



**TRAFFIC AND PARKING IMPACT ASSESSMENT FOR THE
PROPOSED MODIFICATION TO THE EXISTING LANDFILL FACILITY
AT TUMBLONG RESERVE ROAD, TUMBLONG**



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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

Development Type: Landfill Facility

Site Address: Tumblong Reserve Road, Tumblong

Prepared for: MH Earthmoving
c/o Habitat Planning

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1 **INTRODUCTION**

McLaren Traffic Engineering was commissioned by *Habitat Planning* on behalf of *MH Earthmoving* to provide a traffic and parking impact assessment of the proposed modification to the existing Landfill Facility at Tumblong Reserve Road, Tumblong as depicted in **Annexure A**.

1.1 Description and Scale of Development

The proposed development has the following characteristics relevant to traffic and parking:

- Increase the annual waste disposal limit from 60,000 tonnes to 99,000 tonnes;
 - Extra capacity provides opportunities to accept paper machine rejects (general solid waste (non-putrescible)) from Visy Pulp and Paper Mill located in Tumut.
- No physical changes to the landfill cells or infrastructure and no proposed increase to the overall landfill capacity;
- No changes to hours of operation, being:
 - Monday to Friday – 7am-5pm;
 - Saturday – 7am-1pm

1.2 State Environmental Planning Policy (Infrastructure) 2021

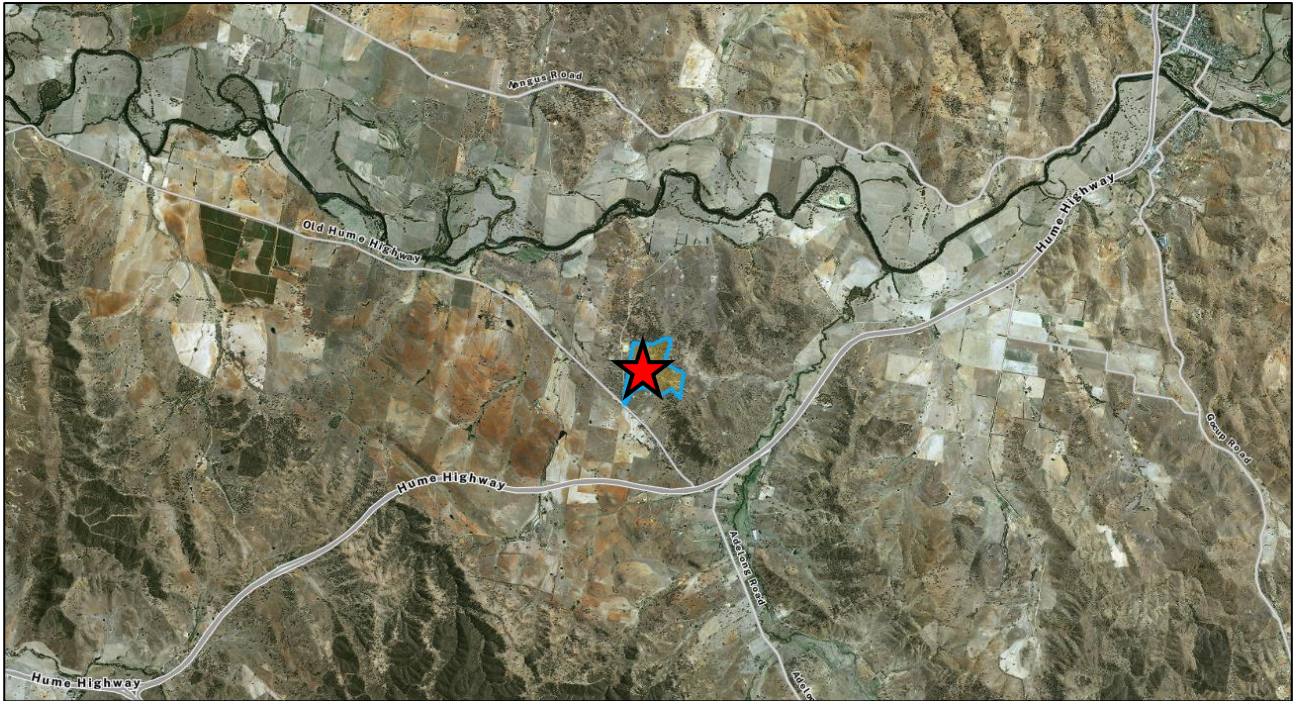
The proposed development does not qualify as a traffic generating development with relevant size and/or capacity under the *SEPP (Infrastructure) 2021* as the development does not incorporate an enlargement of the site area. Accordingly, formal referral to Transport for New South Wales (TfNSW) is unnecessary and the application can be assessed by Department of Planning, Industry and Environment officers accordingly.

1.3 Site Description

The subject site is zoned *RU1: Primary Production* under the Gundagai LEP 2011 and is currently operated by *MH Earthmoving* under a commercial lease agreement with Cootamundra-Gundagai Regional Council who is the landowner. The site has a single road access to Tumblong Reserve Road to the west and has a very small frontage to the Old Hume Highway to the south.

