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# Section 64 Determinations of Equivalent Tenements Guidelines

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*Section 64 Determinations of Equivalent Tenements Guidelines*  
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# 1 DISCLAIMER AND COPYRIGHT

The *Section 64 Determinations of Equivalent Tenements Guidelines* are based on NSW water industry standards and are current as at March 2017.

These Guidelines are to be used only for input into the process of proportioning developer charges under s64 of the *Local Government Act 1993* to ensure full and equitable cost recovery between different land use categories.

The Guidelines are designed to provide a consistent framework for determining water and sewer equivalent tenements (ET) figures. The calculation of the developer contributions for individual developments is the responsibility of the local water authority.

This revised edition of the Guidelines includes suggested ET figures based on a sample of Local Water Utilities across NSW. It is intended that subsequent editions will be based on a more comprehensive data set from across the State, as more detailed data based on typical water consumptions and sewage loadings for various development types becomes available in the future.

The Water Directorate and its consultants:

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## 2 OVERVIEW

*Section 64 Determinations of Equivalent Tenements Guidelines* have been prepared for use by local government water authorities in regional NSW. These Guidelines are to be used only for input into the process of proportioning developer charges under s64 of the *Local Government Act 1993* to ensure full and equitable cost recovery between different land use categories.

These Guidelines were originally prepared by Hunter Water Australia under the direction and peer review of the Water Directorate's Policy Subcommittee consisting of:

- David Byrne
- Mike Rayner
- Daryl McGregor
- Stewart McLeod
- John Gould

Given the ongoing discussions regarding the various aspects of Section 64 methodology, the Water Directorate commenced data collection in 2007 in order to check and validate some examples of the ET loadings categories in the guidelines.

Further data was collected in 2008 from various member Councils across the state for a number of different land use categories. An Addendum was subsequently published in 2009.

It has now been decided to fully review and re-publish the Guidelines, taking account of the 2009 Addendum and further research carried out by the Western Research Institute of Charles Sturt University.

Since the Guidelines were first published, the Water Directorate has encouraged feedback on the content, structure and usefulness of the document. The focus of the document was to assist Councils with calculating the appropriate Equivalent Tenement (ET) load for water and sewerage systems for various types of development. It is clear that a number of Councils have adopted many aspects of the Guidelines.

The methodology for the setting of the actual charge per ET is set out in the document *Developer Charges Guidelines for Water Supply, Sewerage and Stormwater* published by DPI Water in 2016.

The Guidelines attempt to provide Local Water Utilities with a basis for determining commercial and industrial ET loadings. However, each Council should analyse any relevant local factors to develop their own specific system.

In many areas Councils have adopted a two-stage process for commercial and industrial developments which allows an initial ET loading to be assumed at the time of subdivision (at this time the final use for each separate lot may not be known). This initial ET load is based on an average assumed loading per hectare. The charges applied at the time of subdivision then provide a base entitlement for each allotment. As each allotment is developed, the new ET is calculated based on the type of development to be constructed. This may then equate to an additional charge if the development is a higher water/sewerage user than assumed in the base entitlement. Each council should adopt appropriate policies that deal with these types of applications.

These Guidelines have numerous categories with ET loadings given for water and sewerage. The categories have a 'standard unit' of measure (for example, the standard unit for caravan parks is the number of sites), by which the equivalent water and sewerage tenement(s) can be calculated.

For the 2009 Addendum, in order to review the ET calculations, a number of categories were selected with their standard unit. Councils were requested to provide actual water usage data for each category in accordance with each standard unit.

The data collected was then analysed by the Western Research Institute at the Charles Sturt University to determine whether any statistically significant relationships existed between water consumption and a number of different variables in each development category.

At the outset of the exercise, it was recognised that the collection of consistent data across numerous areas and Councils was an extremely difficult task. Although most Councils have easily accessible data from water meter readings, the data relating to the standard unit of measure was far more difficult to obtain. In many cases, information on individual assessments would need to be made by site inspection, interrogation of the GIS for individual parcels of land, or by referral to original development/building application files. Recognising the limited resources available to all Councils to commit to such a task, the number of categories was limited to the following:

- Bulky Goods Centres
- Caravan Parks
- Clubs
- Hotels
- Motels/Resorts
- Schools
- Shopping Centres
- Supermarkets
- Hospitals
- Motor Vehicle service mechanics
- Service Stations
- Storage Facilities
- Swimming Pools
- Landscape Suppliers/Nurseries
- Restaurants

Upon initial analysis of the data, it also became clear that there could also be different interpretations of the standard unit. Different interpretations were clarified to provide as consistent approach as possible. A total of 257 non-residential water usage figures were analysed in this exercise. Eighteen Councils contributed to the data.

The five categories that did not provide statistically significant relationships and possible reasons for this are discussed below.

*Service Stations* – The Guidelines provide for an ET of 0.6 per lane for service stations. The analysis was on the basis of area (as this was considered to be an easier unit to collect data on). No statistically valid relationship was found for all service stations with area (although there was some relationship for larger stations above 1,000m<sup>2</sup>). There is a range of variables which could impact on water usage at service stations, such as the inclusion of car washing facilities, truck parking areas, motor vehicle facilities and a wide range of retail food and beverage facilities.

*Storage Facilities* – The Guidelines suggest a zero water usage and it is expected that such facilities would not consume much water. The variation found in this current analysis probably related to other indirect factors such as landscaping, rather than the primary business activities.

*Swimming Pools* – The study found some relationship between surface area and water usage with those sites that had smaller pools, but overall the data did not provide a statistically valid relationship. There is a wide range of factors that could influence water consumption including age of swimming pools, evaporation rates in different areas, inclusion of play equipment, indoor and outdoor pools, hours of operation, other integrated facilities and the number of patrons.

*Landscape Supplies and Nurseries* - The Guidelines do not provide a standard water ET for plant nurseries, and note that there is insufficient data to support a standard ET and that these facilities should be considered case by case. An attempt was made to correlate water usage to the surface area of operations. The correlation was found to be relatively weak, with likely variables such as the differences between the primary sources of the business. For example, it is likely that an outlet such as a plant nursery would use more water on a square metre basis than an outlet that has a large focus on the supply of soil, mulch and other such landscape supplies.

*Restaurants* - The Guidelines provide an ET basis on the floor area of a restaurant. Data collected on floor areas did not provide a statistically valid relationship. Further data was collected on the number of seats. This also did not provide a good indicator of water consumption. Variation in the types of restaurant outlets in the sample data may have contributed to this, as well as a number of other wide ranging variables such as hours of operation, turnover of patrons and the method.

In 2016, the Western Research Institute was again engaged to undertake a further review. This review includes:

- A review of high priority ET values on selected categories,
- New ET data and suggested values relating to other non-residential categories of priority, and
- A review of the standard unit of measurement on selected categories.

The non-residential development categories that were reviewed in 2016 are:

- Medical centres
- Vet or grooming salons
- Car washes
- Retirement villages
- Single retail shops
- Public amenity blocks
- Offices
- Take away and fast food shops.

The information has been reviewed and prepared by Mr Tony Holmes from Shoalhaven Water in consultation with the Western Research Institute and using data supplied from 14 Local Water Utilities across NSW.

These revised Guidelines provide a basis for each council to set appropriate ET loads for water and sewerage systems for various types of development. Data collected by the Water Directorate from 18 Councils across NSW and analysed by the Western Research Institute provides an indication of the variability that may exist across different categories and different geographical areas. As with any guidelines, it is important for each end-user to apply appropriate local knowledge and characteristics to any adopted formulae. Knowing some of the variables involved in the different development categories means that individual Councils can collect and apply their own data to the local context. As water usage patterns change, such data collection will provide a basis for further reviews of the way in which water and sewerage development charges are applied.

## 3 EXPLANATION OF LOCAL ET AND STANDARD ET

The following sections include an explanation of Local ET and Standard ET, advice on using the Standard ET figures, an explanation of the user categories and methodologies for establishing ET figures based on local and state-wide data.

### 3.1 The Need for a Local ET and a Standard ET

An 'equivalent tenement' or ET is considered to be the demand or loading a development will have on infrastructure in terms of the water consumption or sewage discharge for an average residential dwelling or house.

While the notion of an equivalent tenement for water demands is generally appropriate for a particular water authority operational area (eg township or local government area), the notion of an equivalent tenement applied across all operational areas in NSW is not strictly valid. This is due to the significant variability that exists in average and peak demands for residential development across NSW (refer to the latest NSW Department of Primary Industries-Water performance reporting). This variability is due to numerous factors, including:

- Household occupancy rates
- Climatic variability (eg rainfall, temperature, humidity)
- Socio-economic variability (extent of household fixtures and gardens)
- The presence of water meters and two part tariffs, and
- Penetration of demand management principles.

While a state-wide based ET would represent an average consumption of around 230 kL/a, a regional based ET may represent an average consumption of between 50% and 300% of this value (DEUS, 2004).

