Reflect With Insight for RAMS Interface Design

October 2014

Bentley®
Sustaining Infrastructure

Version Control

Date	Version	Changed by	Notes
November 2014	0.1	JMM	Initial Revision
November 2014	0.2	JMM	Initial Revision
Nov 21, 2014	0.3	JMM	Various Revisions after Discussions with RMS
Nov 25, 2014	0.4	JMM	Various Revisions after Discussions with RMS, Kartat and Tim

Reference Documents

Document	Source
UC0001 Use CaseDatamodel.doc	RMS
UC0002_Use DataUpload.doc	RMS
UC0003_DataUpdate.doc	RMS
UC0004_Reporting Requirements on the uploaded Data.doc	RMS
UC0005_AssetInstalled.doc	RMS
UC0005a_CreateNewAsset.doc	RMS
UC0005b_ModifyExistingAsset.doc	RMS
UC0007_DocumentsAttachedtoInspection.doc	RMS
Accomplishment.xls	RMS
Activity.xls	RMS
Defects.xls	RMS
Incident.xls	RMS
Inspection.xls	RMS
LandingAreaFieldtypes_completeList.xls	RMS
Requests.xls	RMS
FD0005_Main Create New Assets.pdf	RMS
FD0005a Create New Assets.pdf	RMS
FD0005b Update_modify asset_v2.pdf	RMS
FD0007 Attaching Documents with Inspection.pdf	RMS
RAMS Reflect with Insight16052014104251.pdf	Bentley
viewDocumentM3Specs.pdf	RMS
ERD_RwI_RAMS_Int.pdf	RMS
Reflect With Insight for RAMS interface Scope and Requirements v 1.0.pdf	Bentley

1.0 Introduction

In September of 2014 Joseph Mendoza of Bentley Systems was given a set of documents that originated from RMS. These documents showed use cases, flow diagrams and Asset attributes that would be needed by RMS to support loading data from an outside source, in this case, Reflect With Insight (RWI). This should improve the quality of corridor information held by RMS and reduce the cost of duplicating data entry.

RMS and Bentley Systems have established a project to undertake the scope and requirements analysis for this project and then implement the requirements. The Scope and Requirements document is the result of that analysis and it will be used to ensure everyone has a common understanding of the scope and requirements of this project.

This report is being used as the basis of this functional specification and of an acceptance test plan to ensure all requirements are met by the software that is produced.

2.0 High Level Requirements

During initial review of the provided documents and discussions from the requirements workshop it was determined that the main objectives of this project are:

- To add asset types or asset attributes as needed to accommodate the data being pushed into the RAMS system.
- To implement several CSV loaders to allow the creation and updates of various asset items
- To create several reporting objects on the data that has been imported or updated.

This objects are discussed in a higher level in the Scope and Requirements Document.

3.0 Scope

RMS have determined that the following items are in scope for this project.

- Bentley should create any necessary assets to store the Routine Services data.
- Bentley will create a CSV loader to facilitate loading the Routine Services data into RAMS.
- Bentley will provide a CSV file format to RMS so that test data can be created for the Routine Services loader.
- Bentley will create the GIS themes for the Routine Services Data.
- Bentley will create the necessary queries to report on the Routine Services Data.

4.0 Asset Meta-model Create / Update

4.1 Assets needed to model the Routine Services Data

Bentley will create a set of new hierarchical assets to accommodate the Routine Services Data. This data includes information sections for: Accomplishments, defects, Incidents, Inspections and Requests. The data for these sections will be contained under a top level attribute containing the Vendor code and Reference ID, the initial date of creation and location if known.

It is assumed that the combination of Reference ID and one of any of the other IDs (Request ID, Accomplishment ID, Inspect ID, Incident ID or Defect ID) will make a unique listing for that category. It is also assumed that a Unique Reference ID will tie together several categories. For example Reference ID could tie together: a Request, an Incident, and several Accomplishments if needed to complete the item.

The newly created assets would resemble

Parent Asset	Child Asset	Function
RSD		Routine Services Data Holds the Reference ID the creation date and location.
	RSAM	Accomplishments
	RSDE	Defects
	RSIC	Incidents
	RSIS	Inspections
	RSRE	Requests

This would allow the system to have more than one accomplishment or incident (any child asset in practice) linked to the same Vendor Code and reference ID if needed. It also allows for fields to be mandatory for just one child asset and allows the user (via CSV LOADER) to not have to fill out other asset items since they may not have occurred yet. The tables in this section in sections 4.1.1 – 4.1.6 refer to settings and configurations in RMS for creating the Routine Services Data Assets.

4.1.1 Asset for the Top Level Routine Services Data

The top level Routine Services Data Attribute is used as the parent in a hierarchical asset set. This Level will hold things that are common to all the children and be associated with any location information for the Routine Services Data. While this asset will not link directly in Exor to the assets that it is referring to, the necessary field are available to be able to link to that data for reporting purposes.

The asset will have the following settings:

Setting	Value	Notes
Type	RSD	

Type Title	Routine Services Data	
Type Location	Continuous	Needed over a point asset in case several miles are Inspected. If Necessary a 0.1 metre length can be used for point type items.
Elec Drain Carr	C	
Category	I	
Short Description	RSD	
Start Date	01JAN1901	
Replaceable	No	
Multiple Allowed	No	
Top in Hierarchy	Yes	

The Asset will have the following attributes:

Sequence	Name	Screen Text	Length	Format	Domain	Case	View Attr / Column Name	Start Date	Mandatory	Displayed	Notes
1	IIT_CHR_ATTRIB26	Vendor Code	4	VARCHAR2			Vendor_Code		Y	Y	Unique identifier representing the Service Provider. A domain should be created for this item by Bentley and populated by values supplied by RMS.
2	IIT_NUM_ATTRIB25	Reference ID	8	NUMBER		U	reference_id		Y	Y	Unique number sent by the service providers to identify an activity information.
3	IIT_CHR_ATTRIB56	Road Number (Primary Location)	125	VARCHAR2		U	Road_number			Y	Gazetted Road number. This is a 8 digit number and covers all the Motorways, State Roads and regional roads
4	IIT_CHR_ATTRIB27	Asset type code	5	VARCHAR2		U	Asset_type_code			Y	This is a unique identifier in RAMS to identify an asset type
5	IIT_NUM_ATTRIB16	Key-ID		NUMBER		U	Key_ID			Y	Unique identifier in RAMS
6	IIT_CHR_ATTRIB57	Linear Reference Number	125	VARCHAR2		U	Linear_Reference_Number			Y	A number extracted from RAMS and provided to 3rd party service providers initially and periodically updated.

