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February 20, 2018

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By Hand-Delivery

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Chief, Section of Administration
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Surface Transportation Board
395 E Street, SW
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ENTERED
Office of Proceedings
February 20, 2018
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Public Record



Re: Consumers Energy Company v. CSX Transportation, Inc., STB Docket No. NOR 42142

Dear Ms. Brown:

Enclosed for filing in the above-referenced matter is Defendant CSX Transportation, Inc.'s Petition for Reconsideration. The filing includes an original and ten copies of the Petition along with three disks containing the Petition in searchable pdf format.

Please date-stamp the extra copy and return it to our messenger. Thank you for your assistance in this matter. If you have any questions, please contact the undersigned.

Sincerely,

FEE RECEIVED
February 20, 2018
SURFACE
TRANSPORTATION BOARD


Matthew J. Warren

Enclosures

		)	
CONSUMERS ENERGY COMPANY		)	
		)	
Complainant,		)	
		)	
v.		)	Docket No. NOR 42142
		)	
CSX TRANSPORTATION, INC.		)	
		)	
Defendant.		)	
		)	

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John P. Patelli
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ACTIVE 229223576

SHORT FORMS FOR FREQUENTLY CITED CASES

The following short form case citations are used herein:

<i>AEPCO 2011</i>	<i>Arizona Electric Power Cooperative, Inc. v. Burlington Northern & Santa Fe Railroad Co. & Union Pacific Railroad Co.</i> , STB Docket No. 42113 (served Nov. 16, 2011)
<i>AEP Texas</i>	<i>AEP Texas North Co. v. BNSF Railway Co.</i> , STB Docket No. 41191 (Sub-No. 1) (served Sept. 10, 2007)
<i>Bituminous Coal</i>	<i>Bituminous Coal – Hiawatha, Utah, To Moapa, Nevada</i> , 6 I.C.C.2d 1 (1989)
<i>Duke/CSXT</i>	<i>Duke Energy Corp. v. CSX Transportation, Inc.</i> , 7 S.T.B. 402 (2004)
<i>Duke/NS Reconsideration</i>	<i>Duke Energy Corp. v. Norfolk Southern Railway Co.</i> , 7 S.T.B. 862 (2004)
<i>DuPont</i>	<i>E.I. DuPont de Nemours & Co. v. Norfolk Southern Railway Co.</i> , STB Docket No. 42125 (served Mar. 24, 2014)
<i>Major Issues</i>	<i>Major Issues in Rail Rate Cases</i> , STB Ex Parte No. 657 (Sub-No. 1) (served Oct. 30, 2006), <i>aff'd sub nom. BNSF v. STB</i> , 526 F.3d 770 (D.C. Cir. 2008)
<i>Otter Tail</i>	<i>Otter Tail Power Co. v. BNSF Railway Co.</i> , STB Docket No. 42071 (served Jan. 27, 2006)
<i>Rate Regulation Reforms</i>	<i>Rate Regulation Reforms</i> , STB Ex Parte No. 715 (served July 18, 2013)
<i>SunBelt</i>	<i>SunBelt Chlor Alkali Partnership v. Norfolk Southern Railway Co.</i> , STB Docket No. 42130 (served June 20, 2014)
<i>SunBelt Reconsideration</i>	<i>SunBelt Chlor Alkali Partnership v. Norfolk Southern Railway Co.</i> , STB Docket No. 42130 (served June 30, 2016)
<i>TMPA I</i>	<i>Texas Municipal Power Agency v. Burlington Northern & Santa Fe Railway Co.</i> , 6 S.T.B. 573 (2003)

<i>TMPA II</i>	<i>Texas Municipal Power Agency v. Burlington Northern & Santa Fe Railway Co.</i> , 7 S.T.B. 803 (2004)
<i>TPI</i>	<i>Total Petrochemicals & Refining USA, Inc. v. CSX Transportation, Inc.</i> , STB Docket No. 42121 (served Sept. 14, 2016)
<i>WFA</i>	<i>Western Fuels Ass'n & Basin Elec. Power Cooperative v. BNSF Railway Co.</i> , STB Docket No. 42088 (served Sept. 10, 2007)
<i>Xcel I</i>	<i>Public Service Co. of Colorado d/b/a Xcel Energy v. Burlington Northern & Santa Fe Railway Co.</i> , 7 S.T.B. 589 (2004)
<i>Xcel II</i>	<i>Public Service Co. of Colorado d/b/a Xcel Energy v. Burlington Northern & Santa Fe Railway Co.</i> , S.T.B. Docket No. 42057 (served Dec. 14, 2004)

ACRONYMS

ATC	Average Total Cost
BNSF	Burlington Northern Santa Fe Railway Company
CBR	Crude by Rail
CERR	Consumers Energy Railroad
CSX	CSX Corporation
CSXIT	CSX Intermodal Terminals, Inc.
CSXT	CSX Transportation, Inc.
DCF	Discounted Cash Flow
EIA	Energy Information Administration
IHB	Indiana Harbor Belt Railway
MDOT	Michigan Department of Transportation
NS	Norfolk Southern Railway Company
QCS	Quarterly Freight Commodity Statistics
SAC	Stand-Alone Cost
SARR	Stand-Alone Railroad
STB	Surface Transportation Board
UP	Union Pacific Railroad Company
URCS	Uniform Rail Costing System

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I. PREFACE AND SUMMARY OF ARGUMENT

The *Decision*¹ reflects an extraordinary amount of work on the Board's part to resolve hundreds of complex disputes between the parties. Despite the complexity inherent in any large rate dispute, the initial *Decision* contains substantially fewer technical errors than some past cases—a welcome development that is a credit to new procedures put in place by the Board, the hard work of its staff, and the efforts by both parties to provide more user-friendly workpapers. More can be done, but the *Decision* shows that the SAC process continues to be well-suited to resolving large and complex economic disputes like the present case.

That said, the *Decision* includes several material errors that the Board should reconsider. While CSXT disagrees with the Board's resolution of many of the disputed issues in this case, it has limited this petition to a small number of issues presenting clear material error that have a substantive impact on this case and that meet the standards of 49 C.F.R. § 1115.3(b).²

First, in two instances the *Decision*'s analysis includes a major incorrect factual assumption that significantly distorts the economic analysis. One of these is the presumption that the CERR would benefit from the revenue contribution of hundreds of crude oil trains, despite the overwhelming evidence that such trains are no longer moving over the lines the CERR replicated. The year 2015 was a very good year for crude-by-rail shipments, but in 2016 that demand vanished. Before the close of the record, CSXT advised the Board of this momentous industry-wide development, and supported its position with a mountain of news reports, public data from EIA, and updated CSXT internal forecasts. The *Decision* ignored all that evidence and instead accepted Consumers's counterfactual forecasts that crude oil volumes for the CERR would increase from 2015 levels. This conclusion was plainly wrong and contradicted both evidence in the record and public traffic reports mandated by the Board. The public QCS reports provided by CSXT to the STB prove unequivocally that in the real world crude oil shipments on

¹ See *Consumers Energy Co. v. CSX Transp., Inc.*, STB Docket No. 42142 (STB served Jan. 11, 2018) ("*Decision*").

² See *TMPA II*, 7 S.T.B. at 803-04; *SunBelt Reconsideration* at 2.

CSXT have declined to virtually zero. In 2015, CSXT hauled over 30,000 carloads of crude oil per quarter. In 3Q17, CSXT moved a mere 206 carloads—a 99% decrease. There is no plausible justification for allowing nonexistent trains to distort the SAC analysis, let alone for the *Decision*’s assumption of a 10% volume *growth* in such trains between 2015 and 2017.

The other incorrect assumption with a massive effect on this case is the failure to correct an obvious density error that allows Consumers to assume for ATC purposes that a 0.35 mile CERR segment has a density of just 250,000 gross tons per mile while simultaneously assuming that the CERR would move 50 million gross tons of traffic over that same segment. This plain error has a **\$70 million** impact on this case. This is the kind of technical error that the Board routinely has allowed parties to correct, and failure to correct it creates an arbitrary result. For decades, the Board permitted railroads to show that information provided in discovery requires correction (so long as they did so with other information that was also produced in discovery or publicly available). The agency has also permitted shippers to challenge “special studies” or other evidence they produced in discovery, including in this very case where Consumers’s market dominance evidence included new studies that contradicted the conclusions of feasibility studies that Consumers produced in discovery. Here, CSXT complied with agency precedent—careful to correct the flawed density figure with information provided to Consumers in discovery—only to have the Board apply a new and improper double standard. This Board has long been committed to correcting timely raised factual or computational errors. Abandoning that policy now would be arbitrary and capricious.

Second, on a few key issues the Board was led astray by flawed arguments made by Consumers on Rebuttal, to which CSXT had no opportunity to respond. For example, the *Decision* materially erred by adopting an analysis that Consumers first submitted on Rebuttal purporting to show that every single CERR train crew would be able to complete two trips on every shift. Correcting a few obvious errors in that analysis shows that 37% of the CERR’s crews would be unable to complete two trips on their shift. As another example, the Rebuttal bridge redesigns for certain bridges accepted by the Board are infeasible from an engineering

perspective, a fact that would have been amply demonstrated on Reply if Consumers had presented its redesigns on Opening. Relatedly, in some places the *Decision* itself introduced new analyses or unanticipated alterations to the parties' analyses that introduced new errors. For example, the Board's *sua sponte* decision to include movements in privately-owned cars in the calculation of offline ballast transportation costs created a new distortion, since the new calculation failed to include the costs of car ownership.

Third, in several places the *Decision* did not address arguments raised by CSXT or misstated those arguments. Where the *Decision* is silent, CSXT cannot discern if the agency had a reasoned explanation for its decision or simply overlooked an argument. For example, the *Decision* adopted Consumers's proposal to have only a single security agent responsible for CERR traffic in Chicago based upon incorrect characterizations of the evidence. And the *Decision* accepted Consumers's claim that one track crew could maintain 122 route miles of track without addressing or acknowledging CSXT's evidence about the specific infeasibility of such a large district. Where the oversight is important and would have a material impact on this case, CSXT is asking the Board to reconsider that particular issue.

Fourth, in several places the *Decision* breaks from Board precedent without sufficient cause or explanation. The *Decision* dismisses the agency's historic concern about the bias created by cross-over merchandise traffic with a holding that cannot be reconciled with *AEPCO* or *Rate Regulation Reforms*. It likewise breaks from precedent recognizing that real estate acquisition costs must be incorporated in the SAC analysis and that the Board will accept a party's evidence as to an acknowledged SARR cost where it is the only evidence of record.

In sum, CSXT respectfully requests that the Board reconsider the issues identified in this Petition. To serve the Board's and the parties' interests in expeditiously processing this case, the Board should consider issuing a decision on reconsideration that resolves all disputes and instructs the parties to cooperate on the creation of final workpapers implementing the Board's reconsideration decision. This would conserve scarce agency resources, minimize the risk of technical errors, and speed this case to a final resolution.

II. THE BOARD SHOULD RECONSIDER CERTAIN MATERIAL ERRORS

A. Traffic and Revenue

1. Phantom Crude Oil Trains Should Not Be In the SAC Analysis.

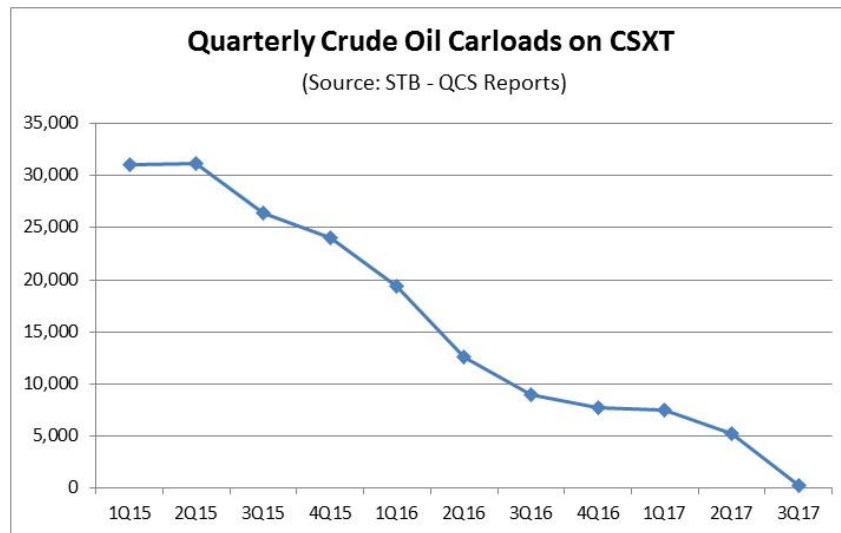
The *Decision*'s SAC analysis relies in part on assumed contributions from oil trains that do not exist. Consumers's evidence proposed that the CERR would have crude oil volumes that only increased from peak demand in 2015, when thousands of tank cars were traversing Chicago *en route* to East Coast refineries. But that demand began to disappear in 2016 and never returned. To support that fact, CSXT pointed the Board to numerous news reports, data from the EIA, and the more recent internal business forecasts developed by CSXT in the ordinary course of business. See CSXT Reply at III-A-24-25; CSXT Br. at 11-12.

The *Decision* nonetheless included these phantom oil trains in its SAC analysis. The agency reasoned that there was no "markedly" different trend in crude oil prices, and thus that continued use of the outdated 2015 forecasts for crude oil trains was "realistic." *Decision* at 83. This assumption that crude oil prices directly drove crude oil volumes is contradicted by public studies of the relationship between price and volumes.³ Moreover, the Board ignored substantial evidence in the case record and the public record showing that its assumption was wrong.

The precipitous drop in crude oil traffic is proven not just by the mountain of news reports, the revised CSXT business forecasts, and EIA public reports, but by the QCS reports

³ See This Week in Petroleum, *Crude-by-rail volumes to the East Coast drop as imports rise*, U.S. Energy Information Administration (July 7, 2016), https://www.eia.gov/petroleum/weekly/archive/2016/160707/includes/analysis_print.php ("The economics of CBR flows to east coast refiners depends largely on the relationship between the prices of domestic and international crudes. Domestic crudes priced in the Midwest and West Texas are no longer heavily discounted compared with imported crudes priced in the North Sea. The narrower the spread between domestic and imported crudes, the more likely coastal refiners will choose to run imported crudes rather than domestic supplies shipped via rail."). Other factors also affect the demand for crude-by-rail. *Id.* ("CBR volumes have generally decreased as crude oil price spreads have narrowed (making imported crudes relatively cheaper compared with railed supplies), pipelines have come online, and domestic inland production has declined"). CSXT did observe that the price of crude oil had rebounded in its Brief. But it also pointed the Board to public evidence showing no rebound in crude oil traffic. CSXT Br. at 12. The *Decision* failed to address this evidence.

provided to the Board by CSXT. CSXT crude oil volumes have dropped precipitously since the first two quarters of 2015, when CSXT was moving over 30,000 carloads of crude oil a quarter. In the third quarter of 2017, CSXT moved a mere 206 carloads: over a 99% drop from early 2015. In contrast, the SAC analysis assumes 10% volume *growth* between 2015 and 2017.



The Board had clear evidence that Consumers’s crude oil assumptions were unrealistic. In 2016, CSXT told the agency that the crude oil trains no longer existed, and the QCS reports for 2016 and 2017 simply confirm that truth. The Board is obligated to “judge the reasonableness of a carrier’s rates based on the best evidence available at the time of its decision.” *Duke/NS Reconsideration*, 7 S.T.B. at 864. The quarterly reports prove that CSXT’s updated forecasts were the best evidence of record and should have been used by the Board.

2. The Plain and Undisputed Density Error Should Be Corrected.

On Reply, CSXT observed that Consumers’s ATC calculations contained a gross error in the density data for a 0.35 mile segment within Chicago. CSXT Reply at III-A-51–52. CSXT corrected this error with actual movement data provided in discovery. Consumers never contested that CSXT was right about the actual densities on the segment, but it nevertheless claimed an absolute right to rely on the density study produced by CSXT in discovery, even after the error had been pointed out. Consumers Reb. at III-A-103–104. By itself, this seemingly small error has a roughly \$70 million impact on the discounted cash flow analysis.

Consumers's ATC calculation assumes that this 0.35 mile stretch of track is virtually empty, sandwiched between two segments with over 80-million gross tons of traffic. At the same time, Consumers selected 50 million of these tons to move over the same segment on the CERR. CSXT Br. at 23. The density figure used for this segment in the Board's analysis is thus wildly inaccurate and deeply distorts the SAC analysis. The Board's ATC revenue allocation formula accounts for economies of density by recognizing that lower density segments experience higher fixed costs per unit of density and thus require a higher revenue allocation.⁴ By calculating its ATC revenue allocation assuming only 0.25 million gross tons per mile moving over this 0.35 mile stretch (while simultaneously assuming the CERR moves 50 million gross tons over the segment), Consumers's ATC annually credits the CERR a fixed cost for this tiny segment of \$11.5 million,⁵ driving a disproportionate amount of revenue to the CERR.

Using the correct density for this 0.35 mile segment has a roughly \$70 million impact and alone would reverse the Board's determination that the rate is unreasonable. "In complex rate cases such as this," the Board has explained, "parties are encouraged to bring computational or technical errors to the Board's attention. . . . The Board is committed to promptly correcting any such technical errors." *Xcel II* at 2. In this case, the Board has already corrected several technical errors, including some affecting the ATC calculations.⁶ There is no way to reconcile the Board's commitment to correcting technical errors with the failure to use the correct density figure for this 0.35 mile segment.

The *Decision* did not dispute the clear-cut error in the density for the 0.35 mile segment. Rather, it announced that Consumers "should be able to rely on information provided in

⁴ See *Major Issues* at 34 (economies of density reflect how average total costs for a network of a given size initially decrease with increases in output).

⁵ CSXT's ATC average fixed cost per mile is approximately \$164,000, but is only \$57,500 for this 0.35 mile segment.

⁶ See *Decision* at 90 (accepting corrective evidence with respect to the densities on line segments affected by transposed mileposts); *Id.* at 84 (permitting Consumers to correct error in forecasting revenues); *Id.* at 157 (accepting three calculation errors regarding lease payments); *Id.* at 277-78 (correcting unidentified error in CSXT's DCF calculation).

discovery, especially here where the information provided was specifically attested to as the best information available.” *Decision* at 89. In addition, the *Decision* faulted CSXT for not correcting the error with another special study—not produced in discovery—and instead “us[ing] the actual train movements that it indicated to Consumers were less reliable.” *Id.* at 90.

This was both an unexplained departure from agency precedent and fundamentally unfair. Agency precedent permits a railroad to show that information provided in discovery contains errors that need correction. It simply restricts such challenges to those based on public information or other information also produced in discovery. In *Xcel*, for example, the STB cautioned parties that “Xcel reasonably relied on the information it received from BNSF in developing its evidence, and BNSF may not impeach that evidence *with information it failed to produce during discovery*.” *Xcel I*, 7 S.T.B. at 673 (emphasis added). In *AEPCO*, the agency declared that “defendants cannot impeach AEPCO’s evidence with information defendants failed to produce in discovery,” but in the same breath observed that the railroad *could* use “Means” data to “impeach” a document produced in discovery. *AEPCO 2011* at 103.⁷ In this very case, the Board allowed Consumers to revisit studies on competitive options that it produced in discovery (and on which CSXT relied on Reply) with new studies presented on Rebuttal. To hold CSXT to a different standard is fundamentally arbitrary.⁸ There is no rule barring the use of data that was produced in discovery to correct errors or proffer more accurate information.

Moreover, CSXT never told Consumers that the density information was the “best information available,” or that “actual train movements were unreliable,” as claimed by the Board. CSXT merely observed that the density information it maintained in the ordinary course of business identifies the tons that traverse any portion of the segment, even if the tons do not traverse the entire segment. Recognizing this could result in a miscalculation of the density-per-

⁷ See also *AEP Texas* at 83 (“BNSF may not impeach that evidence with information it failed to produce during discovery”).

⁸ See also *TMPA I*, 6 S.T.B. at 635 (shipper was permitted to challenge a special fuel consumption study with a new special study).

segment, CSXT provided a second database that used system-wide car event data to calculate total ton-miles by individual segment. That discovery correspondence is attached as Exhibit 3. Consumers was free to use either dataset, or to develop a third, as it saw fit. Likewise, it does not make sense to fault CSXT for correcting the error “us[ing] actual train movements that it indicated to Consumers were less reliable.” *Decision* at 90. There is no dispute that, as to this specific 0.35 mile segment, the actual train movements are far *more* reliable. And a revised special study would have constituted precisely the sort of non-public, non-discovery information that the Board has held railroads cannot use to impeach discovery material.

Ordering relief based on factual information that all parties and the agency agree is inaccurate is not only an unexplained departure from agency precedent, and fundamentally unfair, it is also the kind of arbitrary decision-making that courts view with skepticism. An “agency must, at a minimum, support its conclusions with studies that the agency deems reliable” and “‘explain . . . the reasons it considered the underlying evidence to be reliable.’”⁹ It may not rely on factual information or studies it knows or should know are inaccurate.¹⁰ That is true especially where the agency treats such errors inconsistently in different cases and even (as here) in the same case.¹¹

⁹ *N. Plains Res. Council, Inc. v. STB*, 668 F.3d 1067, 1075 (9th Cir. 2011) (quoting *The Lands Council v. McNair*, 537 F.3d 981, 994 (9th Cir. 2008)).

¹⁰ See *id.* at 1086 (Board erred by “rel[ying] on stale data”); see also *Sierra Club v. EPA*, 356 F.3d 296, 307 (D.C. Cir. 2004) (noting that a “failure to make . . . adjustments” to a mathematical model as “necessary to ensure consistency with real-world observations” would be arbitrary and capricious); *Humana of Aurora, Inc. v. Heckler*, 753 F.2d 1579, 1583 (10th Cir. 1985) (“When an agency adopts a regulation based on a study . . . which is limited and criticized by its authors on points essential to the use sought to be made of it, the administrative action is arbitrary and capricious”); cf. *Nat’l Wildlife Fed’n v. FERC*, 912 F.2d 1471, 1485–86 (D.C. Cir. 1990) (agency reliance on party-submitted data was appropriate where the agency “independently confirmed the data in issue” and the challenger “has not pointed to any inaccuracies in the disputed data”).

¹¹ See *Nat. Res. Def. Council v. NRC*, 879 F.3d 1202, 1214 (D.C. Cir. 2018) (“it would be arbitrary and capricious for the agency’s decision making to be ‘internally inconsistent.’”).

3. The *Decision* Erred By Not Correcting The Recognized Bias in Revenue Allocation for Merchandise Cross-Over Traffic.

“The inclusion of large amounts of carload and multi-carload cross-over traffic has revealed a significant and growing concern.” *Rate Regulation Reforms* at 25. Including carload and multi-carload (herein “merchandise”) cross-over traffic creates a significant disconnect between SAC costs and revenue allocation. *Id.* Recognizing that this biases results in the shipper’s favor, the agency told railroads to correct the bias by modifying the revenue allocation. *Id.* at 29. CSXT therefore proposed a solution to the bias. Now, the *Decision* claims no need to address this “significant and growing concern” because CSXT “has not shown that CERR’s handling of the traffic is any different” than how CSXT serves that traffic. *Decision* at 39. This abrupt departure from precedent requires reconsideration.

The facts are not in dispute. The CERR would provide the same trainload service as CSXT provides for the selected merchandise traffic over the short segments replicated in the SAC analysis. For traffic interchanged with other carriers, neither CSXT nor the CERR would incur the time and expense to originate, terminate, gather, or block the railcars into complete trains “*in the area covered by the CERR.*” *Consumers Reb.* at III-A-82 (emphasis added).

