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16. Abstract
This document describes work undertaken as part of the Texas Model Border Crossing Project (study 5-9014) commissioned by the Texas Department of Transportation in 2000. This is an evaluation of the feasibility of retrofitting existing border crossings with elements of the prototype border crossing facility developed in the early stages of the study. Seven components were identified in the prototype design, five in the federal facility and two in the adjoining state vehicle safety inspection facility. The report evaluates northbound truck processing and is based on the Automated Commercial Environment (ACE)/International Trade Data System (ITDS) systems currently being developed by U.S. Customs. This permits electronic checking of tractor, trailer (or chassis/container), cargo, and driver data to complete more traditional inspection activities. The retrofit analysis is a pre-feasibility physical evaluation of the prototype characteristics—based on site visits and aerial photographs. The photographs are of particular interest to those working at the border since they were taken in mid to late 2001.

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Texas Model Border Crossing Project: Retrofit Report

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Disclaimers

The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of either the U.S. Department of Transportation, Federal Highway Administration, or the Texas Department of Transportation (TxDOT). This report does not constitute a standard, specification, or regulation.

There was no invention or discovery conceived or first actually reduced to practice in the course of or under this contract, including any art, method, process, machine, manufacture, design or composition of matter, or any new and useful improvement thereof, or any variety of plant, which is or may be patentable under the patent laws of the United States of America or any other foreign country.

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This was a joint effort undertaken by both the Center for Transportation Research (CTR) and the Texas Transportation Institute (TTI), with Robert Harrison (CTR) serving as the Research Supervisor. This document was authored by Cesar Quiroga (TTI), Edgar Kraus (TTI), Bill Stockton (TTI), and Robert Harrison (CTR). Any questions related to this document or the research in general should be directed to Robert Harrison at 512-232-3113. Contact information for both CTR and TTI is located on the back cover of this report.

This research was performed in cooperation with the Texas Department of Transportation and the U.S. Department of Transportation, Federal Highway Administration.

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1. Introduction

The Texas Legislature passed Senate Bill 913, introduced by Senator Eliot Shapleigh (D-El Paso), during the 77th Session in 1999. This bill directed the state to determine if the border crossing process could be expedited to reduce the time taken for commercial vehicles to pass through the various federal and state inspection processes. In response to this directive, the Texas Department of Transportation (TxDOT) commissioned study 5-9014 entitled *Criteria and Design for a Model Border Crossing*. The project team, consisting of staff from the Center for Transportation Research (CTR) of the University of Texas at Austin and the Texas Transportation Institute (TTI) of the Texas A&M University System first developed a prototype border crossing facility (Figure 1-1) and determined its feasibility. This document describes the second phase of the study, namely the feasibility of retrofitting existing Texas-Mexican U.S. border crossings with the key elements of the prototype design.

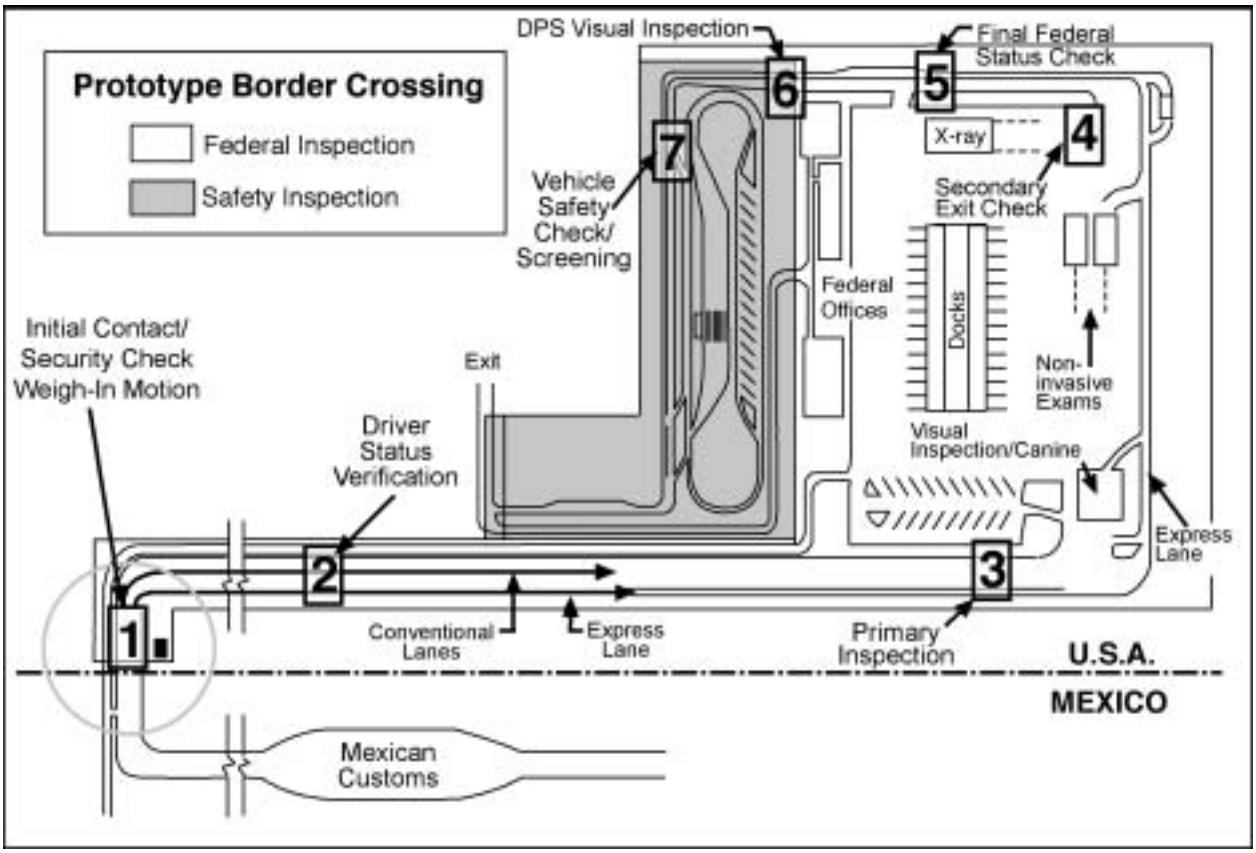


Figure 1-1. Prototype border crossing facility

The project team had already considered the system for a new border port of entry and examined the feasibility of an expedited border process to facilitate trade while permitting the federal and state agencies to maintain their interdiction responsibilities in two separate, contiguous facilities. The project team determined that an expedited crossing

process was feasible and would not add substantially to the existing infrastructure cost of border facilities ("Briefing Document" 2001). The system used new processes being developed for border deployment, specifically the Automated Commercial Environment (ACE)/International Trade Data System (ITDS) systems currently being developed the U.S. Customs Service, which offered a range of benefits to both federal and state agencies.

The ITDS concept is a government wide multi-department, multi-agency program that will create a single window for international trade participants to interact with various federal and state agencies that regulate or impact international trade. This would include truck safety, which means that both the Federal motor Carrier Safety Administration (FMCSA) and the Texas Department of Public Safety (DPS) will be ITDS partners sharing infrastructure and functionality to reduce costs and raise effectiveness.

As part of the prototype border crossing concept, the project team produced a number of versions of the layout and finally identified seven components, as shown in Figure 1-1. Five of these stations are in the federal facility and two are in the adjoining state vehicle safety inspection facility. At each station, the vehicle and driver are identified electronically, the status of the paperwork is checked electronically, and instructions are displayed on bilingual roadside signs to direct the driver to the next stage in the process. Vehicles will either be cleared to move on to the next station or directed inside the facility to undergo certain checks. Each station contributes to the vehicle's verification process and its final release. Table 1-1 provides a full listing of the major elements in the process.

The implementation analysis focused on eight existing border crossings (Figure 1-2):

- Veterans International Bridge at Los Tomates (Brownsville, Texas – Matamoros, Tamaulipas)
- Free Trade Bridge (Los Indios, Texas – Lucio Blanco, Tamaulipas)
- Pharr-Reynosa International Bridge on the Rise (Pharr, Texas – Reynosa, Tamaulipas)
- World Trade Bridge (Laredo, Texas – Nuevo Laredo, Tamaulipas)
- Laredo-Colombia Solidarity Bridge (Laredo, Texas – Colombia, Nuevo Leon)
- Camino Real International Bridge (Eagle Pass, Texas – Piedras Negras, Coahuila)
- Ysleta-Zaragoza Bridge (Ysleta, Texas – Zaragoza, Chihuahua)
- Bridge of the Americas (El Paso, Texas – Ciudad Juarez, Chihuahua)

Table 1-1. Prototype elements for consideration in the retrofit analysis of existing border crossing facilities—northbound

Prototype element	Location on prototype*
General:	
Identification of vehicle through port of entry	1-7
Identification of driver through port of entry	2-7
Verification of step completion status	1-7
Before vehicle arrives:	
Advance notice of vehicle arrival ACE/ITDS	Before 1
Advance information on trip ACE/ITDS	Before 1
On arrival at U.S. port of entry:	
Activation of electronic file	1
Advance determination of vehicle weight	1
Verification of on-board transponder status to use express lane	1
At driver status verification:	
Verification of driver immigration status	2
At primary inspection:	
Verification of step completion status; communication to driver of secondary inspections needed	3
Bypass lane(s) if cleared	3 - 6
At secondary inspection:	
Verification of step completion status, all secondary inspections completed	4
At exit of federal compound:	
Verification of step completion status/Final check	5
Secure link to safety inspection facility	5 - 6
At arrival at safety inspection facility:	
Visual determination of road worthiness	6
Advance determination of vehicle safety inspection certification	6
Verification of vehicle safety inspection certification	7
Determination of need for safety check; communication to driver	7
At exit of safety inspection facility:	
Verification of vehicle safety inspection certification	6
Determination of need for safety check; communication to driver	7

* (see Fig. 1-1)

1: Booth on U.S. port of entry
2: Driver identification station
3: Primary inspection
4: Secondary inspection control point
5: Federal compound exit
6: Safety inspection facility entry point
7: Safety checking/screening

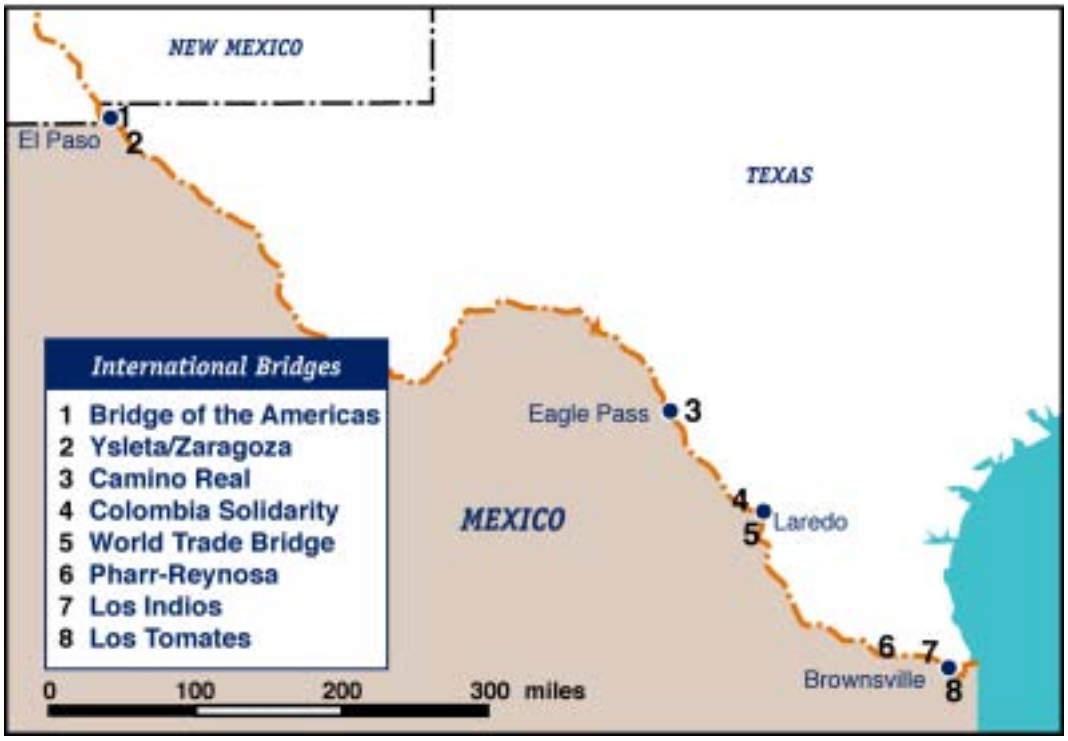


Figure 1-2. International border crossings considered for retrofit

The purpose of the analysis was to assess to what extent the eight existing commercial border crossings could be retrofitted to perform as closely as possible to the prototype border crossing facility. The seven stations and functions of the prototype border crossing facility were compared to each existing border inspection facility to determine the feasibility of their implementation. The feasibility analysis included the input of TxDOT officials at meetings for each of the districts involved. In addition, site visits were undertaken at each border crossing. Following the tragic events of September 11 2001, stringent security measures were adopted at the southern border and U.S. Customs did not allow the research team to access any federal facility as part of the retrofit analysis. As a result, the analysis had to be based on observations from "outside the fence" and currently available documentation, including previous reports by others, and aerial photographs taken specifically for this project.

Opening the U.S.-Mexican border to continental cross-border trucking remains a contentious issue. On November 27, 2002, the U.S. Transportation Secretary directed the U.S. Department of Transportation's Federal Motor Carrier Safety Administration (FMCSA) to act on the processing of applications from Mexico-domiciled trucking companies. This action fulfills U.S. obligations under the North American Free Trade Agreement (NAFTA) regarding border trucking but new trucking services into the U.S. interior will only begin after FMCSA reviews applications and grants provisional operating authority to qualified Mexican trucking companies. Then on January 16, 2003, a three-judge panel of the 9th U.S. Circuit Court of Appeals in San Francisco granted a petition from environmental, labor, and consumer groups that claimed the Transportation Department failed to perform a thorough environmental analysis as required by law. At this time, the Bush administration is considering an appeal.

While this issue is debated, the U.S. Customs Service (USCS) has accelerated its modernization efforts. The trade compliance program built in the first phase of the USCS modernization program is known as the Automated Commercial Environment (ACE). A goal of ACE is to incorporate the ITDS concept to provide a comprehensive solution for border security, truck safety and the enforcement of international trade regulations.

This is a critical step in adopting the expedited but effective border crossing processes which lie at the heart of the proposed model border crossing concept. In 2001/2 TxDOT senior staff, working closely with DPS, had proposed building eight safety inspection stations to enforce state and federal trucking legislation. Federal support was forthcoming and temporary areas were built to handle the traffic while the permanent stations were constructed.

The border crossing sites selected for retrofit analysis were the same as those chosen for vehicle safety inspection facilities, so an important element in the 5-9014 recommended layout was adopted. Ideally, the safety inspection facility should be contiguous with the federal facility but this is only generally possible for new sites. For the eight existing locations, the safety facility was located as closely as possible and some sites have still not been finally selected.

Each border crossing location is treated as a separate chapter and is described using a series of aerial photographs taken in mid to late 2001 specifically for this project. The prototype characteristics specified in Table 1-1 are then assessed in terms of the feasibility of adoption. Where appropriate, comments on any challenges to the adoption of a specific element are noted. It must also be noted that the term feasibility refers to the physical feasibility of adopting a particular characteristic and is not based on the result of any cost-benefit or financial analysis.

This document is organized as follows: Chapter 1 contains this general introduction, Chapters 2-9 contain the retrofit analysis for each of the eight border crossings, and Chapter 10 contains conclusions and recommendations.

2. Veterans International Bridge at Los Tomates

General Description

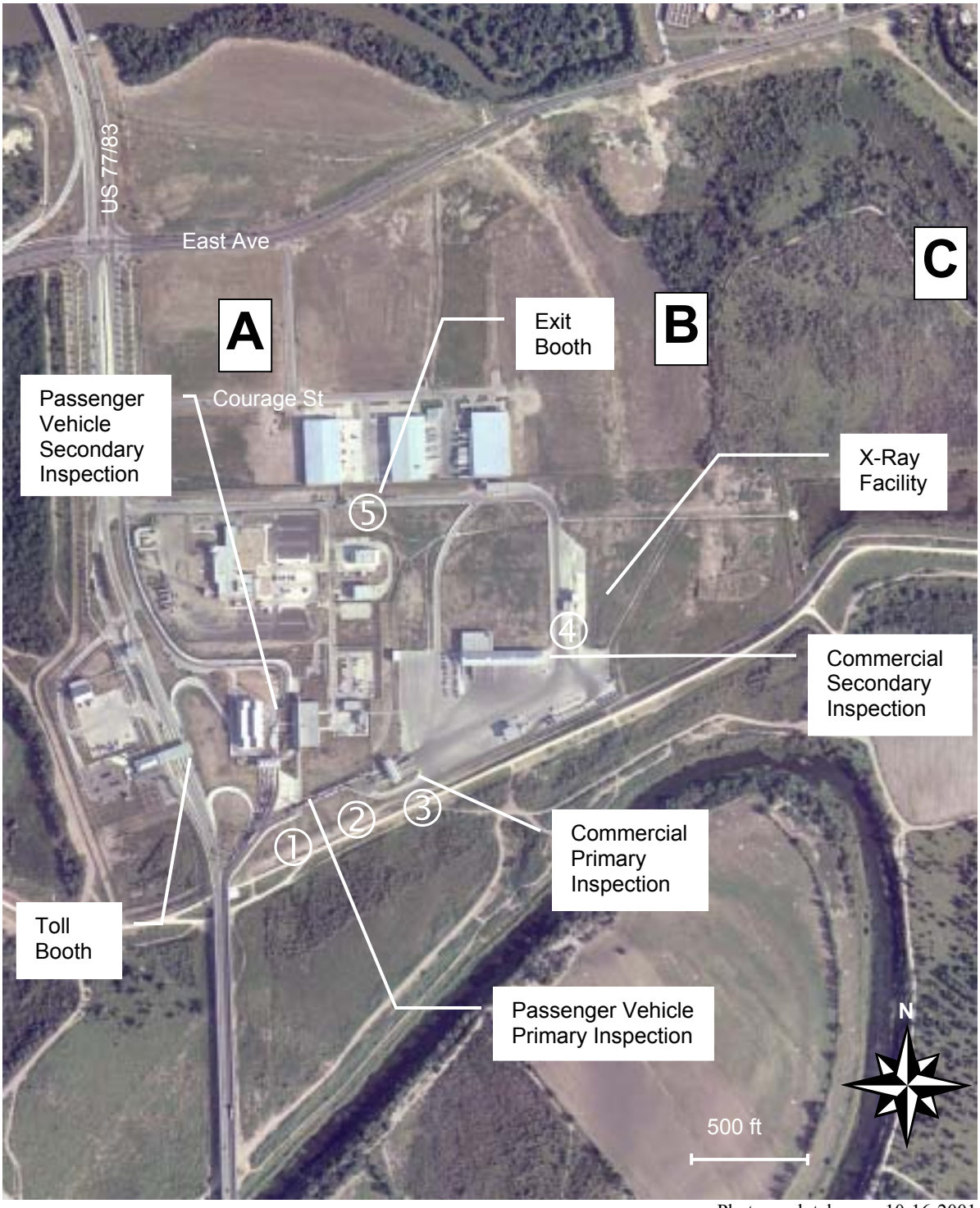
The Veterans International Bridge at Los Tomates border crossing is located at the south terminus of US 77/83 in Brownsville, Texas. The bridge provides four lanes (two in each direction). The federal compound is surrounded by the Rio Grande on the south side and by a mix of undeveloped and planned industrial land on the remaining sides. Details of the border crossing facility are shown in Figures 2-1 to 2-6.

TxDOT has explored three options for the location of the state safety inspection facility. Figures 2-1, 2-2, 2-5, and 2-6 show the potential locations that TxDOT is currently evaluating.

Photograph taken on 10-16-2001

Letters indicate potential location of the state safety inspection facility ("Site Selection Study" 2001).
Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).

Figure 2-1. Veterans International Bridge at Los Tomates



Photograph taken on 10-16-2001

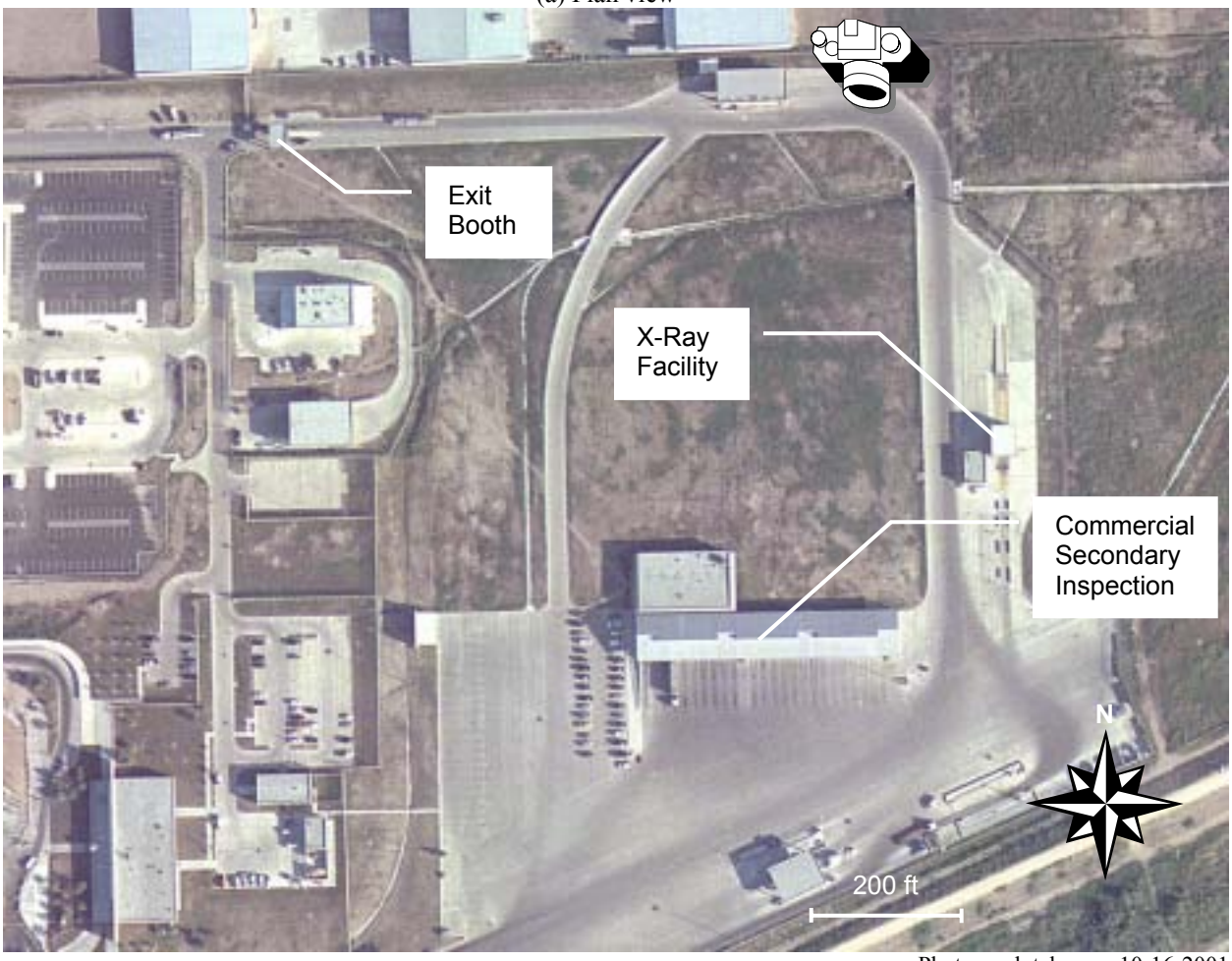
Letters indicate potential location of the state safety inspection facility ("Site Selection Study" 2001). Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).

