



## Project Close-Out Report

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**Project Name:** Comprehensive Road Rehabilitation Project for Tijuana, Baja California

Certified: July 24, 2009

Implemented: October 2008 to November 2010

Close Out Report Prepared: March, 2017

Project ID: 668

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## Comprehensive Road Rehabilitation Project for Tijuana, Baja California.

### I. Project Description

#### Project Objective

The purpose of the Project is to reduce harmful emissions generation by enhancing roadway and traffic infrastructure to promote efficient urban mobility which is expected to result in improvements to air quality.

#### 1.1 General Information

<b>Country</b>	Mexico
<b>State</b>	Baja California
<b>Municipality/County</b>	Tijuana
<b>Population</b>	1,641,570 residents. According to INEGI 2015 <sup>1</sup>
<b>Benefitted Population</b>	1,540,072 residents <sup>2</sup>

#### Location Map



<sup>1</sup> Source: <http://cuentame.inegi.org.mx/monografias/informacion/bc/poblacion/>  
<sup>2</sup> Source: Project Certification Document (PCD), July 24, 2009.

<b>Loan Number</b>	BC4570
<b>Certified Project Title</b>	Comprehensive Road Rehabilitation Project for Tijuana, Baja California
<b>Borrower</b>	Apoyo y Consultoría para la Industria de la Construcción S.A. de C.V. <sup>3</sup>
<b>Implementing Agencies</b>	The Municipality of Tijuana and CEMEX CONCRETOS S.A. DE C.V. under Special Purpose Company “Apoyo y Consultoría para la Industria de la Construcción S.A. de C.V.
<b>Other Funding Partners</b>	CEMEX Concretos S.A. de C.V.
<b>Guaranty</b>	Promissory notes “Pagares” with structured payments backed by Tijuana’s “Participaciones”.
<b>Loan Amount</b>	MX\$ 1,449,220,000.00 <sup>4</sup>
<b>Loan Term</b>	up to 20 years
<b>Grace Period</b>	Did not have a grace period

## 1.2 Project Development

<b>NADB/BECC<sup>5</sup> Application Date</b>	November 14, 2008
<b>Submittal Date to The Board</b>	July 3, 2009
<b>Certification Date</b>	July 24, 2009

## 1.3 Project Implementation

<b>NADB Loan Contract</b>	Loan Contract BC4570 signed on October 30, 2009 <sup>6</sup> Loan Contract amendment signed on March 22, 2010 <sup>7</sup> Second Loan Contract amendment signed on July, 2010 <sup>8</sup>
<b>Procurement Initiated Date</b>	Procurement initiated by Sponsor prior to certification. <sup>9</sup>
<b>Construction Contract Signed</b>	October 27, 2008

<sup>3</sup> Special Purpose Company created by CEMEX Concretos S.A. de C.V.

<sup>4</sup> Approved loan, two amendments occurred to the original contract, see section 1.3

<sup>5</sup> On November 10, 2017, the Second Protocol of Amendment to the Agreement between the Government of the United States and the Government of Mexico Concerning the Establishment of the Border Environment Cooperation Commission (BECC) and the North American Development Bank (NADB) entered into force, merging the two institutions into a single entity.

<sup>6</sup> Loan amendment to increase original loan amount from MX\$611,550,000.00 to MX\$1,223,100,000.00 approved by Board Resolution No. 2010-1 on February 18, 2010

<sup>7</sup> Loan amendment to increase original loan amount from MX\$611,550,000.00 to MX\$1,223,100,000.00 approved by Board Resolution No. 2010-1 on February 18, 2010

<sup>8</sup> Loan amendment to increase loan amount from MX\$1,223,100,000.00 to MX\$ 1,449,220,000.00 approved by Board Resolution No. 2010-8 on July 1, 2010.

<sup>9</sup> On October 27, 2008, as a result of a public bidding process, the municipality of Tijuana and CEMEX Concretos S.A. de C.V. signed the contract AYTO-TIJ-2008-LP- 001 to finance and perform paving rehabilitation works in various areas of Tijuana.

