Benefit-Cost Analysis of Rock Island Connection Project (P2)

December 2024

Prepared for:

CREATE
KEEPING THE GO IN CHICAGO

Prepared by:

HNTB

This page intentionally left blank.

TABLE OF CONTENTS

TABLES

FIGURES

ACRONYMS

AIS	Abbreviated Injury Scale (AIS)
AADT	Annual Average Daily Traffic
ADA	Americans with Disabilities Act
ATRI	American Transportation Research Institute
BCA	Benefit-Cost Analysis
BRC	Belt Railroad Company
CN	Canadian National
CO_2	Carbon Dioxide
CP	Canadian Pacific
CREATE	Chicago Region Environmental and Transportation Efficiency
FHWA	Federal Highway Administration
GDP	Gross Domestic Product
IMR	Interchange Modification Report
KABCO	Injury classification scale
LOS	Level of Service
mph	Miles per Hour
NO_x	Nitrogen Oxide
NPV	Net Present Value
NS	Norfolk Sothern
O&M	Operating and Maintenance
PDO	Property Damage Only
$PM_{2.5}$	Particulate Matter
PV	Present Value
RTC	Rail Traffic Controller
SO_2	Sulfur Dioxide
UP	Union Pacific
USDOT	United States Department of Transportation
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
VOCs	Volatile Organic Compounds
VOT	Value of Time

This page intentionally left blank.

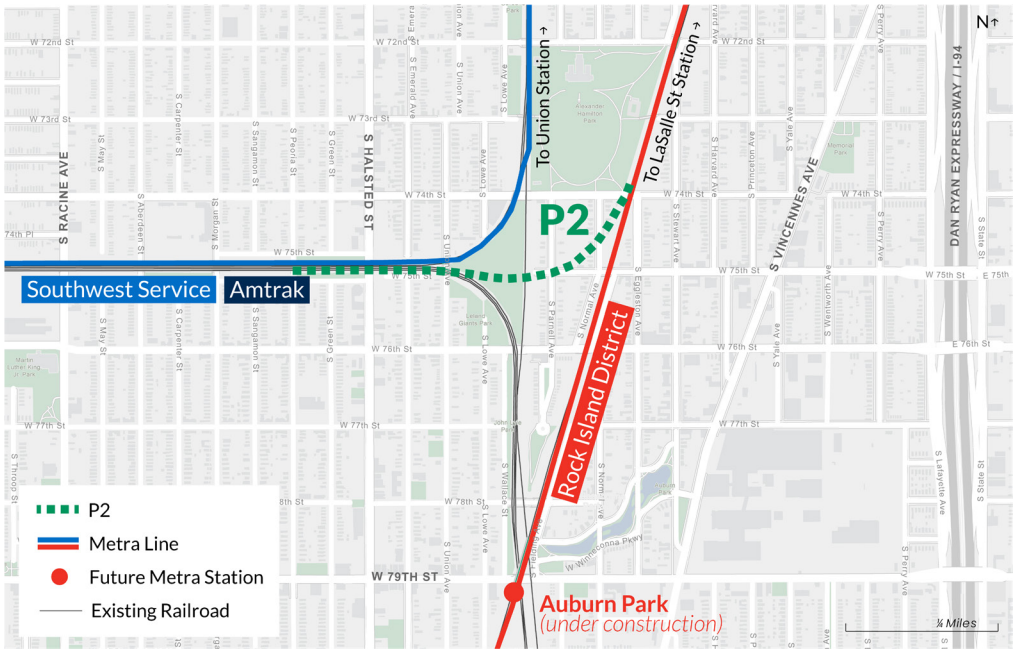
I. INTRODUCTION

This report documents the Benefit-Cost Analysis (BCA) that evaluates the benefits to society resulting from the Chicago Region Environmental and Transportation Efficiency (CREATE) Program improvements associated with the Rock Island Connection Project ("P2" or "the Project") . The BCA demonstrates the cost effectiveness of the Project for which the sponsors are seeking federal support, measured in terms of a Benefit-Cost (B/C) ratio and Net Present Value (NPV).

I.1 Rock Island Connection Project (P2)

The Rock Island Connection Project ("P2" or "the Project") includes building a flyover structure building a flyover structure to divert 30 daily passenger trains carrying 9,000 passengers each day from the congested south concourse of Chicago Union Station. The flyover will connect the Metra SouthWest Service (SWS) to the Metra Rock Island District (RID) near West 75th Street and South Parnell Avenue, as well as constructing a second main track for Metra's SWS operations from near Wrightwood Station (near West 79th Street and South Kedzie Avenue) to east of South Halsted Street, connecting with the new flyover. P2 will allow Metra SWS trains to access the LaSalle Street Station in Chicago's downtown instead of Chicago Union Station, which will increase capacity for the Metra SWS. Additionally, the shift of Metra SWS trains onto the Metra RID will reduce passenger rail conflicts with Norfolk Southern freight operations on the Chicago and Western Indiana (CWI) line north of the P2 Project area and increase operational capacity at Chicago Union Station. P2 also includes community mobility improvements through various street improvements at six separate viaducts or roadway segments along the corridor. These improvements include ADA ramps, LED lighting fixtures, sidewalk/pedestrian enhancements, pavement replacement, sewer upgrades, and landscaping.

Figure 1: P2 Project Area



Project elements that generate benefits include:

- Reconfiguring the east-west tracks at Forest Hill Junction,
- Adding a third track to the Norfolk Southern line,
- Replacing and restoring aging bridge structures, tracks, and viaducts,
- Modernizing signals, and
- Implementing community mobility improvements on streets throughout the corridor.

I.2 Project Context

The scope of this analysis covers the costs and benefits for the P2 phase of the greater 75th St Corridor Improvement Project (CIP) and the Metra Rock Island (RI) Third Main project, because operations using the new P2 flyover are best optimized with the completion of the RI Third Main and Yard. The P2 phase will build upon several projects (including EW2A, P3, and GS19) in the 75th St Corridor that eliminate rail-rail conflicts and improve travel time, safety, and state of good repair leading to the flyover. The Forest Hill Flyover (P3) and 71st Street Grade Separation (GS19) projects are currently under construction, and EW2A received funding as part of the 2024 MPDG grant awards. Once fully implemented, the 75th Street CIP will serve to cut rail traffic delay and emissions and increase safety at the most complex and congested rail junction in the Chicago Terminal 1 (Terminal), yielding substantial benefit towards the Chicago region's freight economy, passenger rail service, infrastructure resilience, and the national distribution of commodities and goods.

I.3 BCA Model Development

The Benefit-Cost Analysis is based on freight rail, passenger rail, and traffic data in the Project area.

A spreadsheet-based BCA model was constructed for the purposes of this analysis. The model uses Rail Traffic Controller (RTC) modeling outputs for delay reduction scenarios, Simplified Trips-on-Project Software (STOPS) ridership forecasting outputs, City of Chicago data, and global parameters provided by the United States Department of Transportation (USDOT) for BCAs.

