Exploratory Study on the Adoption of Traffic Impact Fee in the Philippines

Francis F. Villareal
Master of Science in Civil Engineering (Transportation Engineering)
University of the Philippines

Dr. Karl B.N. Vergel
Associate Professor
College of Engineering, U.P. Diliman
(Adviser)

ABSTRACT

Greater interaction between people, goods and services brought by socio-economic development generates new travel demand. Increased travel demand renders existing road systems deficient which, if not improved, will likely result in traffic congestion, safety concerns and economic losses (e.g., high fuel consumption, higher transportation cost). Local governments are hard-pressed to deal with this development impact particularly in generating resources for road system improvements. In response, this research sought to help local governments explore a new policy alternative. It answered the following research question, ‘To what extent can local governments in the Philippines adopt the Traffic Impact Fee as a policy that will address the inadequacy of future road capacity brought by new developments?’ The TIF requires new developments to pay a proportionate cost of improving road capacity.

This study reviewed the principles and methodologies of different TIF models, reviewed relevant legal and institutional frameworks on local fiscal administration and land use planning, and assessed the technical capability and data availability at the local level for TIF. It also conducted a case study that applied an improvement-driven TIF model (using a limited area approach) on a residential development project in Cabanatuan City. A Traffic Impact Assessment (TIA) was conducted as an integral part of the TIF model. The case study was intended to understand the opportunities and constraints arising from TIF implementation.

This paper concludes that there is potential for TIF adoption despite the legal, institutional, technical and data constraints at the local level. It also argues for TIF because of the clear necessity at the local level for technical guidance on traffic impact assessment and for resources to improve future traffic conditions.

Keywords: Traffic Impact Fee, Traffic Impact Assessment
Background

Greater interaction between people, goods and services brought by socio-economic development generates new travel demand. Increased travel demand renders existing road systems deficient which, if not improved, will result in traffic congestion, safety concerns and economic losses (e.g., high fuel consumption, higher transportation cost). Unfortunately, local governments in the Philippines have meager resources to expand road capacity, with many relying solely on the Internal Revenue Allotment (IRA) for basic public goods and services. It therefore becomes imperative that they be assisted technically and financially in ensuring safe and efficient road systems. A Traffic Impact Fee (TIF) policy which some developed countries have already adopted may be looked into as a possible technical and resource option.

Objectives of the Study

This study explored the adoption of the same policy in the Philippines. It answered the question, “To what extent can local governments in the Philippines adopt the Traffic Impact Fee as a policy that will address the inadequacy of future road capacity brought by new developments?”

The study considered the following specific objectives:
1. Describe the philosophy, principles and methodologies relating to TIF imposition.
2. Review relevant legal and institutional frameworks on Philippine local fiscal administration and land use planning.
3. Assess the technical and information capability of local governments to undertake the TIF process using different models.
4. Apply a modified (or limited area approach) improvement-driven TIF model on a proposed residential development project in Cabanatuan City using Traffic Impact Assessment (TIA).
5. Recommend measures and further studies that will strengthen the adoption of TIF models in the Philippines.

Methodology

Literature Review. Relevant laws (e.g., Philippine Constitution, 1991 Local Government Code), draft guidelines on TIA, and materials on comprehensive land use planning (CLUP) and local fiscal administration were reviewed. Technical papers and case studies on TIA and TIF were also used.

Case study. A case study was conducted wherein the traffic impact of a residential project in Cabanatuan City was analyzed using an improvement-driven TIF model. The model followed four major steps: (1) TIA, (2) estimation and allocation of eligible cost, (3) application of a TIF formula, and (4) computation of a TIF schedule. The TIA used secondary data in undertaking the four-step model for trip forecasting. The four-step model involved analyses on trip generation and mode choice, trip distribution, and trip assignment. The estimation and allocation of eligible cost involved cost estimates of improvement works e.g., traffic signals, with data coming from the city’s 2002 and 2006 Traffic Signalization Projects. A TIF formula was used to compute the improvement cost. A sample TIF schedule was developed using the cost per trip generated through the TIF formula, the data on total target of dwelling units to be built, and the daily trip rate for residential projects.

Limitations of the Study

The improvement-driven TIF model was modified to adapt to the planning realities in Cabanatuan City. Instead of a system-wide approach, the case study focused on a limited area approach - only one development/project and one land use (i.e., residential). A system-wide improvement driven TIF model would have required an integrated land use and transport planning covering the whole city and the use of a
calibrated transportation model (which incorporates multiple traffic analysis zones, different land uses, and city-wide traffic impact study). These requisites are lacking in Cabanatuan City and in the majority of local governments. Technical and data constraints included absence of parameters (e.g., employment, area per land use type) to predict land use change/growth and the unavailability of standard trip rates calibrated to local conditions for use in trip forecasting.

TIF CONCEPTS AND PROCESSES

The Philosophy of Impact Fees and the Rational Nexus Standard

Impact fees are premised on the philosophy that ‘development should pay for the cost of providing the facilities necessary to accommodate growth’ (Recht, 1988 as cited in Ross et al, 1991). These are one-time charges that are imposed on new residents/development and used to offset additional public service costs. Funds are used for capacity expansion of existing services and not for ‘operation, maintenance, repair, alteration, or replacement of existing capital facilities and cannot just be added to general revenue’ (Carrion and Libby, 2004).

