CREATE Simulation Modeling

Prepared for

Chicago Planning Group

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October 2011

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Introduction

This report describes the context, assumptions, methods, and results from a recent, newly run suite of simulation cases run in the RTC (***R***ail ***T***raffic ***C***ontroller) simulation model. These cases have been designed to measure train performance across the Chicago Switching District, and beyond those limits to approximately the Chicago Outer Belt. This geography includes virtually all of the major railroad yards in Chicago, and virtually all of the relevant freight and passenger corridors used by the eight major freight carriers and two passenger carriers that serve greater Chicago. Only the Canadian National Railway operation across the trackage of the Elgin Joliet & Eastern, and some suburban passenger service provided by METRA across the former Illinois Central, and by NICTD across the Chicago, South Shore, and South Bend are not incorporated in this study.

This report is divided into five sections, as follows:

- An Introduction, describing the context of the study, and explaining what is measured and how.
- A background section describing the simulation cases run in 2002 – 2003 which underlay the original set of CREATE projects.
- A section describing the methods and assumptions used in running a new suite of twelve simulation cases in the spring of 2011.
- A section describing the results of the current suite of cases, and comparing those figures to the ones developed eight years before.
- A section analyzing the meaning of the performance numbers, and describing the conclusions to be derived from the study.

Measurements Used in Simulation Modeling

There are a number of different indicators that can be used to measure train performance across railroad network. One potential measure is average speed; another is the absolute amount of time ("train-hours") required to operate all trains; yet another is the amount of delay incurred during normalized train operations. This latter measure is usually expressed as the number of delay hours per operating day.

Simulation modeling also produces ratios as part of the output. Ratios are useful because they measure performance in numbers which can be compared even when the number of trains being operated changes significantly. Absolute numbers change with volume, so if the number of trains doubles over time, the amount of delay expected will naturally increase. If it doesn't actually double, however, train performance may have actually improved over time: that's a finding only the use of ratios will show.

Consequently, the discussion that follows uses a ratio to measure and evaluate freight train performance. That measure, which is used generally by Class 1 freight carriers in North

America, is the number of delay minutes per 100 train-miles. The higher this number, the worse the performance. As an example, say a typical freight train could run 100 miles in 2 1/2 hours, or 150 minutes, with no delay. If that train incurred 30 minutes' delay in that 100 miles, the total time required to make the trip would be 180 minutes, and 20 percent of the total time required would be delay time. That train, and any train with identical performance, would have a delay factor of 30 minutes per 100 train-miles.

This measurement is used throughout this report to evaluate freight train performance. Passenger trains, on the other hand, are measured by whether they are on time: that is what the passenger experiences. Consequently, the measures most appropriate to the analysis of train operations in Chicago are different for the freight and passenger services.

In all cases, results represent measured trains over 96 consecutive hours. Daily train counts are something like 25 percent of those numbers, but the number of freight trains operated varies by day of the week.

Background: 2003 Cases

2003 Cases 3a, 5aa, and 7aa

Between 1999 and 2003, a total of ten suites of simulation cases were run measuring then-current and expected train performance across the Chicago Switching District and its immediate vicinity. These cases quantified the train performance at that time, particularly with respect to freight trains. The impact of passenger service on the Switching District rail network was an issue then, as it is now; consequently, all passenger services which use tracks in common with freight trains have always been included, and both METRA and Amtrak have been co-participants in the freight-related exercises undertaken by the Association of American Railroads and the Chicago Planning Group.

The simulations run eight years ago had two objectives: first, to determine the value of "institutional" improvements; and second, to determine how much investment in physical plant was required, and where it should be located. The "institutional" improvements included all initiatives the freight railroads could take, as between themselves, to smooth and speed up operations across the Switching District. These initiatives came to include:

- Eliminating delays in the interchange of trains between carriers (otherwise called "hand-off" delays). Historically, every time a train operated by one carrier has needed to use (or even to cross) the tracks of another railroad, there has been a dispatching "hand-off" required as between the two control systems. If for any reason the receiving railroad has been unprepared to accept the train, the likely outcome has been delay – often protracted delay.
- Making the use of trackage in the Switching District more flexible, by extending rights to use tracks owned by one carrier to trains of additional carriers (in other words, essentially an expansion of trackage rights. In the simulation exercise, this flexibility is called "clear routing").
- Making the physical locations at which the operating crews of different carriers change more flexible. Historically, the points at which operating crews of carrier A get off, and the crews of carriers B or C get on, have been fixed by agreements between the railroads, and often, by agreements with the labor unions involved. In recent times, these fixed locations have increasingly been superseded by more flexible interchange protocols: if the location where a through train will stop is known in advance, a relief crew can be sent by motor vehicle to that location – the crew goes to the train rather than waiting for the train to come to them. In the simulation cases, this flexibility is called "floating crew changes."