Using both Project-specific inputs and global parameters, the BCA model calculates life-cycle costs, life-cycle benefits, annual benefits, the NPV of quantifiable costs and benefits, and the resulting B/C ratio, utilizing a methodology that aligns with USDOT guidance for FY24 grant applications.

I.4 Organization of BCA Memorandum

Section II describes the mechanisms that generate the benefits of the Project and the classes of benefits evaluated.

Section III describes the inputs and parameters to the BCA model

Section IV describes the detailed methodology for computing Project benefits, including an illustration of the benefits calculated for an example year for the Project.

Section V summarizes the BCA results and the resulting B/C ratio.

Appendix A provides detailed tabulations of annual benefits and costs for the overall Project.

II. PROJECT BENEFITS AND COSTS

II.1 Benefits of the Project

The Project is expected to generate benefits through several mechanisms: service improvements, delay reduction, mode shift, and lighting and sidewalk improvements. Benefits generated through these mechanisms include:

- Metra passenger travel time savings from service improvements
- Avoided delay from improved network effiency
- Avoided additional passenger rail costs resulting from reduced idling
- Passenger travel cost savings from mode shift
- Crash cost savings from mode shift
- Emissions damage savings from mode shift
- Reduced crashes resulting from lighting and sidewalk improvements
- Reduced crime resulting from lighting and sidewalk improvements

In addition to quanitifying project benefits, the disbenefit of increased operating and maintenance costs resulting from increased service is also quantified.

The methodology for evaluating each of these benefits is discussed in Section IV.

Table 1: Project Matrix

Current Status / Baseline & Problem to be Addressed	The project reduces conflicts and congestion between freight trains, passenger rail, and roadway users in Chicago's South Side.
Change to Baseline / Alternatives	Build Scenario includes building a flyover structure to connect the Metra SouthWest Service (SWS) to the Metra Rock Island District (RID); constructing a second main track for Metra's SWS operations; and implementing community mobility improvements on surface streets throughout the corridor.
Type of Impacts	Reduced passenger train delay, reduced idling, travel time savings, reduced vehicle operating costs, reduced crashes, reduced emissions damage, reduced crime, improved freight movement and economic vitality, and improved operational efficiency.
Affected Population	Daily local users and commercial through-traffic.
Economic Benefit	The BCA indicates that the Project will result in travel time savings,traffic delay savings, crash cost reductions, emissions damage savings, and safety improvements.
Summary of Results	Benefit/Cost ratio greater than 1.0 indicates that the Project generates benefits to society that exceed its costs.

In addition to the benefit classes quantified in this analysis, the Project is expected to generate other benefits including:

- Congestion reduction at Chicago Union Station from diverting SWS trains
- Avoided train delay resulting from reduced rail diversion and gate down time
- Reduced community externalities resulting from a more efficient freight network

II.2 Costs of the Project

Construction costs are estimated to be $409,632,467 (2024$) spent between 2028 and 2032. These values are show in Table 2.

Table 2: Project Construction Costs

Year	Project Total	Units
P2	$409,632,647	***2024$***
47th Street Yard	$178,526,477	***2024$***
Third Main - 17th Street to 54th Street	$356,554,931	***2024$***
Third Main - 54th Street to 74th Street	$114,353,035	***2024$***
Base Dollar Value	$980,464,454	***2022$***
Discounted Value	$754,993,256	***2022$***

For the purposes of this analysis, the cost to comlete the Rock Island Third Main are added to the benefit cost ratio calculation, since both projects result in the diversion of SWS trains. Rock Island Third Main costs are estimated to be $649,434,443 (2024$) spent between 2029-2032.

III. MODEL INPUTS AND PARAMETERS

III.1 Period of Analysis

Benefits were evaluated for a period of 30 years beginning with the opening of the Project in 2033 and ending in 2062. The Project is estimated to be complete in 2032, but this analysis assumes an opening year of 2033 to be conservative.

Table 3: Project Schedule

Factor	Year
Construction Start	2028
Opening Year	2033

III.2 Base Year of Analysis

Per USDOT BCA guidance, this analysis was conducted in constant 2022 dollars. All benefits and costs are discounted to 2022 at a 3.1% discount rate, except for carbon-related benefits which are discounted at 2%.

III.3 Residual Value

This analysis estimates the residual value of the Project based on a useful life of 75 years and a project opening year of 2033. The undiscounted residual value in year 2062 is $601,351,532 (2022$).

III.4 Passenger Train Ridership

P2 allows Metra to improve their operations and increase service along the RI and ME corridors. ridership modeling was performed by HNTB to consider changes to the service plan and the resulting change in ridership and incremental operating cost.

- The **No-Build** service plan used in ridership and operating cost modeling is based on the 2019 Metra schedule. The only adjustment made to the service plan is the addition of a planned new Metra station, Auburn Park, which is estimated to open in 2025 on the RI corridor.
- The **Build** scenario includes the added RI Auburn Park station, as well as general schedule updates. For ME, the Build scenario reroutes the corridor to change the downtown terminal station from Chicago Union Station (CUS) to the Lasalle Street Station. For both corridors, the Project allows for train speed improvements which reduces travel time for riders. This analysis does not account for additional service optimization opportunities for Metra and Amtrak associated with capacity improvements at CUS.

The FTA Simplified Trips-on-Project Software (STOPS) model was used to forecast the ridership impact of the improved Metra service along RI and ME. General Transit Feed Specification (GTFS) files were developed to describe the Build and No-Build service plans and modeled using the regional STOPS model calibrated for Chicago. The model assumed no other changes to the region's transit network. The raw STOPS outputs for 2017 and 2037 were used in this analysis, including total corridor ridership and change in passenger miles traveled by automobile as summarized in Table 4.

Table 4: No Build and Build Metra Passengers

Factor	2017	2037
RIDERSHIP[A]		
No Build Daily Weekday Passengers		
RI	24,640	30,813
SWS	7,786	9,055
All Passengers	32,426	39,868
Annualization Factor	284	284
Build Daily Weekday Passengers		
RI	25,417	32,228
SWS	14,293	15,972
All Passengers	39,710	48,200
MODE SHIFT[B]		
PMT Reduction	-154,114	-174,674

Source: A: STOPS Model Output. Table 9.01.

Source: B: STOPS Model Output. Table 10.01

To estimate the operating and maintenance costs required to run the improved service, 2019 data for Metra expenditures and service statistics by corridor were used to develop an O&M cost model. Each Metra expenditure was assigned to a cost driver in order to derive unit costs which are used to estimate the incremental cost increase. To account for operational differences by Metra corridor, unit costs were derived at the corridor level. Five cost drivers were used to estimate the incremental O&M cost for RI and ME: dollars per train mile, dollars per car mile, dollars per train hour, dollars per train trip, and dollars per track mile. Unit costs and cost drivers are summarized in Table 5.

