

Project No. 22023  
 Project: Ningaloo Lighthouse Resort  
 Client: Fiveight



| Quality Assurance |           |        |         |                 |                              |  |
|-------------------|-----------|--------|---------|-----------------|------------------------------|--|
| Revision          |           | Author | Checked | Document Status | Amendments                   |  |
| No                | Date      |        |         |                 |                              |  |
| A                 | 20-Sep-22 | JC     | AZ      | Draft           | Initial estimate             |  |
| B                 | 26-Sep-22 | AZ     | MK      | Draft           | Update water balance         |  |
| 00                | 29-Sep-22 | AZ     | DX      | Final           | Final                        |  |
| 00A               | 1-Nov-22  | AZ     | DX      | Draft           | Add flow Chart and Main Pool |  |
| 01                | 2-Nov-22  | AZ     | DX      | Final           |                              |  |

Notes:

D-Draft    P- Preliminary    F- Final    A- Amended

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## NINGALOO LIGHTHOUSE RESORT - OCCUPANCY

| Occupancy                 | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Peak (Day) | Average (Day) | Min (Day) |
|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------|---------------|-----------|
| Suites, cabins and lodges | 30% | 40% | 60% | 85% | 80% | 80% | 90% | 85% | 85% | 65% | 40% | 30% | 90%        | 64%           | 30%       |
| Caravan Park Sites        | 30% | 40% | 60% | 85% | 80% | 80% | 90% | 85% | 85% | 65% | 40% | 30% | 90%        | 64%           | 30%       |
| <b>Non-Caravan Guests</b> | 59  | 78  | 118 | 167 | 157 | 157 | 177 | 167 | 167 | 128 | 78  | 59  | 177        | 126           | 59        |
| <b>Caravan Guests</b>     | 108 | 144 | 216 | 306 | 288 | 288 | 324 | 306 | 306 | 234 | 144 | 108 | 324        | 231           | 108       |
| <b>Total</b>              | 167 | 222 | 334 | 473 | 445 | 445 | 501 | 473 | 473 | 362 | 222 | 167 | 501        | 357           | 167       |
| Days in the month         | 31  | 28  | 31  | 30  | 31  | 30  | 31  | 31  | 30  | 31  | 30  | 31  |            |               |           |

| Room Type                                   | # Keys | # Bedrooms | Pax per Bedroom | Max Guest  |
|---|--------|------------|-----------------|------------|
| Executive Suites                            | 6      | 1          | 2.5             | 15         |
| 1 Bed Cabin                                 | 19     | 1          | 1.8             | 34         |
| 2 Bed Cabin                                 | 19     | 2          | 1.8             | 68         |
| Surf Lodges                                 | 12     | 1          | 1.8             | 22         |
| Day Visitors                                |        |            |                 | 15         |
| <b>Total Non-Caravan Guests</b>             |        |            |                 | <b>154</b> |
| GM Accommodation                            | 1      | 1          | 2.0             | 2          |
| Non-Residential Staff                       |        |            |                 | 20         |
| Staff Accommodation                         | 20     | 1          | 1.0             | 20         |
| <b>Total Staffs &amp; GM Family</b>         |        |            |                 | <b>42</b>  |
| <b>Total Non-Caravan Guests &amp; Staff</b> |        |            |                 | <b>196</b> |
| Caravans                                    | 120    |            | 3.0             | 360        |
| <b>Total Caravan Guests</b>                 |        |            |                 | <b>360</b> |
| <b>Total Persons on Site</b>                |        |            |                 | <b>556</b> |

| Population Details      | Current Master Plan Peak Population | Equivalent Population |
|-------------------------|-------------------------------------|-----------------------|
| Non-Caravan Park Guests | 139                                 | 1.0                   |
| Day Visitors            | 15                                  | 0.1                   |
| Caravan Park Guests     | 360                                 | 1.0                   |
| Residential Staff       | 22                                  | 1.0                   |
| Non-Residential Staff   | 20                                  | 0.2                   |
| <b>Total</b>            | <b>556</b>                          | <b>5.27</b>           |

## NLR - DETAILED WATER DEMAND CALCULATIONS

## Lodges

| Amenities    | Water Consumption per Fixture | Period Use | Water Usage   | Units               | Assumptions   |
|--------------|-------------------------------|------------|---------------|---------------------|---|
| Showers      | 9                             | 15         | 135           | L/Person/Day        | Assumed 3 to 4 Star WELS rating fixtures with average 7.5 to 9L/min.<br>Guest will typically take 2 long shower daily.  |
| Toilet       | 4.5 / 3 L                     | 5          | 18            | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 4.5 L for full flush and 3 L for half flush.<br>Guest is estimated to utilise toilet with 2 Full Flush & 3 Half Flush daily.             |
| Basin        | 7.5                           | 3.5        | 26.25         | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 7.5 L/min.<br>Each toilet usage will require at least 0.5 min for hand wash with additional 1 min of usage for general hygienic purposes |
| <b>Total</b> |                               |            | <b>179.25</b> | <b>L/person/day</b> |   |

## GM House (Facility available in the building is not known)

| Amenities    | Water Consumption per Fixture | Period Use | Water Usage   | Units               | Assumptions   |
|--------------|-------------------------------|------------|---------------|---------------------|---|
| Showers      | 9                             | 10         | 90            | L/Person/Day        | Assumed 3 to 4 Star WELS rating fixtures with average 7.5 to 9L/min.<br>Staff will typically take shorter shower daily and have a total of 2 showers a day.                               |
| Toilet       | 4.5 / 3 L                     | 5          | 18            | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 4.5 L for full flush and 3 L for half flush.<br>Staff is estimated to utilise toilet with 2 Full Flush & 3 Half Flush daily.             |
| Basins       | 7.5                           | 3.5        | 26.25         | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 7.5 L/min.<br>Each toilet usage will require at least 0.5 min for hand wash with additional 1 min of usage for general hygienic purposes |
| Laundry      | 68                            | 0.25       | 17            | L/Person/Day        | Assumed 4 Star WELS rating appliance with average water usage of 68 L per full load.<br>Assumed staff will do laundry once every 4 days   |
| Kitchen      | 15                            | 3          | 45            | L/Person/Day        | Water consumption per meal is assumed to be 15L/meal and each person prepares 3 meals/ day  |
| <b>Total</b> |                               |            | <b>196.25</b> | <b>L/person/day</b> |   |