By the time the CREATE simulation study concluded, in late 2003, the most important sets of simulation cases remaining were in three groups: a set that had originally carried numbers beginning with 3, which had quantified performance under then-existing conditions; a set beginning with the number 5, which tested for combinations of institutional improvements, and

the original CREATE project list; and a set beginning with the number 7 which tested the capacity of the final list of CREATE projects and the associated institutional improvements to absorb increased traffic over time (to a 20-year horizon).

The planning case suites in 2003 all assumed a new Central Corridor would be constructed on behalf of Canadian National Railway. This route would have extended from Schiller Park on the west via the former B&OCT (CSX) Altenheim Subdivision to Ogden Junction, then south along the west side of existing tracks to a point near 49th Street, east via a restoration of former Grand Truck Western trackage to connection with former Chicago & Western Indiana trackage near 49th and Lowe, south to 57th Street, where the route would have turned southeast to former Pennsylvania Railroad right-of-way to Englewood, then via a former Nickel Plate connection at Grand Crossing back to the former Illinois Central (by then already part of Canadian National). This corridor has subsequently been mooted by CN's purchase of the EJ&E, and is not included in the 2011 study.

The planning cases in suite 5 included 29 CREATE freight projects, 13 CN Central Corridor Projects, and 7 Passenger projects. Twenty-five of the CREATE freight projects survived into suite 7: a full list of the original CREATE freight projects is included in the Appendix in the columns labeled "2003 Suite 5" and "2003 Suite 7."

Table 1 compares the performance measured across the record simulation cases retained from these three suites. The underlying conditions modeled in each suite were as follows:

- **Case 3a –** Freight and passenger train volumes then typical; physical plant then in place; all institutional restrictions still in effect.
- **Case 5aa –** Freight and passenger train volumes then typical; 29 CREATE freight projects, 13 Central Corridor projects, and 7 CREATE passenger projects in place; hand-off delays minimized; most Clear Routes established; crew changes allowed to float.
- **Case(s) 7aa –** Freight volumes increased over a 20-year horizon, using an AAR traffic growth index, adjusted to reflect some trains becoming longer and heavier, thus reducing the number of added trains required to handle increased traffic; 25 surviving CREATE freight projects plus Central Corridor and passenger projects.

Table 1
Freight Train Counts and Performance: 2003 Cases

Case	Number of Freight Trains	Delay Minutes Per 100 Train-Miles
3a	1,858	100.7
5aa	1,850	37.1
7aa(05)	1,941	37.7
7aa(10)	2,078	38.9
7aa(15)	2,233	45.0
7aa(20)	2,409	50.7

Findings from 2003 Cases

At the conclusion of the 2003 study, the modeling showed that two-thirds of the freight delay then experienced under base conditions, and half the base delay even after 20 years' expected traffic growth, could be eliminated, provided that:

- All 25 CREATE freight projects were built;
- All 13 CN Central Corridor projects were built;
- All 7 Passenger projects were built;
- All freight carrier controlled institutional improvements were implemented;
- There was no substantial increase in either inter-city or commuter passenger service on lines shared with freight trains.

The next two sections of this report will describe the 2011 simulation study, and its results.

Current Simulation Cases

Assumptions and Methods in Current Simulations

In the most recent study, the Chicago Planning Group has had a total of twelve simulation cases run, using the later versions of the same software used in 2002 – 2003. The simulation network has been updated to reflect construction and retirements over the last eight years; train counts have been revised to reflect changes to the various carrier's operations; the Canadian National Railway trains that were to have used the Central Corridor have been eliminated from the planning cases, as moved to the EJ&E; the Central Corridor itself has been eliminated from the model; and the number of passenger trains included in the study has increased dramatically, as METRA and Amtrak plans have become more clear.

All of these changes have had significant effects on what is measured with respect to the freight operation.