Table 5: Operating and Maintenance Cost Drivers and Unit Costs

Factor	RI	SWS
Increased Cost Drivers		
Train Miles	44,338	53,839
Car Miles	354,649	398,408
Train Hours	811	-450
Train Trips	3,276	1,638
Track Miles	8	17
Unit Costs		
Train Miles	$8.68	$8.33
Car Miles	$4.41	$4.59
Train Hours	$1,015.06	$906.68
Train Trips	$201.47	$201.47
Track Miles	$261,567.09	$92,416.13

Source: Metra O&M Model, 2019.

III.5 Rail Network Performance

RTC modeling was performed by HDR, Inc. on the Project area to understand the impact of the Project to the overall network. All model outputs are provided for years 2022, 2027, 2032, 2037, 2042, 2047 and 2052. This analysis interpolates values for all interim years to asses project benefits on an annual basis.

RTC modeling was used to develop railroad forecasts for Build and No Build scenarios. Both scenarios, as described below, account for the projected growth in rail volumes and their impact on the network.

- The **Base (No-Build)** scenario describes the network under typical operations if the Project is not completed.
- The **Build** scenario models the network after the Project is completed.

Table 6: Rail Delay Time (hours/year)

Factor	2022	2027	2032	2037	2042	2047	2052
BASE							
Passenger	1,009	866	1,091	1,660	1,865	1,149	1,480
Freight	11,268	12,561	18,233	20,767	27,844	32,687	45,822
BUILD							
Passenger	906	842	986	1,807	1,131	1,211	1,352
Freight	9,600	10,186	15,232	19,326	22,872	30,367	38,808

* Denotes model network saturation.

III.6 Crash Data

To estimate the benefits associated with lighting improvements, crash history was collected at the locations to be improved, as summarized in Table 7. The analysis applies a crash modification factor of 0.7, based on the CMF Clearinghouse value for lighting improvement.

Table 7: Improvement Area Crash History (average annual incidents, 2019-2023)

Factor	Crashes	Injuries	Fatalities
73rd St (West of Stewart Ave)	0.00	0.00	0.00
74th Street (Normal to Eggleston)	2.00	1.00	0.00
75th Street (Normal to Eggleston)	0.40	0.60	0.00
S Normal Ave (74th to 75th)	1.40	0.00	0.00
S Halsted Street	5.60	0.80	0.00
S Peoria Street	1.40	0.00	0.00

Source: City of Chicago Data Portal. Traffic Crashes, from https://data.cityofchicago.org/Transportation/Traffic-Crashes-Crashes/85ca-t3if/

Cook County traffic and crash data was also used to estimate the incremental crash risk by severity when traffic volumes increase. The crash rates per 100 million vehicle miles traveled are summarized in Table 8.

Table 8: Cook County Crashes by Severity

Factor	Value	Units
VMT	103,970	*MVMT/year*
CRASH STATISTICS		
Crashes	298,347	*crashes/year*
Injuries	59,795	*injuries/year*
Fatalities	1,147	*fatalities/year*
CRASH RATES		
Crashes	286.95	*crashes/100MVMT*
Injuries	57.51	*injuries/100MVMT*
Fatalities	1.10	*fatalities/100MVMT*

Source: IDOT 2022 Crash Facts. https://idot.illinois.gov/content/dam/soi/en/web/idot/documents/transportation-system/resources/safety/crash-reports/crash-facts/2022-crash-facts.pdf

Federal Rail Administration Safety Data for Amtrak and Metra was used to calculate the crash safety benefit due to mode shift. The crash rates are summarized in Table 9.

Table 9: Passenger Train Crashes by Severity

Factor	Value	Units
Passenger Miles	5,376	*1M passenger-miles/year*
CRASH STATISTICS		
Injuries	30	*injuries/year*
Fatalities	2	*fatalities/year*
CRASH RATES		
Injuries	0.037	*injuries/100MVMT*
Fatalities	0.554	*fatalities/100MVMT*

Source: Federal Rail Administration Safety Data, Amtrak and Metra. 1.02 Operational Data Tables and 1.12 Ten year Accident/Incident Overview. 2019-2023 Averages. https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/rrstab.aspx

III.7 Crime Data

To estimate the benefits associated lighting improvements under viaducts, crime history was collected at the locations to be improved, as summarized in Table 10. The analysis assumes a 4% crime reduction based on a UChicago study of crime reduction through street lighting in New York City.

Table 10: Improvement Area Crime History (average annual incidents, 2019-2023)

Factor	Burglary	Auto Theft	Larceny	Robbery	Murder	Rape	Assault
73rd St (West of Stewart Ave)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74th Street (Normal to Eggleston)	0.00	0.20	0.00	0.40	0.00	0.00	0.40
75th Street (Normal to Eggleston)	0.00	0.00	0.20	0.00	0.00	0.00	0.00
S Normal Ave (74th to 75th)	0.00	0.40	0.20	0.20	0.00	0.00	0.40
S Halsted Street	0.00	0.20	0.00	0.20	0.00	0.00	0.00
S Peoria Street	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: City of Chicago Data Portal. Crimes, from https://data.cityofchicago.org/Public-Safety/Crimes-2001-to-Present-Map/ahwe-kpsy/

III.8 Global Parameters

In addition to the project-specific data described in this section, the analysis also considers the following global parameters including those provided in the USDOT guidance for completing BCAs.

III.10.i Crime Costs

To convert benefits for reduced crime, the unit values provided by the Federal Emergency Management Agency (FEMA) were inflated to 2022 dollars, as summarized in Table 11.

Table 11: Value of Crimes

Vehicle Type	Value	Units
Burglary	$5,921	*2022$/incident*
Auto Theft	$12,409	*2022$/incident*
Larceny	$2,003	*2022$/incident*
Robbery	$69,261	*2022$/incident*
Murder	$12,654,428	*2022$/incident*
Rape	$298,055	*2022$/incident*
Assault	$166,583	*2022$/incident*

Source: FEMA Benefit-Cost Analysis Re-engineering (BCAR). 2011. Accessed at https://files.hudexchange.info/course-content/ndrc-nofa-benefit-cost-analysis-data-resources-and-expert-tips-webinar/FEMA-BCAR-Resource.pdf

III.10.ii USDOT Parameters

Table 12 summarizes the USDOT-provided values for BCAs used in this analysis.

