Asset Management

Somerset Regional Council / Nambucca Shire Council

# ASSET MANAGEMENT IS NOT AS HARD AS YOU THINK

Sarath Manatunga
Asset Engineer
12-08-2019

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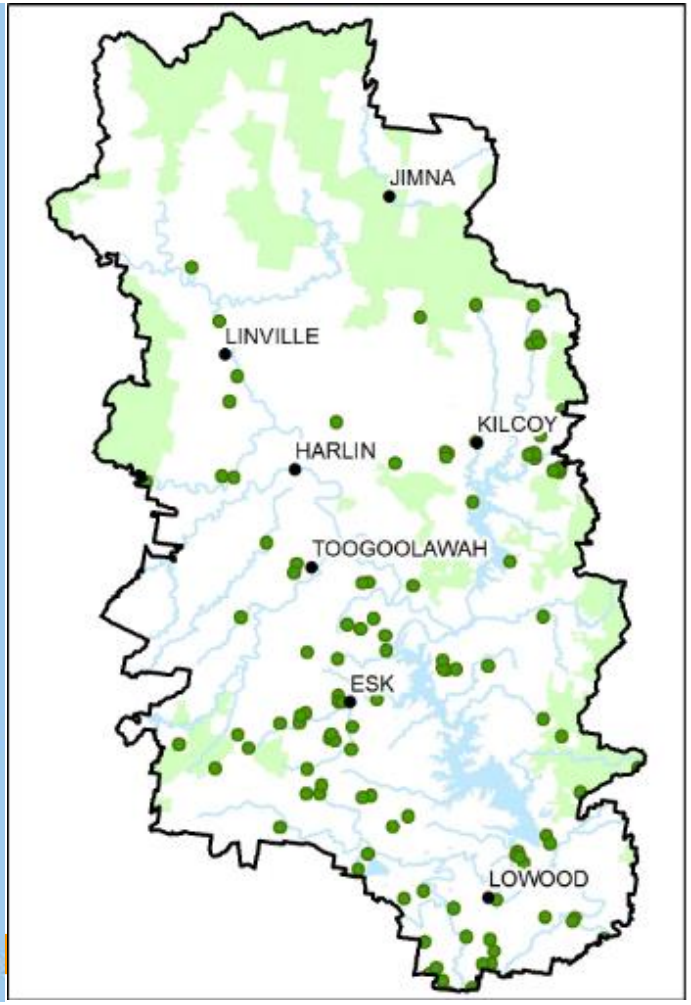
# Where we are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# An Insight into Somerset

- World famous, Lake Wivenhoe
- Lake Somerset
- Iconic Rail Trail
- Family friendly, Brisbane river
- Stunning lookouts
- Historic Esk



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# Content

1. The important factors in data collection
2. Developing an Assets Register.
3. Valuing the Assets (in-house asset valuation, Unit rate & useful life developments and benchmarking, fair value calculation).
4. Benefits of conducting Asset Management processes by the Council itself.
5. Conclusion
6. References


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# Data Collection


# What are the important factors in data collection?

1. Location identification (Road name, segmentation, plant name etc.)
2. Asset hierarchy (urban, rural)
3. Quantity (length, width, depths, diameter)
4. Attribute details (type, manufacturer, serial number)
5. Componentisation (It is important as per the CPA guidelines, that assets that are made of significant parts or have different lifecycles, should be depreciated separately)


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# What are the important factors in data collection? Cont.…

6. Condition assessment:
   a) Professional condition assessment.
   b) In-house/visual condition assessment
   c) Collective condition assessment with field staff/operator.
   d) Underground assets condition assessment – this can be very expensive. Alternatively, you can use an age-based condition assessment using construction year.
7. Photograph the asset, number the photograph and later attach it to the Asset Register


# Important points in data collection

- It is very economical to use a tablet and/or GPS data collecting unit
- Plan and identify the type of data to be collected
- Develop a standard method and consider the practicality
- Create guidelines by reading published documentations (E.g. IPWEA)
- Determine how precise the location data should be:

  1m, 2m or 5m accuracy etc.
- Use the flow of direction to start with:

  Treatment plant – Inlet to outlet

  Roads - Township to rural properties etc

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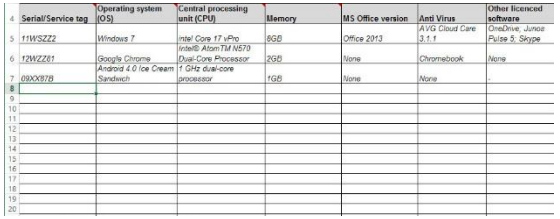
# Asset Registers



| | Serial/Service tag | Operating system (OS) | Central processing unit (CPU) | Memory | MS Office version | Anti Virus | Other licenced software |
|---|---|---|---|---|---|---|---|
| 4 | | | | | | AVG Cloud Care | OneDrive, Junos |
| 5 | 11WSZZ2 | Windows 7 | Intel Core 17 vPro | 8GB | Office 2013 | 3.1.1 | Pulse 5, Skype |
| 6 | 12WZZ61 | Google Chrome | Intel® Atom™ N570 Dual-Core Processor | 2GB | None | Chromebook | None |
| 7 | 09XX97B | Android 4.0 Ice Cream Sandwich | 1 GHz dual-core processor | 1GB | None | None | - |
| 8 | | | | | | | |
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# Developing an Asset Register

1. Develop an asset register by analysing the collected data frequently (at least once in two days). Create an excel document to keep track of data
2. Group the similar assets under the asset hierarchy:
   a) Urban rural roads
   b) Road - Arterial / Major Collector / Miner Collector/ Access
   c) Civil / Mechanical / Electrical/ Telemetry / Pipework & Valves etc
3. Determine the calculation quantity and unit.
4. Hyperlink the photos for each asset if available.