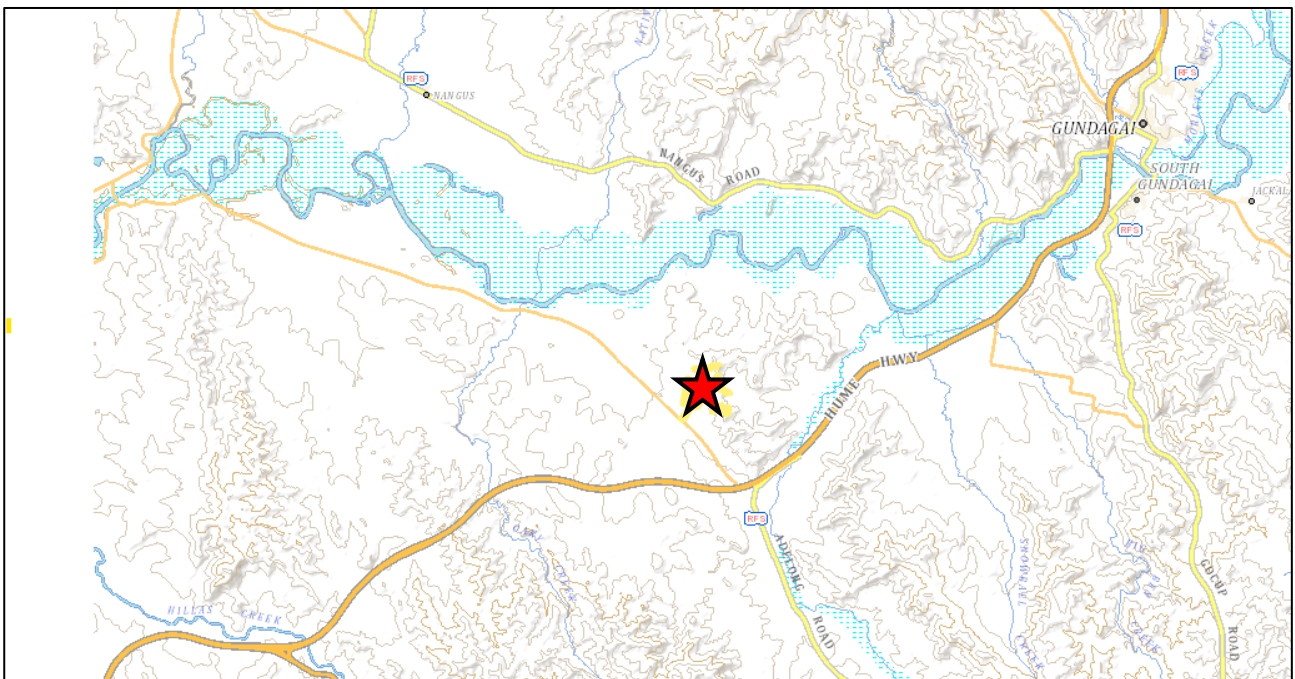
1.4 Site Context

The location of the site is shown on an aerial photo and a street map in **Figure 1** and **Figure 2** respectively.



Site Location

FIGURE 1: SITE CONTEXT – AERIAL PHOTO



Site Location

FIGURE 2: SITE CONTEXT – STREET MAP

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 *Road Hierarchy*

The road network servicing the site has characteristics as described in the following sub-sections.

2.1.1 Tumblong Reserve Road

- Unclassified LOCAL Road;
- Approximately 7m wide carriageway facilitating two-way traffic flow;
- No speed limit signposted, 50km/h applies;
- Unsealed shoulders.

2.1.2 Old Hume Highway

- Unclassified LOCAL Road;
- Approximately 8m wide carriageway facilitating two-way traffic flow;
- No speed limit signposted, 50km/h applies;
- Unsealed shoulders.

2.2 *Existing Traffic Management*

- Give-way controlled intersection of Tumblong Reserve Road / Old Hume Highway.

3 PARKING ASSESSMENT

3.1 **Council Parking Requirement**

The *Cootamundra Shire Council Development Control Plan 2013 Chapter 5* does not designate any car parking requirements for landfill facilities. The existing operations are known and as such a first principles assessment can be undertaken of the development.

The parking of light vehicles on the site currently takes place informally near the leachate dam. There is a large area where light vehicles can park without impacting truck movements. There are currently eight (8) full time staff and only one (1) additional staff member is required for the proposal. The additional staff member is a haulage vehicle driver, so theoretically there is no need for any additional car parking. However, any additional staff members on site can also park within the hardstand area, as shown in **Figure 3**. Therefore, the proposed development is supportable in terms of parking impact.