Table 12: USDOT BCA Parameters

Factor	Value	Units
VALUE OF TIME		
In-Vehicle Travel, All Purposes	$19.60	*2022$/person-hour*
Truck Drivers	$33.50	*2022$/person-hour*
VEHICLE OCCUPANCY		
Passenger Vehicles	1.67	*persons/auto*
Trucks	1.00	*persons/truck*
OPERATING COSTS		
Light Duty Vehicles	$0.52	*2022$/vehicle-mile*
Commercial Trucks	$1.01	*2022$/vehiicle-mile*
Commuter Train (including fuel and labor)	$299	*2022$/train-hour*
Amtrak Long-Distance (including fuel and labor)	$747	*2022$/train-hour*
VALUE OF EMISSIONS (Automobile)		
CO2	$0.303	*2022$/VMT*
Non-CO2	$0.035	*2022$/VMT*
VALUE OF EMISSIONS (Commuter Train & Amtrak)		
CO2	$26	*2022$/train-hour*
Non-CO2	$102	*2022$/train-hour*
FREIGHT BENEFITS		
O&M	$273	*2022$/train-hour*
CO2 Emissions	$28	*2022$/train-hour*
Non-CO2 Emissions	$749	*2022$/train-hour*
EXTERNAL BENEFITS		
Congestion	$0.345	*$2022/VMT*
Noise	$0.044	*$2022/VMT*
Safety	$0.016	*$2022/VMT*
CRASH COSTS		
Killed	$12,500,000	*2022$/person*
Injured (Unknown Severity)	$217,600	*2022$/person*
Property Damage	$9,100	*2022$/vehicle*

Source: U.S. Department of Transportation. Benefit Cost Analysis Guidance for Discretionary Grant Programs, December 2023. Accessed at https://www.transportation.gov/sites/dot.gov/files/2023-12/Benefit%20Cost%20Analysis%20Guidance%202024%20Update.pdf

IV. BENEFIT–COST ANALYSIS METHODOLOGY

IV.1 Benefit 1a: Metra Passenger Travel Time Savings from Service Improvements

This benefit quantifies the travel time savings for Metra passengers due to improved service along the corridor. Once P2 is complete, Metra will be able to improve their service offerings along the RI and ME corridors due to the new P2 flyover and second main track. Table 13 summarizes estimated travel time savings as a result of the Project for the opening year 2033.

Table 13: Metra Passenger Travel Time Savings from Service Improvements

	Input		2033 Value	Units
	AVOIDED DELAY			
	No Build Average Speed			
a	RI		28.3	*mph*
b	SWS		27.0	*mph*
	Build Average Speed			
c	RI		29.3	*mph*
d	SWS		34.5	*mph*
	Average Trip Length			
e	RI		21.2	*miles/passenger*
f	SWS		19.0	*miles/passenger*
	Average Time Savings per Passenger			
g	RI	((e/c)-(e/a))*60	1.5	*minutes/passenger*
h	SWS	((f/d)-(f/b))*60	9.2	*minutes/passenger*
	No Build Daily Weekday Passengers			
i	RI		29,466	*passengers/weekday*
j	SWS		8,786	*passengers/weekday*
	Build Daily Weekday Passengers			
k	RI		30,733	*passengers/weekday*
l	SWS		15,621	*passengers/weekday*
m	Annualization Factor		284	*days*
	Annual Time Savings per Passenger			
	Existing Passengers			
n	RI	g * i * m / 60	208,549	*person-hours/year*
o	SWS	h * j * m / 60	384,491	*person-hours/year*
p	Total	n + o	593,040	*person-hours/year*
	New Passengers			

	Input		2033 Value	Units
q	RI	g * (k - i) * m / 60 / 2	4,487	*person-hours/year*
r	SWS	h * (l - j) * m / 60 / 2	149,572	*person-hours/year*
s	Total	q + r	154,059	*person-hours/year*
	MONETIZATION			
t	In-Vehicle Travel, All Purposes		$17.90	*2022$/year*
	VALUE OF BENEFIT			
u	Existing Riders	p * t	$10,615,413	*2022$/year*
v	New Riders	s * t	$2,757,658	*2022$/year*
	All Riders	u + v	**$13,373,071**	*2022$/year*

Source: See Section III.4 Passenger Train Ridership on page 5

IV.2 Benefit 1b: Incremental O&M Cost Increase resulting from Increased Operations

This benefit considers the incremental operating cost increase due to changes in Metra's service plans and increased operations. Table 14 summarizes the estimated O&M inrease as a result of the Project for the opening year 2033.

Table 14: Incremental O&M Cost Increase

	Factor		**RI**	**SWS**	**Units**
	Increased Cost Drivers				
a	Train Miles		44,338	53,839	*train miles*
b	Car Miles		354,649	398,408	*car miles*
c	Train Hours		811	-450	*train hours*
d	Train Trips		3,276	1,638	*train trips*
e	Track Miles		8	17	*track miles*
	Unit Costs				
f	Train Miles		$8.68	$8.33	*2022$/train mile*
g	Car Miles		$4.41	$4.59	*2022$/car mile*
h	Train Hours		$1,015.06	$906.68	*2022$/train hour*
i	Train Trips		$201.47	$201.47	*2022$/train trip*
j	Track Miles		$261,567.09	$92,416.13	*2022$/track mile*
k	Value of Incremental O&M Cost	(a*f) + (b*g) + (c*h) + (d*i) + (e* j)	$5,524,919	$3,770,312	*2022$/year*
	Total Annual Incremental O&M		**$9,295,231**		**2022$/year**

Source: See Section III.4 Passenger Train Ridership on page 5

IV.3 Benefit 2a: Avoided Rail Delay Under Typical Operations

This benefit is a function of the reduced delay time for freight trains when comparing the Base and Build conditions. This analysis assumes a passenger load of 224 persons per train based on the most recent Metra commuter rail ridership data. Amtrak trains typically carry more passengers per train than Metra, but the same occupancy is assumed for this analysis to be conservative.

Table 15 summaries the estimation of the undiscounted benefit for the year 2033, the first year of benefits, as an example.

Table 15: Avoided Rail Delay under Typical Operations

	Input		2033 Value	Units
	DELAY [A]			
	No Build Delay			
a	Passenger		1,181	*hours/year*
b	Freight		18,714	*hours/year*
	Build Delay			
c	Passenger		1,110	*hours/year*
d	Freight		15,975	*hours/year*
	Avoided Delay			
e	Passenger	a- c	71	*hours/year*
f	Freight	b- d	2,739	*hours/year*
	MONETIZATION			
g	Passenger Train Occupancy		224	*persons/train*
	Passenger			
h	Value of Time [B]		$19.60	*2022$/person-hour*
	Freight [C]			
i	O&M		$273.00	*2022$/train-hour*
j	Non-CO2		$749.00	*2022$/train-hour*
k	CO2		$28.00	*2022$/train-hour*
	VALUE OF BENEFIT			
l	Passenger	e * g * h	$310,664	*2022$/year*
m	Freight	f * (i + j + k)	$2,876,267	*2022$/year*
	Total	l + m	**$3,186,931**	*2022$/year*

Source: A See Section III.5 Rail Network Performance on page 6

Source: B See Section III.10.ii USDOT Parameters on page 10

Source: C See Section III.10.i Freight Costs on page 10

IV.4 Benefit 2b: Avoided Passenger Rail Costs Resulting from Train Delay

This benefit estimates the additional cost savings to passenger rail providers resulting from the reduction in idling time. The analysis considers the costs associated with fuel, emissions, and crew costs, as summarized in Table 16 for the year 2033.

