APPENDIX 9

- 9.3-1 Roadside Environmental Survey
- 9.3-2 Results of Roadside Environmental Survey

APPENDIX 9.3-1

Feasibility Study on Upgrading Inter-Urban Highway System
Along Pan-Philippine Highway (Sta Rita, Plaridel-San Jose Section)

ROADSIDE ENVIRONMENTAL SURVEY

(Type I)

Pangalan (*Name*): _____ Edad (*Age*):_____

Tirahan (*Address*): _____

Sex: _____ Civil Status: _____ Hanapbuhay (*Occupation*): _____

1. Uri ng Sasakyan (*Type of vehicle*)

- ☐ a. Tricycle
- ☐ b. Passenger-type jeep
- ☐ c. All-Purpose Utility Vehicle (AUV)
- ☐ d. Private car/jeep
- ☐ e. Bus
- ☐ f. Cargo Truck (10 wheeler or greater)
- ☐ g. Freight Truck
- ☐ h. Oil tanker
- ☐ i. Iba pa (*Others*) _____

2. Rutang dinadaanan sa pagbibiyahe (*Route serviced/frequently used*)

- ☐ a. Sa loob lang ng bayan (*Within the city/municipality*)
- ☐ b. Hanggang sa kabilang bayan (*Inter-city/municipality*)
- ☐ c. Hanggang sa kabilang probinsiya (*Inter-province*)
- ☐ d. Hanggang sa ibang rehiyon (*Inter-region*)
- ☐ e. Iba pa (Others) _____

3. Pinanggalingan (*Origin of Travel*): _____

Patutunguhan (*Destination of Travel*):_____

Ilang oras ang biyahe: (*Travel time*):

a. Nung nakaraang sampung taon (*Ten years ago*) _____

b. Nung nakaraang limang taon (*Five years ago*) _____

c. Sa kasalukuyan (*At present*) _____

4. Sa inyong palagay ano o anu-ano ang mga dahilan ng trapik? (*Perceived cause(s) of delay/traffic congestion*):

_____

_____

_____

5. Bakit kayo dito dumaraan sa Pan-Philippine o Maharlika Highway? (*Purpose for using Pan-Philippine/ Maharlika Highway*)

- ☐ a. Dito ang trabaho ko (*Work is along this route*)
- ☐ b. Dahil sa negosyo (Business *transaction*)
- ☐ c. Papasok sa eskuela (Going *to school*)
- ☐ d. Papasok sa trabaho (Going *to work place*)
- ☐ e. Uuwi sa prubinsiya (*Going to hometown*)
- ☐ f. Magdedeliber (*Delivery of goods*)
- ☐ g. Iba pa (*Others*) _____

APPENDIX 9.3-1

Feasibility Study on Upgrading Inter-Urban Highway System
Along Pan-Philippine Highway (Sta Rita, Plaridel-San Jose Section)

ROADSIDE ENVIRONMENTAL SURVEY

(Type I)

Pangalan (*Name*): _____ Edad (*Age*) _____

Tirahan (*Address*): _____

Sex: _____ Civil Status: _____ Hanapbuhay (*Occupation*) _____

1. **Uri ng Sasakyan (*Type of vehicle*)**
   - ☐ a. Tricycle
   - ☐ b. Passenger-type jeep
   - ☐ c. All-Purpose Utility Vehicle (AUV)
   - ☐ d. Private car/jeep
   - ☐ e. Bus
   - ☐ f. Cargo Truck (10 wheeler or greater)
   - ☐ g. Freight Truck
   - ☐ h. Oil tanker
   - ☐ i. Iba pa (*Others*) _____

2. **Rutang dinadaanan sa pagbibiyahe (*Route serviced/frequently used*)**
   - ☐ a. Sa loob lang ng bayan (*Within the city/municipality*)
   - ☐ b. Hanggang sa kabilang bayan (*Inter-city/municipality*)
   - ☐ c. Hanggang sa kabilang probinsiya (*Inter-province*)
   - ☐ d. Hanggang sa ibang rehiyon (*Inter-region*)
   - ☐ e. Iba pa (Others) _____

3. **Pinanggalingan (*Origin of Travel*):** _____

   Patutunguhan (*Destination of Travel*): _____

   Ilang oras ang biyahe: (*Travel time*):
   - a. Nung nakaraang sampung taon (*Ten years ago*) _____
   - b. Nung nakaraang limang taon (*Five years ago*) _____
   - c. Sa kasalukuyan (*At present*) _____

4. **Sa inyong palagay ano o anu-ano ang mga dahilan ng trapik? (*Perceived cause(s) of delay/traffic congestion*):**

   _____

   _____

   _____

5. **Bakit kayo dito dumaraan sa Pan-Philippine o Maharlika Highway? (*Purpose for using Pan-Philippine/ Maharlika Highway*)**
   - ☐ a. Dito ang trabaho ko (*Work is along this route*)
   - ☐ b. Dahil sa negosyo (Business *transaction*)
   - ☐ c. Papasok sa eskuela (Going *to school*)
   - ☐ d. Papasok sa trabaho (Going *to work place*)
   - ☐ e. Uuwi sa prubinsiya (*Going to hometown*)
   - ☐ f. Magdedeliber (*Delivery of goods*)
   - ☐ g. Iba pa (*Others*) _____

6. **Naapektuhan ba ng pagka-abala sa biyahe ang inyong kinikita? (*Is your income affected by this delay in travel time?*)**

☐ a. Oo (*Yes*) ☐ b. Hindi (*No*)

Kung Oo, mga magkano? (*If Yes, by how much?*)

☐ a. Nababawasan ng kulang sa 50% kaysa dati (*Decreased but less than 50%)*

☐ b. Naging kalahati na lamang ng dati (*Decreased about 50%)*

☐ c. Mahigit sa kalahati ang ibinaba (Decreased more than 50%)

7. **Ano sa palagay ninyo ano o anu ang puwedeng solusyon sa problemang ito? (*Proposed solution to solve delay in travel time*):**

_____

_____

_____

_____

_____

8. **Kung gagawa ng bypass para malunasan ang trapik, sang-ayon ka ba? (*If a bypass will be constructed to ease traffic congestion, are you in favor?*)**

☐ a. Oo (*Yes*) ☐ b. Hindi (*No*)

Kung hindi, bakit? (*If No, why?*)

_____

_____

_____

9. **Pabor ka ba kung HINDI ang lahat ng uri ng sasakyan ay papayagang dumaan sa bypass? (*Are you in favor if NOT all types of vehicle will be allowed to use the bypass?*)**

☐ a. Oo (*Yes*) ☐ b. Hindi (*No*)

Bakit? (*Why?*)

_____

_____

_____

10. **Sa nakaraang limang taon, may napansin ka bang pagbabago sa iyong kapaligiran? (*In the past five years, have you noticed any changes in the environment?*)**

☐ a. Meron (*Yes*) ☐ b.Wala (*No*)

Kung Oo, anu-ano ang mga ito? (*If Yes, what are these?*)

_____

_____

_____

_____

_____

Feasibility Study on Upgrading Inter-Urban Highway System
Along Pan-Philippine Highway (Sta Rita, Plaridel-San Jose Section)

ROADSIDE ENVIRONMENTAL SURVEY

(Type II)

Name: _____ Occupation: _____

Company Name: _____ Start of Operation (Year): _____

Area of Business: _____

1. Type of product transported

- ☐ a. Rice
- ☐ b. Corn
- ☐ c. Animal feeds
- ☐ d. Petroleum and other oil products
- ☐ e. Cement
- ☐ f. Others _____

2. Destination

- ☐ a. Within the city/municipality _____
- ☐ b. Inter-city/municipality _____
- ☐ c. Inter-province _____
- ☐ d. Inter-region _____
- ☐ e. Others _____

3. Travel time

- a. Ten years ago _____
- b. Five years ago _____
- c. At present _____

4. Perceived cause(s) of delay/traffic congestion:

_____

_____

_____

5. Is your income affected by this delay in travel time?

☐ a. Yes ☐ b. No

If Yes, by how much?

- ☐ a. Decreased but less than 50%
- ☐ b. Decreased about 50%
- ☐ c. Decreased more than 50%

ROADSIDE ENVIRONMENTAL SURVEY

(Type II)

Name: _____ Occupation: _____

Company Name: _____ Start of Operation (Year): _____

Area of Business: _____

1. **Type of product transported**
   - ☐ a. Rice
   - ☐ b. Corn
   - ☐ c. Animal feeds
   - ☐ d. Petroleum and other oil products
   - ☐ e. Cement
   - ☐ f. Others _____

2. **Destination**
   - ☐ a. Within the city/municipality _____
   - ☐ b. Inter-city/municipality _____
   - ☐ c. Inter-province _____
   - ☐ d. Inter-region _____
   - ☐ e. Others _____

3. **Travel time**
   - a. Ten years ago _____
   - b. Five years ago _____
   - c. At present _____

4. **Perceived cause(s) of delay/traffic congestion:**

   _____

   _____

   _____

5. **Is your income affected by this delay in travel time?**

   ☐ a. Yes ☐ b. No

   If Yes, by how much?
   - ☐ a. Decreased but less than 50%
   - ☐ b. Decreased about 50%
   - ☐ c. Decreased more than 50%

6. **Proposed solution to solve delay in travel time**

_____

_____

_____

_____

_____

7. **If a bypass will be constructed to ease traffic congestion, are you in favor?**

☐ a. Yes ☐ b. No

If No, why?

_____

_____

_____

8. **Are you in favor if NOT all types of vehicle will be allowed to use the bypass?**

☐ a. Yes ☐ b. No

Why?

_____

_____

_____

9. **In the past five years, have you noticed any changes in the environment?**

☐ a. Yes ☐ b. No

If Yes, what are these?

_____

_____

_____

_____

_____

ROADSIDE ENVIRONMENTAL SURVEY

(Type III)

Pangalan (*Name*): _____ Edad (*Age*):_____

Tirahan (*Address*): _____

1. **Bakit kayo dito dumaraan sa Pan-Philippine o Maharlika Highway?** ***(Purpose for using Pan-Philippine/ Maharlika Highway)***
   - ☐ a. Uuwi sa prubinsiya (*Going to hometown*)
   - ☐ b. Dahil sa negosyo (Business *transaction*)
   - ☐ c. Papasok sa eskuela (Going *to school*)
   - ☐ d. Papasok sa trabaho (Going *to work place*)
   - ☐ e. Iba pa (*Others*) _____

2. **Uri ng Sinasakyan (*Type of vehicle used*)**
   - ☐ a. Tricycle
   - ☐ b. Passenger-type jeep
   - ☐ c. All-Purpose Utility Vehicle (AUV)
   - ☐ d. Private car/jeep
   - ☐ e. Bus

3. **Rutang dinadaanan sa pagbibiyahe (*Route serviced/frequently used*)**
   - ☐ a. Sa loob lang ng bayan (*Within the city/municipality*)
   - ☐ b. Hanggang sa kabilang bayan (*Inter-city/municipality*)
   - ☐ c. Hanggang sa kabilang probinsiya (*Inter-province*)
   - ☐ d. Hanggang sa ibang rehiyon (*Inter-region*)
   - ☐ e. Iba pa (Others) _____

4. **Ilang oras ang biyahe: (*Travel time*):**
   - a. Nung nakaraang sampung taon (*Ten years ago*) _____
   - b. Nung nakaraang limang taon (*Five years ago*) _____
   - c. Sa kasalukuyan (*At present*) _____

5. **Sa inyong palagay ano o anu-ano ang mga dahilan ng trapik? (*Perceived cause(s) of delay/traffic congestion*):**

   _____

   _____

   _____

ROADSIDE ENVIRONMENTAL SURVEY

(Type III)

Pangalan (*Name*): _____ Edad (*Age*): _____

Tirahan (*Address*): _____

1. **Bakit kayo dito dumaraan sa Pan-Philippine o Maharlika Highway?** ***(Purpose for using Pan-Philippine/ Maharlika Highway)***
   - ☐ a. Uuwi sa prubinsiya (*Going to hometown*)
   - ☐ b. Dahil sa negosyo (Business *transaction*)
   - ☐ c. Papasok sa eskuela (Going *to school*)
   - ☐ d. Papasok sa trabaho (Going *to work place*)
   - ☐ e. Iba pa (*Others*) _____

2. **Uri ng Sinasakyan (*Type of vehicle used*)**
   - ☐ a. Tricycle
   - ☐ b. Passenger-type jeep
   - ☐ c. All-Purpose Utility Vehicle (AUV)
   - ☐ d. Private car/jeep
   - ☐ e. Bus

3. **Rutang dinadaanan sa pagbibiyahe (*Route serviced/frequently used*)**
   - ☐ a. Sa loob lang ng bayan (*Within the city/municipality*)
   - ☐ b. Hanggang sa kabilang bayan (*Inter-city/municipality*)
   - ☐ c. Hanggang sa kabilang probinsiya (*Inter-province*)
   - ☐ d. Hanggang sa ibang rehiyon (*Inter-region*)
   - ☐ e. Iba pa (Others) _____

4. **Ilang oras ang biyahe: (*Travel time*):**
   - a. Nung nakaraang sampung taon (*Ten years ago*) _____
   - b. Nung nakaraang limang taon (*Five years ago*) _____
   - c. Sa kasalukuyan (*At present*) _____

5. **Sa inyong palagay ano o anu-ano ang mga dahilan ng trapik? (*Perceived cause(s) of delay/traffic congestion*):**

   _____

   _____

   _____

6. Ano sa palagay ninyo ano o anu ang puwedeng solusyon sa problemang ito? (*Proposed solution to solve delay in travel time*):

_____

_____

_____

_____

_____

7. Kung gagawa ng bypass para malunasan ang trapik, sang-ayon ka ba? (*If a bypass will be constructed to ease traffic congestion, are you in favor?*)

☐ a. Oo (*Yes*) ☐ b. Hindi (*No*)

Kung hindi, bakit? (*If No, why?*)

_____

_____

_____

8. Pabor ka ba kung HINDI ang lahat ng uri ng sasakyan ay papayagang dumaan sa bypass? (*Are you in favor if NOT all types of vehicle will be allowed to use the bypass?*)

☐ a. Oo (*Yes*) ☐ b. Hindi (*No*)

Bakit? (*Why?*)

_____

_____

_____

9. Sa nakaraang limang taon, may napansin ka bang pagbabago sa iyong kapaligiran? (*In the past five years, have you noticed any changes in the environment?*)

☐ a. Meron (*Yes*) ☐ b.Wala (*No*)

Kung Oo, anu-ano ang mga ito? (*If Yes, what are these?*)

_____

_____

_____

_____

_____

Feasibility Study on Upgrading Inter-Urban Highway System
Along Pan-Philippine Highway (Sta Rita, Plaridel-San Jose Section)

ROADSIDE ENVIRONMENTAL SURVEY

(Type IV)

Name: _____ Occupation: _____

Company Name: _____ Start of Operation (Year): _____

Address: _____

1. **Type of establishment**
   - ☐ a. Gasoline station
   - ☐ b. Food/Restaurant Business
   - ☐ c. Trading
   - ☐ d. Mall/commercial center
   - ☐ e. Convenience Store
   - ☐ f. Car Repair/Services
   - ☐ f. Others _____

2. **Perceived cause(s) of delay/traffic congestion:**

   _____

   _____

   _____

3. **Proposed solution to solve delay in travel time**

   _____

   _____

   _____

4. **If a bypass will be constructed to ease traffic congestion, are you in favor?**

   ☐ a. Yes ☐ b. No

   If No, why?

   _____

   _____

   _____

5. **Are you in favor if NOT all types of vehicle will be allowed to use the bypass?**

   ☐ a. Yes ☐ b. No

   Why?

   _____

   _____

Feasibility Study on Upgrading Inter-Urban Highway System
Along Pan-Philippine Highway (Sta Rita, Plaridel-San Jose Section)

ROADSIDE ENVIRONMENTAL SURVEY

(Type IV)

Name: _____ Occupation: _____

Company Name: _____ Start of Operation (Year): _____

Address: _____

1. **Type of establishment**
   - ☐ a. Gasoline station
   - ☐ b. Food/Restaurant Business
   - ☐ c. Trading
   - ☐ d. Mall/commercial center
   - ☐ e. Convenience Store
   - ☐ f. Car Repair/Services
   - ☐ f. Others _____

2. **Perceived cause(s) of delay/traffic congestion:**

   _____

   _____

   _____

3. **Proposed solution to solve delay in travel time**

   _____

   _____

   _____

4. **If a bypass will be constructed to ease traffic congestion, are you in favor?**

   ☐ a. Yes ☐ b. No

   If No, why?

   _____

   _____

   _____

5. **Are you in favor if NOT all types of vehicle will be allowed to use the bypass?**

   ☐ a. Yes ☐ b. No

   Why?

   _____

   _____

APPENDIX 9.3-2 RESULT OF ROADSIDE ENVIRONMENTAL SURVEY

Observed Ambient Air Quality Along Sta. Rita, Plaridel-San Jose Section of the Pan-Phil Highway

Station	Date &Time	Ave. Time	GLC Concentration in µg/Ncm					
			Sampling Results			DENR Standards		
			SO_2	NO_2	TSP	SO_2	NO_2	TSP
1- Plaridel Intersection to Bustos	1000-1100 05 Jan. 1999	1 hr	84.928	56.200	263.346	340	260	300
2 – Brgy. Tambo, San Leonardo NE	1340-1440 05 Jan. 1999	1 hr	22.748	16.995	41.339	340	260	300
3 – Cabanatuan City Intersection to Palayan City	1625,05 Jan. 99 1625,06 Jan. 99	24 hrs	89.446	72.702	145.639	180	150	230
4 – Purok 6, Brgy. San Isidro, Cabanatuan City	1010-1110 06 Jan. 1999	1 hr	20.221	7.554	81.825	340	260	300

Observed Noise Levels Along Sta. Rita, Plaridel-San Jose Section of the Pan-Phil Highway

Station	Noise Levels in dB (A)			
	Morning (0500-0900HR)	Daytime (0900-1800HR)	Evening (1800-2200HR)	Nighttime (2200-0500HR)
DENR Standard for Residential Areas	70	75	70	65
DENR Standard for Commercial Areas	75	80	75	70
1 - Plaridel Intersection to Bustos	76-78	74-76	88-90	74-76
2 - Brgy. Tambo, San Leonardo NE	70-72	70-72	76-78	72-74
3 - Cabanatuan City Intersection to Palayan City	70-72	78-80	72-74	70-72
4 - Purok 6, Brgy. San Isidro, Cabanatuan City	68-70	62-64	68-70	60-62

APPENDIX 9.3-2 RESULT OF ROADSIDE ENVIRONMENTAL SURVEY

Observed Ambient Air Quality Along Sta. Rita, Plaridel-San Jose Section of the Pan-Phil Highway

Station	Date &Time	Ave. Time	GLC Concentration in µg/Ncm					
			Sampling Results			DENR Standards		
			SO_2	NO_2	TSP	SO_2	NO_2	TSP
1- Plaridel Intersection to Bustos	1000-1100 05 Jan. 1999	1 hr	84.928	56.200	263.346	340	260	300
2 – Brgy. Tambo, San Leonardo NE	1340-1440 05 Jan. 1999	1 hr	22.748	16.995	41.339	340	260	300
3 – Cabanatuan City Intersection to Palayan City	1625,05 Jan. 99 1625,06 Jan. 99	24 hrs	89.446	72.702	145.639	180	150	230
4 – Purok 6, Brgy. San Isidro, Cabanatuan City	1010-1110 06 Jan. 1999	1 hr	20.221	7.554	81.825	340	260	300

Observed Noise Levels Along Sta. Rita, Plaridel-San Jose Section of the Pan-Phil Highway

Station	Noise Levels in dB (A)			
	Morning (0500-0900HR)	Daytime (0900-1800HR)	Evening (1800-2200HR)	Nighttime (2200-0500HR)
DENR Standard for Residential Areas	50	55	50	45
DENR Standard for Commercial Areas	60	65	60	55
1 - Plaridel Intersection to Bustos	76-78	74-76	88-90	74-76
2 - Brgy. Tambo, San Leonardo NE	70-72	70-72	76-78	72-74
3 - Cabanatuan City Intersection to Palayan City	70-72	78-80	72-74	70-72
4 - Purok 6, Brgy. San Isidro, Cabanatuan City	68-70	62-64	68-70	60-62

List of Tree Species Observed Along the Pan-Phil Highway (Sta. Rita, Plaridel-San Jose Section)

Common Name	Scientific Name	Family
Acacia (rain tree)	*Samanea saman (Jacq.) Merr.*	Leguminosae
Agoho	*Casuarina equisetifolia L.*	Casuarinaceae
Alibangbang	*Bauhinia monandra Kurz.*	Leguminosae
Banaba	*Lagerstroema speciosa (L.) Pers.*	Lythaceae
Bayabas (guava)	*Psidium guajava L.*	Myrtaceae
Bougainvillea	*Bougainvillea spectabilis Willd.*	Nyctaginaceae
Bunga de china	*Veitchia merrillii (Becc.) H.E. Moore.*	Palmae
Buri	*Corypha elata Roxb.*	Palmae
Caimito (star-apple)	*Chrysophyllum cainito L.*	Sapotaceae
Calachuche red	*Plumeria rubra L. forma rubra*	Apocynaceae
Calachuchi white	*Plumeria obtusa L.*	Apocynaceae
Camachile	*Pithecellobium dulce (Roxb.) Benth.*	Leguminosae
Campanila	*Thevetia peruviana (Pers.) K. Schum.*	Apocynaceae
Cauayan	*Bambusa & Gigantochloa spp.*	Graminae
Common mahogany	*Swietenia mahogani (L.) Jacq.*	Meliaceae
Dapdap	*Erythrina variegata L. var. orientalis (L.)Merr.*	Leguminosae
Datiles	*Muntingia calabura L.*	Tiliaceaea
Dita	*Alstonia scholaris (L.) R.Br.*	Apocynaceae
Duhat	*Syzygium cumini (L.) Skeels*	Myrtaceae
Eucalyptus (blue gum tree)	*Eucalyptus terecticornis Sm.*	Myrtaceae
Fire tree	*Delonix regia (Bojer.) Raf.*	Leguminosae
Fortune plant	*Dracaena fragans (L.) Ker-Gawl.*	Agavaceae
Melina/yemane	*Gmelina arborea Roxb.*	Verbenaceae
Ilang-ilang	*Cananga odorata (Lamk.) King*	Annonaceae
Indian rubber tree	*Ficus elastica Roxb. Ex Homem*	Moraceae
Indian tree	*Polyalthia longifolia Benth. & Hook. F.*	Annonaceae
Ipil-ipil	*Leucaena leucocephala (lamk.) de Witt.*	Leguminosae
Japanese acacia	*Acacia auriculiformis A. Cunn. Ex Benth.*	Leguminosae
Kamoteng-kahoy (cassava)	*Manihot esculenta Crantz*	Euphorbiaceae
Kapok	*Ceiba pentandra (l.) Gaertn.*	Bombacaceae
Langka (jack fruit)	*Artocarpus heterophyllus Lamk.*	Moraceae
Large-leaved mahogany	*Swietenia machrophylla King*	Meliaceae
Mabolo	*Diospyros philippinensis Rolfe*	Ebenaceae
Macopa	*Syzygium samarangense (Bl.) Merr. & Perry*	Myrtaceae
Malakamias	*Ailanthus triphysa (Dennst.) Alst.*	Simaroubaceae
Maluko	*Pisonia alba Span.*	Nymphaeaceae

List of Tree Species Observed Along the Pan-Phil Highway (Sta. Rita, Plaridel-San Jose Section) Continued...