Rather, those costs occur outside of Chicago for the trains selected by Consumers. As the Board is aware, CSXT maintains a massive gathering network used to serve merchandise traffic, where it incurs the time and expense to gather, classify, distribute, pre-block, and deliver that traffic. For a CERR merchandise train delivered to a Western carrier, CSXT has incurred the cost of gathering and “pre-blocking” that train so it can traverse deep into the western network. Similarly, when the CERR accepts a merchandise train from an interchange partner, it hands the train over to the residual CSXT, which will move it to a classification yard where individual carloads will be switched to different trains (perhaps multiple times) before being delivered to its final destination. This is the essence of a carload network.

These facts are not a defense to the bias in merchandise revenue allocation; they are the source of the bias. There is no dispute that the CERR would provide the same trainload service as CSXT for all the selected merchandise traffic. By Consumers’s own design, that service does

not involve any switching and therefore does not require the switching and terminal resources owned by CSXT in Chicago. But the Board's standard ATC revenue allocation assumes that all CSXT merchandise traffic moving through Chicago requires some level of switching and uses some portion of CSXT's vast Chicago switching resources. As such, ATC is attributing both originating, terminating, gathering, and blocking variable costs and an allocation of switching-facility-related fixed costs to the traffic selected by Consumers, even though Consumers bears none of those costs for the CERR merchandise traffic. Under ATC, costs that should remain with the residual CSXT for the originating, terminating, gathering, and blocking work it actually performs are improperly attributed to Consumers. URCS costs a move by assuming system-average related operating statistics are spread from end to end. It does not accurately reflect the incumbent's costs on each sub-segment of a move. Just because the SARR is handling the small subset of traffic it selects in the same manner as the incumbent on the small portion of the network it replicates does not mean that the URCS costs reflect the actual costs over that portion. On the contrary, the Board found in *AEPCO* that they are not.

By artificially raising the variable costs of merchandise traffic, Consumers is inflating the revenue division. This creates the serious bias the Board identified in *Rate Regulation Reforms*, because the SAC costs replicate efficient trainload service, but the revenue allocation assumes the higher costs of providing merchandise service. This significant and growing bias arises precisely *because* the CERR only replicates the same trainload service as CSXT over the portion of the movements included in the SAC analysis, but then lays claim to a massive revenue share based on the flawed assumption that it is actually replicating more expensive carload service.

The *Decision*'s excuse for closing its eyes to the "significant and growing concern" from merchandise cross-over traffic cannot be reconciled with agency precedent. In *AEPCO*, as here, Union Pacific and BNSF did not incur the costs of originating, terminating, gathering, and blocking railcars into complete trains in the area covered by the SARR. There, as here, the SARR would have provided the identical trainload service as the defendant railroads over the portion of the network replicated by the SAC analysis. There, as here, the merchandise cross-

over traffic introduced serious bias because all the costs to originate, terminate, gather, and block railcars into complete trains incurred off-SARR, yet the revenue allocation assumed they were incurred on-SARR. To require CSXT to show that it provides a different service than the SARR (over the portion of the network replicated by the SAC analysis), is illogical and cannot be reconciled with the facts of the *AEPCO* case, which propelled the Board to nearly ban this kind of cross-over traffic entirely in *Rate Regulation Reforms*.

Accordingly, the Board should use CSXT's ATC revenue allocations for all merchandise traffic as the only evidence that corrects the bias identified in *Rate Regulation Reforms*.

4. Revenue Allocation for Intermodal Shipments to the 59th Street Terminal Should Fairly Correspond to the CERR's Limited Services.

Consumers describes its operations at the 59th Street Intermodal Terminal as originating trains that are loaded and built by CSXIT and interchanging intermodal trains bound for the 59th Street Intermodal terminal with the residual CSXT. *See* Consumers Open. at III-C-8. Under its plan, the CERR picks up and delivers assembled intermodal trains from and to the 59th Street Terminal departure and receiving tracks and adds a cost to lift intermodal units onto and off of intermodal trains. CSXT argued that Consumers was allocating far too much revenue to the 59th Street Terminal for the portion of the service for which it steps into CSXT's shoes because Consumers (1) did not include all the operating costs that CSXT pays CSXIT; (2) did not include any of the inspection costs that CSXT incurs to serve that terminal; and (3) excluded all the land costs for the terminal. CSXT Reply at III-A-43–46. There were two solutions that would maintain the relationship between revenues and costs incurred for the service provided, as required by *Major Issues*: (1) add the full complement of costs incurred by CSXT in originating and terminating the selected shipments into the SAC analysis (in which case the revenue allocation should reflect the full credit for originating or terminating traffic); or (2) include in the SAC only the costs for the interchange services actually provided by the CERR (in which case the revenue for originating or terminating traffic would be properly allocated to the residual CSXT).

What would plainly bias the results in Consumers's favor would be to include part of the costs but all of the revenue. That is precisely what the *Decision* did. Unlike other areas where the Board accepted the evidence of one party or another, here the *Decision* tried to bolster Consumers's evidence by including more of the operating costs that CSXT pays CSXIT. *Decision* at 71. But those efforts fall short. The *Decision* accepted Consumers's unexplained allocation of total lift costs. While CSXT handles 260,518 containers at this terminal, and the CERR would handle 173,848 containers, or 67%, somehow Consumers allocated only 54% of the lift costs. As CSXT said on Reply, the unexplained math did not add up. CSXT Reply at III-A-44 & n.65. Nor did the *Decision* include any of the costs that CSXT will incur to serve the 59th Street terminal. As CSXT explained, "if the Board ultimately allows Consumers to earn a revenue credit for originations and terminations at this facility, the CERR will need to include a dedicated inspector at this location. Indeed, as indicated in CSXT's discovery file in 2014, CSXT (not CSXIT) inspected more than 1,600 intermodal trains at 59th Street, which Consumers selected as CERR traffic. Staffing a 2-person inspection crew 24/7 would require 9 people." CSXT Reply at III-C-64–65. When the *Decision* granted Consumers the full origination and termination credit for ATC, it should have increased the number of inspectors from 10 to 19.¹²

Moreover, none of the land costs are included in the SAC analysis. Here, the *Decision* found it reasonable "to assume that CSXT does not incur a cost for land ownership, because it is covered by CSXIT's lease payments." *Decision* at 71. The *Decision*'s novel treatment of land costs is contrary to agency precedent and the purpose of the ATC revenue allocation. CSXT therefore asks the Board to reconsider and either accept CSXT's solution, reflect all the costs of serving the terminal in the SAC analysis, or craft its own solution to maintain the balance between revenues and costs for services actually provided.

¹² Consumers Suppl. Reb. WP, "CERR Operating Expense_Supplemental Rebuttal.xlsx," tab "Operating-G&A," cell D23.

The *Decision* clashes with the fundamental purpose of the ATC revenue allocation, which is to determine how much of the revenue that the defendant carrier collects for the total movement should be allocated to each segment of the movement based on the costs that need to be recovered on each segment and the amount of other traffic on each segment available to share the joint and common costs.¹³ ATC therefore allocates revenues “based on the costs that need to be recovered.” *WFA I* at 12. Here, however, the *Decision* assumed that “CSXT does not incur a cost for land ownership.” *Decision* at 71. Yet it allocated revenue to the CERR based on variable costs that include a return on same land costs the Board just declared CSXT does not incur. By excluding land costs from the SAC analysis, but including those costs in the revenue allocation, the *Decision* shattered the goal in *Major Issues* to avoid bias by maintaining the relationship between revenues and costs.

Moreover, excluding the land costs from the SAC analysis because CSXT receives an intercorporate lease payment from its sister company is a shell game. Assuming the CSXIT lease payments equal the required return on the replacement costs of land, CSXT investors (through its holding company, CSX) have a fundamental right to recover from shippers a return on that land investment. Yet this will not happen if the Board insists on excluding those land costs in the SAC analysis. As the CERR would serve 67% of the intermodal customers who use this terminal, yet the land costs are excluded from the rate analysis, what customers are paying for those costs?

In sum, failing to include *all* the costs CSXT incurred at the 59th Street terminal, but simultaneously including those costs in the revenue allocation, distorts the SAC analysis. The CERR would pay a total of \$62 to originate or terminate a container at 59th Street, yet the revenue allocation uses approximately \$200 in variable costs that URCS allocates to the move for an origination or termination. This gross inconsistency has nothing to do with the CERR being more efficient than CSXT; in fact, the CERR supposedly is paying precisely what CSXT

¹³ See *Major Issues* at 25 (“By focusing on the ratio of actual costs incurred by the carrier, the revenue allocation method should maintain, to the extent possible, the relationship between revenues and costs that would exist in a full SAC analysis.”).

pays. To remedy this disconnect, the Board should reconsider its position and adopt CSXT's clean solution. As a second-best solution, the Board could substitute the final actual variable cost incurred by the CERR (currently \$62 per container) into the ATC allocation in place of the cost derived from system-average figures (approximately \$200 per container). The revenue allocation would then precisely maintain the proper relationship between revenues allocated to this facility and the costs the Board assumes CSXT incurs at this terminal.

B. Operating Expenses

1. CERR Crews Cannot Complete Two Train Assignments Every Day

Based on analysis Consumer presented for the first time on Rebuttal—to which CSXT had no opportunity to respond—the *Decision* accepted the implausible assumption that every train crew operating in Chicago could complete two train assignments within 12 hours, every single day, 365 days a year. *See Decision* at 101–102. However, the *Decision* was based on Rebuttal Evidence that is fatally flawed for five reasons. First, the analysis used the wrong traffic group. *See Ex. 1, V.S. Chakrabarti* at 3-4. Second, the analysis combined trains from different days to calculate the daily average transit time. *Id.* at 4-5. Third, the Board's modified analysis mistakenly applied train transit times from Consumers's Opening RTC Model, rather than CSXT's Supplemental "Alternative 1" RTC Model (as the Board apparently intended). *Id.* at 5-6. Fourth, the analysis ignored the directional imbalance in train movements. *Id.* at 6-7. Finally, and perhaps most significant, the analysis failed to account for the time of day the trains arrive on the CERR. *Id.* at 8. If a train arrives at 8:00 am, and a second train arrives at 8:00 pm, even if the "average transit times" for those two trains would suggest otherwise, one crew cannot operate both trains without violating the 12-hour federal hours of work law.

After correcting these flaws, Consumers's own Rebuttal analysis indicates that 37% of the CERR's train could not be operated by a "turn" crew. *See Ex. 1, V.S. Chakrabarti*. This is proper "new evidence" to support a petition for reconsideration, because CSXT had no opportunity to respond to the Rebuttal analysis by Consumers. This analysis confirms that the assumption that every single CERR crew could operate two trains per shift, 365 days a year is

inconsistent with the realities of real-world transportation. Rather, the re-crew adjustment of 25% proposed by CSXT is conservative and was the best evidence of record.

2. The *Decision* Materially Erred By Understating Police Staffing.

The *Decision* materially erred by accepting Consumers’s proposal to have only one Security Agent assigned to Chicago despite the substantial need for police staffing in that high-volume, high-crime area of the CERR. First, the *Decision* is a sharp and unexplained break from recent precedent. Consumers provided one Security Agent for the state of Illinois—the densest portion of the CERR with 9,244 trains in the base year (39% of which are intermodal trains highly vulnerable to theft).¹⁴ Such staffing is irreconcilable with recent cases recognizing that SARRs carrying general freight and intermodal traffic through urban areas require more police than rural coal-only SARRs. *See, e.g., TPI* at 90–91; *DuPont* at 92–93. But the *Decision* failed to justify the Board’s change in course, and it failed to hold Consumers to the heightened standard that the Board has held is necessary to justify a break with precedent.¹⁵ This was a material error.

Second, the *Decision* was based on the factually incorrect conclusions that CSXT had provided “no evidence as to the specific security needs of Barr Yard” and only “general statistics concerning crime in the Chicago area. . . .” *Id.* In fact, CSXT provided evidence that “every real-world railroad in Chicago (including BNSF, UP, NS, IHB, and CSXT) has a 24/7 police presence at their major yards.” CSXT Reply at III-D-91. And far from only “general statistics concerning crime,” CSXT provided specific data about specific incidents that its Chicago police staff responded to—which amounted to well over 5,500 incidents in a single year. *See id.*

In contrast, Consumers provided no specific information about how a single Security Agent (possibly assisted by a Deputy Chief of Police) could handle even a small fraction of that workload. Nor did it explain the fundamental inconsistency between Consumers’s minimal police staffing and its assumption that the CERR would experience freight loss and damage at

¹⁴ *See* STB WP “CERR Base Year Trains_Supp_Reply_Alt1stb.xlsx” tab “Trains” (3,593 intermodal out of 9,244 base year trains (excluding coal trains entering the SARR at Holland).

¹⁵ *Decision* at 121.

the same rate as CSXT. CSXT Reply at III-D-93. These multiple material errors require reconsideration.

3. The *Decision* Erred By Finding That A Single Track Crew Could Maintain 122 Route Miles.

The *Decision* also materially erred by accepting Consumers’s proposal that a single track crew could effectively maintain the 122-route-mile, 130-track-mile stretch of the CERR between Porter and West Olive. The parties agreed that two track crews were needed for the dense Chicago portion of the CERR—they differed about whether the remaining 122 route miles of the SARR could be maintained by one track crew or two. See Consumers Open. at III-D-98–99; CSXT Reply at III-D-125. While density over this portion of the CERR was low, CSXT argued that this district was far too large to be effectively maintained by a single track crew, because many maintenance activities are proportional to the length of track to be maintained and because of the sheer distance the track crew would have to travel on the line. *Id.*; CSXT Br. at 34–35.

The *Decision*, however, did not address CSXT’s arguments about the infeasibility of such a large district. Instead, it focused on the average track district size of 70 track miles, which purportedly was reasonable in light of “CERR’s density and maintenance needs.” *Decision* at 138 n.95. It was material error for the *Decision* to accept a track district nearly double that and to fail to address CSXT’s multiple arguments about the specific infeasibility of that district.

4. The Disconnect Between Crossing Repaving Expense and Grade Crossing Construction Costs Is a Material Error.

The Board should correct the CERR’s crossing repaving expense so that it corresponds to the *Decision*’s total grade crossing construction costs. Consumers proposed that 10% of the CERR’s total crossing paving quantity would be re-paved each year, and thus that the CERR’s crossing repaving expense would be 10% of total grade crossing construction costs. Consumers Open. III-D-117. The *Decision* recognized that CSXT’s Reply workpapers followed this methodology, applying it to CSXT’s Reply grade crossing construction costs.¹⁶ But because

¹⁶ *Decision* at 148 n.107; CSXT Reply WP, “CERR MOW Costs_Reply.xlsx,” at “CERR Crossing Repaving Costs” cells E8 and E9.

CSXT’s narrative was unclear (because of what the *Decision* called a “scrivener’s error”), the *Decision* ignored CSXT’s workpapers. Instead, it used Consumers’s original calculation of crossing paving expenses—even though the *Decision* rejected Consumers’s calculation of total grade crossing construction costs. Compare *Decision* at 149 with *id.* at 259.

It was material error for the *Decision* to accept a cost for grade crossing maintenance that had no connection to the construction costs from which it is supposed to be derived. CSXT acknowledges that the *Decision*’s error in this regard derived from the “scrivener’s error” in CSXT’s Reply Narrative, but “[t]he Board routinely allows the correction of minor technical errors in SAC rate cases.” *TPI* at 185. Here, the error can be corrected by a straightforward application of the settled methodology proposed by Consumers and accepted by CSXT—calculating crossing repaving expenses as 10% of the *Decision*’s total grade crossing construction costs.

C. Road Property Investment

1. The *Decision* Erred By Omitting Real Estate Acquisition Costs.

The *Decision* acknowledged that real estate acquisition costs are “inherent in real estate transactions and would be incurred by a new rail entrant.” *Decision* at 175; see *SunBelt* at 104; *TPI* at 136;. Yet the Board refused to account for those costs here, on the grounds that CSXT’s evidence produced real estate acquisition costs higher than those in past cases. *Decision* at 176.

The *Decision* materially erred by rejecting the only evidence in the record as to a cost the SARR would incur. This cannot be reconciled with past precedent, which consistently holds that when only one party presents evidence on a cost, that evidence is necessarily the best evidence of record.¹⁷ Indeed, the *Decision*’s rejection of the only evidence of real estate acquisition costs in

¹⁷ See *WFA* at 69 (accepting equipment cost evidence that “may be flawed” because “it is nevertheless the only evidence of record”); see, e.g., *TPI* at 124 (accepting railroad’s evidence regarding snow removal costs where shipper offered none, despite finding that railroad’s evidence was ‘insubstantial’); *DuPont* at 193 (accepting NS’s unit costs for off-line ballast transportation because NS’s cost quote was “the only evidence of record”); *Duke/CSXT*, 7 S.T.B. at 464 (accepting railroad’s travel expenses because it was “the only evidence of record”);

the record is inconsistent with the *Decision* itself, which elsewhere accepted costs despite the other party's criticism where those costs were "the only evidence of record." *Decision* at 95.

Even if the Board were determined to not follow its "only evidence of record" precedent by accepting CSXT's costs as the best and only evidence in the record, it was material error to assign zero costs in the SAC analysis to an expense that the CERR undoubtedly would incur. The *Decision* could have used evidence in the record to adopt a lower real estate transaction cost than that proposed by CSXT.¹⁸ For example, if the *Decision*'s objection were that CSXT's costs were higher as a percentage of the total valuation than the 4.1% percentage in *Sunbelt*, the Board could have used that percentage as a reasonable approximation of those costs (as the Board does for the analogous SAC expenses of mobilization and engineering costs). What is not reasonable is to ignore those costs altogether.

2. The *Decision* Erred By Accepting Consumers's Land Inflation Index.

The *Decision* materially erred by valuing land appreciation between 2013 and 2015 with Consumers's land inflation index, which assumed an astronomical 27% increase in real estate values between 2013 and 2015 (without any explanation for such an increase). *Decision* at 270. First, the *Decision* wrongly concluded that CSXT did not "sufficiently explain" its objection to this cost increase. *Id.* at 271. On the contrary, CSXT explained that its objection was that the 27% increase in real estate prices proffered by Consumers was completely inconsistent with actual sales over that period in the area surrounding the CERR. CSXT Reply III-G-12. It is the *Decision* that did not adequately explain why it accepted such a dramatic and unexplained increase in real estate values over that two-year period.

Second, the *Decision* wrongly concluded that CSXT's evidence of a 6.3% increase in real estate values over that time was "unsupported" because it "[was] based on the land valuation

Bituminous Coal, 6 I.C.C.2d at 55 (accepting railroad evidence on service lives and salvage value as "the only evidence of record").

¹⁸ *Cf. Decision* at 270 (adopting equity flotation cost not proposed by either party based on Board's analysis of evidence in record).

report rejected by the Board.” *Decision* at 271. But CSXT’s evidence of the value increase was not predicated on its expert’s ultimate valuation conclusions, but rather on a straightforward analysis of the changes in raw sales comparison data along the CERR right of way between 2013 and 2015. CSXT Reply Ex. III-F-1 at 154–55. This analysis was unchallenged by Consumers on Rebuttal,¹⁹ and it was not addressed by the Board in the *Decision*. The *Decision* materially erred by assuming that the appropriate index for historical real estate inflation was controlled by the wholly separate issue of which party’s valuation should control. *Cf. DuPont* at 145–46, 277 (accepting railroad’s evidence on land valuation but shipper’s evidence on land inflation index).

3. The *Decision*’s Acceptance of MDOT Costs Contains Two Material Errors.

The *Decision* broke with longstanding Board precedent by using “MDOT costs” from a Consumers-created study for earthwork unit costs instead of R.S. Means costs. While CSXT believes that any use of MDOT costs is an error for the reasons set forth in CSXT’s Reply, two aspects of the *Decision*’s use of MDOT costs involve particularly stark material errors.

First, the *Decision* materially erred by accepting Consumers’s Rebuttal approach for common excavation unit costs, which introduces a significant mismatch between the implied quantities used to develop the unit costs and the modified Engineering Report quantities to which the unit costs are applied. The *Decision* correctly recognized that Consumers’s MDOT study only included the costs for excavation of *in situ* materials, and not costs for placing and compacting materials as embankment (which were separately itemized in the MDOT bid data). *Decision* at 185. But rather than including those omitted embankment costs as a separate cost

¹⁹ Not only did Consumers’s real estate expert not challenge CSXT’s evidence on real estate inflation, he also chose not to make any inflation adjustment in his own analysis (which used many comparable sales from 2013 and 2014 without adjusting them forward to 2015). See Consumers Op. WP “CERR Land Valuation Report.pdf” at 60–65. Consumers’s inflation adjustments were not made by its real estate expert; they were made in the DCF analysis sponsored by its financial expert. See Consumers Op. at III-G-12-13; Consumers Op. WP “Exhibit III-H-1.xlsm”, Tab “Investment,” Line 12.

item, the Decision accepted Consumers’s Rebuttal proposal for a “combined ‘Embankment CIP’/common earth excavation weighted average unit cost.” *Id.* at 184.

This “weighted average” contains a significant error that understates the actual excavation unit costs that are placed as embankment in the MDOT data. Consumers’s formula adds the total costs of excavation to the costs of embankment, and then divides that entire amount *by the sum of the excavation volumes and the embankment volumes*. See Consumers Reb. III-F-42 at n.107. The formula thus fails to recognize that the Engineering Report embankment volumes are a subset of the total excavation volumes (in other words, 70% of the total volumes excavated are also used for embankment). Consumers’s formula divides the total costs of excavation and embankment by a number that is greater than the “finite” units of earthwork at issue, and therefore it substantially understates the MDOT unit costs. The Board materially erred by accepting this flawed formula, and it should correct the error either by accepting Means costs for these cost items or by adding embankment costs as a separate cost item.

Second, the *Decision* committed material error by accepting Consumers’s MDOT-derived unit cost for borrow. The *Decision* argued that its break with its precedent of using Means costs was justified because “MDOT unit costs [were] derived from multiple real-world construction projects in the same geographic region with the same topographic diversity of that of the CERR.” *Decision* at 179. But that could not possibly be said for the MDOT borrow data that the Board accepted, which derived from just four small projects in Michigan accounting for 6,370 total cubic yards of borrow. CSXT Reply III-F-50. This tiny data set was nevertheless used to estimate costs for over a million cubic yards of CERR borrow, 92% of which was not in Michigan and over 80% of which is in the Chicago, Illinois portion of the SARR. *Id.* Borrow costs in an urban area like Chicago are markedly different than those in rural Michigan, in part because supply constraints require a longer length of haul.²⁰ *Id.*

²⁰ The use of a location factor does not address this issue. A location factor only accounts for differences in labor rates and material prices—not for the length of haul.

CSXT conservatively assumed a 1-mile length of haul for borrow, and this assumption still produced significantly higher average costs than those Consumers derived from its four selected MDOT projects—for which no information on the relative haul distances are available. The *Decision*’s conclusion that this difference “has no bearing on the feasibility of the MDOT data” is wrong. The stark difference between the costs produced by a conservative index that has been accepted in over a dozen cases and those produced in a litigation-created survey of four small projects from a different state is powerful evidence that Consumers’s borrow costs are not a reliable estimate of what the CERR would have to pay for borrow in Chicago. MDOT borrow cost data are the sort of limited, atypical data that the Board has recognized to be unreliable, and the *Decision* materially erred by using them in place of CSXT’s Means-based estimate.