Table 16: Avoided Passenger Rail Costs Resulting from Delay

	Input		2033 Value	Units
a	Avoided Metra Delay[A]		31	*train-hours/year*
b	Avoided Amtrak Delay[A]		40	*train-hours/year*
	Rail Vehicle Emissions Damage Costs[B]			
c	Non-CO2 Emissions Costs		$102	*2022$/train-hour*
d	CO2 Emissions Costs		$26	*2022$/train-hour*
e	Total Avoided Emissions Cost	(a + b)* (c + d)	$10,971	*2022$/year*
	OPERATING COST (FUEL AND LABOR)			
f	Commuter Train		$299	*2022$/train-hour*
g	Amtrak Long-Distance		$747	*2022$/train-hour*
h	Total Avoided Fuel Cost	b * (f + g)	$38,984	*2022$/year*
	Total	e + h	**$48,041**	*2022$/year*

Source: A See Section III.5 Rail Network Performance on page 6

Source: B See Section III.10.ii USDOT Parameters on page 10

IV.5 Benefit 3: Passenger Travel Cost Savings from Mode Shift

As a result of the Project, improved Metra operations and diverting of RID trains to LaSalle Street Station are expected to result in a mode shift of passengers from automobile to passenger train, as modeled using the FTA STOPS ridership model.

Table 17 summarizes the travel cost savings for Metra passengers as a result of the Project for the opening year of 2033.

Table 17: Passenger Travel Cost Savings resulting from Mode Shift

Factor			2033	Units
PASSENGER MILES				
a	Passenger Miles Diverted from Vehicles[A]		170,353	*person-miles/weekday*
IMPACT[B]				
b	Vehicle Occupancy (Passenger Vehicles)		1.67	*persons/automobile*
c	Vehicle Miles Diverted	a * b	102,008	*vehicle-miles/weekday*
d	Annualization Factor		284	*weekdays/year*
OPERATING COST[B]				
e	Light Duty Vehicles		$0.69	*2022$/vehicle-mile*
	Value of Benefit	**c * d * e**	**$19,146,803**	**2022$/year**

Source: A See Section III.4 Passenger Train Ridership on page 5

Source: B See Section III.10.ii USDOT Parameters on page 10

IV.6 Benefit 4: Crash Cost Savings resulting from Mode Shift

This benefit estimates the reduction in crash exposure associted with mode shift from automobile to rail. Table 18 summarizes the benefit in year 2033.

Table 18: Avoided Rail Diversion Cost Savings

Factor			2033 Value	Units
PASSENGER MILES				
a	Passenger Miles Diverted from Vehicles		170,353	*person-miles/weekday*
IMPACT				
b	Vehicle Occupancy (Passenger Vehicles)		1.67	*persons/automobile*
c	Vehicle Miles Diverted	a * b	102,008	*vehicle-miles/weekday*
d	Annualization Factor		284	*weekdays/year*
CRASH RATES BY MODE				
Rail Crashes				
e	Fatality Rate		0.04	*persons/100M passenger-miles*
f	Injury Rate		0.55	*persons/100M passenger-miles*
g	Expected Fatalities	a * d * e	0.02	*persons/year*
h	Expected Injuries	a * d * f	0.26	*persons/year*
Highway Crashes				
i	Fatality Rate		1.10	*persons/100M vehicle-miles*
j	Injury Rate		57.51	*persons/100M vehicle-miles*
k	Crash Rate		286.95	*vehicles/100M vehicle-miles*
l	Average Vehicles per Crash		2.00	*vehicles/crash*
m	Expected Fatalties	c * d * i	0.31	*persons/year*
n	Expected Injuries	c * d * j	16.02	*persons/year*
o	Expected Damaged Vehicles	c * d * k * l	79.92	*vehicles/year*
Net Reduced Crashes				
p	Reduction in Fatalties	m - g	0.29	*persons/year*
q	Reduction in Injuries	n- h	15.76	*persons/year*
r	Reduction in Damaged Vehicles	o	79.92	*vehicles/year*
MONETIZATION				
s	Fatality		$14,022,900	*2022$/person*
t	Injury		$313,000	*2022$/person*
u	Property Damage Only		$9,100	*2022$/vehicle*
v	Fatalities	p * s	$4,065,791	*2022$/year*
w	Injuries	q * t	$4,932,628	*2022$/year*
x	PDO	r * u	$727,242	*2022$/year*
	Value of Benefit	**v + w + x**	**$9,725,661**	**2022$/year**

Source: See Section III.10.ii USDOT Parameters on page 10

IV.7 Benefit 5: Emissions Damage Savings resulting from Mode Shift

The reduction of PMT as a result of the Project reduces emissions from vehicles and creates emissions damage savings. Table 19 summarizes the benefit in year 2033.

Table 19: Traffic Delay Savings

	Input		2033 Value	Units
PASSENGER MILES				
a	Passenger Miles Diverted from Vehicles		170,353	*persons/train*
IMPACT				
b	Vehicle Occupancy (Passenger Vehicles)		1.67	*persons/automobile*
c	Vehicle Miles Diverted	a * b	102,008	*vehicle-miles/weekday*
d	Annualization Factor		284	*weekdays/year*
EMISSIONS				
Highway Vehicle Emissions Damage Costs				
Light-Duty Vehicles- All Locations				
e	CO2 Emissions		0.107	*2022$/VMT*
f	Non- CO2 Emissions		0.012	*2022$/VMT*
VALUE OF BENEFIT				
g	CO2 Emissions	c * d * e	$3,099,741	*2022$/year*
h	Non- CO2 Emissions	c * d * f	$347,634	*2022$/year*
	Total	**g + h**	**$3,447,375**	*2022$/year*

Source: See Section III.4 on page 5

Source: See Section III.10.ii USDOT Parameters on page 10

IV.8 Benefit 6: Reduced Crashes

This benefit estimates the reduction in crashes in the project area resulting from the improved lighting under viaducts and on roadway segments. A crash modification factor of 0.7 was applied to existing crash rates by severity, as summarized in Table 20 for year 2033.