## Caravan Park

| Amenities    | Water Consumption per Fixture | Period Use | Water Usage  | Units               | Assumptions   |
|--------------|-------------------------------|------------|--------------|---------------------|---|
| Showers      | 9                             | 5          | 45           | L/Person/Day        | Assumed 3 to 4 Star WELS rating fixtures with average 7.5 to 9 L/min.<br>Caravan park visitor will be taking quick shower (probably timer shower facility) of approximate 5 min.  |
| Toilet       | 4.5 / 3 L                     | 4          | 13.5         | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 4.5 L for full flush and 3 L for half flush.<br>Guest is estimated to utilise toilet with 1 Full Flush & 3 Half Flush daily.   |
| Basins       | 7.5                           | 5          | 37.5         | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 7.5 L/min.<br>Each toilet usage will require at least 0.5 min for hand wash with additional 3 min of usage for general hygienic purposes and washing of camping equipment.                             |
| Laundry      | 68                            | 0.14       | 9.7          | L/Person/Day        | Assumed 4 Star WELS rating appliance with average water usage of 68 L per full load.<br>Assumed guest will do laundry once every 7 days   |
| Kitchen      | 10                            | 3          | 30           | L/Person/Day        | Water consumption per meal is assumed to be 10L/meal and each Caravan Park guest prepares 3 meals/ day  |
| <b>Total</b> |                               |            | <b>135.7</b> | <b>L/person/day</b> |   |
| <b>Total</b> |                               |            | <b>140.0</b> | <b>L/person/day</b> | <a href="https://ww2.health.wa.gov.au/Articles/S_T/Supplement-to-Regulation-29-and-Schedule-9-Wastewater-system-loading-rates">https://ww2.health.wa.gov.au/Articles/S_T/Supplement-to-Regulation-29-and-Schedule-9-Wastewater-system-loading-rates</a> |

## Staff Accommodation

| Amenities    | Water Consumption per Fixture | Period Use | Water Usage | Units               | Assumptions   |
|--------------|-------------------------------|------------|-------------|---------------------|---|
| Showers      | 9                             | 6          | 54          | L/Person/Day        | Assumed 3 to 4 Star WELS rating fixtures with average 7.5 to 9L/min.<br>Staff will typically take shorter shower daily and have a total of 2 showers a day.                               |
| Toilet       | 4.5 / 3 L                     | 5          | 18          | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 4.5 L for full flush and 3 L for half flush.<br>Staff is estimated to utilise toilet with 2 Full Flush & 3 Half Flush daily.             |
| Basins       | 7.5                           | 2          | 15          | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 7.5 L/min.<br>Each toilet usage will require at least 0.5 min for hand wash with additional 1 min of usage for general hygienic purposes |
| Laundry      | 68                            | 0.25       | 17          | L/Person/Day        | Assumed 4 Star WELS rating appliance with average water usage of 68 L per full load.<br>Assumed staff will do laundry once every 4 days   |
| <b>Total</b> |                               |            | <b>104</b>  | <b>L/person/day</b> |   |

**Bistro/Café/Restaurant (as per AS1547 2012)**

| Item         | Water Usage (L/person/day) | Units               |
|--------------|----------------------------|---------------------|
| Breakfast    | 15                         | L/meal              |
| Lunch        | 20                         | L/meal              |
| Dinner       | 30                         | L/meal              |
| <b>Total</b> | <b>65</b>                  | <b>L/Person/day</b> |

**Day Visitor**

| Amenities    | Water Consumption per Fixture | Period Use | Water Usage | Units               | Assumptions   |
|--------------|-------------------------------|------------|-------------|---------------------|---|
| Toilet       | 4.5 / 3 L                     | 1          | 6           | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 4.5 L for full flush and 3 L for half flush. Day Visitor is estimated to utilise toilet with 2 Half Flush. |
| Basins       | 7.5                           | 1          | 7.5         | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 7.5 L/min. Each toilet usage will require at least 0.5 min for hand wash                                   |
| <b>Total</b> |                               |            | <b>13.5</b> | <b>L/person/day</b> |   |

**Non Residential Staff**

| Amenities    | Water Consumption per Fixture | Period Use | Water Usage | Units               | Assumptions   |
|--------------|-------------------------------|------------|-------------|---------------------|---|
| Toilet       | 4.5 / 3 L                     | 1          | 10.5        | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 4.5 L for full flush and 3 L for half flush. Staff is estimated to utilise toilet with 1 Full Flush & 2 Half Flush.                  |
| Basins       | 7.5                           | 2.5        | 18.75       | L/Person/Day        | Assumed 4 Star WELS rating fixtures with average 7.5 L/min. Each toilet usage will require at least 0.5 min for hand wash and additional 1 min of usage for general hygienic purposes |
| <b>Total</b> |                               |            | <b>29.3</b> | <b>L/person/day</b> |   |

**Resort Laundry**

| Amenities    | Water Consumption per Fixture | Period Use | Water Usage | Units               | Assumptions                                 |
|--------------|-------------------------------|------------|-------------|---------------------|---|
| Laundry      | 22.7                          | 1          | 22.7        | L/Person/Day        | As per Laundry (Linen & Towel) calculations |
| <b>Total</b> |                               |            | <b>22.7</b> | <b>L/person/day</b> |   |

**Laundry (Linen & Towel)**

Linen and Towel Weight for 1 Bed (Queen) for 2 People

| Item                  | Quantity | Weight (g) | Total Weight (g) | Units           |
|-----------------------|----------|------------|------------------|-----------------|
| Queen Duvet Cover     | 1        | 800        | 800              | g               |
| Queen Sheet           | 1        | 900        | 900              | g               |
| Pillow Case           | 2        | 150        | 300              | g               |
| Bath Towel (Rooms)    | 2        | 600        | 1200             | g               |
| Bath Towel (Spa/Pool) | 2        | 600        | 1200             | g               |
| Hand Towel            | 2        | 250        | 500              | g               |
| <b>Total</b>          |          |            | <b>4900</b>      | <b>g</b>        |
|                       |          |            | <b>2450</b>      | <b>g/person</b> |

| Product            | Material  | Weight |
|--------------------|-----------|--------|
| Bath sheet         | Towelling | 800g   |
| Bath-towel         | Towelling | 600g   |
| Double duvet cover | Cotton    | 700g   |
| Double sheet       | Cotton    | 600g   |
| Hand-towel         | Towelling | 250g   |
| Pillow-case        | Cotton    | 150g   |
| Single sheet       | Cotton    | 250g   |
| Tea towel          | Cotton    | 60g    |
| Queen Sheet        | Cotton    | 800g   |
| King Sheet         | Cotton    | 900g   |
| Queen Duvet Cover  | Cotton    | 800g   |
| King Duvet Cover   | Cotton    | 1kg    |