4. The Calculation of Offline Ballast Transportation Costs Introduced An Error.

The Board correctly decided to base the off-line costs for transporting ballast on rates for movements of crushed stone in the 2013 Public Use Waybill Sample. *Decision* at 207. But the *Decision* introduced an error with its *sua sponte* decision to modify CSXT’s proposal by calculating off-line transport costs using movements in both railroad-owned and privately-owned cars. *Id.* Consumers did not propose that the CERR would own any cars for transporting ballast during construction, and the Board did not attribute any costs of car ownership to the CERR. The costs of car ownership are an essential cost element of private car movements, and assuming that the CERR could transport ballast at private-car rates without having its own cars substantially understates the costs of ballast transportation. The Board should correct this error by limiting the analysis to crushed stone movements in railroad-owned cars, as CSXT proposed in its Reply.²¹

5. Technical Errors in Rail Transportation Costs Should Be Corrected.

The *Decision* accepted “CSXT’s rates to transport the rail to CERR railheads,” which first applies a rate derived from the 2013 CWS between Steelton, PA, and Russell, KY (as modified using unmasked 2013 CWS data), and second applies a rate between Russell, KY to the

²¹ See CSXT Reply III-F-69–73.

CERR railheads derived from a rail manufacturer quote (as modified to remove costs for renting the rail train). However, the Board’s workpapers failed to implement its decision in two ways. First, the workpapers apply Consumers’s rejected \$0.035 rate for transportation of 115-pound rail. Second, for both types of rail, the Board did not apply the quoted rate for the second segment from Russell, KY to CERR railheads. These errors should be corrected.²²

6. Consumers’s Rebuttal Bridge Redesigns Are Infeasible.

The *Decision* erred by finding that Consumers’s Rebuttal proposal to redesign certain bridges to use “wingwalls” as wall abutments was feasible. On Opening Consumers proposed standard bridge “types,” which were based on CSXT bridges that used spill slopes.²³ After CSXT showed on Reply that the spill slopes for some bridges would interfere with roadways, sidewalks, and waterways, on Rebuttal Consumers claimed that its opening bridge costs were just “average costs” and that it could repurpose the “wingwalls” in its bridge costs to serve as wall abutments.²⁴ The *Decision*’s acceptance of this evidence materially erred in two ways.

First, the *Decision*’s conclusion that “neither Consumers’s narrative nor its workpapers show that CERR would employ spill slopes” is a mistake of fact. *Decision* at 224. The CSXT bridges that Consumers used as models for its Type I, II, and III bridges all use spill slopes. See Ex. 2, V.S. Magistro at 2–3. And the *Decision*’s *sua sponte* conclusion that the rip rap quantities in Consumers’s bridge costs might not have been used for spill slopes cannot be squared with the sheer volume of rip rap at issue—900 tons for Type 1 bridges and 650 tons for Type 2 and 3 bridges.²⁵ Indeed, Consumers did not dispute that its standard bridge design assumed rip rap

²² To correct the errors, make the following adjustments to “STB WP Rail Worksheet - 2015_Supp_Reply_Alt1_Alt2_STB.xls” at worksheet “Rail Cost per LF”: (1) Change cell L49 to equal “=0.077573”; (2) Change cell E17 to “=0”; (3) Change cell E33 to “=0”; (4) Change cell E23 to “=E21*E20+L54”; and (5) Change cell E39 to “=E37*E36+L53.” CSXT and Consumers discussed including this correction in the Joint Petition for Technical Corrections, but were unable to agree on the correction.

²³ See Consumers Open. at III-F-65, Ex. 2, V.S. Magistro at 2.

²⁴ See CSXT Reply at III-F-95–96; Consumers Reb. at III-F-101.

²⁵ See Consumers Open. WP, “Bridge Costs.xlsx” at “Type 1,” “Type 2,” and “Type 3” tabs (see “RIPRAP” entry on screenshot cost estimates).

quantities for spill slopes; its argument was that for certain bridges those rip rap costs could be foregone to offset higher wingwall costs. *See* Consumers Reb. at III-F-101-02.

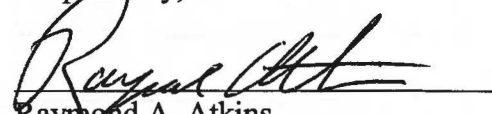
Second, the *Decision* ignored CSXT's argument that Consumers's Rebuttal redesign of its bridges denied CSXT the opportunity to show the engineering flaws in that proposal. *See* CSXT Br. at 49. The attached Verified Statement of David Magistro identifies some of the engineering problems with Consumers's Rebuttal proposal.²⁶ As Mr. Magistro explains, Consumers's redesign would take precast wing walls that were designed to be installed parallel to the track and instead install them perpendicular to the track. Ex. 2, V.S. Magistro at 7. The repositioning would subject the wingwalls to load intensities over three times higher than parallel walls would face. *Id.* Moreover, Consumers's redesign would subject its abutment piles to over three times more combined earth pressure, live load surcharge, and longitudinal forces than would be placed on CSXT's standard abutments. *Id.* The *Decision* materially erred by accepting a Rebuttal redesign of multiple CERR bridges with serious engineering flaws. CSXT's evidence provides the only feasible bridge designs in the record.

III. CONCLUSION

The Board should grant CSXT's Petition for Reconsideration.

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Respectfully,


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Dated: February 20, 2018

²⁶ Mr. Magistro's statement is submitted both to illustrate the material error the Board made when it accepted flawed new Rebuttal evidence and as "new evidence" within the meaning of 49 C.F.R. § 1115.3(b) that CSXT could not have presented earlier.

CERTIFICATE OF SERVICE

I hereby certify that on this 20th day of February, 2018, I caused a copy of the foregoing
CSX Transportation, Inc.'s Petition for Reconsideration to be served by hand-delivery upon:

Kelvin J. Dowd
Slover & Loftus LLP
1224 Seventeenth Street, N.W.
Washington, D.C. 20036



Alec Weingart

VERIFIED STATEMENT
OF
KAUSTUV CHAKRABARTI

My name is Kaustuv Chakrabarti. I am a Senior Director at FTI Consulting, an economic consulting firm. My business address is 8251 Greensboro Drive, McLean, VA, 22102. A statement describing my background, experience, and qualifications was previously submitted in connection with CSXT’s Reply Evidence (at V-58–61). I am actively involved in various aspects of transportation consulting, including economic studies of costs and revenues, traffic and operating analyses, and work with costing and financial reporting systems. Much of my work for the railroad industry has involved analysis of traffic and operational data used by the Surface Transportation Board (“STB” or “Board”) for a variety of regulatory purposes.

The purpose of this Verified Statement is to explain the numerous errors in the analysis presented by Consumers purporting to demonstrate that every CERR train crew operating in the Chicago terminal area would be able to complete two train assignments within 12 hours, every day of the year (referred to herein as the “Consumers Turn Crew Analysis”).¹ The Board adopted the Consumers Turn Crew Analysis (with an intended adjustment to reflect the train transit times generated by CSXT’s supplemental “Alternative 1” RTC model simulation) as the evidentiary basis for its conclusion that Consumers’ 100% turn crew assumption was feasible and supported. *Decision* at 101–02.

Part I of my Verified Statement discusses the data errors and methodological flaws in the Consumers Turn Crew Analysis, as adopted by the Board in its *Decision*. Part II presents the results of a “corrected” turn crew analysis, which utilizes the correct data and remedies the

¹ See Consumers Reb. at III-D-22–23, Reb. Table III-D-2.

methodological errors in the Consumers Turn Crew Analysis. As CSXT's corrected analysis demonstrates, the Board's finding that it would be feasible for 100% of CERR's crews to complete two train assignments in a single day is not supported by the record evidence.

I. Consumers' Turn Crew Analysis Suffers From Numerous Data And Methodological Errors That Render Its Conclusions Meaningless.

On Opening, Consumers' experts testified that the CERR's train operations in the Chicago terminal area would permit CERR train crews to operate in turn service "on a regular basis."² Consumers' crew calculations went even further, applying an assumption that CERR train crews would complete two train assignments per shift, every single day, without ever violating the 12-hour Hours-of-Service law.³ Neither Consumers' Opening narrative nor its workpapers contained any substantive analysis to support this assumption. CSXT's Reply Evidence (at III-C-69–71) explained the reasons why Consumers' assumption was not credible.

On Rebuttal, Consumers presented—for the first time—an analysis that (according to Consumers) proved that its 100% turn crew assumption was feasible.⁴ Consumers purported to calculate, for the trains operating during the RTC Model peak period, the total time required for CERR crews to complete two train assignments, taking into account time that crews would need to taxi between trains, to report on and off duty, and to complete the necessary interchange activities. *Id.* In its *Decision* (at 101–02), the Board adopted Consumers' Turn Crew Analysis, with a modification intended to reflect the train transit times from CSXT's Supplemental "Alternative 1" RTC simulation. *Id.* at 101. Based on its modified analysis, the Board concluded

² See Consumers Open. at III-C-80.

³ See Consumers Op. WP "Base Unit Merch Trains v6_Statistics.xlsx," tab "2014 Full Base Year Unit Merch," column "Y" (showing 0.5 crews for all 9600 CERR Chicago trains operating west of Curtis, IN).

⁴ See Consumers Reb. at III-D-22–23, Reb. Table III-D-2.

that “CSXT’s RTC Model, which the Board is adopting, supports Consumers’ crewing methodology.” *Id.* Contrary to this conclusion, both Consumers’ Turn Crew Analysis and the Board’s own modified analysis are based on incorrect data and a flawed methodology.

A. The Use Of Train Suffixes To Identify Trains For Analysis Was Fatally Flawed.

As Consumers Rebuttal Table III-D-2 (at III-D-23) indicates, Consumers selected trains for its turn crew analysis based on the “Train Suffix” associated with CERR trains. The Board used the same approach as Consumers to identifying trains in developing its modified analysis of the turn crew issue.⁵ Both Consumers and the Board appear to have assumed that all of the trains with the Suffix “20140323” operated on March 23, all trains with the Suffix “20140324” Suffix operated on March 24, etc.⁶

That assumption was incorrect, however. Attachment A to my Verified Statement is a list of all of the trains that operated under the Train Suffixes included in Consumers’ Rebuttal Table III-D-II. As Attachment A indicates, trains operating under a particular Train Suffix did not all operate on the date that corresponds to the Train Suffix. For example, eastbound trains bearing Train Suffix “20140323” had On-SARR times ranging from 9:35pm on March 22 to 7:01pm on March 27, a five-day period. Westbound trains bearing Train Suffix “20140323” included trains that arrived On-SARR at various times (and days) between 8:01pm on March 23 and 3:02 am on March 29, a period of six days. Likewise, eastbound trains bearing Train Suffix

⁵ See STB WP “CERR Base Year Trains_Supp_Reply_Alt1 with Table III-D-2 – STB.xlsx,” column “Row Labels” (showing the same Train Suffixes as those set forth in Consumers’ Rebuttal Table III-D-2).

⁶ The trains included in the Consumers and Board analyses differ slightly due to the Board including West Olive coal trains and excluding several trains due to the application of a filter as described below in Section I.B.

“20140324” arrived on the CERR at various times between 4:50am on March 24 and 6:43pm on April 1—a period encompassing an entire week. As Attachment A shows, trains associated with each of the Train Suffixes selected by Consumers for its Turn Crew Analysis operated over a multi-day period (rather than on the date that might appear to correspond to the Train Suffix). The “average” transit time experienced by a group of trains that operate on entirely different days cannot support the *Decision*’s conclusion that 100% of CERR crews could complete two train assignments on any individual day (much less every day of the year).

As discussed below, CSXT corrects this error in Consumers’ Turn Crew Analysis by substituting a list of trains that actually operated on each day during the peak period in CSXT’s supplemental “Alternative 1” RTC simulation.

B. The Board Failed To Remove Trains Excluded From The CERR Traffic Group.

In its Supplemental Evidence, Consumers removed 897 Base Year merchandise trains (including 24 peak period trains) from the CERR traffic group. *Decision* at 25–26. In addition, the Board agreed with CSXT that certain K300 Series coke trains selected by Consumers should be excluded from the CERR traffic group. *Id.* at 28–32. However, in developing its modified analysis of Consumers’ 100% turn crew assumption, the Board failed to remove those merchandise and coke trains from its calculations.

The Board’s modified analysis also included certain trains that operated beyond Chicago to Consumers’ West Olive, Michigan facility. Crews operating trains to West Olive would obviously be unable to complete a second train assignment on a single day.

Conversely, CSXT’s review of the Board’s workpapers revealed that the Board’s modified analysis failed to include certain CERR trains that operated during the analysis period. This appears to have resulted from the application of a filter by the Board in developing STB workpaper "CERR Base Year Trains_Supp_Reply_Alt1 with Table III-D-2 - STB.xlsx" tab

"STB III-D-2 Table," which resulted in a failure to capture rows 10099 to 10289 from the "Trains" tab.

CSXT's corrected analysis addresses these data errors by excluding the merchandise and coke trains that are not part of the final CERR's traffic group. CSXT also removed the trains moving to Consumers' West Olive, Michigan facility. CSXT's analysis adds the trains that appear to have been dropped inadvertently by the Board, by including trains from all rows 5 to 10289, instead of only rows 5 to 10098, from the "Trains" tab.

C. The Board's Modified Analysis Applied Incorrect RTC Train Transit Times.

In the *Decision* (at 101), the Board stated that it developed its modified version of Consumers' Turn Crew Analysis by "applying Consumers' methodology to CSXT's RTC model." The Board apparently intended to test Consumers' 100% turn crew assumption based upon the train transit times generated by CSXT's Supplemental "Alternative 1" RTC model simulation, which the Board adopted as the basis for its decision in the case.

However, the Board's turn crew analysis workpaper reveals that the Board actually applied train transit times from Consumers' Opening RTC Model, rather than those generated by CSXT's Supplemental "Alternative 1" RTC Model. What appears to have happened is that, when developing the PivotTable in the "STB III-D-2 Table" tab, the Board mistakenly applied column "Z" from CSXT's "Trains" tab, which contained the train transit times from Consumers' Opening RTC simulation. Because Column Z displays as "Transit Time" in the PivotTable, the Board may have mistakenly assumed that the data in Column Z were the transit times generated by CSXT's RTC Model. The train transit times generated by CSXT's Supplemental "Alternative 1" RTC simulation actually appear in Column AQ of the "Trains" tab, which displays as "Transit Time2" in the PivotTable.

Substituting the train transit times generated by CSXT’s “Alternative 1” RTC simulation for the (incorrect) Consumers Opening RTC train transit times alone increases the average one-way transit time in the Board’s modified analysis from 2.7 hours to 3.1 hours and the average round-trip transit time from 5.4 hours to 6.1 hours, or 13 percent. With that additional transit time, the average time required to complete two train assignments exceeds 12 hours on 5 of the 9 days depicted in the Board’s workpaper.

CSXT’s corrected analysis applies the train transit times generated by the RTC simulation adopted by the Board as the basis for decision in this proceeding—the CSXT Supplemental “Alternative 1” RTC simulation.

D. The Methodology Employed By Consumers And The Board Failed To Consider The Effects Of Directional Imbalance In The CERR’s Train Service.

The methodology employed by Consumers in conducting its Turn Crew Analysis (and followed by the Board in developing its modified analysis) treated all CERR trains “generically” without regard to their direction of movement. Consumers simply calculated an aggregate transit time for all of the eastbound and westbound trains under a particular Train Suffix. Consumers then divided that aggregate transit time by the number of trains moving under the Train Suffix to develop an “average” per train transit time. Finally, Consumers multiplied that average by two to calculate the transit time for “2 Trains.” See Consumers Reb. III-D-23, Reb. Table III-D-2. The Board applied the same methodology to conduct its modified turn crew analysis.⁷

Consumers’ observation that train flows in the Chicago area “are relatively similar in each direction” (Consumers Open. at III-C-80) ignores the imbalance that exists on each

⁷ See STB WP “CERR Base Year Trains_Supp_Reply_Alt1 with Table III-D-2 - STB.xlsx” tab “STB III-D-2 Table” III-D-2 – STB.xlsx” (containing same calculations as those shown in Consumers’ Rebuttal Table III-D-2).

particular operating day. As Table 1 below shows, the CERR's train flows are imbalanced on all but one day during the RTC peak period. That imbalance is substantial on several days: for example, the CERR operates five more eastbound trains than westbound trains on March 24 and five more westbound trains than eastbound trains on March 28. The methodology applied by Consumers (and adopted by the Board) fails to consider the impact of directional imbalance on the feasibility of Consumers' 100% turn crew assumption.

CSXT's corrected turn crew analysis properly takes into account both the effect of directional imbalance and the actual arrival and departure times of CERR trains in the RTC Model.

E. The Methodology Employed By Consumers And The Board Failed To Account For The Actual Times At Which CERR Trains Arrive and Depart.

Consumers' methodology failed to account for a factor that would be critical to the ability of CERR crews to complete multiple train assignments during a single shift—*i.e.*, the time of day at which trains arrive at, and depart from, the locations at which those trains are interchanged with connecting carriers. As an overhead carrier for the trains that it receives and delivers in the Chicago terminal area, CERR has no control over the time at which trains would arrive at their On-SARR location. Both Consumers' and CSXT's RTC simulations reflected that reality by assuming that trains would arrive On-SARR at the same time they arrived in CSXT's actual Base Year train operations. (The times at which CERR trains complete their movement and arrive at their Off-SARR location was determined by the RTC Model.)

The methodology employed by Consumers in performing its Turn Crew Analysis ignored (i) the direction in which CERR trains were moving, (ii) the time of day at which trains would arrive On-SARR (and therefore be available for further movement by a CERR crew), and (iii) the time of day at which CERR trains would arrive at their Off-SARR location (and the crew

would become available to handle a second train assignment). Instead, Consumers attempted to predict the total time required for a crew to complete two train assignments by calculating the “average” transit times experienced by all of the trains moving under a particular Train Suffix and certain “generic” time allowances for taxiing crews between trains, performing pre-departure procedures (“on/off duty”), and completing the interchange of trains with connecting carriers.

The time of day at which CERR trains would arrive and depart (and whether CERR could “match” crews to the two specific trains that they might operate within a 12-hour period) is essential to a reliable analysis. It matters not that a crew experiencing an “average” combined transit time of 5.3 hours on a round-trip between 22nd Street and Curtis could theoretically complete both train movements within 12 hours, if the second train would not be available to the arriving crew for 5 or 6 hours after the crew arrived at Curtis.⁸

CSXT’s corrected turn crew analysis incorporates the critical elements—direction of movement and arrival/departure times of CERR trains—that Consumers failed to evaluate in performing its Turn Crew Analysis. As Part II of my testimony shows, when those factors are properly accounted for, it is clear that 100% of CERR crews could not complete two train assignments within 12 hours, every day.

II. CSXT’s Corrected Turn Crew Analysis Demonstrates That CSXT’s Proposed 25% Recrew Adjustment Constitutes The Best Evidence Of Record.

I performed an analysis of the CERR’s train operations to determine whether Consumers’ claim that 100% of CERR crews could complete two train assignments during a single shift is feasible. Unlike Consumers, I based my analysis on the CERR trains moving during the peak

⁸ See, e.g., Attachment B, Line 12 (6.5-hour crew “dwell” time of eastbound crew awaiting arrival of westbound train at Curtis for return to 22nd Street); Line 70 (5.4-hour crew “dwell” time of eastbound crew awaiting arrival of westbound train at Curtis for return to 22nd Street).

period in CSXT's RTC Model simulation. I made the following corrections and modifications to the Consumers/STB analysis:

1. I based CSXT's corrected analysis on a list of trains that actually operated on each day during the peak period, rather than trains moving under the Train Suffixes (erroneously) relied upon by Consumers.⁹
2. I corrected the train data errors in the analyses performed by Consumers and the Board by removing the merchandise and coke trains that are not part of the final CERR traffic group, as well as the coal trains moving to Consumers' West Olive, Michigan facility. I added back those trains that appear to have been inadvertently omitted from the Board's modified analysis (*i.e.*, trains appearing in rows 10099 to 10289 from the "Trains" tab).
3. I applied the train transit times generated by CSXT's Supplemental "Alternative 1" RTC Model simulation.
4. I organized the CERR trains operating on each day during the peak period by direction of movement (eastbound or westbound), to facilitate "matching" crews to two train assignments, where possible.
5. I incorporated into CSXT's corrected analysis the actual dates and times at which each CERR train during the nine-day peak period arrived at, and departed from, its On-SARR and Off-SARR locations.
6. In order to avoid duplication between the crew "dwell" time resulting from delays in arriving trains and the generic 3-hour "taxi" time in Consumers' Turn Crew Analysis, I removed that 3-hour allowance from the analysis, and applied only the actual time between train arrivals and departures. I retained the 2-hour allowance for crews to go on/off duty, and the 1-hour allowance for the completion of two interchanges.

The results of CSXT's corrected turn crew analysis are set forth in Attachment B to my Verified Statement. As Attachment B shows, not every CERR crew can be "matched" with a turn train movement on any particular day due to (i) the directional imbalance in CERR trains moving on that day, or (ii) the unavailability of a second train at the first train's Off-SARR point

⁹ Trains that operated during the peak period were identified by having On SARR times or Off SARR times (calculated as On SARR time plus transit time) from March 23 to 31, 2014, from the "Trains" tab in STB WP "CERR Base Year Trains_Supp_Reply_Alt1 with Table III-D-2 - STB.xlsx".

at a time that would permit the crew to complete the second train movement. For example, on March 23, westbound Trains K053 and K615 depart Curtis, IN at 1:38 am and 2:36 am, respectively, based on the train departure times specified in the RTC simulation. It is not possible to match both of those trains with an arriving eastbound crew, because only one eastbound train (Train K040) arrives at Curtis in time to provide a crew for a 1:38 am or 2:36 am departure. The next eastbound train (Train Q200) does not arrive until 4:59 am.¹⁰ Likewise, on March 24, eastbound Train Q101 arrives at Dolton at 7:56 am. Eastbound Trains N990, K403 and N954 arrive at Curtis 8:23am, 8:41am and 10:23am, respectively. Due to the imbalance of CERR trains on that date, there is no westbound train at either Dolton or Curtis available for the crews of these four trains to operate until 4:44pm, when Train L157 departs from Curtis. The crew “dwell” between the arrival times of the three eastbound trains at Curtis and the departure time for train L157 is, in each case, 6:21 or more. (The crew “dwell” for the crew arriving at 7.56am at Dolton is even greater.)¹¹ Such long dwell times would make it impossible for those four CERR crews to complete a westbound return movement in 12 hours or less.

Attachment B identifies a total of 45 trains—or 18% of the CERR’s peak period trains—for which crews from arriving trains cannot be “matched” for a turn movement.

As Attachment B shows, even where a “turn” train is available for an arriving crew, that crew often cannot complete the second train assignment within 12 hours. In analyzing this issue, I excluded entirely the generic 3-hour “taxi” time applied by Consumers, and applied only the times at which trains actually arrive and depart, based upon the RTC Model. For example, on March 23, eastbound Train K688 arrives at Curtis, IN at 2:18pm. The crew of that train would be

¹⁰ See Attachment B, Lines 4-5.

¹¹ See Attachment B, Lines 24-29.

available to operate Train E958, which departs Curtis at 6:29pm. Due to the 4.2-hour crew “dwell” time between the arrival of Train K688 and the departure of Train E958, the total time required to complete both train movements is 14.8 hours, which exceeds the crew’s permitted hours of service. (Train E958 could theoretically be handled by the crew of Train N954, which arrives later at 4:53pm, but that crew is assumed to operate westbound Train Q028, which departs Dolton at 9:03pm and completes a turn movement within the prescribed hours of service.)¹²

Attachment B identifies a total of 46 trains—or 19% of the CERR’s peak period trains—for which crews can be “matched” to a turn movement, but the total transit time (based on the actual arrival and departure times in the RTC Model) would exceed 12 hours.

