

REQUIREMENT AREA REVIEW: FLEXIBLE STUDY AREA FOR TRAFFIC IMPACT ASSESSMENTS

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Abstract

New developments will contribute to increased traffic to the external environment. Therefore, the majority of nations, in planning and building regulations and guidelines have adopted steps to control them beforehand. Similarly, in Sri Lanka, new developments in the approval process should be undertaken, based on their legal specifications and through a Traffic Impact Assessment (TIA). Although the management of traffic from new developments is exceedingly positive, one of the problematic sectors noted in the TIA study is a fixed study area. Consequently, a 500 m buffer area from the proposed site edges is currently being taken as the study area in Sri Lanka. The geographical extent of the traffic impact area is not a fixed bound-ary. Particularly based on a set of parameters, the true catchment area could be changed. A fixed boundary may, therefore, misdirect developers, consultants and planning authorities in decision making in situations of transport planning. Owing to this very debatable selection, almost all studies have been incorrect. Consequently, this research focuses on investigating the requirement of flexible study areas for traffic impact assessments of distinctly unique developments.

Keywords: *Flexible Study Area, TIA, Traffic Impact, Traffic Impact Area, Traffic Impact Assessment*

1. Introduction

Urban road traffic congestion is a dangerous global issue existing in every major city (Wen, Chin, & Lai, 2017). A new development, thus, essentially attracts vehicle demand for the accessible and adjacent roads and linked junctions in the vicinity (Weerasekera, 2011). Therefore, new constructions or alterations to the existing development or renovations has an impact on the extent of external traffic (Land Transport Authority, 2011). If not properly diagnosed, challenges would become increasingly severe (Ponnurangama&Umadevib, 2014). Therefore, once this was identified, numerous countries have taken different planning and building regulations and guidelines to detect and eliminate adverse effects beforehand (Cooley, Gruyter, &Delbosc, 2016). A Traffic Impact Assessment (TIA) is needed to carry out according to the legal conditions, to obtain a development permit for new developments. It identifies potential traffic impacts from the proposed development for the surrounding road network and provides corrective action to minimise them (Teodoro&Regidor, 2005).

Mega constructions in Sri Lanka too, have to submit a traffic impact assessment as laid down by the parking & traffic control (Regulation 34, Schedule III) under the City of Colombo Development Plan for development permits from 1986 onwards. While there is an enormous positive movement, questionable areas may still emerge in some areas referred to the Term of Reference (TOR) in traffic impact assessments (Director, Enforcement Division of Urban Development Authority, 2019). Delineating the true catchment area for traffic impact analysis is one of the debatable areas. The 500m buffer zone from site edges is currently taken as the study area for traffic impact assessments. This is a fixed figure similar to most other countries (Ponnurangama&Umadevib, 2014). However, the area of influenced traffic after a new development varies with different indicators (Abley, Durdin, & Douglass, 2010).

Even though there are numerous different TIA guidelines in most countries, a flexible boundary for transport impact analysis of the TIA is not well understood through the guidelines, or even at practice (Cooley, Gruyter, &Delbosc, 2016). Besides, the guidelines are included in a reasonable study area, depending on the type and scope of the development, especially in the United States. In the TIA guidelines and the TORs, a minimum study area limit should be recommended as the initial (Weller, 2007). Therefore, the flexible boundary limit should be clearly defined (Cooley, Gruyter, &Delbosc, 2016) and to understand how much the new development will affect the environment, a geographical demarcation of the traffic impact area is needed (Wen, Chin, & Lai, 2017). If not, due to this very arbitrary selection, many findings would be erroneous. In addition,

numerous experts in the transport field believe that it is essential for increasing development to have an acceptable catchment area for the evaluation of traffic impacts. Therefore, this research objects to investigate the requirement of a flexible study area for traffic impact assessments of each unique development.

2. Literature Review

Unanticipated growth is a massive concern since traffic in most countries is unbalanced (Azra&Hoque, 2014). Therefore, some kind of serious transport studies, which are commonly known as the Traffic Impact Assessment (TIA), should be carried out before the approval for construction (May , et al., 2019). Different countries and different researchers use a variety of names for this, such as transport assessment, transport impact assessment, transportation assessment, traffic impact assessment, traffic impact study, traffic report and integrated transport assessment (ITA) (Abley, Durdin, & Douglass, 2010). With certain mitigation actions and directives, this study may be rejected or accepted.

