

• Navigate to the DOS command prompt (Start -> Run -> cmd)

<u>Step 2:</u>

• Type "exp" to enter the Oracle export utility

<u>Step 3:</u>

- The system will prompt for username
 - a. Enter "HYDRA+@HYDRA+DB"
- \circ The system will then prompt for password
 - a. Enter the HYDRA+ password

<u>Step 4:</u>

• Define the path and meaningful filename for the backup file (Example: D:\backups\HYDRA+users_01_30_2005.dmp)

<u>Step 5:</u>

- Type in "2" to specify export users (default)
- Type "yes" for "Export grants" (default)
- Type "yes" for "Export table data" (default)
- Type "yes" for "Compress extents" (default)
- Type "HYDRA+" for "User to be exported"
- Hit return to quit

Step 6:

• Verify the file was created by navigating to the location specified in Step 4

Section 3: System's Hierarchical Functional Decomposition and ERDs

Visual Basic Client

Screen Flow of VB Code: figures A.91 through A.98 graphically depict the flow within HYDRA+.

Oracle Server

System ERD: Figure A.99 shows the major tables within HYDRA+ and the relationships between them. The relationships are broken down into 6 different sections to make viewing easier. These sections are numbered on the System ERD (figure A. 99) and are broken down in the detailed ERD's (figures A.100 through A.105). The following Detailed ERD's show every data field in each table and their relationships.

Input/User ERD Condition ERD Friction ERD Traffic ERD Overlay ERD Routes/Base Section ERD

Data Dictionary: The Data Dictionary describes all of the major tables used by the HYDRA+ system and their associated fields.

Packages with Procedures: Every Oracle package, its purpose, procedures and the function of each procedure is described. The procedures are indexed by package.

Link between Visual Basic Client and Oracle Side

Packages with Procedures called in VB: Lists all forms within HYDRA+. For each form, form sub-procedures are listed with called Oracle procedures (in the format: Package.Procedure). The indexes with their corresponding names and descriptions are in the "Packages with Procedures and descriptions (numbered)" document.

HYDRA+ 1.0



Figure A.91: HYDRA+ 1.0



Figure A.92: HYDRA+ 1.1







Figure A.94: HYDRA+ 1.3

HYDRA+ 1.4





Figure A.96: PPR reporting



Figure A.97: Friction reporting


Figure A.98: GASB reporting



Figure A.99: High level ERD



Figure A.100: Input/user ERD



Figure A.101: Condition ERD



Figure A.102: Friction ERD



Figure A.103: Traffic ERD



Figure A.104: Overlay ERD



Figure A.105: Route/base section ERD

Data Dictionary

The following tables detail each of the attributes, primary and foreign keys, data type, size, mandatory values, range of acceptable values, and a description of each attribute contained in the table. These accompany the previous graphical ERDs.

AGGREGATE_DETAIL	Table associating the AGGTYPE and SOL	JRCES	tables to the (OVERL	AY_YEAR t	ables.	
	Column Name	Kovs	Data Type	Size	Accepts	Range	Description
		Reya	Data Type	5120	Nulls	Range	
	OVERLAYAGG_ID OVERLAYAGG_COARSE_FINE	РК	CHAR	10			Unique Identifier of a Material Used in an Overlay Identifies the Texture of a Material
	OVERLAYAGG_TYPE	PK	VARCHAR2	150			Identifies the AGGTYPE Referenced
	OVERLAYAGG_PERCENT		NUMBER	3		0 - 100	Material Percentage of the Mix
	OVERLAYAGG_SOURCE_NAME	PK	VARCHAR2	200			Identifies the Source of the Material
AGGTYPE	Table hold all information about pavement	makeu	p such as the	various	s types of m	aterial used in thos	se pavement types.
	Column Name	Kevs	Data Type	Size	Accepts	Range	Description
	AGG ID		NUMBED	10	Nulls		Linue Identifier of a Material Lleed in an Overlay
	AGG_AGGTYPE	PK	VARCHAR2	255			Identifies the AGGTYPE
	AGG_STATUS		VARCHAR2	10		VALID / INVALID	Status of a Aggregate Material (Valid / Invalid)
BASE_COND_DETAIL_YEAR	Table associating BASE_SECTION and C	ONDITI	ON_YEAR.				
	Column Namo	Kove	Data Tuno	Sizo	Accepts	Pango	Description
		Keya	Data Type	5120	Nulls	Range	
	BASE_COND_DET_BASE_ID BASE_COND_DET_COND_ID	PK	NUMBER	12	×		Identifies Base Record Referenced by this Record
	BASE_COND_DET_DIR		VARCHAR2	10	x	N/E/S/W	Identifies the Side of the Road Being Tested (North / South / East / West)
	BASE_COND_DET_LANE		VARCHAR2	10	x		Identifies the Lane Being Tested
	BASE_COND_DET_ACTUAL		NUMBER	1			
BASE_FRIC_DETAIL_YEAR	Table associating the BASE_SECTION an	d FRIC	TION_YEAR	tables.			
	Column Name	Keys	Data Type	Size	Accepts	Range	Description
	BASE ERICT DET BASE ID	PK	NUMBER	9	NUIIS	-	Unique Identifier of a Base Section
	BASE_FRICT_DET_FRIC_ID	PK	NUMBER	9			Unique Primary Key for a Friction Rating
	BASE_FRICT_DET_DIRECTION		CHAR	1		N/E/S/W	Identifies the Side of the Road Being Tested (North / South / East / West)
	BASE_FRICT_DET_ACTUAL		NUMBER	1			
BASE_SECTION	Table holds data on every highway in Alab	ama in	increments of	52.8 fe	iet.		
	Column Name	Keys	Data Type	Size	Accepts	Range	Description
	BASE SECTION ID	PK	NUMBER	10	Nulls		Unique Identifier of a Base Section
	BASE_ROUTE_TYPE	FK	VARCHAR2	2		IN / AL	Defines Type of Route
	BASE_ROUTE_NUM	FK	VARCHAR2	5			Route Number Where the Base Section is Located
	BASE_BEGIN_MILE_MARKER	FK	FLOAT	20			Begin Mile Marker for Base Section
	BASE_LAT_GPS_DEC		FLOAT	20	x		GPS Position for Begin of Base Section
	BASE_LNG_GPS_DEC		FLOAT	20	x		GPS Position for End of Base Section
	BASE_COUNTY	ŀK	VARCHAR2	3		0/1	County containing the base section.
	BASE_AL_SENATE		VARCHAR2	3	x	0/1	Identifies the Alabama Senate District Associated with a Particular Stretch of Road
	BASE_US_HOUSE		VARCHAR2	3	x		
	BASE_AL_HOUSE		VARCHAR2	3	х		
BASE_TRAF_DETAIL_YEAR	Table associating the TRAFFIC_YEAR an	d BASE	_SECTION ta	ables.			
	Column Name	Keys	Data Type	Size	Accepts	Range	Description
	BASE TRAF DET BASE ID	PK	NUMBER	9	NUIIS		Unique Identifier of a Base Section
	BASE_TRAF_DET_TRAF_ID	PK	NUMBER	9			Unique Identifier of a Traffic Record
L	BASE_TRAF_DET_ACTUAL		NUMBER	1		1	
CONCURRENT_ROUTES_YEAR	Table holds	data id	entifying all ro	utes that	at overlap e	ach other (i.e. I-20	and I-59 are concurrent routes from Birmingham, AL all the way to Mississippi).
	Column Name	Keys	Data Type	Size	Accepts	Range	Description
	C BOUTE TYPE	PK	CHAR		Nulls	-	Identifies the Type of Route
	C_ROUTE_NUM	PK	VARCHAR2	6			Identifies the Number of the Route
	C_BEG_MP	PK	FLOAT	126			Beginning Mile Post of the Route Within a Given County
	C_END_MP	PK	FLOAT	126			Ending Milepost of the Route Within a Given County
	C_CON_ROUTE_ITTPE		VARCHAR2	2			Identifies the Number of the Concurrent Route
	C_CON_BEG_MP		FLOAT				Beginning Mile Post of the Concurrent Route Within a Given County
L	C_CON_END_MP		FLOAT	10			Ending Milepost of the Concurrent Route Within a Given County
CONDITION_TRANSACTION_LOG	Table holds a record of all conditional ratio	ig transi	actions in the	system			
	Column Name	Kove	Data Type	Size	Accepts	Range	Description
	FIELDNAME		VADOUADO	2.20	Nulls		Identifies the entire that use taken for the perticular entry
	RECORD_NUM		NUMBER	25 10	×		identities the action that was taken for the particular entry
1	DATE_TIME		DATE		x		
	SESSION_ID		VARCHAR2	50	x		
1	NEW_VALUE		VARCHAR2	25 25	x		
,	•						

CONDITION YEAR	Table holds all data related to the conditio	n of a gi	ven overlav.				
	Column Name	Kove	Data Type	Sizo	Accepts	Pange	Description
		Reys		Size	Nulls	Kalige	
	COND_LANE_WIDTH COND_DIRECTION	PK	VARCHAR2	126	×		P=Primary (N, E) S=Secondary (S, W)
	COND_RATER		VARCHAR2	2			Number identifying the one assigning the codition rating to the particular overlay.
	COND_DATE_RATED		DATE	7	x		Date the Rating was done International Revelations Index for outside wheel path. The IRLin a standardized Number involving read
	COND_IRI1		FLOAT	8			quality vs. user cost.
	COND_IRI2		FLOAT	8	x		International Roughness Index for inside wheel path.
	COND_TEX_MPD COND_TEX_RMS		FLOAT FLOAT	8	x		Average mean profile depth Average root mean square of VARCHAR2ure
	COND_GRADE		FLOAT	8	x		Average Grade
	COND_PATCHING_F		FLOAT	8	х		Fair Patching.
	COND_PATCHING_G COND_PATCHING_P		FLOAT FLOAT	8	x		Patching is replacement/repair of pavement with new material. Good Patching Marginal Patching
	COND_SHLDR_COND		VARCHAR2	1	x		Shoulder condition (G=Good, F=Fair, P=Poor)change poor to marginal.
	COND_SHLDR_TYPE		VARCHAR2	3	x		(ASP=Asphalt, CON=Concrete, C&G=Curb and Gutter, D&G=dirt/gravel, GRA=Grass).
	COND_RAVEL_E		FLOAT	8	x		Localized Raveling (1=Low severity, 2=medium severity, 3=high severity)
	COND_RAVEL_W		FLOAT	8	x		Wheel Path Raveling
	COND_BLEED_E		FLOAT	8	×		Entire Lane Bleeding
	COND_BLEED_L COND_BLEED_W		FLOAT	8	x		Wheel Path BleedingBasically Boolean
	COND_ALLIGAT1		FLOAT	8	х		Alligator Cracking Level 1 (slight)
	COND_ALLIGAT2		FLOAT	8	x		Alligator Cracking Level 2 (moderate)
	COND_BLOCK1		FLOAT	8	x		Block Cracking Level 1 (slight)
	COND_BLOCK2		FLOAT	8	х		Block Cracking Level 2 (moderate)
	COND_BLOCK3		FLOAT	8	x		Block Cracking Level 3 (severe)
	COND_LONGIT2		FLOAT	8	x		Longitudinal cracking severity 2
	COND_LONGIT3		FLOAT	8	х		Longitudinal cracking severity 3
	COND_TRANS1		FLOAT	8	x		Transverse Cracking Level 1 Transverse Cracking Level 2
	COND_TRANS3		FLOAT	8	x		Transverse Cracking Level 3
	COND_RRUT		FLOAT	8	x		Average outside wheel path rutting for this section
	COND_LRUT	1	FLOAT FLOAT	8 8	x		Average inside wheel path rutting for this section Crack Sealant condition (0=None, 1=Good, 2=Marginal)
	COND_POTHOLE		FLOAT	8	x		Count of potholes in this section
	COND_PUMP	1	FLOAT	8	×		Presence of pumping
	COND_ARAN COND_BRIDGE	1	VARCHAR2	4	×		1=Present
	COND_CONST	1	VARCHAR2	1	x		Construction and Lane deviations. 1=Present
	COND_ELEVATION	1	FLOAT	8	x		Avg. Elevation
	COND_XFALL COND_LANE_NUM	РК	NUMBER	8	x		Lane Number
	COND_PVMT_TYPE		VARCHAR2	1	x		Type of pavement, F = Asphalt, R = Concrete
	COND_ID	PK	NUMBER	9		0.00	unique id for condition records
	COND_RATING COND_LJSPAL_L		NUMBER	9	x	0 - 96	Calculated Rating of Condition Point Count of Longitudinal Joints that have a Low Level of Spalling
	COND_LJSPAL_M		NUMBER	9	x		Count of Moderately Spalled Longitudinal Joints
	COND_LJSPAL_S		NUMBER	9	х		Count of Severely Spalled Longitudinal Joints
	COND_IJOINI COND_TJSPAL_I		NUMBER	9	x		Count of Unspalled Transverse Joints Count of Transverse Joints that have a Low Level of Spalling
	COND_TJSPAL_M		NUMBER	9	x		Count of Moderately Spalled Transverse Joints
	COND_TJSPAL_S		NUMBER	9	х		Count of Severely Spalled Transverse Joints
	COND_POPOUTS		NUMBER	9	x		Count of all Popouts I ane Senaration (1 = Present)
	COND_JOINT_SEAL		NUMBER	9	x		Joint Sealant Condition (1 = good, 2 = fair, 3 = poor)
	COND_CORNER_BRK		NUMBER	9	х		Count of all Corner Breaks in this Section
	COND_PFAULT_CNT		NUMBER	9	x		Number of Positive Faults Average Depth of Positive Faults
	COND_NFAULT_CNT		NUMBER	9	x		Number of Negative Faults
	COND_NFAULT_AVG		NUMBER	9	х		Average depth of Negative Faults
	COND_FSECTION COND_GENERATION		VARCHAR2 NUMBER	50	x		
	COND_ROUTE_NUMBER	PK	VARCHAR2	6	х		Identifies the Number of the Route
	COND_ROUTE_TYPE	PK	VARCHAR2	10	x		Identifies the Type of Route
	COND_LAT_DEG		FLOAT	30	x		Latitude Decimal Degrees
	COND_LNG_DEG		FLOAT	30	х		Longitude Decimal Degrees
	COND_MILEPOST	PK	FLOAT	126			Route Milepost Associated with a Rating
L	100.10_1 01		LUAI	10	X	1	
COUNTY_YEAR	able holds all county data. This table ide	entifies a	county's nam	e divis	on, district,	and county numbe	er according to the state as well as the system.
	Column Name	Keys	Data Type	Size	Nulls	Range	Description
	COUNTY_FIPS_NUM	Γ	NUMBER	5			Federal County Number
	COUNTY_ST_COUNTY_NUM	1		8			State County Designation
1	COUNTY_DIST	1	NUMBER	20	x		County
	COUNTY_DIV	FK	NUMBER	2	x		Division which County Belongs in
L	RECORDNUM	1	NUMBER	10	1		Auto-Number (Unique Identifier of a Record)
DIVISION_YEAR	Table holds all information related to divisi	ion bour	ndaries, counti	es with	in that divis	on, and the location	on of a given division.
	Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
	DIV_NUM	PK	NUMBER	2			Division Number (1-9)
	DIV_LOCATION		CHAR	40	x		Address of Division Office.
1	DIV_GPS_LAT	1	FLOAT	8	×		GPS position of Longitude of Division Office.
	DIV_NUM_DISTRICTS	1	NUMBER	2	x		Number of Districts in the Division.
	DIV_NUM_COUNTY		NUMBER	2	х		Number of Counties in the Division
L	INCOORDINUM	I	NUMBER	10			
EPPOR	Table contains accelle a survive d'	tor	-		om roll "	approi-t	a out of this table whenever a problem is consistent
EKKUR	able contains possible errors that the sys	stem car	generate. Th	ne syst	em pulls the	appropriate error	s out or this table whenever a problem is encountered.
	Column Name	Keys	Data Type	Size	Nulls	Range	Description
	ERROR_CODE	PK	NUMBER	3			Code Associated with a Given Error
	ERROR_DESCRIPTION		VARCHAR2	100			Description of the Error
ERROR_LOG	Table holds a log of all errors that occur fr	om the	use of the syst	em.			
	Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
	ERROR_CODE	FK	NUMBER	6	X		References ERROR_CODE from the Table ERROR
1	ERROR_TEXT	F 12	VARCHAR2	500	x		Description of the Error that Occurred
	ERROR TIME	гĸ	DATE	50	×		Time Stamp of the Time and Date when the Error Occurred
	DATA_TYPE	1	VARCHAR2	30	x		Identifies the Type of Data that the User was Trying to Input
	RECORD_NUM	1	NUMBER	10	×		Unique Identifier of an Error
	FRR STATUS	1	VAKCHAR2	100	×		Elan Noting Whether the Error has Been Corrected
L			OmDEIN	10	^		· ····································

FRICTION_TRANSACTION_LOG	able holds a record of all friction rating transactions in the system.											
	Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description					
	FIELDNAME		VARCHAR2	25			Identifies the action that was taken for the particular entry					
	RECORD_NUM		NUMBER	6								
	DATE_TIME		DATE									
	SESSION_ID		VARCHAR2	50	х							
	OLD_VALUE		VARCHAR2	25	х							
	NEW_VALUE		VARCHAR2	25	x							

FRICTION_YEAR	Table contains all data related to the fricti	on rating	is of a given o	verlay			
	Column Name	Keys	Data Type	Size	Accepts Nulls	Range	Description
	FRIC_ID	PK	NUMBER	10	х		Unique Primary Key for a Friction Rating
	FRIC_DIV		NUMBER	2			Division Where the Friction Rating was Taken
	FRIC_ROUTE_TYPE		VARCHAR2	2			Identifies the Type of Route
	FRIC_ROUTE_NUM		VARCHAR2	5			Identifies the Number of the Route
	FRIC_MILE_POST		NUMBER	10			Mile Along the Highway Where the Friction Rating was Taken
	FRIC_DIR		VARCHAR2	1			P=Primary (N, E) S=Secondary (S, W)
	FRIC_DATE		DATE	7			Date the Rating was Taken
	FRIC_RESULT		NUMBER	3			Friction Number.
	FRIC_MODIFIER		VARCHAR2	2	x		Any Condition that May Affect the Result. There is a List of Modifiers.
	FRIC_AIR_TEMP		NUMBER	4			Air Temperature When the Rating was Taken
	FRIC_ROLE		VARCHAR2	10			Role of the User Who Entered the Rating
	FRIC_USER		VARCHAR2	25			User Who Entered the Rating
	FRIC FLAG		VARCHAR2	10			Flag Identifying a Friction Rating as New / Valid / Invalid

HYDRA_USERS	able holds all HYDRA user related information. Any time a user is added or deleted, or a user logs in, HYDRA adds, removes, or validates against data in this table.										
	Column Name		Data Type	Size	Accepts Nulls	Range	Description				
	USERNAME ROLE MAX_SESSIONS CURRENT SESSIONS	PK	VARCHAR2 VARCHAR2 NUMBER NUMBER	25 10 10 10			Unique Identifier of a User Role that the User Plays in the System Maximum Number of Concurrent Sessions the User can Have Number of Sessions that a Given User has Runnino at the Current Moment				

INPUT_LOG	Table keeps a record of all traffic and cond	able keeps a record of all traffic and condition data input transactions.										
	Column Name		Data Type	Size	Accepts Nulls	Range	Description					
	DATATYPE		VARCHAR2	25	х		Identifies the Type of Data that the User was Trying to Input					
	USERNAME	FK	VARCHAR2	5	x		Name of the User Who Input the Record					
	SESSIONID		VARCHAR2	50	x		Unique Identifier of the Session that was Running when the Record was Input					
	ATTEMPTED		NUMBER	10	х		Number of Records the User Tried to Input					
	VALID		NUMBER	10	х		Number of Records that were Valid for Input					
	INVALID		NUMBER	10	x		Number of Records that were Invalid for Input					

MIX_TYPE	able holds data about the various types of mixture combinations used for the aggregate material.											
	Column Name		Data Type	Size	Accepts Nulls	Range	Description					
	MIX_ID	Unique Identifier of a MIX_TYPE Record										
	MIX_MIXTYPE	PK	VARCHAR2	10			Name of the Type of Mix					
	MIX_STATUS		VARCHAR2	10		VALID / INVALID	Status of a Mix (Valid / Invalid)					

OVERLAY_DETAIL_YEAR	ssociative table linking OVERLAY_YEAR and BASE_SECTION tables.										
	column Name Data Type Size Accepts Range Description										
	OVERLAY_DT_BASE_SECTION OVERLAY_DT_ID	PK PK	NUMBER NUMBER	10 10			Unique Identifier of a Base Section Unique Identifier of an Overlay				

OVERLAY_ERROR	Table holds a log of the errors that occur when the user makes a mistake entering overlay data.												
	Column Name		Data Type	Size	Accepts Nulls	Range	Description						
	OVERLAY_ID	FK	NUMBER	10	х		Unique Identifier of an Overlay Record						
	OVERLAY_COUNTY		VARCHAR2	100	х		Division the Overlay is in						
	OVERLAY_RATING		FLOAT	10	х	0 - 96	Avg. of the Ratings of the Base Sections Contained in an Overlay (Calculated on Condition Commit)						
	OVERLAY_DATE_RATED		DATE		x		Avg. of the Rating Dates of the Base Sections Contained in an Overlay.						
	OVERLAY_ROUTE_TYPE		VARCHAR2	3	х		Identifies the Type of Route that is Referenced by this Record						
	OVERLAY_ROUTE_NUMBER		VARCHAR2	6	x		Identifies the Number of the Route Referenced by this Record						
	OVERLAY_DESCRIPTION		VARCHAR2	250	x		Description of the Overlay						
	OVERLAY_PROJECTION_YEAR1		FLOAT	10	x	0 - 96	Projected Rating One Year Out.						
	OVERLAY_PROJECTION_YEAR2		FLOAT	10	x	0 - 96	Projected Rating Two Years Out.						
	OVERLAY_PROJECTION_YEAR3		FLOAT	10	x	0 - 96	Projected Rating Three Years Out.						
	OVERLAY_FRIC_RATING		FLOAT	10	х	20 - 65	Weighted Average of Friction Rating (Calculated on Friction Commit)						
	OVERLAY_AADT		NUMBER	10	x		Weighted Average of AADT Rating (Calculated on Traffic Commit)						
	OVERLAY_DATE_PLACED		DATE		x		Date the Overlay was Placed.						
	OVERLAY_MAINTENANCE_SECTION		VARCHAR2	20	х		Maintenance ID						
	OVERLAY_BEGIN_MILEPOST		FLOAT	10	х		Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record						
	OVERLAY_END_MILEPOST		FLOAT	10	x		Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record						
	OVERLAY_MIX_TYPE		VARCHAR2	15	х		Identifies the Type of Mix that was Used in an Overlay						
	OVERLAY_PRODUCER		VARCHAR2	150	х		Identifies the Company that Produced that Made the Asphalt or Concrete that was Used in an Overlay						
	OVERLAY_PLACER		VARCHAR2	150	x		Identifies the Company that Laid the Overlay						
	OVERLAY_PROJECT_NUM		VARCHAR2	150	x		Number Assigned to the Project of Laying the Overlay ?						
	OVERLAY_BEGIN_LAT		FLOAT	40	x		Latitude of the Beginning Milepost of the Overlay						
	OVERLAY_BEGIN_LNG		FLOAT	40	х		Longitude of the Beginning Milepost of the Overlay						
	OVERLAY_END_LAT		FLOAT	40	x		Latitude of the Ending Milepost of the Overlay						
	OVERLAY_END_LNG		FLOAT	40	х		Longitude of the Ending Milepost of the Overlay						

OVERLAY_TRANSACTION_LOG	able holds a log of all the iterations with the OVERLAY_YEAR tables.											
	Column Name	Data	Туре	Size	Accepts Nulls	Range	Description					
	FIELDNAME	VARC	CHAR2	25	х		Identifies the Field from Overlay Table the that was Altered					
	RECORD_NUM	NUME	BER	6	x		Unique Identifier of a Overlay Record that was Altered					
	DATE_TIME	DATE	-		x		Timestamp Identifying the Date and Time that the Transaction Occurred					
	SESSION_ID	VARC	CHAR2	50	х		Unique Identifier of the Session that was Running when the Record was Altered					
	OLD_VALUE	VARC	CHAR2	250	х		Identifies the Original Data that was Held in the Referenced Field					
	NEW_VALUE	VARC	CHAR2	250	х		Identifies the that Replaced the Original Data in the Referenced Field					