<b>Construction Initiated</b>	October 27, 2008
<b>Construction Completed</b>	October 24, 2010 <sup>10</sup>
<b>Construction Contract Closed</b>	N/A <sup>11</sup>

#### 1.4 Disbursements<sup>12</sup>

<b>Initial Disbursement Date</b>	February 18, 2010
<b>Final Disbursement Date</b>	November 24, 2010
<b>Undisbursed Balance</b>	0.0
<b>Final Loan Payment Date</b>	July 19, 2011

## II. Evaluation of design and implementation

### 2.1 Project Certification Summary

<b>Project Summary</b>	<p>At certification, the Project consisted of 160 km (100 miles) of primary roadways rehabilitation in Tijuana, using the “white topping” pavement technique<sup>13</sup>.</p> <p>The Project aimed to enhance roadway and traffic infrastructure to promote efficient urban mobility, in Tijuana, Baja California. Concrete was selected to repave the main corridors, all of which had heavy traffic flow, in order to reduce maintenance and extend the surface life cycle.</p> <p>The Project included the rehabilitation of 17 main traffic corridors, with an average age of 30 years. Repaving works were expected to reduce harmful emissions by increasing traffic speed.</p>
<b>Project Key Objectives and Goals</b>	<p>The Objective of the Project was the rehabilitation of 160 km (100 mi) of roadways. The anticipated outcomes resulting from the project included:</p> <ul style="list-style-type: none"> <li>a) Increase the city's hydraulic concrete pavement coverage from 30.2% to 40.7% by repaving 160 km (100 mi) of primary roadways within Tijuana urban area.<sup>14</sup></li> </ul>

<sup>10</sup> Source: Summary of construction works (Resumen Financiero de Programa General de Obra, Contrato AYTO-TIJ- 2008-LP-001)

<sup>11</sup> Source: Sponsor reported a last disbursement occurred in November 2010 although a completion documentation does not exist

<sup>12</sup> Source: Database from NADB's Finance Department

<sup>13</sup> The White Topping is the covering of an existing asphalt pavement with a layer of Portland cement concrete.

<sup>14</sup> Source: PCD Tijuana AQ, July 24, 2009.

b) Paving rehabilitation works are expected to contribute to the reduction of 318 metric tons/year of volatile organic compounds (VOC), 1,933 metric tons/year of carbon monoxide (CO) and 663 metric tons/years of nitrogen oxides (NOx).<sup>15</sup>

## 2.2 Project Results

Outcomes /Outputs	Target	Actual	Comments
<b>Outcomes</b>			
Increase the city’s hydraulic concrete pavement coverage	From 30.2% to 40.7% (10.5%) (160 km or 100 mi)	From 30.2% to 40.7% (10.5%) (160 km or 100 mi)	Information from the Sponsor that reported completion of works (17 streets, as in the original project scope)
Reduction of harmful emissions by increasing the coverage of concrete pavement in main roadways.	318 metric tons/year of volatile organic compounds (VOC), 1,933 metric tons /year of carbon monoxide (CO) and 663 metric tons /years of nitrogen oxides (NOx). <sup>16</sup>	258 metric tons/year of volatile organic compounds (VOC), 676 metric tons /year of carbon monoxide (CO) and 285 metric tons /years of nitrogen oxides (NOx). <sup>17</sup>	See footnote 13 & 14 for results measurements detail.
<b>Outputs</b>			
Rehabilitation of paving in main roadways.	160 km (100 miles)	160 km (100 miles)	

## 2.3 Project Construction Schedule

Component	Target <sup>18</sup>	Actual	Comments
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<sup>15</sup> The baseline was recalculated utilizing Mobile6 adapted to Mexico. The baseline included in the PCD utilized a version of Mobile6 not adapted for Mexico, as it was not available. The newer model more accurately reflects the composition and characteristics of the vehicle fleet circulating in Mexico.

<sup>16</sup> The streets rehabilitation was expected to allow vehicles to increase their speed from an average of 32 km/h to an average of 45 km/h. The VOC, CO and NOx emissions were expected to be reduced from 3 to 6% from their current levels.

<sup>17</sup> There are not post-project studies to monitor real project results (vehicle speeds and traffic), thus current speed increase was estimated by monitoring average speeds in google maps over a two-week period. The data collected indicates an average speed of 38 km/h. Emission factors were calculated based a pre-certification information related to car flows and a speed increase from 32 km/h to 38 km/h.

<sup>18</sup> Source: Based on the Project task schedule proposed by the Sponsor included in the PCD.