The principles of ‘rational nexus’ and ‘rough proportionality’ govern policies on impact fees. Rational nexus standard requires reasonable connection between the need for additional facilities and the new development with the fee payer benefitting in some way from the fee. Rough proportionality demands that calculation of the fee must be based on a proportionate “fair share” equation. Impact fees should meet specific criteria, namely (Chapin, ____):

1. New developments benefit from facilities it paid for through impact fees;
2. Fees are used to fund only those facilities that benefit new development;
3. Fees are spent within a reasonable space of time;
4. Fees are spent within a zone where development is taking place; and
5. Double taxation is avoided by putting credit on development for other payments made for the same infrastructure facilities (such as property taxes). Likewise, the fees charged must not exceed a proportionate-share of the cost incurred or to be incurred in accommodating the development paying the fee.

Models on Traffic Impact Fees

A TIF is a monetary charge on new developments meant to recoup or offset a proportionate share of transport-related costs arising from these developments (Nicholas, 1992). Three TIF models are currently in use, namely:

Consumption-based Model. The model charges a new development the net cost to construct each additional service unit of traffic (e.g. one daily trip) it generates. Forecasted improvements on transportation facilities are not required because the fee is calculated based on any identified list of road improvements (e.g., list of projects needed at build-out). The list of road improvements is used to determine the cost per unit of capacity. The model is therefore adjustable to changing development plans (Duncan Associates, 2004).

Density Model. The density method assigns identical benefits to similarly used facilities. For example, densely populated residential area with a range of typical class (e.g., single-family or multiple-family residential) may be assigned a weighted value that recognizes the intensity of use of the proposed development. The total projected number of units by land use type is computed then a “density weight” is assigned to each proposed development corresponding the number of units per hectare. A fee schedule is then developed for each type of land use based on its density weight. Based on ITE standards, this method recognizes that higher density development generates fewer trips per unit than lower density housing. In like manner, higher density development is evaluated at a lower fee due to the lower impact of more people on less land (LSC Transport Consultants, 2004).
**Improvement-Driven Model.** This model uses a system-wide approach wherein the traffic impact of changes in all land uses in a city or town is considered in the computation of TIF. It covers all TAZs and develops a TIF schedule that assigns impact fee rate for each land use. It classifies the cost of growth-related improvements needed over a fixed planning horizon by the number of new service units (e.g., average daily trips) projected to be generated by growth over the same planning horizon in order to calculate a cost per service unit. This method is usually based on sound transportation planning that explicitly distinguishes between improvements required to cure existing deficiencies and improvement required to accommodate the traffic generated by future growth (LSC Transport Consultants, 2004). The improvements are identified by a road or transportation plan and the development is identified by a land use plan. Road facility costs are allocated to different categories of development proportional to the amount of development and relative intensity of demand for each category. Travel demand is represented by a quantity indicator. Indicator for roads is measured in vehicle trips generated by development.

### Table 1
**Strengths and Weaknesses of TIF Models as Applied in the Philippines**

<table>
<thead>
<tr>
<th>TIF Models</th>
<th>Strong Points</th>
<th>Weak Points</th>
</tr>
</thead>
</table>
| Consumption-based           | - Suitable for short-term plan of small cities and towns with changing development plans | - Not dependent on forecasting future development  
- Complex use of data on demand for transport services & allocation of revenue credits  
- Discourages LGUs to implement long-term transportation plans |
| Density                     | - Suitable for residential development  
- Suitable for environmentally-sensitive lands only | - Not suitable in mixed land use area as in the case of the Philippines |
| Improvement-driven (System-Wide Approach) | - Suitable for large cities & towns with fixed medium & long-term development plans  
- Complements the proposed TIA policy guidelines  
- Motivates LGUs to conduct trip forecasting study prior to a master transportation plan & legislation of impact fees  
- Strong potential to generate revenues for local road improvements | - No sound transportation planning at the LGUs  
- Inadequate growth forecast by census tract |

**Conduct of Traffic Impact Study**

The TIF models require a transportation model. The latter undertakes a Traffic Impact Study (TIS) to evaluate the impact of proposed developments on an existing road network. It also evaluates the impact of changes in travel demand, anticipates future travel demands and recommends mitigation measures (i.e., on-site, off-site). The following conditions require a TIS (Nelson, 1991):

1. When development will generate a specified number of peak hour trips. One hundred added vehicle trips are of a magnitude that can change the level of service of an intersection approach.
2. When development will generate a specified number of daily trips.
3. When a specified amount of acreage is being rezoned.
4. When development contains specified number of dwelling units or square footage.
5. At the judgment or discretion of public agency staff.
6. When development is in a sensitive area.
7. When changes are proposed in an area already suffering from congestion.

The key components of TIS include the following: (1) data collection on existing operating condition; (2) site traffic forecasting; (3) non-site traffic forecast; and (4) capacity analysis (Nelson, 1991).

CASE STUDY: A MODIFIED IMPROVEMENT-DRIVEN MODEL AS APPLIED IN CABANATUAN CITY

A case study on a proposed expansion of a residential project in Cabanatuan City (referred to in the paper as the Project) was conducted using an improvement-driven TIF model. The model was used because it is more advanced and consistent with the rational nexus and proportional share standards. It encourages holistic and long-term planning and considers the dynamic interaction between land use change and transportation requirements. The model also responds to ongoing efforts by the National Center for Transportation Studies (NCTS) and government agencies to formulate policy guidelines on TIA, the latter being a requisite to TIF design and implementation.

Due to technical and data constraints, the improvement-driven model was modified to adapt to the planning realities in Cabanatuan City (and in most local governments in the Philippines). Instead of a system-wide approach, the case study focused on a limited area approach - only one development/project and one land use (i.e., residential). The improvement-driven model followed three (3) technical steps or processes to arrive at a TIF schedule, namely: TIA, cost analysis and allocation, and computation of traffic impact fee.

