REVIT RTC TECHNOLOGY CONFERENCE AUSTRALASIA 2012

BIM its more about information and people than 3D modelling

Justin Morris

Ardent Architects

Introduction

- **This is session is about ideas, it is not instructional**
- **Who am I**
- **What's the IM in BIM**
- **What's in it for me (you)**
- **What are we going to cover**
  - Resources : Who you need
  - What you need to know (ie, some geeky technical stuff)
  - How do you implement it
  - How do you manage it
  - How do you maintain it
- **Some other interesting stuff**

Whats wrong with this picture

- Minimal implementation of Revit (that guy in the corner has a copy)
- We only use revit on Wednesdays
- We only use revit on jobs larger than $500k and less than $5m
- Oh if you need it quickly we'll have to do it in Autocad
- Can you back save it as we are still using Revit 2010
- Outsourcing of Revit modelling
- Revit "experts" (just because you can model……)
- Lack of advanced training

BIM Culture

(it's not a new flavour of yoghurt)

- Needs to be lead from the top
- The top needs to know what they're talking about
- The team needs a vision as to the destination
- The team needs involvement
- Getting a trainer in for 3 days is not "job done"
- On-going dissemination of learning and knowledge
- Tiers of skill in the office should be minimised over time
- BIM is like hunting
- Learning new skills is not beneath management

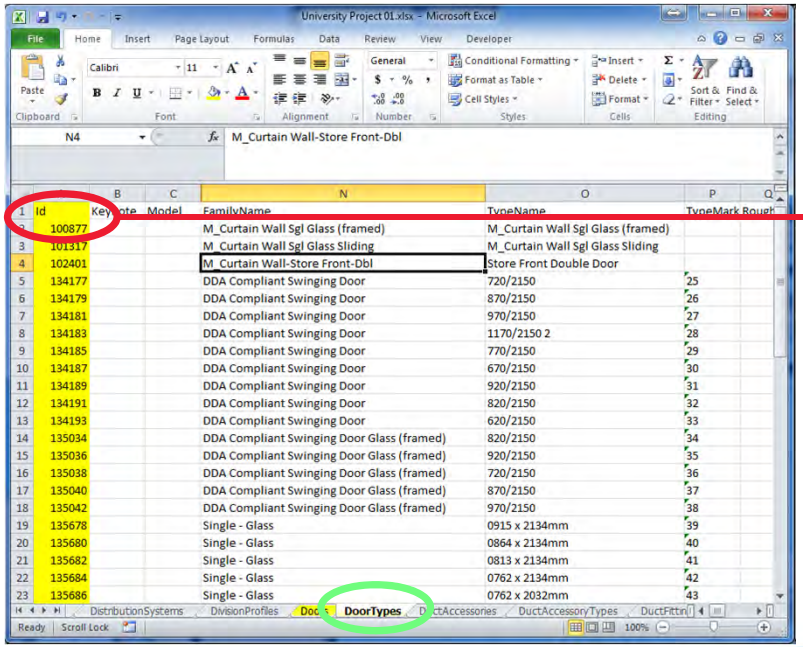
Information

- Is power
- Is data
- Can be:
  - contained in models
  - Linked to models
  - referenced by models
  - a database
  - a spread sheet
  - a text file

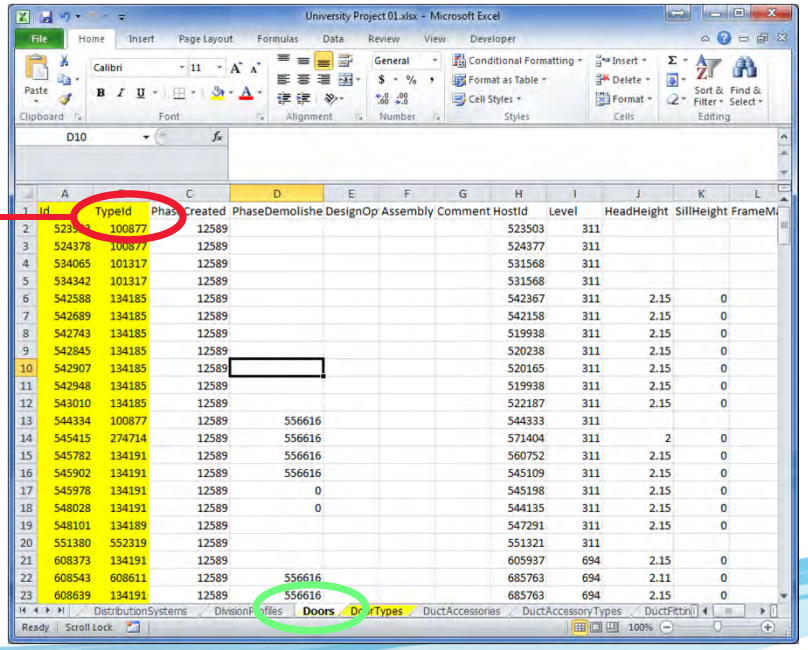
What does information look like?

- **In excel it is a spread sheet with element and type tabs**
- **Windows 64bit & Excel 2010**

Keys / Types

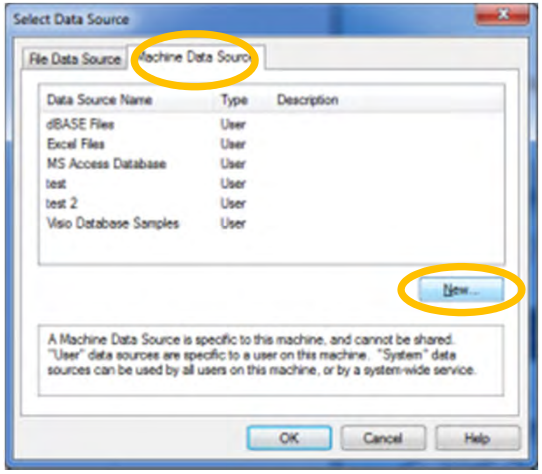


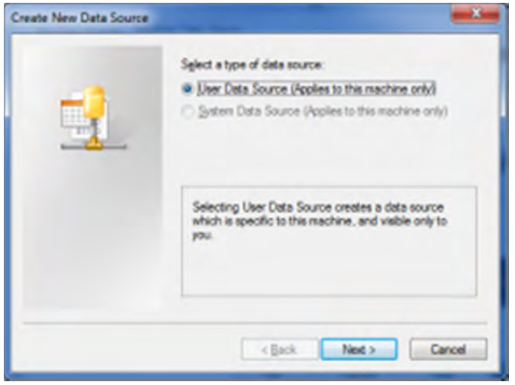
Tables / Instances

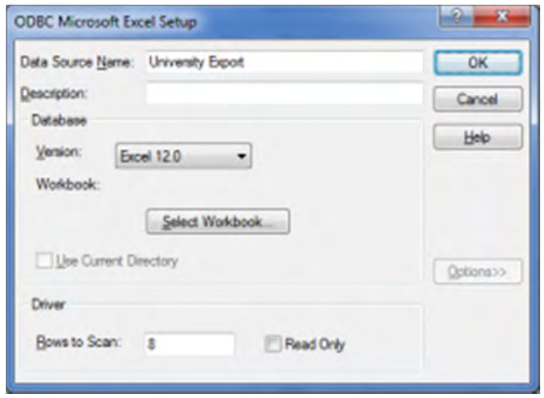


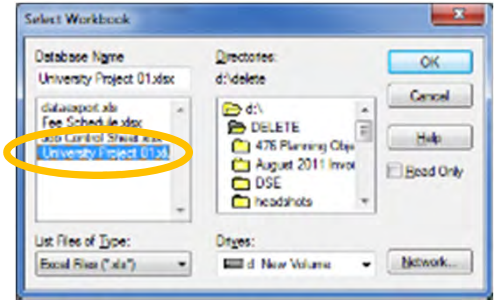
How to we get it out? (Excel)

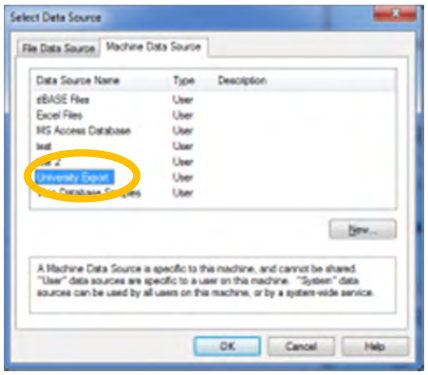
- Start by creating an existing blank excel document
- Don’t use “File Data Source”
- **ODBC** Open Database Connectivity, is the type of file exported
- **DSN** Data Source Name, is the connector created between Revit and the Data Source