Figure 2-2. Veterans International Bridge at Los Tomates

Photograph taken on 10-16-2001

Figure 2-3. Veterans International Bridge at Los Tomates: primary and secondary inspection stations

(a) Plan view *



Photograph taken on 10-16-2001

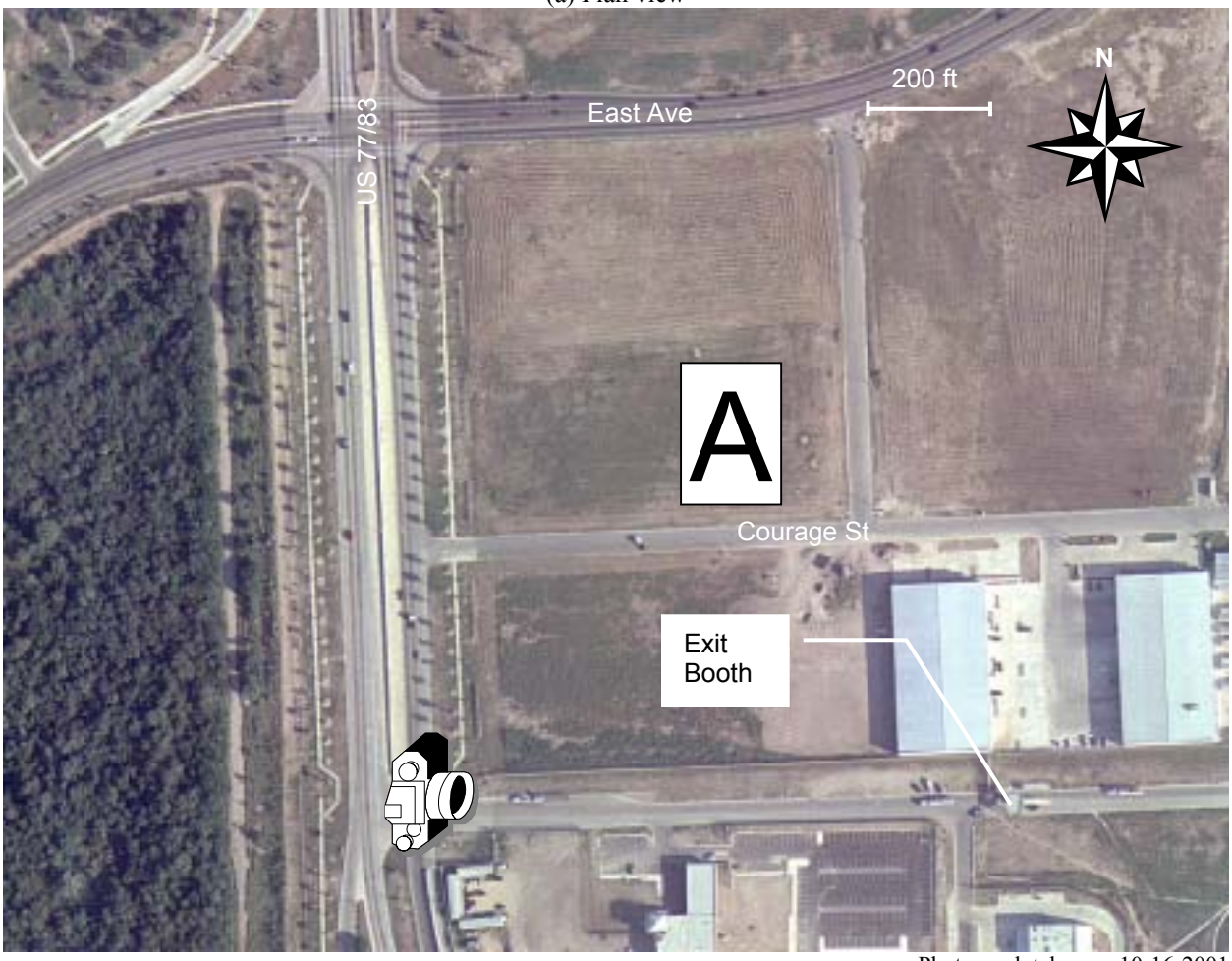
(b) View from the north

Photograph taken on 7-10-2001

Figure 2-4. Veterans International Bridge at Los Tomates: secondary inspection station and X-Ray facility

* Note: In this and all subsequent figures, the presence of a camera icon indicates the location from which an accompanying ground-level picture was taken.

(a) Plan view



Photograph taken on 10-16-2001

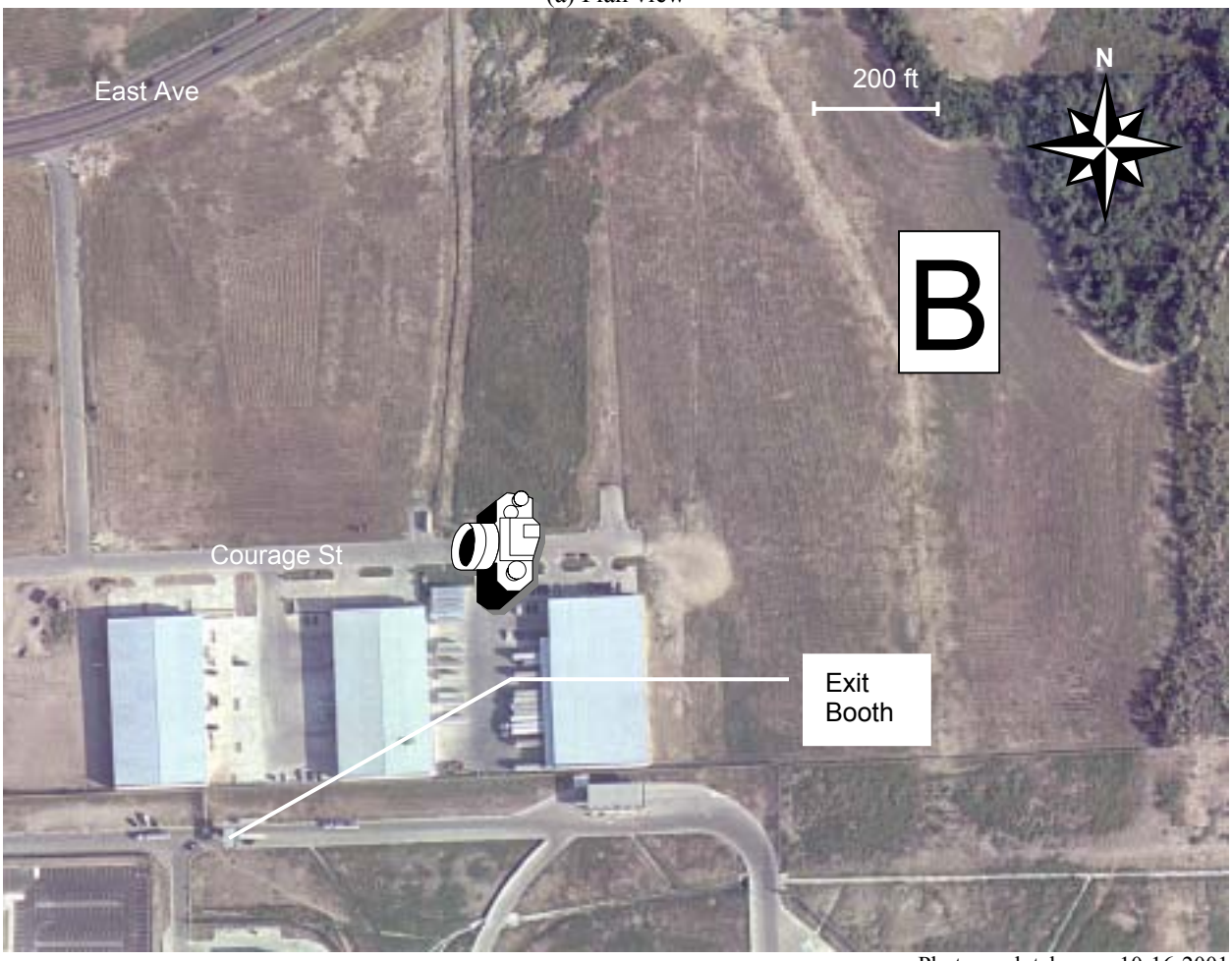
Letter "A" indicates potential location of the state safety inspection facility ("Site Selection Study" 2001).

(b) View from the west

Photograph taken on 7-10-2001

Figure 2-5. Veterans International Bridge at Los Tomates: commercial vehicle exit

(a) Plan view



Photograph taken on 10-16-2001

Letter "B" indicates potential location of the state safety inspection facility ("Site Selection Study" 2001).

(b) View of Courage Street from the east

Photograph taken on 7-10-2001

Figure 2-6. Veterans International Bridge at Los Tomates: area around commercial exit booth

Feasibility of Retrofitting Facility with Prototype Border Crossing Components

A comparison between the actual layout of the Veterans International Bridge at Los Tomates border crossing facility and the prototype border crossing (Fig 1-1) leads to the following observations (Table 2-1):

- There seems to be adequate space between the bridge exit and the primary inspection station (850 ft) for accommodating a bypass lane and stations to conduct an initial roadworthiness evaluation (Location 1) and driver status verification (Location 2). The current layout includes four primary inspection lanes (three are currently used) that could eventually permit the conversion of one of the inspection lanes into a bypass lane. There is also space to add a bypass lane parallel to the existing primary inspection approach lanes. There is only one truck lane on the bridge, which expands to two lanes at the bridge exit, and then to four lanes about 200 ft before the primary inspection station. Unless the bridge is widened, the bypass lane could only start at the bridge exit.
- The configuration of the federal compound is very similar to the configuration of the prototype border crossing facility. There is space within the facility to accommodate a bypass lane. On the north side it would be possible to accommodate the bypass lane with minor internal modifications on the federal compound. This characteristic should facilitate the full implementation of all of the components included in the prototype border crossing concept.
- As described previously, TxDOT is considering three alternative sites for the state safety inspection facility. Alternative "A" would provide an exit point at US 77/83 whereas Alternatives "B" and "C" would provide an exit point at East Avenue. Other factors being equal, Alternative "A" would provide the shortest driving distance from the federal compound exit. It would also provide the easiest control of trucks to ensure they would not avoid the safety inspections. Access to the Alternative "A" location could be provided through US 77/83. Unfortunately, this would also mean that access to the warehouses located on Courage Street would be blocked from US 77/83. Access to these warehouses from East Avenue would still be possible by improving the road connection between East Avenue and Courage Street. Alternatives "B" and "C" would be feasible if the exit booth from the federal compound could be moved to the northeast corner of the facility. This step would require the relocation of facilities within the federal compound after secondary inspection. In addition, a new road would need to be built between the federal compound and East Avenue for access and exit from the state safety inspection facility. In that case, traffic on Courage Street would not be affected.

Table 2-1. Prototype elements for consideration in the retrofit analysis at the Veterans International Bridge at Los Tomates—northbound

Prototype element	Location on prototype*	Feasible?	Challenges
General:			
Identification of vehicle through port of entry	1-7	Yes	
Verification of step completion status	1-7	Yes	
On arrival at U.S. port of entry:			
Activation of electronic file	1	Yes	
Advance determination of vehicle weight	1	Yes	
Verification of on-board transponder status to use express lane	1	Yes	
Verification of driver immigration status	2	Yes	
At primary inspection:			
Verification of step completion status; communication to driver if secondary inspections needed	3	Yes	
Bypass lane(s) if cleared	3 - 6	Yes	May require some minor internal modifications
At secondary inspection:			
Visual determination of road worthiness	6	Yes	
Verification of step completion status, all secondary inspections completed	5	Yes	
At exit of federal compound:			
Verification of step completion status/Final check	5	Yes	
Secure link to safety inspection facility	5-6	Yes	Issues providing access to existing warehouses on Courage Street
At arrival at safety inspection facility:			
Verification of vehicle safety inspection certification	6	Yes	
Determination of the need for safety checks: communication to driver	7	Yes	

* (see Figs 2-1 and 2-2)
1: Booth on U.S. port of entry
2: Driver identification station
3: Primary inspection
4: Secondary inspection control point
5: Federal compound exit
6: Safety inspection facility entry point
7: Safety checking/screening

3. Free Trade Bridge at Los Indios

General Description

The Free Trade Bridge border crossing is located on FM 509, roughly 0.2 miles south of US 281. The bridge is about 0.3 miles long and has a four-lane cross section (two in each direction). The federal compound is surrounded by a levee parallel to the Rio Grande on the south side, by Rio Grande Avenue on the north side, and by agricultural land on the west and east sides. North of Rio Grande Avenue the land use is largely agricultural with some scattered warehouse development. Details of the border crossing facility are shown in Figures 3-1 to 3-6.

TxDOT has explored several options for the location of the state safety inspection facility. Figures 3-2 and 3-6 show the potential locations that TxDOT is currently evaluating.

Photograph taken on 10-16-2001

Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).

Figure 3-1. Free Trade Bridge at Los Indios

Photograph taken on 10-16-2001

Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1). Letters indicate potential location of state safety inspection facility ("Site Selection Study" 2001).

Figure 3-2. Free Trade Bridge at Los Indios

(a) Plan view

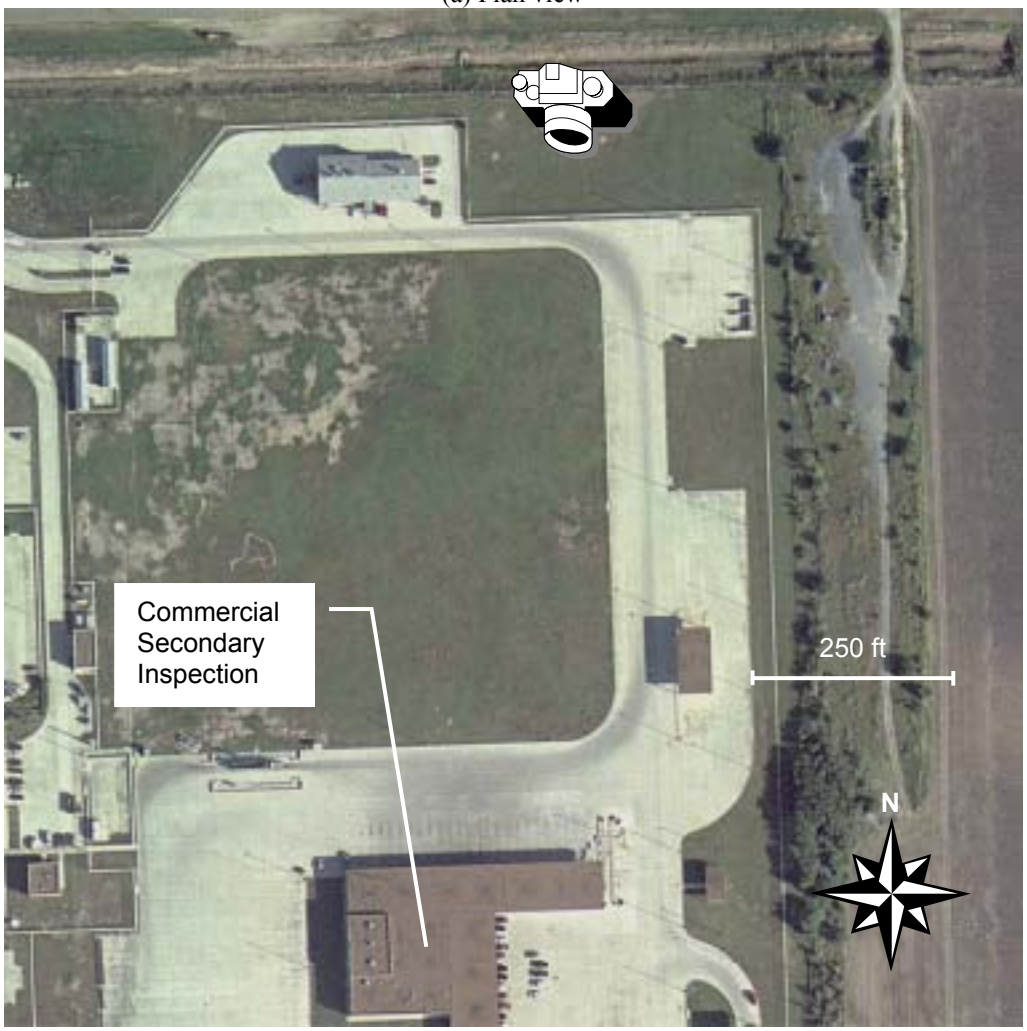
Photograph taken on 10-16-2001

(b) View from the north

Photograph taken on 7-10-2001

Figure 3-3. Free Trade Bridge at Los Indios: exit from federal compound

(a) Plan view

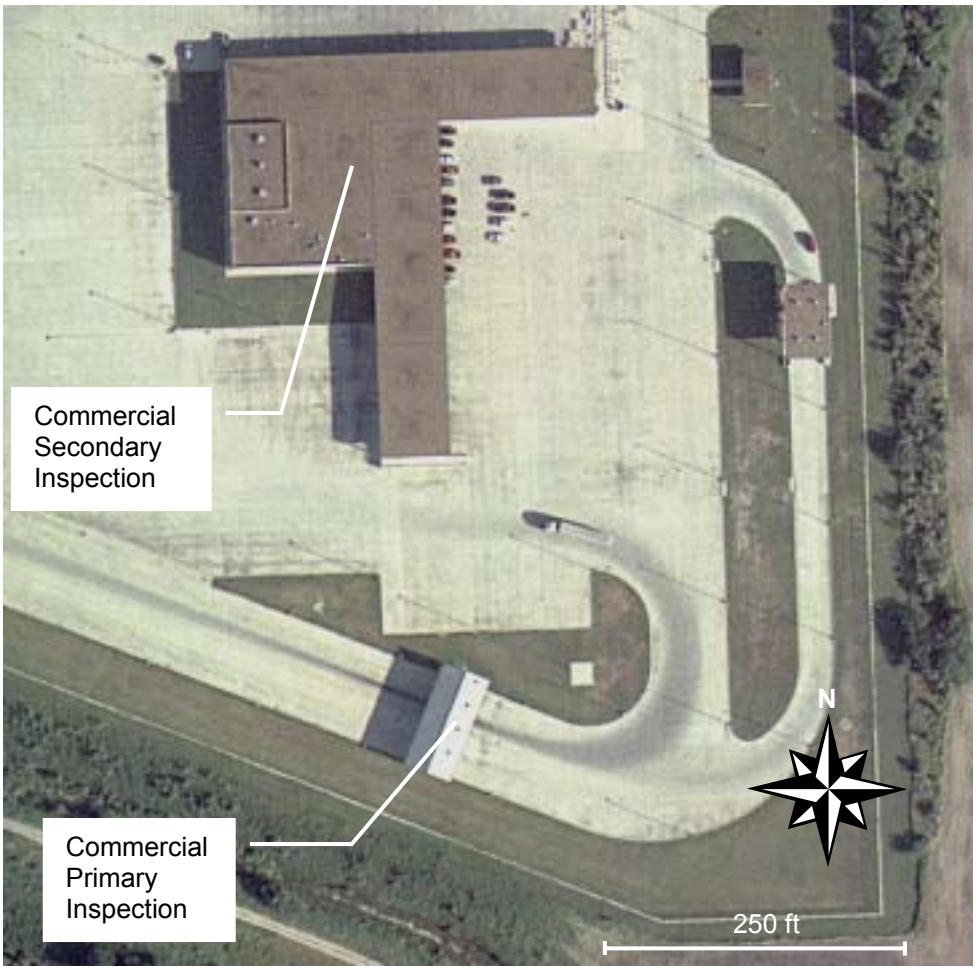


Photograph taken on 10-16-2001

(b) View from the north

Photograph taken on 7-10-2001

Figure 3-4. Free Trade Bridge at Los Indios: secondary inspection station



Photograph taken on 10-16-2001

Figure 3-5. Free Trade Bridge at Los Indios: commercial primary and secondary inspection stations

(a) Plan view

Photograph taken on 10-16-2001

(b) View from the west

Photograph taken on 7-10-2001

View of northbound FM 509 north of the federal compound.

Figure 3-6. Free Trade Bridge at Los Indios: field in the background shows potential locations for the state safety inspection facility ("Site Selection Study" 2001)

Feasibility of Retrofitting Facility with Prototype Border Crossing Components

A comparison between the actual layout of the Free Trade Bridge at Los Indios border crossing facility (Figs 3-1 and 3-2) and the prototype border crossing (Fig 1-1) leads to the following observations (Table 3-1):

- There seems to be adequate space between the bridge exit and the primary inspection station (roughly 1,200 ft) for accommodating a bypass lane and stations to conduct an initial roadworthiness evaluation (Location 1) and driver status verification (Location 2). The current layout includes four primary inspection lanes that could eventually permit the conversion of one of the inspection lanes into a bypass lane. Alternatively, space exists to add a bypass lane parallel to the existing primary inspection approach/queue lanes.
- The configuration of the federal compound is similar to the configuration of the prototype border crossing facility. Further, there is enough open, undeveloped land around the federal compound to accommodate a bypass lane (some minor internal modifications on the federal compound may be required). This characteristic should facilitate the full implementation of all of the components included in the prototype border crossing concept.
- As described previously, TxDOT is considering three alternative sites for the state safety inspection facility. All three alternatives would provide an exit point on FM 509. Because the land north of the federal compound is largely undeveloped, there is considerable flexibility concerning the location of the state safety inspection facility. Other factors being equal, however, Alternative "A" would provide the shortest driving distance from the federal compound exit. At all three locations, in order to provide a secure link from the federal compound to the state safety inspection facility, it would be necessary to sever Rio Grande Avenue. This is not considered a critical limitation at the moment because very little traffic uses Rio Grande Avenue and existing traffic could be easily rerouted using either FM 509 or Joaquin Cavazos Memorial Drive. However, if the site east of the federal compound could be used for the state facility, Rio Grande Avenue could be retained as a through road and the two compounds could be adjacent with a secure link between them. The state site would need to be located far enough east to provide sufficient expansion space for the federal compound.