7	IIT_CHR_ATTRIB58	Asset description	125	VARCHAR2		U	Asset_description			Y	This is the description of asset type in RAMS
8	IIT_CHR_ATTRIB28	Road Maintenance Segment	30	VARCHAR2		U	Road_Maintenance_Segment			Y	Each road that the RMS maintains (State roads) is divided up into manageable lengths. These manageable lengths are called road maintenance segments
9	IIT_DATE_ATTRIB86	Date of creation	11	DATE		U	Date_of_creation			Y	Date the record is created initially Format Mask: DD-MON-YYYY
10	IIT_DATE_ATTRIB87	Time of creation	5	DATE		U	Time_of_creation			Y	Time the record is created initially Format Mask: HH24:MI
11	IIT_NUM_ATTRIB17	Longitude		NUMBER		U	Longitude			Y	Generated based on WGS84 datum and calculated to 5 decimal points
12	IIT_NUM_ATTRIB18	Latitude		NUMBER		U	Latitude			Y	Generated based on WGS84 datum and calculated to 5 decimal points
13	IIT_CHR_ATTRIB29	Local Gov Area	50	VARCHAR2		U	LGA			Y	LGA where the incident has occurred.

The asset will be assigned to the following networks:

- LCWY

The asset will have the following roles

Role	**Mode**

HIG_USER	NORMAL

4.1.2 Asset for the Routine Services Data – Accomplishments

This Child asset will hold the information for the accomplishments data.
The asset will have the following settings:

Setting	Value	Notes
Type	RSAM	
Type Title	RSD Accomplishments	
Type Location	Point	Location Information is Stored on the RSD asset.
Elec Drain Carr	C	
Category	I	
Short Description	RSAM	
Start Date	01JAN1901	
Replaceable	No	
Multiple Allowed	No	
Top in Hierarchy	No	

The asset will have the following attributes:

Sequence	Name	Screen Text	Length	Format	Domain	Case	View Attr / Column Name	Start Date	Mandatory	Displayed	Notes
1	IIT_CHR_ATTRIB27	Accomplishment Number	30	varchar2		U	Accomplishment_Number		Y	Y	This is the identifying number of the accomplishment visible to the user.
2	IIT_NUM_ATTRIB24	Accomplishment ID		number		U	Accomplishment_ID		Y	Y	Unique number for accomplishment. Each service provider will be allocated a series of 10 million number to be used as Accomplishment ID.
3	IIT_DATE_ATTRIB86	Accomplishment Date		date		U	Accomplishment_Date			Y	Date of completion of the task on a incident
4	IIT_CHR_ATTRIB26	Vendor Code	4	VARCHAR 2			Vendor_Code		Y	Y	Unique identifier representing the Service Provider.
5	IIT_NUM_ATTRIB25	Reference ID	8	number		U	Reference_ID		Y	Y	The maintenance activities comprising of routine or reactive services. The activities are allocated activity code.
6	IIT_NUM_ATTRIB16	Activity	4	number		U	Activity			Y	Activity number as per M3 specification

7	IIT_CHR_ATTRIB56	Activity Name	255	varchar2		U	Activity_Name			Y	A description of the activity.
8	IIT_CHR_ATTRIB28	Activity Type	30	varchar2		U	Activity_Type			Y	Grouping of the related activities. For example Activity type 200 is Routine Pavement. It encompasses Pothole repair, Edge repair and similar activities.
9	IIT_NUM_ATTRIB17	Quantity Accomplished		number		U	Quantity_Accomplished			Y	Extent of work done to complete an activity. This is defined in terms of the unit of measurements defined for the activity in question.
10	IIT_CHR_ATTRIB29	Unit Of Measure	30	varchar2		U	Unit_Of_Measure			Y	Unit of measurement defined for an activity, for example, meters, square meter.
11	IIT_NUM_ATTRIB18	Second Quantity		number		U	Second_Quantity			Y	Different documents have defined the quantity in a different way. For example, the quantity could be in terms of length, area or volume. Second quantity is kept to accommodate the historical records.
12	IIT_CHR_ATTRIB30	Second Unit of Measure	30	varchar2		U	Second_Unit_of_Measure			Y	Unit of measurement defined for an activity, for example, meters, square meter. This is separate from Unit of Measure to accommodate historical data.
13	IIT_CHR_ATTRIB57	Accomplishment _Comments	255	varchar2		U	Accomplishment_Comments			Y	Any additional information that is not covered in other fields

14	IIT_NUM_ATTRIB19	Time Work		number		U	Time_Work			Y	Vendor provided total person hours for each activity completed
15	IIT_CHR_ATTRIB31	Completed (Yes/No)		varchar2		U	Completed_(Yes/No)		Y	Y	Status of an activity

The asset will have the following roles

Role	**Mode**
HIG_USER	NORMAL

The asset will have the following groupings:

Parent	**Mandatory**	**Relation**	**Start Date**	**End Date**
RSD	N	AT	Same as RSD	

4.1.3 Asset for the Routine Services Data – Defects

This Child asset will hold the information for the defects data.

The asset will have the following settings:

Setting	Value	Notes
Type	RSDE	
Type Title	RSD Defects	
Type Location	Point	Location Information is Stored on the RSD asset.
Elec Drain Carr	C	
Category	I	
Short Description	RSDE	
Start Date	01JAN1901	
Replaceable	No	
Multiple Allowed	No	
Top in Hierarchy	No	

The asset will have the following attributes:

Sequence	Name	Screen Text	Length	Format	Domain	Case	View Attr / Column Name	Start Date	Mandatory	Displayed	Notes
1	IIT_CHR_ATTRIB26	Vendor Code	4	VARCHAR2			Vendor_Code		Y	Y	Unique identifier representing the Service Provider.
2	IIT_NUM_ATTRIB25	Reference ID	8	number		U	Reference_ID		Y	Y	The maintenance activities comprising of routine or reactive services. The activities are allocated activity code.
3	IIT_CHR_ATTRIB27	Defect Number	12	varchar2		U	Defect_Number		Y	Y	This is the identifying number of the defect visible to the user.
4	IIT_NUM_ATTRIB24	Defect ID		number		U	Defect_ID		Y	Y	Unique number for all Service provider for recording the defects reported.
5	IIT_DATE_ATTRIB86	Date Raised	11	date		U	Date_Raised		Y	Y	Date a defect was raised. Date Format - **dd/mm/yyyy**