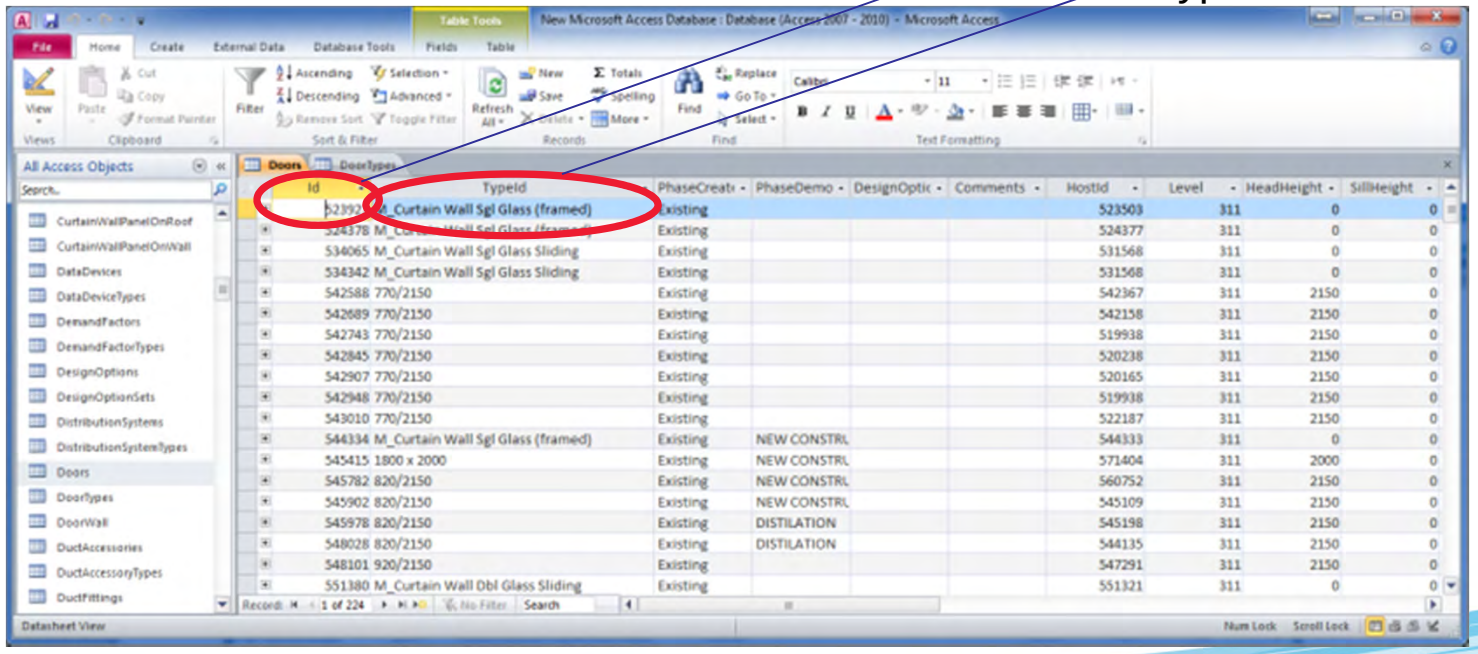
Keep a blank copy of the excel file to paste over the top before each export

What does information look like?

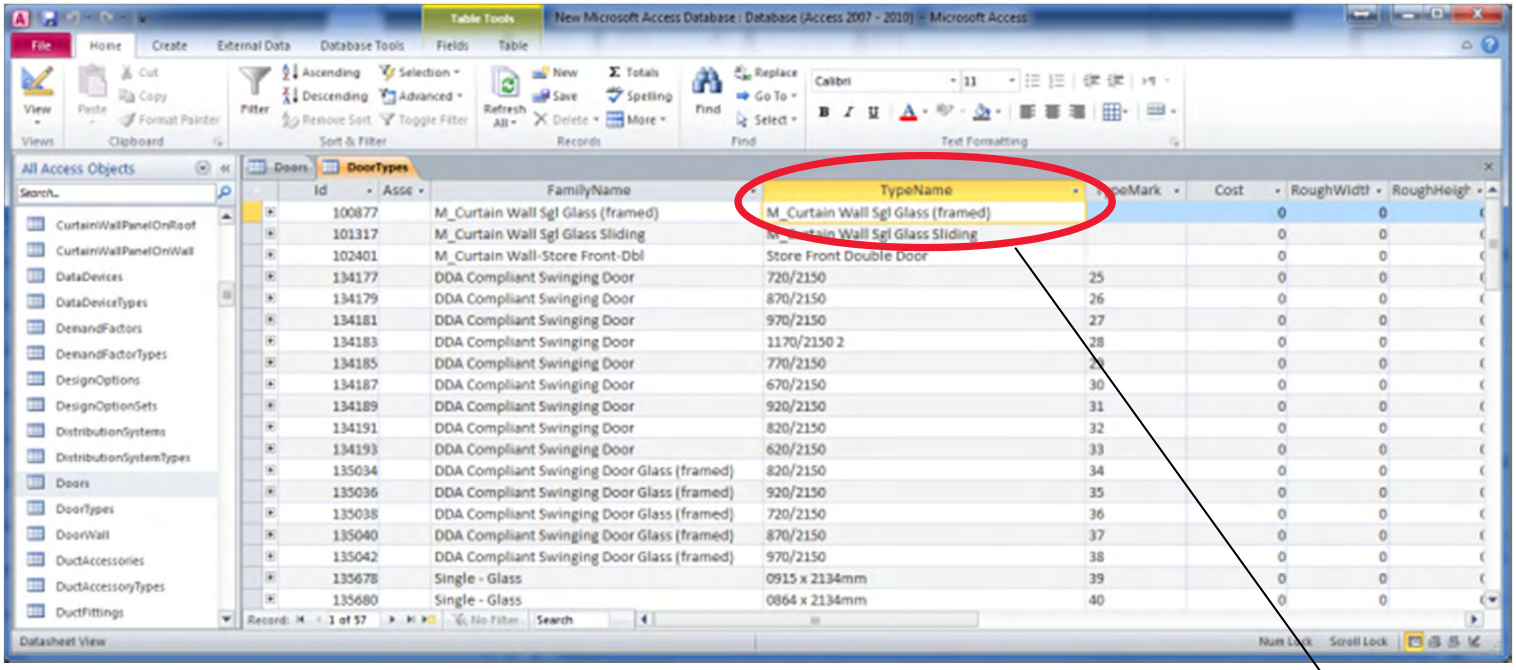
- In access it is a database with keys and tables
- Keys store common information
- Tables store instance information

Unique identifier

Type identifier



The door table showing all the doors in the project



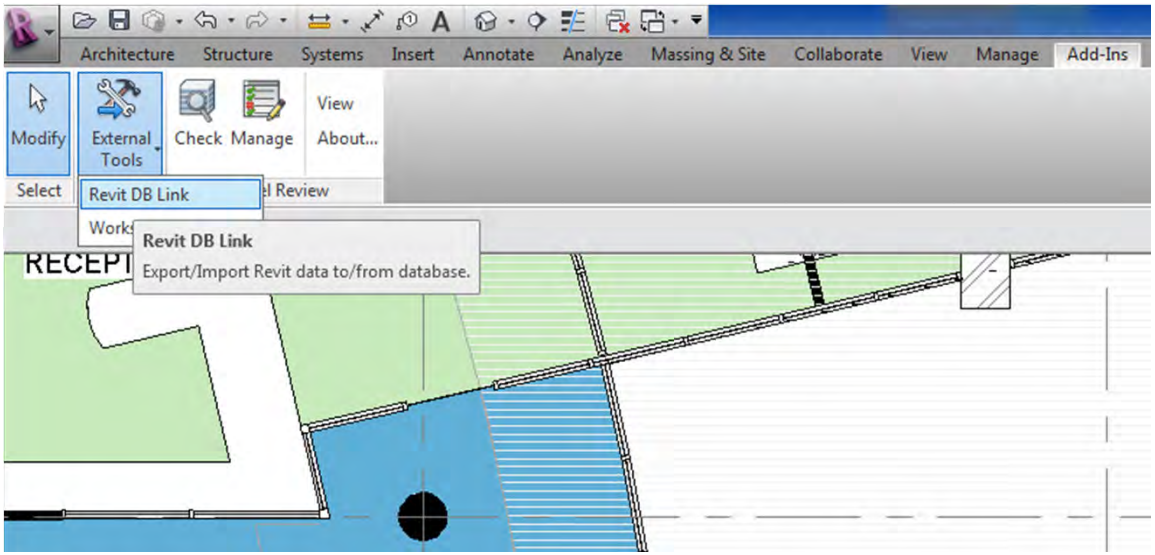
The door key showing all the types in the project

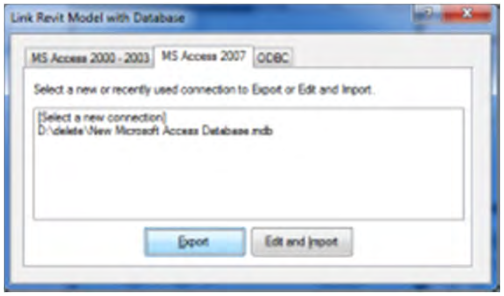
The Key Value is the TypeName field

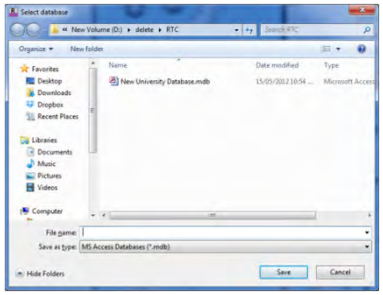
Key value (type)

How to we get it out? (Access)