Table 3-1. Prototype elements for consideration in the retrofit analysis at the Free Trade Bridge at Los Indios—northbound

Prototype element	Location on prototype*	Feasible?	Challenges
General:			
Identification of vehicle through port of entry	1 - 7	Yes	
Verification of step completion status	1 - 7	Yes	
On arrival at U.S. port of entry:			
On arrival at Mexican export inspection facility:			
Activation of electronic file	1	Yes	
Advance determination of vehicle weight	1	Yes	
Visual determination of road worthiness	6	Yes	
Verification of on-board transponder status to use express lane	1	Yes	
Verification of driver immigration status	2	Yes	
At primary inspection:			
Verification of step completion status; communication to driver of secondary inspections needed	3	Yes	
Bypass lane(s) if cleared	3 - 6	Yes	Some minor internal modifications may be required
At secondary inspection:			
Verification of step completion status, all secondary inspections completed	5	Yes	
At exit of federal compound:			
Verification of step completion status/Final check	5	Yes	
Secure link to safety inspection facility	5 - 6	Yes	Rio Grande Avenue would be severed
At arrival at safety inspection facility:			
Verification of vehicle safety inspection certification	6	Yes	
Determination of need for safety check; communication to driver	7	Yes	

* (see Figs 3-1 and 3-2)

1: Booth on U.S. port of entry
2: Driver identification station
3: Primary inspection
4: Secondary inspection control point
5: Federal compound exit
6: Safety inspection facility entry point
7: Safety checking/screening

4. Pharr-Reynosa International Bridge on the Rise

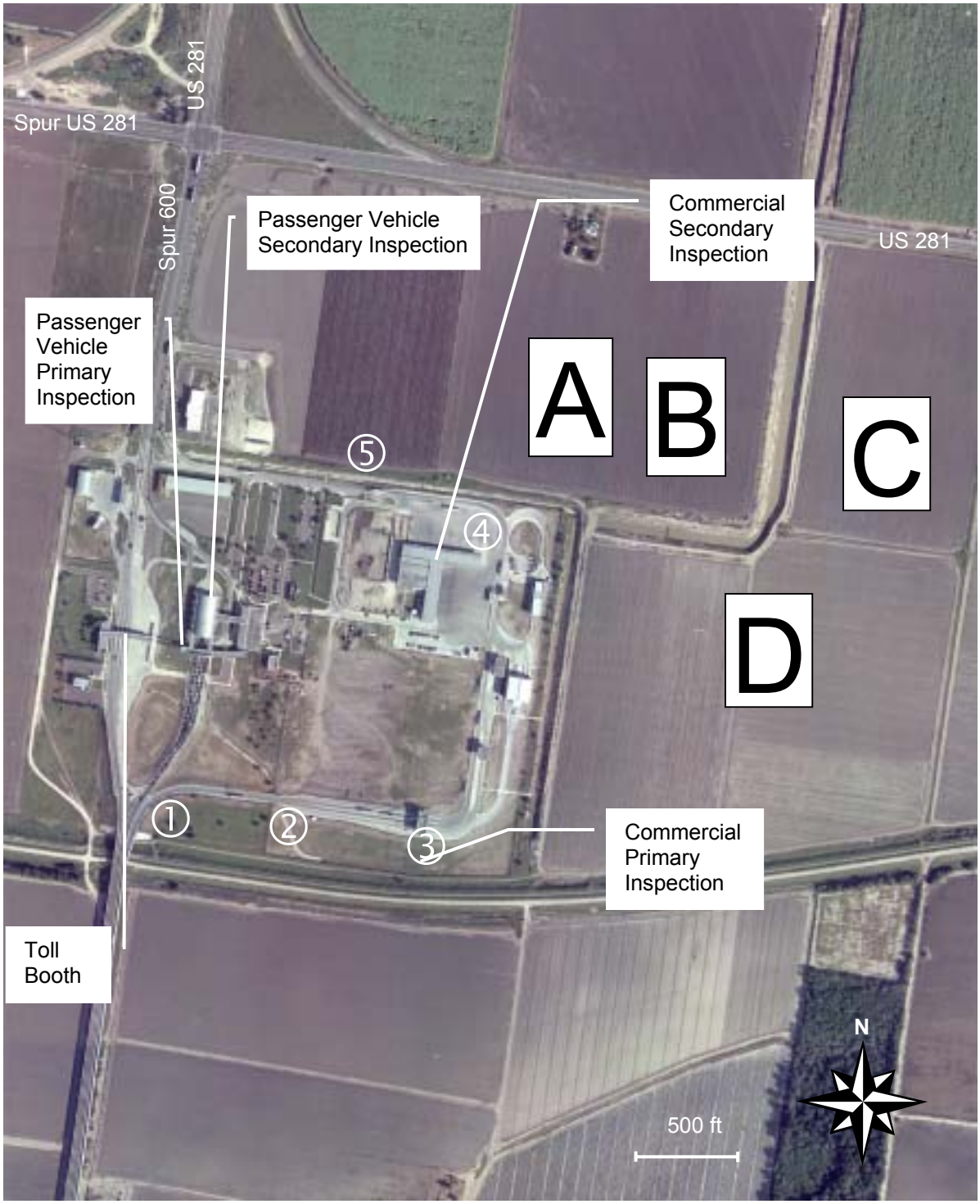
General Description

The Pharr-Reynosa International Bridge on the Rise border crossing is located on Spur 600, roughly 1,500 ft south of US 281. The bridge is a viaduct about 3 miles long and has a four-lane cross section, with three northbound lanes and one southbound lane. The federal compound is surrounded by agricultural land on all sides. Details of the border crossing facility are shown in Figures 4-1 to 4-5.

TxDOT has explored several options for the location of the state safety inspection facility. Figures 4-2 and 4-5 show the potential locations that TxDOT is currently evaluating.

Photograph taken on 10-16-2001

Figure 4-1. Pharr-Reynosa International Bridge on the Rise



Photograph taken on 10-16-2001

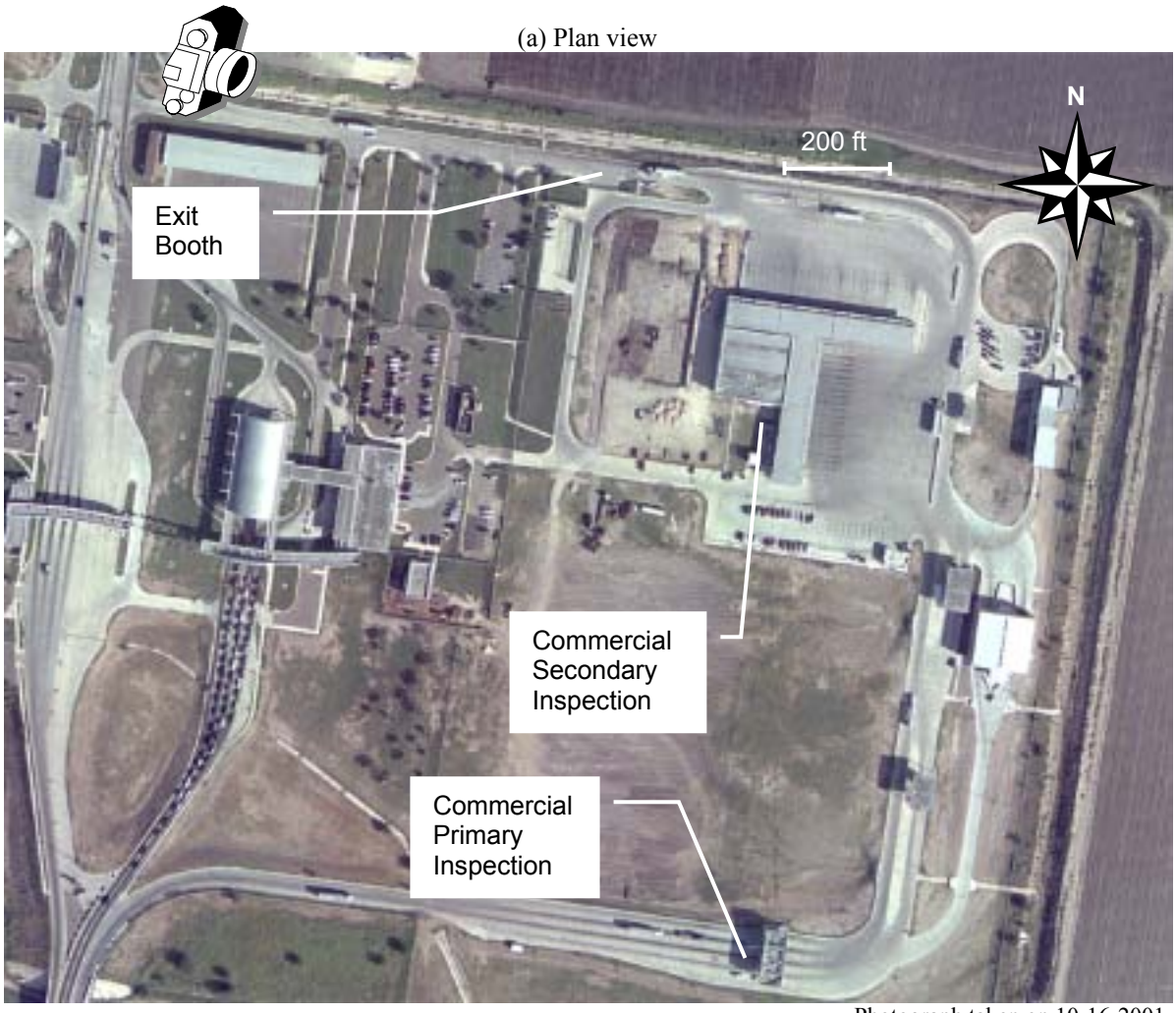
Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1). Letters indicate potential locations of the state safety inspection facility ("Site Selection Study" 2001).

Figure 4-2. Pharr-Reynosa International Bridge on the Rise

Photograph taken on 10-16-2001

Figure 4-3. Pharr-Reynosa International Bridge on the Rise: primary inspection station

(a) Plan view



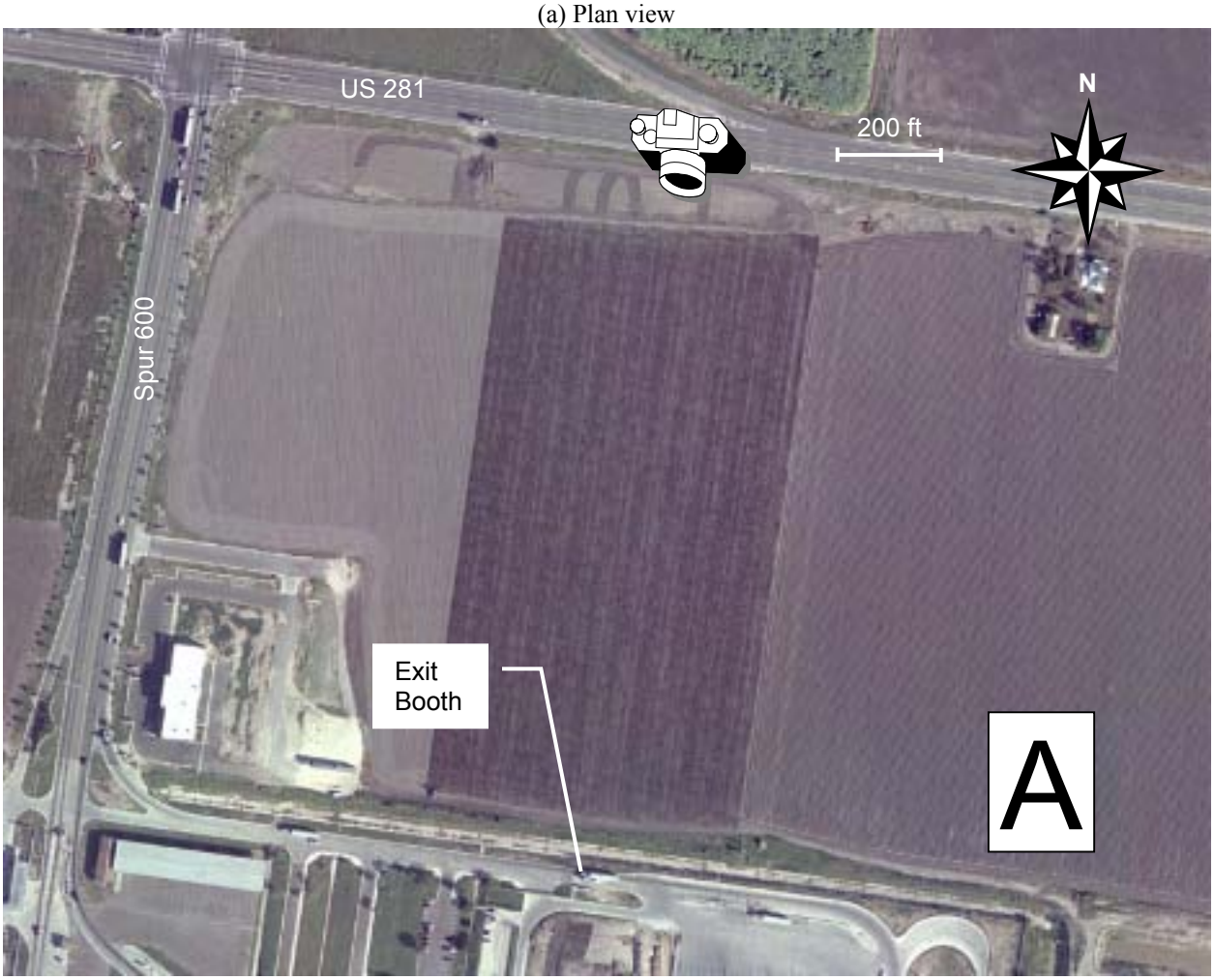
Photograph taken on 10-16-2001

(b) View of secondary inspection station from the west

Photograph taken on 7-10-2001

Figure 4-4. Pharr-Reynosa International Bridge on the Rise: commercial secondary inspection station and exit booth

(a) Plan view



Photograph taken on 10-16-2001

(b) View of federal compound from US 281

Photograph taken on 7-10-2001

Figure 4-5. Pharr-Reynosa International Bridge on the Rise: exit booth and potential location of the state safety inspection facility ("Site Selection Study" 2001)

Feasibility of Retrofitting Facility with Prototype Border Crossing Components

A comparison between the actual layout of the Pharr-Reynosa International Bridge on the Rise border crossing facility and the prototype border crossing (Fig 1-1) leads to the following observations (Table 4-1):

- There seems to be adequate space between the bridge exit and the primary inspection station (roughly 1,300 ft) for accommodating a bypass lane and stations to conduct an initial roadworthiness evaluation (Location 1) and driver status verification (Location 2). The current layout includes four primary inspection lanes, which should permit the conversion of one of the inspection lanes into a bypass lane. Alternatively, space exists to add a bypass lane parallel to the existing primary inspection approach lanes. There is only one truck lane on the bridge, which expands to two lanes at the bridge exit, and then to four lanes about 600 ft before the primary inspection station. Unless the bridge is widened the bypass lane could only start at the bridge exit.
- The configuration of the federal compound is very similar to the configuration of the prototype border crossing facility. There is space within the facility to accommodate a bypass lane. There is also space to accommodate a secure link between the federal compound and the state safety inspection facility. This characteristic should facilitate the full implementation of all of the components included in the prototype border crossing concept.
- As described previously, TxDOT is considering four alternative sites for the state safety inspection facility. Two of the alternatives ("A" and "B") would provide an exit point on Spur 600 and the other two alternatives ("C" and "D") would provide an exit point on US 281. Because the land north of the federal compound is largely undeveloped, there is considerable flexibility concerning the location of the state safety inspection facility. An exit point on Spur 600 would provide a direct connection to northbound US 281. However, it could also result in a weaving problem with other traffic exiting the federal compound, given the short distance from the potential exit point to the US 281/Spur 600 signalized intersection. If the exit from the state safety inspection facility is located on US 281, depending on the amount of truck traffic, it might be necessary to build a high- capacity intersection on US 281.

Table 4-1. Prototype elements for consideration in the retrofit analysis at the Pharr-Reynosa International Bridge on the Rise—northbound

Prototype element	Location on prototype*	Feasible?	Challenges
General:			
Identification of vehicle through port of entry	1-7	Yes	
Verification of step completion status	1-7	Yes	
On arrival at U.S. port of entry:			
Activation of electronic file	1	Yes	
Advance determination of vehicle weight	1	Yes	
Verification of on-board transponder status to use express lane	1	Yes	
Verification of driver immigration status	2	Yes	
At primary inspection:			
Verification of step completion status; communication to driver of secondary inspections needed	3	Yes	
Bypass lane(s) if cleared	3 - 6	Yes	No space for bypass lane on bridge
At secondary inspection:			
Visual determination of road worthiness	6	Yes	
Verification of step completion status, all secondary inspections completed	5	Yes	
At exit of federal compound:			
Verification of step completion status/Final check	5	Yes	
Secure link to safety inspection facility	5-6	Yes	
At arrival at safety inspection facility:			
Verification of vehicle safety inspection certification	6	Yes	
Determination of need for safety check; communication to driver	7	Yes	

* (see Fig 4-2)

1: Booth on U.S. port of entry
2: Driver identification station
3: Primary inspection
4: Secondary inspection control point
5: Federal compound exit
6: Safety inspection facility entry point
7: Safety checking/screening

5. World Trade Bridge

General Description

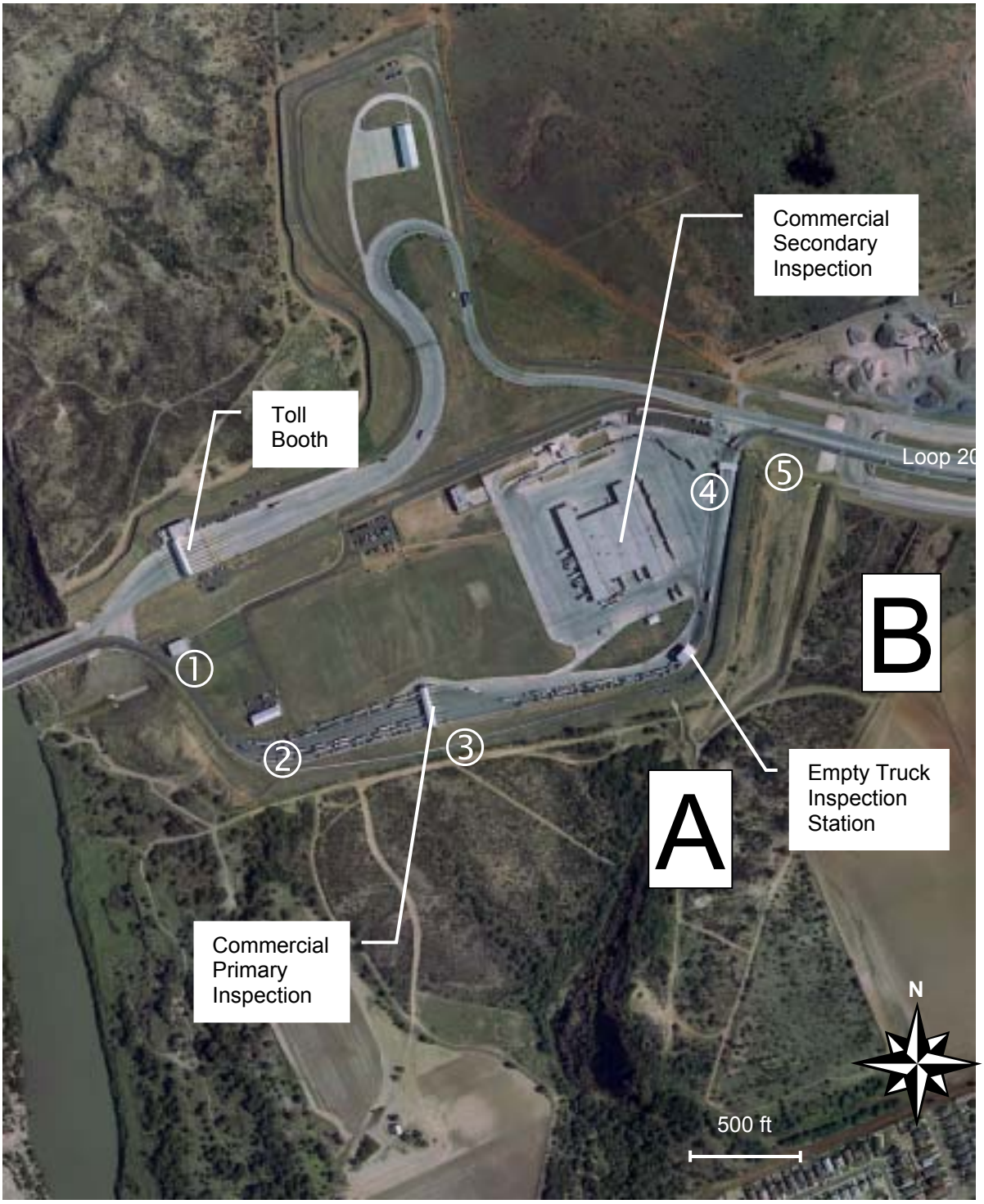
The World Trade Bridge border crossing is located at the west terminus of Loop 20 in northwest Laredo. The bridge is located about 1.5 miles west of FM 1472. The bridge provides eight lanes (four in each direction) that are currently dedicated to commercial traffic. The federal compound, which is located on top of an earth fill is surrounded by the Rio Grande on the west side, and by a mix of industrial facilities and undeveloped areas on the north, south, and east sides. Details of the border crossing facilities are shown in Figures 5-1 to 5-5.

TxDOT is considering three alternatives for locating a state safety inspection facility. Figures 5-1, 5-2, 5-5, and 5-6 show the alternative locations that currently are being evaluated.

Photograph taken on 8-24-2001

Letters indicate potential locations of the state safety inspection facility ("Site Selection Study" 2001). Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).