There are now five sets of cases in the current suite:

- Two cases that measure performance without any CREATE projects or further institutional improvements;
- Four cases that solve for the value of institutional improvements as measured against current train volumes and all CREATE projects, passenger and freight;
- Two cases that solve for performance with institutional improvements included, but only 16 of the CREATE projects built;
- Two cases that solve for performance with institutional improvements included, and all CREATE freight-related projects in place;
- Two cases that include all improvements.

List of CREATE Projects

There are still 25 CREATE freight projects, as well as seven passenger projects — the same total count as in 2003. In most respects, the individual freight projects remain unchanged from 2003: a complete list, and a detailed comparison between 2003 and 2011 projects is contained in the Appendix.

The 25 CREATE freight projects include 11 on the Beltway Corridor (12 in 2003; 11 the same; one deleted); four on the East-West Corridor (all the same); and 10 on the Western Avenue Corridor (one completed; and one extended and subdivided into three parts; the balance all the same). For each set of cases in the discussion that follows there is a column in the table in the Appendix showing specifically which CREATE projects are included in that set of cases.

Train Volumes

There are 3,433 measured trains in the new run of Case 3, the re-stated base, or current conditions case (all counts represent 96 consecutive measured weekday hours of train operations):

- 1,826 freight trains
- 1,607 passenger trains (205 Amtrak; 1,402 METRA)

The 1,826 freight trains include Canadian National Railway freight trains subsequently deleted from the exercise as shifted to the EJ&E.

For comparison, the equivalent case in 2003 contained:

- 1,858 freight trains (cf. Table 1, preceding)
- 1,534 passenger trains (198 Amtrak; 1,336 METRA)

The subsequent cases run with current volumes retained 1,654 freight trains along with the 1,607 passenger trains. One hundred seventy two freight trains left the study for the EJ&E.

One case was run against the existing plant and operating practices with indexed growth included. This case has 1,687 passenger trains and 1,951 freight trains; it represents 15 years' growth, not including any growth on the EJ&E.

All other growth cases include 1,766 passenger trains and 2,165 freight trains, representing 20 years' growth, again not including any increase in train counts on the EJ&E.

Descriptive List of Cases in the Current Suite

The twelve cases in the current study, in the order in which they will be discussed, are:

- **Base: Current Conditions –** Existing plant and trains; no CREATE projects; CN (EJ&E) trains included; institutional improvements only to the extent they reflect better coordination of interchange traffic since 2000 through establishment of the Chicago Traffic Coordination Office, plus other improvements in short-run communications undertaken since 2003.
- **Base15: Current Conditions, plus 15 years' growth –** 3,638 trains; same physical and institutional conditions as the preceding case.
- **Case 1a: Current Train Counts; all CREATE projects –** no further institutional improvements.
- **Case 1b: Current Train Counts; all CREATE projects –** clear routes for freight trains.
- **Case 1c: Current Train Counts; all CREATE projects –** clear routes and no hand-off delays.

- **Case 1d: Current Train Counts; all CREATE projects –** free-running train routes; no hand-off or other interchange delays.
- **Case C16: Current Train Counts; 16 CREATE projects –** institutional improvements included.
- **Case C16(20): Twenty-year Growth Train Counts; 16 CREATE projects –** institutional improvements included.
- **Case C25: Current Train Counts; 25 CREATE projects –** institutional improvements included.
- **Case C25(20): Twenty-year Growth Trains; 25 CREATE projects –** institutional improvements included.
- **Case C-all: Current Train Counts; all CREATE projects –** institutional improvements.
- **Case C-all(20): Twenty-year Train Counts; all CREATE projects –** institutional improvements.

Results

Cases with Current Physical Plant

The first two cases modeled current traffic on the existing infrastructure, with no further improvements to the operating protocols that govern interchange between carriers.

This set of conditions was run at current train volumes, again at 15 years' growth, and again at 20 years' growth, at which point it failed to dispatch to completion.

The results at current volumes and again at 15 years' growth are shown in Table 2:

Table 2
Freight Train Counts and Performance: 2011 Cases
Current Plant

Case	Number of Freight Trains	Delay Minutes Per 100 Train-Miles
Base	1,826	64.8
Base(15)	1,951	176.0

These two cases include 1,607 passenger trains and 1,687 passenger trains respectively, but none of the freight or passenger-specific CREATE projects except the first of two originally foreseen for Brighton Park. The delay counts clearly exceed acceptable levels even at today's volumes, and dramatically so at volumes expected in 15 years.