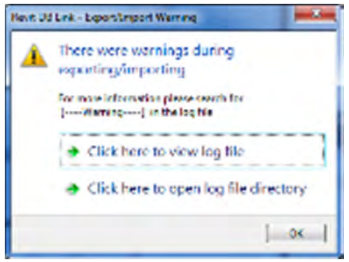
- **Download the Revit DB Link add-in**



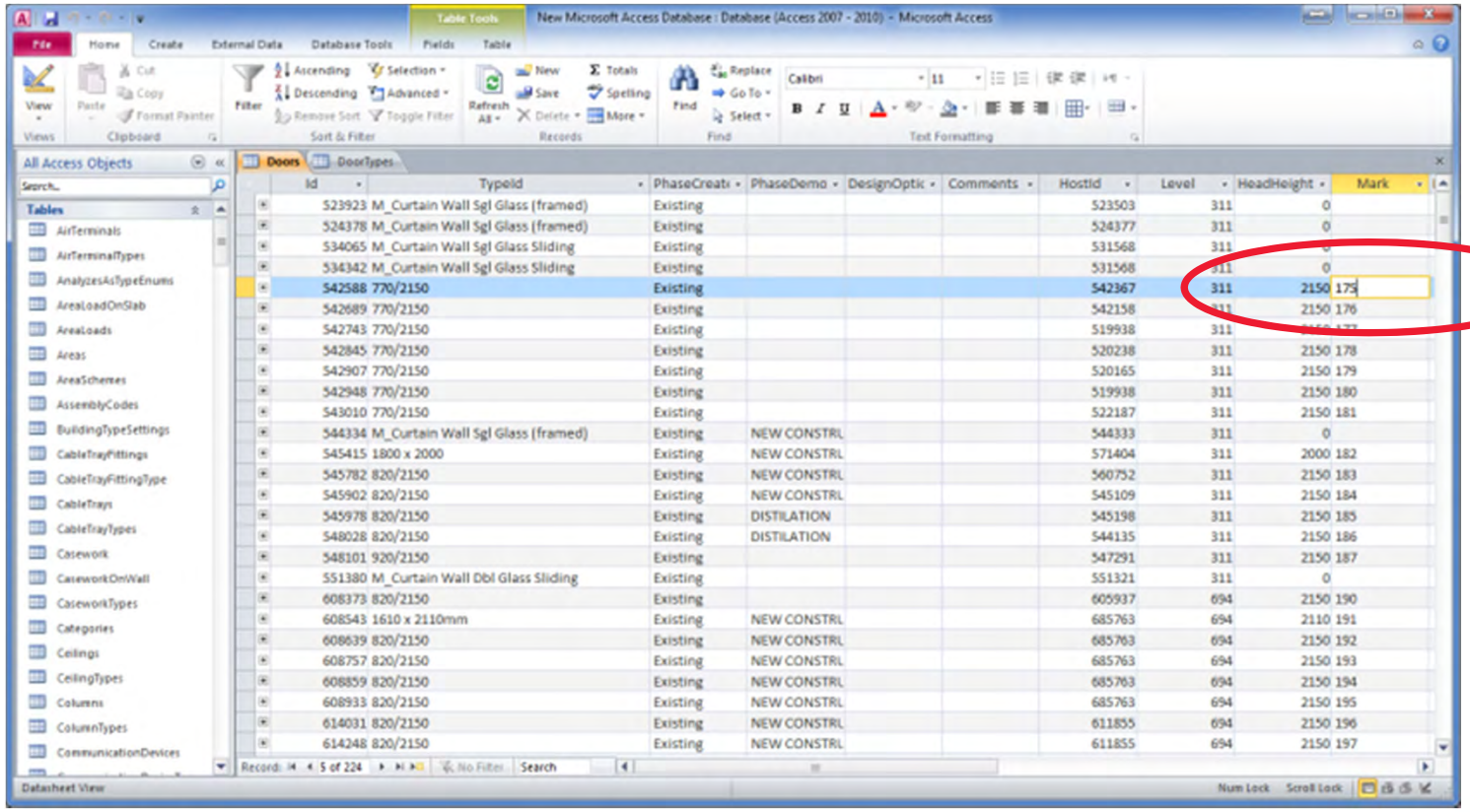

Link Revit Model with Database
MS Access 2000 - 2003
MS Access 2007
ODBC
Select a new or recently used connection to Export or Edit and Import.
[Select a new connection]
D:\delete\New Microsoft Access Database.mdb
Export
Edit and Import


Select database
New University Database.mdb
Save
Cancel

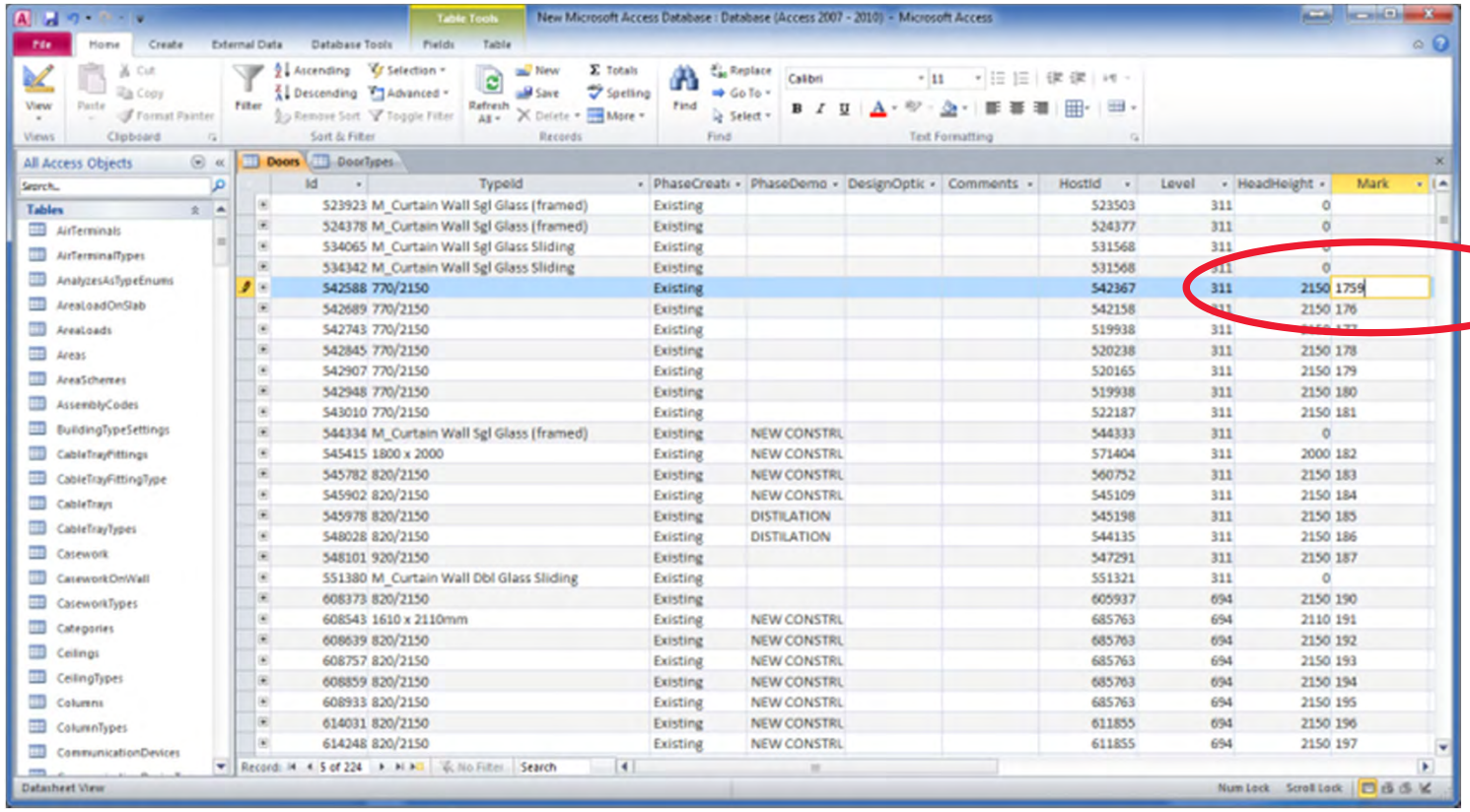
INTERVIEW 2
CORRIDOR
WC


There were warnings during
exporting/importing
Click here to view log file
Click here to open log file directory
OK