Paving rehabilitation of 100 miles (160 Km) in different areas in Tijuana	November 2008 to April 2011	October 27, 2008 to October 24, 2010 <sup>19</sup>	
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## 2.4 Sources and Uses of Funds

Parameter	Target Millions MXP <sup>20</sup>	Actual Millions MXP <sup>21</sup>	Comments
<b>SOURCES</b>			
CEMEX – Tijuana Equity/Loan	255.74	185.99	
NADB Original Loan (Loan A)	611.55	1,293.61	
NADB First Loan Extension (Loan B)	611.55		
NADB Second Loan Extension (Loan C)	226.12		
<b>Total Sources</b>	1,704.96	1,479.6	
<b>USES</b>			
Construction	1,704.96	1,479.6	See more information in section 3.1
<b>Total Uses</b>	1,704.96	1,479.6	

## III. Evaluation of performance

### 3.1 Effectiveness in Achieving Outcomes/Outputs

#### Target Achievement

The Project achieved the expected objectives of increased concrete paving coverage and improved air quality and reducing associated emission for approximately 258 metric tons /year of VOC, 676 metric tons/year of CO and 285 metric tons /year of NOx by repaving 160 km (100 mi) of roadways within Tijuana's urban area.

<sup>19</sup> Source: Copy of summary of financial construction works estimates (*Resumen Financiero de Programa General de Obra, Contrato AYT0-TIJ- 2008-LP-001*)

<sup>20</sup> Source: PCD Tijuana AQ, July 24, 2009.

<sup>21</sup> Information based on Sponsor Oficio DIR/1976/2016 dated 15 Nov 2016

	<p>The paving works helped to improve mobility and reduce operation and maintenance tasks. The works completed included the development of final designs and paving rehabilitation.</p> <p>Project supervision was performed by Tijuana’s department of public works (<i>Dirección de Obras e Infraestructura Urbana Municipal</i>). The paving works were completed within two years with no delays identified or reported by the Sponsor.</p> <p>Based on the updated information provided by the Urban Development, and Ecology Department and Public Works Department, the total of paved area implemented under the contract No. AYO-TIJ-2008-LP-001 was 2'382,814.36 m<sup>2</sup>.</p>
<b>Success Factors</b>	The Project was completed before it was expected. The use of an experienced company and available funding were key to the success of the Project.
<b>Lessons-Learned</b>	This Project provided BECC its first experience in modeling emissions. The model has improved and is now calibrated to reflect Mexico’s conditions. Additionally, a calculation memory is added to project files.

### 3.2 Evaluation of Project’s Operational Performance and Sustainability

<b>Operational Performance and Sustainability</b>	<p>Personnel of BECC and NADB conducted a field visit to oversee the conditions of the rehabilitated roads and confirmed that the 17 corridors included in the Project were rehabilitated and are in good operating conditions.</p> <p>The Municipality of Tijuana, through its department of public works (<i>Dirección de Obras e Infraestructura Urbana Municipal</i>), is responsible for the maintenance of roads. During the field visit, BECC and NADB staff interviewed with Mr. Didio Alberto Téllez Meza, Construction Area Subdirector.</p> <p>According to municipal information, interview with the Sponsor, and during field visit BECC confirmed that the municipality has provided maintenance to the rehabilitated streets with a total authorized area budget of \$61 million pesos in 2016.</p>
<b>Success Factors</b>	None
<b>Lessons-Learned</b>	Changes in administration continue to make it difficult for BECC and NADB to obtain information related to the success and challenges of the Project. Therefore, it is important to perform the close out process after a year of construction or before a change in administration.

### 3.3 Loan Terms, Conditions and Covenants Compliance

**Financing Performance**

There were eight disbursements to the trust in a 9-month period, the loan was re-paid by the Municipality in 21 months from the original loan signing (October 2009). The borrower complied with loan terms, conditions and covenants.