Similar to water, the notion of an equivalent tenement for sewage loadings is generally appropriate for a particular operational area. However, unlike water, the notion of an equivalent tenement applied across all operational areas in NSW is also considered valid. The variability in sewage loadings for single domestic dwellings across NSW is likely to be significantly less than the variability exhibited in water demands, particularly for peak dry weather loadings, as dry weather or average sewage loadings are not greatly influenced by climate. Factors influencing the variability in domestic sewage loadings include:

- Household occupancy rates, and
- Internal water use efficiency, which is dependent on the presence of water meters and two part tariffs, the penetration of demand management principles and the extent of water efficient appliances and fixtures.

Average dry weather sewage rates generally lie between 0.004 L/s/ET and 0.011 L/s/ET. Sewage rates greater than 0.011 L/s/ET may be the result of significant groundwater infiltration. It is generally accepted that a sewer ET represents an average loading of around 0.008 L/s at both a state and local level, with the accepted design value being 0.011 L/s/ET (PWD, 1987).

Therefore, in assessing ET figures, it is important to distinguish between a state-wide or 'Standard' ET and a 'Local' ET.



### **3.2 Definition of a Standard ET**

A Standard ET is considered to be the demand or loading a development will have on infrastructure in terms of the average water consumption or average sewage discharge for an average residential dwelling or house, based on state-wide data.

Based on state averages in performance reporting by the NSW Department of Primary Industries Water (DPI Water) and performance reporting data collected by the Water Services Association of Australia (WSAA, 2001), a Standard ET has been defined, for the purposes of these guidelines, as:

- An average water consumption of 230 kL/a (based on average residential consumption)
- An average sewage loading of 140 kL/a (based on around 60% discharge factor).

### **3.3 Definition of a Local ET**

A Local ET is considered to be the demand or loading a development will have on infrastructure in terms of the average water consumption or average sewage discharge for an average residential dwelling or house, based on data for a particular water authority.

Generally, the average residential water consumption per dwelling should be determined from the total residential house consumption divided by the total number of residential houses. For local water authorities that have a relatively low proportion of medium density type development, the average residential water consumption per dwelling can be taken as the total residential consumption divided by the total number of residential dwellings (ie houses plus flats/units).

If local data on water consumptions for residential houses is not available, the average residential water consumption per dwelling should be adopted from another similar water authority that has established figures.

#### **3.3.1 Local ET Figures for Water**

Residential Local ET figures for water should preferably be determined from local data, where sufficient data is available, on the basis that residential water consumption differs substantially across the state. Standard ET figures may be used where sufficient data is not available to determine figures for a particular residential subcategory (eg units).

For non-residential categories, it is assumed that average water consumptions for particular development types do not differ substantially across the state (particularly if any substantial irrigation usage is considered separately). Therefore, for local water authorities that have a Local ET water consumption that does not differ substantially from the Standard ET water consumption (currently 230 kL/a), Standard ET figures for water can be adopted directly as Local ET figures.

Where the Local ET water consumption does differ substantially from the Standard ET water consumption, Standard ET figures for water should be factored up or down, prior to adopting them for Local ET figures.

#### **3.3.2 Local ET Figures for Sewer**

For both residential and non-residential categories, Standard ET figures for sewer can be adopted directly as Local ET figures, on the basis that sewage loadings for residential and non-residential categories should not differ substantially across the State.

## 4 USING THE STANDARD ET TABLES

Tables of Standard ET figures for a comprehensive list of user categories for Residential, Commercial and Industrial developments are included in the Appendices. The list of user categories is not exhaustive and consequently, advice has been included in the guidelines on how to calculate ET figures for non-typical developments.

The tables may be used to calculate the estimated water and sewer Standard ET for a development in order to assess the applicable water and sewer developer charges. The figures in the tables are based on the current definition of a Standard ET and may need to be converted to Local ET prior to local use by a particular local water authority.

This first edition of the Guidelines includes Standard ET figures for the majority of subcategories, based on current figures used by a sample of water authorities across NSW (refer to Appendix C). However, it is intended that subsequent editions of the Guidelines will include revised Standard ET figures based on a comprehensive set of state-wide data. It is recommended that the revised Standard ET figures are determined using the methodologies proposed within these Guidelines. Priorities for the review and updating of Standard ET figures are included in Appendix E.

## 5 EXPLANATION OF USER CATEGORIES

A list of user categories has been developed based on the range of development types typically encountered by regional NSW local government water authorities. The user categories have been grouped according to the following broad development types:

1. Residential (see *Table 1: Standard ET Figures – Residential User Categories*)
2. Commercial (see *Table 2: Standard ET Figures – Commercial User Categories*)
3. Industrial (see *Table 3: Standard ET Figures – Industrial User Categories*)

The broad development types would generally correspond to the likely land zoning. Contained within each of the broad development types is a list of major categories and subcategories.

### 5.1 Residential User Categories

#### 5.1.1 Single Residential Lots

The majority of developments are residential houses on standard size allotments (approximately 450m<sup>2</sup> to 1,000m<sup>2</sup>). It is generally accepted that a demand / loading of 1 ET is applicable for both water and sewer for residential lots.

An increasing number of single dwelling developments are rural residential developments on larger allotments (greater than 2,000m<sup>2</sup>). While it is generally accepted that for this type of development a loading of 1 ET is applicable for sewer, recorded consumptions from existing rural residential development areas indicate that water consumptions generally exceed standard residential house consumptions.

#### 5.1.2 Multi-Residential Lots (Medium Density – 1 to 2 Storey)

Lots are generally classed as multi-residential if more than one domestic dwelling is located on a single allotment. This includes the following development types:

- Duplexes
- Units (including self care retirement units)
- Flats
- Apartments
- Dual occupancies

While units / flats / apartments exhibit lower water demands (due to reduced occupancy rates and significantly smaller or no gardens) and lower sewage loadings (due to reduced occupancy rates), modern duplexes and dual occupancies exhibit demands / loadings similar to residential houses. Therefore, Duplexes and Dual Occupancies on large lots have generally been considered similar to residential houses.

#### 5.1.3 Multi-Residential Lots (High Density – Multi-storey)

For units / flats / apartments, consideration may be given to further reducing water ET figures for multi-storey developments (compared to standard multi-residential) due to the absence of outdoor watering.

### 5.2 Commercial User Categories

Water ET figures for Commercial user categories exclude allowances for significant irrigation. It is suggested that irrigation be considered separately.

### **5.2.1 Accommodation (Permanent)**

This category includes accommodation dwellings or rooms that are occupied permanently or semi-permanently, but are generally developed on land zoned for commercial purposes. Subcategories include Caravan / Mobile Home Park (with permanent occupation), Boarding House, Nursing Home and Self Care Retirement Unit.

Irrigation and/or tourist accommodation should be considered separately.

### **5.2.2 Accommodation (Short Term)**

This category includes accommodation dwellings or rooms that are occupied temporarily, and are generally developed on land zoned for commercial purposes. Subcategories include Caravan Park, Motel, Backpackers, B&B and Serviced Tourist Apartment.

Irrigation and additional entertainment and sporting facilities such as restaurants, bars, swimming pools, gyms and golf courses should be considered separately.

Permanent accommodation should also be considered separately.

### **5.2.3 Accommodation (Medical Care)**

This category includes medical care accommodation, occupied temporarily, including Hospital and Hostel (medical).

### **5.2.4 Business (Excluding Food Preparation)**

This is a broad category covering general and specific commercial / business development, but generally excludes developments associated with food preparation. General subcategories include Single Shop, Supermarket, Shopping Centre and Office. Specific subcategories have also been included to cover business developments that are likely to differ substantially from the average demands and loadings for the general subcategories. Consequently, the specific subcategories should be used where available, in place of the general subcategories.

### **5.2.5 Food Preparation**

This category covers general and specific commercial / business development associated with food preparation. General subcategories include Restaurant / Cafe, Takeaway / Fast Food and Catering. Specific subcategories have also been included to cover business developments that are likely to differ substantially from the average demands and loadings for the general subcategories (eg Hairdresser, Laundromat). Consequently, the specific subcategories should be used where available, in place of the general subcategories.

### **5.2.6 Entertainment**

This category covers commercial / business development associated with entertainment. Subcategories include Pub / Bar, Licensed Club, Theatre, Function Centre and Marina.

### **5.2.7 Sporting / Spectator Facilities**

This category covers general and specific commercial / business development associated with sporting and spectator facilities. The general subcategory is Amenities & Indoor Facilities. Additional specific facilities such as swimming pools and food preparation areas should be considered separately, as should irrigation. Specific subcategories have been included to cover additional sporting facilities that are likely to differ substantially from the average demands and loadings for the general subcategories (eg Bowling Alley, Swimming Pool). Consequently, the specific subcategories should be used where available, in place of the general subcategories.

### **5.2.8 Community Facilities**

This category covers commercial / business development associated with community facilities. Subcategories include Child Care, Education, Correctional Centre, Church, Community Centre and Public Amenities Block.

## **5.3 Industrial User Categories**

General user categories for Industrial have been listed on Table 3. Additional ET figures for sewer have been included on Table 4, for a large range of detailed subcategories. These figures are provided for background information and should only be used as a general guide or where actual consumption data cannot be obtained.

Water ET figures for Industrial user categories exclude allowances for significant irrigation. It is suggested that irrigation be considered separately.