Done



You can then edit information in the database



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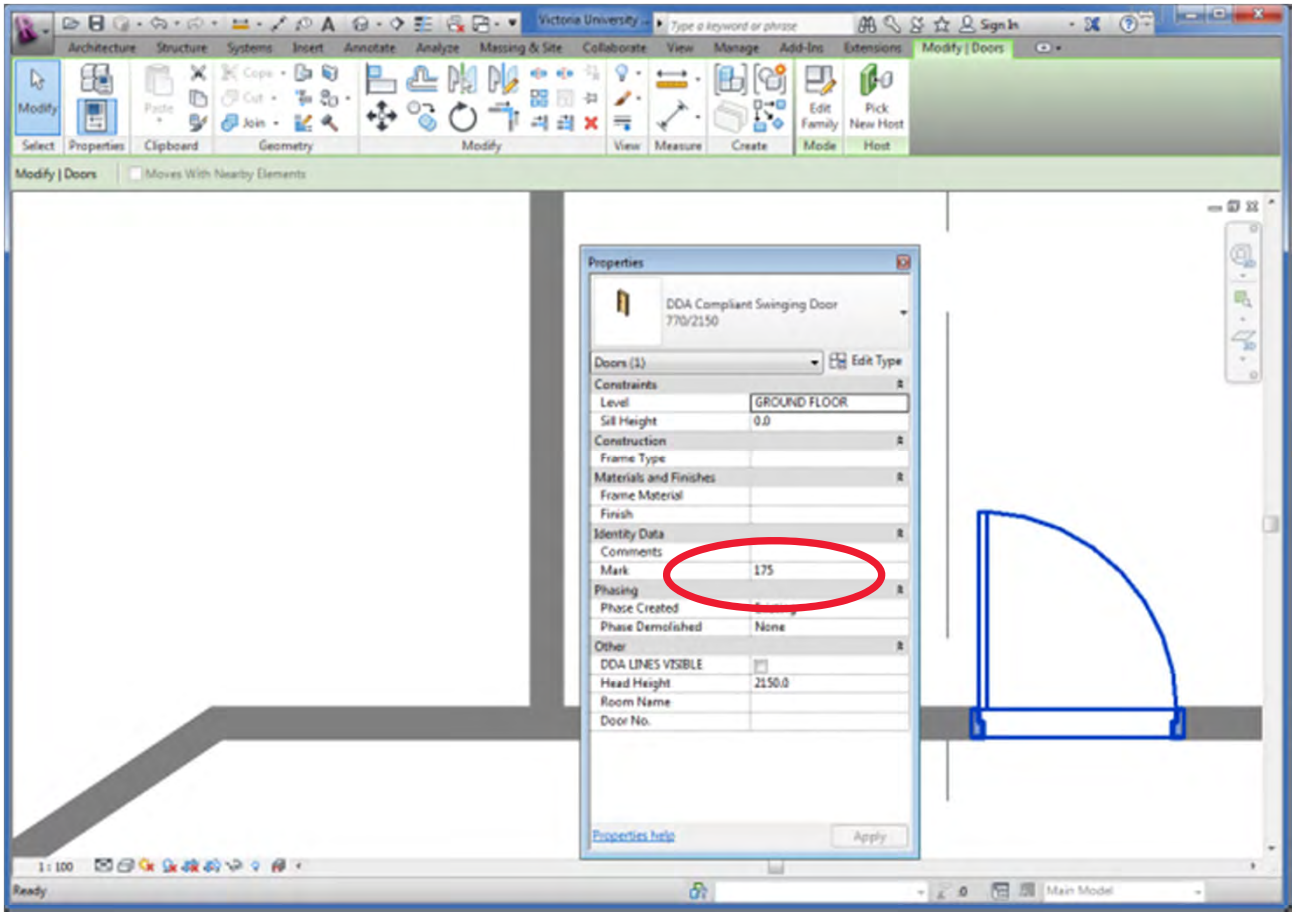
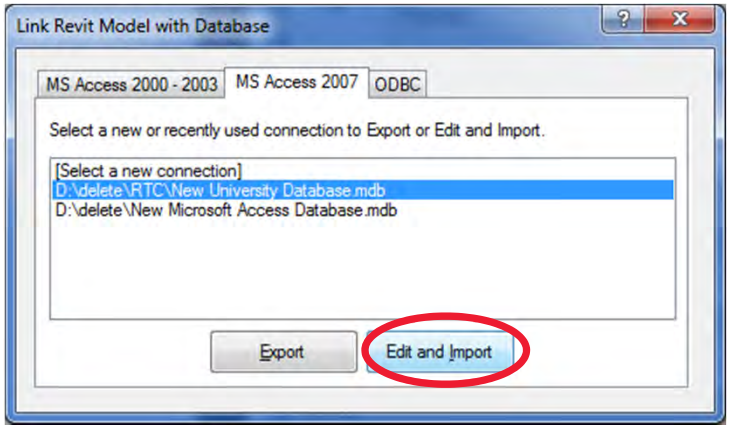
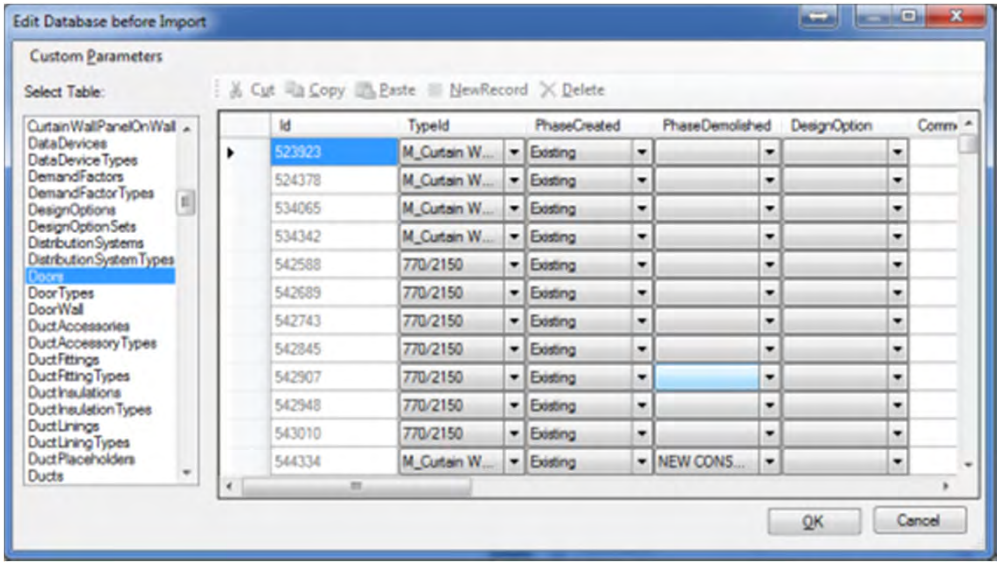
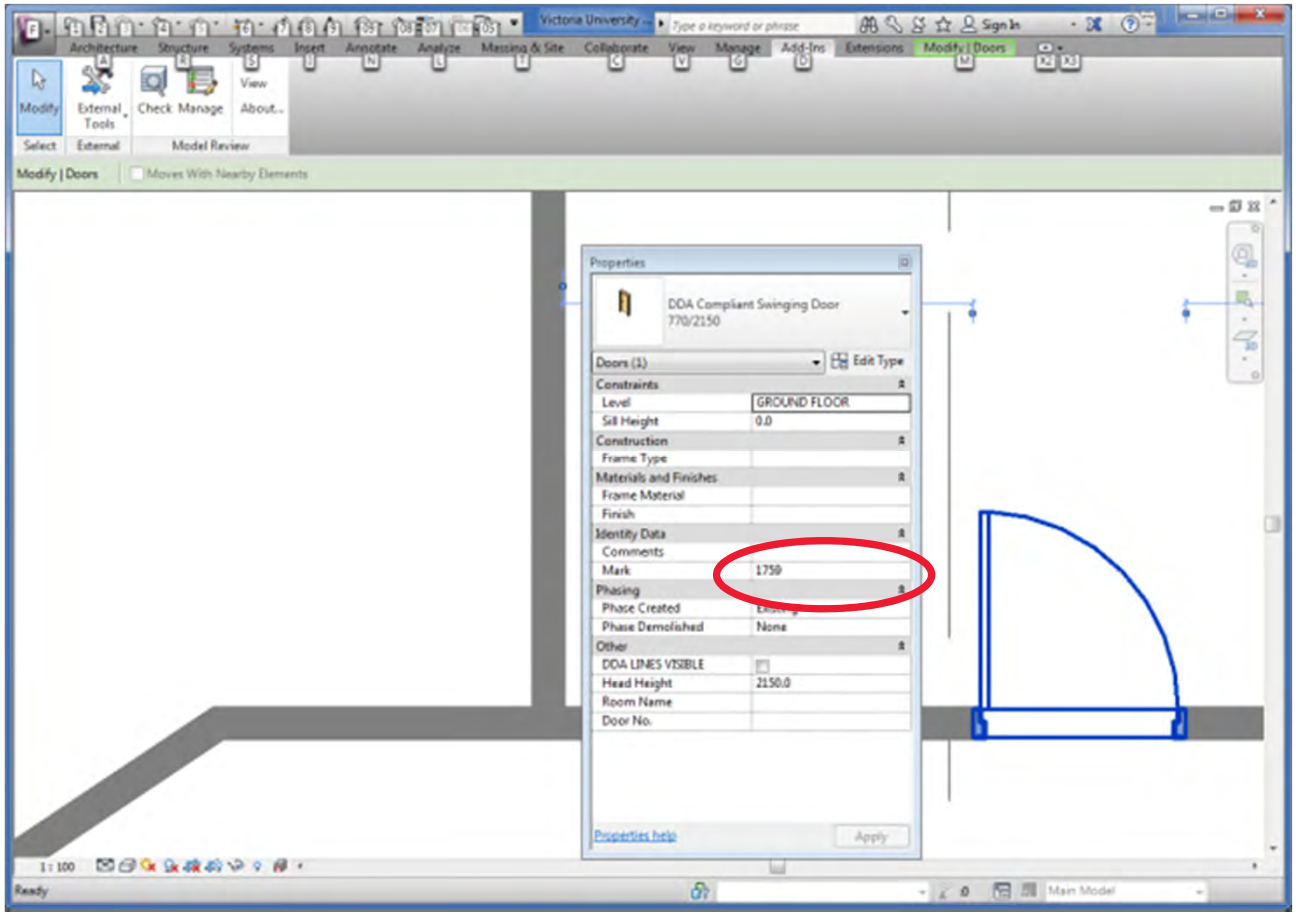


Note the existing door mark





You can alter information before it is imported as well



The doors properties are changed

Hints

Excel

- Only put relevant data in the models or schedules
- Don't save DSN files to the network
- Keep a blank copy of the spread sheet
- Do any workings on newly created tabs
- Don't use the Revit DB Link with Excel

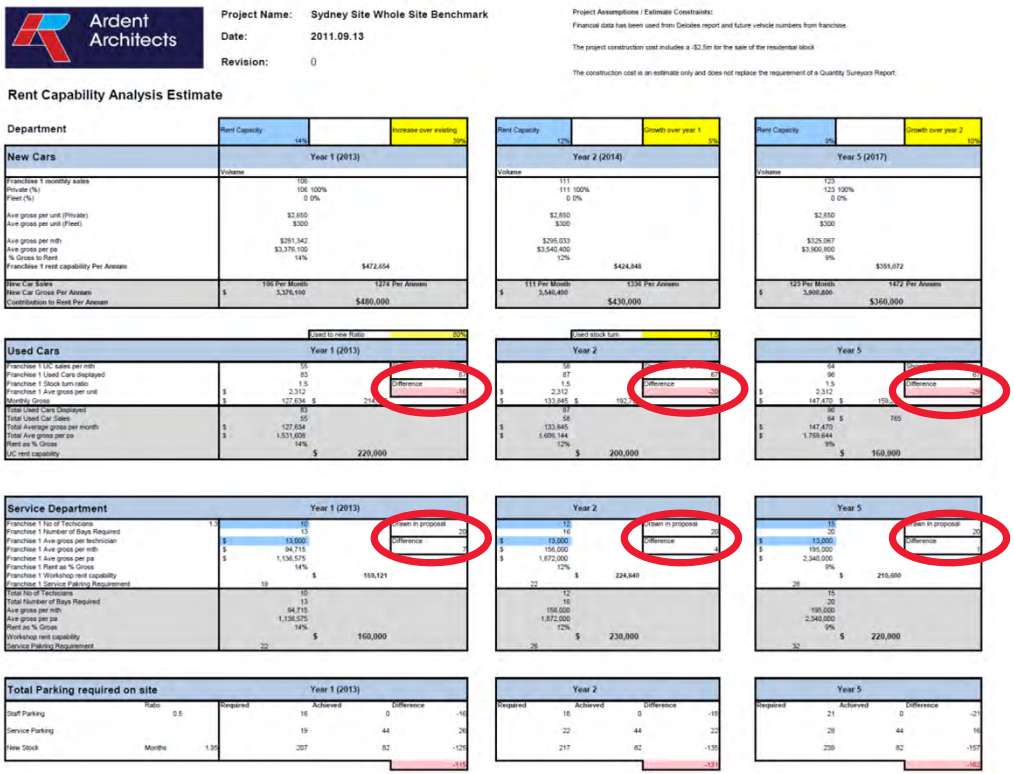
Access

- Only put relevant data in the models or schedules
- Learn how to write reports
- Learn how to write an interface (forms)
- Research other reporting tools (crystal)
- Save and close the database before importing it

Great but what do we do with it now?