Figure 5-1. World Trade Bridge in Laredo



Photograph taken on 8-24-2001

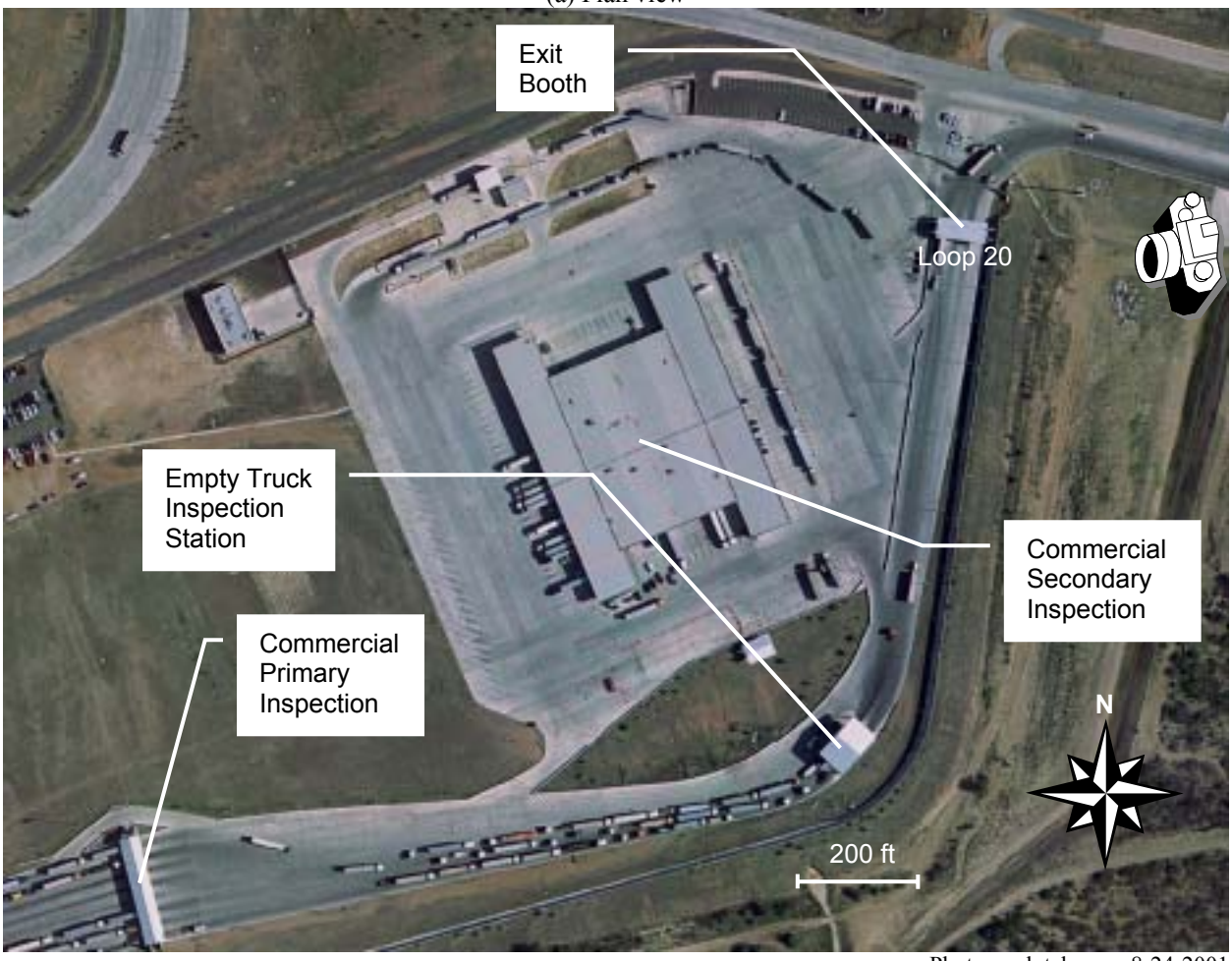
Letters indicate potential locations of the state safety inspection facility ("Site Selection Study" 2001).
Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).

Figure 5-2. World Trade Bridge in Laredo

Photograph taken on 8-24-2001

Figure 5-3. World Trade Bridge: primary inspection station

(a) Plan view



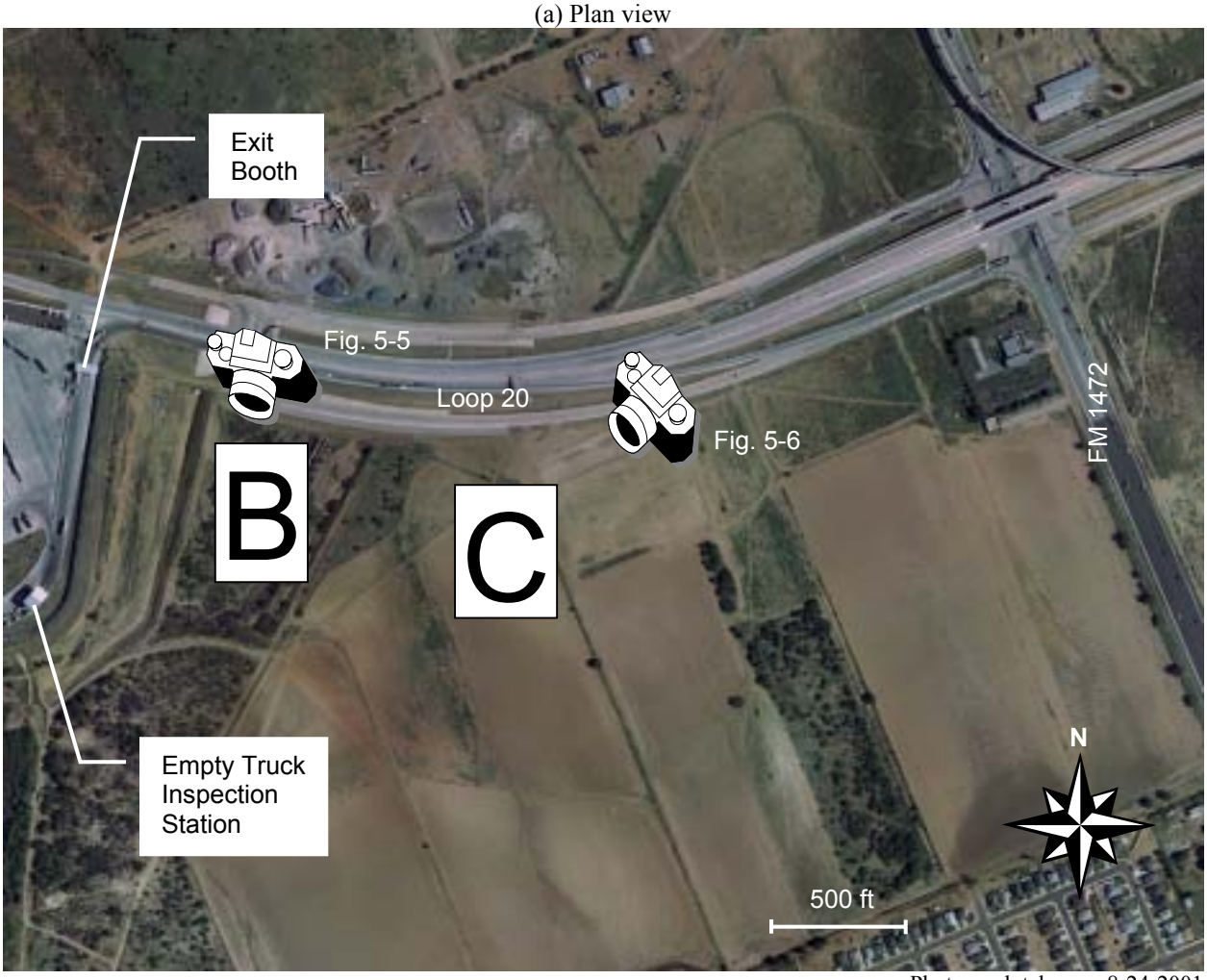
Photograph taken on 8-24-2001

(b) View from the east

Photograph taken on 6-15-2001

Figure 5-4. World Trade Bridge: empty truck inspection station, secondary inspection station, and exit booth

(a) Plan view



Photograph taken on 8-24-2001

(b) View from the north

Photograph taken on 6-15-2001

Figure 5-5. World Trade Bridge: drainage channel and low area east of the federal compound, and potential sites "B" and "C" for state safety inspection facility ("Site Selection Study" 2001)

View from the northeast

Photograph taken on 6-15-2001

Figure 5-6. World Trade Bridge: potential site "C" for state safety inspection facility ("Site Selection Study" 2001)

Feasibility of Retrofitting Facility with Prototype Border Crossing Components

A comparison between the layout of the World Trade Bridge border crossing facility and the prototype border crossing (Fig 1-1) leads to the following observations (Table 5-1):

- There seems to be adequate space between the bridge exit and the primary inspection station (roughly 1,750 ft) for accommodating one or more bypass lanes and stations to conduct an initial roadworthiness evaluation (Location 1) and driver status verification (Location 2). The current layout includes 8 working primary inspection lanes, with four more available for future expansion. This should facilitate the conversion of one or more inspection lanes into bypass lanes.
- The configuration of the federal compound is very similar to the configuration of the prototype border crossing facility. There is enough space within the facility to accommodate bypass lanes. There is also enough space and undeveloped land around the federal compound to accommodate a secure link between the federal compound and the state safety inspection facility. This characteristic should facilitate the full implementation of all of the components included in the prototype border crossing concept.
- As described previously, TxDOT is considering three alternative sites for the state safety inspection facility. Alternatives "A" and "B" are located in a low area that currently drains from north to south. Alternative "C" is located in a higher area that is close to both Loop 20 and FM 1472. With any of the three alternatives considered, it would be possible to build a secure link between the federal compound and the state safety inspection facility. Alternatives "A" and "B" would be preferable from the point of view of connecting the exit of the state safety inspection facility to the main lanes on Loop 20. However, these two alternatives are located in a low area that would require a significant

amount of earth fill to raise them out of the flood plain. Alternative "A" also has the disadvantage of requiring a longer driving distance from Loop 20 to the facility. Alternative "C" is located in a higher area; however, its access to the main lanes of Loop 20 is not as efficient as the access from Alternatives "A" or "B." To increase the efficiency of Alternative "C", TxDOT is considering a grade-separated entrance ramp to the main lanes on Loop 20.

- Unlike other border crossing locations, there seems to be strong local opposition to the idea of building a state safety inspection facility in the immediate vicinity of the federal compound. According to TxDOT Laredo District officials, the opposition is particularly strong from the owner of the tract of land located on the southwest corner of the Loop 20 and FM 1472 interchange, who already has plans for developing the land (as shown in Fig 5-6).

Table 5-1. Prototype elements for consideration in the retrofit analysis at the World Trade Bridge in Laredo—northbound

Prototype element	Location on prototype*	Feasible?	Challenges
General:			
Identification of vehicle through port of entry	1-7	Yes	
Verification of step completion status	1-7	Yes	
On arrival at U.S. port of entry:			
Activation of electronic file	1	Yes	
Advance determination of vehicle weight	1	Yes	
Verification of on-board transponder status to use express lane	1	Yes	
Verification of driver immigration status	2	Yes	
At primary inspection:			
Verification of step completion status; communication to driver of secondary inspections needed	3	Yes	
Bypass lane(s) if cleared	3 - 6	Yes	
At secondary inspection:			
Visual determination of road worthiness	6	Yes	
Verification of step completion status/Final check	5	Yes	
At exit of federal compound:			
Verification of step completion status	5	Yes	
Secure link to safety inspection facility	5-6	Yes	
At arrival at safety inspection facility:			
Verification of vehicle safety inspection certification	6	Yes	
Determination of need for safety check; communication to driver	7	Yes	

* (see Figs 5-1 and 5-2)
1: Booth on U.S. port of entry
2: Driver identification station
3: Primary inspection
4: Secondary inspection control point
5: Federal compound exit
6: Safety inspection facility entry point
7: Safety checking/screening

6. Laredo-Colombia Solidarity Bridge

General Description

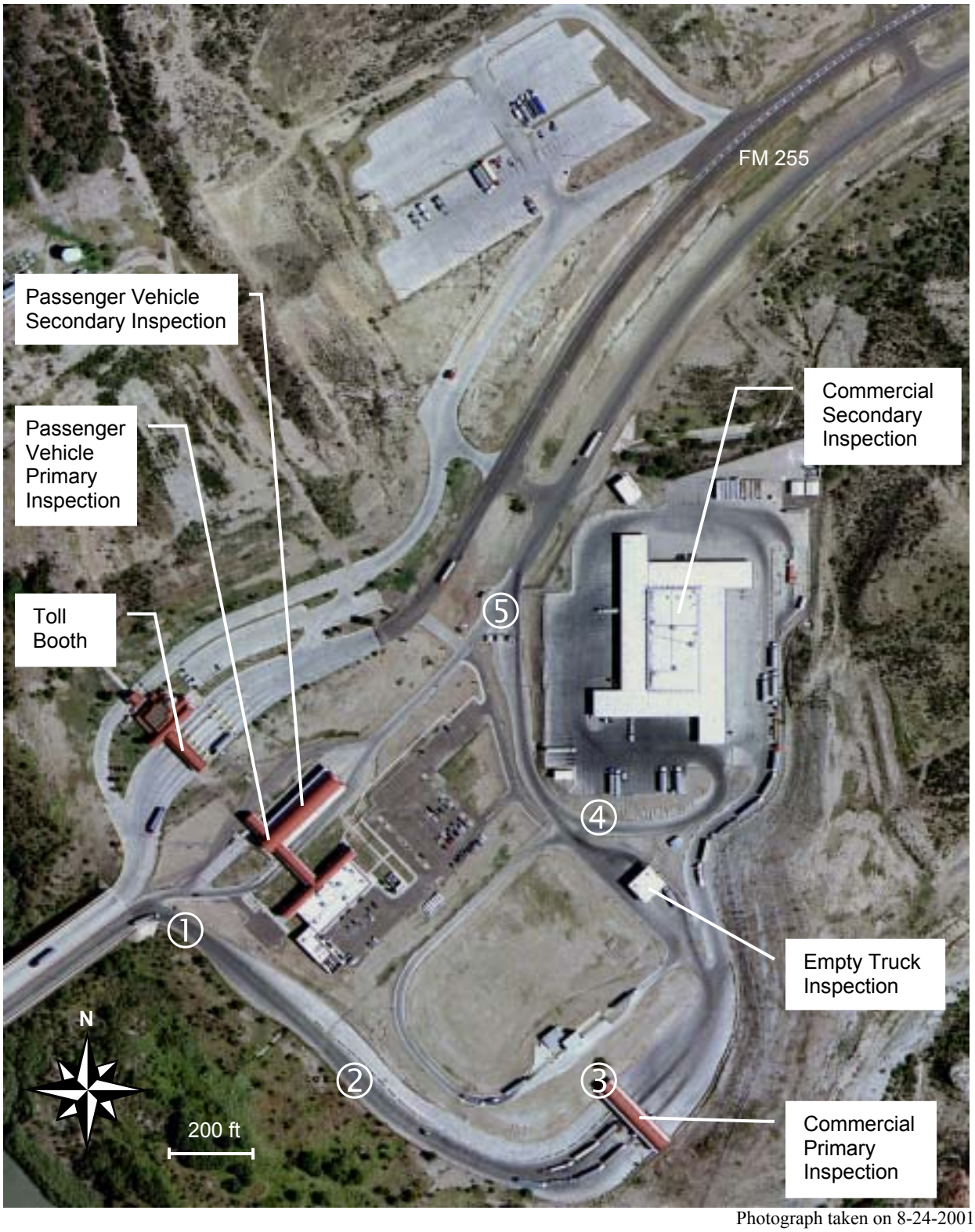
The Laredo-Colombia Solidarity Bridge border crossing is located 25 miles northwest of Laredo, slightly over a mile southwest of FM 1472. FM 255 connects the border crossing with FM 1472 and the recently built Camino Colombia toll road. The bridge provides eight lanes (four in each direction). The two right lanes in the northbound direction feed the commercial vehicle federal inspection facility. The federal compound is surrounded by the Rio Grande on the southwest side and by undeveloped land on the remaining sides. Details of the border crossing facility are shown in Figures 6-1 to 6-5.

TxDOT has explored several options for the location of the state safety inspection facility. Because of the existence of mine tailings and tunnels in the area, the number of potential locations appears to be limited. Figures 6-1 and 6-5 show a potential location that TxDOT is currently evaluating.

Photograph taken on 8-24-2001

Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).
Letter "A" indicates potential location of the state safety inspection facility ("Site Selection Study" 2001).

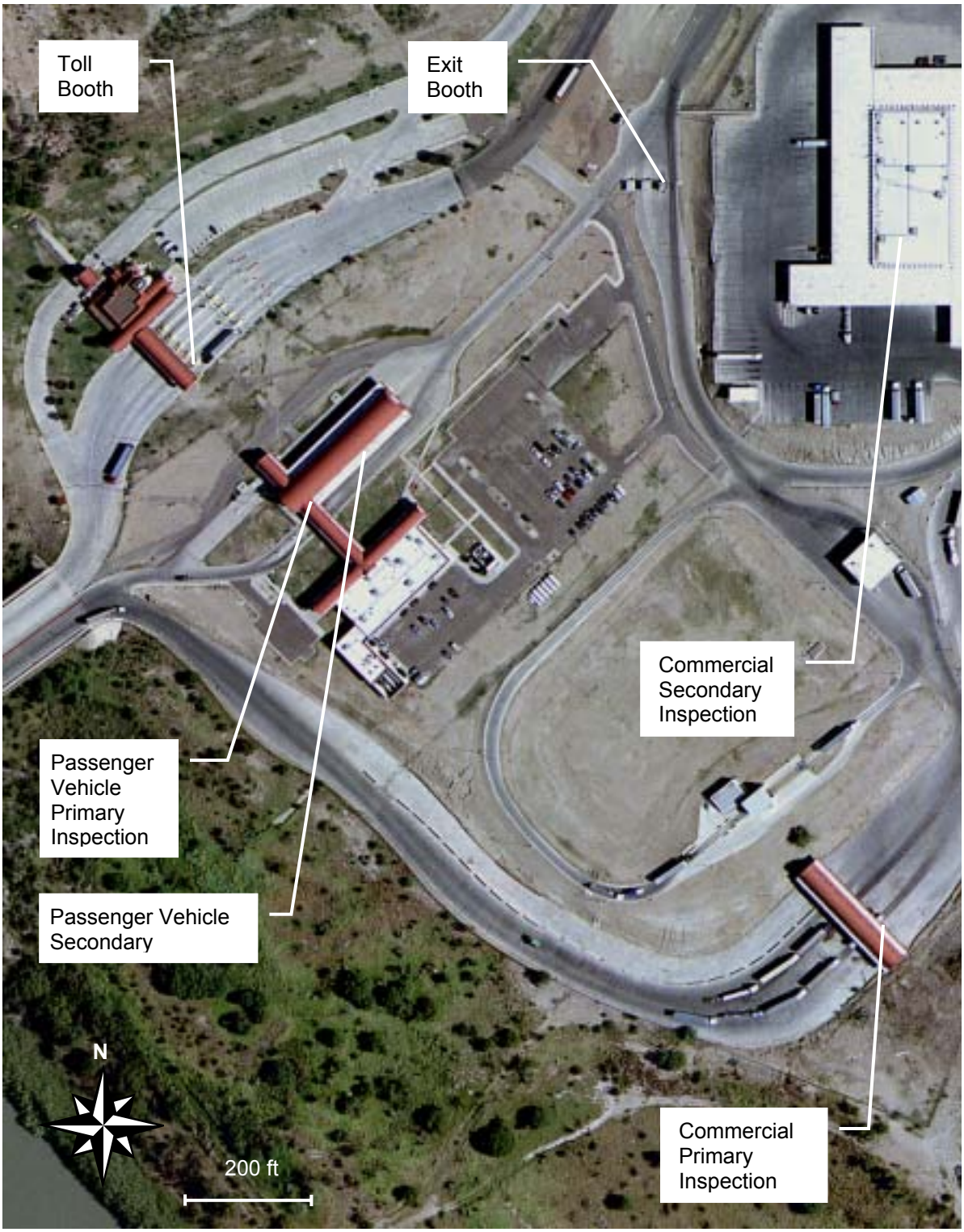
Figure 6-1. Laredo-Colombia Solidarity Bridge in Laredo



Photograph taken on 8-24-2001

Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).

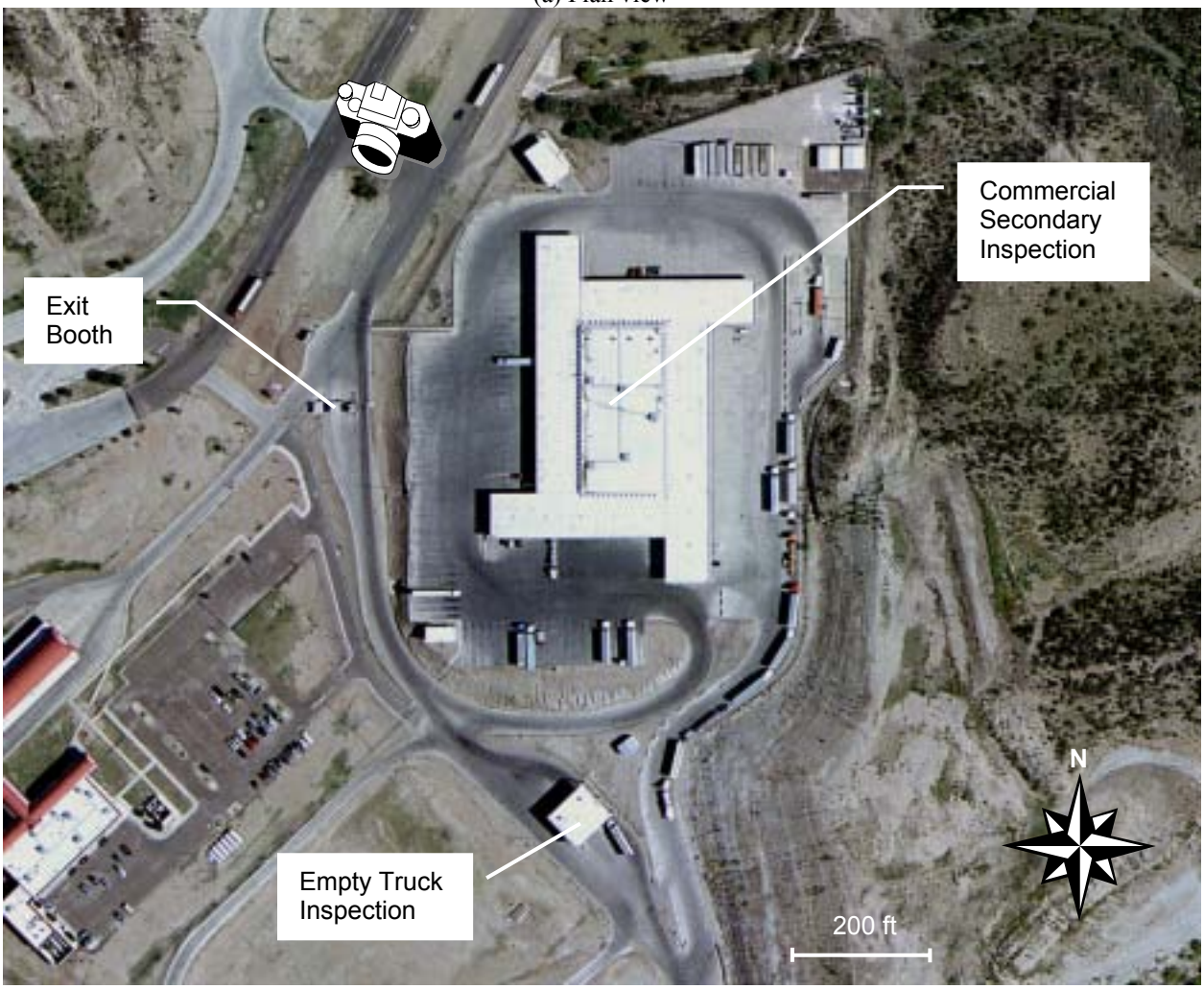
Figure 6-2. Laredo-Colombia Solidarity Bridge



Photograph taken on 8-24-2001

Figure 6-3. Laredo-Colombia Solidarity Bridge: primary and secondary inspection stations

(a) Plan view



Photograph taken on 8-24-2001

(b) View from the north

Photograph taken on 6-15-2001

Figure 6-4. Laredo-Colombia Solidarity Bridge: secondary inspection station and exit booth.