OVERLAY_YEAR	Table contains all overlay data after it has	been er	ntered and val	idated.			
	Column Name	_	Data Type	Size	Accepts	Range	Description
	OVERIAY ID	рк		10	Nulls	-	I Inique Identifier of an Overlav Record
	OVERLAY_COUNTY	FK	VARCHAR2	100	x		County in which the Overlay is in.
	OVERLAY_RATING		FLOAT	10	х	0 - 96	Avg. of the Ratings of the Base Sections Contained in an Overlay (Calculated on Condition Commit)
	OVERLAY_DATE_RATED	DK	DATE		х		Avg. of the Rating Dates of the Base Sections Contained in an Overlay.
	OVERLAT_ROUTE_ITPE	PK	VARCHAR2	6		IN / AL	Identifies the Number of the Route Referenced by this Record
	OVERLAY_DESCRIPTION		VARCHAR2	250	x		Description of the Overlay
	OVERLAY_PROJECTION_YEAR1		FLOAT	10	х	0 - 96	Projected Rating One Year Out.
	OVERLAY_PROJECTION_YEAR2		FLOAT	10	х	0 - 96	Projected Rating Two Years Out.
	OVERLAY_PROJECTION_YEAR3		FLOAT	10	x	0 - 96	Projected Rating Three Years Out.
	OVERLAY AADT		NUMBER	10	x		Weighted Average of AADT Rating (Calculated on Traffic Commit)
	OVERLAY_DATE_PLACED		DATE		х		Date the Overlay was Placed.
	OVERLAY_MAINTENANCE_SECTION		VARCHAR2	20	х		Maintenance ID
	OVERLAY_BEGIN_MILEPOST	PK	NUMBER	10			Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record
	OVERLAT_END_MILEPOST	FK	VARCHAR2	10	x		Identifies the Type of Mix that was Used in an Overlay
	OVERLAY_PRODUCER	FK	VARCHAR2	150	x		Identifies the Company that Produced that Made the Asphalt or Concrete that was Used in an Overlay
	OVERLAY_PLACER	FK	VARCHAR2	150	х		Identifies the Company that Laid the Overlay
	OVERLAY_PROJECT_NUM		VARCHAR2	150	х		Number Assigned to the Project of Laying the Overlay ?
	OVERLAY_BEGIN_LAT		FLOAT	40	x		Latitude of the Beginning Milepost of the Overlay
	OVERLAY_END_LAT		FLOAT	40	x		Latitude of the Ending Milepost of the Overlay
	OVERLAY_END_LNG		FLOAT	40	х		Longitude of the Ending Milepost of the Overlay
PLACERS	Table contains data about the individual or	nanizot	ions that place	overia	ivs for AI D	T	
I LAVENO	auro contains uata about trie muividual or	yanızdi	ions indi piàCé	overia	Accepts	-	
	Column Name		Data Type	Size	Nulls	Range	Description
	PLA_ID	_	NUMBER	10			Unique Identifier of a Company that Places Overlays
	PLA_PLACERNAME	PK	VARCHAR2	255			Company Name of the Placer
	PLA_SIAIUS		VARCHAR2	10		VALID / INVALID	Status of a Placet (Valid / Invalid)
PRODUCER	Table contains information related to the d	ifferent	producers of t	he agg	regate type:	5.	
	Caluma Nama		Data Tuna	C:	Accepts	Denne	Description
	Column Name		Data Type	Size	Nulls	Kalige	Description
	PRO_ID	DI	NUMBER	10			Unique Identifier of a Company that Produces Asphalt or Concrete
	PRO_PRODUCERNAME PRO_STATUS	PK	VARCHAR2	255			Company Name of the Producer Status of a Producer (Valid / Invalid)
			VAROLIARZ	10		VALID / INVALID	
ROUTES_YEAR	Table holds all route related data. This tab	le ident	tifies all route	ranges	and what co	ounty and division t	those routes are located in.
	Column Name		Data Type	Size	Accepts	Range	Description
	ROUTE TYPE	PK	CHAR	2	INUIIS		Identifies the Type of Route
	ROUTE_NUM	PK	CHAR	5			Identifies the Number of the Route
	ROUTE_BEGIN_MILE	PK	FLOAT	126			Beginning Mile Post of the Route Within a Given County
	ROUTE_END_MILE	PK	FLOAT	126			Ending Milepost of the Route Within a Given County
			CHAR	3			County that a Route is Running Through
	ROUTE_NHS_FLAG		NUMBER	1			Flag Identifying Non-National Highway
	RECORDNUM		NUMBER	10			Unique Identifier of a Route
SOURCES	Table contains data about the source of th	o mater	ial usad in a c		orlay		
SOURCES	Table contains data about the source of th	emater	iai useu ili a g	Iven ov	Accents		
	Column Name		Data Type	Size	Nulls	Range	Description
	SOU_PITNUMBER	PK	VARCHAR2	50			ID Number of the Pit that the Material what Taken From
	SOU_PITOWNERCODE	PK	VARCHAR2	50			ID Number of the Owner of a Pit
	SOU_PCA		VARCHAR2	50	x		Percentage of Primary Coarse Aggregate
	SOU_FCA	FK	VARCHAR2	200	x		Name of the Pit
	SOU_STATUS		VARCHAR2	10	x	VALID / INVALID	Status of a Source (Valid / Invalid)
	1						
TEMP_TRAFFIC_LOAD_YEAR	1		-		Accorto		
	Column Name		Data Type	Size	Nulls	Range	Description
	TRAF_ID	PK	NUMBER	10	X		Unique Identifier of a Traffic Record
	TRAF_COUNTY		VARCHAR2	10	x		Identifies the County Referenced by this Record
	TRAF_DIV		NUMBER	10	х		Identifies the Division Referenced by this Record
	TRAF_ROUTE_NUM		VARCHAR2	10			Identifies the Number of the Route Referenced by this Record
	TRAF_KOUTE_TYPE		VARCHAR2	3 10	x		Identities the Type of Koute that is Keterenced by this Record
	TRAF_ALT		VARCHAR2	10	x		Identifies Alternate Routes and Type of Route (eg. ALT / BUS)
	TRAF_BEGMP		FLOAT	126			Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record
	TRAF_ENDMP		FLOAT	126			Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record
	IRAF_DISTML		FLOAT	126	x		Distance in Miles Between TRAF_BEGMP and TRAF_ENDMP ?
	TRAF AADT			126	x		Weighted Average of AADT Rating (Calculated on Traffic Commit)
	TRAF_K		NUMBER	10	x		regned residge of real Fitaling (balculated of Franc Commig
	TRAF_D		NUMBER	10	x		
	TRAF_TDHV		NUMBER	10	х		
	TRAF_IADI		NUMBER	10	x	0 - 100	Percentage Value of Traffic Vahicle Type (Medium vs. Heavy)
	TRAF_HVY		NUMBER	10	x	0 - 100	Percentage Value of Traffic Vehicle Type (Medium vs. Heavy)
	TRAF_GROWTH		FLOAT	126	x		
	TRAF_STGROWTH		FLOAT	126	x		
	TRAF_DVMTGROWTH	PK	VARCHAR?	126	x		Flag Identifying Rating as Valid / Invalid / New
					~		

TEMPCONDITIONLOADYEAR	Table contains all condition data after it ha	s been	entered and v	alidate	d.		
	Column Name		Data Type	Size	Accepts Nulls	Range	Description
	COND_ID	PK	NUMBER	10			Unique Identifier for a Conditional Rating
	COND_DIV		NUMBER	10	х		Division the Rating was Taking Within
	COND_ROUTE_TYPE	PK	VARCHAR2	10			Identifies the Type of Route
		PK	NUMBER	10			B-Brimony (N, E) S-Secondary (S, W)
	COND_DIRECTION	PK	VARCHAR2	10			P=Plifially (N, E) S=Secondary (S, W)
	COND_MILEPOST	PK	FLOAT	126			Identifies the Mile from which the Rating was Taken
	COND_DATE_RATED	PK	DATE	7			Date the Rating was done
							International Roughness Index for outside wheel path. The IRI is a standardized Number involving road
	COND_IRI1		NUMBER		х		quality vs. user cost.
	COND_IRI2		NUMBER		х		International Roughness Index for inside wheel path.
	COND_TEX_RMS		NUMBER		х		Average root mean square of VARCHAR2ure
	COND_TEX_MPD		NUMBER		х		Average mean profile depth
	COND_RRUT		NUMBER		х		Average outside wheel path rutting for this section
	COND_LRUI		NUMBER		x		Average inside wheel path rutting for this section
	COND_GRADE		NUMBER		x		Average Grade
	COND_LATDEG				x		Latitude Decimal Degrees
	COND_LATSEC		NUMBER		÷		Latitude Decimal Seconds
	COND_LONGDEG		NUMBER		÷		Londitude Decimal Degrees
	COND LONGMIN		NUMBER		Ŷ		Longitude Decimal Minutes
	COND LONGSEC		NUMBER		x		Longitude Decimal Seconds
	COND_RATER		VARCHAR2	50	x		Number identifying the one assigning the codition rating to the particular overlay.
	COND_ARAN		VARCHAR2	10	x		ARAN (Automatic Road Analyzer) collection Number. This may be the vehicle Number.
	COND_PATCHING_G		NUMBER		х		Patching is replacement/repair of pavement with new material. Good Patching
	COND_PATCHING_F		NUMBER		х		Fair Patching.
	COND_PATCHING_P		NUMBER		х		Marginal Patching
	COND_SHLDR_COND		VARCHAR2	50	х		Shoulder condition (G=Good, F=Fair, P=Poor)change poor to marginal.
	COND_SHLDR_TYPE		VARCHAR2	50	x		(ASP=Asphalt, CON=Concrete, C&G=Curb and Gutter, D&G=dirt/gravel, GRA=Grass).
	COND_RAVEL_L		VARCHAR2	10	x		Localized Raveling (1=Low severity, 2=medium severity, 3=high severity)
	COND_RAVEL_W		VARCHAR2	10	x		wheel Path Raveling
	COND_RAVEL_E		VARCHAR2	10	×		Entire Lane Raveling
	COND_BLEED_L		VARCHAR2	10	×		Wheel Path Bleeding Basically Boolean
	COND_BLEED_W		VARCHAR2	10	×		Entire Lane Bleeding
	COND_ALLIGAT1		NUMBER	10	Ŷ		Allingtor Cracking Level 1 (slight)
	COND ALLIGAT2		NUMBER		×		Alligator Cracking Level 2 (moderate)
	COND_ALLIGAT3		NUMBER		x		Alligator Cracking Level 3 (severe)
	COND_BLOCK1		NUMBER		x		Block Cracking Level 1 (slight)
	COND_BLOCK2		NUMBER		х		Block Cracking Level 2 (moderate)
	COND_BLOCK3		NUMBER		х		Block Cracking Level 3 (severe)
	COND_LONGIT1		NUMBER		х		Longitudinal cracking severity 1
	COND_LONGIT2		NUMBER		x		Longitudinal cracking severity 2
	COND_LONGI13		NUMBER		х		Longitudinal cracking severity 3
	COND_TRANS1		NUMBER		×		
	COND_TRANS2		NUMBER		×		Transverse Cracking Level 2 Transverse Cracking Level 3
	COND_CRKSEAL		NUMBER		÷		Crack Sealant condition (0=None_1=Good_2=Marginal)
	COND POTHOLE		NUMBER		x		Count of potholes in this section
	COND PUMP		NUMBER		x		Presence of pumping
	COND_LJSPAL_L		NUMBER		x		Count of Longitudinal Joints that have a Low Level of Spalling
	COND_LJSPAL_M		NUMBER		x		Count of Moderately Spalled Longitudinal Joints
1	COND_LJSPAL_S		NUMBER		х		Count of Severely Spalled Longitudinal Joints
	COND_TJOINT		NUMBER		х		Count of Unspalled Transverse Joints
	COND_TJSPAL_L		NUMBER		х		Count of Transverse Joints that have a Low Level of Spalling
	COND_TJSPAL_M		NUMBER		x		Count of Moderately Spalled Transverse Joints
	COND_IJSPAL_S		NUMBER		х		Count of Severely Spalled Transverse Joints
	COND_POPOUTS		NUMBER		×		
	COND_LANE_SEP		NUMBER		×		Lane Separation (1 = Present)
	COND_CORNER_BRK		NUMBER		Ŷ		Count of all Corner Breaks in this Section
	COND LANE WIDTH		NUMBER		Ŷ		1=Outside/indit 2=Inside/ieft
	COND PVMT TYPE		VARCHAR2	50	x		Type of pavement, F = Asphalt, R = Concrete
	COND_BRIDGE		VARCHAR2	10	x		1=Present
	COND_CONST		VARCHAR2	10	х		Construction and Lane deviations. 1=Present
1	COND_XFALL		NUMBER		х		Cross-fall. How much drop in elevation from centerline to edge of the road
1	COND_ELEVATION		NUMBER		х		Avg. Elevation
1	COND_PFAULT_CNT		NUMBER		х		Number of Positive Faults
	COND_PFAULT_AVG		NUMBER		х		Average Depth of Positive Faults
1	COND_NFAULT_CNT		NUMBER		х		Number of Negative Faults
	COND_NFAULT_AVG		NUMBER		х		Average depth of Negative Faults
1	COND_SAMPLE_SIZE	DV		10	x		Eeriger or Noau that was Sampled
	COND_FLAG	PK	FLOAT	10	~	0 - 96	Frag ruenarying a Condition Ratifig as New / Valid / Inivalid
	COND_PSI		FLOAT	10	Ŷ	0 - 30	
	COND BASE SECTION ID		NUMBER	10	â		References an Associated Base Section

TEMPCONDITIONYEAR	Table contains all condition data after it has been entered and before it was validated.							
	Column Name		Data Type	Size	Accepts Nulls	Range	Description	
	COND_ID	PK	NUMBER	10	х		Unique Identifier for a Conditional Rating	
	COND_DIV		NUMBER	10			Division the Rating was Taking Within	
	COND_ROUTE_TYPE	PK	VARCHAR2	10	х		Identifies the Type of Route	
		PK	VARCHAR2	10			P=Primary (N, E) S=Secondary (S, W)	
	COND LANE	PK	VARCHAR2	10			Identifies the Lane Used to Take the Conditional Rating	
	COND MILEPOST	PK	FLOAT	126			Identifies the Mile from which the Rating was Taken	
	COND_DATE_RATED	PK	DATE	7			Date the Rating was done	
							International Roughness Index for outside wheel path. The IRI is a standardized Number involving road	
	COND_IRI1		NUMBER				quality vs. user cost.	
	COND_IRI2		NUMBER		x		International Roughness Index for inside wheel path.	
	COND_TEX_MPD		NUMBER		x	X AVerage root mean square of VARCHAR2ure X Average mean profile depth Average outside wheel path rutting for this section		
	COND RRUT		NUMBER		Ŷ			
	COND_LRUT		NUMBER		x		Average inside wheel path rutting for this section	
	COND_GRADE		NUMBER		х		Average Grade	
	COND_LATDEG		NUMBER		х		Latitude Decimal Degrees	
	COND_LATMIN		NUMBER		х		Latitude Decimal Minutes	
	COND_LATSEC		NUMBER		х		Latitude Decimal Seconds	
	COND_LONGDEG		NUMBER		x		Longitude Decimal Degrees	
			NUMBER		×		Longitude Decimal Nanutes	
	COND RATER		VARCHAR2	50	x		Number identifying the one assigning the codition rating to the particular overlay.	
	COND_ARAN		VARCHAR2	10	x		ARAN (Automatic Road Analyzer) collection Number. This may be the vehicle Number.	
	COND_PATCHING_G		NUMBER	1	х		Patching is replacement/repair of pavement with new material. Good Patching	
	COND_PATCHING_F		NUMBER		х		Fair Patching.	
	COND_PATCHING_P		NUMBER		х		Marginal Patching	
	COND_SHLDR_COND		VARCHAR2	50	х		Shoulder condition (G=Good, F=Fair, P=Poor)change poor to marginal.	
	COND_SHEDR_TYPE		VARCHAR2	50	x		(ASP=Aspnait, CON=Concrete, C&G=Curb and Gutter, D&G=dirt/gravel, GRA=Grass).	
	COND_RAVEL_U		VARCHAR2	10	Ŷ		Wheel Path Raveling	
	COND RAVEL F		VARCHAR2	10	x		Entire Lane Raveling	
	COND_BLEED_L		VARCHAR2	10	x		Localized BleedingBasically Boolean	
	COND_BLEED_W		VARCHAR2	10	х		Wheel Path BleedingBasically Boolean	
	COND_BLEED_E		VARCHAR2	10	х		Entire Lane Bleeding	
	COND_ALLIGAT1		NUMBER		х		Alligator Cracking Level 1 (slight)	
	COND_ALLIGAT2		NUMBER		х		Alligator Cracking Level 2 (moderate)	
	COND_BLOCK1		NUMBER		×		Block Cracking Level 3 (Severe)	
	COND_BLOCK2		NUMBER		x		Block Cracking Level 2 (moderate)	
	COND_BLOCK3		NUMBER		x		Block Cracking Level 3 (severe)	
	COND_LONGIT1		NUMBER		х		Longitudinal cracking severity 1	
	COND_LONGIT2		NUMBER		х		Longitudinal cracking severity 2	
	COND_LONGIT3		NUMBER		х		Longitudinal cracking severity 3	
	COND_TRANS1		NUMBER		x		Transverse Gracking Level 1	
	COND_TRANS2		NUMBER		×		Transverse Cracking Level 2	
	COND_CRKSEAL		NUMBER		Ŷ		Crack Sealant condition (0=None, 1=Good, 2=Marginal) Count of potholes in this section	
	COND POTHOLE		NUMBER		x			
	COND_PUMP		NUMBER		х		Presence of pumping	
	COND_LJSPAL_L		NUMBER		х		Count of Longitudinal Joints that have a Low Level of Spalling	
	COND_LJSPAL_M		NUMBER		х		Count of Moderately Spalled Longitudinal Joints	
	COND_LJSPAL_S		NUMBER	1	x		Count of Severely Spalled Longitudinal Joints	
			NUMBER		x		Count of Unspalled Transverse Joints	
1	COND TUSPAL M		NUMBER	1	x		Count of Moderately Spalled Transverse Joints	
	COND_TJSPAL_S		NUMBER		x		Count of Severely Spalled Transverse Joints	
	COND_POPOUTS		NUMBER		х		Count of all Popouts	
	COND_LANE_SEP		NUMBER		х		Lane Separation (1 = Present)	
	COND_JOINT_SEAL		NUMBER		х		Joint Sealant Condition (1 = good, 2 = fair, 3 = poor)	
	COND_CORNER_BRK		NUMBER		х		Count of all Corner Breaks in this Section	
	COND_LANE_WIDTH			50	x		Type of pavement, E = Asphalt, R = Concrete	
	COND_PVMI_TIPE		VARCHAR2	10	Ŷ		1=Present	
	COND_CONST		VARCHAR2	10	x		Construction and Lane deviations. 1=Present	
1	COND_XFALL		NUMBER	Ī	x		Cross-fall. How much drop in elevation from centerline to edge of the road	
	COND_ELEVATION		NUMBER	1	х		Avg. Elevation	
	COND_PFAULT_CNT		NUMBER	1	х		Number of Positive Faults	
	COND_PFAULT_AVG		NUMBER	1	х		Average Depth of Positive Faults	
	COND_NFAULT_AVG			1	x		Number of Negative Faults	
	COND_NEAUET_AVG		NUMBER	۵	x		Length of Road that was Sampled	
1	COND_FLAG	PK	VARCHAR2	10	x		Flag Identifying a Condition Rating as New / Valid / Invalid	
1	COND_RATING	I	FLOAT	10	x	0 - 96	Calculated Rating of Condition Point	
	COND_PSI		FLOAT	10	x			
	COND_BASE_SECTION_ID		NUMBER	8	х		References an Associated Base Section	
				_				
	Table contains all friction data after it has	haan ar	stored and vali	hateh				

TEMPFRICTIONLOADTEAR	able contains an incluor data alter it has been entered and validated.						
	Column Name		Data Type	Size	Accepts Nulls	Range	Description
	FRIC_ID	FK	NUMBER	10			Unique Primary Key for a Friction Rating
	FRIC_DIV		NUMBER	10	x Division Where the Friction Rating was Taken		Division Where the Friction Rating was Taken
	FRIC_ROUTE_TYPE		VARCHAR2	3	x	Identifies the Type of Route	
	FRIC_ROUTE_NUM	1	VARCHAR2	6	х		Identifies the Number of the Route
	FRIC_MILE_POST	ST FLOAT 10 x Mile Along the Highway			Mile Along the Highway Where the Friction Rating was Taken		
	FRIC_DIR		VARCHAR2	3	х	P=Primary (N, E) S=Secondary (S, W)	
	FRIC_DATE		DATE	7	х		Date the Rating was Taken
	FRIC_RESULT		NUMBER	5	х		Friction Number.
	FRIC_MODIFIER		VARCHAR2	25	х		Any Condition that May Affect the Result. There is a List of Modifiers.
	FRIC_AIR_TEMP		FLOAT	10	х		Air Temperature When the Rating was Taken
	FRIC_ROLE	1	VARCHAR2	20	х		Role of the User Who Entered the Rating
	FRIC_USER		VARCHAR2	25	х		User Who Entered the Rating
	FRIC_FLAG		VARCHAR2	25	х		Flag Identifying a Friction Rating as New / Valid / Invalid

TEMPFRICTIONYEAR	Table contains all friction data after it has been entered and before it was validated.							
	Column Name FRIC_ID		Data Type	Size	Accepts Nulls	Range	Description	
			NUMBER	10			Unique Primary Key for a Friction Rating	
	FRIC_DIV		NUMBER	10	х		Division Where the Friction Rating was Taken	
	FRIC_ROUTE_TYPE		VARCHAR2	3	х		Identifies the Type of Route	
	FRIC_ROUTE_NUM	VARCHAR2 6 x Identifies the Number of the Route FLOAT 10 x Mile Along the Highway Where the Friction Rating was Taken		Identifies the Number of the Route				
	FRIC_MILE_POST			Mile Along the Highway Where the Friction Rating was Taken				
	FRIC_DIR		VARCHAR2	3	х		P=Primary (N, E) S=Secondary (S, W) Date the Rating was Taken Friction Number.	
	FRIC_DATE		DATE	7	х			
	FRIC_RESULT		NUMBER	5	х			
	FRIC_MODIFIER		VARCHAR2	25	х		Any Condition that May Affect the Result. There is a List of Modifiers.	
	FRIC_AIR_TEMP		FLOAT	10	х		Air Temperature When the Rating was Taken	
	FRIC_ROLE VARCHAR2 20 x Role of the User Who Entered		Role of the User Who Entered the Rating					
	FRIC_USER		VARCHAR2	25	х		User Who Entered the Rating	
	FRIC_FLAG		VARCHAR2	25	х		Flag Identifying a Friction Rating as New / Valid / Invalid	

TEMPOVERLAYLOADYEAR Table holds overlay data after the user has validated it and is ready to commit it to the appropriate OVERLAY_YEAR table.					VERLAY_YEAR table.			
	Column Name		Data Type	Size	Accepts	Range	Description	
	Column Name		Data Type	OILC	Nulls	Range	Description	
	OVERLAY_AUTO_NUM	PK	NUMBER	10			Unique Identifier of an Overlay	
	OVERLAY_ROUTE_TYPE		CHAR	2			Identifies the Type of Route that is Referenced by this Record	
	OVERLAY_ROUTE_NUM		VARCHAR2	250	~		Identifies the Number of the Route Referenced by this Record	
	OVERLAY COUNTY		VARCHAR2	100	^		County the Overlav is in	
	OVERLAY_DIVISION		NUMBER	2			Division the Overlay is in	
	OVERLAY_MAINTENANCE		VARCHAR2	13	х		Maintenance ID	
	OVERLAY_BEGIN_MILEPOST		NUMBER 10 Identifies the First Mile Post Along the Stretch of Road that is Represented by th NUMBER 10 Identifies the Last Mile Post Along the Stretch of Road that is Represented by th VAPEVR1 10 Identifies the Stretch of Road that is Represented by th		Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record			
	OVERLAY_END_MILEPOST				Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record			
	OVERLAY_BEGIN_KILOMETER		VARCHAR2	8	x		Identifies the First Kilometer Along the Stretch of Road that is Represented by this Record	
	OVERLAY BEGIN GPS		VARCHAR2	30	x		GPS Location of the Beginning Location of the Overlay	
	OVERLAY_END_GPS		VARCHAR2 30 x GPS Location of the Ending Location of the Overlay		GPS Location of the Ending Location of the Overlay			
	OVERLAY_MIX_TYPE		VARCHAR2	15	х		Identifies the Type of Mix that was Used in an Overlay	
	OVERLAY_PRODUCER		VARCHAR2 150 x			Identifies the Company that Produced that Made the Asphalt or Concrete that was Used in an Overlay		
	OVERLAY_PLACER	VARCHAR2 150 DATE		150 x		Identifies the Company that Laid the Overlay		
	OVERLAY_DATE_PLACED			450	x		Date the Overlay was Placed.	
	OVERLAT_PROJECT_NUM	VARCHAR2 150 VARCHAR2 7		7 X		Number Assigned to the Project of Laying the Overlay ?		
	OVERLAY ROLE		VARCHAR2	40	x		Role that the User Plays in the System	
	OVERLAY_USER		VARCHAR2	50	x		Unique Identifier of a User	
	·							
TEMPOVERLAYYEAR	Table holds overlay data until the user has	s valida	ted it.					
	Column Name		Data Type	Size	Accepts	Range	Description	
			butu 19pc	0.20	Nulls	Hango		
	OVERLAY_AUTO_NUM	FK	NUMBER	10			Identifies the Type of Route that is Referenced by this Record	
	OVERLAY_ROUTE_TYPE	PK		2			Identifies the Number of the Route Referenced by this Record	
	OVERLAY_ROUTE_NUM	PK	VARCHAR2	250	x		County the Overlav is in	
1	OVERLAY_COUNTY	1	VARCHAR2	100	x		Division the Overlay is in	
1	OVERLAY_DIVISION	1	NUMBER	2	x		Maintenance ID	
	OVERLAY_MAINTENANCE	1	VARCHAR2	13	x	l i i i i i i i i i i i i i i i i i i i	Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record	
1	OVERLAY_BEGIN_MILEPOST	PK	NUMBER	10			Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record	
	OVERLAY_END_MILEPOST	PK	NUMBER	10			Identifies the First Kilometer Along the Stretch of Road that is Represented by this Record	
1	OVERLAY_BEGIN_KILOMETER	1	VARCHAR2	8	x		Identities the Last Kilometer Along the Stretch of Road that is Represented by this Record	
	OVERLAY_END_KILOMETER	1	VARCHAR2	8	×	l i i i i i i i i i i i i i i i i i i i	GPS Location of the Beginning Location of the Overlay	
	OVERLAY_BEGIN_GPS		VARCHAR2	30	x		GPS Location of the Ending Location of the Overlay	
	OVERLAT_END_GPS		VARCHAR2	30	×		Identifies the Company that Produced that Made the Asphalt or Concrete that was Used in an Overlay	
	OVERLAY_PRODUCER		VARCHAR2	150	Ŷ		Identifies the Company that I aid the Overlay	
	OVERLAY PLACER		VARCHAR2	150	x		Date the Overlay was Placed.	
	OVERLAY_DATE_PLACED		DATE		x		Number Assigned to the Project of Laving the Overlay ?	
	OVERLAY_PROJECT_NUM		VARCHAR2	150	х		Unique Identifier of a Project that is Associated with an Overlay	
	OVERLAY_NVI		VARCHAR2	7	х			
	OVERLAY_ROLE		VARCHAR2	40	х		Role that the User Plays in the System	
	OVERLAY_USER		VARCHAR2	50	Х		Unique Identifier of a User	
TEMPTRAFFICYEAR	Table holds traffic data until the user has	validate	d it and is read	iv to co	mmit it to th	e appropriate OVE	ERLAY YEAR table.	
		1			Accepts			
	Column Name		Data Type	Size	Nulls	Range	Description	
	TRAF_ID	PK	NUMBER	10	х		Unique Identifier of a Traffic Record	
	TRAF_COUNTY		VARCHAR2	10	х		Identifies the County Referenced by this Record	
	TRAF_DIV	-	NUMBER	10	х		Identifies the Division Referenced by this Record	
	TRAF_DIV TRAF_ROUTE_NUM	PK	NUMBER VARCHAR2	10 10	x		Identifies the Division Referenced by this Record Identifies the Number of the Route Referenced by this Record	
	TRAF_DIV TRAF_ROUTE_NUM TRAF_ROUTE_TYPE	PK	NUMBER VARCHAR2 VARCHAR2	10 10 3	x		Identifies the Division Referenced by this Record Identifies the Number of the Route Referenced by this Record Identifies the Type of Route Rate Referenced by this Record IS Route Number & Recorder with the Route Auto	
	TRAF_DIV TRAF_ROUTE_NUM TRAF_ROUTE_TYPE TRAF_US TRAF_AI T	РК	NUMBER VARCHAR2 VARCHAR2 VARCHAR2 VARCHAR2	10 10 3 10 10	x x x		Identifies the Division Referenced by this Record Identifies the Number of the Route Referenced by this Record Identifies the Type of Route that is Referenced by this Record US Route Number Associated with that Route Identifies Alternate Routes and Type of Route (eg. AI T / BUS)	
	TRAF_DIV TRAF_ROUTE_NUM TRAF_ROUTE_TYPE TRAF_US TRAF_ALT TRAF_BEGMP	РК	NUMBER VARCHAR2 VARCHAR2 VARCHAR2 VARCHAR2 FLOAT	10 10 3 10 10 126	x x x x		Identifies the Division Referenced by this Record Identifies the Number of the Route Referenced by this Record Identifies the Type of Route that is Referenced by this Record US Route Number Associated with that Route Identifies Alternate Routes and Type of Route (eg. ALT / BUS) Identifies Alternate Routes and Type of Route (eg. ALT / BUS)	
	IRAF_DIV TRAF_ROUTE_NUM TRAF_ROUTE_TYPE TRAF_US TRAF_LS TRAF_BEGMP TRAF_BEGMP TRAF_ENDMP	PK PK PK	NUMBER VARCHAR2 VARCHAR2 VARCHAR2 VARCHAR2 FLOAT FLOAT	10 10 3 10 10 126 126	x x x x		Identifies the Division Referenced by this Record Identifies the Number of the Route Referenced by this Record Identifies the Type of Route that is Referenced by this Record US Route Number Associated with that Route Identifies the Trist Mile Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record	
	IRAF_DUTE_NUM TRAF_ROUTE_NUM TRAF_ROUTE_TYPE TRAF_US TRAF_ALT TRAF_BEGMP TRAF_DEISTML	PK PK PK	NUMBER VARCHAR2 VARCHAR2 VARCHAR2 VARCHAR2 FLOAT FLOAT FLOAT	10 10 3 10 126 126 126	x x x x x		Identifies the Division Referenced by this Record Identifies the Number of the Route Referenced by this Record Identifies the Type of Route that is Referenced by this Record US Route Number Associated with that Route Identifies Attemate Routes and Type of Route (eg. ALT / BUS) Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record Distance in Miles Between TRAF_BEOMP and TRAF_ENDMP ?	
	IRAF_DIV TRAF_ROUTE_NUM TRAF_ROUTE_TYPE TRAF_US TRAF_BEGMP TRAF_BEGMP TRAF_DISTML TRAF_DISTML TRAF_DISTKM	РК РК РК	NUMBER VARCHAR2 VARCHAR2 VARCHAR2 VARCHAR2 FLOAT FLOAT FLOAT FLOAT	10 10 10 10 126 126 126 126	x x x x x x		Identifies the Division Referenced by this Record Identifies the Number of the Route Referenced by this Record Identifies the Type of Route Rtatis Referenced by this Record US Route Number Associated with that Route Identifies Atternate Routes and Type of Route (eg. ALT / BUS) Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record Distance in Miles Between TRAF_BECMP and TRAF_ENDMP ? Distance in Kilmeters Between TRAF_BECMP and TRAF_ENDMP ?	
	IRAF_DIV TRAF_ROUTE_NUM TRAF_ROUTE_TYPE TRAF_US TRAF_ALT TRAF_ENDMP TRAF_ENDMP TRAF_DISTML TRAF_DISTKM TRAF_ADT	РК РК РК	NUMBER VARCHAR2 VARCHAR2 VARCHAR2 VARCHAR2 FLOAT FLOAT FLOAT FLOAT FLOAT NUMBER	10 10 3 10 126 126 126 126 126	x x x x x x x x		Identifies the Division Referenced by this Record Identifies the Number of the Route Referenced by this Record Identifies the Type of Route that is Referenced by this Record US Route Number Associated with that Route Identifies the Transet Routes and Type of Route (eg. ALT / BUS) Identifies the First Mile Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record Distance in Miles Between TRAF_BEGMP and TRAF_ENDMP ? Distance in Kilometers Between TRAF_BEGMP and TRAF_ENDMP ?	
	IRAF_DIV TRAF_ROUTE_NUM TRAF_ROUTE_TYPE TRAF_US TRAF_BEGMP TRAF_BEGMP TRAF_BEGMP TRAF_DISTRM TRAF_DISTRM TRAF_ADT TRAF_ADT TRAF_ADT TRAF_ADT	РК РК РК	NUMBER VARCHAR2 VARCHAR2 VARCHAR2 VARCHAR2 FLOAT FLOAT FLOAT FLOAT NUMBER NUMBER	10 10 3 10 126 126 126 126 126 10 10	x x x x x x x x		Identifies the Division Referenced by this Record Identifies the Number of the Route Referenced by this Record Identifies the Type of Route Ital is Referenced by this Record US Route Number Associated with that Rout Identifies the Irits Allernate Routes and Type of Route (eg. ALT / BUS) Identifies the Irits Aller Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record Distance in Miles Between TRAF_BECMP and TRAF_ENDMP ? Distance in Kilometers Between TRAF_BECMP and TRAF_ENDMP ? Weighted Average of AADT Rating (Calculated on Traffic Commit)	
	IRAF_DIV TRAF_ROUTE_NUM TRAF_ROUTE_TYPE TRAF_US TRAF_BEGMP TRAF_ENOMP TRAF_DISTML TRAF_DISTML TRAF_DISTKM TRAF_L TRAF_D TRAF_D TRAF_D TRAF_D	РК РК РК	NUMBER VARCHAR2 VARCHAR2 VARCHAR2 VARCHAR2 FLOAT FLOAT FLOAT FLOAT NUMBER NUMBER NUMBER NUMBER	10 10 3 10 126 126 126 126 126 126 10 10	x x x x x x x x x		Identifies the Division Referenced by this Record Identifies the Number of the Route Referenced by this Record Identifies the Type of Route that is Referenced by this Record US Route Number Associated with that Route Identifies the Trist Mile Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record Identifies the Last Mile Post Along the Stretch of Road that is Represented by this Record Distance in Miles Between TRAF_BEGMP and TRAF_ENDMP ? Distance in Killes Marker TAF_BEGMP and TRAF_ENDMP ? Weighted Average of AADT Rating (Calculated on Traffic Commit)	
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HYDRA Data Flow