- Feasibility Studies
- Project costings
- Renumbering of elements
- Project Scoping
- Asset Management
  - Track delivery and installation of furniture and joinery
  - Track equipment and appliances
- Facilities Management
  - How much carpet & when was it installed on each level in each building
- Furniture, Joinery ordering – costing
- Distillation
  - Report on number of existing people and where they are
  - Report per stage of refurbishment of each floor where people are
  - Provide rental areas per department
  - Measure m² per person

Prove it: Rent Capability



Ardent Architects

Project Name: Sydney Site Whole Site Benchmark
Date: 2011.09.13
Revision: 0

Project Assumptions / Estimate Constraints:
Financial data has been used from Deloites report and future vehicle numbers from franchise.
The project construction cost includes a -$2.5m for the sale of the residential block
The construction cost is an estimate only and does not replace the requirement of a Quantity Sureyors Report.

Rent Capability Analysis Estimate

Department

New Cars	Year 1 (2013)	Year 2 (2014)	Year 5 (2017)
Volume	106	111	123
Private (%)	106 100%	111 100%	123 100%
Fleet (%)	0 0%	0 0%	0 0%
Ave gross per unit (Private)	$2,650	$2,650	$2,650
Ave gross per unit (Fleet)	$300	$300	$300
Ave gross per mth	$281,342	$295,033	$325,067
Ave gross per pa	$3,376,100	$3,540,400	$3,900,800
% Gross to Rent	14%	12%	9%
Franchise 1 rent capability Per Annum	$472,654	$424,848	$351,072
New Car Sales	106 Per Month 1274 Per Annum	111 Per Month 1336 Per Annum	123 Per Month 1472 Per Annum
New Car Gross Per Annum	$ 3,376,100	$ 3,540,400	$ 3,900,800
Contribution to Rent Per Annum	$480,000	$430,000	$360,000

Used Cars	Year 1 (2013)	Year 2	Year 5
Used to new Ratio	80%	Used stock turn	1.5
Franchise 1 UC sales per mth	55	58	64
Franchise 1 Used Cars displayed	83	87	96
Franchise 1 Stock turn ratio	1.5	1.5	1.5
Franchise 1 Ave gross per unit	$ 2,312	$ 2,312	$ 2,312
Monthly Gross	$ 127,634	$ 133,845	$ 147,470
Total Used Cars Displayed	83	87	96
Total Used Car Sales	55	58	64
Total Average gross per month	$ 127,634	$ 133,845	$ 147,470
Total Ave gross per pa	$ 1,531,608	$ 1,606,144	$ 1,769,644
Rent as % Gross	14%	12%	9%
UC rent capability	$ 220,000	$ 200,000	$ 160,000

Difference

Counts used cars drawn in project

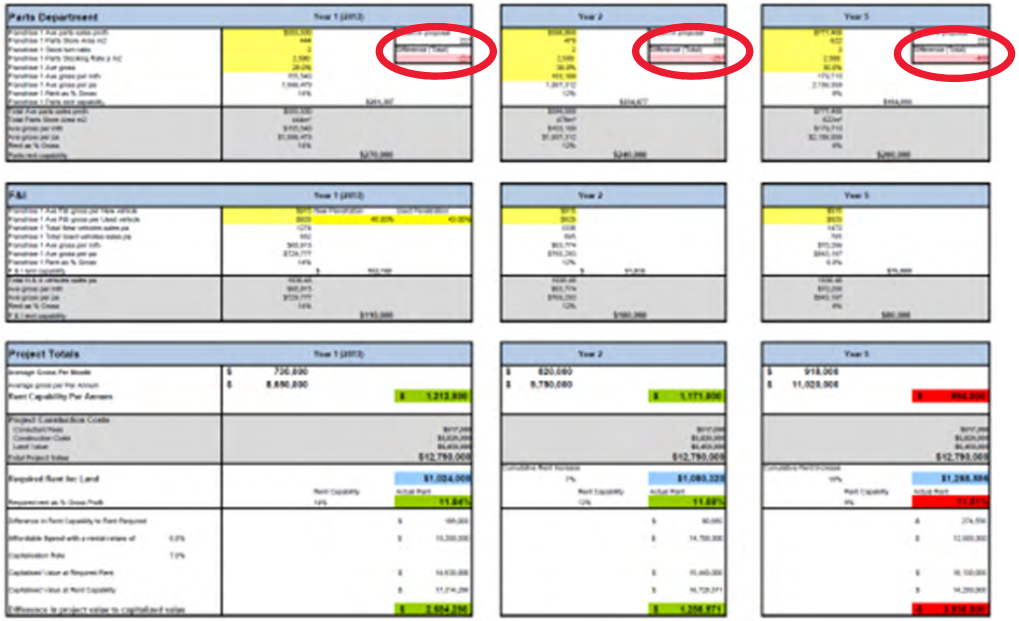
Service Department	Year 1 (2013)	Year 2	Year 5
Franchise 1 No of Technicians	10	12	15
Franchise 1 Number of Bays Required	13	16	20
Franchise 1 Ave gross per technician	$ 13,000	$ 13,000	$ 13,000
Franchise 1 Ave gross per mth	$ 94,715	$ 156,000	$ 195,000
Franchise 1 Ave gross per pa	$ 1,136,575	$ 1,872,000	$ 2,340,000
Franchise 1 Rent as % Gross	14%	12%	9%
Franchise 1 Workshop rent capability	$ 159,121	$ 224,640	$ 210,600
Franchise 1 Service Parking Requirement	19	22	28
Total No of Technicians	10	12	15
Total Number of Bays Required	13	16	20
Ave gross per mth	94,715	156,000	195,000
Ave gross per pa	1,136,575	1,872,000	2,340,000
Rent as % Gross	14%	12%	9%
Workshop rent capability	$ 160,000	$ 230,000	$ 220,000
Service Parking Requirement	22	26	32

Drawn in proposal

Difference

Counts service hoists drawn in project

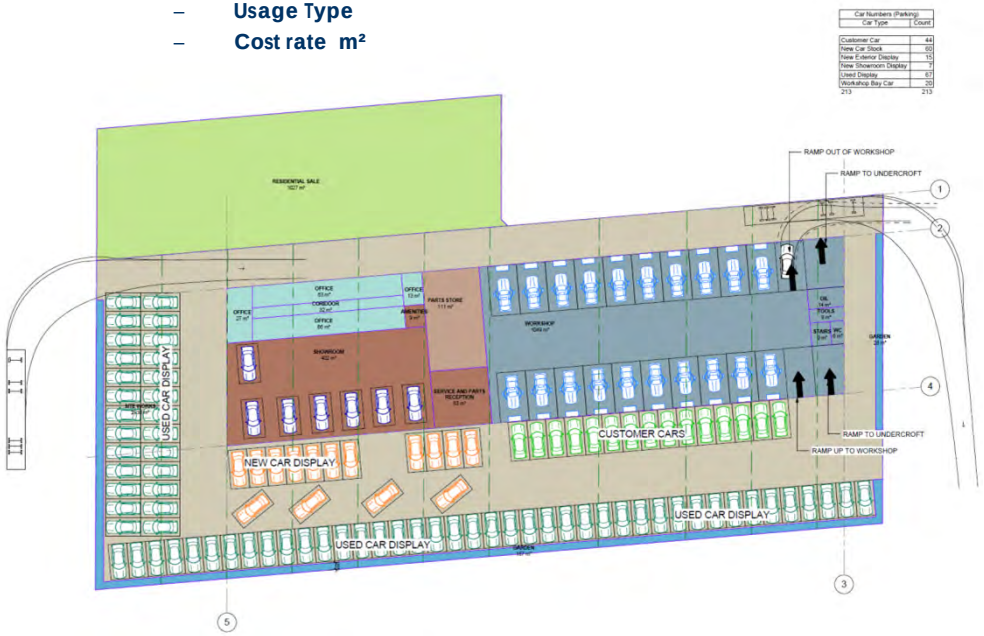
Total Parking required on site	Ratio	Year 1 (2013) Required	Achieved	Difference	Year 2 Required	Achieved	Difference	Year 5 Required	Achieved	Difference
Staff Parking	0.5	16	0	-16	16	0	-16	21	0	-21
Service Parking		19	44	26	22	44	22	28	44	16
New Stock	Months 1.95	207	82	-125	217	82	-135	239	82	-157
				-115			-113			-162