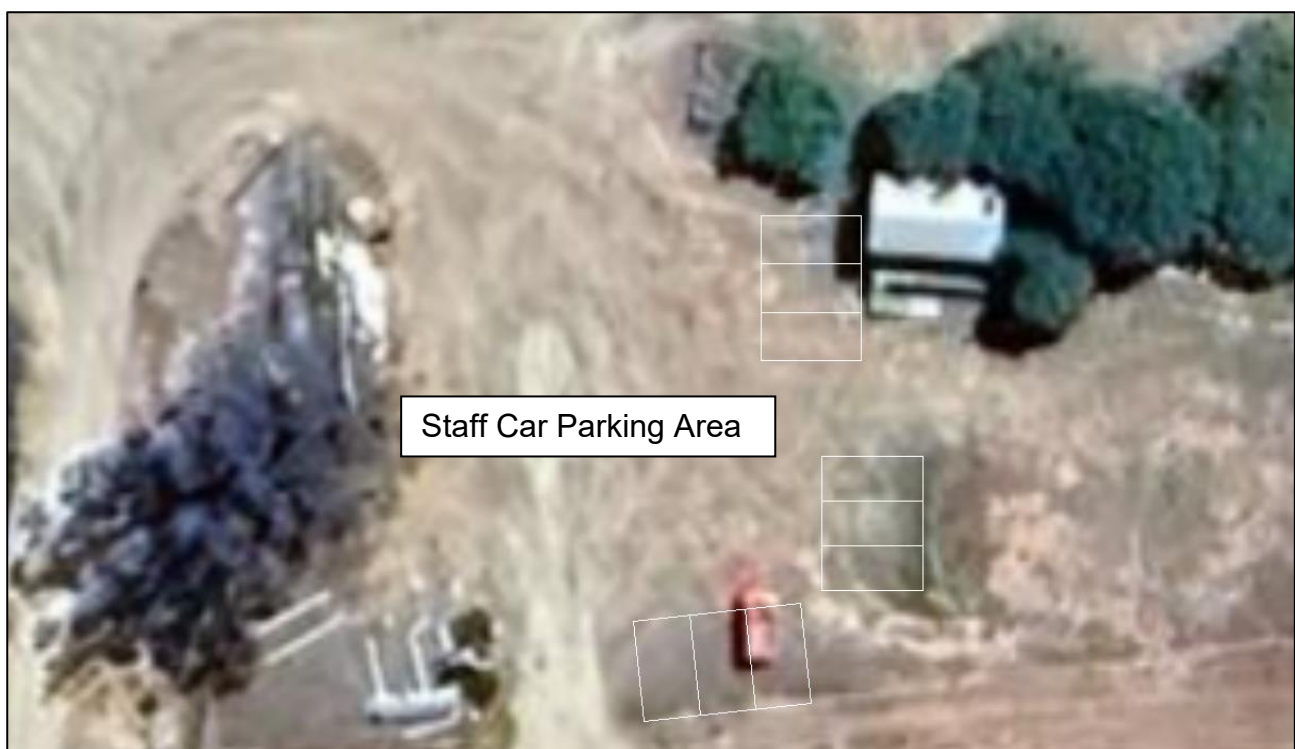


FIGURE 3: AREA FOR 9 CAR PARKING SPACES

3.2 **Disabled Parking**

Cootamundra Shire Council Development Control Plan 2013 Chapter 5 does not designate any requirements for disabled parking provision. It is noted that the site is relatively flat and accessible parking (if necessary) can occur within the hardstand area.

3.3 **Bicycle & Motorcycle Parking Requirements**

Cootamundra Shire Council Development Control Plan 2013 Chapter 5 does not require bicycle or motorcycle parking, as such none has been provided.

3.4 Servicing & Loading

Currently, the largest sized vehicle required to access the site is a 20m length Truck and Dog. Trucks unload waste directly into the cells at the tipping area via an unloading hopper before departing the site. Once in the cells, materials are spread and compacted by excavators within the cell. There are no proposed changes to the existing arrangement, other than more material will be able to be unloaded into the cells over a year.

3.5 Car Park Design & Compliance

The existing car parking areas have not been assessed against the relevant clauses and objectives of AS2890.1:2004, AS2890.2:2018 or AS2890.6:2022 as no changes are proposed to the existing parking layout. The existing layout has been approved as part of previous development approvals and does not require reassessing.

4 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

4.1 *Physical Constraints*

Consideration is given to the physical constraints of the site layout and unloading area. A swept path assessment has been conducted on aerial imagery taken of the site, reproduced in **Annexure B**, with the results demonstrating that the site has ample capacity to accommodate multiple large vehicles for unloading.

Our assessment has identified that in the worst-case scenario whereby all hourly truck movements to the site occur at the same time, the site can comfortably accommodate one (1) unloading B-Double with up to four (4) B-Doubles queued within the site.

4.2 *Typical Truck Sizes and Loads*

There is no weighbridge on site in the current or proposed scenario. The waste is weighed at Visy (its origin) prior to transportation to the Landfill. The applicant has advised that the average truck load is approximately 40T and there is an average of 8 loads delivered per day, and the increase will be an average of 10 loads per day with the extra truck driver. 40T of material is a significant load which can only be carried by large articulated vehicles, including Truck and Dog combinations and B-Doubles. For reference, a 19m length truck and dog combination has a maximum load capacity of 42.5T as per the National Highway Vehicle Regulations. B-Doubles have a maximum load capacity of up to 50T.