\* Assumed Commercial Washing Machine of 9kg Load with 68 L/wash (4 WELS Rating)

<https://www.harveynormancommercial.com.au>

| Details                       | Value       | Unit               |
|-------------------------------|-------------|--------------------|
| Water Usage per Wash          | 68          | L/wash             |
| Washing Machine Max Load      | 9000        | g                  |
| Laundry Weight per Guest      | 2450        | g/guest            |
| No of Guest per Washing Load  | 3           | Guest / Load       |
| Laundry Water Usage per Guest | <b>22.7</b> | <b>L/Guest/Day</b> |

**Executive Suites Shared Jacuzzi Peak Water Usage Calculations**

| Details                                  | Value | Unit         | Notes   |
|--|-------|--------------|---|
| Pool Size                                | 168   | m2           | Approximately 12m x 14m                             |
| Backwash                                 | 2240  | L            | 400 L for 30sqm pool at Emirates Resort             |
| Backwash Frequency                       | 1     | per week     |   |
| Backwash Water per Day                   | 320   | L/day        |   |
| Backwash                                 | 53.3  | mm/month     |   |
| Evaporation Rates                        | 375   | mm/month     | Highest evap. Rate                                  |
| Rainfall                                 | 21    | mm/month     |   |
| Water Loss in Splashing                  | 4     | L/person/day | Assumed   |
| Pool Water Consumption                   | 11.8  | mm/day       | Net evap based on 30 day month                      |
|  | 1982  | L/day        | Multiply net evap. by pool area                     |
| Pool Water Consumption include Splashing | 2356  | L/day        | Pool net evap + backwash + Splashing with max. occ. |

**Executive Suites Shared Jacuzzi Min Water Usage Calculations**

| Details                                  | Value | Unit         | Notes   |
|--|-------|--------------|---|
| Pool Size                                | 168   | m2           | Approximately 12m x 14m                             |
| Backwash                                 | 2240  | L            | 400 L for 30sqm pool at Emirates Resort             |
| Backwash Frequency                       | 1     | per week     |   |
| Backwash Water per Day                   | 320   | L/day        |   |
| Backwash                                 | 53.3  | mm/month     |   |
| Evaporation Rates                        | 120   | mm/month     | Lowest evap rate                                    |
| Rainfall                                 | 21    | mm/month     |   |
| Water Loss in Splashing                  | 4     | L/person/day | Assumed   |
| Pool Water Consumption                   | 3.3   | mm/day       | Net evap based on 30 day month                      |
|  | 554   | L/day        | Multiply net evap. by pool area                     |
| Pool Water Consumption include Splashing | 892   | L/day        | Pool net evap + backwash + Splashing with min. occ. |

**Executive Suites Shared Jacuzzi Average Water Usage Calculations**

| Details                                  | Value | Unit         | Notes  |
|--|-------|--------------|--|
| Pool Size                                | 168   | m2           | Approximately 12m x 14m                              |
| Backwash                                 | 2240  | L            | 400 L for 30sqm pool at Emirates Resort              |
| Backwash Frequency                       | 1     | per week     |  |
| Backwash Water per Day                   | 320   | L/day        |  |
| Backwash                                 | 53.3  | mm/month     |  |
| Evaporation Rates                        | 258   | mm/month     | Average evap rate                                    |
| Rainfall                                 | 21    | mm/month     |  |
| Water Loss in Splashing                  | 4     | L/person/day | Assumed  |
| Pool Water Consumption                   | 7.9   | mm/day       | Net evap based on 30 day month                       |
|  | 1327  | L/day        | Multiply net evap. by pool area                      |
| Pool Water Consumption include Splashing | 1686  | L/day        | Pool net evap + backwash + Splashing with avge. occ. |

## Main Pool Peak Water Usage Calculations

| Details                                  | Value | Unit           | Notes   |
|--|-------|----------------|---|
| Pool Size                                | 200   | m <sup>2</sup> | 25mx8m  |
| Backwash                                 | 2667  | L              | 400 L for 30sqm pool at Emirates Resort         |
| Backwash Frequency                       | 1     | per week       |   |
| Backwash Water per Day                   | 381   | L/day          |   |
| Backwash                                 | 53    | mm/month       |   |
| Evaporation Rates                        | 375   | mm/month       |   |
| Rainfall                                 | 21    | mm/month       |   |
| Water Loss in Splashing                  | 4     | L/person/day   | (Assumed)                                       |
| Pool Water Consumption                   | 11.8  | mm/day         | (based on 30 day month)                         |
|  | 2360  | L/day          |   |
| Pool Water Consumption include Splashing | 4743  | L/day          | (Assume all guest (331 people) uses pool daily) |

## Main Pool Average Water Usage Calculations

| Details                                  | Value | Unit           | Notes   |
|--|-------|----------------|---|
| Pool Size                                | 200   | m <sup>2</sup> | 25mx8m  |
| Backwash                                 | 2667  | L              | 400 L for 30sqm pool at Emirates Resort         |
| Backwash Frequency                       | 1     | per week       |   |
| Backwash Water per Day                   | 381   | L/day          |   |
| Backwash                                 | 53    | mm/month       |   |
| Evaporation Rates                        | 258   | mm/month       |   |
| Rainfall                                 | 21    | mm/month       |   |
| Water Loss in Splashing                  | 4     | L/person/day   | (Assumed)                                       |
| Pool Water Consumption                   | 8     | mm/day         | (based on 30 day month)                         |
|  | 1580  | L/day          |   |
| Pool Water Consumption include Splashing | 3389  | L/day          | (Assume all guest (212 people) uses pool daily) |