The vehicle demand from each new construction activity is usually increased in the neighbouring road network (Khade, Khode, & Bhakhtyapuri, 2017). Thus, the accumulative vehicle trip attraction from new developments will generate many adverse impacts on the street network (Ponnurangama&Umadevib, 2014). The extent of traffic impact should, therefore, be correctly estimated from any new construction of the adjacent roads and intersections. Unless properly managed, serious planning and transportation problems can arise (Abley, Durdin, & Douglass, 2010). Therefore, most cities have undertaken a traffic impact study to approve new developments and improvements to existing developments (May , et al., 2019). The TIAs is used to seek an impact on all aspects of the transportation system due to new developments (Sarkar, Maitri, & Joshi, 2015). Therefore, this assessment is more cost-effective and time-efficient to make future development decisions at the planning stage (Cooley, Gruyter, & Delbosc, 2016). The required inputs and its scope should be clearly described under the TIA study to make a sustainable transport system (Abley, Durdin, & Douglass, 2010). Accordingly, the study area or impact area is the base to conduct any impact study (Cooley, Gruyter, & Delbosc, 2016). Therefore, in a TIA study, the most important and most difficult stage is the delineation of the study area, which is also called the “impact area” (Abley, Durdin, & Douglass, 2010).

Nevertheless, planning and building approving agencies of most countries such as Bangladesh (Azra&Hoque, 2014), Philippines (Teodoro&Regidor, 2005), Canada (Engineering and Capital Infrastructure Services Infrastructure, Development & Enterprise, April 2016), China (Weller, 2007) and United Arab Emirates (Department of Transport, November 2009) etc., have failed to identify a proper mechanism to delineate the study area for the transport study. For generalization, most agencies both local and international have instructed TIA consultants to undertake a certain study area, irrespective of the development type and scale. As an example, the Land Transport Division of the Ministry of Public Infrastructure & Land Transport in Malaysia, through the TIA Guideline in November, 2015 instructs that the study area should be a 1km radius adjacent to the site. Likewise, impact levels to all the access roads, nearby roads and junctions within 1km radius from edge of the site should be studied as the direct traffic impact area under the guidelines in Mauritius (Ministry of Public Infrastructure & Land Transport, November 2015). In this instance, there is a fixed impact area under these regulations and the consultant may discuss the extent of the study area with the Ministry of Public Infrastructure & Land Transport, Mauritius. Locally, the Urban Development Authority in Sri Lanka instructs to get a 500m radius buffer area from the site edges as the traffic impact study area (TOR for TIA, 2019).

Many countries such as Malaysia (Ministry of Public Infrastructure & Land Transport, 2015), Singapore (Land Transport Authority, 2017), Australia (Department of Planning, August 2016), Mauritius (Ministry of Public Infrastructure & Land Transport, November 2015), New Zealand (Abley, Durdin, & Douglass, 2010), and United Kingdom (Department for Regional Development (DRD) & Department of the Environment (DOE), November 2006) etc. also apply a fixed study area for all developments under their own TIA guidelines. Within all the above guidelines, consultants may extend, but have to comply with, the set guideline for the minimum. Some agencies have made a positive movement by requesting the consultants to demarcate study areas

as per the development type and scale. The boundary of the study areas was clearly outlined in the TIA guidelines in many cities and municipalities in the United States, based on the use and scale of the proposed development (Azra&Hoque, 2014) such as the State of Utah (Utah Department of Transportation, February 2015), Indiana (see figure 1) (Indiana Department of Transportation, May 2015), Arizona (Town Council Of Buckeye, December 2012), Minnesota (New Prague City Council, September, 2010) and City of Visalia (Community Development Department, 2019) etc.