### **5.3.1 General**

This category covers basic light industrial development, which includes development such as bulk storage and dry trades, but excludes development with significant process water consumption.

For industrial categories that have process water, it is suggested that a non-typical development ET is determined based on the methodology in Section 6.3.

### **5.3.2 Future Unknown**

This category includes advice on figures to be used for future development areas where the specific development types are unknown. Generally the land zoning should give an indication of whether future development will be light, medium or heavy industry.

### **5.3.3 Detailed Subcategories**

The detailed industrial subcategories shown on Table 4 are based on WSAA guidelines (WSAA, 2002) and PWD guidelines (PWD, 1987). Some subcategories from the WSAA guidelines were not included due to duplication with Commercial user subcategories. These figures should only be used as a general guide or where actual consumption data cannot be obtained

## 6 ESTABLISHMENT OF ET FIGURES

Advice is included in the following sections on the methodology for determining (or revising) Standard ET figures for water and sewer from actual development based data from across the state, the methodology for determining Local ET figures and the methodology for determining non-typical ET figures.

It should be noted that due to the variability in discharge factors (the proportion of water consumption that is discharged to the sewerage system) for various user categories, water ET figures should not be directly adopted as sewer ET figures. Sewer ET figures will only be the same as water ET figures if the discharge factor for the user category is the same as the residential discharge factor (currently 60%). If the discharge factor exceeds the residential discharge factor, sewer ET figures will be higher and conversely, if the discharge factor is less than the residential discharge factor, sewer ET figures will be lower.

Once a set of revised Standard ET figures has been established, it is proposed that the figures be subject to periodic review in order to ensure they are kept up-to-date, including the addition of new categories and the removal of redundant categories.

It is recommended that during the establishment of revised Standard ET figures (based on state-wide data), the assumption that residential sewage loadings and non-residential town water demands and sewage loadings generally do not exhibit significant variability between various water authorities, is reviewed.

### 6.1 Establishment of Revised Standard ET Figures

#### 6.1.1 Residential Water Standard ET

The proposed methodology for establishing water Standard ET figures for Residential user categories is presented below:

- Water consumption data from across the state, taken from meter readings (over a rolling five year average) of residential properties, should be collated and average consumptions for each user category determined.
- In order to collate the various user categories, information on lot type, number of dwellings, lot area and in some cases the number of bedrooms, will need to be compiled.
- The state-wide average consumption for a residential house becomes the Standard ET water consumption (currently 230 kL/a).
- Having determined the various average consumption figures for the remaining user categories, Standard ET figures can be determined by dividing by the Standard ET water consumption (230 kL/a).

#### 6.1.2 Residential Sewer Standard ET

The proposed methodology for establishing sewer Standard ET figures for Residential user categories is presented below:

- Standard ET figures for water for each user category should be determined, based on the methodology described above.
- Standard Discharge Factors (DF) for each user category then need to be determined based on state-wide data. There are two methods that may be employed for determining Standard DF:

- **The first method** involves the determination of discharge factors from a water consumption approach. An assessment would have to be made of the typical proportions of water consumption for the various fixtures in and around the dwelling and the summation of the proportions for fixtures that contribute to the sewer would become the discharge factor. Alternatively, outdoor water usage could be metered and subtracted from metered total water consumption to determine the internal usage and DF.
- **The second method** involves the determination of discharge factors from a sewage loading approach. Flow gauging of a sample range of each Residential user category would have to be undertaken over a period sufficient to assess average loadings and compared to metered water consumption. The discharge factor would be determined as the ratio of average day sewage flows to average day water consumption.
- Sewer Standard ET figures may be determined by multiplying each Standard water ET figure by the relevant Standard DF for the category and dividing by the residential house Standard DF (currently 60%).

### 6.1.3 Non-Residential Water Standard ET

The proposed methodology for establishing water Standard ET figures for Non-Residential user categories is presented below:

- Water consumption data from across the state, taken from meter readings (over a rolling five year average) of Non-Residential properties, should be collated and average consumptions for each user category determined.
- For tourist type developments that have significant variations in occupancy rates across the year, water consumption data over peak occupancy periods (eg peak week of tourist season) will need to be collected.
- For developments that have a significant irrigation component, consideration should be given to excluding this irrigation component from the average consumptions and allowing the irrigation component to be considered separately.
- In order to collate the various user subcategories, additional information such as lot type, lot area, floor area, number of rooms, etc will also need to be compiled.
- Having determined the various state-wide average consumption figures for each user subcategory, water Standard ET figures can be determined by dividing by the Standard ET water consumption (230 kL/a).

### 6.1.4 Non-Residential Sewer Standard ET

The proposed methodology for determining sewer Standard ET figures for Non-Residential user categories is presented below:

- Standard ET figures for water for each user subcategory should be determined, based on the methodology described above.
- Standard DF for each user category then need to be determined based on state-wide data. There are two methods that may be employed for determining Standard DF:
  - **The first method** involves the determination of discharge factors from a water consumption approach. An assessment would have to be made of the typical proportions of water consumption for various fixtures and the summation of the proportions for fixtures that contribute to the sewer would become the discharge factor. Alternatively, metering of fixtures that do not contribute to sewage loadings could be undertaken. This method may be appropriate for commercial, light industrial, shops, motels, etc.

- **The second method** involves the determination of discharge factors from a sewage loading approach. Flow gauging of a sample range of a particular user category would have to be undertaken over a set period and compared to metered water consumption. The discharge factor would be determined as the ratio of average day sewage flows to average day water consumption.
- Sewer Standard ET figures may then be determined by multiplying each Standard water ET figure by the relevant Standard DF for the category and divide by the residential house Standard DF (currently 60%).

## 6.2 Establishment of Local ET Figures

### 6.2.1 Residential Water Local ET

A methodology is included below for establishing residential Local ET figures for water. Residential Local ET figures for water should be determined from local data, where sufficient data is available.

The proposed methodology for establishing Local ET figures for residential user categories is presented below:

- Local water consumption data taken from meter readings (over a rolling five year average) of residential properties should be collated and average consumptions for each user category determined.
- In order to collate the various user categories, information on lot type, number of dwellings, lot area and in some cases the number of bedrooms, will need to be compiled.
- The average consumption for a residential house, based on local data, becomes the Local ET water consumption.
- Having determined the various average consumption figures for the other user subcategories, Local ET figures can be determined by dividing by the Local ET water consumption.
- Where sufficient data is not available to determine figures for a particular residential subcategory (eg units), Standard ET figures may be used.

### 6.2.2 Non-Residential Water Local ET

For non-residential categories, Standard ET figures for water should be factored up or down, prior to adopting them for Local ET figures. Standard ET figures may be converted to Local ET units according to the following formula:

$$\text{Local ET} = \text{Standard ET} \times \frac{\text{Standard ET Water Consumption (ie 230 kL/a)}}{\text{Local ET Water Consumption}}$$

Where the Local ET water consumption does not differ substantially from the Standard ET water consumption, Standard ET figures may be adopted directly.

### 6.2.3 Residential & Non-Residential Sewer Local ET

Standard ET figures for sewer can be adopted directly as Local ET figures.



### 6.3 Advice on Determining a Non-Typical Development ET

It is recommended that the following formulae be used to determine non-typical development ET figures.

For water:

$$\text{Standard ET} = \frac{\text{Estimated Ave Development Water Consumption}}{\text{Standard ET Water Consumption (ie 230 kL/a)}}$$

OR

If Local ET figures are being used:

$$\text{Local ET} = \frac{\text{Estimated Ave Development Water Consumption}}{\text{Local ET Water Consumption}}$$

For sewer:

$$\text{Standard ET} = \frac{\text{Estimated Ave Development Sewage Loading (water usage x DF)}}{\text{Standard ET Sewage Loading (ie 140 kL/a)}}$$

For industrial categories it may be appropriate to separate the process water consumption from the consumption associated with office and amenity facilities. The ET for the process water should be then determined based on the above formulae, while the ET for the remainder of the development could be determined according to the typical user categories.