6	IIT_DATE_ATTRIB87	Time Raised	5	date		U	Time_Raised		Y	Y	Time a defect was raised. Time Format - **13:00 hrs**
7	IIT_CHR_ATTRIB28	Cause Of Defect	30	varchar2		U	Cause_Of_Defect		Y	Y	The reason for the damage.
8	IIT_CHR_ATTRIB29	Reoccurring Defect (Yes/No)		varchar2		U	Reoccurring_Defect		Y	Y	This is to identify find out the root cause of the problem.
9	IIT_CHR_ATTRIB30	Defect Type	50	varchar2		U	Defect_Type		Y	Y	Define categories of defects with allocated number to each defect type
10	IIT_NUM_ATTRIB16	Position within Location		number		U	Position_within_Location			Y	Shows the lane affected by Incident, Defect or Accomplishment.
11	IIT_DATE_ATTRIB88	Defect Completion Date	11	date		U	Defect_Completion_Date			Y	Date when a defect was fixed. Format Mask: DD-MON-YYYY
12	IIT_DATE_ATTRIB89	Defect Completion Time	5	date		U	Defect_Completion_Time			Y	Time when a defect was fixed. Format Mask: HH24:MI
13	IIT_NUM_ATTRIB16	Estimated Quantity for repair		number		U	Estimated_Quantity_for_repair			Y	Estimated extent of work to be performed to complete the repair. This is defined in terms of the unit of measurements

											defined for the activity in question.
14	IIT_CHR_ATTRIB31	Unit of Measure	30	varchar2		U	Unit_of_Measure			Y	Unit of measurement defined for an activity, for example, meters, square meter. This will be populated for accomplishment and defects.
15	IIT_NUM_ATTRIB16	Estimated Second Quantity		Number		U	Estimated_Second_Quantity			Y	Different documents have defined the quantity in a different way. For example, the quantity could be in terms of length, area or volume. Second quantity is kept to accommodate the different specifications. This field is to cater for historical data on estimation.

16	IIT_CHR_ATTRIB32	Second Unit of Measure	30	varchar2			Second_Unit_of_Measure				Unit of measurement defined for an activity, for example, meters, square meter. This is separate from Unit of Measure to accommodate historical data.
17	IIT_CHR_ATTRIB56	Defect_Comments	255	varchar2			Defect_Comments				Additional information that is not covered in other fields.

The asset will have the following roles

Role	Mode
HIG_USER	NORMAL

The asset will have the following groupings:

Parent	Mandatory	Relation	Start Date	End Date
RSD	N	AT	Same as RSD	

4.1.4 Asset for the Routine Services Data – Incidents

This Child asset will hold the information for the Incidents data.
The asset will have the following settings:

Setting	Value	Notes
Type	RSIC	
Type Title	RSD Incidents	
Type Location	Point	Location Information is Stored on the RSD asset.
Elec Drain Carr	C	
Category	I	
Short Description	RSIC	
Start Date	01JAN1901	
Replaceable	No	
Multiple Allowed	No	
Top in Hierarchy	No	

The asset will have the following attributes:

Sequence	Name	Screen Text	Length	Format	Domain	Case	View Attr / Column Name	Start Date	Mandatory	Displayed	Notes
1	IIT_CHR_ATTRIB26	Vendor Code	4	VARCHAR2			Vendor_Code		Y	Y	Unique identifier representing the Service Provider.
2	IIT_NUM_ATTRIB25	Reference ID	8	number		U	Reference_ID		Y	Y	The maintenance activities comprising of routine or reactive services. The activities are allocated activity code.
3	IIT_NUM_ATTRIB16	Incident ID	8	number		U	Incident_ID		Y	Y	Unique number for all Service provider for recording the incidents.
4	IIT_CHR_ATTRIB27	Incident Type	30	varchar2		U	Incident_Type			Y	Define categories of incident with allocated number to each incident type

5	IIT_DATE_ATTRIB86	Date Call Received	11	Date		U	Date_Call_Received		Y	Y	Record the date of call received for the incident. Format Mask: DD-MON-YYYY
6	IIT_DATE_ATTRIB87	Time Call Received	5	Date		U	Time_Call_Received		Y	Y	Record the time of call received for the incident. Format Mask: HH24:MI
7	IIT_CHR_ATTRIB66	Incident Description	255	varchar2		U	Incident_Description		Y	Y	Textual description of the incident
8	IIT_CHR_ATTRIB28	Advice Received From	50	varchar2		U	Advice_Received_From			Y	The person who reported the incident.
9	IIT_CHR_ATTRIB29	Condition At Time Of Incident	50	varchar2		U	Condition_At_Time_Of_Incident_			Y	A list of conditions to be established and supplied to the service providers for dropdown list. Please see the maintenance specifications.
10	IIT_CHR_ATTRIB30	Action Required	50	varchar2		U	Action_Required			Y	What is the action required to handle the request.
11	IIT_CHR_ATTRIB31	Damage To Property	30	varchar2		U	Damage_To_Property		Y	Y	Nature and extent of damage to RMS assets
12	IIT_DATE_ATTRIB88	Incident Completion Date	11	date		U	Incident_Completion_Date		Y	Y	The date of fixing the

											incident. Date Format Mask: DD-MON-YYYY
13	IIT_DATE_ATTRIB89	Incident Completion Time	5	date		U	Incident_Completion_Time		Y	Y	Time of fixing the incident. Format Mask: HH24:MI

The asset will have the following roles

Role	Mode
HIG_USER	NORMAL

The asset will have the following groupings:

Parent	Mandatory	Relation	Start Date	End Date
RSD	N	AT	Same as RSD	

4.1.5 Asset for the Routine Services Data – Inspections

This Child asset will hold the information for the Inspections data.
The asset will have the following settings:

Setting	Value	Notes
Type	RSIS	
Type Title	RSD Inspections	
Type Location	point	Location Information is Stored on the RSD asset.
Elec Drain Carr	C	
Category	I	
Short Description	RSIS	
Start Date	01JAN1901	
Replaceable	No	
Multiple Allowed	No	
Top in Hierarchy	No	

The asset will have the following attributes:

Sequence	Name	Screen Text	Length	Format	Domain	Case	View Attr / Column Name	Start Date	Mandatory	Displayed	Notes
1	IIT_CHR_ATTRIB26	Vendor Code	4	VARCHAR2			Vendor_Code		Y	Y	Unique identifier representing the Service Provider.
2	IIT_NUM_ATTRIB25	Reference ID	8	number		U	Reference_ID		Y	Y	The maintenance activities comprising of routine or reactive services. The activities are allocated activity code.
3	IIT_CHR_ATTRIB27	Inspection Number	30	varchar2		U	Inspection_Number		Y	Y	This is the identifying number of the inspection visible to the user.
4	IIT_NUM_ATTRIB16	Inspection ID	8	number		U	Inspection_ID		Y	Y	Unique number for all Service provider for recording the inspections.
5	IIT_CHR_ATTRIB28	Inspection Type	30	varchar2		U	Inspection_Type		Y	Y	Define categories of inspection with allocated number to each inspection type
6	IIT_DATE_ATTRIB86	Target Date	11	Date		U	Target_Date			Y	Planned date for completion. Date Format Mask: DD-

											MON-YYYY
7	IIT_DATE_ATTRIB87	Target Time	5	Date		U	Target_Time			Y	Planned time for completion. Format Mask: HH24:MI
8	IIT_DATE_ATTRIB88	Inspection Completion Date	11	Date		U	Inspection_Completion_Date		Y	Y	Date of completion of the inspection. Format Mask: DD-MON-YYYY
9	IIT_DATE_ATTRIB89	Inspection Completion Time	5	Date		U	Inspection_Completion_Time		Y	Y	Time of completion of the inspection. Format Mask: HH24:MI
10	IIT_CHR_ATTRIB66	Inspection_Comments	255	varchar2		U	Inspection_Comments			Y	Additional information that is not covered in other fields.