Figure A.106: HYDRA+ data flow

HYDRA Data Flow



- 1. The HYDRA User inputs data into the system using the application. A record of the input session and data type are recorded in the Input Log.
- 2. The data goes into the Temp____ table of its data type and the flag in each record is set to "New".
- 3. The data in the Temp____ table is then validated. The flag in each record is set to either "Valid" or "Invalid".
- 4. All Valid records in the Temp table are put into the Temp___Load table of its data type.
- 5. The records in the Temp___Load table are moved into the final table of its data type. The Temp___Load table is then deleted.

Figure A.107: HYDRA+ data flow

Section 4: Forms, Packages, Procedures and Triggers

Client-side Forms

This section contains a list of client-side (Visual Basic) forms in the HYDRA+ application. All form sub-procedures that make calls to server-side (Oracle) procedures within packages are listed along with the mapping to the client server procedure. The first number denotes the server package and the second denotes the procedure within that package. Note the sub-procedures for each form can call different procedures depending on the data type, e.g. Condition, Friction, Overlay, and/or Traffic.

frmAbout (No external call)

frmAddUser (No external call)

frmAdminWizard

VB-client: cmdDataInInputDate_Click()
Server Package.Procedure 7.1
VB-client: cmdDatValValidate_Click()
Server Package.Procedure 2.1, 1.4
VB-client: Validate()
Server Package.Procedure 2.1, 7.1, 13.1, 20.1, 1.4, 19.4, 4.4
Error Message: ***NO OVERLAY_PKG.VALIDATE_OVERLAY_DATA3***
VB-client: UpdateDataString()
Server Package.Procedure 2.1, 7.1, 13.1, 20.1, 9.1, 11.1, 3.1, 21.1, 22.1, 2.1, 7.1,
13.1, 20.1, 2.9, 7.10, 13.12, 20.10

frmAutomatedInput

VB-client: SendTrafficToDB(...) Server Package.Procedure 20.1, 19.1, 19.2 VB-client: SendConditionToDB(...) Server Package.Procedure 2.1, 1.1, 1.2

frmCommitProcessing (No external call)

frmDeleteUser (No external call)

<u>frmErrorLog</u>

VB-client: cmdSave_Click(...) Server Package.Procedure 19.3, 1.3, 4.3 Error Message: ***NO OVERLAY_PKG.OVERLAY_RESUBMIT***

frmFrictionInput (No external call)

frmGenGASB (No external call)

frmGenGIS (No external call)

frmInterfaceSelection (No external call)

frmMain (No external call)

frmOverlayCheck (No external call)

<u>frmOverlayInput</u>

VB-client: InsertOverlay(...) Server Package.Procedure 12.11, 12.1 VB-client: UpdateOverlay(...) Error Message: ***NO OVERLAY_PKG.OVERLAY_UPDATE*** VB-client: Form_Load() Server Package.Procedure 13.1

frmPPR (No external call)

frmProcSplash (No external call)

frmREPORT

VB-client: cmdPPRsubmit_Click() Server Package.Procedure 16.6, 14.3, 14.2, 14.4, 16.1
VB-client: GetDataPPR() Server Package.Procedure 15.1, 15.2, 15.3, 14.1
VB-client: cmdFRICsubmit_Click() Server Package.Procedure 7.1
VB-client: cmdGASBsubmit_Click() Server Package.Procedure 16.1

frmReportProcessing (No external call)

frmSplash (No external call)

frmTableUpdating (No external call)

<u>frmUpdateTables</u>

VB-client: CommitStaticTable() Server Package.Procedure 13.11

Server-side Packages and Procedures

This section lists every server-side (Oracle) package and its corresponding procedures. The purpose for each package is stated and the function of each procedure is described. The procedures are indexed by package.

1.0 <u>CONDITION_PKG</u>

- <u>**Purpose:**</u> Insert condition records into tables and error logs, validation procedure handles validation checks
- <u>Procedures</u>:
 - **1.1** CONDITION_INSERT
 - Takes input data and inserts it into TEMPCONDITION_CURRENT
 - **1.2** INPUT_LOG_INSERT
 - Inserts session info into INPUT_LOG
 - **1.3** CONDITION_RESUBMIT
 - This procedure overwrites an incorrect condition with the corrected condition record and deletes its record from the error log

1.4 COND_VALIDATE

• Validates input data and flags it if it is invalid

1.5 COND_REVALIDATE

• Validates new input data if there were previous errors and flags it if it is invalid

1.6 WRITE_ERROR

• Records error with error information in the ERROR_LOG

2.0 <u>CONDITION_SETUP_PKG</u>

- <u>**Purpose:**</u> Creates necessary tables, sequences and triggers for automatic import of Condition data
- <u>Procedures</u>:
 - **2.1** CHECK_CONDITION_TABLES
 - Checks if tables exist or not and flags them if they do exist
 - **2.2** CREATE_TABLE
 - Creates Condition table and it's fields
 - **2.3** CREATE_SEQUENCE
 - Creates the sequence used for the COND_ID in the condition table 2.4 CREATE_TRANSACTION_LOG
 - Creates the table CONDITION_TRANSACTION_LOG and it's fields
 - 2.5 CREATE_ERROR_LOG
 - Creates the table ERROR_LOG and it's fields
 - 2.6 CREATE_INPUT_LOG

- Creates the table INPUT_LOG and it's fields
- **2.7** CREATE_CONDITION_DETAIL_TABLE

Creates the table CONDITION_DETAIL_LOG and it's fields
 2.8 CREATE_CONDITION_INDEX

- Creates or replaces unique primary keys on the CONDITION_YEAR table
- 2.9 DROP_TABLES_AFTER_COMMIT
- Drops the table TEMPCONDITIONLOAD_YEAR after the commit
 2.10 SET_SYNONYMS
 - Creates or replaces specified synonyms for specified tables

3.0 <u>COND_COMMIT_CALC_RATINGS_PKG</u>

- <u>Purpose</u>: Calculates and commits condition rating to DB.
- <u>Procedures</u>:
 - **3.1** CALL_GENERATE_PROCEDURES

• *Calls the other condition commit procedures in the proper order* **3.2** CALCULATE_CONDITION_RATING

- This procedure calculates the "COND_RATING" field in the TEMPCONDITIONLOAD table according to the year of the table
- **3.3** CALCULATE_COND_RATING_PRE_1996
 - This procedure calculates the "COND_RATING" field in the TEMPCONDITIONLOAD table for years before 1996
- **3.4** CALCULATE_COND_RATING_96_99
 - This procedure calculates the "COND_RATING" field in the TEMPCONDITIONLOAD table for years between 1996 and 1999
- **3.5** CALCULATE_COND_RATING_2002
 - This procedure calculates the "COND_RATING" field in the TEMPCONDITIONLOAD table for the year 2002
- 3.6 CONDITION_INIT
 - This procedure calls CONDITION_ROUTE_INIT and passes each route individually
- 3.7 CONDITION_ROUTE_INIT
 - This procedure inserts detail condition records for each route and calls CONDITION_FULL_INSERT when needed to insert the condition record
- 3.8 CONDITION_FULL_INSERT
 - This procedure is responsible for inserting data into CONDITION_CURRENT and returning the CONDITION_ID that was generated
- **3.9** GEN_ALL_OVERLAY_RATINGS
 - This procedure selects individual overlays and passes them to GEN_OVERLAY_RATING
- 3.10 GEN_OVERLAY_RATING
 - This procedure uses all the condition records within an overlay's milepost to calculate it a weighted condition rating
- 3.11 PROMOTE_OVERLAY_RATINGS

This procedure assigns ratings and DATE_RATED to overlays that were not rated in the condition table being committed. If an overlay's begin and end milepost have not changed then it pulls up the rating from the previous year's overlay table. If the mileposts have change then it calculates a rating with the previous condition table.

3.12 PROMOTE

- This gets ratings and date rated from the previous year's overlay table for an overlay
- 3.13 GEN_DYN_RATING
 - This calculates a weighted condition average for an overlay
- 3.14 SET_PROJECTION_YEAR
 - This procedure sets the synonym "CONDITION_PRJ" to reference the condition table for the year P_YEAR
- 3.15 SET_OVERLAY_YEAR
 - This procedure sets the synonym "OVERLAY_PRJ" to reference the overlay table for the year P_YEAR

4.0 <u>FRICTION_PKG</u>

- <u>**Purpose:**</u> Insert friction records into tables and error logs, validation procedure handles validation checks
- <u>Procedures</u>:
 - 4.1 FRICTION_INSERT
 - Takes input data and inserts it into TEMPFRICTION_CURRENT
 - 4.2 INPUT_LOG_INSERT
 - Inserts session info into INPUT_LOG
 - **4.3** FRICTION_RESUBMIT
 - This procedure overwrites an incorrect friction record with the corrected friction record and deletes its record from the error log
 - **4.4** VALIDATE_FRICTION_DATA3
 - Validates input data and flags it if it is invalid
 - 4.5 WRITE_ERROR
 - *Records error with error information in the ERROR_LOG*

5.0 <u>FRICTION_RPT</u>

- <u>**Purpose:**</u> *Pulls in data for the PPR.*
- <u>Procedures</u>:
 - **5.1** Get_Fric_Record_Set
 - This procedure pulls PPR data for queries with a 1 or 2 search option

6.0 <u>FRICTION_RPT_PTS</u>

- **<u>Purpose</u>**: *Pulls in data for the PPR.*
- <u>Procedures</u>:
 - 6.1 Get_Fric_Record_Set_Pts

• This procedure pulls PPR data for queries with a 1 or 2 search option

7.0 <u>FRICTION_SETUP_PKG</u>

- <u>**Purpose:**</u> Checks and sets up all tables for friction input
- **Procedures**:
 - 7.1 CHECK_FRICTION_TABLES
 - Checks if tables exist or not and flags them if they do exist
 - 7.2 CREATE_TABLE
 - Creates Friction table and it's fields
 - **7.3** CREATE_FINAL_TABLE
 - Creates Friction table and it's fields without flag, user, role and air_temp
 - 7.4 CREATE_SEQUENCE
 - Creates the sequence used for the COND_ID in the condition table 7.5 CREATE_TRIGGER
 - This procedure creates the trigger for execution based on the trigger
 - 7.6 CREATE_TRANSACTION_LOG
 - Creates the table FRICTION_TRANSACTION_LOG and it's fields
 - 7.7 CREATE_ERROR_LOG
 - Creates the table ERROR_LOG and it's fields
 - 7.8 CREATE_INPUT_LOG
 - Creates the table INPUT_LOG and it's fields
 - 7.9 CREATE_BASE_FRIC_DETAIL_TABLE
 - Creates the table BASE_FRIC_DETAIL and it's fields
 - 7.10 DROP_TABLES_AFTER_COMMIT
 - Drops the table TEMPCONDITIONLOAD_YEAR after the commit

8.0 <u>FRICTION_SYN</u>

- <u>**Purpose</u>**: This package creates the synonyms for variables received from VB</u>
- <u>Procedures</u>:
 - 8.1 Cre_Cty_Fric_Syn
 - This retrieves a year variable from the VB application and creates a synonym for the county table name based on the year given
 - 8.2 Cre_Fric_Syn
 - This retrieves a year variable from the VB application and creates a synonym for the Friction table name based on the year given
 - 8.3 Cre_Fric_Base_Fric_Det_Syn
 - This retrieves a year variable from the VB application and creates a synonym for the Friction Detail table name based on the year given
 - 8.4 Cre_Fric_Over_Syn
 - This retrieves a year variable from the VB application and creates a synonym for the Friction table name based on the year given
 - 8.5 Cre_Fric_Over_Det_Syn

- This retrieves a year variable from the VB application and creates a synonym for the Friction Detail table name based on the year given
- 8.6 Cre_Fric_Agg_Det_Syn
 - This retrieves a year variable from the VB application and creates a synonym for the Friction Detail table name based on the year given

9.0 <u>FRIC_COMMIT_CALC_RATINGS_PKG</u>

• <u>Purpose</u>: Calculates and commits friction rating to DB.

• **Procedures**:

- 9.1 CALL_GENERATE_PROCEDURES
 - This procedure calls the stored procedures SET_SYNONYM in the OVERLAY_SETUP_PKG package; it also calls procedures in this package
- 9.2 FRICTION_INIT
 - This procedure calls FRIC_ROUTE_INIT and passes each route individually
- 9.3 FRICTION_ROUTE_INIT
 - This procedure inserts detail friction records for each route and calls "FRICTION_FULL_INSERT" when needed
- 9.4 FRICTION_FULL_INSERT
 - This procedure is responsible for inserting data into CONDITION_CURRENT and returning the CONDITION_ID that was generated
- 9.5 CALC_FRIC_OVERLAY_RATINGS
 - This procedure sets the OVERLAY_FRIC_RATING for each overlay by calculating the OVERLAY_AVERAGE for that overlay

10.0 <u>OVERLAY_CLEAN_PKG</u>

- <u>**Purpose:**</u> This package contains two procedures, call_overlay_clean and overlay_clean
- <u>Procedures</u>:

10.1 call_overlay_clean

• This procedure absorbs all overlays in a given year that are less than 1 mile

10.2 overlay_clean

 This procedure calls overlay_clean until there are no overlays that are less than 1 mile. The procedure makes new tables for inserting cleaned data into. The name format of the new tables is OVERLAY_1984_NEW0. The 0 at the end is a counter that is incremented after each iteration.

11.0 <u>OVERLAY_COMMIT_PKG</u>

- <u>**Purpose:**</u> This package is in charge of committing the overlay tables.
- Procedures:
 11.1 CALL_OVERLAY_COMMIT

- This procedure calls the rest of the procedures in the package depending on whether the year is the previous year or if it is the current year.
- 11.2 APPEND_CURRENT_OVERLAYS
 - This procedure pulls all overlays from previous year into current year TEMPOVERLAYLOAD table
- 11.3 CLEAN_OVERLAYLOAD_TABLE
- cleans up overlapping overlays by keeping most recent overlay
 11.4 OVERLAY_INSERT
 - Called by the CLEAN_OVERLAYLAOD_TABLE, this procedure inserts the "last record" into overlay current

11.5 OVERLAY_INIT

This procedure creates overlay_detail table to relate to a base_section

12.0 OVERLAY_PKG

- **<u>Purpose</u>**: This package does calculations for overlays and inserts them into the overlay table.
- <u>Procedures</u>:

12.1 OVERLAY_SUBMIT

- This procedure inserts the inputted overlay data into the TEMPOVERLAYYEAR table. It also inputs overlay data into the OVERLAY_BREAKUP table.
- 12.2 WRITE_ERROR
 - If there are errors, the errors are written to the ERROR_LOG
- 12.3 OVERLAY_BREAKUP
 - This procedure breaks up the affected overlays when a new overlay is inserted.
- 12.4 SET_SYNONYM
 - This procedure creates or replaces the synonym for a specified table.
- **12.5** RECALCULATE_RATINGS
 - This procedure calls CALC_CONDITION and CALC_TRAFFIC for the overlay in the OVERLAY_BREAKUP table.
- **12.6** CALC_CONDITION
 - This procedure calculates the condition for the overlay sent by RECALCULATE_RATINGS
- 12.7 CALC_TRAFFIC
 - This procedure calculates the traffic for the overlay sent by RECALCULATE_RATINGS
- 12.8 OVERLAY_INSERT
 - This procedure adds, deletes, and modifies overlays. It calls OVERLAY_ROUT_INIT and sends it an overlay.
- **12.9** UPDATE_AGGREGATE

- This procedure updates the aggregate detail of the affected old overlay with the new overlay aggregate detail.
- 12.10 OVERLAY_ROUTE_INIT
 - This procedure sets the synonyms needed to connect the BASE SECTION table to the OVERLAY DETAIL YEAR table
- 12.11 GET_AFFECTED_OVERLAY
 - This procedure gets the affected overlays after a new overlay has been inserted
- **12.12** ABSORB_HALF_MILE

13.0 OVERLAY_SETUP_PKG

- **<u>Purpose</u>**: This packages checks and sets up all tables for overlay input.
- <u>Procedures</u>:
 - **13.1** CHECK_OVERLAY_TABLES
 - This procedure checks to see if the proper tables already exist and flags them if they do.
 - 13.2 CREATE_OVERLAYAGGDETAIL_TABLE
 - This procedure creates the OVERLAYAGGDETAIL table and its fields
 - 13.3 CREATE_TABLE
 - This procedure creates a Temp Overlay table
 - **13.4** CREATE_TABLE2
 - This procedure creates a Temp Overlay Load table
 - **13.5** CREATE_FINAL_TABLE
 - This procedure creates an Overlay table
 - **13.6** CREATE_SEQUENCE
 - This procedure creates the sequence
 - **13.7** CREATE_TRIGGER
 - This procedure creates the trigger for Overlay inserts
 - 13.8 CREATE_TRANSACTION_LOG
 - This procedure creates the TRANSACTION_LOG table and its fields
 - **13.9** CREATE_FINAL_AGG_DETAIL_TABLE
 - This procedure creates the AGGREGATE_DETAIL table and its fields
 - 13.10 CREATE_OVERLAY_DETAIL_TABLE
 - This procedure creates the OVERLAY_DETAIL_YEAR table and its fields
 - 13.11 SET_SYNONYM
 - This procedure sets the synonyms for the overlay tables
 - 13.12 DROP_TABLES_AFTER_COMMIT
 - This procedure drops the TEMPOVERLAYLOADYEAR table after the OVERLAY_YEAR table has been committed.
- 14.0 <u>PPR_PKG</u>

- <u>**Purpose:**</u> This package is responsible for calculating and organizing the data that goes into the PPR.
- <u>Procedures</u>:
 - 14.1 Get_Record_Set12
 - This procedure pulls PPR data for queries with a 1 or 2 search option
 - 14.2 move_asofins
 - This procedure creates or replaces the synonym PPR_ASOF_INSERT for the OVERLAY_YEAR and CONDITION_YEAR tables.
 - 14.3 move_asofread
 - This procedure creates or replaces the synonym PPR_ASOF_READ for the OVERLAY_YEAR and CONDITION_YEAR tables.
 - 14.4 Build_ASOF
 - This procedure inserts everything from PPR_ASOF_READ into OVERLAY_ASOF and calls the procedure PPR_OVERLAY_SUBMIT.
 - 14.5 PPR OVERLAY SUBMIT
 - This procedure calculates the projections for the overlays.
 - 14.6 PPR_OVERLAY_INSERT
 - This procedure inserts the projections into the overlay table.
 - 14.7 PPR_OVERLAY_BREAKUP
 - This procedure breaks up effected overlays.
- 15.0 <u>PPR_SYN</u>
 - <u>**Purpose:**</u> This package creates the synonyms for variables received from VB
 - <u>Procedures</u>:
 - 15.1 Cre_Cty_PPR_Syn
 - This retrieves a year variable from the VB application and creates a synonym for the county table name based on the year given
 - 15.2 Cre_Ovr_PPR_Syn
 - This retrieves a year variable from the VB application and creates a synonym for the Overlay table name based on the year given
 - **15.3** Cre_Ovr_Det_PPR_Syn
 - This retrieves a year variable from the VB application and creates a synonym for the Base Section table name based on the year given
 - **15.4** Cre_Base_PPR_Syn
 - This retrieves a year variable from the VB application and creates a synonym for the Overlay_Detail table name based on the year given

16.0 **PROJECTION_CALC**

- <u>**Purpose:**</u> This package does calculations for projection data for each overlay
- <u>Procedures</u>:
 - **16.1** GEN_OVERLAY_PROJECTION
 - Generates 3 projections for each overlay " Overlays must have OVERLAY_DATE_PLACED"
 - 16.2 GEN_DYN_RATING
 - Calculates weighted condition average for overlay for year CONDITION_PRJ2 references
 - 16.3 CALCULATE_PRJ_SUMS
 - Sums regression coefficients needed by CALCULATE_PRJ_FACTORS to get factors
 - **16.4** CALCULATE_PRJ_FACTORS
 - Calculates factors needed in the projection equation
 - **16.5** SET_PROJECTION_YEAR
 - Sets synonym "CONDITION_PRJ2" to the condition table needed in GEN_DYN_RATING
 - **16.6** SET_OVERLAY_YEAR
 - This procedure sets the synonym "OVERLAY_PRJ" for the overlay year being projected

17.0 <u>ROLLOVER_PKG</u>

- <u>**Purpose:**</u> This package rolls over the tables that need to be rolled over.
- <u>Procedures</u>:
 - 17.1 COMPARE_YEAR
 - This procedure checks if current year is greater than the system date passed to the function from the VB side.
 - **17.2** CREATE_TABLES
 - This procedure creates tables that should be rolled over.
 - **17.3** CREATE_MOVE_SYNONYMS
 - This procedure moves the current year synonyms to point to the new year and temporary synonyms are created to hold the previous year's value.
 - 17.4 COPY_DATA
 - This procedure copies over all the data from the previous year into the new year's table.
 - **17.5** DROP_SYNONYM
 - This procedure deletes the synonyms for the previous year.
 - **17.6** DECAY
 - This procedure decrements the condition of the overlay by a standard amount each year.

18.0 TRAFFIC_BREAKUP_PKG

- <u>**Purpose:**</u> This package breaks the traffic data into a temporary table called traffic_breakup_table.
- <u>Procedures</u>:
 - 18.1 traffic_record_cursor
 - This procedure passes one traffic record at a time to the traffic_breakup procedure
 - 18.2 traffic_breakup
 - This procedure loops through a traffic records beginning and end mileposts. While it is between the two it assigns the data in that record to another record in the traffic_breakup_table and inserts the mp_counter value for the milepost. The mp_counter value is incremented by .1 after each interation.
 - 18.3 drop_traffic_breakup_table
 - *This procedure drops the TRAFFIC_BREAKUP_TABLE.*

19.0 TRAFFIC_PKG

- <u>**Purpose:**</u> This package inserts traffic records into tables and error logs, validation procedure handles validation checks.
- <u>Procedures</u>:
 - **19.1** TRAFFIC_INSERT
 - Takes input data and inserts it into TEMPTRAFFIC_CURRENT 19.2 INPUT_LOG_INSERT
 - Inserts session info into INPUT_LOG
 - **19.3** TRAFFIC_RESUBMIT
 - This procedure overwrites an incorrect traffic field with the corrected traffic field and deletes its record from the error log
 - **19.4** VALIDATE TRAFFIC DATA3
 - Validates input data and flags it if it is invalid
 - 19.5 WRITE_ERROR
 - *Records error with error information in the ERROR_LOG*

20.0 <u>TRAFFIC_SETUP_PKG</u>

- <u>**Purpose:**</u> This package creates necessary tables, sequences and triggers for automatic import of traffic data.
- <u>Procedures</u>:
 - **20.1** CHECK_TRAFFIC_TABLES
 - This procedure checks to see if the proper tables already exist and flags them if they do.
 - **20.2** CREATE_INPUT_TABLE
 - This procedure creates the TEMPTRAFFICYEAR table and its fields.
 - 20.3 CREATE_TRANSACTION_LOG
 - This procedure creates the table TRAFFIC_TRANSACTION_LOG and its fields.