## 7 STANDARD ET FIGURES – RESIDENTIAL USER CATEGORIES

Table 1: Standard ET Figures - Residential User Categories

CATEGORY	STANDARD UNIT	SUGGESTED VALUES	
		WATER ET	SEWER ET
<b>Single Residential Lots (House)</b>			
<b>Standard Residential Lot (450m<sup>2</sup> - 2000m<sup>2</sup>)</b>	Lot	<b>1.00</b>	<b>1.00</b>
Small Residential Lot (< 450m <sup>2</sup> )	Lot	<b>Use Units</b>	
Large Residential Lot (> 2000m <sup>2</sup> )	Lot	<b>1.20</b>	<b>1.00</b>
<b>Multi-Residential Lots (Medium Density 1 - 2 Storey)</b>			
Dual Occ - 1 bedroom	Dwelling	Use Units for Lot Size of < 450m <sup>2</sup> / dwelling or Standard Residential Lot for Lot Size > or = 450m <sup>2</sup> / dwelling	
Dual Occ - 2 bedroom	Dwelling		
Dual Occ - 3 bedroom (or more)	Dwelling		
Duplex - 1 bedroom	Dwelling		
Duplex - 2 bedroom	Dwelling		
Duplex - 3 bedroom (or more)	Dwelling		
Units - 1 bedroom	Dwelling	<b>0.40</b>	<b>0.50</b>
Units - 2 bedroom	Dwelling	<b>0.60</b>	<b>0.75</b>
Units - 3 bedroom (or more)	Dwelling	<b>0.80</b>	<b>1.00</b>
<b>Multi-Residential Lots (High Density)</b>			
Multi Storey Apartments (1 bedroom)	Dwelling	<b>0.33</b>	<b>0.50</b>
Multi Storey Apartments (2 bedroom)	Dwelling	<b>0.50</b>	<b>0.75</b>
Multi Storey Apartments (3 or more bedroom)	Dwelling	<b>0.67</b>	<b>1.00</b>

### Notes

1 Standard ET = Town Water Usage of 230 kL/a & Sewage Loading of 140 kL/a

## 8 STANDARD ET FIGURES – COMMERCIAL USER CATEGORIES

Table 2: Standard ET Figures - Commercial User Categories

CATEGORY	STANDARD UNIT	SUGGESTED VALUES		COMMENTS
		WATER ET	SEWER ET	
<b>ACCOMMODATION (PERMANENT)</b>				
Nursing Home / Special Care Home	Bed	0.50	0.75	Unchanged in 2017 edition. Limited medical facilities, communal kitchen / laundry
Self-Care Retirement Units / Villas	-	Use Residential Units		Internal kitchen / laundry facilities
Self-Care Retirement - Serviced Unit (Onsite)	-	Use Nursing Homes		No internal kitchen / laundry facilities
Self-Care Retirement - Serviced Unit (Offsite)	Bed	0.30	0.45	No internal kitchen / laundry facilities
Boarding House	Bed	0.33	0.50	Communal kitchen / laundry
Caravan / Mobile Home Park (1 br)	Van	0.40	0.50	
Caravan / Mobile Home Park (2 br)	Van	0.60	0.75	Use if number of rooms unknown
Caravan / Mobile Home Park (3 br)	Van	0.80	1.00	
<b>ACCOMMODATION (SHORT TERM)</b>				
<b>Peak week loading - use peak occupancy</b>				
Caravan Park				
Camping Site (temporary)	Site	0.50	0.63	Site approx. equivalent to average caravan site
Caravan / Cabin Site (temporary)	Site	0.50	0.63	Also use for on-site caravans / cabins
Bed & Breakfast / Guest House	Room	0.40	0.50	House based with communal kitchen / laundry
Motel / Hotel / Resort Room	Room	0.30	0.45	Consider food prep, entertainment & sporting separately
Backpackers / Hostel	Bed	0.15	0.23	Communal kitchen, small laundry, not serviced
Serviced / Unserviced Apartments	-	Use multi-res lots (high density)		Self contained (if not use motel)
<b>ACCOMMODATION (MEDICAL CARE)</b>				
Hospital	Bed	0.90	1.43	Includes medical facilities
Hostel (Medical)	Bed	0.70	1.11	Includes some medical facilities
Business (Excluding Food Preparation)				
<b>General</b>				
Single Retail Shop	Floor Area m <sup>2</sup>	0.01	0.01	Reviewed 2017
Supermarket	Floor Area m <sup>2</sup>	0.00	0.00	Includes minor food preparation
Shopping Centre	-	Insufficient Data		Consider amenities, food prep & specific bus. separately
Offices	Floor Area m <sup>2</sup>	0.01	0.01	Reviewed 2017
<b>Specific</b>				
Hairdresser / Beauty Salon	Basin	0.50	0.79	
Laundromat	Machine	0.45	0.71	
Medical Centre	Room	0.40	0.63	Based on number of consultation rooms, unchanged in 2017 edition
Plant Nursery	-	Insufficient Data		Consider case by case
Car Yard / Showroom	Floor Area m <sup>2</sup>	0.00	0.00	
Service Station	Lane	0.60	0.90	

CATEGORY	STANDARD UNIT	SUGGESTED VALUES		COMMENTS
		WATER ET	SEWER ET	
Car Wash (auto wash or self-serve)	Bays or Lanes	5.70	9.03	Unchanged in 2017 edition but with updated standard unit of measure description.
Escort Agency	Room	0.40	0.50	
Animal Boarding	Floor Area m <sup>2</sup>	Insufficient Data		Consider case by case
Vet or Grooming	Floor Area m <sup>2</sup>	0.01	0.01	
Self Storage	Floor Area m <sup>2</sup>	0.00	0.01	Consider office area only
<b>FOOD PREPARATION</b>				
General				
Restaurant / Café	Floor Area m <sup>2</sup>	0.01	0.01	
Take Away / Fast Food (no amenities)	Floor Area m <sup>2</sup>	0.02	0.02	Unchanged in V2 review. Also use for general food preparation
Take Away / Fast Food (including amenities)	Floor Area m <sup>2</sup>	0.03	0.05	Unchanged in V2 review.
Catering	Floor Area m <sup>2</sup>	0.02	0.02	
Specific				
Bakery	-	Insufficient Data		Use Take Away / Fast Food (non amenities)
Butcher	-	Insufficient Data		Use Take Away / Fast Food (non amenities)
Fishing Co-op	-	Insufficient Data		Use Take Away / Fast Food (non amenities)
<b>ENTERTAINMENT</b>				
Licensed Club	Floor Area m <sup>2</sup>	Insufficient Data		Separate into Food Preparation, Entertainment, Amenities
Pub / Bar	Floor Area m <sup>2</sup>	0.03	0.05	Consider food preparation area separately
Cinema / Theatre / Public Entertainment	-	Insufficient Data		Use Food Preparation & Amenities
Function / Conference Centre	-	Insufficient Data		Use Food Preparation & Amenities
Marina	Berth	0.60	0.90	
<b>SPORTING/SPECTATOR FACILITIES</b>				
General				
Amenities & Indoor Facilities	-	Insufficient Data		Use Food Preparation & Amenities
Specific				
Hockey Field (artificial surface)	-	Insufficient Data		Consider case by case
Bowling Alley	Lane	0.35	0.55	
Bowling Green	-	Insufficient Data		Separate into Food Preparation, Amenities, Irrigation
Swimming Pool - Indoor	ML	Insufficient Data		Consider case by case
Swimming Pool - Outdoor	ML	Insufficient Data		Consider case by case
<b>COMMUNITY FACILITIES</b>				
Child Care Centre / Pre-school	Person	0.06	0.10	
Education - School (primary & secondary)	Person	0.03	0.05	
Education - College, University (tertiary)	Person	0.02	0.02	Consider Food Preparation separately
Correctional Centre	Person	0.50	0.75	
Church / Place of Worship	-	Insufficient Data		Use Food Preparation & Amenities
Community Centre / Hall	-	Insufficient Data		Use Food Preparation & Amenities
Parks / Gardens / Reserves (Irrigation)		Insufficient Data		Consider case by case
Public Amenities Block (per shower)	Shower	0.40	0.63	Unchanged in V2 review.
Public Amenities Block (per wc)	wc	0.40	0.63	Unchanged in V2 review.

**Notes**

1 Standard ET = Town Water Usage of 230 kL/a & Sewage Loading of 140 kL/a  
Assumed Residential Standard Discharge Factor: 60%

## 9 Standard ET Figures – Industrial User Categories (General)

**Table 3: Standard ET Figures - Industrial User Categories\***

CATEGORY	STANDARD UNIT	SUGGESTED VALUES	
		WATER ET	SEWER ET**
<b>INDUSTRIAL GENERAL</b>			
Light Industrial	Gross Ha	<b>15</b>	<b>15</b>
Future Unknown - Light	Gross Ha	<b>15</b>	<b>15</b>
Future Unknown - Med	Gross Ha	<b>30</b>	<b>30</b>
Future Unknown - Heavy	Gross Ha	<b>50</b>	<b>50</b>
* For industrial categories that have process water, it is suggested that a non-typical development ET is determined based on the methodology in Section 6.3 of the guidelines.			
** Additional ET figures for sewer have been included on Table 4, for a large range of detailed subcategories. These figures are provided for background information and should only be used as a general guide or where actual consumption data cannot be obtained.			