The asset will have the following roles

Role	Mode
HIG_USER	NORMAL

The asset will have the following groupings:

Parent	Mandatory	Relation	Start Date	End Date
RSD	N	AT	Same as RSD	

4.1.6 Asset for the Routine Services Data – Requests

This Child asset will hold the information for the requests data.
The asset will have the following settings:

Setting	Value	Notes
Type	RSRE	
Type Title	RSD Requests	
Type Location	Point	Location Information is Stored on the RSD asset.
Elec Drain Carr	C	
Category	I	
Short Description	RSRE	
Start Date	0JAN1901	
Replaceable	No	
Multiple Allowed	No	
Top in Hierarchy	No	

The asset will have the following attributes:

Sequence	Name	Screen Text	Length	Format	Domain	Case	View Attr / Column Name	Start Date	Mandatory	Displayed	Notes
1	IIT_CHR_ATTRIB26	Vendor Code	4	VARCHAR2			Vendor_Code		Y	Y	Unique identifier representing the Service Provider.
2	IIT_NUM_ATTRIB25	Reference ID	8	number		U	Reference_ID		Y	Y	The maintenance activities comprising of routine or reactive services. The activities are allocated activity code.
3	IIT_NUM_ATTRIB16	Request ID	8	number		U	Request_ID		Y	Y	Unique number for all Service provider for recording the requests.
4	IIT_CHR_ATTRIB27	Request Type	30	varchar2		U	Request_Type			Y	Define categories of request with allocated number to each request type
5	IIT_DATE_ATTRIB86	Request Date Received	11	date		U	Request_Date_Received		Y	Y	Record the time of call received for the request. Format Mask: DD-MON-YYYY
6	IIT_DATE_ATTRIB87	Request Time Received	5	date		U	Request_Time_Received		Y	Y	Record the time of call received for the request. Format Mask: HH24:MI
7	IIT_CHR_ATTRIB28	Request Number	30	varchar2		U	Request_Number		Y	Y	This is the identifying number of the request visible to the user.

8	IIT_DATE_ATTRIB88	Request Completion Date	11	date		U	Request_Completion_Date		Y	Y	Actual completion date of the request. Format Mask: DD-MON-YYYY
9	IIT_DATE_ATTRIB89	Request Completion Time	5	date		U	Request_Completion_Time		Y	Y	Actual completion time of the request. Format Mask: HH24:MI
10	IIT_CHR_ATTRIB66	Request_Comments	255	varchar2		U	Request_Comments			Y	Additional information that is not covered in other fields for the request received.

The asset will have the following roles

Role	**Mode**
HIG_USER	NORMAL

The asset will have the following groupings:

Parent	**Mandatory**	**Relation**	**Start Date**	**End Date**
RSD	N	AT	Same as RSD	

4.2 Routine Services Asset GIS Themes

GIS themes need to be created so that RMS can view the Routine Services Data in Bentley Exor Spatial Manager.

4.2.1 Standard Theme

A standard Asset GIS layer will be created by Bentley using the GIS Layer Tool in Exor for the RSD asset.

4.2.2 Custom Themes

Custom Themes will be created by Bentley and shown in Spatial Manager. Custom themes are added and then shown in the "Exor Themes" tree of the Exor Groups Tab in Spatial Manager.

The following GIS Themes will be created for mapping in Spatial Manager for the following reports from the section labeled: Reporting on Routine Services Data

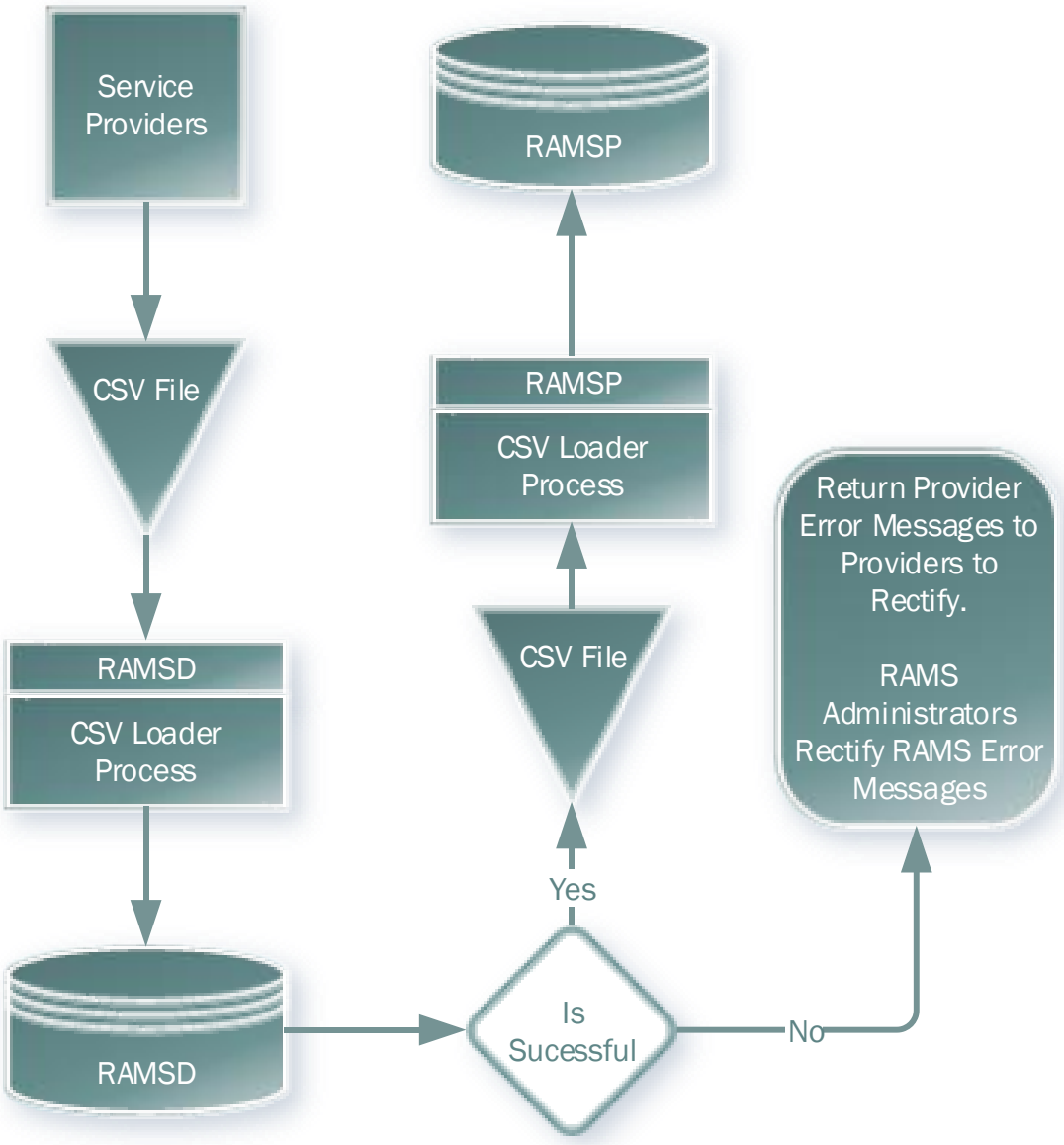
- Outstanding Defects
- Outstanding Requests
- Accomplishments during a Period
- Inspections during a Period
- Vendor Performance During A Selected Period

The filtering methods allowed by Spatial Manager would be used to filter the data.