4.3 *Queueing Analysis*

Vehicles will arrive to the site and enter via the southern driveway travel to the loading area in a forward direction. Unloading will occur along the edge of the cell area along the southern edge. There is approximately 110 metres of room for incoming vehicles to queue before entering the manoeuvring area to unload. Once unloaded, the truck and dogs return and exit out the southern gate. This is enough room for up to:

- Four (4) B-Doubles, or;
- Five (5) Truck and Dogs.

The proposed hours of operation are outlined in **Table 1** for reference.

TABLE 1: PROPOSED HOURS OF OPERATION

<i>Days</i>	<i>Hours of operation</i>
	<i>Tipping</i>
<i>Monday – Friday</i>	<i>7am-5pm</i>
<i>Saturday</i>	<i>7am-1pm</i>
<i>Sunday / Public holidays</i>	<i>None</i>

Considering all of the above, in order to calculate the maximum site capacity as determined by the development consent, we can make the following assumptions:

- The truck movements occur at their maximum during every hour of operation, such that the site operates for a total of 10 hours on a weekday and 5 hours on a Saturday (total of 55 operating hours per week);
- The yearly target is to transport 99,000 tonnes of material into the site;
- The average load per truck is of 40 tonnes;
- The average dwell time for incoming trucks is 15 minutes;
- 50 operating weeks (conservative assuming two full weeks of shutdown periods per year).

Under the above assumptions and restrictions, the site will demand 0.9 trucks per hour for incoming vehicles. The required traffic demand calculation for 99,000 tonnes per annum is shown below.

$$\text{Traffic Demand} = \frac{99,000T}{40 \frac{T}{\text{truck}} * 50 \text{ weeks}} * \frac{1 \text{ week}}{55 \text{ hours}} = 0.9 \frac{\text{trucks}}{\text{hour}}$$

Based on this information, *MTE* has completed queuing analysis of the site assuming an average unloading time of 0.9 minutes and an average load of 40T. *MTE* has found that the 98th percentile demand would result in a total of two (2) incoming vehicles within the system at any one time. This represents one (1) unloading whilst another is queued outside of the manoeuvring area. Refer to **Annexure C** for the detailed queuing analysis results.

As discussed previously, the site has the ability to accommodate more than one (1) queued incoming vehicle. Therefore, there is sufficient space within the site to accommodate the proposal's incoming truck demand.

4.4 Theoretical Site Capacity

Although the site easily has capacity to handle an average arrival rate of 0.9 trucks per hour, it is reasonable to expect that the arrival rate will not be uniform throughout all opening hours. For example, the 7-8am hour would likely generate lower traffic demand than the 12-1pm hour. As such, it is important to assess the site's ability to accommodate a peak arrival rate, which is above the average rate of 0.9 trucks per hour.

Considering the hours of the unloading operation and the expected truck characteristics, in order to calculate the theoretical maximum site capacity, we can make the following assumptions:

- The truck movements occur at their maximum during every hour of operation, such that the site operates for a total of 10 hours on a weekday and 5 hours on a Saturday (total of 55 operating hours per week);
- The average load per truck is of 40 tonnes;

- 50 operating weeks (conservative assuming two full weeks of shutdown periods per year);
- Capacity to handle four (4) vehicles queued outside the loading area without queueing onto the public road.

Under the above assumptions and restrictions, the site can accommodate up to 2.08 incoming material trucks per hour. Based on this, the site has the theoretical capacity to load and unload **83.2 tonnes** in a peak hour as demonstrated in the below calculation.

$$\text{Maximum Unloading Rate} = \frac{2.08 \text{ trucks}}{\text{hour}} * \frac{40T}{\text{truck}} = \mathbf{83.2 \text{ T/hr}}$$

The proposal is for **99,000 tonnes** per annum which breaks down to an average tonnage rate of **36.0 tonnes** per hour as demonstrated in the below calculation.

$$\text{Average Unloading Rate} = \frac{99\,000T}{\text{year}} * \frac{1 \text{ year}}{50 \text{ weeks}} * \frac{1 \text{ week}}{55 \text{ hours}} = \mathbf{36.0 \text{ T/hr}}$$

In summary, an average tonnage rate of 36.0 T/hr applied over the entire year will achieve the proposed 99,000 tonnes per annum. Meanwhile, the site has the ability in peak hours to unload 83.2 T in a peak hour. Therefore, the site has the theoretical capacity to load and unload **2.3 times more** of the proposal's average rate should there be a concentrated period in which trucks arrive to the site, rather than uniformly throughout the day.

A capacity of over double the average rate within the peak hours is reasonable and will be covered by the operator's on-site management operations. It is therefore reasonable to conclude that the site can effectively manage the arrival rate such that the proposal will not cause queueing onto the public road.