![Methodological Framework of an Improvement-Driven TIF](image-url)
Criteria for Selecting Cabanatuan City

Cabanatuan is one of the fastest growing cities in Central Luzon in terms of population and economic growth. In 2000, Cabanatuan had 222,859 total individual population which surpassed Gapan City’s 89,199 and San Jose City’s 108,254. It has the highest vehicle registration compared to the two cities implying highest trips being generated. The city government has expanded its authority to impose local fees and charges (pursuant to the 1991 Local Government Code) which makes it very strategic for TIF implementation. It also has traffic signalization projects and geographical data that are necessary for the study.

The Study Area

Cabanatuan City is 125 km north of Manila. It has a total land area of 19,069 hectares where 58.19% is classified as agricultural land, 37.66% residential, 0.14% commercial, 0.10% industrial, 0.41% institutional, 0.83% for recreational activities, and 2.67% unclassified areas. In April 2006, the city’s population was estimated at 245,375 with a population density of 12.87 per hectare and an annual growth of 2% (CPDO, 2006a).

The city has a land transportation system covering major national highways and arterial road network. The road network has a total length of 350.24 km. which is divided into national roads (16.64%), city roads (4%), and barangay roads (79.36%). The Cabanatuan City Transport Terminal is the focal point of the public transportation network. Public buses ply between Cabanatuan and Manila route while public jeepneys and mini-buses connect Cabanatuan with San Fernando, Pampanga and nearby towns and cities. Jeepneys and tricycles service other routes within the city. Around 500 jeepneys ply from the rural barangays to the poblacion and some 1,976 jeepneys, mini-buses and buses operate in the city and nearby towns. Tricycle is the prime mode of intra-city transportation (CPDO, 2006b). In 2005, there were 59,408 units of registered vehicles (Land Transportation Office, 2005).

Proposed Infrastructure Improvements to be Undertaken by the City Government

In the absence of a transportation plan, this paper suggested a series of infrastructure improvements based on the 2002 and 2006 Traffic Signalization Projects and from formal discussions with the CPDO regarding long-term scenario on road improvements. The proposed improvements included geometric improvement of road approaches, channelization and lane marking of all intersections (scheduled for 2006), and traffic signalization of all key intersections (commencing in 2008). Loading and unloading bays for public bus shuttles will be constructed in 2010. Bicycle and tricycle lanes will be built in 2012 while road widening of the Maharlika Highway from the present two-lane to four-lane traffic per direction will commence in the same year. Road widening of all city and arterial roads from one/two lane highway to three-lane highway was also suggested.

Table 2 shows the schedule of suggested improvements. These improvements should be in place by 2020 when all 518 units of Lakewood are fully completed.
Table 2
Schedule of Transport-Related Infrastructure Improvements Within the TAZ

<table>
<thead>
<tr>
<th>Activities/Projects</th>
<th>Year of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Traffic signalization of all key intersections</td>
<td>2006</td>
</tr>
<tr>
<td>2. Geometric improvement of approaches of key intersections using standard lane markings, widening of shoulder roads and channelization for turning movement traffic</td>
<td>2007</td>
</tr>
<tr>
<td>3. Provision of loading and unloading bays for public transportation</td>
<td>2008</td>
</tr>
<tr>
<td>4. Provision of bicycle and tricycle lane on shoulder roads</td>
<td>2009</td>
</tr>
<tr>
<td>5. Widening of the Maharlika Highway (from two-lane to four-lane traffic per direction)</td>
<td>2010</td>
</tr>
<tr>
<td>6. Widening of major city/arterial roads (from two-lane to three-lane traffic per direction)</td>
<td>2011</td>
</tr>
<tr>
<td>- M. de Leon Avenue</td>
<td>2012</td>
</tr>
<tr>
<td>- Zulueta Street</td>
<td>2013</td>
</tr>
<tr>
<td>- Sanciangco Street</td>
<td>2014</td>
</tr>
<tr>
<td>- Gabaldon Street</td>
<td>2015</td>
</tr>
<tr>
<td>- Gen. Tinio Street</td>
<td>2016</td>
</tr>
<tr>
<td>- Burgos Street</td>
<td>2017</td>
</tr>
<tr>
<td>- Del Pilar Street</td>
<td>2018</td>
</tr>
<tr>
<td>7. Construction of Emilio Vergara Blvd. &amp; Extension Road</td>
<td>2019</td>
</tr>
<tr>
<td>- initial one way lane traffic per direction</td>
<td>2020</td>
</tr>
<tr>
<td>- widening to three way lane per direction</td>
<td></td>
</tr>
</tbody>
</table>

Scope of the Traffic Impact Assessment

Project Description. The TIA focused on only one land use – residential development. It evaluated the potential traffic and circulation impacts of a proposed expansion of Lakewood City’s residential project. Lakewood City is a combination of 65 has. 18-hole championship golf course and 90 has. residential area. Around 19.77 has. will be devoted to the Project which will build 518 high-end residential units with an average lot size of 300 sq.m. Amenities of the project include landscaped entrances, wide concrete roads,

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1 Some background developments may occur within the 14-year timeframe. However, there are no available data on projected land use areas and trip rates on these projects that can be used in the study. Thus only one residential development project was considered.
underground drainage, 24-hour security, cable and telephone ready, landscaped parks, country club and outdoor activities (Lakewood Estate and Country Club, 2007).

**Traffic Analysis Zone (TAZ).** The Project is situated in a delineated TAZ. A TAZ determines the boundaries of the TIA and TIF. It is normally delineated by state and/or local transportation officials when tabulating traffic related data. Figure 2 shows the TAZ which covers the Central Business District, large portions of commercial and institutional activities and areas for agro-industrial and residential purposes. Residential zones comprise mostly of high and medium density residential areas. The TAZ has 18,502 existing structures covering 1,554.34 hectares and with total gross floor area of 2,255,376 sqm.