These themes are Oracle Spatial Layers and can be viewed by other oracle spatial aware programs if RMS finds it necessary. Bentley will not be setting up other spatially aware software.

5.0 Data Loader for Routine Service Data

RMS requires the ability to import 3rd party Routine Services Data into RAMS. This will be accomplished via a CSV loader through RAMS. The CSV Loader feature in RAMS will be created with a customized procedure to accommodate the need of loading this data. Details of the custom procedure are located in the section titled "Procedure." The CSV loader feature in RAMS will show the user which records failed and have a failure message attached. Once the Load is successful into the RAMS Development Database (RAMSD) then the CSV file is processed into RAMS Production Database (RAMSP.) The general data flow would be:



5.1 CSV Loader for Routine Service Data

A CSV loader definition needs to be created in RAMS. This is done through the Destination Tables Form and the Files Destination Form. The settings for these forms and the format of the CSV file are described below.

5.1.1 Input File

The CSV loader uses a text file to input data. This file will be bar/pipe separated "|" and outlined in Appendix A. The file will be used by the CSV loader, parsed into the Destination Table, and processed by the procedure.

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5.1.2 Destination Tables Form

In order to create a custom CSV Loader a new destination table needs to be created and the Destination Tables Form completed out. This form tells the CSV Loader which procedures to run when a destination table is selected in the file definition form.

The Destination table will mirror the CSV loading file as outlined in Appendix A. The following settings will be inputted into the form:

Setting	Value	Notes
Table Name	X_RMS_RSD_CSV_HOLDING	
Abbrev	XRDS	
Insert Procedure	X_RMS_RSD_CSV_PACK.P_INSERT	
Validation Procedure	X_RMS_RSD_CSV_PACK.P_VALIDATE	

5.1.3 File Definition Tables Form

In order to create a custom CSV Loader the Files Destination Form needs to be completed. This form maps the CSV Input file to columns in one or more Destination tables. For the purposes of the Routine Services data only one Destination Table will be used. . The following settings will be inputted into the form:

Setting	Value	Notes
Unique Ref	RSDCSV	
Description	Routine Services Data CSV Loader	
Delimiter	Pipe/Bar |	
Holding Table	Default	

5.1.3.1 File Columns Tab

The file column tab maps the CSV input file via sequence ID to a Column Name to be used as a reference later. This will mirror the CSV loading file as outlined in Appendix A. Only Items in Appendix A marked as required for all will have the Reqd checkmark checked in this form. Appendix A will be used to fill out the values to configure this part of the form.

5.1.3.2 File Destinations Tab

The File Destinations Tab maps the Column Names form the File Columns tab to columns in the Destination Table(s.) In this case there will be one Destination Table: X_RMS_RSD_CSV_HOLDING. The Seq, Destination Column, and Source Column will map the columns form the file columns tab to the destination table. The columns should all have the same name since this is a custom destination table. The Column names are dictated in Appendix A. Appendix A will be used to fill out the values to configure this part of the form.

5.1.4 Procedure

Loading of the Routine Services Data is dictated though custom code that processes the data passed to it from the csv loader. This code needs to process the relevant data for the various RSD Assets and Create or Update entries for those assets as needed. It also needs to be able to reject a line of input if something is missing or incorrect. This package will be named: X_RMS_RSD_CSV_PACK.

The CSV Loader checks to make sure that all the fields marked as required by the service provider (mandatory column in Appendix A) are supplied, if not an error is produced. The errors produced by the CSV loader will be looked at by a RAMS administrator to determine if the error is a message that should be handled by a RAMS administrator or sent to the service provider.

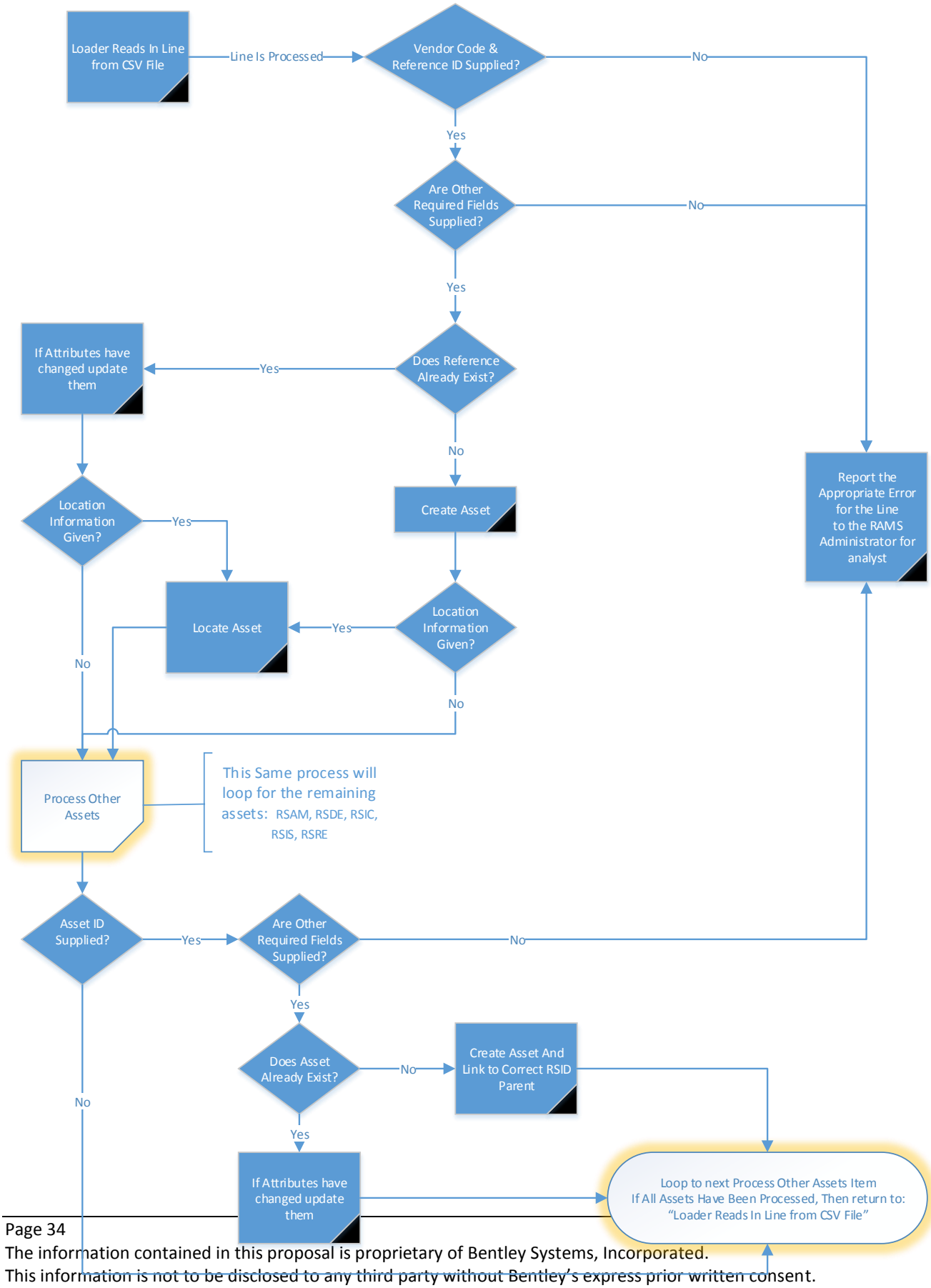
The CSV Loader then passes a line from the holding table that was defined in the File Definitions Table Form to the Procedure. The procedure does the following:

- Takes the Vendor Code and Reference ID and determines if this is a new RSD asset or an existing one.
    - If New then Create the RSD Asset and fill in the suppled attributes.
        - If the provider did not include the Local Government Area, use the Latitude and longitude to determine it and fill it in.
        - Locate the RSD Asset in the same place as the asset described by: Asset type code, road number and the latitude and longitude. If the asset does not exist then produce an error to add the asset to RAMS.
    - If Existing then see if any Values in RSD have changed or have been added.

- If Accomplishment ID is supplied then process accomplishments
    - If it is a new Accomplishment ID then Create the RSAM asset as a Child of the RSD asset associated with the Vendor Code & Reference ID and fill in the suppled attributes.
        - Make sure that Items marked in mandatory column of Appendix A as: “If Recording an Accomplishment” are supplied, otherwise throw an exception.
    - If Existing then see if any Values in RSAM have changed or have been added.

- If Defect ID is supplied then process Defects
    - If it is a new Defect ID then Create the RSDE asset as a Child of the RSD asset associated with the Vendor Code & Reference ID and fill in the suppled attributes.
        - Make sure that Items marked in mandatory column of Appendix A as: “If Recording a Defect” are supplied, otherwise throw an exception.
    - If Existing then see if any Values in RSDE have changed or have been added.
- If Incident ID is supplied then process Incidents
    - If it is a new Incident ID then Create the RSIC asset as a Child of the RSD asset associated with the Vendor Code & Reference ID and fill in the suppled attributes.
        - Make sure that Items marked in mandatory column of Appendix A as: “If Recording an Incident” are supplied, otherwise throw an exception.
    - If Existing then see if any Values in RSIC have changed or have been added.
- If Inspection ID is supplied then process Inspections
    - If it is a new Inspection ID then Create the RSIS asset as a Child of the RSD asset associated with the Vendor Code & Reference ID and fill in the suppled attributes.
        - Make sure that Items marked in mandatory column of Appendix A as: “If Recording an Inspection” are supplied, otherwise throw an exception.
    - If Existing then see if any Values in RSIS have changed or have been added.
- If Request ID is supplied then process Requests
    - If it is a new Request ID then Create the RSRE asset as a Child of the RSD asset associated with the Vendor Code & Reference ID and fill in the suppled attributes.
        - Make sure that Items marked in mandatory column of Appendix A as: “If Recording a Request” are supplied, otherwise throw an exception.
    - If Existing then see if any Values in RSRE have changed or have been added.

The next page shows a simplified flow chart diagram on how the custom CSV Load procedure will process the input file. The diagram represents reading in one line of the data provided by the CSV input file. This is repeated until all the supplied data is processed.



6.0 Reporting on Routine Services Data

The RAMS system needs to have the data in place to be able to produce the following reporting objects. Bentley will create views that can then be added and used by and external reporting tool.

The reports can be spilt into two categories: Management Reports and 3rd party service provider reports.

6.1 Management Reports

The following management level reports have been defined as needed by RMS.

6.1.1 Outstanding Defects

This report uses data from the Defect Asset to determine which defects have not been resolved. If the Defect_Completetion_Date is Null then the defect has not been resolved.

This report needs to link the RSDE asset back to RSD in nm_inv_items. This report will also need to join nm_members and nm_elements to retrieve relevant location information.

Column Name	RAMS Internal Name	Comments
Vendor_Code	IIT_CHR_ATTRIB26	
Reference_id	IIT_NUM_ATTRIB25	
Road_Number	IIT_CHR_ATTRIB56	
Road_Maintenance_Segment	IIT_CHR_ATTRIB28	
Date of creation	IIT_DATE_ATTRIB86	
Longitude	IIT_NUM_ATTRIB17	
Latitude	IIT_NUM_ATTRIB18	
LGA	IIT_CHR_ATTRIB29	
Asset_type_code	IIT_CHR_ATTRIB27	
Key_ID	IIT_NUM_ATTRIB16	
Asset_description	IIT_CHR_ATTRIB58	
Defect_Number	IIT_CHR_ATTRIB27	
Defect_ID	IIT_NUM_ATTRIB24	
Date_Raised	IIT_DATE_ATTRIB86	
Time_Raised	IIT_DATE_ATTRIB87	
Cause_Of_Defect	IIT_CHR_ATTRIB28	
Reoccurring_Defect_(Yes/No)	IIT_CHR_ATTRIB29	
Defect_Type	IIT_CHR_ATTRIB30	
Position_within_Location	IIT_NUM_ATTRIB16	
Defect_Completion_Date	IIT_DATE_ATTRIB88	

Defect_Completion_Time	IIT_DATE_ATTRIB89	
Estimated_Quantity_for_repair	IIT_NUM_ATTRIB16	
Unit_of_Measure	IIT_CHR_ATTRIB31	
Estimated_Second_Quantity	IIT_NUM_ATTRIB16	
Second_Unit_of_Measure	IIT_CHR_ATTRIB32	
Defect_Comments	IIT_CHR_ATTRIB56	
NE_Unique	NE_Unique	Route
Ne_Descr	Ne_descr	Route

6.1.2 Inspections during a Period

This report uses data from the Inspections Asset to determine which defects have not been resolved.

This report needs to link the RSIS asset back to RSD in nm_inv_items. This report will also need to join nm_members and nm_elements to retrieve relevant location information.