A minimum study area is an essential aspect under the TIA guidelines (Weller, 2007) and it should define the detailed study area limits for all development types (Cooley, Gruyter, &Delbosc, 2016). Abley, Durdin, & Douglass (2010), clearly explained that the design years are generally changing by the location, scope, and development type and therefore, it is recommended that there should be at least a 10-year space as “future assessment year”. Nevertheless, all demarcations are static and no rigid dynamic ways for demarcation could be observed elsewhere. Abley, Durdin, & Douglass (2010), have explained that the scope of the TIA study should be described based on the different development types. At the same time, the minimum study area for all developments should be specified according to its use and development size (Cooley, Gruyter, &Delbosc, 2016). Subsequently, he illustrated that the flexible impact areas should be defined, based on the “scale of activity and the extent of impact”. Also, many research studies discuss that the impactable boundary of each development will differ and is not fixed. Therefore, due to variations in travel patterns, socio-economic and cultural conditions, and locational characteristics, the same guideline cannot be applied to all developments (Azra&Hoque, 2014). Thus, a large number of developments will attract massive traffic around (Yayat K.D., Kombaitan B., Pradono, Purboyo H.P.H., 2015). The bare land available around is also one of the factors to change the impact proportion of the area (Chen Y. & Liu A., 2019).

According to most scholars, the extent of the true catchment area after a new development, varies with different parameters such as the proposed development type / use (Abley, Durdin, & Douglass, 2010), size / scale of the proposed development, location of the proposed development (Azra&Hoque, 2014), scale of activity of the proposed development, around land use pattern (chen y. &liu a., 2019), modes of transport facilities around, nature of transport network around, trip generation from the proposed development (Cooley, Gruyter, &Delbosc, 2016), intersection performance around, road link performance around (Weerasekera, 2011), topographical barriers, connectivity of road network, nearby trip production / attraction points, population density around (Sarkar, Maitri, & Joshi, 2015), prevailing traffic conditions on the existing road systems (Ministry of Public Infrastructure & Land Transport, 2015), considerable distance from the site, close proximity of new developments to the site (Land Transport Authority, 2017), site access points (PMK Associates, Inc., July 2006), transport related infrastructure developments (Department of Planning, August 2016), pedestrian routes and cycle routes, availability of bare land (chen y. &liu a., 2019), access road classifications, access road width and speed limits, number of lanes of the access road, walking distances to public transport connections (Engineering and Capital Infrastructure Services Infrastructure, Development & Enterprise, April 2016), drive distance (Dramowicz, 2005), drive time (Segal, 1998), trading hours (Dolega, Pavlis, & Singleton, 2015), perception of safety, parking facilities (Wegener &Fuerst, 2004), travel cost, employment, density, urban density, neighbourhood design (Leszczyc, Sinha, &Sahgal, 2004) and accessibility (Delloye, 2018) etc. Hence, a fixed border might also point in the wrong direction for the planning authorities to take transport planning decisions.

3. Methodology

This research reviewed 50 TIA reports in Sri Lanka through the cornel method, and they were analyzed to recognize the requirement of a flexible study area or fixed study area for traffic impact assessments of each development. All the TIA reports have been collected from the Urban Development Authority and randomly selected for this study. All reports, prepared by different consultants for a variety of development categories, have been submitted within the past 5 years, to obtain traffic planning clearance for a development permit.

This study used Google Earth Pro Software, Microsoft Excel and IBM SPSS Statistics software. Google Earth Pro Software was used to identify the traffic count locations and to find the direct

distances from each site edges to traffic count locations. Microsoft Excel and IBM SPSS Statistics software were applied to identify the radius of the adopted impact areas and the gap between the true catchment and adopted catchment in TIA studies.