20.4 CREATE_ERROR_LOG

• This procedure creates the table ERROR_LOG and its fields. 20.5 CREATE_INPUT_LOG

- This procedure creates the table INPUT_LOG and its fields.
 20.6 CREATE_LOAD_TABLE
 - This procedure creates the table TEMPTRAFFICLOADYEAR and its fields.
- **20.7** CREATE_TRAFFIC_TABLE
 - This procedure creates the tables TRAFFIC_YEAR and TEMPTRAFFICCOMMITYEAR and their fields.
- **20.8** CREATE_TRAFFIC_DETAIL_TABLE
 - This procedure creates the tables BASE_TRAF_DETAIL_YEAR and TEMPTRAFFICDETCOMMITYEAR and their fields.
- **20.9** CREATE_TRAFFIC_BREAKUP_TABLE
 - This procedure creates the table TRAFFIC_BREAKUP_TABLE and its fields.
- 20.10 DROP_TABLES_AFTER_COMMIT
 - This procedure drops the table TEMPTRAFFICLOADYEAR and it deletes everything from the TRAFFIC_BREAKUP_TABLE.

21.0 TRAF_COMMIT_CALC_RATINGS_PKG

- **<u>Purpose</u>**: This package creates synonyms for traffic tables and calculates ratings for traffic data.
- <u>Procedures</u>:
 - **21.1** CALL_GENERATE_PROCEDURES
 - This procedure calls the stored procedures SET_SYNONYM in the OVERLAY_SETUP_PKG package; it also calls procedures in this package
 - **21.2** SET_TRAFFIC_SYN
 - This procedure creates the synonym TRAFFIC_CURRENT for the TRAFFIC_YEAR table.
 - 21.3 SET_LOAD_SYN
 - This procedure creates the synonym TEMPTRAFFICLOAD_CURRENT for the TEMPTRAFFICLOADYEAR table.
 - 21.4 GEN_ALL_OVERLAY_RATINGS
 - This procedure calls the procedure GEN_OVERLAY_RATING for every overlay.
 - 21.5 GEN_OVERLAY_RATING
 - This procedure gets the average of the traf_aadt and
 - 21.6 TRAFFIC_INIT
 - This procedure calls TRAFFIC_ROUTE_INIT and passes each route individually
 - **21.7** TRAFFIC_ROUTE_INIT

- This procedure inserts detail traffic records for each route and calls TRAFFIC_FULL_INSERT when needed to insert the traffic record
- **21.8** TRAFFIC_FULL_INSERT
 - This procedure is responsible for inserting data into TRAFFIC_CURRENT and returning the TRAFFIC_ID that was generated.

22.0 <u>UPDATE_ADMIN_STATE</u>

• **<u>Purpose</u>**: This package updates the ADMIN_STATE table and its synonyms.

• **Procedures**:

22.1 INSERT_RECORDS

• This procedure inserts records into the ADMIN_STATE table.

22.2 SET_COUNT_TABLE

• This procedure creates the synonym ADMIN_STATE_COUNT.

Trigger List

This section lists every server-side (Oracle) triggers and the corresponding table that it acts upon. Details of the event and location of each event within a table is also noted.

Trigger	Туре	Event	Table
AGGTYPE_INSERT	BEFORE EACH ROW	INSERT	AGGTYPE
AGGTYPE_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	AGGTYPE
ARCHIVE EVENT OCCURRENCES	AFTER FACH ROW	UPDATE	SMP VDE EVENT TARGET DETAILS
CONCURRENT_ROUTESTEMP_INSERT	BEFORE EACH ROW	INSERT	CONCURRENT_ROUTES_TEMP
CONCURRENT_ROUTESTEMP_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	CONCURRENT_ROUTESTEMP
CONDITION1999_TRANS			TEMPCONDITION1999
CONDITION2001_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPCONDITION2001
CONDITION2002_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPCONDITION2002
CONDITION2004_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPCONDITION2004
	AFTER FACH ROW	INSERT OR LIPDATE OR DELETE	
DIVISION_TEMP_INSERT	BEFORE EACH ROW	INSERT	DIVISION_TEMP
DIVISIONTEMP_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	DIVISION_TEMP
EVENT_ARCHIVE_AGENT_STATE	AFTER EACH ROW	UPDATE	SMP_VDE_EVENT_TARGET_DETAILS
FRICTION_LOG_1999 FRICTION_LOG_2000	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPERICTION 1999
FRICTION_LOG_2001	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPFRICTION2001
FRICTION_LOG_2002	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPFRICTION2002
FRICTION_LOG_2003	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPERICTION2003
FRICTION LOG 2005	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	TEMPFRICTION2004
FRIC_MODIFIER_TEMP_INSERT	BEFORE EACH ROW	INSERT	FRIC_MODIFIER_TEMP
LOG_EVENT_REGISTRATION_STAT	AFTER EACH ROW	INSERT OR UPDATE	SMP_VDE_EVENT_TARGET_INFO
MIXTYPE_INSERT	BEFORE EACH ROW	INSERT	
MIX TYPE LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	MIX_TYPE
OVERLAYTRANSACTION2001_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPOVERLAY2001
OVERLAYTRANSACTION2002_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPOVERLAY2002
OVERLAYTRANSACTION2003_TRANS	AFTER EACH ROW		TEMPOVERLAY2003
OVERLAYTRANSACTION2005 TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPOVERLAY2005
PERPETUAL_OVERLAY_AUTONUM_1984	BEFORE EACH ROW	INSERT	TEMPOVERLAY1984
PERPETUAL_OVERLAY_AUTONUM_1985	BEFORE EACH ROW	INSERT	TEMPOVERLAY1985
PERPETUAL_OVERLAY_AUTONUM_1986	BEFORE EACH ROW	INSERT	TEMPOVERLAY1986
PERPETUAL_OVERLAY_AUTONUM_1988	BEFORE EACH ROW	INSERT	TEMPOVERLAY1988
PERPETUAL_OVERLAY_AUTONUM_1989	BEFORE EACH ROW	INSERT	TEMPOVERLAY1989
PERPETUAL_OVERLAY_AUTONUM_1990	BEFORE EACH ROW	INSERT	TEMPOVERLAY1990
PERPETUAL_OVERLAY_AUTONUM_1991 PERPETUAL_OVERLAY_AUTONUM_1991	BEFORE EACH ROW	INSERT	TEMPOVERLAY1991
PERPETUAL_OVERLAY_AUTONUM_1993	BEFORE EACH ROW	INSERT	TEMPOVERLAY1993
PERPETUAL_OVERLAY_AUTONUM_1994	BEFORE EACH ROW	INSERT	TEMPOVERLAY1994
PERPETUAL_OVERLAY_AUTONUM_1995	BEFORE EACH ROW	INSERT	TEMPOVERLAY1995
PERPETUAL_OVERLAT_AUTONUM_1996 PERPETUAL_OVERLAY_AUTONUM_1997	BEFORE EACH ROW	INSERT	TEMPOVERLAT 1996
PERPETUAL_OVERLAY_AUTONUM_1998	BEFORE EACH ROW	INSERT	TEMPOVERLAY1998
PERPETUAL_OVERLAY_AUTONUM_1999	BEFORE EACH ROW	INSERT	TEMPOVERLAY1999
PERPETUAL_OVERLAY_AUTONUM_2000	BEFORE EACH ROW	INSERT	TEMPOVERLAY2000
PERPETUAL_OVERLAY_AUTONUM_2002	BEFORE EACH ROW	INSERT	TEMPOVERLAY2002
PERPETUAL_OVERLAY_AUTONUM_2003	BEFORE EACH ROW	INSERT	TEMPOVERLAY2003
PERPETUAL_OVERLAY_AUTONUM_2004	BEFORE EACH ROW	INSERT	TEMPOVERLAY2004
PLACERS_INSERT	AFTER EACH ROW	INSERT OR LIPDATE OR DELETE	PLACERS
PLACERS_TEMP_INSERT	BEFORE EACH ROW	INSERT	PLACERS_TEMP
PRODUCER_INSERT	BEFORE EACH ROW	INSERT	PRODUCER
PRODUCER_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	PRODUCER TEMP
ROUTES TEMP INSERT	BEFORE EACH ROW	INSERT	ROUTES TEMP
ROUTES_TEMP_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	ROUTES_TEMP
SMP_UPDATE_LAST_NOTIFICATION	AFTER EACH ROW	INSERT	SMP_VDM_NOTIFICATION
SMP_VDE_ON_OCCURRENCE_DELETE	AFTER EACH ROW	DELETE	SMP_VDE_EVENT_OCCURRENCE
SMP_VDJ_ON_REMOVE_JOB_LOG	BEFORE EACH ROW	DELETE	SMP_VDJ_JOB_LOG
SMP_VDM_ON_DELETE_PAG_SERVER	AFTER EACH ROW	DELETE	SMP_VDM_NOTIFICATION_SERVICES
SMP_VDN_GROUP_LIST_TRIG	BEFORE EACH ROW	DELETE	SMP_VDN_GROUP_LIST
SMP_VDN_GRF_CHECK_CTCLES	BEFORE EACH ROW	DELETE	SMP_VDN_TARGET_LIST
SMP_VDU_PRIV_OBJECT_TRIG	BEFORE EACH ROW	DELETE	SMP_VDU_OBJECTS_TABLE
SMP_VDU_PRIV_PRINCIPALS_TRIG	BEFORE EACH ROW	DELETE	SMP_VDU_PRINCIPALS_TABLE
SMP_VDV_DELETE_TRIG	AFTER EACH ROW	INSERT	SMP_VDU_PRINCIPALS_TABLE
SMP_VDV_ON_DELETE_USER	AFTER EACH ROW	DELETE	SMP_VDV_USER
SMP_VDV_ON_INSERT_USER	AFTER EACH ROW	INSERT	SMP_VDV_USER
SOURCES_LOG	AFTER EACH ROW	INSERT OR UPDATE OR DELETE	SOURCES
TEMPOVERLAY AUTONUM 2002	BEFORE EACH ROW	INSERT	TEMPOVERLAYLOAD2002
TRAFFIC1984_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1984
TRAFFIC1985_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1985
TRAFFIC1986_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1986
TRAFFIC1988_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1988
TRAFFIC1989_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1989
I RAFFIC1990_TRANS	AFTER EACH ROW	UPDATE OR DELETE	I EMP (RAFFIC1990
TRAFFIC1992_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1992
TRAFFIC1993_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1993
TRAFFIC1994_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1994
TRAFFIC1995_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1995
TRAFFIC1997_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1997
TRAFFIC1998_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1998
TRAFFIC1999_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC1999
TRAFFIC2001 TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC2001
TRAFFIC2002_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC2002
TRAFFIC2003_TRANS	AFTER EACH ROW	UPDATE OR DELETE	TEMPTRAFFIC2003
I KAFFIC2004_I RANS	AFTER EACH ROW	UPDATE OR DELETE	LEMPTRAFFIC2004

APPENDIX A.1:

Traffic Table format:

Field Names / Data types/ Size

CNYF / Double / 8 CITY / Double / 8 DIV / Double / 8 RTE / Double / 8 US / Double / 8 ALT / Text / 3 BEGINML / Double / 8 ENDML / Double / 8 DISTML / Double / 8 DISTKM / Double / 8 AADT / Double / 8 K / Double / 8 D / Double / 8 TDHV / Long Integer / 4 TADT / Double / 8 MED / Double / 8 HVY / Double / 8 GROWTH / Double / 8 STGROWTH / Double / 8 DVMTGWTH / Double / 8 ACTMP / Double / 8 DESCRIPTION / Text / 50

APPENDIX A.2:

Condition Table format:

Field Names / Data types / Size

ROUTE TYPE / Text / 1 ROUTE / Double / 5 DIR / Text / 1 LANE / Text / 1 KM / Double / 8 DATE_RATED / DateTime / 8 IRI1 / Double / 8 IRI2 / Double / 8 TEX RMS / Double / 8 TEX_MPD / Double / 8 RRUT / Double / 8 LRUT / Double / 8 GRADE / Double / 8 LATDEG / Double / 8 LATMIN / Double / 8 LATSEC / Double / 8 LONGDEG / Double / 8 LONGMIN / Double / 8 LONGSEC / Double / 8 RATER / Text / 2 ARAN / Text / 4 PATCHING_G / Double / 8 PATCHING_F / Double / 8 PATCHING P / Double / 8 SHLDR COND / Text / 1 SHLDR TYPE / Text / 3 RAVEL_L / Double / 8 RAVEL_W / Double / 8 RAVEL E / Double / 8 BLEED L / Double / 8 BLEED_W / Double / 8 BLEED E / Double / 8 ALLIGAT1 / Double / 8 ALLIGAT2 / Double / 8 ALLIGAT3 / Double / 8 BLOCK1 / Double / 8 BLOCK2 / Double / 8 BLOCK3 / Double / 8 LONGIT1 / Double / 8 LONGIT2 / Double / 8

LONGIT3 / Double / 8 TRANS1 / Double / 8 TRANS2 / Double / 8 TRANS3 / Double / 8 CRKSEAL / Double / 8 POTHOLE / Double / 8 PUMP / Double / 8 LJSPAL_L / Double / 8 LJSPAL_M / Double / 8 LJSPAL_S / Double / 8 TJOINT / Double / 8 TJSPAL_L / Double / 8 TJSPAL M / Double / 8 TJSPAL_S / Double / 8 POPOUTS / Double / 8 LANE_SEP / Double / 8 JOINT SEAL / Double / 8 CORNER_BRK / Double / 8 LANE_WIDTH / Double / 8 PVMT_TYPE / Text / 3 BRIDGE / Text / 1 CONST / Text / 1 XFALL / Double / 8 ELEVATION / Double / 8 PFAULT_CNT / Double / 8 PFAULT_AVG / Double / 8 NFAULT_CNT / Double / 8 NFAULT_AVG / Double / 8

APPENDIX A.3:

System requirements:

- 1) Windows XP
 - Windows XP Professional with Service Pack 1 must be installed on any computer that will run the HYDRA+ program.
- 2) Oracle
 - The Oracle 9i release 2 client must be installed on any computer that will run the HYDRA+ program.
 - Users must have permission to access the Ora92 folder on the local computer.
 - Note: Oracle must be installed prior to running the HYDRA+ setup package.
- 3) Microsoft Office XP
 - Access version 10 is required to import Condition and Traffic Data.
 - Excel version 10 is required for reporting purposes.

Optional software:

- 4) Adobe Writer
 - In order to use the PDF reporting function of HYDRA+, the Adobe Writer software must be installed on the computer. Reporting will still be available without the software, but only in Excel form.
- 5) Crystal Reports 10
 - Used for statistical analysis of data, chart creation, and ad hoc queries
- 6) GeoMedia
 - Used to create maps from overlay data

APPENDIX A.4:

Setting up the Oracle ODBC driver:

The ODBC driver is necessary for any computer that will make a connection to the database server. Only the system administrator can perform this function on a local computer.

<u>Step 1:</u>

Click the **Start** menu, then select **Control Panel.** <u>Step 2:</u> Choose **Administrative Tools**, then choose **Data Sources (ODBC).** <u>Step 3:</u>

Click the **System DSN** tab, and you will see the following box:



Figure A.4.1: ODBC data source administrator
Step 4:

Click the **Add...** button. The following box will appear:

Create New Data Source		
	Select a driver for which you want to set up a da Name Microsoft ODBC for Oracle Microsoft Paradox-Treiber (*.db) Microsoft Text Driver (*.txt; *.csv) Microsoft Text-Treiber (*.txt; *.csv) Microsoft Visual FoxPro Driver Microsoft Visual FoxPro Driver Microsoft Visual FoxPro Driver Microsoft Visual FoxPro Driver Microsoft Visual FoxPro Treiber Discle in OraHome92 SQL Server	ta source.
	< Back Finish	Cancel

Figure A.4.2: Create new data source

<u>Step 5:</u>

Select the Oracle in OraHome92 driver and click Finish.

• Note: Be sure to choose this driver rather than the Microsoft ODBC for Oracle driver. If the Oracle driver is not available, verify that the Oracle client is installed on the local computer.

The following box will appear:

Data Source Name HYORA OK Description Cancel TNS Service Name HYORA Help User ID Tes Connection
User ID
Application Oracle Workarounds SQLServer Migration Translation Options
Enable Result Sets 🔽 Enable Query Timeout 🔽 Read-Only Connection 🔽
Enable Closing Cursors 🧮 Enable Thread Safety 🔽 SQLGetData Extensions 🗖
Batch Autocommit Mode Commit only if all statements succeed

Figure A.4.3: ODBC driver configuration

In the Data Source name box type HYDRA+, and in the TNS Service Name box, also type HYDRA+. The other boxes may be left blank.

You may test the connection to ensure that it is set up correctly by clicking the **Test Connection** button. You will see the following box:

Oracle ODBC Driver Connect	×
Service Name	
HYDRA	
Úser Name	OK
	Cancel
Password	About
,	

Figure A.4.4: ODBC driver connect

Type your user name and password into the boxes and press OK. You will be informed of the success or failure of the connection.

Complete the driver setup by clicking OK in the Driver Configuration box and the Data Source Administration box.

Appendix B: User's Manual

User's Manual Overview	
Section 1: Table Administration (Manual Information)	
Section 2: Description of Administrator Options	
A. UPDATE TABLE: B. CHANGE STATUS: C. ADD RECORD: D. DELETE RECORD: E. MANIPULATE TABLE:	
Section 3: Automatic Data Load User Information	
A. TRAFFIC AUTOMATED DATA LOAD B. CONDITION AUTOMATED DATA LOAD	
Section 4: Manual Data Load User Information	
A. MANUAL FRICTION DATA LOAD B. MANUAL OVERLAY INPUT USER INFORMATION	
Section 5: Automated Input Data Validation	
Section 6: Updating Data	
Section 7: Reporting Options	
A. GASB 34 B. Preliminary Prioritization Report (PPR) C. Friction Report D. Other Reporting	
I. Manual Data Load User Information	
A. MANUAL FRICTION DATA LOAD	

User's Manual Overview

The User's Manual provides system administration and client (user) operations for the HYDRA+ system. Section 1 and 2 details the administrator's ability to manually update a series of database tables that describe location, payment type, producer information, and traffic loads. Section 3 provides automated input of traffic and condition data.

Section 4 provides manual input by the user of friction and condition data. Section 5 details the process by which a user can manage the automatic validation of condition data. Section 6 provides instructions for the user to update traffic and condition data prior to the data having been committed to the database. Section 7 provides instructions to the user on creating PPRs, friction reports, GASB reports and exports for data usage outside the system

Section 1: Table Administration (Manual Information)

The purpose of this process is to allow users to update the following tables manually:

AGGTYPE CONCURRENT_ROUTES CONDITION_VALIDATION_RANGES COUNTY DISTRICT DIVISION FRICTION_VALIDATION_RANGES FRIC_MODIFIER MIX_TYPE PLACER PRODUCER OVERLAY_PROJECTION_ERROR ROUTES SOURCES TRAFFIC_VALIDATION_RANGES

• Note: To begin inputting Table data follow the steps and diagrams below.

<u>Step 1:</u>

Open the HYDRA+ program and select **Data Input** from the interface selection screen.



Figure B.1: Interface selection screen

Step 2:

Select the **Administration** tab and select the table that you wish to update from the **Select Table** drop-down menu. After a table is selected, update buttons will appear below the menu box which will allow you to edit the tables.

Selecting *Aggtype*, *Fric_Modifier*, *Mix_Type*, *Placers*, *Producer*, or *Sources* will give the user four options: **Update Table**, **Change Status**, **Add Record**, and **Delete Record**.

Selecting Concurrent_Routes, County, Division, Routes, Overlay_Projection_Error, Friction_Validation_Ranges, Condition_Validation_Ranges, or Traffic_Validation_Ranges table names will give the user only one option: Manipulate Table. This is detailed in the Manipulate Table Section (I. E).



Figure B.2: Administration tab table selection

NOTE: The Table Maintenance Transaction Log shows the records in a selected table the user has changed. After selecting a table you can see the **Field Name, Record #, Session ID, Old Value,** and the **New Value** of the changed records in this table.

Section 2: Description of Administrator Options

A. Update Table:

Selecting this option will update the table that currently appears in the **Select Table** menu box. A message box will appear when this option is selected to confirm that the user wishes to proceed with an update. Clicking *Yes* will cause a second message box to appear. Choose *Yes* again to update the selected table.

• **NOTE:** Once the user selects *Yes* in the second message box, the update cannot be stopped or undone. Choosing *No* will cancel the update. A message box will appear to confirm that no update has taken place.

HYDRA+ ADMINISTRATION									
Administration	Data Input	Data Validation	Update Data						
	•								
Table Maintenance									
Select Table									
SOURCES	Table	Main4ananaa Taanaa dian Lan							
	Field Name REC #	Session ID Old Value	New Value						
<u>U</u> pdate Table									
<u>C</u> hange Status									
	HYDRA+	\mathbf{X}							
Add Record	Are you sure you would like to	update these SOURCES records?							
Delete Record	Yes	No							
	User Mail	ntenance							
	Name	Role	Max Session						
	Administrate	or ADMIN	10						
Add <u>N</u> ew User	Brandon								
	administrati	admin	10						
Delete User	bharper	ADMIN	1						
	bobjones	ADMIN	6						
	eilaime	ADMIN	10						
	hydra	ADMIN	10 🗸						
L									
			<u>B</u> ack						

When the update is complete, a message box will inform the user of the update's success.

Figure B.3: Administration tab - table update confirmation

B. Change Status:

When this feature is selected all of the items from the selected static table appear (e.g. AGGTYPE table). The user can not change, delete, or add items; however, the user can change the Status to either **Inactive** or **Active**. The user can change the status of the mix type to concrete if applicable. Y designates the status as concrete and N designates the status as non-concrete. This also results in writing a record of any change to the appropriate Transaction Log Table.

HYDRA+	MIX_TYPE - UpdateStat	us		3
MIX T	YPE	STATUS	CONCRETE	
NA	the T	ACTIVE	N	
16×9		ACTIVE	N	-
301E		ACTIVE	N	
311B		ACTIVE	N	-
330		ACTIVE	N	
330B		ACTIVE	N	-
340		ACTIVE	Y	
340B		ACTIVE	Y	
401		ACTIVE	N	-
404A		ACTIVE	N	-
404		ACTIVE	N	-
403A		ACTIVE	N	
401K		ACTIVE	N	
401J		ACTIVE	N	
401G		ACTIVE	N	
401E		ACTIVE	N	
401B		ACTIVE	N	
401A		ACTIVE	N	-
416X		ACTIVE	N	
416B		ACTIVE	N	-
416A		ACTIVE	N	-
4168		ACTIVE	N	-
4166		ACTIVE	N	-
4165		ACTIVE	N	-
4164		ACTIVE	N	-
4163		ACTIVE	N	-
4162		ACTIVE	N	-
423B		ACTIVE	N	-
423A		ACTIVE	N	-
421A		ACTIVE	N	-
420B		ACTIVE	N	-
420A		ACTIVE	N	
4202		ACTIVE	N	
417x		ACTIVE	N	
417B		ACTIVE	N	
4174		ACTIVE	N	
429AD	<u>s</u>	ACTIVE	N	
42940		ACTIVE	N	
4296B			N	
42966			N	
4296	6		N	-

Figure B.4: Administration tab - change status of record

C. Add Record:

This option allows the user to add records to the selected table. Once clicked, all of the items in the Main Table and the Temp Table will be displayed (shown below).

• **NOTE:** The user may not alter or delete any items in the table. Attempting to edit or delete an item will cause a warning box to appear. Selecting *OK* in the warning box will cause the data shown in the table to be refreshed.

To add an item, scroll to the end of the list to find a blank line for entry (see below). Enter all necessary fields on this line. If the record already exists or a required field is omitted, the changes that were entered will not be saved and the data grid will refresh itself with the initial set of data. The *Status* field and *Id* field are entered automatically by the system.

AG	GTYPE
mar	nuractured imestone sand
mar	nuractured sand
mar	
I mar	i de sand
min	eral hiler
mix	ed #416 & 420 waste gravel
nat	ural line aggregate
nat	ural sand
oys	ter shell dust
pea	a gravel
pit r	run pea gravel
pit r	run sand
piti	run sand-gravel
por	id sand
rec	laimed asphalt
rec	rushed slag
red	dog
rep	rocessed sand
rive	er-run screenings
san	ıd
san	idstone sand
san	idstone screenings
scre	eened sand
sha	ut gravel
sho	ut sand
slag	9
slag	g sand
slag	g screenings
sta	ck dust
stor	ne sand
sun	np lime
sun	np sand
sun	np sand #1 Type new record here
tan	sand
top	soil
type	e I cement
wa:	shed coarse sand
wa:	shed granite sand
wa:	shed gravel
wa:	shed sand
1	

Figure B.5: Administration tab - add record

D. Delete Record:

Selecting this option will allow a user to delete records from the temp table associated with the selected table. A message box will appear to remind the user that a delete command results in immediate and permanent deletion of the selected record. Click **OK** to continue. The items in the related temporary table will then be displayed. In order to delete a record, the row must first be selected. Do this by clicking anywhere in the row and then clicking on the triangle that appears to the left of the record (see below). After the row is highlighted, press the delete button on the keyboard to delete the record.

• **NOTE:** Users may <u>not</u> alter items or add new rows from this screen. This function is intended only for deleting entire records. The delete option <u>cannot</u> be undone.

Figure B.6: Administration tab - delete record

E. Manipulate Table:

This option only applies to the *Concurrent_Routes*, *County*, *Division*, *Routes*, *Overlay_Projection_Error*, *Friction_Validation_Ranges*, *Condition_Validation_Ranges*, or *Traffic_Validation_Ranges* tables. For update options related to the *Aggtype*, *Fric_Modifier*, *Mix_Type*, *Placers*, *Producer*, or *Sources* tables, see sections I.A – D.

YDRA+ ADMINISTRATION				
Administration	Data Input		Data Validation	Update Data
Select Table CONCURRENT_ROUTES	Ta	ble Maintenar Table	Information on ID Old Value	New Value
	U	ser Maintenan	ce	
	N	ame	Role	Max Session
	► Ac	Iministrator	ADMIN	10
Add <u>N</u> ew User	B	andon	ADMIN	6
		wner	ADMIN	1
	a	Iministrator	ADMIN	10
Delete U <u>s</u> er	Id	harper	ADMIN	1
		bjones		6
	ei	laime	ADMIN	10
	hy	dra		10
				<u>B</u> ack

Figure B.7: Administration tab – manipulate table

When this option is selected the user can add or delete any record (row) in the table. The user can also change any item within a record (row) of the selected table. Once selected the Temp Table is displayed (see next page), and contains all the items from the last table updated, unless it has already been altered. *An error will occur for any duplicate items* (*PK*) and for any fields that need to be filled in (Null).

• Note: The user may not change the Record Number – this is used for logging purposes.