Consumers suggested that the inability of some crews to complete two assignments within 12 hours would be offset by “crewing credits for the times that the CERR crew could make more than two movements in a day.”¹³ As Attachment B demonstrates, however, the average time required to complete two train movements—counting only those trains that do not already exceed 12 hours—is 10.1 hours.¹⁴ When the time required for the crew to complete the interchange of a third train (0.5 hours) is added to that total, there would be only 1.4 hours to complete a third train movement, assuming that the crew did not experience any “dwell” time waiting for the third train. None of the CERR trains listed on Attachment B has a one-way transit time of 1.4 hours or less.

¹² See Attachment B, Lines 14, 16.

¹³ Consumers Reb. at III-D-21.

¹⁴ See Attachment B, “Hours Per Crew,” column “Total.”

Table 1. Total Crew Times for Chicago Area Crews

Day	Eastbound Trains	Westbound Trains	Imbalance		Trains	East and West Not Matched (Imbalance)	Matched But 12+ Hours Round- Trip	No Match Or 12+ Hours
March 23	15	18	-3		33	5	12	17
March 24	17	12	5		29	4	7	11
March 25	14	13	1		27	5	3	8
March 26	13	13	0		26	4	4	8
March 27	14	15	-1		29	2	6	8
March 28	10	15	-5		25	6	0	6
March 29	16	13	3		29	10	4	14
March 30	11	10	1		21	6	5	11
March 31	13	16	-3		29	3	5	8
Total	123	125	-2		248	45	46	91
%						18%	19%	37%

Table 1 summarizes the results of CSXT’s corrected turn crew analysis. As that Table shows, the CERR’s train operations in the Chicago terminal area are characterized by a daily imbalance between eastbound and westbound trains. When that imbalance, and the actual times at which CERR trains arrive at and depart their On-SARR locations each day (according to the RTC Model), are taken into account, it is clear that it is simply not feasible for 100% of the CERR’s train crews to complete two train assignments on any particular day—much less every day of the year.

VERIFICATION

I, Kaustuv Chakrabarti, declare under penalty of perjury that I have read the foregoing Verified Statement, that I know the contents thereof, and that the statements set forth therein are true and correct. Further, I certify that I am qualified and authorized to file this statement.



Kaustuv Chakrabarti

Executed on this 16th day of February, 2018

Chicago Area Trains with Train Suffix Included in Consumers/Board Analysis

141 Eastbound Trains						142 Westbound Trains				
Eastbound Trains						Westbound Trains				
Row	Profile	Train Suffix	On SARR Location	Off SARR Location	On SARR Time	Profile	Train Suffix	On SARR Location	Off SARR Location	On SARR Time
1	K040	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/22/14 9:35 PM	Q171	20140323	CURTIS, IN	22ND ST, IL	3/23/14 8:01 PM
2	Q200	20140323	CALUMET PARK CP, IL	CURTIS, IN	3/23/14 3:24 AM	E922	20140323	CURTIS, IN	22ND ST, IL	3/24/14 1:02 AM
3	K042	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/23/14 5:50 AM	Q383	20140323	CURTIS, IN	22ND ST, IL	3/24/14 7:23 AM
4	K080	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/23/14 7:55 AM	Q028	20140323	DOLTON, IL	CHICAGO 59TH ST, IL	3/24/14 7:02 PM
5	K688	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/23/14 11:45 AM	E937	20140323	CURTIS, IN	22ND ST, IL	3/24/14 9:28 PM
6	Q146	20140323	CHICAGO 59TH ST, IL	CURTIS, IN	3/23/14 12:00 PM	L124	20140323	DOLTON, IL	CHICAGO 59TH ST, IL	3/24/14 9:34 PM
7	Q138	20140323	CHICAGO 59TH ST, IL	CURTIS, IN	3/23/14 4:00 PM	L113	20140323	CURTIS, IN	CHICAGO 59TH ST, IL	3/25/14 2:41 AM
8	Q090	20140323	CHICAGO, IL	CURTIS, IN	3/23/14 5:30 PM	Q391	20140323	CURTIS, IN	BLUE ISL IHB CONN, IL	3/25/14 5:12 AM
9	N791	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/23/14 5:35 PM	K017	20140323	CURTIS, IN	22ND ST, IL	3/25/14 5:55 PM
10	N492	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/24/14 3:51 AM	K041	20140323	CURTIS, IN	22ND ST, IL	3/25/14 9:56 PM
11	K044	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/24/14 4:45 AM	K055	20140323	CURTIS, IN	22ND ST, IL	3/26/14 5:48 AM
12	K627	20140323	CALUMET PARK CP, IL	CURTIS, IN	3/24/14 5:25 AM	K415	20140323	CURTIS, IN	22ND ST, IL	3/27/14 1:41 PM
13	N990	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/24/14 5:50 AM	E958	20140323	CURTIS, IN	BLUE ISL IHB CONN, IL	3/27/14 2:13 PM
14	K403	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/24/14 6:08 AM	K049	20140323	CURTIS, IN	DOLTON, IL	3/29/14 3:02 AM
15	N954	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/24/14 7:50 AM	E949	20140323	WEST OLIVE, MI	22ND ST, IL	3/29/14 1:45 PM
16	N841	20140323	22ND ST-71ST ST, IL	CURTIS, IN	3/24/14 12:30 PM					
17	N903	20140323	22ND ST-71ST ST, IL	WEST OLIVE, MI	3/24/14 3:30 PM					
18	Q172	20140323	CHICAGO 59TH ST, IL	CURTIS, IN	3/24/14 7:50 PM					
19	K310	20140323	CALUMET PARK CP, IL	CURTIS, IN	3/27/14 7:01 PM					
20	Q200	20140324	CALUMET PARK CP, IL	CURTIS, IN	3/24/14 4:50 AM	S171	20140324	CURTIS, IN	22ND ST, IL	3/24/14 7:54 AM
21	Q101	20140324	CHICAGO 59TH ST, IL	DOLTON, IL	3/24/14 6:00 AM	Q171	20140324	CURTIS, IN	22ND ST, IL	3/24/14 10:34 PM
22	Q146	20140324	CHICAGO 59TH ST, IL	CURTIS, IN	3/24/14 12:00 PM	Q383	20140324	CURTIS, IN	22ND ST, IL	3/25/14 2:09 AM
23	Q138	20140324	CHICAGO 59TH ST, IL	CURTIS, IN	3/24/14 4:00 PM	E922	20140324	CURTIS, IN	22ND ST, IL	3/25/14 8:31 AM
24	N492	20140324	DOLTON, IL	CURTIS, IN	3/24/14 4:25 PM	L246	20140324	CURTIS, IN	CALUMET PARK CP, IL	3/25/14 11:35 AM
25	K080	20140324	22ND ST-71ST ST, IL	CURTIS, IN	3/24/14 5:45 PM	Q028	20140324	DOLTON, IL	CHICAGO 59TH ST, IL	3/25/14 10:17 PM
26	N990	20140324	22ND ST-71ST ST, IL	CURTIS, IN	3/24/14 7:15 PM	Q124	20140324	DOLTON, IL	CHICAGO 59TH ST, IL	3/26/14 1:29 AM
27	Q029	20140324	CHICAGO 59TH ST, IL	DOLTON, IL	3/24/14 8:30 PM	Q137	20140324	CURTIS, IN	CHICAGO 59TH ST, IL	3/26/14 7:10 AM
28	Q172	20140324	CHICAGO 59TH ST, IL	CURTIS, IN	3/25/14 4:35 AM	E937	20140324	CURTIS, IN	22ND ST, IL	3/26/14 10:10 AM
29	K044	20140324	22ND ST-71ST ST, IL	CURTIS, IN	3/25/14 6:40 PM	Q157	20140324	CURTIS, IN	CHICAGO 59TH ST, IL	3/26/14 11:37 AM
30	N831	20140324	22ND ST-71ST ST, IL	CURTIS, IN	3/26/14 4:25 AM	K241	20140324	CURTIS, IN	BLUE ISL IHB CONN, IL	3/26/14 11:51 AM
31	N791	20140324	22ND ST-71ST ST, IL	CURTIS, IN	3/26/14 7:45 AM	Q102	20140324	DOLTON, IL	CHICAGO 59TH ST, IL	3/26/14 9:29 PM
32	K040	20140324	22ND ST-71ST ST, IL	CURTIS, IN	3/27/14 1:06 PM	K011	20140324	CURTIS, IN	22ND ST, IL	3/27/14 1:58 AM
33	T882	20140324	DOLTON, IL	CURTIS, IN	4/1/14 6:43 PM	K041	20140324	CURTIS, IN	22ND ST, IL	3/27/14 1:59 PM
34						K055	20140324	CURTIS, IN	22ND ST, IL	3/27/14 8:08 PM
35						K081	20140324	CURTIS, IN	22ND ST, IL	3/27/14 10:27 PM
36	Q200	20140325	CALUMET PARK CP, IL	CURTIS, IN	3/25/14 3:24 AM	S171	20140325	CURTIS, IN	22ND ST, IL	3/25/14 1:28 PM
37	N990	20140325	22ND ST-71ST ST, IL	CURTIS, IN	3/25/14 4:35 AM	Q171	20140325	CURTIS, IN	22ND ST, IL	3/25/14 10:08 PM
38	Q101	20140325	CHICAGO 59TH ST, IL	DOLTON, IL	3/25/14 6:00 AM	Q383	20140325	CURTIS, IN	22ND ST, IL	3/26/14 2:22 AM
39	Q090	20140325	CHICAGO, IL	CURTIS, IN	3/25/14 6:55 AM	E922	20140325	CURTIS, IN	22ND ST, IL	3/26/14 11:10 AM
40	Q267	20140325	CHICAGO, IL	CURTIS, IN	3/25/14 8:20 AM	Q246	20140325	CURTIS, IN	CALUMET PARK CP, IL	3/26/14 12:42 PM

Chicago Area Trains with Train Suffix Included in Consumers/Board Analysis

141 Eastbound Trains						142 Westbound Trains				
Eastbound Trains						Westbound Trains				
Row	Profile	Train Suffix	On SARR Location	Off SARR Location	On SARR Time	Profile	Train Suffix	On SARR Location	Off SARR Location	On SARR Time
41	K010	20140325	22ND ST-71ST ST, IL	CURTIS, IN	3/25/14 10:40 AM	Q028	20140325	DOLTON, IL	CHICAGO 59TH ST, IL	3/26/14 11:14 PM
42	Q386	20140325	DOLTON, IL	CURTIS, IN	3/25/14 11:37 AM	Q391	20140325	CURTIS, IN	22ND ST, IL	3/27/14 1:49 AM
43	Q146	20140325	CHICAGO 59TH ST, IL	CURTIS, IN	3/25/14 12:00 PM	Q124	20140325	DOLTON, IL	CHICAGO 59TH ST, IL	3/27/14 3:41 AM
44	Q138	20140325	CHICAGO 59TH ST, IL	CURTIS, IN	3/25/14 4:00 PM	E937	20140325	CURTIS, IN	22ND ST, IL	3/27/14 11:38 AM
45	K016	20140325	22ND ST-71ST ST, IL	CURTIS, IN	3/25/14 6:18 PM	Q500	20140325	CURTIS, IN	DOLTON, IL	3/27/14 3:42 PM
46	K042	20140325	22ND ST-71ST ST, IL	CURTIS, IN	3/25/14 8:00 PM	Q157	20140325	CURTIS, IN	CHICAGO 59TH ST, IL	3/27/14 4:14 PM
47	Q029	20140325	CHICAGO 59TH ST, IL	DOLTON, IL	3/25/14 8:45 PM	K311	20140325	CURTIS, IN	CHICAGO, IL	3/27/14 4:41 PM
48	K636	20140325	DOLTON, IL	CURTIS, IN	3/25/14 9:03 PM	Q137	20140325	CURTIS, IN	CHICAGO 59TH ST, IL	3/27/14 6:54 PM
49	Q172	20140325	CHICAGO 59TH ST, IL	CURTIS, IN	3/25/14 10:15 PM	Q102	20140325	DOLTON, IL	CHICAGO 59TH ST, IL	3/28/14 2:28 AM
50	N793	20140325	22ND ST-71ST ST, IL	CURTIS, IN	3/25/14 10:45 PM	K041	20140325	CURTIS, IN	22ND ST, IL	3/28/14 4:46 AM
51	Q206	20140325	CHICAGO, IL	CURTIS, IN	3/26/14 1:30 AM	K055	20140325	CURTIS, IN	22ND ST, IL	3/28/14 9:52 AM
52	N492	20140325	22ND ST-71ST ST, IL	CURTIS, IN	3/26/14 9:39 AM	Q393	20140325	CURTIS, IN	DOLTON, IL	3/29/14 4:38 AM
53	N841	20140325	22ND ST-71ST ST, IL	CURTIS, IN	3/26/14 11:45 AM	K802	20140325	CURTIS, IN	22ND ST, IL	3/31/14 12:08 PM
54	K044	20140325	22ND ST-71ST ST, IL	CURTIS, IN	3/27/14 4:53 AM	K446	20140325	CURTIS, IN	BLUE ISL IHB CONN, IL	4/1/14 8:04 PM
55	N910	20140325	22ND ST-71ST ST, IL	WEST OLIVE, MI	3/27/14 4:45 PM					
56	N954	20140325	22ND ST-71ST ST, IL	CURTIS, IN	3/28/14 4:15 AM					
57	Q200	20140326	DOLTON, IL	CURTIS, IN	3/26/14 2:19 AM	G041	20140326	CURTIS, IN	22ND ST, IL	3/12/14 7:14 PM
58	Q101	20140326	CHICAGO 59TH ST, IL	DOLTON, IL	3/26/14 6:00 AM	Q171	20140326	CURTIS, IN	22ND ST, IL	3/26/14 9:14 PM
59	Q146	20140326	CHICAGO 59TH ST, IL	CURTIS, IN	3/26/14 12:00 PM	Q246	20140326	CURTIS, IN	CALUMET PARK CP, IL	3/27/14 11:58 AM
60	Q138	20140326	CHICAGO 59TH ST, IL	CURTIS, IN	3/26/14 4:00 PM	Q028	20140326	DOLTON, IL	CHICAGO 59TH ST, IL	3/28/14 3:17 AM
61	Q029	20140326	CHICAGO 59TH ST, IL	DOLTON, IL	3/26/14 8:45 PM	Q124	20140326	DOLTON, IL	CHICAGO 59TH ST, IL	3/28/14 8:21 AM
62	K803	20140326	22ND ST-71ST ST, IL	CURTIS, IN	3/26/14 11:10 PM	Q157	20140326	CURTIS, IN	CHICAGO 59TH ST, IL	3/28/14 10:42 AM
63	N954	20140326	22ND ST-71ST ST, IL	CURTIS, IN	3/27/14 12:10 AM	E922	20140326	CURTIS, IN	22ND ST, IL	3/28/14 4:34 PM
64	L172	20140326	CHICAGO 59TH ST, IL	CURTIS, IN	3/27/14 12:30 AM	E951	20140326	CURTIS, IN	22ND ST, IL	3/28/14 5:01 PM
65	N903	20140326	22ND ST-71ST ST, IL	WEST OLIVE, MI	3/27/14 6:00 AM	Q102	20140326	DOLTON, IL	CHICAGO 59TH ST, IL	3/28/14 6:34 PM
66	N791	20140326	22ND ST-71ST ST, IL	CURTIS, IN	4/2/14 1:15 PM	Q137	20140326	CURTIS, IN	CHICAGO 59TH ST, IL	3/28/14 6:55 PM
67						K041	20140326	CURTIS, IN	22ND ST, IL	3/29/14 11:40 AM
68						K055	20140326	CURTIS, IN	22ND ST, IL	3/29/14 1:48 PM
69						K683	20140326	CURTIS, IN	BLUE ISL IHB CONN, IL	3/29/14 10:14 PM
70						E946	20140326	CURTIS, IN	22ND ST, IL	3/31/14 12:36 AM
71	K040	20140327	22ND ST-71ST ST, IL	CURTIS, IN	3/26/14 6:10 PM	Q171	20140327	CURTIS, IN	22ND ST, IL	3/28/14 12:34 AM
72	Q200	20140327	CALUMET PARK CP, IL	CURTIS, IN	3/27/14 12:48 AM	Q383	20140327	CURTIS, IN	22ND ST, IL	3/28/14 5:46 AM
73	Q101	20140327	CHICAGO 59TH ST, IL	DOLTON, IL	3/27/14 6:00 AM	Q391	20140327	CURTIS, IN	22ND ST, IL	3/28/14 8:15 PM
74	Q267	20140327	DOLTON, IL	CURTIS, IN	3/27/14 8:29 AM	L091	20140327	CURTIS, IN	22ND ST, IL	3/28/14 9:12 PM
75	L172	20140327	CHICAGO 59TH ST, IL	CURTIS, IN	3/27/14 9:50 AM	Q028	20140327	DOLTON, IL	CHICAGO 59TH ST, IL	3/28/14 11:16 PM
76	Q386	20140327	CALUMET PARK CP, IL	CURTIS, IN	3/27/14 11:37 AM	Q137	20140327	CURTIS, IN	CHICAGO 59TH ST, IL	3/29/14 9:15 AM
77	Q146	20140327	CHICAGO 59TH ST, IL	CURTIS, IN	3/27/14 12:00 PM	Q124	20140327	DOLTON, IL	CHICAGO 59TH ST, IL	3/29/14 10:55 AM
78	L138	20140327	CHICAGO 59TH ST, IL	CURTIS, IN	3/27/14 2:30 PM	Q157	20140327	CURTIS, IN	CHICAGO 59TH ST, IL	3/29/14 1:37 PM
79	K042	20140327	22ND ST-71ST ST, IL	CURTIS, IN	3/27/14 6:45 PM	E922	20140327	CURTIS, IN	22ND ST, IL	3/29/14 2:03 PM
80	Q029	20140327	CHICAGO 59TH ST, IL	DOLTON, IL	3/27/14 8:45 PM	Q102	20140327	DOLTON, IL	CHICAGO 59TH ST, IL	3/29/14 7:14 PM

Chicago Area Trains with Train Suffix Included in Consumers/Board Analysis

141 Eastbound Trains						142 Westbound Trains				
Eastbound Trains						Westbound Trains				
Row	Profile	Train Suffix	On SARR Location	Off SARR Location	On SARR Time	Profile	Train Suffix	On SARR Location	Off SARR Location	On SARR Time
81	K010	20140327	22ND ST-71ST ST, IL	CURTIS, IN	3/28/14 12:05 AM	E940	20140327	CURTIS, IN	22ND ST, IL	3/30/14 1:14 AM
82	N910	20140327	22ND ST-71ST ST, IL	WEST OLIVE, MI	3/28/14 9:30 AM	K081	20140327	CURTIS, IN	22ND ST, IL	3/30/14 8:26 AM
83	K088	20140327	DOLTON, IL	CURTIS, IN	3/28/14 10:24 PM	Q389	20140327	CURTIS, IN	DOLTON, IL	3/30/14 11:06 AM
84	K048	20140327	DOLTON, IL	CURTIS, IN	3/29/14 5:08 PM	K041	20140327	CURTIS, IN	22ND ST, IL	3/30/14 11:21 AM
85	K044	20140327	22ND ST-71ST ST, IL	CURTIS, IN	3/29/14 10:15 PM	E951	20140327	CURTIS, IN	22ND ST, IL	3/30/14 12:07 PM
86	K803	20140327	22ND ST-71ST ST, IL	CURTIS, IN	3/31/14 3:00 PM	K311	20140327	CURTIS, IN	CHICAGO, IL	3/30/14 12:47 PM
87	K636	20140327	BLUE ISL IHB CONN, IL	CURTIS, IN	4/1/14 6:26 AM	K055	20140327	CURTIS, IN	22ND ST, IL	3/31/14 12:56 AM
88	N921	20140327	HOLLAND, MI	HOLLAND, MI	4/1/14 11:10 AM	K600	20140327	CURTIS, IN	CALUMET PARK CP, IL	4/3/14 7:45 PM
89						K802	20140327	CURTIS, IN	22ND ST, IL	4/4/14 1:57 AM
90	Q267	20140328	DOLTON, IL	CURTIS, IN	3/27/14 10:45 PM	S171	20140328	CURTIS, IN	22ND ST, IL	3/28/14 5:21 AM
91	Q200	20140328	CALUMET PARK CP, IL	CURTIS, IN	3/28/14 12:53 AM	Q171	20140328	CURTIS, IN	22ND ST, IL	3/28/14 10:25 PM
92	L101	20140328	CHICAGO 59TH ST, IL	DOLTON, IL	3/28/14 5:30 AM	K011	20140328	CURTIS, IN	22ND ST, IL	3/29/14 11:57 AM
93	Q164	20140328	CHICAGO, IL	CURTIS, IN	3/28/14 8:30 AM	Q383	20140328	CURTIS, IN	22ND ST, IL	3/29/14 12:20 PM
94	Q146	20140328	CHICAGO 59TH ST, IL	CURTIS, IN	3/28/14 1:00 PM	E922	20140328	CURTIS, IN	22ND ST, IL	3/29/14 12:35 PM
95	L138	20140328	CHICAGO 59TH ST, IL	CURTIS, IN	3/28/14 4:00 PM	Q028	20140328	DOLTON, IL	CHICAGO 59TH ST, IL	3/29/14 7:43 PM
96	K423	20140328	DOLTON, IL	CURTIS, IN	3/28/14 8:04 PM	Q091	20140328	CURTIS, IN	22ND ST, IL	3/30/14 12:02 AM
97	Q029	20140328	CHICAGO 59TH ST, IL	DOLTON, IL	3/28/14 8:45 PM	L137	20140328	CURTIS, IN	CHICAGO 59TH ST, IL	3/30/14 4:27 AM
98	K010	20140328	22ND ST-71ST ST, IL	CURTIS, IN	3/28/14 9:35 PM	Q124	20140328	DOLTON, IL	CHICAGO 59TH ST, IL	3/30/14 8:05 AM
99	N492	20140328	DOLTON, IL	CURTIS, IN	3/28/14 10:38 PM	E949	20140328	WEST OLIVE, MI	22ND ST, IL	3/30/14 3:15 PM
100	L172	20140328	CHICAGO 59TH ST, IL	CURTIS, IN	3/28/14 10:40 PM	Q157	20140328	CURTIS, IN	CHICAGO 59TH ST, IL	3/30/14 7:25 PM
101	N793	20140328	22ND ST-71ST ST, IL	CURTIS, IN	3/29/14 7:00 AM	K017	20140328	CURTIS, IN	BLUE ISL IHB CONN, IL	3/31/14 1:16 AM
102	N891	20140328	22ND ST-71ST ST, IL	CURTIS, IN	3/29/14 7:45 AM	K081	20140328	CURTIS, IN	22ND ST, IL	3/31/14 6:48 AM
103	N792	20140328	22ND ST-71ST ST, IL	CURTIS, IN	3/29/14 9:00 AM	K049	20140328	CURTIS, IN	DOLTON, IL	3/31/14 11:49 AM
104	N903	20140328	22ND ST-71ST ST, IL	WEST OLIVE, MI	3/29/14 2:00 PM	K055	20140328	CURTIS, IN	22ND ST, IL	3/31/14 3:27 PM
105	K040	20140328	22ND ST-71ST ST, IL	CURTIS, IN	3/29/14 5:45 PM	K402	20140328	CURTIS, IN	22ND ST, IL	3/31/14 8:59 PM
106	K803	20140328	22ND ST-71ST ST, IL	CURTIS, IN	4/1/14 8:15 AM	E958	20140328	CURTIS, IN	22ND ST, IL	4/1/14 10:50 AM
107						K635	20140328	CURTIS, IN	BLUE ISL IHB CONN, IL	4/1/14 2:32 PM
108						E960	20140328	CURTIS, IN	22ND ST, IL	4/3/14 10:25 AM
109	Q200	20140329	CALUMET PARK CP, IL	CURTIS, IN	3/29/14 3:28 AM	Q171	20140329	CURTIS, IN	22ND ST, IL	3/29/14 11:44 PM
110	Q146	20140329	CHICAGO 59TH ST, IL	CURTIS, IN	3/29/14 12:00 PM	Q391	20140329	CURTIS, IN	BLUE ISL IHB CONN, IL	3/30/14 4:39 PM
111	S172	20140329	CHICAGO 59TH ST, IL	CURTIS, IN	3/29/14 12:15 PM	Q500	20140329	CURTIS, IN	DOLTON, IL	3/30/14 6:53 PM
112	Q138	20140329	CHICAGO 59TH ST, IL	CURTIS, IN	3/29/14 4:00 PM	Q028	20140329	DOLTON, IL	CHICAGO 59TH ST, IL	3/30/14 7:55 PM
113	Q172	20140329	CHICAGO 59TH ST, IL	CURTIS, IN	3/29/14 8:35 PM	Q124	20140329	DOLTON, IL	CHICAGO 59TH ST, IL	3/31/14 6:09 AM
114	Q029	20140329	CHICAGO 59TH ST, IL	DOLTON, IL	3/29/14 8:45 PM	E937	20140329	CURTIS, IN	22ND ST, IL	3/31/14 9:18 AM
115	K044	20140329	22ND ST-71ST ST, IL	CURTIS, IN	3/29/14 9:45 PM	K055	20140329	CURTIS, IN	22ND ST, IL	3/31/14 7:12 PM
116	K042	20140329	22ND ST-71ST ST, IL	CURTIS, IN	3/30/14 4:50 AM	L157	20140329	CURTIS, IN	CHICAGO 59TH ST, IL	4/1/14 1:49 AM
117	K403	20140329	22ND ST-71ST ST, IL	CURTIS, IN	3/30/14 9:35 AM	K041	20140329	CURTIS, IN	22ND ST, IL	4/1/14 7:05 AM
118	K427	20140329	CALUMET PARK CP, IL	CURTIS, IN	3/30/14 3:20 PM	E951	20140329	CURTIS, IN	22ND ST, IL	4/1/14 7:20 AM
119	N910	20140329	22ND ST-71ST ST, IL	WEST OLIVE, MI	3/30/14 9:15 PM	K057	20140329	CURTIS, IN	22ND ST, IL	4/1/14 2:52 PM
120	N954	20140329	22ND ST-71ST ST, IL	CURTIS, IN	3/31/14 3:20 AM	Q102	20140329	DOLTON, IL	CHICAGO 59TH ST, IL	4/1/14 6:23 PM