**Success factors**

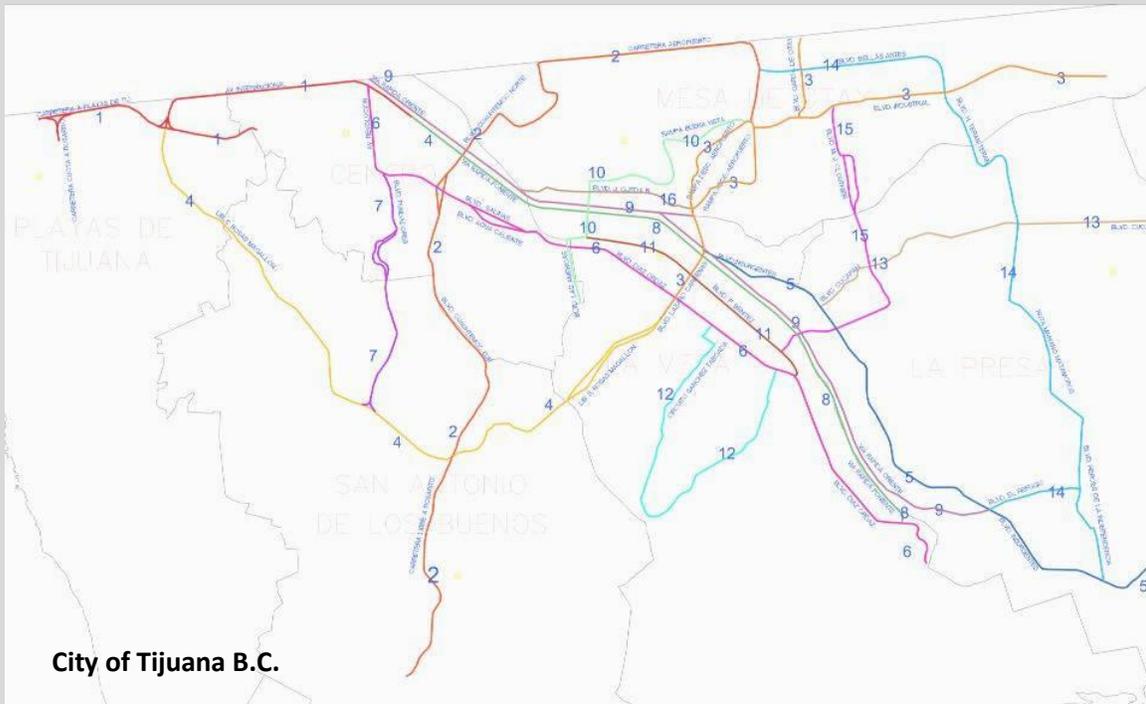
None

**Lessons-learned**

None

# Annexes

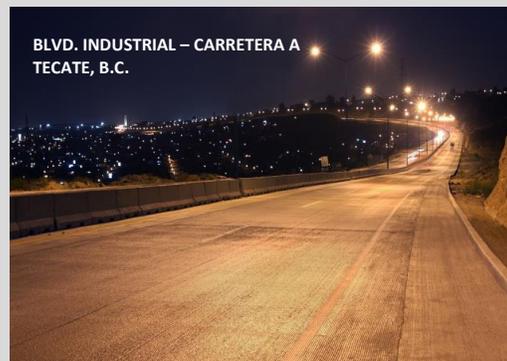
## A) Map(s) of Project Area



City of Tijuana B.C.



BLVD. INDUSTRIAL – CARRETERA A TECATE, B.C.  
147,400 m<sup>2</sup> – 6.7 km  
45,470 Vehículos diarios  
136,410 Habitantes beneficiados



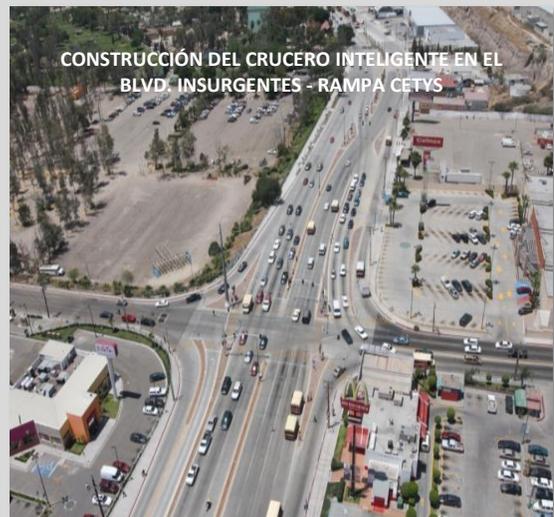
BLVD. INDUSTRIAL – CARRETERA A TECATE, B.C.