4.5 Traffic Impact Assessment

The site has the capacity to accommodate up to two (2) trips by trucks in a peak hour, though only 0.9 trucks per hour on average will reach the limit of 99,000T per year. Reference is made to *Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments Figure 5.1* which states the following regarding peak hour vehicle trips:

Likely impact of development:

Low Impact (<10 Trips): No Detailed Assessment Required

Moderate Impact (10-100 Trips): Traffic Impact Statement Required

High Impact (>100 Trips): Traffic Impact Assessment Required

Accordingly, the proposal is a low impact development, and no detailed assessment is required.

5 **CONCLUSION**

In view of the foregoing, the subject Landfill Facility proposal at Tumblong Reserve Road, Tumblong (as depicted in **Annexure A**) is fully supportable in terms of its traffic and parking impacts. The following outcomes of this traffic impact assessment are relevant to note:

- No changes to the peak parking demand of the site will result of the proposed modifications, with adequate parking provided for staff based on a first principles assessment and considering the operation holistically.
- Council's DCP does not require the provision of motorcycle or bicycle parking facilities.
- The parking areas of the site have not been assessed against the relevant sections of AS2890.1:2004, AS2890.2:2018 and AS2890.6:2009 as no changes are proposed to the existing layout.
- The 98th percentile demand would result in a total of two (2) incoming vehicles within the system at any one time. This represents one (1) unloading whilst another is queued outside of the manoeuvring area. The site has the ability to accommodate more than up to four (4) queued B-Doubles. Therefore, there is sufficient space within the site to accommodate the proposal's incoming truck demand.
- The site has the theoretical capacity to load and unload 2.3 times more of the proposal's average rate should there be a concentrated period in which trucks arrive to the site, rather than uniformly throughout the day.
- the proposal is a low impact development, as it will generate fewer than 10 vehicle trips in a peak hour. No detailed assessment is required.



**ANNEXURE A: SITE LAYOUT
(1 SHEET)**



Stormwater pond



Tumblong Reserve Rd

CELL 1

CELL 2

Leachate pond

Temporary
leachate dam

Existing
overburden
stockpile



**ANNEXURE B: SWEPT PATH ANALYSIS
(1 SHEET)**



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Client / Project:
Habitat Planning

Project Address:
Tumblong Reserve Road

Notes:
CONCEPT PLAN ONLY.
NOT FOR CONSTRUCTION.

Tested Using:
*AutoTURN 11
*ZWCAD 2019
Scale @ A3 1:100

Project No:
250318

Drawing Title:
01 - Truck And Dog Loading Paths

Revision History		
Version	Date	Notes
A	05/06/2025	





**ANNEXURE C: QUEUEING ANALYSIS
(2 SHEETS)**

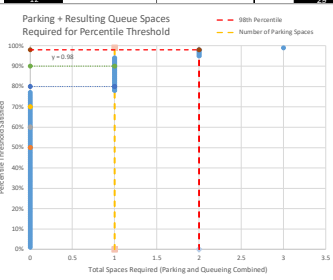
Multi-Server Queue Worksheet

Service Bays	1	Arrival Rate (vehicles/hour)	0.9	Wait Time in Each Bay (seconds)	900
Vehicles/Second IN	0.0003	Vehicles/Second OUT (per bay)	0.0011		
P0	0.7750	rho (M/M/c and M/M/1 Non-Random Service Bays Minimum)	0.225	rho (M/M/1 only)	0.2250

	CCC Average Lengths of Stay			
	TEF AM (LDCC)	TEF PM (LDCC)	Guide Avg (General)	Guide Avg (LDCC)
Wait Time	341	496	408	468
Traffic Gen to Use	0.8	0.7	0.8	0.7