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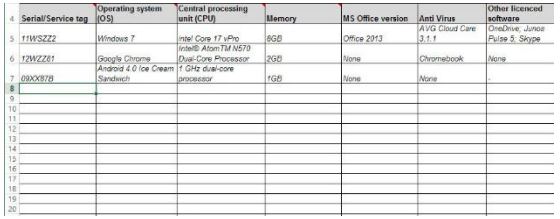

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| 5 | 11WSZZ2 | Windows 7 | Intel Core 17 vPro | 8GB | Office 2013 | AVG Cloud Care 3.1.1 | OneDrive, Junos Pulse 5, Skype |
| 6 | 12WZZ61 | Google Chrome | Intel® Atom™ N570 Dual-Core Processor | 2GB | None | Chromebook | None |
| 7 | 09XX97B | Android 4.0 Ice Cream Sandwich | 1 GHz dual-core processor | 1GB | None | None | - |
| 8 | | | | | | | |
| 9 | | | | | | | |
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# Developing an Assets Register Cont.…

5. Create a component code for each asset to calculate unit rate, useful life etc.,
   a) Pipe type & diameter or Pipe type, diameter & depth (AC - Día 150, PVC-150mm-1.5-3.0m)
   b) Pit length, width & depth ( Grated Pit 1.2 * 0.9 * (<1.5 d))
   c) Pump well diameter and depth (Structure - Pump well - Dia 2.4 * 5.1)
   d) Pump type and capacity (kw) (Pump - Submersible - 0.75kW)
   e) Urban / rural or Gravel road surface type (Urban Gravel Pavement 150 - 300mm)

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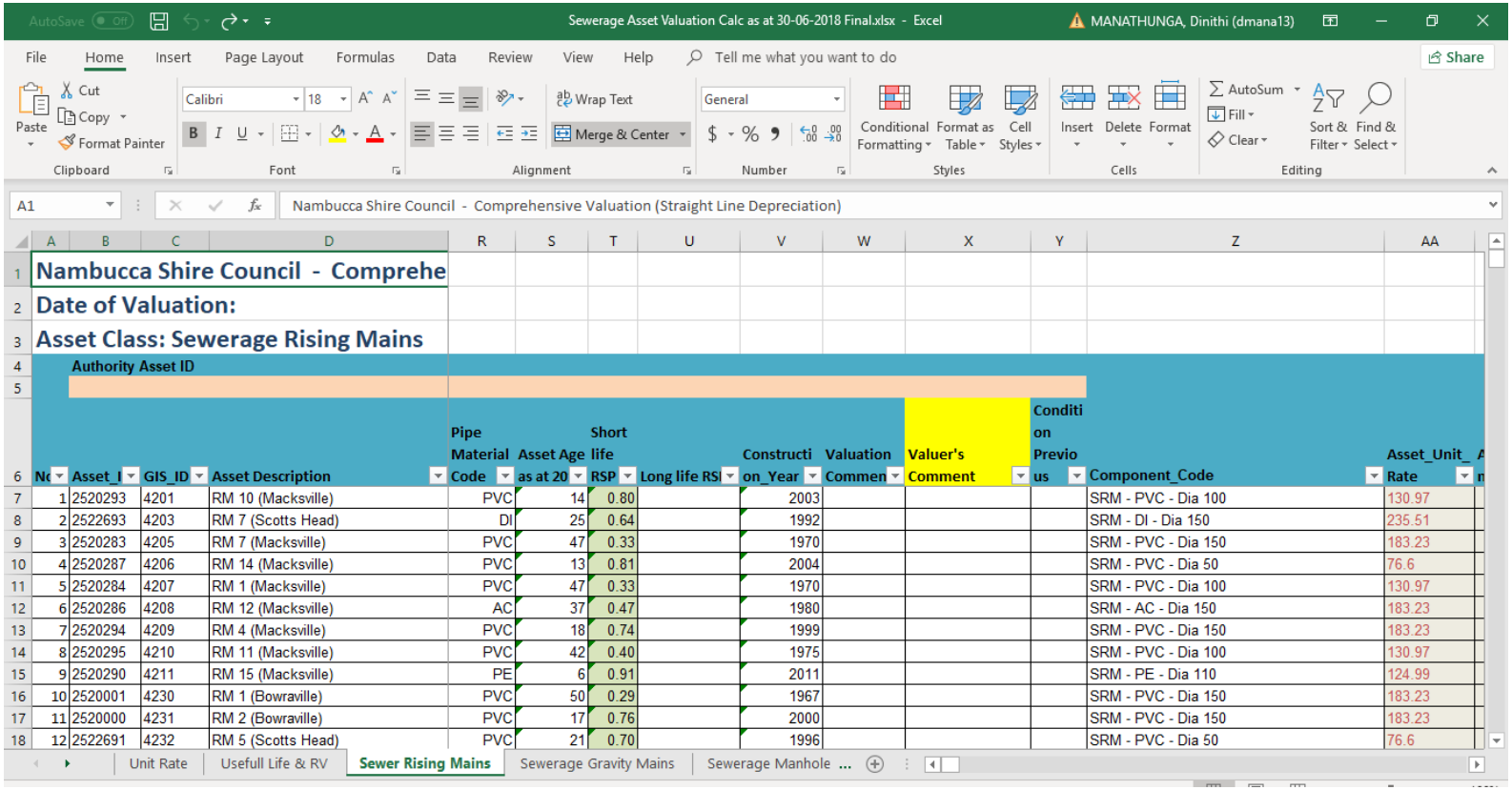
# Assets Register Example