VÍA RÁPIDA PONIENTE  
130,000 m<sup>2</sup> – 7.6 km  
85,560 vehículos diarios  
213,900 Habitantes beneficiados

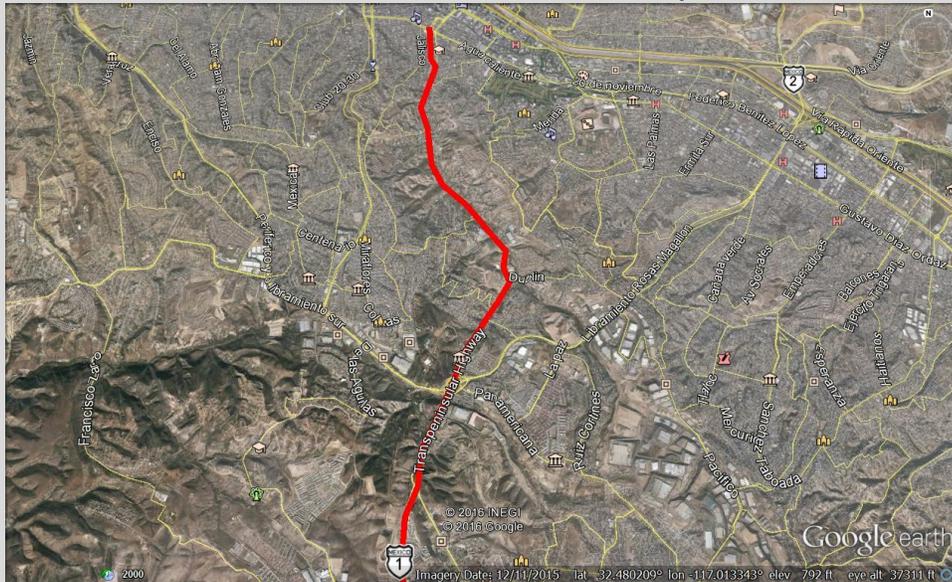


VÍA RÁPIDA PONIENTE Y VÍA LENTA PONIENTE



### SITE VISITS IN JUNE 2016

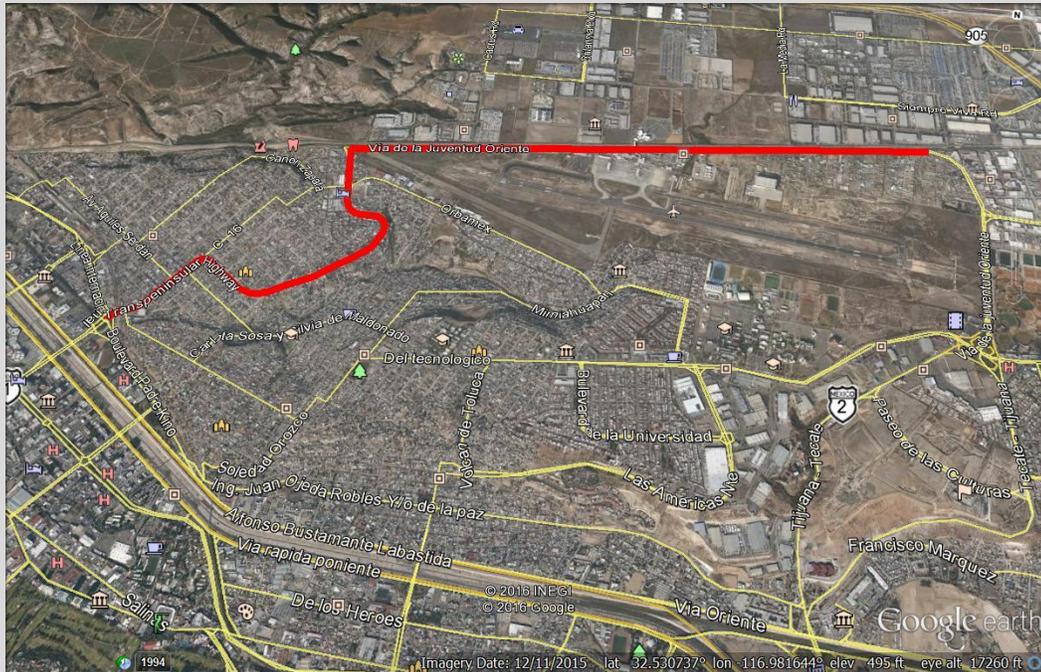
#### Carretera Libre a Rosarito Aeropuerto