n	1st Term	P(n)	P(>n)	Alternate (P>n)
0	1.00E+00	0.775	22.5%	20.15%
1	2.25E-01	0.174	5.1%	2.18%
2	2.53E-02	0.039	1.1%	0.16%
3	1.90E-03	0.009	0.3%	0.01%
4	1.07E-04	0.002	0.1%	0.00%
5	4.81E-06	0.000	0.0%	0.00%
6	1.80E-07	0.000	0.0%	0.00%
7	5.79E-09	0.000	0.0%	0.00%
8	1.63E-10	0.000	0.0%	0.00%
9	4.07E-12	0.000	0.0%	0.00%
10	9.16E-14	0.000	0.0%	0.00%
11	1.87E-15	0.000	0.0%	0.00%
12	3.51E-17	0.000	0.0%	0.00%
13	6.08E-19	0.000	0.0%	0.00%
14	9.78E-21	0.000	0.0%	0.00%
15	1.47E-22	0.000	0.0%	0.00%
16	2.06E-24	0.000	0.0%	0.00%
17	2.73E-26	0.000	0.0%	0.00%
18	3.41E-28	0.000	0.0%	0.00%
19	4.04E-30	0.000	0.0%	0.00%
20	4.54E-32	0.000	0.0%	0.00%
21	4.87E-34	0.000	0.0%	0.00%
22	4.98E-36	0.000	0.0%	0.00%
23	4.87E-38	0.000	0.0%	0.00%
24	4.37E-40	0.000	0.0%	0.00%
25	4.11E-42	0.000	0.0%	0.00%
26	3.56E-44	0.000	0.0%	0.00%
27	2.98E-46	0.000	0.0%	0.00%
28	2.38E-48	0.000	0.0%	0.00%
29	1.85E-50	0.000	0.0%	0.00%
30	1.36E-52	0.000	0.0%	0.00%
31	1.01E-54	0.000	0.0%	0.00%
32	7.07E-57	0.000	0.0%	0.00%
33	4.82E-59	0.000	0.0%	0.00%
34	3.19E-61	0.000	0.0%	0.00%
35	2.05E-63	0.000	0.0%	0.00%
36	1.28E-65	0.000	0.0%	0.00%
37	7.80E-68	0.000	0.0%	0.00%
38	4.62E-70	0.000	0.0%	0.00%
39	2.66E-72	0.000	0.0%	0.00%
40	1.50E-74	0.000	0.0%	0.00%
41	8.22E-77	0.000	0.0%	0.00%
42	4.41E-79	0.000	0.0%	0.00%
43	2.31E-81	0.000	0.0%	0.00%
44	1.18E-83	0.000	0.0%	0.00%
45	5.99E-86	0.000	0.0%	0.00%
46	2.88E-88	0.000	0.0%	0.00%
47	1.38E-90	0.000	0.0%	0.00%
48	6.47E-93	0.000	0.0%	0.00%
49	2.97E-95	0.000	0.0%	0.00%
50	1.34E-97	0.000	0.0%	0.00%
51	5.95E-100	0.000	0.0%	0.00%
52	2.55E-102	0.000	0.0%	0.00%
53	1.08E-104	0.000	0.0%	0.00%
54	4.51E-107	0.000	0.0%	0.00%
55	1.85E-109	0.000	0.0%	0.00%
56	7.42E-112	0.000	0.0%	0.00%
57	2.93E-114	0.000	0.0%	0.00%
58	1.14E-116	0.000	0.0%	0.00%
59	4.33E-119	0.000	0.0%	0.00%
60	1.63E-121	0.000	0.0%	0.00%
61	5.99E-124	0.000	0.0%	0.00%
62	2.17E-126	0.000	0.0%	0.00%
63	7.77E-129	0.000	0.0%	0.00%
64	2.73E-131	0.000	0.0%	0.00%

Percentile	Number of Vehicles in System	Number of Vehicles Queued
0%	0	0
50%	0	0
60%	0	0
70%	0	0
80%	1	0
90%	1	0
98%	2	1
99.90%	4	3
Erlang B (Blocking)		
Erlang C (Queueing)		
Average Queue Time = 756.4 seconds		
Probability of Overspill		
Probability of Arriving Driver Having to Queue		
16.4%		
Lamda		
mu		
Erlang B		
Erlang C		
n		
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

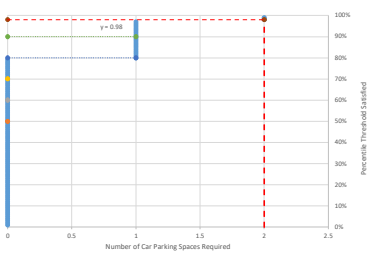


Single Bay System Only

n	P(n)	P(>n)
0	77.50%	22.50%
1	17.44%	5.06%
2	3.52%	1.14%
3	0.88%	0.26%
4	0.20%	0.06%
5	0.04%	0.01%
6	0.01%	0.00%
7	0.00%	0.00%
8	0.00%	0.00%
9	0.00%	0.00%
10	0.00%	0.00%
11	0.00%	0.00%
12	0.00%	0.00%
13	0.00%	0.00%
14	0.00%	0.00%
15	0.00%	0.00%
16	0.00%	0.00%
17	0.00%	0.00%
18	0.00%	0.00%
19	0.00%	0.00%
20	0.00%	0.00%
21	0.00%	0.00%
22	0.00%	0.00%
23	0.00%	0.00%
24	0.00%	0.00%
25	0.00%	0.00%
26	0.00%	0.00%
27	0.00%	0.00%
28	0.00%	0.00%
29	0.00%	0.00%

Vehicles in System	Number Vehicles Queued
1.6	1
2	1
3	1
4	1
5	1
6	1
7	1
8	1
9	1
10	1
11	1
12	1
13	1
14	1
15	1
16	1
17	1
18	1
19	1
20	1
21	1
22	1
23	1
24	1
25	1
26	1
27	1
28	1
29	1

Parking Bays Required for Percentile Threshold to Avoid Queueing



Percentile Threshold Satisfied	Number of Car Parking Spaces Required
0%	0.00%
10%	0.00%
20%	0.00%
30%	0.00%
40%	0.00%
50%	0.00%
60%	0.00%
70%	0.00%
80%	0.00%
90%	0.00%
98%	0.00%
99%	0.00%
100%	0.00%