Sewerage Asset Valuation Calc as at 30-06-2018 Final.xlsx - Excel

Nambucca Shire Council - Comprehensive Valuation (Straight Line Depreciation)

| | A | B | C | D | R | S | T | U | V | W | X | Y | Z | AA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Nambucca Shire Council - Comprehe | | | | | | | | | | | | | |
| 2 | Date of Valuation: | | | | | | | | | | | | | |
| 3 | Asset Class: Sewerage Rising Mains | | | | | | | | | | | | | |
| 4 | Authority Asset ID | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | |
| 6 | Nc | Asset_I | GIS_ID | Asset Description | Pipe Material Code | Asset Age as at 20 | Short life RSP | Long life RSI | Constructi on_Year | Valuation Commen | Valuer's Comment | Conditi on Previo us | Component_Code | Asset_Unit_ Rate |
| 7 | 1 | 2520293 | 4201 | RM 10 (Macksville) | PVC | 14 | 0.80 | | 2003 | | | | SRM - PVC - Dia 100 | 130.97 |
| 8 | 2 | 2522693 | 4203 | RM 7 (Scotts Head) | DI | 25 | 0.64 | | 1992 | | | | SRM - DI - Dia 150 | 235.51 |
| 9 | 3 | 2520283 | 4205 | RM 7 (Macksville) | PVC | 47 | 0.33 | | 1970 | | | | SRM - PVC - Dia 150 | 183.23 |
| 10 | 4 | 2520287 | 4206 | RM 14 (Macksville) | PVC | 13 | 0.81 | | 2004 | | | | SRM - PVC - Dia 50 | 76.6 |
| 11 | 5 | 2520284 | 4207 | RM 1 (Macksville) | PVC | 47 | 0.33 | | 1970 | | | | SRM - PVC - Dia 100 | 130.97 |
| 12 | 6 | 2520286 | 4208 | RM 12 (Macksville) | AC | 37 | 0.47 | | 1980 | | | | SRM - AC - Dia 150 | 183.23 |
| 13 | 7 | 2520294 | 4209 | RM 4 (Macksville) | PVC | 18 | 0.74 | | 1999 | | | | SRM - PVC - Dia 150 | 183.23 |
| 14 | 8 | 2520295 | 4210 | RM 11 (Macksville) | PVC | 42 | 0.40 | | 1975 | | | | SRM - PVC - Dia 100 | 130.97 |
| 15 | 9 | 2520290 | 4211 | RM 15 (Macksville) | PE | 6 | 0.91 | | 2011 | | | | SRM - PE - Dia 110 | 124.99 |
| 16 | 10 | 2520001 | 4230 | RM 1 (Bowraville) | PVC | 50 | 0.29 | | 1967 | | | | SRM - PVC - Dia 150 | 183.23 |
| 17 | 11 | 2520000 | 4231 | RM 2 (Bowraville) | PVC | 17 | 0.76 | | 2000 | | | | SRM - PVC - Dia 150 | 183.23 |
| 18 | 12 | 2522691 | 4232 | RM 5 (Scotts Head) | PVC | 21 | 0.70 | | 1996 | | | | SRM - PVC - Dia 50 | 76.6 |

Unit Rate | Usefull Life & RV | Sewer Rising Mains | Sewerage Gravity Mains | Sewerage Manhole ...

# Asset Valuations


# Unit Rate Calculation And Benchmarking Methods

Source of unit rates:

a) Project cost analysis

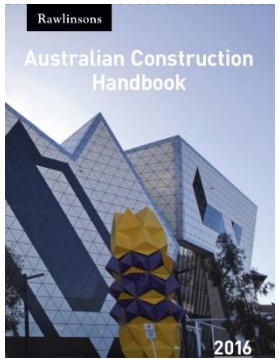
b) Calculation cost from first principle using publications (e.g. Rawlinsons)

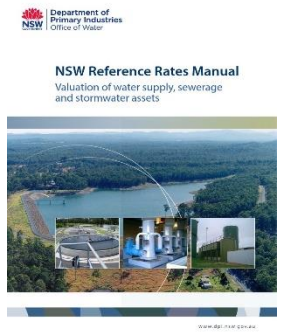
c) Neighboring similar council unit rates

d) Publications (NSW reference rates for Water, Sewer and Stormwater)

e) Supplier costs

f) Other sources of similar rates

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# Unit Rate Calculation And Benchmarking Process

Project cost analysis (At least two recent projects for each cost component)

a) Get the details cost breakdown with variations if possible. If unavailable, cost estimates, quotations, tender documents etc.
   1. Nambucca Head Sewerage Treatment Plant Project [1]
   2. Bowraville Dam Project [4]
   3. Road Pavement and Surface Project (0.8 Million.) [7]

b) Allocate cost component code for each task.

c) Identify direct and indirect overhead separately and allocate based on cost.

d) Determine the cost component quantities constructed for this project.

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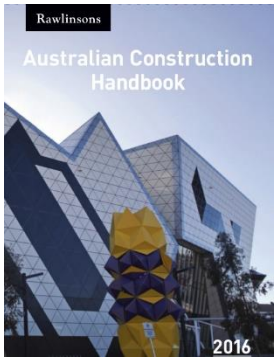
# Unit Rate Calculation And Benchmarking Process Cont...

## Unit rate development from Rawlinsons Construction Handbook 2018 for Roads

Traffic management cost and project overhead and engineering cost can be considered additionally for each cost component code.




Spray seal surface (Page No. 683)

a) Two coat spray bitumen seal can be considered

Asphalt surface (Page No. 683)

a) Hot bitumen typical depth is considered
b) Prime seal coat is considered

Pavement (Page No. 683,682,484)

a) Road base course can be considered as crushed rock/ blue metal.
b) Typical depth is considered for calculation of pavement quantity.
c) Road shoulders cross section is considered for the pavement volume.
d) Geotextile fabric cost can be included for pavement as well as fc shoulders.
e) Subsoil drain can be considered.

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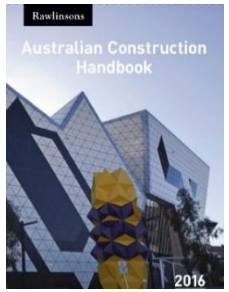
# Unit rate developed from Rawlinsons Construction Handbook 2018 for Roads Cont.…

Earthworks (Page No 678, 211, 228)

a) Typical road hierachery depth can be considered for the calculating excavating volume.

b) Excavate to reduce level, deposit, spread and level with in 1 km can be used as activity task.




c) Soil type is used as clay or appropriate.

d) Additional cartage of 1km is considered.

e) Compaction to 90% is considered.

f) Additional 100% width may be considered for road shoulders.

g) Clear medium vegetation and cart away is considered for the road and shoulder width.

h) Level, grade, prepare and grass seeding activities can be considered for road shoulders.