#### Aguacaliente – Blvd Santa Fe



### Aguacaliente – Blvd Santa Fe



### Vía Oriente - Aeropuerto



### Bldv. Bellas Artes – Terán



### Bldv. Bellas Artes a Blvd. Cucapah



### DOWNTOWN STREETS



#### Calle 4ta y Martínez



#### Calle 5ta y Emiliano Zapata



**Calle 5ta y Niños Héroes**



**Calle 5ta y Constitución**



**Calle 5ta y Revolución**



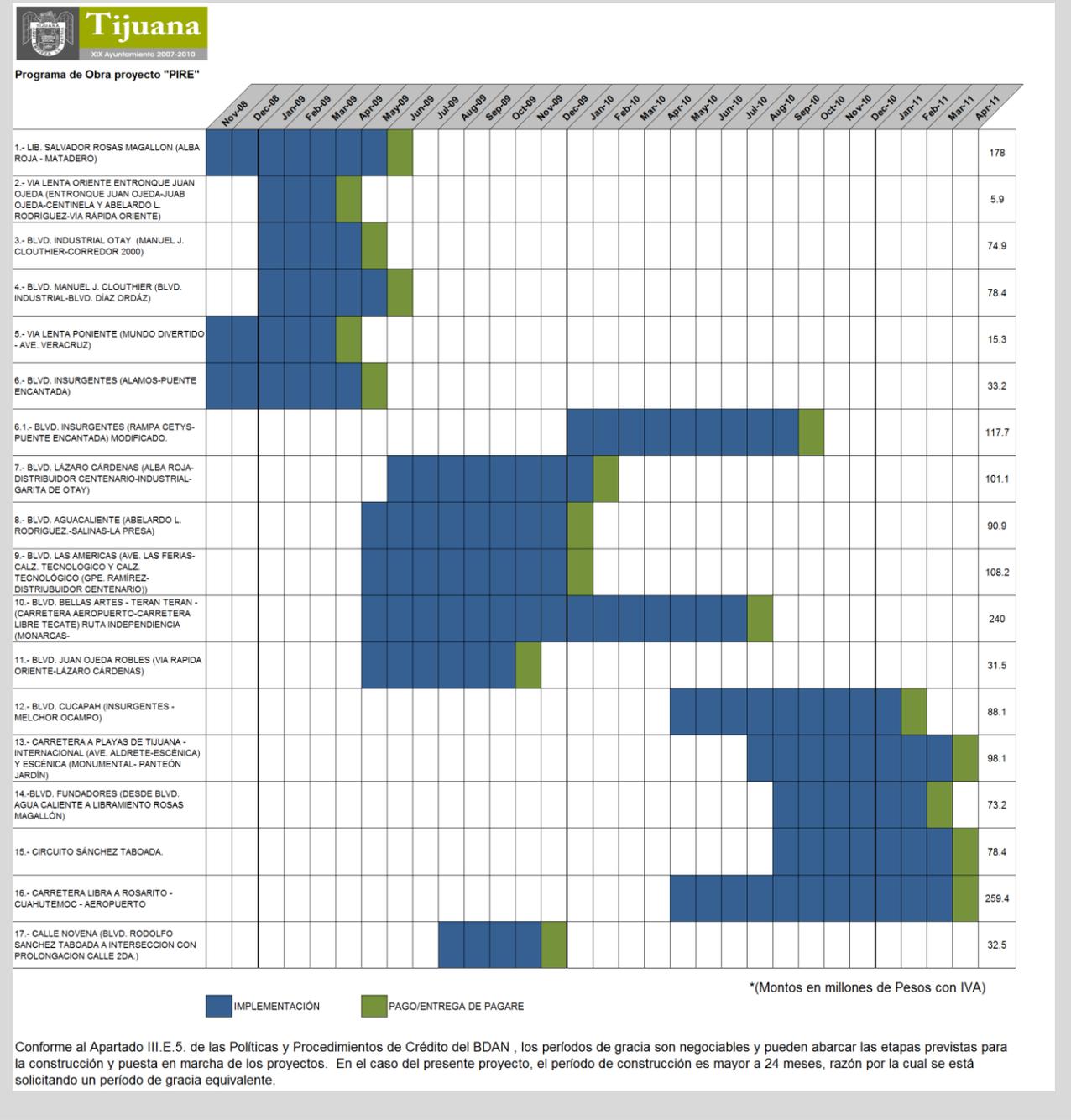
**Calle 4ta y Revolución**



**Calle 2da y Revolución**



## B) Project Implementation Schedule<sup>22</sup>



<sup>22</sup> Source: Based on the Project task schedule proposed by the Sponsor and included in the PCD.