(a) Plan view

Photograph taken on 8-24-2001

Letter "A" indicates site currently considered by TxDOT for the state safety inspection facility ("Site Selection Study" 2001). Letter "B" indicates alternative site that could be considered by TxDOT in combination with relocating one or both main lanes on FM 255.

(b) View from the northwest

Photograph taken on 6-15-2001

Figure 6-5. Laredo-Colombia Solidarity Bridge: potential sites "A" and "B"

Feasibility of Retrofitting Facility with Prototype Border Crossing Components

A comparison between the actual layout of the Laredo-Colombia Solidarity Bridge border crossing facility and the prototype border crossing (Fig 1-1) leads to the following observations (Table 6-1):

- There seems to be adequate space between the bridge exit and the primary inspection station (roughly 1,500 ft) to accommodate a bypass lane and stations to conduct an initial roadworthiness evaluation (Location 1) and driver status verification (Location 2). The current layout includes four primary inspection lanes of which two are not used at the moment. One of them could be converted easily into a bypass lane.
- There seems to be enough space after the primary inspection station and around the secondary inspection station to accommodate a bypass lane. There is also space for a secure link between the federal compound and the state safety inspection facility. This characteristic should facilitate the full implementation of all of the components included in the prototype border crossing concept. Some modifications within the facility might be necessary to accommodate the bypass lanes around the secondary inspection station. If internal modifications are not possible, it may be necessary to undertake a substantial amount of earth work (mainly cuts) on the east side of the facility to create the space needed for both the main circulation lanes and the bypass lane.
- Figures 6-1 and 6-5 show the location of a potential state safety inspection facility being considered by TxDOT. According to information provided by TxDOT officials, this location minimizes the amount of earth work required for the construction of the facility while still providing access to both FM 1472 and the Camino Colombia toll road. A secure link from the federal inspection compound to Site "A" would require either a parallel road along the east side of FM 255 or, given the wide right-of-way occupied by FM 255, relocating the FM 255 roadbeds to the northwest to provide additional space within the right-of-way for the link to the state safety inspection facility. If the main lanes on FM 255 could be moved to the northwest, there is a possibility the state safety inspection facility could be located right next to the federal compound (Alternative "B" in Figure 6-5). This alternative would reduce the length of the secure link between the two facilities and the amount of land to acquire for the state safety inspection facility.

Table 6-1. Prototype elements for consideration in the retrofit analysis at the Laredo-Colombia Solidarity Bridge in Laredo—northbound

Prototype element	Location on prototype*	Feasible?	Challenges
General:			
Identification of vehicle through port of entry	1-7	Yes	
Verification of step completion status	1-7	Yes	
On arrival at U.S. port of entry:			
Activation of electronic file	1	Yes	
Advance determination of vehicle weight	1	Yes	
Verification of on-board transponder status to use express lane	2	Yes	
Verification of driver immigration status	3	Yes	
At primary inspection:			
Verification of step completion status; communication to driver of secondary inspections needed	3	Yes	
Bypass lane(s) if cleared	3 - 6	Yes	Internal modifications required
At secondary inspection:			
Visual determination of road worthiness	6	Yes	
Verification of step completion status/Final check	5	Yes	
At exit of federal compound:			
Verification of step completion status	5	Yes	
Secure link to safety inspection facility	5-6	Yes	
At arrival at safety inspection facility:			
Verification of vehicle safety inspection certification	6	Yes	
Determination of need for safety check; communication to driver	7	Yes	

* (see Figs 6-1 and 6-2)

1: Booth on U.S. port of entry
2: Driver identification station
3: Primary inspection
4: Secondary inspection control point
5: Federal compound exit
6: Safety inspection facility entry point
7: Safety checking/screening

7. Camino Real International Bridge

General Description

The Camino Real International Bridge border crossing is located on the south side of downtown Eagle Pass, Texas, immediately north of an international railroad bridge. The bridge provides six lanes (three in each direction) and includes sidewalks for pedestrians. The rightmost lane in the inbound direction is dedicated to truck traffic. The federal compound is surrounded by the Rio Grande on the west side, the railroad track on the south side, and a park and recreational area owned and operated by the City of Eagle Pass on the north side. A half-mile long truck route connects the bridge to FM 1021. Details of the border crossing facility are shown in Figures 7-1 to 7-8.

TxDOT is planning the construction of an Outer Loop that would connect the bridge to FM 1021 and US 277 on the southeast side of Eagle Pass. The Outer Loop would start on the north side of the federal compound, go under the international bridge, and follow a north-south alignment parallel to the river. South of the railroad tracks, the alignment would veer slightly to the east. In conjunction with the City of Eagle Pass, TxDOT is also planning to extend FM 375 and connect this facility with the Outer Loop south of the railroad tracks.

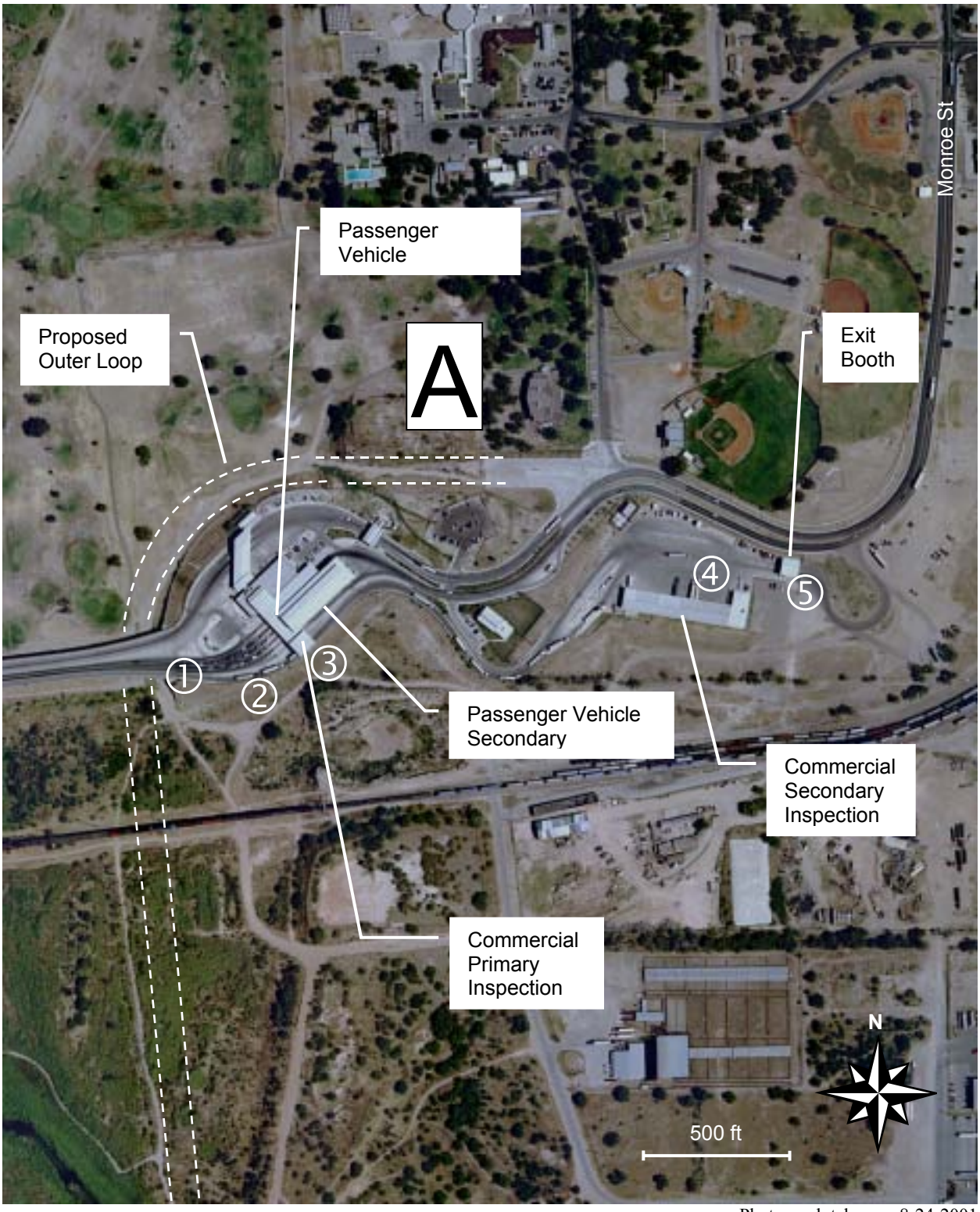
TxDOT is considering several alternatives for locating a state safety inspection facility. Figure 7-2 and Figures 7-6 to 7-11 show four alternative locations that are being currently evaluated. Figure 7-12 shows a fifth alternative location that is presented in this document.

Terrain in the immediate vicinity of the federal compound is characterized by significant differences in elevation, with the west side being much lower than the east side. While the federal compound itself is located on high ground (most likely raised by earth fill on the west side), the surrounding area appears to be prone to river flooding. The proposed alignment of the Outer Loop under the international bridge would be affected by that flooding.

Photograph taken on 8-24-2001

Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1). Letters indicate potential locations of the state safety inspection facility ("Site Selection Study" 2001).

Figure 7-1. Camino Real International Bridge in Eagle Pass

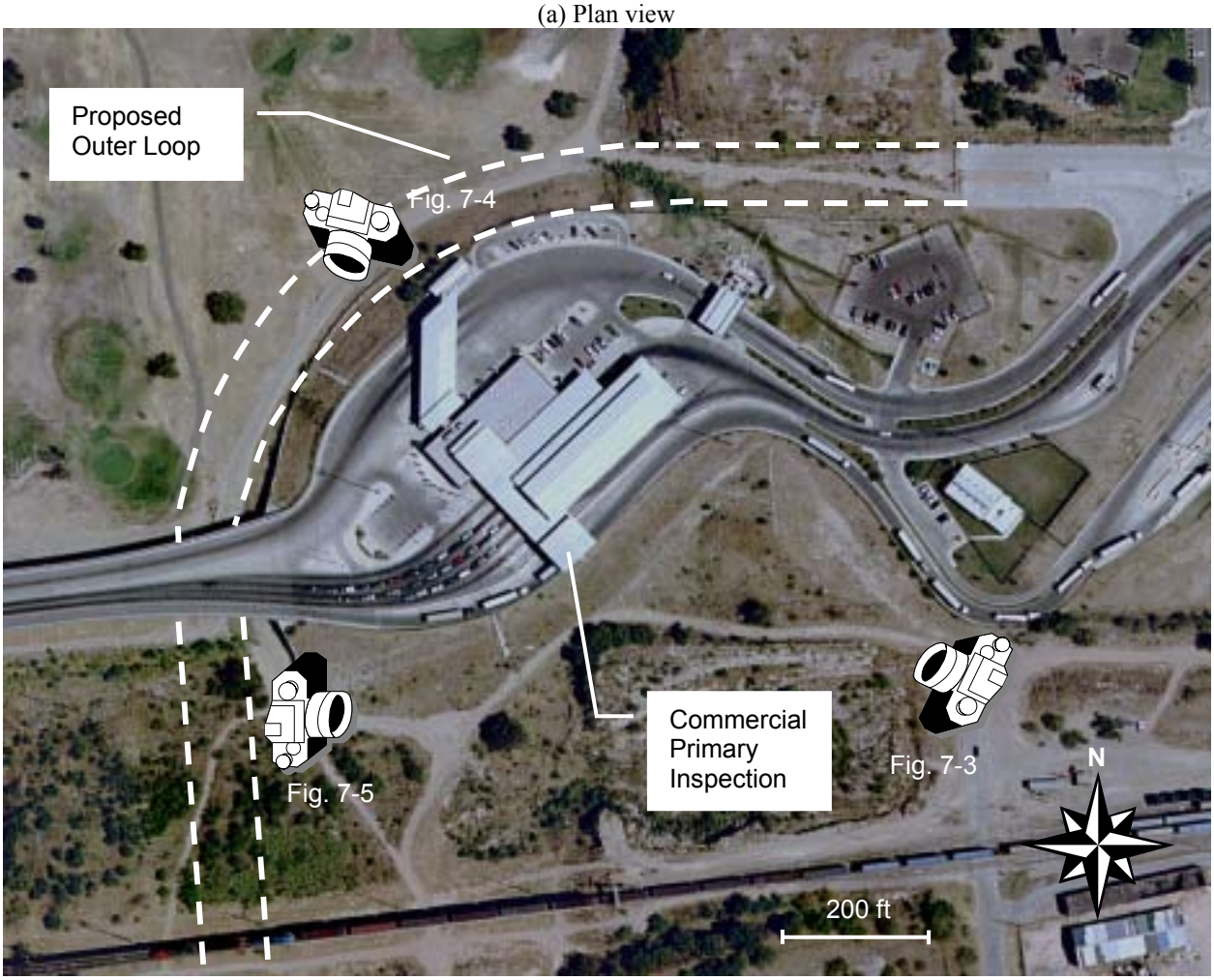


Photograph taken on 8-24-2001

Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1). Letter "A" indicates potential location of the state safety inspection facility ("Site Selection Study" 2001).

Figure 7-2. Camino Real International Bridge

(a) Plan view



Photograph taken on 8-24-2001

(b) View from the southeast

Photograph taken on 6-14-2001

Figure 7-3. Camino Real International Bridge: primary inspection station

Photograph taken on 6-14-2001

Path follows approximate alignment of proposed Outer Loop. Federal compound is on the left behind the fence.

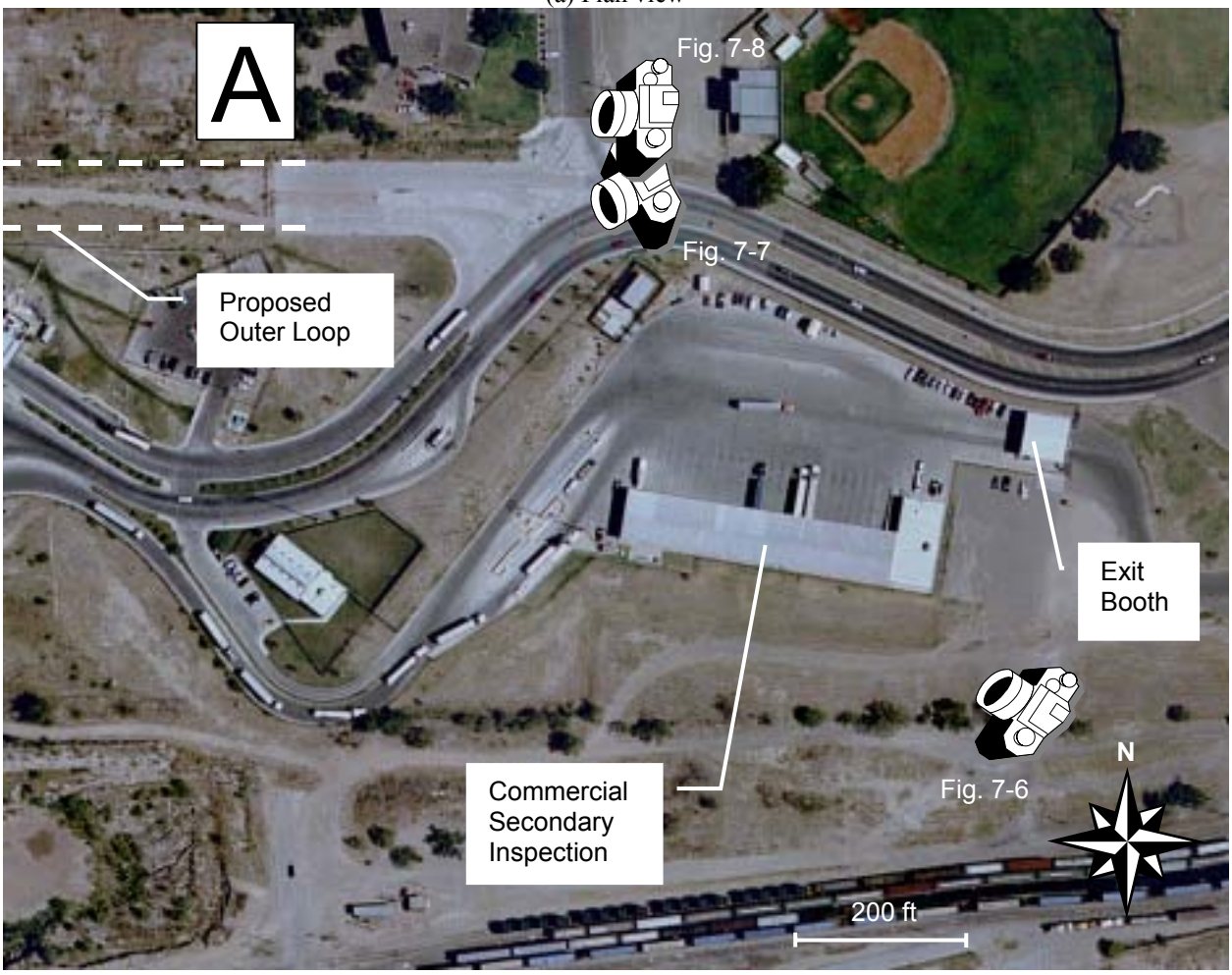
Figure 7-4. Camino Real International Bridge: view of international bridge from the north

Photograph taken on 6-14-2001

Federal compound is on the left (north) side. Railroad track is on the right (south) side.
Notice difference in elevation between the federal compound and this area.

Figure 7-5. Camino Real International Bridge: view from the southwest

(a) Plan view



Photograph taken on 8-24-2001

Letter "A" indicates potential location of the state safety inspection facility ("Site Selection Study" 2001).

(b) View from the southeast

Photograph taken on 6-14-2001

Figure 7-6. Camino Real International Bridge: view of secondary inspection station

Photograph taken on 6-14-2001

Export lot is in foreground; dead end is where the proposed Outer Loop would begin.

Figure 7-7. Camino Real International Bridge: view of federal compound from the northeast

Photograph taken on 6-14-2001

Building on the right side is a multipurpose recreational center owned and operated by the City of Eagle Pass.

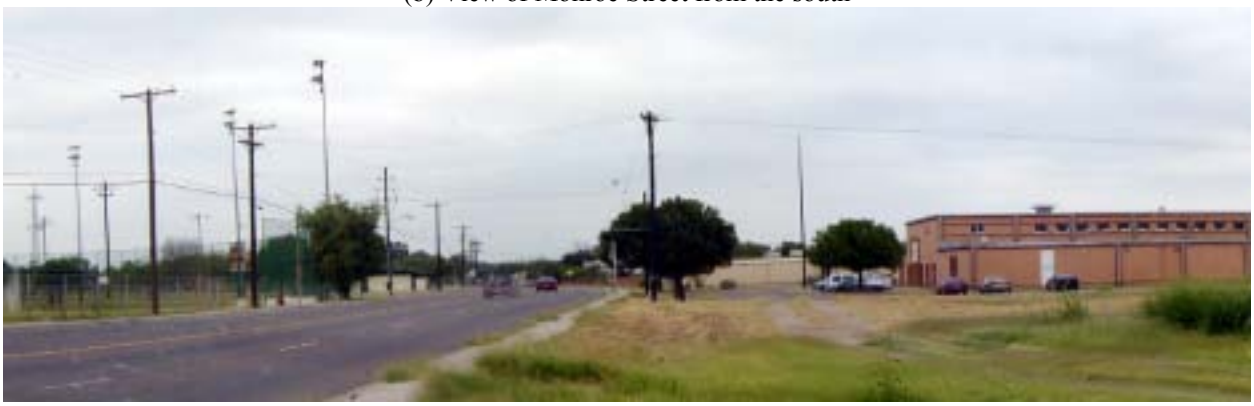
Figure 7-8. Camino Real International Bridge: view from the east

(a) Plan view

Photograph taken on 8-24-2001

Letter “B” indicates potential location of the state safety inspection facility (“Site Selection Study” 2001).