Common Name	Scientific Name	Family
Malunggay	*Moringa oleifera Lam.*	Moraceae
Mangium	*Acacia mangium Willd.*	Leguminosae
Mango	*Magifera indica L.*	Anacardiaceae
Narra	*Pterocarpus Indicus subsp. Indicus Willd.*.	Leguminosae
Neem tree	*Azidarachta indica A. Juss.*	Meliaceae
Niyog (coconut)	*Cocos nucifera L.*	Palmae
Papaya	*Carica papaya L.*	Caricaceae
Saging (banana)	*Musa sp. Andr.*	Musaceae
Sampalok (tamarind)	*Tamarindus indica L.*	Leguminosae
Santol	*Sandoricum koetjape (Burm.f.) Merr.*	Meliaceae
Talisai	*Terminalia catappa L.*	Combretaceae
Teak tree	*Tectona grandis L.f.*	Verbenaceae
Tiesa	*Pouteria campechiana (HBK) Baehni*	Sapotaceae

List of Historical Markers and Protected Areas in Bulacan and Nueva Ecija

Historical Markers	
Name	Location
Building and Structure	
Casa Real	Malolos, Bulacan
Church and Other Places of Piety	
Barasoain Church	Malolos, Bulacan
Church of Hagonoy	Hagonoy, Bulacan
Simbahan ng Hagonoy	Hagonoy, Bulacan
Simbahan ng Marilao	Marilao, Bulacan
Simbahan ng Sta. Maria	Sta. Maria, Bulacan
Church of Meycauayan	Meycauayan, Bulacan
Simbahan ng Obando	Obando, Bulacan
Church of Pandi	Pandi, Bulacan
Simbahan ng Quingua	Plaridel, Bulacan
Simbahan ng Sta. Maria	Sta. Maria, Bulacan
Church of Peñaranda	Peñaranda, Nueva Ecija

List of Tree Species Observed Along the Pan-Phil Highway (Sta. Rita, Plaridel-San Jose Section) Continued...

Common Name	Scientific Name	Family
Malunggay	*Moringa oleifera Lam.*	Moraceae
Mangium	*Acacia mangium Willd.*	Leguminosae
Mango	*Magifera indica L.*	Anacardiaceae
Narra	*Pterocarpus indicus subsp. Indicus Willd.*	Leguminosae
Neem tree	*Azidarachta indica A. Juss*	Meliaceae
Niyog (coconut)	*Cocos nucifera L.*	Palmae
Papaya	*Carica papaya L.*	Caricaceae
Saging (banana)	*Musa sp. Andr.*	Musaceae
Sampalok (tamarind)	*Tamarindus indica L.*	Leguminosae
Santol	*Sandoricum koetjape (Burm f.) Merr.*	Meliaceae
Talisai	*Terminalia catappa L.*	Combretaceae
Teak tree	*Tectona grandis L.f.*	Verbenaceae
Tiesa	*Pouteria campechiana (HBK) Bachni*	Sapotaceae

List of Historical Markers and Protected Areas in Bulacan and Nueva Ecija

Historical Markers	
Name	Location
Building and Structure	
Casa Real	Malolos, Bulacan
Church and Other Places of Piety	
Barasoain Church	Malolos, Bulacan
Church of Hagonoy	Hagonoy, Bulacan
Simbahan ng Hagonoy	Hagonoy, Bulacan
Simbahan ng Marilao	Marilao, Bulacan
Simbahan ng Sta. Maria	Sta. Maria, Bulacan
Church of Meycauayan	Meycauayan, Bulacan
Simbahan ng Obando	Obando, Bulacan
Church of Pandi	Pandi, Bulacan
Simbahan ng Quingua	Plaridel, Bulacan
Simbahan ng Sta. Maria	Sta. Maria, Bulacan
Church of Peñaranda	Peñaranda, Nueva Ecija

List of Historical Markers and Protected Areas in Bulacan and Nueva Ecija (Continued...)

Historical Markers	
Name	Location
Military Site	
Bulacan Military Area	Bustos, Bulacan
Paliparang Maniquis, P. A. A. C.	Cabanatuan City, Nueva Ecija
Monuments and National Historical Landmarks	
Church of Barasoain	Malolos, Bulacan
Personages	
Nicanor Abelardo at Sta. Ana (1893-1934)	San Miguel, Bulacan
Felipe Buencamino	San Miguel, Bulacan
Jose Corazon de Jesus	Sta. Maria, Bulacan
Francisco Santiago	Sta. Maria, Bulacan
Heneral Isidoro Torres	Malolos, Bulacan
Dr. Maximo Viola	San Miguel, Bulacan
Joaquin Gonzales	Baliuag, Bulacan
Trinidad Tecson	San Miguel, Bulacan
Dr. Pio Valenzuela	Valenzuela, Bulacan
Jose P. Bantug	San Isidro, Nueva Ecija
Lazaro Francisco	Cabanatuan City, Nueva Ecija
Heneral Manuel S. Tinio	Aliaga, Nueva Ecija
Sites	
Pook na Kinatatayuan ng Bahay Paaralan ng Kadalagahan na Niihaman ni Rizal	Malolos, Bulacan
Mabuhay ang Mga Bayani	Bustos, Bulacan
Birthplace of Gen. Gregorio del Pilar	Bulacan, Bulacan
Labanan sa Kakarong	Balagtas, Bulacan
Philippine Republic	Malolos, Bulacan
Republika Filipina (1898-1901)	Malolos, Bulacan
Biyak na Bato	San Miguel, Bulacan
Birthplace of Marcelo H. del Pilar	Bulacan, Bulacan
Simbahan ng Malolos	Malolos, Bulacan
Birthplace of Mariano Ponce	Baliuag, Bulacan
Labanan sa San Rafael	San Rafael, Bulacan
Kuyapo, Nueva Ecija (bahay na tinigilan ni Apolinario Mabini)	Kuyapo, Nueva Ecija
Pook na Kinamatayan ni Aurora Quezon	Bongabon, Nueva Ecija
Antonio Luna's Death Place	Nueva Ecija

List of Historical Markers and Protected Areas in Bulacan and Nueva Ecija (Continued...)

Historical Markers	
Name	Location
Military Site	
Bulacan Military Area	Bustos, Bulacan
Paliparang Maniquis, P. A. A. C.	Cabanatuan City, Nueva Ecija
Monuments and National Historical Landmarks	
Church of Barasoain	Malolos, Bulacan
Personages	
Nicanor Abelardo at Sta. Ana (1893-1934)	San Miguel, Bulacan
Felipe Buencamino	San Miguel, Bulacan
Jose Corazon de Jesus	Sta. Maria, Bulacan
Francisco Santiago	Sta. Maria, Bulacan
Heneral Isidoro Torres	Malolos, Bulacan
Dr. Maximo Viola	San Miguel, Bulacan
Joaquin Gonzales	Baliuag, Bulacan
Trinidad Tecson	San Miguel, Bulacan
Dr. Pio Valenzuela	Valenzuela, Bulacan
Jose P. Bantug	San Isidro, Nueva Ecija
Lazaro Francisco	Cabanatuan City, Nueva Ecija
Heneral Manuel S. Tinio	Aliaga, Nueva Ecija
Sites	
Pook na Kinatatayuan ng Bahay Paaralan ng Kadalagahan na Nilihaman ni Rizal	Malolos, Bulacan
Mabuhay ang Mga Bayani	Bustos, Bulacan
Birthplace of Gen. Gregorio del Pilar	Bulacan, Bulacan
Labanan sa Kakarong	Balagtas, Bulacan
Philippine Republic	Malolos, Bulacan
Republika Filipina (1898-1901)	Malolos, Bulacan
Biyak na Bato	San Miguel, Bulacan
Birthplace of Marcelo H. del Pilar	Bulacan, Bulacan
Simbahan ng Malolos	Malolos, Bulacan
Birthplace of Mariano Ponce	Baliuag, Bulacan
Labanan sa San Rafael	San Rafael, Bulacan
Kuyapo, Nueva Ecija (bahay na tinigilan ni Apolinario Mabini)	Kuyapo, Nueva Ecija
Pook na Kinamatayan ni Aurora Quezon	Bongabon, Nueva Ecija
Antonio Luna's Death Place	Nueva Ecija

List of Historical Markers and Protected Areas in Bulacan and Nueva Ecija (Continued...)

Protected Areas			
Name	Location	Proclamation No./Date	Area (Ha)
1. Minalungao National Park	Gapan & Gen. Tinio, Nueva Ecija	R. A. 5100/06-11-97	2,018.00
2. Biak-Na-Bato National Park	San Miguel and Dona Remedios Trinidad, Bulacan	Proc. 223/11-16-37 Proc. 2204/06-05-82 Proc. 84/03-09-87 Proc. 401/4-11-89	2,117.00 330.62 2,117.00 658.85
3. Aurora Memorial Park	Bongabon, Nueva Ecija	Proc. 220/11-11-37	2,356.00
4. Angat Watershed Forest Reserve District (Metro Water District)	Montalban, Rizal, Norzagaray, Angat, San Rafael, and San Jose del Monte, Bulacan	Proc. 71/03-10-27 Proc. 391/04-30-68	55,709.10
5. Angat Watershed and Forest Range (Pilot)	Montalban, Rizal, Norzagaray, and San Jose del Monte, Bulacan	Proc. 391/04-30-68	6,600.00
6. Talavera Watershed Reservation	Carranglan, Lupao, San Jose, and Pantabangan, Nueva Ecija, and Sta. Fe, Nueva Viscaya	Proc. 350/12-28-38	37,156.00
7. Pantabangan-Carranglan Watershed Reservation	Pantabangan and Carranglan, Nueva Ecija	Proc. 561/05-21-69	84,500.00
8. Dona Remedios Trinidad/Gen. Tinio Watershed	Dona Remedios Trinidad, Bulacan, and Gen. Tinio, Nueva Ecija	Proc. 230/03-23-88	20,760.00

Sources: DENR-PAWB, 1999. List of Protected Areas in the Philippines

National Historical Institute, 1999. Historical Markers, Regions I-IV and CAR. Manila

List of Key Informants by Category

Category	Group/Key Informants
Type I	**Drivers** • Public vehicles---tricycles, passenger-type jeeps, All-Purpose Utility Vehicles (AUVs), buses, • Private vehicles--- cargo trucks, delivery vans, cars and owner-type jeeps
Type II	**Rice mill owners** in Bulacan and Nueva Ecija
Type III	Public transportation **commuters**
Type IV	**Owners of commercial establishments** such as gasoline stations and restaurants (particularly those who are dependent on transient customers, and will most probably be affected by the bypass) along the Pan-Philippine Highway

Distribution of Interviewees According to Type and Place of Interview

Category	Number of Respondents	Sampling Station	Municipality/City
Tricycle	20	St. Joseph Church	San Jose City, Nueva Ecija
	17	Shell Vistan, Plaridel	Plaridel ,Bulacan
	13	Bukana, San Vicente	San, Vicente, Gapan, Nueva Ecija
	11	BLTODA - Barrera Lote Operators and Drivers Association	Cabanatuan City, Nueva Ecija
	7	BBTA - Balsod Bayan Tricycle Association	Cabanatuan City, Nueva Ecija
	12	Sta. Arcadia	Cabanatuan City, Nueva Ecija
	5	Cirtoda	Cabanatuan City, Nueva Ecija
	7	Accta beside Jollibee	Cabanatuan City, Nueva Ecija
	1	Sto. Niño TODA - Sto. Niño Tricycle Operators and Drivers Association	Plaridel ,Bulacan
Passenger Jeepneys	38	Central Transit Terminal	Cabanatuan City, Nueva Ecija
	3	Pag-Asa San, Jose	San Jose City, Nueva Ecija
	20	BASIDOPAS - Baliuag San Ildefonso Drivers & Operators Association	Tambubong, San Rafael Bulacan, along Maharlika Highway
	1	Shell Vistan, Plaridel	Plaridel ,Bulacan
	1	Gapan	Gapan, Nueva Ecija
AUVs - All Purpose Utility Vehicles	7	San Jose Terminal	San Jose City, Nueva Ecija
	4	PAG-ASA Area	San Jose City, Nueva Ecija
	16	Central Transit Terminal	Cabanatuan City, Nueva Ecija
Bus	17	Central transit Terminal	Cabanatuan City, Nueva Ecija
	1	St. Joseph Church	San Jose City, Nueva Ecija
Private Vehicles	7	Shell Vistan, Plaridel	Plaridel, Bulacan
Rice Mill Owners	6	A.Castellano Rice Mill	Sto. Domingo, Nueva Ecija
		ABAR Rice Mill	Abar 1st, San Jose City, Nueva Ecija
		Sabariaga Rice Mill	Sampaloc, San Rafael, Bulacan
		F.B. Herrera Rice Mill	San Rafael, Bulacan
		Kat-Man Rice Mill	Brgy. Sabang, Baliuag, Bulacan
		A.R. Santos Rice Mill	Mafayantoc, Sto. Domingo, Nueva Ecija
Animal Feeds Dealer	4	Francisco Poultry and Agricultural Supplies	Poblacion, San Rafael, Bulacan
		Veramar Trading	Sampaloc, San Rafael, Bulacan
		A-1 Agro Supply	Talavera, Nueva Ecija
Soft Drink Distributor	1	Coca-Cola Bottlers Phil.	Abar 1st, San Jose City, Nueva Ecija
Commuters	43	Baliwag Transit Terminal	San Jose City, Nueva Ecija
	48	Central Transit Terminal	Cabanatuan City, Nueva Ecija
Gasoline Stations	12	Sta. Rosa Service	Sta. Rosa, Nueva Ecija
		Augustine Shell Service Station	Cabanatuan City, Nueva Ecija
		Sta. Monica (CALTEX)	Baliuag, Bulacan
		Sta. Monica Nissan Service	Baliuag, Bulacan
		GTC Shell Service Station	Pulilan, Bulacan
		Maharlika PETRON	Maharlika, Sn. Jose City, Nueva Ecija
		Violago PETRON	San Rafael, Bulacan
		Violago CALTEX Service Station	Cruz na Daan, San Rafael, Bulacan
		Rodriguez CALTEX	San Ildefonso, Bulacan
		Deleon CALTEX	Poblacion, Talavera, Nueva Ecija
		A-1 Shell Service Station	Marcos District, Talavera, Nueva Ecija
		Deleon CALTEX	Cabanatuan City, Nueva Ecija
		St. Jerome PETRON	Sto. Domingo, Nueva Ecija
Food/Restaurant Business	6	Chowking Plaridel	Plaridel, Bulacan
		Hot-Taste Food Restaurant	San Jose City, Nueva Ecija
		Arriza's Restaurant & Pasalubong	San Ildefonso, Bulacan
		Bulacan Bake House	Plaridel, Bulacan
		Baliwag Lechon Manok	Plaridel, Bulacan
Convenient Store	1	9 Wines M-Liquor	Plaridel, Bulacan
Trading	1	3M Sisters	San Rafael, Bulacan
Auto Supply	1	Forum Auto Supply	Plaridel, Bulacan

Distribution of Interviewees According to Type and Place of Interview

Category	Number of Respondents	Sampling Station	Municipality City
Type I			
Tricycle	20	St. Joseph Church	San Jose City, Nueva Ecija
	12	Shell Vistan, Plandel	Plandel, Bulacan
	13	Bukana, San Vicente	San Vicente, Gapan, Nueva Ecija
	11	BLTODA - Barrera Loto Operators and Drivers Association	Cabanatuan City, Nueva Ecija
	7	BBTA - Balsod Bayan Tricycle Association	Cabanatuan City, Nueva Ecija
	12	Sta. Arcadia	Cabanatuan City, Nueva Ecija
	5	Cintoda	Cabanatuan City, Nueva Ecija
	7	Accta beside Jollibee	Cabanatuan City, Nueva Ecija
	1	Sto. Niño TODA - Sto. Niño Tricycle Operators and Drivers Association	Plandel, Bulacan
Passenger Jeepneys	38	Central Transit Terminal	Cabanatuan City, Nueva Ecija
	3	Pag-Asa San Jose	San Jose City, Nueva Ecija
	20	BASIDOPAS - Baliuag San Ildefonso Drivers & Operators Association	Tambubong, San Rafael Bulacan along Maharlika Highway
	1	Shell Vistan, Plandel	Plandel, Bulacan
	1	Gapan	Gapan, Nueva Ecija
Adlvs - All Purpose Utility Vehicles	7	San Jose Terminal	San Jose City, Nueva Ecija
	4	PAG ASA Area	San Jose City, Nueva Ecija
	16	Central Transit Terminal	Cabanatuan City, Nueva Ecija
Bus	17	Central Transit Terminal	Cabanatuan City, Nueva Ecija
	1	St. Joseph Church	San Jose City, Nueva Ecija
Private Vehicles	7	Shell Vistan, Plandel	Plandel, Bulacan
Type II			
Rice Mill Owners	6	A Castellano Rice Mill	Sto. Domingo, Nueva Ecija
		ABAR Rice Mill	Abar 1st, San Jose City, Nueva Ecija
		Sabanaga Rice Mill	Sampaloc, San Rafael, Bulacan
		F.B. Herrera Rice Mill	San Rafael, Bulacan
		Kat-Man Rice Mill	Brgy. Sabang, Baliuag, Bulacan
		A.R. Santos Rice Mill	Malayantoc, Sto. Domingo, Nueva Ecija
Animal Feeds Dealer	4	Francisco Poultry and Agricultural Supplies	Poblacion, San Rafael, Bulacan
		Veramar Trading	Sampaloc, San Rafael, Bulacan
		A-1 Agro Supply	Talavera, Nueva Ecija
Soft Drink Distributor	1	Coca-Cola Bottlers Phil.	Abar 1st, San Jose City, Nueva Ecija
Type III			
Commuters	43	Baliwag Transit Terminal	San Jose City, Nueva Ecija
	43	Central Transit Terminal	Cabanatuan City, Nueva Ecija
Type IV			
Gasoline Stations	12	Sta. Rosa Service	Sta. Rosa, Nueva Ecija
		Augustine Shell Service Station	Cabanatuan City, Nueva Ecija
		Sta. Monica (CALTEX)	Baliuag, Bulacan
		Sta. Monica Nissan Service	Baliuag, Bulacan
		GTC Shell Service Station	Pulilan, Bulacan
		Maharlika PETRON	Maharlika, San Jose City, Nueva Ecija
		Violago PETRON	San Rafael, Bulacan
		Violago CALTEX Service Station	Cruz na Daan, San Rafael, Bulacan
		Rodriguez CALTEX	San Ildefonso, Bulacan
		Deleon CALTEX	Poblacion, Talavera, Nueva Ecija
		A-1 Shell Service Station	Marcos District, Talavera, Nueva Ecija
		Deleon CALTEX	Cabanatuan City, Nueva Ecija
		St. Jerome PETRON	Sto. Domingo, Nueva Ecija
Food Restaurant Business	6	Crowking Plandel	Plandel, Bulacan
		Hot-Taste Food Restaurant	San Jose City, Nueva Ecija
		Arniza's Restaurant & Pasalubong	San Ildefonso, Bulacan
		Bulacan Bake House	Plandel, Bulacan
		Baliwag Lechon Manok	Plandel, Bulacan
Convenient Store	1	9 Wines M Liquor	Plandel, Bulacan
Trading	1	3M Sisters	San Rafael, Bulacan
Auto Supply	1	Forum Auto Supply	Plandel, Bulacan

Results of interview on question if income is affected by the traffic congestion along the national highway