## Main Pool Min Water Usage Calculations

| Details                                  | Value | Unit           | Notes  |
|--|-------|----------------|--|
| Pool Size                                | 200   | m <sup>2</sup> | 25mx8m   |
| Backwash                                 | 2667  | L              | 400 L for 30sqm pool at Emirates Resort        |
| Backwash Frequency                       | 1     | per week       |  |
| Backwash Water per Day                   | 381   | L/day          |  |
| Backwash                                 | 53    | mm/month       |  |
| Evaporation Rates                        | 120   | mm/month       |  |
| Rainfall                                 | 21    | mm/month       |  |
| Water Loss in Splashing                  | 4     | L/person/day   | (Assumed)                                      |
| Pool Water Consumption                   | 3.3   | mm/day         | (based on 30 day month)                        |
|  | 660   | L/day          |  |
| Pool Water Consumption include Splashing | 1708  | L/day          | (Assume all guest (99 people) uses pool daily) |

NLR Potable Water Balance

| Resort Occupancy Summary  |           |
|---------------------------|-----------|
| Location                  | Occupancy |
| Resort Peak Occupancy     | 90%       |
| Caravan Peak Occupancy    | 90%       |
| Resort Average Occupancy  | 64%       |
| Caravan Average Occupancy | 64%       |
| Resort Minimum Occupancy  | 30%       |
| Caravan Minimum Occupancy | 30%       |

| Proportion of Bistro/Cafe Catering |            |
|------------------------------------|------------|
| Location                           | Proportion |
| Executive Suites                   | 50%        |
| Cabins and Lodges                  | 50%        |
| Caravan Park                       | 50%        |

| Proportion of Bar Catering |            |
|----------------------------|------------|
| Population                 | Proportion |
| Caravan Park               | 0%         |
| Staff                      | 0%         |

| Spa & Wellness Centre Usage |            |
|-----------------------------|------------|
| Location                    | Proportion |
| Resort                      | 0%         |
| Caravan Park                | 0%         |

| EP Cals for Water Balance |     |  |
|---------------------------|-----|--|
| Population                | EP  | Notes                                      |
| Non-Residential Staff     | 0.2 | 1/5 water consumption of Residential Staff |
| Day Visitor               | 0.1 | 1/10 water consumption of Guest            |

| Facility                                       | Dwellings Type & Beds |           |   | Population      |                    |                    | Water Demand (L/person/day) | Peak Water Usage (L/day) | Average Water Usage (L/day) | Minimum Water Usage (L/day) |
|--|-----------------------|-----------|---|-----------------|--------------------|--------------------|-----------------------------|--------------------------|-----------------------------|-----------------------------|
|  | Dwellings/ No         | No of Bed | Pax per Bed (Overnight Population) / Occupancy (Day Population) / Usage Rate (Facility) | Peak Population | Average Population | Minimum Population |                             |                          |                             |                             |
| Executive Suites                               | 6                     | 1         | 2.5   | 15              | 10                 | 5                  | 349.3                       | 5,239                    | 3,493                       | 1,746                       |
| 1 Bed Cabin Self-Catered                       | 9.5                   | 1         | 1.8   | 17              | 11                 | 5                  | 224.3                       | 3,835                    | 2,461                       | 1,150                       |
| 1 Bed Cabin Cafe Catered                       | 9.5                   | 1         | 1.8   | 17              | 11                 | 5                  | 179.3                       | 3,065                    | 1,967                       | 920                         |
| 2 Bed Cabin Self-Catered                       | 9.5                   | 2         | 1.8   | 34              | 22                 | 10                 | 349.3                       | 11,875                   | 7,664                       | 3,493                       |
| 2 Bed Cabin Cafe Catered                       | 9.5                   | 2         | 1.8   | 34              | 22                 | 10                 | 304.3                       | 10,345                   | 6,677                       | 3,043                       |
| Surf Lodges                                    | 12                    | 1         | 1.8   | 22              | 14                 | 6                  | 179.3                       | 3,944                    | 2,510                       | 1,076                       |
| Day Visitor                                    | 1                     |           | 15  | 15              | 15                 | 15                 | 13.5                        | 203                      | 203                         | 203                         |
| <b>Total Guest &amp; Visitor Usage (L/day)</b> |                       |           |   | <b>154</b>      | <b>105</b>         | <b>56</b>          |                             | <b>38,504</b>            | <b>24,973</b>               | <b>11,629</b>               |
| GM House                                       | 1                     | 1         | 2   | 2               | 2                  | 2                  | 196.3                       | 393                      | 393                         | 393                         |
| Staff Accommodation                            | 20                    |           | 1   | 20              | 20                 | 20                 | 104.0                       | 2,080                    | 2,080                       | 2,080                       |
| Non-Residential Staff                          | 1                     |           | 20  | 20              | 13                 | 6                  | 29.3                        | 585                      | 380                         | 176                         |
| <b>Total Staff Usage (L/day)</b>               |                       |           |   | <b>42</b>       | <b>35</b>          | <b>28</b>          |                             | <b>3,058</b>             | <b>2,853</b>                | <b>2,648</b>                |