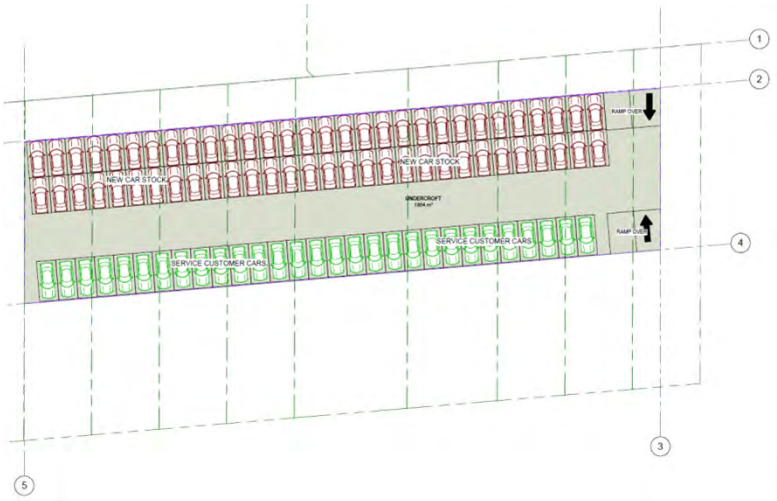


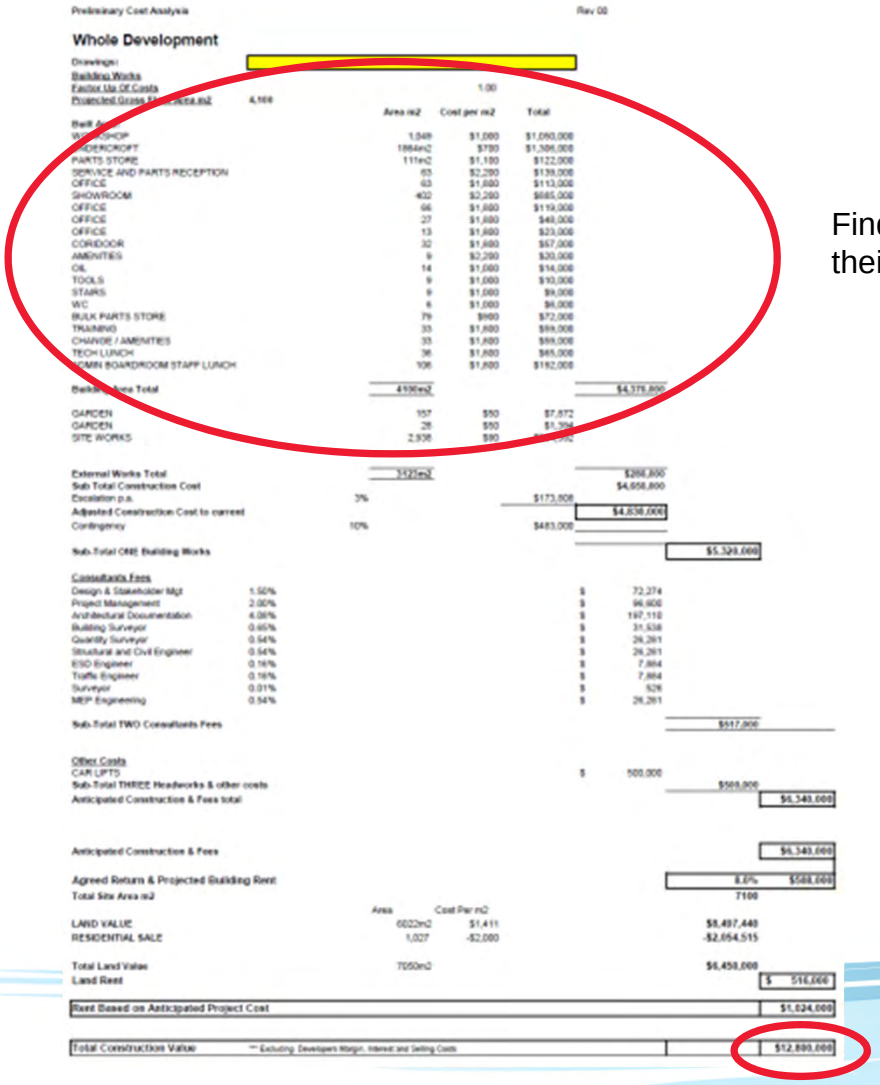
Finds the parts store room and takes its area m²

Prove it: Cost Plan A

- A master plan with areas
- The areas have parameters
  - Name
  - Area
  - Usage Type
  - Cost rate m²







Preliminary Cost Analysis — Rev 00

Whole Development

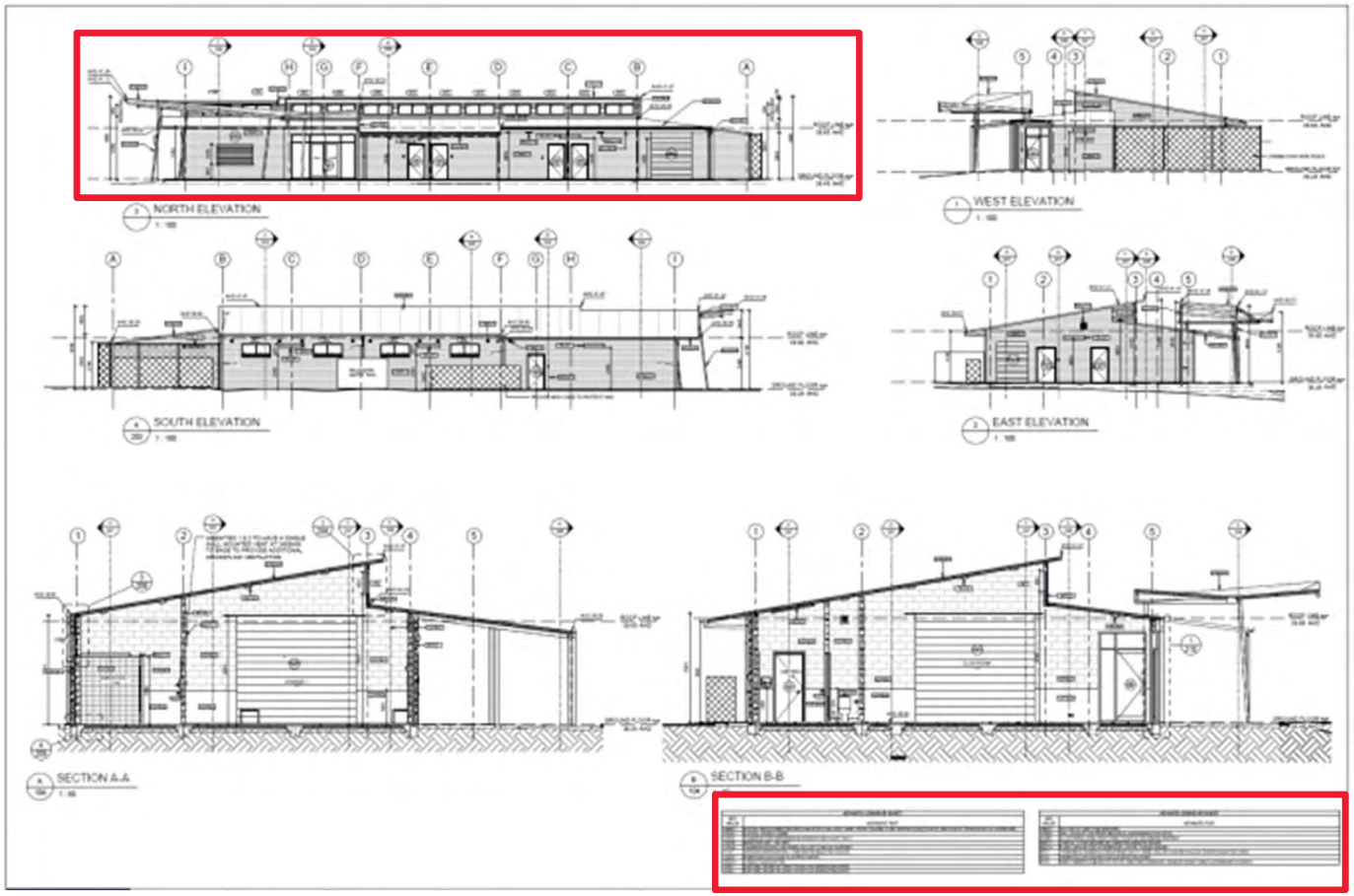
		Area m2	Cost per m2	Total
Drawings:				
Building Works			1.00	
Factor Up Of Costs				
Projected Gross Floor Area m2	4,100			
Built Area				
WORKSHOP		1,049	$1,000	$1,050,000
REDECROFT		1864m2	$700	$1,305,000
PARTS STORE		111m2	$1,100	$122,000
SERVICE AND PARTS RECEPTION		63	$2,200	$139,000
OFFICE		63	$1,800	$113,000
SHOWROOM		402	$2,200	$885,000
OFFICE		66	$1,800	$119,000
OFFICE		27	$1,800	$48,000
OFFICE		13	$1,800	$23,000
CORIDOOR		32	$1,800	$57,000
AMENITIES		9	$2,200	$20,000
OIL		14	$1,000	$14,000
TOOLS		9	$1,000	$10,000
STAIRS		9	$1,000	$9,000
WC		6	$1,000	$6,000
BULK PARTS STORE		79	$900	$72,000
TRAINING		33	$1,800	$59,000
CHANGE / AMENITIES		33	$1,800	$59,000
TECH LUNCH		36	$1,800	$65,000
COMIN BOARDROOM STAFF LUNCH		106	$1,800	$192,000
Building Area Total		4190m2		$4,375,000
GARDEN		157	$50	$7,872
GARDEN		28	$50	$1,394
SITE WORKS		2,936	$90	$264,242
External Works Total		3121m2		$268,000
Sub Total Construction Cost				$4,658,000
Escalation p.a.	3%		$173,808	
Adjusted Construction Cost to current				$4,830,000
Contingency	10%		$483,000	
Sub-Total ONE Building Works				$5,320,000
Consultants Fees				
Design & Stakeholder Mgt	1.50%			$ 72,274
Project Management	2.00%			$ 96,600
Architectural Documentation	4.08%			$ 197,110
Building Surveyor	0.65%			$ 31,538
Quantity Surveyor	0.54%			$ 26,291
Structural and Civil Engineer	0.54%			$ 26,291
ESD Engineer	0.16%			$ 7,884
Traffic Engineer	0.16%			$ 7,884
Surveyor	0.01%			$ 526
MEP Engineering	0.54%			$ 26,291
Sub-Total TWO Consultants Fees				$517,000
Other Costs				
CAR LIFTS				$ 500,000
Sub-Total THREE Headworks & other costs				$500,000
Anticipated Construction & Fees total				$6,340,000
Anticipated Construction & Fees				$6,340,000
Agreed Return & Projected Building Rent				8.0% $508,000
Total Site Area m2				7100
		Area	Cost Per m2	
LAND VALUE		6022m2	$1,411	$8,497,440
RESIDENTIAL SALE		1,027	-$2,000	-$2,054,515
Total Land Value		7050m2		$6,450,000
Land Rent				$ 516,000
Rent Based on Anticipated Project Cost				$1,024,000
Total Construction Value		** Excluding: Developers Margin, Interest and Selling Costs		$12,800,000