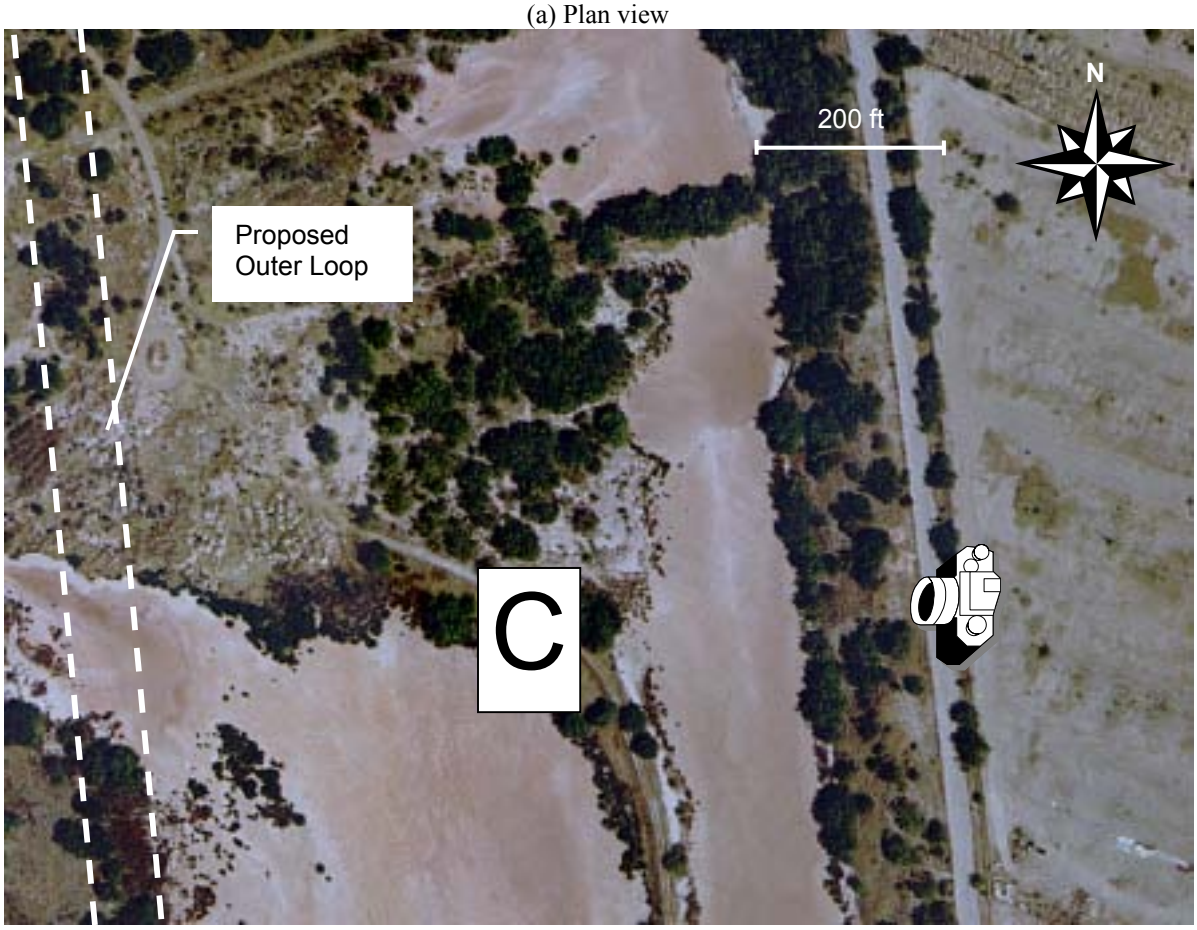
(b) View of Monroe Street from the south



Photograph taken on 6-14-2001

Figure 7-9. Camino Real International Bridge: view of Monroe Street

(a) Plan view



Photograph taken on 8-24-2001

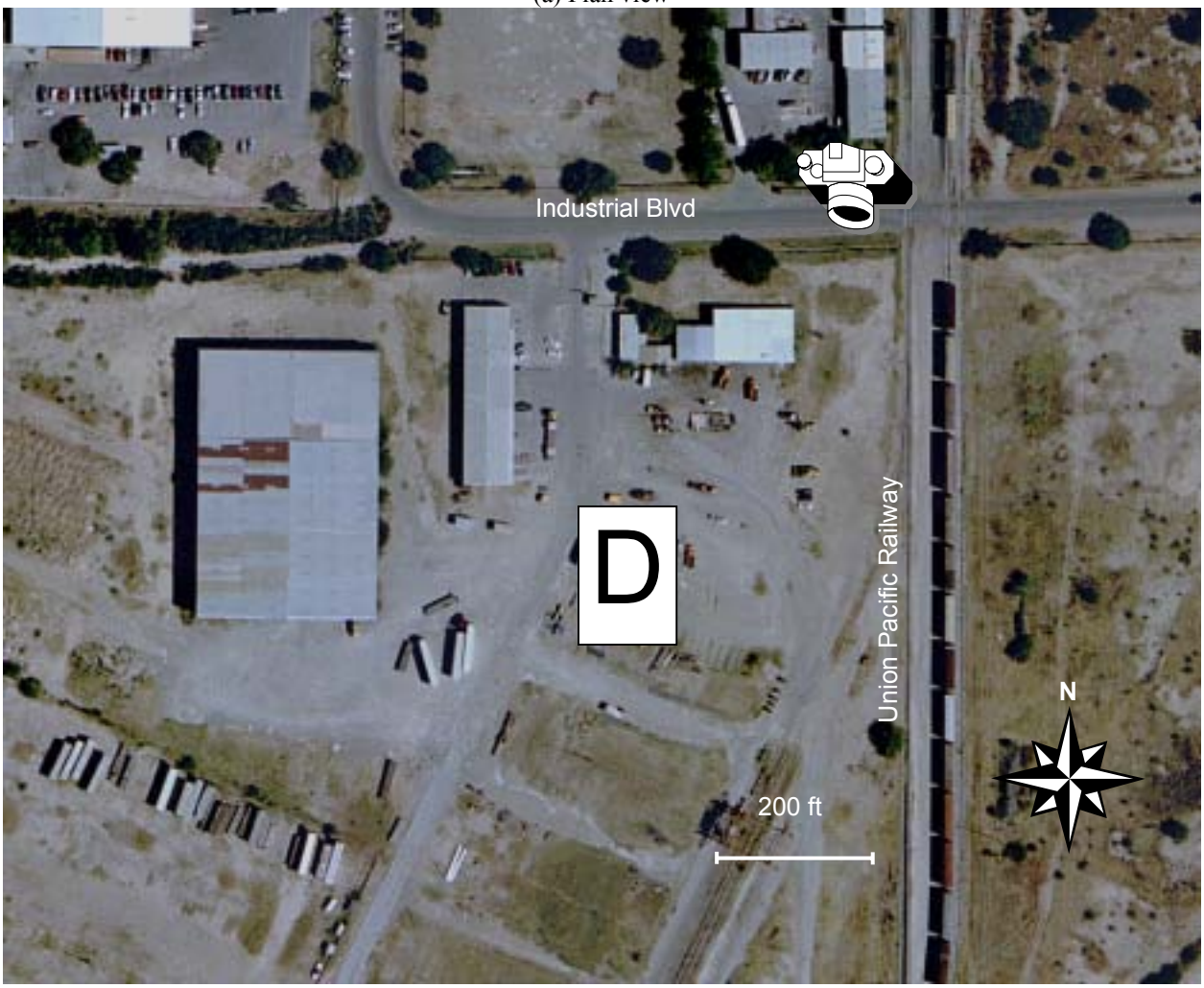
Letter "C" indicates potential location of the state safety inspection facility ("Site Selection Study" 2001).

(b) View from the east

Photograph taken on 6-14-2001

Figure 7-10. Camino Real International Bridge: bare soil area is apparently a dumping area on the floodplain used by a former industrial plant

(a) Plan view



Photograph taken on 8-24-2001

Letter "D" indicates potential location of the state safety inspection facility ("Site Selection Study" 2001).

(b) View from the north

Photograph taken on 6-14-2001

Figure 7-11. Camino Real International Bridge: potential location of inspection facility

Photograph taken on 8-24-2001

Letter "E" indicates alternative location of state safety inspection facility.

Figure 7-12. Camino Real International Bridge in Eagle Pass: alternative location of inspection facility

Feasibility of Retrofitting Facility with Prototype Border Crossing Components

A comparison between the actual layout of the Camino Real International Bridge border crossing facility and the prototype border crossing (Fig 1-1) leads to the following observations (Table 7-1):

- The distance from the bridge exit to the primary inspection station is limited (roughly 400 ft). This situation offers some challenges for the conversion of one of the existing lanes into a bypass lane and the addition of stations to conduct an initial roadworthiness evaluation (Location 1) and driver status verification (Location 2). Currently, the primary inspection station uses one of two available lanes. However, it appears that the road width between primary and secondary inspection allows for only one lane. To implement a bypass lane after the primary inspection station, the road would need to be widened.
- If a bypass lane retrofit using the current configuration is not possible, adding a shoulder eastbound lane east of the bridge exit should be possible. Because the space between the inspection stations and the fence on the south side of the federal compound is limited, adding a bypass lane would likely involve acquiring additional land. The tract of land between the federal compound and the railroad track is currently vacant. Except for a sizable earth fill on the southwest side of the compound, no major engineering challenges for the construction of the bypass lane are foreseen. Obviously, the feasibility of providing a bypass lane would also depend on the General Services Administration's (GSA) future expansion plans, which at the moment appear to include an X-ray facility for inspecting railroad cars east of the current exit booth.
- Implementation of a bypass lane on the Mexican side may be required to realize the full potential of the bypass lane strategy because of the limited availability of space between the bridge exit and the primary inspection station. In this case, two lanes should be dedicated on the bridge for commercial traffic. Currently, of three lanes going into the U.S., two are passenger vehicle lanes. Depending on traffic volumes, a bridge widening could be necessary. A detailed recommendation on this issue would probably require an in-depth analysis involving traffic flow simulation.
- Given the current alignment of the proposed Outer Loop, none of the four TxDOT alternatives proposed for a state safety inspection facility presents an ideal location to provide a secure link from the federal compound to the state safety inspection facility. For example, location "A" (Figs 7-1, 7-2, and 7-6) would be located on the north side of the Outer Loop, i.e. across the street from the federal compound. In this case, a city ordinance would need to force all inbound commercial vehicles to make a left turn once they leave the federal compound. A secure connection could not be provided between the federal and state compounds. Location "A" also has the disadvantage of being located in a park and recreational area owned by the City of Eagle Pass. Location "B" (Figs 7-1, 7-2, and 7-9) would require a new dedicated secure link from the federal inspection facility. This road could be adjacent to the

railroad track or Monroe Street. Egress would need to be on Monroe Street. Locations "C" and "D" (Figs 7-1, 7-2, 7-10, and 7-11) are located even further away from the federal compound exit booths. Inbound commercial vehicles would be required to make a left turn at the Outer Loop once they leave the federal compound. A secure link between the federal and state compounds could not be provided if the state safety inspection facility is at either location "C" or "D." In addition, Alternative "D" is located too far away from the Outer Loop. Egress from Alternative "C" and "D" would need to use the Outer Loop or the proposed FM 375 Extension and Industrial Blvd. to connect with US 57 or US 277.

- Because of the disadvantages of locations "A" to "D," it may be necessary to evaluate other potential sites. For example, Figure 7-12 shows an additional potential state safety inspection site located on the south side of the federal compound, north of the railroad track (Alternative "E"). This alternative might require some earth fill and moving the railroad alignment slightly to the south. Commercial vehicles would make a sharp turn to the right as soon as they leave the federal compound and would drive a short distance over a secure link to access the state safety inspection facility. Commercial vehicles leaving or bypassing this facility would access the Outer Loop between the railroad track and the international bridge.

Table 7-1. Prototype elements for consideration in the retrofit analysis at the Camino Real International Bridge in Eagle Pass—northbound

Prototype element	Location on prototype*	Feasible?	Challenges
General:			
Identification of vehicle through port of entry	1-7	Yes	
Verification of step completion status	1-7	Yes	
On arrival at U.S. port of entry:			
Activation of electronic file	1	Yes	
Advance determination of vehicle weight	1	Yes	
Verification of on-board transponder status to use express lane	1	Yes	Limited available space; might need additional shoulder lane
Verification of driver immigration status	2	Possibly	
At primary inspection:			
Verification of step completion status; communication to driver of secondary inspections needed	3	Yes	
Bypass lane(s) if cleared	3 - 6	Possibly	Might depend on whether additional shoulder lane can be built
At secondary inspection:			
Visual determination of road worthiness	6	Possibly	Limited available space; might need additional shoulder lane
Verification of step completion status/Final check	5	Yes	
At exit of federal compound:			
Verification of step completion status	5	Yes	
Secure link to safety inspection facility	5-6	Possibly	Depending on feasibility to locate state inspection facility in immediate vicinity of federal compound
At arrival at safety inspection facility:			
Verification of vehicle safety inspection certification	6	Yes	
Determination of need for safety check; communication to driver	7	Yes	

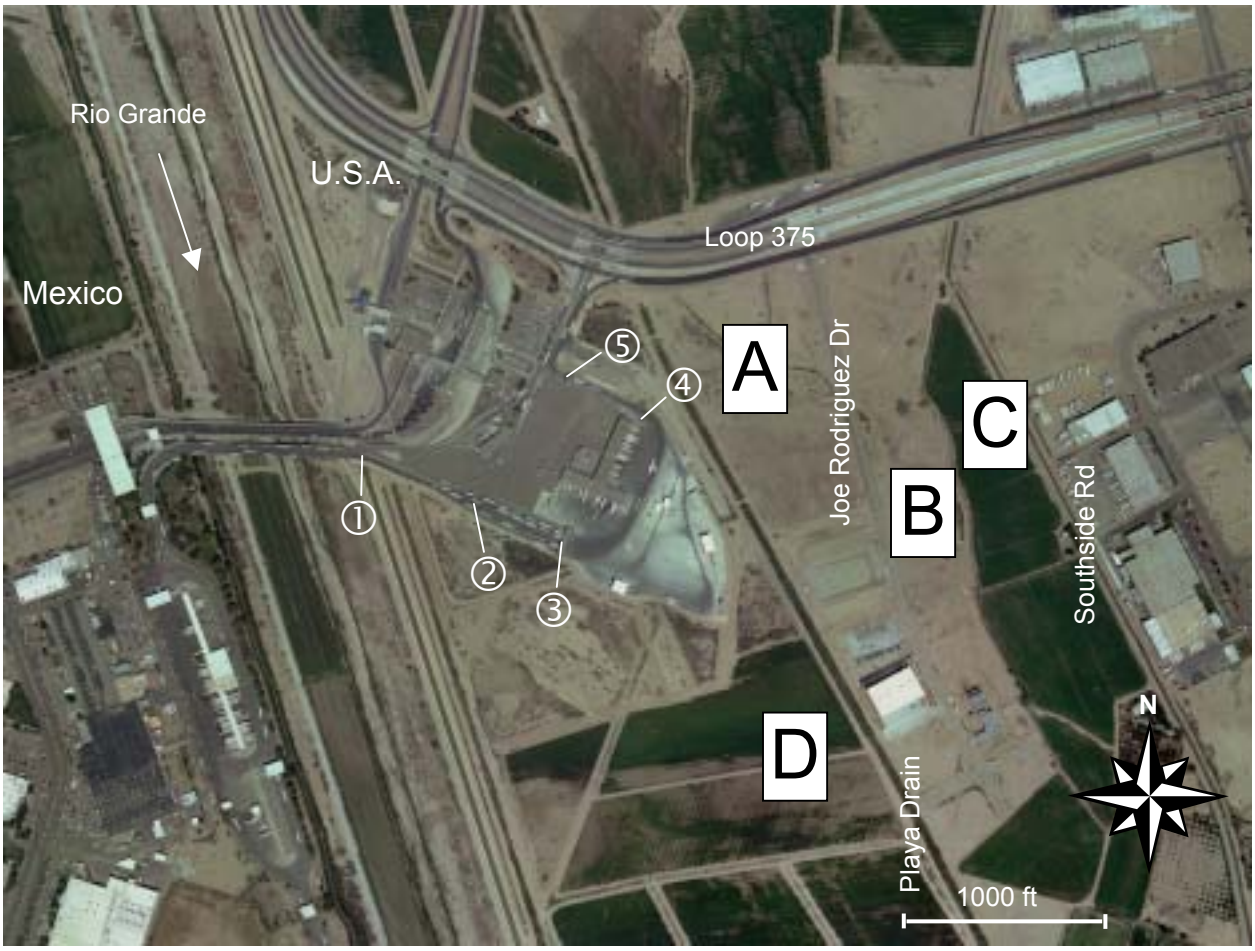
* (see Figs 7-1 and 7-2)

1: Booth on U.S. port of entry
2: Driver identification station
3: Primary inspection
4: Secondary inspection control point
5: Federal compound exit
6: Safety inspection facility entry point
7: Safety checking/screening

8. Ysleta-Zaragoza Bridge

General Description

The Ysleta-Zaragoza Bridge border crossing is located near State Loop 375 on the southeast side of El Paso, Texas. The bridge is composed of two separate structures, one for commercial traffic, and the other one for noncommercial traffic. The truck bridge is a four-lane facility with two lanes for each direction. The federal compound is surrounded by the Rio Grande on the west and southwest sides, agricultural fields on the south side, and a currently vacant lot on the east side. This vacant lot is being developed as an industrial park. TxDOT is considering several options for the state safety inspection facility, including the agricultural field adjacent to the federal compound and the northwest corner of the industrial park. Details of the border crossing facilities are shown in Figures 8-1 to 8-5.



Photograph taken on 8-24-2001

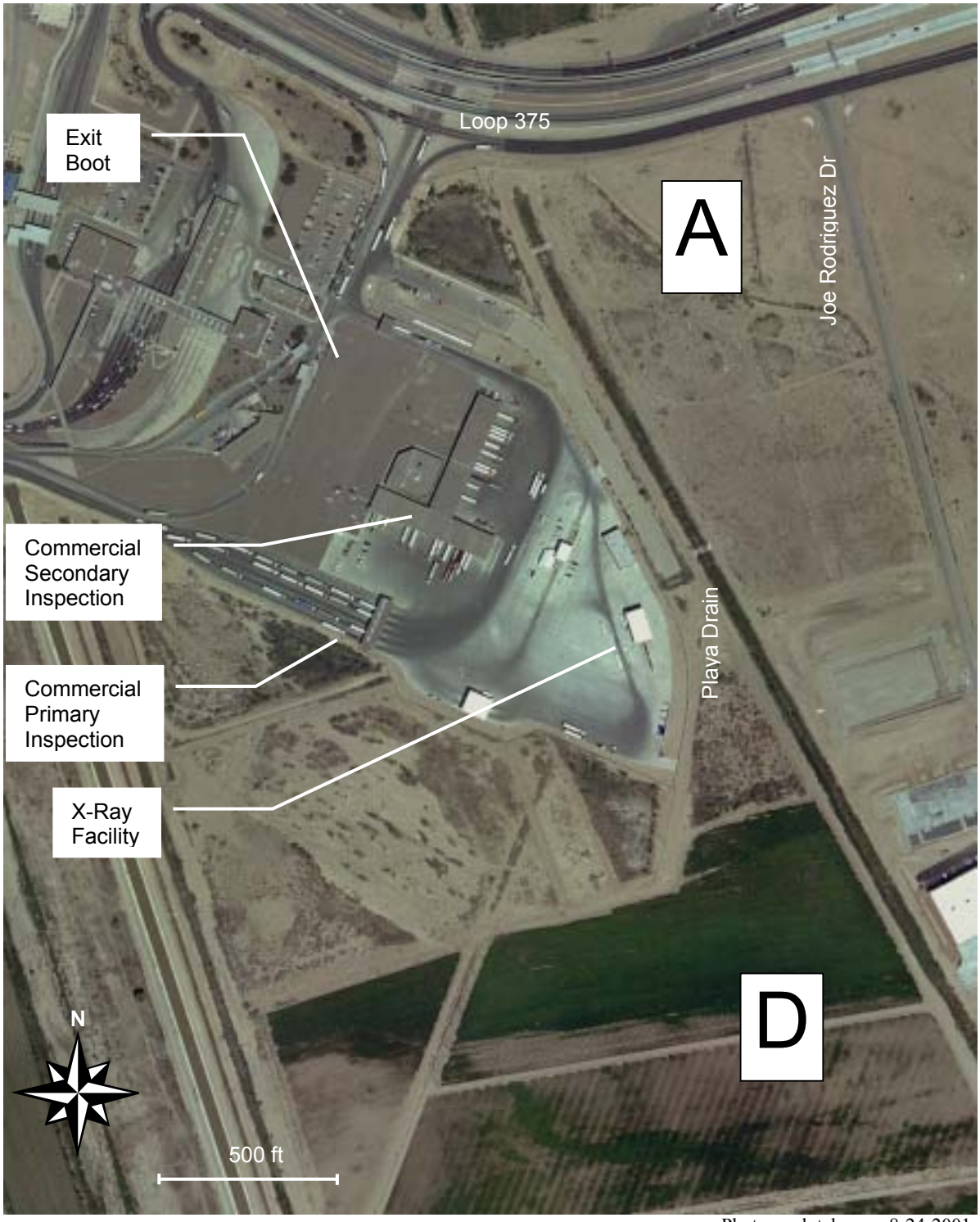
Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).
Letters "A"-"C" indicate potential locations of the state safety inspection facility ("Site Selection Study" 2001).
Letter "D" indicates a fourth option now being considered by TxDOT.

Figure 8-1. Ysleta-Zaragoza Bridge

Photograph taken on 8-24-2001

Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).