| Facility  | Dwellings Type & Beds |           |   | Population      |                    |                    | Water Demand (L/person/day)      | Peak Water Usage (L/day) | Average Water Usage (L/day) | Minimum Water Usage (L/day) |
|---|-----------------------|-----------|---|-----------------|--------------------|--------------------|----------------------------------|--------------------------|-----------------------------|-----------------------------|
|   | Dwellings/ No         | No of Bed | Pax per Bed (Overnight Population) / Occupancy (Day Population) / Usage Rate (Facility) | Peak Population | Average Population | Minimum Population |                                  |                          |                             |                             |
| Caravan -Self Catered                                 | 120                   |           | 3   | 360             | 231                | 108                | 140.0                            | 50,400                   | 32,340                      | 15,120                      |
| <b>Total Caravan Park Usage (L/day)</b>               |                       |           |   | <b>360</b>      | <b>231</b>         | <b>108</b>         |                                  | <b>50,400</b>            | <b>32,340</b>               | <b>15,120</b>               |
| Cafe Guests - 1 Bed Cabins                            |                       |           | 50%   | 17              | 11                 | 5                  | 65.0                             | 1,112                    | 713                         | 333                         |
| Cafe Guests - 2 Bed Cabins                            |                       |           | 50%   | 34              | 22                 | 10                 | 65.0                             | 2,210                    | 1,426                       | 650                         |
| Cafe Guests - Surf Lodges                             |                       |           | 50%   | 11              | 7                  | 3                  | 65.0                             | 715                      | 455                         | 195                         |
| Cafe Guests - Caravan Park                            |                       |           | 30%   | 108             | 69                 | 32                 | 65.0                             | 7,020                    | 4,505                       | 2,106                       |
| Cafe Guests - Day Visitor (1 Meal)                    |                       |           | 50%   | 15              | 15                 | 15                 | 32.5                             | 488                      | 488                         | 488                         |
| Camp kitchen  |                       |           | 50%   | 180             | 116                | 54                 | 65.0                             | 11,700                   | 7,508                       | 3,510                       |
| Restaurant Guests - Non Residential Staff (1 Meal)    |                       |           | 0%  | 0               | 0                  | 0                  | 65.0                             | 0                        | 0                           | 0                           |
| <b>Total Bistro/Café + Camp Kitchen Usage (L/day)</b> |                       |           |   | <b>365</b>      | <b>240</b>         | <b>120</b>         |                                  | <b>23,244</b>            | <b>15,094</b>               | <b>7,282</b>                |
| Main Pool   |                       |           |   |                 |                    |                    |                                  | 4,743                    | 3,389                       | 1,708                       |
| Executive Suites Shared Jacuzzi                       |                       |           |   |                 |                    |                    |                                  | 2,356                    | 1,686                       | 892                         |
| Laundry   |                       |           | 100%  | 139             | 90                 | 41                 | 22.7                             | 3,155                    | 2,036                       | 935                         |
| <b>Total Facilities Usage (L/day)</b>                 |                       |           |   |                 |                    |                    |                                  | <b>10,255</b>            | <b>7,110</b>                | <b>3,536</b>                |
| <b>Total Population (EP)</b>                          |                       |           |   | <b>527</b>      | <b>347</b>         | <b>174</b>         | <b>Water Consumption (L/Day)</b> | <b>125,460</b>           | <b>82,370</b>               | <b>40,215</b>               |
| <b>Annual Water Demand (ML/annum)</b>                 |                       |           |   |                 |                    |                    |                                  | <b>46</b>                | <b>30</b>                   | <b>15</b>                   |
| <b>Water Consumption Per Capita (L/Person/Day)</b>    |                       |           |   |                 |                    |                    |                                  | <b>238</b>               | <b>237</b>                  | <b>231</b>                  |

**Assumptions**

- 1) A total of 20 staff staying on-site and remains constant throughout the year.
- 2) General Manager family will reside at GM Lodge for 365 days annually. Assumed GM family consist of 2 adults.
- 3) Other water usages (such as boat/vehicle washing) is not being considered.
- 4) Day visitor population assumed to be 15 people and is assumed to remain the same for the entire year as it has negligible impact on the water and wastewater balance and it allows for some conservatism to be built in to the water & wastewater balance. Day visitor water consumption is based on two toilet uses and two hand basin uses. Water usage has been calculated to be 13.5L/day visitor
- 5) Based on the water consumption per capita, day visitor and non-residential staff is assumed to have an EP of 0.1 and 0.2 respectively.
- 6) 50% of caravan users will use camp kitchen.
- 7) Bistro/Café has 150 PAX capacity



**NINGALOO LIGHTHOUSE RESORT - MONTHLY POTABLE WATER DEMAND**

| No. of Day / Month               | Jan<br>31  | Feb<br>28  | Mar<br>31  | Apr<br>30  | May<br>31  | Jun<br>30  | Jul<br>31  | Aug<br>31  | Sep<br>30  | Oct<br>31  | Nov<br>30  | Dec<br>31  | Average    |
|----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>DAILY EP</b>                  |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Non-Caravan Guests               | 59         | 78         | 118        | 167        | 157        | 157        | 177        | 167        | 167        | 128        | 78         | 59         | 126        |
| Caravan Guests                   | 108        | 144        | 216        | 306        | 288        | 288        | 324        | 306        | 306        | 234        | 144        | 108        | 231        |
| Day Visitors                     | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 2          |
| Residential Staffs               | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         |
| Non-Residential Staffs           | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          |
| <b>Total EP</b>                  | <b>214</b> | <b>270</b> | <b>381</b> | <b>520</b> | <b>492</b> | <b>492</b> | <b>548</b> | <b>520</b> | <b>520</b> | <b>409</b> | <b>270</b> | <b>214</b> | <b>404</b> |
| <b>WATER USAGE</b>               |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Average Water Usage (kL/day)     | 51         | 64         | 91         | 124        | 117        | 117        | 130        | 124        | 124        | 97         | 64         | 51         | 96         |
| Average Water Usage (ML/month)   | 1.578      | 1.795      | 2.806      | 3.706      | 3.625      | 3.508      | 4.034      | 3.829      | 3.706      | 3.011      | 1.923      | 1.578      | 2.925      |
| Bore water demand (kL/month)     | 2630       | 2991       | 4676       | 6176       | 6041       | 5846       | 6723       | 6382       | 6176       | 5018       | 3205       | 2630       |            |
| RO plant reject water (kL/month) | 1052       | 1197       | 1871       | 2470       | 2416       | 2338       | 2689       | 2553       | 2470       | 2007       | 1282       | 1052       |            |
| Bore water demand (kL/month)     | 3944       | 4487       | 7015       | 9264       | 9061       | 8769       | 10085      | 9573       | 9264       | 7526       | 4807       | 3944       |            |
| RO plant reject water (kL/month) | 1578       | 1795       | 2806       | 3706       | 3625       | 3508       | 4034       | 3829       | 3706       | 3011       | 1923       | 1578       |            |