### Notes

1 Standard ET = Town Water Usage of 230 kL/a & Sewage Loading of 140 kL/a

Assumed Residential Standard Discharge Factor: 60%

Gross Ha = Total land area of zone

## 10 Standard ET Figures for Sewer – Industrial User Categories

Table 4: Standard ET Figures for Sewer - Industrial User Categories (Detailed)

CATEGORY	STANDARD UNIT	SEWER ET				
		WSAA ET / Built-up Ha (N=1)	WSAA ET / Built-up Ha (N=2)	WSAA ET / Built-up Ha (N=3)	WSAA ET / Built-up Ha (N=4)	PWD
<b>FOOD MANUFACTURE</b>						
<b>Dairy</b>						
Milk	Built-up Ha	2,857	1,914	1,743	1,600	1,400
Cheese, butter and yoghurt	Built-up Ha	1,714	1,149	1,046	960	850
Ice Cream	Built-up Ha	571	383	349	320	350
<b>Fruit and Vegetable</b>						
Cannery	Built-up Ha	1,143	766	697	640	550
Condiments and Sauces	Built-up Ha	1,143	766	697	640	550
<b>Meat</b>						
Abattoir	Built-up Ha	1,143	766	697	640	550
Rendering tallow	Built-up Ha	571	383	349	320	300
Gelatine and glue	Built-up Ha	1,714	1,149	1,046	960	850
Poultry	Built-up Ha	2,286	1,531	1,394	1,280	1,100
Small-goods	Built-up Ha	1,143	766	697	640	550
<b>Grain</b>						
Flour milling	Built-up Ha	29	19	17	16	15
Starch	Built-up Ha	1,714	1,149	1,046	960	850
Edible oils and fats	Built-up Ha	2,286	1,531	1,394	1,280	1,100
Cereals	Built-up Ha	286	191	174	160	150
Bakery	Built-up Ha	29	19	17	16	15
Biscuits and cakes	Built-up Ha	286	191	174	160	150
<b>Beverages</b>						
Beer	Built-up Ha	1,143	766	697	640	550
Soft drinks and cordials	Built-up Ha	571	383	349	320	300
<b>Others</b>						
Yeast	Built-up Ha	2,286	1,531	1,394	1,280	1,100
Confectionery	Built-up Ha	143	96	87	80	80
Salt	Built-up Ha	571	383	349	320	300
<b>TEXTILE AND LEATHER</b>						
<b>Tannery and Hides</b>	Built-up Ha	1,143	766	697	3,640	550
<b>Wool</b>						
Wool scour	Built-up Ha	2,286	1,531	1,394	1,280	1,100
Felt and Carpet	Built-up Ha	571	383	349	320	300
Dyeing and spinning	Built-up Ha	571	383	349	320	300
<b>Cotton and Synthetics</b>						
Dyeing and spinning	Built-up Ha	1,143	766	697	320	550

CATEGORY	STANDARD UNIT	SEWER ET				PWD
		WSAA ET / Built-up Ha (N=1)	WSAA ET / Built-up Ha (N=2)	WSAA ET / Built-up Ha (N=3)	WSAA ET / Built-up Ha (N=4)	
<b>CHEMICAL</b>						
<b>Petrochemical</b>						
Oil Refinery	Gross Ha	29	19	17	16	15
<b>Pharmaceutical</b>	Built-up Ha	286	191	174	160	150
<b>Organic</b>						
Liquids	Built-up Ha	571	383	349	320	300
Resins, polymers and plastics	Built-up Ha	571	383	349	320	300
Adhesives	Built-up Ha	571	383	349	320	300
Soaps and detergents	Built-up Ha	286	191	174	160	150
Paint manufacture	Built-up Ha	143	96	87	80	80
<b>Metal Processing</b>						
<b>Metal Finishing</b>						
Electroplating	Built-up Ha	571	383	349	320	300
Anodizing	Built-up Ha	571	383	349	320	300
Galvanizing	Built-up Ha	571	383	349	320	300
<b>Battery Manufacture</b>						
Dry Cell	Built-up Ha	286	191	174	160	150
Wet cell (lead acid)	Built-up Ha	286	191	174	160	
<b>Engineering</b>						
Machine shops	Built-up Ha	286	191	174	160	
Sheet metal	Built-up Ha	286	191	174	160	
Foundry	Built-up Ha	286	191	174	160	
Rolling	Built-up Ha	286	191	174	160	
Extrusion	Built-up Ha	286	191	174	160	
<b>Manufacture - Non-Metallic</b>						
<b>Paper</b>	Built-up Ha	143	96	87	80	80
<b>Plastics</b>	Built-up Ha	571	383	349	320	
<b>Wood</b>	Built-up Ha	143	96	87	80	80
<b>Mining (Earth)</b>						
Glass	Built-up Ha	143	96	87	80	80
Fibre cement	Built-up Ha	71	48	43	40	
Concrete products	Built-up Ha	1,143	766	697	640	
<b>Services</b>						
<b>Laboratories</b>						
Industrial and research	Built-up Ha	1,143	766	697	640	550
<b>Others</b>						
Film Processing	Built-up Ha	571	383	349	320	300

**Notes**

N = number of independent same category industrial connections

Built-up Ha = Total floor area of building

Gross Ha = Total land area of zone

For more information refer to (PWD, 1987) & (WSAA, 2002)

## 11 REFERENCES

1. *NSW Water Supply and Sewerage Performance Monitoring* NSW Department of Primary Industries Water (produced annually)
2. *Developer Charges Guidelines for Water Supply, Sewerage and Stormwater* DPI Water (2016)
3. *Manual of Practice, Sewer Design* NSW Public Works Department (now the responsibility of DEUS) (1987)
4. *WSAA Facts 2001* Water Services Association of Australia (2001)
5. *Sewerage Code of Australia (WSA 02-2002 V2.2)* Water Services Association of Australia (2002)



## 12 GLOSSARY OF TERMS

ABBREVIATION	DESCRIPTION
BASIX	Building Sustainability Index – an online assessment tool for rating expected performance of residential development in terms of water efficiency
DEUS	Department of Energy, Utilities & Sustainability
DPI Water	NSW Department of Primary Industries Water
Developer Charge	A charge levied on developers to recover part of the capital cost incurred in providing infrastructure to new development, under Section 64 of the <i>Local Government Act 1993</i> .
DF	Discharge Factor. The proportion of water consumption (volume) for a particular development that is discharged to the sewerage system.
DPI Water	NSW Department of Primary Industries Water
Dwelling	A place of residence or home
EP	Equivalent Persons (or equivalent population). A measure of the demand or loading a development will have on infrastructure in terms of the average water consumption or average sewage discharge for an average person.
ET	Equivalent Tenements. A measure of the demand or loading a development will have on infrastructure in terms of the average water consumption or average sewage discharge for an average residential dwelling.
Local ET	An ET based on local data for a particular water authority.
Standard ET	An ET based on state-wide data.
Fixtures	Taps, toilets, showers and sinks / drains
Floor Area m <sup>2</sup>	Building floor area in m <sup>2</sup>
kL	Kilolitre (1,000 litres)
kL/a	Kilolitres / annum
L/s	Litres / second (flow rate)
Occupancy Rate	The average number of people per residential house
PWD	NSW Public Works Department (The PWD Guidelines are now the responsibility of DPI Water).
WSAA	Water Services Association of Australia

## 13 FEEDBACK FORM

The Water Directorate welcomes comments and feedback on the use of the Section 64 Determinations of Equivalent Tenements Guidelines. Please tick the appropriate box and write any additional comments you may have regarding the format, content or practical use of these guidelines.

	VERY USEFUL	USEFUL	NOT USEFUL
<b>How useful were the following Sections of the Section 64 Determinations of Equivalent Tenements Guidelines?</b>			
Section 3 Explanation of Local ET and Standard ET?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 4 Using the Standard ET Tables?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 5 Explanation of User Categories?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 6 Establishment of ET Figures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 7 Standard ET Figures – Residential User Categories?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 8 Standard ET Figures – Commercial User Categories?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 9 Standard Et Figures – Industrial User Categories?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 10 Standard Et Figures for Sewer – Industrial User Categories?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 11 References?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 12 Glossary of Terms?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appendix A – Background?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appendix B – What are the Available Methods?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appendix C -Determination of User Categories & Standard ET Figures ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appendix D – Benchmarking with other Water Authorities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appendix E – Priorities for Review and Update of Standard ET Figures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appendix F – Worked Examples (Standard ET)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>YES</b>	<b>NOT SURE</b>	<b>NO</b>
<b>Overall use of these Technical Guidelines</b>			
Is there a need for this type of document?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has your Council used these Technical Guidelines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If not, does your Council plan to use these Technical Guidelines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please write any general comments you have here, particularly in relation to drought experiences that may assist future review of this document:			
.....			
.....			
.....			

Please post or email this form to:

**Executive Officer, Water Directorate, Level 12, 32 Walker Street, North Sydney 2060**  
**Email: [gmitchell@waterdirectorate.asn.au](mailto:gmitchell@waterdirectorate.asn.au)**

## APPENDIX A - BACKGROUND

The Water Directorate, through its technical advisory role to local government water authorities in regional NSW, identified the need to establish consistent and defensible guidelines for the determination of water and sewer equivalent tenements (ETs) for input to the process of calculating developer contributions under s64 of the Local Government Act 1993. The need for the guidelines has been driven by the inconsistencies (and subsequent challenges by developers) associated with the existing methodologies adopted by regional water authorities across NSW and the lack of up-to-date guidelines on the estimation of ET figures.

The Water Directorate has proposed a three-staged approach to the project in order to maximise the benefit to its members. The three stages are:

- Determination of user categories and development of methodology to establish corresponding ET figures
- Establishment of ET figures
- Periodic review and update of user categories and ET figures.

In order to establish a set of ET figures, the process requires that two key components be considered. The first component is the list of user categories for which ETs are required. The second component is the actual ET figures that apply to each category. The first stage of this project addresses the first component and provides advice on the methodology / strategy for addressing the second component. The second stage of the project will fully address the second component. Once each authority has established a revised set of ET figures, the process should be subject to periodic review and update (third component).