	No. of Respon-dents	Yes	%	No	%	No Answer	%
Type I (Drivers)							
Tricycles	76	71	93.4	4	5.3	1	1.1
Passenger-type jeeps	69	58	84.1	4	5.8	7	8.3
AUVs	27	26	96.3	1	3.7	-	-
Buses	17	13	76.5	4	23.5	-	-
Cargo trucks	14	14	100.0	-	0.0	-	-
Total	203	182	89%	13	6.4	8	3.9
Type II							
Owners of rice mills	10	6	60%	1	10	3	30

Results of interview on question if income is affected by the traffic congestion along the national highway

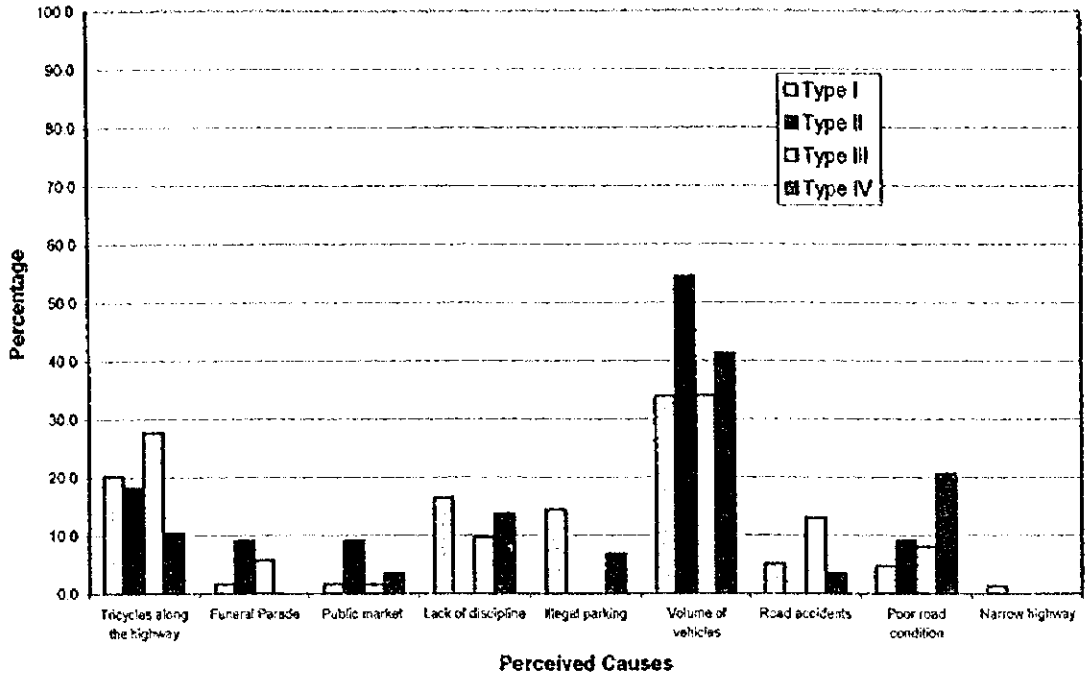
	No. of Respon-dents	Yes	%	No	%	No Answer	%
Type I (Drivers)							
Tricycles	76	71	93.4	4	5.3	1	1.1
Passenger-type jeeps	69	58	84.1	4	5.8	7	8.3
AUVs	27	26	96.3	1	3.7	-	-
Buses	17	13	76.5	4	23.5	-	-
Cargo trucks	14	14	100.0	-	0.0	-	-
Total	**203**	**182**	**89.7**	**13**	**6.4**	**8**	**3.9**
Type II							
Owners of rice mills	10	6	60	1	10	3	30

Answers to questions on respondents' perceived causes of traffic congestion along the study road

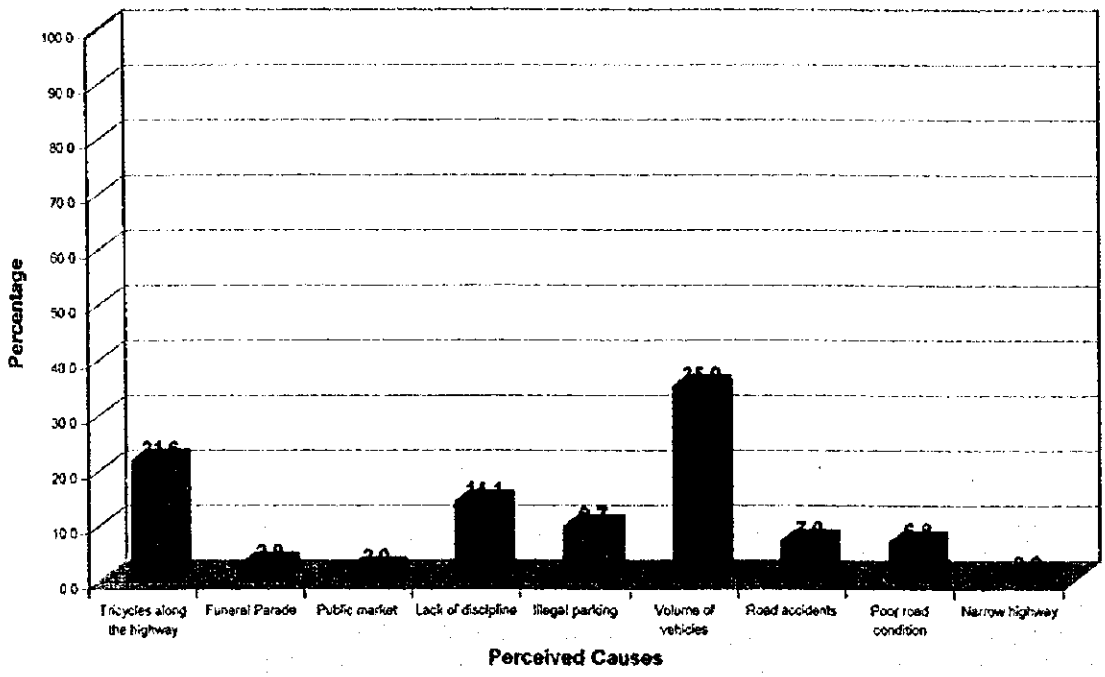
	Tricycles	Funeral Parade	Public market	Lack of discipline	Illegal parking	Volume of vehicles	Road accidents	Poor road condition	Narrow highway	Number of Respondents
Type I										
Tricycle	2	1	0	13	26	37	1	2	4	86
Passenger-type jeep	30	4	3	25	10	27	9	0	0	108
AUVs	10	0	0		1	15	3	6	0	35
Buses	9	0	1	8	4	8	0	0	0	30
Cargo trucks	6	0	0	1	1	7	2	6	0	23
Private cars	2	0	1	1	0	5	0	0	0	9
Sub-Total	59	5	5	48	42	99	15	14	4	291
Percentage to Total	**20.3**	**1.7**	**1.7**	**16.5**	**14.4**	**34.0**	**5.2**	**4.8**	**1.4**	
Type II										
Rice mill owners	2	1	1	0	0	6	0	1	0	11
Percentage to total	**18.2**	**9.1**	**9.1**	**0.0**	**0.0**	**54.5**	**0.0**	**9.1**	**0.0**	
Type III										
Commuters	34	7	2	12	0	42	16	10	0	123
Percentage to total	**27.6**	**5.7**	**1.6**	**9.8**	**0.0**	**34.1**	**13.0**	**8.1**	**0.0**	
Type IV										
Gasoline station owners	3	0	1	4	2	12	1	6	0	29
Percentage to total	**10.3**	**0.0**	**3.4**	**13.8**	**6.9**	**41.4**	**3.4**	**20.7**	**0.0**	
OVERALL TOTAL	98	13	9	64	44	159	32	31	4	454
Percentage to total	**21.6**	**2.9**	**2.0**	**14.1**	**9.7**	**35.0**	**7.0**	**6.8**	**0.9**	

Answers to questions on respondents' perceived causes of traffic congestion along the study road

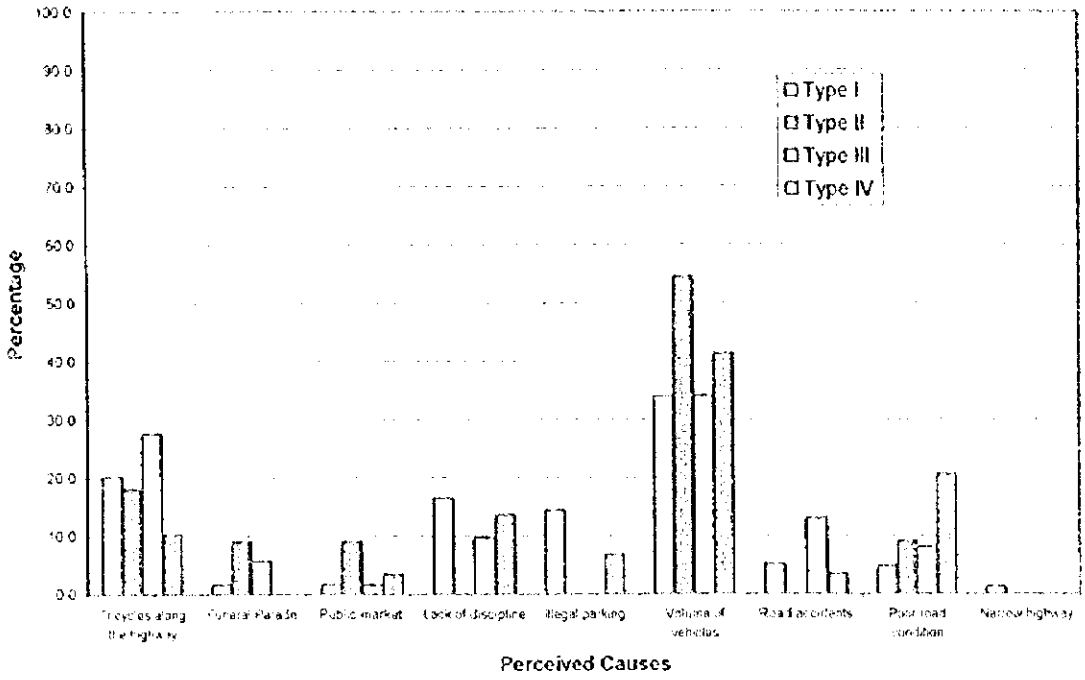
	Tricycles	Funeral Parade	Public market	Lack of discipline	Illegal parking	Volume of vehicles	Road accidents	Poor road condition	Narrow highway	Number of Respondents
Type I										
Tricycle	2	1	0	13	26	37	1	2	4	86
Passenger-type jeep	30	4	3	25	10	27	9	0	0	108
AUVs	10	0	0		1	15	3	6	0	35
Buses	9	0	1	8	4	8	0	0	0	30
Cargo trucks	6	0	0	1	1	7	2	6	0	23
Private cars	2	0	1	1	0	5	0	0	0	9
Sub-Total	59	5	5	48	42	99	15	14	4	291
Percentage to Total	20.3	1.7	1.7	16.5	14.4	34.0	5.2	4.8	1.4	
Type II										
Rice mill owners	2	1	1	0	0	6	0	1	0	11
Percentage to total	18.2	9.1	9.1	0.0	0.0	54.5	0.0	9.1	0.0	
Type III										
Commuters	34	7	2	12	0	42	16	10	0	123
Percentage to total	27.6	5.7	1.6	9.8	0.0	34.1	13.0	8.1	0.0	
Type IV										
Gasoline station owners	3	0	1	4	2	12	1	6	0	29
Percentage to total	10.3	0.0	3.4	13.8	6.9	41.4	3.4	20.7	0.0	
OVERALL TOTAL	98	13	9	64	44	159	32	31	4	454
Percentage to total	21.6	2.9	2.0	14.1	9.7	35.0	7.0	6.8	0.9	



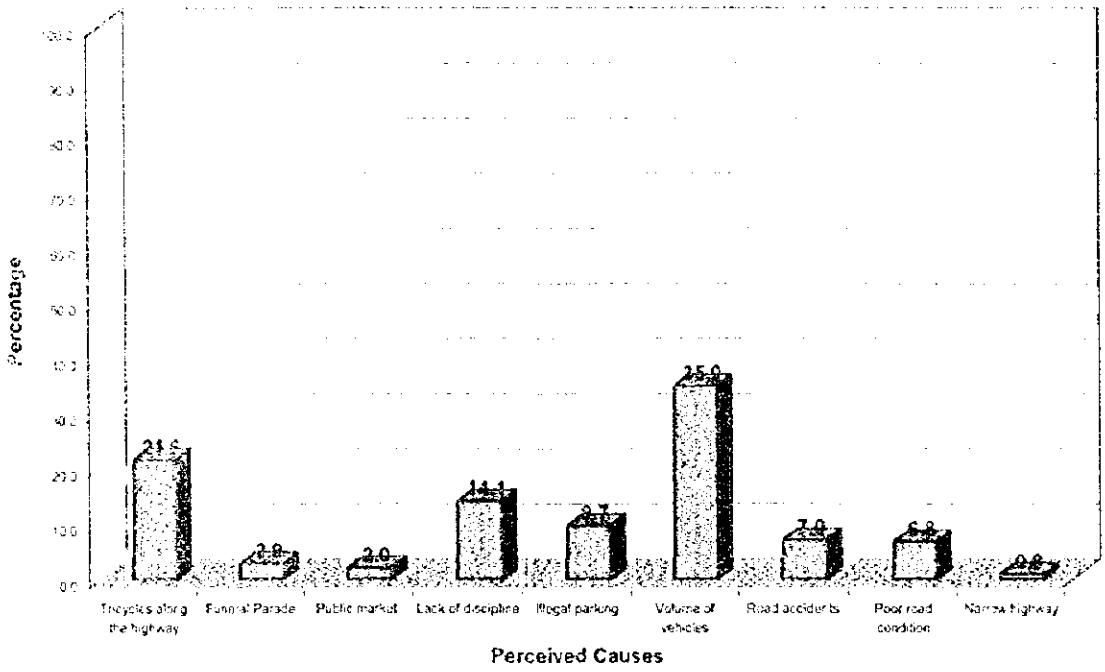
Perceived Causes of Traffic Congestion Along the
Sta. Rita-San Jose Section of the Pan-Philippine Highway
(By Sector)



Perceived Causes of Traffic Congestion Along the
Sta. Rita-San Jose Section of the Pan-Philippine Highway
(Overall)



Perceived Causes of Traffic Congestion Along the
Sta. Rita-San Jose Section of the Pan-Philippine Highway
(By Sector)



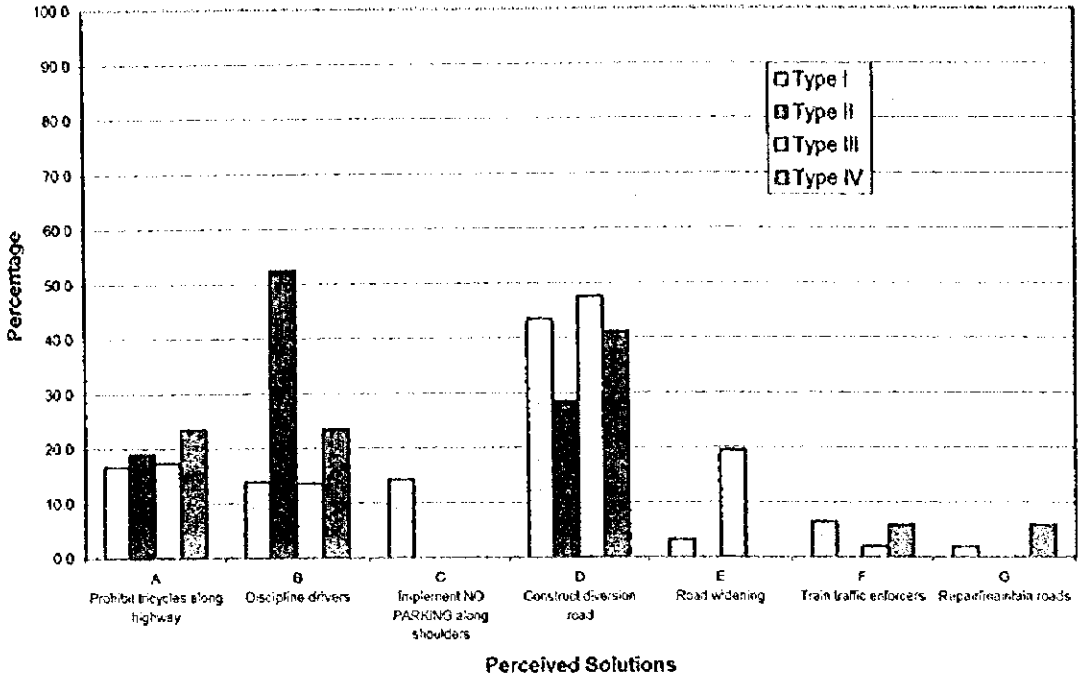
Perceived Causes of Traffic Congestion Along the
Sta. Rita-San Jose Section of the Pan-Philippine Highway
(Overall)

Answers to questions on respondents' perceived solutions to traffic congestion along the study road

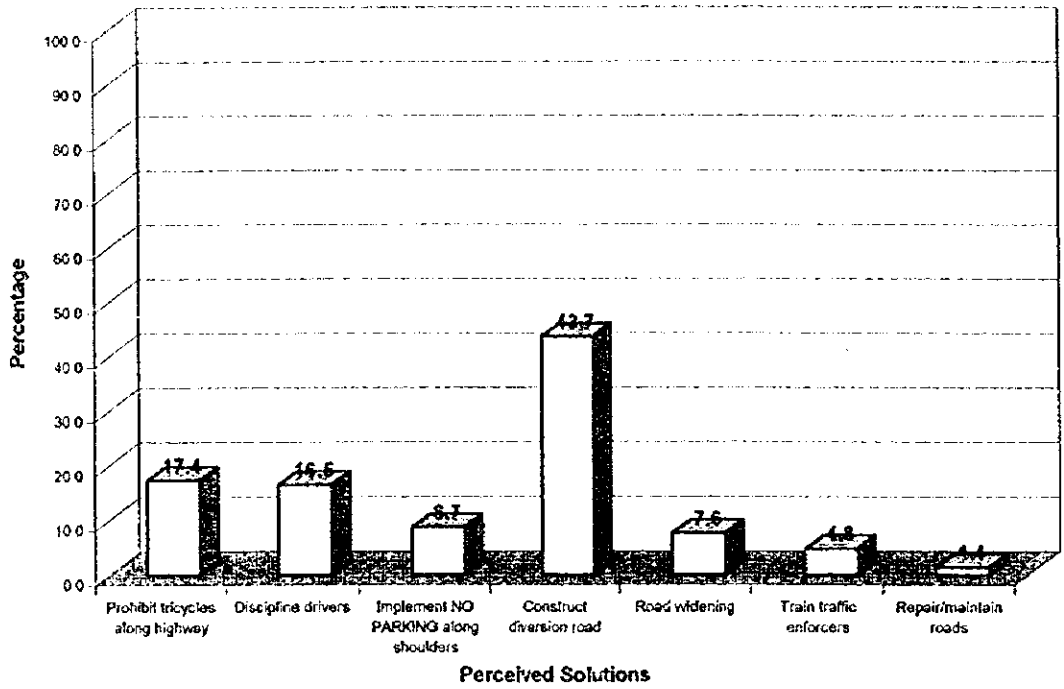
	Prohibit tricycles along highway	Discipline drivers	Implement NO PARKING along shoulders	Construct diversion road	Road widening	Train traffic enforcers	Repair/maintain roads	Number of Respondents
Type I								
Tricycle	0	18	21	24	0	9	4	76
Passenger-type jeep	13	7	3	39	0	0	0	62
AUVs	9	3	2	12	5	2	0	33
Buses	10	1	5	8	0	0	0	24
Cargo trucks	4	1	0	6	0	0	0	11
Private cars	0	0	0	5	2	3	0	10
Sub-Total	36	30	31	94	7	14	4	216
Percentage to Total	**16.7**	**13.9**	**14.4**	**43.5**	**3.2**	**6.5**	**1.9**	
Type II								
Rice mill owners	4	11	0	6	0	0	0	21
Percentage to Total	**19.0**	**52.4**	**0.0**	**28.6**	**0.0**	**0.0**	**0.0**	
Type III								
Commuters	18	14	0	49	20	2	0	103
Percentage to Total	**17.5**	**13.6**	**0.0**	**47.6**	**19.4**	**1.9**	**0.0**	
Type IV								
Gasoline station owners	4	4	0	7	0	1	1	17
Percentage to Total	**23.5**	**23.5**	**0.0**	**41.2**	**0.0**	**5.9**	**5.9**	
OVERALL TOTAL	62	59	31	156	27	17	5	357
Percentage to total	**17.4**	**16.5**	**8.7**	**43.7**	**7.6**	**4.8**	**1.4**	

Answers to questions on respondents' perceived solutions to traffic congestion along the study road

	Prohibit tricycles along highway	Discipline drivers	Implement NO PARKING along shoulders	Construct diversion road	Road widening	Train traffic enforcers	Repair/maintain roads	Number of Respondents
Type I								
Tricycle	0	18	21	24	0	9	4	76
Passenger-type jeep	13	7	3	39	0	0	0	62
AUVs	9	3	2	12	5	2	0	33
Buses	10	1	5	8	0	0	0	24
Cargo trucks	4	1	0	6	0	0	0	11
Private cars	0	0	0	5	2	3	0	10
Sub-Total	36	30	31	94	7	14	4	216
Percentage to Total	16.7	13.9	14.4	43.5	3.2	6.5	1.9	
Type II								
Rice mill owners	4	11	0	6	0	0	0	21
Percentage to Total	19.0	52.4	0.0	28.6	0.0	0.0	0.0	
Type III								
Commuters	18	14	0	49	20	2	0	103
Percentage to Total	17.5	13.6	0.0	47.6	19.4	1.9	0.0	
Type IV								
Gasoline station owners	4	4	0	7	0	1	1	17
Percentage to Total	23.5	23.5	0.0	41.2	0.0	5.9	5.9	
OVERALL TOTAL	62	59	31	156	27	17	5	357
Percentage to total	17.4	16.5	8.7	43.7	7.6	4.8	1.4	