**Study Intersections.** Eight existing intersections and three future intersections were identified for analysis. Some of the existing intersections have traffic signals that are non-operational.

**TIA Scenarios.** The TIA analyzed the potential traffic impact of the Project on the roadway system using the following scenarios:

- **Existing (2006) Conditions** – Baseline information on roads, traffic volumes and operating conditions were provided.
- **Future (2020) ‘Without Project’ Conditions** – Future traffic condition without the Project was developed for the horizon year 2020. Future traffic growth and operating conditions resulting from regional growth and background projects in the TAZ were forecasted. Trip generation rates for
background projects in the next 10-14 years were not considered since there were no data available. Additional analysis on ‘future traffic condition without the project but with city government’s transport infrastructure improvements’ was included.

- Future (2020) ‘With Project’ – Traffic conditions resulting from the Project were estimated and added to the future ‘without project’ forecast. The traffic impact of the Project on future traffic operating conditions was identified and evaluated. Also analyzed was the ‘future traffic condition with project and with city government’s infrastructure improvements’ scenario.

**Traffic Data and Traffic Forecast.** Data from the 2002 and 2006 traffic signalization projects on traffic count volumes (12-hour) of eight (8) key intersections were used to compute peak-hour volumes per intersection for existing traffic condition. Traffic forecast used a regression analysis of vehicle registration and population. The two are statistically correlated ($R=0.996$).

**Traffic Growth.** The growth rate of 7.85% per year (based on the vehicle registration growth rate of Cabanatuan City) was used. Traffic volume for ‘future without project conditions’ was used as benchmark in evaluating the traffic impact of the Project. Traffic condition 14 years into the future (2020) without the Project was also projected. Future increase in background traffic volumes due to regional growth was assumed to follow the growth rate. However, projects currently under government approval process were assumed to have minimal impact and were therefore excluded.

**Trip Generation.** The project vehicle trip generation was estimated using the locally calibrated trip generation rates developed by Sigua (2007). The trip rates were patterned after the standard trip rates published in the ITE Trip Generation Handbook (ITE, 1997). The trip rates (which were originally defined using person trips per dwelling unit or D.U.) were converted to vehicle trips (see figures in parenthesis, Table 3) using a standard occupancy factor of 2.2 persons per vehicle (car/jeep/UV) based on the Metro Manila Urban Transportation Integrated Study (JICA, 2000b). The A.M. and P.M. peak hours have the same trip generation rate with the A.M. directional movement reversed and used for P.M. directional movement. The Project is expected to generate a total of 1,064 veh/hr (358 entering, 706 exiting) during the morning peak hour and 1,064 veh/hr (706 entering, 358 exiting) during the afternoon peak hour. Pass-by trips were considered zero since residential land use generates home-based to work-based trip origin-destination.

**Table 3**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Peak Hour Time</th>
<th>Size</th>
<th>Unit</th>
<th>Peak Hour Rate</th>
<th>Trips</th>
<th>Pass-by Trips</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In</td>
<td>Out</td>
<td>In</td>
<td>Out</td>
</tr>
<tr>
<td>Residential</td>
<td>AM</td>
<td>518</td>
<td>D.U.</td>
<td>1.52</td>
<td>3.00</td>
<td>787</td>
<td>(358)</td>
</tr>
<tr>
<td>Residential</td>
<td>PM</td>
<td>518</td>
<td>D.U.</td>
<td>3.00</td>
<td>1.52</td>
<td>1554</td>
<td>(706)</td>
</tr>
</tbody>
</table>

**Trip Distribution and Assignment.** The trip generation estimated the total vehicle trips and the additional trips from the Project. Trip distribution done on the local roadway system evaluated the impact of additional traffic volume. Additional trips generated were assigned to the road network based on existing travel street patterns adjacent to affected intersections and road segments along the Maharlika Highway. Figure 3 shows future (2020) AM peak hour volume with project and with trips distributed to 11 study intersections. Figure 4 shows the PM peak hour volume with project at build-out.

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2 The rates were based on local trip rates developed for Makati City by Edgardo Sigua. These rates are potentially applicable to other towns and cities in the Philippines.
Figure 3
Future (2020) A.M. Peak Hour Volume-With Project
Traffic Impact Analysis (TIS). TIS compared the volume to capacity (v/c) ratios at each study intersection using the three scenarios:

1. **Existing Traffic Scenario.** The intersection of Sanciangco St. and Maharlika Highway has reached LOS F or total breakdown with ‘stop and go’ operation. Other key intersections have moderate flow to severe level of saturation (see Table 5).

2. **Future Traffic Without Project Scenario.** Due to an expected area-wide traffic growth, increased volume in traffic flows will dramatically affect capacity. By 2020, all intersections will experience total breakdown of operation (LOS F).

   In ‘Future Traffic Without Project but with Infrastructure Improvements’ scenario, a list of infrastructure improvements was suggested (see Table 2). With these improvements, six key intersections will improve from LOS F to LOS E, C and B. The rest of the key intersections will remain at LOS F despite improvements.

3. **Future Traffic With Project Scenario.** Intersections at M. de Leon and Mabini Sts. (traversing Maharlika Highway) will remain at LOS F because of additional trips from the Project. Additional traffic volume increases capacity demand. Putting up three new intersections near the project site will open access points for existing critical intersections. The new intersections will also reach LOS F.