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# Important consideration for unit rate calculations

1. It may be required to adjust neighbouring council rates to bring their cost components in line with your cost component. (e.g. a neighbouring council may have 30mm asphalt surface, whereas your cost component is 50mm)
2. To develop unit rates from Rawlinsons you may have to develop some assumption and keep a note for audit purposes.
3. Convert all the cost to today's value and to your local area. This can be done by adjusting annual and area indexation using Rawlinson.
4. Populate the data for each cost component.

**Adopt a unit rate from the available rates (using professional judgement, average etc.) [9]**

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# Useful Life

## Determining useful life, short life, long life percentages

1. Neighbouring similar council useful life.
2. Publications (NSW reference rates for manual useful life).
3. Asset custodians' professions knowledge, treatment history or past experience.
4. Other similar asset registers.

Alternatively you can do further componentised assets without using short life long life method. (eg: Pavement can be sub componentised as pavement and sub pavement).

**Adopt a useful life and short life long life cost % for each cost component. [11]**


# Fair value calculation

Definition of fair value:

"*The price that would be received to sell an asset or, paid to transfer a liability, in an orderly transaction between market participants at the measurement date*."
(Australian Accounting Standards Board, 2015, *Fair Value Measurement*)

Level of inputs

a) Level 1 – Level 1 inputs are quoted prices in active markets – E.g. Shares

b) Level 2 - Level 2 inputs are inputs other than quoted prices included within Level 1 that are observable – E.g. Motor Vehicle

**c) Level 3 - Level 3 inputs are unobservable inputs (All infrastructure assets are covered under this category. The Gross Replacement Cost (GRC) and the Useful life can vary from Council to Council or Valuer to Valuer)**

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# Fair Value Calculation Cont…

Valuation techniques

There are three main approaches:

a) Market approach – Prices and other relevant information generated by market (debt securities)

b) Income approach – Consider the future amount (cash flow)

**c) Cost approach – The amount that would be required to replace the asset. Use cost approach for most infrastructure assets**


# Fair Value Calculation Cont…

Consider straight line depreciation method since it is simple and has become widely accepted. You can calculate the Remaining Service Potential as per the below table.

| Condition Rating | Remaining Service Potential | Description of the condition |
|---|---|---|
| 1 | 98% | Excellent – No work required |
| 2 | 75% | Good – Only minor maintenance work required |
| 3 | 50% | Average – Maintenance work required |
| 4 | 25% | Poor – Renewal required |
| 5 | 5% | Very poor – Urgent renewal / upgrading required |

Remaining service potential = Remaining useful life/ Useful life

So that you can back calculate the remaining useful life.

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# Fair Value Calculation Cont…

If an asset component has no residual value, the fair value can be calculated as follows:

Fair Value = Remaining Service Potential * Gross Replacement Cost (GRC)

| | |
|---|---|
| Area (square metres) | 10,000 |
| Unit rate per sq. m. | $50 |
| Gross replacement cost | $500,000 |
| Assessed level of remaining service potential | 64% |
| Assessed DRC (pre-renewal) | $320,000 |

The seal was then renewed.

| | |
|---|---|
| Cost of renewal work | $250,000 |
| Has the unit rate used to determine the GRC changed? | No |
| Has the overall gross service potential of the seal changed? | No |
| Assessed gross replacement cost | $500,000 |
| Reassessed level of remaining service potential | 95% |
| Assessed DRC (post renewal) | $475,000 |

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# Depreciation Calculation

$$\text{Depreciation} = \frac{\text{Fair Value}}{\text{Remaining useful life}}.$$

# Benefits Of Asset Management With Council Staff

# Benefits of conducting Asset Management processes by Council staff

1. You have a better understanding of your asset portfolio and thorough knowledge of the asset conditions.
2. By using Excel spreadsheets, you are able to do asset management, without significant investment in expensive software. This will be a value addition specially for small councils.
3. You can develop accurate, realistic Replacement Costs (RC); compared to using percentage sample inspections and developing an RC based on the sample. (Eg. One Sewer Pump Station previously valued as 264k and recent valuation confirm it is 71k [13])


# Benefits of conducting Asset Management processes by Council staff, Cont.

4. The assets can be inspected by Council staff thereby reducing inspection costs and increasing efficiency as they are local, compared to engaging a third party to undertake inspections.
5. Asset capitalisation is easy since you have access to the entire calculation. Using the asset valuation in the short life/long life method, you report both components as one asset. To do this, you must combine gross, fair value, useful life and remaining useful life.
6. If you develop a reasonably good asset register you can use that data to develop a meaningful asset management plan & then relate to budget development.

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# Benefits of conducting Asset Management processes by Council staff, Cont.

7. Start with a small asset class, create a template, and once you have completed one asset class, applying the principles to another asset class is relatively easy.
8. Asset management is an ongoing continuous process. Doing this by yourself will improve the efficiencies and maintain consistency.
9. Asset valuation is a periodical activity. If you do it yourself more than 75% of the data can be reused for the next revaluation and it will be relatively easy.