B , N	lanipu	lateTable -	CONCURRE	NT_ROUTES	;													
	TYPE	NUMBER	BEGIN MILE	END MILE	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7	TYPE 8	TYPE 9	TYPE 10	NUM 1	NUM 2	NUM 3	NUM 4
•	AL	00003	177.262	178.494	AL										00021			
	NH	00003	178.494	186.018	US										00082			
	NH	00003	186.927	190.356	US										00031			
	NH	00003	190.356	190.775	NH	US									00014	00031		
	AL	00003	190.775	208.202	US										00031			
	AL	00003	208.202	213.408	US										00031			
	AL	00003	213.408	221.71	AL	US									00022	00031		
	AL	00003	221.71	240.565	US										00031			
	AL	00003	240.565	242.795	US										00031			
	AL	00003	242.795	242.955	AL	US									00025	00031		
	AL	00003	242.955	253.652	US										00031			
	AL	00003	253.652	260.473	AL	US									00119	00031		
	AL	00189	16.604	16.934	AL										00087			
	AL	00183	34.458	34.904	AL										00219			
	IN	0359S	2.789	2.605	NH	NH	US								0013S	0069S	00043	
	NH	0013S	195.249	194.502	NH	US									0069S	00043		
	NH	0001S	295.247	297.304	NH										0079S			
	IN	00359	0	2.594	NH	NH									00007	00069		
	IN	00359	2.594	2.789	NH	NH	US								00013	00069	00043	
	AL	00172	22.934	23.369	AL										00241			
	AL	00171	35.486	52.775	US										00043			
	AL	00171	60.236	68.598	US	US	US								00043	00078	00278	
	AL	00171	68.598	73.355	US	US									00043	00278		
	AL	00166	0	4.726	US										00084			
	IN	00165	4.844	5.07	NH										0016W			
	NH	00158	2.618	2.76	AL										00213			
	AL	00133	12.869	13.661	AL										00157			
	AL	00123	18.917	21.345	AL										00134			
	AL	00118	19.692	26.232	AL	US									00171	00078		
	AL	00118	26.232	28.252	US										00078			
	NH	00118	28.252	29.652	NH	US									00129	00078		
	NH	00118	29.652	36.951	US										00078			
	NH	00118	36.951	57.315	US										00078			
	AL	00088	0.973	1.406	AL										00134			
	AL	00088	1.84	2.351	AL										00134			
	AL	00087	23.434	24.038	AL										00134			
	AL	00085	15.208	15.945	AL										00092			
	AL	00085	20.375	21.225	AL										00134			
	IN	00085	51.438	58.754	NH	US									00015	00029		
	IN	00085	58.754	62.197	NH	NH	US	US							00015	00038	00029	00280
	IN	00085	62.197	64.551	NH	US									00015	00029		
	AL	00075	58.179	58.258	AL										00205			
	AL	00074	4.837	26.094	US										00278			
	INH	00074	26.094	28.076	US										00278			
•																		

Figure B.8: Administration tab – manipulate concurrent routes temp table

Section 3: Automatic Data Load User Information

The purpose of this process is to allow users to automatically load **Traffic** and **Condition** data. This process will load data from Microsoft Access tables into temporary Oracle tables after a series of validation procedures are completed.

A. Traffic Automated Data Load

<u>Step 1:</u>

Open the HYDRA+ program and select the **Data Input** option from the main interface selection screen:

Data Input	
Reports and Visualization	
Exit	

Figure B.9: Interface selection screen

<u>Step 2:</u>

Select the **Traffic** radio button from the **Data Type** field. Then click the **Input Data** button.

HYDRA+ ADMINISTRATION					
Administration	Data Input	Data Validatio	n	Update Data	
	·		I	· ·	-
	Data	Input			
	Dutu				
	Previous Input Da	ta			
D	Data Type	Session ID	Attempted	Valid	
Data Type	CONDITION 2002 2	10/29/2003 8:16:57 AM	228430		
C Eriction	CONDITION 2002 3	10/29/2003 8:17:32 AM	356743		
* Theaton	CONDITION 2002 4	10/29/2003 8:17:43 AM	289806		
C Overlay	CONDITION 2002 (10/29/2003 8:17:50 AM	358722		
veriay	CONDITION 1999 1	10/30/2003 4:16:00 PM	106085		
C. Condition		10/30/2003 4:50:50 PM	110585		
, Condition		10/30/2003 7:58:02 PM	68093		
Traffic		10/30/2003 8:02:00 PM	78157		
(Traine		10/30/2003 8:02:21 PM	76355		
		10/30/2003 8:07:13 PM	93713		
	CONDITION 2000 F	10/30/2003 0.07.131 M	96212		
	CONDITION_2000_3	10/30/2003 0.07.20 PM	102652		
		10/30/2003 0.07.30 PM	102000		
		2/4/2004 2:36:34 PM	117301		
	TRAFFIC_2002	2/4/2004 2:20:41 PM	318		
	TRAFFIC_2002	2/4/2004 2:53:32 PM	5205		
	TRAFFIC_2002	3/15/2004 8:42:35 PM	773		
Input Data	TRAFFIC_2002	8/6/2003 12:25:03 PM	569		
[TRAFFIC_2003	8/6/2003 12:41:02 PM	569		
	TRAFFIC_2003	8/6/2003 12:41:02 PM	569		
				<u>B</u> ack	

Figure B.10: Data input tab, traffic

<u>Step 3:</u>

Begin entering the required information for the TRAFFIC data to be loaded.

O HYDRA+ TRAFFIC INPUT				X
Ente	er Path of Traffic Inpu	t File or Browse		
			Browse	
Import Year:	Route Type:	C Interstate Traffic File	C State Road Traffic File	
	Import	<u>B</u> ack		

Figure B.11: Traffic data input interface

Description of Features and Fields

• Browse:

Allows the user to locate the desired file by manually looking through directories. Selecting this will produce the following user interface window:

Browse for Traff	c Input File				<u>?</u> ×		×
Look in:	Care Process 2.0		•	🗢 🗈 💣 🎟•			
History Desktop My Computer	Development DFD Documentation HYDRAv3.2 HYDRAv3.3 (team2) Old CONDITION PKO Pseudocode Status Report	C Structure Chart				vse raffic File	
My Network P	File name: Files of type: Ac	cess (*.mdb) Open as read-only		V	Open Cancel		

Figure B.12: Choose traffic input file

Select the Microsoft Access database that contains the desired TRAFFIC (in this example, the user should select the file 'ALLTRAF.mdb').

After finding and selecting the appropriate TRAFFIC database, select the **Open** button; this will transfer the pathname of the file to the HYDRA+ user interface.

• **NOTE:** The traffic tables <u>**MUST**</u> be named '*TRAFFICYYYY*' where YYYY is the year (ex: 'TRAFFIC2003'). The field names and the data types in the table must match the table structure defined in Appendix A.

• Import Year:

The user should enter the year corresponding to the data that is to be loaded. The format is 'YYYY' (example: 2003). This should match the year in the table name in the Access database.

• <u>Route Type:</u>

The user must select one of the following radio buttons: Interstate Traffic File or State Road Traffic File. This selection provides the data load process with necessary reporting and querying functionality.

• <u>Import:</u>

Clicking the **Import** button initiates the data import process from the selected Microsoft Access database.

• **NOTE:** All necessary fields must be filled correctly in order for the automated data load to execute properly.

• Back:

Selecting **Back** aborts the current data load session and returns to the **Data Input** tab screen (see Step 2 in section II. A).

<u>Step 4:</u>

Select the **Import** button to initiate automated TRAFFIC data load. The user will be shown a progress screen that will display the status and estimated completion of the TRAFFIC data load.

After the data load is complete, the following screen will appear to provide the user with summary statistics of the data import:

O HYDRA+ TRAFFIC II	NPUT					×
	Enter F	ath of Traffic	Input File o	r Browse		
C:\Documents and	Settings\e	ilaime.ENTER	PRISE\Desk	top\Traf_Tes	<u>B</u> rowse	
Import Year: 200)3	Route Type:	C Interstate Ti	raffic File 💿 S	State Road Traffic File	
		Import	<u>B</u> ack			
Import Statistics:	#IMPORTED	IMPORTED BY	# VALID	#INVALID	DATE/TIME	
	50	eilaime	0	50	6/10/2003 3:40:41 PM	
'						

Figure B.13: Traffic data import results and statistics

<u>Step 5:</u>

To view any errors associated with the automated data load, begin by opening the HYDRA+ program and select the **Data Input** option from the interface selection screen:



Figure B.14: Interface selection screen

Step 6:

Select the **Data Validation** tab and click the Traffic radio button from the **Data Type** field. Select a year from the drop-down menu. This will enable the **Correct Invalid Data** button. Click it to begin correcting invalid records.

Auministration	Data Input	Data	a Validation	Upo	late Data
	Data \	alidation			
	Session Status				
Data Type	Overall Status				
		LU N	Courier ID	N-F-	Luce Pat 1
G Traffia		eilaime	3/14/2004 10:53:56 PM	770	Invalid 0
• Itanic	TBAFFIC 2002	eilaime	3/14/2004 11:21:44 PM	770	li li
C Condition	TRAFFIC 2002	eilaime	3/15/2004 8:02:51 PM	770	0
condition	TRAFFIC_2002	eilaime	3/15/2004 8:43:29 PM	770	0
	TRAFFIC_2003	eilaime	3/18/2004 8:55:34 PM	0	0
	TRAFFIC_2002	eilaime	3/7/2004 7:09:51 PM	0	0
Validation Yea					
Validate New Da	ata				

Figure B.15: Data validation tab, traffic

<u>Step 7:</u>

On the following screen a list of records and their corresponding errors are shown. The user must first click on a record to see the errors associated with that record. The errors will appear in the table at the top of the screen. To correct the errors, click on the record and type the correct value into the corresponding field(s).

ode	:	Error T	ext								User		Ti	ime			Datatyp	e R	ecord #	Sess	ion		
29		Condit	ion LC	DNGTI3 d	out of ra	nge					eilaime	9	20	003-06-09	9 21:09:5	50	CONDIT	10N 1	66313	eilair	ne6/9/2	003 6:	10:00
52		Condit	ion Su	m of Lon	gitudinal	Cracking	Exceeds .5 * l	.ane Wic	lth * Sam	ple Size	eilaime	э	20	003-06-09	9 21:09:5	50	CONDIT	10N 1	66313	eilair	ne6/9/2	003 6:	10:0
Va	alid	Rec	ord	ls Directio	1	Miles of	Data B IBI1	LIBIO	TEVE	TEVI	loout		Grada	LATDE		LATCE	LONG		J. ONCO	DATE		Data	Inited I
2	Vision H Al	2	1001.00 4	S	Lane 1	75.354	1/15/201.22	1.76	0.64	0.942	3	6	0.4	34	28	25.05	-87	23	3.62	WX	1727	Pate	nin r O
2	AL	. 2	4	S	1	75.304	1/15/2(1.1	2.27	1.113	1.39	4	3	0.3	34	28	24.46	-87	23	5.43	WX	1727	0	0
2	Al	. 2	4	S	1	75.154	1/15/2(1.45	1.63	0.89	1.226	3	6	-0.6	34	28	22.79	-87	23	10.95	WX	1727	0	0
2	Al	. 2	4	S	1	75.104	1/15/2(1.21	1.13	0.765	1.091	2	4	-0.8	34	28	22.21	-87	23	12.79	WΧ	1727	0	0
2	Al	. 2	4	S	1	75.004	1/15/201.51	1.6	0.754	1.14	4	3	-0.8	34	28	21.04	-87	23	16.44	WX	1727	0	0
2	AL	2	4	5	1	71.404	1/15/201.3	1.92	0.747	1.043	4	4	-0.4	34	28	11.59	-87	25	34.51	WX	1727	0	
2	AL	. 2	4	5 C	1	71.304	1715/201.29	2.14	0.565	0.9	0	3 C	-1.1	34	28	11.65	-87	25	38.44	WX WW	1727	0	
2		2	4 4	S	1	71.204	1/15/2(2.07	1.04	0.673	0.851	2	5	-0.4	34	20	11.03	-07	25	40.33	wx	1727	0	
2	A	2	4	s	1	71.154	1/15/201.92	2.23	0.624	0.943	2	5	-0.2	34	28	11.74	-87	25	44.29	WX	1727	0	0
2	AL	2	4	S	1	71.104	1/15/2(1.59	1.37	0.59	0.973	2	7	0.2	34	28	11.77	-87	25	46.27	WX	1727	0	0
2	AL	. 2	4	S	1	71.054	1/15/2(1.44	2.28	0.58	0.894	3	3	1	34	28	11.81	-87	25	48.22	WX	1727	0	0
2	Al	. 2	4	S	1	70.004	1/15/2(2.22	1.97	0.663	0.987	4	5	-0.5	34	28	12.69	-87	26	29.34	WX	1727	0	0
2	Al	. 2	4	S	1	69.354	1/15/2(1.92	1.95	0.687	1.117	6	5	-1.3	34	28	13.34	-87	26	54.83	WX	1727	0	0
2	Al	2	4	S	1	69.154	1/15/202.82	3.9	0.594	0.888	4	3	-0.5	34	28	13.02	-87	27	2.62	WΧ	1727	0	0
2	AL	. 2	4	S	1	69.104	1/15/202.42	4.86	0.982	1.303	10	4	-0.1	34	28	12.69	-87	27	4.55	WX	1727	0	0
2	AL	2	4	5 c	1	69.054	1/15/201.82	2.59	0.931	1.42	5	3	02	34	28	12.33	-87	27	0.44	WX WZ	1727	0	
2		2	4 A	S	1	66 254	1/15/2(1.76	1.2	0.761	0.745	3	2	.1.2	34	20	49.1	-07	28	52.22	wx	1727	0	0
2	A	2	4	s	1	65.839	1/15/201.40	1.5	0.421	0.651	2	5	-0.6	34	27	49.68	-87	29	8.61	WX	1727	0	0
2	AL	1	3	N	2	485.408	1/15/20.54	0.91	0.262	0.356	2	1	0.6	34	35	14.92	-87	40	37.7	WX	1727	Ō	0
2	AL	. 1	3	S	2	499.409	1/16/2(1.54	1.32	0.424	0.64	2	2	-0.1	34	42	14.66	-87	40	2.9	WX	1727	0	0
2	Al	. 1	3	S	2	496.109	1/16/2(1.75	1.55	0.339	0.461	3	1	1.5	34	40	28.6	-87	39	52.63	WX	1727	0	0
2	Al	. 1	3	S	2	493.309	1/16/2(1.63	1.85	0.395	0.551	1	2	-3.4	34	39	2.67	-87	39	17.31	WΧ	1727	0	0
2	Al	. 1	3	S	2	493.059	1/16/2(1.27	1.48	0.407	0.574	2	1	-3.4	34	38	54.98	-87	39	14.18	WX	1727	0	0
2	A		3	5	2	492,809	1/16/201.73	1.68	0.506	0.671	4	2	-2	34	38 24	47.3 24.51	-87 07	39 40	F9 12	WX WM	1727	0	0
2		1	3	N N	2	484.909	1/15/2(1.01	1.30	0.27	0.404	1	1	J.D -1.8	34	34	54.51 60	-07 -87	40	45.42	wA WX	1727	0	0
2		1	9	N	1	41 989	1/19/2020	2.53	0.010	0.000	2	2	-3.7	34	20	58 11	-88	1	60	WX	1727	n	n
																							►
							<u>C</u> lear		<u>P</u> rin	t Rep	oort		<u>R</u> e	subm	nit			<u>B</u> ac	k				

Figure B.16: Correct invalid traffic records

Step 8:

If the **Print** button is clicked, a progress box will appear to indicate that an exception report is being generated in an Excel spreadsheet. When the printing process completes, the user may return to the *Error Log* screen and correct the errors. The user may print the generated report by using the **Print** function inside Excel. The user may also save the report by using Excel's **Save** function.

da	En	or Text					lleer		Time		Datatuna	Record #	Session	
ue		ur ext					losei		Trime		Datatype	Thecold #	Jession	
		licrosoft	Excel - E	iook13										
	9	<u>File</u> Edit	: ⊻iew	Insert Form	at <u>T</u> ools	<u>D</u> ata <u>W</u> ini	dow <u>H</u> elp				Т	ype a questio	n for help	₽ ×
	D	🖻 🔛 j	a 🔁	🖨 🖪 🖤 🗎	አ 🖻 🛍	🔁 = 🝼 🗠	🝷 🖂 👻 🍓	Σ - A	KI 🛍 🦧	100% -	2.			
zalio	Aria	J		10 - B	7 II	= = = =	a 98 %	+.0 .00	₹ ≣ ₹ ≣ 0		Α.			
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29	1	<u>I RAF</u>	-FIC E	XCEPT	ION L	<u> </u>	EPORT							
51 55	2	Created E	By: eilain	ne										
55 55	3	Created [Date : 6/1	2/2003 1:37:	17 PM									
17	4	01.0VE	0.771/							D.071.4	D.071.04			
47	5	CNYF	CITY	DIV	RIE	US	ALI	BEGINML	ENDML	DISTME	DISTRM	AADT	K aa	D
17	6	5		7 00130			13.77	15.57	1.8	2.9	1520	12	6U 60	
17	/	25		810078		-		196	196	3 14	2191		60	
73		29		Clear		Print Re	port	Resu	ubmit		Exit		50	
75	10	51			1					_		12	60	
/5 75	11	55 55		3 00205	-		a 0	2.4	1.8	2.88	5660	12	00	
75	12	47		6 00140			0.0	2.85	2.85	4 59	2050	14	60	
75	13	47		6 00140			2 85	9.55	67	10.8	1610	14	60	
75	14	47		6 00140			9.55	10.78	1.23	1.98	1760	14	60	
75	15	47		6 00140			10.78	12.48	1.7	2.74	1270	14	60	
75	16	73		3 00151			0	0.4	0.4	0.66	15470	11	60	
37	17	75		5 00118	278		0	1.3	1.3	2.09	2880	11	55	
39	18	75		5 00118	278		1.3	4.8	3.5	5.63	4180	10	60	
39	19	75		5 00118	278		4.8	5.74	0.94	1.51	7540	10	60	
39	20	75		5 00118	278		5.74	7.14	1.4	2.25	4370	10	60	
53 70	21	75		5 00118	278		7.14	8.99	1.85	2.96	3670	10	60	
r J 101	22	75		5 00118	278		8.99	12.77	3.78	6.08	3080	10	60	
101	23	75		5 00118	278		12.77	15.27	2.5	4.02	2540	10	60	
101	24	75		5 00118	278		15.27	17.13	1.86	2.99	2560	10	60	
101	25	87		6 00199			0	0.81	0.81	1.3	1090	11	60	
97	26	89	boot1 /	1 00020 Shoot2 / Sho	72		81.2	83 /1	2 22	3 57	53/0	11	03	
	114 4	P P \3	meetrA	Sheers Y She	eus/									

Figure B.17: Traffic exception data report (Excel)

B. Condition Automated Data Load

<u>Step 1:</u>

Open the HYDRA+ program and select the **Data Input** option from the interface selection screen:

<	Data Input	
	Reports and Visualization	
	Exit	

Figure B.18: Interface selection screen

<u>Step 2:</u>

Select the CONDITION radio button from the **Data Type** field. Then select the **Input Data** button.

Data Input Data Type Friction Condition Overlay Condition	Data Type Previous Input Data Friction CONDITION_2002 2 10/29/2003 8:16:57 AM 228430 0 Overlay CONDITION_2002 2 10/29/2003 8:17:32 AM 356743 0 Condition Condition CONDITION_2002 10/29/2003 8:17:59 AM 356743 0 Condition Condition CONDITION_2002 10/29/2003 8:17:59 AM 356743 0 CONDITION_2002 10/29/2003 8:17:59 AM 356743 0 0 CONDITION_2002 10/29/2003 8:17:59 AM 356743 0 0 CONDITION_2002 10/29/2003 8:17:59 AM 356743 0 0 CONDITION_2002 10/29/2003 8:17:50 AM 358722 0 0 CONDITION_2002 10/29/2003 8:17:50 AM 358725 0 0 CONDITION_2002 10/39/2003 8:17:50 AM 105655 0 0 CONDITION_2002 10/39/2003 8:07:13 PM 93713 0 0 CONDITION_2002 10/39/2003 8:07:25 PM 96213 0 0 CONDITION_2002 10/39/2003 8:07:25 PM 96213 0 0 CONDITION_2002 10/39/2003 8:07:35 PM 102563	Data Type Previous Input Data Friction Condition Session ID Attempted Valid Overlay Condition 2002 410/29/2003 816:57 AM 288430 0 Condition Condition 2002 410/29/2003 816:57 AM 288430 0 Condition Condition 2002 410/29/2003 817:32 AM 356743 0 Condition Condition 2002 410/29/2003 817:50 AM 356722 0 Condition 2002 10/29/2003 817:50 AM 356722 0 0 Condition 2002 10/29/2003 817:50 AM 356722 0 0 Condition 2002 10/30/2003 416:00 PM 10585 0 0 Condition 2000 110/30/2003 80:20 PM 80933 0 0 Condition 2000 110/30/2003 80:20 PM 10585 0 0 Condition 2000 110/30/2003 80:21 PM 758:55 0 0 Condition 2003 200 21/30/2003 80:73 PM 3713 0 0 Condition 2002 10/30/2003 80:73 PM 3713 0		<u>Data</u>	<u>Input</u>			
Data Input Data Type Friction Overlay Condition	Data Type Session ID Attempted Valid Friction CONDITION_2002 10/29/2003 816.57 AM 228430 0 Overlay CONDITION_2002 10/29/2003 817.53 AM 298066 0 CONDITION_2002_C 10/29/2003 817.53 AM 356743 0 0 CONDITION_2002_C 10/29/2003 817.53 AM 358722 0 0 CONDITION_2002_C 10/29/2003 817.50 AM 358722 0 0 CONDITION_2002_C 10/29/2003 817.50 AM 358722 0 0 CONDITION_2002_C 10/29/2003 817.50 AM 358722 0 0 CONDITION_2002_C 10/30/2003 410.00 PM 105085 0 0 CONDITION_2000_C 10/30/2003 807.20 PM 78157 0 0 CONDITION_2000_E 10/30/2003 807.21 PM 76355 0 0 CONDITION_2000_E 10/30/2003 807.25 PM 96213 0 0 CONDITION_2000_E	Data Input Data Type Friction Overlay Overlay OutDITION_2002_10/29/2003 817.53 AM 228430 O Cendition Traffic CONDITION_2002_10/29/2003 817.53 AM 356743 O CONDITION_2002_10/29/2003 817.53 AM 356743 O CONDITION_2002_10/29/2003 817.53 AM 256743 O CONDITION_2002_10/29/2003 817.53 AM 256743 O CONDITION_2002_10/29/2003 817.53 AM 256743 O CONDITION_2002_10/29/2003 817.53 AM 25690 O CONDITION_2002_10/29/2003 817.53 AM 25805 O CONDITION_2002_10/29/2003 817.59 AM 105085 O CONDITION_2002_10/29/2003 817.59 AM 25805 O CONDITION_2002_10/29/2003 817.59 AM 105085 O CONDITION_2002_10/29/2003 817.59 AM 105085 O CONDITION_2002_10/29/2003 817.59 AM 105085 O CONDITION_2002_10/29/2003 416.00 PM 106085 O CONDITION_2002_10/29/2003 416.00 PM 105085 O CONDITION_2000_2 10/39/2003 807.20 PM 680933 O CONDITION_2000_2 10/39/2003 807.21 PM 75355 O CONDITION_2000_2 10/30/2003 807.23 PM 102553 O CONDITION_2000_2 10/30/2003 8		Data	linput			
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Figure B.19: Data input tab, condition

Step 3:

Begin entering the required information for the CONDITION data to be loaded.

HYDRA + CONDITIO	N INPUT	×
	Enter Path of Condition Input File or Browse	
	Browse	
Import Year:	Division: Sample Size(in ft.):	
	Import <u>Ex Ba</u> ck	

Figure B.20: Condition data input interface

Description of Features and Fields

• Browse:

This allows the user to locate the desired file by manually looking through directories.

Selecting this will produce the following user interface window:

Browse for Condi	tion Input File			<u>? ×</u>		x
Look in:	🗹 Desktop	•	⇔ 🛍 📸 🛲 -			
History Desktop My Documents	My Documents My Computer My Network Places Adobe Acrobat AlME-MITC Presentation ALDOT on Aldot-file-svr converteddata crptvoc Desktop 10-24-02	HYDRAv3.1.3 HYDRAv3.2 (Current) HYDRAv3.3 (current) LEC MGT 395p3 oracle 9i release 2 clier oracle 9i release 2 clien processes Team DC	나 WS FTP 셸]50m.mdb 셸]ALLTRAF.mdb		vse	
My Computer	File name: Access	×.mdb) as read-only	v (Open Cancel		

Figure B.21: Choose condition file

Select the Microsoft Access database that contains the desired CONDITION (in this example, the user should select the file '50m.mdb').

After finding and selecting the appropriate CONDITION database, select the **Open** button; this will transfer the pathname of the file to the HYDRA+ user interface.

• **NOTE:** The condition tables <u>**MUST**</u> be named '*CONDITIONYYYY*' where YYYY is the year (ex: 'CONDITION2003'). The field names and the data types in the table must match the table structure defined in Appendix B.

• Import Year:

The user should enter the year corresponding to the data that is to be loaded. The format is 'YYYY' (for example: 2003). This should match the year in the table name in the Access database.

• Sample Size:

This field is intended to describe the length, **in feet**, of road surface that has been inspected regarding CONDITION data. The value entered must be of type integer, greater than 0, and no more than 1000.

• **Division:**

The user must select a specific Division, #1-9. This selection will provide the data load process with necessary reporting and querying functionality.

• Import:

Selecting **Import** initiates the data import process. All necessary fields must be filled correctly in order for the automated data load to execute properly.

• <u>Exit:</u>

This feature aborts the current data load session and allows the user to return to the **Data Input** tab screen (see Step 2 on page 19).

Step 4:

Select **Import** button to initiate automated CONDITION data load. The user will be shown a progress screen that will visually represent the status and estimated completion of the CONDITION data load.

After the data load is complete, a statistic screen will appear (similar to the TRAFFIC statistic screen in Automated TRAFFIC Load) to provide the user with summary statistics of the data import.

<u>Step 5:</u>

To view any errors associated with the automated data load, begin by opening the HYDRA+ program and select the **Data Input** option from the interface selection screen:



Figure B.22: Interface selection screen

<u>Step 6:</u>

Select the **Data Validation** tab and click the CONDITION radio button from the **Data Type** field. Then select the **Correct Invalid Data** button.

🖸 HYDF	RA+ ADMINISTRATION						
6		·					
	Administration	Data Input	Data	a Validation	Upo	late Data	
		Data Va	lidation				
		Session Status					
	Data Type						
		Overall Status					
		Data Type	User Name	Session ID	Valid	Invalid	
	C Traffic	TRAFFIC_2002	eilaime	3/14/2004 10:53:56 PM	770	0	
		TRAFFIC_2002	eilaime	3/14/2004 11:21:44 PM	770	0	
	C Condition	TRAFFIC_2002	eilaime	3/15/2004 8:02:51 PM	770	0	
		TRAFFIC_2002	eilaime	3/15/2004 8:43:29 PM	770	0	
		TRAFFIC_2003	eilaime	3/18/2004 8:55:34 PM	0	0	
		TRAFFIC_2002	eilaime	3/7/2004 7:09:51 PM	0	0	
	Validation Yea	-					
	-	7					
	· -	J					
	⊻alidate New Da	ta					
	Corr <u>e</u> ct Invalid Da	ita i					
		2					
						Back	
						<u>Б</u> аск	

Figure B.23: Data validation tab, condition

<u>Step 7:</u>

On the following screen a list of records and their corresponding errors will be shown. The user must first click on a record to see the errors associated with that record. To correct the errors, click on the record and type the correct value into the corresponding field.