   In ‘Future Traffic With Project and With Infrastructure Improvements’ scenario, the Project will produce additional local traffic at M. De Leon and Mabini Sts. (traversing Maharlika Highway) with LOS remaining at F. The three new intersections will improve from LOS F to LOS C and LOS D. The rest of the intersections will improve and will have the same LOS results as that of the future conditions ‘without project but with infrastructure improvements’.

<table>
<thead>
<tr>
<th>LOS</th>
<th>v/c ratio</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.00-0.20</td>
<td>Uncongested operation, all vehicles clear in a single signal cycle. Free flow traffic.</td>
</tr>
<tr>
<td>B</td>
<td>&gt;0.21-0.50</td>
<td>Light congestion, occasional back-up in critical approaches. Free flow traffic.</td>
</tr>
<tr>
<td>C</td>
<td>&gt;0.51-0.70</td>
<td>Some congestion on approaches, but intersection functional. Free flow traffic to moderate flow.</td>
</tr>
<tr>
<td>D</td>
<td>&gt;0.71-0.85</td>
<td>Traffic required to wait though more than one cycle during short peaks. However, no long-lasting queues result. Moderate traffic.</td>
</tr>
<tr>
<td>E</td>
<td>&gt;0.86-1.00</td>
<td>Severe congestion with some long-lasting queues in critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected left turn movements. Heavy traffic.</td>
</tr>
<tr>
<td>F</td>
<td>&gt;1.00</td>
<td>Total breakdown with ‘stop-and-go’ operation. Backup may occur at nearby intersections. Forced flow.</td>
</tr>
</tbody>
</table>


Findings of the Traffic Impact Analysis

The overall LOS of the three traffic conditions (i.e., existing, future without project, future with project) illustrates that traffic volume in the roadway system and critical intersections has good to ‘total breakdown’ conditions during existing scenario. The operating conditions of both without and with development future scenarios are saturated traffic flow. When improvements are in place for both without and with project
future scenarios, the level of congestion in seven key intersections will improve while four intersections remain at LOS F. Table 5 shows the LOS summary at three operating conditions.

Table 5
Summary of Level of Service – Morning and Afternoon Peak Hour

<table>
<thead>
<tr>
<th>Intersection Number and Name</th>
<th>2006 Existing Condition</th>
<th>2020 Future Condition w/o Project</th>
<th>2020 Future Condition w/o Project but with Improvements</th>
<th>2020 Future Condition w/ Project but w/o Improvements</th>
<th>2020 Future Condition w/ Project &amp; w/ Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Signalized Intersections</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 M. de Leon St./Maharlika Highway</td>
<td>D (D)</td>
<td>F (F)</td>
<td>F (F)</td>
<td>F (F)</td>
<td>F (F)</td>
</tr>
<tr>
<td>2 Zulueta St./Maharlika Highway</td>
<td>C (C)</td>
<td>F (F)</td>
<td>E (E)</td>
<td>F (F)</td>
<td>E (E)</td>
</tr>
<tr>
<td>3 Sanciangco St./Maharlika Highway</td>
<td>F (F)</td>
<td>F (F)</td>
<td>F (F)</td>
<td>F (F)</td>
<td>F (F)</td>
</tr>
<tr>
<td>4 Gabaldon St./Maharlika Highway</td>
<td>C (C)</td>
<td>F (F)</td>
<td>E (D)</td>
<td>F (F)</td>
<td>E (D)</td>
</tr>
<tr>
<td>5 Mabini St./Maharlika Highway</td>
<td>E (E)</td>
<td>F (F)</td>
<td>F (F)</td>
<td>F (F)</td>
<td>F (F)</td>
</tr>
<tr>
<td>6 Gen. Tinio St./Maharlika Highway</td>
<td>C (C)</td>
<td>F (F)</td>
<td>E (F)</td>
<td>F (F)</td>
<td>E (F)</td>
</tr>
<tr>
<td>7 Burgos St./Maharlika Highway</td>
<td>C (C)</td>
<td>F (F)</td>
<td>D (D)</td>
<td>F (F)</td>
<td>D (D)</td>
</tr>
<tr>
<td>8 Del Pilar St./Maharlika Highway</td>
<td>E (E)</td>
<td>F (F)</td>
<td>F (F)</td>
<td>F (F)</td>
<td>F (F)</td>
</tr>
<tr>
<td>Proposed Signalized Intersections</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Circumferential Rd./Extension Rd.</td>
<td>Does Not Exist</td>
<td>F (F)</td>
<td>C (C)</td>
<td>F (F)</td>
<td>D (D)</td>
</tr>
<tr>
<td>10 Extension Road/E. Vergara Blvd</td>
<td></td>
<td>F (F)</td>
<td>C (C)</td>
<td>F (F)</td>
<td>C (C)</td>
</tr>
<tr>
<td>11 Cabanatuan-Papaya Road/ E.Vergara Blvd</td>
<td></td>
<td>F (F)</td>
<td>B (B)</td>
<td>F (F)</td>
<td>C (C)</td>
</tr>
</tbody>
</table>

**Recommended Mitigation Measures**

The preceding TIA highlighted two important conditions. Firstly, without introducing any road improvement, the LOS will reach total breakdown (LOS F) by build-out year (2020) thus underscoring the need for urgent intervention. Secondly, the proposed infrastructure improvements will improve the LOS of seven key intersections. The remaining deficient four key intersections (i.e., M. de Leon St., Sanciangco St., Mabini St., del Pilar St., all connecting to Maharlika Highway) will need different interventions. It is therefore advisable that the approved Cabanatuan By-Pass project be implemented.