In the single-line, multiserver, single-phase model, customers form a single line and are served by the first server available. The model assumes that there are m identical servers, the service time distribution for each server is exponential, and the mean service time is $1/\mu$. Using these assumptions, we can describe the operating characteristics with the following formulas:

$$\rho = \frac{\lambda}{m\mu} = \text{the average utilization of the system}$$

$$P_0 = \left[\sum_{n=0}^{\infty} \frac{(m\lambda)^n}{n!} + \frac{(m\lambda)^m}{m!} \left(\frac{1}{1-\rho} \right) \right]^{-1} = \text{the probability that no customers are in the system}$$

$$L_q = \frac{P_0(m\lambda)^m}{m!} = \text{the average number of customers waiting in line}$$

$$W_q = \frac{L_q}{\lambda} = \text{the average time spent waiting in line}$$

$$W = W_q + \frac{1}{\mu} = \text{the average time spent in the system, including service}$$

$$L = \lambda W = \text{the average number of customers in the service system}$$

$$P_n = \begin{cases} \frac{(m\lambda)^n}{n!} P_0 & \text{for } n \leq m \\ \frac{(m\lambda)^n}{m! m^{n-m}} P_0 & \text{for } n > m \end{cases} = \text{the probability that } n \text{ customers are in the system at a given time}$$

Average Number of Customers Waiting in Line: 0.065322581
Average Waiting Time in Line: 261.2903226

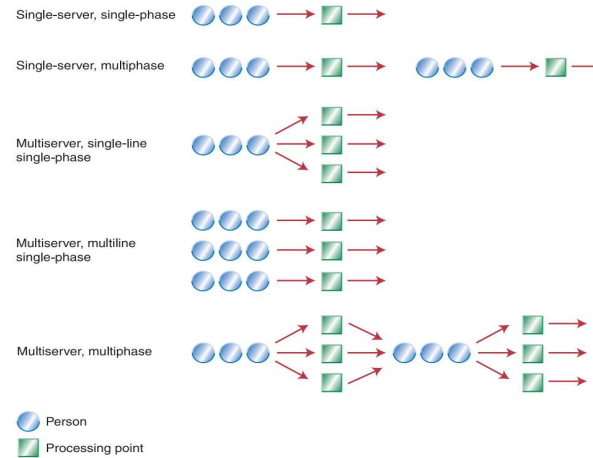


FIGURE C-2

Examples of waiting line systems

Multi-Server Queue Worksheet

Service Bays	1	Arrival Rate (vehicles/hour)	2.08	Wait Time in Each Bay (seconds)	900
Vehicles/Second IN	0.0006	Vehicles/Second OUT (per bay)	0.0011		
PQ	0.4800	rho (M/M/c and M/M/1) Non-Random Service Bays Minimum	0.520	rho (M/M/1 only)	0.5200

	CCC Average Lengths of Stay			
	TEF AM (LDCC)	TEF PM (LDCC)	Guide Avg (General)	Guide Avg (LDCC)
Wait Time	341	496	408	468
Traffic Gen to Use	0.8	0.7	0.8	0.7

In the single-line, multiserver, single-phase model, customers form a single line and are served by the first server available. The model assumes that there are s identical servers, the service time distribution for each server is exponential, and the mean service time is $1/\mu$. Using these assumptions, we can describe the operating characteristics with the following formulas:

$$\rho = \frac{\lambda}{s\mu} = \text{the average utilization of the system}$$

$$P_0 = \left[\sum_{n=0}^{\infty} \frac{(\lambda/\mu)^n}{n!} + \frac{(\lambda/\mu)^s}{s!} \left(\frac{1}{1-\rho} \right) \right]^{-1} = \text{the probability that no customers are in the system}$$

$$L_q = \frac{\rho(\lambda/\mu)^2}{s(1-\rho)^2} = \text{the average number of customers waiting in line}$$

$$W_q = \frac{L_q}{\lambda} = \text{the average time spent waiting in line}$$

$$W = W_q + \frac{1}{\mu} = \text{the average time spent in the system, including service}$$

$$L = \lambda W = \text{the average number of customers in the service system}$$

$$P_n = \begin{cases} \frac{(\lambda/\mu)^n}{n!} P_0 & \text{for } n \leq s \\ \frac{(\lambda/\mu)^n}{s! s^{n-s}} P_0 & \text{for } n > s \end{cases} = \text{the probability that } n \text{ customers are in the system at a given time}$$

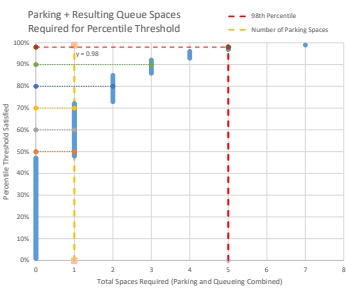
Average Number of Customers Waiting in Line Average Waiting Time in Line