4. Analysis and Results

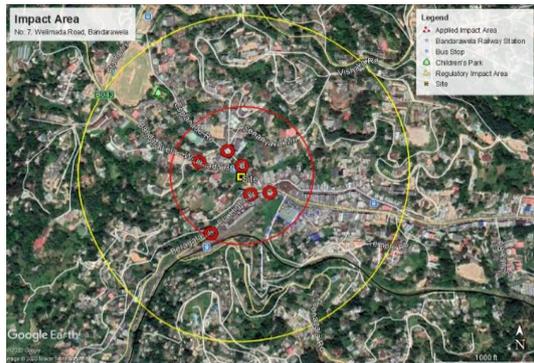


Figure 1: Impact Area - No: 7, Welimada Road,



Figure 2: Impact Area - No: 50, Panadura Road,

All 50 locations of TIA reports are within different local authorities in Sri Lanka. They were taken through a random sampling technique to analyze the need for a flexible study area for TIA studies. These TIA reports are prepared for different development purposes such as retail, shopping, religious, recreational, industrial, residential, office, educational and other utilities etc., and different development scales. Further, the area, where the traffic count locations (traffic data collected and analyzed roads and junctions) in these TIA reports, are considered as the adopted impact area or “Applied Impact Area” at the practice in this study. Moreover, the direct distances in each direction from the site edges to traffic count locations will be measured and the maximum value of the radius will be taken as the radius of the applied impact areas. The 500m radius is the study area or initial impact area under the Urban Development Authority guidelines and regulations for TIAs in Sri Lanka (Urban Development Authority, 2018). Although it is a fixed study area, there is a gap between the regulatory boundary and the adopted boundaries at the practice in TIAs. It is obviously proven as below.



Figure 3: Impact Area - No: 4/B, Kanduboda, Delgoda

The total floor area of the proposed development in Figure 1 is 5,785.16 sqm. The TIA report was prepared on 17th September 2018 and it is now at the operational stage. The boundary of traffic count locations is the practically adopted impact area throughout this TIA study. All the traffic planning decisions have been taken based on this study area. But, the regulated study area (500m radius) is larger than the adopted impact area at the practice. Accordingly, this TIA study has taken a maximum 240m radius impact area, which is lesser than the legal requirement. It is clearly shown in Figure 1.

The total floor area of the proposed development in Figure 2 is 1,160 sqm. The TIA report was prepared in December 2017 and it is now at the operational stage. Here also, TIA study has taken a maximum of 130m radius impact area and is much less than the legal requirement. It is clearly shown in Figure 2.

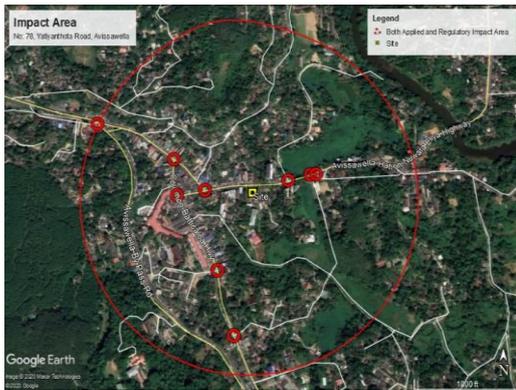


Figure 4: Impact Area - No: 78, Yatiyanthota Road,

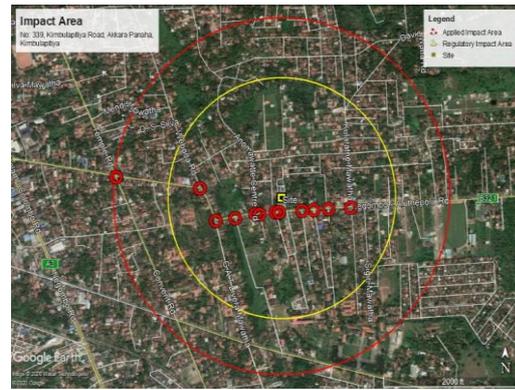


Figure 5: Impact Area - No: 339, Kimbulapitiya Road, Akkara Panaha, Kimbulapitiya

The total gross area of the building in Figure 3 is 15,060 sqm. This TIA study has taken the maximum 500m radius impact area. Therefore, the legally required impact area and the practically adopted impact area are the same boundaries of this TIA study. Accordingly, this study has been carried out following the legal guidelines by the TIA consultant (Figure 3).

The total gross area of the building in Figure 5 is 11,516.89 sqm. This TIA study also has taken the maximum 500m radius impact area. Therefore, this study has been carried out following the legal guidelines by the TIA consultant (Figure 5).

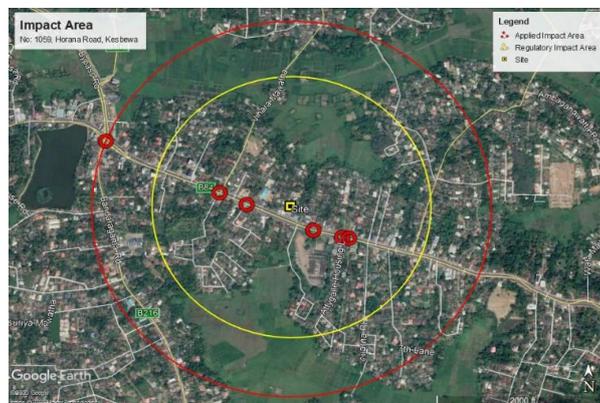


Figure 6: Impact Area - No: 1059, Horana Road, Kesbewa

The total floor area of the proposed development in Figure 4 is 1,151 sqm. The TIA report was prepared in February 2018 and is now at the operational stage. This study has taken a maximum of 740m radius impact area, and is larger than the legal requirement. It is clearly shown in figure 4.