Table 20: Reduced Crashes

	Input		2033 Value	Units
	EXISTING CRASH RATES [A]			
a	Fatalities		0.0	*persons/year*
b	Injuries		2.4	*persons/year*
c	Property Damage		10.8	*crashes/year*
	CRASH REDUCTION			
d	Crash Modification Factor		0.70	
e	Average Vehicles per Crash [B]		1.80	*vehicles/crash*
	Avoided Crashes			
f	Fatalities	a * d	0	*persons/year*
g	Injuries	b * d	0.72	persons/year
h	Property Damage	c * d * e	5.82	*vehicles/year*
	CRASH UNIT VALUE [C]			
i	Fatalities		$12,500,000	*2022$/person*
j	Injuries		$217,600	2022$/person
k	Property Damage		$9,100	*2022$/vehicle*
	VALUE OF BENEFIT			
l	Fatalities	f * i	$0	*2022$/year*
m	Injuries	g * m	$156,672	2022$/year
n	Property Damage	h * k	$53,002	*2022$/year*
	Total	l + m + n	**$209,674**	*2022$/year*

Source: A. See Section III.6 Crash Data on page 7

Source: B: Estimated from crash data from the National Highway Traffic Safety Administration.

Source: C: See Section III.10.ii USDOT Parameters on page 10

IV.9 Benefit 7: Reduced Crime

This benefit estimates the reduction in crime in the project area resulting from the improved lighting under viaducts and on roadway segments. The analysis assumes a 4% reduction in crime, as summarized in Table 21 for year 2033.

Table 21: Reduced Crime

	Input		2033 Value	Units
	EXISTING CRIME RATES [A]			
a	Burglary		0	*incidents/year*
b	Auto Theft		0.8	*incidents/year*
c	Larceny		0.4	*incidents/year*
d	Robbery		0.8	*incidents/year*
e	Murder		0	*incidents/year*
f	Rape		0	*incidents/year*
g	Assault		0.8	*incidents/year*
	CRIME REDUCTION			
h	Crime Reduction		4.0%	
	AVOIDED CRIME			
i	Burglary	h * a	0	*incidents/year*
j	Auto Theft	h * b	0.03	incidents/year
k	Larceny	h * c	0.02	incidents/year
l	Robbery	h * d	0.03	incidents/year
m	Murder	h * e	0	incidents/year
n	Rape	h * f	0	incidents/year
o	Assault	h * g	0.03	*incidents/year*
	VALUE OF BENEFIT			
p	Burglary		$5,921	*2022$/year*
q	Auto Theft		$12,409	*2022$/year*
r	Larceny		$2,003	*2022$/year*
s	Robbery		$69,261	*2022$/year*
t	Murder		$12,654,428	*2022$/year*
u	Rape		$298,055	*2022$/year*
v	Assault		$166,583	*2022$/year*
	Total	**(i*p) + (j*q) + (k*r) + (l*s) + (m*t) + (n*u) + (o*v)**	**$7,976**	*2022$/year*

Source: A. See Section III.7 Crime Data on page 8

V. BENEFIT–COST ANALYSIS RESULTS

The BCA indicates that the Project will result in avoided delay for rail and traffic, avoided rail idling, reduced crashes, and reduced crime. All values are discounted at 3.1% with the exception of carbon-related benefits which are discounted at 2%.

The Project produces a Benefit/Cost ratio of 1.01, shown in Table 22, indicating that the benefits to society exceed the Project's costs.

Appendix A provides detailed tabulations of annual benefits and costs for the Project.

Table 22: Discounted Benefits and Costs for the Project (in millions)

	Total
PROJECT BENEFITS	
Metra Passenger Travel Time Savings resulting from Service Improvements	$205.4
O&M Cost Disbenefit resulting from Increased Maintenance	-$129.8
Avoided Delay resulting from Typical Operations*	$70.7
Avoided Passenger Rail Cost resulting from Reduced Idling*	$0.9
Passenger Travel Cost Savings resulting from Mode Shift	$361.4
Crash Cost Savings resulting from Mode Shift	$64.5
Emissions Damage Savings resulting from Mode Shift*	$6.5
Reduced Crashes resulting from Lighting and Sidewalk Improvements	$2.9
Reduced Crime resulting from Lighting and Sidewalk Improvements	$0.1
plus Residual Value	$177.3
Net Benefits	**$760.2**
TOTAL COSTS	**$755.0**
B/C RATIO	**1.01**
NET PRESENT VALUE	**$5.2**

* includes carbon-related benefits discounted at 2%

APPENDIX A
Detailed Benefit–Cost Analysis Results

TABLE A-1: P2 PROJECT BCA SUMMARY- UNDISCOUNTED

		Undiscounted Benefits					
Year	Calendar Year	Initial Construction Costs	Residual Value	Metra Passenger Travel Time Savings: Service Improvements	O&M Cost Disbenefit: Increased Maintenance	Avoided Delay: Typical Operations	Avoided Passenger Rail Cost: Reduced Idling
0	2022	$0	$0	$0	$0	$0	$0
1	2023	$0	$0	$0	$0	$0	$0
2	2024	$0	$0	$0	$0	$0	$0
3	2025	$0	$0	$0	$0	$0	$0
4	2026	$0	$0	$0	$0	$0	$0
5	2027	$0	$0	$0	$0	$0	$0
6	2028	$75,846,045	$0	$0	$0	$0	$0
7	2029	$117,165,161	$0	$0	$0	$0	$0
8	2030	$227,195,784	$0	$0	$0	$0	$0
9	2031	$280,128,732	$0	$0	$0	$0	$0
10	2032	$280,128,732	$0	$0	$0	$0	$0
11	2033	$0	$0	$13,373,071	$9,295,231	$3,186,931	$48,041
12	2034	$0	$0	$13,477,452	$9,295,231	$2,707,004	$26,705
13	2035	$0	$0	$13,582,733	$9,295,231	$2,166,198	$2,206
14	2036	$0	$0	$13,688,923	$9,295,231	$1,555,944	-$26,149
15	2037	$0	$0	$13,796,032	$9,295,231	$866,456	-$59,158
16	2038	$0	$0	$13,904,067	$9,295,231	$2,388,558	$28,013
17	2039	$0	$0	$14,013,037	$9,295,231	$3,895,807	$108,290
18	2040	$0	$0	$14,122,952	$9,295,231	$5,399,621	$182,392
19	2041	$0	$0	$14,233,820	$9,295,231	$6,910,954	$250,971
20	2042	$0	$0	$14,345,650	$9,295,231	$8,440,382	$314,613
21	2043	$0	$0	$14,458,452	$9,295,231	$7,152,472	$230,820
22	2044	$0	$0	$14,572,235	$9,295,231	$5,892,431	$154,503
23	2045	$0	$0	$14,687,008	$9,295,231	$4,648,163	$84,842
24	2046	$0	$0	$14,802,780	$9,295,231	$3,408,166	$21,096
25	2047	$0	$0	$14,919,561	$9,295,231	$2,161,432	-$37,402
26	2048	$0	$0	$15,037,361	$9,295,231	$3,100,899	-$22,050
27	2049	$0	$0	$15,156,189	$9,295,231	$4,138,485	-$5,546
28	2050	$0	$0	$15,276,055	$9,295,231	$5,282,520	$12,178
29	2051	$0	$0	$15,396,970	$9,295,231	$6,541,988	$31,193
30	2052	$0	$0	$15,518,942	$9,295,231	$7,926,573	$51,575
31	2053	$0	$0	$15,641,983	$9,295,231	$7,926,573	$51,575
32	2054	$0	$0	$15,766,102	$9,295,231	$7,926,573	$51,575
33	2055	$0	$0	$15,891,311	$9,295,231	$7,926,573	$51,575
34	2056	$0	$0	$16,017,618	$9,295,231	$7,926,573	$51,575
35	2057	$0	$0	$16,145,035	$9,295,231	$7,926,573	$51,575
36	2058	$0	$0	$16,273,573	$9,295,231	$7,926,573	$51,575
37	2059	$0	$0	$16,403,242	$9,295,231	$7,926,573	$51,575
38	2060	$0	$0	$16,534,053	$9,295,231	$7,926,573	$51,575
39	2061	$0	$0	$16,666,017	$9,295,231	$7,926,573	$51,575
40	2062	$0	$601,351,532	$0	$0	$0	$0
Total		**$980,464,454**	**$601,351,532**	**$433,702,223**	**$269,561,697**	**$159,110,136**	**$1,861,310**