Finds all the areas in the project and takes their names, areas and cost rates from Revit

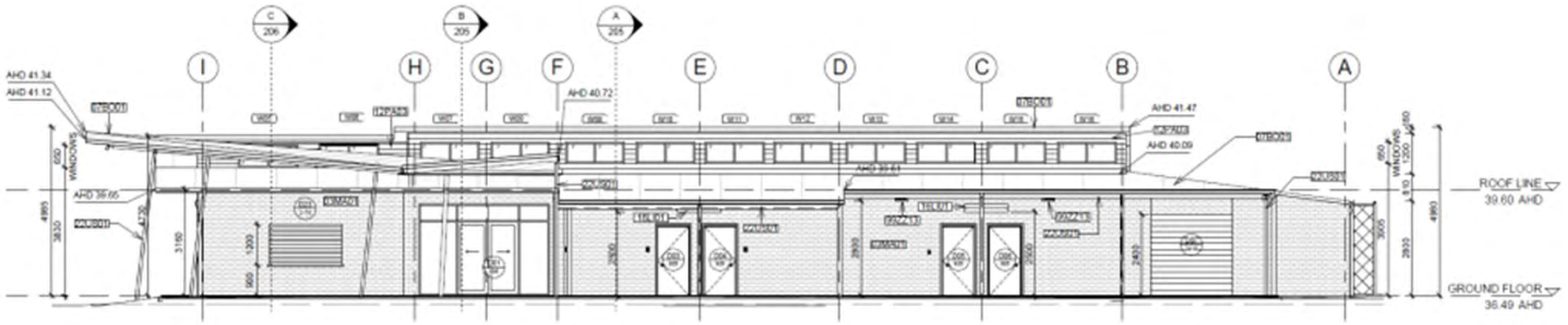
And used them estimate a project cost

Something Simple: Keynotes

- Thoroughly underutilised
- Commonly misused
- Cleaner drawings
- Usually managed with the text file
- Can be opened in Excel
- TXT file is formatted as a CSV file Comma Separated Values
- Can be prealocated and managed easily
- Prealocate paint1, paint2, carpet1, carpet2
- Allows for completion of documentation without all decisions made

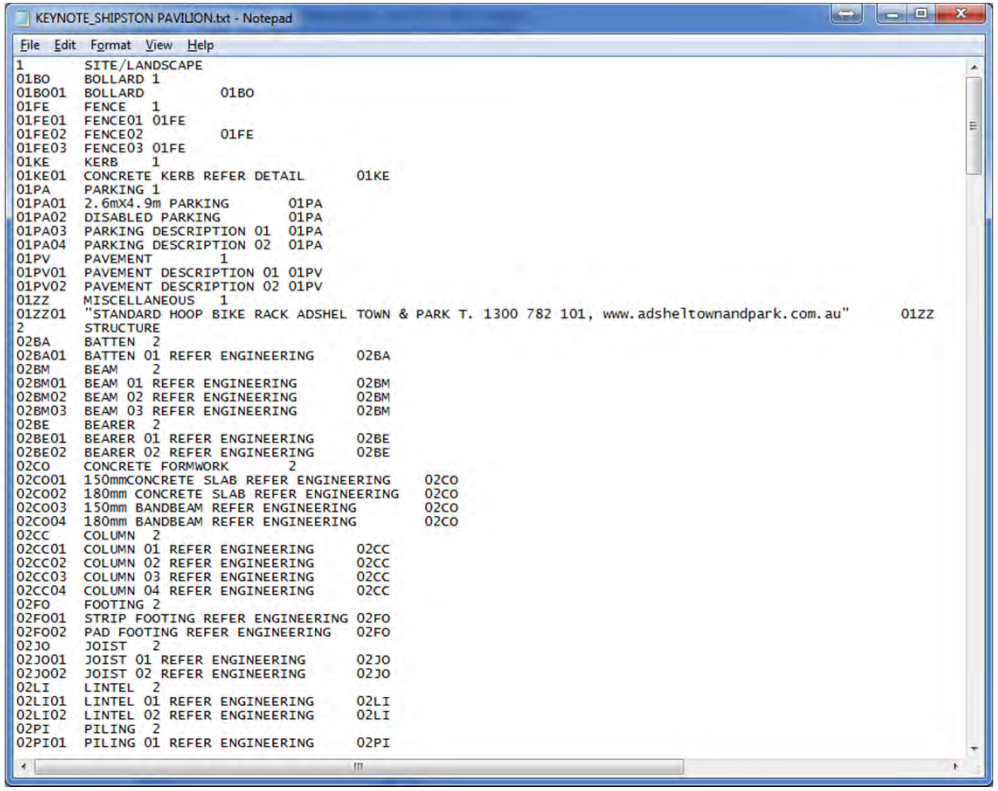


Keynotes by sheet

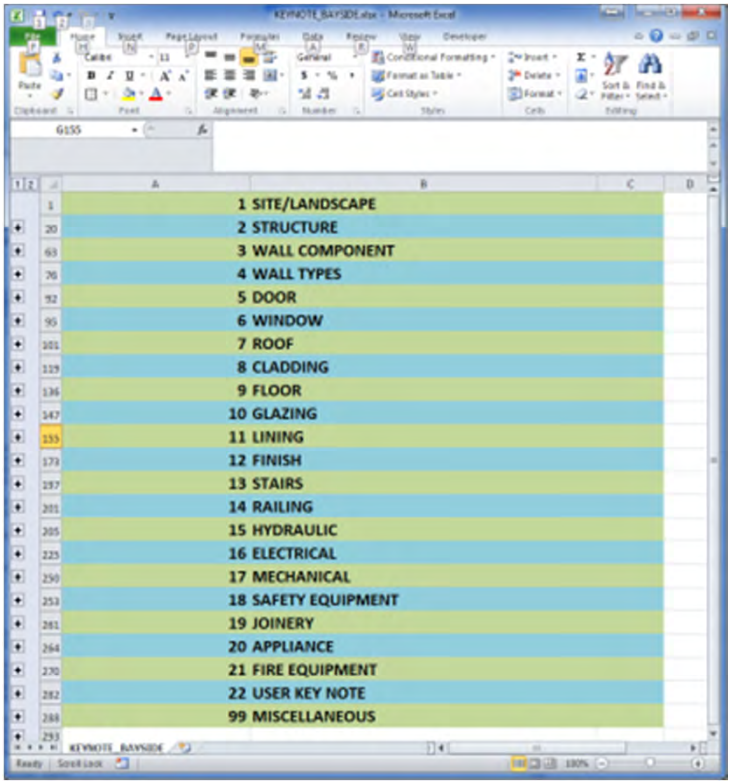


KEYNOTE LEGEND BY SHEET	
KEY VALUE	KEYNOTE TEXT
03MAD1	AUSTRAL BRICK HOMESTEAD RED GUM WITH FLUSH JOINT. DAMP PROOF COURSE TO BE 100% RECYCLED PLASTIC, SEE PLASTIC TECHNOLOGY PH: 03 9546 2655
07BD01	AUSTRAL UNIDECK 100MM
12PA01	TAUBMANS PURE PERFORMANCE INTERIOR 'FAIRY DUST' T08 3-1
12PA02	SIKAFLOOR 264T - RAL 9001
12PA03	TAUBMANS ENDURA LOW SHEEN COLOUR TO MATCH 'SURFMIST'
12TI01	JOHNSON WARINGAR WALL TILES 200X100 SELECTED COLOUR
12ZZ01	ARMSTRONG ACCOLADE PLUS 'SPICY WHITE'
15GU01	LYSAGHT QUAD GUTTER
16LI01	ZUMTOBEL SCUBA PM 1/28W T16 ENG V2A SURFACE MOUNTED
16LI02	ZUMTOBEL SCUBA PM 2/28W T16 ENG V2A SURFACE MOUNTED