Chicago Area Trains with Train Suffix Included in Consumers/Board Analysis

141 Eastbound Trains						142 Westbound Trains				
Eastbound Trains						Westbound Trains				
Row	Profile	Train Suffix	On SARR Location	Off SARR Location	On SARR Time	Profile	Train Suffix	On SARR Location	Off SARR Location	On SARR Time
121	N793	20140329	22ND ST-71ST ST, IL	CURTIS, IN	4/3/14 9:00 AM	K637	20140329	CURTIS, IN	BLUE ISL IHB CONN, IL	4/3/14 11:29 AM
122	N841	20140329	22ND ST-71ST ST, IL	CURTIS, IN	4/5/14 3:20 AM					
123	S148	20140330	CHICAGO 59TH ST, IL	CURTIS, IN	3/29/14 1:00 PM	E950	20140330	WEST OLIVE, MI	22ND ST, IL	3/30/14 5:00 PM
124	Q386	20140330	DOLTON, IL	CURTIS, IN	3/30/14 9:12 AM	Q171	20140330	CURTIS, IN	22ND ST, IL	3/30/14 11:51 PM
125	Q090	20140330	CHICAGO, IL	CURTIS, IN	3/30/14 10:30 AM	Q383	20140330	CURTIS, IN	22ND ST, IL	3/31/14 4:09 AM
126	Q146	20140330	CHICAGO 59TH ST, IL	CURTIS, IN	3/30/14 12:00 PM	S137	20140330	CURTIS, IN	CHICAGO 59TH ST, IL	3/31/14 7:25 AM
127	G414	20140330	22ND ST-71ST ST, IL	CURTIS, IN	3/30/14 2:35 PM	Q500	20140330	CURTIS, IN	DOLTON, IL	3/31/14 6:53 PM
128	Q138	20140330	CHICAGO 59TH ST, IL	CURTIS, IN	3/30/14 4:00 PM	Q028	20140330	DOLTON, IL	CHICAGO 59TH ST, IL	3/31/14 9:32 PM
129	G344	20140330	22ND ST-71ST ST, IL	CURTIS, IN	3/30/14 5:30 PM	L124	20140330	DOLTON, IL	CHICAGO 59TH ST, IL	4/1/14 12:53 AM
130	Q388	20140330	DOLTON, IL	CURTIS, IN	3/30/14 8:36 PM	L113	20140330	CURTIS, IN	CHICAGO 59TH ST, IL	4/1/14 5:17 AM
131	Q172	20140330	CHICAGO 59TH ST, IL	CURTIS, IN	3/30/14 9:30 PM	E922	20140330	CURTIS, IN	22ND ST, IL	4/1/14 5:59 AM
132	N841	20140330	22ND ST-71ST ST, IL	CURTIS, IN	3/30/14 11:15 PM	Q139	20140330	CURTIS, IN	CHICAGO 59TH ST, IL	4/1/14 9:39 AM
133	K080	20140330	22ND ST-71ST ST, IL	CURTIS, IN	3/31/14 9:15 AM	E937	20140330	CURTIS, IN	22ND ST, IL	4/1/14 6:12 PM
134	K694	20140330	CALUMET PARK CP, IL	CURTIS, IN	3/31/14 5:40 PM	K041	20140330	CURTIS, IN	22ND ST, IL	4/1/14 10:32 PM
135	K688	20140330	22ND ST-71ST ST, IL	CURTIS, IN	4/1/14 3:50 AM	Q137	20140330	CURTIS, IN	CHICAGO 59TH ST, IL	4/2/14 4:51 AM
136	K042	20140330	22ND ST-71ST ST, IL	CURTIS, IN	4/1/14 8:30 AM	Q124	20140330	DOLTON, IL	CHICAGO 59TH ST, IL	4/2/14 5:00 AM
137	K680	20140330	CALUMET PARK CP, IL	CURTIS, IN	4/2/14 4:44 AM	K011	20140330	CURTIS, IN	22ND ST, IL	4/2/14 5:23 AM
138	K803	20140330	22ND ST-71ST ST, IL	CURTIS, IN	4/2/14 11:30 PM	E947	20140330	CURTIS, IN	22ND ST, IL	4/2/14 11:23 AM
139	K040	20140330	22ND ST-71ST ST, IL	CURTIS, IN	4/3/14 1:00 PM	Q157	20140330	CURTIS, IN	CHICAGO 59TH ST, IL	4/2/14 2:05 PM
140	K431	20140330	22ND ST-71ST ST, IL	CURTIS, IN	4/4/14 12:30 AM	E949	20140330	WEST OLIVE, MI	22ND ST, IL	4/2/14 6:40 PM
141	N820	20140330	22ND ST-71ST ST, IL	CURTIS, IN	4/4/14 12:35 PM	Q102	20140330	DOLTON, IL	CHICAGO 59TH ST, IL	4/2/14 10:54 PM
142						K849	20140330	CURTIS, IN	22ND ST, IL	4/3/14 2:00 AM
143						K689	20140330	CURTIS, IN	22ND ST, IL	4/3/14 8:27 PM
144						K055	20140330	CURTIS, IN	22ND ST, IL	4/4/14 9:39 PM
145						K836	20140330	DOLTON, IL	22ND ST, IL	4/6/14 8:14 PM
146						K089	20140330	CURTIS, IN	BLUE ISL IHB CONN, IL	4/10/14 12:55 PM
147	Q200	20140331	CALUMET PARK CP, IL	CURTIS, IN	3/31/14 3:16 AM	S171	20140331	CURTIS, IN	22ND ST, IL	3/31/14 3:55 PM
148	Q101	20140331	CHICAGO 59TH ST, IL	DOLTON, IL	3/31/14 6:00 AM	Q171	20140331	CURTIS, IN	22ND ST, IL	3/31/14 11:07 PM
149	Q386	20140331	DOLTON, IL	CURTIS, IN	3/31/14 6:11 AM	Q383	20140331	CURTIS, IN	22ND ST, IL	4/1/14 5:06 PM
150	K080	20140331	22ND ST-71ST ST, IL	CURTIS, IN	3/31/14 8:50 AM					
151	Q172	20140331	CHICAGO 59TH ST, IL	CURTIS, IN	3/31/14 12:15 PM					
152	Q146	20140331	CHICAGO 59TH ST, IL	CURTIS, IN	3/31/14 1:00 PM					
153	K240	20140331	DOLTON, IL	CURTIS, IN	3/31/14 2:59 PM					
154	Q138	20140331	CHICAGO 59TH ST, IL	CURTIS, IN	3/31/14 4:00 PM					
155	Q029	20140331	CHICAGO 59TH ST, IL	DOLTON, IL	3/31/14 8:30 PM					

Source: STB Workpaper "CERR Base Year Trains_Supp_Reply_Alt1 with Table III-D-2 - STB.xlsx" tab "Trains"

CSXT Corrected Turn Crew Analysis (Trains Going On SARR or Off SARR During Peak Period, March 23 - 31, 2014)

123 Eastbound Trains										125 Westbound Trains																
Eastbound Trains										Westbound Trains										Hours per Crew						
Row	Train Profile	Suffix	Miles	MPH	Transit Time	On SARR Location	Off SARR Location	On SARR Time	Off SARR Time	Profile	Train Suffix	Miles	MPH	Transit Time	On SARR Location	Off SARR Location	On SARR Time	Off SARR Time	Transit 2 Trains	On/Off Duty	Taxi	I/C	Dwell	Total		
1										K041	20140320	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/22/14 8:23 PM	3/23/14 12:04 AM	No match (imbalance)							
2										Q124	20140321	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/22/14 11:40 PM	3/23/14 1:40 AM	No match (imbalance)							
3										Q171	20140322	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/22/14 8:57 PM	3/23/14 12:32 AM	No match (imbalance)							
4										K053	20140320	45	9.8	4.6	CURTIS, IN	22ND ST, IL	3/23/14 1:38 AM	3/23/14 6:15 AM	No match (imbalance)							
5	K040	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/22/14 9:35 PM	3/23/14 12:08 AM	K615	20140314	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/23/14 2:36 AM	3/23/14 6:17 AM	6.2	2.0	-	1.0	2.5	11.7		
6	Q200	20140323	16	10.2	1.6	CALUMET PARK C CURTIS, IN		3/23/14 3:24 AM	3/23/14 4:59 AM	E922	20140321	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/23/14 6:41 AM	3/23/14 10:22 AM	5.3	2.0	-	1.0	1.7	10.0		
7	K040	20140322	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/23/14 3:40 AM	3/23/14 6:13 AM	Q091	20140321	45	9.8	4.6	CURTIS, IN	22ND ST, IL	3/23/14 8:39 AM	3/23/14 1:16 PM	7.2	2.0	-	1.0	2.4	12.6		
8	K042	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/23/14 5:50 AM	3/23/14 8:23 AM	Q028	20140321	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/23/14 1:36 AM	3/23/14 3:36 AM	4.6	2.0	-	1.0	2.2	9.8		
9	K080	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/23/14 7:55 AM	3/23/14 10:28 AM	L137	20140321	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/23/14 12:36 PM	3/23/14 3:34 PM	5.5	2.0	-	1.0	2.1	10.7		
10	K044	20140322	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/23/14 8:15 AM	3/23/14 10:48 AM	E951	20140320	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/23/14 2:01 PM	3/23/14 5:42 PM	6.2	2.0	-	1.0	3.2	12.5		
11	Q172	20140322	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/23/14 10:00 AM	3/23/14 12:22 PM	K081	20140320	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/23/14 4:42 PM	3/23/14 8:23 PM	6.1	2.0	-	1.0	4.3	13.4		
12	N792	20140321	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/23/14 10:30 AM	3/23/14 1:03 PM	Q157	20140321	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/23/14 7:33 PM	3/23/14 10:31 PM	5.5	2.0	-	1.0	6.5	15.0		
13	K634	20140320	14	7.2	1.9	DOLTON, IL	CURTIS, IN	3/23/14 11:14 AM	3/23/14 1:09 PM	K047	20140320	45	9.8	4.6	CURTIS, IN	22ND ST, IL	3/23/14 6:13 PM	3/23/14 10:50 PM	6.5	2.0	-	1.0	5.1	14.6		
14	K688	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/23/14 11:45 AM	3/23/14 2:18 PM	E958	20140321	28	5.5	5.1	CURTIS, IN	BLUE ISL IHB CON	3/23/14 6:29 PM	3/23/14 11:33 PM	7.6	2.0	-	1.0	4.2	14.8		
15	Q146	20140323	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/23/14 12:00 PM	3/23/14 2:22 PM									No match (imbalance)								
16	N954	20140322	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/23/14 2:20 PM	3/23/14 4:53 PM	Q028	20140322	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/23/14 9:03 PM	3/23/14 11:03 PM	4.6	2.0	-	1.0	4.2	11.7		
17	Q138	20140323	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/23/14 4:00 PM	3/23/14 6:22 PM	Q171	20140323	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/23/14 8:01 PM	3/23/14 11:36 PM	6.0	2.0	-	1.0	1.6	10.6		
18	Q090	20140323	15	10.3	1.5	CHICAGO, IL	CURTIS, IN	3/23/14 5:30 PM	3/23/14 6:58 PM	K055	20140320	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/23/14 10:02 PM	3/24/14 1:43 AM	5.2	2.0	-	1.0	3.1	11.2		
19	N791	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/23/14 5:35 PM	3/23/14 8:08 PM	Q124	20140322	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/23/14 11:53 PM	3/24/14 1:53 AM	4.6	2.0	-	1.0	3.7	11.3		
20	K661	20140322	14	7.2	1.9	DOLTON, IL	CURTIS, IN	3/23/14 11:38 PM	3/24/14 1:33 AM	K011	20140321	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/24/14 5:36 AM	3/24/14 9:17 AM	5.6	2.0	-	1.0	4.0	12.7		
21	N492	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/24/14 3:51 AM	3/24/14 6:24 AM	E946	20140322	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/24/14 6:56 AM	3/24/14 10:37 AM	6.2	2.0	-	1.0	0.5	9.8		
22	Q200	20140324	16	10.2	1.6	CALUMET PARK C CURTIS, IN		3/24/14 4:50 AM	3/24/14 6:25 AM	S171	20140324	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/24/14 7:54 AM	3/24/14 11:29 AM	5.2	2.0	-	1.0	1.5	9.7		
23	K627	20140323	16	10.2	1.6	CALUMET PARK C CURTIS, IN		3/24/14 5:25 AM	3/24/14 7:00 AM	L137	20140322	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/24/14 9:10 AM	3/24/14 12:08 PM	4.6	2.0	-	1.0	2.2	9.7		
24	K044	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/24/14 4:45 AM	3/24/14 7:18 AM	E922	20140323	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/24/14 1:02 AM	3/24/14 4:43 AM	6.2	2.0	-	1.0	6.3	15.5		
25	Q101	20140324	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/24/14 6:00 AM	3/24/14 7:56 AM									No match (imbalance)								
26	N990	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/24/14 5:50 AM	3/24/14 8:23 AM									No match (imbalance)								
27	K403	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/24/14 6:08 AM	3/24/14 8:41 AM									No match (imbalance)								
28	N954	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/24/14 7:50 AM	3/24/14 10:23 AM									No match (imbalance)								
29	Q146	20140324	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/24/14 12:00 PM	3/24/14 2:22 PM	L157	20140322	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/24/14 4:44 PM	3/24/14 7:42 PM	5.3	2.0	-	1.0	2.4	10.7		
30	N841	20140323	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/24/14 12:30 PM	3/24/14 3:03 PM	Q028	20140323	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/24/14 7:02 PM	3/24/14 9:02 PM	4.6	2.0	-	1.0	4.0	11.5		
31	N492	20140324	14	7.2	1.9	DOLTON, IL	CURTIS, IN	3/24/14 4:25 PM	3/24/14 6:20 PM	K043	20140321	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/24/14 8:17 PM	3/24/14 11:58 PM	5.6	2.0	-	1.0	1.9	10.6		
32	Q138	20140324	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/24/14 4:00 PM	3/24/14 6:22 PM	E937	20140323	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/24/14 9:28 PM	3/25/14 1:09 AM	6.1	2.0	-	1.0	3.1	12.2		
33	K080	20140324	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/24/14 5:45 PM	3/24/14 8:18 PM	L124	20140323	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/24/14 9:34 PM	3/24/14 11:34 PM	4.6	2.0	-	1.0	1.3	8.8		
34	N990	20140324	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/24/14 7:15 PM	3/24/14 9:48 PM	K081	20140321	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/24/14 10:21 PM	3/25/14 2:02 AM	6.2	2.0	-	1.0	0.5	9.8		
35	Q172	20140323	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/24/14 7:50 PM	3/24/14 10:12 PM	Q171	20140324	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/24/14 10:34 PM	3/25/14 2:09 AM	6.0	2.0	-	1.0	0.4	9.3		
36	Q029	20140324	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/24/14 8:30 PM	3/24/14 10:26 PM	L113	20140323	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/25/14 2:41 AM	3/25/14 5:39 AM	4.9	2.0	-	1.0	4.2	12.2		
37	Q200	20140325	16	10.2	1.6	CALUMET PARK C CURTIS, IN		3/25/14 3:24 AM	3/25/14 4:59 AM	K041	20140321	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/25/14 5:32 AM	3/25/14 9:13 AM	5.3	2.0	-	1.0	0.5	8.8		
38										K055	20140322	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/25/14 6:54 AM	3/25/14 10:35 AM	No match (imbalance)							
39	Q172	20140324	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/25/14 4:35 AM	3/25/14 6:57 AM	E922	20140324	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/25/14 8:31 AM	3/25/14 12:12 PM	6.1	2.0	-	1.0	1.6	10.6		
40	N990	20140325	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/25/14 4:35 AM	3/25/14 7:08 AM	L246	20140324	16	10.1	1.6	CURTIS, IN	CALUMET PARK C	3/25/14 11:35 AM	3/25/14 1:10 PM	4.2	2.0	-	1.0	4.4	11.6		
41	Q101	20140325	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/25/14 6:00 AM	3/25/14 7:56 AM	Q102	20140322	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/25/14 11:31 AM	3/25/14 1:31 PM	3.9	2.0	-	1.0	3.6	10.5		
42	Q090	20140325	15	10.3	1.5	CHICAGO, IL	CURTIS, IN	3/25/14 6:55 AM	3/25/14 8:23 AM	E960	20140321	45	9.8	4.6	CURTIS, IN	22ND ST, IL	3/25/14 9:30 AM	3/25/14 2:07 PM	6.1	2.0	-	1.0	1.1	10.2		
43	Q267	20140325	15	10.3	1.5	CHICAGO, IL	CURTIS, IN	3/25/14 8:20 AM	3/25/14 9:48 AM									No match (imbalance)								
44	K010	20140325	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/25/14 10:40 AM	3/25/14 1:13 PM	S171	20140325	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/25/14 1:28 PM	3/25/14 5:09 PM	6.2	2.0	-	1.0	0.2	9.5		
45	Q146	20140325	27	11.5	2.4																					

CSXT Corrected Turn Crew Analysis (Trains Going On SARR or Off SARR During Peak Period, March 23 - 31, 2014)