The case study also showed that in undertaking the TIA/TIF process, future LOS is determined with more rigor and therefore strengthens or supports the city government’s plan for infrastructure improvement. For this alone, a TIF policy is desirable for adoption. The succeeding sections will weigh if TIF as a resource-generating policy is desirable.

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3 Figures in parenthesis denote the afternoon peak-hour LOS for all five conditions.

4 A four-lane per direction expressway approved by the national government that is designed to decongest vehicular through traffic along the Bulacan- Cabanatuan- Nueva Ecija Growth Corridor. The by-pass diverts both inter-zonal and intra-zonal trips that ply Maharlika Highway.
Cost Analysis and Allocation

Cost analysis and allocation determines the total capital cost needed to improve affected roadway area, particularly the cost to be recovered through TIF. The first step was to identify roadways needing immediate improvements. It uses a traffic demand forecasting model for trip assignments and capacity on LOS measurements for identifying road deficiencies. The second step is to allocate the cost to benefiting users.

Estimation of Total Eligible Cost and Cost Allocation. The TIA showed deficiency in 11 key intersections. However, only those intersections directly affected by (or loaded with new trips from) the Project were included in the cost computation, namely: (1) M. de Leon Ave./Maharlika Highway; (2) Mabini St./Maharlika Highway; (3) Circumferential Road/Maharlika Highway; (4) E. Vergara Blvd./Extension Road; and (5) E. Vergara Blvd./Cabanatuan-Papaya Road. Of the total added trips of 1,064 veh/hr entering and 1,064 veh/hr exiting the project site, 40.3% additional trips occur at the intersection of M. de Leon Ave. and Maharlika Highway. Around 46.2% additional trips occur at the intersection of Mabini St. and Maharlika Highway. Improvement cost was estimated at P10,963,585.78 based on the traffic signalization projects.

It is recommended that said intersections be provided with traffic signalization and geometry improvements related works. Traffic signal facilities include the supply of materials and electrical works. Geometry improvement works include excavation, concreting, civil works and supply of materials/accessories. Cost also includes labor and material costs as well as contingency and overhead costs. The construction of E.Vergara Rd. and adjacent streets are city government’s pipeline projects and were therefore excluded from the TIF.

Computation of Traffic Impact Fee Model

Data from TIA and cost analysis were used to calculate the full cost-based TIF schedule for the TAZ. Computation has two steps: (1) the development of a base impact fee per trip; and (2) the application of this fee to each type of land use.

Cost per Trip. The TIA estimated that the expansion project will generate a total of 1,064 veh/hr for A.M. peak-hour and 1,064 veh/hr for P.M peak-hour or an equivalent of 2,128 average daily trips. These peak-hour trips were converted to daily trips to suit the standard formula for impact fee. After which the improvement cost taken from cost allocation eligible for TIF was calculated. The following standard formula for cost per trip was used:

\[
Total \ Cost \ per \ Trip = \frac{Total \ improvement \ cost}{Total \ new \ trips}
\]

\[= \frac{10,963,585.78}{2,128}
\]

\[= P \ 5,152.06
\]

Fee Formula and Schedule. The impact fee formula is the product of the cost per trip, the number of units of each land use and the average daily trip rate of each land use. It is expressed as:

\[Fee = \text{Total cost per Trip} \times \text{No. of Units} \times \text{Daily Trip Rate of Land Use}
\]

Table 6 shows the fee schedule for the Project.
### Table 6
Sample Fee Schedule

<table>
<thead>
<tr>
<th>Type of Land Use</th>
<th>Unit</th>
<th>Cost per Trip (PhP)</th>
<th>Daily Trip Rate$^5$</th>
<th>Pass-by Trip</th>
<th>Impact Fee (PhP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Dwelling Unit</td>
<td>5,152.06</td>
<td>9.57</td>
<td>0</td>
<td>49,305.21</td>
</tr>
</tbody>
</table>

**Projected Revenue.** Based on fee schedule, the development of 518 residential units at build-out will give the city government P25,540,098.78 in additional revenues to collected between 2006 to 2020 from the developer and homeowners.

**Assessment of Fairness and Acceptability of the Fee Schedule**

How fair or reasonable is the fee schedule for Lakewood City? This question was answered using the different conditions that determine fairness or ‘reasonableness’ (refer to page 3 on impact fee criteria).

Condition 1: New developments (will) benefit from facilities it paid for. The case study met this requirement by recommending road improvements that will address future road deficiencies brought by the Project.

Condition 2: Fees are spent within a zone where development is taking place. The case study met this requirement by delineating the TAZ where the Project has direct impact on the road system. Likewise, only those roads and intersections directly affected were considered for road improvement. Road improvements made possible through TIF will ease up the traffic flow to and from the Project.

Condition 3: Fees are spent within reasonable time. It is assumed that the cost of road improvements will be recovered within 14 years, thus the timeframe for spending the fee is also within this period. Fee collection will be done yearly (or incremental) but the improvements can be made when sufficient amount is collected to undertake major improvement projects. The phasing of improvements must be explained fully to Lakewood City (or to any fee payer) and included in the local ordinance for transparency.

Condition 4: Fees are used to fund only those facilities that benefit new development. This criterion is more a function of implementation than of the TIF process. A full-blown TIF policy (e.g., in the form of local ordinance) should make sure that a Special Fund is devoted solely for TIF charges. Segregation of TIF proceeds from the General Fund ensures that the fund is not diverted to other expenses and is insulated from political influence. In-kind payments (e.g., building of specific road improvements) can also help address accountability issues and enhance perception of developers’ direct benefit from TIF.