| Details  | Value | Unit         |
|--|-------|--------------|
| Average Water Usage per Capita                           | 237.4 | L/person/day |
| WTP Brackish Water Reject                                | 40%   |              |
| WTP Seawater Water Reject                                | 60%   |              |
| Peak Daily Average Water Usage Rate                      | 130.1 | kL/day       |
| Average Daily Water Usage Rate                           | 96.0  | kL/day       |
| Minimum Daily Water Usage Rate                           | 50.9  | kL/day       |
| Annual Average Potable Water Demand                      | 35.1  | ML/annum     |
| Annual Minimum Brackish Bore Water Demand to Feed the RO | 58.5  | ML/annum     |
| Annual Minimum Seawater Bore Water Demand to Feed the RO | 87.7  | ML/annum     |
| Current GW Abstraction Licence Allowance                 | 72    | ML/annum     |

|                             |         |            |
|-----------------------------|---------|------------|
| Brackish salt concentration | 14,000  | mg/L       |
| Brackish salt removed       | 818.91  | Tonne/year |
| Saltwater concentration     | 35,000  | mg/L       |
| Saltwater removed           | 3070.93 | Tonne/year |

## Notes

- 1) Based on the water consumption per capita, Day Visitors and Non-Residential Staff is assumed to have an EP of 0.1 and 0.2 respectively.

NLR Wastewater Balance

| Resort Occupancy Summary  |           |
|---------------------------|-----------|
| Location                  | Occupancy |
| Resort Peak Occupancy     | 90%       |
| Caravan Peak Occupancy    | 90%       |
| Resort Average Occupancy  | 64%       |
| Caravan Average Occupancy | 64%       |
| Resort Minimum Occupancy  | 30%       |
| Caravan Minimum Occupancy | 30%       |

| Proportion of Bistro/Cafe Catering |            |
|------------------------------------|------------|
| Location                           | Proportion |
| High End Villa                     | 50%        |
| Sunset Villa                       | 50%        |
| Caravan Park                       | 50%        |

| Proportion of Bar Catering |            |
|----------------------------|------------|
| Population                 | Proportion |
| Caravan Park               | 0%         |
| Staff                      | 0%         |

| Spa & Wellness Centre Usage |            |
|-----------------------------|------------|
| Location                    | Proportion |
| Resort                      | 0%         |
| Caravan Park                | 0%         |

| EP Cals for Wastewater Balance |     |  |
|--------------------------------|-----|--|
| Population                     | EP  | Notes  |
| Non-Residential Staff          | 0.2 | 1/5 wastewater generation of Residential Staff |
| Day Visitor                    | 0.1 | 1/10 wastewater generation of Guest            |

| Facility   | Dwellings Type & Beds |           |   | Population      |                    |                    | Wastewater Generation (L/person/day) | Peak Wastewater Generation (L/day) | Average Wastewater Generation (L/day) | Minimum Wastewater Generation (L/day) |
|--|-----------------------|-----------|---|-----------------|--------------------|--------------------|--------------------------------------|------------------------------------|---------------------------------------|---------------------------------------|
|  | Dwellings/ No         | No of Bed | Pax per Bed (Overnight Population) / Occupancy (Day Population) / Usage Rate (Facility) | Peak Population | Average Population | Minimum Population |                                      |                                    |                                       |                                       |
| Executive Suites                                       | 6                     | 1         | 2.5   | 15              | 10                 | 5                  | 179.3                                | 2,689                              | 1,793                                 | 896                                   |
| 1 Bed Cabin Self-Catered                               | 9.5                   | 1         | 1.8   | 17              | 11                 | 5                  | 224.3                                | 3,835                              | 2,461                                 | 1,150                                 |
| 1 Bed Cabin Cafe Catered                               | 9.5                   | 1         | 1.8   | 17              | 11                 | 5                  | 179.3                                | 3,065                              | 1,967                                 | 920                                   |
| 2 Bed Cabin Self-Catered                               | 9.5                   | 2         | 1.8   | 34              | 22                 | 10                 | 349.3                                | 11,875                             | 7,664                                 | 3,493                                 |
| 2 Bed Cabin Cafe Catered                               | 9.5                   | 2         | 1.8   | 34              | 22                 | 10                 | 304.3                                | 10,345                             | 6,677                                 | 3,043                                 |
| Surf Lodges  | 12                    | 1         | 1.8   | 22              | 14                 | 6                  | 179.3                                | 3,944                              | 2,510                                 | 1,076                                 |
| Day Visitor  | 1                     |           | 15  | 15              | 15                 | 15                 | 13.5                                 | 203                                | 203                                   | 203                                   |
| <b>Total Guest &amp; Visitor WW Generation (L/day)</b> |                       |           |   | <b>154</b>      | <b>105</b>         | <b>56</b>          |                                      | <b>35,954</b>                      | <b>23,273</b>                         | <b>10,779</b>                         |
| GM House   | 1                     | 1         | 2   | 2               | 2                  | 2                  | 196.3                                | 393                                | 393                                   | 393                                   |
| Staff Accommodation                                    | 20                    |           | 1   | 20              | 20                 | 20                 | 104.0                                | 2,080                              | 2,080                                 | 2,080                                 |
| Non-Residential Staff                                  | 1                     |           | 20  | 20              | 13                 | 6                  | 29.3                                 | 585                                | 380                                   | 176                                   |
| <b>Total Staff WW Generation (L/day)</b>               |                       |           |   | <b>42</b>       | <b>35</b>          | <b>28</b>          |                                      | <b>3,058</b>                       | <b>2,853</b>                          | <b>2,648</b>                          |
| Caravan -Self Catered                                  | 120                   |           | 3   | 360             | 231                | 108                | 140.0                                | 50,400                             | 32,340                                | 15,120                                |
| Caravan - Restaurant Catered                           | 0                     |           | 3   | 0               | 0                  | 0                  | 110.0                                | 0                                  | 0                                     | 0                                     |