Column Name	RAMS Internal Name	Comments
Vendor_Code	IIT_CHR_ATTRIB26	
Reference_id	IIT_NUM_ATTRIB25	
Road_Number	IIT_CHR_ATTRIB56	
Road_Maintenance_Segment	IIT_CHR_ATTRIB28	
Date of creation	IIT_DATE_ATTRIB86	
Longitude	IIT_NUM_ATTRIB17	
Latitude	IIT_NUM_ATTRIB18	
LGA	IIT_CHR_ATTRIB29	
Asset_type_code	IIT_CHR_ATTRIB27	
Key_ID	IIT_NUM_ATTRIB16	
Asset_description	IIT_CHR_ATTRIB58	
Inspection_ID	IIT_NUM_ATTRIB16	
Inspection_Type	IIT_CHR_ATTRIB27	
Inspection_Completion_Date	IIT_DATE_ATTRIB88	
Inspection_Completion_Time	IIT_DATE_ATTRIB89	
Inspection Number	IIT_CHR_ATTRIB28	
Inspection_Comments	IIT_CHR_ATTRIB66	
NE_Unique	NE_Unique	Route
Ne_Descr	Ne_descr	Route

6.1.3 Outstanding Requests

This report uses data from the Requests Asset to determine which defects have not been resolved. If the Request_Completetion_Date is Null then the defect has not been resolved.

This report needs to link the RSRE asset back to RSID in nm_inv_items. This report will also need to join nm_members and nm_elements to retrieve relevant location information.

Column Name	RAMS Internal Name	Comments
Reference_id	IIT_CHR_ATTRIB26	
Road_Number	IIT_CHR_ATTRIB56	
Road_Maintenance_Segment	IIT_CHR_ATTRIB28	
Date of creation	IIT_DATE_ATTRIB86	
Longitude	IIT_NUM_ATTRIB17	
Latitude	IIT_NUM_ATTRIB18	
Suburb	IIT_CHR_ATTRIB29	
Asset_type_code	IIT_CHR_ATTRIB27	
Key_in	IIT_NUM_ATTRIB16	
Asset_description	IIT_CHR_ATTRIB58	
Request_ID	IIT_NUM_ATTRIB16	
Request Type	IIT_CHR_ATTRIB27	
Request Date Received	IIT_DATE_ATTRIB86	
Request Time Received	IIT_DATE_ATTRIB86	
Request Number	IIT_CHR_ATTRIB28	
Request Completion Date	IIT_DATE_ATTRIB88	
Request Completion Time	IIT_DATE_ATTRIB89	
Request_Comments	IIT_CHR_ATTRIB66	
NE_Unique	NE_Unique	Route
Ne_Descr	Ne_descr	Route

6.1.4 Accomplishments during a period

This report uses data from the Routine Services Data Accomplishment section to determine which Accomplishments have been completed during a period. If the Accomplishment_Date is Null then the Accomplishment has not been completed and it should not appear in his report.

This report needs to link the RSAM asset back to RSD in nm_inv_items. This report will also need to join nm_members and nm_elements to retrieve relevant location information.

Column Name	RAMS Internal Name	Comments
Vendor_Code	IIT_CHR_ATTRIB26	
Reference_id	IIT_NUM_ATTRIB25	
Road_Number	IIT_CHR_ATTRIB56	
Road_Maintenance_Segment	IIT_CHR_ATTRIB28	
Date of creation	IIT_DATE_ATTRIB86	
Longitude	IIT_NUM_ATTRIB17	
Latitude	IIT_NUM_ATTRIB18	

LGA	IIT_CHR_ATTRIB29	
Asset_type_code	IIT_CHR_ATTRIB27	
Key_ID	IIT_NUM_ATTRIB16	
Asset_description	IIT_CHR_ATTRIB58	
Defect_Number	IIT_CHR_ATTRIB27	
Defect Type		
Position within Location		
Incident number	IIT_NUM_ATTRIB16	Asset: RSIC
Incident Type		
Incident Description		
Request Id		
Request Type		
Request Comments		
Inspection Id		
Inspection Number		
Inspection Type		
Inspection Comments		
Accomplishment ID	IIT_NUM_ATTRIB24	
Accomplishment Date	IIT_DATE_ATTRIB86	
Activity	IIT_NUM_ATTRIB16	
Activity Name	IIT_CHR_ATTRIB56	
Activity Type	IIT_CHR_ATTRIB28	
Quantity Accomplished	IIT_NUM_ATTRIB17	
Unit Of Measure	IIT_CHR_ATTRIB29	
Second Quantity	IIT_NUM_ATTRIB18	
Second Unit of Measure	IIT_CHR_ATTRIB30	
Accomplishment_Comments	IIT_CHR_ATTRIB57	
Time Work	IIT_NUM_ATTRIB19	
Completed (Yes/No)	IIT_CHR_ATTRIB31	
NE_Unique	NE_Unique	Route
Ne_Descr	Ne_descr	Route

6.2 3rd Party Service Provider Reports

6.2.1 Performance During A Selected Period.

This report uses data from the Routine Services Data Defects section to determine which Defects have been completed during a period. It should be grouped by provider and be able to be filtered by Date_Rasied for a period.

This report needs to link the RSAM asset back to RSD in nm_inv_items.

Column Name	RAMS Internal Name	Comments
Provider		Vendor Code Decoded
Date_range_begins	Min(IIT_DATE_ATTRIB86)	
Date_range_end	Max(IIT_DATE_ATTRIB86)	
Average Days	Avg(Request Completion Date - Request Date Received).	Request Completion Date not null
Defects fixed	Sum(Request Completion Date)	Request Completion Date is not null
Defect Number	IIT_CHR_ATTRIB27	Asset: RSDE
Accomplishment details		
Vendor Code	IIT_CHR_ATTRIB26	Asset: RSD
Reference ID	IIT_NUM_ATTRIB25	Asset: RSD
Date of fix	IIT_DATE_ATTRIB88	Asset: RSDE
Latitude	IIT_NUM_ATTRIB17	Asset: RSD
Longitude	IIT_NUM_ATTRIB18	Asset: RSD
LGA	IIT_CHR_ATTRIB29	Asset: RSD
Asset Type Code	IIT_CHR_ATTRIB27	Asset: RSD
Key_id (Asset Description)	IIT_NUM_ATTRIB16	Asset: RSD
Defects Open	Sum(Request Completion Date)	Request Completion Date is null
Asset_description	IIT_CHR_ATTRIB27	Asset: RSD
Defect_Number	IIT_CHR_ATTRIB27	Asset: RSDE
Defect_ID	IIT_NUM_ATTRIB24	Asset: RSDE
Date_Raised	IIT_DATE_ATTRIB86	Asset: RSDE
Time_Raised	IIT_DATE_ATTRIB87	Asset: RSDE
Cause_Of_Defect	IIT_CHR_ATTRIB28	Asset: RSDE
Reoccurring_Defect_(Yes/No)	IIT_CHR_ATTRIB29	Asset: RSDE
Defect_Type	IIT_CHR_ATTRIB30	Asset: RSDE

7.0 Documentation Requirements

Documentation is required to administer and run the interface. It needs to include detail on the Installation and use of the assets, the CSV Loader, the GIS themes and the reports that have been detailed in this document.