Cases with Current Volume, CREATE Build, and Institutional Improvements

Four cases were run which modeled the value of increasingly aggressive initiatives on the part of the Chicago Planning Group freight carriers to minimize or eliminate delays caused by interchange hand-offs and restrictions on trackage rights. Table 3 shows the results of these four cases, as compared to the preceding current conditions case.

The Base case is shown in this table for comparison, although there is significantly more freight train dwell time included in the four institutional improvement cases than is present in the most recent Base case. The added dwell time produces knock-on delays in the dispatch of the One series cases that is not present in the Base case (that's why the Delay Minutes per 100 train-miles in Case 1a is actually a little higher than it is in the Base case).

Table 3
Freight Train Counts and Performance: 2011 Cases
Current Volume; Full CREATE; Institutional Improvements

Case	Number of Freight Trains	Delay Minutes Per 100 Train-Miles
Base	1,826	64.8
1a	1,654	66.9
1b	1,654	56.4
1c	1,654	41.6
1d	1,654	32.8

Still, these four cases show that, at current volumes (CN 's EJ&E trains being subtracted), if all CREATE projects are in place, including the seven passenger projects, the added initiatives that the CPG carriers can undertake on their own can capitalize on the improved infrastructure to the extent that half the freight train delay remaining after CREATE can be eliminated. Those things that the industry can do to smooth the flow of interchange traffic are therefore an important part of ensuring that The Switching District plant can absorb the expected growth in freight and passenger demand.

Cases with Institutional Improvements and Partial Build

The argument for continued institutional improvements being accepted, the subsequent groups of simulation cases tested for performance under both current and future conditions with part of the CREATE projects built.

Table 4 shows performance at current freight train counts and again with 20 years' growth, with 16 CREATE projects in place (for a detailed list, see the Appendix):

Table 4
Freight Train Counts and Performance: 2011 Cases
16 CREATE Projects

Case	Number of Freight Trains	Delay Minutes Per 100 Train-Miles
C16	1,654	46.4
C16(20)	2,165	143.3

The 16 CREATE projects in this set of simulations include 13 freight and one passenger project currently fully funded, plus two further freight projects expected to receive full funding. The

freight performance figures indicate that this partial build of CREATE infrastructure confers significant short-term benefits on the operation. It is insufficient to protect required performance at the freight volumes expected in 20 years.

Cases with Institutional Improvements and All Freight Projects except 75th Street CIP

An additional pair of simulation cases was run that include nine further freight-related CREATE projects not assumed to be funded in the two Partial Build cases. In this scenario, there is one added Beltway project, two added East-West Corridor projects, and six added Western Avenue Corridor freight projects. The Appendix highlights these added nine projects in the column labeled "All Projects;" this list then contains all the directly freight-related projects except 75th Street CIP (project EW2). These two cases were run to determine the incremental value of completing the freight-related projects with additional carrier funding. Table 5 shows the freight train performance at current and 20-year growth levels with all freight-related CREATE projects, plus institutional improvements, switched on:

Table 5
Freight Train Counts and Performance: 2011 Cases
25 CREATE Projects

Case	Number of Freight Trains	Delay Minutes Per 100 Train-Miles
C25	1,654	41.3
C25(20)	2,165	91.4

These two cases demonstrate the value of completing at least nine more directly freight-related CREATE projects. Once again, however, the freight train performance at 20 years' growth shows considerably more delay than desired, and considerably more delay than the suite of CREATE projects promised when modeled in 2003.

Cases with Institutional Improvements and Full Build

The final pair of simulation cases described in this report presupposes that all CREATE projects are built, including all seven of those defined as passenger projects. These two cases, as shown in Table 6, contain the same number of freight trains at both current traffic and 20-year growth demand as the preceding cases do: the only difference is that the passenger projects, and the 75th Street project (EW2) are added to the case:

Table 6
Freight Train Counts and Performance: 2011 Cases
Full CREATE Build

Case	Number of Freight Trains	Delay Minutes Per 100 Train-Miles
C-all	1,654	33.3
C-all(20)	2,165	76.2

These two cases represent the best cases so far solved for as part of the overall study. At current freight train volumes, freight performance models slightly better than it did eight years ago – but there are fewer freight trains in the simulation because the Canadian National's EJ&E trains have disappeared. At 20 year growth volumes, performance is better than in any scenario that contains less than 100 percent of the CREATE projects, as well as CPG institutional initiatives, but freight delays are still higher than desired.