Corrected records should then be resubmitted for revalidation. The corrected records will be removed from the Invalid Records list.

rror	Loş	z																				_~
Code	F	ror Text								Ulser		T	ime			Datatune	e F	Becord #	Ses	sion		
129	C	ondition l	LONGTI3	out of r	ange					eilaime		2	003-06-0	9 21:09:5	50	CONDIT	ION 1	166313	eilai	me6/9/2	003 6:1	10:00
162	C	ondition S	um of Lo	ngitudina	I Cracking	Exceeds .5 * L	ane Wic	lth * Sam	ple Size	eilaime		2	003-06-0	9 21:09:	50	CONDIT	10N 1	166313	eilai	me6/9/2	003 6:1	10:00
ıvali	id R	ecor	ds	1			-		1						1							
Divisi	or Rout	e Route	e Directi	o Lane	Milepos	Date R. IRI1	IRI2	TEX R	N TEX M	RRUT	LRUT	Grade	LATD	E LATMI	LATSE		LONG	AN LONGS	RATE	ARAN	Pate	hin P
2	AL	24	3 C	1	75.334	1/15/2(1.22	1.76	0.64	1.342	3	2	0.4	34	20	25.05	-07	23	5.62	WA WA	1727	0	
2		24	S	1	75.304	1/15/2(1.45	1.63	0.89	1.33	3	6	-0.6	34	20	29.90	-87	23	10.45	WX	1727	0	-0
2	AL	24	s	1	75.104	1/15/201.21	1.13	0.765	1.091	2	4	-0.8	34	28	22.21	-87	23	12.79	WX	1727	0	
2	AL	24	S	1	75.004	1/15/2(1.51	1.6	0.754	1.14	4	3	-0.8	34	28	21.04	-87	23	16.44	WX	1727	0	0
2	AL	24	S	1	71.404	1/15/2(1.3	1.92	0.747	1.043	4	4	-0.4	34	28	11.59	-87	25	34.51	WΧ	1727	0	0
2	AL	24	S	1	71.304	1/15/2(1.29	2.14	0.565	0.9	6	3	-1.1	34	28	11.65	-87	25	38.44	WΧ	1727	0	0
2	AL	24	S	1	71.254	1/15/2(2.07	1.64	0.673	1.052	2	6	-0.4	34	28	11.69	-87	25	40.39	WΧ	1727	0	0
2	AL	24	S	1	71.204	1/15/2(1.91	1.85	0.606	0.851	2	5	-0.4	34	28	11.7	-87	25	42.34	WX	1727	0	0
2	AL	24	S	1	71.154	1/15/201.92	2.23	0.624	0.943	2	5	-0.2	34	28	11.74	-87	25	44.29	WX	1727	0	0
2	AL	24	5	1	71.104	1/15/201.59	1.37	0.59	0.973	2	1	0.2	34	28	11.77	-87	25	46.27	WX	1727	U	
2	AL	24	5	1	71.054	1/15/201.44	2.28	0.58	0.894	3	5	0.5	34	28	12.69	-87	20	48.22	WX WV	1727	0	
2		24	S	1	69.354	1/15/2(2.22	1.95	0.687	1 117	6	5	-1.3	34	20	13.34	-87	26	54.83	WX	1727	0	-0
2	AL	24	S	1	69.154	1/15/202.82	3.9	0.594	0.888	4	3	-0.5	34	28	13.02	-87	27	2.62	WX	1727	0	
2	AL	24	S	1	69.104	1/15/2(2.42	4.86	0.982	1.303	10	4	-0.1	34	28	12.69	-87	27	4.55	WX	1727	0	0
2	AL	24	S	1	69.054	1/15/2(1.82	2.59	0.931	1.42	5	3	0	34	28	12.33	-87	27	6.44	WΧ	1727	0	0
2	AL	24	S	1	69.004	1/15/2(1.76	2.55	0.761	1.174	5	3	0.2	34	28	11.84	-87	27	8.31	WΧ	1727	0	0
2	AL	24	S	1	66.254	1/15/2(1.46	1.2	0.473	0.745	6	2	-1.2	34	27	49.1	-87	28	52.22	WΧ	1727	0	0
2	AL	24	S	1	65.839	1/15/201.42	1.5	0.421	0.651	2	5	-0.6	34	27	49.68	-87	29	8.61	WΧ	1727	0	0
2	AL	13	N	2	485.408	1/15/200.54	0.91	0.262	0.356	2	1	0.6	34	35	14.92	-87	40	37.7	WX	1727	0	
2	AL	13	5 C	2	499.409	1/16/201.54	1.32	0.424	0.64	2	2	-0.1 1.5	34	42	14.66	-87	40 20	2.9	WX WZ	1727	0	0
2	AL AL	13	5	2	493 309	1/16/2(1.75	1.00	0.335	0.401	1	2	.3.4	34	39	267	-07	39	17.31	wx	1727	0	
2	AL	13	S	2	493.059	1/16/201.27	1.48	0.407	0.574	2	1	-3.4	34	38	54.98	-87	39	14.18	WX	1727	0	-0
2	AL	13	S	2	492.809	1/16/2(1.73	1.68	0.506	0.671	4	2	-2	34	38	47.3	-87	39	11.02	WX	1727	Ō	Ō
2	AL	13	S	2	484.098	1/16/2(1.01	1.36	0.27	0.404	1	1	3.6	34	34	34.51	-87	40	59.12	WΧ	1727	0	0
2	AL	13	N	2	484.908	1/15/20.67	1	0.316	0.396	1	1	-1.8	34	34	60	-87	40	45.42	WΧ	1727	0	0
2	ΔΙ	19	N	1	41 989	1/19/202 19	2.53	10 242	0.267	2	2	37	34	20	58 11	-88	1	0.0	WX	1727	In	•
						<u>C</u> lear		<u>P</u> rin	t Rep	oort		<u>R</u> e	esubr	nit			<u>B</u> ac	ж				

Figure B.24: Correct invalid condition records

Step 8:

If the print button is clicked, a progress box will appear, indicating an exception report is being generated in an Excel spreadsheet. This will allow the user to print all the errors so that he/she may look through them by hand. Once done, the user can come back to the above screen and correct the errors. The user may print the report by using the Print function inside Excel. The user may also save the report by using Excel's Save function. There is also a Resubmit button that resubmits the re-entered data (this will be better explained later in the manual).

Emer Los													
error Log													
Code Error T	e Error Text					Us	er	Time		Datatype Record # Session			
300 Traffic Route Number / Route Type not valid					eila	ime	2003-06-1	1 19:58:21	TRAFFIC	1696	eilaime6	/11/2003 7:52:53	
County Div Fit 5 7 00 25 8 00 25 8 00 31 7 00 55 3 00 55 3 00 55 3 00 47 6 00 47 6 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00 75 5 00	Aria Aria 4 5 7 1 1 2 3 4 5 6 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	icrosoft E: Ele Edit X41 A Croated B: Created B: Created D: Created D:	xcel - Bool View Ins Image: Second secon	<1 ert Format ■ B Z 6 C EXCEP 003 3:27:13 DIV 003 3:27:13 DIV 0003 3:27:13 0003 3:27:13 0003 0:27:13 0003 0:078 0003 0:078 0003 0:078 0003 0:078 00030 00040 00140 00140 00140 00151 00151 00118	<u>I</u> ools D. Σ • (10) U ■ TION I 3 PM RTE	ata Windo Para E DATA US	₩ Help F REPOR ALT 13.77 0 0 0 0 0 0 0 0 0 0 0 0 0	Ca Sa C (30 + 30 + 30 + 30 + 30 + 30 + 30 + 30 +	H ENDML 1.8 1.96 1.06 1.85 6.7 1.23 1.7 0.4 1.3	Type a qu	Listion for he changes J DISTKM 1520 2090 1100 3500 1610 1760 1270 15470 2880	AADT 12 12 11 12 11 12 11 12 11 12 14 14 14 14 11 11 11	 DVMTGrowth 1.0460526315 0.9806612440 0.9306612440 0.9305612440 0.93257142857 0.93257142857 0.930305590 1.0681281818181 1.1336582677 1.061201855505 0.9519450800 0.9453125 0.9425196850 0.9453125 1.0543071161 1.0537438833 0.925795559
79 2 00	1 18	/5	6	00118	278		1.3	4.8	3.5	5.63	4180	10	1.0182370820
101 6 00	19	/5 5c	5	00118	2/8 570		4.8	5.74	0.94	1.51	7540	10	0.9716358839
101 6 00	20	/5	5	00118	278		5.74	7.14	1.4	2.25	4370	10	• 0.9684921230
101 6 00		→ MI\Sh	eet1 / She	eet2 / Shee	t3 /			141				•	0.9647946353
<	Read	У									NUM		
				<u>C</u> lear	P	rint Rep	ort	<u>R</u> esu	ubmit		<u>B</u> ack		

Figure B.25: Condition exception data report (Excel)

Section 4: Manual Data Load User Information

A. Manual Friction Data Load

The purpose of this process is to allow users to manually input Friction records. This process will constrain the range and types of data entered according to the limits given by the Alabama Department of Transportation. Follow the steps and diagrams below to input friction data manually.

Note: Manual data inputting is the only functionality of the system available to users with role of Supervisor.

Step 1:

Open the HYDRA+ program and select **Data Input** from the interface selection screen.



Figure B.26: Interface selection screen

<u>Step 2:</u>

Select the **Data Input** tab.

Administration	Data Input	Data Validatio	n	Update D	ata
	Data	Input			
	Developed Investigation	•-			
	Previous input Da		A	ly-ra	
Data Type	CONDITION 2002	5 ession IU 3 10/29/2002 0:16:57 AM	Attempted	Valid	
~ F • <i>A</i>	CONDITION 2002	3 10/23/2003 0:16:37 AM	220430	0	_ 8
• Friction	CONDITION_2002_	1 10/23/2003 0.17.32 AM	200006	0	_
C. Ourstau		10/29/2003 8:17:50 AM	358722	0	_
Overlay	CONDITION 1999	10/20/2003 4:16:00 PM	106085	0	_
C. Condition	CONDITION 1999 (10/30/2003 4:50:50 PM	110585	0	_
Condition	CONDITION 2000 2	10/30/2003 7:58:02 PM	68093	0	_
C Traffic	CONDITION 2000 8	10/30/2003 8:02:00 PM	78157	0	_
- Trunc	CONDITION_2000_S	10/30/2003 8:02:21 PM	76355	0	
	CONDITION_2000_6	10/30/2003 8:07:13 PM	93713	0	
	CONDITION_2000_5	10/30/2003 8:07:25 PM	96213	0	
	CONDITION_2000_3	10/30/2003 8:07:30 PM	102653	0	
	CONDITION_2001_0	10/30/2003 8:38:34 PM	117581	0	
	TRAFFIC_2002	2/4/2004 2:25:41 PM	318	0	
	TRAFFIC_2002	2/4/2004 2:53:32 PM	5205	0	
	TRAFFIC_2002	3/15/2004 8:42:35 PM	773	0	
	TRAFFIC_2002	8/6/2003 12:25:03 PM	569	0	
<u>I</u> nput Data	TRAFFIC_2003	8/6/2003 12:41:02 PM	569	0	~
			Locatio	10	

Figure B.27: Data input tab

<u>Step 3:</u>

Select the **Friction** from the **Data Type** box. Then click the **Input Data** button.

		Data Validatio	n	Update D	ata
	Data	Input			
	Previous Input Da	ita			
-Data Tyne	Data Type	Session ID	Attempted	Valid	
Data Type	CONDITION 2002	2 10/29/2003 8:16:57 AM	228430	0	
CFriction	CONDITION_2002_	3 10/29/2003 8:17:32 AM	356743	0	
	CONDITION_2002_	4 10/29/2003 8:17:43 AM	289806	0	
⊂ 0verlay	CONDITION_2002_	C 10/29/2003 8:17:50 AM	358722	0	
-	CONDITION_1999_	1 10/30/2003 4:16:00 PM	106085	0	
Condition	CONDITION_1999_	3 10/30/2003 4:50:50 PM	110585	0	
	CONDITION_2000_	2 10/30/2003 7:58:02 PM	68093	0	
C Traffic	CONDITION_2000_	E 10/30/2003 8:02:00 PM	78157	0	_
	CONDITION_2000_	5 10/30/2003 8:02:21 PM	76355	0	_
	CONDITION_2000_	E 10/30/2003 8:07:13 PM	93713	0	_
	CONDITION_2000_	E 10/30/2003 8:07:25 PM	96213	0	_
	CONDITION 2000	7 10/30/2003 8:07:30 PM	102653	0	_
			117581	In	
	CONDITION_2001_	C 10/30/2003 8:38:34 PM	111301	•	
	CONDITION_2001_ TRAFFIC_2002	C 10/30/2003 8:38:34 PM 2/4/2004 2:25:41 PM	318	0	
	CONDITION_2001_ TRAFFIC_2002 TRAFFIC_2002	C 10/30/2003 8:38:34 PM 2/4/2004 2:25:41 PM 2/4/2004 2:53:32 PM	318 5205	0	
	CONDITION_2001 TRAFFIC_2002 TRAFFIC_2002 TRAFFIC_2002	10/30/2003 8:38:34 PM 2/4/2004 2:25:41 PM 2/4/2004 2:53:32 PM 3/15/2004 8:42:35 PM	318 5205 773	0	
Insuit Data	CONDITION_2001 TRAFFIC_2002 TRAFFIC_2002 TRAFFIC_2002 TRAFFIC_2002 TRAFFIC_2002	10/30/2003 8:38:34 PM 2/4/2004 2:25:41 PM 2/4/2004 2:53:32 PM 3/15/2004 8:42:35 PM 8/6/2003 12:25:03 PM	318 5205 773 569	0 0 0 0	

Figure B.28: Data input tab, friction

<u>Step 4:</u>

Enter the year of the data being entered and click the **OK** button.



Figure B.29: Friction input year selection

Step 5:

Use the form below to manually input friction information into the database.

O Friction Input 2000										
Division 5	Division #	Route Type	Route Number	Mile Post	Direction	Date	Friction Number	Modifier	Air Temp	7
Route Type										
Route Number										
Mile Post										
Direction										
Date 1 / 2 / 2002										
Friction Number 67										
Modifier B 💌										
Air Temperature										
<u>R</u> eset										
<u>A</u> dd										
<u>U</u> pdate										
Back										

Figure B.30: Manual friction data entry

Description of Features and Fields for Friction Input

• **Division:**

Valid data is a number 1-9 representing the divisions of the state.

• <u>Route Type:</u>

Valid data is IN (Interstate) or AL (Alabama) which can be selected from the drop down menu. A user can also type in the Route Type.

• Route Number:

Valid data must be a whole number greater than zero. Ex. 256 Note: The system will not allow the user to input Route Numbers if the combination of a Route Number and Route Type are not inside the specified division. An Error Message will appear showing the record is invalid.

• Mile Post:

This is Mile post where the Friction has taken place. Valid data is a number with up to one decimal point. Ex: 136.5

Note: To insert continuous Mile Posts with all the other same fields just change the Mile Post field and press Add. If the Mile Post has a different Modifier, press the Reset button and insert new data into the reset fields.

The system will not allow the user to input Mile Posts that are not within an overlay. The system verifies that the combination of a Route Number, Route Type and Mile Post are inside a division; otherwise, an Error Message will appear showing the record is invalid.

• **Direction:**

Valid data is N (north), E (east), S (south), or W (west) which can be selected from the drop down list. A user can also type in the direction. Note: For odd Route Numbers only N (north) and S (south) directions are valid. For even Route Numbers only E (east) and W (west) directions are valid. If invalid data is entered, the system will give an Error message.

• Date:

Valid data must be entered in the following format: mm/dd/yyyy. Ex: 04/07/2002

• Friction Number:

Valid data is a whole number between 0 and 100. However, any value less than 20 or greater than 65 is considered to be an abnormal rating therefore a warning will appear asking the user if he/she is certain the value entered is correct. Ex: 54

• <u>Modifier:</u>

Valid data is (\$) Lime, (A) Overlay, (B) Bridge, (C) Concrete, (D) Detour, (E) Full patch, (F) Bleeding, (G) Ground, (H) Raveled, (L) Older, (M) Muddy, (N) Newer, (O) Oily, (P) Patching, (R) Old Pavement, (S) Skin Patch, (V) Leveling, (W) Wheel Path Level, and (X)Leveling will appear as a drop down list. Ex: (A) Overlay

Note: This field will not accept user input by keyboard.

• <u>Air Temp:</u>

Valid data is a whole number between 30 and 110. Ex: 74

• Back Button:

Clicking this button will exit the data entry session and take the user back to the administration screen.

Add Button:

Click this button to add the Friction Input into the HYDRA+ system. To submit a new Friction Input, all the fields must contain values except the Modifier. If there are values that have not been entered, the system will notify the user that the Add process can not take place until the values are filled.

Note: The system will not allow the user to input the same Input Record twice. An error message will appear showing that the record is a duplicate.

• <u>Reset Button:</u>

Clicking this will allow the user to reset all the fields on the screen to blank.

• Update Button:

Clicking this will allow the user to update selected data already in the friction table with the new data entered into the friction data input fields. Note: The system will verify if the updated Record is consistent with all of the above requirements; otherwise, an Update will not be performed.

B. Manual Overlay Input User Information

The purpose of this process is to allow users to input data about all of the Overlays that are completed within a given reporting year. This process will constrain the range and types of data entered according to the limits given by the Alabama Department of Transportation. Follow the steps and diagrams below to input overlay data.

<u>Step 1:</u>

Open the HYDRA+ program and select **Data Input** from the interface selection screen.



Figure B.31: Interface selection screen
Step 2:

Select the **Data Input** tab.

<u>Step 3:</u>

Select the **Overlay** radio button from the **Data Type** field. Then click the **Input Data** button.

				Opuale D	ata
	<u>Data I</u>	<u>nput</u>			
Data Tuna	Previous Input Dat	a Session ID	Attempted	Valid	
Data Type	CONDITION_2002_2	10/29/2003 8:16:57 AM	228430	0	
C Friction	CONDITION_2002_3	10/29/2003 8:17:32 AM	356743	0	
	CONDITION_2002_4	10/29/2003 8:17:43 AM	289806	0	
C Overlay	CONDITION_2002_C	10/29/2003 8:17:50 AM	358722	0	
	CONDITION_1999_1	10/30/2003 4:16:00 PM	106085	0	
Condition	CONDITION_1999_3	10/30/2003 4:50:50 PM	110585	0	
	CONDITION_2000_2	10/30/2003 7:58:02 PM	68093	0	
○ Traffic	CONDITION_2000_8	10/30/2003 8:02:00 PM	78157	0	
	CONDITION_2000_S	10/30/2003 8:02:21 PM	76355	0	
	CONDITION_2000_6	10/30/2003 8:07:13 PM	93713	0	
	CONDITION_2000_5	10/30/2003 8:07:25 PM	96213	0	
	CONDITION_2000_7	10/30/2003 8:07:30 PM	102653	0	
	CONDITION 2001 C	10/30/2003 8:38:34 PM	117581	0	
	TRAFFIC 2002	2/4/2004 2:25:41 PM	318	0	
	TRAFFIC_2002	2/4/2004 2:53:32 PM	5205	0	
	TRAFFIC 2002	3/15/2004 8:42:35 PM	773	0	
	TBAFFIC 2002	8/6/2003 12:25:03 PM	569	0	
Input Data	TBAFFIC 2003	8/6/2003 12:41:02 PM	1569	10	

Figure B.32: Data input tab, overlay

Step 4:

Enter the **Input Year** for the overlays to be entered and click the **OK** button.

Overlay Input Year	
Enter the 4-Digit Overlay input year: Ex. 2004	ОК
	Cancel
2004	

Figure B.33: Overlay input year selection

Step 5:

Begin entering valid data according to the form guidelines.

O HYDRA+ INPUT OVERLAY	2004							
Type AL 💌	Route	County Name Division Maint. Section Bibb						
Beg MP 255.000	End MP 260.000	Description (General Description of overlay and location)						
Beg KM 410.364	End KM 418.410							
Fine Aggregate Agg. Description / Type	%	- 50% gravel from Donnell Sand Co., Claybatchee						
#10 sandstone	▼ 50	Add						
Source Name / Location								
Coarse Aggregate Agg. Description / Type	%							
pea gravel	▼ 25	Add 75% agg. lime from McGinnis pit						
Source Name / L	ocation							
Flint Concrete Products	-							
Produce	r	Placer						
Deep South Const. Co., Gree	nville 🗾 🔽	Mississippi Cook Const. Co., Inc. 🗨						
Mix Typ 424A	e	Date Placed (MM/YYY) Project Number 03/2004 FR-481						
<u>S</u> ubmit <u>R</u> es	set Se <u>a</u> rch	Edit Overlay Return to Input Exit						

Figure B.34: Overlay data input

Description of Features and Fields for Overlay Input

General Overlay Condition

• **<u>Route Type:</u>** This is the type of route on which the Overlay has been placed which can be selected from the drop down box. Ex: IN or AL

• Route Number:

This is the specific route number where the Overlay has been placed. Must be a whole number greater than zero. Ex: 256

<u>County Name:</u>

This is the county where the Overlay has taken place. All available counties will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

• **Division:**

This is the division number (1-9) where the Overlay has taken place. All division numbers will be in the drop-down list. This field will also take keyboard input.

• <u>Maintenance Section:</u>

This is the Maintenance Section ID that is related to the Overlay being entered. This field should follow **standard** Alabama Department of Transportation Format for Maintenance Section ID's. **Ex. 17-002-01AP1**.

Standard \rightarrow The first two digits of the Maintenance section ID will be the FIPS county number or the line number of the county record in the flat file. The next 3 digits after the dash represent the state route number. The next two digits represent whether the segment falls within rural (01-49) or urban (50 and up) areas. The letter following represents the paving type (A – Asphalt, C – Concrete, B – Bridge, T – Tunnel). The next letter will be a "P." The last two digits are reserved for the paving segment number. This will be a number but may not always fill two digits. Ex: 1 instead of 01 and the number can go higher than 10.

• <u>Beg MP:</u>

This is the milepost that marks the beginning of an Overlay. The field will accept positive values up to 9999.999.

• End MP:

This is the milepost that marks the end on an Overlay. The field will accept positive values up to 9999.999. The ending milepost should be the larger of the two numbers. Ex: Beg MP = 26.5 End MP = 34.7

• Beg KM:

This is the kilometer post that marks the beginning on an Overlay. The field will accept positive values up to 9999.999. Input to this field has been disabled to avoid confusion, although it will still auto-populate when miles are entered.

• End KM:

This is the kilometer post that marks the end on an Overlay. The field will accept positive values up to 9999.999. Input to this field has been disabled to avoid confusion, although it will still auto-populate when miles are entered.

• **Description:** This is general descriptive information about the physical location of the Overlay.

• <u>Producer:</u>

This is the name of the producer associated with the aggregate mix as related to an overlay. All available producers will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

• <u>Placer:</u>

This is the name of the placer responsible for the completion of the overlay. All available placers will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

• Mix Type:

This is the mix type code used for the overlay. All active mix types will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

• Date Placed:

This is the date that the overlay was completed. The acceptable format for date entry includes the month and year of the overlay. e.g. (MM/YYYY) - 03/2004

Project Number:

This is the project number associated with the overlay. The project number should follow the standards used by the Alabama Department of Transportation. Ex. FR-481

• **NOTE:** The system will not allow the user to enter the same overlay twice.

Aggregate Information (Coarse and Fine)

• <u>Agg. Description / Type:</u>

This contains aggregate names and descriptions that the user may add to the aggregate list for the overlay. All available aggregates will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

• <u>%</u>:

This is the mix percentage of the aggregate being added to the aggregate list. It allows the user to enter positive whole numbers from 0 - 100. The % values for all aggregates (fine and coarse) must total to 100%.

• <u>Source Name / Location:</u>

This is the pit name and location of the source of the aggregate. All available sources will be in the drop-down list. This field has auto-completion capabilities for keyboard input but will only allow the user to type in values that are in the list.

• Add Button:

Click this button to add an aggregate record to the list of aggregates used in the mix for an Overlay. In order to add a new aggregate to the list, all of the relating fields must contain a value (Agg. Description / Type, %, and Source Name / Location). There can be no more than 15 aggregates added to each of the two lists (coarse and fine).

• Delete Button:

Click this button to delete one of the aggregate records that is in the list. In order to delete an aggregate, the corresponding record must be highlighted in the list.

General Function Buttons

• Submit Button:

Click this button to add the Overlay into the HYDRA+ system. To submit a new Overlay all of the fields must contain values. If there are values that have not been entered, the system will notify the user that the submit process can not take place until the values are filled. If the aggregate list total does not equal 100%, the user will be notified and he or she will be given the opportunity to continue using the incorrect data, or correct this error.

• <u>Reset Button:</u>

Click this button to reset all of the fields on the screen to blank.

• Search Button:

Click this button to begin a search of a previously entered Overlay that is within the current input year. The *first* time the user clicks this button, the search screen will be setup and only allow the key fields to be entered (Type, Route, Beg MP, and End MP – all required). Once the search criteria has been entered, click the Search button *again (second time)* and it retrieves actual data between the input parameters for that year. Then the next and back buttons allow for navigating through those data sets.

NOTE: pressing this button will enter Search and Edit mode, and the user will not be allowed to enter new records until returning to Overlay Input.

• Edit Overlay Button:

Click this button to edit an Overlay that has been returned by a search and has now populated all of the fields on the screen. This will enable the user to alter the values in each of the Overlay input fields as needed. The user will only be able to click this button if a previously entered Overlay has been searched and found within the current input year.

• Update Button:

Click this button to add an updated (changed) Overlay into the HYDRA+ system. When the update button is clicked, all of the fields on the screen will take the place of the old Overlay record in the HYDRA+ system. In the event that the user needs to retrieve old values for the Overlay, the changes are placed in an Overlay transaction log (contact your database administrator to retrieve the old values). If there are values that have not been entered, the system will notify the user that the update can not take place until the values are filled. If the aggregate list total does not equal 100%, the user will be notified and he or she will be given the opportunity to continue the update with incorrect data or correct this error.

• <u>Return to Input Button:</u>

Click this button to return to the normal new Overlay Input mode. The user has the ability to click this button at any point in the search, find, and edit modes of the Overlay Input section of HYDRA+ to return to standard input.

• Exit Button:

Clicking this button will exit the data entry session and return the user to the administration screen.

Section 5: Automated Input Data Validation

The data validation function allows the user to validate data that has been entered in the current session or any data from previous sessions which have not yet been validated. Functionality is also provided to correct errors that have been found in data that has been loaded.

Step 1:

Open the HYDRA+ program and select the **Data Input** option from the interface selection screen



Figure B.35: Interface selection screen

Step 2:

Select the **Data Validation** tab then select the type of data and year of data that you would like to validate by clicking the radio button associated with the data type.