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# Conclusion

1. There is no right or wrong answers in most activities in managing assets.
2. Methodical, consistent, systematic, and continuous improvements are the key in asset management.
3. Keep the minimum amount of data in asset registers which can be used by the asset management practitioners and work crew while covering reporting and legislative requirements.
4. **It is important to keep it simple (KISS principle).**
5. **Think twice, DIY, save money, benefit the community.**

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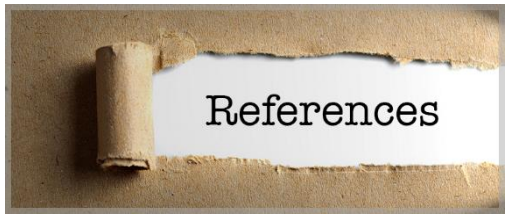


# References

1. Austroads (2016) AP-T315-16, *Data Standard for Road Management and Investment in Australia and New Zealand*.
2. Rawlinsons, 2018, *Australian Construction Handbook*
3. CPA Australia (2013), *Valuation and depreciation*
4. Australian Accounting Standards Board (2015), *Fair Value Measurement*

# Thank you for listening.

## I appreciate the support from Nambucca Shire Council and Somerset Regional Council.

## Do you have any questions?

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# Referencing photo [14] – Pit dimensions Dia 1.2 * 1.8 h

# Referencing photo [2] – Nambucca Head Sewerage Treatment Plant ($20 Million.)


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# Referencing photo [5] – Bowraville Dam ($52 Million.)

# Nambucca Sewerage Treatment Plant [3] Project Cost Analysis

Sewerage Treatment Plant

Nambucca Heads Sewerage Treatment Plant

| No | GENERAL | Cost include GST | Cost Exclude GST | Cost Componant | Note | Total Cost Componant | Project Management | Toal Cost | Qty | Unit | Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1 | All work and obligations under the Contract NOT INCLUDED ELSEWHERE in this Schedule | 138,617 | 126,015 | Project Management | | | | | | | |
| 1.2 | Documentation of Contractor's Management Plans and Details | 4,990 | 4,536 | Project Management | | | | | | | |
| 1.3 | Construction Program | 5,881 | 5,346 | Project Management | | | | | | | |
| 1.4 | Quality Plan, and Inspection and Test Plans | 2,825 | 2,568 | Project Management | | | | | | | |
| 1.5 | Project OHS Management Plan | 3,826 | 3,478 | Project Management | | | | | | | |
| 1.6 | Construction Environmental Management Plan | 5,024 | 4,567 | Project Management | | | | | | | |
| 1.7 | Site establishment | 24,200 | 22,000 | Project Management | | | | | | | |
| 1.8 | Site disestablishment | 7,600 | 6,909 | Project Management | | | | | | | |
| 1.9 | Provide and maintain all necessary environmental measures | 146,001 | 132,728 | Project Management | | | | | | | |
| 1.10 | Complete all additional designs | 36,157 | 32,870 | Project Management | | | | | | | |
| B | SEWAGE PUMPING STATIONS | | | . | | | | | | | |
| 2 | PUMPING STATION 1 AT NAMBUCCA HEADS | | | . | | | | | | | |
| 2.1 | Civil works, pipeworks and valves | 38,798 | 17,635 | Structure - Pump well - Dia 1.8 * 5.2 h | Partly upgrade | 17,635 | 4,696 | 22,331 | | | |
| 2.2 | Pumping equipment | 23,977 | 21,797 | Pump - Submersible - 5.9kW | | 21,797 | 5,805 | 27,602 | 2 | No | 13801 |
| 2.3 | Electrical works | 5,684 | 5,167 | Rad Tel - 3000 | | 5,167 | 1,376 | 6,543 | | | |
| . | | | 17,635 | Electrical Switchboard - Type 6 | | 17,635 | 4,696 | 22,331 | | | |
| 3 | PUMPING STATION 3 AT NAMBUCCA HEADS | | | . | | | | | | | |
| 3.1 | Civil works, pipeworks and valves | 409,235 | 178,575 | Structure - Pump well - Dia 3.6 * 4.2 h | Pump well, pit & storage tank | 180,388 | 48,040 | 228,428 | 24.13 | | 9466.57 |

# Bowraville Dam [6] Project Cost Analysis

Water Treatment Plant Bore & Dam

| No | Description | Quantity | Unit | Rate (with GST) | Amount | Cost Componant | Total Direct Cost | Indirect Cost (PM for only this project) | Project Management | Toal Cost | Qty | Unit | Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | All work and obligations under the Contract NOT INCLUDED ELSEWHERE in this Schedule. Details to be provided. | | | | | | | | | | | | |
| 2 | Preliminaries | | | | | | | | | | | | |
| 2.1 | Contract preliminaries including insurances and long services levy | | | | 913488 | 3,043.64 | Project Management | | | | | | |
| 2.2 | Prepare Management Plans | | | | 198741 | 8,067.27 | Project Management | | | | | | |
| 2.3 | Site establishment and disestablishment | | | | 288502 | 6,227.27 | Project Management | | | | | | |
| 2.4 | Provision of the Contractor's Monthly Reports on the Contract works | | | | 42723 | ,883.64 | Project Management | | | | | | |
| 2.5 | Survey establishment and control | | | | 107209 | ,745.45 | Project Management | | | | | | |
| 3 | Borefield | | | | - | | | | | | | | |
| 3.1 | Two new bores 300mm diameter and 15m deep including drilling, casing and testing | 25.5 | | | 832147 | 5,649.09 | Bore casing - Dia 275 | 75649.09 | 5243.12 | 19468.96 | 100361.17 | 25.5 | m 3935.73 |
| 3.2 | Pipework (valves and fittings), reinforced concrete pits, air valves, pit covers and steel poles at existing bores. | 1 | | | 847993 | 1,606.90 | Structure - pit - 2.85*1.48*1.3 h | 34,628.41 | 2400.04 | 8911.93 | 45940.38 | 4.70 | m3 9774.55 |
| | | 1 | | | 30,065.10 | | Structure - pit - 2.85*1.48*1.2 h | 33,086.61 | 2293.18 | 8515.13 | 43894.92 | 4.50 | m3 9754.43 |
| | | 2 | | | 15,418.00 | | PWV - Dia 150 | 15,418.00 | 1068.6 | 3967.96 | 20454.56 | 2.00 | Nos 10227.28 |
| 3.3 | Submersible electric bore pumps | | | | 262851 | 0,991.91 | Pump - Submersible - Two stage - 15kw | 7,755.22 | 537.5 | 1995.87 | 10288.59 | 1 | Nos 10288.59 |
| | | | | | 12,903.55 | | Pump - Submersible - Three stage - 30kw | 9,666.86 | 669.99 | 2487.85 | 12824.7 | 1 | Nos 12824.7 |
| 3.4 | DN315 PE PN10 pipeline to connect new bores to existing network | 192.21 | | | 571575 | 1,960.91 | WTM - PE - Dia 315 | 51,960.91 | 3601.33 | 13372.6 | 68934.84 | 192.21 | m 358.64 |
| 3.5 | New steel poles at eight existing bores | | | | 324052 | 9,459.09 | Part of Structure - pit | 32,691.52 | 2265.8 | 8413.45 | 43370.77 | | |
| 3.6 | Environmental management controls and restoration | | | | 38473 | ,497.27 | Project Management | | | | | | |
| 4 | Headworks Upgrade – Valve Cluster and Collection Tank | | | | - | | | | | | | | |
| 4.1 | Temporary works including diversion of the southern borefield | | | | 126041 | 1,458.18 | Project Management | | | | | | |
| 4.2 | Remove redundant pipework and fittings | | | | 51934 | ,720.91 | Part of PWV - Type 25 | 76,549.18 | 5305.5 | 19700.6 | 101555.28 | | |
| 4.3 | Earthworks | | | | 159512 | ,900.18 | Concrete Reservoir - 0.086 ML | 229,560.83 | 15910.5 | 59079.5 | 304550.83 | 33.07 | M3 9209.28 |