123 Eastbound Trains										125 Westbound Trains																
Eastbound Trains										Westbound Trains										Hours per Crew						
Row	Profile	Train Suffix	Miles	MPH	Transit Time	On SARR Location	Off SARR Location	On SARR Time	Off SARR Time	Profile	Train Suffix	Miles	MPH	Transit Time	On SARR Location	Off SARR Location	On SARR Time	Off SARR Time	Transit 2 Trains	On/Off Duty	Taxi	I/C	Dwell	Total		
54	N793	20140325	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/25/14 10:45 PM	3/26/14 1:18 AM	K081	20140322	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/26/14 4:21 AM	3/26/14 8:02 AM	6.2	2.0	-	1.0	3.0	12.3		
55	Q206	20140325	15	10.3	1.5	CHICAGO, IL	CURTIS, IN	3/26/14 1:30 AM	3/26/14 2:58 AM	K055	20140323	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/26/14 5:48 AM	3/26/14 9:29 AM	5.2	2.0	-	1.0	2.8	11.0		
56	Q200	20140326	14	7.2	1.9	DOLTON, IL	CURTIS, IN	3/26/14 2:19 AM	3/26/14 4:14 AM	Q137	20140324	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/26/14 7:10 AM	3/26/14 10:08 AM	4.9	2.0	-	1.0	2.9	10.8		
57	N831	20140324	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/26/14 4:25 AM	3/26/14 6:58 AM	E937	20140324	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/26/14 10:10 AM	3/26/14 1:51 PM	6.2	2.0	-	1.0	3.2	12.4		
58	Q101	20140326	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/26/14 6:00 AM	3/26/14 7:56 AM	Q246	20140325	16	10.1	1.6	CURTIS, IN	CALUMET PARK C	3/26/14 12:42 PM	3/26/14 2:17 PM	3.5	2.0	-	1.0	4.8	11.3		
59	N791	20140324	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/26/14 7:45 AM	3/26/14 10:18 AM	Q157	20140324	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/26/14 11:37 AM	3/26/14 2:35 PM	5.5	2.0	-	1.0	1.3	9.8		
60										E922	20140325	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/26/14 11:10 AM	3/26/14 2:51 PM	No match (imbalance)							
61	N492	20140325	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/26/14 9:39 AM	3/26/14 12:12 PM	E951	20140322	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/26/14 1:11 PM	3/26/14 4:52 PM	6.2	2.0	-	1.0	1.0	10.2		
62										K241	20140324	30	5.5	5.5	CURTIS, IN	BLUE ISL IHB CON	3/26/14 11:51 AM	3/26/14 5:19 PM	No match (imbalance)							
63	N841	20140325	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/26/14 11:45 AM	3/26/14 2:18 PM									No match (imbalance)								
64	Q146	20140326	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/26/14 12:00 PM	3/26/14 2:22 PM									No match (imbalance)								
65	Q138	20140326	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/26/14 4:00 PM	3/26/14 6:22 PM	Q102	20140324	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/26/14 9:29 PM	3/26/14 11:29 PM	4.4	2.0	-	1.0	3.1	10.5		
66	K040	20140327	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/26/14 6:10 PM	3/26/14 8:43 PM	Q171	20140326	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/26/14 9:14 PM	3/27/14 12:49 AM	6.1	2.0	-	1.0	0.5	9.7		
67	Q029	20140326	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/26/14 8:45 PM	3/26/14 10:41 PM	Q028	20140325	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/26/14 11:14 PM	3/27/14 1:14 AM	3.9	2.0	-	1.0	0.5	7.5		
68	K803	20140326	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/26/14 11:10 PM	3/27/14 1:43 AM	K011	20140324	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/27/14 1:58 AM	3/27/14 5:39 AM	6.2	2.0	-	1.0	0.2	9.5		
69	Q200	20140327	16	10.2	1.6	CALUMET PARK C CURTIS, IN		3/27/14 12:48 AM	3/27/14 2:23 AM	K124	20140325	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/27/14 3:41 AM	3/27/14 5:41 AM	3.6	2.0	-	1.0	1.3	7.9		
70	N954	20140326	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/27/14 12:10 AM	3/27/14 2:43 AM	K802	20140320	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/27/14 8:09 AM	3/27/14 11:50 AM	6.2	2.0	-	1.0	5.4	14.7		
71	L172	20140326	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/27/14 12:30 AM	3/27/14 2:52 AM	K424	20140322	45	9.8	4.6	CURTIS, IN	22ND ST, IL	3/27/14 7:17 AM	3/27/14 11:54 AM	7.0	2.0	-	1.0	4.4	14.4		
72	K044	20140325	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/27/14 4:53 AM	3/27/14 7:26 AM	Q246	20140326	16	10.1	1.6	CURTIS, IN	CALUMET PARK C	3/27/14 11:58 AM	3/27/14 1:33 PM	4.2	2.0	-	1.0	4.5	11.7		
73	Q101	20140327	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/27/14 6:00 AM	3/27/14 7:56 AM	K083	20140322	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/27/14 10:02 AM	3/27/14 1:43 PM	5.6	2.0	-	1.0	2.1	10.7		
74										K836	20140320	34	8.2	4.2	DOLTON, IL	22ND ST, IL	3/27/14 10:11 AM	3/27/14 2:22 PM	No match (imbalance)							
75	Q267	20140327	14	7.2	1.9	DOLTON, IL	CURTIS, IN	3/27/14 8:29 AM	3/27/14 10:24 AM	E937	20140325	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/27/14 11:38 AM	3/27/14 3:19 PM	5.6	2.0	-	1.0	1.2	9.8		
76	L172	20140327	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/27/14 9:50 AM	3/27/14 12:12 PM	K415	20140323	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/27/14 1:41 PM	3/27/14 5:22 PM	6.1	2.0	-	1.0	1.5	10.5		
77										E958	20140323	28	5.5	5.1	CURTIS, IN	BLUE ISL IHB CON	3/27/14 2:13 PM	3/27/14 7:17 PM	No match (imbalance)							
78	Q146	20140327	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/27/14 12:00 PM	3/27/14 2:22 PM	Q157	20140325	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/27/14 4:14 PM	3/27/14 7:12 PM	5.3	2.0	-	1.0	1.9	10.2		
79	K040	20140324	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/27/14 1:06 PM	3/27/14 3:39 PM	Q137	20140325	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/27/14 6:54 PM	3/27/14 9:52 PM	5.5	2.0	-	1.0	3.2	11.8		
80	L138	20140327	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/27/14 2:30 PM	3/27/14 4:52 PM	K055	20140324	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/27/14 8:08 PM	3/27/14 11:49 PM	6.1	2.0	-	1.0	3.3	12.3		
81	K310	20140323	16	10.2	1.6	CALUMET PARK C CURTIS, IN		3/27/14 7:01 PM	3/27/14 8:36 PM	K081	20140324	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/27/14 10:27 PM	3/28/14 2:08 AM	5.3	2.0	-	1.0	1.8	10.1		
82	K042	20140327	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/27/14 6:45 PM	3/27/14 9:18 PM	K041	20140324	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/27/14 1:59 PM	3/27/14 5:40 PM	6.2	2.0	-	1.0	1.1	10.3		
83	Q029	20140327	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/27/14 8:45 PM	3/27/14 10:41 PM	Q171	20140327	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/28/14 12:34 AM	3/28/14 4:09 AM	5.5	2.0	-	1.0	1.9	10.4		
84	Q267	20140328	14	7.2	1.9	DOLTON, IL	CURTIS, IN	3/27/14 10:45 PM	3/28/14 12:40 AM	Q102	20140325	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/28/14 2:28 AM	3/28/14 4:28 AM	3.9	2.0	-	1.0	1.8	8.7		
85	Q200	20140328	16	10.2	1.6	CALUMET PARK C CURTIS, IN		3/28/14 12:53 AM	3/28/14 2:28 AM	Q028	20140326	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/28/14 3:17 AM	3/28/14 5:17 AM	3.6	2.0	-	1.0	0.8	7.4		
86	K010	20140327	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/28/14 12:05 AM	3/28/14 2:38 AM	K041	20140325	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/28/14 4:46 AM	3/28/14 8:27 AM	6.2	2.0	-	1.0	2.1	11.4		
87										S171	20140328	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/28/14 5:21 AM	3/28/14 8:56 AM	No match (imbalance)							
88	N954	20140325	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/28/14 4:15 AM	3/28/14 6:48 AM	Q124	20140326	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/28/14 8:21 AM	3/28/14 10:21 AM	4.6	2.0	-	1.0	1.5	9.1		
89	L101	20140328	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/28/14 5:30 AM	3/28/14 7:26 AM	K055	20140325	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/28/14 9:52 AM	3/28/14 1:33 PM	5.6	2.0	-	1.0	2.4	11.1		
90	Q164	20140328	15	10.3	1.5	CHICAGO, IL	CURTIS, IN	3/28/14 8:30 AM	3/28/14 9:58 AM	Q157	20140326	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/28/14 10:42 AM	3/28/14 1:40 PM	4.5	2.0	-	1.0	0.7	8.2		
91	Q146	20140328	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/28/14 1:00 PM	3/28/14 3:22 PM	E922	20140326	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/28/14 4:34 PM	3/28/14 8:15 PM	6.1	2.0	-	1.0	1.2	10.3		
92										E951	20140326	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/28/14 5:01 PM	3/28/14 8:42 PM	No match (imbalance)							
93										Q102	20140326	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/28/14 6:34 PM	3/28/14 8:34 PM	No match (imbalance)							
94	L138	20140328	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/28/14 4:00 PM	3/28/14 6:22 PM	Q137	20140326	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/28/14 6:55 PM	3/28/14 9:53 PM	5.3	2.0	-	1.0	0.5	8.9		
95										Q028	20140327	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/28/14 11:16 PM	3/29/14 1:16 AM	No match (imbalance)							
96										L091	20140327	45	9.8	4.6	CURTIS, IN	22ND ST, IL	3/28/14 9:12 PM	3/29/14 1:49 AM	No match (imbalance)							
97	K423	20140328	14	7.2	1.9	DOLTON, IL	CURTIS, IN	3/28/14 8:04 PM	3/28/14 9:59 PM	Q171	20140328	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/28/14 10:25 PM	3/29/14 2:00 AM	5.5	2.0	-	1.0	0.4	8.9		
98	Q029	20140328	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/28/14 8:45 PM	3/28/14 10:41 PM									No match (imbalance)								
99	K010	20140328	25																							

CSXT Corrected Turn Crew Analysis (Trains Going On SARR or Off SARR During Peak Period, March 23 - 31, 2014)

123 Eastbound Trains										125 Westbound Trains																
Eastbound Trains										Westbound Trains										Hours per Crew						
Row	Profile	Train Suffix	Miles	MPH	Transit Time	On SARR Location	Off SARR Location	On SARR Time	Off SARR Time	Profile	Train Suffix	Miles	MPH	Transit Time	On SARR Location	Off SARR Location	On SARR Time	Off SARR Time	Transit 2 Trains	On/Off Duty	Taxi	I/C	Dwell	Total		
104	N793	20140328	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/29/14 7:00 AM	3/29/14 9:33 AM	Q124	20140327	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/29/14 10:55 AM	3/29/14 12:55 PM	4.6	2.0	-	1.0	1.4	8.9		
105	N891	20140328	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/29/14 7:45 AM	3/29/14 10:18 AM	K041	20140326	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/29/14 11:40 AM	3/29/14 3:21 PM	6.2	2.0	-	1.0	1.4	10.6		
106	N792	20140328	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/29/14 9:00 AM	3/29/14 11:33 AM	K011	20140328	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/29/14 11:57 AM	3/29/14 3:38 PM	6.2	2.0	-	1.0	0.4	9.6		
107										E922	20140328	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/29/14 12:35 PM	3/29/14 4:16 PM	No match (imbalance)							
108										Q157	20140327	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/29/14 1:37 PM	3/29/14 4:35 PM	No match (imbalance)							
109										K055	20140326	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/29/14 1:48 PM	3/29/14 5:29 PM	No match (imbalance)							
110	Q146	20140329	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/29/14 12:00 PM	3/29/14 2:22 PM										No match (imbalance)							
111										E922	20140327	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/29/14 2:03 PM	3/29/14 5:44 PM	No match (imbalance)							
112	S172	20140329	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/29/14 12:15 PM	3/29/14 2:37 PM										No match (imbalance)							
113	S148	20140330	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/29/14 1:00 PM	3/29/14 3:22 PM	Q102	20140327	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/29/14 7:14 PM	3/29/14 9:14 PM	4.4	2.0	-	1.0	3.9	11.2		
114	Q138	20140329	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/29/14 4:00 PM	3/29/14 6:22 PM	Q028	20140328	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/29/14 7:43 PM	3/29/14 9:43 PM	4.4	2.0	-	1.0	1.3	8.7		
115	K048	20140327	14	7.2	1.9	DOLTON, IL	CURTIS, IN	3/29/14 5:08 PM	3/29/14 7:03 PM	K683	20140326	28	5.5	5.1	CURTIS, IN	BLUE ISL IHB CON	3/29/14 10:14 PM	3/30/14 3:18 AM	7.0	2.0	-	1.0	3.2	13.2		
116	K040	20140328	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/29/14 5:45 PM	3/29/14 8:18 PM	Q171	20140329	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/29/14 11:44 PM	3/30/14 3:19 AM	6.1	2.0	-	1.0	3.4	12.6		
117	Q029	20140329	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/29/14 8:45 PM	3/29/14 10:41 PM										No match (imbalance)							
118	Q172	20140329	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/29/14 8:35 PM	3/29/14 10:57 PM	Q091	20140328	45	9.8	4.6	CURTIS, IN	22ND ST, IL	3/30/14 12:02 AM	3/30/14 4:39 AM	7.0	2.0	-	1.0	1.1	11.1		
119	K044	20140329	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/29/14 9:45 PM	3/30/14 12:18 AM	E940	20140327	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/30/14 1:14 AM	3/30/14 4:55 AM	6.2	2.0	-	1.0	0.9	10.2		
120	K044	20140327	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/29/14 10:15 PM	3/30/14 12:48 AM	L137	20140328	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/30/14 4:27 AM	3/30/14 7:25 AM	5.5	2.0	-	1.0	3.6	12.2		
121	K042	20140329	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/30/14 4:50 AM	3/30/14 7:23 AM	Q124	20140328	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/30/14 8:05 AM	3/30/14 10:05 AM	4.6	2.0	-	1.0	0.7	8.3		
122										K081	20140327	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/30/14 8:26 AM	3/30/14 12:07 PM	No match (imbalance)							
123										K041	20140327	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/30/14 11:21 AM	3/30/14 3:02 PM	No match (imbalance)							
124										E951	20140327	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/30/14 12:07 PM	3/30/14 3:48 PM	No match (imbalance)							
125	Q090	20140330	15	10.3	1.5	CHICAGO, IL	CURTIS, IN	3/30/14 10:30 AM	3/30/14 11:58 AM										No match (imbalance)							
126	K403	20140329	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/30/14 9:35 AM	3/30/14 12:08 PM										No match (imbalance)							
127	Q146	20140330	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/30/14 12:00 PM	3/30/14 2:22 PM										No match (imbalance)							
128	K427	20140329	16	10.2	1.6	CALUMET PARK C CURTIS, IN		3/30/14 3:20 PM	3/30/14 4:55 PM	Q028	20140329	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/30/14 7:55 PM	3/30/14 9:55 PM	3.6	2.0	-	1.0	3.0	9.6		
129	G414	20140330	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/30/14 2:35 PM	3/30/14 5:08 PM	Q157	20140328	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/30/14 7:25 PM	3/30/14 10:23 PM	5.5	2.0	-	1.0	2.3	10.8		
130	Q138	20140330	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/30/14 4:00 PM	3/30/14 6:22 PM	Q171	20140330	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/30/14 11:51 PM	3/31/14 3:26 AM	6.0	2.0	-	1.0	5.5	14.4		
131	G344	20140330	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/30/14 5:30 PM	3/30/14 8:03 PM	E946	20140326	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/31/14 12:36 AM	3/31/14 4:17 AM	6.2	2.0	-	1.0	4.5	13.8		
132	Q172	20140330	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/30/14 9:30 PM	3/30/14 11:52 PM	K894	20140321	25	8.2	3.1	DOLTON, IL	22ND ST, IL	3/31/14 12:58 AM	3/31/14 4:02 AM	5.5	2.0	-	1.0	1.1	9.5		
133										K055	20140327	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/31/14 12:56 AM	3/31/14 4:37 AM	No match (imbalance)							
134										K017	20140328	28	5.5	5.1	CURTIS, IN	BLUE ISL IHB CON	3/31/14 1:16 AM	3/31/14 6:20 AM	No match (imbalance)							
135	N841	20140330	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/30/14 11:15 PM	3/31/14 1:48 AM	Q124	20140329	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/31/14 6:09 AM	3/31/14 8:09 AM	4.6	2.0	-	1.0	4.3	11.9		
136	Q200	20140331	16	10.2	1.6	CALUMET PARK C CURTIS, IN		3/31/14 3:16 AM	3/31/14 4:51 AM	S137	20140330	27	9.1	3.0	CURTIS, IN	CHICAGO 59TH ST	3/31/14 7:25 AM	3/31/14 10:23 AM	4.6	2.0	-	1.0	2.6	10.1		
137	N954	20140329	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/31/14 3:20 AM	3/31/14 5:53 AM	K081	20140328	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/31/14 6:48 AM	3/31/14 10:29 AM	6.2	2.0	-	1.0	0.9	10.2		
138	Q101	20140331	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/31/14 6:00 AM	3/31/14 7:56 AM	E937	20140329	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/31/14 9:18 AM	3/31/14 12:59 PM	5.6	2.0	-	1.0	1.4	10.0		
139	K080	20140331	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/31/14 8:50 AM	3/31/14 11:23 AM	K802	20140325	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/31/14 12:08 PM	3/31/14 3:49 PM	6.2	2.0	-	1.0	0.7	10.0		
140	K080	20140330	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/31/14 9:15 AM	3/31/14 11:48 AM	K049	20140328	29	6.9	4.1	CURTIS, IN	DOLTON, IL	3/31/14 11:49 AM	3/31/14 3:57 PM	6.7	2.0	-	1.0	0.0	9.7		
141	Q172	20140331	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/31/14 12:15 PM	3/31/14 2:37 PM	K055	20140328	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/31/14 3:27 PM	3/31/14 7:08 PM	6.1	2.0	-	1.0	0.8	9.9		
142	Q146	20140331	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/31/14 1:00 PM	3/31/14 3:22 PM	S171	20140331	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/31/14 3:55 PM	3/31/14 7:36 PM	6.1	2.0	-	1.0	0.5	9.6		
143	K240	20140331	14	7.2	1.9	DOLTON, IL	CURTIS, IN	3/31/14 2:59 PM	3/31/14 4:54 PM	K055	20140329	36	9.8	3.7	CURTIS, IN	22ND ST, IL	3/31/14 7:12 PM	3/31/14 10:53 PM	5.6	2.0	-	1.0	2.3	10.9		
144	K803	20140327	25	9.9	2.6	22ND ST-71ST ST, CURTIS, IN		3/31/14 3:00 PM	3/31/14 5:33 PM	K402	20140328	45	9.8	4.6	CURTIS, IN	22ND ST, IL	3/31/14 8:59 PM	4/1/14 1:36 AM	7.2	2.0	-	1.0	3.4	13.6		
145	Q138	20140331	27	11.5	2.4	CHICAGO 59TH ST CURTIS, IN		3/31/14 4:00 PM	3/31/14 6:22 PM	Q028	20140330	17	8.2	2.0	DOLTON, IL	CHICAGO 59TH ST	3/31/14 9:32 PM	3/31/14 11:32 PM	4.4	2.0	-	1.0	3.2	10.5		
146	K694	20140330	16	10.2	1.6	CALUMET PARK C CURTIS, IN		3/31/14 5:40 PM	3/31/14 7:15 PM	Q171	20140331	35	9.8	3.6	CURTIS, IN	22ND ST, IL	3/31/14 11:07 PM	4/1/14 2:42 AM	5.2	2.0	-	1.0	3.9	12.0		
147	Q029	20140331	17	8.5	1.9	CHICAGO 59TH ST DOLTON, IL		3/31/14 8:30 PM	3/31/14 10:26 PM										No match (imbalance)							

Color-Coding: Yellow: No matching train in the opposite direction. Green: Dwell calculated based on Westbound train preceding the Eastbound train instead of vice versa. Red: Train pairs where the total crew time is 12+ hours.

Source: STB Workpaper "CERR Base Year Trains_Supp_Reply_Alt1 with Table III-D-2 - STB.xlsx" tab "Trains." Off SARR Time = On SARR Time plus Transit Time from column AQ of "Trains" tab.

BEFORE THE
SURFACE TRANSPORTATION BOARD

NOR 42142

CONSUMERS ENERGY COMPANY
v.
CSX TRANSPORTATION, INC.

VERIFIED STATEMENT

OF

DAVID A. MAGISTRO

My name is David A. Magistro, and I am a senior engineer with more than 15 years of experience in structural bridge design and project management for railroad projects, including movable bridge construction and rehabilitation for numerous private railroad and public transportation agency clients. I am currently a Bridge Engineer at George Butler Associates. I sponsored the portions of Section III-F of CSXT's Reply Evidence in the above-captioned matter relating to bridges. CSXT's Reply at V-92-100 provides a more detailed explanation of my education, professional registrations, memberships, and experiences.

I submit this Verified Statement to make two points. First, Consumers's Opening Evidence contained no indication that it proposed to use precast wingwalls as vertical abutment walls. On the contrary, Consumers's Opening Evidence contemplated the use of spill slopes with its bridges, both because Consumers proposed the use of standard abutment components that are only used with spill slopes and because it used construction costs for bridges that incorporated spill slopes. Second, Consumers's new Rebuttal proposal to use precast wingwalls

to build vertical abutment walls is not feasible, because the precast walls Consumers proposed to use were not designed to withstand the high loads placed on a vertical abutment wall.

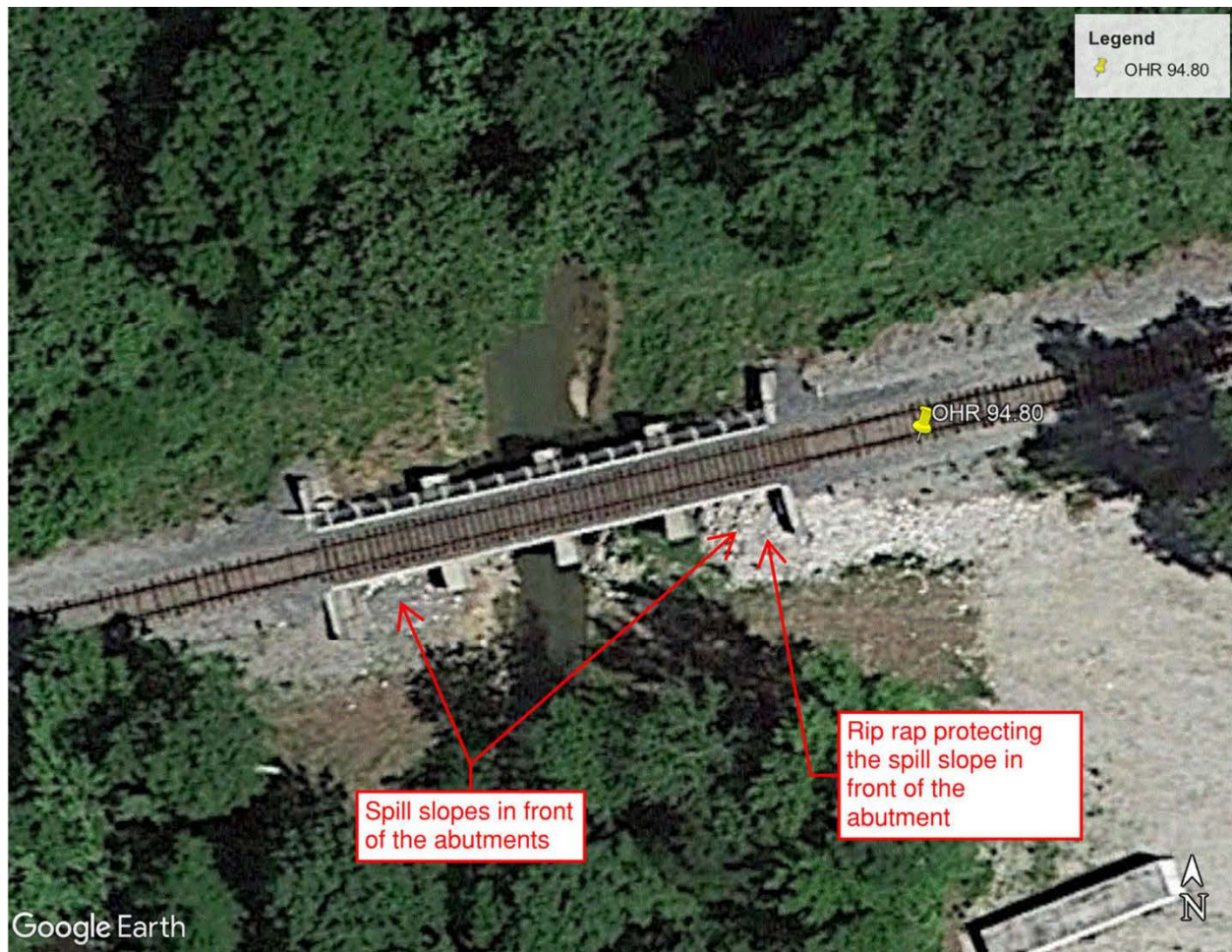
I. Consumers’s Use of “Wing Walls” Was First Proposed on Rebuttal.

The “vertical abutment walls” that Consumers proposed on Rebuttal were not mentioned in its Opening narrative nor its Opening workpapers. Consumers provided no details or sketches showing vertical abutment walls, nor did it show any bridge layouts with such walls.

On the contrary, Consumers’s Opening bridges evidence suggested that it intended to build spill slopes. The “model” bridges that Consumers cited in its Opening workpapers had spill slopes, not vertical abutment walls. For example, Consumers modeled its Type I bridges after CSXT Bridge 0HR 94.80, which is depicted below in Figure 1.¹ The bridge is on the Louisville Division, LH&STL Subdivision, and is located a little over a mile east-northeast of Lewisport, KY. This real-world bridge that Consumers used as a prototype for their Type I bridges has spill slopes. It does not have vertical abutment walls.

¹ See Consumers Open. WP “Bridge Costs.xlsx”, tab “Type I.”

Figure 1: CSXT Bridge OHR 94.80 (Model for Consumers Type I Bridges)



Similarly, Consumers’s Types II & III bridges were modeled after CSXT Bridge IHR 3.80, depicted below in Figure 2.² This bridge is on the Nashville Division, Henderson Subdivision, and is located a few miles southwest of Henderson, KY. This real-world bridge also has spill slopes, and it does not have vertical abutment walls.