Data Validation Session Status Outant Type Traffic Condition Validation Year Validation Year Validate New Data	Administration	Data Input	Data	Validation	Upo	late Data
Data Type C Traffic C Condition Data Type User Name Session Status Data Type C Traffic C Condition Validation Year Validate New Data Validate New Data		<u>Data Va</u> Session Status	lidation			
Validation Year. Validate New Data	Data Type C Traffic C Condition	Overall Status Data Type TRAFFIC_2002 TRAFFIC_2002 TRAFFIC_2002 TRAFFIC_2002 TRAFFIC_2002 TRAFFIC_2002	User Name eilaime eilaime eilaime eilaime eilaime	Session ID 3/14/2004 10:53:56 PM 3/14/2004 11:21:44 PM 3/15/2004 8:03:51 PM 3/15/2004 8:43:29 PM 3/18/2004 8:55:34 PM	Valid 770 770 770 770 0	Invalid 0 0 0 0 0 0
	Validation Year.	TRAFFIC_2002	eilaime	3/7/2004 7:09:51 PM	0	0

Figure B.36: Data validation tab

<u>Step 3:</u>

Click the **Validate New Data** button and a message will be shown indicating that the validation is in process.

• **NOTE:** The amount of time required to validate the data will vary depending on the size of the data set.

Step 4:

Once the validation is complete for a data set, some basic information about the validation process will be displayed in the **Session Status** window. This information includes the number of valid and invalid records as well as the user name and session ID associated with that particular validation process.

Administration	Data Input	Data	a Validation	Upo	late Data
	Data Va	lidation			
	Session Status				
⊤Data Type	Session ID: eilaime3/1 User Name: eilaime Total number of valid r Total number of invalid Started: 8:55:34 PM E	8/2004 8:15:19 ecords: 0 records: 0 nded: 8:55:34 P	PM M		
	Overall Status				
	Data Type	User Name	Session ID	Valid	Invalid
Traffic	TRAFFIC_2002	eilaime	3/14/2004 10:53:56 PM	770	0
	TRAFFIC_2002	eilaime	3/14/2004 11:21:44 PM	770	0
Condition	TRAFFIC_2002	eilaime	3/15/2004 8:02:51 PM	770	
	TRAFFIC_2002	ellaime	3/15/2004 8:43:29 PM	1//0	
	TRAFFIC_2003	eilaime	3/7/2004 7:09:51 PM	0	0
Validation Year: 2003 ▼ Validate New Data Corr <u>e</u> ct Invalid Dat	a				

Figure B.37: Data validation tab, traffic

<u>Step 5:</u>

If the validation procedure has found records that are invalid then the user can correct those records by selecting the desired data type radio button, then clicking the **Correct Invalid Records** button. When the button is clicked a screen will be displayed containing two data grids. The data grid on the top contains the "errors" associated with a record and the data grid on the bottom contains the contents of the entire record. To correct records, click on a record to see what errors are associated with it. Then click in the field that you would like to change and enter the desired value. You can change multiple records before resubmitting them.

ror L	og،																	
ode	Error	Text					User		Ti	me		Dataty	уре		Record	# Sess	ion	
31	Condi	tion TRANS2 o	ut of ra	nge			eilaime		20	04-06-18 0	00:50:43	TEMF	CONDIT	10N2001	108823	INVA	LID	
valid	Rec	cords																
ID	Divisio	on Route Type	Route	Directio	n Lane	Milepost	Date Rated	IBI1	IRI2	TEX RM	IS TEX MPI		LRUT	Grade	LATDEG	LATMIN	LATSEC	LONG
109125	0	IN	59	N	1	177.096	2/4/2001	1.09	1.16	0.495	0.582	0	0	-1.6	33	23	12.34	-86
109126	0	IN	59	N	1	177.146	2/4/2001	1.45	1.75	0.559	0.624	0	0	-1.6	33	23	13.82	-86
109127	0	IN	59	N	1	177.196	2/4/2001	1.26	1.08	0.534	0.538	0	0	-1.5	33	23	15.31	-86
109128	0	IN	59	N	1	177.246	2/4/2001	3.35	3.61	0.443	0.469	0	0	-1.6	33	23	16.79	-86
109129	0	IN	59	N	1	177.296	2/4/2001	3	2.25	0.376	0.491	0	0	-1.5	33	23	18.27	-86
109130	U	IN	59	N	1	177.346	2/4/2001	1.77	1.26	0.453	0.488	U	U	-1.5	33	23	19.76	-86
109131	0	IN	59	N	1	177.396	2/4/2001	3.43	2.7	0.367	0.403	0	U	-1.6	33 22	23	21.24	-86
109151	0	IN	33	N N	1	170.335	27472001	1 42	1.14	0.231	0.289	0	0	1.2	33 33	23	50.3	-00
103132	0	IN	59	N	1	1/0.445	27472001	1.43	1.43	0.432	0.94	7	7	-1.0	33 33	10	57.59	-00
108822		IN .	59	N	1	161.078	2/4/2001	1.05	1.53	0.336	0.674	4	8	-1.5	33	16	58.69	-07
107775	0	IN	59	N	1	109.33	2/4/2001	1.42	1.35	1 115	1 468	7	5	0.2	33	9	0.68	-87
107809	0	IN	59	N	1	111.03	2/4/2001	0.85	1.36	1.232	1.509	5	5	-0.1	33	9	19.56	-87
107757	Ō	IN	59	N	1	108.43	2/4/2001	1.33	1.94	1.52	1.881	8	10	0.1	33	8	49.42	-87
107758	0	IN	59	N	1	108.48	2/4/2001	1.03	1.44	1.241	1.619	6	6	0	33	8	50.04	-87
107794	0	IN	59	N	1	110.28	2/4/2001	0.99	1.77	1.106	1.517	6	6	-0.2	33	9	11.83	-87
107856	0	IN	59	N	1	113.38	2/4/2001	2.05	2.04	1.152	1.413	6	8	-0.9	33	9	51.22	-87
117126	0	IN	59	S	1	197.892	2/5/2001	1.93	2.54	0.519	0.568	0	0	-0.2	33	31	12.36	-86
117129	0	IN	59	S	1	197.742	2/5/2001	1.72	2	0.174	0.21	0	0	-0.1	33	31	10.83	-86
117130	0	IN	59	S	1	197.692	2/5/2001	1.9	1.56	0.193	0.238	0	0	-0.2	33	31	10.31	-86
117131	0	IN	59	S	1	197.642	2/5/2001	3.15	2.85	0.314	0.4	0	0	-0.2	33	31	9.79	-86
117132	0	IN	59	S	1	197.592	2/5/2001	1.96	2.21	0.176	0.226	0	0	-0.3	33	31	9.27	-86
117135	0	IN	59	S	1	197.442	2/5/2001	1.93	2.52	0.309	0.428	0	0	-0.6	33	31	7.76	-86
117144	0	IN	59	S	1	196.992	2/5/2001	1.23	1.35	0.249	0.346	0	0	-0.3	33	31	3.13	-86
117145	0	IN	59	S	1	196.942	2/5/2001	1.34	1.82	0.279	0.394	0	0	-0.6	33	31	2.59	-86
117146	0	IN	59	S	1	196.892	2/5/2001	2.16	2.83	0.393	0.488	0	0	-0.6	33	31	2.02	-86
117158	0	IN	59	S	1	196.292	2/5/2001	4.33	1.74	0.352	0.429	0	0	0.7	33	30	51.2	-86
117215	0	AL	15	S	1	182.027	2/6/2001	1.69	2.1	0.48	0.821	6	3	0.6	31	48	57.89	-85
																		Þ
					<u>C</u> lear	-	<u>P</u> rint	Repo	ort		<u>R</u> esub	nit			<u>B</u> ack			

Figure B.38: Traffic error log

<u>Step 6:</u>

After correcting the invalid fields, click the **Resubmit** button. This will take you back to the Validation screen.

<u>Step 7:</u>

To re-validate your new data, select the year and type of data just corrected, and click the **Validate New Data** button.

Section 6: Updating Data

This function allows the user to review, update and correct (as necessary) any data modified or added since the last update. This function is used to associate overlays to all other types of data for reporting purposes, and commits the data to the database.

<u>Step 1:</u>

Open the HYDRA+ program and select the **Data Input** option from the interface selection screen:



Figure B.39: Interface selection screen

<u>Step 2:</u>

Select the **Update Data** tab then select the type of data and year that you would like to update by clicking the radio button associated with the data type.

	Data Input	Data Valida	tion	Update Da	ata
	Upda	<u>te Data</u>			
\frown	Statistics	Completed	Becard Count	Undated Bu	~
	OVERLAY 1999	2003-07-18 10:26:46	2109	hvdra	
/ Data Type ——	TRAFFIC 1999	2003-07-18 10:31:40	5065	hvdra	
/	FRICTION 1999	2003-07-18 10:33:34	12673	hydra	
	CONDITION_1999	2003-07-18 16:39:19	211392	hydra	
	FRICTION_2000	2003-07-20 15:47:59	0	hydra	
C Traffic	OVERLAY_2000	2003-07-21 10:40:39	2134	hydra	
	TRAFFIC_2000	2003-07-21 10:52:23	5065	hydra	
Condition	CONDITION_2000	2003-07-21 14:19:20	508261	hydra	
	OVERLAY_2001	2003-07-21 14:27:46	2155	hydra	
N N	OVERLAY_2002	2003-07-21 14:38:26	2227	hydra	
	TRAFFIC_2002	2003-07-22 15:43:41	5099	Administrator	
	CONDITION_2002	2003-07-22 19:36:27	653080	Administrator	-
	CONDITION_2002	2003-07-23 01:12:00	653080	Administrator	
Opdate Year (YY)	CONDITION_2001	2003-07-23 13:07:20	0	Administrator	-
-	UVERLAY_2001	2003-08-01 16:16:47	2155	Administrator	-
,	TRAFFIC_2001	2003-08-01 16:21:58	5069	Administrator	-
	FRICTION_2001	2003-08-01 16:22:43	U	Administrator	-
		2003-08-01 16:50:25	0	Administrator	- ~
			111	LENGINE	

Figure B.40: Update data tab (data type)

• **NOTE:** Every year's data must go through the update data process, whether or not data exists for that year. For example: Condition data may only be available every other year, such as 2000 and 2002. Although condition data for 2001 may not be available, it is still necessary to choose that year and update the data before updating 2002 so that associations and projections will be valid for the next year.

<u>Step 3:</u>

Click the **Update Data** button and a message will be shown indicating that the update is in process.

• **NOTE:** The amount of time required to update the data will vary depending on the size of the data set.

Step 4:

Once the update is complete for a data set, some basic information about the process will be displayed in the window to the right. This information includes the type of data updated, the time the process completed, the number of records, and the user ID of the person who ran the update process. This list is cumulative, so it will show previous update processes as well. The most recent record will appear at the bottom.



Figure B.41: Update data tab (statistics)

Once all of the data types for a year have been processed, reports may then be run on that data. *Failure to update data before running a report will produce incorrect results*.

Section 7: Reporting Options

A. GASB 34

<u>Step 1:</u>

Open the HYDRA+ program and select **Reports and Visualization** from the interface selection screen.



Figure B.42: Interface selection screen

- **NOTE:** The primary reporting screen will then appear. To change screens, select the desired report by clicking on the appropriate tab at the top of the form.
- **NOTE:** After the GASB report has been created for the current year, it cannot be recreated for that same year. If the GASB report is resubmitted at anytime that same year, a copy of the original report is given.

Step 2:

Click on the **GASB 34** tab. From this screen the GASB 34 report will be run. The only option available to select is the year. The available years are loaded in the **Select Year** list box.

<u>Step 3:</u>

After choosing a year, click on the **Submit** button.

O HYDF	RA+ REPORTS	FRICTION	GASB 34	Other Reporting	
		GASE 3 Select Year 20	14 Report		
		DEPARTMENT	P TRANSPORTATION		
			abmit		
				Back	

Figure B.43: GASB 34 reporting tab

• **NOTE:** The report is then generated and formatted into an Excel spreadsheet.

Step 4:

At this point, you may use the Excel commands to print or save the report.

<u>Step 5:</u>

Click on the **Back** button to return to the interface selection screen.

B. Preliminary Prioritization Report (PPR)

<u>Step 1:</u>

Open the HYDRA+ program and select **Reports and Visualization** from the interface selection screen.



Figure B.44: Interface selection screen

• **NOTE:** The primary reporting screen will then appear. To change screens, select the desired report by clicking on the appropriate tab at the top of the form.

Step 2:

	EDICTION	CASE 34	Other Benerting
FFR		GASB 34	
	Preliminary Prio	ritization Report	
Select Year 200	14 Run PPR	Batch Select Division 4	¥
As-Of Date			
June	Projection In	crements 1 2	3
,	(years from	current)	3
	Create PDF		
	<u>S</u> ubmit	<u>R</u> eset	

Click on the **PPR** tab. The following screen will appear:

Figure B.45: PPR tab

- NOTE: To run a report for each Division and Interstate back-to-back, click the **Run Batch PPRs** checkbox. This will automatically start with an *Interstate PPR*; therefore you <u>will not</u> have to choose a Division. This option will allow for every PPR to be run without running them individually. A message box will let you know when the PPRs are done.
- NOTE: When the option *ALL* is selected for Division, a PPR will be created that shows all routes in the state from beginning to end. When a specific division is selected, a PPR will be created for routes in that division. After choosing an As-Of Date you must enter Projection Increments. <u>These increments should not exceed a length of 10 years as that data would not be reliable.</u>

Step 3:

After the Year, Division, As-Of Date, and Increments have been selected, click Submit.

- **NOTE:** If you make a mistake, press the **Reset** button to clear the form.
- **NOTE:** If you wish to generate the report into a PDF select the Create PDF button before pressing submit.

<u>Step 4:</u>

The report will be processed and formatted as an Excel spreadsheet and saved to the Desktop. From here, it can be opened for viewing and printing.

• **NOTE:** If a connection is lost during batch PPR generation, you can look on the Desktop to see the last PPR finished and just run each PPR individually after that.

<u>Step 5:</u>

If you wish to clear the chosen options and start again, click the **Reset** button.

<u>Step 6:</u>

Click on the **Back** button to return to the interface selection screen.

C. Friction Report

<u>Step 1:</u>

Open the HYDRA+ program and select **Reports and Visualization** from the interface selection screen.



Figure B.46: Interface selection screen

• **NOTE:** The primary reporting screen will then appear. To change screens, select the desired report by clicking on the appropriate tab at the top of the form.

Step 2:

PPR	GASB 34 Other Reporting
Friction	Report
Select Year 2002	Select Division 5
Select County Tuscaloosa	
Select Route	
Type Number	
	<u>R</u> eset

Click on the **Friction** tab. The following screen will appear:

Figure B.47: Friction reporting tab

• **NOTE:** The only option necessary for processing is the year. If no other option is chosen, then the program automatically generates a report for the entire state. Along with the year, any combination of options is possible.

<u>Step 3:</u>

Choose your selections and click on **Submit**.

• **NOTE:** After choosing a value in each box, the box will be grayed out, saving your selection. If you make a mistake, press the **Reset** button to clear the form.

<u>Step 4:</u>

The report will be processed and formatted to an Excel spreadsheet for printing or saving.

<u>Step 5:</u>

If you wish to clear the chosen options and start again, click on the **Reset** button.

Step 6:

Click on the **Back** button to return to the interface selection screen.

D. Other Reporting

<u>Step 1:</u>

Open the HYDRA+ program and select **Reports and Visualization** from the interface selection screen.



Figure B.48: Interface selection screen

• **NOTE:** The primary reporting screen will then appear. To change screens, select the desired report by clicking on the appropriate tab at the top of the form.

Step 2:

Click on the **Other Reporting** tab. The following screen will appear:

PPR	F F		FRICTION	GASB 34	Other Reporting
	<u>C</u> rystal Re	ports	Launch Crystal Reports database and to manipu options include: joining t capabilities.	. This tool allows you to query data late it, preparing it for ad hoc reporti ables, built-in functions, file export, a	from the HYDRA ng. Manipulation and chart creation
<u>G</u> enerate tables		Create and export tables GeoMedia.	required for use by visualization so	ftware such as	
	Geo <u>M</u> ed	ia	Lauch GeoMedia. This to visual report.	ol allows queried information to be r	epresented in a

Figure B.49: Other reporting tab

Step 3a:

Choose from either **Crystal Reports** or **GeoMedia**. The program will find the chosen utility on the local computer and open it automatically. If the utility is not found, a message box will inform the user.

• **NOTE:** This process may take several seconds, because the hard drive is searched to find the desired program.

Step 3b:

Choose **Generate Tables** to create the condition tables needed for GeoMedia. You will see the following box:

Ogenerate GIS tables	×
Previously Generated: 1999 2000 2003	Available:
	Generate

Figure B.50: Generate GIS table

The list on the left shows years for which GIS data has already been generated. The drop-down box on the right contains all the years that are available to generate GIS tables. Once a year's tables have been generated, they no longer appear in the drop-down box, but appear in the list on the left.

<u>Step 4:</u>

Choose a year from the drop down box and click the **Generate** button. The mouse pointer will change to an hourglass, indicating that the tables are being generated.

• **NOTE:** The time involved in this process will vary based on the amount of condition data for that year.

When the tables have been generated, a message box indicating success will appear and the user will be returned to the Other Reporting screen.

Appendix C: Friction Tester's Manual

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I. Manual Data Load User Information

A. Manual Friction Data Load

The purpose of this process is to allow users to manually input Friction records. This process will constrain the range and types of data entered according to the limits given by the Alabama Department of Transportation. Follow the steps and diagrams below to input friction data manually.

Step 1:

Open the HYDRA+ program and select **Data Input** from the interface selection screen.



Figure C.1: Interface selection screen

<u>Step 2:</u>

The **Data Input** tab will open.

Da a Input	Data	<u>i Input</u>			
	Previous Input D	ata	Automated	IV-E4	
Data Type	CONDITION 2002	3 10/29/2002 0:17:22 AM	Attempted 256742		
C Edator	CONDITION 1999	S 10/20/2003 6:17:32 AM	110595	0	
• Friction		2/4/2004 2/52/22 DM	E205	0	_
		2/4/2004 2:33:32 FM	3203	0	_
	TRAFFIC_1984	3/24/2004 10:22:41 PM	318	0	_
	TRAFFIC_1984	3/24/2004 10:23:37 FM	0220	0	_
	TRAFFIC_1905	3/24/2004 11:01:46 FM	500	0	_
	TRAFFIC_1985	3/24/2004 11:02:34 PM	3220	0	_
	TRAFFIC_1986	3/24/2004 11:23:26 FM	5000	0	_
	TRAFFIC_1986	3/24/2004 11:23:57 PM	5220	0	_
	TRAFFIC_1987	3/24/2004 11:33:49 PM	318		_
	TRAFFIC_1987	3/24/2004 11:41:23 PM	5220		_
	TRAFFIC_1988	3/24/2004 11:59:40 PM	318	0	_
	TRAFFIC_1988	372572004 12:00:30 AM	5220		_
	TRAFFIC_1989	372572004 12:09:52 AM	318		_
	TRAFFIC_1989	3/25/2004 12:10:42 AM	5220	0	_
	TRAFFIC_1990	3/25/2004 12:49:11 AM	318	0	_
Innut Data	TRAFFIC_1990	3/25/2004 12:50:14 AM	5220	0	_
Tubut Data	TRAFFIC_1991	3/25/2004 12:56:28 AM	318	0	~

Figure C.2: Data input tab

<u>Step 3:</u>

Select the **Friction** from the **Data Type** box. Then click the **Input Data** button.

	Previous Input Da	ta			
Data Type	Data Type	Session ID	Attempted	Valid	<u> </u>
	CONDITION 2002	10/29/2003 8:17:32 AM	356743		
C Friction	CONDITION_1999_3	10/30/2003 4:50:50 PM	110585	0	_
	TRAFFIC_2002	2/4/2004 2:53:32 PM	5205	0	
	TRAFFIC_1984	3/24/2004 10:22:41 PM	318	0	
	TRAFFIC_1984	3/24/2004 10:23:37 PM	5220	0	
	TRAFFIC_1985	3/24/2004 11:01:46 PM	318	0	
	TRAFFIC_1985	3/24/2004 11:02:34 PM	5220	0	
	TRAFFIC_1986	3/24/2004 11:29:26 PM	318	0	_
	TRAFFIC_1986	3/24/2004 11:29:57 PM	5220	0	
	TRAFFIC_1987	3/24/2004 11:39:49 PM	318	0	
	TRAFFIC_1987	3/24/2004 11:41:23 PM	5220	0	
	TRAFFIC_1988	3/24/2004 11:59:40 PM	318	0	
	TRAFFIC_1988	3/25/2004 12:00:30 AM	5220	0	
	TRAFFIC_1989	3/25/2004 12:09:52 AM	318	0	
	TRAFFIC_1989	3/25/2004 12:10:42 AM	5220	0	
	TRAFFIC_1990	3/25/2004 12:49:11 AM	318	0	
Innut Data	TRAFFIC_1990	3/25/2004 12:50:14 AM	5220	0	
input Data	TRAFFIC_1991	3/25/2004 12:56:28 AM	318	0	
			15000	10	

Figure C.3: Friction input selection

<u>Step 4:</u>

Enter the year of the data being entered and click the **OK** button.



Figure C.4: Select friction input year

<u>Step 5:</u>

Use the form below to manually input friction information into the database.

Friction Input 2000										
Division 5	Division #	Route Type	Route Number	Mile Post	Direction	Date	Friction Number	Modifier	Air Temp	
Route Type										
Route Number										
Mile Post										
Direction										
Date 1 / 2 / 2002										
Friction Number 67										
Modifier B 🗨										
Air Temperature										
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<u>A</u> dd										
<u>U</u> pdate										
<u>B</u> ack										

Figure C.5: Friction input screen

Description of Features and Fields for Friction Input

• <u>Division:</u>

Valid data is a number 1-9 representing the divisions of the state.

• <u>Route Type:</u>

Valid data is IN (Interstate) or AL (Alabama) which can be selected from the drop down menu. A user can also type in the Route Type.

• Route Number:

Valid data must be a whole number greater than zero. Ex. 256 Note: The system will not allow the user to input Route Numbers if the combination of a Route Number and Route Type are not inside the specified division. An Error Message will appear showing the record is invalid.

• Mile Post:

This is Mile post where the Friction has taken place. Valid data is a number with up to one decimal point. Ex: 136.5

Note: To insert continuous Mile Posts with all the other same fields just change the Mile Post field and press Add. If the Mile Post has a different Modifier, press the Reset button and insert new data into the reset fields.

The system will not allow the user to input Mile Posts that are not within an overlay. The system verifies that the combination of a Route Number, Route Type and Mile Post are inside a division; otherwise, an Error Message will appear showing the record is invalid.

• **Direction:**

Valid data is N (north), E (east), S (south), or W (west) which can be selected from the drop down list. A user can also type in the direction. Note: For odd Route Numbers only N (north) and S (south) directions are valid. For even Route Numbers only E (east) and W (west) directions are valid. If invalid data is entered, the system will give an Error message.

• Date:

Valid data must be entered in the following format: mm/dd/yyyy. Ex: 04/07/2002

• Friction Number:

Valid data is a whole number between 0 and 100. However, any value less than 20 or greater than 65 is considered to be an abnormal rating and you must contact an Administrator in order to submit those ratings. Ex: 54

• <u>Modifier:</u>

Valid data is (\$) Lime, (A) Overlay, (B) Bridge, (C) Concrete, (D) Detour, (E) Full patch, (F) Bleeding, (G) Ground, (H) Raveled, (L) Older, (M) Muddy, (N) Newer, (O) Oily, (P) Patching, (R) Old Pavement, (S) Skin Patch, (V) Leveling, (W) Wheel Path Level, and (X)Leveling will appear as a drop down list. Ex: (A) Overlay

Note: This field will not accept user input by keyboard.

• <u>Air Temp:</u>

Valid data is a whole number between 30 and 110. Ex: 74

• Back Button:

Clicking this button will exit the data entry session and take the user back to the administration screen.

Add Button:

Click this button to add the Friction Input into the HYDRA+ system. To submit a new Friction Input, all the fields must contain values except the Modifier. If there are values that have not been entered, the system will notify the user that the Add process can not take place until the values are filled.

Note: The system will not allow the user to input the same Input Record twice. An error message will appear showing that the record is a duplicate.

• <u>Reset Button:</u>

Clicking this will allow the user to reset all the fields on the screen to blank.

• Update Button:

Clicking this will allow the user to update selected data already in the friction table with the new data entered into the friction data input fields.

Note: The system will verify if the updated Record is consistent with all of the above requirements; otherwise, an Update will not be performed.

Appendix D: Cost-Budget Calculators

Cost-Budget Calculators	
COST CALCULATOR	
BUDGET CALCULATOR	

Cost-Budget Calculators

The contract proposal specified a database modification to support overlay structures. The Project Advisory Committee (PAC) requested a change that stated a budge and target condition calculator be substituted for the original overlay structure database modification.

Cost Calculator

The budget forecasting component of the Pavement Maintenance Cost Analysis Budget Calculator provides estimated future condition values. The user enters a budget amount to be spent per division per year, cost per lane mile for maintenance of state routes and interstate routes, the condition rating decay rate and the budget inflation rate. The budget calculator displays the state's budget for state and interstate routes and also the deflated budget for state and interstate routes. The cost calculator also displays the percentage of the state budget allocated to each division. Resultant condition ratings by division per year are shown based on the budget allocated to each division per year.

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20	Year 2	75	82	85	81	82	83	80	84	88	82			8	5		8	2					
21	Year 3	75	82	85	79	81	82	80	84	88	81		E	8	5	E	8	2					
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Figure D.1: Pavement cost calculator

Budget Calculator

The target condition component of the Pavement Maintenance Cost Analysis Budget Calculator allows the user to enter a cost per lane mile for state routes and interstate routes, the pavement condition rating decay rate, the desired condition rating to be achieved, the budget inflation rate and the number of years to achieve the desired rating. The calculator displays the current pavement condition ratings for every division in the state plus an average for all divisions. Once the forecast is generated, the calculator will display the budget for each year that must be allocated to achieve the desired rating for each division. The calculator also displays the percentage of the total state budget that must be allocated to each division and the total to be spent on that division in order to achieve the targeted pavement conditions.

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16	1	21,081,504	10,453,846	6,674,965	15,342,587	10,484,136	10,104,799	13,769,333	8,025,268	3,824,718	99,761,155	51,346,170	151,107,326
17	2	21,713,949	10,767,461	6,875,214	15,802,864	10,798,660	10,407,943	14,182,413	8,266,026	3,939,460	102,753,990	52,886,555	155,640,545
18	3	22,365,368	11,090,485	7,081,471	16,276,950	11,122,620	10,720,181	14,607,886	8,514,006	4,057,644	105,836,610	54,473,152	160,309,762
19	4	23,036,329	11,423,199	7,293,915	16,765,259	11,456,298	11,041,786	15,046,122	8,769,427	4,179,373	109,011,708	56,107,347	165,119,055
20	5	23,727,419	11,765,895	7,512,732	17,268,217	11,799,987	11,373,040	15,497,506	9,032,509	4,304,754	112,282,059	57,790,567	170,072,626
21	6	24,439,241	12,118,872	7,738,114	17,786,263	12,153,987	11,714,231	15,962,431	9,303,485	4,433,897	115,650,521	59,524,284	175,174,805
22	8	25,172,418	12,482,438	8 209 365	18,319,801	12,018,606	12,060,608	16,934,543	9,082,089	4,066,914	122,693,638	63,149,313	185,842,95
31						** Des	sired Ratin	gs and Buc	lget % 🏧				
32	Forecast Rating	79	76	73	77	74	74	75	73	71	75	83	76
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30	Current\$ Benaue LeMi	168,652,033	83,630,765	53,399,722 845	122,740,695	83,873,086	80,838,390	110,154,666	64,202,141	30,597,746	135,089,243	410,769,362	1,208,858,605
38	Tot Ln Miles	3,302	2,199	2,187	2,798	2,596	2.500	2.850	2,303	1.571	22,306	3,846	26,152
39		Cur	rent Date:	4/29/2004			End of Spi	readsheet		444.4	Collection	Date: 10/1/2003	
40	Note: Calcu	lations only v	valid when D	ecay Rate 1	Yrs is less	than 41							
41	Note: Concr	ete calculati	ons have be	en excludeo	l								
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Figure D.2: Pavement budget calculator

Appendix E: PPR Generation Process

Process Overview	
HYDRA+ PROCESSES:	207
HYDRA+ PROCESSES: DETAILED DESCRIPTIONS	

This section identifies the steps required to generate the yearly Preliminary Prioritization Report (PPR) used by maintenance engineers to help prioritize resurfacing projects. This appendix will describe these steps as well as the specific locations within the HYDRA+ database that are changed during the process. This will allow for coordination with the database administrators (DBA) in the Computer Services bureau who are responsible for routine backups and can also assist with backups of tables or the entire database at specific points in the process. Also, the external activities necessary to complete the process will also be identified so that potential bottlenecks can be prevented.