# Road Pavement and Surface Project [8] Project Cost Analysis

Project : H38G ,Veldt Street Slacks Creek

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Traffic Control | | | | | 1 | | Item | | | | |
| | Code | Description | Comment | CD | Vol | Hours | Days | Qty | Units | Rate | Sub Total | Cost Componat | |
| | 12.000 | Traffic Controller | include traffic controller for meal breaks | SE | 2.00 | 8.60 | 46.00 | 791.20 | hrs | 37.20 | 29432.64 | Overheads | |
| | 12.100 | Traffic Controller + Vehicle | | SE | 1.00 | 8.60 | 46.00 | 395.60 | hrs | 61.20 | 24210.72 | Overheads | |
| 2 | | Site Establishment | | | | | 1 | | Item | | | | |
| | Code | Description | Comment | CD | Vol | Hours | Days | Qty | Units | Rate | Sub Total | | |
| | 7.400 | Generator | | P | 1.00 | | 46.00 | 46.00 | Day | 70.70 | 3252.20 | Overheads | |
| | 1.500 | Site Office | | EM | 1.00 | | 46.00 | 46.00 | Day | 20.00 | 920.00 | Overheads | |
| 13 | | Excavate & Remove unsuitable material | | | | | 200 | | m3 | | | | |
| | Code | Description | Comment | CD | Vol | Hours | Days | Qty | Units | Rate | Sub Total | | |
| | 1.100 | Team Member (labourer) | | L | 2.00 | 8.60 | 2.00 | 34.40 | hrs | 38.00 | 1307.20 | Earthworks | |
| | 1.310 | Team Leader | | L | 1.00 | 8.60 | 2.00 | 17.20 | hrs | 50.00 | 860.00 | Earthworks | |
| 17 | | Compact Subgrade | | | | | 2800 | | m2 | | | | |
| | Code | Description | Comment | CD | Vol | Hours | Days | Qty | Units | Rate | Sub Total | | |
| | 8.000 | Grader - incl opp | | P | 1.00 | | 3.00 | 3.00 | Day | 1389.76 | 4169.28 | Pavement | |
| | 20.600 | Large Multi Roller | | P | 1.00 | | 3.00 | 3.00 | Day | 138.60 | 415.80 | Pavement | |
| 19 | | Excavate for Pavement Construction | | | | | 1400 | | m3 | | | | |
| | Code | Description | Comment | CD | Vol | Hours | Days | Qty | Units | Rate | Sub Total | | |
| | 7.100 | Isuzu Crew Truck | | P | 1.00 | 8.60 | 7.00 | 60.20 | hrs | 39.98 | 2406.54 | Pavement | |
| | 11.000 | 20T Excavator - incl opp | | SE | 1.00 | 8.60 | 7.00 | 60.20 | hrs | 144.00 | 8668.80 | Pavement | |
| 206 | | DG14 Asphalt 50mm layer | | | | | 364 | | T | | | | |
| | Code | Description | Comment | CD | Vol | Hours | Days | Qty | Units | Rate | Sub Total | | |
| | 81.000 | Type 2 - 0-50 t | | SE | 364.00 | | | 364.00 | T | 177.50 | 64610.00 | Surface | |