Condition 5: Fees charged must not exceed a proportionate-share of the cost incurred or to be incurred in accommodating the development that pays the fee. The case study did not meet this requirement as shown by the relatively high impact fee to be charged per residential unit (at P49,305.21). The cost per trip formula is designed in such a way that the number of trips generated can greatly reduce (or hike up) the amount of fee. The more trips generated (and new developments considered), the lower the fee is. Since only one project was considered, all costs were shouldered by the Project. It is therefore advisable to include other development projects occurring within the same timeframe to generate a realistic number of trips and to distribute cost equitably across projects.

The case study also showed the inherent weakness of an improvement-driven TIF model that adopts a ‘limited area’ approach as compared to a ‘systems-wide approach’. A per project or limited area focus will most likely generate fewer trips and higher fee. It will also encourage the ‘last developer in’ mechanism.

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wherein the first development or project that may have minimal impact on the road system pays substantially for road improvements. Succeeding developers pay minimal fee and take advantage of new improvements until the last developer comes in. This cycle of disproportionate payment starts all over once a new developer renders existing road systems inadequate.

In contrast, a system-wide approach evaluates the traffic impacts of all new development across different land use types. The cost is therefore proportionately shared by new developments through a systems development charge. In the Philippines, it is difficult to adopt a systems-wide approach because of inadequate transportation planning (e.g., traffic impact studies) and comprehensive land use planning, lack of modeling tools to forecast future conditions, unpredictability of land use conversion, and erratic behavior of investments.

Condition 6: Social acceptability of TIF. From the perspective of new developers, a high TIF charge as that of Lakewood’s will be unacceptable and prohibitive of new investments. However, with a better-designed TIF equation and approach, the issue of affordability can be addressed. Social acceptability can also be attained by getting across the message that TIF is developmental (and not regulatory) and therefore has wider socio-economic impact.

Another contention that must be dealt with is the issue of double taxation. The case study addressed this by ensuring that the TIF will only fund new road improvements and not the recurring maintenance of roadways or construction of road facilities that fall within the responsibilities of the local government. Maintenance expenses are funded through the General Fund where tax proceeds are pooled.

RESEARCH FINDINGS

An enabling legal and institutional environment exists for TIF adoption. A reasonable level of local autonomy is necessary for a TIF policy to prosper. Fortunately, the Philippine Constitution guarantees this through increased decentralization of functions and devolution of power to local governments. The 1991 LGC further expands the power of local governments to generate resources, to define and regulate local development, and to undertake a comprehensive land use and transportation planning as an integral part of their development planning functions.

The TIF, being a novel idea, is not included in the specific fees under the 1991 LGC. Fortunately, a miscellaneous provision exists that allows local governments to go beyond what is stipulated in the Code. Section 186 states that ‘local government units may exercise the power to levy taxes, fees or charges on any base or subject not otherwise specifically enumerated herein or taxed under the provisions of the National Internal Revenue Code, as amended, or other applicable laws’ (LGC, 1991). The TIF can easily be rationalized under this section provided that it can pass constitutional, statutory, and inherent limitations.

The objective of local fees and charges is viewed more as regulatory rather than developmental. Policies on local taxation reiterates the role of fees and charges to control social and economic activities. For TIF to prosper, its essence as a charge on the impact of development on traffic, whose purpose is developmental (e.g., improvement of present transportation capacity) has to be understood and appreciated. A shift in perspective will help local governments maximize their power to undertake innovative resource generation schemes and impose fees beyond those specifically provided in the 1991 LGC.

The system-wide improvement-driven TIF model is conceptually sound but faces operational difficulties if adopted in the Philippines. It is the most advanced model that supports the rational nexus and proportional share standards. It encourages long-term planning and coherent integration between land use and transportation planning. However, as shown in the case study, this model faces several technical and data constraints. Among other things, many local governments lack an integrated land use and transportation planning, long-term development plans, transportation plans and clear investment plans that indicate detailed cost and assured resources. Also lacking are data on forecasted land uses in terms of size, area (e.g., gross floor area), accurate parcellary boundaries by census tract of properties proposed for
development, transportation model calibrated to local condition, and statistical models that forecast inflation rates of construction cost/cost index. Moreover, developments at the local level are mostly private-driven (which makes information difficult to access), largely unplanned or spontaneous, and influenced by issues such as land conversion.

Table 7
Assessment of the TIF Technical Processes as Applied in the Philippine Context

<table>
<thead>
<tr>
<th>Technical Process</th>
<th>Gaps</th>
<th>Alternatives (short-term)</th>
<th>Suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth analysis</td>
<td>Lack of land use models in land use planning.</td>
<td>- Use exponential growth models for transition plans only.</td>
<td>- Develop land use models suitable in the Philippine context</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Integrate the land use models in existing land use planning process.</td>
<td>- Integrate the land use models in existing land use planning process.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Improve data gathering on parameters needed in land use modeling (e.g. population, land uses, income, etc.)</td>
<td>- Improve data gathering on parameters needed in land use modeling (e.g. population, land uses, income, etc.)</td>
</tr>
<tr>
<td>Trip forecasting</td>
<td>Non-adaptation of transportation models and absence of TIA guidelines.</td>
<td>- Utilize existing traffic engineering studies (e.g. traffic signalization program).</td>
<td>- Develop a trip generation and transportation models calibrated based on local conditions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Use a ‘limited area’ or per project TIA process (as proposed by existing draft TIA guidelines).</td>
<td>- Develop an alternative ‘system-wide’ TIA process.</td>
</tr>
<tr>
<td>Traffic Impact Analysis</td>
<td>Absence of a master transportation plans on road infrastructure funding programs and capacity/LOS models.</td>
<td>- Utilize existing capital investment plans on road programs for short-term plans using adjusted costs for inflation.</td>
<td>- Develop a road improvement program outlining the costs.</td>
</tr>
<tr>
<td>Cost analysis and allocation</td>
<td></td>
<td>- Utilize existing traffic engineering studies (e.g. traffic signalization program).</td>
<td>- Develop capacity models based on TIA guidelines.</td>
</tr>
</tbody>
</table>

An improvement-driven TIF model that uses a limited area approach has inherent weaknesses that affect the TIF principles, the level of fees and social acceptability. The case study illustrated that focusing on a project (or a limited number of projects) tends to generate fewer trips resulting in disproportionately high fee imposed on the project. In contrast, a system-wide TIF model considers the impact of all developments across different land use types thus proportionately allocating the fee. A compromise between ‘limited area’ and ‘systems-wide’ approaches should be developed to adjust to the planning realities in the country.