The total floor area of the proposed development in Figure 6 is 1,186.0 sqm. The TIA report was prepared in June 2018 and it is now at the operational stage. This study has taken a maximum of 710m radius impact area and exceeds the legal requirement. It is clearly shown in Figure 6, and the table below shows the results of the study in a summary.

Table 1: Results - Radius of the Applied Study Area

No.	GPS Location	Address	Development Type	Scale of the Proposed Development (Floor Area - sqm)	Radius of the Applied Study Area (500m / < 500m / >500m)	Radius of the Applied Study Area (m)
1	6°53'59.8"N 79°51'21.6"E	No: 45, Alfred House Gardens, Colombo 3	Luxury apartment complex	15,110.00	<500	270
2	6°49'51.4"N 80°59'18.9"E	No: 7, Welimada Road, Bandarawela	Supermarket	5,785.16	<500	240

3	6°58'13.5"N 80°00'36.3"E	No: 4/B, Kanduboda, Delgoda	Hotel	15,060.00	500	500
4	6°42'42.3"N 79°59'09.9"E	No: 50, Panadura Road, Bandaragama	Supermarket	1,160.00	<500	130
5	6°54'28.1"N 80°04'34.9"E	No: 143/6, Hanwella Road, Pahala Hanwella, Hanwella	Supermarket	1,160.00	<500	190
6	7°12'15.0"N 79°51'43.9"E	No: 339, Kimbulapitiya Road, Akkara Panaha, Kimbulapitiya	Supermarket	1,151.00	>500	740
7	7°10'39.5"N 79°51'43.6"E	No: 58, Negombo Road, Kurana, Katunayake	Supermarket	1,151.00	<500	470
8	6°31'22.9"N 80°06'33.7"E	No: 185, Kalutara Road, Matugama	Supermarket	1,137.20	>500	540
9	6°45'48.5"N 79°53'50.1"E	No: 350/13, Gorakana, Panadura	Hotel	6,169.40	<500	120
10	6°49'53.4"N 80°59'16.2"E	Jummah Masjid, Welimada Road, Bandarawela	Mosque	2,892.70	>500	560
11	6°50'20.3"N 79°58'43.9"E	No: 1285, High Level Road, Makubura, Kottawa	Supermarket	1,031.22	<500	140
12	6°49'54.0"N 80°59'11.7"E	No: 21, Welimada Road, Bandarawela	Supermarket	1,140.30	>500	750
13	6°53'45.0"N 79°56'31.7"E	No: 427, Siriwedapura, Akuregoda, Battaramulla	Supermarket	1185.56	<500	360
14	6°57'07.9"N 80°12'52.7"E	No: 78, Yatiyanthota Road, Avisawella	Commercial & Office Building	11,516.89	500	500
15	7°04'32.1"N 80°00'50.7"E	No: 03, Miriswatta, Gampaha	Supermarket	1,069.47	<500	340
16	7°07'37.0"N 80°04'16.1"E	No: 120, Thihariya, Kalagedihena	Supermarket	1098.8	>500	620
17	6°54'16.0"N 79°54'48.8"E	Sethsiripaya Premises (Sethsiripaya Stage III), Battaramulla	High-Rise Office Complex - "Sethsiripaya Stage-III"	123,909.20	<500	350
18	6°54'35.0"N 79°51'01.4"E	No: 271, & 271/1, Galle Road, Colombo 3	Supermarket	567.64	<500	300
19	6°52'19.0"N 79°51'45.9"E	No: 12, 12A, 14, Rudra Mawatha, Colombo 06	Apartment	14,160	>500	570
20	6°51'41.9"N 79°53'41.2"E	No: 68, Pepiliyana Road, Gangodawila, Nugegoda	Supermarket	754	<500	410
21	6°53'34.2"N 79°53'18.4"E	No: 03, Swarna Place, Nawala Road, Rajagiriya	Office Building	4,197	500	500
22	6°02'52.9"N 80°13'18.2"E	No: 314C, 316, 318, Sirimbura road, Dangedara, Galle	Supermarket	1,082.40	<500	50
23	7°04'57.5"N 79°53'19.6"E	No: 32, Gamamedda Road, Thudella, Ja-Ela	Storage Building	55.83	<500	250
24	6°47'34.4"N 79°56'48.8"E	No: 1059, Horana Road, Kesbewa	Supermarket	1,186	>500	710
25	5°56'44.6"N 80°30'54.5"E	No: 259, Sri Sunanda Mawatha, Walgama, Matara	Private School	2,677.74	<500	480
26	7°10'15.3"N 79°56'35.9"E	No: 125/1, Katunayake Road, Minuwangoda	Supermarket	4,094.70	<500	310
27	7°13'42.8"N 79°54'43.7"E	East Field Estate, Kaluwarippuwa East Village, Negombo Road, Miriswatta	Cargills Distribution Centre	26,300	<500	300
28	6°46'49.6"N 79°52'58.3"E	No: 776, Galle Road, Moratuwa	Supermarket	1,703.83	<500	480
29	6°50'10.3"N 79°52'01.5"E	No: 282, Galle Road, Mt. Lavinia	Supermarket	3,228.60	<500	380
30	6°54'47.7"N 79°56'01.7"E	No. 30, Pipe Road, Battaramulla	Apartment	27,722.90	<500	400
31	7°13'48.6"N 79°51'00.3"E	No: 254/1, Chilaw Road, Kattuwa, Negambo	Supermarket	1190.7	<500	100
32	6°56'31.1"N 79°51'56.6"E	No: 38, M. Vincent Perera Mawatha, Colombo 14	Retail Complex	3,158	<500	260
33	7°35'01.4"N 79°47'49.1"E	Lansiya Watta, Chilaw	Supermarket	1,082.40	<500	20
34	6°58'41.1"N 79°53'19.5"E	No: 85, Negombo Road, Wattala	Supermarket	1114.3	<500	130
35	6°48'56.3"N 80°57'47.5"E	Boer Road, Range View, Kahagolla, Diyathalawa	Fuel Filling Station	672.62	>500	520
36	6°55'02.5"N 79°51'39.2"E	No: 69, Hyde Park Corner, Colombo 2	Supermarket	13,154.00	<500	320
37	6°50'55.3"N 79°52'39.1"E	No.15, Rohini Road, Nikape, Dehiwala	Apartment	9,766.50	<500	430
38	6°59'09.3"N 79°53'18.3"E	No.331, Negombo Road, Wattala	Supermarket	2,772.42	>500	660
39	6°50'37.9"N 79°55'07.8"E	No. 24, Lake Road, Maharagama	Hirdaramani Discovery Lab	2,956.08	<500	450