Perceived Solutions to Traffic Congestion Along the
Sta. Rita-San Jose Section of the Pan-Philippine Highway
(By Sector)



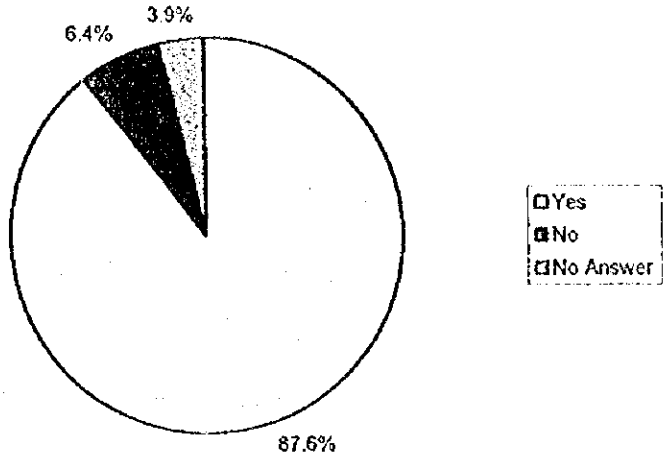
Perceived Solutions to Traffic Congestion Along the
Sta. Rita-San Jose Section of the Pan-Philippine Highway
(Overall)

Answers to question on whether the respondents are in favor of a bypass

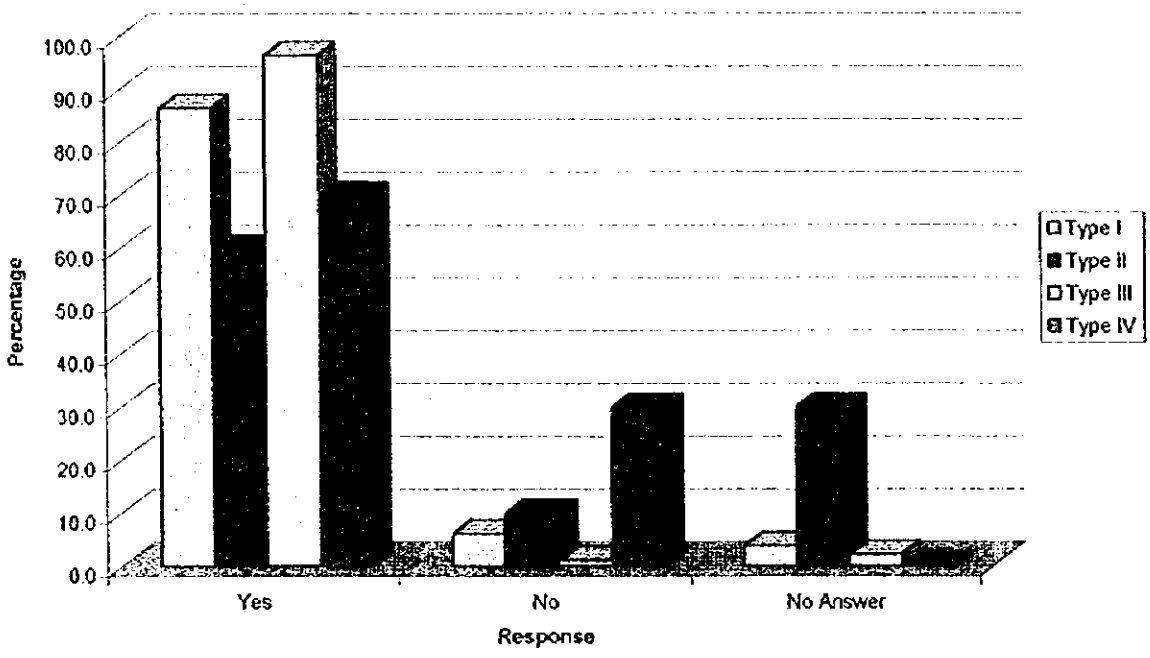
	Sample Size	Yes	%	No	%	No Answer	%
Type I							
Tricycles	76	71	93.4	4	5.3	1	1.1
Passenger-type jeeps	69	58	84.1	4	5.8	7	8.3
AUVs	27	26	96.3	1	3.7	0	0.0
Buses	17	13	76.5	4	23.5	0	0.0
Cargo trucks	14	14	100.0	0	0.0	0	0.0
Private cars	7	6	85.7	1	14.3	0	0.0
TOTAL	210	182	86.7	13	6.2	8	3.8
Type II							
Owners of rice mills	10	6	60.0	1	10.0	3	30.0
Type III							
Commuters	90	87	96.7	1	1.1	2	2.2
Type IV							
Gasoline station owners	20	14	70.0	6	30.0	0	0.0
OVERALL TOTAL	330	289	87.6	21	6.4	13	3.9

Answers to question on whether the respondents are in favor of a "controlled" bypass (e.g., if bypass (e.g., if tricycles will not be allowed to use it)

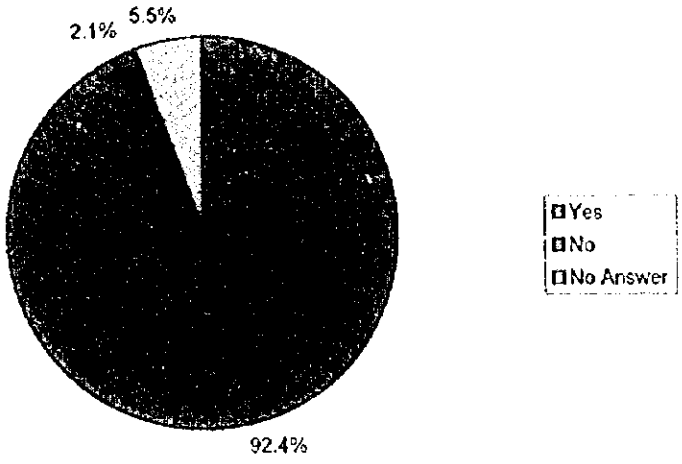
	Sample Size	Yes	%	No	%	No Answer	%
Type I							
Tricycles	76	72	94.7	2	2.6	2	2.1
Passenger-type jeeps	69	60	87.0	1	1.4	8	9.2
AUVs	27	23	85.2	1	3.7	3	3.5
Buses	17	15	88.2	1	5.9	1	1.1
Cargo trucks	14	14	100.0	0	0.0	0	0.0
Private cars	7	6	85.7	0	0.0	1	1.2
TOTAL	210	190	90.5	5	2.4	15	7.1
Type II							
Owners of rice mills	10	10	100	0	0.0	0	0.0
Type III							
Commuters	90	87	96.7	0	0.0	3	3.3
Type IV							
Gasoline station operators	20	18	90.0	2	10.0	0	0.0
OVERALL TOTAL	330	305	92.4	7	2.1	18	5.5



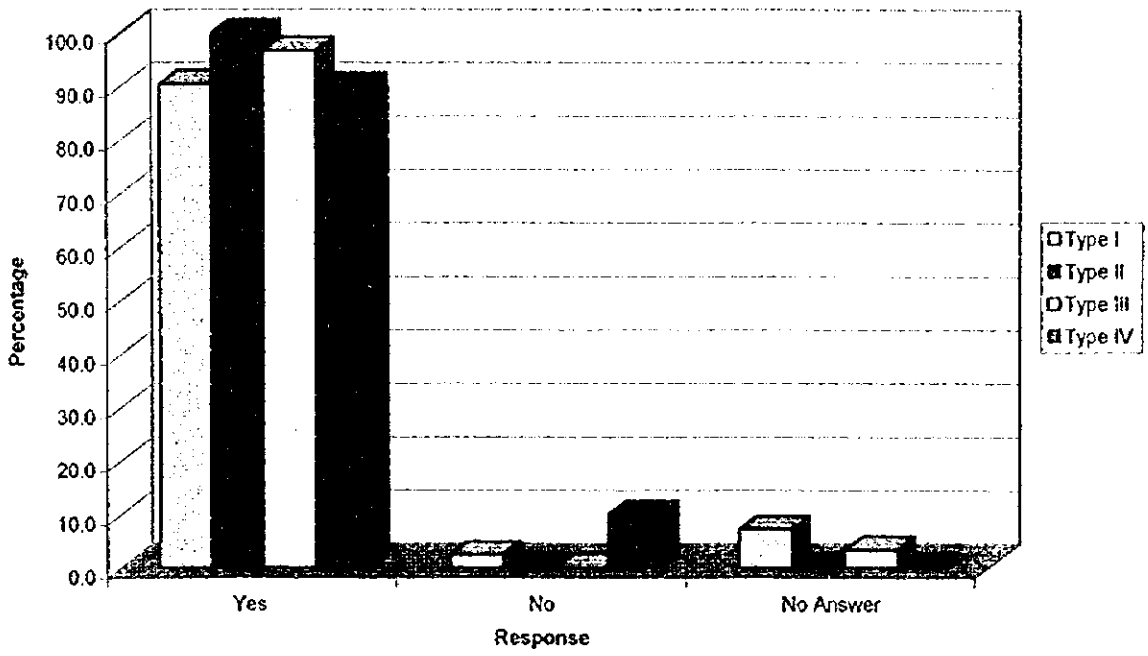
Favorability of A Bypass As A Solution to Traffic Congestion
Along the Sta. Rita-San Jose Section of the Pan-Philippine Highway
(Overall)



Favorability of a Bypass as a Solution to Traffic Congestion
Along the Sta. Rita-San Jose Section of the Pan-Philippine Highway
(By Sector)



Favorability of A Controlled Bypass As A Solution to Traffic Congestion
Along the Sta. Rita-San Jose Section of the Pan-Philippine Highway
(Overall)



Favorability of A Controlled Bypass As A Solution to Traffic Congestion
Along the Sta. Rita-San Jose Section of the Pan-Philippine Highway
(By Sector)

1995 and Projected Hierarchy of Urban Centers Along the Study Road

Level in Urban Hierarchy	1995	2007
Major Urban Center	Baliuag Plaridel	Baliuag Plaridel Pulilan
Secondary Urban Center	Pulilan San Miguel	San Miguel San Ildefonso
Medium Town/Non-Central Places	San Rafael San Ildefonso	San Rafael

Source: PPFP Technical Working Group, 1998. *Provincial Physical Framework Plan, Province of Bulacan (1998-2007).*

1993 and Projected Hierarchy of Urban Centers Along the Study Road

Level in Urban Hierarchy	1993	2002
Large Town (Primary Urban Center A)	Cabanatuan City	Cabanatuan City Gapan Talavera San Jose City
Medium Town (Secondary Urban Center A)	Gapan Talavera San Jose City	Muñoz Sta. Rosa
Small Town (Secondary Urban Center B)	Muñoz Sta. Rosa	–

Source: Provincial Development Council of Nueva Ecija, 1993. *Draft Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan*, Province of Nueva Ecija, *Planning Period 1993-2002*

Viability of the alternative routes for the Plaridel-Baliuag Bypass in terms of existing environmental condition

	Alternative Routes			
Environmental Control Points	1	2	3	4
Physical constraints	low	low	low	medium
Biological constraints	medium	low	low	medium
Historical value	none (?)	none (?)	none (?)	none (?)
Density of communities	medium	medium	medium	low
Agricultural productivity	medium	low	low	medium
Conflict with land use plan	medium	low	Low	high
Overall Ranking	2nd			3rd

1995 and Projected Hierarchy of Urban Centers Along the Study Road

Level in Urban Hierarchy	1995	2007
Major Urban Center	Baliuag	Baliuag
	Plaridel	Plaridel
		Pulilan
Secondary Urban Center	Pulilan	San Miguel
	San Miguel	San Ildefonso
Medium Town/Non Central Places	San Rafael	San Rafael
	San Ildefonso	

Source: PPFP Technical Working Group, 1998. *Provincial Physical Framework Plan, Province of Bulacan (1998-2007).*

1993 and Projected Hierarchy of Urban Centers Along the Study Road

Level in Urban Hierarchy	1993	2002
Large Town (Primary Urban Center A)	Cabanatuan City	Cabanatuan City Gapan Talavera San Jose City
Medium Town (Secondary Urban Center A)	Gapan Talavera San Jose City	Muñoz Sta. Rosa
Small Town (Secondary Urban Center B)	Muñoz Sta. Rosa	

Source: Provincial Development Council of Nueva Ecija, 1993. *Draft Provincial Physical Framework Plan/Comprehensive Provincial Land Use Plan*, Province of Nueva Ecija, *Planning Period 1993-2002*

Viability of the alternative routes for the Plaridel-Baliuag Bypass in terms of existing environmental condition

	Alternative Routes			
Environmental Control Points	1	2	3	4
Physical constraints	low	low	low	medium
Biological constraints	medium	low	low	medium
Historical value	none (?)	none (?)	none (?)	none (?)
Density of communities	medium	medium	medium	low
Agricultural productivity	medium	low	low	medium
Conflict with land use plan	medium	low	Low	high
Overall Ranking	2nd	1st	1st	3rd

Viability of the alternative routes for the Cabanatuan Bypass in terms of existing environmental condition				
	Alternative Routes			
Environmental Control Points	1	2	3	4
Physical constraints	low	low	low	medium
Biological constraints	high	low	low	low
Historical value	none	none	none	none
Density of communities	medium	low	medium	high
Agricultural productivity	low	medium	medium	high
Conflict with land use plan	none	none	none	none
Overall Ranking	3rd	[redacted]	2nd	4th

Viability of the alternative routes for the San Jose Bypass in terms of existing environmental conditions		
	Alternative Routes	
Environmental Control Points	1	2
Physical constraints	low	medium
Biological constraints	low	low
Historical value	none	none
Density of communities	medium	medium
Agricultural productivity	medium	low
Conflict with land use plan	high	none
Overall Ranking	2nd	[redacted]

Viability of the alternative routes for the Cabanatuan Bypass in terms of existing environmental condition				
	Alternative Routes			
Environmental Control Points	1	2	3	4
Physical constraints	low	low	low	medium
Biological constraints	high	low	low	low
Historical value	none	none	none	none
Density of communities	medium	low	medium	high
Agricultural productivity	low	medium	medium	high
Conflict with land use plan	none	none	none	none
Overall Ranking	3rd	1st	2nd	4th

Viability of the alternative routes for the San Jose Bypass in terms of existing environmental conditions		
	Alternative Routes	
Environmental Control Points	1	2
Physical constraints	low	medium
Biological constraints	low	low
Historical value	none	none
Density of communities	medium	medium
Agricultural productivity	medium	low
Conflict with land use plan	high	none
Overall Ranking	2nd	1st

APPENDIX 10

- 10.1-1 Construction Cost, ROW Acquisition & Compensation and Maintenance Costs of Alternative Routes
- 10.2-1 Disbursement Schedule of Project Cost
- 10.2-2 Cash Flow of Economic Cost and Benefit for Route-2 of All Bypass Alternatives
- 10.2-3 Annual Disbursement Schedule for All Alternative Routes of All Bypass Routes (Financial Price)
- 10.2-4 Annual Disbursement Schedule for All Alternative Routes of All Bypass Routes (Economic Price)
- 10.3-1 Initial EIA

APPENDIX 10.1-1 Summary of Estimated Cost by Bypass Route

Unit : Million Peso

Bypass Section	Item of Cost	Cost by Bypass Route			
		Route-1	Route-2	Route-3	Route-4
Baliuag Bypass	Construction Cost	2,861	2,568	2,331	1,632
	ROW acquisition	624	702	784	293
	Compensation	12	18	25	18
	Total	3,497	3,288	3,140	1,943
	Maintenance Cost (10 Year)	49	33	31	29
Cabanatuan Bypass	Construction Cost	3,721	2,955	2,462	1,893
	ROW acquisition	294	322	291	188
	Compensation	24	31	25	25
	Total	4,039	3,308	2,778	2,106
	Maintenance Cost (10 Year)	80	46	37	33
San Jose Bypass	Construction Cost	316	243		
	ROW acquisition	32	27		
	Compensation	6	12		
	Total	354	282		
	Maintenance Cost (10 Year)	21	10		

Estimated Construction Cost of Baliuag Bypass by Alternative Route

Item		Unit	Unit Cost	Route 1		Route 2		Route 3		Route 4	
				Length=22.50 km		Length=22.00 km		Length=20.25 km		Length=16.8 km	
				Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Construction Cost	New Road Construction (Urban Section-1)	km	90,600,000	21.45	1,943,370,000	21.35	1,934,310,000	19.6	1,775,760,000	16.8	1,522,080,000
	PCIG Bridge (4-lane)	l.m.	669,000	1000	669,000,000	425	284,325,000	425	284,325,000	0	-
	RCDG Bridge (4-lane)	l.m.	652,000	50	32,600,000	105	68,460,000	105	68,460,000	0	-
	Box Culvert (2-1.8x1.8x45m)	each	35,000	20	700,000	16	560,000	10	350,000	23	805,000
	Intersection (4-lane x 2-lane)	each	926,000	6	5,556,000	6	5,556,000	6	5,556,000	4	3,704,000
	New Access Road (2-Lane)	km	25,553,000	3.0	76,659,000	3.2	81,769,600	2.5	63,882,500	1.9	48,550,700
	Sub-Total (Bridge)				701,600,000		352,785,000		352,785,000		-
	Sub-Total (Other than Bridge)				2,026,285,000		2,022,195,600		1,845,548,500		1,575,139,700
	Total				2,727,885,000		2,374,980,600		2,198,333,500		1,575,139,700
	Interchange at Manila North Exp.way	l.s			133,164,000		193,049,000		133,164,000		56,403,000
	Total				2,861,049,000		2,568,029,600		2,331,497,500		1,631,542,700
Right of Way Acquisition	Width of ROW	m		50		50		50		50	
	Agricultural Area	ha	130,000	965.3	125,482,500	939.4	122,122,000	833.0	108,290,000	798.0	103,740,000
	Residential Area	ha	3,950,000	53.6	211,818,750	74.7	295,163,750	78.4	309,680,000	25.2	99,540,000
	Commertial Area	ha	5,445,000	32.2	175,192,875	32.0	174,376,125	39.2	213,444,000	8.4	45,738,000
	Industrial Area	ha	5,178,000	21.5	111,068,100	21.4	110,550,300	29.4	152,233,200	8.4	43,495,200
	Total	ha		1072.5	623,562,225	1067.5	702,212,175	980.0	783,647,200	840.0	292,513,200
Compensation	Concrete Building	each		0		0		0		0	
	Concrete House	each	1,200,000	10	12,000,000	15	18,000,000	20	24,000,000	15	18,000,000
	Wooden House	each	20,000	10	200,000	10	200,000	10	200,000	5	100,000
	Sarisari Store	each		0		0		0		0	
	Temporary Building	each		0		0		0		0	
	Big Tree	each	5,000	20	100,000	30	150,000	50	250,000	20	100,000
	Total				12,300,000		18,350,000		24,450,000		18,200,000
Total					3,496,911,225		3,288,591,775		3,139,594,700		1,942,255,900

Note : Quantities of ROW acquisition and compensation are roughly estimated based on ocular survey.

Estimated Construction Cost of Cabanatuan Bypass by Alternative Route

Item		Unit	Unit Cost	Route 1		Route 2		Route 3		Route 4	
				Length=36.00 km		Length=29.50 km		Length=24.00 km		Length=19.5 km	
				Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Construction Cost	New Road Construction (Urban Section-1)	km	90,600,000	34.7	3,143,820,000	29.2	2,645,520,000	23.7	2,147,220,000	19.3	1,748,580,000
	PCIG Bridge (4-lane)	l.m.	669,000	280	187,320,000	280	187,320,000	280	187,320,000	150	100,350,000
	RCDG Bridge (4-lane)	l.m.	652,000	20	13,040,000	20	13,040,000	30	19,560,000	60	39,120,000
	Box Culvert (2-1.8x1.8x45m)	each	35,000	25	875,000	25	875,000	10	350,000	9	315,000
	Intersection (4-lane x 2-lane)	each	926,000	6	5,556,000	7	6,482,000	6	5,556,000	5	4,630,000
	New Access Road (2-Lane)	km	25,553,000	14.5	370,518,500	4.0	102,212,000	4.0	102,212,000	0	-
	Sub-Total (Bridge)				200,360,000		200,360,000		206,880,000		139,470,000
	Sub-Total (Other than Bridge)				3,520,769,500		2,755,089,000		2,255,338,000		1,753,525,000
	Total				**3,721,129,500**		**2,955,449,000**		**2,462,218,000**		**1,892,995,000**
Right of Way Acquisition	Width of ROW	m		50		50		50		50	
	Agricultural Area	ha	48,300	1,665.6	80,448,480	1372.4	66,286,920	1102.1	53,229,015	916.8	44,279,025
	Residential Area	ha	2,605,000	34.7	90,393,500	58.4	152,132,000	59.3	154,346,250	29.0	75,414,750
	Commertial Area	ha	3,535,400	17.4	61,339,190	14.6	51,616,840	11.9	41,894,490	9.7	34,116,610
	Industrial Area	ha	3,535,400	17.4	61,339,190	14.6	51,616,840	11.9	41,894,490	9.7	34,116,610
	Total	ha		1735.0	**293,520,360**	1460.0	**321,652,600**	1185.0	**291,364,245**	965.0	**187,926,995**
Compensation	Concrete Building	each		0		0		0		0	
	Concrete House	each	1,200,000	20	24,000,000	25	30,000,000	20	24,000,000	20	24,000,000
	Wooden House	each	20,000	10	200,000	15	300,000	15	300,000	10	200,000
	Sarisari Store	each		0		0		0		0	
	Temporary Building	each		0		0		0		0	
	Big Tree	each	5,000	30	150,000	30	150,000	40	200,000	50	250,000
	Total				**24,350,000**		**30,450,000**		**24,500,000**		**24,450,000**
Total					**4,038,999,860**		**3,307,551,600**		**2,778,082,245**		**2,105,371,995**

Note : Quantities of ROW acquisition and compensation are roughly estimated based on ocular survey.