² See Consumers Open. WP “Bridge Costs.xlsx”, tabs “Type II” and “Type III.”

Figure 2: CSXT Bridge IHR 3.80 (Model for Consumers Types II & III Bridges)



Moreover, consistent with the design of the real-world prototype bridges selected by Consumers, the design of CSXT standard abutments provided to Consumers in discovery likewise utilize rip rap spill slopes, not vertical wall abutments.³

In short, Consumers's Opening bridge costs plainly contemplated the use of spill slopes, although Consumers apparently did not think through the implications of such spill slopes on the roadways, sidewalks, and waterways that the CERR's bridges must clear. Nothing in

³ See Attachment A (annotated version of "RSTD3517.DGN," which was provided to Consumers in discovery).

Consumers's Opening could have led a reasonable bridge engineer to discern that Consumers intended to use precast wingwalls as vertical abutment walls.

II. Consumers's Proposed Use of Precast Wingwalls As Vertical Abutments Is Not Feasible.

If Consumers's Opening Evidence had proposed using abutment costs derived from prototype bridges with spill slopes, but for an abutment design that removed those spill slopes and instead used precast wingwalls to form a wall abutment, I would have shown why such a design is clearly infeasible from an engineering standpoint. As I explain below, Consumers's bridge design is flawed for two related reasons. First, removing spill slopes from the prototype abutment would significantly increase the abutment's height and thus impose a load over three-times greater on the abutment piles that would cause them to collapse without necessary reinforcement. Second, the wingwall Consumers proposed does not provide necessary reinforcement to support the additional load that it would be required to carry as a wall abutment, and, in fact, it was not designed for such an application.

First, Consumers's Rebuttal redesign of its bridges created a substantial structural flaw in the abutment piles supporting the abutment walls. Even if Consumers had provided concrete panels adequately engineered to serve as vertical abutment walls, those walls must transfer the surcharge loads to the abutment piles.

The height of a wall is the single biggest variable in calculating the earth pressure and live load surcharge loads it must support. Both types of loads increase substantially as the height of the wall increases. Because CSXT's standard abutment is constructed with a spill slope, the height of the wall is simply the height of the precast abutment cap itself. On the other hand, in the case of a vertical wall abutment like Consumers proposed, the height of the wall is the full height of the abutment. As Attachment B at page 1 shows, the bending moment imposed on the

piles that support the wall abutment by the live load surcharge and earth pressure is over 300% higher than the bending moment on the piles that support a standard abutment with a spill slope.

In the same vein, longitudinal forces on the abutment piles are substantially higher for wall abutments than for standard abutments with spill slopes. Attachment B at page 2 illustrates that Consumers's wall abutments will induce a bending moment due to longitudinal forces on the abutment piles that is 33% higher than the bending moment on the piles supporting a standard CSXT abutment with a spill slope.

The combination of earth pressure, live load surcharge, and longitudinal forces induce a total bending moment on Consumers's Rebuttal abutment piles that is 333% higher than the bending moment imposed by these same loads on CSXT's Reply abutment piles (which use Consumers prototype bridges with spill slopes as the design intended). Consumers provided no evidence from which the Board could conclude that abutment piles that were designed to support a certain load with the aid of spill slopes are actually strong enough to forgo spill slopes and support a load three times greater than their intended application.

Second, Consumers's standard precast wingwalls are not able to provide the necessary reinforcement required to take the place of the spill slopes Consumers removes. From an engineering standpoint, these precast wingwalls are not even in the realm of possibilities of potential substitutes for spill slopes. The price quote that Consumers obtained for precast wingwalls was for standard abutment wingwalls that are attached to the ends of the abutments and oriented parallel to the track. Consumers's quote was for "precast bridge components used on railroad bridges for Class 1s west of the Mississippi River." See Consumers Reb. WP "Coreslab Precast Components Cost.pdf." Both Union Pacific and BNSF utilize standard

abutment wingwalls that are attached to the ends of the abutments and oriented parallel to the track.⁴

Consumers, however, proposed to use the wingwalls as vertical abutment walls placed below the abutment cap and oriented perpendicular to the track. But the load on a wall oriented perpendicular to the track will be substantially higher than to the load on a wall oriented parallel to the track. Attachment D illustrates this with a side-by-side calculation for a hypothetical retaining structure 15 feet tall. It demonstrates that a structure perpendicular to the track, such as a wall abutment, will have a load intensity over three times higher than one that is parallel to the track. In short, this precast wingwall is deficient even in an ordinary application perpendicular to the track because it is designed for a parallel application.

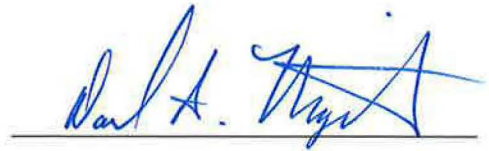
For the above reasons, it is my opinion that from an engineering standpoint Consumers proposed wingwalls simply could not serve the purpose that Consumers's Rebuttal bridge design requires, *i.e.*, providing equivalent support to the abutment piles that the removed spill slopes were intended to provide.

⁴ See Attachment C.

VERIFICATION

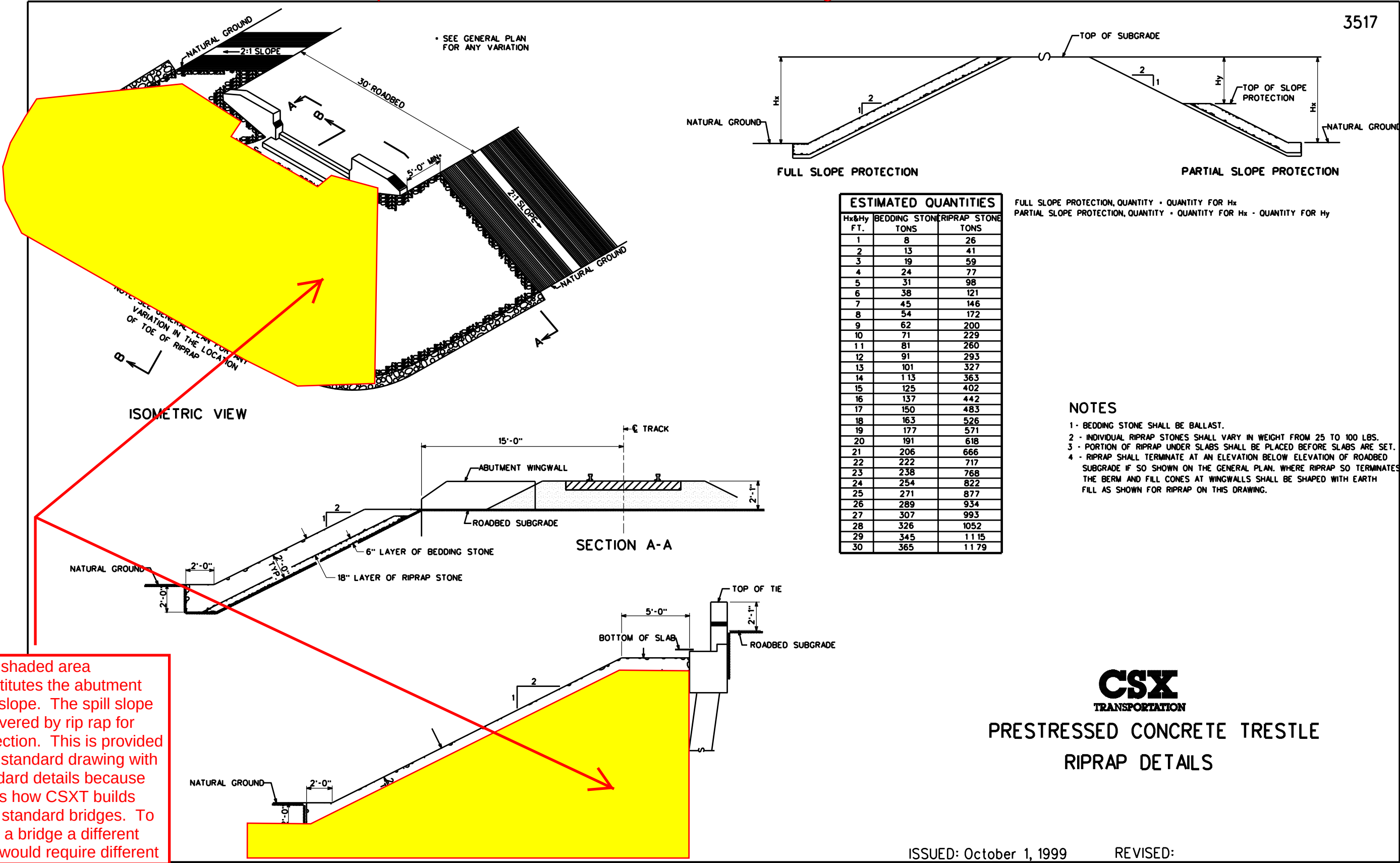
I, David A. Magistro, declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief. Further, I certify that I am qualified and authorized to file this statement.

Executed on February 16th, 2018



David A. Magistro

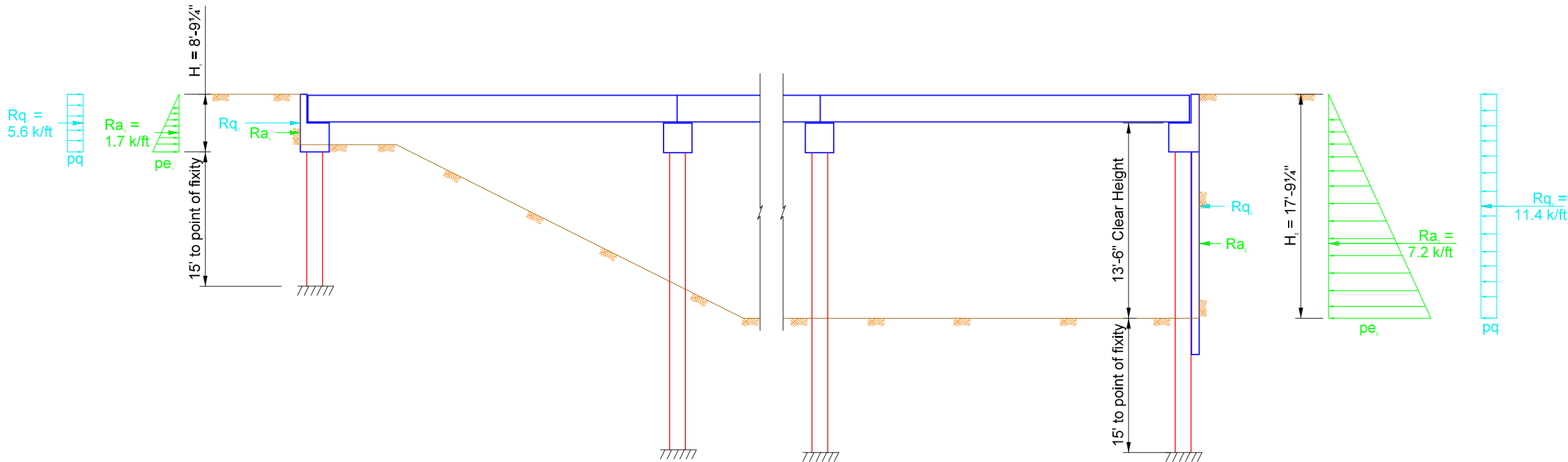
Source: CSXT RFP 86 (C-DVD-008) Discovery Document "RSTD3517.DGN" -- Yellow shading and notes in red are added



This shaded area constitutes the abutment spill slope. The spill slope is covered by rip rap for protection. This is provided as a standard drawing with standard details because this is how CSXT builds their standard bridges. To build a bridge a different way would require different

CSX
TRANSPORTATION
PRESTRESSED CONCRETE TRESTLE
RIPRAP DETAILS

ISSUED: October 1, 1999 REVISED:



Standard Abutment:

Surcharge Loading:

$R_q = k_a \cdot q \cdot H_1$ (CERM 37.28)
 $p_q = k_a \cdot q$ (CERM 37.27)
 k_a = Active earth pressure coefficient
 $k_a = \frac{(1 - \sin \phi)}{(1 + \sin \phi)}$ (CERM 37.7)
 ϕ = Angle of Internal Friction = 28°
 $k_a = 0.361$
 q = live load surcharge
 $q = \frac{LL}{d \cdot Lt} = 1778 \text{ psf}$
 LL = live load, 80,000 for E80 loading
 d = distance between wheels = 5'
 Lt = length of tie = 9'
 $H_1 = H$ = Height of retained fill = 8'-9 1/4"

$p_q = 0.64 \text{ ksf}$
 $R_q = 5.6 \text{ klf}$
(@ $\frac{H_1}{2}$ from bottom of abutment)
POF = Point of Fixity = 15'
 $M_q = R_q \cdot \left(\frac{H_1}{2} + \text{POF} \right) = 108.6 \text{ k-ft/ft}$

L = Length of Abutment = 24'-6"

P_1 = Total force acting on abutment = $(R_q + R_a) \cdot L = 178.9 \text{ k}$

M_1 = Total end bend moment = $(M_q + M_a) \cdot L = 3,408 \text{ k-ft}$

Earth Pressure Loading:

$R_a = \frac{1}{2} \cdot k_a \cdot \gamma \cdot H_1^2$ (CERM 37.10)
 $p_{e1} = k_a \cdot \gamma \cdot H_1$
 k_a = Active earth pressure coefficient
 $k_a = \frac{(1 - \sin \phi)}{(1 + \sin \phi)}$ (CERM 37.7)
 ϕ = Angle of Internal Friction = 28°
 $k_a = 0.361$
 γ = Soil Unit Weight = 125 pcf
 $H_1 = H$ = Height of retained fill = 8'-9 1/4"

$p_{e1} = 0.40 \text{ ksf}$
 $R_a = 1.7 \text{ klf}$
(@ $\frac{H_1}{3}$ from bottom of abutment)
POF = Point of Fixity = 15'
 $M_a = R_a \cdot \left(\frac{H_1}{3} + \text{POF} \right) = 30.5 \text{ k-ft/ft}$

	CSXT STANDARD ABUTMENT	CONSUMERS' CERR WALL ABUTMENT
HORIZ. FORCE, P	179 k	446 k
MOMENT, M	3,408 k-ft	10,364 k-ft

Deep Wall Abutment:

Earth Pressure Loading:

$R_a = \frac{1}{2} \cdot k_a \cdot \gamma \cdot H_2^2$ (CERM 37.10)
 $p_{e2} = k_a \cdot \gamma \cdot H_2$
 k_a = Active earth pressure coefficient
 $k_a = \frac{(1 - \sin \phi)}{(1 + \sin \phi)}$ (CERM 37.7)
 ϕ = Angle of Internal Friction = 28°
 $k_a = 0.361$
 γ = Soil Unit Weight = 125 pcf
 H_2 = Height of retained fill = 17'-9 1/4"

$p_{e2} = 0.82 \text{ ksf}$
 $R_a = 7.2 \text{ klf}$
(@ $\frac{H_2}{3}$ from bottom of abutment)
POF = Point of Fixity = 15'
 $M_a = R_a \cdot \left(\frac{H_2}{3} + \text{POF} \right) = 150.7 \text{ k-ft/ft}$

Surcharge Loading:

$R_q = k_a \cdot q \cdot H_2$ (CERM 37.28)
 $p_q = k_a \cdot q$ (CERM 37.27)
 k_a = Active earth pressure coefficient
 $k_a = \frac{(1 - \sin \phi)}{(1 + \sin \phi)}$ (CERM 37.7)
 ϕ = Angle of Internal Friction = 28°
 $k_a = 0.361$
 q = live load surcharge
 $q = \frac{LL}{d \cdot Lt} = 1778 \text{ psf}$
 LL = live load, 80,000 for E80 loading
 d = distance between wheels = 5'
 Lt = length of tie = 9'
 $H_2 = H$ = Height of retained fill = 17'-9 1/4"

$p_q = 0.64 \text{ ksf}$
 $R_q = 11.4 \text{ klf}$
(@ $\frac{H_2}{2}$ from bottom of abutment)
POF = Point of Fixity = 15'
 $M_q = R_q \cdot \left(\frac{H_2}{2} + \text{POF} \right) = 272.3 \text{ k-ft/ft}$

$H_2 = 8'-9 \frac{1}{4}" - 4'-6" + 13'-6" = 17'-9 \frac{1}{4}"$

L = Length of Abutment = 24'-6"

P_2 = Total force acting on abutment = $(R_q + R_a) \cdot L = 445.7 \text{ k}$

M_2 = Total end bend moment = $(M_q + M_a) \cdot L = 10,364 \text{ k-ft}$

Active Earth Pressure
Live Load Surcharge

Note that the piles supporting Consumers' abutment wall are subjected to a bending moment over 300% higher than the piles supporting CSXT's standard abutment due to earth pressure and live load surcharge. CSXT's standard abutment is not suitable to be used as a wall abutment.

Longitudinal Braking Force (kips) = $45 + 1.2 \cdot L$ acting 8 feet above top of rail
Longitudinal Traction Force (kips) = $25 \cdot (L)^{1/2}$ acting 3 feet above top of rail

L is bridge length in feet

Assume a 3-span bridge w/ spans @ 28 feet each --> $L = 3 \cdot 28 = 84$ ft.

$LF_{Br} = 145.8$ kips
 $LF_{Tr} = 229.1$ kips

Bending moment on the abutment piles is calculated using the braking and tractive forces times the distance to pile fixity.

H (CSXT Standard Abutment) = 8.8 ft.
H (CERR Wall Abutment) = 17.8 ft.

Both cases assume point of pile fixity is 15' below ground line

	CSXT Standard Abutment	CERR Wall Abutment
Braking		
Point of application to Point of Fixity (ft) =	$8 + 8.8 + 15$ 31.8	$8 + 17.8 + 15$ 40.8
Traction		
Point of application to Point of Fixity (ft) =	$3 + 8.8 + 15$ 26.8	$3 + 17.8 + 15$ 35.8
Moment _{Br} (k-ft) =	4,636.4	5,948.6
* Moment _{Tr} (k-ft) =	6,140.7	8,202.8

* Traction Force Governs

Note that the piles supporting Consumers' abutment wall are subjected to a bending moment over 33% higher than the piles supporting CSXT's standard abutment due to longitudinal forces. CSXT's standard abutment is not suitable to be used as a wall abutment.

Notes:

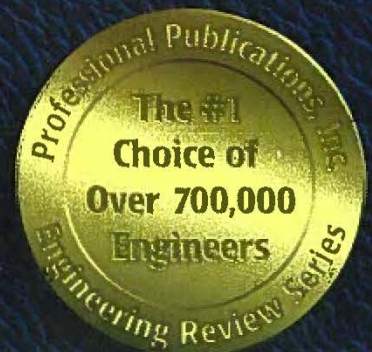
1. AREMA Type 3 Backfill (Attached AREMA Table 8-5-2)
 $\gamma = 125$ pcf, Soil Unit Weight
 $\phi = 28^\circ$, Angle of Internal Friction
 2. Standard Abutment H = 8'-9" (Attached CSXT Abutment Detail)
 3. CERM = Civil Engineering Reference Manual, 8th Edition
 4. Clear height from groundline to bottom of concrete beam = 13'-6"
 5. Assume pile fixity @ 15' below groundline
-

**The most complete reference for CEs,
updated for the breadth-and-depth PE exam**

Civil Engineering Reference Manual for the PE Exam

Eighth Edition

Michael R. Lindeburg, PE



37-4 CIVIL ENGINEERING REFERENCE MANUAL

The Rankine theory disregards wall friction. The most general Rankine equation is derived by setting $\delta = 0$ in Eq. 37.5.

$$k_a = \cos \beta \left(\frac{\cos \beta - \sqrt{\cos^2 \beta - \cos^2 \phi}}{\cos \beta + \sqrt{\cos^2 \beta - \cos^2 \phi}} \right) \quad [\text{Rankine}] \quad 37.6$$

If the backfill is horizontal ($\beta = 0$) and the wall face is vertical ($\theta = 90^\circ$), then

$$k_a = \frac{1}{k_p} = \tan^2 \left(45^\circ - \frac{\phi}{2} \right) = \frac{1 - \sin \phi}{1 + \sin \phi} \quad \left[\begin{array}{l} \text{Rankine: horizontal} \\ \text{backfill; vertical face} \end{array} \right] \quad 37.7$$

For saturated clays, the angle of internal friction, ϕ , is zero. As long as tension cracks do not develop near the top of the retaining wall, $k_a = 1$ and Eq. 37.4 resolves to

$$p_a = p_v - 2c \quad [\phi = 0] \quad 37.8$$

For granular soils, $c = 0$. In that case, Eq. 37.4 resolves to

$$p_a = k_a p_v \quad [c = 0] \quad 37.9$$

Since Eq. 37.9 describes a triangular pressure distribution, the total active resultant acts $H/3$ above the base for both the Rankine and Coulomb cases and is

$$R_a = \frac{1}{2} p_a H = \frac{1}{2} k_a \rho g H^2 \quad [\text{SI}] \quad 37.10(a)$$

$$R_a = \frac{1}{2} p_a H = \frac{1}{2} k_a \gamma H^2 \quad [\text{U.S.}] \quad 37.10(b)$$

Since wall friction is disregarded with the Rankine case, the earth pressure resultant is normal to the wall. For the Coulomb case, there is a downward force component, and the earth pressure resultant is directed at the angle δ above the normal, or $90^\circ - \delta$ from the wall.

$$\theta_R = 90^\circ \text{ from the wall} \quad [\text{Rankine}] \quad 37.11$$

$$\theta_R = 90^\circ - \delta \text{ from the wall} \quad [\text{Coulomb}] \quad 37.12$$

6. PASSIVE EARTH PRESSURE

Equation 37.13 is the equation for horizontal passive earth pressure with level backfill for all soil types (i.e., sandy soils and clayey soils). k_p is the coefficient of passive earth pressure (passive earth pressure coefficient).

$$p_p = p_v k_p + 2c \sqrt{k_p} \quad 37.13$$

The method of calculating k_p depends on the assumptions made. Equation 37.14 is the most general form of the passive Coulomb equation. This form allows for sloping backfill (angle β), inclined active-side wall face (angle θ), and friction between the soil and wall face (angle δ).

$$k_p = \frac{\sin^2(\theta - \phi)}{\sin^2 \theta \sin(\theta + \delta) \left(1 - \sqrt{\frac{\sin(\phi + \delta) \sin(\phi + \beta)}{\sin(\theta + \delta) \sin(\theta + \beta)}} \right)^2} \quad [\text{Coulomb}] \quad 37.14$$

The Rankine theory disregards wall friction. The most general Rankine equation is derived by setting $\delta = 0$ in Eq. 37.14.

$$k_p = \cos \beta \left(\frac{\cos \beta + \sqrt{\cos^2 \beta - \cos^2 \phi}}{\cos \beta - \sqrt{\cos^2 \beta - \cos^2 \phi}} \right) \quad [\text{Rankine}] \quad 37.15$$

If the backfill is horizontal ($\beta = 0$) and the wall face is vertical ($\theta = 90^\circ$), then

$$k_p = \frac{1}{k_a} = \tan^2 \left(45^\circ + \frac{\phi}{2} \right) = \frac{1 + \sin \phi}{1 - \sin \phi} \quad \left[\begin{array}{l} \text{Rankine: horizontal} \\ \text{backfill; vertical face} \end{array} \right] \quad 37.16$$

For saturated clays, the angle of internal friction, ϕ , is zero and $k_p = 1$. Eq. 37.13 resolves to

$$p_p = p_v + 2c \quad [\phi = 0] \quad 37.17$$

For granular soils, $c = 0$. In that case, Eq. 37.13 resolves to

$$p_p = k_p p_v \quad [c = 0] \quad 37.18$$

$$R_p = \frac{1}{2} p_p H = \frac{1}{2} k_p \rho g H^2 \quad [\text{SI}] \quad 37.19(a)$$

$$R_p = \frac{1}{2} p_p H = \frac{1}{2} k_p \gamma H^2 \quad [\text{U.S.}] \quad 37.19(b)$$

Passive earth pressure may not always be present during the life of the wall. When a retaining wall is first backfilled, or when the toe of the wall is excavated for repair or other work, the passive pressure may be absent. Because of this, the restraint from passive pressure is usually disregarded in factor-of-safety calculations.