40	6°48'09.0"N 79°53'17.2"E	No: 339 & 3, Galle Road, Moratuwa	Mixed Development	7,090.50	>500	540
41	6°57'10.2"N 79°55'47.4"E	No. 356, Biyagama Road, Gonawela, Kelaniya	Supermarket	1,098.80	<500	230
42	5°57'15.3"N 80°32'01.8"E	No. 53B, Sri Rathanapala Mawatha, Matara	Mixed Development	821.69	<500	470
43	6°52'04.8"N 79°55'48.3"E	31A, Hospital Road, Sri Jayawardenapura	Banquet Hall Complex	13,608.70	<500	320
44	6°56'10.5"N 81°09'42.7"E	Batticaloa Road, Passara	Fuel Station	827.3	<500	330
45	6°01'11.2"N 80°14'52.1"E	No: 134, Matara Road, Unawatuna	Supermarket	625.42	<500	50
46	7°13'10.3"N 79°52'06.5"E	Dawatagahawatte, Thimbirigaskatuwa, Negombo	Private School	2,877.18	>500	590
47	6°51'18.9"N 79°53'29.4"E	No: 338, Colombo Road, Pepiliyana	Supermarket	1,270.90	<500	220
48	6°51'19.3"N 79°54'44.7"E	No: 443, High Level Road, Nawinna, Maharagama	Assembly of God Church	1,432.65	>500	520
49	6°52'10.4"N 79°55'47.2"E	No: 31, Hospital Road, Madiwela, Thalapatpitiya	Apartment	48,099.23	<500	460
50	6°04'01.8"N 80°13'24.3"E	No: 572, Hirimbura Road, Karapitiya, Galle	Supermarket	660.26	<500	320