This tool is a network level pavement management tool, not intended to be used on a project level. Any updates to database information outside the administrative console or routine data entry screens must be performed by a DBA to insure data integrity be maintained.

Process Overview

The diagram below shows the steps involved in the generation of the PPR. Many of these steps are accomplished within HYDRA+. The first row of activities is done within the software: the second row is external to HYDRA+.



Figure E.1: Process overview

HYDRA+ Processes:

The following is a brief description of the major processes involved in the PPR generation process within HYDRA+. A more detailed description of each process follows this overview.

- 1. *Update routes tables.* New construction is accounted for in both the routes and the overlay tables in the application. The routes table provides the framework over which the overlays and the rest of the data are laid. For this reason, updating the routes table <u>must</u> be done first, using information gathered from the various milepost map updates issued from Transportation Planning. The updates are done using the manipulate tables function within the Administration tab in HYDRA+.
- 2. Update overlay project and state static tables. The overlay project tables provide the information necessary for creating new overlays and should be updated when attributes of an overlay such as new mix types, pavement producers, et cetera are being used. If these are not updated before adding overlays, the necessary information about an overlay will not be available and the insertion of new overlay records will have to be stopped until the necessary records are added.
- 3. *Modify overlays affected by routes table changes*. Some changes to the routes table may result in the relocation and/or extension/shortening of routes. These overlays should be adjusted to match the revisions made to the routes table. This adjustment has to be made external to the software by a DBA through the Oracle Enterprise Management Console, but is listed as a HYDRA+ process since it involves direct manipulation to a HYDRA+ table. Alternatively, if an overlay is greater than 1 ½ years old, it can be re-entered into the system through the software.
- 4. *Add new overlays to overlay tables.* Accepted for Maintenance (AFM) letters are received throughout the year and entered periodically into an Access database which allows interface with CPMS to verify the milepost and project number of the completed overlays. A report from this database provides the raw data for this step. The updates are done using the Data Input tab in HYDRA+.
- 5. *Import traffic*. Traffic data was formerly supplied directly from Transportation Planning; however, it is now processed by the GIS section of Computer Services. Once this data is finalized it can be imported into HYDRA+ using the Data Input tab and validated using the Data Validation tab. Finally this data is committed to the database using the Update Data tab.
- 6. *Generate PPR*. Since there is no new condition data to import, the next step in the process is to generate the PPR using the Reports and Visualization option on the main menu.
- 7. *Check PPR and post.* This step involves using previous years' PPRs and other sources to check the reasonableness of values shown on the PPR. After this is completed, the files can be formatted, printed to pdf format, and posted to the ALDOT intranet for use by Maintenance and the Divisions.

HYDRA+ Processes: Detailed Descriptions



Figure E.2: Update routes tables

<u>Step 1:</u>

Update Routes table

Predecessor: Identify milepost map changes since last HYDRA+ update *Suggested backups:* full database

Once the milepost map changes since the last HYDRA+ update have been identified, these changes should be applied to the current year's routes table within HYDRA+. This process is performed by clicking the "Data Input" button on the Interface Selection

screen. From here, click the "Administration" tab and select "ROUTES" from the "Select Table" dropdown box, and then click the "Manipulate Table" button. This will load all the records from the current year's routes table into a temporary table that can be manipulated.

After all changes have been made to this table, the cursor must be changed from the record that has been changed to a different record. This commits the changes to the temporary routes table. Once the cursor has been moved, close the window. A message box appears and requests confirmation that the table should actually be updated. If "No" is clicked, no changes will be made to the routes table. By clicking "Yes", the updated records from the temporary tables are transferred to the current year's routes table. Additionally, when a route is added where there previously was not one the proper base section records are added to the base section table.

Note: If any of the new routes fall into the category of concurrent routes, the concurrent routes table should be updated in the next step to ensure proper handling. Concurrent routes are updated through the Administration tab by selecting the "CONCURRENT_ROUTES" option and modifying the table presented. To add a concurrent route, locate the primary route and then add the concurrent route number (CON_ROUTE_NUM), and the beginning and ending mileposts for the concurrent route. This is repeated for each additional concurrent route along the primary route.



Figure E.3: Update state static tables

Step 2:

Update Overlay Project and State Static Tables

Predecessor: update routes table Suggested backups: AGGTYPE, CONCURRENT_ROUTES, CONDITION_VALIDATION_RANGES, COUNTY, DIVISION, FRICTION,_VALIDATION_RANGES, FRIC_MODIFIER, MIX_TYPE, PLACERS, PRODUCER, SOURCES, TRAFFIC_VALIDATION_RANGES, and OVERLAY_YEAR for year of change forward to present

After updating the routes table, necessary updates to the overlay project and state static tables should be made. These include AGGTYPE, CONCURRENT_ROUTES, CONDITION_VALIDATION_RANGES, COUNTY, DIVISION, FRICTION,_VALIDATION_RANGES, FRIC_MODIFIER, MIX_TYPE, PLACERS, PRODUCER, SOURCES, and TRAFFIC_VALIDATION_RANGES. These tables can be modified and updated by choosing "Data Input" from the Interface Selection screen, and then clicking the "Administration" tab. Then, select the appropriate table from the drop-down menu and update the necessary tables. This step is to ensure that records required for the next steps in this process are created and available (such as a producer or placer for a new overlay), as well as updating the validation ranges as appropriate for the traffic import.



Figure E.4: Modify overlays affected by routes table changes

<u>Step 3:</u>

Modify overlays affected by routes table changes

Predecessor: update overlay project and state static tables *Suggested backups:* overlay_*year* where *year* = current year

Alternatively, if the overlays affected are of sufficient age (>1.5 years), the overlays can be re-entered with their new limits.

Once the routes table has been updated with the most recent changes, any overlays that were located on a route that has been shortened will have to be modified by a DBA. It is not possible to change the route type, number, beginning, or ending mileposts within the application. Great care should be taken in updating overlays from the database side, and they should only be made when absolutely necessary. The updates should be applied only to the current year's overlay table, and must be performed by a DBA.



Figure E.5: Add new overlays to overlay tables

<u>Step 4:</u>

Add new overlays

Predecessors: Modify overlays affected by routes table changesUpdate overlay project and state static tables as necessary
(aggregates, producers, mix types, and placers)Update AFM letter database (external process)Suggested backups:overlay_year where year = current year

Once the routes, overlay project, and static tables have been updated and affected overlays have been shortened in the previous step, new overlays can be added to the overlay table. With the relatively small number of records added each year, special care should be taken in the addition of new overlay information, as these are not able to be updated within the application. In order to add new overlays, click the "Data Input" button on the Interface Selection screen. From here, click the "Data Input" tab and select the "Overlay" radio button. Once this is done, click the "Input Data" button below the radio button. The application then requests the overlay input year (which can be no greater than the current year). This then brings up the data input screen, where the information about the overlay is entered. The application checks that the overlay has been placed on a valid route within the mileposts of that route, as well as limits producer, placer, mix type, aggregate description/type, and source name/location to values that have already been entered into their respective tables.

When an overlay record is updated (as opposed to a new record being added), the changes made are reflected in each of the years where that overlay is present. For example, when overlay 605 is updated, each instance of overlay 605 is updated from 1984 to the present.

If an error is made while adding a new overlay record with the tool, it cannot be remedied by simply adding a new overlay over the one previously entered. For example, assume a record was entered incorrectly as having a beginning milepost of 10 and an ending milepost of 20. If the correct beginning milepost is 12, and a new overlay is entered as from milepost 12 to 20 this will leave a two mile portion of the previously entered overlay orphaned, and will cause the overlay table to be invalid.



Figure E.6: Import traffic

Step 5: Import traffic

Predecessors: Add new overlays to overlay tables Obtain traffic data from GIS/Transportation Planning Suggested backups: none

Traffic data is input though an automated process that reads from a Microsoft Access database. To import a traffic file, from the interface selection screen click "Data Input", and then select the "Data Input" tab from the administrator panel. Select the "Traffic" radio button, and then click the "Input Data" button. This brings up a screen requesting that the traffic file to be imported be specified. Do this by clicking the "Browse" button, and navigate to the file to be imported. HYDRA+ requires that the file being imported have a table named in the format "TRAFFICYYYY", where YYYY is the year being imported (ex: "TRAFFIC2006"). The Access file can have both the Interstate and State Routes table in it, but for each import the appropriate table has to be renamed in the format mentioned above. Additional information regarding the table structure of the data in the tables being imported can be found in the user manual. Once the file being loaded is specified, the year for the input must be specified, and should correspond to the year referenced in the table name above (in this case, 2006). Finally, the type of route for the data should be selected by clicking the radio button beside either "Interstate Traffic File" or "State Road Traffic File". Once this is completed, the "Input" button should be clicked, which will begin the automated traffic data load. There will be a progress screen showing the status and estimated completion time of the import.

Once the data is successfully loaded, there will be a summary screen that displays summary statistics for the data import that includes the number of valid and invalid records. To view any errors associated with the automated data load, once again select "Data Input" from the interface selection screen. Then, select the "Data Validation" tab and click the "Traffic" radio button, and select a year from the drop-down box below. This will enable the "Correct Invalid Data" button that will open a new window to all correction of invalid data. In this new window a list of records and their corresponding errors will be shown. To correct these errors, click on the invalid record and enter the correct value into the corresponding field or fields at the top of the screen. Adjustments to the validation ranges should have been made in Step 2; however, adjustments can be made and the data re-validated at this point if necessary.



Figure E.7: Generate PPR

Step 6: Generate PPR

Predecessor: Import Traffic *Suggested backups:* none

Once all the previous steps have been taken, a new PPR can be generated. To do this, click the "Reports and Visualization" button on the interface selection screen and then select the "PPR" tab. Then, select the year, division, as-of date, and projection increments as years from current for the report and click the "Submit" button. The report will be processed and formatted as an Excel spreadsheet and saved to the desktop. From here, it can be opened for viewing and printing. The report generation time for a single division can take more than thirty minutes. Several divisions may be run in batch mode overnight to make better use of computer time.



Figure E.8: Check PPR and post

<u>Step 7:</u>

Check PPR and post

Predecessor: Generate PPR *Suggested backups:* full database

Following generation of the PPR, each Division's file is sorted by route and milepost to yield a second version of this report. Both reports are posted in .pdf form to the Materials & Tests intranet site after they are checked for reasonableness. These checks may include but are not limited to the following:

Worst first report—verify that:

- 1. Pavements with low PCR ratings have high traffic and/or are old pavements.
- 2. Pavements with low PCR ratings are not concrete pavements (date placed <1985 is a possible indicator, though there remain some pavements in service placed before 1985).
- 3. Pavements with low PCR ratings are longer than 0.5 mi long. Investigate pavements that do not fit this criteria.
- 4. Pavements with extremely high PCR ratings (>85) were placed in the previous four paving cycles.

Route and milepost report—verify that:

- 1. All portions of a route appear on the report. This should only affect those routes that were changed in steps 2 and 3 of this appendix for the current PPR cycle. It is generally easier to identify expected gaps in the route based on the milepost maps and check the PPR for those gaps rather than to check the PPR against the milepost maps.
- 2. Common/concurrent route sections do not appear on report. Again, this should only affect routes that were changed in the current PPR cycle.
- 3. All pavements have traffic values. If traffic values are not present, identify cause of missing values using Transportation Planning database, then HYDRA+ traffic table.
- 4. Short segments with ages that are significantly different than those of surrounding overlays are noted and investigated.

Appendix F: GASB 34

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Section 1: GASB 2004 Procedure & Issues

The 2004 GASB Report for Roadways was generated using the HYDRA+ for the first time since its development. Previously, the GASB 2002 and 2003 GASB reports were not generated using the HYDRA+ system, but were created using data and procedures that were later automated in the HYDRA+ system. Upon generating the 2004 GASB report, it was noted that the vales for the report were approximately 10 points too low based on the submitted 2002 GASB procedures and report. The decay algorithms used to deteriorate the roadway overlays were revised between 2002 and 2003. Thus, the 2003 GASB report had to use a procedure similar to the 2002 report to ensure consistency required to compare asset management across years. This same procedure is applied to the 2004 report for consistency—and will have to be applied until the new condition rating algorithm is in place. It is important that there is consistency in the number of center lane miles across the state from year to year. Only deviations based on new construction should affect the totals. These lane miles are based on designations of Interstate routes, National Highway Non-Interstate routes, and Alabama Non-National Highway routes found in the Routes table MINUS the center lane miles associated with Concurrent Routes.

2004 GASB Procedure:

- The only new data set available this year was the 2004 Interstate data set. Condition values from this set were checked against the most recent (2002) Interstate condition values (less the new overlays) to assess the rate of decay, which yielded an average decay rate of approximately 5% per year.
- As the 2004 automated procedure in HYDRA+ could not be applied, we used the 2003 GASB report values and decayed all the routes (Decayed Rating) by four points (4% per year). This is consistent with the rate of decay across the state.
- Using the 2004 New Overlay report (2004 New Overlays.pdf) obtained from Frank Bell, we then applied a value of 96 (new overlay rating) for the new overlays and applied the overlays (Total Miles New Overlay) to the appropriate route (NHS Non-Interstate vs Non-NHS). We used the Routes Tables extracted from HYDRA+ (Routes Tables.mdb) which contain NHS designation and begin/end mileposts) to correctly apply the new overlays to the appropriate report section. We then determined the proportion of the entire route affected by the new overlay(s) by determining the length of the new overlay relative to the length of the corresponding route (Proportion Route Total Mi). We then adjusted the route's average condition value upward (Adjusted Decay Rating) to account for the new overlays. e.g. 10 mile route with an average condition rating of 76 and 5 miles of this route was overlaid in the current year, which receives a rating of 96. The entire route's value is an 86. (172 * 0.5). Finally, we determined the Decayed Weighted Rating for the route relative to the total number of miles for all routes in the designated section (Interstate, National Non-Interstate Routes, and Non-National Routes).

- Check length of each route per category (Interstate, National Highway Non-Interstate and Alabama Non-National Highway) against the overlay tables and the routes tables to ensure the correct number of miles is reported.
- Adjustments made for concrete/asphalt as per several files sent by Frank Bell to ensure these are consistent with those reported by the Planning Bureau. These adjustments were made to the Decayed GASB 2003 worksheet. This spreadsheet files is: Concrete mileage for FY 2004 GASB Issues with concrete: a. changed I165 to asphalt, b. included I10 and I65 bridge segments.
- Adjustments made to NHS and non-NHS flags based on adjustments associated with the following files send by Frank Bell: GASB vs Routes Table Comparison PDF file

Section 2: Roadway GASB 34 Summary Screen Shot

DE	PARTMENT OF TRANSPORTATIO	N		
	GASB34 Report			
	Road Cond	ition		
Rep	ort Generated:	12/15/2004		
C.	Data as of:	2004		
Con	overage Area: dition Ratings as of 9/30	2004		
Summary for Alabama Non-Nation	nal Highway Rating			
This contains all rating data for Non-National	Highways using lane 1 where ra	ating has been performed.		
11489 26	7140 62	Distress Rating 75.00		
11405.20	1140.02	10.00		
Summary for Alabama Non-Inters	tate National Highway R	ating		
This contains all rating data for Non-Interstat	e Highways using lane 1 where	rating has been performed.		
Total Kilometers	Total Miles	Distress Rating		
4464.20	2774.52	77.95		
Summary for Alabama Interstate Rating This contains all rating data for Interstate Highways using lane 1 where rating has been performed.				
Total Kilometers	Total Miles	Distress Rating		
1150.13	714.81	83.73		
Total Kilomatara (Aanhalt)	Total Miles (Asphali)			
17103.59	10629.95			
Summary for Alabama Non-National Highway (Concrete)				
This contains all data for Non-National Highv	vays using lane 1 where rating h	as been performed.		
20.74	12.89			
20114	12.00			
Summary for Alabama Non-Inters	tate National Highway (C	Concrete)		
This contains all data for Non-Interstate High	ways using lane 1 where rating	has been performed.		
Total Kilometers	Total Miles			
12.12	1.53			
Summary for Alabama Interstate (Concrete)			
This contains all data for Interstate Highways	s using lane 1 where rating has b	been performed.		
Total Kilometers	Total Miles			
307.17	190.91			
Total Kilometers (Concrete)	Total Miles (Concrete)			
340.03	211.33			
Summary for Alabama Roads				
This contains all rating data for Alabama Roa	ads using lane 1 where rating ha	s been performed.		
Total Kilometers	Total Miles	Distress Rating		
17443.62	10841.28	76.36		



Section 3: Auditor's Notes

- 1. Describe the <u>procedures</u>, both automated and manual, by which transactions are initiated, recorded, processed, and reported from their occurrence to their inclusion in the financial statements. **BE SURE TO DESCRIBE THE EXTENT TO WHICH INFORMATION TECHNOLOGY (IT) IS USED.**
 - 1) The Alabama Department of Transportation (DOT) has divided infrastructure into two networks, which consist of roads and bridges.
 - 2) Road and bridge projects will only be capitalized when the project is complete and has been accepted by National Highway Administration (NHA). For the 2003 Fiscal Year DOT has chosen to capitalize the road and bridge projects that were closed out on Comprehensive Project Management System (CPMS) during FY 2003. All costs for these projects (some projects began prior to FY 2003) from beginning to end will be capitalized. In some cases projects can be finished but not closed out for many years due to problems with acceptance by NHA. Infrastructure assets that were completed prior to fiscal year 2003 will not be reported this year. Retroactive reporting of infrastructure will be done possibly for FY 2003 CAFR.
 - 3) Infrastructure construction-in-progress will be reported to the Finance Department and will consist of road and bridge projects that have not been capitalized and are still open projects.
 - 4) Infrastructure costs that result in an increase in capacity, an improvement in the efficiency, or a replacement of a portion of the infrastructure network are capitalized and added to the historical cost of the assets.
 - 5) Costs that allow the infrastructure network to be used efficiently over the expected useful life of the assets are expensed as general maintenance costs.
 - 6) Certain maintenance costs that extend the useful life of the assets but do not increase capacity or efficiency are classified as preservation costs.
 - DOT has established a measurement scale for the condition of its roads and bridges. See page _____ of this W/P for the preliminary RSI disclosure for the CAFR.
 - 8) DOT has disclosed that the weighted average of all State maintained roadways shall be "Satisfactory" or better.
 - 9) DOT has disclosed that the weighted average of all State maintained bridges and culverts shall be "Satisfactory" or better.

DOT has an asset management system that has an up-to-date inventory of eligible infrastructure assets. DOT performs condition assessments of the eligible infrastructure assets and summarizes the results using a measurement scale. DOT also estimates each year the annual amount to maintain and preserve the eligible infrastructure assets at the established condition level.

DOT's asset management system consists of several component systems including the Comprehensive Project Management System (CPMS), Pavement Management System (PMS), Alabama Bridge Information Management System (ABIMS), and the GASB 34 reporting program developed and maintained by the University of Alabama. ABIMS and PMS provide the condition assessment data that the GASB 34 reporting program needs to produce the GASB 34 Road Condition Report and the GASB 34 Bridge Condition Report. These reports are the source of condition data reported in the Required Supplementary Information (RSI) section of the CAFR. CPMS's project cost accounting data is used by Bill Flowers, Assistant Finance Director, to produce the annual preservation cost amount that is reported in the (RSI) section of the CAFR.

Comprehensive Project Management System (CPMS)

The main cost accounting system for DOT is the Comprehensive Project Management System (CPMS). CPMS contains data on all construction and maintenance projects that are contracted out by DOT. Construction and maintenance projects are assigned work codes by GASB category.

Mr. Flowers has taken the total dollar amount that has been spent on maintenance projects from the GASB Expenditure Summary Report from CPMS and has averaged the last three years in order to determine the annual preservation cost to be reported in the RSI section of the CAFR.

Pavement Management System (PMS)

The Pavement Management System contains all of the condition assessment data for roads. Scott George, Acting Pavement Management Engineer, of the Materials and Test Bureau of ALDOT, has the responsibility of maintaining the Pavement Management System's day-to-day operations. DOT has contracted with Roadware to collect road stress data. Roadware takes videos roadways across the state. Roadware collects condition assessment data on Alabama interstate highways once a year. Other National Highway System (NHS) and other state non-NHS roads are collected once every two years. After the road data is collected, Roadware provides DOT with copies of the data on DVD's. These DVD's contain road stress information as well as moving video of the road surface. DOT performs quality control checks of Roadware data by sending pavement management technicians out to take samples of road conditions to compare back to data received from Roadware. Access to the pavement management system is controlled by user login by password. Data access permission is assigned to each user login by a needs only basis. Road condition data is provided to the University of Alabama for the GASB 34 reporting program on CD and by File Transfer Protocol (FTP) over the Internet.

Alabama Bridge Information Management System (ABIMS)

The Alabama Bridge Information Management System (ABIMS) contains all of the condition assessment data for all the state's bridges. Each bridge in the state is assigned a bin number to separately identify it. Lesley J. Morrissette, Bridge Management Engineer/Management & Training, of the Maintenance Division of DOT is the administrator of the ABIMS system. ABIMS is located on a mainframe computer at the DOT central office in Montgomery. Ed Phillips, P.E., Assistant State Maintenance Engineer/Management & Training, is Mr. Morrissette's immediate

supervisor. George Conner, P.E., Assistant State Maintenance Engineer/Bridges, is responsible for compliance in the area of bridge inspections.

The state is divided into nine divisions with each division having a bridge inspection team. Bridge inspection teams have at least one Chief Inspector who has completed the requirements for becoming a Certified Bridge Inspector. The Chief Bridge Inspector of that particular team enters inspections completed by the inspection team into ABIMS. Bridge inspection teams from other DOT divisions do not have the ability to change data entered by other divisions. Access to the ABIMS system for entering inspection data is user access controlled by password login. Bridge condition data is provided to the University of Alabama for the GASB 34 reporting program on CD and by File Transfer Protocol (FTP) over the Internet.

GASB 34 Reporting Program

The Alabama Department of Transportation contracted with the Center for Economic & Business Research (CBER) at the University of Alabama in May 2001 to assist ALDOT in establishing an "asset management system" as the driver of its modified method for reporting infrastructure investments, modifications, and maintenance. This new system will integrate data from the Alabama Bridge Information Management System (ABIMS), ALBRIDGE, Comprehensive Project Management System (CPMS), Proposal Estimate System (PES), and Pavement Management System (PMS).

CBER receives data from DOT by downloading the files from the Internet using File Transfer Protocol (FTP). Once the data is downloaded it is copied to a CD and stored in a locked cabinet for backup purposes. The GASB 34 program is housed in a secured lab only accessible by card access with three security checkpoints. Faculty and students working on the project must sign a non-disclosure form. Data is backed up weekly and a backup copy is stored off-site. Backups are destroyed weekly after a new backup has been created. Each user accessing the program is assigned a specific level of access.

Only those with administrative privileges can enter changes to the program. There are three faculty members (all PhD's) and one professional staff member working on the project. Detailed testing of the accuracy of the data and calculations is checked by graduate students of the University. CBER has performed black box and white box testing of the program. CBER has documented the program code and other information in a users manual and a developer's manual.

CBER provides DOT with two reports on an annual basis. These reports are the GASB 34 Road Condition Report and the GASB 34 Bridge Condition Report. CBER does not perform the condition assessments of the roads and bridges. The GASB 34 reporting program takes the condition assessment data received from DOT for each segment of roadway and for each bridge and weights them to calculate an overall road condition rating and an overall bridge condition rating.

2. Describe the <u>related accounting records</u>, whether electronic or manual, <u>supporting</u> <u>information</u>, and <u>specific accounts</u> in the financial statements involved in initiating, recording, processing and reporting transactions.

The CPMS has various screens from which information about projects may be obtained. Some of these include:

- The general purpose inquiry this captures data related to particular projects including a description of the project, GASB work codes, payment history, stage, etc.
- The payment by vendor history lists all payment vouchers charged to a project.

The construction-in-progress and capitalized projects listings are kept on the CPMS. These are the reports from which the infrastructure is reported on the CAFR.

3. Describe how the information system captures any other events or conditions that are significant to the financial statements. (*For example, commitments and contingencies, subsequent events, compliance with debt covenants, related party transactions, fair values of financial instruments, disclosures, etc.*)

N/A

4. Describe any other procedures used to record recurring and nonrecurring adjustments to the financial statements. (*For example, reclassifications, adjusting journal entries, etc.*)

N/A

- 5. Describe the significant controls, both electronic and manual, which appear to exist. **BE SURE TO INCLUDE ANY IT RELATED CONTROLS.**
 - A) Access to each component of ALDOT's asset management system is controlled by user login by password.
 - B) ALDOT performs quality control checks of Roadware data by sending pavement management technicians out to take samples of road conditions to compare back to data received from Roadware.
 - C) Detailed testing of the accuracy of the data and calculations from the GASB reporting program is checked by graduate students as part of a senior class project.
- 6. List and describe any supporting documents that are used and/or generated in the process above, including any journal or subsidiary ledger used in the recording process.
 - A. Vouchers, material receipts, etc., are used when roads and bridges are constructed.

- 7. List and describe any computer reports or other input or output data that is used in the recording process.
 - A) GASB Expenditure Summary Report A CPMS report that details the total annual dollar amount of maintenance projects by GASB code.
 - B) GASB Expenditure Detail Report A CPMS report that is the detailed version of the GASB Expenditure Summary Report broken down by project.
 - C) GASB Capital Project Detail Report A CPMS report that summarizes the total dollar amount of capitalized infrastructure projects by GASB code.
 - D) GASB Active Capital Project Summary Report A CPMS report that summarizes the infrastructure projects that have not been capitalized and are still in Construction-in-progress.
 - E) GASB 34 Road Condition Report Report generated by the GASB 34 reporting program developed by the University of Alabama that is used to prepare the RSI section of the CAFR.
 - F) GASB 34 Bridge Condition Report Report generated by the GASB 34 reporting program developed by the University of Alabama that is used to prepare the RSI section of the CAFR.
- 8. a) Do the controls identified in No. 5 above appear to be effective? Yesb) If yes, are there efficiencies to be obtained from testing the controls? No
- Will control risk be assessed below the maximum? No If yes, be sure and include the tests of controls which will be performed on the audit program(s) as well as indicate them on the *Summary of Internal Control and Control Risk Assessment* Form.
- 9. Based on the understanding gathered above, were any reportable conditions noted? If so, describe below as well as include on the *Summary of Internal Control and Control Risk Assessment* Form.

Based on our understanding of the internal control, there appear to be no reportable conditions.

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