# Adopt a unit rate from the available rates [10]

| Road Type | Hierarchy | LG Stereotype | Length | % network | Component | Material Type | Surface Type | Typical Depth (mm) of Pavement | Rate ($) By m2 | Rawlinsons 2018 | Project No 1 | Project No 2 | Project No 1 | Council A | Trip cost Rates | | Council B | Council C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Cost 2018 | Cost 2018 | Cost 2018 | Cost 2018 | Cost 2018 | Cost 2018 | Cost 2018 | Cost 2018 |
| Rural | Rural Access | F | 431 | 19.34% | Earthworks | Standard | Spray Seal | 250 | 20.15 | 23.26 | 31.96 | 31.39 | 29.06 | 14.38 | 5.3 | 14.4 | 14.33 | 17.3 |
| Urban | Urban Access | | | | Earthworks | Standard | Spray Seal | 250 | 20.15 | 23.26 | 31.96 | 31.39 | 29.06 | 14.38 | 5.3 | 14.4 | 14.33 | 17.3 |
| | Urban Minor Collector | | | | Earthworks | Standard | Spray Seal | 380 | 28.00 | 28.76 | 48.58 | 47.71 | 44.18 | 14.38 | 7.78 | 21.54 | 21.77 | 17.3 |
| | Urban Collector | E | 63 | 2.82% | Earthworks | Standard | Spray Seal | 380 | 28.00 | 28.76 | 48.58 | 47.71 | 44.18 | 14.38 | 7.78 | 21.54 | 21.77 | 17.3 |
| Urban | Arterial | | | | Earthworks | Standard | Spray Seal | 380 | 28.00 | 28.76 | 48.58 | 47.71 | 44.18 | 14.38 | 7.78 | 21.54 | 21.77 | 17.3 |
| | Industrial Access | | | | Earthworks | Standard | Spray Seal | 380 | 28.00 | 28.76 | 48.58 | 47.71 | 44.18 | 14.38 | 7.78 | 21.54 | 21.77 | 17.3 |
| | Industrial Collector | | | | Earthworks | Standard | Spray Seal | 380 | 28.00 | 28.76 | 48.58 | 47.71 | 44.18 | 14.38 | 7.78 | 21.54 | 21.77 | 17.3 |
| Rural | Rural Collector | C | 302 | 13.57% | Earthworks | Standard | Spray Seal | 275 | 21.66 | 24.32 | 35.16 | 34.53 | 31.97 | 14.38 | 5.78 | 15.78 | 15.76 | 17.3 |
| | Rural Arterial | | | | Earthworks | Standard | Spray Seal | 275 | 21.66 | 24.32 | 35.16 | 34.53 | 31.97 | 14.38 | 5.78 | 15.78 | 15.76 | 17.3 |
| Rural | Rural Access | F | 431 | 19.34% | Pavement | Gravel | Spray Seal | 250 | 52.85 | 69.1 | 84.78 | 81.13 | 33.37 | 31.73 | 33.81 | 63.64 | 44.32 | 33.75 |
| Urban | Urban Access | | | | Pavement | Gravel | Spray Seal | 250 | 52.85 | 69.1 | 84.78 | 81.13 | 33.37 | 31.73 | 33.81 | 63.64 | 44.32 | 33.75 |
| | Urban Minor Collector | | | | Pavement | Gravel | Spray Seal | 380 | 76.07 | 83.01 | 128.87 | 123.31 | 50.72 | 48.23 | 43.12 | 85.36 | 70.67 | 51.3 |
| | Urban Collector | E | 63 | 2.82% | Pavement | Gravel | Spray Seal | 380 | 76.07 | 83.01 | 128.87 | 123.31 | 50.72 | 48.23 | 43.12 | 85.36 | 70.67 | 51.3 |
| Urban | Arterial | | | | Pavement | Gravel | Spray Seal | 380 | 76.07 | 83.01 | 128.87 | 123.31 | 50.72 | 48.23 | 43.12 | 85.36 | 70.67 | 51.3 |
| | Industrial Access | | | | Pavement | Gravel | Spray Seal | 380 | 76.07 | 83.01 | 128.87 | 123.31 | 50.72 | 48.23 | 43.12 | 85.36 | 70.67 | 51.3 |
| | Industrial Collector | | | | Pavement | Gravel | Spray Seal | 380 | 76.07 | 83.01 | 128.87 | 123.31 | 50.72 | 48.23 | 43.12 | 85.36 | 70.67 | 51.3 |
| Rural | Rural Collector | D | 302 | 13.57% | Pavement | Gravel | Spray Seal | 275 | 57.03 | 71.77 | 93.26 | 89.24 | 36.71 | 34.9 | 35.6 | 67.82 | 46.51 | 37.43 |
| | Rural Arterial | | | | Pavement | Gravel | Spray Seal | 275 | 57.03 | 71.77 | 93.26 | 89.24 | 36.71 | 34.9 | 35.6 | 67.82 | 46.51 | 37.43 |
| Rural | Rural Access | F | 431 | 19.34% | Surface | Spray Seal | Spray Seal | | 12.87 | 13.34 | 19.8 | 18.02 | 14.17 | 14.08 | 8.69 | 11.29 | 7.62 | 8.78 |
| Urban | Urban Access | | | | Surface | Spray Seal | Spray Seal | | 12.87 | 13.34 | 19.80 | 18.02 | 14.17 | 14.08 | 8.69 | 11.29 | 7.62 | 8.78 |
| | Urban Minor Collector | | | | Surface | Spray Seal | Spray Seal | | 12.88 | 13.34 | 19.80 | 18.02 | 14.17 | 14.08 | 8.69 | 11.29 | 7.72 | 8.78 |
| | Urban Collector | E | 63 | 2.82% | Surface | Spray Seal | Spray Seal | | 12.88 | 13.34 | 19.80 | 18.02 | 14.17 | 14.08 | 8.69 | 11.29 | 7.72 | 8.78 |
| Urban | Arterial | | | | Surface | Spray Seal | Spray Seal | | 12.88 | 13.34 | 19.80 | 18.02 | 14.17 | 14.08 | 8.69 | 11.29 | 7.72 | 8.78 |
| | Industrial Access | | | | Surface | Spray Seal | Spray Seal | | 12.88 | 13.34 | 19.80 | 18.02 | 14.17 | 14.08 | 8.69 | 11.29 | 7.72 | 8.78 |
| | Industrial Collector | | | | Surface | Spray Seal | Spray Seal | | 12.88 | 13.34 | 19.80 | 18.02 | 14.17 | 14.08 | 8.69 | 11.29 | 7.72 | 8.78 |
| Rural | Rural Collector | D | 302 | 13.57% | Surface | Spray Seal | Spray Seal | | 12.87 | 13.34 | 19.80 | 18.02 | 14.17 | 14.08 | 8.69 | 11.29 | 7.64 | 8.78 |
| | Rural Arterial | | | | Surface | Spray Seal | Spray Seal | | 12.87 | 13.34 | 19.8 | 18.02 | 14.17 | 14.08 | 8.69 | 11.29 | 7.64 | 8.78 |