By undertaking the project in this manner, the Water Directorate and its members can be assured that a consistent and defensible methodology is adopted and applied by regional water authorities across NSW.

## APPENDIX B - WHAT ARE THE AVAILABLE METHODS?

The estimation of water and sewer ETs for developments is complex and therefore contentious. There is no perfect, universal approach and consequently a number of different methodologies have been adopted by water authorities and Councils around Australia.

The following methodologies have either been used or have been considered by water authorities in the past:

- **Recorded Water Consumption (Water)** – This methodology is based on actual average recorded consumption data (eg over a rolling 5 year period) for similar developments in the system. The equivalent water ETs are standardised based on various measurable units such as ET per m<sup>2</sup> or ET per facility.
- **Recorded Water Consumption (Sewer)** – While most authorities only use metered data to determine average water consumption, sewer ETs could potentially be determined from water consumption of similar developments, taking into account the discharge factor for the development. The discharge factor represents the proportion of water consumption that is discharged to the sewerage system. Two difficulties with this method are the accurate estimation of a discharge factor and the adoption of a sewage rate for a standard ET. Discharge factors are often assumed or guessed and are sometimes difficult to estimate. The average sewage rate for a standard house is generally around 0.004 to 0.008 L/s/ET. However, this is substantially less than the design average dry weather sewage rate of 0.011 L/s/ET.
- **PWD Design Criteria (Sewer)** – This methodology is based on the well known and widely adopted Public Work Department design criteria for sewerage systems developed in the late 1970s and early 1980s. The criteria are widely used as the basis for determining design loadings for the design and investigation of sewerage systems. The sewer ETs are standardised based on various measurable units such as ET per bed and more generally ET per built up hectare. While the methodology would potential produce a reasonable estimate of ETs on average, the method may fail for developments that are not average developments.
- **PWD Design Criteria (Water)** – This methodology is not as widely used as the PWD design criteria for sewer, however, it is still commonly used in the absence of metered consumption data. The number of categories listed in the criteria is limited and the focus is on peak usage for typical development types. Similar to the sewer design criteria, the water design criteria was developed in the late 1970s and early 1980s.
- **Fixtures (Water & Sewer)** – This methodology may be adopted for the estimation of both water and sewer ETs. The method is based on assigning equivalent demands/loadings to each individual fixture within the development. The main drawback of this method is the requirement to determine or accurately estimate the numbers of various types of fixtures to be installed in the development. In addition, the methodology is more suited to estimating potential peak demands rather than assessing average consumption.
- **Meter Size (Water)** – This methodology is generally only applicable to water ETs and is based on water meter sizes. The size of a water meter for a new development is generally based on bands of average water consumption. Small developments may require a 20mm to 40mm meter size, while

larger developments may require meters greater than 40mm or multiple meters. Different ET factors apply to each meter size.

- **WSAA Water Supply & Sewerage Codes** – These two documents are focused on the design and construction of water supply and sewerage transportation systems and consequently are focused on peak demands / loadings. While the codes offer some guidance for assessing peak demands / loadings, there is limited application for determining water and sewer ETs. The sewerage code does include a useful table (Table A2 WSA 02-2002 v2.2) for assessment of industrial loadings.

## APPENDIX C – DETERMINATION OF USER CATEGORIES AND STANDARD ET FIGURES

A brief survey and review of the existing user categories and methodologies adopted by various water authorities across NSW as well as other parts of Australia has been undertaken. The review encompassed the following water authorities:

- 9 NSW local government authorities
- 2 NSW state authorities
- 4 interstate authorities, and
- 1 national association.

This 2017 review was undertaken in 2016 with data obtained from 14 NSW Local Government water utilities across eight non-residential activities. This review encompassed assessment of current and additional categories as annotated in Table 2 as applicable.

The purpose of the original 2009 Addendum was to determine a general list of water and sewer user categories that encompasses the range of categories likely to be encountered by the majority of regional water authorities in NSW. The compiled list was grouped into Residential, Commercial and Industrial development types.

An assessment of the general list of user categories compiled from the 2009 review was undertaken in order to determine the importance of including various user categories in the proposed list. While the proposed list is comprehensive and generally covers the full range of common development types across NSW, it is not exhaustive and consequently the guidelines include advice on how to calculate an equivalent loading for non-typical developments. It should be noted that the standard units used to assess ET figures need to be reviewed during the establishment of ET figures phase.

Standard ET figures included in the guidelines were determined by reviewing water and sewer ET figures currently used by a sample of water authorities across NSW, including:

- Hunter Water Corporation
- Sydney Water Corporation
- Shoalhaven Council
- Coffs Harbour Council
- Hastings Council
- Tweed Council
- Dubbo Council
- Lismore Council
- Albury Council
- Gosford Council

Water and sewer ET figures based on PWD criteria (PWD, 1987) and WSAA guidelines (WSAA, 2002) were also reviewed.

Adopted ET figures for each sub-category were generally based on the following:

- Hunter Water values for water ET figures were adopted where data was available, as their values are based on a comprehensive database of local water users.

- Average values were adopted where there was some agreement between values used by various water authorities.

For consistency, some adopted values were based on an assumed proportion of other adopted ET figures (eg based on a comparison of internal fixtures or a comparison of the proportion of external usage).

Internal usage was assumed to be split into 15% kitchen usage, 25% laundry usage, 30% toilet usage and 30% bathroom usage.

Sewer ET figures were generally determined from the water ET figures and an assumed discharge factor. Where insufficient data was available, no specific value was provided.

For each sub-category, the basis for the adopted ET figures is shown on the following tables, along with the assumed discharge factor.

**Table 5: Standard ET Figures – Residential User Categories including Assumed Discharge Factor**

CATEGORY	STANDARD UNIT	SUGGESTED VALUES		ASSUMED DISCHARGE FACTOR	BASIS
		WATER ET	SEWER ET		
<b>Single Residential Lots (House)</b>					
Standard Residential Lot (450m <sup>2</sup> - 2000m <sup>2</sup> )	Lot	1.00	1.00	60%	Standard ET
Small Residential Lot (< 450m <sup>2</sup> )	Lot	Use Units			SWC
Large Residential Lot (> 2000m <sup>2</sup> )	Lot	1.20	1.00	50%	HWC data, increased outdoor
<b>Multi-Residential Lots - Med Density (1 - 2 Storey)</b>					
Dual Occ - 1 bedroom	Dwelling	Use Units for Lot Size of < 450m <sup>2</sup> / dwelling or Standard Residential Lot for Lot Size > or= 450m <sup>2</sup> / dwelling			
Dual Occ - 2 bedroom	Dwelling				
Dual Occ - 3 bedroom (or more)	Dwelling				
Duplex - 1 bedroom	Dwelling				
Duplex - 2 bedroom	Dwelling				
Duplex - 3 bedroom (or more)	Dwelling				
Units - 1 bedroom	Dwelling	0.40	0.50	75%	Half 3 b/room Unit
Units - 2 bedroom	Dwelling	0.60	0.75	75%	Average
Units - 3 bedroom (or more)	Dwelling	0.80	1.00	75%	Sewer ET same as House
<b>Multi-Residential Lots (High Density)</b>					
Multi Storey Apartments (1 bedroom)	Dwelling	0.33	0.50	90%	Sewer ET same as Units
Multi Storey Apartments (2 bedroom)	Dwelling	0.50	0.75	90%	Sewer ET same as Units
Multi Storey Apartments (3 or more bedroom)	Dwelling	0.67	1.00	90%	Sewer ET same as Units

**Notes**

1 Standard ET = Town Water Usage of 230 kL/a & Sewage Loading of 140 kL/a



Table 6: Standard ET Figures – Commercial User Categories including Assumed Discharge Factor

CATEGORY	STANDARD UNIT	SUGGESTED VALUES		COMMENTS	ASSUMED DISCHARGE FACTOR	BASIS
		WATER ET	SEWER ET			
<b>Accommodation (Permanent)</b>						
Nursing Home / Special Care Home	Bed	0.50	0.75	Limited medical facilities, communal kitchen / laundry	90%	HWC water ET
Self Care Retirement Units / Villas	-	<b>Use Residential Units</b>		Internal kitchen / laundry facilities	-	
Self Care Retirement - Serviced Unit (Onsite)	-	<b>Use Nursing Homes</b>		No internal kitchen / laundry facilities	-	
Self Care Retirement - Serviced Unit (Offsite)	Bed	0.30	0.45	No internal kitchen / laundry facilities	90%	60% of Nursing Home
Boarding House	Bed	0.33	0.50	Communal kitchen / laundry	90%	Sewer = House / 2
Caravan / Mobile Home Park (1 br)	Van	0.40	0.50		75%	Same as Units
Caravan / Mobile Home Park (2 br)	Van	0.60	0.75	Use if number of rooms unknown	75%	Same as Units
Caravan / Mobile Home Park (3 br)	Van	0.80	1.00		75%	Same as Units
<b>Accommodation (Short Term)</b>						
Caravan Park						
Camping Site (temporary)	Site	0.50	0.63	Site approx. equivalent. to ave caravan site	75%	< ave permanent caravan
Caravan / Cabin Site (temporary)	Site	0.50	0.63	Also use for on-site caravans / cabins	75%	As above
Bed & Breakfast / Guest House	Room	0.40	0.50	House based with communal kitchen / laundry	75%	Same as 1 b/r Unit
Motel / Hotel / Resort Room	Room	0.30	0.45	Consider food prep., entertainment & sporting separately	90%	Average
Backpackers / Hostel	Bed	0.15	0.23	Communal kitchen, small laundry, not serviced	90%	1/2 boarding house / motel
Serviced / Unserviced Apartments	-	<b>Use multi-res lots (high density)</b>		Self contained (if not use motel)	-	
<b>Accommodation (Medical Care)</b>						
Hospital	Bed	0.90	1.43	Includes medical facilities	95%	HWC water ET
Hostel (Medical)	Bed	0.70	1.11	Includes some medical facilities	95%	Ave Nursing / Hospital