Estimated Construction of San Jose Bypass by Alternative Route

Item		Unit	Unit Cost	Route 1 Length=9.00 km		Route 2 Length=6.50 km	
				Quantity	Amount	Quantity	Amount
Construction Cost	New Road Construction (Urban Section-1)	km	32,006,000	9.0	288,054,000	6.5	208,039,000
	PCIG Bridge (4-lane)	l.m.	-	0	-	0	-
	RCDG Bridge (4-lane)	l.m.	-	0	-	0	-
	Box Culvert (2-1.8x1.8x45m)	each	35,000	5	175,000	8	280,000
	Intersection (2-lane x 2-lane)	each	926,000	2	1,852,000	2	1,852,000
	New Access Road (2-lane)	km	25,553,000	1.0	25,553,000	1.3	33,218,900
	Sub-Total (Bridge)				-		-
	Sub-Total (Other than Bridge)				315,634,000		243,389,900
	Total				**315,634,000**		**243,389,900**
Right of Way Acquisition	Width of ROW	m		25		25	
	Agricultural Area	ha	48,300	218.3	10,541,475	156.0	7,534,800
	Residential Area	ha	2,605,000	2.3	5,861,250	3.3	8,466,250
	Commertial Area	ha	3,535,400	2.3	7,954,650	1.6	5,745,025
	Industrial Area	ha	3,535,400	2.3	7,954,650	1.6	5,745,025
	Total	ha		225.0	**32,312,025**	162.5	**27,491,100**
Compensation	Concrete Building	each		0		0	
	Concrete House	each	1,200,000	5	6,000,000	10	12,000,000
	Wooden House	each	20,000	5	100,000	5	100,000
	Sarisari Store	each		0		0	
	Temporary Building	each		0		0	
	Big Tree	each	5,000	10	50,000	15	75,000
	Total				**6,150,000**		**12,175,000**
Total					**354,096,025**		**283,056,000**

Note : Quantities of ROW acquisition and compensation are roughly estimated based on ocular survey.

Estimated Cost of Improvement of Burol Interchange (Bypass Route-2)

Item	Unit	Unit Cost	Scheme-2		Scheme-4	
			Quantity	Amount	Quantity	Amount
Pavement	sq.m	1,812	22,817	41,344,404	18,995	34,418,940
Embankment	cu.m	167	111,728	18,658,576	135,720	22,665,240
Superstructure (PC Box Girder)	sq.m	34,515	1,050	36,240,750	1,978	68,270,670
Substuructure (Abutment)	cu.m	8,808	386	3,399,888	1,050	9,248,400
Substructure (Pier)	cu.m	8,808	170	1,497,360	554	4,879,632
Foundation Piles	l.m.	3,217	1,380	4,439,460	4,080	13,125,360
Sub-total				105,580,438		152,608,242
Miscellanious Strucrures and Facility & Labo.(15%)				15,837,066		22,891,236
Contingency (10%)				12,141,750		17,549,948
Total				133,559,254		193,049,426

Estimated Cost of Improvement of Interchange Connection with Manila North Exp.way

Item	Unit	Unit Cost	Route-1		Route-2		Route-3		Route-4	
			Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Pavement	sq.m	1,812	15,238	27,611,256	18,995	34,418,940	15,238	27,611,256	18,433	33,400,596
Embankment	cu.m	167	110,500	18,453,500	135,720	22,665,240	110,500	18,453,500	66,985	11,186,495
Superstructure (PC Box Girder)	sq.m	34,515	1,350	46,595,250	1,978	68,270,670	1,350	46,595,250	-	-
Substuructure (Abutment)	cu.m	8,808	521	4,588,968	1,050	9,248,400	521	4,588,968	-	-
Substructure (Pier)	cu.m	8,808	230	2,025,840	554	4,879,632	230	2,025,840	-	-
Foundation Piles	l.m.	3,217	1,863	5,993,271	4,080	13,125,360	1,863	5,993,271	-	-
Sub-total				105,268,085		152,608,242		105,268,085		44,587,091
Miscellanious Strucrures and Facility & Labo.(15%)				15,790,213		22,891,236		15,790,213		6,688,064
Contingency (10%)				12,105,830		17,549,948		12,105,830		5,127,515
Total				133,164,128		193,049,426		133,164,128		56,402,670

Estimated Cost of Road Maintenance

Unit : Peso per Year

Bypass Section			Maintenance Cost by Bypass Route			
			Route-1	Route-2	Route-3	Route-4
Baliuag Bypass	Road Length (L)	km	21.45	21.35	19.60	16.8
	EMK		85,000	85,000	85,000	85,000
	Surface Factor (SF)		1.15	1.15	1.15	1.15
	Width Factor (WF)		2.35	1.60	1.60	1.75
	LxEMKxSFxWF		4,927,333	3,339,140	3,065,440	2,873,850
						-
	Bridge Length (BL)	km	1.050	0.650	0.650	
	Bridge Factor (BF)		0.01	0.01	0.01	0.01
	EMKxBLxBF		893	553	553	-
	Total		4,928,226	3,339,693	3,065,993	2,873,850
Cabanatuan Bypass	Road Length (L)	km	34.70	29.20	23.70	19.30
	EMK		85,000	85,000	85,000	85,000
	Surface Factor (SF)		1.15	1.15	1.15	1.15
	Width Factor (WF)		2.35	1.60	1.60	1.75
	LxEMKxSFxWF		7,971,024	4,566,880	3,706,680	3,301,506
						-
	Bridge Length (BL)	km	0.32	0.32	0.33	0.21
	Bridge Factor (BF)		0.01	0.01	0.01	0.01
	EMKxBLxBF		272	272	281	179
	Total		7,971,296	4,567,152	3,706,961	3,301,685
San Jose Bypass	Road Length (L)	km	9.00	6.50		
	EMK		85,000	85,000		
	Surface Factor (SF)		1.15	1.15		
	Width Factor (WF)		2.35	1.60		
	LxEMKxSFxWF		2,067,413	1,016,600		
	Bridge Length (BL)	km	-	-		
	Bridge Factor (BF)		0.01	0.01		
	EMKxBLxBF		-	-		
	Total		2,067,413	1,016,600		

Estimated Construction Cost per km of New Road Construction (Embankment Section)

Item No.	Description	Unit	Unit Price	Urban Type-1		Urban Type-2		Rural Type-1		Rural Type-2	
				Length =	1.0 km	Length=	1.0 km	Length =	1.0 km	Length =	1.0 km
				Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
100	Clearing and Grubbing	sq. m.	5.32	48,000	255,290	39,000	207,423	34,000	180,830	29,000	154,238
102	Excavation of Unsuitable Soils	cu.m	120.00	48,000	5,760,000	39,000	4,680,000	34,000	4,080,000	29,000	3,480,000
103(6)	Pipe Culverts and Drain Excavation	cu.m.	93.00	190	17,670	151	14,043	130	12,090	108	10,044
104	Embankment from Borrow	cu.m.	250.00	111,566	27,891,500	98,370	24,592,500	82,370	20,592,500	69,100	17,275,000
105	Subgrade Preparation	sq.m.	12.00	48,000	576,000	30,000	360,000	25,000	300,000	20,000	240,000
200	Aggregate Sub-base course	cu.m.	333.00	8,570	2,853,810	6,940	2,311,020	6,940	2,311,020	5,920	1,971,360
311	PCC t=25cm	sq.m.	690.00	14,000	9,660,000	14,000	9,660,000	14,000	9,660,000	14,000	9,660,000
	PCC t=23cm	sq.m.	631.00	13,500	8,518,500	2,500	1,577,500	2,500	1,577,500	4,000	2,524,000
	PCC t=18cm	sq.m.	454.00	5,640	2,560,560	6,000	2,724,000	5,640	2,560,560	0	0
407.1(b)	RCBC (2-3.00 m x 2.50 m)	l.m.	53,024.00	22	1,166,528	0	0	0	0		0
500a	RCCP - 1220mm diameter	l.m.	5,720.00	135	772,200	99	566,280	90	514,800	75	429,000
500d	RCCP-460mm diameter	l.m.	1,165.00	980	1,141,700	860	1,001,900	756	880,740	640	745,600
501a	Side Ditch(300x300)	l.m.	1,800.00	2,000	3,600,000	0	0	0	0	0	0
502	Inlet/Outlet RCPC,1220 m dia.	each	40,364.00	6	242,184	6	242,184	6	242,184	6	242,184
504	Grouted Riprap Class "A"	cu.m.	1,780.00	0	0	0	0		0		0
505	Stone Masonry (supported type)	cu.m.	2,200.00	172	378,400	0	0	0	0		0
600	Curb and Gutter	cu.m.	3,915.00	560	2,192,400	600	2,349,000	560	2,192,400	290	1,135,350
603(3)	Guardrail Metal Beam	l.m.	1,800.00	200	360,000	0	0	0	0	0	0
605	Road signs	each	5,000.00	6	30,000	6	30,000	6	30,000	6	30,000
606(1)	Reflective Pavement Markings (white)	sq.m.	508.00	750	381,000	750	381,000	750	381,000	750	381,000
610	Sodding	sq.m.	103.00	12,100	1,246,300	12,080	1,244,240	10,080	1,038,240	10,080	1,038,240
611	Tree Planting						0		0		0
	Large size	each	1,000.00	1,000.00	1,000,000	0	0	0	0	0	0
	Small size	each	100.00	-	0	6,700	670,000	0	0	0	0
	Miscellaneous Structures (10%)				7,060,404		5,261,109		4,655,386		3,931,602
	Facility & Laboratory (5%)				3,883,222		2,893,610		2,560,463		2,162,381
	Mobilization & Demobilization (1%)				815,477		607,658		537,697		454,100
	Construction Cost				**82,363,145**		**61,373,467**		**54,307,410**		**45,864,098**
	Contingencies (10%)				8,236,314		6,137,347		5,430,741		4,586,410
	Sub-Total				**90,599,459**		**67,510,814**		**59,738,151**		**50,450,508**
	Total Cost per km				**90,599,459**		**67,510,814**		**59,738,151**		**50,450,508**

APPENDIX 10.2-1 ANNUAL DISBURSEMENT SCHEDULE FOR ALTERNATIVE ROUTES OF ALL BYPASS ROUTES (FINANCIAL PRICE)

(Unit: Million Peso in 1998 Price)

Name of Bypass	Route Alternative	Work Item	2001			2002			2003			2004			Total		
			F.C.	L.C.	Sub-Total	F.C.	L.C.	Sub-Total	F.C.	L.C.	Sub-Total	F.C.	L.C.	Sub-Total	F.C.	L.C.	Total
Plaridel-Baliuag	Route-1	1. Land Acquisition															
		(1) Right of Way Acquisition		312.0	312.0		312.0	312.0							0.0	624.0	624.0
		(2) Compensation		6.0	6.0	0.0	6.0	6.0							0.0	12.0	12.0
		Sub-Total		318.0	318.0	0.0	318.0	318.0							0.0	636.0	636.0
		2. Detailed Design	96.9	58.1	155.0	10.8	6.5	17.2							107.6	64.6	172.2
		3. Construction				204.4	122.6	327.0	818.8	491.3	1,310.0	818.8	491.3	1,310.0	1,841.9	1,105.1	2,947.0
		Total	96.9	376.1	473.0	215.1	447.1	662.2	818.8	491.3	1,310.0	818.8	491.3	1,310.0	1,949.5	1,805.7	3,755.2
	Route-2	1. Land Acquisition															
		(1) Right of Way Acquisition		351.0	351.0		351.0	351.0							0.0	702.0	702.0
		(2) Compensation		9.0	9.0	0.0	9.0	9.0							0.0	18.0	18.0
		Sub-Total		360.0	360.0	0.0	360.0	360.0							0.0	720.0	720.0
		2. Detailed Design	86.6	52.0	138.6	9.6	5.8	15.4							96.3	57.8	154.0
		3. Construction				183.8	110.3	294.0	734.7	440.8	1,175.5	734.7	440.8	1,175.5	1,653.1	991.9	2,645.0
		Total	86.6	412.0	498.6	193.4	476.0	669.4	734.7	440.8	1,175.5	734.7	440.8	1,175.5	1,749.4	1,769.6	3,519.0
	Route-3	1. Land Acquisition															
		(1) Right of Way Acquisition		392.0	392.0		392.0	392.0							0.0	784.0	784.0
		(2) Compensation		12.5	12.5	0.0	12.5	12.5							0.0	25.0	25.0
		Sub-Total		404.5	404.5	0.0	404.5	404.5							0.0	809.0	809.0
		2. Detailed Design	78.8	47.3	126.0	8.8	5.3	14.0							87.5	52.5	140.0
		3. Construction				166.9	100.1	267.0	666.9	400.1	1,067.0	666.9	400.1	1,067.0	1,500.6	900.4	2,401.0
		Total	78.8	451.8	530.5	175.6	509.9	685.5	666.9	400.1	1,067.0	666.9	400.1	1,067.0	1,588.1	1,761.9	3,350.0
	Route-4	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		146.5	146.5		146.5	146.5							0.0	293.0	293.0
		(2) Compensation		9.0	9.0	0.0	9.0	9.0							0.0	18.0	18.0
		Sub-Total		155.5	155.5	0.0	155.5	155.5							0.0	311.0	311.0
		2. Detailed Design	55.1	33.1	88.2	6.1	3.7	9.8							61.3	36.8	98.0
		3. Construction				116.9	70.1	187.0	473.1	283.9	757.0	473.1	283.9	757.0	1,063.1	637.9	1,701.0
		Total	55.1	188.6	243.7	123.0	229.3	352.3	473.1	283.9	757.0	473.1	283.9	757.0	1,124.4	985.6	2,110.0
Cabanatuan	Route-1	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		147.0	147.0		147.0	147.0							0.0	294.0	294.0
		(2) Compensation		12.0	12.0	0.0	12.0	12.0							0.0	24.0	24.0
		Sub-Total		159.0	159.0	0.0	159.0	159.0							0.0	318.0	318.0
		2. Detailed Design	125.4	75.3	200.7	13.9	8.4	22.3							139.4	83.6	223.0
		3. Construction				266.3	159.8	426.0	1,064.7	638.8	1,703.5	1,064.7	638.8	1,703.5	2,395.6	1,437.4	3,833.0
		Total	125.4	234.3	359.7	280.2	327.1	607.3	1,064.7	638.8	1,703.5	1,064.7	638.8	1,703.5	2,535.0	1,839.0	4,374.0
	Route-2	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		161.0	161.0		161.0	161.0							0.0	322.0	322.0
		(2) Compensation		15.5	15.5	0.0	15.5	15.5							0.0	31.0	31.0
		Sub-Total		176.5	176.5	0.0	176.5	176.5							0.0	353.0	353.0
		2. Detailed Design	99.6	59.7	159.3	11.1	6.6	17.7							110.6	66.4	177.0
		3. Construction				211.3	126.8	338.0	845.6	507.4	1,353.0	845.6	507.4	1,353.0	1,902.5	1,141.5	3,044.0
		Total	99.6	236.2	335.8	222.3	309.9	532.2	845.6	507.4	1,353.0	845.6	507.4	1,353.0	2,013.1	1,560.9	3,574.0

APPENDIX 10.2-2 CASH FLOW OF ECONOMIC COST AND BENEFIT FOR ROUTE-2 OF ALL BYPASS ALTERNATIVES

(Unit: Million Pesos)

No	Year	Cost					Benefit	Net Benefit
		Detailed Design	Construction	Land Aquisition	O&M Cost	Total		
-4	2001	290		503		793	0	-793
-3	2002	32	614	503		1,150	0	-1,150
-2	2003		2,458			2,458	0	-2,458
-1	2004		2,458			2,458	0	-2,458
1	2005				277	277	2,983	2,707
2	2006				277	277	3,282	3,006
3	2007				277	277	3,581	3,304
4	2008				277	277	3,880	3,603
5	2009				277	277	4,178	3,902
6	2010				277	277	1,852	1,575
7	2011				277	277	2,235	1,959
8	2012				277	277	2,619	2,342
9	2013				277	277	3,002	2,726
10	2014				277	277	3,386	3,109
11	2015				277	277	3,769	3,493
12	2016				277	277	4,153	3,876
13	2017				277	277	4,536	4,260
14	2018				277	277	4,920	4,643
15	2019				277	277	5,304	5,027
16	2020				277	277	7,221	6,945
17	2021				277	277	7,221	6,945
18	2022				277	277	7,221	6,945
19	2023				277	277	7,221	6,945
20	2024				277	277	7,221	6,945
	Total	322	5,531	1,007	5,531	12,390	89,787	77,397

EIRR = **31.85%**
(Discount Rate 15%)
B/C = **2.32**
NPV = **7,328**

APPENDIX 10.2-3 ANNUAL DISBURSEMENT SCHEDULE FOR ALTERNATIVE ROUTES OF ALL BYPASS ROUTE (FINANCIAL PRICE)

(Unit: Million Peso in 1998 Price)

Name of Bypass	Route Alternative	Work Item	2001			2002			2003			2004			Total		
			F.C.	L.C.	Sub-Total	F.C.	L.C.	Sub-Total	F.C.	L.C.	Sub-Total	F.C.	L.C.	Sub-Total	F.C.	L.C.	Total
Cabanatuan	Route-3	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		145.5	145.5		145.5	145.5							0.0	291.0	291.0
		(2) Compensation		12.5	12.5	0.0	12.5	12.5							0.0	25.0	25.0
		Sub-Total		158.0	158.0	0.0	158.0	158.0							0.0	316.0	316.0
		2. Detailed Design	83.3	50.0	133.2	9.3	5.6	14.8							92.5	55.5	148.0
		3. Construction				176.3	105.8	282.0	704.4	422.6	1,127.0	704.4	422.6	1,127.0	1,585.0	951.0	2,536.0
		Total	83.3	208.0	291.2	185.5	269.3	454.8	704.4	422.6	1,127.0	704.4	422.6	1,127.0	1,677.5	1,322.5	3,000.0
	Route-4	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		94.0	94.0		94.0	94.0							0.0	188.0	188.0
		(2) Compensation		12.5	12.5	0.0	12.5	12.5							0.0	25.0	25.0
		Sub-Total		106.5	106.5	0.0	106.5	106.5							0.0	213.0	213.0
		2. Detailed Design	64.1	38.5	102.6	7.1	4.3	11.4							71.3	42.8	114.0
		3. Construction				135.6	81.4	217.0	541.6	324.9	866.5	541.6	324.9	866.5	1,218.8	731.3	1,950.0
		Total	64.1	145.0	209.1	142.8	192.2	334.9	541.6	324.9	866.5	541.6	324.9	866.5	1,290.0	987.0	2,277.0
San Jose	Route-1	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		16.0	16.0		16.0	16.0							0.0	32.0	32.0
		(2) Compensation		3.0	3.0	0.0	3.0	3.0							0.0	6.0	6.0
		Sub-Total		19.0	19.0	0.0	19.0	19.0							0.0	38.0	38.0
		2. Detailed Design	11.8	7.1	18.9	1.3	0.8	2.1							13.1	7.9	21.0
		3. Construction				25.4	15.2	40.6	101.4	60.8	162.2	101.4	60.8	162.2	228.1	136.9	365.0
		Total	11.8	26.1	37.9	26.7	35.0	61.7	101.4	60.8	162.2	101.4	60.8	162.2	241.3	182.8	424.0
	Route-2	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		13.5	13.5		13.5	13.5							0.0	27.0	27.0
		(2) Compensation		6.0	6.0	0.0	6.0	6.0							0.0	12.0	12.0
		Sub-Total		19.5	19.5	0.0	19.5	19.5							0.0	39.0	39.0
		2. Detailed Design	9.6	5.7	15.3	1.1	0.6	1.7							10.6	6.4	17.0
		3. Construction				20.1	12.1	32.2	80.6	48.3	128.9	80.6	48.3	128.9	181.3	108.8	290.0
		Total	9.6	25.2	34.8	21.2	32.2	53.4	80.6	48.3	128.9	80.6	48.3	128.9	191.9	154.1	346.0

APPENDIX 10.2-4 ANNUAL DISBURSEMENT SCHEDULE FOR ALTERNATIVE ROUTES OF ALL BYPASS ROUTE (ECONOMIC PRICE)

(Unit: Million Peso in 1998 Price)