Figure 8-2. Ysleta-Zaragoza Bridge

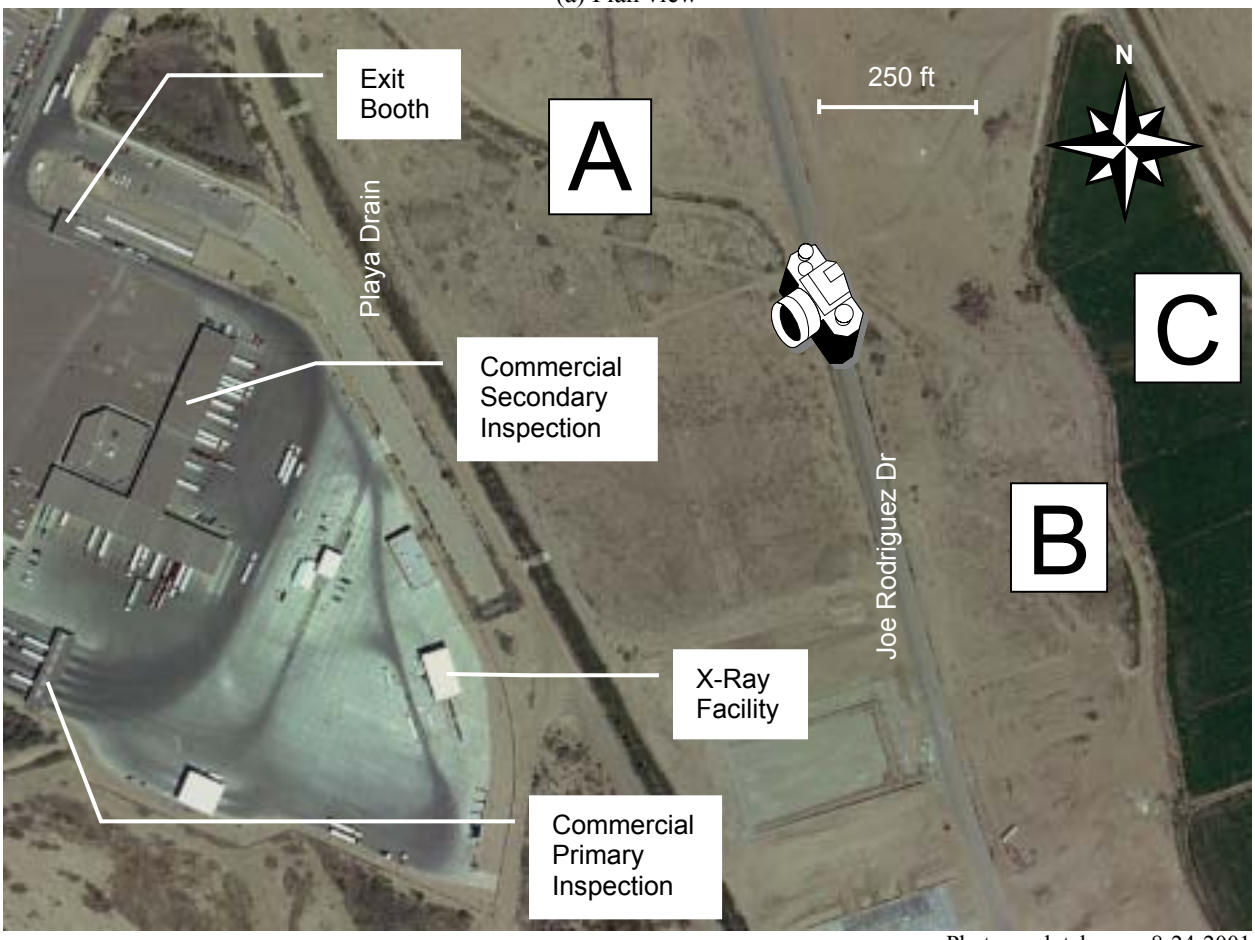


Photograph taken on 8-24-2001

Letter "A" indicates potential locations of the state safety inspection facility ("Site Selection Study" 2001). Letter "D" indicates additional alternative location being considered by TxDOT.

Figure 8-3. Ysleta-Zaragoza Bridge: potential sites "A" and "D"

(a) Plan view



Photograph taken on 8-24-2001

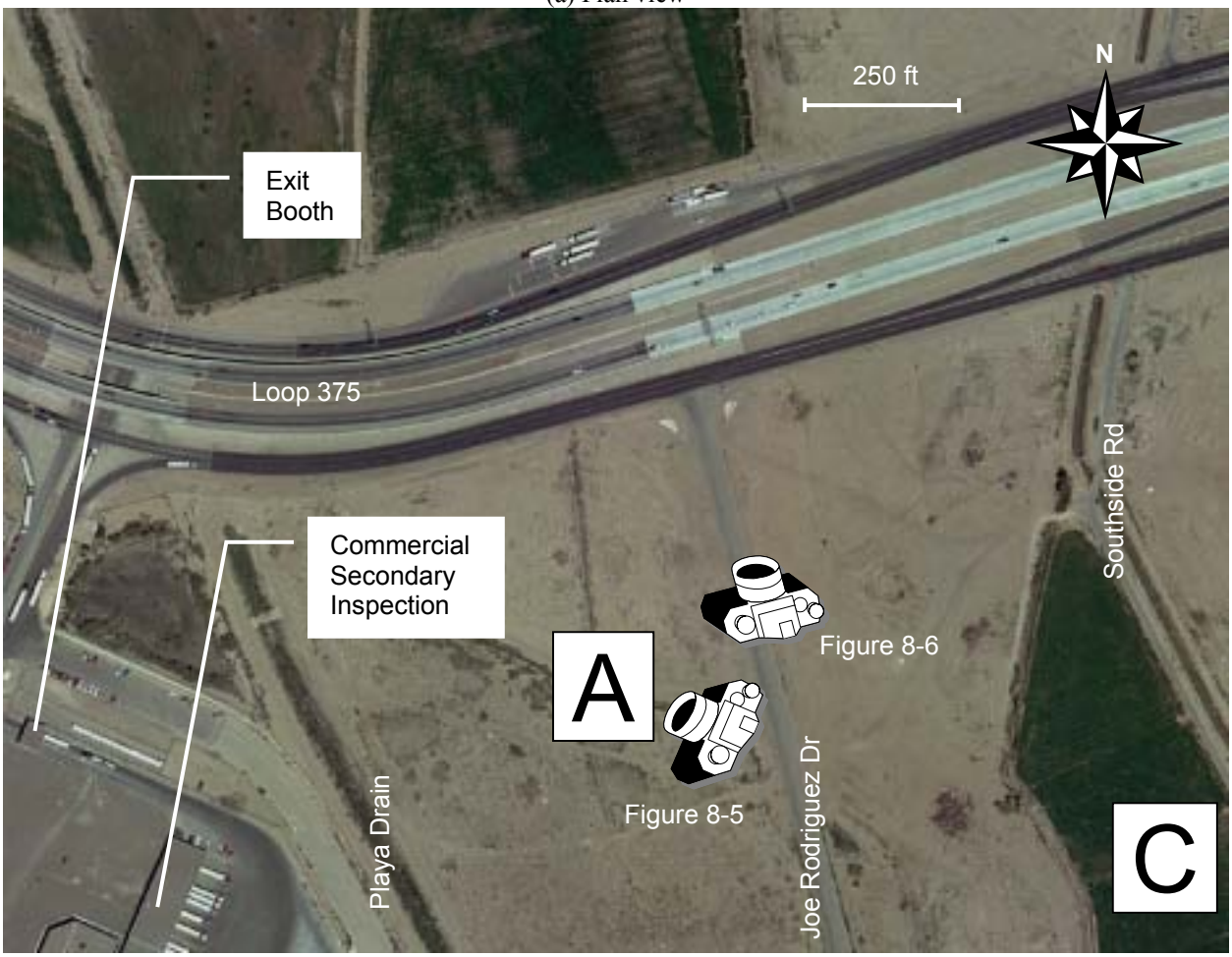
Letters indicate potential locations of the state safety inspection facility ("Site Selection Study" 2001).

(b) View of federal compound from the east

Photograph taken on 5-25-2001

Figure 8-4. Ysleta-Zaragoza Bridge: potential sites "A", "B", and "C"

(a) Plan view



Photograph taken on 8-24-2001

Letters indicate potential locations of the state safety inspection facility ("Site Selection Study" 2001).

(b) View of federal compound from the southeast

Photograph taken on 5-25-2001

Figure 8-5. Ysleta-Zaragoza Bridge: industrial park east of federal compound

Photograph taken on 5-25-2001

Figure 8-6. Ysleta-Zaragoza Bridge: industrial park entrance on Loop 375 frontage road

Feasibility of Retrofitting Facility with Prototype Border Crossing Components

A comparison between the actual layout of the Ysleta-Zaragoza Bridge border crossing facility and the prototype border crossing (Fig 1-1) leads to the following observations (Table 8-1):

- Compared to the Bridge of the Americas facility (see Chapter 9), the Ysleta-Zaragoza Bridge border crossing facility has considerable flexibility concerning the potential for expansion. Apparently, GSA is considering using the agricultural land on the south side of the federal facility to expand capacity. In fact, the southeast corner of the facility, where the X-ray station is currently located, is the result of a recent expansion effort. Because the Ysleta-Zaragoza Bridge facility has been designated to handle hazardous materials, U.S. Customs would like to have two exits from the federal facility to facilitate evacuation activities in case of emergencies such as hazardous cargo leaks. One exit could be through a secure link to the state safety inspection facility on the east side of the federal compound. The other exit, which would be designated as an emergency-only exit, could be the existing exit to the Loop 375 eastbound frontage road.
- There seems to be sufficient space between the bridge exit and the primary inspection station. As a result, converting one of the existing six lanes to a bypass lane or adding a bypass lane and stations to conduct an initial roadworthiness evaluation (Location 1) and driver status verification (Location 2) should be relatively straightforward.
- The configuration of the federal compound is similar to the configuration of the prototype border crossing facility. There is enough space within the facility to accommodate bypass lanes. There is also enough space and undeveloped land around the federal compound to accommodate a secure link between the federal compound and the state safety inspection facility. This characteristic should facilitate the full implementation of all of the components included in the prototype border crossing concept.

- The location of the state safety inspection facility is flexible. As indicated previously, TxDOT is considering the vacant lot on the east side of the federal compound as one of the potential sites for the state safety inspection facility (see Figs 8-3 and 8-4, Alternatives "A," "B," and "C"). With the current layout, Alternative "A" seems to be the most advantageous location because it is closest to the existing exit from the federal compound and would not need a relocation of the exit. A secure link south of the eastbound frontage road would provide access from the federal compound to the state safety inspection facility. Egress from the state inspection site would be possible through the eastbound frontage road or Joe Rodriguez Drive. In this case, it might be necessary to upgrade Joe Rodriguez Drive. Westbound truck traffic would need to travel about a mile on the eastbound frontage road and take the turnaround lane at Pan American Drive, because the exit from the safety inspection facility would not have a grade separation to access westbound Loop 375. If westbound traffic is directed towards the Pan American Drive interchange, a capacity analysis would need to be conducted to determine whether the interchange can handle the increased volume in commercial vehicles. If the federal compound exit location is changed, Alternative "A" would still be feasible. For Alternatives "B" and "C," located to the east of the federal compound, it would be useful to relocate the exit of the federal compound to the south of the X-ray facility. In this case, the secure link would cross the Playa Drain, and egress from the state safety inspection facility would use Joe Rodriguez Drive. If the exit of the federal compound could not be relocated, the secure link to the state safety inspection facility would be about twice as long as the link to Alternative "A." Unfortunately, the secure link from the federal compound to both locations "B" and "C" would block through traffic on Joe Rodriguez Drive. Currently, there is no connection from Joe Rodriguez Drive to Southside Road. A road connecting those two roads would be needed for location "B" or "C" to remain feasible.
- Alternative "D" is now being considered by TxDOT as an additional potential location for the state safety inspection facility (Figure 8-3). It is located to the south of the federal compound and west of the Playa Drain. This location would also benefit from the relocation of the federal compound's exit to the southeast corner of the facility. Egress from the state safety inspection facility would exit slightly to the north of the current exit of the federal compound to enable westbound traffic to use the Loop 375 underpass. If use of the current exit continued, traffic towards the state safety inspection facility would use a newly constructed link to the east of federal compound and parallel to the Playa Drain. Egress would use the same link exiting to the north of the federal compound's old exit. It is likely that the exit from the federal compound will be moved to the new location because U.S. Customs is interested in using the existing exit only as an emergency exit. If the federal compound exit is relocated, Alternative "D" would be an excellent location for the state safety inspection facility.

Table 8-1. Prototype elements for consideration in the retrofit analysis at the Ysleta-Zaragoza Bridge facility in El Paso—northbound

Prototype element	Location on prototype*	Feasible?	Challenges
General:			
Identification of vehicle through port of entry	1-7	Yes	
Verification of step completion status	1-7	Yes	
On arrival at U.S. port of entry:			
Activation of electronic file	1	Yes	
Advance determination of vehicle weight	1	Yes	
Verification of on-board transponder status to use express lane	1	Yes	
Verification of driver immigration status	2	Yes	
At primary inspection:			
Verification of step completion status; communication to driver of secondary inspections needed	3	Yes	
Bypass lane(s) if cleared	3 - 6	Yes	
At secondary inspection:			
Visual determination of road worthiness	6	Yes	
Verification of step completion status	5	Yes	
At exit of federal compound:			
Verification of step completion status/Final check	5	Yes	
Secure link to safety inspection facility	5 -6	Yes	
At arrival at safety inspection facility:			
Verification of vehicle safety inspection certification	6	Yes	
Determination of need for safety check; communication to driver	7	Yes	

* (see Figs 8-1 and 8-2)

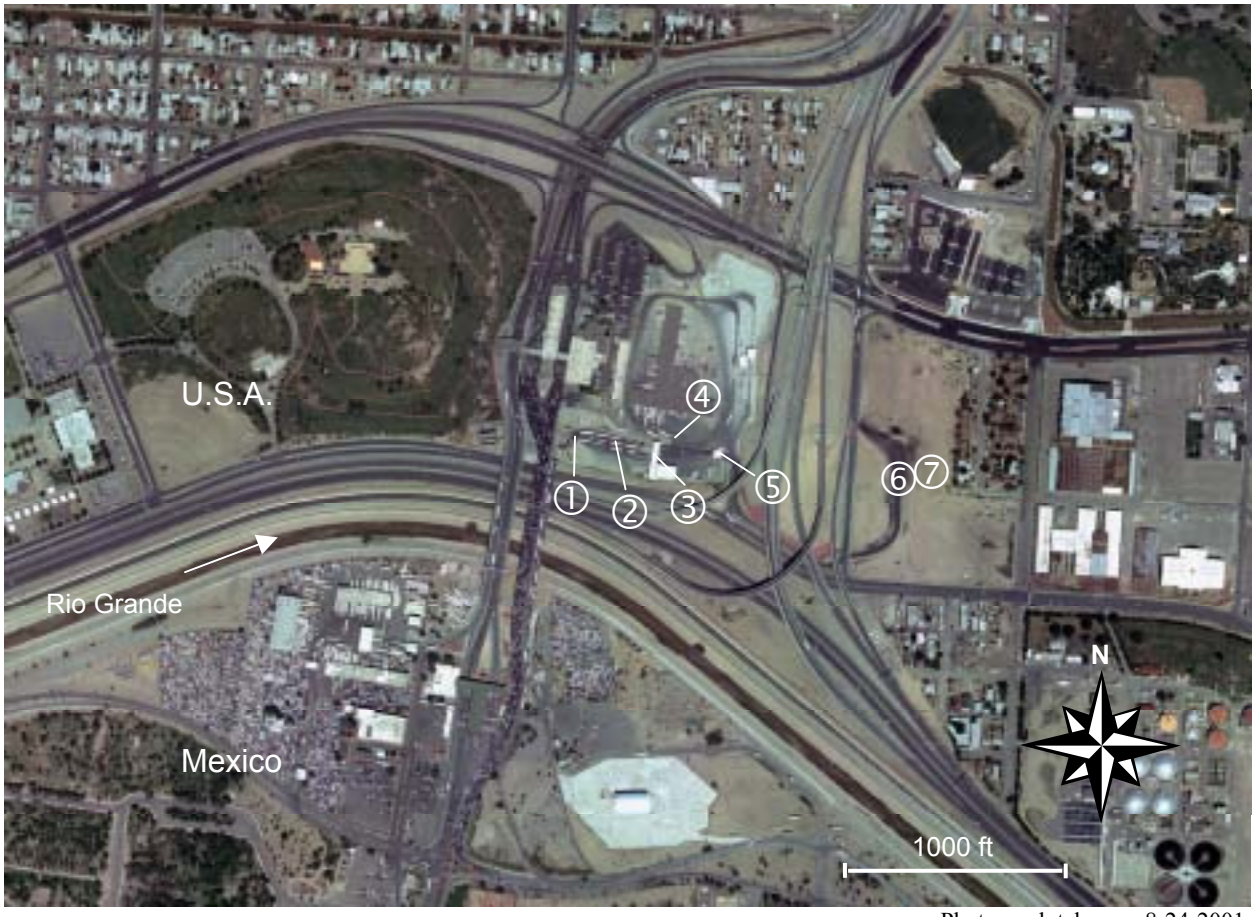
1: Booth on U.S. port of entry
2: Driver identification station
3: Primary inspection
4: Secondary inspection control point
5: Federal compound exit
6: Safety inspection facility entry point
7: Safety checking/screening

9. Bridge of the Americas

General Description

The Bridge of the Americas (BOTA) border crossing facility is located between Paisano Drive and Delta Drive, west of US-54, in El Paso, Texas. The bridge is composed of two separate structures, one for northbound traffic and one for southbound traffic. Truck traffic is handled by two dedicated outside lanes on each bridge structure. Details of the border crossing facilities are shown in Figures 9-1 to 9-6.

TxDOT has already selected the location of the state safety inspection facility. As shown in Figures 9-1 and 9-2, this facility will be located on the east side of the US-54 northbound frontage road (No. 7). A former turnaround lane will provide a secure link between the federal compound and the state safety inspection facility. To ensure that the link between the federal and state compounds is secure, TxDOT has now closed access to the US-54 northbound frontage road from Delta Drive.



Photograph taken on 8-24-2001.

Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).

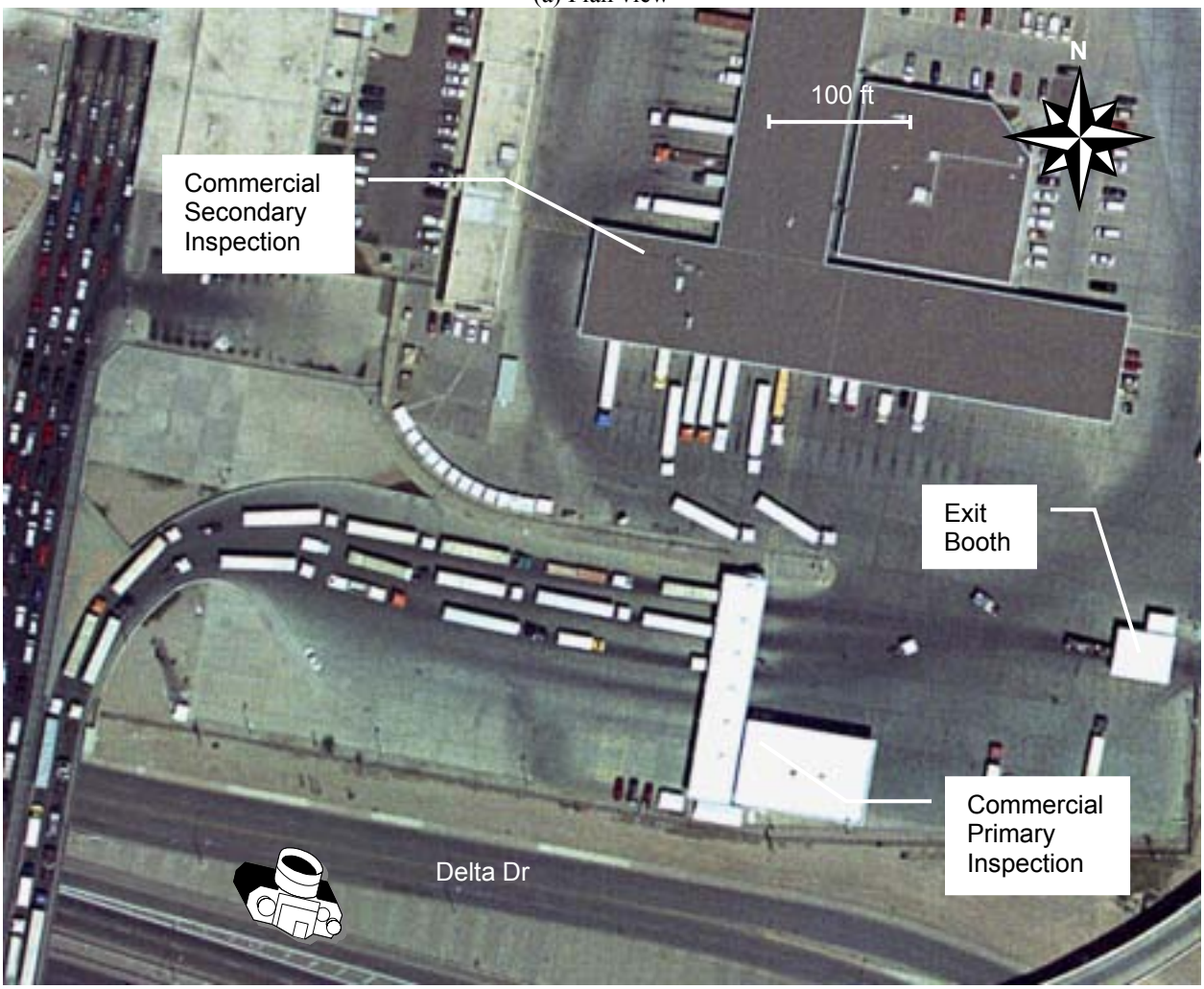
Figure 9-1. Bridge of the Americas (BOTA)

Photograph taken on 8-24-2001

Numbers indicate locations for automated processing on the prototype border crossing model (see Fig 1-1).