Table 6: Standard ET Figures – Commercial User Categories including Assumed Discharge Factor (Continued)

CATEGORY	STANDARD UNIT	SUGGESTED VALUES		COMMENTS	ASSUMED DISCHARGE FACTOR	BASIS
		WATER ET	SEWER ET			
<b>Business (Excluding Food Preparation)</b>						
General						
Single Retail Shop	Floor Area m <sup>2</sup>	0.01	0.01		95%	Average
Supermarket	Floor Area m <sup>2</sup>	0.002	0.003	<i>Includes minor food preparation</i>	95%	HWC water ET, average
Shopping Centre	-	Insufficient Data		<i>Consider amenities, food preparation and specific business separately</i>	-	
Offices	Floor Area m <sup>2</sup>	0.01	0.01		95%	Average
Specific Business						
Hairdresser / Beauty Salon	Basin	0.50	0.79		95%	HWC water ET
Laundromat	Machine	0.45	0.71		95%	HWC water ET
Medical Centre	Room	0.40	0.63	<i>Based on number of consultation rooms</i>	95%	HWC water ET
Plant Nursery	-	Insufficient Data		<i>Consider case by case</i>	-	
Car Yard / Showroom	Floor Area m <sup>2</sup>	0.002	0.002		60%	Average
Service Station	Lane	0.60	0.90		90%	HWC water ET
Car Wash (auto or self-serve)	Bays or Lanes	5.70	9.03		95%	HWC water ET
Escort Agency	Room	0.40	0.50		75%	HWC water ET
Animal Boarding	Floor Area m <sup>2</sup>	Insufficient Data		<i>Consider case by case</i>	-	
Vet or Grooming	Floor Area m <sup>2</sup>	0.01	0.01		90%	
Self Storage	Floor Area m <sup>2</sup>	0.004	0.006	<i>Consider office area only</i>	95%	Same as Office
<b>Food Preparation</b>						
General						
Restaurant / Café	Floor Area m <sup>2</sup>	0.01	0.01		95%	Average
Take Away / Fast Food (no amenities)	Floor Area m <sup>2</sup>	0.02	0.02	<i>Also use for general food preparation</i>	95%	HWC water ET / average area
Take Away / Fast Food (including amenities)	Floor Area m <sup>2</sup>	0.03	0.048		95%	2 x Take Away (no amenities)
Catering	Floor Area m <sup>2</sup>	0.02	0.02		95%	Take Away (no amenities)
Specific						
Bakery	-	Insufficient Data		<i>Use Take Away / Fast Food (no amenities)</i>	-	
Butcher	-	Insufficient Data		<i>Use Take Away / Fast Food (no amenities)</i>	-	
Fishing Co-op	-	Insufficient Data		<i>Use Take Away / Fast Food (no amenities)</i>	-	

Table 6: Standard ET Figures – Commercial User Categories including Assumed Discharge Factor (Continued)

CATEGORY	STANDARD UNIT	SUGGESTED VALUES		COMMENTS	ASSUMED DISCHARGE FACTOR	BASIS
		WATER ET	SEWER ET			
<b>Entertainment</b>						
Licensed Club	Floor Area m <sup>2</sup>	Insufficient Data		Separate into Food Preparation, Entertainment, Amenities -	-	
Pub / Bar	Floor Area m <sup>2</sup>	0.03	0.05	Consider food preparation area separately	95%	Take Away (incl amenities)
Cinema / Theatre / Public Entertainment	-	Insufficient Data		Use Food Preparation & Amenities	-	
Function / Conference Centre	-	Insufficient Data		Use Food Preparation & Amenities	-	
Marina	Berth	0.60	0.90		90%	HWC Water ET
<b>Sporting / Spectator Facilities</b>						
General						
Amenities & Indoor Facilities	-	Insufficient Data		Use Food Preparation & Amenities	-	
Specific						
Hockey Field (artificial surface)	-	Insufficient Data		Consider case by case	-	
Bowling Alley	Lane	0.35	0.55		95%	HWC Water ET
Bowling Green	-	Insufficient Data		Separate into Food Preparation, Amenities, Irrigation	-	
Swimming Pool - Indoor	ML	Insufficient Data		Consider case by case	-	
Swimming Pool - Outdoor	ML	Insufficient Data		Consider case by case	-	
<b>Community Facilities</b>						
Child Care Centre / Pre-school	Person	0.06	0.10		95%	HWC water ET
Education - School (primary & secondary)	Person	0.03	0.05		95%	HWC water ET
Education - College, University (tertiary)	Person	0.015	0.024	Consider Food Preparation separately	95%	HWC water ET
Correctional Centre	Person	0.50	0.75		90%	Nursing Home
Church / Place of Worship	-	Insufficient Data		Use Food Preparation & Amenities	-	
Community Centre / Hall	-	Insufficient Data		Use Food Preparation & Amenities	-	
Parks / Gardens / Reserves (Irrigation)		Insufficient Data		Consider case by case	-	
Public Amenities Block (per shower)	Shower	0.40	0.63		95%	Average
Public Amenities Block (per wc)	WC	0.40	0.63		95%	Average

**Table 7: Standard ET Figures – Industrial User Categories\* (General) including Assumed Discharge Factor**

CATEGORY	STANDARD UNIT	SUGGESTED VALUES		ASSUMED DISCHARGE FACTOR	BASIS
		WATER ET	SEWER ET**		
<b>Industrial General</b>					
Light Industrial	Gross Ha	15	15	60%	Average
Future Unknown - Light	Gross Ha	15	15	60%	Light Industrial
Future Unknown - Med	Gross Ha	30	30	60%	PWD, HWC Sewer ET
Future Unknown - Heavy	Gross Ha	50	50	60%	PWD, HWC Sewer ET
<p>* For industrial categories that have process water, it is suggested that a non-typical development ET is determined based on the methodology in Section 6.3 of the guidelines.</p>					
<p>** Additional ET figures for sewer have been included on Table 4, for a large range of detailed subcategories. These figures are provided for background information and should only be used as a general guide or where actual consumption data cannot be observed.</p>					

**Notes**

1 Standard ET = Town Water Usage of 230 kL/a & Sewage Loading of 140 kL/a  
 Assumed Residential Standard Discharge Factor: 60%  
 Gross Ha = Total land area of zone

## **APPENDIX D – BENCHMARKING WITH OTHER WATER AUTHORITIES**

Where it is suspected that the average residential water consumption per dwelling for a particular local water authority is likely to differ substantially from the Standard ET water consumption, but sufficient data is not available to accurately determine local consumptions, it is suggested that the average residential water consumption per dwelling be adopted from another similar local water authority that has accurate consumption data.

DEUS benchmarking data on NSW Water Supply & Sewerage Performance Monitoring (DEUS, 2004) and regional climate averages should be used to assess the most appropriate water authority to adopt figures from, based on a consideration of factors such as:

- Climate (rainfall, evaporation, temperature)
- Household occupancy rates
- Use of water meters
- Tariff structure
- Demand management measures
- Socio-economic variability (such as extent of fixtures and gardens).

## APPENDIX E – PRIORITIES FOR REVIEW AND UPDATE OF STANDARD ET FIGURES

The following priorities for review and update of Standard ET figures have been set based on a consideration of typical new development types, the likelihood of quality data being available and the uncertainty in the current ET figures.

High, medium and low priorities have been set, with high priority categories being targeted over the next one to two years from 2017, medium priority categories being targeted within three to four years and low priority categories after that.

**Table 8: Priorities for Review and Update of Standard ET Figures**

<b>High Priority Categories</b>	Caravan / Mobile Home Park Motel / Hotel / Resort Tourist Apartments Supermarket	Shopping Centre Restaurant / Café
<b>Medium Priority Categories</b>	Nursing Home Caravan Park B&B / Guest House Backpackers / Hostel Laundromat Plant Nursery Service Station Catering	Self Storage Licensed Club Pub/ Bar Function / Conference Centre Swimming Pool Child Care / Preschool Education (school / TAFE) Community Centre / Hall
<b>Low Priority Categories</b>	Boarding House Hospital Hostel (medical) Hairdresser Medical Centre Car Yard / Showroom Escort Agency Animal Boarding Bakery	Butcher Fish Co-op Cinema / Theatre Marina Hockey Field (artificial surface) Bowling Alley Bowling Green Correctional Centre Church

## APPENDIX F - WORKED EXAMPLES (STANDARD ET)

### WORKED EXAMPLE FOR A RESIDENTIAL DEVELOPMENT

Calculate the ET for a proposed residential subdivision consisting of 20 × 750m<sup>2</sup> lots, 10 × 400m<sup>2</sup> lots (3 bedroom dwellings) and 5 × 2 bedroom units.