Name of Bypass	Route Alternative	Work Item	2001			2002			2003			2004			Total		
			F C	L C	Sub-Total	F C	L C	Sub-Total	F C	L C	Sub-Total	F C	L C	Sub-Total	F C	L C	Total
Plaridel-Baluag	Route-1	1. Land Acquisition															
		(1) Right of Way Acquisition		280.8	280.8		280.8	280.8							0.0	561.6	561.6
		(2) Compensation		6.0	6.0	0.0	6.0	6.0							0.0	12.0	12.0
		Sub-Total		286.8	286.8	0.0	286.8	286.8							0.0	573.6	573.6
		2. Detailed Design	96.9	46.5	143.4	10.8	5.2	15.9							107.6	51.7	159.3
		3. Construction				204.4	98.1	302.5	818.8	393.0	1,211.8	818.8	393.0	1,211.8	1,841.9	884.1	2,726.0
		Total	96.9	333.3	430.2	215.1	390.1	605.2	818.8	393.0	1,211.8	818.8	393.0	1,211.8	1,949.5	1,509.4	3,458.9
	Route-2	1. Land Acquisition															
		(1) Right of Way Acquisition		315.9	315.9		315.9	315.9							0.0	631.8	631.8
		(2) Compensation		9.0	9.0	0.0	9.0	9.0							0.0	18.0	18.0
		Sub-Total		324.9	324.9	0.0	324.9	324.9							0.0	649.8	649.8
		2. Detailed Design	86.6	41.6	128.2	9.6	4.6	14.2							96.3	46.2	142.5
		3. Construction				183.8	88.2	272.0	734.7	352.7	1,087.3	734.7	352.7	1,087.3	1,653.1	793.5	2,446.6
		Total	86.6	366.5	453.1	193.4	417.7	611.1	734.7	352.7	1,087.3	734.7	352.7	1,087.3	1,749.4	1,489.5	3,238.9
	Route-3	1. Land Acquisition															
		(1) Right of Way Acquisition		352.8	352.8		352.8	352.8							0.0	705.6	705.6
		(2) Compensation		12.5	12.5	0.0	12.5	12.5							0.0	25.0	25.0
		Sub-Total		365.3	365.3	0.0	365.3	365.3							0.0	730.6	730.6
		2. Detailed Design	78.8	37.8	116.6	8.8	4.2	13.0							87.5	42.0	129.5
		3. Construction				166.9	80.1	247.0	666.9	320.1	987.0	666.9	320.1	987.0	1,500.6	720.3	2,220.9
		Total	78.8	403.1	481.9	175.6	449.6	625.2	666.9	320.1	987.0	666.9	320.1	987.0	1,588.1	1,492.9	3,081.0
	Route-4	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		131.9	131.9		131.9	131.9							0.0	263.7	263.7
		(2) Compensation		9.0	9.0	0.0	9.0	9.0							0.0	18.0	18.0
		Sub-Total		140.9	140.9	0.0	140.9	140.9							0.0	281.7	281.7
		2. Detailed Design	55.1	26.5	81.6	6.1	2.9	9.1							61.3	29.4	90.7
		3. Construction				116.9	56.1	173.0	473.1	227.1	700.2	473.1	227.1	700.2	1,063.1	510.3	1,573.4
		Total	55.1	167.3	222.4	123.0	199.9	322.9	473.1	227.1	700.2	473.1	227.1	700.2	1,124.4	821.4	1,945.8
Cabanatuan	Route-1	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		132.3	132.3		132.3	132.3							0.0	264.6	264.6
		(2) Compensation		12.0	12.0	0.0	12.0	12.0							0.0	24.0	24.0
		Sub-Total		144.3	144.3	0.0	144.3	144.3							0.0	288.6	288.6
		2. Detailed Design	125.4	60.2	185.6	13.9	6.7	20.6							139.4	66.9	206.3
		3. Construction				266.3	127.8	394.1	1,064.7	511.1	1,575.7	1,064.7	511.1	1,575.7	2,395.6	1,149.9	3,545.5
		Total	125.4	204.5	329.9	280.2	278.8	559.0	1,064.7	511.1	1,575.7	1,064.7	511.1	1,575.7	2,535.0	1,505.4	4,040.4
	Route-2	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		144.9	144.9		144.9	144.9							0.0	289.8	289.8
		(2) Compensation		15.5	15.5	0.0	15.5	15.5							0.0	31.0	31.0
		Sub-Total		160.4	160.4	0.0	160.4	160.4							0.0	320.8	320.8
		2. Detailed Design	99.6	47.8	147.4	11.1	5.3	16.4							110.6	53.1	163.7
		3. Construction				211.3	101.4	312.7	845.6	405.9	1,251.5	845.6	405.9	1,251.5	1,902.5	913.2	2,815.7
		Total	99.6	208.2	307.8	222.3	267.1	489.4	845.6	405.9	1,251.5	845.6	405.9	1,251.5	2,013.1	1,287.1	3,300.2

APPENDIX 10.2-4 ANNUAL DISBURSEMENT SCHEDULE FOR ALTERNATIVE ROUTES OF ALL BYPASS ROUTE (ECONOMIC PRICE)

(Unit: Million Peso in 1998 Price)

Name of Bypass	Route Alternative	Work Item	2001			2002			2003			2004			Total		
			F.C.	L.C.	Sub-Total	F.C.	L.C.	Sub-Total	F.C.	L.C.	Sub-Total	F.C.	L.C.	Sub-Total	F.C.	L.C.	Total
Cabanatuan	Route-3	1. Land Acquisition															
		(1) Right of Way Acquisition		131.0	131.0		131.0	131.0							0.0	261.9	261.9
		(2) Compensation		12.5	12.5	0.0	12.5	12.5							0.0	25.0	25.0
		Sub-Total		143.5	143.5	0.0	143.5	143.5							0.0	286.9	286.9
		2. Detailed Design	83.3	40.0	123.2	9.3	4.4	13.7							92.5	44.4	136.9
		3. Construction				176.3	84.6	260.9	704.4	338.1	1,042.5	704.4	338.1	1,042.5	1,585.0	760.8	2,345.8
		Total	83.3	183.4	266.7	185.5	232.5	418.0	704.4	338.1	1,042.5	704.4	338.1	1,042.5	1,677.5	1,092.1	2,769.6
	Route-4	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		84.6	84.6		84.6	84.6							0.0	169.2	169.2
		(2) Compensation		12.5	12.5	0.0	12.5	12.5							0.0	25.0	25.0
		Sub-Total		97.1	97.1	0.0	97.1	97.1							0.0	194.2	194.2
		2. Detailed Design	64.1	30.8	94.9	7.1	3.4	10.5							71.3	34.2	105.5
		3. Construction				135.6	65.1	200.7	541.6	260.0	801.5	541.6	260.0	801.5	1,218.8	585.0	1,803.8
		Total	64.1	127.9	192.0	142.8	165.6	308.4	541.6	260.0	801.5	541.6	260.0	801.5	1,290.0	813.4	2,103.4
San Jose	Route-1	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		14.4	14.4		14.4	14.4							0.0	28.8	28.8
		(2) Compensation		3.0	3.0	0.0	3.0	3.0							0.0	6.0	6.0
		Sub-Total		17.4	17.4	0.0	17.4	17.4							0.0	34.8	34.8
		2. Detailed Design	11.8	5.7	17.5	1.3	0.6	1.9							13.1	6.3	19.4
		3. Construction				25.4	12.2	37.6	101.4	48.7	150.0	101.4	48.7	150.0	228.1	109.5	337.6
		Total	11.8	23.1	34.9	26.7	30.2	56.9	101.4	48.7	150.0	101.4	48.7	150.0	241.3	150.6	391.9
	Route-2	1. Land Acquisition															0.0
		(1) Right of Way Acquisition		12.2	12.2		12.2	12.2							0.0	24.3	24.3
		(2) Compensation		6.0	6.0	0.0	6.0	6.0							0.0	12.0	12.0
		Sub-Total		18.2	18.2	0.0	18.2	18.2							0.0	36.3	36.3
		2. Detailed Design	9.6	4.6	14.2	1.1	0.5	1.6							10.6	5.1	15.7
		3. Construction				20.1	9.7	29.8	80.6	38.7	119.2	80.6	38.7	119.2	181.3	87.0	268.3
		Total	9.6	22.7	32.3	21.2	28.3	49.5	80.6	38.7	119.2	80.6	38.7	119.2	191.9	128.4	320.3

In terms of negative or adverse impacts:

(i) 0 – No impact

(ii) Low – Impact is not significant

(iii) Medium – Impact is moderate and significant but can be mitigated

(iv) High – Impact is high, can be mitigated, but with residual adverse impacts

In terms of positive impacts:

(i) 0 – No impact

(ii) Low – Impact is not significant

(iii) Medium – Impact is moderate and significant but needs enhancement to be sustained

(iv) High – Impact will definitely contribute to the betterment of the recipient environment

Impact assessment of the alternative routes for the Plaridel-Baliuag Bypass

	Alternative Routes			
IMPACTS	1	2	3	4
Air Quality and Noise Levels Increase in dust particles, gaseous emissions and noise levels at bypass construction area				
Construction Phase				
Type	(-)	(-)	(-)	(-)
Intensity	medium	medium	medium	medium
Duration	short term	short term	short term	short term
Operational Phase				
type	(-)	(-)	(-)	(-)
intensity	low	low	low	low
duration	long term	long term	long term	long term
Decrease in gaseous emissions and noise levels along the Pan-Philippine Highway as a result of through traffic diversion to new bypass				
Operational Phase				
type	(+)	(+)	(+)	(+)
intensity	high	medium	medium	low
duration	long term	long term	long term	long term
Biological aspects Loss of vegetation and wildlife habitat				
Construction Phase				
type	(-)	(-)	(-)	(-)
intensity	low	low	low	medium
duration	long term	long term	long term	long term
Historical Markers and Protected areas Loss of or damage to Historical Markers and Protected areas				
Construction Phase				
type	0 (?)	0 (?)	0 (?)	0 (?)
intensity	n.a.	n.a.	n.a.	n.a.
duration	n.a.	n.a.	n.a.	n.a.
Socioeconomic aspects				
Construction Phase				
Displacement of communities				
type	(-)	(-)	(-)	(-)

Impact assessment of the alternative routes for the Plaridel-Baliuag Bypass (Continued)

IMPACTS	Alternative Routes			
	1	2	3	4
intensity	medium	medium	medium	low
duration	long term	long term	long term	long term
Disruption of commercial activities				
type	(-)	(-)	(-)	(-)
intensity	medium	medium	medium	low
duration	short term	short term	short term	short term
Public inconvenience due to construction activities				
type	(-)	(-)	(-)	(-)
intensity	high	medium	medium	low
duration	short term	short term	short term	short term
Generation of employment (at construction site)				
type	(+)	(+)	(+)	(+)
Intensity	medium	high	high	low
duration	short term	short term	short term	short term
Operational Phase				
Decrease in income of commercial establishments along Pan-Philippine Highway				
type	(-)	(-)	(-)	(-)
intensity	medium	medium	medium	medium
duration	long term	long term	long term	long term
More efficient delivery of goods (rice, corn, petroleum, etc.)				
type	(+)	(+)	(+)	(+)
intensity	medium	high	medium	medium
duration	long term	long term	long term	long term
Faster, safer travel for through-traffic vehicles				
type	(+)	(+)	(+)	(+)
intensity	medium	high	medium	medium
duration	long term	long term	long term	long term
Land Use				
Operational Phase				
Potential loss of productive agricultural land due to conversion to non-agricultural use				
type	(-)	(-)	(-)	(-)
intensity	low	low	low	high
duration	long term	long term	long term	long term
OVERALL RANKING	3rd		2nd	4th

Note:

n.a. – not applicable

Impact assessment of the alternative routes for the Plaridel-Baliuag Bypass (Continued)

IMPACTS	Alternative Routes			
	1	2	3	4
intensity	medium	medium	medium	low
duration	long term	long term	long term	long term
Disruption of commercial activities				
type	(-)	(-)	(-)	(-)
intensity	medium	medium	medium	low
duration	short term	short term	short term	short term
Public inconvenience due to construction activities				
type	(-)	(-)	(-)	(-)
intensity	high	medium	medium	low
duration	short term	short term	short term	short term
Generation of employment (at construction site)				
type	(+)	(+)	(+)	(+)
intensity	medium	high	high	low
duration	short term	short term	short term	short term
Operational Phase				
Decrease in income of commercial establishments along Pan-Philippine Highway				
type	(-)	(-)	(-)	(-)
intensity	medium	medium	medium	medium
duration	long term	long term	long term	long term
More efficient delivery of goods (rice, corn, petroleum, etc.)				
type	(+)	(+)	(+)	(+)
intensity	medium	high	medium	medium
duration	long term	long term	long term	long term
Faster, safer travel for through-traffic vehicles				
type	(+)	(+)	(+)	(+)
intensity	medium	high	medium	medium
duration	long term	long term	long term	long term
Land Use				
Operational Phase				
Potential loss of productive agricultural land due to conversion to non-agricultural use				
type	(-)	(-)	(-)	(-)
intensity	low	low	low	high
duration	long term	long term	long term	long term
OVERALL RANKING	3rd	1st	2nd	4th

Note:

n.a. – not applicable

Impact assessment of the alternative routes for the Cabanatuan Bypass

IMPACTS	Alternative Routes			
	1	2	3	4
Air Quality and Noise Levels				
Increase in dust particles, gaseous emissions and noise levels at bypass construction area				
Construction Phase				
type	(-)	(-)	(-)	(-)
intensity	low	low	low	medium
duration	short term	short term	short term	short term
Operational Phase				
type	(-)	(-)	(-)	(-)
intensity	low	low	low	medium
duration	long term	long term	long term	long term
Decrease in gaseous emissions and noise levels along the Pan-Philippine Highway as a result of through traffic diversion to new bypass				
Operational Phase				
type	(+)	(+)	(+)	(+)
intensity	low	high	high	medium
duration	long term	long term	long term	long term
Biological				
Loss of vegetation and wildlife habitat				
Construction Phase				
type	(-)	(-)	(-)	(-)
intensity	high	low	low	low
duration	long term	long term	long term	long term
Historical Markers and Protected areas				
Loss of or damage to historical spots and Protected areas				
Construction Phase				
type	0 (?)	0 (?)	0 (?)	0 (?)
intensity	n.a.	n.a.	n.a.	n.a.
duration	n.a.	n.a.	n.a.	n.a.
Socioeconomic				
Construction Phase				
Displacement of communities				
Type	(-)	(-)	(-)	(-)
Intensity	high	medium	medium	high

Impact assessment of the alternative routes for the Cabanatuan Bypass

IMPACTS	Alternative Routes 1	2	3	4
Air Quality and Noise Levels Increase in dust particles, gaseous emissions and noise levels at bypass construction area				
Construction Phase				
type	(-)	(-)	(-)	(-)
intensity	low	low	low	medium
duration	short term	short term	short term	short term
Operational Phase				
type	(-)	(-)	(-)	(-)
intensity	low	low	low	medium
duration	long term	long term	long term	long term
Decrease in gaseous emissions and noise levels along the Pan-Philippine Highway as a result of through traffic diversion to new bypass				
Operational Phase				
type	(+)	(+)	(+)	(+)
intensity	low	high	high	medium
duration	long term	long term	long term	long term
Biological Loss of vegetation and wildlife habitat				
Construction Phase				
type	(-)	(-)	(-)	(-)
intensity	high	low	low	low
duration	long term	long term	long term	long term
Historical Markers and Protected areas Loss of or damage to historical spots and Protected areas				
Construction Phase				
type	0 (?)	0 (?)	0 (?)	0 (?)
intensity	n.a.	n.a.	n.a.	n.a.
duration	n.a.	n.a.	n.a.	n.a.
Socioeconomic				
Construction Phase				
Displacement of communities				
Type	(-)	(-)	(-)	(-)
Intensity	high	medium	medium	high

Impact assessment of the alternative routes for the Cabanatuan Bypass (Continued)

IMPACTS	Alternative Routes			
	1	2	3	4
Duration	long term	long term	long term	long term
Disruption of commercial activities				
Type	(-)	(-)	(-)	(-)
Intensity	low	low	medium	low
Duration	short term	short term	short term	short term
Public inconvenience due to construction activities				
Type	(-)	(-)	(-)	(-)
intensity	low	low	medium	medium
duration	short term	short term	short term	short term
Generation of employment (at construction site)				
type	(+)	(+)	(+)	(+)
intensity	low	high	high	high
duration	short term	short term	short term	short term
Operational Phase				
Decrease in income of commercial establishments along Pan-Philippine Highway				
type	(-)	(-)	(-)	(-)
intensity	low	medium	medium	low
duration	long term	long term	long term	long term
More efficient delivery of goods (rice, corn, petroleum, etc.)				
type	(+)	(+)	(+)	(+)
intensity	medium	high	medium	medium
duration	long term	long term	long term	long term
Faster, safer travel for through-traffic vehicles				
type	(+)	(+)	(+)	(+)
intensity	medium	high	high	medium
duration	long term	long term	long term	long term
Land Use				
Operational Phase				
Potential loss of productive agricultural land due to conversion to non-agricultural use				
type	(-)	(-)	(-)	(-)
intensity	low	medium	low	high
duration	long term	long term	long term	long term
OVERALL RANKING	3rd		2nd	4th

Note:

n.a. – not applicable

Impact assessment of the alternative routes for the Cabanatuan Bypass (Continued)

	Alternative Routes			
IMPACTS	1	2	3	4
Duration	long term	long term	long term	long term
Disruption of commercial activities				
Type	(-)	(-)	(-)	(-)
Intensity	low	low	medium	low
Duration	short term	short term	short term	short term
Public inconvenience due to construction activities				
Type	(-)	(-)	(-)	(-)
intensity	low	low	medium	medium
duration	short term	short term	short term	short term
Generation of employment (at construction site)				
type	(+)	(+)	(+)	(+)
intensity	low	high	high	high
duration	short term	short term	short term	short term
Operational Phase				
Decrease in income of commercial establishments along Pan-Philippine Highway				
type	(-)	(-)	(-)	(-)
intensity	low	medium	medium	low
duration	long term	long term	long term	long term
More efficient delivery of goods (rice, corn, petroleum, etc.)				
type	(+)	(+)	(+)	(+)
intensity	medium	high	medium	medium
duration	long term	long term	long term	long term
Faster, safer travel for through-traffic vehicles				
type	(+)	(+)	(+)	(+)
intensity	medium	high	high	medium
duration	long term	long term	long term	long term
Land Use				
Operational Phase				
Potential loss of productive agricultural land due to conversion to non-agricultural use				
type	(-)	(-)	(-)	(-)
intensity	low	medium	low	high
duration	long term	long term	long term	long term
OVERALL RANKING	3rd	1st	2nd	4th

Note:

n.a. – not applicable

Impact assessment of the alternative routes for the San Jose Bypass

IMPACTS	Alternative Routes	
	1	2
Air Quality and Noise Levels		
Increase in dust particles, gaseous emissions and noise levels at bypass construction area		
Construction Phase		
type	(-)	(-)
intensity	low	medium
duration	short term	short term
Operational Phase		
type	(-)	(-)
intensity	low	low
duration	long term	long term
Decrease in gaseous emissions and noise levels along the Pan-Philippine Highway as a result of through traffic diversion to new bypass		
Operational Phase		
type	(+)	(+)
intensity	high	high
duration	long term	long term
Biological		
Loss of vegetation and wildlife habitat		
Construction Phase		
type	(-)	(-)
intensity	medium	low
duration	long term	long term
Historical Markers and Protected areas		
Loss of or damage to historical sites and Protected areas		
Construction Phase		
type	0 (?)	0 (?)
intensity	n.a.	n.a.
duration	n.a.	n.a.
Socioeconomic		
Construction Phase		
Displacement of communities		
type	(-)	(-)
intensity	low	medium
duration	long term	long term
Disruption of commercial activities		
type	(-)	(-)

Impact assessment of the alternative routes for the San Jose Bypass

IMPACTS	Alternative Routes	
	1	2
Air Quality and Noise Levels		
Increase in dust particles, gaseous emissions and noise levels at bypass construction area		
Construction Phase		
type	(-)	(-)
intensity	low	medium
duration	short term	short term
Operational Phase		
type	(-)	(-)
intensity	low	low
duration	long term	long term
Decrease in gaseous emissions and noise levels along the Pan-Philippine Highway as a result of through traffic diversion to new bypass		
Operational Phase		
type	(+)	(+)
intensity	high	high
duration	long term	long term
Biological		
Loss of vegetation and wildlife habitat		
Construction Phase		
type	(-)	(-)
intensity	medium	low
duration	long term	long term
Historical Markers and Protected areas		
Loss of or damage to historical spots and Protected areas		
Construction Phase		
type	0 (?)	0 (?)
intensity	n.a.	n.a.
duration	n.a.	n.a.
Socioeconomic		
Construction Phase		
Displacement of communities		
type	(-)	(-)
intensity	low	medium
duration	long term	long term
Disruption of commercial activities		
type	(-)	(-)

Impact assessment of the alternative routes for the San Jose Bypass (Continued)

IMPACTS	Alternative Routes	
	1	2
intensity	medium	low
duration	short term	short term
Public inconvenience due to construction activities		
type	(-)	(-)
intensity	low	medium
duration	short term	short term
Generation of employment (at construction site)		
type	(+)	(+)
intensity	medium	high
duration	short term	short term
Operational Phase		
Decrease in income of commercial establishments along Pan-Philippine Highway		
type	(-)	(-)
intensity	medium	medium
duration	long term	long term
More efficient delivery of goods (rice, corn, petroleum, etc.)		
type	(-)	(+)
intensity	high	high
duration	long term	long term
Faster, safer travel for through-traffic vehicles		
type	(+)	(+)
intensity	high	high
duration	long term	long term
Land Use		
Operational Phase		
Potential loss of productive agricultural land due to conversion to non-agricultural use		
type	(-)	(-)
intensity	high	low
Duration	long term	long term
OVERALL RANKING	2nd	

Note:

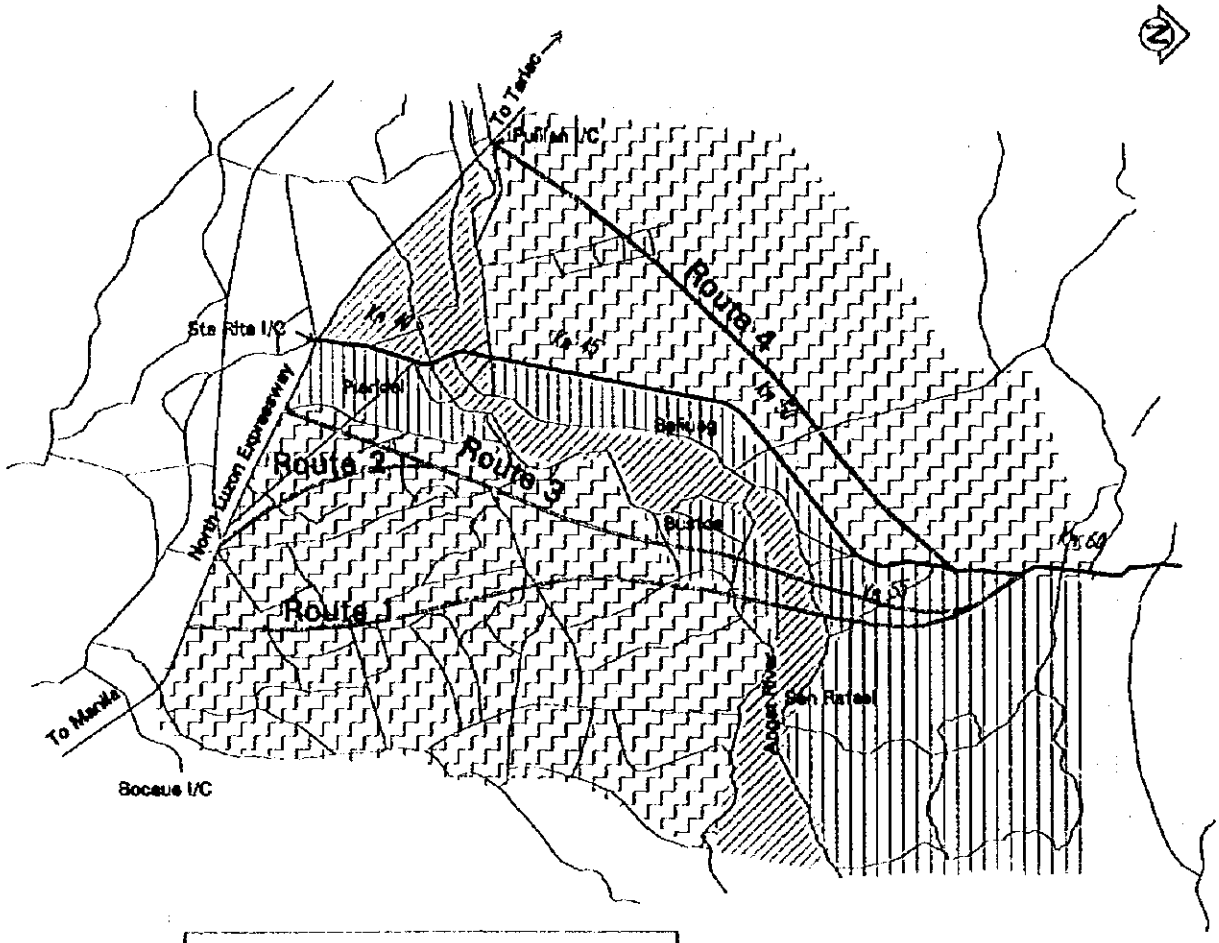
n. a. – not applicable

Impact assessment of the alternative routes for the San Jose Bypass (Continued)

IMPACTS	Alternative Routes	
	1	2
intensity	medium	low
duration	short term	short term
Public inconvenience due to construction activities		
type	(-)	(-)
intensity	low	medium
duration	short term	short term
Generation of employment (at construction site)		
type	(+)	(+)
intensity	medium	high
duration	short term	short term
Operational Phase		
Decrease in income of commercial establishments along Pan-Philippine Highway		
type	(-)	(-)
intensity	medium	medium
duration	long term	long term
More efficient delivery of goods (rice, corn, petroleum, etc.)		
type	(+)	(+)
intensity	high	high
duration	long term	long term
Faster, safer travel for through-traffic vehicles		
type	(+)	(+)
intensity	high	high
duration	long term	long term
Land Use		
Operational Phase		
Potential loss of productive agricultural land due to conversion to non-agricultural use		
type	(-)	(-)
intensity	high	low
Duration	long term	long term
OVERALL RANKING	2nd	1st

Note:

n. a – not applicable



Legend:
Alternative Bypass Routes

Pan Philippine Highway

Existing Road Network

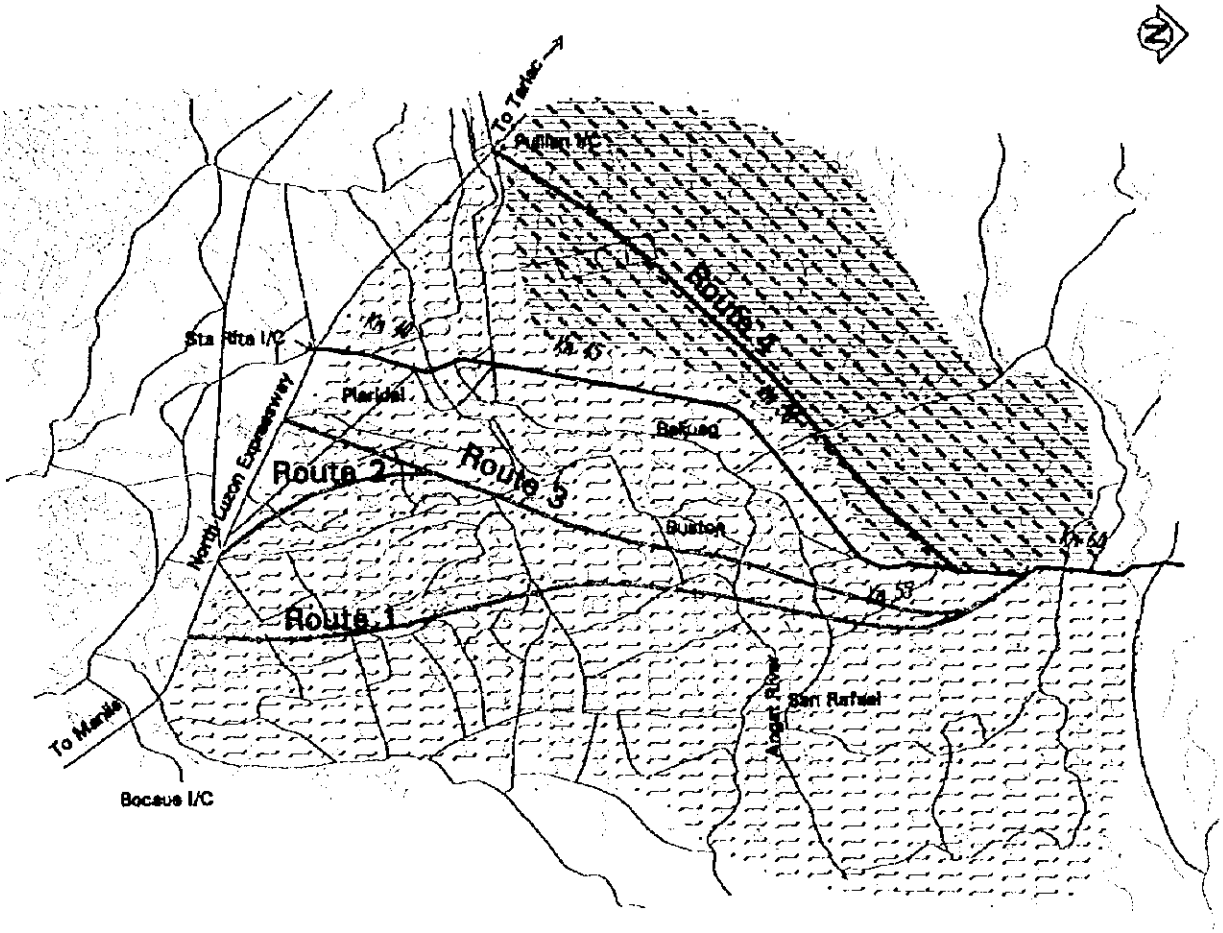
Legend:
Agricultural Productivity

Low

Medium

High

Viability of the Alternative Routes at the Plaridel-Baliuag Bypass Based on Agricultural Productivity



Legend:
Alternative Bypass Routes

Pan Philippine Highway

Existing Road Network

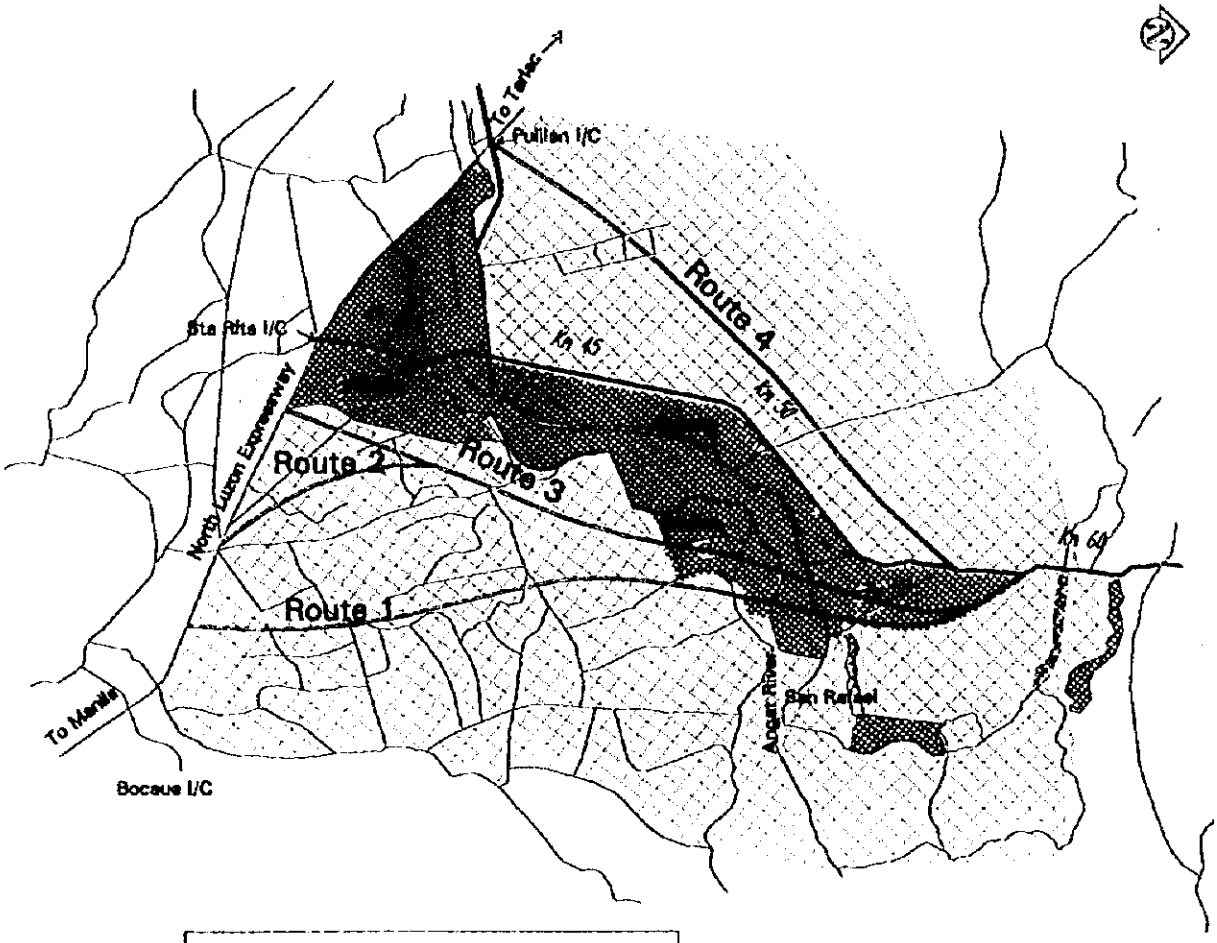
Legend:
Biological Constraints

Low

Medium

High

Viability of the Alternative Routes at the Plaridel- Baliuag Bypass Based on Biological Constraints



Legend:
Alternative Bypass Routes

Pan Philippine Highway

Existing Road Network

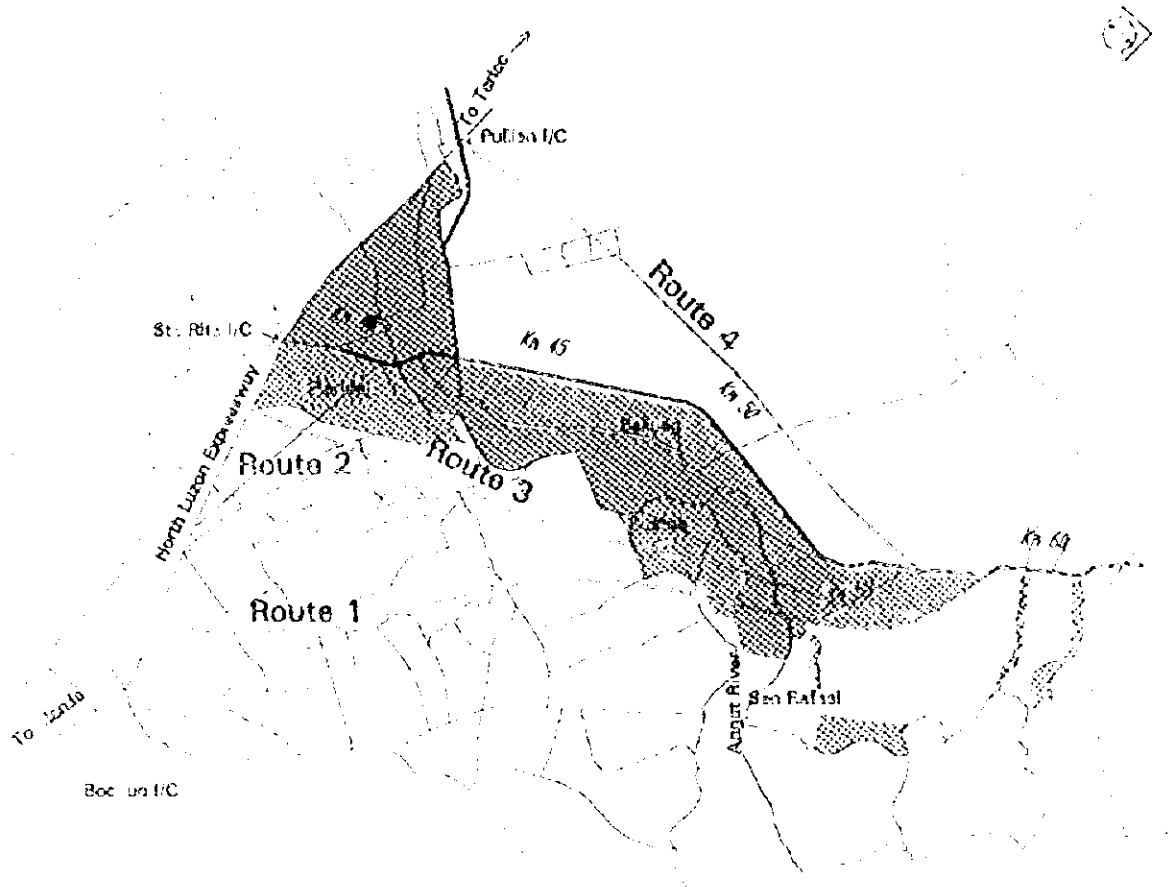
Legend:
Density of Communities

Low

Medium

High

Viability of the Aternative Routes at the Plaridel- Baliuag Bypass Based on Density of Communities



Legend:
Alternative
Bypass Routes

Pan Philippine
Highway

Existing Road Network

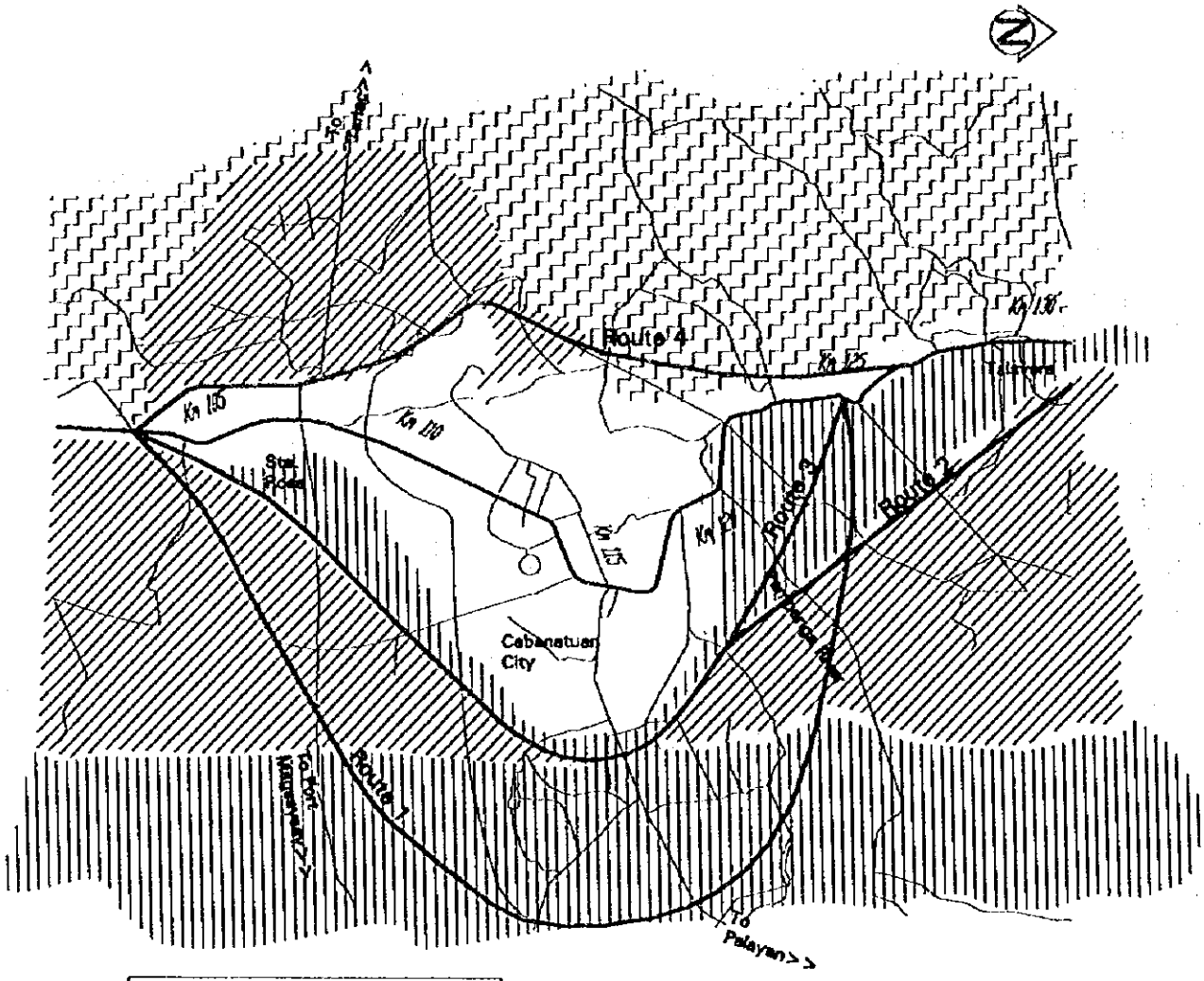
Legend:
Density of
Communities

Low

Medium

High

Viability of the Alternative Routes at the Plaridel- Baliuag Bypass
Based on Density of Communities