## C) Results Matrix

Please find the Results Matrix Document in the attached folder documents.

<b>Results Measurement Project Logframe Matrix Comprehensive Road Rehabilitation Project in Tijuana, Baja California</b>			
<b>Project Objective:</b>			
Rehabilitate 100 miles of Tijuana's main thoroughfares. The Project will improve road conditions on the primary roadway system to facilitate the flow of traffic, minimize traffic congestion and pollutant air emissions, thus creating a positive impact for the health of residents.			
Results Measurement	Indicators and Targets	Baseline Value	Measurement Methodology
<b>Outcomes:</b> Access to, use of, and satisfaction with goods and services provided, building evidence of the achievement of the project objective. These should be directly attributable to the project and should describe an improvement in existing conditions related, whenever possible, to environmental and human health, financial, and sustainable development.			
<b>1 Improved Financial Self-Sustainability</b>	Sufficiency of annual Tijuana's Federal Tax Revenues to properly cover NADB debt service. (Target > = 1)	N/A <sup>1</sup>	Reviewed on an annual basis with the debt service coverage ratio report.
<b>2 Strengthen Institutional Capacity</b>	Full compliance with all applicable laws, rules and regulations	N/A <sup>2</sup>	Reviewed at construction completion.
<b>3 Operational Performance and Environmental Cost-Effectiveness</b>	\$\$ / m <sup>2</sup> (Target=MX\$397 / m <sup>2</sup> )	MX\$397 / m <sup>2</sup> (2008)	Reviewed at construction completion using actual project investment.
<b>4 Human Health Indicator</b>	Cases per 10,000 inhabitants of acute respiratory infections	1,091 cases (2006)	Reviewed at construction completion.
<b>5 Air Quality Indicators (Mobile sources)</b>	Nitrogen Oxides (NOx) (tons/yr) Carbon Monoxide (CO) (tons/yr) Particulate Matter 2.5 (PM <sub>2.5</sub> ) (tons/yr)	2,754 20,331 4.19	Reviewed at one year of construction completion.
<b>Outputs:</b> Goods and services that the project will deliver			
<b>Technical:</b>			
Square feet of streets paved	46.29 million square feet		
Roads constructed	100 miles		
<b>Financial:</b>			
Debt Service Coverage Ratio Report	>=1		
<b>Institutional Capacity:</b>			
Report addressing regulatory compliance activities carried out by the Municipality	Report		
<b>Implementation</b>			
<b>Inputs and Activities:</b>			
<b>Technical:</b>			
<i>NADB Implementation Activities</i>			
Procurement process			
Construction			
Square feet of streets paved	46.29 million square feet		
Project close-out			
<b>Financial:</b>			
<b>Inputs</b>			
CEMEX-Tijuana	MX\$ 1,093.41 million		
NADB Loan	MX\$ 611.55 million		
<b>Activities</b>			
Execution of loan contract NADB / Municipality & CEMEX			
Compliance with disbursement conditions			
NADB Auditing - covenants compliance review			
<b>Public Participation:</b>			
Outreach activities - construction updates; education/awareness			
<sup>1</sup> Baseline Value will be determined at loan disbursement			
<sup>2</sup> Baseline Value will be determined at loan closing			

**D) Board Certification document**

Please find the Board Certification Document in the following link:

[http://server.cocef.org/CertProj/Eng/BD%202009-20%20Tijuana-Cemex%20AQ%20Certification%20Document%20\(Eng\).pdf](http://server.cocef.org/CertProj/Eng/BD%202009-20%20Tijuana-Cemex%20AQ%20Certification%20Document%20(Eng).pdf)

**E) Board Loan document**

Please find the Board Loan Document in the following link:

<https://app.box.com/s/ing7vln07a0d9nv2919kmdnfx0e0kiz>