Figure 7 clearly shows the different radius values for the study area between the TIA guidelines and at practice. The scatter graph shows the different radius values of the study areas at the practice and dotted straight line shows 500m radius under the TIA guideline. Accordingly, very few studies have undertaken the 500m or a closer radius of the study area for their analysis. Besides, according to the 50 TIA case studies, most of them had been carried out with either more than or less than the 500m radius of the study area for traffic impact analysis. Hence, there is a strong gap between the true catchment areas and applied catchment areas in these TIA studies.

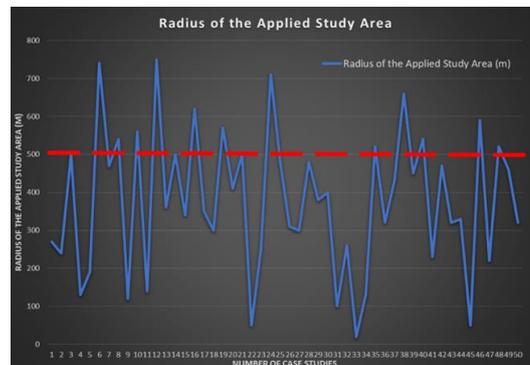


Figure 7: different radius values for the study area under the TIA guidelines and at the practice

According to the results of the descriptive statistic analysis for the floor area of each development from BM SPSS Statistics software, the mean value is 7874.7638 sqm. There is a high range between maximum and minimum radiuses which is 123853.37 sqm. This data set which has a high variance is 357466269.668 sqm. A high standard deviation is in the data set, which is 18906.77841 sqm. Further, this data set is widely spread out.

According to the results of the descriptive statistics analysis for the radius of the applied study area from BM SPSS Statistics software, the middle value of the data set (median) is 370m. There are multiple modes in this data list and the smallest mode value is 320m and maximum mode value 500m. The applied average radius of the study area (mean) for each development is 378m. Thus, the maximum radius value of the applied study area is 750m and the minimum radius value of the applied study area is 20m. Thus, there is a high range between maximum and minimum radiuses which is 730m. This data set has a high variance, which is 33995.918m. A high standard deviation is in the data set, which is 184.37982m. Furthermore, this data set is widely spread out. Therefore, the application of a fixed radius for different development types misdirects the planning decisions in a city.

Table 2: Results of the Descriptive Statistics Analysis

Statistics			Statistics		
Floor Area_sqm			Radius of the Study Area		
N	Valid	50	N	Valid	50
	Missing	0		Missing	0
Mean		7874.7638	Mean		378.0000
Median		1351.7750	Median		370.0000
Mode		1082.40 ^a	Mode		320.00 ^a
Std. Deviation		18906.77841	Std. Deviation		184.37982
Variance		357466269.668	Variance		33995.918
Range		123853.37	Range		730.00
Minimum		55.83	Minimum		20.00
Maximum		123909.20	Maximum		750.00

a. Multiple modes exist. The smallest value is shown

5. Conclusion

There are different problematic areas in TIA guidelines and it may negatively affect the future of town planning. Cooley, Gruyter, & Delbosc (2016), argue that although many national TIA guidelines are available, there is no proper scope to practice well. Accordingly, although planning authorities of different countries recommend adopting the TIA guidelines to prepare TIAs to assess the transport impacts (Abley, Durdin, & Douglass, 2010), many technical and operational disparities have been identified in the TIA guidelines (van Rensburg & van As, 2004). One of them is the absence of a flexible study area (Ponnurangama & Umadevib, 2014). It means that there is a gap between the regulatory boundary and the adopted boundaries at the practice in TIAs. Different kinds of literature and analytical results prove undoubtedly that there is a requirement of a flexible study area for traffic impact assessments of each distinctly unique development. Hence, this study not only shows the way to adopt or develop a new technique to define the true catchment area for traffic impact assessments, but has also helped to rectify reasonable decision making in the transport planning sector.

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