Development	Sub-Category	Water ET	Sewer ET
750m <sup>2</sup> lots	Residential Lots (450m <sup>2</sup> – 2000m <sup>2</sup> )	$1 \times 20 = 20.0$	$1 \times 20 = 20.0$
400m <sup>2</sup> lots	Use Units – 3 bedroom (or more)	$0.80 \times 10 = 8.0$	$1 \times 10 = 10.0$
Units	Units – 2 bedroom	$0.6 \times 5 = 3.0$	$0.75 \times 5 = 3.75$
<b>TOTALS</b>		<b>31.0</b>	<b>33.75</b>

### WORKED EXAMPLE FOR A COMMERCIAL DEVELOPMENT (1)

Calculate the ET for a proposed caravan park with an expected peak holiday loading (based on peak occupancy) of 20 × camping sites, 10 × on-site cabins and 30 × 2 bedroom self-contained permanent caravans.

Development	Sub-Category	Water ET	Sewer ET
Camping sites	Camping Site (temporary)	$0.5 \times 20 = 10.0$	$0.6 \times 20 = 12.0$
On-site cabins	Caravan / Cabin Site (temporary)	$0.5 \times 10 = 5.0$	$0.6 \times 10 = 6.0$
Caravans	Caravan / Mobile Home Park (2 bed)	$0.6 \times 30 = 18.0$	$0.75 \times 30 = 22.5$
<b>TOTALS</b>		<b>33.0</b>	<b>40.5</b>

### WORKED EXAMPLE FOR A COMMERCIAL DEVELOPMENT (2)

Calculate the ET for a proposed catholic school consisting of pre-school (20 children), primary school (300 students) and a church (20m<sup>2</sup> kitchen & 10 WCs).

Development	Sub-Category	Water ET	Sewer ET
Pre-school	Child Care Centre / Pre-school	$0.06 \times 20 = 1.2$	$0.095 \times 20 = 1.9$
Primary school	Education – School (primary & tertiary)	$0.03 \times 300 = 9.0$	$0.048 \times 300 = 14.4$
Church	Church / Place of Worship	$0.015 \times 20 + 0.4 \times 10 = 4.3$	$0.024 \times 20 + 0.6 \times 10 = 6.5$
<b>TOTALS</b>		<b>14.5</b>	<b>22.8</b>
Sporting Fields	Irrigated Field	<i>Calculate on a case by case basis</i>	

**WORKED EXAMPLE FOR A MIXED USE DEVELOPMENT**

Calculate the ET for a proposed golf course resort consisting of

- Accommodation – 100 × 450m<sup>2</sup> residential lots, 30 × 3 bedroom apartments and 20 × 3 bedroom serviced tourist apartment;
- Resort – 200 × 2 bedroom units, including bar (100m<sup>2</sup>), swimming pool (300kL);
- Clubhouse – Bar (100m<sup>2</sup>), restaurant (300m<sup>2</sup>), change rooms (6 showers + 6 toilets);

Development	Sub-Category	Water ET	Sewer ET
450m <sup>2</sup> lots	Standard Residential Lots	$1 \times 100 = 100.0$	$1 \times 100 = 100.0$
3 bedroom apartments	Multi-storey apartments (3 or more bed)	$0.67 \times 30 = 20.0$	$1 \times 30 = 30.0$
Serviced tourist apartments	Use Multi-storey apartments (3 or more bed)	$0.67 \times 20 = 13.3$	$1 \times 20 = 20.0$
Resort units	Motel / Hotel / Resort	$0.3 \times 200 = 60.0$	$0.45 \times 200 = 90.0$
Bars	Pub / Bar	$0.03 \times 200 = 6.0$	$0.048 \times 200 = 9.6$
Restaurant	Restaurant / Café	$0.008 \times 300 = 2.4$	$0.013 \times 300 = 3.9$
Change rooms	Public Amenities Block (shower)	$0.4 \times 6 = 2.4$	$0.63 \times 6 = 3.8$
	Public Amenities Block (wc)	$0.4 \times 6 = 2.4$	$0.63 \times 6 = 3.8$
<b>TOTALS</b>		<b>206.5</b>	<b>261.1</b>
Swimming pool	Swimming pool – outdoor	Calculate on a case by case basis	
Golf Course	Irrigated Field	Calculate on a case by case basis	

**WORKED EXAMPLE FOR AN INDUSTRIAL DEVELOPMENT**

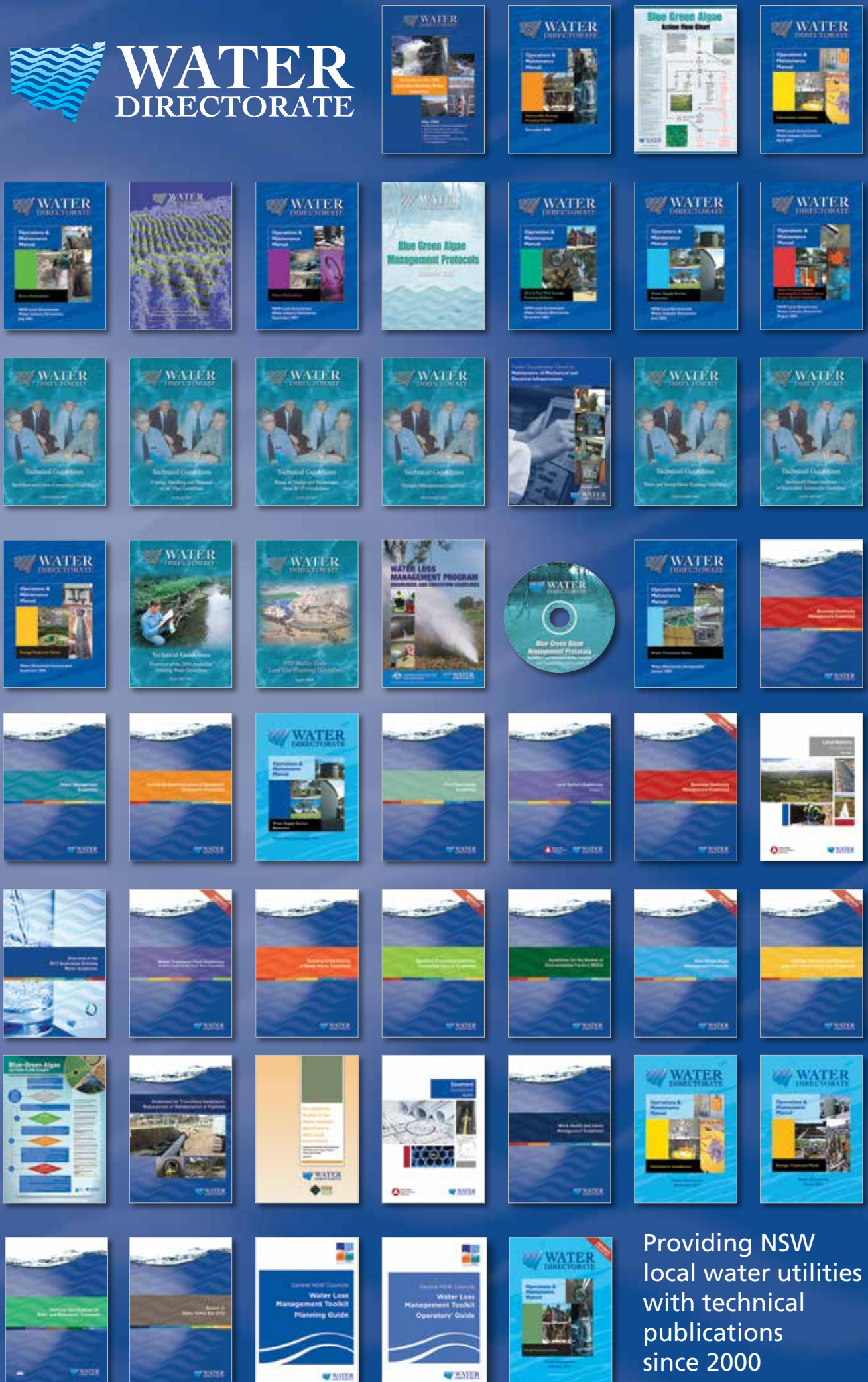
Calculate the ET for a proposed light industrial development consisting of 10 × 0.5 Ha lots.

Development	Sub-Category	Water ET	Sewer ET
General	Light Industrial (including showers)	$15 \times 10 \times 0.5 = 90$	$15 \times 10 \times 0.5 = 90$
<b>TOTALS</b>		<b>90.0</b>	<b>90.0</b>





# WATER DIRECTORATE



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