8.0 Assumptions

- The technologies being used will be limited to Exor, Exor Spatial Manager
- Views will be provided to report against. The external reporting method is not in scope of this part of the project.
- RMS will provide access to the technologies needed to implement this design.

9.0 Conclusion

This document is the result of a series of conversations between Bentley Systems and RMS with the objective of creating means to import data, update data and report on data in the RAMS system.

During these discussions Bentley Systems and RMS has established the scope of this project and the requirements that will need to be met in order for the project to be successful.

Using the Functional Specification recorded above Bentley Systems will create a series of items to meet the requirements.

10.0 Appendix A

Column Definition for the CSV Loader file. This will be a pipe/bar (|) delimited file.

The format for the Date fields are: DD/MM/YYYY

- For example: 08/11/2013

- The time fields that immediately follow a Date field are identified as Varchar2 with a Size of 5. The expected format is: hh:mm
  - For example: 13:00

Column ID	Name	Type	Size	Related RSD Asset	Mandatory	Comments
1	Vendor Code	Varchar2	4	RSD	Yes – For ALL	
2	Reference_id	Number	8	RSD	Yes – For ALL	
3	Road_Number	Varchar2	125	RSD	Yes – For ALL	
3	Asset_type_code	Varchar2	5	RSD	Yes – For ALL	
4	Key_ID	Number		RSD		Retrieved from RAMS Using other data if not supplied
5	Asset_description	Varchar2	125	RSD		Retrieved from RAMS Using other data if not supplied
6	Road_Maintenance_Segment	Varchar2	30	RSD	Yes - For All	Retrieved from RAMS Using other data if not supplied
7	Date of creation	Date		RSD	Yes - For All	
8	Time of creation	Varchar2	5	RSD		Omission will assume a default of 00:00h
9	Longitude	Number		RSD	Yes - For All	
10	Latitude	Number		RSD	Yes - For All	
11	LGA	Varchar2	50	RSD		Retrieved from RAMS Using other data if

						not supplied
12	Accomplishment_Number	Varchar2	30	RSAM	If Recording an Accomplishment	
13	Accomplishment_ID	number	8	RSAM	If Recording an Accomplishment	
14	Accomplishment_Date	Date		RSAM	If Recording an Accomplishment	
15	Activity	Number		RSAM	If Recording an Accomplishment	
16	Activity_Name	Varchar2	255	RSAM	If Recording an Accomplishment	
17	Activity_Type	Varchar2	30	RSAM	If Recording an Accomplishment	
18	Quantity_Accomplished	Number		RSAM	If Recording an Accomplishment	
19	Unit_Of_Measure	Varchar2	30	RSAM	If Recording an Accomplishment	
20	Second_Quantity	Number		RSAM		
21	Second_Unit_of_Measure	Varchar2	30	RSAM		
22	Accomplishment_Comments	Varchar2	255	RSAM	If Recording an Accomplishment	
23	Time_Work	Number		RSAM	If Recording an Accomplishment	
24	Completed_(Yes/No)	Varchar2	1	RSAM	If Recording an Accomplishment	Y or N
25	Defect_Number	Varchar2	12	RSDE	If Recording a Defect	
26	Defect_ID	number	8	RSDE	If Recording a Defect	Number or Varchar2
27	Date_Raised	Date		RSDE	If Recording a Defect	
28	Time_Raised	Varchar2	5	RSDE		Omission will assume a default of 00:00h

29	Cause_Of_Defect	Varchar2	30	RSDE	If Recording a Defect	
30	Reoccurring_Defect_(Yes/No)	Varchar2	1	RSDE	If Recording a Defect	Y or N
31	Defect_Type	Varchar2	50	RSDE	If Recording a Defect	
32	Position_within_Location	Number		RSDE	If Recording a Defect	
33	Defect_Completion_Date	Date		RSDE	If Recording a Defect	
34	Defect_Completion_Time	Varchar2	5	RSDE		Omission will assume a default of 00:00h
35	Estimated_Quantity_for_repair	Number		RSDE	If Recording a Defect	
36	Unit_of_Measure	Varchar2	30	RSDE	If Recording a Defect	
37	Estimated_Second_Quantity	Number		RSDE	If Recording a Defect	
38	Second_Unit_of_Measure	Varchar2	30	RSDE	If Recording a Defect	
39	Defect_Comments	Varchar2	255	RSDE	If Recording a Defect	
40	Incident_ID	Number	8	RSIC	If Recording an Incident	
41	Incident_Type	Varchar2	30	RSIC		
42	Date_Call_Received	Date		RSIC	If Recording an Incident	
43	Time_Call_Received	Varchar2	5	RSIC		Omission will assume a default of 00:00h
44	Incident_Description	Varchar2	255	RSIC	If Recording an Incident	
45	Advice_Received_From	Varchar2	50	RSIC		
46	Condition_At_Time_Of_Incident_	Varchar2	50	RSIC		
47	Action_Required	Varchar2	50	RSIC		
48	Damage_To_Property	Varchar2	30	RSIC	If Recording an Incident	
49	Incident_Completion_Date	Date		RSIC	If Recording an Incident	
50	Incident_Completion_Time	Varchar2	5	RSIC	If Recording an Incident	Omission will assume a default of 00:00h
51	Inspection_Number	Varchar2	30	RSIS	If Recording an Inspection	
52	Inspection_ID	Number		RSIS	If Recording an Inspection	
53	Inspection_Type	Varchar2	30	RSIS	If Recording an	

					Inspection	
54	Target_Date	Date		RSIS	If Recording an Inspection	
55	Target_Time	Varchar2	5	RSIS		Omission will assume a default of 00:00h
56	Inspection_Completion_Date	Date		RSIS	If Recording an Inspection	
57	Inspection_Completion_Time	Varchar2	5	RSIS		Omission will assume a default of 00:00h
58	Inspection_Comments	Varchar2	255	RSIS	If Recording an Inspection	
59	Request_ID	Number	8	RSRE	If Recording a Request	
60	Request_Type	Varchar2	30	RSRE		
61	Request_Date_Received	Date		RSRE	If Recording a Request	
62	Request_Time_Received	Varchar2	5	RSRE	If Recording a Request	Omission will assume a default of 00:00h
63	Request_Number	Varchar2	30	RSRE	If Recording a Request	
64	Request_Completion_Date	Date		RSRE	If Recording a Request	
65	Request_Completion_Time	Varchar2	5	RSRE	If Recording a Request	Omission will assume a default of 00:00h
66	Request_Comments	Varchar2	255	RSRE	If Recording a Request	