The incremental change from 20 years out at Partial Build (16 projects) to 20 years out at Full Build is striking: almost half of all the freight delay predicted by the model at 20 years out can be avoided if all of CREATE is completed instead of just the 16 projects currently assumed to be complete.

Summary Comparison of Freight Performance

Table 7 summarizes the expected change in freight performance as the number of CREATE projects are introduced into the network. Except for the benchmark current conditions case, all these measures assume freight train counts 20 years in the future.

Table 7
Comparative Freight Train Performance

Case	Number of Freight Trains	Delay Minutes Per 100 Train-Miles
Base	1,826	64.8
2003(20)	2,409	50.7
C16(20)	2,165	143.3
C25(20)	2,165	91.4
C-all(20)	2,165	76.2

Passenger Train Performance

The simulation software used to measure train performance in this study allows the analyst to set the relative priority between trains of different types. Throughout greater Chicago, the commuter trains operated by METRA and the intercity passenger trains operated by Amtrak are accorded priority over freight trains, and every effort is made to operate these trains on time.

These priorities have been reflected in the simulation exercise as well. For the most part, in every simulation case, the passenger service performs with little or no delay. At much higher levels of both freight and passenger traffic, however, the model predicts that performance will decay for both freight and passenger services – especially if not all CREATE projects are built.

Table 8 shows passenger train counts and modeled passenger performance across the suite of twelve simulation cases (the four freight-related cases that tested for institutional improvements are labeled Freight 1a through 1d respectively):

Table 8
Passenger Train Counts and Performance: 2011 Cases

Case	Number of Passenger Trains	Delay Minutes Per 100 Train-Miles
Base	1,607	0.9
Base(15)	1,687	2.5
1a	1,607	0.5
1b	1,607	0.5
1c	1,607	0.4
1d	1,607	0.3
C16	1,607	0.6
C16(20)	1,766	3.1
C25	1,607	0.5
C25(20)	1,766	2.0
C-all	1,607	0.3
C-all(20)	1,766	1.0

As the suite of simulation case results show, the regional passenger service has every bit as much at stake 20 years' out as the freight service: the difference in predicted passenger performance between a partial and a full build of CREATE infrastructure is 67 percent, significantly higher than the incremental impact on the freight service.

Findings

The 2011 simulation exercise validates the original premise of the CREATE program: at current traffic levels (1,850 measured trains in 2003; 1,654 measured freight trains in 2011), the model predicted 37 minutes' delay per 100 train miles then, and predicts 33 minutes' delay per 100 train-miles now. These freight delay ratios are about 50 percent better than delay modeled under current conditions, and something like two-thirds better than delay measured in 2003 under then current conditions.

At freight and passenger demand 20 years out, the best-case performance numbers are significantly worse than they were eight years ago. What has changed is not the forecast number of freight trains: it was 2,400 in 2003; it is 2,200 now, or about 50 freight trains per day less than when CREATE was designed.

What has changed is the predicted level of passenger service. The highest number of week day passenger trains modeled in 2003 was about 385. It is now expected to exceed 440 – an increase of 14 percent. Those added passenger trains must operate with schedule priority in order to meet their commercial goals; as the numbers from the current simulation suite show, there will need to be significant investment in passenger rail infrastructure over the next 20 years in order to accommodate the increased passenger operation without incurring a decay in on-time performance.

The patterns that emerge from these performance figures, and which speak directly to the communities most interested in freight and passenger capacity and performance respectively are:

- Industry initiatives to eliminate hand-off, crew-change, and route-related delays to interchange traffic are a necessary and important part of keeping the freight train system reasonably fluid. Even building all of CREATE (including the passenger projects) by itself will not suffice in the long run.
- All of the CREATE projects, including the passenger ones, have value for the freight operation. However, the greatest value of the passenger projects goes directly to the passenger train operation: as Table 7 shows, the passenger operation can expect unacceptable levels of delay 20 years from now if only 16 CREATE projects (all freight), or 25 CREATE projects (again – all freight) are constructed.
- About 77 percent of all the freight benefits come from the full suite of directly freight-related CREATE projects, and about 23 percent of the freight benefits come from the full set of passenger –related projects (including 75th Street CIP/EW2, which is partly a freight project).
- About 50 percent of the passenger benefits actually come from the freight-related projects, while the remaining 50 percent of the passenger benefits come from the passenger-related projects. In that sense, the freight-related projects have a

particularly positive effect on the passenger service. Even so, the passenger service really requires the full suite of passenger projects in order to grow the train volume without incurring what is very likely to be an unacceptable decay in service reliability.