# Adopt a useful life and short life long life cost % for component [12]

| Asset Class | Heirarchy | Component_Code | Adapted for valuation | | | | NSW Reference | | | | Port Macquarie-Hastings Council | | | | Richmond Valley Council | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Usefull Life (y) | | Value % | Adapted | Usefull Life (y) | | Value % | Adapted | Usefull Life (y) | | Value % | Adapted | Usefull Life (y) | | Value % | Adapted |
| | | | Short Life | Long Life | Short Life | Long Life | Short Life | Long Life | Short Life | Long Life | Short Life | Long Life | Short Life | Long Life | Short Life | Long Life | Short Life | Long Life |
| | Sewerage Treatment Plant | | | | | | | | | | | | | | | | | |
| STP | Civil | Chemical tank - Plastic - 25000L | 30 | | 100% | 0% | | | | | 30 | | 100% | 0% | 50 | 150 | 40% | 60% |
| STP | Civil | Concrete Hardstand - 150mm | 50 | | 100% | 0% | 50 | | | | 50 | | 40% | 60% | 50 | | 100% | 0% |
| STP | Civil | Earth - Effluent storage pond | 100 | 200 | 50% | 50% | 50 | | | | 100 | | 50% | 50% | 100 | 200 | 50% | 50% |
| STP | Civil | Eye washer | 50 | | 100% | 0% | | | | | 50 | | 100% | 0% | 50 | | 100% | 0% |
| STP | Civil | Flocculator timber & steel | 35 | | 100% | 0% | | | | | 35 | | 100% | 0% | | | | |
| STP | Civil | Manhole Dia 1200 - 3m<Depth<4.5m | 70 | 100 | 30% | 70% | 50 | | | | 50 | | 50% | 50% | 70 | 140 | 40% | 60% |
| STP | Pipework & Valves | Micro bug aeration system | 30 | | 100% | 0% | | | | | | | | | | | | |
| STP | Civil | Pontoon | 35 | | 100% | 0% | | | | | 35 | | 100% | 0% | 80 | 150 | 40% | 60% |
| STP | Civil | Structure - Aeration tank 5000 EP - 37.1*29.7*4.5h | 70 | | 100% | 0% | 50 | | | | 50 | | 40% | 60% | 80 | 160 | 40% | 60% |
| STP | Civil | Structure - Aerator - 72*17.5*4.7 | 70 | | 100% | 0% | 50 | | | | 50 | | 40% | 60% | 80 | 160 | 40% | 60% |
| STP | Civil | Tank - Poly - 20000L | 30 | | 100% | 0% | | | | | 30 | | 100% | 0% | 50 | | 100% | 0% |
| STP | Electrical | Ammonium / nitrate sensor | 20 | | 100% | 0% | 25 | | | | 20 | | 100% | 0% | 20 | | 100% | 0% |
| STP | Electrical | Auto control Switchboard - Type 12 | 25 | 40 | 40% | 60% | 25 | | | | 20 | | 40% | 60% | 20 | | 100% | 0% |
| STP | Electrical | D.O.T Meter | 20 | | 100% | 0% | 25 | | | | 20 | | 100% | 0% | 20 | | 100% | 0% |
| STP | Electrical | Electrical butterfly valve - Dia 600 | 20 | 40 | 40% | 60% | 25 | | | | 20 | | 40% | 60% | 20 | | 100% | 0% |
| SPS | Electrical | Electrical Flowmeter - Dia 150 | 20 | | 100% | 0% | 25 | | | | 20 | | 100% | 0% | 20 | | 100% | 0% |
| STP | Electrical | Electrical Switchboard - Type 0.5 | 25 | 40 | 40% | 60% | 25 | | | | 50 | | 40% | 60% | 20 | | 100% | 0% |
| STP | Electrical | Electrical Switchboard - Type 1 | 25 | 40 | 40% | 60% | 25 | | | | 50 | | 40% | 60% | 20 | | 100% | 0% |
| STP | Electrical | Electrical penstock | 20 | 40 | 40% | 60% | 25 | | | | 20 | | 40% | 60% | 20 | | 100% | 0% |
| STP | Electrical | Electrical work - Type 1 | 70 | | 100% | 0% | 25 | | | | 60 | | 100% | 0% | | | | |
| STP | Electrical | Lighting pole with two light - 6m | 50 | | 100% | 0% | | | | | | | | | | | | |
| STP | Electrical | Mag flow meter - Dia 50 | 20 | | 100% | 0% | 25 | | | | 20 | | 100% | 0% | 20 | | 100% | 0% |
| STP | Electrical | Mag flow meter - Dia 63 | 20 | | 100% | 0% | 25 | | | | 20 | | 100% | 0% | 20 | | 100% | 0% |
| STP | Mechanical | Aerator - 15kW | 25 | | 100% | 0% | 20 | | | | 20 | | 40% | 60% | 25 | 60 | 40% | 60% |
| STP | Mechanical | Aerator - Pasveer - 5.5kW | 25 | | 100% | 0% | 20 | | | | 20 | | 40% | 60% | 25 | 60 | 40% | 60% |
| STP | Mechanical | Air compressor - 1.65kW | 25 | | 100% | 0% | 20 | | | | 20 | | 40% | 60% | 25 | 60 | 40% | 60% |
| STP | Mechanical | Decanter - Type 1 | 25 | 40 | 40% | 60% | 20 | | | | 20 | | 40% | 60% | 25 | 60 | 40% | 60% |
| STP | Mechanical | Decanter - Type 2 | 25 | 40 | 40% | 60% | 20 | | | | 20 | | 40% | 60% | 25 | 60 | 40% | 60% |
| STP | Mechanical | Pump - Close couple - Multistage - 1.1Kw | 25 | | 100% | 0% | 20 | | | | 20 | | 40% | 60% | 25 | 60 | 40% | 60% |