05-Wastewater Balance

|   |  |      |  |            |            |            |  |                |               |               |
|---|--|------|--|------------|------------|------------|--|----------------|---------------|---------------|
| <b>Total Caravan Park WW Generation (L/day)</b>               |  |      |  | <b>360</b> | <b>231</b> | <b>108</b> |  | <b>50,400</b>  | <b>32,340</b> | <b>15,120</b> |
| Cafe Guests - 1 Bed Cabins                                    |  | 50%  |  | 17         | 11         | 5          | 65.0                                       | 1,112          | 713           | 333           |
| Cafe Guests - 2 Bed Cabins                                    |  | 50%  |  | 34         | 22         | 10         | 65.0                                       | 2,210          | 1,426         | 650           |
| Cafe Guests - Surf Lodges                                     |  | 50%  |  | 11         | 7          | 3          | 65.0                                       | 715            | 455           | 195           |
| Cafe Guests - Caravan Park                                    |  | 30%  |  | 108        | 69         | 32         | 65.0                                       | 7,020          | 4,505         | 2,106         |
| Cafe Guests - Day Visitor (1 Meal)                            |  | 50%  |  | 15         | 15         | 15         | 32.5                                       | 488            | 488           | 488           |
| Camp kitchen  |  | 50%  |  | 180        | 116        | 54         | 65.0                                       | 11,700         | 7,508         | 3,510         |
| Restaurant Guests - Non Residential Staff (1 Meal)            |  | 0%   |  | 0          | 0          | 0          | 65.0                                       | 0              | 0             | 0             |
| <b>Total Bistro/Café + Camp Kitchen WW Generation (L/day)</b> |  |      |  | <b>365</b> | <b>240</b> | <b>120</b> |  | <b>23,244</b>  | <b>15,094</b> | <b>7,282</b>  |
| Main Pool   |  |      |  |            |            |            |  | 381            | 381           | 381           |
| Executive Suites Shared Jacuzzi                               |  |      |  |            |            |            |  | 320            | 320           | 320           |
| Laundry   |  | 100% |  | 139        | 90         | 41         | 22.7                                       | 3,155          | 2,036         | 935           |
| <b>Total Facilities WW Generation (L/day)</b>                 |  |      |  |            |            |            |  | <b>3,856</b>   | <b>2,737</b>  | <b>1,636</b>  |
| <b>Total Population (EP)</b>                                  |  |      |  | <b>527</b> | <b>347</b> | <b>174</b> | <b>Wastewater Daily Generation (L/Day)</b> | <b>116,511</b> | <b>76,297</b> | <b>37,465</b> |
| <b>Annual Wastewater Generation (ML/annum)</b>                |  |      |  |            |            |            |  | <b>43</b>      | <b>28</b>     | <b>14</b>     |
| <b>Wastewater Generation Per Capita (L/Person/Day)</b>        |  |      |  |            |            |            |  | <b>221</b>     | <b>220</b>    | <b>215</b>    |

**Executive Suites Shared Jacuzzi Peak Wastewater Usage Calculations**

| Details                     | Value | Unit         | Notes     |
|-----------------------------|-------|--------------|-----------|
| Backwash Water per Day      | 320.0 | L/day        |           |
| Other wastewater generation | 0     | L/person/day | (Assumed) |
| Pool Wastewater Generation  | 320.0 | L/day        |           |

**Executive Suites Shared Jacuzzi Average Wastewater Usage Calculations**

| Details                     | Value | Unit         | Notes     |
|-----------------------------|-------|--------------|-----------|
| Backwash Water per Day      | 320.0 | L/day        |           |
| Other wastewater generation | 0     | L/person/day | (Assumed) |
| Pool Wastewater Generation  | 320.0 | L/day        |           |

**Executive Suites Shared Jacuzzi Minimum Wastewater Usage Calculations**

| Details                     | Value | Unit         | Notes     |
|-----------------------------|-------|--------------|-----------|
| Backwash Water per Day      | 320.0 | L/day        |           |
| Other wastewater generation | 0     | L/person/day | (Assumed) |
| Pool Wastewater Generation  | 320.0 | L/day        |           |

**Main Pool Peak Wastewater Contribution Calculations**

| Details                     | Value | Unit         | Notes     |
|-----------------------------|-------|--------------|-----------|
| Backwash Water per Day      | 381.0 | L/day        |           |
| Other wastewater generation | 0     | L/person/day | (Assumed) |
| Pool Wastewater Generation  | 381.0 | L/day        |           |

**Main Pool Average Wastewater Contribution Calculations**

| Details                     | Value | Unit         | Notes     |
|-----------------------------|-------|--------------|-----------|
| Backwash Water per Day      | 381.0 | L/day        |           |
| Other wastewater generation | 0     | L/person/day | (Assumed) |
| Pool Wastewater Generation  | 381.0 | L/day        |           |

**Main Pool Minimum Wastewater Contribution Calculations**

| Details                     | Value  | Unit         | Notes     |
|-----------------------------|--------|--------------|-----------|
| Backwash Water per Day      | 380.95 | L/day        |           |
| Other wastewater generation | 0      | L/person/day | (Assumed) |
| Pool Wastewater Generation  | 381.0  | L/day        |           |

**Assumptions**

- 1) A total of 20 staff staying on-site and remains constant throughout the year.
- 2) General Manager family will reside at GM Lodge for 365 days annually. Assumed GM family consist of 2 adults.
- 3) Other water usages (such as boat/vehicle washing) is not being considered.
- 4) Day visitor population assumed to be 15 people and is assumed to remain the same for the entire year as it has negligible impact on the water and wastewater balance and it allows for some conservatism to be built in
- 5) Based on the wastewater generation per capita, day visitor and non-residential staff is assumed to have an EP of 0.1 and 0.2 respectively.
- 6) 50% of caravan users will use camp kitchen.
- 7) Bistro/Café has 150 PAX capacity
- 8) It was assumed that wastewater generation rate is equivalent to the water usage rate. The wastewater generation rate for the pools only includes backwash water usage.