TABLE A-1: CONTINUED

		Undiscounted Benefits					
Year	Calendar Year	Passenger Travel Cost Savings: Mode Shift	Crash Cost Savings: Mode Shift	Emissions Damage Savings: Mode Shift	Reduced Crashes: Lighting and Sidewalk Improvements	Reduced Crime: Lighting and Sidewalk Improvements	Total Benefits
0	2022	$0	$0	$0	$0	$0	$0
1	2023	$0	$0	$0	$0	$0	$0
2	2024	$0	$0	$0	$0	$0	$0
3	2025	$0	$0	$0	$0	$0	$0
4	2026	$0	$0	$0	$0	$0	$0
5	2027	$0	$0	$0	$0	$0	$0
6	2028	$0	$0	$0	$0	$0	$0
7	2029	$0	$0	$0	$0	$0	$0
8	2030	$0	$0	$0	$0	$0	$0
9	2031	$0	$0	$0	$0	$0	$0
10	2032	$0	$0	$0	$0	$0	$0
11	2033	$19,146,803	$9,725,661	$334,199	$209,674	$7,976	$55,341,024
12	2034	$19,606,370	$9,786,749	$336,298	$209,674	$7,976	$55,466,978
13	2035	$20,076,968	$9,848,220	$338,411	$209,674	$7,976	$55,541,220
14	2036	$20,558,861	$9,910,078	$340,536	$209,674	$7,976	$55,554,765
15	2037	$21,052,320	$9,972,324	$342,675	$209,674	$7,976	$55,497,306
16	2038	$21,557,624	$10,034,961	$344,828	$209,674	$7,976	$57,784,794
17	2039	$22,075,056	$10,097,991	$346,993	$209,674	$7,976	$60,064,005
18	2040	$22,604,908	$10,161,418	$349,173	$209,674	$7,976	$62,347,382
19	2041	$23,147,477	$10,225,242	$351,366	$209,674	$7,976	$64,646,838
20	2042	$23,703,069	$10,289,468	$353,573	$209,674	$7,976	$66,973,851
21	2043	$24,271,997	$10,354,097	$355,794	$209,674	$7,976	$66,350,816
22	2044	$24,854,580	$10,419,132	$358,029	$209,674	$7,976	$65,778,184
23	2045	$25,451,147	$10,484,575	$360,277	$209,674	$7,976	$65,243,377
24	2046	$26,062,032	$10,550,430	$362,540	$209,674	$7,976	$64,734,501
25	2047	$26,687,581	$10,616,698	$364,818	$209,674	$7,976	$64,240,235
26	2048	$27,328,143	$10,683,382	$367,109	$209,674	$7,976	$66,022,484
27	2049	$27,984,081	$10,750,485	$369,415	$209,674	$7,976	$67,920,842
28	2050	$28,655,763	$10,818,010	$371,735	$209,674	$7,976	$69,944,087
29	2051	$29,343,566	$10,885,959	$374,070	$209,674	$7,976	$72,101,666
30	2052	$30,047,879	$10,954,335	$376,420	$209,674	$7,976	$74,403,737
31	2053	$30,769,097	$11,023,140	$378,784	$209,674	$7,976	$75,319,260
32	2054	$31,507,625	$11,092,377	$381,163	$209,674	$7,976	$76,253,620
33	2055	$32,263,880	$11,162,049	$383,557	$209,674	$7,976	$77,207,246
34	2056	$33,038,287	$11,232,159	$385,966	$209,674	$7,976	$78,180,575
35	2057	$33,831,281	$11,302,709	$388,391	$209,674	$7,976	$79,174,059
36	2058	$34,643,309	$11,373,702	$390,830	$209,674	$7,976	$80,188,155
37	2059	$35,474,827	$11,445,141	$393,285	$209,674	$7,976	$81,223,335
38	2060	$36,326,304	$11,517,029	$395,755	$209,674	$7,976	$82,280,080
39	2061	$37,198,218	$11,589,369	$398,241	$209,674	$7,976	$83,358,884
40	2062	$0	$0	$0	$0	$0	$0
Total		**$789,269,050**	**$308,306,890**	**$10,594,233**	**$6,080,553**	**$231,308**	**$1,979,143,304**