RIGID RETAINING WALLS 37-5

7. AT-REST SOIL PRESSURE

The active and passive pressures predicted by the Rankine and Coulomb theories assume the wall moves slightly. Lateral movement as little as $H/200$ is sufficient for the active/passive distributions to develop. In some situations, however, the soil is completely confined and cannot move. This "at rest" case is appropriate for soil next to bridge abutments, basement walls restrained at their tops, walls bearing on rock, and walls with soft-clay backfill, as well as for sand deposits of infinite depth and extent.

The horizontal pressure at rest depends on the *coefficient of earth pressure at rest*, k_o , which varies from 0.4 to 0.5 for untamped sand, from 0.5 to 0.7 for normally consolidated clays, and from 1.0 and up for overconsolidated clays.

$$p_o = k_o p_v \quad 37.20$$

$$k_o \approx 1 - \sin \phi \quad 37.21$$

$$R_o = \frac{1}{2} k_o \rho g H^2 \quad [\text{SI}] \quad 37.22(a)$$

$$R_o = \frac{1}{2} k_o \gamma H^2 \quad [\text{U.S.}] \quad 37.22(b)$$

Table 37.2 Typical Range of Earth Pressure Coefficients

condition	granular soil	cohesive soil
active	0.33–0.22	1–0.5
passive	3–14	1–2
at rest	0.4–0.6	0.4–0.8

8. GRAPHICAL SOLUTIONS

Appendix 37.A provides a convenient graphical method of evaluating the horizontal and vertical earth pressures for various soil types. Since average values of soil density have been incorporated, K_h and K_v have units of lb/ft^4 (lb/ft^2 per lineal foot of wall). H is defined as shown: the height of the soil directly above the heel.

$$R_{a,h} = \frac{1}{2} K_h H^2 \quad 37.23$$

$$R_{a,v} = \frac{1}{2} K_v H^2 \quad 37.24$$

$$R_a = \sqrt{R_{a,h}^2 + R_{a,v}^2} \quad 37.25$$

$$\theta = \arctan \left(\frac{R_v}{R_h} \right) \quad 37.26$$

Most complications involving irregular and stratified backfill, irregular surcharges, and sloping water tables require more complex calculations. However, App. 37.B provides a way of evaluating retaining walls with *broken slope backfill*.

9. SURCHARGE LOADING

A *surcharge* is an additional force applied at the exposed upper surface of the restrained soil. A surcharge can result from a uniform load, point load, line load, or strip load. (Line and strip loads are parallel to the wall.)

With a *uniform load surcharge* of q (in lb/ft^2 (N/m^2)) at the surface, there will be an additional active force, R_q . R_q acts horizontally at $H/2$ above the base. This surcharge resultant is in addition to the backfill active force that acts at $H/3$ above the base.

$$p_q = k_a q \quad 37.27$$

$$R_q = k_a q H \times (\text{wall width}) \quad 37.28$$

$$R_q = \frac{1}{2} k_a q H$$

If a vertical *point load surcharge* (e.g., a truck wheel), V_q , in pounds (newtons) is applied a distance x back from the wall face, the approximate distribution of pressure behind the wall can be found from Eq. 37.29 or 37.30. These equations assume elastic soil performance and a Poisson's ratio of 0.5. The coefficients have been adjusted to bring the theoretical results into agreement with observed values.

$$p_q = \frac{1.77 V_q m^2 n^2}{H^2 (m^2 + n^2)^3} \quad [m > 0.4] \quad 37.29$$

$$p_q = \frac{0.28 V_q n^2}{H^2 (0.16 + n^2)^3} \quad [m \leq 0.4] \quad 37.30$$

$$R_q \approx \frac{0.78 V_q}{H} \quad [m = 0.4] \quad 37.31$$

$$R_q \approx \frac{0.60 V_q}{H} \quad [m = 0.5] \quad 37.32$$

$$R_q \approx \frac{0.46 V_q}{H} \quad [m = 0.6] \quad 37.33$$

$$m = \frac{x}{H} \quad 37.34$$

$$n = \frac{y}{H} \quad 37.35$$

For a *line load surcharge*, L_q (in lb/ft (N/m)), the distribution of pressure behind the wall is given by Eqs. 37.36 and 37.38.

$$p_q = \frac{4 L_q m^2 n}{\pi H (m^2 + n^2)^2} \quad [m > 0.4] \quad 37.36$$

$$R_q = \frac{0.64 L_q}{m^2 + 1} \quad 37.37$$

$$p_q = \frac{0.203 L_q n}{H (0.16 + n^2)^2} \quad [m \leq 0.4] \quad 37.38$$

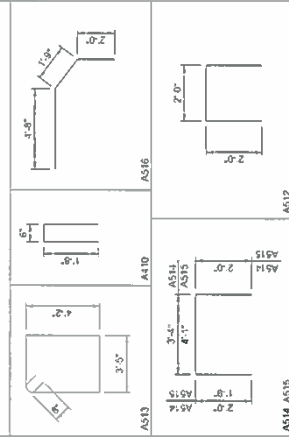
$$R_q = 0.55 L_q \quad 37.39$$

Sidewalks, railways, and roadways parallel to the retaining wall are examples of *strip surcharges*. The effect of a strip surcharge, S_q (in lb/ft^2 (N/m^2)), is covered in most soils textbooks.

REINFORCING STEEL SCHEDULE

(FOR ONE END BENT)					WEIGHT (LBS.)	
MARK NO.	BAR NO. REQUIRED	LENGTH	TYPE	LOCATION	WEIGHT (LBS.)	
A410	4	3'-2"	II	BACKWALL	29	
A510	4	2'-6"	—	CAP	431	
A611	6	2'-6"	—	BACKWALL	100	
A612	5	15'	—	BACKWALL	79	
A513	2	2'-2"	II	BACKWALL	409	
A514	2	16'-2"	—	BACKWALL	79	
A515	4	7'-2"	—	CAP	32	
A516	5	4	—	CAP	34	
A517	4	6'-2"	—	BACKWALL	276	
A518	5	3'-2"	—	BACKWALL	276	
A1110	11	20'-5"	—	CAP	2022	

BENDING DIAGRAM



ESTIMATED QUANTITIES

QTY.	UNIT	LOCATION
4355	LB	REINFORCING STEEL - CAP
NOTE	LB	REINFORCING STEEL - CAISSONS
193	CY	CONCRETE P - CAP
NOTE	CY	CONCRETE A-1A21 CAISSONS
NOTE	QAL	CONCRETE CURING COMPOUND
NOTE	QAL	WATER REPELLENT
NOTE	GAL	ASPHALT JOINT COMPOUND
NOTE	LF	EXPANSION JOINT MATERIAL 4" x ½"
NOTE	LF	30' DIA STEEL PIPE CAISSON SHELL
2	EA	CONICAL STEEL CAISSON SHAFT POINT
NOTE	EA	8" x 7' x 5' 1" NEOPRENE PAD

NOTE - ENGINEER OF RECORD SHALL DETERMINE QUANTITIES BASED ON THE FINAL DESIGN AND FIELD CONDITIONS



PRESTRESSED CONCRETE BRIDGE
ABUTMENT DETAILS - 3 BEAM

1. (F, F) DENOTES EACH FACE, (E, F) DENOTES FAR FACE, (N, F) DENOTES NEAR FACE
2. ALL CONCRETE CORNERS OF 90 DEGREES OR GREATER SHALL HAVE A 1" CHAMFER PROVIDED
3. SEE TYPE II SINGLE INTERMEDIATE BENT FOR CAISSON DETAILS.

NOTES:

- 1 (E F) DENOTES EACH FACE. (E F) DENOTES FAR FACE. (N F) DENOTES NEAR FACE

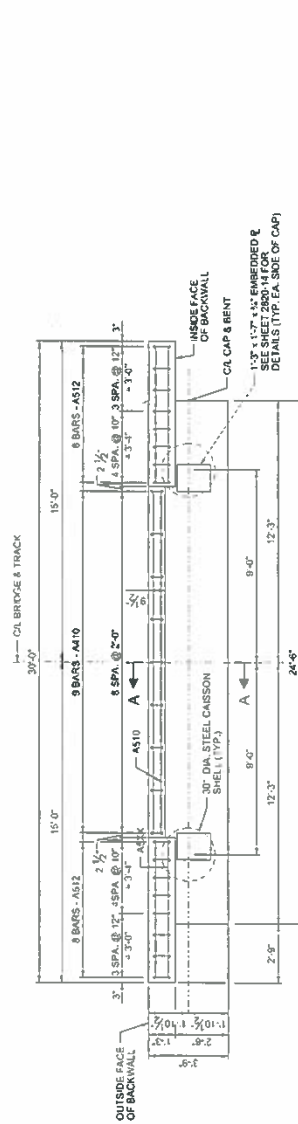
- 3 SEE TYPE II SINGLE INTERMEDIATE BENT FOR CAISSON DE TAILS.

APPROVED - ASSISTANT CHIEF
ENGINEERING STANDARDS

APPROVED - ASSISTANT CHIEF
ENGINEER OF STRUCTURES

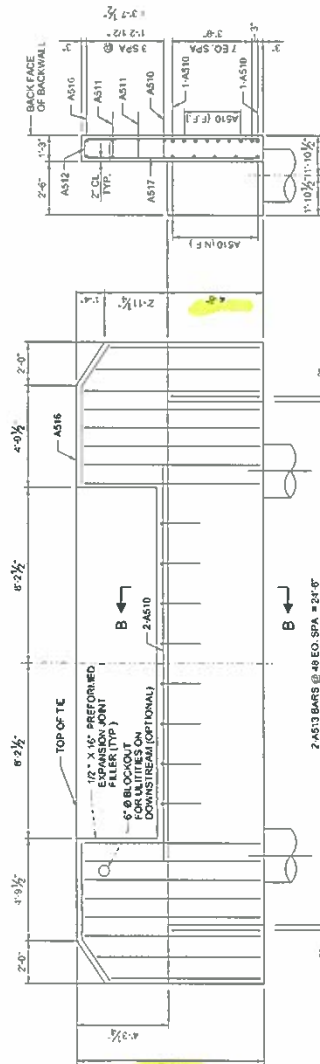
PROPOSED BY:
DATE TO PO

ISSUED: NOVEMBER 87, 2013
REV: 000000

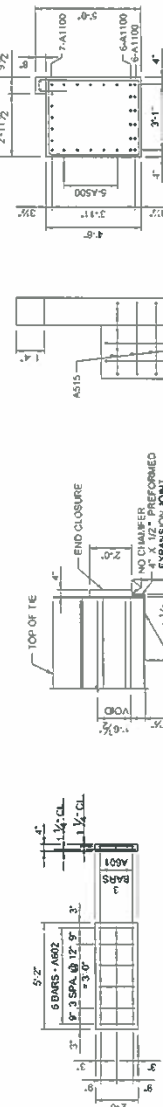


PLAN

SCALE 1/4" = 1'-0"



ELEVATION

[illegible]

END CLOSURE SLAB

SCALE $\gamma_{45} = 1'-0"$
(3 REQ'D. AT EACH END BENT)

END ELEVATION

SCALE: 1/4" = 1'-0"

SECTION B-B

SCALE: 100 = 100%

NOTES:

- 1 (E F) DENOTES EACH FACE, (E F) DENOTES FAR FACE, (N F) DENOTES NEAR FACE
2 ALL CONCRETE CORNERS OF 90 DEGREES OR GREATER SHAL HAVE A 1" RADIUS REQUIRED

- 3 SEE TYPE II SINGLE INTERMEDIATE BENT FOR CAISSON DE TAILS.

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ISSUED: NOVEMBER 07, 2013
REV: 000000



2015

Manual for Railway Engineering

Volume 2

Structures

Chapter 7 Timber Structures

Chapter 8 Concrete Structures and Foundations

Chapter 9 Seismic Design for Railway Structures

Chapter 10 Structures, Maintenance and Construction

Chapter 15 Steel Structures

General Subject Index

Concrete Structures and Foundations

- f. Live load impact shall not be considered in the design of an abutment or pier unless the bridge bearings are supported by a structural beam, such as the seat of a spill-through abutment or a pier cap supported by individual columns, piles, or shafts. In such a case, the impact shall be applied to the beam only, and not to footings, or piles.
- g. For the design of abutments and piers, consideration must be given to all forces transmitted from the superstructure to the substructure, depending on the bearing fixity conditions.

5.3.2 COMPUTATION OF BACKFILL PRESSURE (2002)¹

- a. Values of the unit weight, cohesion, and angle of internal friction of the backfill material shall be determined directly by means of soil tests or, if the expense of such tests is not justifiable, by means of Table 8-5-2 referring to the soil types defined in Table 8-5-1. Unless the minimum cohesive strength of the backfill material can be evaluated reliably, the cohesion shall be neglected and only the internal friction considered. See Part 20, Flexible Sheet Pile Bulkheads, Table 8-20-3.

Table 8-5-2. Properties of Backfill Materials

Type of Backfill	Unit Weight Lb. Per Cu. Ft.	Cohesion "c"	Angle of Internal Friction
1	105	0	33° 42' (38° for broken stone)
2	110	0	30°
3	125	0	28°
4	100	0	0°
5	120	240	0°

- b. The magnitude, direction and point of application of the backfill pressure shall be computed on the basis of appropriate values of the unit weight, cohesion and internal friction.
- c. When the backfill is assumed to be cohesionless and when 1) the surcharge load, if any, on the backfill can be converted into an equivalent uniform load or when 2) the surcharge can be converted into an equivalent uniform earth surcharge, Rankine's or Coulomb's formulas may be used under the conditions to which each applies. Formulas and charts given in the Commentary and the trial wedge methods given in the Commentary are both applicable.
- d. When the backfill cannot be considered cohesionless, when the surcharge on the backfill is irregular, or when the surcharge cannot be converted to an equivalent uniform earth surcharge, the trial wedge methods illustrated in the Commentary are preferable.
- e. If the wall or abutment is not more than 20 ft. high and if the backfill has been classified according to Table 8-5-1, the charts given in the Commentary may be used.
- f. If the surcharge is of a lesser width than the height of the wall, a more satisfactory design can be obtained by the use of trial wedge methods given in the Commentary.
- g. If the wall or abutment is prevented from deflecting freely at its crest, as in a rigid frame bridge, some types of U-shaped abutments, or in laterally braced or anchored walls, the computed backfill pressure shall be increased 25%.

¹ See C - Commentary

Typical Railroad Bridge West of the Mississippi

Wingwall Orientation

Legend

Note the wingwalls
are parallel to the
tracks

Google Earth

100 ft



E80 Live Load Surcharge on Abutments (psf) Wall is oriented perpendicular to the track				E80 Live Load Surcharge on Wingwalls (Boussinesq) Wall is oriented parallel to the track								
$P_U = K_A \cdot q'$ $K_A = \tan^2 (45 - \phi/2)$ $\phi = 0$ $q' = 1,455$ $K_A = 1.000$				$q = 80,000 / (5 \text{ Ft} \times L_d) = 1,455 \text{ psf}$ $L_d = 9 \text{ Ft (Length of Tie)} + H_1$ $H_1 \text{ (Ft)} = 2$ $S \text{ (Ft)} = 12$ $\text{Tie Length (Ft)} = 9$ $X_1 \text{ (Ft)} = 6.5$ $L_d \text{ (Ft)} = 11$ $X_2 \text{ (Ft)} = 17.5$								
$Z_{q'}$	$P_{U} \text{ (psf)}$	$R_{q'} \text{ (lbs / ft)}$	$\dot{Z}_{q'} \text{ (ft)}$	H	$\Theta_1 \text{ (radians)}$	$\Theta_2 \text{ (radians)}$	$\beta \text{ (radians)}$	$\alpha \text{ (radians)}$	$P_S \text{ (psf)}$	$R_Y \text{ (lbs / ft)}$	$\dot{Z} \text{ (ft)}$	$M \text{ (ft-lbs / ft)}$
1	1455	1,455	0.50	1	1.418	1.514	0.096	1.466	175	88	0.67	30
2	1455	2,909	1.00	2	1.272	1.457	0.185	1.365	327	342	1.32	232
3	1455	4,364	1.50	3	1.138	1.401	0.263	1.270	441	730	1.96	759
4	1455	5,818	2.00	4	1.019	1.346	0.327	1.183	515	1,211	2.58	1,723
5	1455	7,273	2.50	5	0.915	1.292	0.377	1.104	552	1,747	3.17	3,199
6	1455	8,727	3.00	6	0.825	1.240	0.415	1.033	562	2,306	3.73	5,225
7	1455	10,182	3.50	7	0.748	1.190	0.442	0.969	552	2,864	4.27	7,811
8	1455	11,636	4.00	8	0.682	1.142	0.460	0.912	529	3,405	4.79	10,948
9	1455	13,091	4.50	9	0.625	1.096	0.470	0.861	498	3,919	5.27	14,613
10	1455	14,545	5.00	10	0.576	1.052	0.475	0.814	464	4,401	5.73	18,776
11	1455	16,000	5.50	11	0.534	1.010	0.476	0.772	429	4,848	6.17	23,403
12	1455	17,455	6.00	12	0.496	0.970	0.473	0.733	394	5,259	6.59	28,460
13	1455	18,909	6.50	13	0.464	0.932	0.468	0.698	361	5,637	6.98	33,910
14	1455	20,364	7.00	14	0.435	0.896	0.461	0.665	329	5,981	7.36	39,722
15	1455	21,818	7.50	15	0.409	0.862	0.453	0.636	300	6,296	7.72	45,863
16	1455	23,273	8.00	16	0.386	0.830	0.444	0.608	273	6,582	8.05	52,304
17	1455	24,727	8.50	17	0.365	0.800	0.435	0.583	249	6,843	8.38	59,019
18	1455	26,182	9.00	18	0.347	0.771	0.425	0.559	226	7,080	8.68	65,982
19	1455	27,636	9.50	19	0.330	0.744	0.415	0.537	206	7,296	8.97	73,172
20	1455	29,091	10.00	20	0.314	0.719	0.405	0.517	188	7,493	9.25	80,568

This is the force resulting from live load surcharge acting on a vertical abutment wall at depth of 15 feet. This abutment wall is perpendicular to the track.

Note the force resulting from the same live load that acts on the abutment wall is over 3 times larger than the force acting on the wingwall.

This is the force resulting from live load surcharge acting on a wingwall at depth of 15 feet. This wingwall is parallel to the track.



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June 12, 2015

By Courier

Kelvin J. Dowd
Slover & Loftus
1224 17th Street, N.W.
Washington, D.C. 20036

Re: *Consumers Energy Company v. CSX Transportation, Inc.*
STB Docket No. NOR 42142

Dear Kelvin:

Enclosed please find materials that CSX Transportation, Inc. (“CSXT”) is producing to Consumers Energy Company (“Consumers”) in response to Consumers’ discovery requests in the above-referenced proceeding. The enclosed DVD labeled CSX-CNSMR-C-DVD-026 and the files contained thereon have been designated “Confidential” pursuant to the March 18, 2015 Protective Order entered by the Surface Transportation Board in this proceeding. The DVD labeled CSX-CNSMR-HC-DVD-027, the hard drives CNSMR-HC-EHD-001-R and CSX-CNSMR-HC-EHD-002, and the files thereon have been designated “Highly Confidential” pursuant to that same Protective Order. Hard Drives CNSMR-HC-EHD-001-R and CSX-CNSMR-HC-EHD-002 also contain Sensitive Security Information.¹

The documents on DVD-026 are responsive to Consumers’ requests for production numbers 4, 6, and 46. Documents responsive to RFP 6 include density data. The gross tonnage data in RFP 6 are generated by CSXT in the normal course of business. For each segment, these data identify the tons that traverse any portion of the segment, even if the tons do not traverse the entire segment. As a result, calculating the segment’s gross ton-miles by multiplying the reported tonnages by the segment’s total miles can produce a figure that overstates the actual total ton-miles, because such an approach would wrongly assume that all the tonnages traveled the entire segment. The overstatement can be particularly acute at or near terminal locations.

¹ Sensitive Security Information is controlled under 49 C.F.R. Part 15. No part of the records contained on the enclosed DVD may be disclosed to persons without a “need to know” as defined in 49 C.F.R. Part 15, except with the written permission of the Secretary of Transportation. Unauthorized release or disclosure of SSI may result in civil penalty of other action. For U.S. government agencies, public disclosure is governed by 5 U.S.C. § 552 and 49 C.F.R. Part 15.



Kelvin Dowd
June 12, 2015
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Recognizing the limitations of the gross tonnage data, CSXT performed a special study of its system-wide car event data to calculate total ton-miles by individual segment, including net tonnage calculations, which are not available for the other data source. That density file was produced last week on CSX-CNSMR-C-DVD-022 as “CSXT Segment Ton-Miles from Car Event Data.xlsx.”

Documents produced on DVD-027 are responsive to RFPs 62, 128 and 175. Documents responsive to RFP 62 relating to maintenance of way staffing are a more accurate reflection of CSXT’s maintenance of way staffing levels than the org chart data previously provided.

CSXT’s production also includes two External Hard Drives. The first, labeled CSX-CNSMR-HC-EHD-001-R is a replacement, password protected, copy of the external hard drive CSX-CNSMR-HC-EHD-001, which was produced to Consumers on June 5th. The data on CSX-CNSMR-HC-EHD-001-R is identical to the data produced on CSX-CNSMR-HC-EHD-001, but in light of the highly confidential SSI information on that hard drive CSXT is replacing it with a password-protected drive. The password will be provided to Consumers under separate cover. CSXT requests that Consumers return the unprotected hard drive CSX-CNSMR-HC-EHD-001 to our office.

The second hard drive, labeled CSX-CNSMR-HC-EHD-002 includes traffic and event records—car waybill, container waybill, car shipment, and car event data—for the first quarter of 2015. The fields and instructions for linking the data can be found in the “Consumers Database Fields.xlsx” included on CSX-CNSMR-HC-EHD-001-R.

CSXT is producing two additional files to supplement the traffic data produced last week. First, the Equipment Attributes table contains information on the equipment found in the event data produced. Second, the Car Waybills Price Authority Supplement file contains additional price authorities. This data can be linked to the Car Waybills data by joining the Waybill Date, Waybill Number, Waybill Mod, and Ultimate Origin FSAC fields. The price authority in the supplement data replaces a previously UNKNOWN price authority value in the Car Waybill data.

Also, the definitions provided on June 5 in the “Consumers Database Fields.xlsx” file for two fields in the Car Waybill data should be corrected. The TARE_TONS and LADING_TONS fields reflect the average tons per car, and not the total tons of the cars on the waybill.



Kelvin Dowd
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Today's production completes CSXT's production of traffic and revenue data. CSXT will be producing additional responsive documents on a rolling basis.

Sincerely,

A handwritten signature in black ink, appearing to read "Hanna M. Chouest", written in a cursive style.

Hanna M. Chouest

HMC/mpt
Enclosures