Figure 9-2. Bridge of the Americas (BOTA)

(a) Plan view



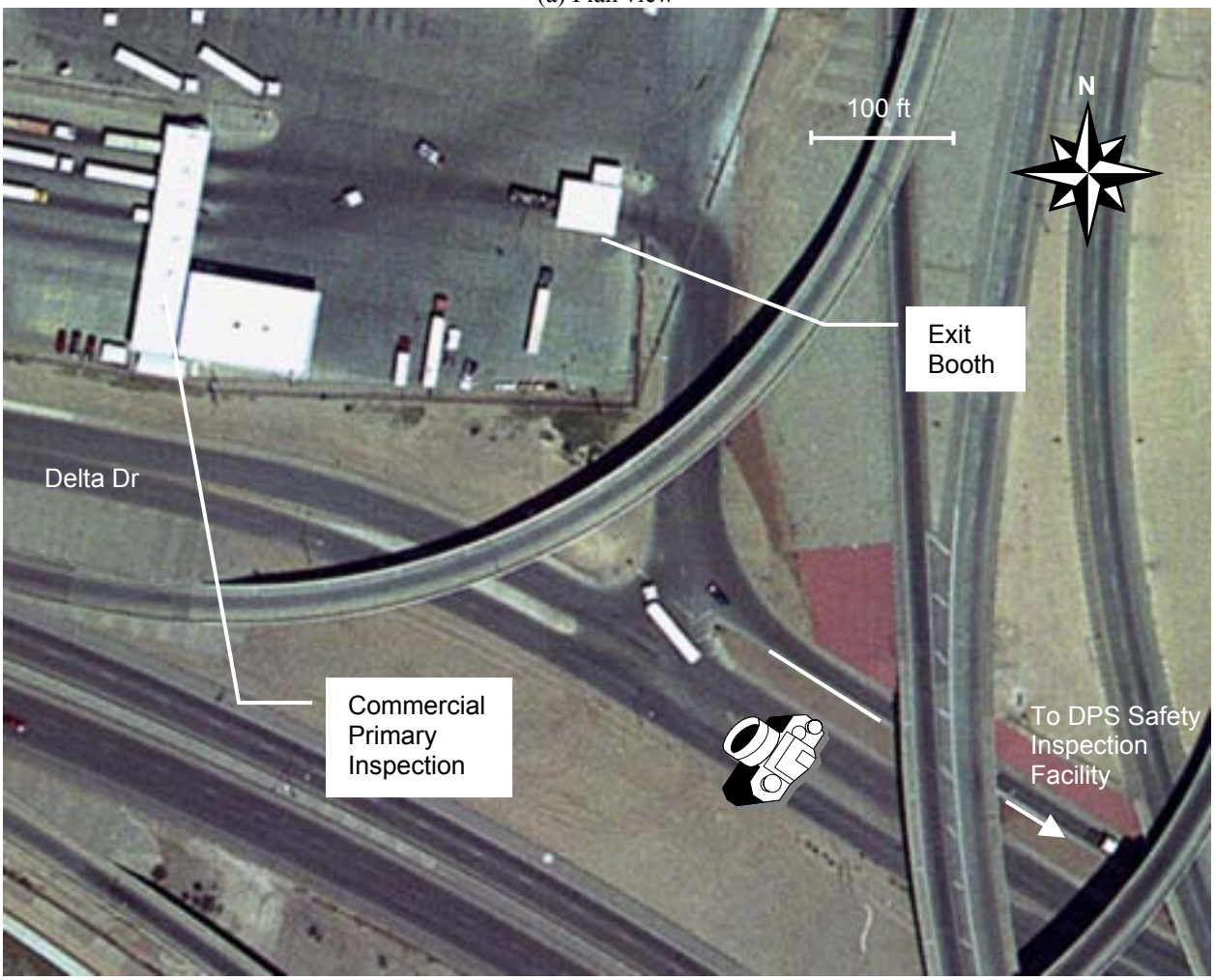
Photograph taken on 8-24-2001

(b) View from Delta Drive, looking north

Photograph taken on 6-15-2001

Figure 9-3. Bridge of the Americas (BOTA): primary and secondary inspection stations

(a) Plan view



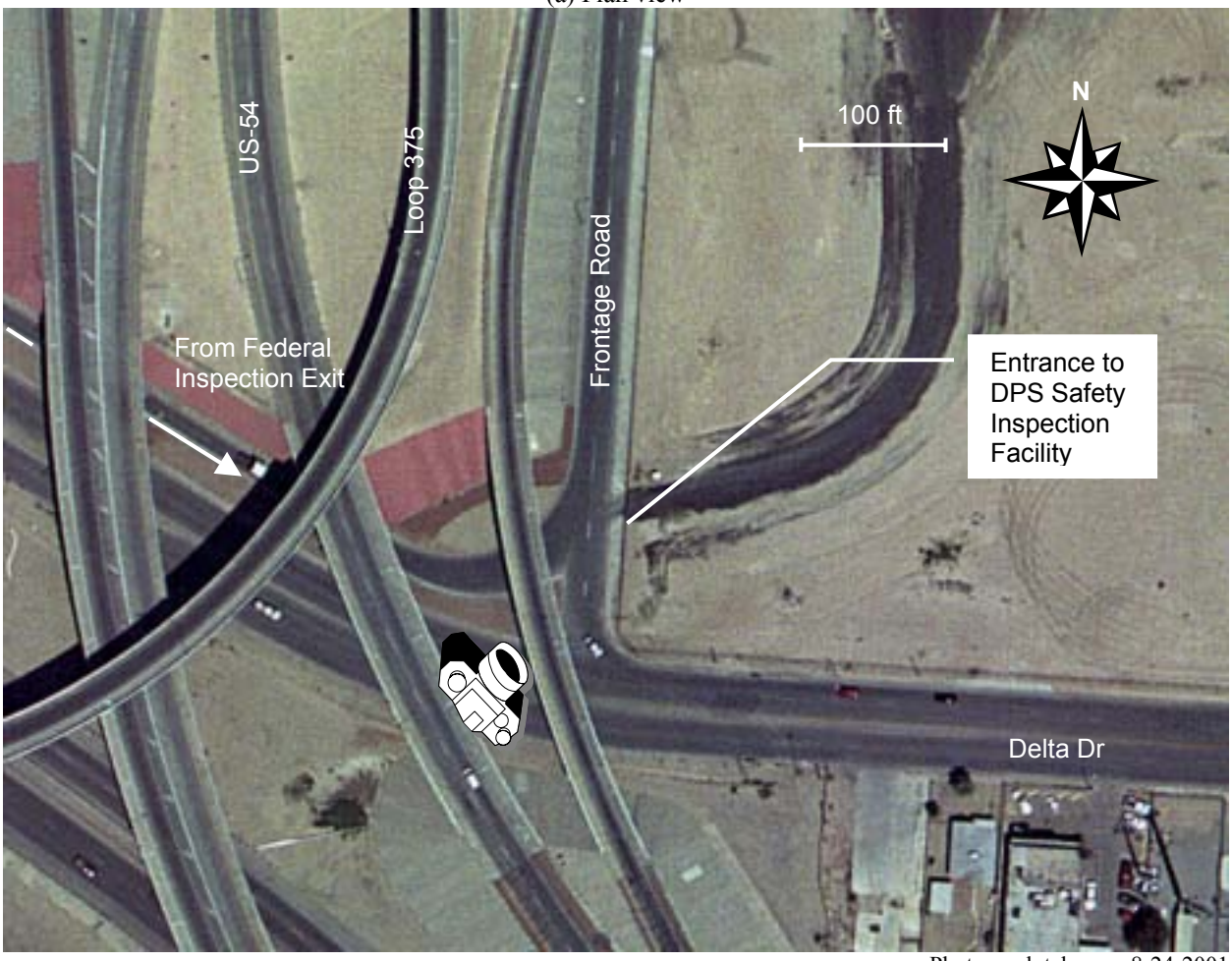
Photograph taken on 8-24-2001

(b) View from Delta Drive, looking west

Photograph taken on 5-25-2001

Figure 9-4. Bridge of the Americas (BOTA): primary inspection station and exit booth

(a) Plan view



Photograph taken on 8-24-2001

(b) View from Delta Drive, looking northeast

Photograph taken on 5-25-2001

Note: Access to frontage road from Delta Drive has been closed.

Figure 9-5. Bridge of the Americas (BOTA): entrance to state safety inspection facility

(a) Plan view

Photograph taken on 8-24-2001

(b) View of US-54 frontage road, looking north

Photograph taken on 5-25-2001

State safety inspection facility location is on the right.

Figure 9-6. Bridge of the Americas (BOTA): state safety inspection facility

Feasibility of Retrofitting Facility with Prototype Border Crossing Components

A comparison between the existing layout of the BOTA border crossing facility and the prototype border crossing (Fig 1-1) leads to the following observations (Table 9-1):

- The space between the bridge exit and the primary inspection station is limited (roughly 400 ft). Further, there is a sharp curve in combination with a downgrade that trucks need to negotiate as soon as they exit the bridge to go to primary inspection. This situation would make it difficult with the current layout to add stations to conduct the initial roadworthiness evaluation (Location 1) and driver status verification (Location 2). One possible solution could be to move Locations 1 and 2 to the bridge structure, which would likely require modifications to the bridge structure to add space for the necessary booth and equipment. A second solution could be to move the primary inspection station closer to the current exit booth to provide more space for roadworthiness evaluation and driver status verification between the end of the bridge structure and the primary inspection station. This would likely necessitate relocating the exit booth to the former turnaround lane leading to the state inspection facility site. A third solution could be to move Location 1 and/or 2 after the exit from the federal compound on the turnaround lane. In addition, video surveillance cameras could be mounted on posts between the bridge exit and the primary inspection station to support the inspection facility.
- One of the two existing lanes on the bridge would need to be converted to a bypass lane or one extra lane would need to be added. Implementation of the bypass lane would need to include the Mexican side of the bridge to realize the full potential of the bypass lane strategy for trucks with transponders. The bypass lane on the Mexican side would also help ensure that trucks without a transponder that need to merge with trucks on the general purpose lane(s) do not block the bypass lane. It appears that one general purpose lane on the bridge should be sufficient to feed three primary inspection lanes (the south existing lane would be used for the bypass lane). However, depending on traffic volumes and the percentage of trucks using the bypass lane, the storage capacity of the one-lane approach could be exceeded. A detailed recommendation on this issue would probably require an in-depth analysis involving traffic flow simulation.
- From the aerial photograph, it is not clear whether trucks exiting secondary inspection could be checked electronically in a reliable way. At Location 4, the prototype border crossing assumes a single exit point from secondary inspection. However, the current secondary inspection layout does not appear to have a clearly defined “single” exit point. To facilitate electronic checking of trucks exiting secondary inspection, it may be necessary to relocate the federal compound exit to the former turnaround lane. This road would need to be widened to provide enough space for the bypass lane.
- The connection between the federal compound and the future state safety inspection facility via a turnaround lane under the Loop 375 ramps has already been defined by El Paso District officials. To ensure that the link between the federal and state compounds is secure, TxDOT closed access to the US-54 northbound frontage road from Delta Drive. Very little traffic used that

section of frontage road before the closure. TxDOT has a weigh-in-motion station on the turnaround lane.

- The state inspection facility will be located to the east of the federal compound on grounds already acquired by TxDOT. The exit from the facility is located on the US-54 northbound frontage road. This configuration provides bypass capability to the state safety inspection process using an already existing section of roadway.

Table 9-1. Prototype elements for consideration in the retrofit analysis at the Bridge of the Americas in El Paso—northbound

Prototype element	Location on prototype*	Feasible?	Challenges
General:			
Identification of vehicle through port of entry	1-7	Yes	
Verification of step completion status	1-7	Yes	
On arrival at U.S. port of entry:			
Activation of electronic file	1	Yes	
Advance determination of vehicle weight	1	Yes	
Verification of on-board transponder status to use express lane	2	Yes	
Verification of driver immigration status	2	Difficult	Limited available space; relocation may be necessary
At primary inspection:			
Verification of step completion status; communication to driver of secondary inspections needed	3	Yes	
Bypass lane(s) if cleared	3 – 6	Difficult	Roadway/bridge modifications required
At secondary inspection:			
Visual determination of road worthiness	6	Difficult	Limited available space; relocation may be necessary
Verification of step completion status/Final check	5	Yes	Spacing may need relocation of exit to turnaround road and widening of that road to two lanes
At exit of federal compound:			
Verification of step completion status	5		
Secure link to safety inspection facility	5 – 6	Yes	
At arrival at safety inspection facility:			
Verification of vehicle safety inspection certification	6	Yes	
Determination of need for safety check; communication to driver	7	Yes	

* (see Figs 9-1 and 9-2)

1: Booth on U.S. port of entry
2: Driver identification station
3: Primary inspection
4: Secondary inspection control point
5: Federal compound exit
6: Safety inspection facility entry point
7: Safety checking/screening

10. Conclusions

Chapters 2–9 provided an evaluation of the feasibility to retrofit eight border crossings along the Texas-Mexico border with specific elements that had been identified as part of a prototype commercial vehicle border crossing concept. Each border crossing is different and, consequently, the feasibility to retrofit existing facilities varies from location to location. Nonetheless, some common trends and issues were observed.

In an effort to provide a relative measure of the potential to retrofit the eight border crossings, a preliminary rating system was developed (Table 10-1). Table 10-2 shows the results of the rating process.

Table 10-1. General retrofitting potential based on total score

Average Rating	General Retrofitting Potential
A	High
B	Good
C	Fair
D	Low

Table 10-2. Prototype element rating

Evaluation Item	Location on prototype*	Border crossing							
		Los Tomates	Los Indios	Pharr-Reynosa	World Trade	Colombia	Eagle Pass	Ysleta-Zaragoza	BOTA
At federal compound:									
Verification of driver immigration status	2	A	A	A	A	A	B	A	C
Implementation of express and bypass lane(s)	2 - 6	B	B	B	A	B	D	A	D
Secure link from federal compound to safety inspection facility	5 - 6	C	B	A	A	C	C	B	A
At safety inspection facility:									
Visual determination of road worthiness	6	A	A	A	B	B	B	A	A
Inspection facility location	7	A	A	A	B	C	D	A	A

* (see Figs 9-1 and 9-2)
1: Booth on U.S. port of entry
2: Driver identification station
3: Primary inspection
4: Secondary inspection control
5: Federal compound exit
6: Safety inspection facility entry point
7: Safety check/screening

Because the retrofit evaluation included only the U.S. side, no ratings were given for general functions and functions before arrival at the U.S. port of entry. Table 10-2 focuses on elements and functions that were considered critical to the general retrofitting potential: visual determination of road worthiness, verification of driver immigration status, implementation of a bypass lane within the federal compound, a secure link from the federal compound to the state safety inspection facility, and the location of the state safety inspection facility. In the case of the roadworthiness potential evaluation, it was assumed that a remotely operated camera could be installed within the federal compound and that the space requirements for the installation of the camera were minimal. In the case of the driver immigration status verification, many approaches are currently being evaluated (including biometric screening) but no firm decisions had been reached on which technology would be selected. As a result, the rating in Table 10-2 reflects the assumption that a physical presence (booth) would be necessary. All other functions have relatively little space requirements and therefore were not rated.

An analysis of the ratings led to the following conclusions:

- All border facilities were rated "A" for "visual determination of road worthiness" because even if there was not enough space for an inspection booth at the facility, it was assumed that it would be possible to install cameras that would link back to the state safety inspection facility. There seemed to be enough space for an inspection booth at all border crossings except in the case of the Camino Real International Bridge in Eagle Pass and the Bridge of the Americas (BOTA) in Laredo. The installation of a booth at both crossings would be challenging.
- The bypass lane, a key function of the prototype border crossing facility, can be easily implemented at most border crossings.
  - The World Trade Bridge facility in Laredo would be the easiest to retrofit because an existing lane could be converted to a bypass lane and there is enough space to route the bypassed traffic around the facility.
  - Border facilities rated "B" in this category usually had enough space for potential lane reassignment, but had challenges related to the routing of bypassed trucks within the federal compound. At a minimum, cones and partially new road construction would be necessary at Los Tomates, Los Indios, Pharr-Reynosa, Colombia, and Ysleta-Zaragoza to prevent truck traffic from changing lanes between the bypass lane and the regular traffic lanes.
  - Potential for implementation of a bypass lane was rated "low" at both the Eagle Pass and BOTA facilities.
  - Eagle Pass faces challenges because the federal facility is limited by Monroe Street to the north and the railway track to the south, and there is not enough space within the federal compound to accommodate the bypass lane. If new land could be allocated to the south of the facility, a new bypass lane could be built parallel to the exiting lanes. However, challenges remain concerning the location of the exit booth, the General

Services Administration (GSA) plans to expand the federal compound to include train inspections, and the location of the state safety inspection facility.

- The BOTA facility faces bypass lane challenges as well, because space between the primary inspection station and the exit booth is very limited. Furthermore, traffic exiting primary inspection merges with and/or intersects traffic exiting secondary inspection at the same point right before the exit booth. Because random checks at the secondary inspection station are also intended for traffic using the bypass lane, it would be challenging to find an acceptable bypass lane geometric configuration that would also be compatible with the current internal traffic circulation within the federal compound.

- Another key element of the prototype border crossing facility is the secure link from the federal compound to the state safety inspection facility. An overall assessment of this feature is difficult because every crossing has more than one option for a site that might be more or less well suited. In general, the closer the location of the potential site to the federal compound, the less new construction will be necessary and the less time trucks will need to pass through the facility. Therefore, the closer the location, the higher the rating. In addition, locations that did not require traffic to take substantial detours after exiting the state safety inspection facility were rated higher. The border crossing facilities at Pharr-Reynosa, the World Trade Bridge facility in Laredo, and the BOTA facility in El Paso were rated the highest. All alternative locations at both Pharr-Reynosa and the World Trade Bridge are easily accessible and fairly close to the federal compound, and the state safety inspection facility at the BOTA facility is already under construction.
- The border crossing facilities at Los Indios and Ysleta-Zaragoza were rated slightly lower. At Los Indios, it would be necessary to cross or partly block Rio Grande Avenue to build the secure link from the federal compound to the state safety inspection facility. At Ysleta-Zaragoza, it would be necessary to cross a drain channel to access the state safety inspection facility. In addition, the alternatives are farther away from the federal compound than the current location chosen for the BOTA facility. The border crossing facilities at Los Tomates and Laredo-Colombia Solidarity Bridge facility were rated "fair." At Los Tomates, one alternative might block access to warehouses on Courage Street, whereas other alternatives could only be accessed if the exit booth from the federal compound is moved. At Laredo-Colombia, the Texas Department of Transportation (TxDOT) is currently evaluating one potential site for the state safety inspection facility, which is located about 0.5 miles away from the federal compound. The link does not cross existing roads and was rated "fair" because of the amount of earthwork and potential foundation challenges. An additional alternative discussed in this report, located about 1,200 ft from the federal compound's exit, could result in a "good" or "high" rating if relocating FM 255 is shown to be feasible. The Eagle Pass border crossing facility was rated "low." Two of the alternatives are located 1.3 – 1.5 miles away from the federal compound. In addition, three alternatives would require truck traffic to cross the access road to the border crossing facility.

Furthermore, three alternatives would require the construction of two new roads. Only Alternative "B" would be rated "good."

- The last rated item on the list, the state safety inspection facility location, faced similar problems in the rating process as the secure link did, because of the variety of alternative locations considered at each border crossing facility. Most locations seem to offer no major difficulties for the construction of the state safety inspection facility. This was the case at Los Tomates, Los Indios, Pharr-Reynosa, Ysleta-Zaragoza, and the BOTA. The World Trade Bridge facility was rated slightly lower. At this facility, two alternatives are located in a low area that would require a significant amount of earth fill to raise them out of a flood plain. The Colombia border crossing facility was rated "fair." The location that is being evaluated by TxDOT would likely involve a substantial amount of earthwork required for the construction of the facility. An additional site considered in this report would be located closer to the federal compound; however, it is not clear at this point whether it could result in a lower amount of earthwork. Some of the alternative locations at the Eagle Pass facility would require earth fill as well and were rated "low."

Overall, based on the availability of space inside the federal compound, availability of adjacent land, and impact on the adjacent transportation system, the eight border crossings were ranked in Table 10-3 as follows:

Table 10-3. Border crossing retrofit potential

	Border crossing	**Location**
Highest potential	World Trade Bridge	Laredo
↓	International Bridge on the Rise	Pharr-Reynosa
↓	Ysleta-Zaragoza Bridge	El Paso
↓	Free Trade Bridge	Los Indios
↓	Veterans International Bridge	Los Tomates
↓	Laredo-Colombia Solidarity Bridge	Laredo
↓	Bridge of the Americas	El Paso
Lowest potential	Camino Real International Bridge	Eagle Pass

Additional observations with respect to specific elements at some border crossings include the following:

- At several border crossings, implementation on the Mexican side would be required to realize the full potential of the bypass lane strategy. This is particularly critical in the case of the Camino Real Bridge (Eagle Pass) and

the BOTA (El Paso) because of the limited availability of space between the bridge exit and the primary inspection station.

- Provided a secure link between the federal compounds and the state safety inspection facilities can be built, implementing and automating the state safety inspection facilities could be accomplished ahead of the implementation of the rest of the components included in the border crossing prototype.

Closing Remarks

As previously mentioned, the analysis in Chapters 2-9 was preliminary and did not include a detailed evaluation of engineering and economic benefits and costs. To better understand specific issues and challenges at each of the locations, a more detailed analysis would need to be conducted. The rating in Table 10-2 and the ranking in Table 10-3 are intended to assist TxDOT in the process of selecting which border crossings to consider for the next planning phase. To ensure the successful retrofit implementation at the selected locations, the project team recommends that TxDOT take into consideration the following:

- Traffic flow simulation and capacity analyses, including both federal and state facilities, and the adjacent transportation system would be required to better understand the impact of any modifications on overall traffic circulation. Those analyses could be used to provide quantitative measures such as travel times, delays, queue lengths, level of service, emissions, and inspection workforce requirements. These measures would ultimately translate into expected economic benefits and costs, which would be useful to assess the effectiveness of the border crossing modifications.
- Improved communications with Mexican officials will be critical to realize the full potential of a bi-national border crossing system. In the "Briefing Document" (2001), the weigh-in-motion site was located at the exit to the Mexican Federal Export Lot so that vehicles exceeding the U.S. size and weight limits could be redirected before entering U.S. territory. A number of objections were raised about this feature, and in later versions of the prototype, the weigh-in-motion site was moved into the U.S. port of entry. However, it is clear that full efficiency at the border can only be reached if a coordinated bi-national approach is implemented and operated. Weigh-in-motion is best undertaken prior to bridge tolls being levied and that remains a key recommendation of the study.
- Proposed modifications should be discussed with Mexican entities to develop an effective bi-national plan to avoid congestion in Mexican urban areas and on the international bridges.
- To increase public acceptance about the retrofitting process, it is critical to continue the exchange of information with all affected stakeholders. Potential stakeholders include trade associations, truck associations, local government, federal agencies, and law enforcement agencies. During previous exchanges, some local government officials, particularly in Laredo, voiced strong concerns about the implementation of state safety inspection facilities within their jurisdictions. TxDOT continues to make every effort to reach consensus with local authorities and interests as it implements federal law and policies

related to truck safety within NAFTA. The success of the implementation will depend to a large degree on the ability of TxDOT and other agencies to reach a consensus with the stakeholders involved.

Finally, in recent months U.S. Customs announced their intention to redesign the Ysleta-Zaragoza port of entry to improve the processing of trucks. Their design includes a number of the physical elements recommended in 5-9014 and includes creating a "fast" lane from the border to primary inspection for empties, Border Release Advanced Screening and Selectivity (BRASS) and trucks registered under future programs like ITDS. This lane will then feed into a by-pass lane for released vehicles, which will take them around and away from the secondary inspection area. More space will be made available for inspection technologies and the need for dock space may diminish. TxDOT staff have developed excellent relationships with U.S. Customs managers in the El Paso area and the study staff recommend that future research should focus on those ports of entry where the need for cooperation is clearly recognized and established.

References

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"Site Selection Study - Volume 1 and 2" (2001). Ashley Humphries & Sanchez Architects PLLC, Laredo, Texas. Commissioned by Texas Department of Transportation, and Texas Department of Public Safety, Border Safety Inspection Facilities.