Typically managed by a TXT file

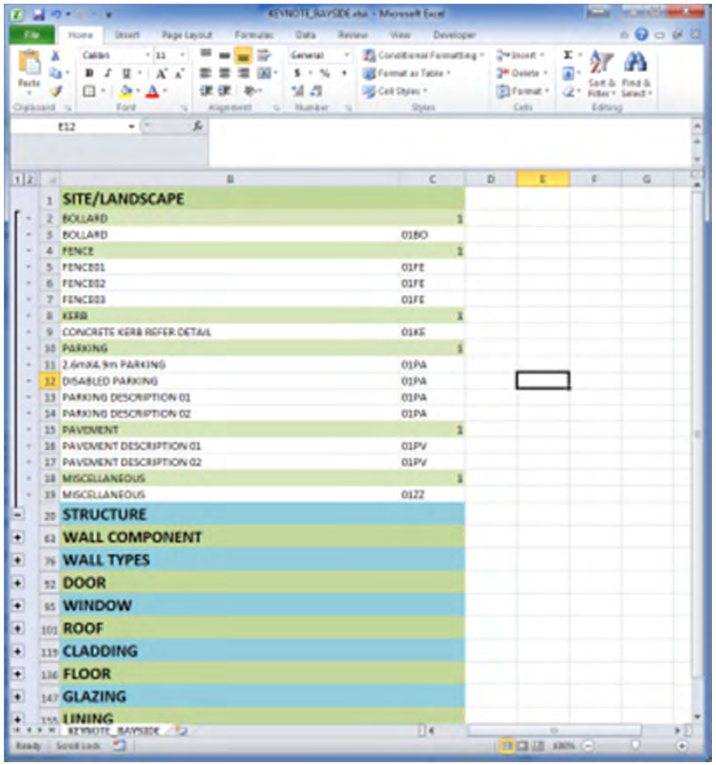


But easier in excel

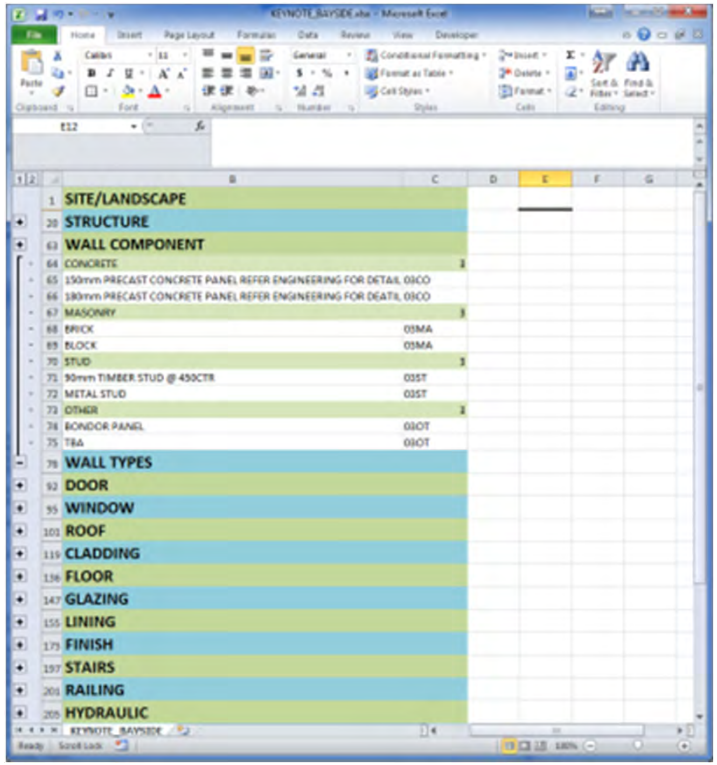


1	SITE/LANDSCAPE
20	STRUCTURE
63	WALL COMPONENT
76	WALL TYPES
92	DOOR
95	WINDOW
101	ROOF
119	CLADDING
136	FLOOR
147	GLAZING
155	LINING
173	FINISH
197	STAIRS
201	RAILING
205	HYDRAULIC
225	ELECTRICAL
250	MECHANICAL
253	SAFETY EQUIPMENT
261	JOINERY
264	APPLIANCE
270	FIRE EQUIPMENT
282	USER KEY NOTE
288	MISCELLANEOUS

Easily navigated and pre-allocated



1	SITE/LANDSCAPE	
2	BOLLARD	1
3	BOLLARD	01BO
4	FENCE	1
5	FENCE01	01FE
6	FENCE02	01FE
7	FENCE03	01FE
8	KERB	1
9	CONCRETE KERB REFER DETAIL	01KE
10	PARKING	1
11	2.6mX4.9m PARKING	01PA
12	DISABLED PARKING	01PA
13	PARKING DESCRIPTION 01	01PA
14	PARKING DESCRIPTION 02	01PA
15	PAVEMENT	1
16	PAVEMENT DESCRIPTION 01	01PV
17	PAVEMENT DESCRIPTION 02	01PV
18	MISCELLANEOUS	1
19	MISCELLANEOUS	01ZZ
20	STRUCTURE	
63	WALL COMPONENT	
76	WALL TYPES	
92	DOOR	
95	WINDOW	
101	ROOF	
119	CLADDING	
136	FLOOR	
147	GLAZING	
155	LINING	



1	SITE/LANDSCAPE	
20	STRUCTURE	
63	WALL COMPONENT	
64	CONCRETE	1
65	150mm PRECAST CONCRETE PANEL REFER ENGINEERING FOR DETAIL	03CO
66	180mm PRECAST CONCRETE PANEL REFER ENGINEERING FOR DEATIL	03CO
67	MASONRY	1
68	BRICK	03MA
69	BLOCK	03MA
70	STUD	1
71	90mm TIMBER STUD @ 450CTR	03ST
72	METAL STUD	03ST
73	OTHER	1
74	BONDOR PANEL	03OT
75	T&A	03OT
76	WALL TYPES	
92	DOOR	
95	WINDOW	
101	ROOF	
119	CLADDING	
136	FLOOR	
147	GLAZING	
155	LINING	
173	FINISH	
197	STAIRS	
201	RAILING	
205	HYDRAULIC	

The API

- Isn’t a thing of myth or to be afraid of
- Doesn’t only have to be used in large offices
- Can do amazing things
- Can reduce mundane and monotonous tasks

The API: What can it do for us?

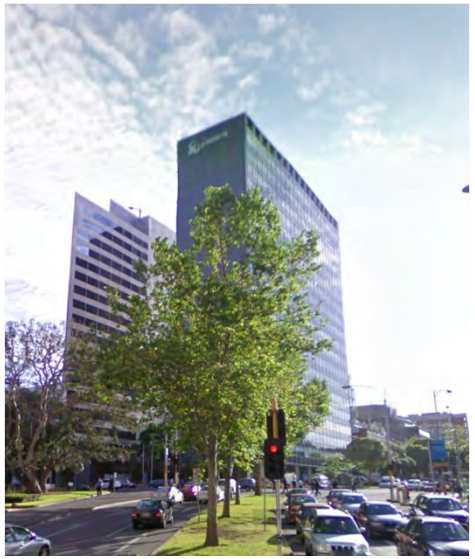
- Furniture and joinery checking and budget
- Area or room costings on the fly
- Project feasibilities live
- Corporate identity costings
- Check different categories against each other
  - No. beds against oxygen outlets, car parks, toilets
  - No. units/bedrooms against parking requirements
- Alter family properties
- HTML reporting

The API: But who and how?

- Programing is not that difficult to learn
- Have two people learn it so that they can work through issues together
- Join the Autodesk Developers Network
- If your not in it for the long term hire a contract programmer with experience in the Api
- Agree a fixed price with the programmer, with payment on completion
- Beware of using an external developer

Case Study: Orica Headquarters Melbourne

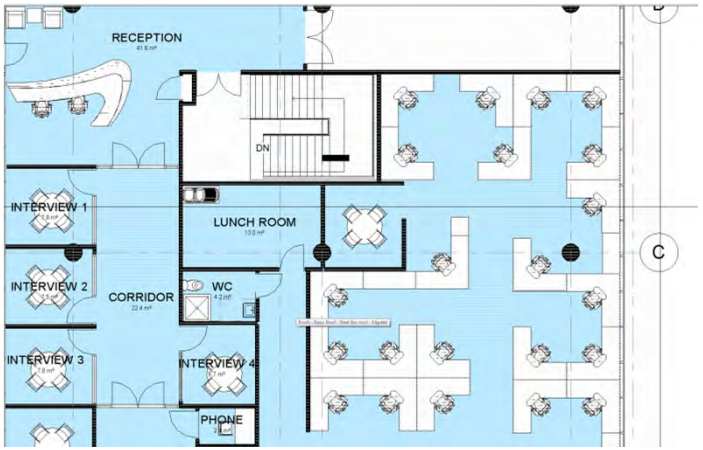
- 10 floors to be refurbished
- Rental of another 2 stories to distil management into
- 4 stages of distillation



Case Study: Orica Headquarters Melbourne

Plan

- Building modelled in Revit
- Each distillation stage given a phase
- Staff put into revit as objects (but not objectified)
- All workstations given numbers
- All staff with staff numbers at desks



Case Study: Orica Headquarters Melbourne

Deliverables

- Staged plans for each floor with all staff shown and scheduled
- Excel reports showing all floors and stages
  - Client could assess seating arrangements
  - Client could make decisions on seating numbers
  - Client could clearly see clashes in seating numbers
- Plans for the removalists and deliveries
- Plans for data and telco contractors for phone numbers
- Furniture and joinery report for ordering and audit
- Department area plans and reports for rent apportioning
- Full reporting out of Access with customised reports

Culture Change: Management

- You don’t need to know how fillet a fish to run a restaurant
- Don’t let BIM be your emperors new clothes
- The days of not having to learn anything more now that you’re the man; are over
- Yes it will be hard to start with, and then it will get harder

Culture Change: The Whole Team

- Staff need to know what is expected
- Staff need to be supported
- Training is ongoing
- Failure is not an option
- 2D date of expiration

Culture Change: Training

- In house training is great team building
- Having one person get good at something and then train everybody else is rewarding
- Schedule training on a set regular basis
- Cover many different packages, areas and theory's
- You can teach junior staff advanced ideas
- You can teach senior people very technical things
- Not everyone has to retain everything
- Measure it by whether a director has to call a junior in to simply navigate the Revit model of their design

Culture Change: People

- Some people are not suited to this brave new world
- Dissidents can undermine efforts
- 2D is not quicker or easier
- It is not faster to key the figures in
- BIM is exciting; employ excited staff
- Preaching to the choir
- People who do not want to change and or do not want to learn and embrace BIM……..

Culture Change: What makes an excellent BIM'er

- Staff who have excellent problem solving skills
- Good at mathematics and or puzzles
- Can concentrate for long periods
- Don't give up, find challenges in setbacks
- Are highly adaptable

Number 1: The type of person who when there is an issue on Friday afternoon, comes in Monday morning with the solution because they couldn't stand not knowing the answer and found figuring it out fun.

Yes they are hard to find.

Culture Change: New versions

- The moment you have the new features list distribute it with comments
- New versions should come with anticipation and excitement, it should be like a new album release
- New enhancements that allow for BIM expansion should be researched to stay ahead of the curve
- Get in to beta testing, find out what is coming months in advance

Other Flavours: MEP, Structural

- Play the big brother role (as in mentoring)
- Encourage your secondary consultants to change
- Have people in your team who can use the other flavours
- Review your consultants models and offer feedback
- Pass on interesting papers, add-ons, suggestions
- Pre prepare them for when you are going to upgrade
- BIM looses most of its advantages when your sub consultants are hopeless at it
  - Drafted member schedules in Revit???

But why?? We are moderately happy the way we are……

- More fees
- Additional scopes of work
- Control of the crucial information in projects
- Take back some ground lost to other professions
- Added value to client
- Ongoing work on multisite BIM information management
- Internal QA becomes less laborious
- Reduction in labour hours
- Consistency
- Reduced bottlenecks