0.563333333

975

n	1st Term	Pn	P(>n)	Alternate (P>n)
0	1.00E+00	0.480	52.0%	40.55%
1	5.20E-01	0.250	27.0%	9.63%
2	1.35E-01	0.130	14.1%	1.59%
3	2.34E-02	0.067	7.3%	0.20%
4	3.05E-03	0.035	3.8%	0.02%
5	3.17E-04	0.018	2.0%	0.00%
6	2.75E-05	0.009	1.0%	0.00%
7	2.04E-06	0.005	0.5%	0.00%
8	1.33E-07	0.003	0.3%	0.00%
9	7.66E-09	0.001	0.1%	0.00%
10	3.98E-10	0.001	0.1%	0.00%
11	1.88E-11	0.000	0.0%	0.00%
12	8.16E-13	0.000	0.0%	0.00%
13	3.26E-14	0.000	0.0%	0.00%
14	1.21E-15	0.000	0.0%	0.00%
15	4.20E-17	0.000	0.0%	0.00%
16	1.37E-18	0.000	0.0%	0.00%
17	4.18E-20	0.000	0.0%	0.00%
18	1.21E-21	0.000	0.0%	0.00%
19	3.30E-23	0.000	0.0%	0.00%
20	8.59E-25	0.000	0.0%	0.00%
21	2.13E-26	0.000	0.0%	0.00%
22	5.03E-28	0.000	0.0%	0.00%
23	1.14E-29	0.000	0.0%	0.00%
24	2.46E-31	0.000	0.0%	0.00%
25	5.12E-33	0.000	0.0%	0.00%
26	1.02E-34	0.000	0.0%	0.00%
27	1.97E-36	0.000	0.0%	0.00%
28	3.66E-38	0.000	0.0%	0.00%
29	6.57E-40	0.000	0.0%	0.00%
30	1.14E-41	0.000	0.0%	0.00%
31	1.91E-43	0.000	0.0%	0.00%
32	3.10E-45	0.000	0.0%	0.00%
33	4.89E-47	0.000	0.0%	0.00%
34	7.48E-49	0.000	0.0%	0.00%
35	1.11E-50	0.000	0.0%	0.00%
36	1.61E-52	0.000	0.0%	0.00%
37	2.28E-54	0.000	0.0%	0.00%
38	3.09E-56	0.000	0.0%	0.00%
39	4.12E-58	0.000	0.0%	0.00%
40	5.35E-60	0.000	0.0%	0.00%
41	6.79E-62	0.000	0.0%	0.00%
42	8.40E-64	0.000	0.0%	0.00%
43	1.02E-65	0.000	0.0%	0.00%
44	1.20E-67	0.000	0.0%	0.00%
45	1.39E-69	0.000	0.0%	0.00%
46	1.57E-71	0.000	0.0%	0.00%
47	1.74E-73	0.000	0.0%	0.00%
48	1.88E-75	0.000	0.0%	0.00%
49	2.00E-77	0.000	0.0%	0.00%
50	2.08E-79	0.000	0.0%	0.00%
51	2.12E-81	0.000	0.0%	0.00%
52	2.12E-83	0.000	0.0%	0.00%
53	2.08E-85	0.000	0.0%	0.00%
54	2.00E-87	0.000	0.0%	0.00%
55	1.89E-89	0.000	0.0%	0.00%

Percentile	Number of Vehicles in System	Number of Vehicles Queued
0%	0	0
50%	1	0
60%	1	0
70%	1	0
80%	2	1
90%	3	2
98%	5	4
99.90%	10	9
Erlang		
Erlang-B (Blocking)		
Erlang-C (Queueing)		
Average Queue Time = 720.2 seconds		
Probability of Overspill		
Probability of Arriving Driver Having to Queue		
34.2%		
41.6%		
Average Queue Time = 720.2 seconds		
Lamda		
mu		
Erlang		
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		



Single Bay System Only		
n	Pn	P(>n)
0	48.00%	52.00%
1	24.96%	27.04%
2	12.98%	14.06%
3	6.75%	7.31%
4	3.51%	3.80%
5	1.82%	1.98%
6	0.95%	1.03%
7	0.49%	0.53%
8	0.25%	0.28%
9	0.13%	0.14%
10	0.07%	0.08%
11	0.04%	0.04%
12	0.02%	0.02%
13	0.01%	0.01%
14	0.01%	0.01%
15	0.00%	0.00%
16	0.00%	0.00%
17	0.00%	0.00%
18	0.00%	0.00%
19	0.00%	0.00%
20	0.00%	0.00%
21	0.00%	0.00%
22	0.00%	0.00%
23	0.00%	0.00%
24	0.00%	0.00%
25	0.00%	0.00%
26	0.00%	0.00%
27	0.00%	0.00%
28	0.00%	0.00%
29	0.00%	0.00%

Vehicles in System: Number Vehicles Queued		
98th Percentile Queue (Single Bay System)	5.0	4
98%	5	4