**NINGALOO LIGHTHOUSE RESORT - MONTHLY WASTEWATER GENERATION**

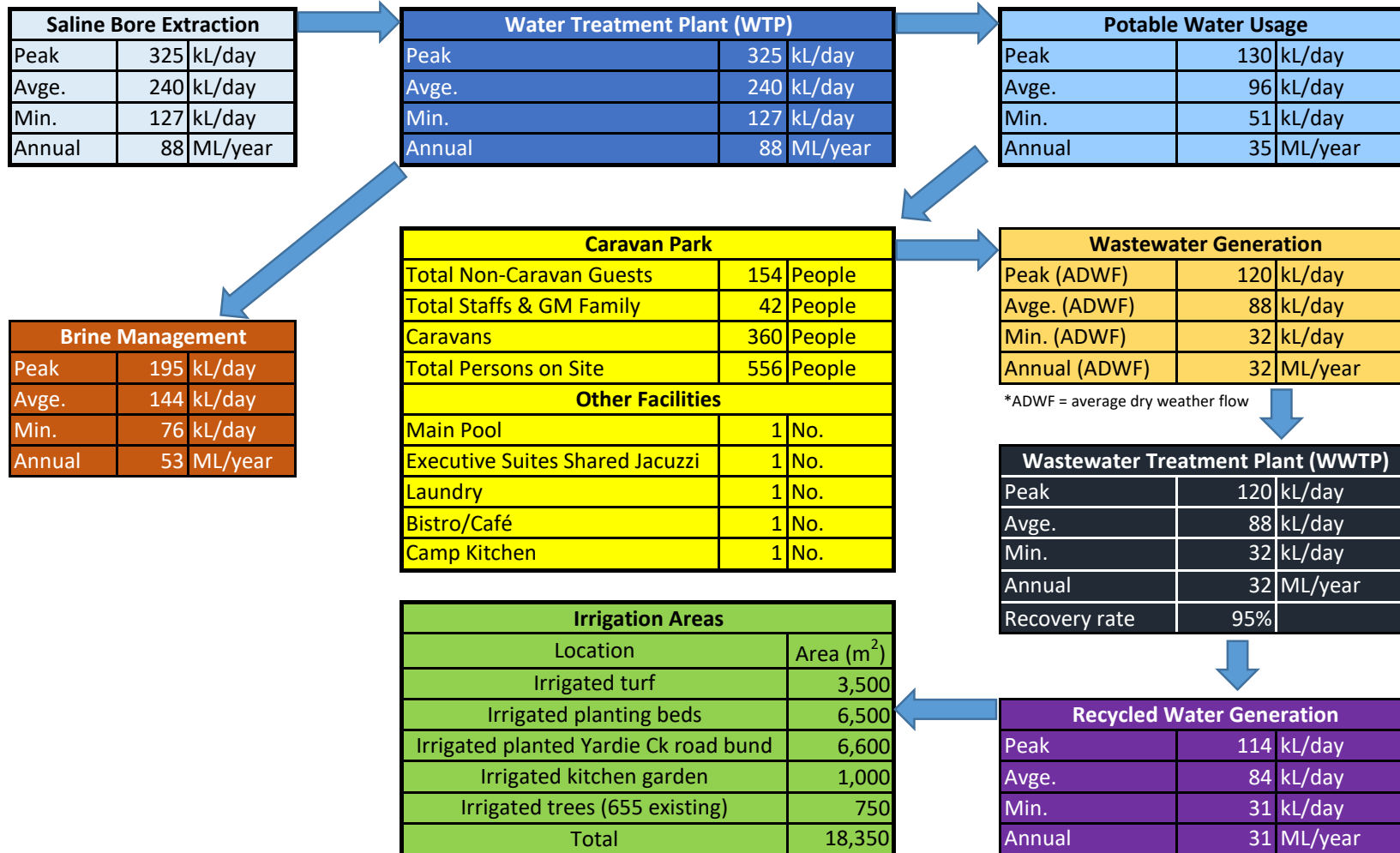
|                                  | Jan        | Feb        | Mar        | Apr        | May        | Jun        | Jul        | Aug        | Sep        | Oct        | Nov        | Dec        | Average    |
|----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>No. of Day / Month</b>        | <b>31</b>  | <b>28</b>  | <b>31</b>  | <b>30</b>  | <b>31</b>  | <b>30</b>  | <b>31</b>  | <b>31</b>  | <b>30</b>  | <b>31</b>  | <b>30</b>  | <b>31</b>  |            |
| <b>DAILY EP</b>                  |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Resort Guests                    | 59         | 78         | 118        | 167        | 157        | 157        | 177        | 167        | 167        | 128        | 78         | 59         | 126        |
| Caravan Guests                   | 108        | 144        | 216        | 306        | 288        | 288        | 324        | 306        | 306        | 234        | 144        | 108        | 231        |
| Day Visitors                     | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 2          |
| Residential Staffs               | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         | 42         |
| Non-Residential Staffs           | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          | 4          |
| <b>Total EP</b>                  | <b>214</b> | <b>270</b> | <b>381</b> | <b>520</b> | <b>492</b> | <b>492</b> | <b>548</b> | <b>520</b> | <b>520</b> | <b>409</b> | <b>270</b> | <b>214</b> | <b>404</b> |
| <b>WASTEWATER GENERATION</b>     |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Wastewater Generation (kL/day)   | 47         | 59         | 83         | 114        | 108        | 108        | 120        | 114        | 114        | 90         | 59         | 47         | 88         |
| Wastewater Generation (ML/month) | 1.5        | 1.7        | 2.6        | 3.4        | 3.3        | 3.2        | 3.7        | 3.5        | 3.4        | 2.8        | 1.8        | 1.5        | 2.7        |

| Details   | Value | Unit         |
|---|-------|--------------|
| Average Wastewater Generation per Capita        | 218.8 | L/person/day |
| Peak Daily Wastewater Generation Rate (ADWF)    | 119.9 | kL/day       |
| Average Daily Wastewater Generation Rate (ADWF) | 88.5  | kL/day       |
| Annual Wastewater Generation Rate (ADWF)        | 32.3  | ML/annum     |

## Notes

- 1) Based on the wastewater generation per capita, Day Visitors and Non-Residential Staff is assumed to have an EP of 0.1 and 0.2 respectively.
- 2) It is assumed that the wastewater will be treated and used for irrigation purposes onsite as recycled water.
- 3) No consideration made regarding infiltration.

**NINGALOO LIGHTHOUSE RESORT- OVERALL WATER BALANCE FLOW CHART**



Notes:

- 1) Based on Master Plan file: 221018\_Site Master Plan\_1-2000@A3.pdf from Fiveight on 20 Oct, 2022.
- 2) Irrigation Areas from Emerge email of 17 Oct, 2022. Areas can vary based on results of MEDLI modelling.
- 3) Brine management options: reinjection or evaporation ponds.