TABLE A-2: P2 PROJECT BCA SUMMARY- DISCOUNTED

		Discounted Benefits					
Year	Calendar Year	Initial Construction Costs	Residual Value	Metra Passenger Travel Time Savings: Service Improvements	O&M Cost Disbenefit: Increased Maintenance	Avoided Delay: Typical Operations*	Avoided Passenger Rail Cost: Reduced Idling*
0	2022	$0	$0	$0	$0	$0	$0
1	2023	$0	$0	$0	$0	$0	$0
2	2024	$0	$0	$0	$0	$0	$0
3	2025	$0	$0	$0	$0	$0	$0
4	2026	$0	$0	$0	$0	$0	$0
5	2027	$0	$0	$0	$0	$0	$0
6	2028	$63,151,104	$0	$0	$0	$0	$0
7	2029	$94,621,066	$0	$0	$0	$0	$0
8	2030	$177,963,503	$0	$0	$0	$0	$0
9	2031	$212,828,443	$0	$0	$0	$0	$0
10	2032	$206,429,140	$0	$0	$0	$0	$0
11	2033	$0	$0	$9,558,414	-$6,643,774	$2,284,727	$34,502
12	2034	$0	$0	$9,343,375	-$6,444,010	$1,883,200	$18,587
13	2035	$0	$0	$9,133,232	-$6,250,252	$1,462,621	$1,433
14	2036	$0	$0	$8,927,872	-$6,062,320	$1,020,125	-$17,267
15	2037	$0	$0	$8,727,185	-$5,880,039	$552,563	-$37,845
16	2038	$0	$0	$8,531,064	-$5,703,239	$1,472,078	$17,361
17	2039	$0	$0	$8,339,403	-$5,531,754	$2,327,390	$65,209
18	2040	$0	$0	$8,152,100	-$5,365,426	$3,128,425	$106,628
19	2041	$0	$0	$7,969,055	-$5,204,099	$3,883,904	$142,429
20	2042	$0	$0	$7,790,170	-$5,047,623	$4,601,502	$173,322
21	2043	$0	$0	$7,615,349	-$4,895,851	$3,784,185	$123,449
22	2044	$0	$0	$7,444,500	-$4,748,643	$3,025,757	$80,234
23	2045	$0	$0	$7,277,530	-$4,605,862	$2,316,960	$42,801
24	2046	$0	$0	$7,114,351	-$4,467,373	$1,649,698	$10,388
25	2047	$0	$0	$6,954,876	-$4,333,049	$1,016,881	-$17,668
26	2048	$0	$0	$6,799,020	-$4,202,763	$1,414,578	-$10,082
27	2049	$0	$0	$6,646,700	-$4,076,395	$1,831,081	-$2,411
28	2050	$0	$0	$6,497,834	-$3,953,826	$2,267,209	$5,349
29	2051	$0	$0	$6,352,343	-$3,834,943	$2,723,811	$13,199
30	2052	$0	$0	$6,210,151	-$3,719,634	$3,201,775	$21,144
31	2053	$0	$0	$6,071,181	-$3,607,793	$3,106,639	$20,528
32	2054	$0	$0	$5,935,360	-$3,499,314	$3,014,341	$19,929
33	2055	$0	$0	$5,802,615	-$3,394,097	$2,924,796	$19,349
34	2056	$0	$0	$5,672,876	-$3,292,043	$2,837,922	$18,785
35	2057	$0	$0	$5,546,075	-$3,193,059	$2,753,639	$18,238
36	2058	$0	$0	$5,422,143	-$3,097,050	$2,671,870	$17,707
37	2059	$0	$0	$5,301,015	-$3,003,928	$2,592,540	$17,192
38	2060	$0	$0	$5,182,628	-$2,913,607	$2,515,575	$16,691
39	2061	$0	$0	$5,066,918	-$2,826,001	$2,440,905	$16,206
40	2062	$0	$177,329,835	$0	$0	$0	$0
Total		**$754,993,256**	**$177,329,835**	**$205,385,338**	**-$129,797,765**	**$70,706,697**	**$935,389**

TABLE A-2: CONTINUED

		Discounted Benefits					
Year	Calendar Year	Passenger Travel Cost Savings: Mode Shift	Crash Cost Savings: Mode Shift	Emissions Damage Savings: Mode Shift*	Reduced Crashes: Lighting and Sidewalk Improvements	Reduced Crime: Lighting and Sidewalk Improvements	Total Benefits
0	2022	$0	$0	$0	$0	$0	$0
1	2023	$0	$0	$0	$0	$0	$0
2	2024	$0	$0	$0	$0	$0	$0
3	2025	$0	$0	$0	$0	$0	$0
4	2026	$0	$0	$0	$0	$0	$0
5	2027	$0	$0	$0	$0	$0	$0
6	2028	$0	$0	$0	$0	$0	$0
7	2029	$0	$0	$0	$0	$0	$0
8	2030	$0	$0	$0	$0	$0	$0
9	2031	$0	$0	$0	$0	$0	$0
10	2032	$0	$0	$0	$0	$0	$0
11	2033	$13,685,194	$4,620,592	$279,590	$149,865	$5,701	$23,974,810
12	2034	$13,592,308	$4,345,434	$275,829	$145,359	$5,530	$23,165,611
13	2035	$13,500,053	$4,086,661	$272,119	$140,988	$5,363	$22,352,219
14	2036	$13,408,424	$3,843,299	$268,459	$136,749	$5,202	$21,530,544
15	2037	$13,317,417	$3,614,429	$264,848	$132,637	$5,046	$20,696,241
16	2038	$13,227,027	$3,399,188	$261,286	$128,649	$4,894	$21,338,309
17	2039	$13,137,251	$3,196,765	$257,772	$124,781	$4,747	$21,921,564
18	2040	$13,048,085	$3,006,397	$254,305	$121,029	$4,604	$22,456,146
19	2041	$12,959,523	$2,827,365	$250,885	$117,390	$4,466	$22,950,918
20	2042	$12,871,563	$2,658,994	$247,510	$113,860	$4,331	$23,413,630
21	2043	$12,784,199	$2,500,650	$244,181	$110,437	$4,201	$22,270,800
22	2044	$12,697,429	$2,351,735	$240,897	$107,116	$4,075	$21,203,099
23	2045	$12,611,248	$2,211,688	$237,657	$103,895	$3,952	$20,199,871
24	2046	$12,525,651	$2,079,982	$234,461	$100,771	$3,833	$19,251,763
25	2047	$12,440,636	$1,956,118	$231,307	$97,741	$3,718	$18,350,561
26	2048	$12,356,197	$1,839,630	$228,196	$94,803	$3,606	$18,523,186
27	2049	$12,272,332	$1,730,080	$225,127	$91,952	$3,498	$18,721,963
28	2050	$12,189,036	$1,627,053	$222,099	$89,187	$3,393	$18,947,332
29	2051	$12,106,305	$1,530,161	$219,112	$86,506	$3,291	$19,199,785
30	2052	$12,024,136	$1,439,039	$216,165	$83,904	$3,192	$19,479,872
31	2053	$11,942,524	$1,353,344	$213,257	$81,382	$3,096	$19,184,158
32	2054	$11,861,466	$1,272,752	$210,389	$78,935	$3,003	$18,896,860
33	2055	$11,780,959	$1,196,959	$207,559	$76,561	$2,912	$18,617,613
34	2056	$11,700,998	$1,125,680	$204,768	$74,259	$2,825	$18,346,069
35	2057	$11,621,579	$1,058,645	$202,013	$72,026	$2,740	$18,081,897
36	2058	$11,542,700	$995,602	$199,296	$69,861	$2,658	$17,824,787
37	2059	$11,464,356	$936,314	$196,616	$67,760	$2,578	$17,574,442
38	2060	$11,386,544	$880,556	$193,971	$65,723	$2,500	$17,330,582
39	2061	$11,309,260	$828,118	$191,362	$63,747	$2,425	$17,092,941
40	2062	$0	$0	$0	$0	$0	$0
Total		**$361,364,398**	**$64,513,229**	**$6,751,037**	**$2,927,872**	**$111,378**	**$582,897,574**

* includes carbon-related benefits discounted at 2%


CREATE
KEEPING THE GO IN CHICAGO