It now also seems likely that, in planning for the long term, something more than what is now contained in the CREATE script may be needed. In 2003, 50 minutes of freight delay per 100 train-miles seemed like decent performance after 20 years' projected growth, and no further major investment in plant. Now, the freight service models at over 75 minutes' delay per 100 train-miles 20 years in the future. CREATE can carry the industry for quite some time, but given the competing demand for track capacity now expected from growing passenger services, it is likely that new projects, not now on the list, will be needed.

Appendix
CREATE Projects Included In Alternative Proposals

Project	Name	2003 Suite 5	2003 Suite 7	2011 Project	Partial Build	All Projects[1]
Beltway Corridor						
B1	CPR/IHB B-12	Yes	Yes	Yes	–	Yes
B2	UP/IHB Hill	Yes	Yes	Yes	Yes	Yes
B3	Melrose Connection	Yes	Yes	Yes	Yes	Yes
B4	TCS, LaGrange – Hill	Yes	Yes	Yes	Yes	Yes
B5	Crossovers, Broadview	Yes	Yes	Yes	Yes	Yes
B6	SW connection, McCook	Yes	Yes	Yes	Yes	Yes
B7	IC Connection, Canal	Yes	–	–	–	–
B8	TCS, Argo – Canal	Yes	Yes	Yes	Yes	Yes
B9	DT Connection, Argo	Yes	Yes	Yes	Yes	Yes
B12	Added Main, Francisco – 123rd Street	Yes	Yes	Yes	Yes	Yes
B13	Blue Island Junction	Yes	Yes	–	–	–
B14	IC—GTW Connection	Yes	–	–	–	–
B15	TCS, Harvey – Dolton	Yes	Yes	Yes	Yes	Yes
B16	SW Connection, UP/CSX – GTW	Yes	Yes	Yes	Yes	Yes
Western Avenue Corridor						
WA1	Ogden Junction	Yes	Yes	Yes	–	Yes
WA2	TCS, Ogden Junction – 75th Street (B&OCT)	Yes	Yes	Yes[2]	Segment A	Yes
WA3	TCS, Ogden Junction – CP 518 (CJ Rwy)	Yes	Yes	Yes	Yes	Yes
WA4	BNSF Connection, Ash Street	Yes	Yes	Yes	–	Yes
WA5	Corwith Tower	Yes	Yes	Yes	Yes	Yes
WA6	Crossovers	Yes	–	–	–	–
WA7	Brighton Park Interlocking 1	Yes	Yes	Yes	–	Yes
WA8	Brighton Park Interlocking 2	Yes	Yes	Complete[3]	Complete[3]	Complete[3]
WA9	NE Conn/Inside Crossover	Yes	–	–	–	–
WA10	Blue Island Junction	Yes	Yes	Yes	Yes	Yes
WA11	Dolton Interlocking	Yes	Yes	Yes	–	Yes
East-West Corridor						
EW1	Clearing Yard Mains	Yes	Yes	Yes	–	Yes
EW2	Belt Junction/75th Street CIP	Yes	Yes	Yes	–	–
EW3	Pullman Junction	Yes	Yes	Yes	–	Yes
EW4	CP 509	Yes	Yes	Yes	Yes	Yes
Passenger						
P1	Englewood	Yes	Yes	Yes	Yes	Yes
P2	74th Street	Yes	Yes	Yes	–	Yes
P3	75th Street	Yes	Yes	Yes	–	Yes
P4	Grand Crossing	Yes	Yes	Yes	–	Yes
P5	Brighton Park	Yes	Yes	Yes	–	Yes
P6	Canal	Yes	Yes	Yes	–	Yes
P7	Chicago Ridge	Yes	Yes	Yes	–	Yes

[1] Includes all projects except 75th Street CIP (Freight) and Belt Junction Cases.
[2] Now shows as three sub-projects: 75th Street (B&OCT), Segments A, B and C.
[3] Included in revised Base Case.