The case study showed the urgent need to address impending traffic congestion in Cabanatuan City and therefore argued for TIF adoption as one of the mitigation measures. The TIF and TIA generated the following findings:
- Existing volume flow in study intersections are in good to severe conditions.
- Cabanatuan City has very high annual traffic growth rate of 7.85%.
- The LOS of future scenario ‘without development and without improvements’ showed that all 11 intersections will reach LOS F or total breakdown of operation at build-out year.
- The LOS of future scenario ‘without development but with improvements’ showed that out of the 11 intersections at LOS F, seven (7) will improve (fair, moderate, severe) at build-out year. Therefore, the four (4) remaining intersections will need additional interventions.
A total of 1,064 for AM peak hour and 1,064 for PM peak hour brought by the Lakewood City project will be added on an already saturated traffic.

The LOS of future scenario with development and with improvements show that future traffic condition (for both AM and PM peak hour) in seven intersections will ease up while four intersections will remain at LOS F.

CONCLUSION AND RECOMMENDATIONS

This paper concludes that there is potential for TIF adoption despite the legal, institutional, technical and data constraints at the local level. It also argues that the TIF be adopted because of the clear necessity at the local level for technical guidance on traffic impact assessment and need for resources to improve future traffic conditions.

The following are some recommendations to help improve studies and policies on TIF:

**Exaction and Utilization of TIF**

1. Encourage local governments to expand the definition of a ‘fee’ under the 1991 LGC. As it is, a ‘fee’ is defined as a charge fixed by law or ordinance for the regulation or inspection of a business or activity (Nolledo, 1991).

2. Encourage local governments to legislate on traffic impact fee in their area of jurisdiction as provided by relevant zoning ordinances and local government taxation. It should be noted that only those land uses identified under the TIF zone are eligible for the impact fee project.

3. Encourage developers to pay impact fees in kind such as physical improvements on-site or physical improvements off-site. Payments in kind help developers to bring property taxes down by utilizing an alternative revenue source to pay for infrastructure. Moreover, since in kind payment is tangible and actively involves the developers in putting up infrastructure or facilities, it creates a positive perception among developers of direct benefit from the TIF. It also lessens perceptions of corruption and fund diversion by local governments.

4. Design a lump-sum payment of TIF (cash or in kind) instead of a stream of payments. This supports the general principle that impact fees should be based on land development regulation rather than on taxation programs or schemes (e.g., RA 8794 Road User Tax).

5. Encourage local governments to adopt the ‘fair share’ principle in exacting TIF rather than resorting to ‘last developer in’ mechanisms. Fair share is based on the argument that ‘systems development charges [e.g., TIF] assumed ‘that all new trips do impact the system, whether to the point of inadequacy or not, and that sharing the cost of those impacts is better than only the last developer is paying. A fair share is the stated goal. Thus, a new development is assessed an SDC based on that development’s trip-producing characteristics’ (Baumgaertner and Chadda, 1986). Encouraging fair share is also consistent with the statutory and inherent limitations in taxes, fees and charges that local governments can impose.

6. Ensure that local governments open a Special Fund for TIF proceeds and discourages its merger with General Funds. This ensures financial accountability as well as efficiency in financing projects identified under the TIF scheme. This is also consistent with TIF’s principle that funds from TIF should not finance transportation infrastructures as well as the cost for maintenance and regulation of existing infrastructure that fall under the responsibility of the national and local governments.

**Planning Issues**

1. Increase understanding of local governments on TIF as a developmental rather than as a control mechanism (to regulate or limit development in an area). Thus, its design and level of charges should strike a balance between making developers responsible for their impact on traffic thru fee payment and ensuring that developers are not discouraged to invest in TIF areas because of exorbitant fees. Accountability and perception of direct benefit to developers will also help strike a balance.

2. Develop an integrated land use and transportation models to address issues on forecasting growth and future transportation demand needs. The said models will undergo an urban transportation planning process consisting of six phases, namely: (1) inventory, (2) development of land use allocation and
travel demand models; (3) plan synthesis and forecast; (4) evaluation; (5) program adoption and implementation; and (6) continuing study.

Areas for Further Study:
1. On exaction of fees
   - Study criteria and techniques to determine projects that will fall under General Fund and Special Fund financing.
   - Determine the ideal timing of fee payment. This is usually done during building permit application but the possibility of incremental payments can also be studied.
   - Study the difference between a tax and a TIF to avoid the issue of double taxation.
2. On local development planning
   - Study the inclusion of TIF in the overall CLUP process down to investment programming. The conduct of Traffic Impact Studies at the onset of CLUP to project traffic impact of projected land use and existing transportation supply is a worthwhile undertaking.
   - Study the implications of TIF in the proposed guidelines on TIA.
3. On technical capability
   - Study the development of modeling tools to integrate land use and transportation planning in the Philippines.
References


20