Legend:
Alternative
Bypass Routes

Pan-Philippine Highway

Existing Road Network

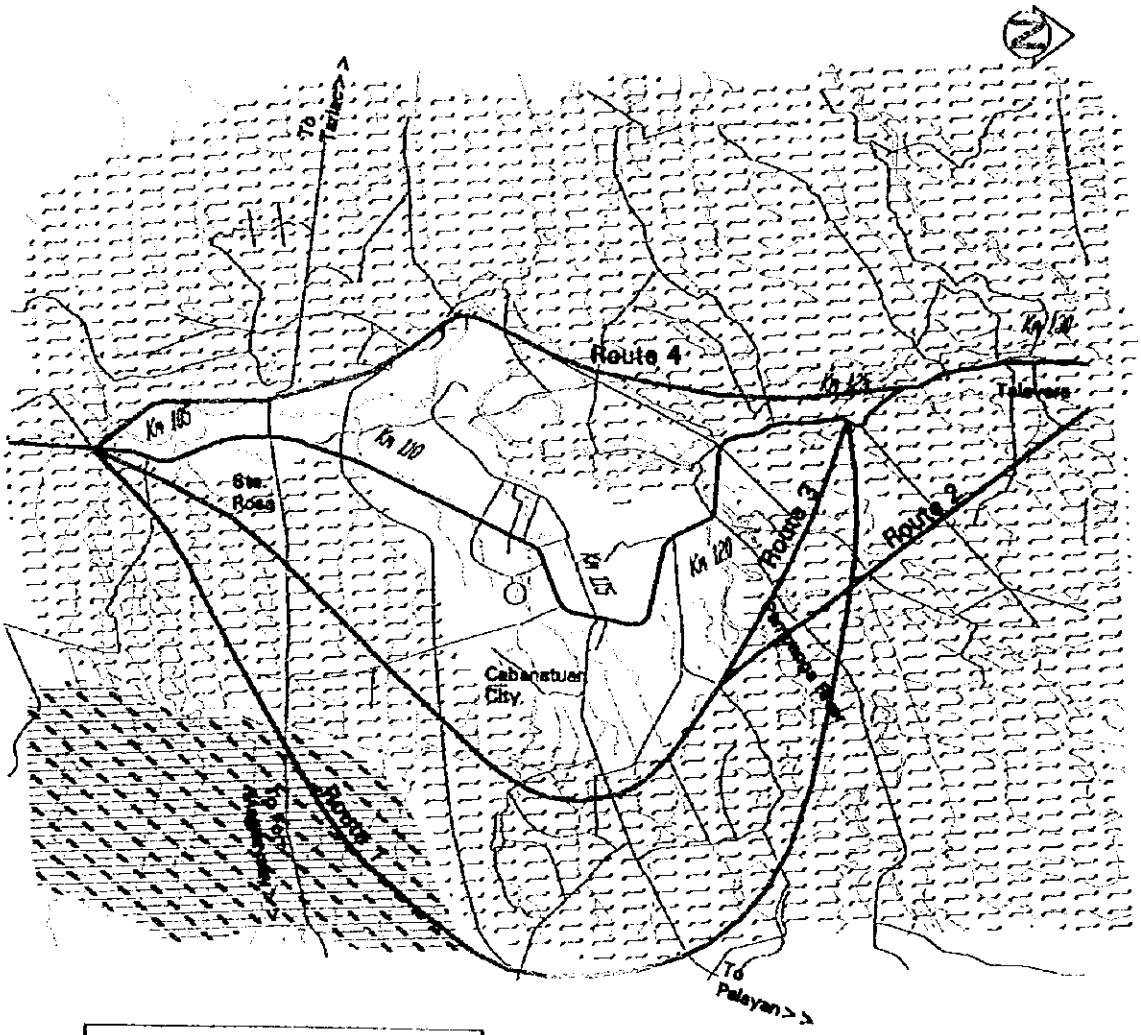
Legend:
Agricultural
Productivity

Low

Medium

High

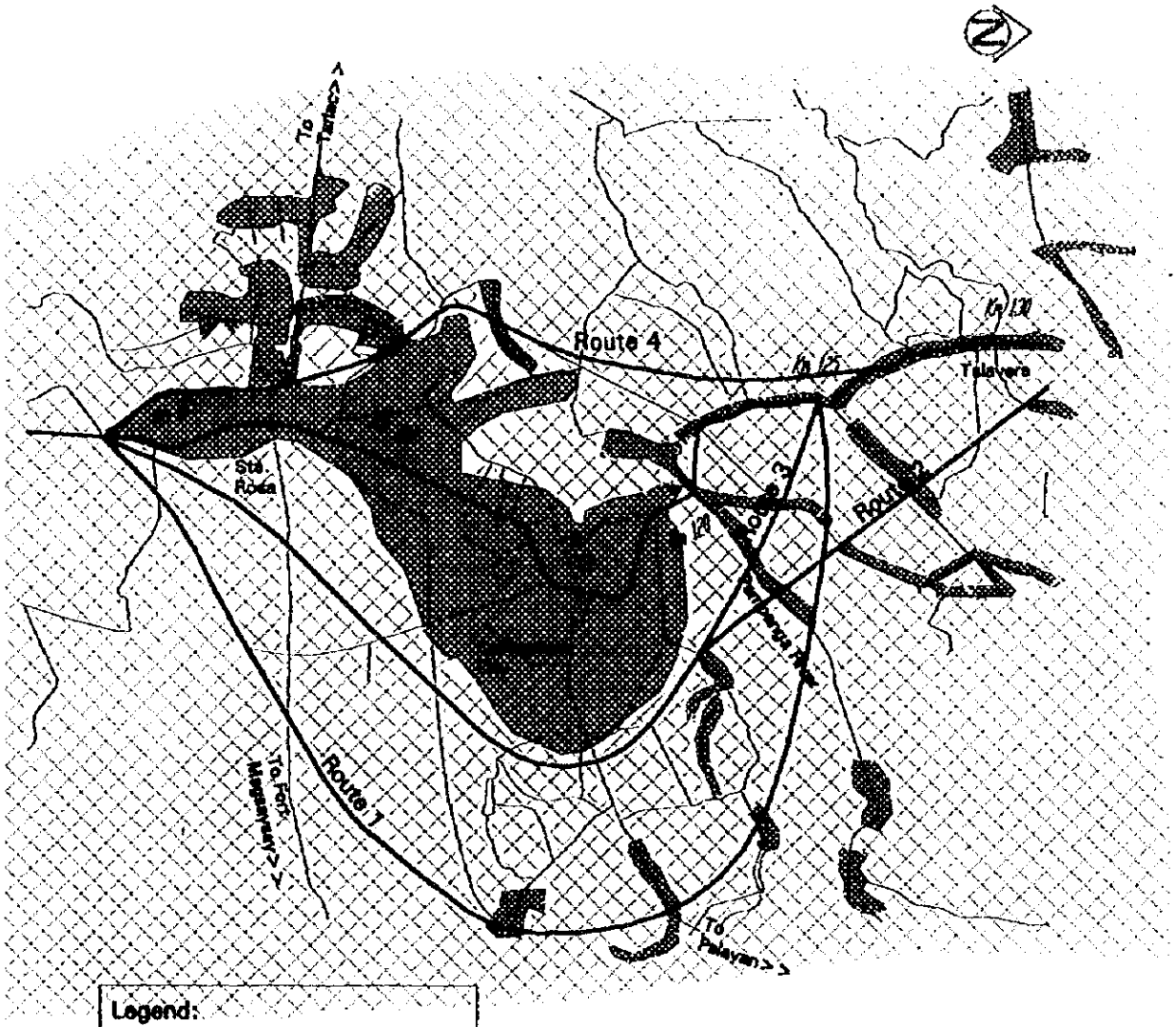
Viability of the Alternative Routes at the Cabanatuan Bypass Based on Agricultural Productivity



Legend:
Alternative Bypass Routes
Pan-Philippine Highway
Existing Road Network

Legend:
Biological Constraints
Low
Medium
High

Viability of the Alternative Routes at the Cabanatuan Bypass Based on Biological Constraints



Legend:
Alternative
Bypass Routes

Pan-Philippine Highway

Existing Road Network

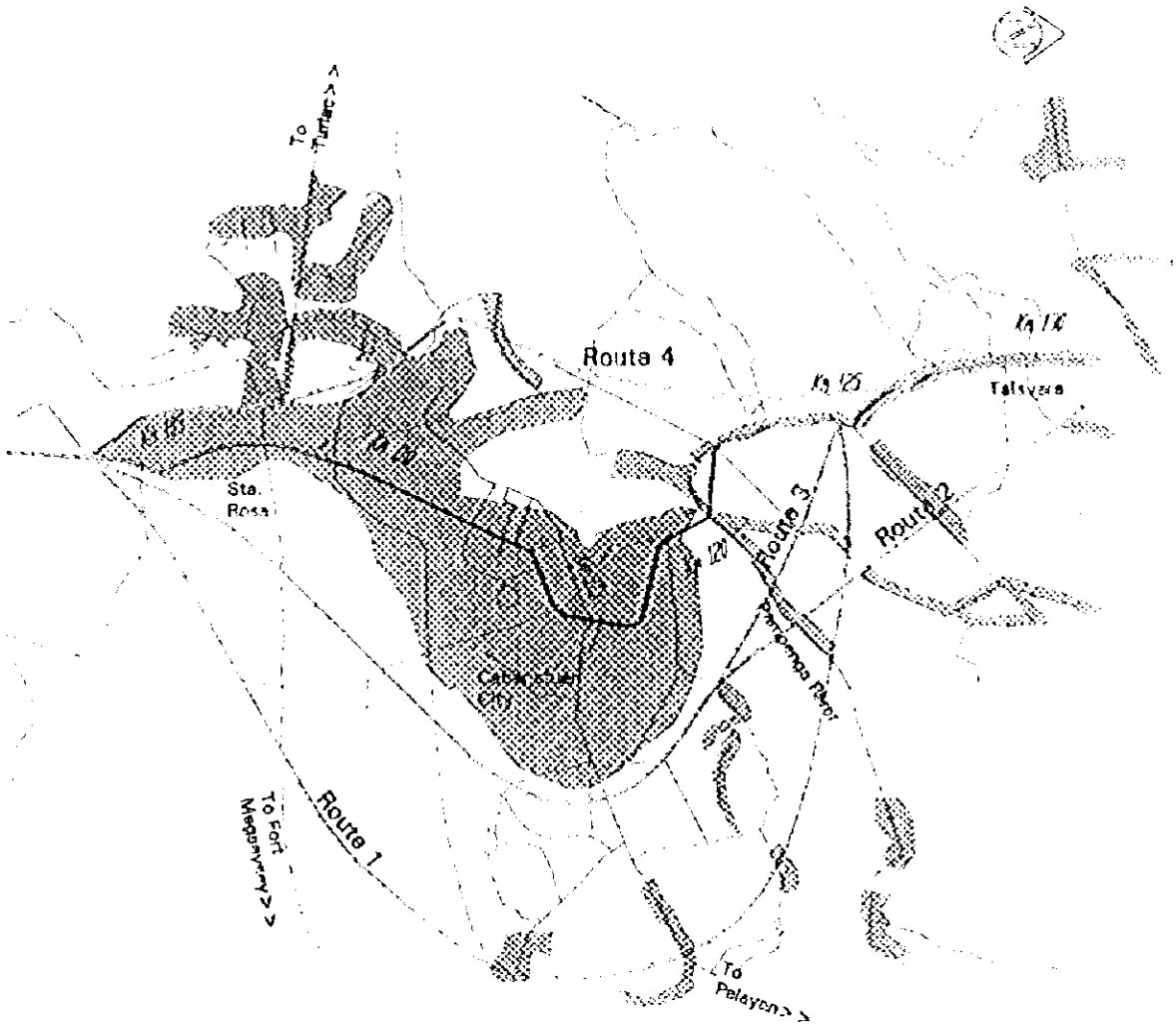
Legend:
Density
of Communities

Low

Medium

High

Viability of the Alternative Routes at the Cabanatuan Bypass Based on Density of Communities



Legend:
Alternative
Bypass Routes

Pan-Philippine Highway

Existing Road Network

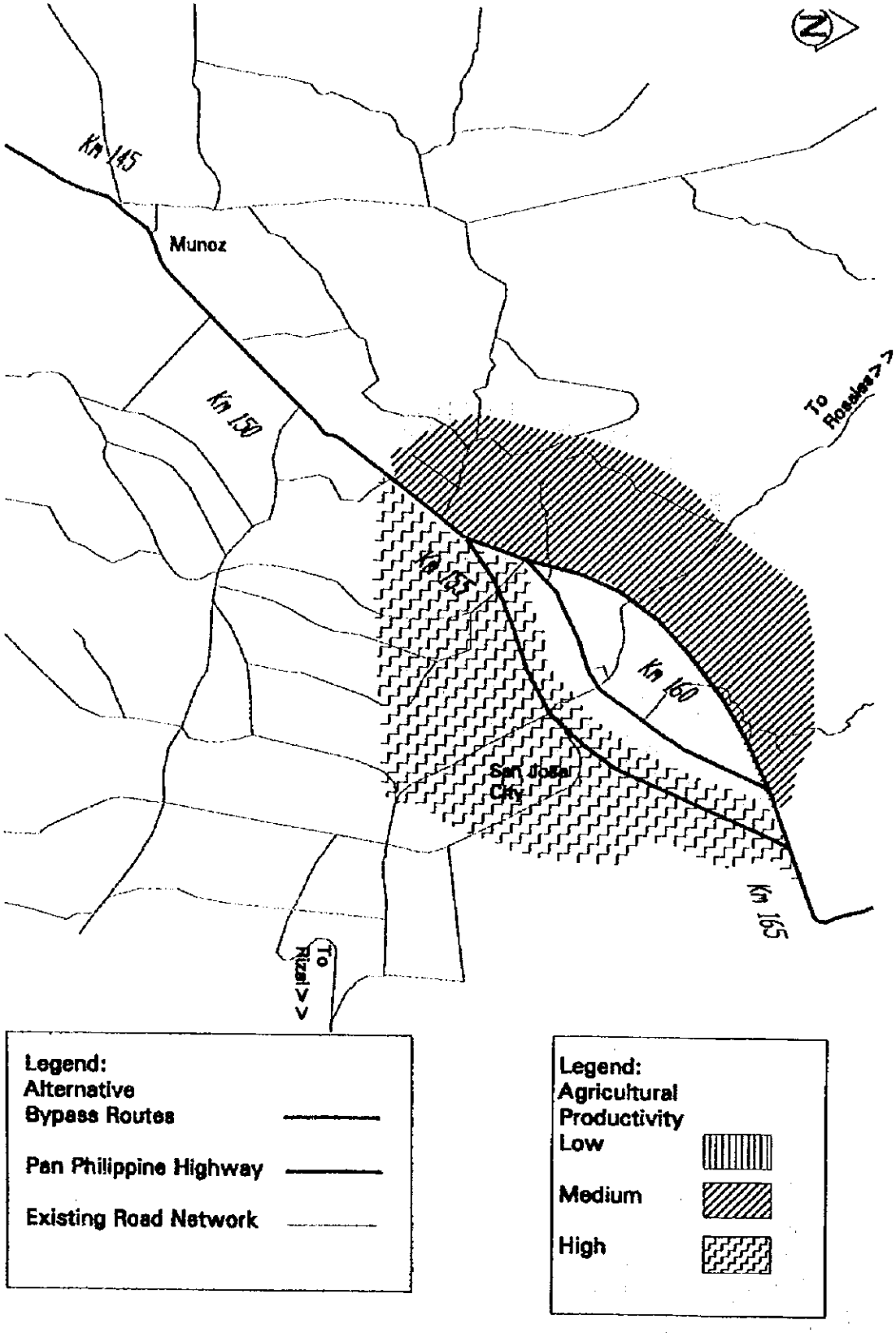
Legend:
Density
of Communities

Low

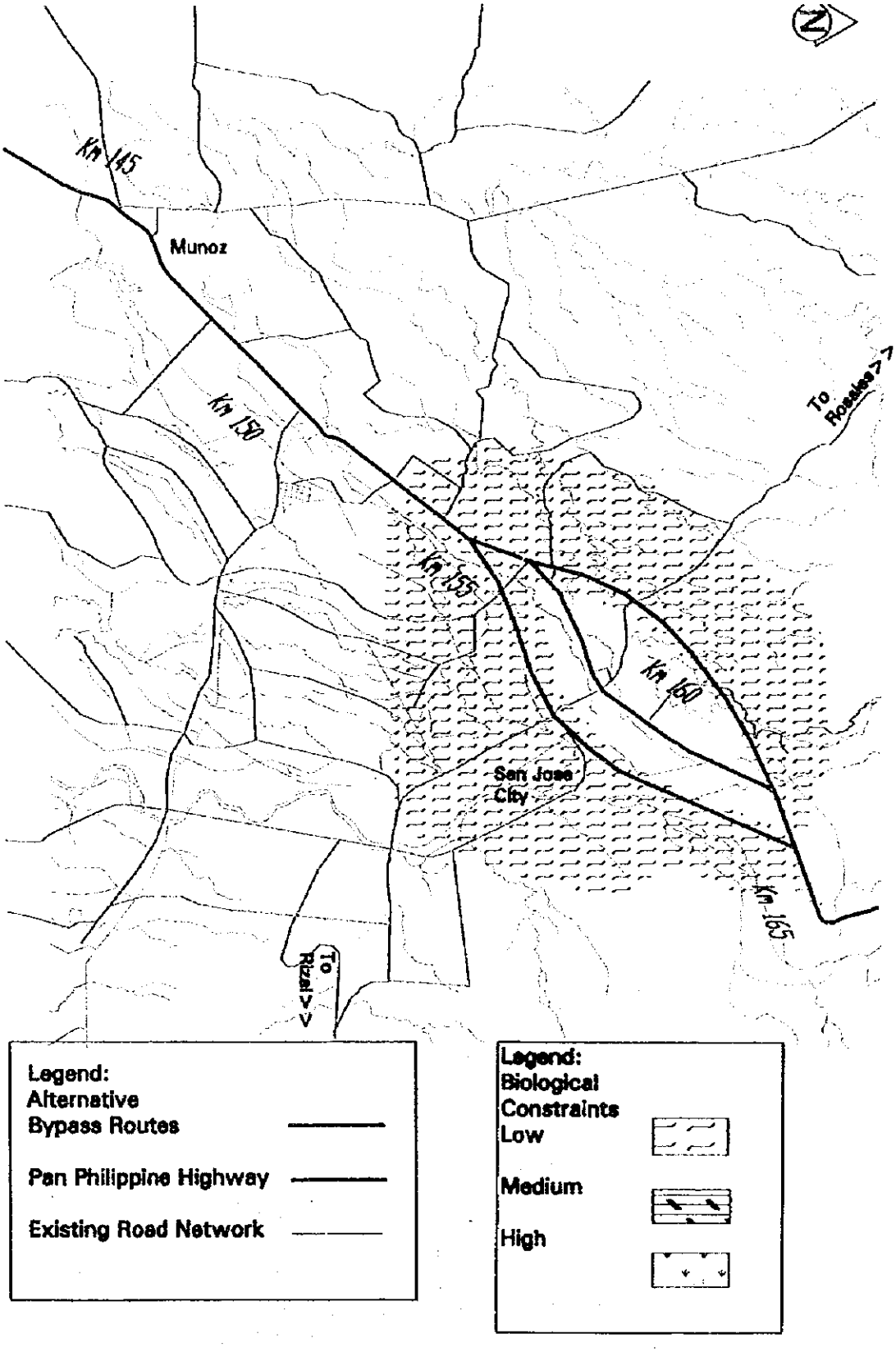
Medium

High

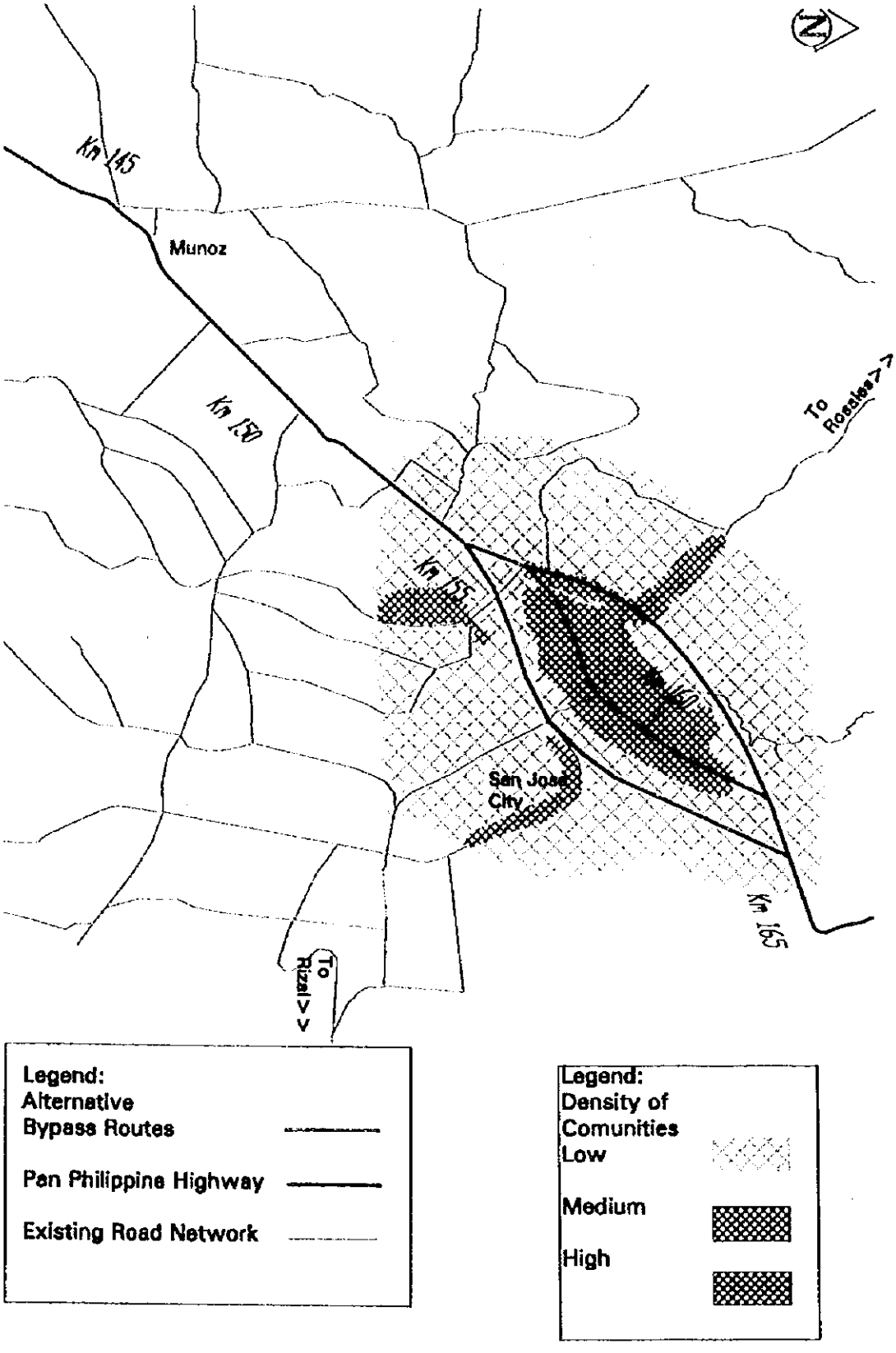
Viability of the Alternative Routes at the Cabanatuan Bypass Based on Density of Communities



Viability of the Alternative Routes at the San Jose Bypass Based on Agricultural Productivity



Viability of the Alternative Routes at the San Jose Bypass Based on Biological Constraints



Viability of the Alternative Route at the San Jose Bypass Based on Density of Communities